Latin American Economic Outlook 2014

LOGISTICS AND COMPETITIVENESS FOR DEVELOPMENT

OECD DEVELOPMENT CENTRE
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CAF DEVELOPMENT BANK OF LATIN AMERICA
UNITED NATIONS
ECLAC

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OECD
BETTER POLICIES FOR BETTER LIVES

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Foreword

The *Latin American Economic Outlook* analyses issues related to Latin America's economic and social development. Ever since the first edition was launched at the Ibero-American Summit in November 2007 in Santiago (Chile), the report has offered a comparison of Latin American performance with that of other countries and regions in the world, sharing experiences and good practices with the region's policy makers.

Since 2011, the report has been published in conjunction with the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) and has tied in with the economic theme of the annual Ibero-American Summit organised by the Ibero-American governments and Ibero-American General Secretariat (SEGIB). From this year's edition, the CAF, development bank of Latin America has joined the team of authors. This edition will be launched at the Ibero-American Summit to be held in Panama on 17-18 October 2013.

This seventh edition of the report has a new structure. Three of the chapters are on topics that will be kept in future editions (macroeconomic outlook, Latin America in the context of shifting wealth, and productive development for structural change). The fourth and final chapter analyses the theme chosen for this year's Ibero-American Summit: the region's logistics performance and its impact on competitiveness.

Editorial

Over the course of the last decade, Latin America's economic expansion was accompanied by significant progress in poverty reduction. Between 2003 and 2012, the region grew at an average annual rate of 4.0%, in spite of the contraction brought about by the international financial crisis (2008-09). This growth was primarily driven by favourable international conditions, marked by the rapid growth of world trade and increasing commodity prices, resulting in positive terms of trade impacts for the region.

Currently, the international context is looking less favourable as a result of decreasing external demand, the moderation of commodity prices which form a significant share of regional exports, and the uncertainty generated by the hardening monetary and financial conditions across the globe.

Even though the deterioration in terms of trade over the last few years continues to be less significant than that of the previous decade, the region is facing mounting constraints such as a decrease in fiscal space with which to stimulate internal demand, increasing social demands, and persisting structural limitations which hinder the dynamism of the region. The possibility of lower growth rates in the medium term puts at risk the headway that has been made in the fight against poverty and inequality in the region. This scenario increases the urgency of needed reforms to promote the deepening of the regional market and allow Latin American countries to capture a greater share of value added in their trade relations.

To confront these challenges, Latin America needs to pursue a greater degree of diversification, supported by policies promoting innovation and strengthening productive linkages. This requires putting in place reforms to boost productivity and strengthen government capacities to better respond to the needs of the "emerging middle classes", while at the same time redoubling efforts to reduce poverty and inequality. As part of its development strategy, the region needs to take advantage of the transformation taking place in Asian economies and seek out new business opportunities, deepen its regional market, and make use of the advantages associated with geographical proximity to the United States and other markets, primarily through lowering transport costs and improving logistics.

This edition of the *Latin American Economic Outlook* provides substantive policy recommendations on how the region can increase its competitiveness and diversify its productive structure. This involves putting in place policies to strengthen innovative capacities and increase the technological content of exports, as well as improving logistics performance and bringing down transport costs. Policies should aim to tackle the infrastructure gap, develop new platforms for multimodal transport, increase competition in the transport sector, strengthen public sector capacities in attracting and managing private investment, as well as incorporate new technologies to increase the efficiency of customs procedures. An improvement in logistics performance will

provide many benefits including facilitating the vertical integration of firms, increasing opportunities for SME participation in exports, and fortifying connectivity both within the region and with the global economy at large.

By providing an overview of experiences and good practices in the areas of diversification of production structure as well as improvements in logistics of Latin American countries as well as those of OECD member countries, the report offers an array of policy options for designing policies and strategies for overcoming bottlenecks and structural limitations to the economic and social development of Latin America.

We hope this joint effort on the part of CAF – development bank of Latin America, the UN Economic Commission for Latin America and the Caribbean (CEPAL) and the Development Centre of the Organisation for Economic Co-operation and Development (OECD), which will be presented at the XXIII Iberoamerican Summit to Heads of State at the government of Panama, will feed a fruitful policy dialogue on how to increase the competitiveness of Latin American economies and make progress towards a development strategy that promotes greater social inclusion in the region.

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Acronyms and abbreviations

ADB Asian Development Bank
AI Adaptability index
ASEAN Association of Southeast Asian Nations
BBVA Banco Bilbao Vizcaya Argentaria
BEC Broad Economic Categories
BIS Bank for International Settlements
CAF Development Bank of Latin America
CARICOM Caribbean Community
CEI *Centro de Economía Internacional* (Centre for International Economics)
CELADE Latin American and Caribbean Demographic Centre *(Centro Latinoamericano y Caribeño de Demografía)*
COMTRADE United Nations Commodity Trade Statistics Database
COSIPLAN South American Infrastructure and Planning Council *(Consejo Suramericano de Infraestructura y Planeamiento)*
ECLAC Economic Commission for Latin America and the Caribbean
EIU Economic Intelligence Unit
ESCAP Economic and Social Commission for Asia and the Pacific
ETI Enabling Trade Index
EXPY Index of Export sophistication per GDP per capita
FAO Food and Agriculture Organization of the United Nations
FDI Foreign direct investment
FED Federal Reserve System
FONPLATA River Plate Basin Financial Development Fund
FUCE Single foreign-trade forms *(Formularios Únicos para el Comercio Exterior)*
GDP Gross domestic product
GVCs Global Value Chains
IATA International Air Transport Association
ICTs Information and communication technologies
IDB Inter-American Development Bank
IDH Integration and Development Hubs

IFS International Financial Statistics

IIF Institute of International Finance

IIRSA South American Infrastructure and Planning Council *(Iniciativa para la Integración de la Infraestructura Regional Sudamericana)*

IMF International Monetary Fund

INAC National Meat Institute (Uruguay) *(Instituto Nacional de Carnes)*

ITF International Transport Forum

JETRO Japan External Trade Organization

LAC Latin America and the Caribbean

LPI Logistics Performance Index

MHTE Medium- and high-tech exports

MP Mesoamerica Project in Central America

NAFTA North American Free Trade Agreement

NBER National Bureau of Economic Research

OECD Organisation for Economic Co-operation and Development

PPP Purchasing power parity

PPPs Public–private partnerships

QE3 US expansion of the monetary base in exchange for the purchase of corporate bonds

R&D Research and developments

RER Real exchange rate

S&P Standard & Poor's

SELA Latin American and Caribbean Economic System *(Sistema Económico Latinoamericano y del Caribe)*

SELIC Brazilian reference rate *(Sistema Especial de Liquidação e Custodia)*

SMEs Small and medium-sized enterprises

UNASUR Union of South American Nations

UNCTAD United Nations Conference on Trade and Development

UNIDO United Nations Industrial Development Organization

VUCE Single-window facilities for foreign trade *(ventanillas únicas de comercio exterior)*

WB World Bank

WDI World Development Indicators

WEF World Economic Forum

WEO World Economic Outlook

WTO World Trade Organization

Executive summary

Clouds gather on economic horizon: After a decade of relatively strong growth, Latin America's economic prospects are becoming more convoluted in response to three main factors: declining trade, moderation of commodity prices and increasing uncertainty surrounding external monetary and financing conditions. This is a consequence of the euro area's weak performance, the slowdown in China's economy and uncertainty over U.S. monetary policy. Rising domestic demand could make up for some of the weakening in external demand, but as many Latin American economies are now converging towards their potential GDP from an expansionary period, domestic demand stimulus could increase imbalances. Thus, previous experiences in the region signal the need to carefully monitor the expansion of credit and ensure the sustainability of government spending.

Weakening economic prospects highlight structural challenges facing the region: In 2011, commodities accounted for up 60% of the region's goods exports, up from 40% in 2000. The value of these exports rose over the past decade, but half this increase was accounted for by rising prices and not, as in the 1990s, by rising volumes. Furthermore, the rise in commodity exports has led Latin American economies to substitute locally made goods with imports, contributing to a slowdown in regional manufacturing.

Challenges come at critical time for emerging "middle classes": The past decade saw a substantial reduction in poverty as well as some lessening in inequality in Latin America. Meanwhile, there has been an emergence of a "middle class", whose evolving needs now pose a number of challenges for policymakers, as they call for access to efficient and high quality public services. There are also growing demands for more and better jobs, and the adoption of policies to improve productivity.

Latin America needs to raise its tax revenues: Responding to rising demand for public services will require governments to dedicate more resources to improved infrastructure, thus increasing the need for higher tax revenues. This will require reforms, including setting up institutions and rules to steer spending towards high-yield projects and strengthening the legitimacy of tax collection, thus resulting in increased tax revenue collection.

The region must meet the challenge – and seize the opportunities – created by Asia: The dynamism of Asia's emerging economies poses a challenge for the competitiveness of manufacturing in Latin America, but at the same time brings new business opportunities, to the extent that the Asian production structure continues to shift. Nevertheless, to benefit from these new opportunities, Latin America must diversify its exports and capture more value added.

Reforms should seek to increase productivity: Technological innovation is key for promoting the necessary structural change, which underpins diversification, increases productivity and reduces technology gaps in the region. Latin American countries should avoid excessive concentration of their export structures in natural resource-based commodities, as this can hinder the adoption of new technologies. Nevertheless, the income generated from the export of natural resources can serve as a foundation for advancing towards production that makes greater use of technology and knowledge. Such a shift would improve job quality for the emerging middle classes and strengthen the growth prospects of the region.

Industrial policy is a key factor in driving economic modernisation: The experience of the emerging Asian economies, as well as those of developed OECD countries, can be useful in guiding the design of new industrial policies for the region. In order to bring this about, Latin America needs strong institutions and more capacity to implement policies. This will facilitate progress towards a new type of knowledge-based and skills-based specialisation, which will permit Latin American countries to move up in value chains and capture increased value added. As a starting point, countries in the region need to address existing supply-side bottlenecks, permit an efficient flow of goods and services, adopt simplified customs procedures, and improve their logistics.

Improved logistics performance could help bolster structural change in the region: In Latin America, 57% of the exports consist of perishable or logistics-intensive products. This proportion is, on average, 17% in OECD countries. Meanwhile, cargo costs, especially to destinations within the region, are relatively high while transport services can be unreliable. These logistical challenges are reducing the region's competitiveness and threatening the foundations of sustainable economic growth. For example, improvements to logistics services could boost labour productivity in the region by around 35%.

Better logistics raise competitiveness: On average, freight costs between the United States and its trading partners are less than double tariff costs. However, for Latin American and Caribbean partners, they are almost nine times higher. Despite substantial efforts to promote free-trade agreements which facilitate trade in goods and services, there is still a wide margin for action in bringing down logistics costs. Raising Latin America's logistics performance would help the region's economies reposition themselves within global value chains. Furthermore, improved logistics could improve SME export performance, as well as strengthening their productive linkages as a result of the reduced transaction costs.

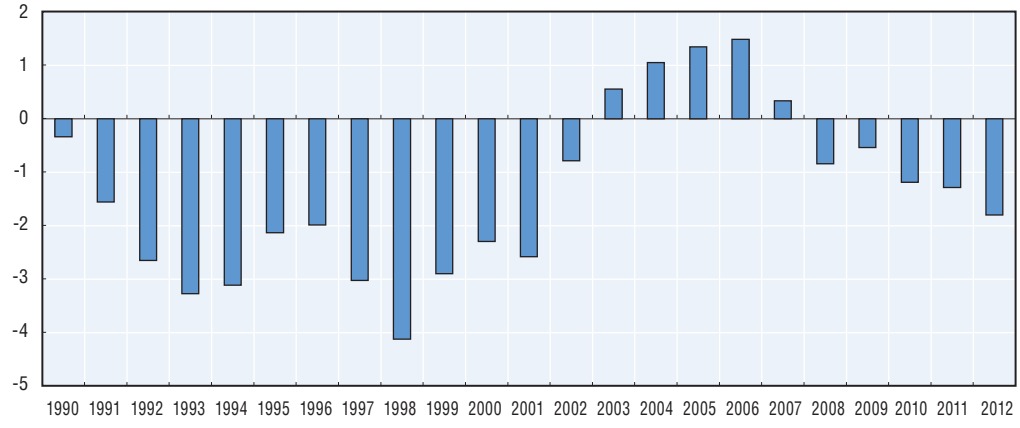
The region needs to implement short-term solutions to reduce transport costs: Better roads, railways, ports and airports are essential for improving logistics. However, such projects require time and resources for their planning and execution. In the meantime, much can be done to improve the transport of goods and services using existing infrastructure. These "soft" solutions can include developing integrated logistics policies supported by the necessary governance and institutions; providing modern storage facilities and efficient customs and certification procedures; making better use of information and communication technologies; and promoting competition in transport.

General overview

The external scenario is less favourable for the region due to the downturn in global trade, the moderation in commodity prices and the increased uncertainty surrounding global financing conditions.

The euro area's weak economic performance, the slowdown in the Chinese economy and its effects on metal and mineral prices, and the impact that the normalisation of US monetary policy will have on international capital markets directly affect Latin American economies. First, demand for exports of the region's goods and services is forecast to decline due to more moderate growth in global trade. Second, while the prices of imports have remained stable, the prices of Latin America and the Caribbean's main commodity exports have declined since 2012. These factors have contributed to the deterioration of the trade balance (Figure 0.1), which is lower than in the 1990s, but increasingly more uniform. At the one extreme are the net exporters of oil and gas, which have current-account surpluses, and at the other are the economies of Central America and the Caribbean, which are net importers of commodities and have current-account deficits of more than 10% of GDP. Finally, if the United States tightens its monetary policy, external financing will steadily become more expensive and capital outflows to the region will probably fall, resulting in greater uncertainty and more volatile capital markets.

Figure 0.1. **Current account as percentage of GDP of Latin America and the Caribbean**



Source: Based on ECLAC (CEPALSTAT) data.

StatLink http://dx.doi.org/10.1787/888932906350

Although an increase in domestic demand could partly compensate the slowdown in external demand, many Latin American economies are converging towards their potential GDP following an expansionary phase of the business cycle.

Although many of the region's economies have some monetary and fiscal space for an additional stimulus to compensate for temporary external shocks, the region is faced with a more permanent, widespread economic slowdown that makes it difficult to provide this kind of stimulus. Moreover, several countries are converging towards their potential GDP from an expansionary phase of the business cycle, and some are also faced with supply-side bottlenecks, making them vulnerable to domestic and external imbalances if there is an additional stimulus.

Previous episodes of economic instability in the region are a reminder to be vigilant of expanding domestic credit and changes in fiscal aggregates.

Credit relative to the size of the economy has grown rapidly in most Latin American countries in the last ten years, especially mortgages and consumer credit. The authorities should therefore monitor the amount of credit so they can prevent or mitigate potential booms, which lead to internal and external imbalances. They should take measures to ensure that the financial system remains solvent, avoiding excessive risk-taking and limiting the system's procyclical nature. Moreover, although currents debt levels are sustainable under the baseline scenario, the fiscal space has shrunk considerably in various Latin American countries. This divergence between fiscal balances and indebtedness is the result of a series of factors, including currency appreciation and lower effective interest rates compared to the recorded rate of GDP growth. It is therefore important to design and implement fiscal reforms to create a larger fiscal space and to adopt measures to ensure continued access to sufficient levels of liquidity, whether by accumulating and holding international reserves or arranging contingent credit lines.

The current macroeconomic context further highlights the structural challenges that remain, such as the imbalance between tradeable and non-tradeable sectors of the economy.

Commodities make up 60% of the region's exports of goods, up from less than 40% at the beginning of the last decade (2000-10). Also, around half the increase in the value of Latin American exports in the 2000s was a result of commodity price rises, whereas in the 1990s it was mainly due to increases in the volume exported. Moreover, the surplus resulting from the concentration of exports in a limited number of commodities has also contributed to growth in domestic sales, which, in line with the decline in domestic industrial production, have led to a rise in imports. Consequently, manufacturing has slowed and the imbalance between the tradeable and non-tradeable sectors has widened.

The challenge of achieving sustainable growth and greater economic diversification comes at a time in which a new "middle class" is emerging.

After a decade in which economic growth was accompanied by a substantial reduction in poverty and improvements to inequality indicators, a "middle class" has emerged in the region. In the emerging economies this "middle class" will grow from 55% of the population in 2010 to 78% in 2025, so it can become a fundamental pillar for further economic development. It will also place new demands on the region's policy makers for efficient, high-quality public services. To meet these demands countries will need to expand their fiscal space by introducing reforms to increase fiscal revenue and

by setting up institutions to ensure that government resources are spent on projects that greatly benefit society. Meanwhile, the deficiencies in the region's infrastructure and logistics considerably hinder economic growth, and will therefore require additional financial effort by the public sector and substantially better quality spending. In addition to the new demands for public services from Latin America's "middle classes", public policies must provide growth in a way that also improves the market distribution of income in the long run. Therefore, the economic structure must create opportunities for more and better jobs and greater productivity for large sectors of society to consolidate the emerging "middle class".

These needs are even more pressing in the light of Latin American integration into the context of shifting global wealth, led mainly by the Asian economies.

The current economic climate is characterised by a shift in global wealth towards emerging economies. This transition is mainly a result of China's and India's economic modernisation and their integration into the world economy. The size of these economies, in conjunction with their rapid, sustained growth and their strong demand for natural resources, has supported growth in many emerging and developing economies. While at the turn of the century non-OECD economies accounted for 40% of the global economy, by 2010 this figure had risen to 49%, and by 2030 it is projected to rise to 57%. This is in sharp contrast to the contribution made by Latin America and the Caribbean, which remains at the 1990s level of between 8% and 9%.

The emerging economies, including those in Latin America, must avoid falling into the middle-income trap, and this would help them satisfy the needs of their "middle classes".

A rise in per capita income in emerging economies is bolstered by factors that characterise early-stage economic development, such as urbanisation, demographic shifts, cutting the size of the agricultural workforce, and closing the technology gap. Because these sources of development reach their limits, economies often see their per capita income stall, a phenomenon known as the middle-income trap. The middle-income trap is a source of vulnerability for the emerging "middle classes", which demand more and better public services, and it can reduce social mobility and create a more convulsive social environment.

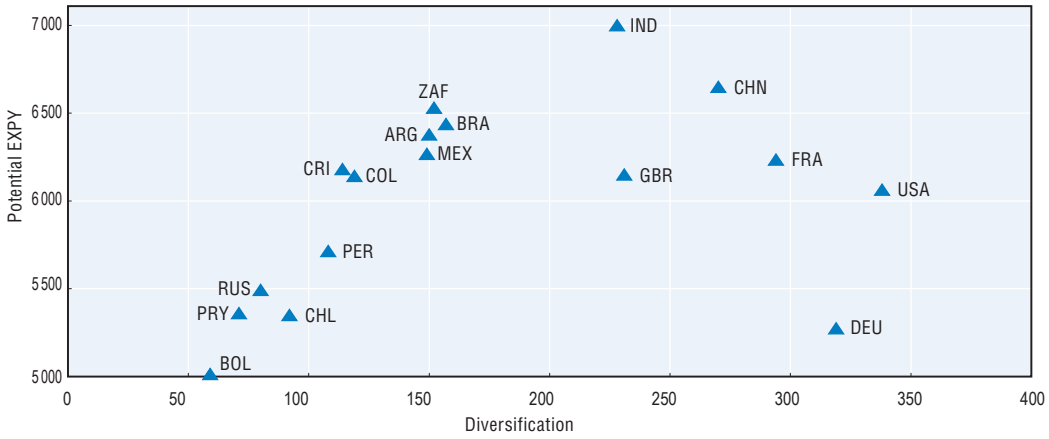
The increasingly dynamic role of the Asian emerging economies in global shifting wealth is a challenge for the competitiveness of many of the region's manufacturing industries.

China's development pattern combines elements such as factor endowments, scale and productivity that considerably bolster the competitiveness of Chinese manufacturing. Latin America, for its part, is faced with systematic problems that make it difficult for the region to raise its productivity due to the limitations of its development model, from structural heterogeneity to low rates of savings. Growing competition from Asia's emerging economies magnified the impact of these limitations, counteracting some of the natural advantages that some Latin American countries enjoy, such as being located close to the United States. This trend towards de-industrialisation in Latin America caused by endogenous and exogenous factors can be counteracted by the development of new capacities to produce increasingly sophisticated goods.

At the same time, changes to the production structure of Asian economies are bringing new business opportunities to Latin America.

As emerging countries are experiencing a convergence of their income, their production structures are beginning to shift towards more highly sophisticated goods, and they are increasing their imports of labour-intensive goods. New business opportunities are thus arising for the Latin American exporters that suffered most from the economic opening of China and India. One way of estimating the potential of the region's countries to take advantage of these opportunities is by analysing the diversification of their economies in terms of the number of sectors in which a country has revealed comparative advantages. The other factor to consider is the connectivity of the country's export basket, i.e. the probability that the production of a certain good would allow the production of another, technologically related good. Connectivity is therefore estimated as a "proxy" variable for proximity, density and number of connections between two goods. Latin America is still experiencing increasing potential returns, both in terms of diversification and in terms of the connectivity of its export basket (Figure 0.2). This gives the region an opportunity to integrate into new global value chains and to make progress in achieving a structural transformation by seeking to export increasingly more sophisticated goods, the production of which has the knock-on effect of enabling other goods to be developed for export.

Figure 0.2. **Diversification vs. export connectivity (2009)**



Note: On the horizontal axis, the degree of diversification is given by the number of sectors in which the country has revealed comparative advantage (RCA>1). The vertical axis measures the connectivity of the export basket through the "potential expy" variable (methodological details in Appendix 2.A2).

Source: Authors' calculations based on data from COMTRADE and Feenstra et al. (2005), "World Trade Flows: 1962-2000", *NBER Working Paper* N° 11040.

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Latin America needs to diversify its exports by deepening the regional market and capturing more value added.

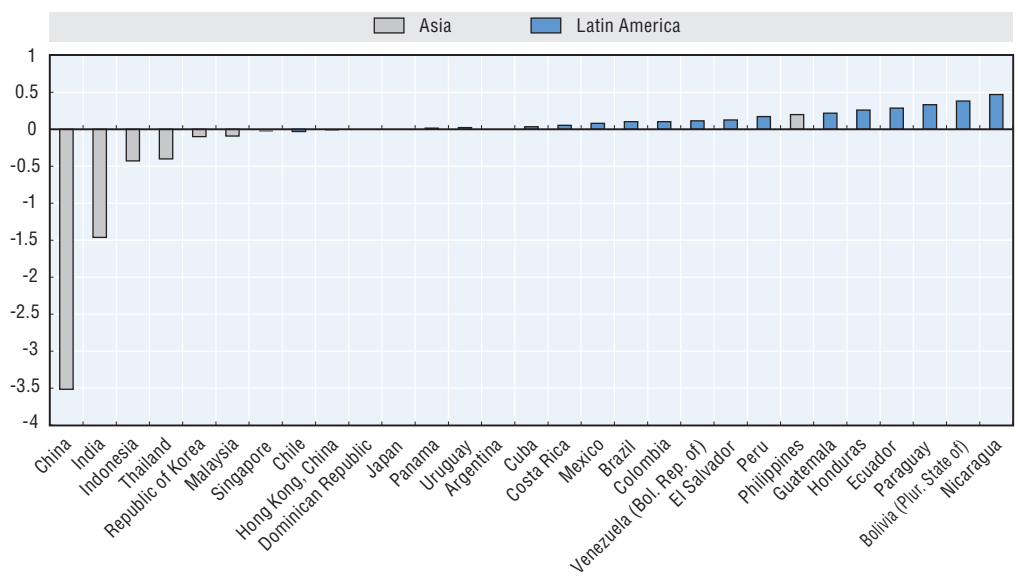
Two policy options, which are not mutually exclusive, could help diversify exports in a context where it is especially hard to compete with large Asian manufacturers on price. An initial strategy is to deepen Latin America's internal regional market, which remains far less developed than those of other regions. For instance, trade between Central and South America and among Mercosur countries and those of the Andean Community could increase if they take advantage of the differences among their export

profiles. Since trade within the region focuses largely on goods with a higher value added, particularly in intra-industrial trade in manufactured goods, additional trade would also help strengthen the diversification of the region's exports. A second strategy consists of seeking to capture greater value added in trade. The geographical fragmentation of the production process and the advent of global value chains as a paradigm of the organisational model have changed the rules of diversification. Currently, these production networks allow countries to specialise in specific parts of the production process without needing to take on every step required to complete the production of a good. Moreover, in Latin America such services appear to be a potential source of value added for certain manufacturing industries and primary products.

The region needs to raise its productivity to make its production structure more sophisticated and diversified.

Latin America has an external gap as a result of the asymmetrical gaps between the countries' technological capabilities and the frontier set by international best practices. It also has an internal gap as a result of the differences in productivity levels within and among sectors. Indeed, low productivity is one of the main factors preventing the region from creating more value added and achieving sustained growth. The productivity gap between most Latin American and Caribbean countries and the more developed countries is still increasing, Asia's productivity gap has closed (Figure 0.3). In addition, the regions' countries have become more heterogeneous in terms of productivity. To reduce the structural heterogeneity and increase productivity, countries in the region will need more diversified and more complex production structures that make greater use of technology. Many of the convergence success stories in the region have been associated with the development of new sectors or business activities. Structural change is therefore essential to narrow the productivity gap with the developed world and to lay the foundations for more inclusive growth.

Figure 0.3. **Changes in productivity gaps between selected Asian and Latin American countries and the United States (1980-2011)**
(as percentages, annual growth rates in GDP per worker)



Source: Authors' calculations based on World Bank, *World Development Indicators* and CEPALSTAT data.
StatLink http://dx.doi.org/10.1787/888932906787

Technological innovation is one of the key elements for promoting structural change and encouraging a dynamic of virtuous economic growth.

Technological advances are one of the key drivers of structural change. There is a direct relationship between the dissemination of general technologies and progress towards a diversified, complex production system. In Latin America, this relationship is insufficiently developed given how far the region lags behind in certain key areas of technology. The region can use new technologies to develop sectors, activities and markets that promote greater economic growth.

Some Latin American countries have a production structure that is heavily concentrated on commodity exports.

Many developed countries that initially had natural resource-based economies used this initial resource as a foundation for developing new, more sophisticated sectors and business activities. These countries used an industrial and economic strategy to channel the income they obtained from natural resources towards a more diversified production structure that made greater use of technology and knowledge. Latin America lags far behind in indicators related to the sophistication of its production, such as technological effort, knowledge intensity and the adaptability of its exports, which are fundamental for promoting structural change.

Latin America's move from a model based on exporting natural resources to a knowledge-based model integrated into the global economy will improve the quality of employment and help to consolidate the emerging middle class.

In countries where productivity stagnated during the last decade, increases in production were brought about only by a greater absorption of labour. A key component of the structural change needed by Latin America involves transferring labour from low-productivity sectors that tend to have high levels of informal employment to higher-productivity businesses that can generate production linkages and knowledge spillovers. Countries must transform their production base to generate high-quality jobs and promote new business activities that are more technology-intensive and knowledge-intensive.

The reemergence of industrial policy is a central part of the new development strategy of the Latin American and Caribbean economies.

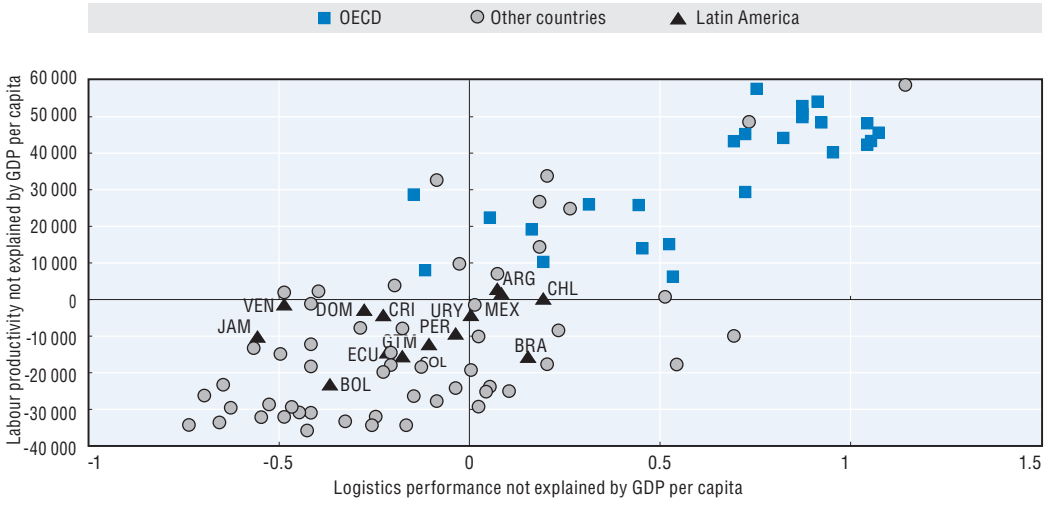
Developing countries have recently renewed their interest in industrial policies, spurred largely by the successful experience of the Asian countries, which were driven and steered by the public sector during most of their economic transformation. The return of industrial policy in the region must be backed by full legal support and strong policies. Otherwise, the region will not be able to fully participate in the new technology revolution or progress towards a new type of knowledge-based and skills-based specialisation.

The development of industrial policy and promotion of productivity require improvements to logistics, a fundamental pillar of structural change.

The concept of logistics encompasses a range of key elements for production and trade, and is defined as all the services and processes needed to transport goods and services from the point of production to the end consumer. The cost and quality of logistics

have fundamental implications for sustainable economic growth. Analyses show that improvements to logistics services could substantially boost labour productivity in the region (Figure 0.4). After taking into account other variables affecting economic growth, there is a significant association between improved logistics performance on the one hand and productivity gains and greater sophistication of exports on the other. More specifically, countries improving their score by 1 in the Logistics Performance Index improve their labour productivity by about 35%.

Figure 0.4. **Logistics and economic performance: Partial correlations**



Note: Data for 2012. Partial correlations used GDP per capita as a control variable.
Outliers were discarded using the standard DFBETA methodology (no country in Latin America and the Caribbean was removed). Labour productivity is defined as GDP in US dollars per person employed in 2012, adjusted for purchasing power parity (PPP). The Logistics Performance Index is developed by the World Bank. The level of sophistication of the country's export basket was estimated using the EXPY index (see Chapter 2 for more details). In the legends, Chile and Mexico are included as Latin American countries rather than as OECD countries.
Source: Authors' work based on *The Conference Board Total Economy Database,* World Bank (LPI), Comtrade.
StatLink http://dx.doi.org/10.1787/888932906882

Although Latin America has made substantial efforts to increase the number of free-trade agreements, it should invest the same or greater efforts in adopting policies to reduce logistics costs.

Using U.S. trade as a reference, while the average freight costs for trade between the United States and its partners are less than double the tariff costs, in Latin America this ratio rises to almost 9:1. Trade in parts and components, meanwhile, is almost 50% more sensitive to improvements in logistics performance than is trade in final goods. Better logistics performance is therefore essential to integrate Latin American economies into the global value chains. Reducing logistics costs is also essential to promote trade within the region. Improvements must therefore be made to the standardisation practices relating to the regulation of land transport, and road corridors and logistics solutions need developing to connect Latin American cities and ports together. Finally, cheaper logistics costs benefit SMEs the most, since they are too small to provide all production phases in-house, so they need a business environment with low transaction costs to facilitate business-to-business trade relations. Since jobs and GDP are highly concentrated in SMEs in Latin American countries, any reduction to logistics costs will make the region substantially more competitive.

Improving logistics performance is essential because the share of logistics-intensive or time-sensitive exports in Latin America is three times that of the OECD economies.

By measuring logistics intensity in each economic sector based on the cost or time invested, one can measure the impact of logistics performance on each sector. Latin America's production structure is more sensitive to logistics performance than that of the OECD countries. On average around 57% of the region's total exports are time-sensitive or logistics-intensive, compared to an OECD average of 17%. The region's specialisation pattern means there is a high involvement of logistics-intensive natural resources, as well as agricultural products and garments, which are sensitive to the transport time to the destination. Logistical challenges, therefore, greatly hinder the region's competitiveness.

The infrastructure deficit is a factor behind the region's poor logistics performance.

The biggest infrastructure gap is in the transport sector, as in some Latin American countries domestic transport costs per container are among the highest in the world. Logistics costs in the region represent 18-35% of a product's value, compared to around 8% in the OECD countries. Road transport is the area where the region lags furthest behind, with standards below those of middle-income countries. Also, the insufficient co-modal transport options in Latin America increases logistics costs by up to 57% and reduces the region's competitiveness and capacity for international integration. The strong concentration on road transport, as opposed to other, more efficient modes of transport (15 times higher than in the United States), also affects complementarities among the different modes of transport in the region. Finally, the poor regulatory and institutional capacity in Latin America's concessions system prevents governments from obtaining all the benefits they would have hoped for from additional private investment in infrastructure.

While transport infrastructure is the main factor behind the low logistics performance, some "soft" solutions could considerably reduce logistics costs.

Latin America needs to adopt a series of policies to improve both "soft" and "hard" aspects of logistics. The "hard" components are associated with transport infrastructure, which, given the costs involved, will be hard to change in the short run. It is therefore necessary to accompany the measures aimed at "hard" components with improvements to "soft" aspects that are linked to strengthening the institutional structure and improving governance as part of an integral logistics policy offering modern storage facilities, more efficient customs and certification procedures, and the use of new information and communication technologies. Measures are also needed to boost competition in the transport sector. These elements can be used to encourage efficient use of available infrastructure and thus reduce logistics costs.

CHAPTER ONE

Macroeconomic outlook

Summary

Latin America is currently experiencing a slowdown in growth due to the downturn in external demand and the structural limitations of its economies. Although the slowdown is only moderate for the moment, there are reasons to believe that it could be persistent if there is no policy action to raise the growth capacity of the region's economies. Given this scenario, this chapter analyses three important aspects and discusses suitable policies for reducing the associated vulnerabilities. First, it documents the changes in the external context and their consequences for the dynamics of external demand, considering some of the vulnerabilities resulting from the pattern of trade specialisation in the region and the limited ability of domestic demand to sustain growth. It also analyses the potential risks to financial and economic stability in the region's financial systems amid the high uncertainty regarding the future direction of US monetary policy and liquidity in international capital markets. Finally, the chapter looks at how fiscal policy and the fiscal space are being changed. Institutions and regulations that can facilitate the sustainable creation of fiscal space are particularly important for the Latin American economies. Governments must do more than merely increase their revenue; they must also invest more efficiently and effectively to respond to new needs and demands.

Introduction

After a period of very strong growth, barely affected by the global financial crisis, Latin America is now going through an economic slowdown. Although the slowdown is only moderate for the moment, there are reasons to believe that it could be relatively persistent if there is no policy action to raise the growth capacity of the region's economies. Lower growth can have severe consequences for the countries in the region, many of whose citizens have lifted themselves out of poverty and begun to join the emerging middle classes. Overall there will be fewer new jobs, smaller pay rises and less fiscal space with which to provide the more and new public services and goods that Latin American citizens are increasingly demanding from their governments.

Latin America's current international context is shaped by lower external demand and more uncertainty regarding the external financing conditions at a time of normalisation of US monetary policy. On average, the region has moderate external financing needs and its composition of assets and liabilities mitigates the risks of balance-of-payments problems. But this average hides great differences from one country to another. Some countries have solid foundations, but others – especially in the Caribbean – have considerably more restrictions. The situation is similar with the fiscal space available for countercyclical action if there is a further deterioration in aggregate demand. Although fiscal balances have deteriorated in many countries in the region, some countries have been able to reduce their indebtedness thanks to favourable debt levels and valuation effects. The normalisation of US monetary policy could also pose challenges to Latin America's financial systems following major credit expansions in several countries in the region. It is therefore necessary to monitor the robustness of the region's financial systems and to take appropriate measures to safeguard it. Specifically, suitable indicators for systemic risks and systems for monitoring credit should be designed and macroprudential measures should be taken to prevent and mitigate any financial stability problems.

This chapter is divided into four sections. The first analyses the external context and its interaction with the structural characteristics and macroeconomic fundamentals of the countries in the region. In particular, slower world growth, not only in developed countries but also in some emerging economies, has significant economic effects that vary from country to country in the region according to each one's trade patterns and production specialisation. For instance, commodity-exporting countries are exposed to the risks associated with more sluggish growth in China and a more accelerated rebalance of China's sources of growth in demand.[1] This first section also analyses the risks associated with greater uncertainty regarding the pace of normalisation of US monetary policy. The second section examines the stability of the region's financial systems in this context and suggests some macroprudential policies that could be used to mitigate risks. The third section assesses the fiscal space for countercyclical fiscal policy and for financing investment in areas such as infrastructure and logistics to increase potential GDP growth. The fourth section presents conclusions and policy recommendations.

Slower Latin American growth amid a global slowdown

This section discusses four aspects related to the short-term and medium-term external scenario. First it presents growth projections for the next five years in the main markets. Next it analyses what implications the global slowdown in growth will have on the economies of Latin America. It then places particular emphasis on analysing the potential vulnerabilities of the region's economies to a further drop in external demand. Finally, it analyses the factors that prevent current growth rates from being maintained by the strong domestic demand, especially for consumer goods, and discusses some policy options to address the fall in external demand.

The anatomy of lower global growth in the medium term

Global economic growth for the next five years is not expected to exceed 4.1%.

The global economy has entered a period of slower growth. Global growth of 5.2% in 2010 marked the end of the recession, but growth is now slowing once again. Although the global economy is expected to gradually improve in the next few years, growth is not expected to return to the levels seen before the financial crisis. Between 2003 and 2007, the global economy expanded by an average of 4.8% a year, well above the rate seen in previous decades, but IMF forecasts for the next five years predict an average growth rate of no more than 4.1% a year. This global slowdown has dragged down Latin American growth, since economic activity in the region is strongly linked to global business and financial cycles.

There are great differences in the dynamics of growth across the world. Emerging economies remain the driving forces of growth, whereas advanced economies are growing at a slower pace and are at different stages in the business cycle. The United States and Japan are showing positive signs that their recoveries will continue, but Europe is still plunged in recession. The large emerging economies of India and China are converging to somewhat lower rates of growth, albeit still well above the global average.

The medium-term outlook for the advanced economies is one of slower growth than before the crisis. The United States recovery seems to be well cemented, with continuous improvements in employment levels, the property sector, lending activity and the trade balance. However, the fiscal consolidation process that is currently underway will hold back economic growth in the next few years. It is expected that a significant portion of the budget sequestration (automatic public-spending cuts to achieve budget targets if the US Congress fails to agree on which budget items to cut) will be concentrated between 2013 and 2014. The cuts are likely to be gradually reduced from 2015. Consequently, GDP is expected to grow by 1.7% in 2013 (OECD, 2013a) and by 2.8% in 2014 (OECD, 2013b), with growth fluctuating between 2.5% and 2.9% between 2015 and 2018 (IMF, 2013). As the recovery is further consolidated, monetary policy is expected to become less expansionary.

The euro area has recorded negative growth since the final quarter of 2011, and the recession is expected to continue in 2013, with the economy improving slightly towards the back end of the year. Recent data on industrial production and consumer and investor confidence suggest the recession might be bottoming out, but the recovery will be slow. In addition to the fiscal consolidation process that countries have embarked upon, private-sector deleveraging is not yet finished, particularly in peripheral countries, and this will hold back the recovery in demand. Indeed, credit is showing no signs of further recovery. High unemployment and the low prospects of growth in household disposable income will continue to prevent a significant reduction in debt levels. Consequently, the euro area is expected to contract by 0.6% in 2013 and grow by just 1.1% in 2014 (OECD, 2013b). This will make monetary conditions in the euro area remain lax for at least the next two years. For the following four years, once the recovery has been consolidated, growth is expected to remain low, fluctuating at around 1.5% (IMF, 2013).

Finally, Japan is beginning to show signs of a gradual recovery thanks to the monetary and fiscal stimulus introduced in January. These signs include greater investor confidence, higher exports, higher industrial production and price rises for some goods. Nevertheless, a stellar performance is not expected from the world's third-largest economy over the next few years. First, part of the spending growth announced for 2013 and 2014 could be offset by higher consumption taxes as part of the fiscal consolidation. Also, as previous experience has shown, doubling the monetary base over the next two years will not guarantee that financial intermediation will pick up and significantly boost economic activity. Forecasts therefore predict growth of 1.6% in 2013 and 1.4% in 2014 (OECD, 2013b).

Meanwhile, though emerging economies are still growing fast, they are showing signs of a slowdown. China in particular is growing slower than it did over the last decade, when its economy was expanding at a rate above 10%. Annual GDP growth between 2013 and 2017 is expected to average at 8.3% (OECD, 2013c).[2] Apart from weakening external demand, China is also faced with risks associated with its growth model, which could prevent a return to levels of growth akin to those recorded during the previous decade. For instance, following the 2008 crisis the increase in investments largely offset the reduction in the contribution of exports to growth. However, although exports will remain the main driver of domestic demand until China consolidates the transition towards a model that relies more on domestic consumption, the risks of accumulating overcapacity in manufacturing will hold back greater expansion of investment. Moreover, the rapid expansion of credit to shore up demand following the financial crisis (liquidity expanded by 145% between 2008 and the first quarter of 2013) seems to be reaching its limit. Credit-market conditions tightened following the liquidity restrictions recently introduced by the authorities in the interbank market to prevent excessive risk-taking by financial intermediaries, particularly through non-bank financial instruments.[3] This makes a difference in terms of the cyclical response of monetary policy at a time when the economy is showing greater signs of a slowdown than was anticipated, which could harm demand dynamics.

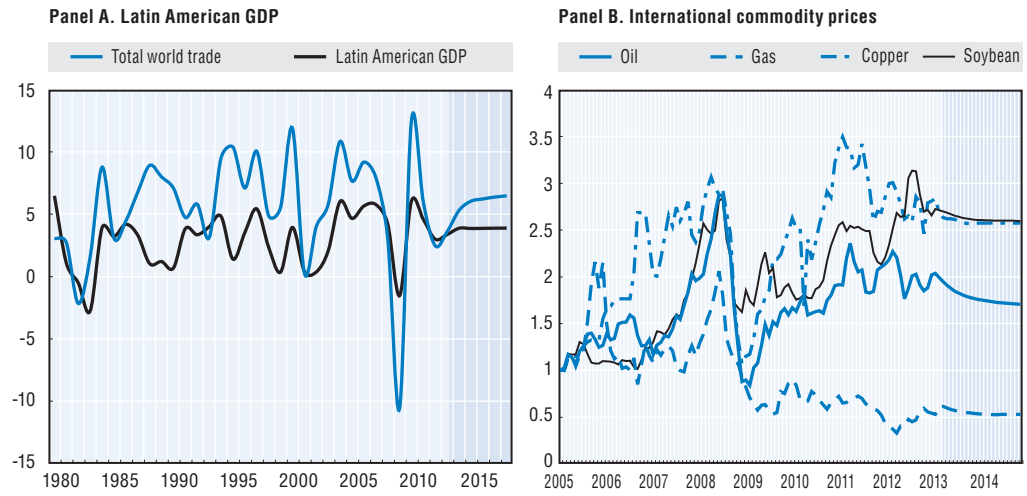
What impact does this scenario have on Latin America?

Although growth will still fare well compared with previous decades, a less benign global scenario will have three negative effects on Latin American development: a decrease in the volume of foreign trade, a fall in commodity prices and the normalisation of financial conditions for obtaining credit.

Growth in world trade slowed from more than 7% in the 2000s to 4% in 2012.

First, slower worldwide growth will lead to slower growth in trade. Growth in world trade of goods and services fell from more than 7% in the 2000s to around 4% in 2012, and is forecast not to exceed 6% in the next few years. A natural consequence of a slowdown in world trade is a reduction in demand for goods and services exported by the region, which in turn reduces production. There is actually a strong correlation between Latin American growth and growth in global trade (Figure 1.1, left panel).

Figure 1.1. **Variation in global trade in goods and services**



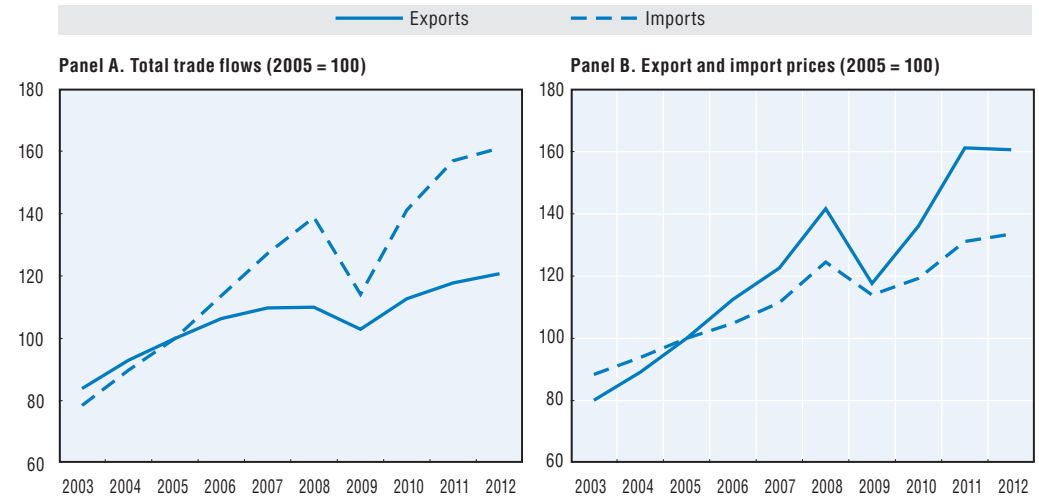
Source: Based on IMF (2013), *World Economic Outlook: Hopes, Realities, Risks, World Economic and Financial Surveys.*

Source: Authors' calculations based on Datastream and Bloomberg data.

StatLink http://dx.doi.org/10.1787/888932906312

Second, lower global demand curbs price rises for commodities, which form a large proportion of exports, especially in South America. The prices of Latin America's main commodity exports have actually fallen since 2012 (Figure 1.1, right panel). This is particularly true for industrial metals (especially copper), which have seen one of the largest falls in prices since mid-2011. Although commodity prices are not expected to continue falling over the next two years, they are not expected to rise either. Even when commodity prices stabilise at historically high levels, there are implications for the region. Unlike in the 2000s, when commodity prices rose rapidly, resulting in continuous increases in national incomes, no major increases in income from improvements in terms of trade are expected in the immediate future. Indeed, since 2011 exports from the region have grown slowly compared with imports, which have been boosted by strong domestic demand and appreciation of the region's currencies (Figure 1.2, left panel). The region's export prices actually declined slightly in 2011 as prices of the region's main commodities fell, while its import prices stabilised thanks to the absence of inflationary pressures internationally (Figure 1.2, right panel).

Figure 1.2. **Latin American export and import volumes and prices**



Source: Based on Datastream data

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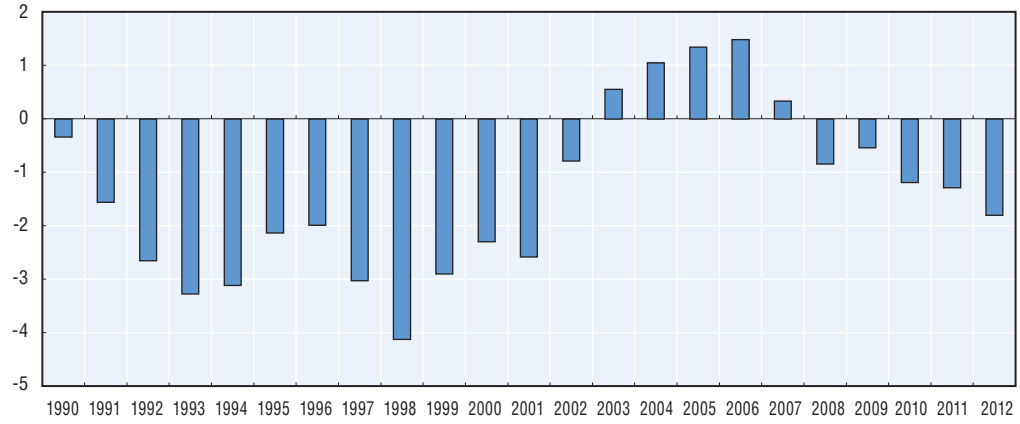
The aggregate current-account deficit of 1.8% of GDP in 2012 remains relatively manageable.

For the most part this situation has damaged the trade balance of Latin American countries (Figure 1.3) and diminished the contribution of external demand to growth. Despite the recent decline, Latin America's aggregate current-account deficit of 1.8% of GDP in 2012 is still relatively manageable compared with the situation in the 1990s, and the latest projections for 2013 show only a slight deterioration in the region's current-account deficit to 2.0% of GDP (ECLAC, 2013). However, this total deficit average hides considerable differences from country to country. At the one extreme are the net exporters of oil and gas, which have current-account surpluses (in 2012 these countries were Trinidad and Tobago [8.4% of GDP], Bolivia [4.5%] and Venezuela [4.0%]), and at the other are the various net commodity importers in Central America and the Caribbean, which have current-account deficits of more than 10% of GDP. South American countries tend to have a more moderate deficit or even a positive balance, ranging from Colombia's deficit of 3.2% of GDP to Argentina's marginal surplus of 0.3%, whereas Mexico has a deficit of 0.7%.

Figure 1.3. **Current account as percentage of GDP of Latin America and the Caribbean**



Source: Based on ECLAC (CEPALSTAT) data.

StatLink http://dx.doi.org/10.1787/888932906350

The conditions that push capital flows towards emerging markets have become less favourable.

Finally, the scenario of lower growth and a deterioration of external accounts will be accompanied by normalisation of access to credit, with external financing becoming progressively more expensive and capital flows towards emerging markets declining. The United States Federal Reserve announced in mid-June that it will steadily reduce the amount it purchases under the QE3 programme starting from the final quarter of 2013; it hopes to end all such purchases by mid-2014.[4] Depending on the signals indicating that the economy is strengthening, interest rates will begin to be raised in 2015. In anticipation of these measures, international investors reacted strongly, liquidating their holdings in emerging markets. This reaction caused emerging markets' credit conditions to be tightened, with lower net capital flows and higher spreads (Box 1.1). Although this makes it more expensive to cover external financing needs, it does not mean that major difficulties are anticipated nor that capital flows will vanish. Capital inflows to emerging economies – including Latin America – have not vanished, and are not expected to do so in the next few years.[5] So, there is a reduction in capital inflows rather than a mass withdrawal. There are two reasons why this is happening. First, although the conditions that push capital flows towards emerging markets have become less favourable, the withdrawal of the QE3 programme will be gradual, and the performance of treasury bonds is not expected to spiral upwards in the short term. Part of the adjustment of both capital flows and asset prices seems to have been anticipated. And while monetary conditions in the United States will be less lax, in Europe and Japan they will not. Second, even though emerging economies have slowed, their fundamentals remain strong and they are expected to grow more quickly than advanced economies. Emerging countries will therefore remain an attractive option for investment, even amid greater caution towards risk.

Box 1.1 **The impact of the Federal Reserve's announced gradual withdrawal of monetary stimulus on Latin American financial markets**

On 19 June, Federal Reserve chairman Ben Bernanke hinted during a press conference that the Federal Reserve would taper asset purchases (QE3) towards the end of 2013. The announcement led to strong movements in the capital markets, especially heavy capital outflows from emerging markets, including Latin America. This box examines developments in financial assets (currency, stocks and bonds) in the five countries of the region that have the highest level of financial integration in the three markets. The analysis yields some interesting results.

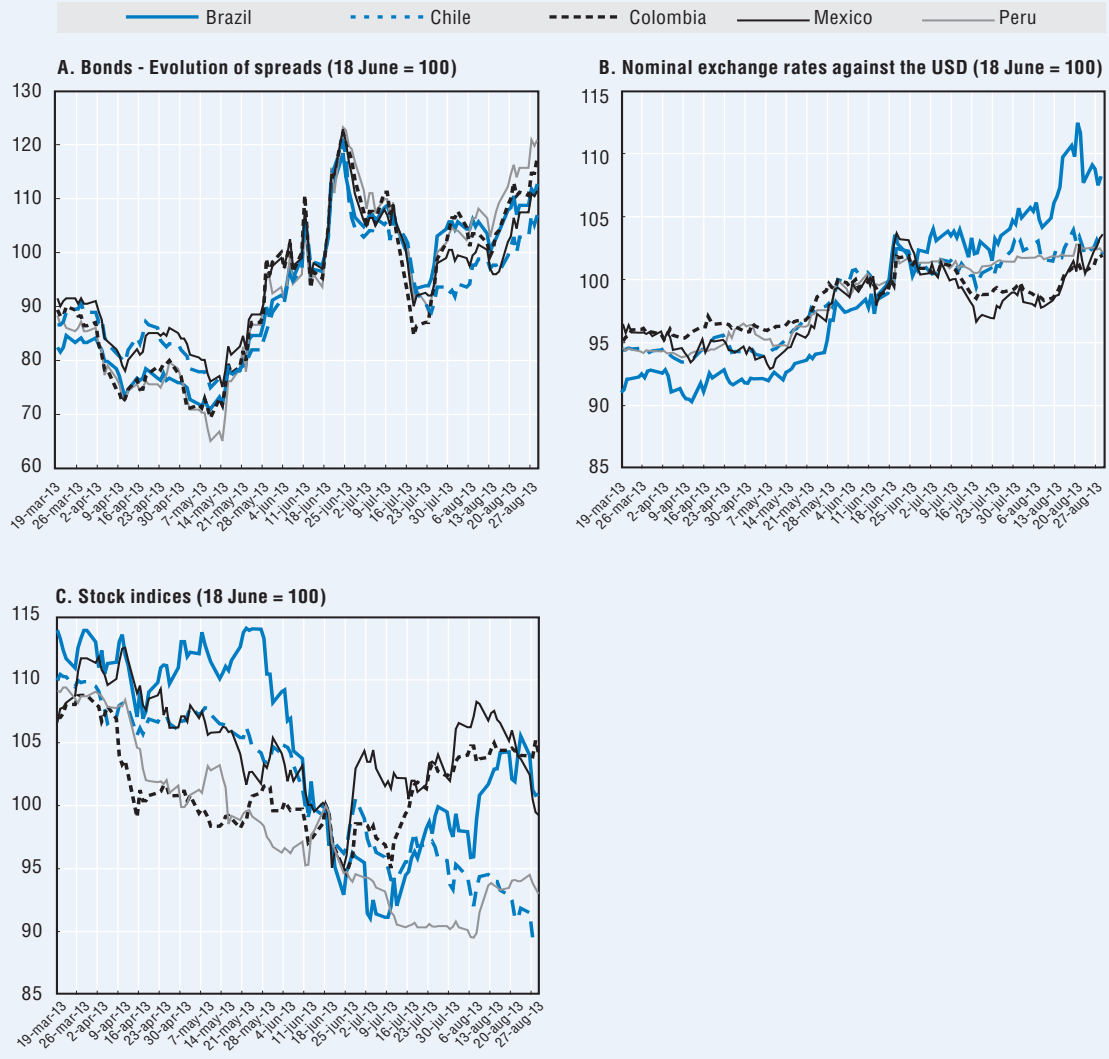
The charts below compare nominal exchange rates against the US dollar, the main stock market indices of each country and sovereign-debt spreads in the worldwide bond market. Changes in bond prices are similar in all five countries both before and after 19 June. Spreads had been increasing in all countries since mid-May. Following the 19 June announcement all spreads leaped by around 20%, or approximately 40 basis points. Less than a month after the episode, all the spreads had returned to their previous levels, behaving in the same fashion as other similar assets, such as high-yield bonds. However, it is important to note that between mid-June and the end of August benchmark rates (the ten-year rates paid on US Treasury bonds) have risen by 60 basis points, so the cost of borrowing for the region has increased slightly. At the same time since the end of July the spreads have retaken their upward trend.

In the currency and equity markets there are wider differences among countries. While the currencies from Chile, Colombia, Mexico and Peru depreciated mildly against the US dollar, oscillating in between 2% and 3% above their value of 18 June, the Brazilian real continues to depreciate by over 8%. Similarly, Mexico's, Brazil and Colombia's equity markets recovered quickly, but, Chile's and Peru's remain 10% below. This probably reflects corrections in their respective domestic markets and the idiosyncratic economic fundamentals that already existed before 19 June.

So, although the 19 June episode was generally short-lived, it made the markets of all the financial assets of the five countries highly volatile. However, just a month later, some assets (bonds and currencies, except in Brazil) returned to their previous values, while in the equity and currency markets there were greater divergences from one country to another, with strong co-movement in sovereign-bond spreads. The withdrawal of monetary stimulus in the US economy will therefore probably restore volatility in the Latin American markets, so it is important to maintain a prudential focus and to use the right instruments (such as foreign-exchange interventions) to temper the harmful collateral effects of that volatility. The fact that some countries seem more robust than others in some markets would provide the right incentives to strengthen macroeconomic fundamentals and reduce vulnerabilities.

Box 1.1. (contd.)

Figure 1.4. **Impact of 19 June announcement on various financial assets in selected Latin American countries**



Note: Spreads are defined as the differentials between the performance of sovereign bonds denominated in US dollars and US Treasury bonds, as calculated by JP Morgan Chase. The indices shown are BOVESPA (Brazil), IPSA (Chile), IGBC (Colombia), IPC (Mexico) and IGBVL (Peru).

Source: Authors' calculations based on Datastream and Bloomberg data.

StatLink http://dx.doi.org/10.1787/888932906369

We may not see a stampede, but tighter external credit conditions will affect the region's economies. The impact of these conditions will depend on each country's financing needs and the shock-absorbing mechanisms they have available.

The situation in Latin America looks relatively manageable. Most countries in the region have moderate external financing needs, so they will not have to make drastic adjustments to domestic demand to improve their current accounts. However, Central American and Caribbean countries with high deficits are generally more vulnerable. Also, economies with limited access to global capital markets could find it difficult to obtain additional financing. Furthermore, the bulk of the region's current-account deficit is financed by direct investment, which is less responsive to the external credit cycle than portfolio investment. The region also has vast international reserves and flexible exchange rates to make the adjustment smoother. Several of the region's central banks have been making efforts in advance to counter the flow of short-term capital in order to mitigate currency appreciation and prevent excesses in the domestic financial markets, so a reduction in inflows of portfolio investment would actually be desirable.[6]

In summary, the external scenario for the region remains positive, but it is less benign than in previous years because: *i)* the region's exports have lost momentum, resulting in lower overall growth than in the previous decade; *ii)* commodity prices are high but without the prospect of higher profits; and *iii)* financing conditions are less favourable. The main risks resulting from this scenario would be an intensification of the crisis in Europe, a sharp reduction in Chinese growth, or a faster currency adjustment than expected by the Federal Reserve. The following subsection looks at the exposure of countries in the region to a further deterioration of the external climate.

Latin America's vulnerabilities to a further deterioration in external demand

Latin America does not move monolithically at the same pace as the global economy. It is not the rate of world growth that matters but its composition, since the extent to which countries are affected depends on what they export and to whom, and the amount of external financing they need. This section will focus on the macroeconomic vulnerabilities that are a result of the region's trade specialisation pattern.

Latin America's foreign trade is exposed due to the concentration of products and of trade partners. The United States remains the region's main trading partner, buying 35% of total exports (Table 1.1). For example, the United States receives 80% of Mexico's exports, 43% of Colombia's, 37% of Costa Rica's, and 28% of Venezuela's. Mexico is particularly vulnerable to the US business cycle since the bulk of its exports to the United States are manufactured goods in value chains, especially electronics, textiles, cars and car parts. A change in US demand therefore has direct repercussions on industrial production in Mexico. It is no coincidence that Mexico's recent recovery has concurred with that of the United States. Exports to United States are also highly vulnerable in Central American countries with manufacturing industries. If US activity were to decline, the volume of industrial production would contract, hurting external demand's contribution to growth. By contrast, some net commodity exporters would be affected not so much by a decline in the volume of a trade as by price corrections, especially for oil and gas. On the other hand Latin America's direct trade exposure to Europe is moderate (12%), although it varies from country to country, and is highest in Brazil (22%), Costa Rica (18%), Chile (17%), Argentina (16%) and Peru (16%). So, although a further contraction in European demand for goods and services could have more than a negligible impact, in most countries it would be relatively small.

Table 1.1. **Latin America and the Caribbean exports**
(average growth, contribution and share)

	1991-2000			2001-10			2011
Region	**Value**	**Volume**	**Price**	**Value**	**Volume**	**Price**	**Share**
World	10.8	9.6	1.1	10.1	4.9	5.1	100%
Latin America and the Caribbean	10.8	9.8	0.9	12.4	7.8	4.5	18%
United States	16.3	14.2	2.1	6.7	3.2	3.4	35%
European Union	2.7	2.4	0.3	11	4.9	6.1	12%
Japan	0.5	-0.3	0.7	11.5	2.6	8.9	2%
Developing Asia	6.6	6.9	-0.4	25.1	14.4	10.7	7%
China	12.8	13.6	-0.8	29.9	17.3	12.7	8%

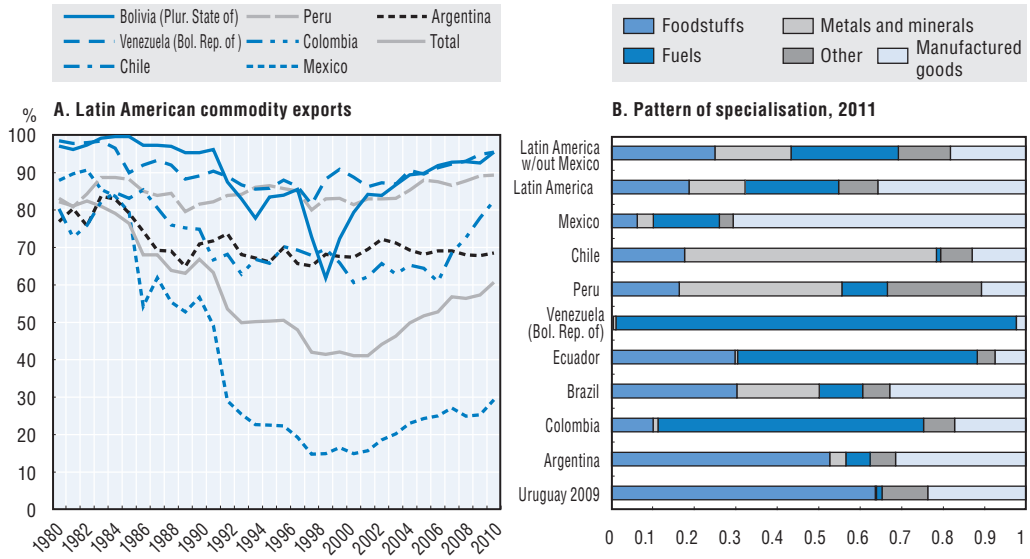
Source: Based on data from CAF (2012), *Reporte Comercial,* Banco de Desarrollo de América Latina, Caracas.

Owing to their pattern of specialisation, several Latin American countries have become more vulnerable to a sharp slowdown in China.

The greatest risk for net commodity exporters, most of which are in South America, is probably a sharp slowdown in Chinese growth. China's position as a trading partner rose a great deal in the last decade (from less than 1% to 8%), but exposure to Chinese trade varies greatly from country to country. Chile and Brazil are particularly exposed: China provides a large share of their external demand (26% for Chile and 19% for Brazil), and their exports are concentrated on a few commodities whose international prices are strongly influenced by Chinese performance. It is estimated, for example, that if growth in Chinese investment were to slow by just 1 percentage point, Chilean economic growth could slow by almost 0.4 percentage points. For Brazil, however, the same slowdown would reduce growth by less than a tenth of a percentage point, since Brazilian exports are much more diversified than Chilean exports and Brazil has a much larger, more closed economy (IMF, 2012). Mexico and Central American countries, on the other hand, have a low trade exposure to China, with only a small proportion of their exports going there.

China mainly imports commodities from Latin America, the bulk of which are metal and minerals (Europe and the United States import a wider range of commodities). A slowdown in China – particularly in investment – would therefore directly and significantly impact the region's metal-exporting countries (Chile, Peru, and to a lesser extent Brazil). However, China's performance not only affects the value of commodity exports in terms of quantity, but also in terms of prices. China is a key player in the commodities market, with a share of around 60% of global iron ore demand, 40% of copper demand, 42% of aluminium demand and 45% of coal demand (BBVA, 2012). There is also evidence that the dynamics of industrial production and investment have significant effects on copper and base metal prices (Roache, 2012; Ahuja and Nabar, 2012). Consequently, both growth in Chinese demand and the balance between consumption and investment have a differential effect on commodity prices. So, although higher trade integration with China provided resilience against the slowdown in industrial economies, it also poses challenges due to greater exposure to the Chinese business cycle and factors associated with financial globalisation (Levy Yeyati and Williams, 2012).

Figure 1.5. **Contribution of commodities to exports and composition of goods exports for selected Latin American countries**



Source: Based on CAF(2013) data.

StatLink http://dx.doi.org/10.1787/888932906388

Notes: "Other" includes codes 21 23, 24, 25, 26, 29, 667 and 9 of SITC Rev.3 – basically "commodities and transactions not classified elsewhere" (Section 9) and agricultural raw materials.

Source: Based on CAF(2013) data.

One of the major trends in the last decade resulting from price rises rather than volume rises has been the reprimarisation of exports (Figure 1.5), which exposes the region to commodity price fluctuations. It has also been shown that China has played a key role in making commodities the bulk of the region's exports (Fung, Garcia-Herrero and Nigrinis Ospina, 2013). Commodities now comprise 60% of the region's exports, up from 40% at the turn of the century. This figure rises to around 80% if Mexico is taken out of the equation. Once again, the figure for the entire region hides considerable differences from country to country. While in Mexico commodities represent less than 30% of exports, in Venezuela, Ecuador and Chile they represent a much larger proportion (Figure 1.5, right panel). This is partly due to prices rebounding. Almost half the increase in the total value of Latin American exports in the last decade was a result of price rises, whereas in the 1990s it was mainly due to increases in the volume exported (Table 1.1). However, in some countries, including Colombia, there has been a marked expansion of production (CAF, 2013).

Also, commodity specialisation and concentration varies from one country to another. Chile and Peru have a high concentration of metal exports: mainly copper in Chile and polymetals in Peru. Oil and gas are the predominant exports of Venezuela, Ecuador, Colombia, Bolivia and Mexico, while foodstuffs are the main export of Uruguay, Paraguay and Argentina. Foodstuffs are also Brazil's main commodity export, but metals, especially iron ore, are gaining ground. These trade patterns have made several countries in the region more vulnerable to a sudden slowdown in Chinese growth because of the impact it would have on commodity prices and because of the potential challenges they pose for medium-term growth (see Chapter 2).

Domestic demand evolution

With a lower external-demand stimulus, domestic demand will continue to underpin growth in Latin America thanks to the good performance of the labour markets, the gradual expansion of the emerging middle classes, favourable credit conditions, flourishing productive sectors that have attracted foreign direct investment (FDI) and domestic investment. The contribution that consumption and investment make to growth varies from one country to another. For instance, the situation in Brazil, where investment accounts for less than a quarter of growth, is in sharp contrast to the situations in Chile, Peru, Ecuador, Bolivia and Colombia, where investment has made substantial contributions to growth, even exceeding 50% some years. In Brazil, consumption was by far the main driver of growth. However, the contribution that investment makes to growth has fallen in several countries in the region, in line with their current phase of the business cycle.

The key issue is whether this good performance by domestic demand is sustainable, and more importantly, whether domestic demand can offset the slowdown in external demand. First we must consider that, as we have discussed in previous sections, although the region's external scenario has deteriorated, it is far from being critical. Economic activity is expected to slow as global activity declines and credit becomes more expensive, but it is not expected to fall into recession or collapse.

Although in many of the region's economies there is some monetary and fiscal space for additional stimulus to compensate for the temporary external shock, the slowdown discussed earlier is more permanent. Demand stimulus would not be very effective, since following a period of high growth, output gaps have closed in most countries in the region. Most economies are converging to their potential growth, albeit in different ways. Chile, Colombia and Peru, for instance, are converging downwards towards their potential growth from slightly higher levels, while Mexico is converging upwards from a lower level. Uruguay and Panama are also converging downwards, albeit with a much wider gap. Argentina, Brazil and Venezuela, meanwhile, are experiencing a sharp slowdown, with their economies even performing below their potential. Although the recent decline in global demand has sparked a slowdown in the region's growth, in these three countries more structural problems have combined to form supply-side bottlenecks, which have accelerated the loss of dynamism.

Provided that the baseline scenario does not deteriorate, countries that are converging to their potential GDP from an expansionary phase of the business cycle and those that are faced with supply-side bottlenecks could suffer internal and external imbalances if fiscal or monetary stimulus is used to bolster domestic spending. For example, further increases in spending would lead to higher imports, which would make the current-account balance deteriorate further, given the weak performance of exports. With conditions for obtaining financing from international capital markets gradually tightening, there could be problems if current-account deficits continue to expand, especially in Central American countries that already have substantial trade deficits (see previous section). However, the recent currency depreciations could improve countries' trade balances and reduce the need for external financing.

The deterioration of internal and external imbalances preceded many economic crises in emerging markets in the past, especially at times when interest rates were rising in the United States, thus reversing some of the capital flows. These imbalances include

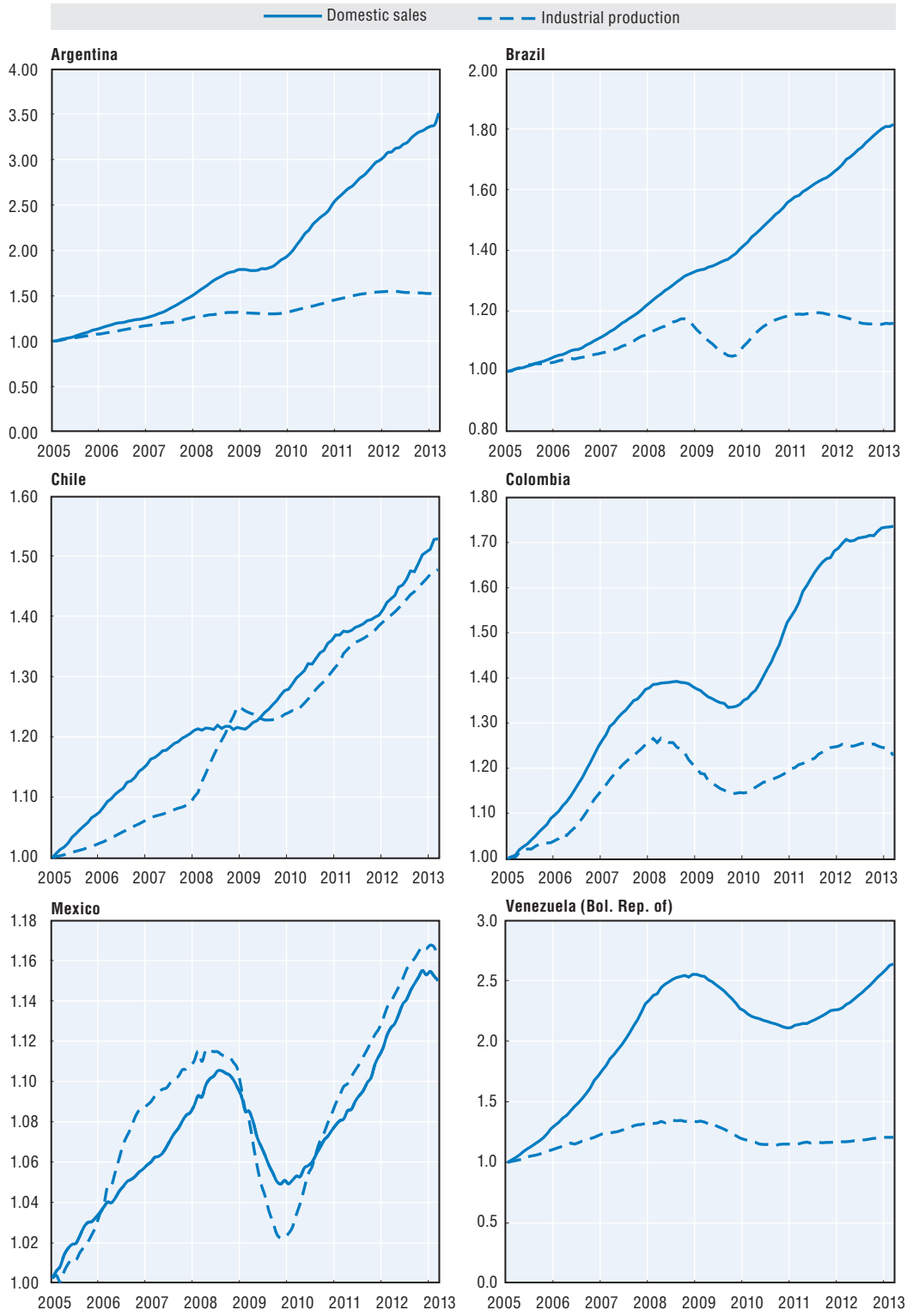
sharp declines in the current-account balance, rapid growth in domestic credit, short-term foreign debt rebounds, financial-asset price bubbles and a substantial appreciation of the real exchange rate. Although the symptoms are not visible everywhere in the region, certain trends should be carefully monitored.

For example, credit relative to the size of the economy has grown rapidly in most Latin American countries in the last ten years (see next section). Another worrying trend in the region is the growing imbalance between tradeable-goods sectors and non-tradeable-goods sectors, which is reflected in a considerable rise in domestic sales and a fall in industrial production offset by higher imports. Mexico is perhaps the exception. This dynamic is explained in part by the appreciation of the real exchange rate, driven not only by the terms of trade but also by capital inflows, particularly in the financially integrated economies of the region. Apart from the vulnerability on the side of the external accounts, the problem is that resources in the economy cannot easily be reallocated once market conditions have been reversed. In other words, this is the flip side of reprimarising export patterns as discussed above (Figure 1.6).

To increase trade in the region, trade barriers must be reduced and poor infrastructure and logistics must be improved.

In this context, efforts to improve productivity and increased diversification opportunities are vital. In particular, there is scope to generate more trade among countries within Latin America because currently trade barriers are high and infrastructure and logistics are poor (Chapter 4). Additional trade could provide impetus for structural change in Latin America's economies. Even when it is restricted, regional trade allows countries to export goods with a higher value added, whether for final consumption or as part of regional value chains. At a time when external demand will remain weak and domestic demand is faced with restrictions in many of the region's smaller economies, regional trade would be a good strategy to add value to exports and diversify them, and to take advantage of the development of the region's larger economies, Brazil and Mexico. This will unquestionably require investment in infrastructure and administrative and regulatory reforms to reduce logistics costs, but it could make some of the sectors currently suffering from the region's poor economic climate competitive again. It is worth noting that, in recent years, many countries in the region have signed bilateral trade agreements with the United States, Europe and Asian countries. Many of these agreements do not allow the countries in the region to add value to their exports, which could hinder integration into global value chains to export to those countries. It would therefore be useful to explore the potential for integration into global production chains offered by regional trade associations.

Figure 1.6. **Industrial production and sales in Latin America**
(domestic sales vs. industrial production)



Note: 12-month moving average. 2005 = 100.
Source: Based on Datastream data.

StatLink http://dx.doi.org/10.1787/888932906407

Financial systems and changes in global capital markets

Amid growing uncertainty surrounding the direction to be taken by the United States monetary policy and its consequences on global liquidity, as well as a slowdown in most Latin American economies, it is important to determine how robust the region's financial systems are to face less favourable conditions. Given the recent major rise in credit in several of the region's economies, it is important to know whether less favourable conditions can create major disruptions if economies are faced with a financial shock or a more severe slowdown in economic growth than expected.

Credit growth in emerging economies has influenced macroeconomic policy in recent years. Credit booms (credit levels that are significantly higher than the long-term trend) increase macroeconomic volatility and vulnerability, and have been associated with periods of inflation and financial instability (Mendoza and Terrones, 2008). The documented correlation between credit booms and economic turbulence and the recent rise in credit to the private sector in several Latin American economies have given rise to a series of studies on the subject in the region.[7] The trend has also attracted greater attention from Latin America's economic authorities.

This section focuses on analysing the credit outlook in four main areas. First, it looks at the main external and domestic factors that have stimulated credit growth. Second, it describes these developments for each type of credit facility and for each Latin American country for which information is available. It then discusses methods for identifying and measuring credit booms. Finally, it discusses macroprudential policy instruments introduced in the region to prevent or soften the impact of credit booms, highlighting certain successful experiences.

The international environment: A source of uncertainty for Latin America's financial systems

The recent increase in international liquidity is due to the expansion of the monetary base in several OECD economies.

International liquidity levels, which are largely determined by the credit conditions in global financial centres, partly explain the credit growth in some Latin American countries. International liquidity has an "official" component, made up of reserves and credit lines among central banks, and a private component, which comes from cross-border transactions among banks and financial institutions. The current increase in liquidity is mainly due to the expansion of the monetary base in several OECD economies as part of an expansionary monetary policy with increasingly limited room for manoeuvre (given that interest rates are at historical lows). In this regard, it is important to note that the United States Federal Reserve plans to curb asset purchases and will probably halt them altogether by mid-2014, but it still has no immediate plans to remove this liquidity and reduce its balance. Past experience has shown that liquidity shocks can have short-term benefits, providing investment credit and driving economic growth. But they can also compromise the financial sector's long-term stability through excessive leverage and price bubbles for some assets (BIS, 2011).

Because different economies are in different phases of the business cycle, and therefore have different interest rates, capital has flowed towards more dynamic economies, such as those of Latin America. Countries in Latin America have maintained

a stable monetary policy with lower interest rates in 2012 and 2013 than in previous periods.[8] For instance, all the central banks of countries with explicit inflation targets, except Brazil's, have frozen their interest rates throughout 2013 as they wait to see what effects the global economy will have on their respective domestic economies. With inflation continuing above the target rate, Brazil's central bank began to increase its overnight rate (SELIC) in April 2013 from 7.25% to the current 8.5%.

Lax monetary policy in OECD economies and relatively high interest rates in Latin America led to significant capital inflows to the region up to the first quarter of 2013. This trend could reverse as industrial economies gradually remove their monetary stimulus, emerging economies begin to experience an economic slowdown and advanced economies improve their economic outlook. This possible reversal of capital flows was exemplified in the recent surge of capital outflows in mid-June when the Federal Reserve announced it would gradually end the QE3 asset-buying programme. In January 2013 market estimates indicated that net capital flows to emerging markets would increase by 5% in 2013 and 6% in Latin America, but forecasts made in June 2013 reflected a 2% decrease in net capital flows in emerging countries in 2013 and a 5% decrease in Latin America (IIF, 2013a and 2013b).

Around 47% of credit booms are linked to excessive capital inflows.

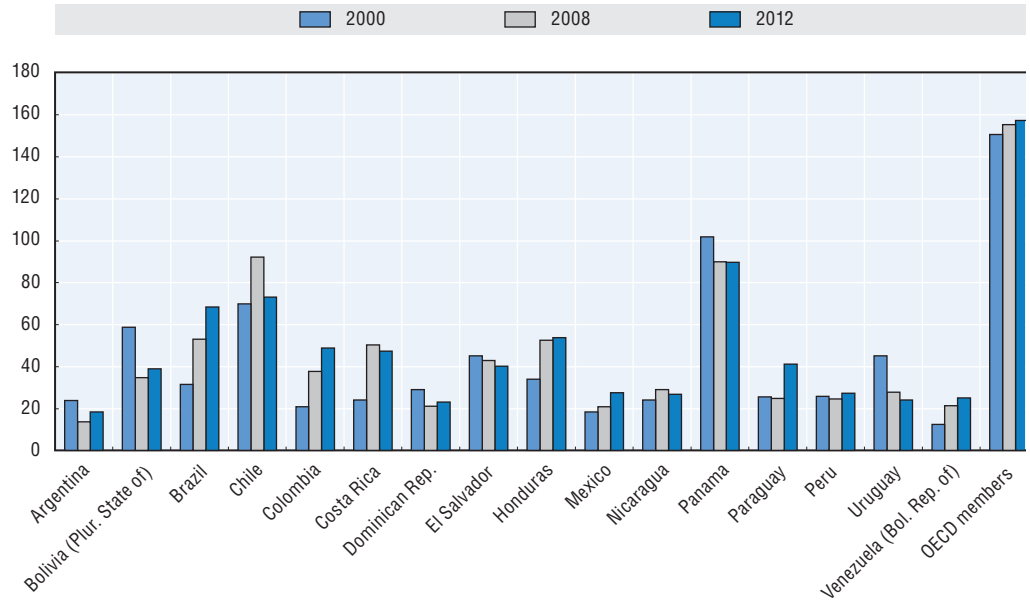
Until the first quarter of 2013, the major risks for Latin America from the expansionary monetary policy adopted by the developed countries of the OECD were associated with the consequences of a significant influx of capital. These risks included strong currency appreciations, excessive leverage by some economic operators and potential economic bubbles in financial or real assets. Capital inflows often involve an increase in obligations to the banking sector. Moreover, around 47% of credit booms are linked to excessive capital inflows, a much higher number than those associated with productivity gains or financial reforms (Mendoza and Terrones, 2012). The performance and financial stability achieved by the region in recent years could be disrupted by three different channels. First, exchange-rate fluctuations could cause problems in countries that still have currency mismatches. Second, there could still be excessive leverage even though the region has lower levels of consumer loans, mortgages and business loans than other regions, as is suggested by the upward trend in some countries. Third, currency appreciations could spark a hike in the prices of non-tradeable assets, as has already occurred in some countries' property markets (e.g. Colombia, Mexico and Uruguay). The extent to which these price increases converge to levels consistent with regional fundamentals is unclear (Hansen and Sulla, 2013).

Contraction of credit in Latin America

Credit as a percentage of GDP has grown in Latin America over the past few years, but the figures vary significantly between one country and another. In Brazil, Colombia, Costa Rica, Honduras and Paraguay, credit to the private sector has grown by more than 10 percentage points of GDP, whereas in Argentina, Bolivia, the Dominican Republic, El Salvador, Panama and Uruguay it has actually fallen. The extent to which the credit expansions reflect a financial deepening or higher leverage is open to discussion. In some countries the strong growth or contraction during the period analysed is the result of the climate that followed major financial crises in the region between the mid-1990s

and the early 2000s. The 1998-99 banking crisis, for instance, caused domestic credit to the private sector to fall from 35.2% of GDP in 1998 to 20.9% in 2000. Although there was a swift recovery, credit did not return to pre-crisis levels until 2007. It is therefore difficult to separate these factors from those that could be indicating excessive growth in credit once again. And despite recent high growth, credit to the private sector in the region remains lower than in OECD countries (Figure 1.7).

Figure 1.7. **Evolution of credit to the private sector**
(percentage of GDP)

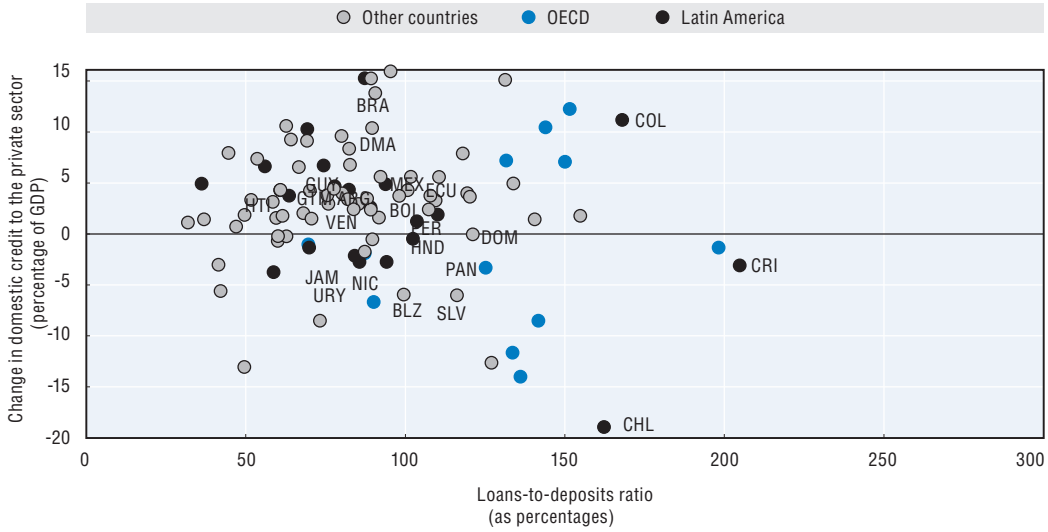


Note: For Costa Rica, 2000, 2008 and 2011 data were used.
Source: Based on information from central banks and the World Bank's *World Development Indicators*.
StatLink http://dx.doi.org/10.1787/888932906426

The ratio of loans to deposits shows that leverage – measured as the amount of credit relative to equity – is on the rise in many countries in the region, albeit with significant differences between one country and another. While Argentina, Brazil, Mexico, Uruguay and Venezuela have a relatively low, albeit rising, ratio of 60-70%, Chile, Colombia and Costa Rica have much higher, albeit falling, ratios of close to 150% (Figure 1.8). The Dominican Republic, Ecuador, Honduras, Panama and Peru lie between the two groups, with similar ratios to those found in other regions. The differences among the three groups illustrate the varying levels of risk aversion in the banking sector, but it is not necessarily the most highly leveraged economies that show symptoms of a credit boom.

The composition of leverage also varies among different countries in Latin America. Overall, mortgage and consumer credit have expanded. As a proportion of total credit, mortgages grew significantly between 2002 and 2012 in Brazil (reaching 11%), Chile (22%) and Peru (12%). Consumer credit, meanwhile, showed strong growth in Colombia, Mexico and Peru, but commercial loans lost ground in these countries. Despite low leverage compared with other regions, the trend in some Latin American countries might suggest that the level of credit has grown at a rate that could not be entirely due to the business cycle and fundamentals. Recent evidence shows there are major differences among Latin American countries in this regard (Hansen and Sulla, 2013).

Figure 1.8. **Growth in domestic credit to the private sector (2008-11) and loans-to-deposits ratio**



Source: Based on data from the *Financial Development and Structured Dataset* (consulted in June 2013) and the World Bank's *World Development Indicators*.

StatLink http://dx.doi.org/10.1787/888932906445

Corporate issues in the region grew by more than 24% in 2012.

The expansion of credit in the region has not just been through bank loans. The corporate bond market and other financial instruments have also issued more credit. Corporate issues (international debt obligations) in the region grew by more than 24% between December 2011 and December 2012. In countries such as Mexico, the increase in the value of corporate (non-financial) international emissions between 2011 and 2012 was close to 34%. Domestic bond issues have also increased considerably in recent years. Between 2011 and 2012, total domestic bonds for the non-financial sector in Colombia, Mexico and Peru increased by 7%, 12% and 42%, respectively (BIS, 2013). Bond maturities, meanwhile, have lengthened significantly in recent years, especially in Brazil, Chile and Bolivia; but in Mexico, 70% of bonds have a maturity of less than a year (Hansen and Sulla, 2013).

Mortgages account for around 16% of total credit in Latin America.

Although credit has increased in some countries, the current context mitigates the risk of a repeat of previous credit booms. First of all, credit expansion in Latin America is of a different nature to that observed in the various OECD economies, especially the United States, in the early 2000s. While in the United States credit was tied to real estate (as collateral), helping to spawn a crisis in the real economy (Mendoza and Quadrini 2009; Kiyotaki and Moore, 1998), in Latin America credit continues to be driven by corporate and

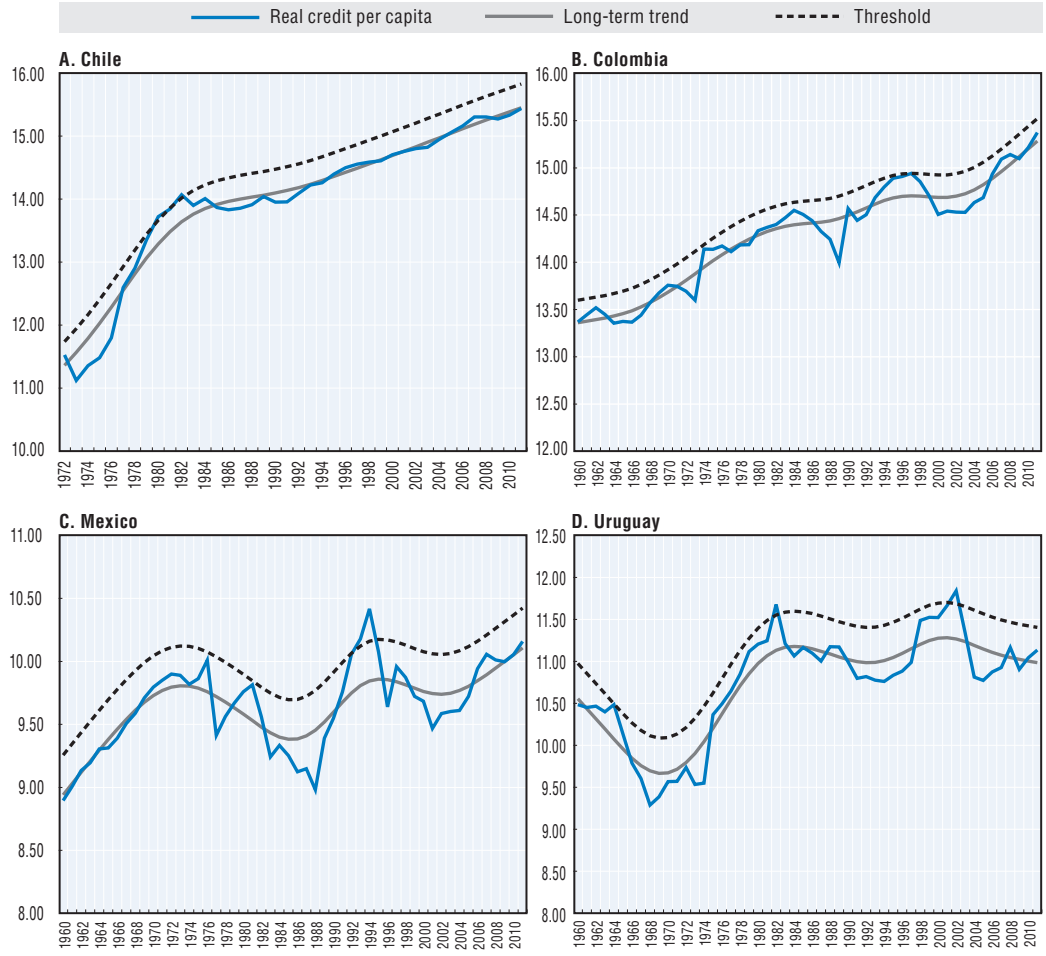
consumer loans. Consequently, if leverage were to become excessive, its effects would propagate in a very different way to what occurred in several industrialised countries. While in countries like the United States, Spain and Ireland mortgages accounted for 30-40% of total credit, in Latin America the figure was 16% on average. These factors suggest that although the level of credit in Latin America is above the long-term trends, the region is not as exposed as some OECD economies. Furthermore, past-due loans in Latin America are relatively stable despite the 2008 financial crisis and the strong increase in credit to the private sector, although they do vary from one country to another, depending on each country's financial characteristics and business cycle. At the turn of the century the region had a higher proportion of past-due loans than OECD countries. But by the end of the decade the situation had reversed because the quality of bank assets in some developed countries (United States, Spain and Ireland) had deteriorated and there was a strong relationship between past-due loans and the business cycle. We should bear in mind that past-due loans are a good indicator of a financial system's state of health, but they do not forecast or predict how a financial system will evolve, since they are usually a lagging indicator of financial health. However, on the whole the region's financial systems have high or sufficient capitalisation and provisions for the total value of credit.

Credit booms in Latin America

Latin America has substantially improved its credit management compared with previous decades. In both public and private banking, management indicators have shown marked improvements. Yet, to properly identify credit booms one must monitor the macroeconomic conditions in which they are most likely to occur. Credit booms are associated with periods of economic expansion, rising equity and housing prices, real appreciation and widening external deficits (Mendoza and Terrones, 2008 and 2012). They have also been associated with deteriorating bank and corporate balance-sheet soundness (Elekdag and Wu, 2011), and in some emerging economies they have had beneficial short-term effects but have compromised the financial sector's long-term stability (Mogliani, 2008).

If credit booms are recognised in time, suitable preventive mechanisms can be put in place. The most common indicators, such as the "threshold method", define a boom as when credit to the private sector exceeds its long-term trend over and above a predetermined threshold.[9] However, these indicators are unable to detect possible credit excesses in the short term (Box 1.2). For instance, the booms in Uruguay in 2002 and Mexico in 1994 (Figure 1.9) were only identified several years after they took place. In some other notable banking crises, such as the ones in Chile in the early 1980s and Colombia in the late 1990s, credit rarely exceeded the thresholds. Used in conjunction with the threshold methods, multivariate models for estimating imbalances in the credit channel allow greater precision and have become more widespread in the region (Hansen and Sulla, 2013). As discussed in the next section, the macroprudential policies introduced in some countries may therefore be more effective because the indicators are fine-tuned and provide valuable information in the short term.

Figure 1.9. **Credit booms in selected Latin American countries**
Credit to the private sector



Note: The data are presented as logarithms.
A credit boom is defined as when credit to the private sector exceeds its long-term trend over and above a threshold. The threshold is normally set at 1.75 times the standard deviation of the cyclical component.
Source: Based on IMF (2013), *World Economic Outlook: Hopes, Realities, Risks, World Economic and Financial Surveys*, April, and national central banks.
StatLink http://dx.doi.org/10.1787/888932906464

Box 1.2. **Estimating credit booms: *Ex post* indicators in real time**

The credit booms in both emerging and advanced economies have commonly been associated with different types of financial crises, including banking crises, exchange-rate crises and balance-of-payment crises. It is therefore important to create suitable indicators so that possible credit booms can be quickly detected and monitored. Yet, creating and measuring these indicators is difficult to achieve. The literature generally uses two methods to identify credit booms: univariate methods, which focus on a credit indicator's fluctuations over time, and multivariate methods, which look at the long-term relationship between credit and other indicators (e.g. deposits).

The univariate methods include the "threshold method", probably one of the most common in the literature on credit booms. This method seeks to separate the trend component and the cyclical component of interest, usually using the Hodrick-Prescott filter. It sets a threshold based on the variation (such as standard deviation) of the difference between the credit series and the trend. The sensitivity of this difference during the period analysed means that credit booms differ depending on the sample. If we add the period since the 2008 crisis to the analysis already conducted using this method for the period from 1960 to 2006, the results change substantially (Mendoza and Terrones, 2008 and 2012). A broader comparison of the various methods used to identify credit booms shows the sensitivity of these results (Table 1.2). Identifying credit booms partly depends on the filter parameters used. For countries like Brazil (1988/89) and Argentina (1982), the different models identify different credit-boom episodes.

The main difficulty with such indicators is that misalignments are not captured by coincident indicators, and are only visible when credit levels exceed their trend for a sustained period. In response to this deficiency, a threshold method was used with a Kalman filter for a group of Latin American countries (Avendaño, Daude and Orozco, 2013). The Kalman filter is a recursive method, so it can give different weights to past data in the credit series. It is a more robust filter because more recent data are given greater weight in the estimation of the trend. However, the threshold remains sensitive to the difference between the actual credit series and the trend. Therefore it is advisable to complete the analysis with multivariate methods.

Multivariate methods have gained ground in the literature on credit booms, as they seek to identify long-term relationships between the level of credit and other factors. A recent study shows that large deviations in the relationship between credit and deposits can indicate vulnerabilities in the credit sector (Sulla and Hansen, 2013). The results show that in some Latin American countries the gap between the level of credit (as a percentage of GDP) and its long-term trend has increased recently. Analysis of transmission channels between credit booms and macroeconomic factors finds that a liquidity shock can be good in the short run but could jeopardize the financial-sector stability in the long run (Mogliani, 2008). Similarly, a study of mortgage credit in Latin America observed no significant misalignments, but did find an increase in mortgage credit in some countries (Cubbedu, Tovar and Tsounta, 2012). Unless this trend persists, it cannot be identified as a mortgage credit boom.

Box 1.2 (contd.)

Table 1.2. **Credit booms in Latin America by identification method (1970-2013)**

	Credit boom peak Mendoza and Terrones (2008)	Credit boom peak Mendoza and Terrones (2012)	Credit boom episodes Gourinchas (2001)	Credit boom peak (OECD)
Argentina	1982		1979 a 1982, 1992 a 1995	1989
Brazil		1989	1986 a 1986, 1988 a 1990, 1993 a 1994	1989
Chile	1981	1980	1975 a 1984	1980, 1982
Colombia	1997	1998	1993 a 1995	1998
Costa Rica	1979	1979	1971 a 1972, 1992 a 1994	1978 a 1980
Ecuador		1997	1977 a 1985, 1993 a 1995	1997
Mexico	1994	1994	1988 a 1994	1993 a 1994
Peru	1981	1987	1981 a 1985, 1990 a 1994	
Uruguay		2002	1980 a 1982	1982, 2002
Venezuela (Bol. Rep. of)	Credit boom at time of publication	2007	1975 a 1978	2007

Source: Authors' calculations based on Avendaño et al. (2013) with data from IMF (2012), *World Economic Outlook*, International Monetary Fund, Washington, DC. and national central banks.

Despite the resurgence of literature on credit booms, there is still no consensus as to the best methodology for identifying them, given the high sensitivity of the indicators, the model and the parameters used. A methodology needs to be perfected that identifies credit booms in real time to prevent their potential effects on the real economy.

Measures of macro-prudential regulation: Achievements and challenges

Latin America has expedited its implementation of macroprudential measures, but it still lags behind other regions.

After several periods of financial instability linked to credit, macroprudential regulation measures in the region have sought to prevent and mitigate the possible effect of a credit boom. Unlike in OECD countries, where credit cycles are shorter, Latin America has experienced short periods of credit expansion. In the Andean countries a credit boom lasts 10.1 quarters on average, compared with 7.7 quarters in the rest of Latin America (Galindo, Rojas-Suarez and del Valle, 2013). Packages of macroprudential measures implemented in the region have used various instruments to try to reduce this vulnerability, including countercyclical capital buffers, dynamic provisioning, and liquidity and reserve requirements. As confirmed by an estimate of the level of implementation of these policies (Figure 1.10), macroprudential regulations vary greatly among different countries in the region. Various macroprudential measures have been introduced only recently, so their effects in the medium and long run have not yet been studied.

Countercyclical buffers offer banks some level of protection against possible credit booms. Experience shows that the effectiveness of these buffers depends on their capacity to activate and deactivate themselves at the right time, in response to the business cycle (Borio et al., 2010). They must also be the right size to absorb shocks without putting too much pressure on the financial system. Ideally, they should act as automatic stabilisers based on systematic rules that the monetary and financial authorities can implement. However, during periods of economic growth, when leverage tends to increase, countercyclical buffers do not necessarily prevent credit expansion. During crises they may even operate procyclically, becoming too active and preventing the use of credit buffers.

Excessive risk-taking by financial institutions in OECD countries during the 2008 crisis showed that microprudential policies are not enough to guarantee the stability of the financial system. They must be accompanied by macroprudential policies aimed at mitigating systemic risks. Developing economies generally have more macroprudential measures than developed economies. Latin America is no exception to the rule, though it has less of such measures than other emerging regions. Nevertheless, since the crisis broke out it has stepped up the pace at which it is introducing them, and it currently has various combinations of macroprudential policies in place. Policies must take into account the context of high liquidity and volatility and the potential positive (lower systemic risk) and negative (credit disincentives) consequences on the real economy.

Policy makers have access to a range of macroprudential policies related to credit, liquidity and capital (Lim et al., 2011). The range of macroprudential measures related to credit include maximum loan-to-value ratios, maximum household debt service ratios, upper limits on foreign-currency loans and limits on credit or credit expansion. One such example is the maximum loan-to-value ratio introduced by Ecuador in 2011 to limit credit over-expansion. On the whole, Latin America lags behind several Asian countries in this area.

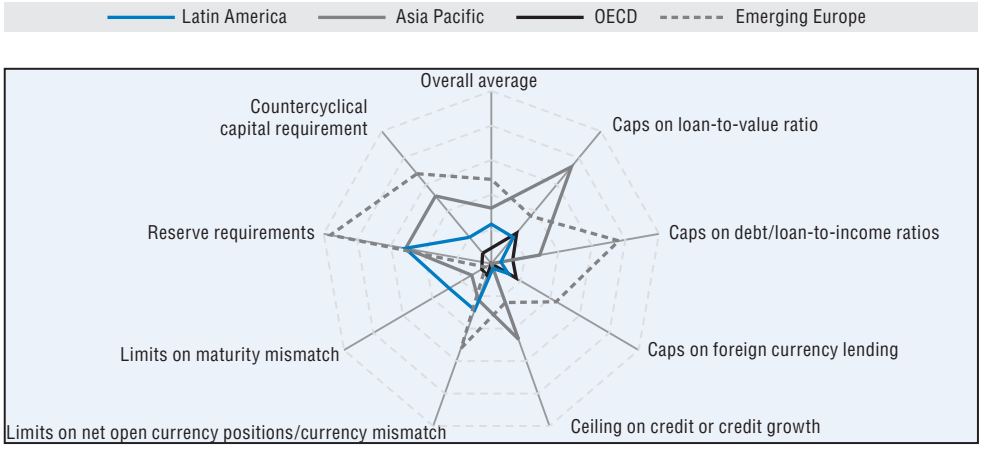
The economies also have a number of measures at their disposal related to liquidity, including limits on net open currency positions, limits on maturity mismatches and liquidity requirements. Colombia introduced liquidity requirements in 2009 entitled "Sistema de Administración de Riesgo de Liquidez" (Liquidity Risk Management System) to measure and control liquidity risk by ensuring that banks were sufficiently financed, certifying that they had enough liquidity to survive any short-term difficulties. These tools are more developed in Latin America than in other regions.

A third group of macroprudential policies available to Latin American countries are those related to capital. This category includes dynamic provisioning, dynamic capital reserves and restrictions on profit distribution. For example, in 2011 Peru introduced a policy known as dynamic capital reserves or "business-cycle core capital requirements", which obliges financial institutions to accumulate more capital reserves than the usual minimum requirements to counteract loan-portfolio losses during an economic slowdown. Brazil and Mexico use similar measures. In this group of macro-prudential policies Latin America is lagging behind other regions.

The number of modalities of capital provision to the banking sector in Latin America has increased, although they vary from country to country. Credit provisions, contingent credit and dynamic provisioning have been implemented by many countries in the region (Galindo and Rojas-Suárez, 2011), but capital requirements vary from country to country. While Argentina, Chile, Ecuador and Mexico have a general provision on credit, other

countries combine general and countercyclical provisions. In some countries (such as Colombia) dynamic provisioning is calculated according to the expansion of each bank's individual credit, while in others (such as Peru) a general macroeconomic rule is used.

Figure 1.10. **Intensity of use of macroprudential policies by region**



Note: The scale goes from 0 to 6, with 6 representing the most intensive use of macroprudential policies and 0 representing no use. The figures for each region are simple averages.
OECD: Australia, Austria, Belgium, Canada, Czech Republic, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom and United States. Emerging Europe: Croatia, Romania, Russia and Serbia.
Source: Based on IMF data.
StatLink http://dx.doi.org/10.1787/888932906483

In summary, few suitable credit indicators are available, which makes it difficult to design and implement the right control mechanisms. Various countries in the region still need to use better indicators to monitor the level and intensity of credit. Although many countries publish their public-sector balance sheets, they still lag behind in the area of transparency and credit to the private sector, which is often dominant.

It is essential to develop real-time indicators that can prevent or taper the consequences of credit booms.

These problems make it even more necessary to create a set of real-time indicators of the level of credit in the region. Although the indicators provided to central banks and regulators, particularly by private banks, have improved, not all countries have systematic indicators of the actual level of credit in the economy and its composition. Because of the experience of OECD countries during the 2008 crisis, when, for instance, in various countries it was difficult to calculate the level of credit held by SMEs, using this type of indicator has become common practice among central banks. How effective a real-time credit-boom indicator is depends largely on whether this kind of information is available. Credit indicators should be just as effective when credit is expanding as they are when it is contracting. In post-boom periods, current indicators do not distinguish between new credit operations and refinancing operations for existing credit, so they can be skewed and disguise a credit upsurge.

Although the evidence is not unequivocal, there is certainly a possibility that credit booms may have occurred in some countries in the region. Though these booms may have a different dynamic from those in OECD countries, this possibility emphasises the importance of studying and monitoring credit booms in Latin America and designing instruments to prevent them. Most existing indicators work a posteriori, so it is essential to develop real-time indicators that can prevent or taper the consequences of credit booms. Such indicators could also be used to bolster the implementation of certain macroprudential measures that would have a major impact on the credit cycle.[10]

Fiscal policy and fiscal space

This section discusses certain aspects of how fiscal aggregates have developed in identifying the fiscal space available, both to increase taxes in response to a decline in external demand and to finance investment in the medium and long run to increase productivity and competitiveness, facilitate structural change and thus increase potential output.

The section begins by analysing the most significant recent trends in the main fiscal aggregates. Next it looks at the availability and development of fiscal space in the region's economies, highlighting fiscal performance and indebtedness. The section then discusses aspects related to access to finance, which is important to cover any temporary spending rises that are necessary and to ensure liquidity. Finally, it discusses some of the tax-policy options available in the region's current macroeconomic scenario.

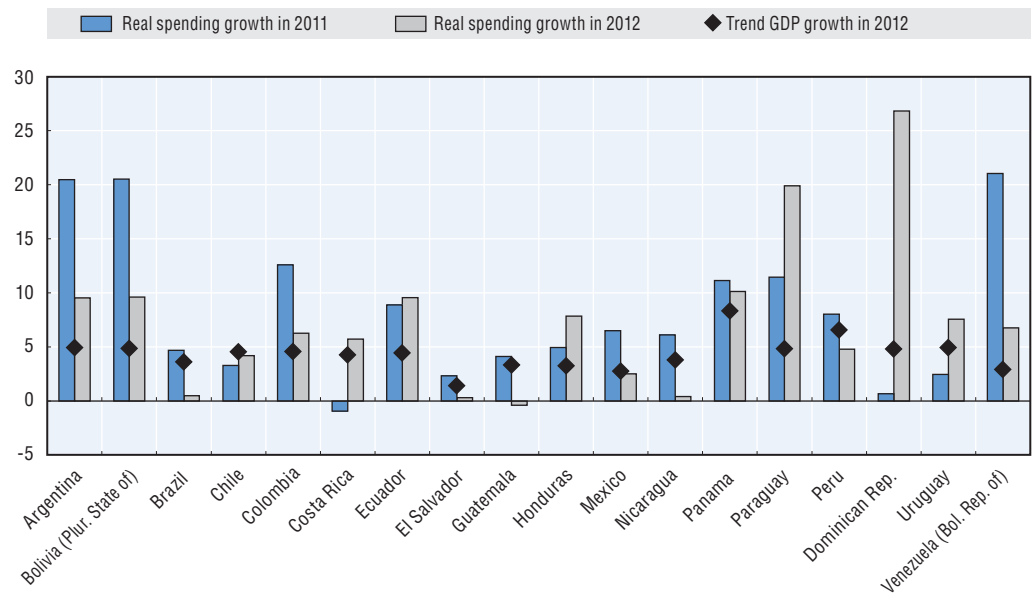
Recent developments in fiscal aggregates: A mixed picture

Central America and the Caribbean both have high debt levels. Central America's debts rose by almost 6 percentage points of GDP and the Caribbean's by more than 8 percentage points between 2008 and 2012.

Fiscal aggregates in the region deteriorated somewhat in 2012. In many countries this was due to a downturn in growth, a decline in commodity prices and, in some countries, a rise in public spending that was greater than the increase in revenue. In Latin America, between 2003 and 2008 central governments' gross debt as a percentage of GDP fell by 29 percentage points of GDP on average (from 61% to 32%). The factors that enable this marked reduction of debt vary from one country to another. Generally, though, there was strong economic growth, high commodity prices and improvements to tax administration. In several countries these factors were supported by prudent spending that increased by less than the rise in tax revenue and potential output, while in others they were supported by negative interest rates in real terms (IMF, 2013). Since 2009, however, gross debt in Latin America has remained fairly stable relative to GDP. This is partly because tax revenue shrank in 2009 and spending rose countercyclically in response to the global crisis, but also because spending rises in 2011 and 2012 were far above the trend growth level and the increase in tax revenue (Figure 1.11). In this regard, it is important to note that debt levels in South America and Mexico – which were a relatively low 29.1% in 2012 and continued to decline between 2008 and 2012 – are generally very different to those in the rest of the region. During the same period, debt in Central America rose by almost 6 percentage points of GDP, while in the Caribbean it grew by more than 8 points. Also, while the debt-to-GDP ratio for Central America and the Dominican Republic was 34.2% in 2012, in the rest of the Caribbean it was more than double, at 76.9%.

Growth in public spending has also varied a lot across the region. While in some Central American countries (Nicaragua, El Salvador, Guatemala and Honduras) spending growth in 2011 and 2012 was in line with their trend growth or just below it, in Ecuador, Paraguay and the Dominican Republic spending growth was higher than their trend growth. Ecuador and the Dominican Republic recorded GDP that was slightly above their potential output in 2011 and 2012, while various economies in Central America, where spending growth was very low, are converging upwards towards their potential output. These differences are partly explained by the fiscal balance and the capacity of countries to obtain financing from the international capital markets. These are indications that for many countries it was easier to act countercyclically during the downturn following the 2009 international crisis than during the the subsequent upswing.

Figure 1.11. **Real growth in public spending and trend GDP growth in Latin America**



Note: Public spending refers to central government, adjusted for each country's consumer price index. Trend GDP is estimated by applying the Hodrick-Prescott filter to the real GDP series, extended with WEO forecasts (April 2013) for the period 2013-18.

Source: Based on ECLAC (CEPALSTAT) data and IMF (2013), *World Economic Outlook: Hopes, Realities, Risks, World Economic and Financial Surveys*.

StatLink http://dx.doi.org/10.1787/888932906502

Government revenue saw a slowdown in growth in tax revenue, and even a slight downturn in the final quarters, as domestic demand (especially consumption) and commodity prices (which have a considerable fiscal impact in some countries) also slowed. However, there were major differences between one country and another in the region. In Bolivia, Colombia, Costa Rica, the Dominican Republic, and Trinidad and Tobago, government revenue grew sharply in the first quarter of 2013. In Bolivia, Colombia, and Trinidad and Tobago this additional revenue was fuelled mainly by non-tax revenues from oil and gas, while in Costa Rica and the Dominican Republic, the main source of additional government revenue was tax adjustments made in 2012 to reduce the fiscal deficit. The mineral-exporting countries (Chile and Peru) have seen their revenue fall as a result of declining international mineral prices (ECLAC, 2013).

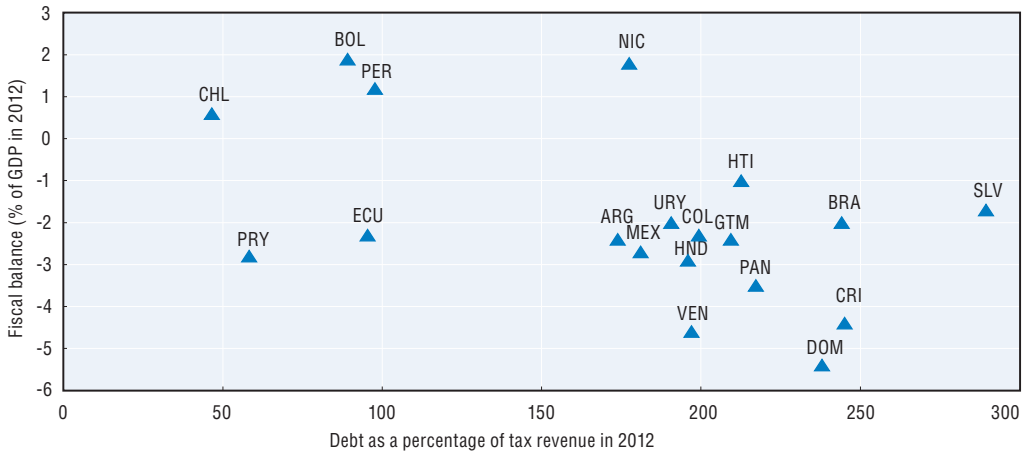
The changes in income and expenditure have resulted in an overall reduction in government revenue in most of the region's economies. In South America and Mexico, for instance, only Colombia managed to improve its fiscal balance – and only slightly – between 2007 and 2012. All other economies have seen their fiscal balance worsen. Although this deterioration was only moderate (-1.6% of GDP in 2012 for this group of countries), the overall fiscal balance is 2.3% of GDP lower than it was in 2007. The Caribbean is even more vulnerable, because apart from their high debt levels, their fiscal deficit has widened from 2.0% of GDP in 2007 to 3.5%. Central America, meanwhile, lies between the two groups, with a deficit of 2.4% in 2012, compared with 0.5% in 2007.

Differences in the fiscal space available for countercyclical policies

Countries with good fiscal balances and low debt have fiscal space to respond countercyclically.

Generally, current debt levels in the region are sustainable under the baseline scenario described earlier and if the scenario deteriorates slightly, but some countries' vulnerabilities have grown substantially. The countries fall into three groups in terms of their fiscal space to respond to any shocks in aggregate demand that would justify a countercyclical fiscal policy, or even to declines in growth that would justify allowing automatic stabilisers to operate. The first group is the commodity-exporting countries of South America that have fiscal surpluses and low debt (Chile, Peru and Bolivia). Those countries should have sufficient fiscal space to respond countercyclically without compromising their fiscal solvency, even if commodity prices fall a little more. The second group consists of several Central American and Caribbean countries that are in more difficult situations (especially Dominican Republic and Costa Rica), with large fiscal deficits and high debt-to-revenue ratios. To put their situations in context, in 2012 Spain and Portugal had fiscal deficits of 10.6% and 6.4% of GDP, respectively, and debt-to-revenue ratios of approximately 194% and 301%.[11] Several Latin American countries have similar debt figures, and need to draw up a strategy to make the government finances less vulnerable. The final group is formed by countries with an intermediate position between those of the other two groups (Figure 1.12).

Figure 1.12. **Indicators of fiscal solvency in selected Latin American countries**



Source: Based on ECLAC (CEPALSTAT) data.

StatLink http://dx.doi.org/10.1787/888932906521

Although there has been a very clear reduction in the size of many countries' fiscal space, Argentina, Bolivia, Panama, Paraguay, Peru and Uruguay drastically reduced their debt-to-GDP ratio between 2007 and 2012 (by more than 10 percentage points of GDP in several countries). This divergence between fiscal balances and debt is the result of a series of factors, including currency appreciation and lower effective interest rates compared to the rate of GDP growth. The question that must be asked then, is whether these valuation effects that have been so effective in reducing debts are permanent or temporary. The normalisation of interest rates in the United States and the slowdown in growth in the region should close the gap between interest rates on debt and economic growth, and should cause currencies to depreciate. Both of these will have negative effects on public finances, although in most countries these effects will be dampened by the current composition of public debt.

Contingent credit lines and reserves are instruments that can be used when the financial markets are drying up.

The main concern for many countries from a fiscal perspective is related to access to finance in the event of a sudden stop in their current account, since most countries are currently running a deficit. In the short run, they should consider using instruments such as contingent credit lines or hold liquid assets as reserves to survive the drying-up of the financial markets. For these reasons several countries have a much lower net debt than gross debt. Brazil, Chile, Peru and Uruguay, for example, have liquid assets in foreign currency worth between 15% and 20% of GDP. These stocks would, in particular, mitigate the risks associated with sudden changes in the capital markets that could reverse capital flows. However, since many of these assets come from sterilised interventions in the foreign-exchange market rather than from current-account surpluses, the large difference between international rates in dollars and local rates in local currency mean that this asset accumulation sometimes has a quasi-fiscal cost that is not negligible.

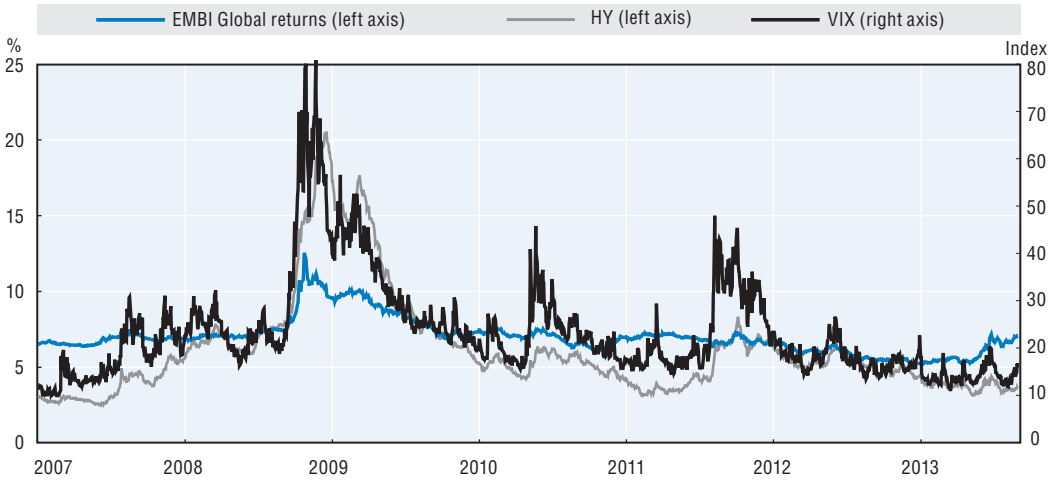
Commodity-exporting countries, particularly those that export non-renewable resources and rely heavily on export prices for their revenue, need to determine how strong and persistent the current price decline will be, as this will affect how they use fiscal policy in response. If the decline is only in the short term, they can rely mainly on debt to alleviate the temporary fluctuations in tax revenue. However, if the decline is more permanent, they will need to diversify their sources of income in the medium term to compensate for the lasting decline in revenue from the sale of commodities.

Access to finance

Latin America's conditions of access to international capital markets in 2013 are still fairly good, even for several of the countries with balance-of-payment problems. For example, in April 2013 the Dominican Republic issued 10-year bonds worth USD 1 billion[12] at a yield of 5.86%, while Costa Rica issued 10-year and 30-year bonds worth USD 500 million at a yield of 4.5% and 5.75%, respectively. In early 2013 Paraguay and Honduras used the private international capital markets for the first time, each issuing bonds worth USD 500 million at favourable rates: 4.625% for Paraguay and 7.5% for Honduras. These lower rates of return are not just explained by better domestic macroeconomic fundamentals, but also global factors, such as the still abundant international liquidity generated by the expansionary policies of central banks in the

advanced OECD countries and a greater risk appetite among international investors. As noted earlier in this chapter, the recently announced change in direction of US monetary policy has already affected Latin American bonds, whose yields have risen slightly since mid-June (Figure 1.13).

Figure 1.13. **Latin American yields and global risk aversion**



Note: VIX refers to the Chicago Board Options Exchange Market Volatility Index.
HY refers to the risk premium of non-investment-grade US corporate bonds vs. US Treasury bonds.
EMBI Global returns refers to the rate of return of bonds issued by Latin American economies in US dollars and US Treasury bonds, as calculated by JP Morgan Chase.
Source: Based on Datastream data.
StatLink http://dx.doi.org/10.1787/888932906540

Macroeconomic policies have a significant effect on market-access conditions. Despite the important role that global factors played in reducing the yields of bonds issued by emerging markets, in countries with stable access to capital markets (investment grade) there is evidence that investors continue to discriminate among countries based on their fiscal solvency. For these countries there is a tight relationship between changes in the debt-to-GDP ratio and changes in sovereign risk as proxied by each country's spread (Figure 1.14).[13] This is significant, as it shows that prudent macroeconomic policies improve financing conditions. This finding is consistent with the evidence that in recent times the common factor in spread changes has become less relevant than it was during 2003-07 and during the actual crisis (Box 1.3).

Box 1.3. **The relative importance of domestic fundamentals and global factors in Latin American sovereign spreads**

With the aim of shedding light on the effect that the future normalisation of international interest rates will have on the borrowing costs of Latin American countries, this box discusses the relative influence of domestic fundamentals and global factors – such as the risk appetite of international investors and international liquidity – on recent sovereign-spread changes in the region.

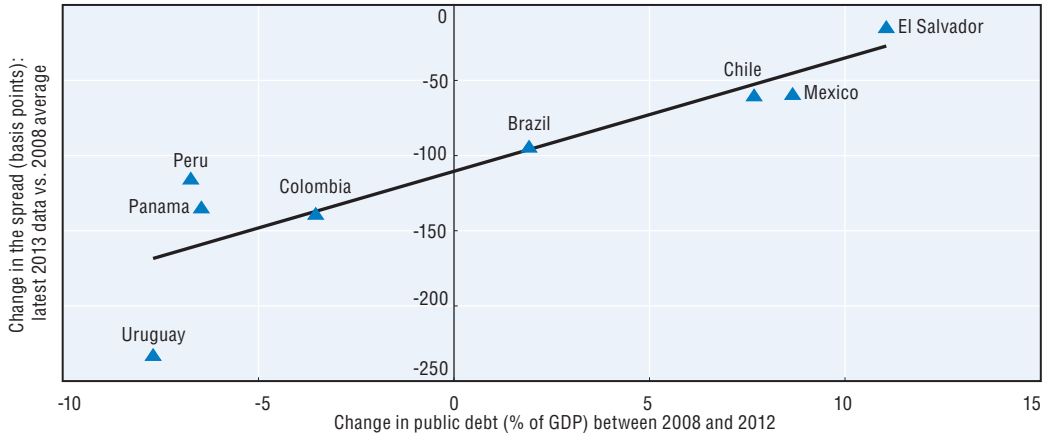
One approach to the subject is to analyse co-movement among the spreads. A principal component analysis shows that for the 2003-07 period more than 84% of daily spread change was down to a single common factor (the first principal component). By contrast, between 2010 and July 2013, the single common factor accounted for only 54% of spread change.[14] This first piece of data thus suggests that although the common factor is still relevant, it has become less so in recent years.

Another approach is to estimate the long-run relationship between spread levels, economic fundamentals and global factors, as well as short-run dynamics. A panel error-correction model can be used to study spread changes in emerging economies, as proposed by González-Rozada and Levy Yeyati (2008). Spread fluctuations may depend on simultaneous exogenous factors such as global risk appetite and international liquidity levels (González-Rodaza and Levy Yeyati, 2008). An analysis was carried out using the model designed by González-Rosada and Levy Yeyati (2008) with data up to the first quarter of 2013. The explanatory variables used were Standard & Poor's ratings (as a proxy of macroeconomic fundamentals), the performance of high-yield bonds and the performance of ten-year treasury bonds. The results for this period show that the factors that explain the spread changes are similar to what they before 2008. These factors may account for 50% of spread changes in the long run and 14% in the short run.

A third method is to separate the influence of global and local effects on spreads in developed economies using panel regressions (Csonto and Ivaschenko, 2013). Csonto and Ivaschenko (2013) found that spreads depend on both local and global factors in the long run, but mainly on global factors in the short run. Countries with more solid economic fundamentals therefore tend to be less vulnerable to external changes. The model used can only explain about half of the changes that occurred in the lead-up to the 2008 crisis; the other half were due to imbalances generated by the crises of the 1990s and early 2000s. Csonto and Ivaschenko (2013) conclude that, in general, in periods of severe market stress, global factors tend to drive changes in spreads.

Using the long-run model to decompose spread change, we find that between early 2010 and July 2013 spreads in the region fell by only 20 basis points, whereas the model predicted a fall of about 40 basis points. About half of this fall (49%) was due to a better debt rating, while the other half (51%) was due to global factors (55% was due to the high yield, while interest rates in the United States made a negative contribution of 4%). So, both fundamentals and global factors have affected spread changes.

Figure 1.14. **Change in indebtedness vs. change in pre- and post-crisis spreads in countries with access to capital markets**



Source: Based on ECLAC (ECLACSTAT) and Datastream data.

StatLink http://dx.doi.org/10.1787/888932906559

Countries should obviously make the most of the favourable conditions to improve their debt profiles, reducing maturity, currency and interest-rate risks. Several sovereign-debt management offices are making the most of the exceptionally low interest rates for finance. Even for countries that need to adjust their fiscal balances, this could be a good time to reduce the cost of this adjustment. However, it is important to note that solvency is not guaranteed in several countries in the region, so a fiscal expansion by increasing the debt would not be helpful in those countries, especially when there could be a sudden increase in global interest rates due to uncertainties associated with the withdrawal of monetary stimulus in the United States. If, then, the scenario worsens, economies with liquid assets, low debt and high market credibility will be in a position to adopt countercyclical fiscal policies, but economies with different circumstances will have less leeway to do so. However, one factor that could reduce these difficulties is the growing bilateral financing that many economies in the region are receiving from China.

Average tax revenue is 19.5% of GDP in Latin America, compared with more than 33% in OECD countries.

Apart from the cyclical need to rebuild the fiscal space, in the medium run most countries in the region also need to take measures to expand their fiscal space by introducing fiscal reforms to gradually increase tax revenue. Such measures include setting up institutions and rules to steer government revenue towards high-yield projects. Given this objective, it is also good that several countries in the region appear to be attempting to isolate the investment component from public spending cuts throughout the cycle (ECLAC, 2013). Average tax revenue is 19.5% of GDP in Latin America, compared with more than 33% in OECD countries. The major deficiencies in infrastructure and logistics that are currently a major obstacle to economic growth therefore clearly require additional financial effort by the public sector. The most obvious measures include tax rules that can create the necessary fiscal space to offer investment a framework of stability. For example, Peru's recent experience with a fiscal rule that set ceilings on

fiscal deficits and on current-expenditure growth shifted the balance of the government budget towards investment, which had been in a lull since the 1980s (Carranza, Daude and Melguizo, 2013). Another notable strategy was Colombia's decision to earmark a proportion of royalties from commodity production to improving the competitiveness of sectors and regions that did not benefit directly from the bonanza (OECD, 2013d).

Nevertheless, most countries must accompany such measures with reforms to increase tax revenue by making tax collection more efficient, broadening tax bases or raising taxes. This endeavour is further complicated by the need to provide better services and greater transparency in how the resources are managed, given the low tax morale in many countries in the region. Fiscal policy can thus be made more effective if it has the backing of credible, transparent institutions.

Conclusions and recommendations

Latin American economies will have a less favourable global context in terms of external demand and commodity prices. Their external financing will be subject to risks and uncertainties, particularly because of the volatile international capital markets as the United States normalises its monetary policy. On average, the region has moderate external financing needs and its composition of assets and liabilities mitigates the risks of balance-of-payments problems. However, this average hides great differences from one country to another. While some commodity-exporting countries of South America confront these risks from a solid standpoint, others, especially in the Caribbean, have considerably more restrictions. The situation is similar with the fiscal space available for countercyclical action if there is a further deterioration in aggregate demand. Although fiscal balances have deteriorated in many countries in the region, some countries have been able to reduce their indebtedness thanks to favourable debt levels and valuation effects.

In recent years, Latin America's financial systems have benefited from strong international liquidity, leading to major credit expansions in several countries in the region. However, the normalisation of US monetary policy, the slight slowdown in the region's growth and the more positive outlook in advanced economies could create greater volatility and uncertainty and exert considerable pressure on Latin America's domestic financial systems. Since past experiences show that liquidity shocks can stimulate the economy in the short run, but also hurt financial-sector stability in the long run, it is necessary to monitor the robustness of the region's+ financial systems and to take appropriate measures to safeguard it. Suitable indicators for systemic risks and systems for monitoring credit should be designed and macroprudential measures should be taken to prevent and mitigate any financial stability problems resulting from excessive credit expansions. Several countries in the region have made progress in this area, but the region as a whole is still lagging behind other regions.

Unless economic policies change to help accelerate long-run growth, the current scenario will result in slower growth than in the 2000s. Chinese growth has enabled the commodity-exporting economies to improve their terms of trade, among other benefits. However, because these economies have over-concentrated exports in the Chinese market and reprimarised their exports, they are now faced with a new risk that the Chinese economy will slow down more than expected. The commodity-exporting countries therefore need to adopt policies geared at diversifying and increasing the value added of their exports, and closing the productivity gaps within and among sectors of

the economy. Chapters 2 and 3 of this report offer some recommendations in this regard. Meanwhile, in several of the region's economies domestic demand has been the main driver of growth in recent years. However, this process is facing some limitations, such as a slowdown in the labour markets and wages, a contraction of credit, and greater current-account restrictions. Some policy options to sustain growth include greater regional integration, as well as improvements in international competitiveness through the cutting of logistics costs. These areas are analysed in greater depth in Chapter 4.

This slowdown in growth comes at a critical time for the region from a social-dynamics perspective. After a decade in which economic growth was accompanied by a substantial reduction in poverty and improvements to certain inequality indicators, the rise of the so-called emerging "middle classes" represents a challenge for government policy. In addition to the new demands for public services from the "middle classes", public policies must provide growth in a way that also improves the market distribution of income in the long run. Therefore, the production structure must create opportunities of more productive employment for broad sectors of society.

Notes

1. This chapter analyses the macroeconomic risks associated with a downturn in external demand from China; other aspects related to trade relations with China that influence the trade patterns and long-term growth of Latin American economies are dealt with in Chapter 2.
2. These projections are very close to the average growth of 8.4% forecast for the same period by the IMF (2013).
3. According to figures published by the Institute of International Finance (IIF), the size of so-called shadow banking has quintupled since 2009, reaching more than USD 1 trillion (8.4% of total bank deposits). Shadow-banking transactions are not subject to prudential regulation or rate controls.
4. The QE3 programme involves expanding the monetary base in exchange for the purchase of mortgage-backed corporate bonds with the aim of stimulating the economy.
5. The IIF estimates that emerging economies will receive private inflows of USD 1.145 trillion in 2013, representing a drop of nearly USD 40 billion from the amount collected in 2012. In 2014 they are expected to decline again to USD 1.112 trillion.
6. An exception would be Brazil, where inflation recently rebounded and depreciation could exert additional pressure on prices.
7. The number of credit booms in emerging economies has also increased in the last two decades, especially in Southeast Asia (IMF, 2013).
8. Between 2007 and 2013 the Federal Reserve increased its balance from 7% to 20% of GDP, while the European Central Bank increased its balance from 13% to 28%.
9. Gourinchas, Valdes and Landerretche (2001) implement this methodology, calculating the trend using the Hodrick–Prescott filter and defining the threshold in terms of probability of occurrence. Mendoza and Terrones (2008 and 2012) refine this methodology by using country-specific thresholds. The threshold is normally set at 1.75 times the standard deviation of the cyclical component.
10. See Guarin et al. (2012).
11. The traditional debt-to-GDP indicator is lower in these Latin American countries than in Spain and Portugal. However, past experience shows that the region has major technical and political problems that make it difficult to increase tax revenue. Therefore, rather than confiscating more resources to pay off their debts, Latin American countries have historically preferred to restructure their liabilities. The debt-to-revenue ratio is therefore a much better indicator of fiscal solvency problems.
12. Equivalent to a third of the projected deficit for 2013.
13. For the eight investment-grade countries in the region, the simple correlation coefficient between these two variables is 0.87, which is statistically significant at conventional confidence levels
14. This analysis uses spreads (JPMorgan EMBI Global) from 11 countries for which data was available for the entire period: Argentina, Brazil, Chile, Colombia, Ecuador, El Salvador, Mexico, Panama, Peru, Uruguay and Venezuela.

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CHAPTER TWO

Latin America and shifting wealth

Summary

This chapter analyses how economic development in Latin America is being influenced by the contemporary global context, in which global wealth is shifting towards emerging economies. It begins by explaining the main characteristics of this shift, in which China is playing a key role. It then assesses Latin America's role in the process and some of the consequences that the shift is having on the region's development model. The new global economic context is shaping an environment that makes it particularly difficult for Latin America to continue its structural transformation, overcome the middle-income trap and make its growth more inclusive. Finally, faced with the prospect that the global scenario will not change much in the near future, the chapter proposes various policy options to enable international integration in a way that fosters the region's development: creating a more diversified production structure, enlarging the regional market, and capturing value added in the production chain.

Introduction

The relative weight of non-OECD economies in the global economy will increase from 49% in 2010 to 57% by 2030.

The contemporary economic climate is characterised by a global wealth shift towards emerging economies. This shift began when China and India began to open up their economies in the 1990s, and has gathered steam since the turn of the century. The size of these economies, in conjunction with their rapid, sustained growth and their strong demand for natural resources, has supported growth in many emerging and developing economies. As a result, emerging economies are increasing their relative weight in the global economy. In 2000, non-OECD economies accounted for 40% of the global economy, but by 2010 the percentage had risen to 49%, and it is projected to rise to 57% by 2030 (OECD, 2010a). Similarly, trade and financial flows are becoming a larger part of emerging economies. South-South trade grew from 25% of global trade in the mid-1990s to 41% in 2011, while the proportion of total world foreign direct investment (FDI) flowing to emerging economies rose from 20% in 2000 to more than 50% in 2010. These changes clearly reflect a shift in the balance of the global economy towards emerging economies.

This chapter analyses Latin America's role in this shift and its consequences on Latin America's development model. The rise of large emerging Asian economies has had a mixed bag of consequences for Latin America. Commodity exporters have benefited most but the effects have been less positive for economies poorly endowed in natural resources. Besides this difference, the new global economy has placed most Latin American countries in a context that makes it difficult for them to pursue their structural transformation. This situation leaves the region under the influence of some of its pressing problems, especially the middle-income trap. This development trap describes the situation in countries whose growth stagnates after they have become middle-income economies (Eichengreen, Park and Shin 2011; Kharas and Kohli, 2011). Given this predicament, integrating into the global economy to enable more inclusive growth has become a priority with a view to justifying the region's development model economically and socially.

This chapter is divided into four sections. The first section defines the main characteristics and the phases of the global wealth shift to the East and the South, with China being a key protagonist. The next section analyses Latin America's contribution to this process, attributing a secondary role to the region in creating new economic centres of gravity, at a time when the economic environment makes it difficult for the region to pursue its structural transformation. The third section defines the still-incipient second phase of the global wealth shift, which is marked by structural changes in the Chinese development model. It also discusses the consequences of this new phase for Latin America's future development. The final section looks at some of the options available to the region in terms of its production structure in a context of changes and profuse challenges.

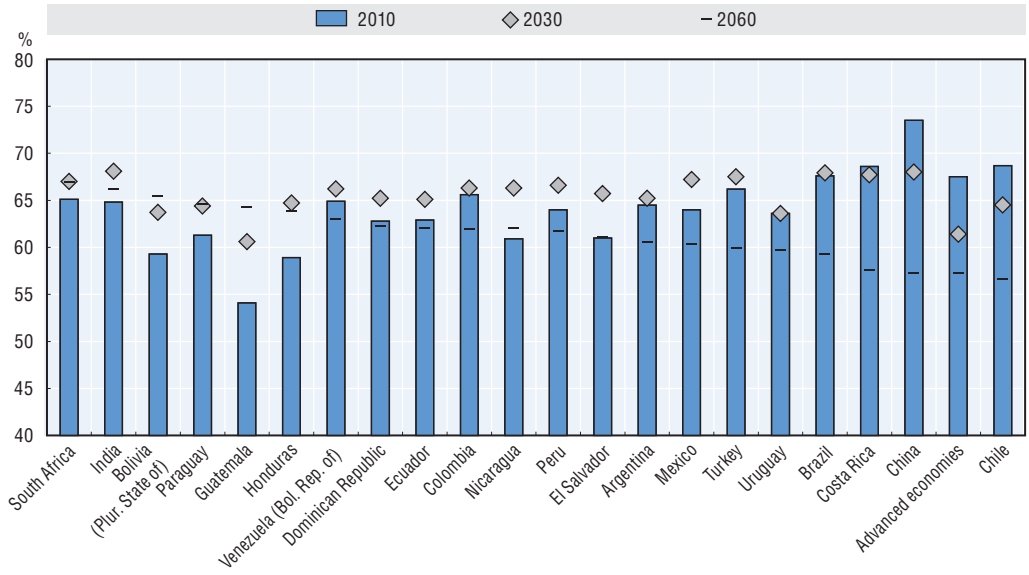
Shifting wealth: Main features

This section sets out the main characteristics of the global wealth shift towards emerging economies. There are three hallmarks that define this process: a favourable demographic dividend in many of the emerging economies, the rise of a new middle-class in those economies, and China's leadership.

Demographic dividend in emerging economies

The positive demographic dividend in many emerging economies plays a significant role in shifting wealth. In many of these countries, economic development is bringing down the birth rate, which, coupled with a youth bulge, reduces dependency ratios (CELADE, 2008; Johansson et al., 2012). The scenario in the OECD countries is the complete opposite, with an ageing population and dependency ratios that are gradually increasing.

Figure 2.1. **Active population (current and projected)**



Note: Working population as the percentage of the population of 15- to 64-year olds. Actual data from 2010 and projections for 2030 and 2060.

Source: United Nations (*World Population Prospects 2012*).

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Forecasts up to 2060 predict an overall decline in the percentage of the population that are potentially active in most economies (Figure 2.1). However, the varying speeds of this decline from one country to another will further cement the growth differentials between emerging and advanced economies. Advanced economies are forecast to see their active population shrink sharply and continually to 57% of the total population by 2060. Among emerging economies, China – like the OECD economies – lacks a demographic bonus. The active population in China is currently at a record level, but is forecast to shrink to around the OECD average by 2060. In Latin America, the active population will grow for at least the next twenty years before shrinking, albeit with different trends from one country to another. The Latin American countries enjoy a demographic bonus, but not as relevant as India and South Africa, where the active population will remain about the same throughout the forecast horizon.

In principle, demographic differences between advanced and emerging economies facilitate shifting wealth without radical changes to factors of production. The demographic dividend in many emerging economies, especially the larger ones (India), facilitates the multipolar nature of this wealth shift. Also, thanks to the demographic factor this shift can take place without drastic changes to factors of production or productivity. Therefore, a progressive increase in labour input and a moderate rise in productivity are sufficient to produce this growth differential between emerging and advanced economies (Johansson et al., 2012). However, it is important to stress that this link between demographic bonus and growth is in no way guaranteed. Though China has no demographic bonus, it is actually one of the most dynamic economies and a fundamental part of the wealth shift. Meanwhile, some regions that do have a demographic bonus, such as Latin America, have performed less well. Stepping up investment and diversifying the economy are essential to ensure that the increasing active population is provided with jobs that sustain or increase aggregate productivity.

The new middle classes

The "middle classes" in emerging economies will increase from 55% of total in 2010 to 78% in 2025, and have therefore become an important foundation for further economic development.

The growth of middle classes in emerging economies is another important factor in the shift in the centre of gravity of the global economy towards those countries. Income convergence in a number of emerging economies has reduced absolute poverty levels[1] and increased the size of the middle classes. This transition is set to continue, enabling middle-income strata in emerging economies to drive the global growth of the middle classes.[2] The middle classes in these countries will increase from 55% of the total middle classes in 2010 to 78% in 2025, while their contribution to overall spending will climb from 35% to 60% (Kharas and Rogerson, 2012). A larger middle class with greater purchasing power will therefore lead to profound changes in demand patterns. These factors boost growth, making the middle classes central to the further development of emerging economies on both the income side and the consumption side.

The middle classes' capacity to sustain economic development is by no means guaranteed, given their vulnerability. First, their development could be compromised by high inequality in the distribution of national income. Periods of strong growth such as the current one among emerging economies can significantly widen income inequalities to an extent that eclipses improvements to absolute poverty levels. Some emerging economies that have been converging to advanced economies' income levels have been unable to improve their relative-poverty indicators[3] and/or their inequality indicators (OECD, 2010a). Economic growth is not inclusive in those countries, leaving the middle class vulnerable to economic shocks and susceptible to a return to their previous levels of poverty.[4]

In addition to its distributional bias, the development model's sustainability is a further source of vulnerability for the middle classes in emerging economies. These groups normally develop in middle-income countries, where a rise in per capita income has been bolstered by factors that typify early-stage economic development. Examples include urbanisation, the reduction of the agricultural workforce, and the adoption of cutting-edge technology. However, the arrival of middle-income levels often comes hand in hand with exhaustion of these sources of development. In reinventing their

development model, many of these countries have troubles that lead per capita income to stall, a phenomenon that economics literature has dubbed the middle-income trap (Eichengreen, Park and Shin, 2011; Kharas and Kholi, 2011). In short, countries that are home to many of these new middle classes often face a major development dilemma that compromises the stability of these social groups.

Public provision of services often lacks the capacity to adapt quickly to the population's expectations, creating an additional source of friction between society and state.

In this context, the emerging middle classes place new demands on policy makers. Rapid economic growth in emerging economies can undermine social cohesion if it is unsustainable, or if its benefits are distributed asymmetrically. In many emerging economies, the public sector has a very limited capacity to tackle this situation. Such economies typically have a low capacity to redistribute income through the tax system or a welfare system (pensions, unemployment benefits) with poor coverage. This is coupled with the changing demand patterns of the middle class, which gives more weight to discretionary expenses such as transport and education. Public provision of these services often lacks the capacity to adapt quickly to the population's expectations, creating an additional source of friction between society and state. Governments that fail to respond properly to this new reality are vulnerable to social turmoil, as seen in the large-scale protests in many emerging countries in recent years.

China's leadership

A key feature of shifting wealth is China's leadership. China's growth has benefited from highly dynamic investment and a sectoral factor reallocation. Strong growth in investment has enabled capital to increase its contribution to economic growth, reaching record levels in the last few years.[5] Furthermore, because agriculture's share of jobs remains high, at around 35%, there is ample scope for this sector to fuel factor reallocation towards industry and services.[6] These two factors give China a unique combination of scale and growth, allowing the country to become an engine for shifting wealth. China's strong growth has been identified as the cause of growth in many emerging economies, which are pulled along by the Asian giant (Garroway et al., 2012).

China's role means that changes in its development model can help us to identify different phases of the wealth shift. The first phase is marked by the integration of China and India into the global economy, starting in the 1990s. This integration brought two billion workers into the global economy, most of whom had basic skills, bringing down the world land/labour ratio (OECD, 2013a). This lower ratio has made many manufactured goods and services cheaper and more accessible to many developing countries; it has also improved the terms of trade of commodity-exporting countries. Both these factors have helped boost growth in a wide range of emerging and developing economies (OECD, 2010a).

The second phase of the wealth shift is still at an embryonic stage, and like the first, it has China as its main protagonist. It involves a shift in China's sources of growth away from investment and towards domestic consumption (ECLAC, 2012a). This change is supported by a growing middle class and will bring major changes to the demand pattern. The second phase will also gradually change the country's production structure, which will be steered towards knowledge-intensive and technology-intensive industries

and away from the current specialisation in labour-intensive industries. In turn, these changes will have repercussions on other countries' opportunities to join the global economy.

China is maintaining its leadership in the emergence of a new economic centre of gravity according to all references and variables used. Whether we consider stock variables (such as net international investment position) or flow (contribution to world growth), China leads the way in shaping this new economic scenario (OECD, 2010a; ECLAC, 2012a). It comes as no surprise, then, that all the literature sees China as a leading player in the wealth shift, particularly in terms of its contribution to world growth[7] and its possible rise to become the world's leading economic power.[8]

Latin America's contribution to shifting wealth

This section analyses Latin America's role in shifting wealth and some of its consequences for the region's development. It begins by outlining Latin America's contribution to the shift towards emerging economies. Though it has enjoyed a long expansionary cycle, Latin America's contribution to the process is fairly modest, especially compared with Asia's. The second part of this section looks at how the wealth shift is hindering the region's structural transformation by encouraging a type of trade specialisation that has not helped the region build its productive capabilities. The resulting scenario makes it difficult for the region to break free from the middle-income trap.

Latin America's contribution to world growth has not advanced from its position in the early 1990s, remaining at around 8-9%.

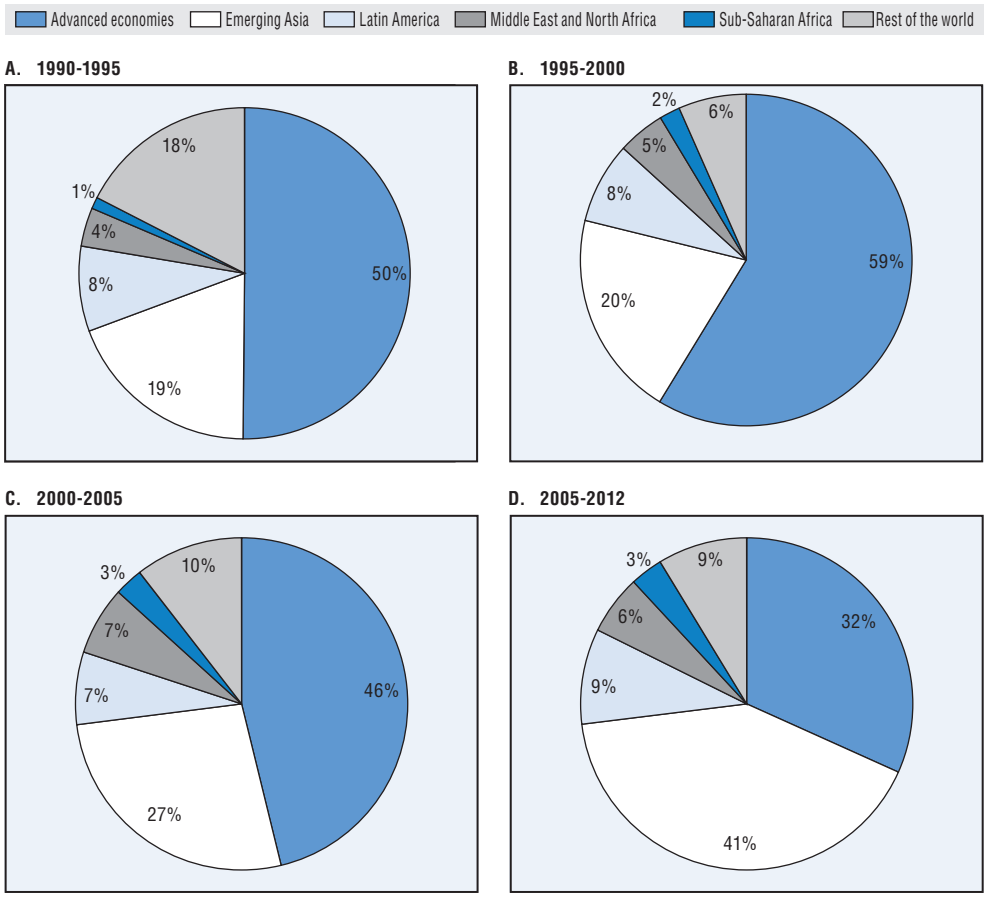
Compared with Asia, Latin America makes a modest contribution to shifting wealth. Despite the period of growth in the region since the turn of the century, Latin America cannot be branded a new global growth pole (Figure 2.2). The region's contribution to world growth has not advanced from its position in the early 1990s, remaining at around 8-9%. This is in sharp contrast to emerging Asia, whose contribution to world growth is continually rising, and has recently been particularly strong. Furthermore, Latin America's almost stagnant contribution to world growth is reflected in its share of world GDP. At the end of the last century, emerging Asia had a very similar share of the world economy to Latin America (6.1% and 6.9% respectively in 1999), but by 2011 emerging Asia had opened a huge gap, representing 16% of the world economy and almost doubling Latin America's share.[9]

Latin American commodity-exporting countries have increased their business cycle synchronisation with China.

The aggregate regional figure conceals vast differences among countries. Shifting wealth affects each of the region's countries differently, depending on their trade specialisation. Commodity-exporting countries, mainly in South America, have increased their business cycle synchronisation with emerging Asia, especially with China (see Box 2.1). This synchronisation has been transferred to other macroeconomic variables: trade and fiscal balances have improved, capital flows have increased and debt ratios have lowered. Similarly, Chinese demand for commodities allowed Latin American commodity exporters to enjoy an increasing flow of income from exports,

which remained relatively stable even when world trade collapsed after Lehman Brothers went under. As a result, the real economy of countries that had increased their proportion of exports to China (Brazil, Chile and Peru) was not hit as hard as that of countries with less trade complementarity with China and India (OECD, 2010b). The financial channel also behaved differently from one country to another: countries in the region that benefited from Asian demand for commodities and that demonstrated efficient management of their increased export revenues became less vulnerable to financial shocks (OECD, 2009). Asia's economic relations with Latin America therefore vary greatly from one country to another.

Figure 2.2. **Contribution to global GDP growth (1990-2012)**



Note: GDP measured in purchasing power parity (PPP) terms. This contribution is measured as the proportion of GDP growth of each region with respect to global GDP growth.

Source: Authors' calculations based on data and regional aggregates from IMF (*World Economic Outlook*).

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Box 2.1. **Business cycle synchronisation between China and Latin America**

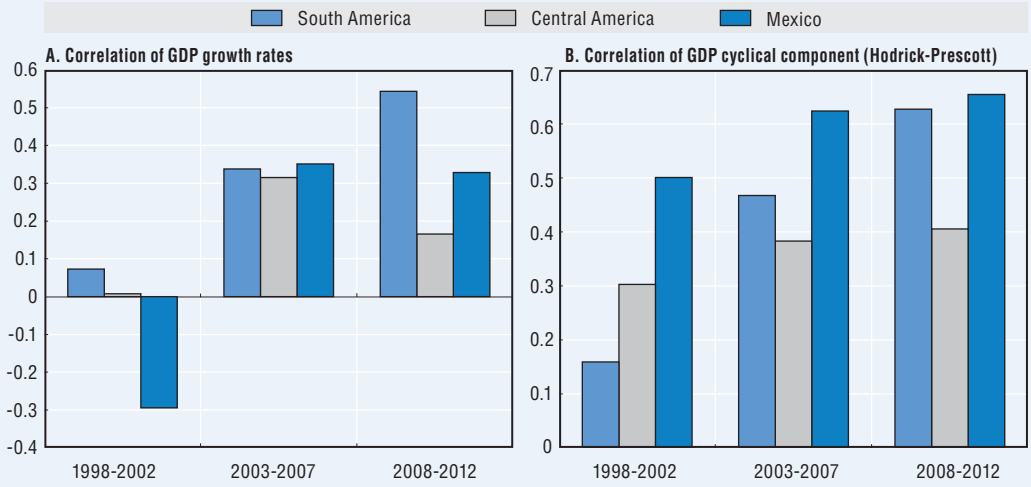
Variations in the extent of the Chinese economy's impact on different Latin American countries are reflected in the levels of business cycle synchronisation. Empirical evidence suggests that the correlation of growth between China and Latin America has been increasing since global wealth began to shift towards emerging economies (Cesa-Bianchi et al., 2011). China's demand externalities, changes to Latin American countries' production structures and commercial integration between the two regions are some of the factors behind the growing business cycle synchronisation (Calderón, 2007). As a result of these factors, the level of business cycle synchronisation with China – like other areas of the economic relationship between China and Latin America – varies from country to country (Lederman, Olarreaga, and Rubiano, 2008).

To illustrate this trend, this box discusses two aspects of the link between the business cycles of China and Latin America. The graph below on the left shows how the correlations between China's GDP growth and that of various country groups (South America, Central America, and Mexico) have developed. The graph reveals an overall increase in the correlation between China and Latin America since the expansionary cycle of the 2000s. South America's correlation has grown sharply during the most recent period. Mexico's, meanwhile, has stabilised and Central America's has waned.

Business cycle synchronisation can also be evaluated using the correlation between the cyclical components of GDP. The cyclical component can be separated from the non-stationary trend component using the Hodrick-Prescott filter. This analysis reveals that the correlation between China's cyclical component and those of South America and Mexico has steadily increased, while its correlation with that of Central America has remained low.

Joint analysis of both indicators provides results that are consistent with the Chinese economy's disparate impact on Latin America. Synchronisation with the Chinese business cycle is clearest in the South American economies, and is a result of Chinese demand for commodities. By contrast, for Central America both indicators show a lower level of synchronisation with China, especially in terms of the correlation between growth rates. Finally, Mexico's level of synchronisation seems counterintuitive, given its low trade complementarity with China. However, this synchronisation may be a result of the high volume of intra-industry trade between the two countries (Calderón, 2007), as well as Mexico's membership of the North American Free Trade Agreement (NAFTA), which provides an indirect transfer mechanism between the two business cycles thanks to China's trade links with the United States and Canada (Cesa-Bianchi et al., 2011). Similar trends could thus also be influential for Central America.

Figure 2.3. **Latin America: Business cycle synchronisation with China (1998-2012)**



Notes: Applying the Hodrick–Prescott filter involves a multiplier lambda=1600, traditionally used in quarterly series.
South America: Argentina, Bolivia (Plur. State of), Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Venezuela (Bol. Rep. of).
Central America: Costa Rica, Dominican Republic, Guatemala, El Salvador.
Source: Authors' calculations based on IMF quarterly data *(International Financial Statistics)*.
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Latin America's international integration

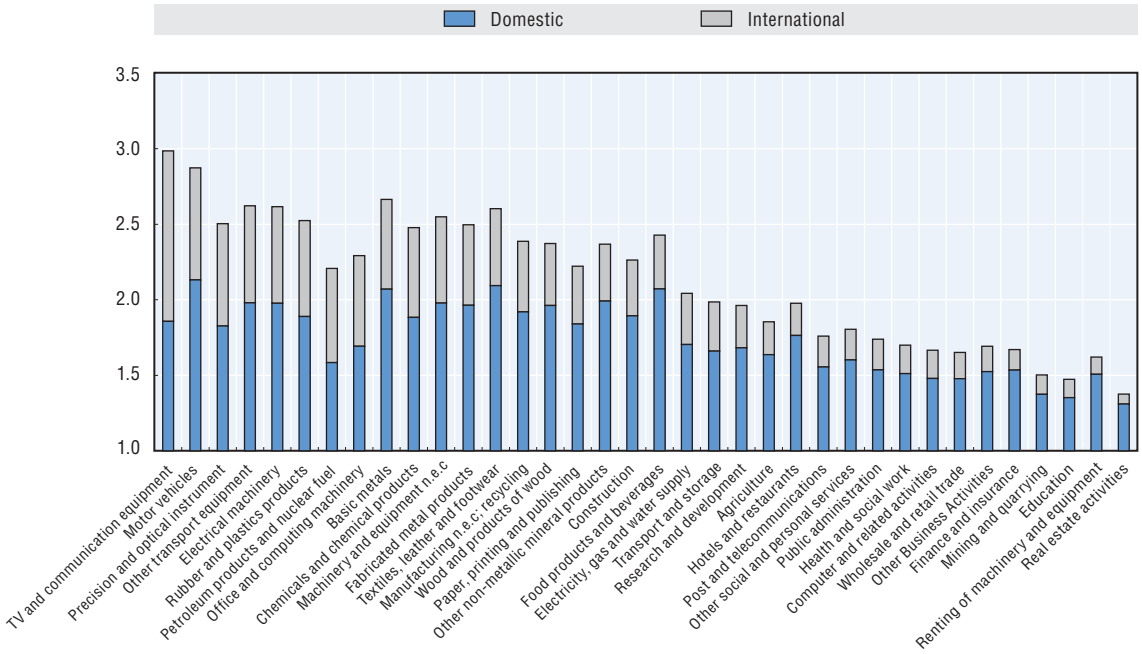
The first phase of the global wealth shift gave Latin America major problems with maintaining or developing comparative advantages in manufacturing industries. The decrease in the land/labour ratio following the entry of large Asian emerging economies into the global economy helped to improve the terms of trade of natural resource-rich countries, which tended to enhance their specialisation in the primary sector or the services sector. It also creates an environment that makes it much harder for countries that export manufactured goods to maintain their comparative advantages in these industries. The opening up of the big Asian emerging economies is therefore often seen as a cause of de-industrialisation of the region, thanks mainly to a trade exchange that inhibits the development of labour-intensive manufacturing, fosters the primarisation of the region's export basket (Lederman, Olarreaga, and Rubiano, 2008) and fails to contribute to technology and knowledge spillovers (de la Torre, Didier and Pienknagura, 2012). Among the emerging Asian economies, China is the main threat to Latin America's development of its manufacturing industry, as this economy combines factors (factor endowments, scale, productivity and the role of public policy) that significantly support its competitiveness in manufacturing (Mesquita-Moreira, 2006).

Difficulties in developing dynamic relative advantages in manufacturing is also symptomatic of the region's specific problems with achieving good productivity levels. This is widely documented in the literature (Solimano and Soto, 2005; Daude and Fernández-Arias, 2010) and is due to the limitations of the region's development model, from structural heterogeneity to low rates of savings. Therefore, growing competition from Asia's emerging economies would only have magnified the effect of these limitations, counteracting some of the natural advantages Latin America enjoys in certain markets (e.g. geographical proximity). Seen this way, the trend towards the de-industrialisation of Latin America reflects both endogenous and exogenous factors.

The process of diversification in Latin America does not substantially change the region's specialisation in less sophisticated goods. To illustrate this trend, Annex 2.A1 examines the sectors towards which several Latin American countries diversified their economies between 1990 and 2009. Many South American countries (Argentina, Bolivia, Chile, Ecuador, Paraguay, Peru and Uruguay) still specialise in agriculture and in mining and quarrying. In Central America, by contrast, Guatemala and the Dominican Republic are increasing their comparative advantages in labour-intensive manufacturing industries, i.e. industries with little sophistication.[10]

By contrast, a small group of countries, including Mexico in particular, have been able to steer their diversification towards more sophisticated sectors. However, there is some doubt as to whether the diversification process in those countries includes business activities with a high value added. The fragmentation of production that typifies some of the industries towards which these countries are diversifying their economies enables them to develop comparative advantages in highly sophisticated sectors by engaging in business activities with low value added. The resulting extensive margin of trade[11] for these countries in highly sophisticated sectors (machinery and chemicals) is concentrated in exports related to the automotive industry, electrical machinery, plastics and office equipment. These industries are among the most likely to be segmented across countries (Figure 2.4). It is therefore in these industries where the type of exports might not reflect a country's competences or technology (Sturgeon and Gereffi, 2008). This type of trade specialisation is fairly frequent in emerging economies, which often import many intermediates in high-technology industries (OECD, 2013b).

Figure 2.4. **Fragmentation of production, by sector**



Notes: The index shows the vertical fragmentation of a sector's production chain, following the methodology described in Fally (2011). The index measures the average number of steps that make up the production chain, weighted by the value added by each one. The index's minimum possible value is 1, when the production process does not require intermediate goods. The index also distinguishes between fragmentation between countries (international) and fragmentation within countries (domestic). This distinction makes it possible to sort sectors along the horizontal axis based on their greater propensity to be fragmented between different countries.

Source: OECD (2012), *Mapping Global Value Chains*, OECD, Paris.

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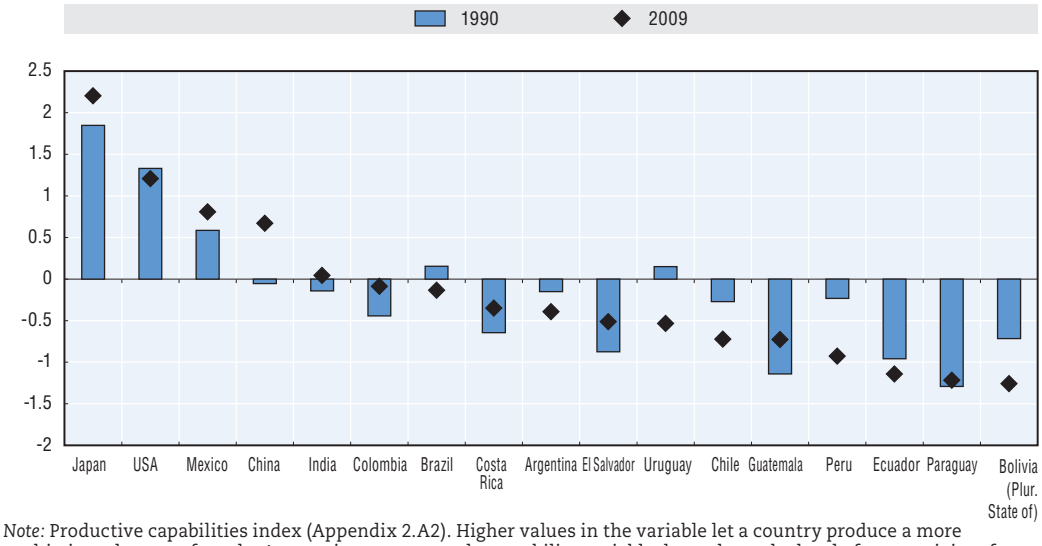
> ***Only those countries that are able to develop a sufficiently broad stock of capabilities for themselves will be able to produce more sophisticated goods.***

Let us now turn our focus towards trade specialisation in the region by analysing changes in the stock of capabilities[12] in Latin American countries (Figure 2.5). These are a country's non-tradeable skills, and include such a wide range of aspects as the quality of institutions, levels of human capital and infrastructure (Hidalgo and Hausmann, 2009). Because these capabiliies are non-tradeable, only those countries that are able to develop a sufficiently broad or complex stock of capabilities for themselves are able to produce more sophisticated goods. With these considerations, Figure 2.5 shows the lower rate of capability accumulation in several Latin American countries since 1990 compared with the world average.[13]

The aforementioned indicator illustrates the obstacles that make it difficult for the region to follow a "virtuous" growth path. The diversification process maintains or accentuates regional trade specialisation in less technology-intensive goods, and has failed to create the production linkages needed for rapid capability-building. There is thus ample space for transformation to be explored by the countries of the region (each according to its own specificities and initial specialisation) in the coming years. It is notable that countries that have achieved comparative advantages in more sophisticated industries – normally manufacturing – tend to have done so in those industries that

are prone to a geographical fragmentation of the production chain, namely Mexico and Central America (ECLAC, 2012b). This means economies can specialise in business activities that generate little value added, even in high-technology sectors.

Figure 2.5. **Productive capabilities indicator (1990 vs 2009)**



Note: Productive capabilities index (Appendix 2.A2). Higher values in the variable let a country produce a more sophisticated range of goods. At any given moment, the capability variable depends on the level of connectivity of the network of products, which is why it is normalised. Thus a value equal to 0 implies capability levels equal to the worldwide average. A value of 1 (-1) indicates capabilities one standard deviation above (below) that average.

Source: Authors' calculations based on data from COMTRADE and Feenstra et al.(2005), "World Trade Flows: 1962-2000", *NBER Working Paper* No. 11040.

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These circumstances create a context in which policies need to be strengthened to prevent the middle-income trap from spreading across the region. Structural transformation must lead to a production structure with an increasing proportion of more productive activities. The need to move in this direction is prominent in the literature on the product space (Hausmann, Hwang and Rodrik, 2007; Hidalgo and Hausmann, 2009; Felipe, Kuma and Abdon, 2010) and, more generally, in the tradition that associates economic development with the accumulation of capabilities (Ciarli et al, 2010; ECLAC, 2007).

In short, the shift in global wealth towards emerging Asia has created in Latin America an even greater concern about the middle-income trap (Paus, 2009; Foxley, 2012). Although some countries have significantly transformed their economies, there still remain wide gaps that represent public-policy opportunities for diversification and capability accumulation.

Towards the second phase of shifting wealth

This section discusses the second phase of shifting wealth, which is gradually emerging, and its expected impact on Latin America. Key emerging economies, led by China, will still be involved in this second phase. Two characteristics of China's development model help plot the future course of the wealth shift and have significant consequences for other emerging economies, including Latin America.

As the great emerging Asian economies undergo changes in their production structure, new business opportunities will become available to other countries.

The main feature of this new rebalancing phase is the consolidation of a sustained rate of growth in a large number of economies. The first phase of the wealth shift was fuelled by the opening up of the Chinese and Indian economies; the second is marked by continued income convergence in a large number of emerging economies. This process will be accompanied by the transformations that usually take place when an economy reaches the middle-income category: falling birth rates (and sometimes falling dependency ratios), expansion of the middle classes, accumulation of human capital and technology, and a shift in the production structure towards higher value-added goods (OECD, 2013a). As the big emerging Asian countries experience these changes, their production structures will focus on more highly sophisticated goods, increasing their demand for imports of labour-intensive goods. New business opportunities will thus arise for some of the exporters that were most severely hit by the economic opening of China and India, especially low-income countries specialising in labour-intensive goods (Chamon and Kremer, 2009). This new phase in global shifting wealth therefore would garner support from a large group of both emerging and developing economies.

China is called to continue playing an essential role in this second phase of the shift of global wealth towards emerging economies. The Asian giant is already seeing some of these transformations, sparking additional changes to its development model. Specifically, there are two considerations regarding China that help define the shape that the shift of global wealth towards emerging economies will take in the future. First, China is moving towards more moderate growth with an economy increasingly based on domestic consumption rather than on investment. Second, future Chinese growth will be marked by a continuation of the economy's structural transformation, which will enable the country to develop comparative advantages in high value-added goods and to phase out the low-skilled, labour-intensive industries that have formed the bulk of China's trade integration into the global economy.

From investment to growth

Various factors explain China's transition towards a growth model based less on investment and more on domestic consumption. First, the development model is overly dependent on investment and is gradually being exhausted. The level of investment in China is one of the highest in the world, representing 45% of GDP in 2011 (OECD, 2013c). This level supports the view that capital returns are approaching the point of diminishing returns, which would facilitate a reduction in the level of investment. Second, the expected slowdown in the rate of urbanisation in China would reduce investment's contribution to the economy (OECD, 2013a). Third, as in many emerging economies, China's continued growth over the last few decades has expanded the middle classes and thus increased their demand, which will boost domestic consumption (OECD, 2010a).

These factors will spark major changes in the country's external demand. Chinese demand for investment-related inputs is set to fall, especially in infrastructure development and the housing market (ESCAP, 2013). The priority inputs in these sectors include a range of base metals, particularly iron, aluminium, copper, zinc, nickel and lead. At the moment, China's rate of investment has sent demand for these products well above the normal rates for a country with its income per capita. Therefore, both current demand and the lower rates of investment that are forecasted support the hypothesis that Chinese demand for these products will subside. If this hypothesis is confirmed, Latin America's main exporters of base metals will be hit hardest by China's new growth scenario, namely Chile and Peru.

Others do not predict such a dramatic fall in investment-related Asian demand for natural resources. On the contrary, they see Chinese demand for commodities decades away from a significant downturn (ADB, IDB and ADB Institute, 2012). Furthermore, any gap in demand left by China could be filled by other countries. India is a prime example, with its rapidly growing demand for base metals. This demand will continue to benefit from urbanisation in the future[14], since the process is much less developed than in other emerging economies, and therefore still has further to go.

The other factor in the shift in Chinese demand is the expected change in demand for consumer goods. As the middle classes grow in China, not only will demand for consumer goods increase, but the quality of demand will change too, especially for food. Chinese demand for food will change not only because of its increasing dependency on food, but also because the country will gradually begin to consume more of the foods that are typical of higher living standards, such as milk, meat and eggs. Turning to Latin America, these changes could benefit major exporters of agricultural products such as Argentina and Peru. Another consequence of China's continued economic convergence will be a rise in its discretionary expenses, which will translate into a growing demand for financial services and transport (BBVA, 2013). The automotive industry will also benefit from the additional discretionary expenses, with demand set to rise in emerging economies, especially China. In Latin America, this trend could benefit Mexico, which has one of the most developed automotive industries in the region. Mexico can benefit even if it does not export to China thanks to the knock-on effects of a rise in global car demand (Citigroup, 2012).

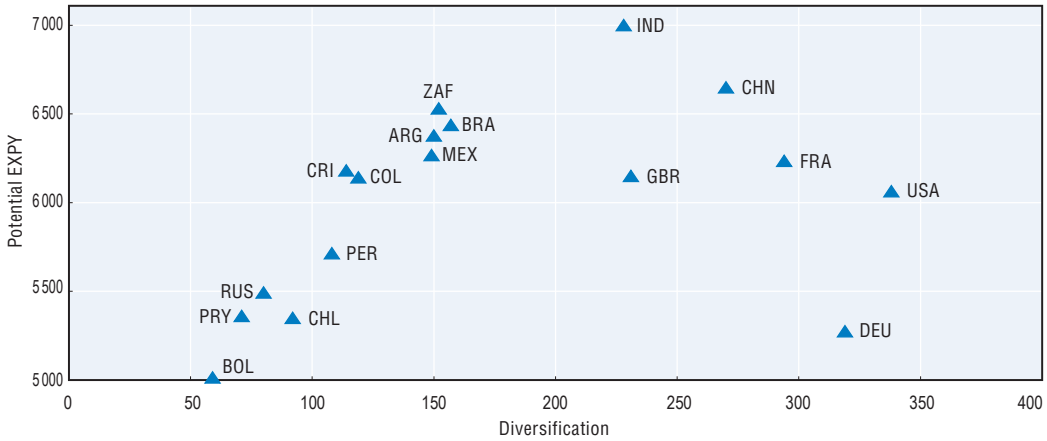
Structural transformation in China

The development of China's structural transformation is the second factor that will influence the course of global wealth shift. China has become the "world's factory" by specialising in a wide range of sectors, usually through processing or assembly. The common denominator of all these business activities is intensive use of labour (OECD, 2013a). Over time, China has supplemented this initial specialisation by developing comparative advantages in medium- and high-technology goods through its market size, the development of its education and innovation system, and government intervention for technology improvements (Altenburg, Schmitz and Stamm, 2008). Thanks to this recipe, China's export basket now looks similar to those of countries with a higher income per capita (Paus, 2009).

Two aspects of China's product space place the country in an advantageous position for developing its extensive margin of trade (Figure 2.6). The graph compares the level of diversification with the connectivity between the export basket and non-exported highly sophisticated goods. The latter is measured using the "potential expy" variable

(Jankowska, Nagengast and Perea, 2012), the details of which are set out in Annex 2.A2. This index is characterised by its inverted-U shape relationship with diversification, since economies that are highly diversified towards knowledge-intensive or technology-intensive sectors will have fewer non-export industries for their baskets to be connected to. In this regard, China has entered the area of diminishing returns in connectivity, though it still lags far behind the connectivity levels of the advanced economies. This leaves it in a strong position to continue its structural transformation. It has the eighth most diversified economy and the sixth highest level of connectivity in the world.

Figure 2.6. **Diversification vs. export connectivity (2009)**



Note: On the horizontal axis, the degree of diversification is given by the number of sectors in which the country has revealed comparative advantage (RCA>1). The vertical axis measures the connectivity of the export basket through the "potential expy" variable (methodological details in Appendix 2.A2).

Source: Authors' calculations based on data from COMTRADE and Feenstra et al., (2005), "World Trade Flows: 1962-2000", *NBER Working Paper* N° 11040.

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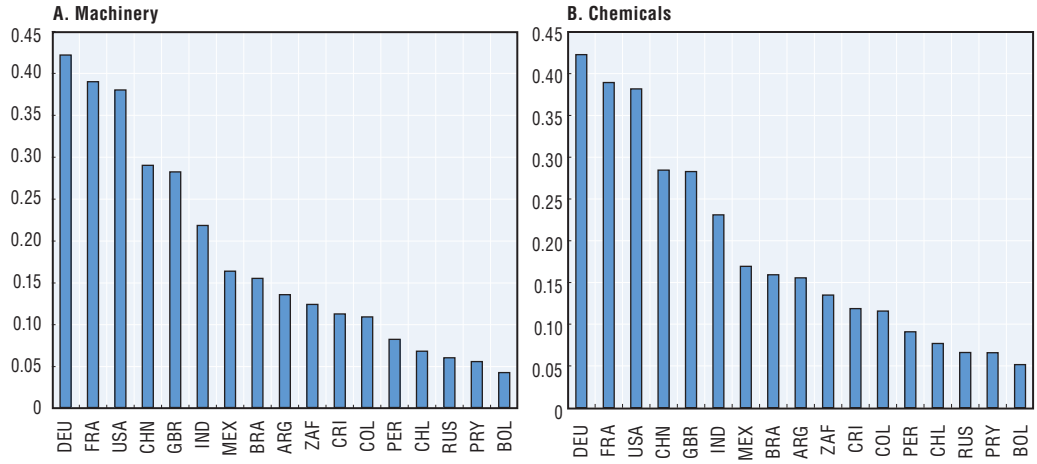
China has the highest density in advanced manufacturing industries among emerging economies, well above the levels found among Latin American countries.

China's export-basket connectivity reaches the more sophisticated industries (Figure 2.7). The graph illustrates the proximity of Chinese exports to advanced industries (machinery and chemicals). The proximity is assessed using the density variable[15] (Hidalgo et al., 2007), and a higher value means that a good is easier to incorporate into the export basket. As the graph shows, China's density for machinery and chemicals is the highest among all emerging economies and well above the best Latin American country's density in each sector (78% higher than Mexico for machinery and 66% higher than Brazil for chemicals). These results also corroborate studies that consider China to be well placed to maintain its strong competitiveness in advanced manufacturing industries and technology-intensive industries (Paus, 2009), leaving some machinery industries (industrial, electrical and transport equipment) among the most vulnerable to China's rise as a manufacturing power (Lederman, Olarreaga and Perry, 2009).

Figure 2.7. **Density in advanced manufacturing sectors (2009)**



Note: Average density for each industrial category. Higher values imply greater average easiness for developing comparative advantages in that category. Methodological details in Appendix 2.A2.

Source: Authors' calculations based on data from COMTRADE and Feenstra et al., (2005), "World Trade Flows: 1962-2000", *NBER Working Paper* N° 11040.

StatLink http://dx.doi.org/10.1787/888932906692

Real wage increases in China raise questions about the country's ability to maintain its comparative advantages in labour-intensive industries.

The second change faced by China's production structure is the possible loss of comparative advantages for labour-intensive goods produced by low-skilled workers. Some studies conclude that China is close to crossing the development threshold marking the point where the transfer of labour from the traditional sector to the modern sector takes place without generating wage pressures (Cai and Wang, 2008; Zhang, Yang and Wang, 2010). China has seen significant real-term wage increases in recent years (ECLAC, 2012a), which have also benefited from moderate appreciation of the renminbi. All these factors sow doubt regarding China's capacity to maintain its comparative advantages in labour-intensive industries, which are generally those most vulnerable to labour costs. Yet, Brazil, China and Russia are the emerging countries that have experienced the biggest surges in relative unit labour costs since 2005, while Mexico is the Latin American country that has experienced the sharpest falls (OECD, 2013a).

There are other considerations that would enable China to maintain its comparative advantages in a wide range of labour-intensive industries. A huge labour force in Inner China, where 800 million people live, means there is lumpiness across the regions in the distribution of factors of production. This trend is particularly important in terms of the knowledge intensity incorporated in labour (Lu, Milner and Yu, 2009). This lumpiness would enable China to have competitive advantages in a range of industries simultaneously, from labour-intensive industries using unskilled workers to those that are more technology- and knowledge-intensive. In this scenarion, China could thus outsource labour-intensive industries within its own borders.

Even if China eventually abandons its specialisation in labour-intensive manufacturing industries, there are no guarantees that Latin America will be able to cash in. There are other countries in Asia with a high labour endowment and an

unskilled workforce that could take over any labour-intensive industries that China abandons. India, for instance, is in a stronger position than Latin America to take over labour-intensive manufacturing[16] (Lederman, Olarreaga and Rubiano, 2008). The same is true of other emerging Asian countries (Bangladesh, Viet Nam), which are particularly competitive in labour-intensive manufacturing and have begun to welcome some industries that have been relocated from China (OECD, 2013a). For these reasons, emerging Asia is likely to maintain a large proportion of the world's unskilled, labour-intensive output.

Towards international integration for development: Options for Latin America

This final section sets out some of the options available to Latin America to successfully integrate into the global economy in a way that fosters development in a global scenario that should continue to encourage the primarisation of its exports. It begins by looking at some of the reasons why Latin America should make diversifying exports an objective. Next, taking into account a context that makes it particularly difficult for the region to compete with the prices of large Asian manufacturers, this section proposes two complementary pathways to stimulate diversification. The first involves furthering the region's trade integration, while the second involves generating and retaining value added in the production chain.

A more diversified export basket is needed

In addition, trade diversification is closely linked to structural transformation and economic development. Empirical evidence points to a positive correlation between export diversification and economic growth (de Ferranti et al., 2002). This correlation is particularly strong among lower-income countries (Imbs and Waczyarg, 2003), where a successful structural transformation requires the gradual introduction of new goods rather than greater specialisation in a fixed set of goods (Hausmann, Hwang and Rodrik, 2007; ECLAC, 2012b).

Greater export diversification in Latin America is justified for reasons that are intrinsic to the region's development model. Growing Asian demand for commodities has led several Latin American countries to increase their already high specialisation in natural resources. This strategy has well-documented risks,[17] from volatile export revenue to problems related to Dutch disease. Besides, specialising in natural resources does not seem an appropriate means of successfully transforming an economy and escaping the middle-income trap. While exceptions do exist, evidence suggests that economies that are highly concentrated in natural resources are more likely to see their development stagnate, since natural resources are unlikely to generate positive externalities on the rest of the economy, such as by creating jobs (McMillan and Rodrik, 2011).

A successful diversification strategy must involve more than simply expanding into sectors unrelated to natural resources. Latin America is faced with major questions regarding how to diversify its production structure towards manufacturing industries, regardless of the industry's degree of sophistication. This is partly because of uncertainty as to whether the forces that drove Latin America's specialisation in commodities (specifically Asian demand) will change significantly in the future. But it is also because there are several countries, especially in Asia, that have a great capacity to compete

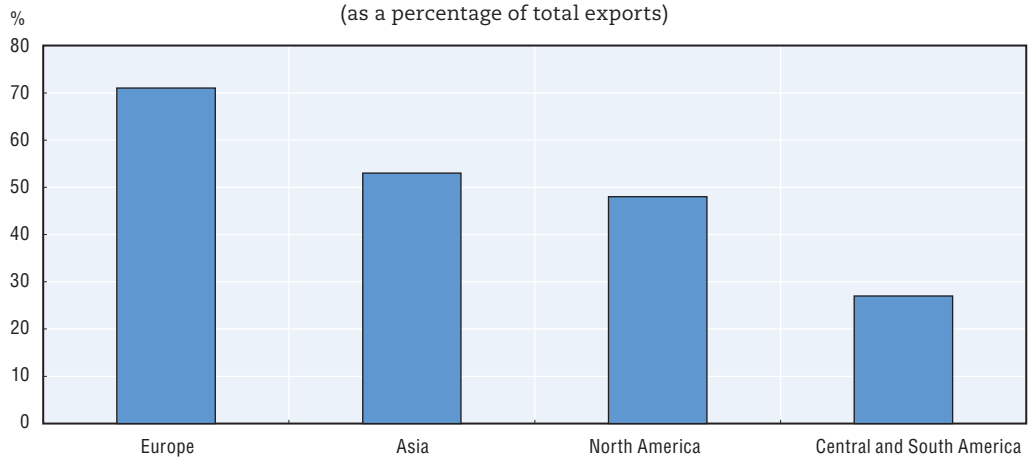
with Latin American prices in a wide range of manufactures, from labour to technology intensive. Latin America's capacity to industrialise its economies will therefore continue to come up against considerable challenges.

Deepening the regional market

The vast number of regional trade agreements has not resulted in a significant increase in intra-regional trade in Latin America.

An initial strategy is to deepen Latin America's internal regional market. Institutions for regional economic integration began to spring up in the mid-20th century. Their activity has been irregular but they have engendered many regional trade agreements in Latin America. The region's economies have also increased their trade openness[18] from a rate of 33% in 1990 to 48% in 2011.[19] However, most of this additional trade has come from countries outside the region. Intra-regional trade is still dwarfed by extra-regional trade, contributing far less than in other economic regions[20] (Figure 2.8). The vast number of regional trade agreements has not resulted in a significant increase in intra-regional trade flows in Latin America.

Figure 2.8. **Intra-regional exports (2011)**
(as a percentage of total exports)



Source: Authors' calculations based on data and regional aggregates from WTO (*World and Regional Merchandise Export Profiles*, 2011).

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Many reasons have been given to justify this lower intra-regional trade in Latin America. One of the most oft-cited is that there are various trade agreements in the region, some of which are based on political motives rather than trade complementarity among their members. Furthermore, the plethora of regional agreements means that countries are simultaneously members of several of them. This overlapping membership can make it difficult to devise national trade strategies within each regional initiative (Malamud and Gardini, 2012).

In addition to improvements to the region's institutional design, there is great potential for increased intra-regional trade in Latin America. Trade between Central and South America is a good example. The two sub-regions have very different export baskets, which partly explains their unequal economic performance during the last

expansionary cycle. These differences in the export basket suggest a high level of trade complementarity, which is not reflected in current levels of intra-regional trade. This complementarity exists between other regions, such as the countries of Mercosur and the Andean Community (CEI, 2003).

A single trade space would allow the region to make progress in diversifying its economy, especially in the direction of goods that are higher up the value chain.

Deepening the regional market offers many benefits. A single trade space would allow the region to make progress in diversifying its economy by creating a friendlier environment for some of the industries that have most struggled to develop in recent times. Trade data show that intra-regional flows focus largely on goods with higher value added, particularly in manufacturing industries (Baunmann, 2008). Moreover, a regional market in Latin America would allow many of the countries to benefit from regional economies with a relatively large combined market size and sustained growth. Latin America's economic weight is distributed unevenly, with around 85% of regional GDP concentrated in the seven largest economies in 2012.[21] Given this asymmetry, the deepening of the regional market could become a pillar for the development of smaller economies by giving them much larger scales of production and a reference market that transcends the confines of its borders.

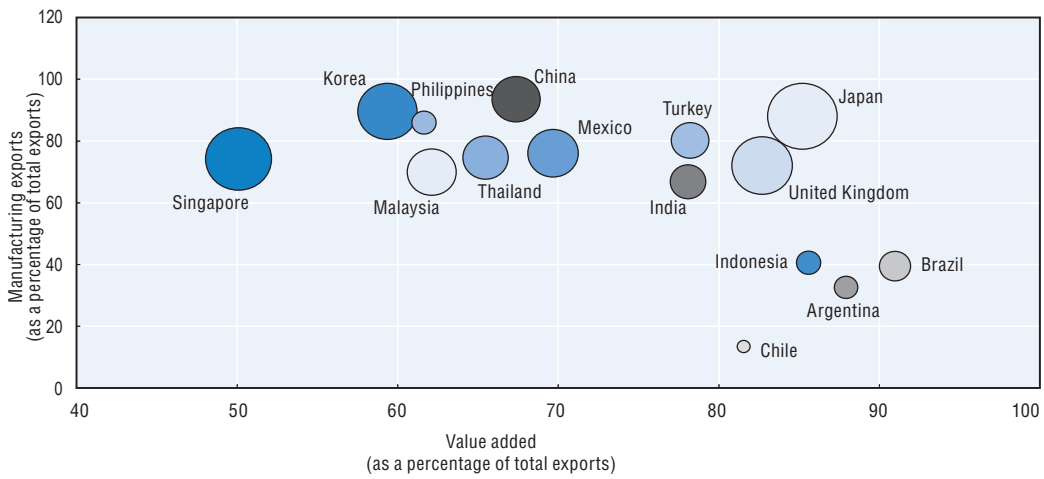
Generating value added

Another strategy that can help the international integration of Latin American economies is to direct diversification towards generating value added. There are several reasons why this strategy is justified. First, the geographical fragmentation of the production process and the advent of global value chains (GVCs) as an organisational model have changed the rules of diversification. Development of these production networks allows for specialisation in specific parts of the production process, with no need to take on every step involved in the production of a product (OECD, 2013b). Participation in international trade is therefore defined more by the task being undertaken than by the industry in which it is taking place, as exemplified by assembly activities in China or corporate services in India. In this new production framework, value added has become the reference variable for assessing the quality of an economy's trade specialisation. The second reason for focusing diversification on value added is that, because it is difficult for the region to develop manufacturing industries in the current climate, it needs to explore opportunities for diversification in both natural resources and services. Natural resource industries can contribute to structural transformation through various means, from generating government revenue to attracting FDI (OECD, 2013d), while the services sector can, for instance, create good-quality jobs.[22]

The search for value added as a central part of a diversification strategy is particularly relevant in emerging economies, which have greater difficulties generating and retaining value added. Let us compare three aspects of a country's exports (Figure 2.9): the percentage of domestic value added (horizontal axis), trade specialisation (vertical axis) and the stock of capabilities (circle diameters). With these variables several points stand out. First, emerging economies specialising in manufacturing are less able to generate value added in the production chain. This seems to be a more serious problem for countries with relatively sophisticated export baskets (such as Korea and Singapore) than for those that specialise in standardised, less sophisticated industries (such as Malaysia and Thailand). Second, on the other side of the graph we see emerging

economies with greater specialisation in natural resources (Argentina, Brazil, Chile and Indonesia), which are able to retain a higher percentage of value added on their exports. Their results, however, are a consequence of their lower integration in GVCs and the fact that their commodity exports generally require fewer imported intermediate inputs (OECD, 2013b). Also, their low level of productive capabilities suggest that their export baskets are not very sophisticated. In contrast to these two groups of countries, advanced economies show a better balance between the capabilities they use in their exports and the value added that they generate.

Figure 2.9. **Value added, trade specialisation and productive capabilities (2009)**



Notes: The horizontal axis reflects the ratio of domestic value added to exports, divided by the exports' final value. The vertical axis measures the percentage of the country's exports that belong to manufacturing industries. The diameter of the circle is directly proportional to the stock of productive capabilities.

Source: Authors' calculations based on data from the OECD/WTO (*Trade in Value Added database*) and the World Bank *(World Development Indicators)*.

StatLink http://dx.doi.org/10.1787/888932906730

Irrespective of their trade specialisation, many emerging economies struggle to increase the value added of their economic activity (Figure 2.9). On the one hand, the high value retention shown by economies specialising in natural resources is a result of the scant value added of their exports, with very little production and few opportunities to move up the value chain. This substantially reduces the external sector's capacity to generate positive externalities for the rest of the economy through job creation or production linkages with other segments in the production chain. These countries can only generate more value added if they diversify their economy to include additional stages in the production chain, and specifically those that most affect the end product (Box 2.2).

Value added retention seems to be a more pressing problem for emerging economies specialising in manufactured goods. These countries have greater productive capabilities (albeit some countries more than others), and their business activities and sectors are more knowledge intensive and technology intensive. Nevertheless, emerging economies that operate in such sectors are usually involved in less-skilled, less-productive tasks in the value chain (Globerman, 2011) where there is a high volume of imported intermediate inputs. Consequently, in these economies there are more likely to be differences between the value they add to exports and the final value of those exports.

Box 2.2. **Diversification in Latin American exports of natural resources through the product space**

Identifying the sectors that can bridge the gap to a more diversified and more sophisticated export basket is crucial for countries specialising in commodities. Such sectors are relatively isolated from the product space, making it difficult to develop comparative advantages in other industries and to transform the structure of the economy (Felipe, Kuma and Abdon, 2010). Some studies have therefore proposed using natural richness as the basis for diversifying the economy in a way that will increase the sophistication and added value of exports (Lederman, Olarreaga and Rubiano, 2008; OECD, 2013d).

This box summarises the result of using product-space analysis as a guide to diversification in Latin American countries specialising in natural resources. The overall purpose of this method is to identify sectors that provide latent comparative advantages to an economy, i.e. those whose production requirements closely match the country's capabilities. Developing comparative advantages in those sectors would require occasional policy interventions to surmount specific problems, such as those related to co-ordinating stakeholders or the existence of externalities.

Thanks to the product space three criteria can be used to select the objectives of a diversification strategy. First, we select sectors that are not exported competitively but are situated close to the country's export basket. Next, to ensure that including these sectors results in a more sophisticated export basket, only those sectors whose level of sophistication is greater than that of the country's export basket (PRODY > EXPY) are retained. Finally, from the remaining sectors only those in which China has not developed a sufficient relative competitive advantage (RCA) are retained (RCA<1).

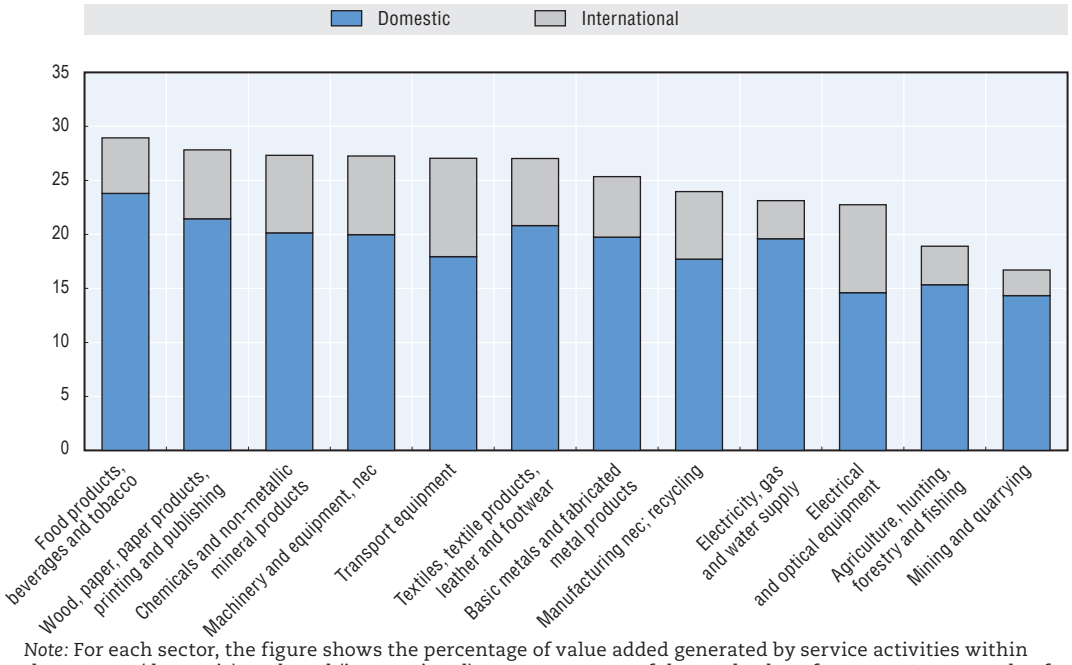
Using these criteria, countries can target certain sectors in a strategy of diversification from natural resource industries. Although the type of sectors identified varies from one economy to another, overall this strategy targets industries that include a stage of production after the product has been harvested or extracted. In other words, it targets industries in which the country is involved in a larger fraction of the value chain.

This should not be treated as an exclusive set of criteria, but exercises of this kind can be a good point of reference, offering several advantages for guiding a country's diversification strategy. First, it selects sectors in which diversification is both feasible, because of their proximity to the country's export basket, and recommended, since they would raise the basket's sophistication. Second, since it involves natural-resource industries, it minimises competition from major emerging economies in Asia, which are heavily dependent on these goods. China's product space, for instance, is located relatively far from the industries identified using this exercise, so the country is less likely to threaten the development of these industries in Latin America.

Another focus of attention for a strategy geared at value added is the service sector. Data for service sectors are not available, so they could not be included in the above analysis, but they make a fundamental contribution to adding value. The distribution of value up and down the chain is far from uniform. Activities related to the physical production of goods tend to represent only a small proportion of the total value (OECD, 2013b), while service activities (R&D, logistics) are the main source of value in the production chain.

Services are therefore a vital input for producing manufactured goods (Hoekman and Aaditaya, 2008). Although services are still of secondary importance in final export statistics, the use of data on value added suggests a much more important role for these activities. Around 50% of the value added of OECD exports is provided by services (OECD, 2013b). For Latin America, services are a vital source of value added for some manufacturing and commodity industries (Figure 2.10). Thus, domestic sources contribute most to the value added generated through service activities.

Figure 2.10. **Latin America: Value added of service activities (2009)**
(as a percentage of total export value)



Note: For each sector, the figure shows the percentage of value added generated by service activities within the country (domestic) or abroad (international), as a percentage of the total value of exports. Average value for Argentina, Brazil, Chile, Mexico.

Source: OECD/WTO (*Trade in Value Added database*).

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In addition to their role in the production chain, services can play a crucial role in the development strategies of emerging economies. The recent experience of countries that have cemented their development in the services industries (e.g. India) confirms the critical role these industries can play in development by contributing to GDP, creating good-quality jobs and reducing poverty (Ghani, 2010). Services are also a good solution in countries where an attractive natural environment combined with abundant labour fuel the development of tourism, or where a low-density population and high transport costs make it difficult to develop manufacturing (OECD, 2013a).

Latin America generally has a favourable environment for the development of services. In addition to some of the benefits mentioned above, services in Latin America have other benefits such as geographical proximity and similar time zones to some of the target markets (especially the United States, and to a lesser extent Europe). Competition from Asia is therefore less of a concern in some of these sectors than it is in manufacturing. The statistics on trade in services confirm this trend, highlighting the fact that China remains one of the world's main importers of services, especially corporate, transport and insurance services (OECD, 2013a). India seems to have much more potential than China to compete with Latin America, especially considering its rapid growth in exports of services in recent years. But India does not seem to be displacing significant amounts of exports of services away from Latin America (Lederman, Olarreaga and Perry, 2009). In short, the threat of competition to Latin America's exported services from the big emerging Asian economies remains slim, especially in some of Latin America's priority markets.[23]

Functional upgrading to generate value

Given the position of most emerging economies in the value chain, increasing the value added of their exports involves adopting new activities in the chain, a process known as "functional upgrading". The distribution of value in the production chain is profoundly asymmetrical, with most value concentrated at the start (R&D, product design) and end (marketing, logistics) of the chain. The opposite is true for activities related to the physical production of a good (OECD, 2012), which is precisely where emerging economies tend to specialise. Consequently, achieving the objective of increasing value added in these economies often involves shifting towards new activities in the chain.

The main way for a company to functionally upgrade is by accumulating knowledge-based, or intangible, assets. Knowledge-based assets are normally classified as IT resources (software and databases), intellectual property (patents, copyrights, designs and brand names), or economic competencies (such as human and technological capital and management know-how). When a company that is part of a GVC holds intangible assets, it can provide products or services to the chain that are difficult for other firms to replicate. As an essential part of the production chain the company can thus act as a bottleneck and increase its chances of generating a greater share of value added (OECD, 2013b).

Functional upgrading in the value chain is a particularly difficult objective. First, it usually requires the acquisition of a vast number of knowledge-based assets, an arduous task because the assets are highly specific and are difficult to acquire outside the chain. Considerable innovation efforts are therefore needed to generate the assets within the company. Companies are also faced with the additional hurdle of the chain leader's reluctance to transfer knowledge to other members of the chain (Pietrobelli and Rabellotti, 2006). This is especially true when functional upgrading would compromise the leader's control over the chain. Finally, the ability of natural resource industries to achieve functional upgrading is hindered by differences in the production requirements at different parts of the chain (OECD, 2013b). These differences stymie the movement from extractive operations to derived manufacturing.

The objective of generating value added poses new challenges to policy making

A diversification strategy based on generating value added poses new challenges to policy making. Because of the fragmentation of production, diversification strategies can target very specific activities in a production chain. The more a production chain is segmented, the more complex it becomes to pick out the niches or activities that should be part of this strategy.

Another challenge is to strike the right balance between accumulating general and specific skills. As explained in previous sections, Latin America's lack of skills is one of the main reasons why the region's production structure is concentrated in low-productivity products. To reverse this trend, the region must improve its productive capabilities, which would require a wide range of initiatives, including promoting R&D, human capital formation and infrastructure development. But in addition to these general measures, capability accumulation must be closely connected to the target activities and sectors. It must be specifically geared at the production process if knowledge-based assets are to be developed, which, as explained earlier, are a prerequisite to generating and retaining more value added in the production chain.

Finally, the institutional design needs to establish effective linkages between the public and private sector. The business sector usually has crucial information for designing an effective diversification strategy (Hausmann and Klinger, 2010), especially regarding the barriers that hinder the development of comparative advantages in the target activities (co-ordination problems, market failures) and regarding the type of investments that will enable businesses to acquire knowledge-based assets. Public policy's role is therefore fully justified. Because upgrading in GVCs – and especially functional upgrading – are so hard to achieve, they are unlikely to occur if left to market dynamics and private-sector action (Humphrey and Schmitz, 2002). Public policy can, for instance, facilitate the provision of infrastructure or R&D projects, which often require levels of investment that are beyond the investment capacity of firms in the productive sector. Public-private initiatives are therefore the most suitable form of intervention for productive chain upgrading (Giuliani, Pietrobelli and Rabellotti, 2005), especially those that emphasise the capacity to co-ordinate across the government agencies involved, and for liaising with the private sector in designing and implementing policies (Farfan, 2005).

Conclusions

The shift in global wealth towards emerging economies is having a disparate impact on Latin America. On the one hand, Latin America has had an almost unprecedented macroeconomic performance thanks to strong Asian demand for commodities. Several countries in the region have had sustained growth that has been relatively resistant to the global financial crisis and have substantially improved a wide variety of macroeconomic indicators. On the other hand, shifting wealth prevents Latin American countries from diversifying their economies towards industries with a higher value added, thus further entangling the region in the middle-income trap.

The future course of shifting wealth will not substantially change this outlook. It is doubtful whether external demand for commodities will decline substantially if Chinese growth sources change. Also, other countries (especially India) are in a position to compensate in part for any downturn in Chinese demand for natural resources. The situation is similar with Chinese competitiveness in labour-intensive manufacturing industries. Regardless of whether China abandons its specialisation in these industries, many Asian countries have a mix of competitive advantages (labour costs, integration into GVCs) that makes them likely candidates to replace the Asian giant in those sectors. If this came to pass, Latin America would continue to be faced with major obstacles to developing comparative advantages in the industries that make the most use of productive capabilities.

It is therefore essential for countries in the region to adopt policies to help them diversify their production structures towards industries with a higher value added. This chapter has discussed some of the options they can consider to achieve this goal. The primary purpose of all those options is to bring about a production structure with greater capabilities and more value added.

The objective of generating value added represents a formidable challenge for public policy. Given the position of the Latin American economies in the value chain, many countries can only increase their value added if they begin new activities in the production chain. This functional upgrading involves the development of knowledge-based assets resulting from a commitment to innovation and human capital that many

Latin American companies are not in a position to adopt. Furthermore, chain leaders are usually reluctant to assist with this functional upgrading. To overcome these obstacles, public policy can guide the accumulation of productive capabilities towards a suitable balance between developing general capacities and developing capacities closely tied to the supply chain in question. To achieve this it is essential for the business sector to take part in policy making alongside the many government agencies that often have responsibilities for productive development. Public policy that emerges in this context is highly complex, due to both the difficulty of its objectives and the need co-ordinate the actions of many stakeholders.

Annex 2.A1. Sector development in Latin America's diversification process (1990-2009)

This annex aims to illustrate how diversification in Latin America has developed over the past two decades. This analysis allows us to observe how trade specialisation has evolved during the first phase of shifting global wealth towards emerging economies.

The graphs below show the distribution of each country's revealed comparative advantages (RCA) for the years 1990 and 2009. The horizontal axis indicates the Leamer categories (Leamer, 1984), which classify products according to the intensity of use of a specific input. This methodology classifies the 779 sectors in Revision 4 of the Standard International Trade Classification (SITC, Rev. 4) into ten categories: two for primary-sector goods (petroleum and raw materials), four for agricultural goods (forest products, tropical agricultural products, animal products and cereals) and four for manufactured goods (labour-intensive manufactures, capital-intensive manufactures, machinery and chemicals). The vertical axis shows the percentage of industries in each category that have comparative advantages (RCA>1).

According to these parameters, many countries in the region have maintained or increased their trade specialisation in unsophisticated goods. This includes most South American countries, which have specialised in both types of primary-sector goods: agricultural goods (cereals, tropical agriculture, and animal products) and raw materials. These categories are less sophisticated than manufactured goods. The categories with the highest average sophistication levels (PRODY) are machinery (USD 19 945) and chemicals (USD 18 380). Behind these two categories are forest products, labour-intensive manufactures and capital-intensive manufactures, whose PRODY values lie between USD 12 500 and USD 14 000. The PRODY values for petroleum, raw materials and agricultural production fall to around USD 10 000. Finally, the lowest PRODY levels are USD 7 967 for tropical agriculture and USD 8 526 for cereals.

Figure 2.A1. **Degree of diversification of exports (1990-2009)**
(by Leamer categories)

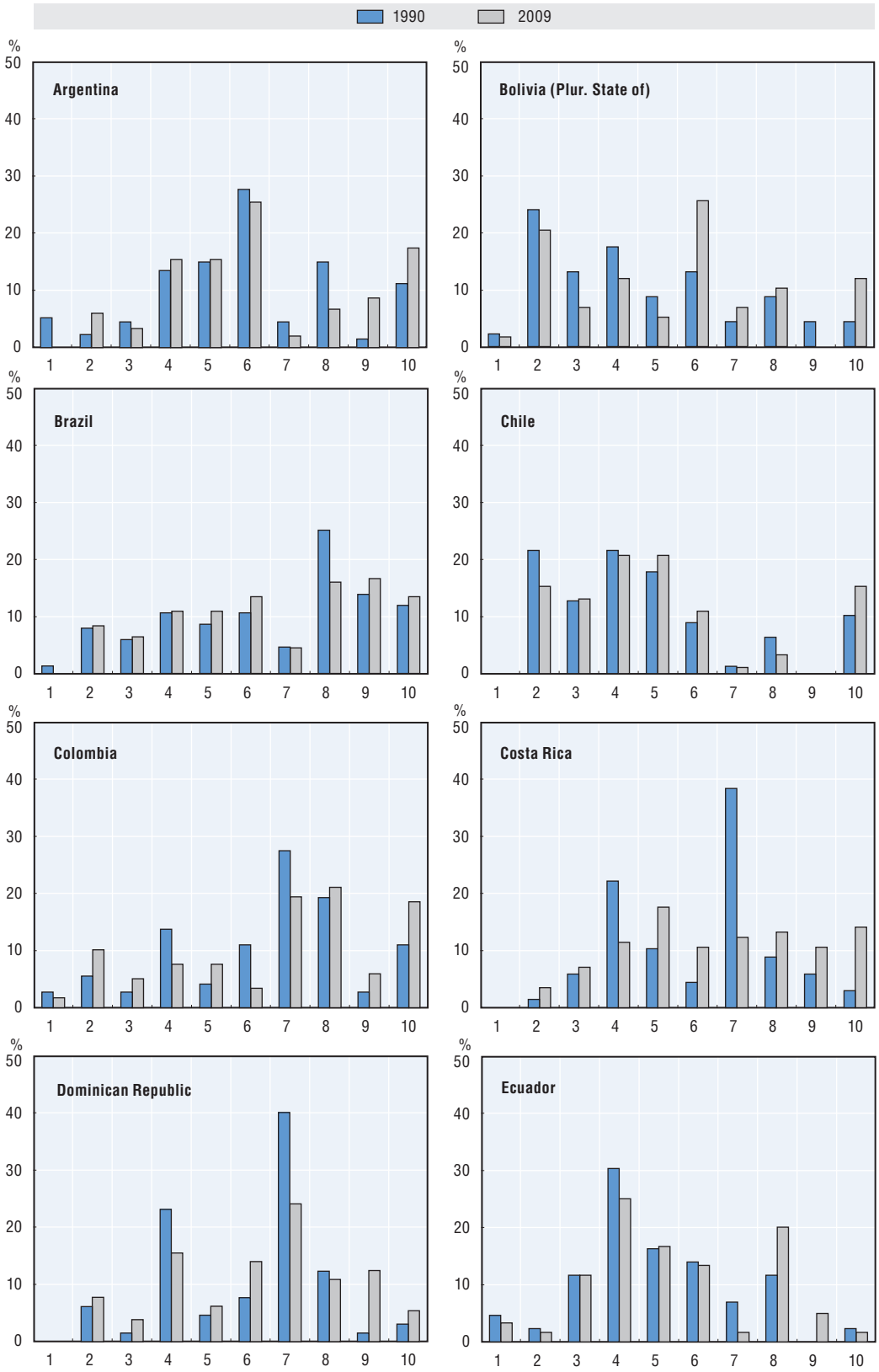
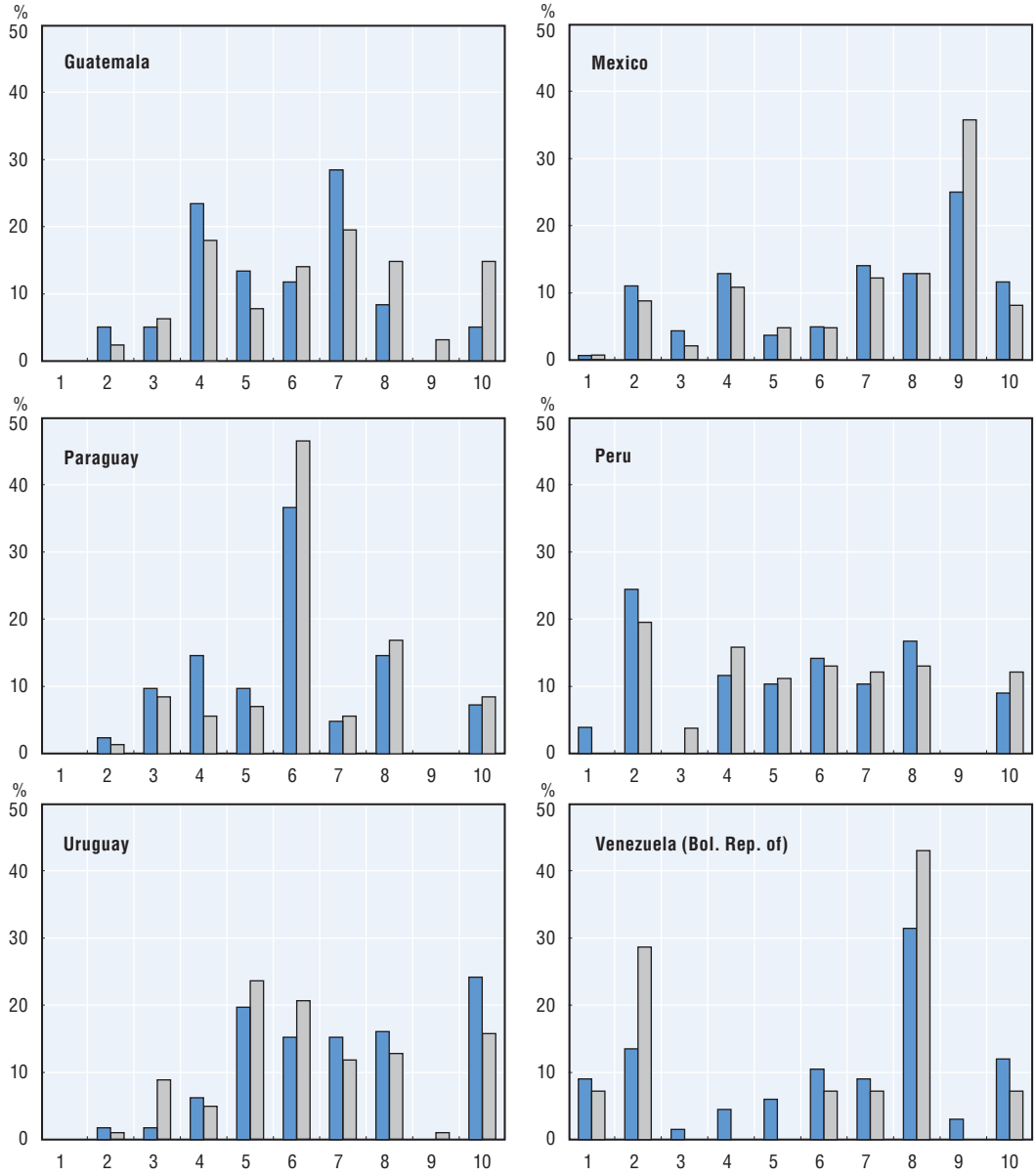


Figure 2.A1. (cont.)



Note: For each country, the graph reflects the sector distribution of comparative advantages. The horizontal axis shows the sector categories following the classification of Leamer (1984): petroleum (1), raw materials (2), forest products (3), tropical agriculture (4), animal agriculture (5), cereals (6), labour-intensive industries (7), capital intensive industries (8), machinery (9), chemicals (10). The vertical axis shows the percentage of industries with a comparative advantage in each category, over the total number of industries with a comparative advantage in the country.

Source: Authors' calculations based on data from the United Nations (COMTRADE) and Feenstra et al.(2005), "World Trade Flows: 1962-2000", *NBER Working Paper* No. 11040.

StatLink http://dx.doi.org/10.1787/888932906768

Annex 2.A2. Definition of the variables

This annex explains in detail the construction of the variables related to the product space analysis we include in this chapter. It also explains the revealed comparative advantage (RCA) indicator and the index on capabilities. Some of these variables are among the most recent developments in the literature on international trade. Their main advantages are the ability to categorise similarities between tradeable industries, the degree of sophistication of a country's export basket at a given time, and a country's accumulation of productive capabilities. Revealed comparative advantage (RCA): index based on Balassa (1977) that measures the ratio between the contribution a product (i) makes to the exports of a country (c) and the same product's contribution to world trade. A country is therefore considered competitive in exporting a product if that product's share of the country's exports is higher than the same share for world trade, i.e. RCA> 1.

$$RCA_{ci} = \frac{x_{ci} / \sum_i x_{ci}}{\sum_c x_{ci} / \sum_c \sum_i x_{ci}}$$

Proximity: the minimum probability that a country exports a product with RCA>1 if it exports another product (Hidalgo et al., 2007). Product i is considered close to product j if the countries that have a comparative advantage in product i tend also to have a comparative advantage in product j, through the following expression.

$$\emptyset_{ij} = min\{P(RCA_i > 1 | RCA_j > 1), P(RCA_j > 1 | RCA_i > 1)\}$$

Prody: sector sophistication index. A product's Prody index is a weighted average of GDP per capita of countries (c) that export the product with a revealed comparative advantage (RCA>1), where the weights reflect the RCA. The Prody index thus represents the income per capita associated with the product (Hausmann, Hwang and Rodrik, 2007). Higher Prody levels are associated with products exported by countries with a higher GDP per capita. Thus, the variable is an indicator of the product's degree of sophistication. To reduce the volatility of the series, the Prody index used in this analysis is the average annual value for the years 2000-05.

$$Prody_i = \sum_c [RCA_{ci}\, GDP_c]$$

EXPY: estimate of the degree of sophistication of a country's export basket. It is calculated as the weighted average of the PRODY of goods exported with RCA> 1, where the weights reflect the RCA in the export basket.

$$Expy_c = \sum_i \left[\frac{x_{ci}}{X_c}\right] PRODY_i$$

$$x_{ci} = exports\ of\ product\ i\ for\ country\ c$$
$$X_c = total\ value\ of\ exports\ of\ country\ c$$

Potential EXPY: index that measures the connectivity of the export basket. It is calculated as the weighted average of the Prody of all products that a country does not export, where the weights reflect the minimum distance to a product that is exported with RCA>1 (Jankowska, Nagengast and Perea, 2012).

Density: variable that measures the average distance between a potential export product (j) and the export structure of a country (c). The variable can take a value between 0 and 1, where a high value means the product is close to the country's export structure, sharing many of the production requirements of goods already exported (Hidalgo et al., 2007).

$$w_{cj} = \frac{\sum_i d_i \emptyset_{ij}}{\sum_i \emptyset_{ij}}$$

$$d_i = 1 \; if \; the \; product \; i \; is \; exported \; with \; VCR > 1 \; for \; country \; c$$
$$\emptyset_{ij} = proximity \; matrix \; between \; products \; i \; and \; j$$

There are two considerations that limit the product space's usefulness. First, its use of the external sector to measure a country's production structure might not be appropriate for economies that are not very open to international trade. The same applies to the tertiary sector's share of the economy. The product space does not include data from the services sector, given the little coverage of services in data on trade. Yet in most countries, the services sector is the largest sector in the economy.[24] In these countries in particular there may be significant discrepancies between the production structure and the export basket, with the product space providing only a partial picture of a country's economy.

Productive capability index: Index created by Hidalgo and Hausmann (2009) using the "method of reflections". This method uses information on a country's diversification of exports and the ubiquity of the products it exports. The degree of diversification is defined as the number of products (i) that the country exports with RCA>1. A product's ubiquity is the number of countries (c) that export the product with RCA>1.

$$K_{c,0} = \sum_i |RCA|_{ci}$$

$$K_{i,0} = \sum_c |RCA|_{ci}$$

These two concepts (country and product) are used in an iterative calculation through moments of the order N, as shown in the following expressions. This iterative process extracts additional information on the product's sophistication and the country's capabilities.

$$K_{c,N} = \frac{1}{K_{c,0}} \sum_i |RCA|_{ci} K_{i,N-1}$$

$$K_{i,N} = \frac{1}{K_{i,0}} \sum_c |RCA|_{ci} K_{c,N-1}$$

Finally, the capabilities index is normalised. This modification is desirable because the index value is sensitive to the degree of connectivity in the product space, which changes with time. A negative (positive) capabilities index for a country in a given year indicates that the country's productive capabilities are below (above) the global average.

The use of the productive capabilities variable avoids the main limitations of the indicators of the sophistication of exports in the product space. Specifically, the new variable does not use GDP per capita to calculate an industry's sophistication. By using only diversification and ubiquity data we can identify which goods are produced by fewer countries, i.e. goods with more complex production requirements. Empirical evidence has found a positive relationship between the index on capabilities and economic growth (Hidalgo and Hausmann, 2009). This evidence is backed up by a study using several robustness tests and alternative data sources (Ourens, 2012).

The capabilities index does, however, have some limitations. One of the main limitations is that its construction does not include a direct evaluation of a country's existing skills, such as by measuring the quality of the education system, the skills of the workforce, the quality and maturity of R&D, and the patents filed. The index therefore provides an indirect approach to productive capabilities, since the way it is calculated does not take into account the main requirements that lie behind capability accumulation.

Notes

1. A traditionally accepted measure of absolute poverty is the proportion of the population living on less than USD 1.25 a day, measured using purchasing power parity (PPP).
2. The worldwide middle class is expected to expand from the current 2 billion people to almost 4 billion by 2025 (Kharas and Rogerson, 2012).
3. Percentage of the population living below 50% of the country's median income.
4. Latin America behaves somewhat differently, having consistently and significantly reduced its poverty and inequality indicators. However, the new middle classes spawned by these improvements are still highly vulnerable.
5. A breakdown of growth reveals that capital stock's contribution to annual growth was 5.3 percentage points for 1996-2001, 6.5 points for 2001-06 and 6.9 points for 2006-11 (OECD, 2013c).
6. Sectoral factor reallocation's annual contribution to growth was 2.7 percentage points for 2003-08, higher than it has been since 1988 (OECD, 2010c).
7. Chinese growth during the present decade will be such that it will contribute 30% to world growth, more than double the contribution expected from all the G7 countries combined and around 2.4 times the total contribution expected from the other BRICS countries (BBVA, 2011).
8. Some estimates predict that China will overtake the United States to become the largest economy by the end of this decade (Buiter and Rahbari, 2011). Looking further ahead, by 2060 the total GDP of China and India will exceed the GDP of all the OECD countries combined (Johansson et al., 2012).
9. Calculated using PPP, but there are no substantial changes to the figures if nominal GDP is used.
10. As measured by the PRODY index (Hausmann, Hwang and Rodrik, 2007), calculated as described in Annex 2 of this chapter.
11. A country can grow its exports by increasing the quantity of exported goods that are already part of its export basket (intensive margin), by selling goods it already exports to new countries, or by exporting new goods (extensive margin).
12. The methodology is described in Annex 2.A2.
13. These results are broadly consistent with those found by performing a direct comparison of some of the factors that are presumed to be behind capabilities. For example, Latin America's human capital lags well behind that of advanced economies and that of China (OECD, 2010d). The same is true of Latin America's infrastructure and logistics, as shown in Chapter 4 of this report.
14. According to estimates by the United Nations (2011), India's urban population will increase from 30.9% to 51.7% of the total population between 2010 and 2050, while China's will increase from 49.2% to 77.3%. In Latin America the rate of urbanisation is much slower, because the process is already much more advanced, with 78% living in urban areas in Mexico, 92% in Argentina, and 84% in Brazil.
15. The design of this variable is explained in Annex 2.A2.
16. India exports to markets where Latin America exports the same goods.
17. For a review of the literature, see Frankel (2012).
18. Balance of exports and imports divided by GDP.
19. According to the World Bank's *World Development Indicators*.
20. These differences remain if we compare regional trade agreements. For example, intra-regional exports in Mercosur represented 14.8% of the region's total trade in 2007, well below the 66.4% recorded in the European Union, 49.7% in the Association of Southeast Asian Nations (ASEAN) region, and 35.3% among the countries of the North American Free Trade Agreement (NAFTA) (Curran and Zignago, 2013).
21. Measured using PPP, based on World Bank data.
22. Looking at the recent experience of India, Ghani (2010) finds that the services sector creates most new jobs and has higher real-term wage increases than agriculture and industry.
23. Lederman, Olarreaga and Perry (2009) note that Latin American exports to the United States are currently seven times higher than total Chinese and Indian exports to the same country.
24. In OECD economies, the services sector provides 74.8% of GDP on average. This figure falls to 55.7% in upper-middle-income countries and 51.6% in lower-middle-income countries (UNIDO, 2012).

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CHAPTER THREE

Productivity, structural change and diversification of production in Latin America

Summary

Development involves economic, social and political changes. Within this process, productivity and change in the production structure are closely related to other areas of the economy and society. For technology and income per capita to converge, countries must move towards more diversified, more complex production structures with more technology and knowledge so they can make progress in improving their productivity and reducing their structural heterogeneity. Endogenous capacity-building and reducing economic and social gaps go hand in hand and require the appropriate public policies. Industrial, technological and capacity-building policies are therefore necessary to achieve these objectives. Consequently in Latin American countries, production diversification policies and industrial and innovation policies should play a central role in the new development strategy. The development agenda must prioritise long-term policies geared towards more knowledge-intensive and innovation-intensive production structures in which social and environmental sustainability are priority objectives.

Introduction

This chapter deals with a fundamental area of the development process, productivity and a change in the production structure. First it discusses concepts associated with productivity and structural change. It then presents empirical evidence on the relationship between diversification, technology and growth. This section also presents a broad set of indicators to take stock of structural change in the region, and also takes a comparative view of how structures have changed over time. Given the importance that information and communication technologies (ICTs) have taken on in recent years, the chapter then gives an overview of the region's progress in the dissemination and use of digital technology and its impact on the countries' competitiveness. Next, it briefly analyses the ties between employment and productivity and how production structure is a deciding factor in the potential for sustaining long growth periods in output and productivity. The final section of the chapter addresses the main policy implications of the comparative analysis in the earlier sections from a country perspective.

Productivity and structural change: Conceptual aspects

Development requires quantitative and qualitative economic, social and policy changes. It is a multifaceted process that reinforces democracy and citizenship in a context of dynamic economies that participate virtuously in the international system.

Countries must transition towards more diversified production structures that make greater use of technology and knowledge to help bolster productivity.

The productivity aspect and changing the production structure are tightly interrelated with the other areas of the economy and society within the development process. If technology and per capita income are to converge with those of developed countries, production structures must become more diversified and complex and make greater use of technology and knowledge to foster better productivity and reduce structural heterogeneity. Historical experience underscores that all successful cases of convergence (including China's recent rise as a new commercial and world power) were associated with the implementation and development of new sectors or business activities. The spread of technology and increases in productivity do not derive from accumulating the same type of capital or producing more of the same goods, but rather they occur when new products and processes emerge and shift the production matrix. Structural change, in turn, is not only necessary to close the productivity and income gap with the developed world (external gap), but is also needed to narrow the income gap within economies (internal gap), especially in a region known for some of the most extreme income disparities in the world. Distribution can be improved through social policy and redistributive policies, but these cannot be sustained in the long term unless high-quality jobs are created. Various conditional-transfer initiatives have been carried out in the region, helping to reduce poverty substantially, but their sustainability, which depends largely on income from activities related to exploiting natural resources, is limited. One central component of development is to transfer labour from low-productivity subsistence sectors with high levels of informal employment to higher-productivity business activities with stronger linkages and more knowledge spillovers. Creating good-quality jobs requires transforming the production base, which must be expanded to include new types of technology-intensive, knowledge-intensive activities and technology paths. This is a key factor not only for narrowing the gap in some sectors or centres of excellence, but also to close the external and internal gaps.

The two conditions that structural change for development must meet – a dynamic technology path and strong demand – define a highly efficient production structure, ensuring that technology spillovers and the expansion of effective demand benefit not only a set of large companies but also the economy as a whole through backward and forward linkages. In this structural change process, new stakeholders emerge and the workforce increasingly moves from low-productivity sectors to new sectors that fill the space between pioneering and subsistence activities (ECLAC, 2007, 2012; McMillan and Rodrik, 2011). Medium- and high-productivity activities thus become more evenly distributed, which increases equity. As a result, productivity and employment go hand in hand.

But it should be remembered that in some cases there is tension between the two efficiencies. A country that performs solidly in sectors with few increasing returns may direct resources to these areas (static efficiency) and away from sectors with lower short-term productivity but prospects for higher productivity in the long term. Policies should focus on turning static efficiencies into dynamic ones, avoiding "lock-in" effects in business areas that are less knowledge-intensive.

In Latin America and the Caribbean the challenge of competitiveness is more pressing than ever. Some countries in the region have enjoyed many years of economic boom. However, the economies still lag behind other countries and face limitations where new technologies are concerned. The technology revolution seems to be happening primarily outside this region, due to a lack of local effort needed to fully exploit its potential. This is reflected in its productivity.

While Latin America's productivity gap with the United States has grown over the past two decades, Asia's has narrowed.

Box 3.1. **Productivity gaps (Latin America vs. Asia)**

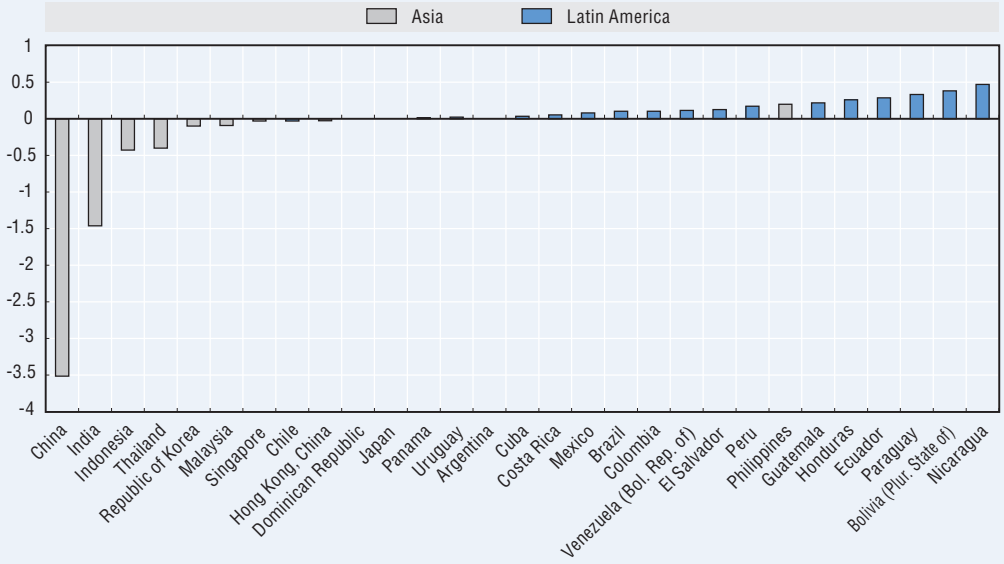
The productivity gap can be considered an indicator of the countries' production capacities and technological capabilities, and of the distance that separates developing regions from developed regions. It is defined as the ratio between US productivity (used as a proxy or benchmark variable for the productivity of countries on or near the technological frontier) and the productivity of developing economies. The ratio measures the distance or gap that must be closed to position the region on the technological frontier, using the United States as a benchmark.

Comparing the productivity dynamics of countries in Asia with those of Latin America and the Caribbean shows divergent progress in the two regions for the period from 1980-2011. In general, the Asian economies' productivity gap narrowed greatly. For example, in the 1980s, Hong Kong, China's productivity was 50-70% that of the US, while by 2011 the number had risen to 98%. The Republic of Korea's productivity went from 20-25% that of the US in the 1980s to 44% in 2011. Additionally, countries such as China and India, which initially had greater productivity gaps to the United States than did the countries mentioned above, also drastically reduced them from 1980-2011.

In 1980, US productivity was 125 times that of China, while in 2011 it was just 17 times that of China. The same pattern and progress occurred in India: in 1980, US productivity was 70 times that of India, while by 2011 the ratio had dropped to 33:1. Though Asian countries travelled different routes and began from different starting points, most reduced their productivity gap with the United States significantly from 1980-2011.

Box 3.1. (contd.)

Figure 3.1. **Changes in productivity gaps between selected Asian and Latin American countries and the United States (1980-2011)**
(as percentages, annual growth rates in GDP per worker)



Source: Authors' calculations based on World Bank, *World Development Indicators* and CEPALSTAT data.
StatLink http://dx.doi.org/10.1787/888932906787

This is a marked contrast to the countries of Latin America and the Caribbean. Not only did they fail to significantly cut their overall productivity gap in this period, but some even increased it. For instance, from 1980 to 2011, US productivity rose by magnitudes of some 60-100% compared with the economies of countries like Bolivia, Nicaragua, Paraguay and Honduras. Some countries that showed stronger performance in recent years were conspicuously unable to regain their relative productivity of the early 1980s compared to the US (e.g. Argentina and Uruguay). The region also became far more heterogeneous than before, with sharper contrasts between countries' productivity levels.

Structural change is associated with innovation and the capacity to diversify towards business activities that are more technology intensive.

Latin America needs to make a focused effort to embrace information and communication technologies (ICTs) and build its endogenous capabilities for the adaptation, use and innovation of these technologies. New technological paradigms are generating production and innovation paths that bring together the best technological opportunities; at the same time, allied sectors produce goods and services that play an ever-increasing role in foreign and domestic demand. Programmes supporting the emergence of innovative start-ups, for instance, clearly reflect the region's tendency to link structural change to innovation and foster diversification into more technology-based endeavours (Box 3.2).

Box 3.2. **Latin America aims to foster start-ups**

Amid renewed interest in innovation in Latin American countries, the founding of start-ups is increasingly important in some of the region's countries, in terms of private-sector initiatives and public policy. Start-ups contribute to structural change in the economy by helping to introduce new knowledge-intensive products and services and bolster the economic system's productivity and innovation capacity. Though there is no single definition of what counts as a start-up, they are characterised by their dynamic, innovative nature. Typically they originate in specific sectors such as information and communication technologies, health and pharmaceuticals, new energy and clean technologies. For start-ups to be able to grow and develop their potential, it is important to set up a robust innovation system, foster a good entrepreneurial base and set up an R&D system that can generate a relevant flow of knowledge and technology, as well as providing financing and an appropriate legal framework.

We can have a global vision of the support systems for start-ups consisting of three major categories of instruments: financing, development of entrepreneurial skills, and reforms of the regulatory framework. Through this taxonomy, the existing public policies in each of the region's six countries are analysed and compared (Figure 3.2) (OECD, 2013).

Figure 3.2. **Targeted policy tools to promote start-ups in Latin America: A comparison between countries**

Implemented · In development · Recently created · Need to be created or reformed

Category	Tool	Argentina	Brazil	Chile	Colombia	Mexico	Peru
Financing	Seed capital	In development	Implemented	Implemented	Recently created	Need to be created or reformed	Recently created
	Angel investors	Need to be created or reformed	Implemented	In development	Recently created	Need to be created or reformed	Need to be created or reformed
	Venture capital	Need to be created or reformed	Implemented	Implemented	Recently created	In development	Need to be created or reformed
Business services and entrepreneurial training	Incubators	Implemented	Implemented	Implemented	In development	In development	Recently created
	Accelerators	In development	In development	In development	Need to be created or reformed	In development	Need to be created or reformed
	Corporate spin-offs	Need to be created or reformed	Need to be created or reformed	Need to be created or reformed	Need to be created or reformed	Need to be created or reformed	Need to be created or reformed
	Technology transfer and university spin-offs	In development	Implemented	In development	Need to be created or reformed	Implemented	Need to be created or reformed
	Business training	Implemented	Implemented	Implemented	In development	In development	In development
Regulatory framework	Ease of creating or closing down businesses	Need to be created or reformed	Need to be created or reformed	In development	In development	In development	In development
	Taxation and special legislation	Need to be created or reformed	In development	In development	Need to be created or reformed	In development	Need to be created or reformed

Beyond the countries' individual experiences, an overall analysis of their experiences can provide a set of lessons about the role of public policy in fostering start-ups. Two aspects will be highlighted: the need for support policies for start-ups to be made a part of production-transformation and innovation strategies; and the design of increasingly integrated instruments that simultaneously offer finance options with consulting services and capacity-building.

Source: OECD (2013), *Start-up Latin America: Promoting Innovation in the Region*, OECD Publishing, Paris.

One defining feature of the new technological paradigms, such as ICTs, biotechnology and nanotechnology, is their impact throughout the production structure (ECLAC, 2013). These are general-purpose technologies, which magnifies their impact when there is a wide range of sectors in which they can be applied. The new paradigms affect the competitiveness, innovation and productivity of the entire production fabric. The potential benefit from adopting and developing these technologies depends heavily on the characteristics of the economies themselves. As a corollary, a more diversified production structure offers more chances to use these technologies and benefits more from their widespread adoption, while also helping to develop them. To that end, strong complementarities are identified between new and old paradigms; the co-evolution of production structures and new technologies is a phenomenon that should be a central subject of analysis and should inform the region's industrial policies.

Production structure, industrial dynamics and specialisation: A comparative analysis

Empirical evidence confirms the importance of structural change as a key variable that promotes and supports the development and international convergence of productivity and income (Box 3.3). Below we shall illustrate the relationship between production structure, specialisation and relative productivity.

Sophistication of exports and the complexity of the production structure are key elements for sustained growth.

Box 3.3. **A brief literature review on diversification, technology and productivity**

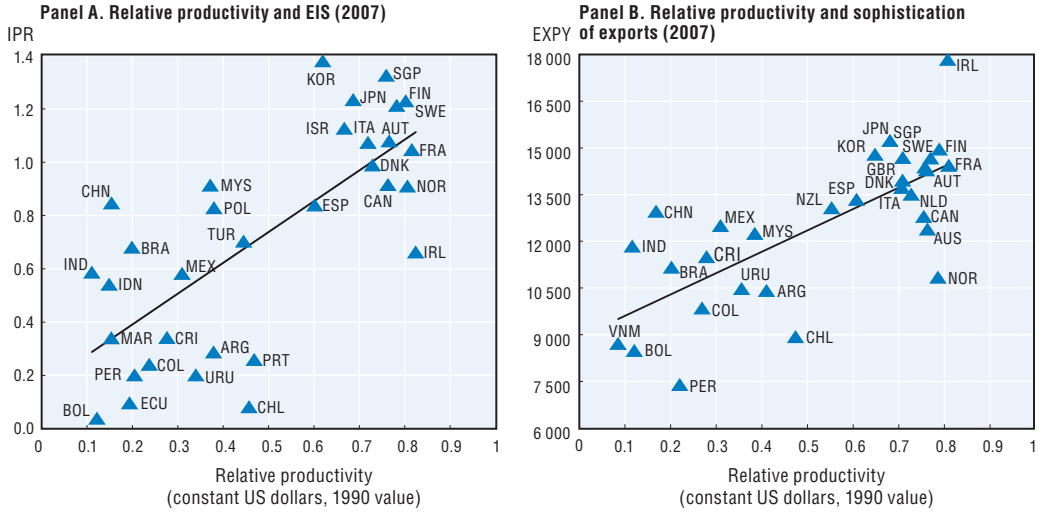
Though evidence of the relationship between structural change, technology and productivity is much more extensive than can be covered here, the topic is worthy of a brief discussion. The empirical analysis initially focused on recognising the considerable heterogeneity of production functions across the different sectors. Durlauf and Johnson (1995) as well as Eberhardt and Teal (2013) show that within the countries, the technologies and production functions vary widely between sectors (Herrendorf, Rogerson and Valentinyi, 2013). Therefore, estimating total factor productivity based on aggregate production in a way that ignores the specifics of the various industries creates strong distortions that seriously compromise the validity of such exercises. Recognising the sectoral aspect also generated greater concern for understanding the determinants of diversification and their impact on countries' income. Per capita income is systematically and positively associated with diversification of production (de Benedectis, 2006). However, some studies report a non-linear relationship between these variables (Imbs and Wacziarg, 2003). Another approach has been to study the link between specialisation patterns and growth. This has been increasingly accepted by economists, especially since the impact of the Asian economic miracles (e.g. the Republic of Korea and, more recently, China). These miracles were associated with marked changes in the countries' production and export profiles.

Box 3.3. (contd.)

Some of the first empirical studies on output and export composition's role in boosting growth rates found that technology gaps are a determining factor (Dosi, Pavitt and Soete, 1990). The relationship between these variables was later analysed in greater detail by Dalum, Laursen and Villumsen (1998). Recent empirical work confirms that the sophistication of exports and complexity of production structure are important determinants of long-term growth (ECLAC, 2007, 2012; Hausmann, Hwang and Rodrik, 2007; Hidalgo, 2007; Rodrik, 2008; Agosin, 2009; Cimoli, Porcile and Rovira, 2010; Felipe, 2012). Though there is still disagreement about the right way to measure sophistication and complexity, there seems to be consensus that specialisation and the production structure are essential to sustained growth.

It is worth mentioning that the concept of structural change underlies Keynesian growth models, especially where long-term growth depends on the income elasticity of exports and imports (Thirlwall, 2011). These elasticities are a function of the production structure; changes to that structure are why elasticities change over time, leading to convergence or divergence (ECLAC, 2012; Gouvêa and Lima, 2009).

Figure 3.3. **Relative productivity, specialisation and EIS (2007)**



Note Panel A: Countries' relative productivity is calculated as the ratio between the country's labour productivity and that of the benchmark country, the United States. Relative productivity is thus the inverse of the productivity gap. The complexity of a production structure (i.e. how technology-intensive it is) is measured using two indicators: the relative weight of engineering-intensive sectors (EIS), which is the ratio between the sectors' contribution to manufacturing value added in the country and the equivalent figure in the United States.
Source Panel A: Based on data from the World Bank's *World Development Indicators* and UNIDO.

Note Panel B: The indicator for sophistication of exports (EXPY, as proposed by Haussmann et al. [2007]) is also a good indicator of the efficiency of specialisation from the perspective of the strength of demand.
Source Panel B: Based on information from the World Bank, *World Development Indicators* and COMTRADE, United Nations.

StatLink http://dx.doi.org/10.1787/888932906806

A stylised fact that emerges from the evidence is that a production structure's relative productivity and dynamic efficiency move in the same direction. As mentioned above, structure, technology and productivity co-evolve and reinforce one another. Both indicators clearly show that Latin American countries tend to be concentrated in the southeast portion of Figure 3.3. For these countries, one of the challenges to moving forward in the development process consists largely of moving gradually towards the northeast region of this figure.

A more comprehensive, detailed view of Latin America's production structure and technological capabilities requires the inclusion of other variables and indicators in the analysis, as described in Annex 3.A1. A joint analysis of these indicators makes it possible to correct the biases of each one. When the indicators point in the same direction, one can draw solid conclusions about the level of technological capabilities. But if they point in different directions, this dissonance itself raises questions that help better understand the dynamics of technological change in the countries. This is why it is appropriate to present a broad set of indicators for production capacity and technological capabilities.

For comparisons between Latin America and other regions, the countries were grouped by different criteria. On the one hand, Latin America was divided into two subregions: South America and Central America. Additionally, individual data are given for the region's three largest economies (Brazil, Mexico and Argentina) since they account for a large share of Latin America's GDP. Asia's emerging countries, in turn, are included as points of reference, as development success stories that narrowed their technology gap and per capita income gap with the developed world.

Natural resources don't necessarily bring a curse, as they can also serve as a base for movement towards more diversified production structures.

Developed economies, which are also included in the comparison, are divided into two groups: ones whose total exports consist largely of primary resources and natural-resource-intensive manufacturing (above 70% and labelled ME-NRs in Table 3.1); and a group in which these make up a smaller percentage of exports (below 70%, simply labelled mature economies, MEs). This subdivision into two groups of developed economies aims to show that natural resources are not an inherent obstacle or "curse" for structural change. They can, in fact, be the foundation for transitioning to new, increasingly sophisticated, knowledge-intensive sectors and business activities.

But the move from static to dynamic comparative advantages is not automatic and the risk of lock-in always exists. In Scandinavian countries, the shift from natural resources to engineering-intensive sectors (capital goods, dairy centrifuges, filtration technologies) was neither instantaneous nor involuntary. Starting in the 1980s there were important technology policies designed to foster new business activities: for instance, strong private-sector support for R&D in Finland, and public procurement policy in Denmark co-ordinated with the pharmaceutical sector to achieve a leadership position in some biotechnology fields.

So although countries in the ME-NRs group are often compared with certain Latin American economies with ample natural resources, the production structures of the two regions differ greatly. The data indicate a stark contrast between the complexity of the two regions' production structure. This difference in structures reflects how the ME-RNs countries created industrial policies to use the revenue from natural resources, and reflects each country's ability to administer macro-prices so as not to jeopardise production of new tradeable goods that are more dependent on technology and knowledge.

The region lags far behind in technological effort, labour productivity, knowledge intensity and the adaptability of its production structure.

In Latin America, the classic indicators of technological effort and results (R&D and patents) are, in fact, less favourable than in other regions, regardless of whether one looks at the subregions (South America and Central America) or one considers the region's largest economies individually (Argentina, Brazil and Mexico) (Table 3.1). The behaviour of Latin America's relative productivity also reflects how far the region is lagging behind. For example, South America's labour productivity is roughly one third that of Asia's developing economies. The same is true of the indicator for the knowledge intensity of manufacturing, as the relative weight of engineering in Latin America is less than one quarter that of developing Asian economies. South America's adaptability index (AI) is below that of Central America, and its progress has been less favourable than Asia's. The AI observed in Asia quadrupled between 1985 and 2007, while South America's only doubled. Central America shows a more favourable trend, since AI rose from 0.2 to 1.1 thanks to advances in export assembly.

Indicators do not always send a consistent message. For instance, Mexico and Central America's medium- and high-technology exports are conspicuously high, greater than South America's. For this variable, Mexico achieved better figures than developed, natural-resource-exporting economies and similar figures to Asian developing economies. This is consistent with the AI indicators seen in Mexico and Central America, which are better than South America's. However, they contradict the other indicators for technology capabilities and structural change in Table 3.1. The high numbers for X_MHT/T in Mexico and Central America are strongly influenced by free-trade-zone exports and exports made under special temporary import regimes, which are defined by labour costs and not by knowledge intensity. The low numbers for other variables (such as patents, relative productivity and the EIS share) confirm the lack of a process to upgrade capabilities in these countries.

Table 3.1. **Indicators of the production structure and technological capabilities**

	Relative productivity	AI		X_HMT/X	EXPY	EIS	Patents	R&D	MTEL	FBB	MBB	Internet
	2001-10	1985	2007	2007	2008	2005	1990-2010	1996-2009	2009-11	2009-11	2009-11	2009-11
Argentina	25.7%	0.1	0.2	22.0%	10.4	0.4	1.0	0.5%	132.9	9.6	8.4	40.6
Brazil	11.7%	0.4	0.9	32.0%	11.4	0.7	0.5	1.0%	105.8	7.1	12.0	41.6
Mexico	19.8%	0.3	1.1	60.5%	13.2	0.6	0.6	0.4%	79.1	9.6	2.3	31.2
Developing Asia	33.8%	0.5	2.3	64.3%	14.6	0.9	17.2	1.3%	119.8	15.0	36.7	48.5
South America	12.1%	0.3	0.6	18.5%	9.1	0.2	0.4	0.4%	104.3	5.2	5.6	35.4
Central America	11.0%	0.2	1.1	34.2%	11.2	0.2	0.3	0.2%	107.6	3.2	3.2	19.8
ME-NRs	71.3%	0.5	1.3	32.4%	14.1	0.8	55.2	2.0%	119.0	28.5	49.9	83.1
Advanced economies	76.3%	0.8	1.5	64.6%	15	1.1	126.1	2.4%	116.7	29.1	51.3	76.3

Legend:
Relative productivity: average labour productivity relative to that of the United States for the period 2001-10 (the simple average for aggregates).
AI Adaptability index 1985-2007.
X_HMT/X: Percentage of exports for medium- and high-tech manufactures based on the Lall classification (2000) for 2007.
EXPY: Indicator of sophistication of exports, calculated as a weighted average (weighted by the share of exports) of the PRODY indicator. This is a weighted average (using each country's revealed comparative advantage) of the income per capita of countries that export a particular good.
EIS: contribution of engineering-intensive sectors to manufacturing relative to the level in the United States (2005).
Patents: number of patents granted by the USTPO per million inhabitants.
R&D: spending on research and development as a percentage of GDP.
MTEL: penetration of mobile telephones.
FBB: penetration of fixed broadband.
MBB: penetration of mobile broadband.
Internet: Internet penetration.

Note: Developing Asia comprises Hong Kong, China; Indonesia; Malaysia; the Philippines; the Republic of Korea; Singapore; and Thailand. Advanced economies comprise France, Germany, Italy, Japan, Sweden, the United Kingdom and the United States. Natural-resource-intensive developed economies are countries with a high GDP per capita and natural resources that make up more than 30% of exports (Australia, Denmark, Finland, Ireland, New Zealand and Norway). The number of patents is the average for 1990 2010. R&D spending is for 1996 to 2009 and averages are calculated based on the availability of each country's data each year. For the purposes of calculating EIS, South America includes Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Peru and Uruguay. Central America comprises Costa Rica and Panama. The developed economies are France, Italy, Japan, Sweden and the United Kingdom. For relative productivity, South America comprises Argentina, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru and Venezuela. Central America comprises Costa Rica, Honduras and Panama.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), based on CEPALSTAT [online database] http://website.eclac.cl/sisgen/ConsultaIntegrada.asp; TradeCAN (version 2009), [online database] http://comtrade.un.org/db/default.aspx; World Bank, World Development Indicators (WDI), [online database] http://databank.worldbank.org/; Organisation for Economic Co-operation and Development (OECD), Labour Force Survey (MEI) [online database] http://stats.oecd.org/; European Commission, Eurostat [online database] http://epp.eurostat.ec.europa.eu/; United Nations Commodity Trade Statistics Database (COMTRADE), [online database] http://comtrade.un.org/db/default.aspx; United States Patent and Trademark Office (USTPO), [online database] http://www.uspto.gov/. R&D spending is for 1996 to 2009 and averages are calculated based on the availability of each country's data each year.

A comparative analysis confirms the need to focus the discussion not on natural resources but on policy and diversification. The more intense diversification in successful economies rich in natural resources (ME-NRs) can be seen by comparing some production-structure indicators. In particular, the EIS share of ME-MRs is four times that of South and Central America, and the EXPY is high, closer to developing Asia's than to Latin America's. The other indicators point to the same conclusion. These major structural differences contrast with the fact that the percentage of natural-resource exports is not too different in South or Central America than in the ME-NRs countries.

Technology is a key to the diversification of natural-resource-based economies.

Technology plays a vital role in diversifying natural-resource-based economies. Identifying opportunities and the potential for exploiting them depends on technological capabilities that are built in other segments of the economy (engineering in the case of prospecting, knowledge in the case of biotechnology, etc.). Developing linkages requires transitioning from mainly innovation-consuming activities to innovation-producing activities that can drive and refine the former's efficiency and competitiveness. This is no small feat. New paradigms do not necessarily offer incremental, cumulative learning paths, as was formerly the case in metallurgy; and technology often arrives through foreign investment, which requires complex policies (for political and technological reasons) if technology is to increase local levels of R&D and training.

An analysis of the spread of ICTs confirms the perception of very different processes for building capabilities on top of the initial base of resources (Table 3.1). The digital and ICT gap between countries is a widely recognised. The differences are smaller for mobile phones, the dissemination of which is less dependent on income levels, and more pronounced for fixed and mobile broadband, a more advanced use of these technologies. Latin America's fixed-broadband penetration rate has reached one-third of developing Asia's, while its mobile broadband penetration rate is less than one-seventh of developing Asia's. The differences are even greater in comparisons with mature economies or with developed economies with natural-resource-intensive exports. This marked asymmetry in ICT use is another indicator of deep structural differences. To the extent that there is high complementarity between ICT use and building a more diversified, sophisticated, complex structure, the lack of structural change will hinder the full dissemination of ICTs.

The technological potential in natural-resource-intensive sectors has changed considerably due to new ICT-driven technological paradigms. Access to, adoption of and use of these technologies are part of a system in which complementarities are fundamental. So, for instance, the spread of mobile phones in rural parts of Latin America and the Caribbean has let the region's farmers skip some of the usual stages of technological development, but their income, education levels, and level of integration into networks and value chains still limit their access to ICTs. On the other hand, the spread of "technology packages" that include ICTs built into farm equipment and bundled with the services of specialised technicians is a catalyst for the spread of technology in the sector. However, the adoption and success of new technologies still depends on the development of technological capabilities within the country, and of a diversified endogenous offering of services and capabilities to let producers choose, implement and properly use such technologies and interact and learn through them (Rodrigues, 2013). Reducing the gap means overcoming the limits imposed by a pattern of low-tech specialisation.

By boosting the productivity of the various sectors of an economy, innovation helps narrow both the internal and external gaps.

In short, resources that are channelled into innovation open up new investment opportunities and, to the extent that there are complementary pre-existing capabilities, help build new production sectors. Services and industries respond to new technological demands; the more knowledge-intensive business activities increase their share of the economy, while the more sophisticated goods increase their share of exports. Exports become more diversified and sophisticated, reaching more-demanding markets where product differentiation is an important competitive weapon. The stimuli of foreign and domestic demand generate impetus that the economy can respond to endogenously, generating better, more productive jobs. Diversification of the economy's structure and the spread of general-purpose technologies such as ICTs generate virtuous, self-reinforcing processes based on externalities and increasing returns in the form of learning. Throughout this process, both gaps are reduced: the external gap with the international technological frontier, and the internal gap that shut a wide range of workers out of the more productive business activities.

Policies are needed to generate these virtuous processes. Generating revenue or additional benefits from the sectors' use of natural resources in countries where they are abundant reinforces the specialisation pattern. This reflects the aforementioned tension between static efficiency and dynamic efficiency at any given moment. If the institutional structure necessary to promote structural change is not present and there are no industrial policies, then the virtuous process will be thwarted quickly (more on this later in the chapter).

A concentration of exports in natural resources does not seem, in itself, a barrier to moving towards higher-technology exports.

Box 3.4. **Natural resources and export diversification: From curse to blessing?**

Are natural resources a barrier to progressing towards more technology-intensive exports? The evidence does not seem to suggest this, at least not for all natural resources. Table 3.1 illustrates this point with a dynamic panel data exercise (Cimoli, Fleitas and Porcile, 2013). While the dependent variable is medium- and high-tech exports as a percentage of total exports, the independent variables will include different types of natural resources (agricultural, mineral and energy resources), besides a broad range of control variables, including the stock of physical and human capital, openness of the economy, and the real exchange rate.

According to this econometric analysis, natural resources do not have a negative effect on technology content, except for energy resources. Agricultural exports lose their negative effect when one controls for human capital. Meanwhile, the real exchange rate has a stronger, more robust effect in favour of a more technology-intensive export basket. In this regard, if the abundance of natural resources pushes up the exchange rate in times of economic boom, exports can definitely be hit. Moreover, the dynamic panel shows that the lagged dependent variable is significant, suggesting that the behaviour of exports can be path dependent. This is why macroeconomic policy, especially exchange-rate policy, should correct the movements towards an unsustainable appreciation of the real exchange rate. Such appreciation could discourage or depress the technological upgrading of exports.

Box 3.4 (contd.)

Table 3.2. **Medium and high technology export share**

Dependent variable: Medium and high tech exports

MHTE (t-1)	0.0430	0.0707**	0.109***	0.145***	0.141***	0.132***
	(1.31)	(2.16)	(3.31)	(4.39)	(4.16)	(3.81)
RER	0.472***	0.393***	0.331***	0.154*	0.287***	0.200**
	(5.43)	(4.61)	(3.89)	(1.75)	(3.22)	(2.17)
GDP	1.095***	0.957***	0.762***	0.653***	0.548***	0.555***
	(9.12)	(8.21)	(6.31)	(3.51)	(4.27)	(2.91)
Volatility		0.167	0.284	0.151	0.361	0.219
		(0.75)	(1.26)	(0.68)	(1.59)	(0.96)
OPEN			0.204*	-0.118	0.198	-0.0360
			(1.65)	(-1.01)	(1.60)	(-0.29)
HumanK				0.412***		0.451***
				(3.78)		(3.78)
PhysicalK				-0.0449		0.118
				(-0.22)		(0.57)
AGRIPC					-59.24*	81.28***
					(-1.89)	(2.79)
ENERGY					-0.014***	-0.013***
					(-3.15)	(-2.95)
MINERY					-0.0261	-0.0029
					(-1.43)	(-0.14)
Obs	**701**	**701**	**701**	**701**	**661**	**661**
Countries	**110**	**110**	**110**	**110**	**105**	**105**
AB(2)	**0.185**	**0.235**	**0.281**	**0.534**	**0.625**	**0.6**

Notes: *Statistically significant at the 10% significance level. ** Statistically significant at the 5% significance level. *** Statistically significant at the 1% significance level.
All the equations are estimated by Arellano-Bond (1991). The only difference is the control variables used in the model. The first model includes the shift in the dependent variable and in the real exchange rate (RER), while the other models include different combinations of the set of control variables. The estimate is based on a five-year panel for the period 1965-2005. The autocorrelation of the residuals (Arellano-Bond test) was used to confirm the presence of a dynamic variable and the Hansen test was used as a validation test for the instruments.
Source: Cimoli, Fleitas and Porcile (2013).

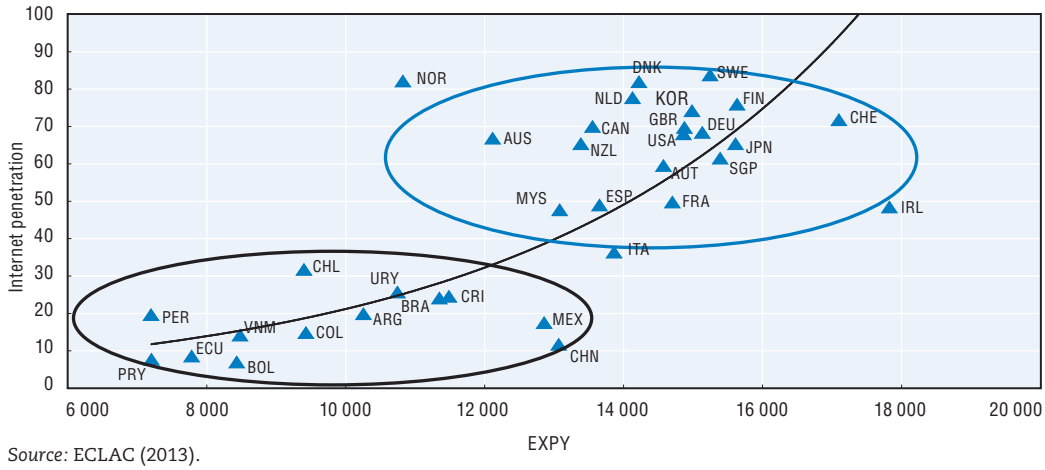
ICTs as an asset complementing growth and structural change

Fully exploiting the potential of general-purpose technology requires a large number of sectors in which it can be used and demanded. Sectors subject to increasing returns achieve greater economic efficiency and innovation intensity. ICTs are no exception to this rule. As people find ways to incorporate ICTs into new business activities, the system's efficiency rises. Besides the traditional economies of scale there are the benefits from increasing the number and variety of users and technologies, which feed mutual learning processes. The effect of general-use technologies is magnified when they permeate a denser, more sophisticated production fabric.

Various indicators can illustrate the process of virtuous interaction between ICTs and structural change. The penetration of the Internet was the indicator chosen to reflect the dissemination of ICTs (Table 3.1). This is considered a good proxy for the

spread of ICTs given its elevated ability to affect users' and businesses' efficiency, and because relatively long series are available. The EXPY variable, described in the previous section, was used as a proxy for the intensity of structural change.

Figure 3.4. **Relationship between Internet penetration and sophistication of exports**
(2003-08 average)



Source: ECLAC (2013).

StatLink http://dx.doi.org/10.1787/888932906825

There is a positive relationship between ICT use and the diversification and sophistication of the production system.

There is a positive relationship between the sophistication of exports (EXPY) and Internet penetration. This reflects the complementarity between two movements: the spread of general-use technologies and the building of a diversified, complex production system. Another conclusion is that different ICTs spread through the global economy at different speeds and following different patterns (Figure 3.4). On the one hand, Asian and European countries are concentrated in the northeast quadrant of the figure, representing high dissemination of ICTs and structural change that have gone hand in hand. Conversely, Latin America is concentrated in the southwest quadrant, where neither process achieved the same momentum.

Industrial and technology policies in the region face the challenge of making the leap to levels that characterise mature economies as well as developing economies that have successfully narrowed gaps. A lack of diversification can be an obstacle to deepening the region's digital economy, as suggested by the co-evolution of the two variables. There is a contrast between the behaviour of these variables in the different regions. This requires simultaneous progress in both areas, ICTs and the knowledge intensity of the production structure.

The way that ICTs' impact on growth is studied has evolved over time. At first, ICTs were included in the growth accounting exercises. This was a fairly simple, indirect way to look at the role that structural change plays in the economy. It was accepted that capital was not homogeneous, and that some types of capital could contribute more to growth than others.

New technologies generate growth because they drive the emergence of new sectors, business activities, and markets.

Gradually, the studies began to stress the link between growth and structural transformation. Innovation, technical progress, and growth come together in structural change. New technologies generate growth because they give rise to new sectors, business activities, and markets. Innovation and the spread of technology are intertwined with the advent and disappearance of sectors and changes to the production landscape. Investment booms come from the production of new goods, capabilities and infrastructure that respond to successive imbalances, generating innovation and the emergence of new technological paradigms.

Box 3.5. **Growth with structural change and ICTs**

Analysing ICTs' contribution to growth without considering structural change, which encompasses and/or complements them, would omit an important part of the story of growth. To test this hypothesis, a simple exercise in conditional convergence was performed, with explanatory variables that included both Internet penetration and structural change (Table 3.3). Medium- and high-tech exports as a percentage of total exports were used as proxies for structural change, as was rurality, defined as the percentage of the population living in a rural setting (a proxy for transference of labour to industrial and service activities).

The coefficient of lagged per capita GDP is negative, as is usual in such exercises, indicating diminishing returns on (homogeneous) capital accumulation or, alternatively, the beneficial effects on lags in international technological spillover (catching up). Schooling shows a positive coefficient, as does R&D spending. The variable for appreciation of the real exchange rate (the undervaluation index, defined as a downward deviation from its equilibrium value) is positively associated with growth, as suggested by McMillan and Rodrik (2011).

The variables for Internet penetration and for medium- and high-tech exports as a percentage of total exports are both positively associated with growth. The effect of structural change complements the effect of ICTs. The exercise therefore confirms the role of ICTs in driving growth, while suggesting that this role must be seen in conjunction with, and not as a replacement for, the role of structural change.

Box 3.5. (contd.)

Table 3.3. **Growth, ICTs and structural change**
Dependent variable: Growth rate of GDP per capita

Explanatory variable	(1)	(2)	(3)
Internet	0.03***	0.03***	
	(0.009)	(0.008)	
	0.05**	0.05***	
Medium- and high-tech exports	(0.019)	(0.018)	
			0.05***
Internet * Medium- and high-tech exports			(0.01)
Undervaluation index		2.43***	2.5***
		(0.86)	(0.86)
Rurality		-0.2***	-0.2***
		(0.07)	(0.07)
Average schooling rate	9.47***	8.65***	8.17***
	(2.24)	(2.25)	(2.24)
Research and development (R&D)	0.64*	0.86**	0.97**
	(0.48)	(0.49)	(0.48)
Investment	0.29***	0.33***	0.34***
	(0.03)	(0.03)	(0.03)
Change in GDP per capita (PPP)	-5.51***	-6.88***	-5.37***
	(1.03)	(1.13)	(0.07)
Constant	26.83***	46.47***	34.83***
	(7.57)	(10.27)	(9.24)
R-squared (within)	0.15	0.17	0.16
Hausmann test	Fixed effect	Fixed effect	Fixed effect
No. of observations	694	694	694
No. of groups	39	39	39

Notes: *Statistically significant at the 10% significance level. ** Statistically significant at the 5% significance level. *** Statistically significant at the 1% significance level.
The dependent variable is growth in GDP per capita (PPP). The estimation uses a panel data regression method with fixed effect. Standard deviations are in brackets.
Source: ECLAC (2013).

Productivity and jobs

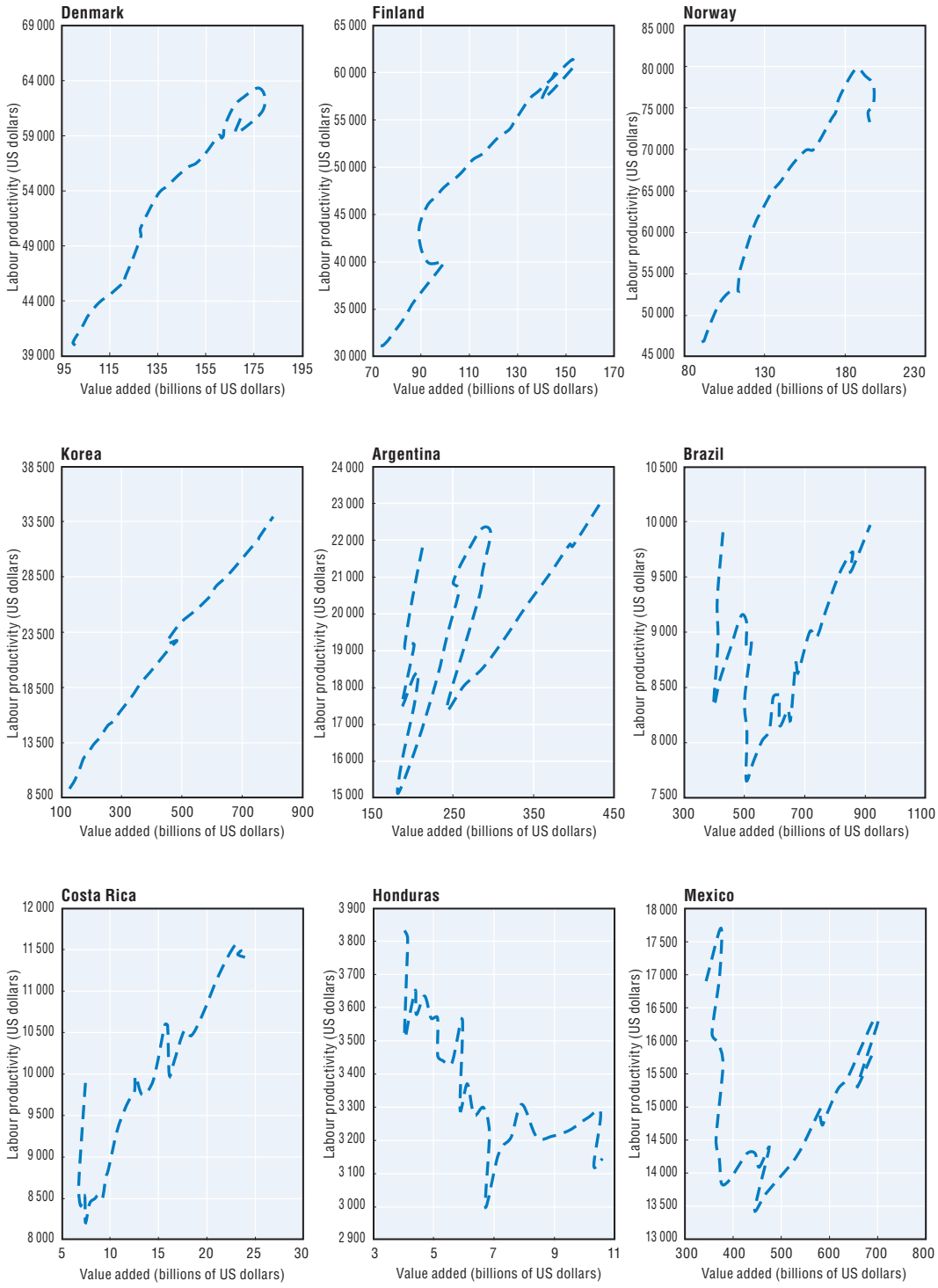
Generating high-quality jobs is associated with two main goals: creating sustained growth with productivity gains, and fostering social inclusion (ECLAC, 2010). The first of these goals, in particular, is closely related to the type of structure: whether the structure is relatively dynamic and whether or not it fosters learning and knowledge, technological development, and innovation. Labour is the activity through which most people generate income to live on, and the labour market is where people gain and develop a large portion of their skills and abilities. This is why the countries that have fostered structural change to bolster dynamic efficiency and to develop sectors that are more sophisticated technologically while speeding up the growth of effective demand have also simultaneously boosted employment and productivity. By contrast, when a country's structure moves towards low-productivity sectors, employment may rise but productivity may fall. If workers leave higher-productivity sectors to work in lower-productivity sectors, aggregate productivity may fall even as output increases, because more workers are employed. Conversely, if productivity grows but effective demand does not expand at least as quickly, then output will rise as employment falls, which would seriously hinder the chances of progressing towards inclusive development.

Expanding output has not always increased productivity, given the displacement of jobs to less productive sectors.

Latin American economies sometimes experience volatile, erratic periods when output rises even as productivity falls. Meanwhile, those Asian and European economies that have moved towards dynamic efficiency show curves in which both variables, output and productivity, rise together in a sustained manner. The data for Latin America indicate that jobs are shifting towards lower-productivity sectors, which often is merely a way of taking shelter from outright unemployment. Latin America is highly heterogeneous and the countries shown in Figure 3.5 do not accurately reflect the range of circumstances that exist in the region. Even among the countries shown in the figure, there are very different scenarios: some have shown more solid growth since 2004, while others have followed an even more erratic course. A long-term view shows that the region has had trouble sustaining increases in productivity and employment at the same time; sustaining these increases is one of the main challenges for 21st century industrial policy.

Latin America stands in contrast with the more regular upward movement seen in the output and productivity variables in the sample of Asian and European countries. The drop in productivity in Latin America was especially sharp during the "lost decade" of the 1980s. Such episodes also occurred at other points in the region's economic history (in the late 1990s and early 2000s, for instance), but they did not last as long as in the 1980s. Some segments of the curve are nearly horizontal. In other words, they reflect growth based almost entirely on the absorption of labour rather than the absorption of technical progress or on diversification.

Figure 3.5. **Dynamics of labour productivity and value added for selected countries (1980-2010)**
(constant US dollars, 2000 value)



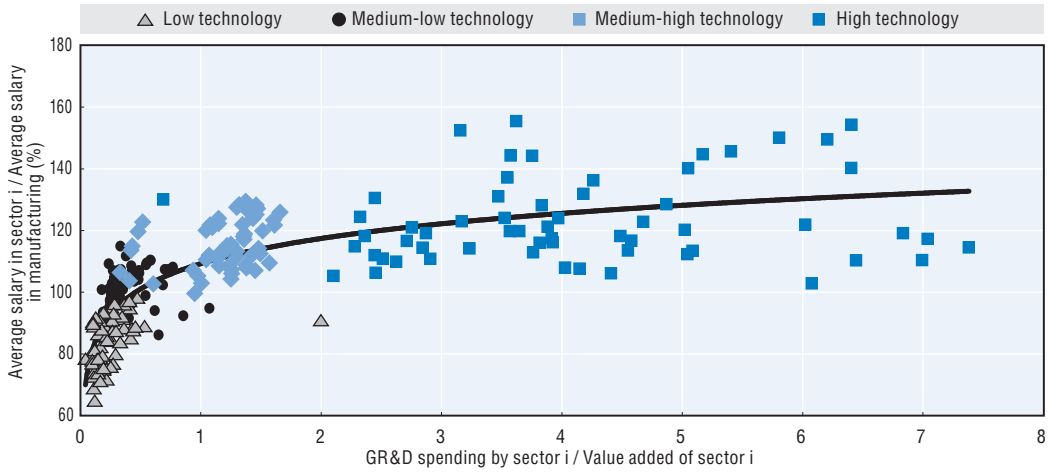
Source: CEPALSTAT, World Bank, *World Development Indicators*, Organisation for Economic Co-operation and Development (OECD), *Labour Force Survey* (MEI) 2012.

StatLink http://dx.doi.org/10.1787/888932906844

It is often difficult to achieve sustained productivity gains due to problems with countries' production structures, which hinder the creation of good jobs and better pay. The relationship between production structure and workers' pay illustrates this and shows the relevance of industrial policy and structural change as decisive factors in shaping more inclusive economies, making pertinent distributive policies and strong social inclusion policies (Figure 3.6). Thus, actions that tend to diversify and homogenise the production structure make it possible to develop certain abilities and skills that fuel the production processes and in turn are fuelled by them. At the same time, higher pay helps develop greater demand, which, thanks to local production capacity, helps put the country on a virtuous path of inclusive growth.

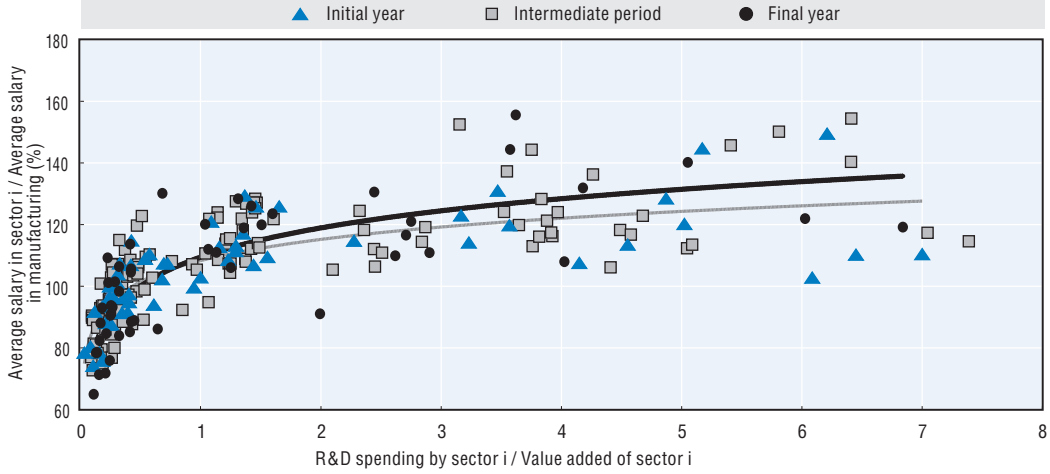
Figure 3.6. **Technology intensity and salary distribution**

Panel A. By level of technology



Note: Data are for 17 countries: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Netherlands, Ireland, Italy, Japan, Norway, Korea, Spain, Sweden, United Kingdom and United States.
Sectors are classified by their technology intensity (OECD, 2013). The ISIC Rev. 3 sectors in each category are as follows: Low-technology sectors: 15-16, 17-19, 20-22 and 36-37. Medium-low technology sectors: 23, 25, 26, 27-28 and 35. Medium-high technology sectors: 24, 29, 31, 34, 352 and 359. High-technology sectors: 2423, 30, 32, 33, 353.
Source: Rovira and Scotto (2013).

Panel B. Movement over time



Note: Data are for 17 countries: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Netherlands, Ireland, Italy, Japan, Norway, Republic of Korea, Spain, Sweden, United Kingdom and United States.
The initial year is 1990, the intermediate period is 1997-2000, and the final year is 2005.
Source: Rovira and Scotto (2013).
StatLink http://dx.doi.org/10.1787/888932906863

Also, a comparative analysis between different periods of time reveals a strengthened relationship between production structure and pay distribution. This is related to the rise of new techno-economic paradigms and their growing role in the growth and the economic and social development of economies (Figure 3.6).

Conclusions and policy recommendations

Public policy should foster a transition from a natural-resource-based model to a knowledge-based international-integration model.

Endogenous capacity-building and narrowing the economic and social gaps are complementary processes. But complementarities do not emerge spontaneously. Some endogenous forces, associated with increasing returns, generate trends of international divergence. Industrial, technological and training policies are needed to counteract these trends (ECLAC, 2012). Greater international and regional dissemination of technology can be achieved through appropriate incentives. International experience indicates that technological, production and trade dynamics that lead to divergence are not inevitable when there are policies promoting endogenous capacity-building in developing countries, and it is possible to move from growth based on abundant resources to a development and international integration strategy built on knowledge. Although many elements contribute to a successful strategy, four elements and the complementarity between them are especially important: *i)* capacities/human capital; *ii)* production diversification; *iii)* sophistication of the production structure; and *iv)* technological development.

The various development strategies are associated with different ways of seeing and conceiving the involvement of public policy. The latter part of the "lost decade" of the 1980s was associated with a vision of development that relied exclusively on market forces. Government intervention and especially industrial policy were seen as sources of distortion and were therefore rejected. The 2000s brought a more balanced, pragmatic vision. International experience suggests that industrial policy is necessary, but should be designed to avoid the known risk of being co-opted by private interests or of being renewed with no evaluation of results (creating "perpetual infants" or simply transferring revenue to companies that would show a profit even without government support). Evaluating and redefining the focus and level of government support, with effective monitoring of objectives and results, is a vital part of policy implementation.

There has been a distinct resurgence of industrial policy in the developing world, largely spurred by the success stories in a number of Asian countries (OECD, 2013). These experiences were largely driven and steered by the public sector. New answers are needed in response to the redefined production and technology map resulting from Asia's emergence: answers inspired by these success stories, and which build on what the region has learned since World War II and on the OECD's own experience in economic stimulus and planning. In this new wave of industrial policies, and linked to the important complementarity of the previously mentioned ones, there has been a pronounced effort to associate them with the policies designed to foster innovation and strengthen regional and international production networks and research networks, which close the distance to the technological frontier.

The resurgence of industrial policy should be used to promote production diversification through knowledge and capacities.

Production diversification policies are set to occupy a central position in the new development strategy. The return of industrial policy, as regards the creation of new sectors and business activities, must be backed by full legal support and policies. Otherwise, the region will not be able to fully participate in the new technology revolution or progress towards a new type of knowledge-based and skills-based specialisation, both within value chains and through intra-industry trade. This remains a pending issue in the slow return to the industrial policies of the 2000s. New business activities can be created only if people carry them forward and invest financial and political resources in them. Productivity policy is not just a policy that aims to do the same things more efficiently, but to increase efficiency by changing the make-up of output and the employment profile.

Co-ordinating the different public policies is an essential goal of a structural-change policy for equitable development.

There is cause for optimism with regards to a new industrial policy that simultaneously addresses the old challenges of productivity, distribution and employment and the newer issues of new technologies, innovation, and environmental responsibility. This greater optimism is due to the complementarity that can be built among the various policies, and the greater degree of legal recognition that can now be achieved. In fact, economic and policy analysis often tends to contrast short- and long-term goals and highlight the trade-offs between them. But there are major exploitable complementarities between goals and policies. This suggests that co-ordination among the various public policies should be a basic goal in a structural change strategy for equitable development.

Another important complementarity is the one between fiscal policy, investment and the elusive goal of equality. Counter-cyclical fiscal policies, which aim to expand fiscal space during booms and to stimulate the economy through public spending during depressions, can be co-ordinated with other policy goals in two ways. First, by targeting spending. To the extent that both tax savings and their subsequent use prioritise public investment (with its crowding in effect on private investment), there will also be a tendency towards stability and structural change. In this regard, it is key for the target of the public investment to be in line with the broader goals of industrial policy and of efforts to diversify and build a more complex structure. Second, they can be co-ordinated through the foundations on which the fiscal space is built: the sources from which taxes are collected. Taxes in Latin America tend to be regressive or neutral at best, and there is ample room to build a more equitable fiscal space.

Additionally, social spending on health and education has a positive impact on productivity and learning capacities. Protecting children is an investment in future productivity. Likewise, if money is spent on training and capacity-building for workers while protection is offered in times of unemployment, workers will take less time to rejoin the labour market. There are also important complementarities between the welfare state and demands for health and education, in which new technologies (especially ICTs and biotechnology) have broad applications. Governments are the main users and co-ordinators of many of these demands, so they can work to bring equality and act as catalysts for innovation.

Structural change must not only aim at greater knowledge intensity and innovation intensity, but also social and environmental sustainability.

Lastly, there are future policies that should be priorities in this strategy. Not only should the production structure be more knowledge intensive and innovation intensive, but the knowledge and innovation should be used in the service of social and environmental sustainability. Other factors matter beyond the speed of technical progress: its direction, content and approaches to sustainability, which point the way to the future. The supply side must be redefined based on a vision that takes into account the production structure's impact on emissions and other environmental sustainability variables, as well as how inclusive the production and consumption system is of sectors that benefit only marginally from growth.

New ICTs, new materials, biotechnology and nanotechnology, among many others, are tools that can help transform the production system in the desired direction. Convergence of these technologies and the environmental and inclusion issues is feasible, as shown by some successful examples. These examples are still very localised, but indicate the viability of new technological approaches, in sections of the production system as well as the organisation of cities and provision of services to low-income sectors.

The convergence of new technologies and the environment means using green technologies. These result from the combination of advances in recycling and in water and gas treatment; power generation from renewable energy sources (wind, solar, hydroelectric, kinetic) and hydrogen fuel cells; biotech fuels (biodiesel, bioethanol); intelligent control networks for urban systems (buildings, traffic) and electrical smart grids; and the rise in the energy efficiency of many devices and machines, including cars.

Combining new technological paradigms oriented towards sustainable, inclusive economies can be a strategic focus for structural change and industrial and technology policies. Such policies would have both domestic and international legitimacy in a world where the effects of climate change and environmental degradation are increasingly visible.

Regional co-operation in all these matters is bound to play a central role (as suggested in Chapter 2). The different spaces for interaction and connection that have been developing and strengthening in recent years among the countries in the region can be platforms to support sectors that are strategic to technological upgrading of the entire system (while also reducing structural heterogeneity). It is also necessary to explore the potential for changing the parameters for interaction with Asia's new dynamic centres. It is necessary to diversify exports from Latin America to create an intra-industry pattern reliant on new technologies that will help to tackle new challenges of social inclusion and sustainable growth.

Annex 3.A1. Indicators for measuring the production structure's technology intensity and its complexity

Creating indicators that reflect the production structure's technology intensity or its complexity is no simple task, and requires considering a host of indicators. A set of variables is therefore identified to reveal those traits. Next, the indicators used are presented and their main strengths and weaknesses are discussed.

a) The classic indicators of technological effort and performance, namely investment in research and development (R&D) and the number of patents per capita, respectively;

b) Relative productivity, defined as the ratio of an economy's labour productivity to that of a benchmark advanced economy (inverse of the technology gap). The United States is generally used as the benchmark, since it is on the technological frontier and has strong investment and trade links with Latin America and the Caribbean;

c) The percentage of total exports accounted for by medium- and high-technology exports (X_MHT/T), using Lall's classification (2000);

d) The ratio of the engineering-intensive sectors' share of an economy's manufacturing value added compared to the equivalent figure in the United States (EIS share). It is assumed that the higher the EIS share (greater relative weight of engineering), the more knowledge intensive an industry will be; The EIS indicator is calculated as follows: EIS share = Si / SR, where Si is the relative weight of engineering in a country's manufacturing value added and SR is the same ratio in a benchmark country (in this case, the United States).

e) Dissemination of information and communication technologies (ICTs), measured through four indicators:

i) penetration of mobile telephones (MTEL);

ii) penetration of fixed broadband (FBB);

iii) penetration of mobile broadband (MBB);

iv) Internet penetration.

These dissemination indicators are highly significant since they refer to technologies associated with a new general-use technology paradigm, with a strong effect on competitiveness, overall efficiency of the economy, and paths for future growth.

f) The adaptability index (AI), defined as the relationship between dynamic and non-dynamic sectors as a percentage of total exports; in other words, the magnitude of dynamic sectors compared to the magnitude of non-dynamic sectors. Dynamic sectors are those whose worldwide demand, measured by the value of its exports, shows above-average growth. Historically the most dynamic sectors were the most modern branches of manufacturing (mechanical, electro/electronics, transport equipment, etc.), but that pattern does not always hold true of products and dynamic agricultural and mining products do exist.

g) The export sophistication indicator, EXPY, was developed by Hausmann, Hwang and Rodrik (2007). Calculated from highly disaggregated trade data, it seeks to identify differences in exports' quality or level of sophistication. Constructing this indicator requires first calculating the PRODY value, a weighted average of per capita income in countries that export a certain product, weighted by the country's revealed comparative advantage for that product. Each product thus has a PRODY indicator. The EXPY value is then calculated as the weighted average of the PRODY values, where the weights are each product's share of the country's export basket. A high EXPY indicates that the country mainly exports goods that are also exported by high-income countries. Exports originating in high-income countries are assumed to be more knowledge intensive than those originating in low-income countries. The rationale for this distinction is that wealthier economies have greater technological capabilities and a larger market capacity, letting them compete with differentiated goods in the more demanding markets. As usual, the more sophisticated goods and services exported by wealthy economies have greater income elasticity than those exported by poor economies; this indicator simultaneously reflects the technology intensity of exports and the strength of external demand.

Indicators (a) to (d) are for technological capabilities. Indicator (e) also deals with capabilities and reflects the take-up (though from a consumption standpoint) for one of the new technological paradigms that has the greatest impact on the economic system: the digital paradigm. Indicator (f), however, measures the strength of external demand, and captures the efficiency of growth from specialisation, regardless of the technological base of the sector. Lastly, indicator (g) captures technology intensity along with the strength of demand, referring to more sophisticated goods being exported to higher-income markets.

Of the various indicators analysed, two (EIS share and X_MHT/T) refer to the manufacturing sector; four are aggregates and refer to all sectors of the economy (relative productivity, R&D, patents, EXPY); three refer to the trade pattern (EXPY, AI and X_MHT/T); and four aim to capture the dissemination of general-purpose technologies (MTEL, FBB, MBB, Internet). It is worth noting that in Table 3.1, the indicators for the dissemination of communication technology are not ideal since they deal with personal use and therefore affect both consumption and production. They should therefore be viewed as approximations and not indicators that faithfully reflect these technologies' systemic impact on the production fabric.

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CHAPTER FOUR

Policies for boosting logistics performance in Latin America

Summary

Logistics, defined as the process required for transporting goods and services from the point of production to the end consumer, is a decisive factor for development and competitiveness. A country improving its score in the Logistics Performance Index by just 1 point has an average labour productivity gain of close to 35%. This is critical for Latin America and the Caribbean, since the region still lags far behind the OECD economies, and the region's proportion of time-sensitive and logistics-intensive exports is three times more than that of the OECD countries. A range of policies need to be introduced to reduce transport costs, which, relative to tariffs, are much higher than in other regions. Gradually bridging the transport-infrastructure gap is vital for the region. In the short term, however, the region must use "soft" solutions to make the most of current infrastructure and thus improve its logistics performance and competitiveness. These solutions include providing modern storage facilities, streamlining customs and certification procedures and using information and communication technologies for logistics.

Introduction

This chapter analyses the policies needed to make logistics effective and efficient in the economies of Latin America. The region's logistics performance significantly lags behind that of the OECD countries, and even that of other emerging economies. Consequently, the lack of an appropriate framework for production, transport, storage and distribution compromises the region's growth potential and competitiveness. To bridge these gaps, governments must design better sectoral policies to boost infrastructure development, streamline procedures (including customs procedures), properly regulate markets, reinforce logistics security and make logistics services more efficient.

Greater and better investment in infrastructure is essential but insufficient on its own. Improved transport infrastructure and a suitable framework for transport investment are essential. Since compliance with these requirements will not happen immediately, other measures to boost trade using existing transport infrastructure are a priority. The most important measures are to improve co-ordination among the various organisations involved in logistics and to promote good governance through mechanisms that co-ordinate the various national and regional public-private partnership initiatives at both the national and sub-national levels. Likewise, countries must work to make customs procedures, goods inspections and the management of packaging, storage and stock more efficient and more effective to reduce logistics costs. Finally, competition in the transport sector, logistics education and the use of information and communication technologies (ICTs) are also essential, but are often ignored, even when such measures have a substantial impact on the region's logistics cost overruns. Addressing these issues will therefore improve logistics performance, maximising the use of existing transport infrastructure.

This chapter has five sections. First, it defines the concept of logistics and discusses its impact on economic growth. The second section compares Latin America's logistics performance with that of other regions and the OECD economies. The third part focuses on the impact of logistics on logistics-intensive economic sectors. In particular, it compares the proportion of logistics-intensive exports in Latin America and the OECD countries and the impact of logistics performance on productivity and exports in logistics-intensive economic sectors. The fourth section discusses the main direct benefits of better logistics, analysing how it can promote trade in the region, allow entry into global value chains (GVCs) and boost small and medium-sized enterprises (SMEs). The final section of the chapter presents the policy actions to improve logistics in Latin America, underlining that although the transport-infrastructure deficit is the main cause of the logistics gap, other measures could be taken to make logistics more effective in boosting trade, including developing an integrated logistics policy, facilitating trade and making greater use of ICTs for logistics.

Logistics, a key factor for development and competitiveness

This first section defines logistics and the different ways of measuring it. It also briefly presents evidence of its positive effects on countries' sustainable economic growth.

The concept of logistics encompasses a range of key elements for the sale of goods. Logistics comprises all services and processes needed to transport goods and services from the point of production to the end consumer. Thus the transport endpoint within

a country can be the port or airport, or a domestic final destination. Logistics includes various "soft" components, such as administrative and customs procedures; transport organisation and management; packaging, storage and stock costs; tracking and tracing services; and the use of ICTs throughout the process. It also includes "hard" components such as transport, telecommunications and storage infrastructure to connect the entire distribution supply chain. Logistics is therefore seen to encompass both private-sector activities and government action through its policies on logistics design, provision, facilitation and regulation.

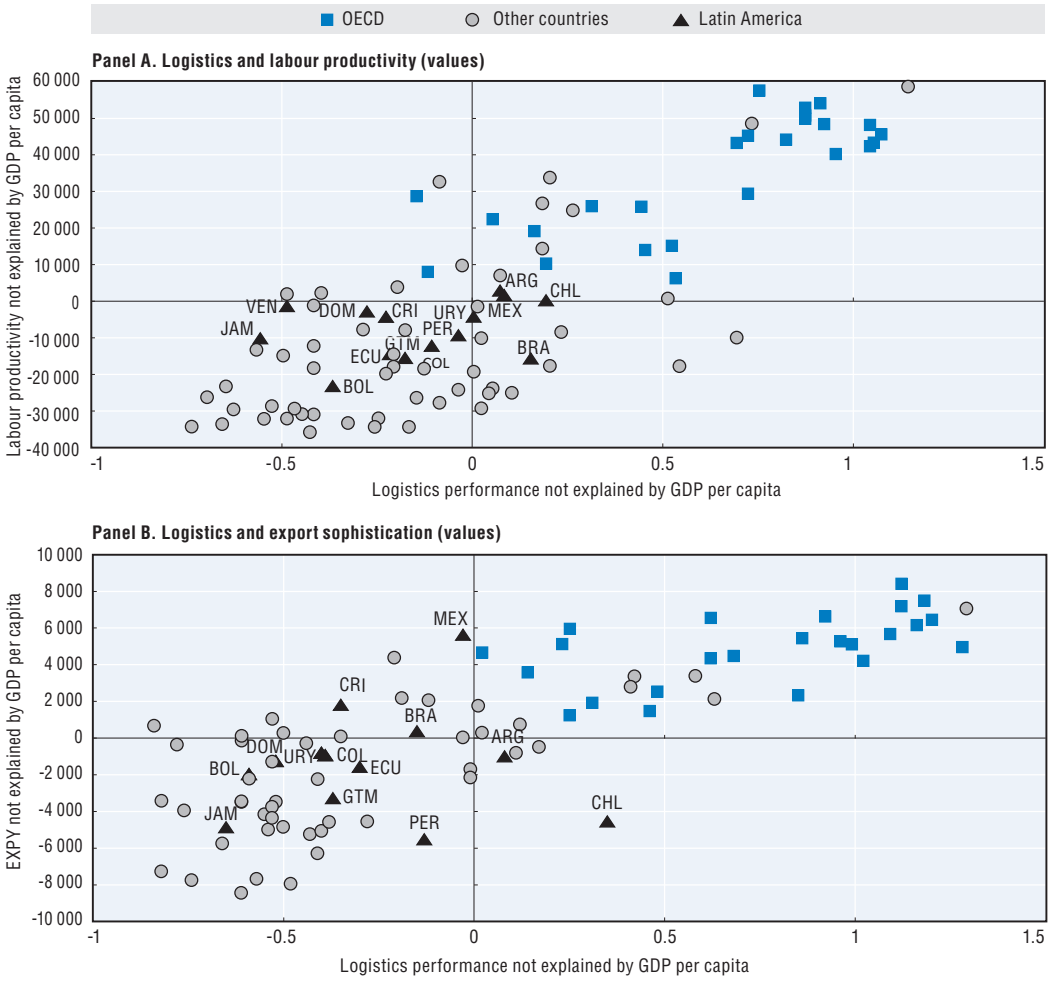
The different strategies used to measure logistics costs offer additional information depending on the levels of aggregation, approaches and objectives. There are three approaches to measuring logistics costs: micro-level, macro-level and perceived costs (Rantasila and Ojala, 2012). The macro approach looks at national accounts and measures the logistics sector's contribution to GDP. This approach thus provides an overview of the sector's relative size. However, these macro-level measurements do not provide an unequivocal indicator of logistics performance, since the relationship between the size of the sector and logistics performance is non-monotonic. Similarly, there is no systematic relationship between the sector's contribution to GDP and economic outputs (Shepherd, 2011). Micro-level measurements of sectors, products and logistics chains allow logistics costs to be compared with the product's final value. High relative logistics costs indicate that the sector relies heavily on logistics inputs and reduce the sector's competitiveness. Nevertheless, the assembly of comparable microdata across countries remains a challenge for the region. The third method for measuring logistics costs is based on the perceptions of freight staff. These perceptions allow us to compare transport facilitation by country based on aspects such as efficiency of customs procedures, quality of transport infrastructure, competition and quality in logistics services, and capacity to track and trace freight.[1] This report focuses primarily on using perception data to analyse the components of national logistics performance in greater detail and compare performance internationally.

The cost and quality of logistics have fundamental implications for sustainable economic growth. Better logistics performance benefits domestic and foreign trade. First, it ensures good transport links and reduces transaction costs. This is critical, since high transport costs reduce domestic firms' competitiveness, and thus affect the potential for linkages with suppliers. Second, it promotes integration into international trade, helping to boost exports, reduce import costs, diversify products and trade partners, and facilitate entry into GVCs. These benefits result in more jobs in logistics-intensive sectors, support for SME competitiveness, lower food prices, and essential services for remote regions (Rodrigue, 2012; OECD/WTO, 2013). Consequently, if every country improved just two key supply-chain barriers – border administration, and transport and communications infrastructure and related services – even halfway to the world's best practices, global GDP could increase by almost 5% (USD 2.6 billion) and exports by 14.5% (WEF, Bain and World Bank, 2013).

Countries improving their score by 1 in the Logistics Performance Index improve their labour productivity by 35%.

After controlling for other variables affecting economic growth, there is a significant association between improved logistics performance on the one hand and productivity gains and sophistication of exports on the other (Figure 4.1). More specifically, countries improving their score by 1 in the Logistics Performance Index (which gives countries a score between 1 and 5) improve their labour productivity by about 35% on average. For instance, this would be the productivity gain for Paraguay or Venezuela if they were to achieve the same level of logistics performance as Portugal or Turkey. Similarly, the Dominican Republic would achieve the same gain if it were to raise its logistics performance to the same level as Korea.[2]

Figure 4.1. **Logistics and economic performance: Partial correlations**



Note: 2012 data for Panel A and 2007 data for Panel B. Partial correlations used GDP per capita as a control variable. Outliers were discarded using the standard DFBETA methodology (no country in Latin America and the Caribbean was removed). Labour productivity is defined as GDP in US dollars per person employed in 2012, adjusted for purchasing power parity (PPP). The Logistics Performance Index is developed by the World Bank. The level of sophistication of the country's export basket was estimated using the EXPY index (see Chapter 2 for more details). In the legends, Chile and Mexico are included as Latin American countries rather than as OECD countries.

Source: Authors' work based on *The Conference Board Total Economy Database*, World Bank (LPI), Comtrade.

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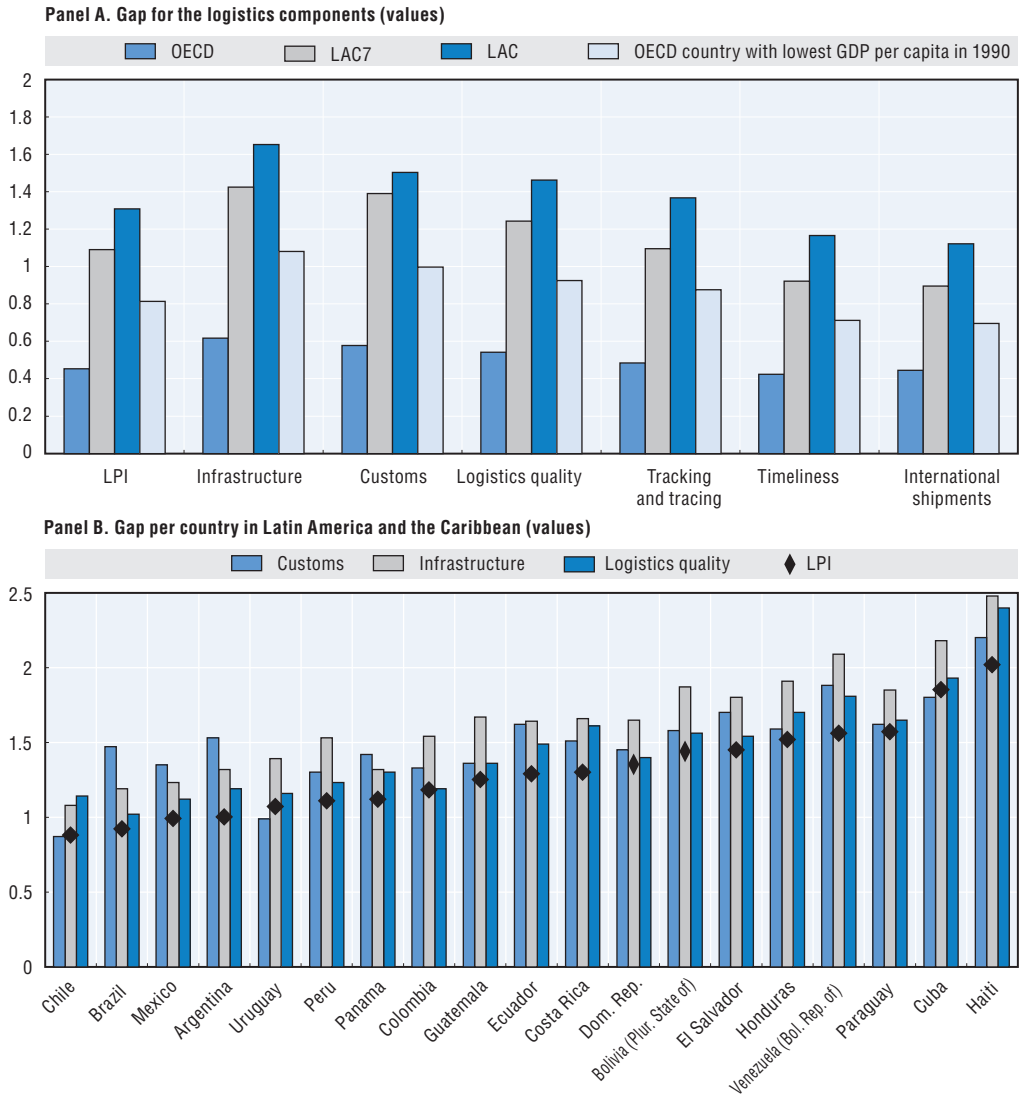
Logistics performance in the countries of the region: Differences and challenges

This section presents changes that have taken place in logistics performance in Latin America and the Caribbean and compares those changes with what has taken place in other emerging economies and the OECD countries. It also analyses the various factors that have caused the region's logistics performance to lag behind, and outlines the differences among countries in the region and the range of challenges they face.

The Latin American and Caribbean region still lags some way behind other regions in terms of its logistics performance. The World Bank's Logistics Performance Index compares logistics performance and its main components among different countries. Figure 4.2, Panel A shows the differential in logistics performance between the OECD country with the highest logistics performance and four different country groups. The figure shows that the differential for countries of Latin America and the Caribbean is significantly greater than that of the OECD countries and that of the OECD countries with the lowest levels of GDP per capita in 1990. This difference is particularly clear for the region as a whole, followed by the seven largest Latin American economies (Figure 4.2, Panel A). As was the case for the OECD economies as a whole and the group of OECD economies with lower levels of GDP per capita in 1990, the countries of Latin America and the Caribbean partly closed the gap to the highest-performing OECD country in terms of logistics compared to figures from 2007 and 2010, other years for which this indicator is available. However, the differential between the countries of Latin America and the Caribbean and all OECD economies was not significantly reduced.[3]

There are still major differences in the overall logistics performance of countries in the region and in their scores in the individual components used to calculate the index. Although all countries in the index lag well behind the OECD country with the best score, some countries (Haiti, Cuba, Paraguay, Venezuela, Honduras, El Salvador, Bolivia and the Dominican Republic) have a differential that is 50-100% greater than that of the region's leading country, Chile (Figure 4.2, Panel B). Additionally, the public-policy challenges to improve logistics performance vary from country to country. For example, while in Bolivia, Colombia, Guatemala and Peru it seems essential to further develop transport infrastructure, Argentina and Brazil must improve how they design their customs regulations.

Figure 4.2. **Logistics performance gap to the best-performing OECD country (2012)**



Note: The Logistics Performance Index (LPI) has a scale of 1 to 5, where 5 represents the best logistics performance. The gap refers to the difference for each logistics component with the best-performing OECD country, which is Finland for the LPI and for customs, logistics quality, and tracking and tracing; Germany for infrastructure and timeliness; the Netherlands for international shipments. Latin America and the Caribbean (LAC) consists of 19 countries. LAC7 refers to the seven largest economies as measured by GDP: Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela (Bol. Rep. of). The OECD countries with the lowest GDP per capita in 1990 were Chile, Czech Republic, Estonia, Hungary, Korea, Mexico, Poland, Slovak Republic, Slovenia and Turkey.

Source: Based on World Bank data (Logistics Performance Index).

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Some countries in the region have recorded significant changes in their logistics performance in the last five years. Since 2007, the first year for which the LPI was published, Uruguay, Colombia, Bolivia and Brazil have significantly improved their global ranking, with for example, Uruguay moving up 23 places in the ranking. There are a number of reasons for these improvements. Uruguay moved up the ranking thanks

to improvements in several components of the index. Colombia, meanwhile, improved the performance of its customs, logistics services (for instance, the quality of transport firms) and infrastructure, and Brazil improved traceability and reduced the price of the shipment of goods. The improvements made to some of the components of the LPI do not necessarily imply that no additional government action is needed. For example, Colombia has improved its score for perception of infrastructure, but infrastructure remains the main cause of the country's gap with the OECD countries. Paraguay, Venezuela, Haiti, El Salvador and Honduras have slipped substantially down the ranking, with Paraguay and Venezuela falling 42 places in just five years. In Haiti, this drop was caused by deteriorating perceptions of the quality of infrastructure; in Venezuela it was due to less favourable perceptions of customs procedures; and in Paraguay it was mainly due to an increase in the delivery time of goods.

Generally, improvements in logistics performance in Latin America and the Caribbean have been smaller than in other regions of the world. Although South America improved its logistics performance at rates similar to those of Asia, Europe, Central Asia, the Middle East and North Africa between 2007 and 2012, the greater Latin America and the Caribbean region improved at a much slower rate. The region as a whole therefore saw its LPI scores increase at a slower rate, similar to that recorded by the East Asia and Pacific region.

The infrastructure deficit is the main factor behind the region's poor logistics performance.

The region's logistics gap is mainly due to areas of public policy such as infrastructure, customs and logistics services. The six components of the LPI can be divided into two groups of three components. The first group comprises the regulatory and institutional components, which indicate the main inputs in the logistics chain, on which public policy has a direct effect: customs, infrastructure and logistics services. The second group comprises the components that measure the performance of the logistics chain: timeliness of shipments, cost of shipments and traceability of consignments (Arvis et al., 2012). The components for which Latin America's performance is furthest behind the most advanced OECD country for the same component are those in the first group, where public policy plays a vital role. The largest gap is for infrastructure, followed by customs and then logistics services (Figure 4.2). When comparing Latin American countries with all the OECD countries, the largest gaps are for the same three components.

The transport-infrastructure gap continues in the region

Logistics specialists' dissatisfaction is more with the quality of infrastructure than with the services provided. According to the LPI, the gap between Latin American countries and high-income countries has more to do with the low quality of storage, distribution and transport infrastructure than with the quality of storage, distribution and transport services. Although these results for Latin America are similar to those observed in upper-middle-income countries as a whole, the gap between the quality of service and the quality of infrastructure is smaller in lower-middle-income and low-income economies. This gap is similar to that found in Eastern European and Central Asian countries, but is larger than in other emerging regions such as the Middle East and North Africa, East Asia and Pacific, and South Asia.

Insufficient infrastructure affects the development of Latin America's trade evolution. The largest infrastructure gap is in the transport sector, especially roads, where standards remain below those typical of middle-income countries (Calderon and Serven, 2010; WEF, 2012). The large gap in transport infrastructure is hindering trade (see Eslava et al., 2009 for the situation in Colombia). Brazil and Colombia, for instance, have some of the world's highest domestic costs per container for international transport and handling.[4] Similarly, in Costa Rica 80% of exporters in the three largest export markets identified poor-quality roads as one of the three main impediments to business (Guasch, 2011).

A co-modal transport system reduces transport costs by 57% and social costs by 27%.

Insufficient availability of co-modal transport options in Latin America increases logistics costs and reduces competitiveness and international integration. The strong preference for road transport over other modes of transport affects complementarities among modes of transport in the region. The concentration of road transport in Latin America is 15 times greater than in the United States (OECD/ECLAC, 2011). If Brazil were to double its number of multimodal transport hubs from 250 to 500, storage costs and total stock would be reduced by up to USD 1 billion a year (Guasch, 2011). Finally, unimodal transport hinders environmental sustainability. A co-modal transport system reduces transport costs by 57%, in addition to a 27% reduction in social externalities, resulting in a total saving of 42% (Gomes et al., 2010). Similarly, when comparing CO_2 emissions between a unimodal and a multimodal system, environmental and social sustainability can be implemented simultaneously along side greater economic competitiveness (Kim and Van Wee, 2009).

Although maritime transport is playing an active role in the region's integration into the global economy, domestic maritime shipping and river transport are almost non-existent, despite the favourable geography. Although 80% of exports to the United States are transported by ship, for some Latin American countries, like Argentina, Brazil, Chile, Colombia, Ecuador and Venezuela, the quality and size of ports are low.[5] No Latin American port is ranked among the world's 20 largest in terms of size or traffic.[6] Furthermore, there is a worrying lack of logistics and infrastructure projects to efficiently connect ports with where consumers are located. A small improvement in logistics performance through port efficiency can make an economy competitive in exporting natural resources of relatively low value (Sanchez et al., 2003).

The picture is much the same for airport infrastructure. Although the region accounted for only 4% of global air cargo in the period 2000-08, International Air Transport Association (IATA) forecasts predict that Latin American economies will be among the emerging economies that will see a sharp rise in air passenger numbers and air cargo in the coming years. No Latin American airport is among the top 30 in the world for air cargo.[7] The absence of exclusive freight carriers often creates logistical difficulties and impedes the export of perishable goods, as space is not guaranteed in aeroplane holds.

Rail transport has stalled and the existing network has grown very little since it was set up as a means of transport for the extractive industries. As a result, 90% of

logistics firms deem the rail network to be of poor or very poor quality. Rail transport is concentrated exclusively on bulk trade. Of the 626 million tonnes of freight transported in the region, 62% is mineral products; the next most common types of cargo are bulk goods such as grain and construction material.

Of the 61 highway concessions signed up to 2010 in Colombia, Chile and Peru, 50 have been renegotiated at least once, resulting in more than 540 renegotiations.

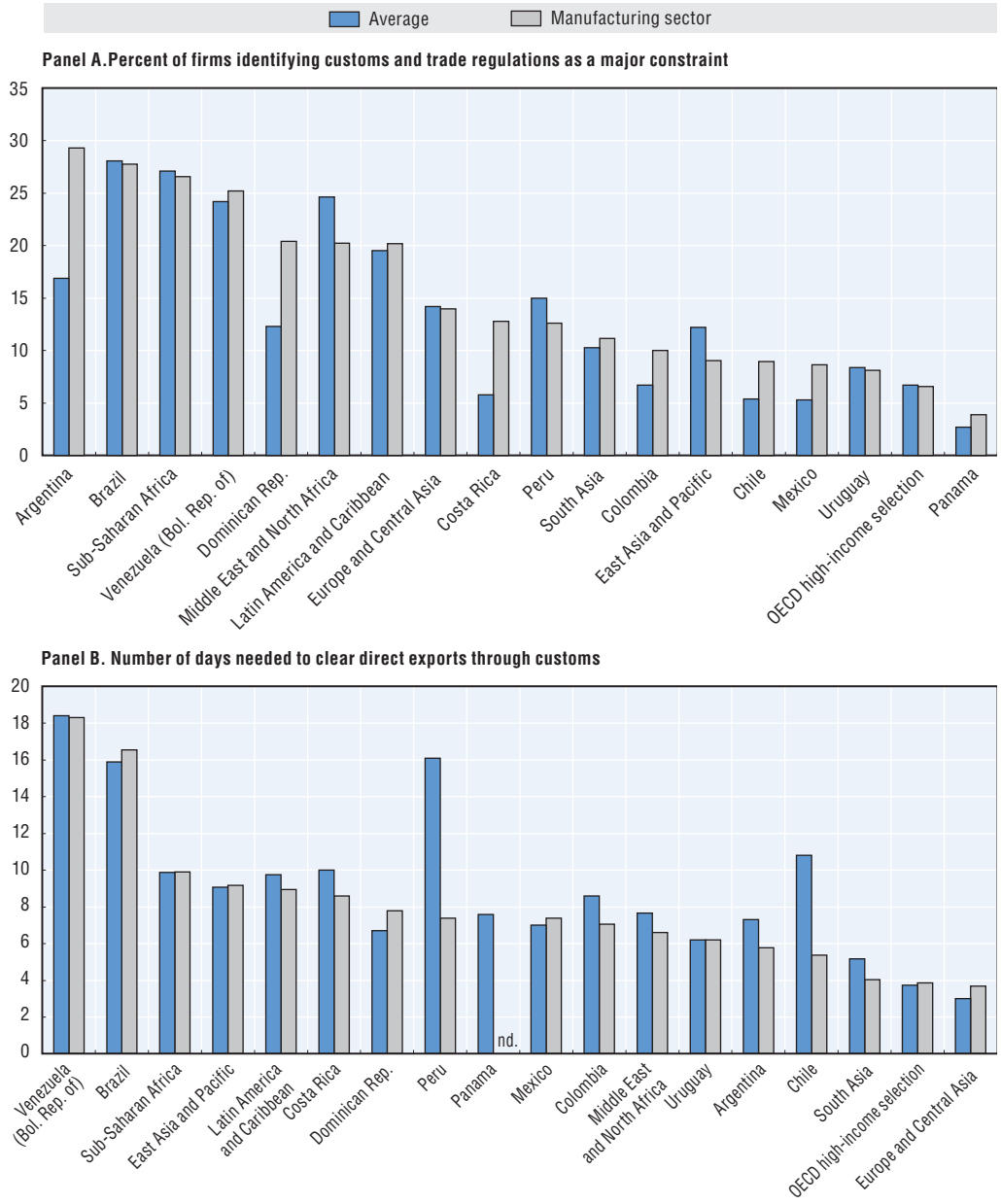
Finally, the regulatory and institutional weakness of concessions in Latin America has caused continuous renegotiations, without necessarily lowering logistics costs. In the 1990s close to 50% of transport concessions were renegotiated in Argentina, Brazil, Chile, Colombia and Mexico. In Chile each concession was renegotiated an average of four times between 1993 and 2007 (Guasch, Laffont and Straub, 2008; Engel, Fischer and Galetovic, 2009), and by 2011 an average of 40% of concessions in the region had been renegotiated (Nieto-Parra, Olivera and Tibocha, 2013). Also, 50 of the 61 highway concessions signed up to 2010 in Colombia, Chile and Peru have been renegotiated at least once, resulting in more than 540 renegotiations. The first modification of all renegotiations took place less than three years after the concession was granted. The situation in Colombia is particularly striking, where 21 concessions were renegotiated a total of more than 400 times, costing almost three times the initial cost of the 21 renegotiated concessions (Bitran, Nieto-Parra and Robledo, 2013).

Customs procedures restrict the expansion of trade

Most countries in the region are also seen to have serious deficiencies in their customs and goods-export procedures. According to interviews with companies in the real sector (World Bank Enterprise Survey), particularly the manufacturing sector, some Latin American countries' customs and trade regulations (Argentina's, Brazil's and Venezuela's) are a major obstacle to conducting business (Figure 4.3, Panel A). Similarly, 57% of Japanese firms surveyed indicated that the complicated customs system in Latin America is the main logistical obstacle to conducting business, particularly in Argentina, Brazil and Mexico (JETRO, 2008). Finally, while in OECD countries it takes around four days to complete customs procedures for direct exports, in some Latin American countries it takes close to or more than ten days (Figure 4.3, Panel B).

The deficiencies in customs procedures thus significantly affect trade costs. *Ceteris paribus,* a 10% improvement in the quality of an importing country's trade facilitation as measured by the Enabling Trade Index of the World Economic Forum (WEF) is associated with a 19% increase in trade, while the same improvement in an exporting country's trade facilitation is associated with a 36% increase in trade (Korinek and Sourdin, 2011). In Latin America, the trade-facilitation indicators that have the greatest impact on trade costs are those that cover formalities and procedures, documents, and governance and impartiality (Moïsé and Sorescu, 2013). Similarly, evidence suggests that customs clearance delays in Latin America increase transport costs by 4-12% (Guasch and Schwartz, 2008). Customs delays and border procedures in general can significantly reduce both trade and productivity in Latin American economies. Based on firm-level data in Uruguay, an extra day's customs delay results in a 2.8% reduction in the export growth rate (Volpe Martincus, Carballo and Graziano, 2013).

Figure 4.3. **Real-economy firms' perceptions of international trade procedures, 2011** (or closest year)



Note: Data not available for the manufacturing industry in Panama. Latin America and the Caribbean (LAC) consists of 27 countries.

Source: World Bank Enterprise Survey.

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Logistics costs can be more than four times greater in Latin America as they are in the OECD countries.

In short, the region's poor logistics performance results in higher costs than in high-income countries. At the micro level, logistics costs represent 18-35% of a product's value, compared to around 8% in the OECD countries. At the macro level, while in the OECD countries logistics costs represent around 9% of GDP, in Latin America and the Caribbean they represent between 16% and 26%. There is a wide range of logistics costs across the region, but on the whole they remain relatively high. In Peru they represent 32% of a product's value on average, while in Chile they represent 18%. These costs are higher than in developed countries like the United States and Singapore, where the figure stands at only around 9-10% (Guasch, 2011).

Logistics and logistics intensity in economic sectors

Logistics intensity refers to how dependent an economic sector is on the country's logistics performance. A change in logistics performance therefore mainly affects economic sectors in which the efficiency and quality of the process of delivering goods is crucial to the total cost. This section begins by analysing the possible definitions of logistics intensity before comparing Latin America's logistics intensity with that of the OECD countries. It analyses the benefits that logistics improvements bring to the region for sectors that use logistics intensively.

By measuring logistics intensity in each economic sector based on logistics costs or time, one can measure the impact of logistics performance on each sector. The first strategy measures the intensity of logistics input or logistics cost as a part of the product's final value to determine which sectors' competitiveness is most heavily impacted by logistics performance. Although logistics-sensitive sectors vary somewhat from country to country, they normally include industries like mining and quarrying, wood products, paper publishing and printing (Table 4.1). The second way of measuring logistics intensity is through transport-time sensitivity. This second category can be measured by goods transported by air, which is generally quicker than maritime shipping. The category includes agriculture, garments and pharmaceuticals. In addition, manufactured goods that are part of value chains may also be more time-sensitive (Table 4.2).

The share of logistics-intensive or time-sensitive exports in Latin America is three times that of the OECD countries.

Table 4.1. **Logistics-intensive sectors**

Country	ISIC	Sector
Brazil	c10-14	Mining and quarrying
	c24	Chemical products
	c27	Iron and steel
	c26	Minerals
Chile	c20	Wood products
	c21-22	Paper / Publishing and printing
	c10-14	Mining and quarrying
	c26	Minerals
	c36-37	Furniture
Mexico	C21-22	Paper / Publishing and printing
	C40-41	Electricity and gas
	C20	Wood products
	c10-14	Mining and quarrying
China	c10-14	Mining and quarrying
	c26	Minerals
	c25	Rubber and plastics
	c20	Wood products
Indonesia	c20	Wood products
	c38	Other manufacturing
	c32	Radio, television and communication equipment
	c24	Chemical products
	c33	Precision medical instruments, optical instruments
France	c26	Minerals
	c21-22	Paper / Publishing and printing
	c10-14	Mining and quarrying
	c20	Wood products
	c17-19	Textiles
United States	c26	Minerals
	c40-41	Electricity and gas
	c27	Base metals
	c20	Wood products
	c21-22	Paper / Publishing and printing

Source: OECD I-O Tables and Shepherd (2011).

Table 4.2. **Time-sensitive products**

Percent of air transported	Products	BEC Classification
100.0	Frozen food manufacturing	Intermediate
99.9	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment	Consumption
98.7	Manufacture of aircraft and spacecraft	Intermediate
96.8	Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment	Consumption
95.8	Manufacture of other fabricated metal products	Capital
94.5	Manufacture of pharmaceuticals, medicinal chemicals and botanical products	Consumption
91.4	Manufacture of basic precious and non-ferrous metals	Capital
90.1	Manufacture of other chemical products	Intermediate
89.1	Manufacture of basic iron and steel	Intermediate
87.8	Manufacture of sports goods	Intermediate
86.9	Manufacture of jewellery and related articles	Intermediate
86.3	Vegetables	Consumption
84.4	Manufacture of wearing apparel, except fur apparel	Consumption
83.7	Manufacture of other fabricated metal products	Intermediate
83.7	Manufacture of other electrical equipment.	Intermediate

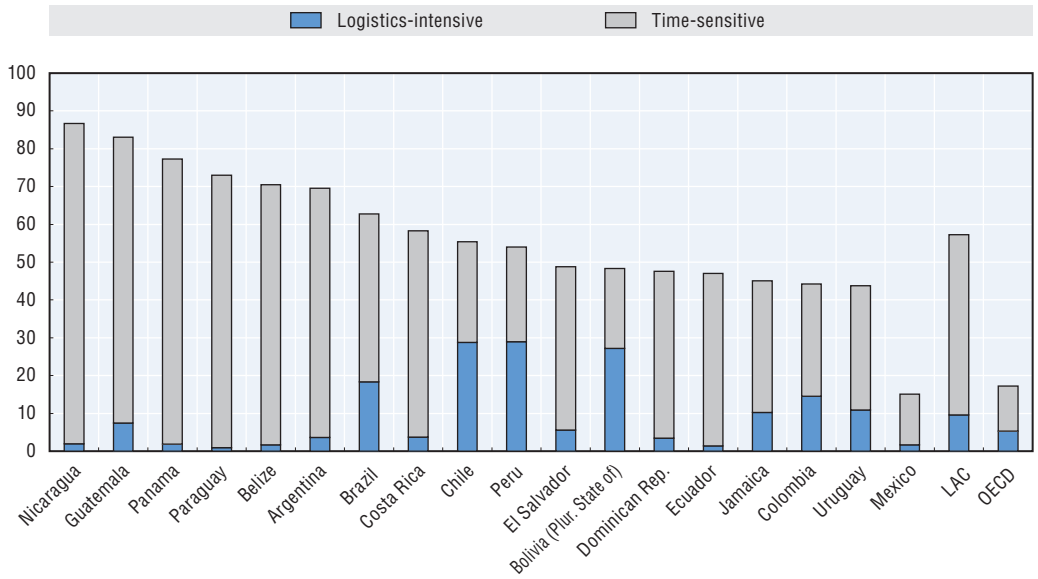
Source: Data on imports from the US in 2000 from Schott's *International Economics* Resource Page.

Latin America's production structure is more sensitive to logistics performance than that of the OECD countries. In Latin America, the specialisation pattern within the factor endowments shows a high involvement of logistics-intensive natural resources as well as agricultural products and garments, which are time-sensitive. The share of logistics-intensive or time-sensitive exports varies from country to country in Latin America, but is on average three times that of the OECD economies (Figure 4.4).

Logistical challenges therefore hinder the region's competitiveness in logistics-intensive products such as food. More than 50% of fruit produced in Latin America is lost or wasted before it reaches its final destination (FAO, 2012). Most of the post-harvest loss occurs during storage, packaging and distribution due to problems with the provision and co-ordination of logistics services. The cost and quality of transport services are therefore important. Analysis of the pineapple trade from Costa Rica to Saint Lucia via Miami suggests that the cost of pineapple production accounts for only 10% of the final delivered price, whereas land and sea transport and handling account for 43%. Similarly, sending a kilo of wheat from Vancouver to Manta in Ecuador costs less than half of what it costs to send the same amount of wheat from Manta to Quevedo, also in Ecuador. Logistics thus increases food prices by 30-100% between production and delivery (Guasch, 2011).[8]

Private investment has helped meet the needs of logistics-intensive sectors such as raw materials, which has stymied competition. In Chile, port infrastructure deficiencies resulted in concessions for private ports. In 2006, 11 of Chile's 36 functioning ports were private. Access limitations to some privatised ports led to investigations by competition authorities (OECD, 2011). Chile's case underlines the importance of regulating port operations to promote competition among port services and illustrates some of the challenges that arise when access to infrastructure is limited. Similarly, in Colombia railways have been financed by private investment and have been used almost exclusively for transporting coal, affecting access to the network for other cargo.

Figure 4.4. **Time-sensitive, logistics-intensive exports (2010)**
(% of total exports)



Note: Logistics-intensive sectors include mining, forestry and logging, wood manufacturing, paper publishing and printing. Time-sensitive sectors include agriculture, fisheries, food and drink manufacturing, clothing and horticulture. Latin America and the Caribbean (LAC) consists of 18 countries.

Source: UN COMTRADE.

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As the prices of logistics services fall in relation to the prices of other goods and services in the economy, logistics-intensive sectors tend to increase their relative contribution to the economy. Improvements in logistics performance can therefore be expected to affect relative sector size, and thus the pattern of specialisation across countries (Shepherd, 2011). A 10 percentage point decrease in logistics costs would increase demand from various industries and would increase employment levels to differing degrees depending on each industry's elasticity (Guasch, 2011). Finally, pre-shipment delays are associated with a lesser degree of export diversification in developing countries; since it limits the markets they can access (Dennis and Shepherd, 2011). For manufacturing sectors that are heavily dependent on logistics there is a strong relationship between labour productivity and the country's logistics performance. In Latin America, improvements to logistics could drive greater productivity gains.

The potential benefits of better logistics performance for the region

This section looks at the direct benefits of better logistics performance. First it compares the gains resulting from lower logistics costs relative to distance and to international trade tariffs. Next it looks at the importance of logistics for SMEs compared to large companies. Finally it analyses the impact of better logistics performance on regional and global connectivity.

For promoting trade among countries, the quality and cost of logistics is at least as important as distance. Better logistics gives firms access to competitive import and export prices, thus boosting trade. Several studies support the idea that logistics strongly influences the cost of trade (see Mesquita-Moreira, Volpe Martincus and Blyde [2008] for Latin America). If low-income countries were to increase their logistics performance to the same level as middle-income countries, as per the 2010 LPI, their trade would increase by 15%. Maritime and air connectivity and logistics performance together contribute the same cost to international trade as geographical distance (OECD-WTO, 2013), This is even more so in upper-middle-income economies than in high-income economies (Arvis et al., 2013). Finally, improvements to the quality of logistics can have an even greater impact than distance on trade, especially on exports. While for imports, changes in logistics performance have a 37% higher impact than distance on trade, for exports this figure rises to 96% (Korinek and Sourdin, 2011).

Delays in deliveries of shipments create high transaction costs for trade. Customs procedures, tracking and tracing services, infrastructure and logistics competence are areas of logistics that affect the timeliness of shipments and trade.[9] Each additional day that goods spend at the border reduces trade by around 4% (Korinek and Sourdin, 2011). According to data from the United States, reducing international shipping time by a day increases the value of goods by an estimated 0.8% (Hummels, 2001). In terms of distance, each additional day of delay is equivalent to a country distancing itself from its trade partners by about 70 km on average (Djankov, Freund and Pham, 2010). Brazil could reduce its logistics costs by up to 16% if customs processing times at the port of Santos were reduced by four days (World Bank, IDB and ECLAC, 2010).

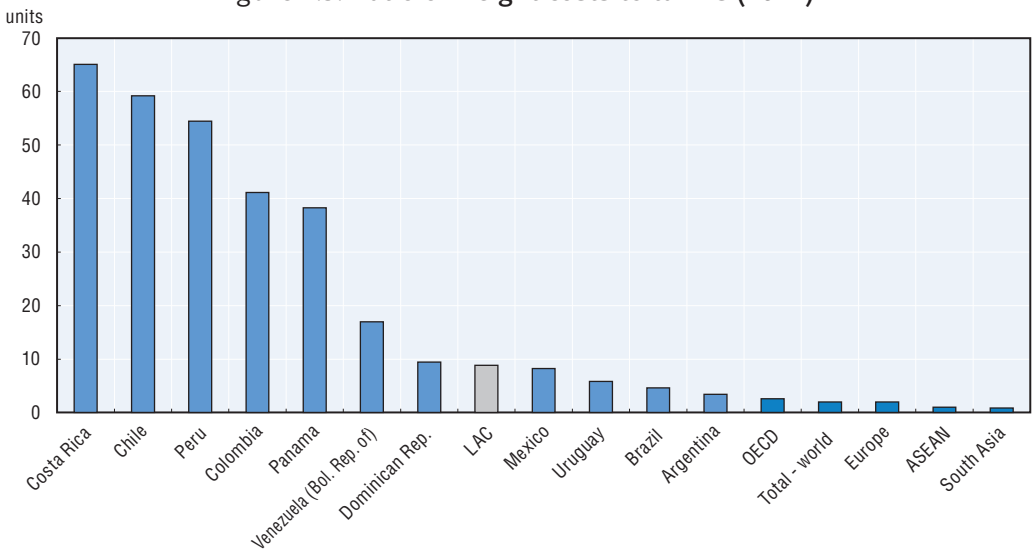
Trade policy should prioritise logistics improvement to be at least as important as tariff reduction.

While some countries have made efforts to sign free-trade agreements, the same or greater efforts need to be invested in policy making to reduce logistics costs. The progress made by many Latin American countries in relaxing restrictions on trade brought average tariffs in the region down from 40% in the 1980s to around 8% in 2012 (González, Guasch and Serebrisky, 2008). These cuts to tariffs along with the gradual geographical fragmentation of production and the use of logistics techniques aimed at optimising stocks increased the weight of logistics costs in the final price compared to the average tariff for foreign trade.

In line with previous studies on Latin America (Clark, Dollar and Micco, 2004; Mesquita-Moreira, Volpe Martincus and Blyde, 2008), analysis of exports to the United States shows that transport costs are much higher than the tariffs.[10] Although this high ratio is sometimes caused by distance, as in Chile, or low tariffs, as in Costa Rica,

it is also largely due to inefficient logistics. Average freight costs for trade between the United States and all its partners are less than double the tariff costs, but if only its LAC partners are considered the ratio rises to almost 9:1 (Figure 4.5). Finally, poor logistics performance can have a greater impact than tariffs on variation in trade costs. A study in North Africa found that tariffs represent only about 0.6% of the variation in trade costs, while logistics represents more than 15% (Shepherd, 2011).

Figure 4.5. **Ratio of freight costs to tariffs (2012)**



Note: Calculations based on imports from the US market. The figures show the ratio of freight cost to tariffs on imports to the region. ASEAN is the Association of Southeast Asian Nations. Latin America and the Caribbean (LAC) consists of 20 countries.

Source: Based on data from the US Census Bureau.

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Reducing the logistics gap would mainly generate productivity gains for SMEs.

Better logistics performance improves trade opportunities for SMEs in particular. Logistics tends to cost more for small producers than for large producers (Fernández et al., 2011; Guasch, 2011; Fries and Fernández, 2012; Rodrigue, 2012). Since jobs and GDP are highly concentrated in SMEs in Latin American countries, cutting logistics costs for SMEs makes the economies more competitive. In Latin America, domestic logistics costs, including stock management, storage, transport and distribution, can add up to more than 42% of total sales for SMEs, compared to 15-18% for large firms (Guasch, 2011). For example, in the Nicaraguan beef industry, small producers' logistics costs from the farms to the abattoirs are more than double what they are for large producers. Small producers also have longer transport times, often exceeding three days, compared to around 30 hours for large producers (Fries and Fernández, 2012).

SME trade is hindered by poor-quality secondary and tertiary roads and a lack of access to ICTs. The regional logistics gaps within countries mainly affect small food producers. In this regard, improved road access to Lambayeque, Cajamarca and

Amazonas in Peru cut the cost per container of organic coffee by USD 600 and increased exports by 40%. For small exporters moving a kilo of tomatoes from a Costa Rican farm to the final point of sale in Managua, Nicaragua, transport represents the main cost, at almost a quarter of the total (23%), followed by customs (11%) and taxes (6%). By contrast, for large exporters, the main cost is customs (10%), followed by transport (6%) and taxes (5%). As a result of these logistical and operational inefficiencies, small producers' profit or competitiveness margin is 19% lower than that of large regional exporters, a difference of USD 0.275 for each kilo of tomatoes sold (Fernández et al., 2011). Improving connectivity with rural areas through improvements in logistics could therefore increase competitiveness, facilitate market access and raise small farmers' income.

Increasing connectivity within the region and with the global economy

In Latin America, reducing logistics costs is essential to promote trade in the region. Regional trade integration is weaker than in other regions of the world. Only 27% of trade in Latin America is regional, compared with 63% in the European Union and 52% in Asia. Latin America therefore depends more heavily on external demand and could benefit from greater efforts to support regional integration. A 10% reduction in freight costs and tariffs would increase Latin America and the Caribbean's bilateral imports by 45% and would increase regional imports by 60% (Rodrigue, 2012). For maritime transport among Latin American countries, doubling port efficiency in a pair of ports would have the same impact on transport costs as halving the distance between them. There is greater scope for action in reducing logistics costs at the domestic level than at the international level (Wilmsmeier, Hoffmann and Sánchez, 2006).

The region's poor logistics performance makes freight costs almost as expensive for intra-regional exports as they are for extra-regional exports, and sometimes even more so.

Despite the geographical proximity among the countries of Latin America, logistical deficiencies mean that freight costs are almost as expensive for intra-regional exports as they are for extra-regional exports, and sometimes they are more expensive. This is the case for Argentina, Brazil, Chile, Peru and Uruguay in South America. As is the case for trade with the United States (see Figure 4.5, above), transport costs are far higher than tariffs (Mesquita-Moreira, Volpe Martinicus and Blyde, 2008). Indeed, 20% of the total costs incurred in the import of Paraguayan soy beans into Brazil and beef into Chile are the result of inefficiencies in the regional logistics chain (Schwartz et al., 2009). In some Central American countries such as Costa Rica, Guatemala, Nicaragua and Panama, regional trade is hindered by poor co-ordination and information problems, resulting in lorries returning to their bases empty.[11] Additionally, improvements can be made to standardisation practices relating to the regulation of land transport, the preferred mode of transport within the region (see IDB [2013] for an analysis of the Central American countries). Road corridors must be developed and logistics solutions to connect Latin American cities and ports must be implemented to boost intra-regional trade (see Box 4.1).

Box 4.1. **Integration corridors and regional economic development: The case of the IIRSA**

The three main initiatives to integrate infrastructure and regional logistics in Latin America are the Initiative for the Integration of Regional Infrastructure in South America (IIRSA), the Mesoamerica Project (MP) in Central America and CARICOM in the Caribbean.

IIRSA is the most advanced of the three. It was born out of co-operation between the governments of South America, with the collaboration of the development bank of Latin America (CAF), the Inter-American Development Bank (IDB) and the River Plate Basin Financial Development Fund (FONPLATA). Initiated in 2000, the IIRSA aims to create a database of projects intended to integrate the region in the areas of transport, telecommunications and energy, building missing infrastructure links and reducing and eliminating barriers to intra-regional trade. The IIRSA currently operates under the South American Infrastructure and Planning Council (COSIPLAN) of the Union of South American Nations (UNASUR).

Based on existing economic and trade corridors in South America, the IIRSA defined a series of Integration and Development Hubs for regional planning and integration for infrastructure and "structuring" equipment. The hubs include the Andean Hub, the Central Inter-Oceanic Hub and the Mercosur–Chile Hub. The Andean Hub comprises the main nodes in Bolivia, Colombia, Ecuador and Peru, linking the five countries' main cities and covering a 2.6 million km^2 area. The Central Inter-Oceanic Hub crosses South America, linking the main Pacific and Atlantic ports and covering an area of 3.5 million km^2; it passes through various nodes in Bolivia, Brazil, Chile, Paraguay and Peru. The Mercosur–Chile Hub links the main cities, ports and economic centres in an area covering much of Argentina, Brazil, Chile, Paraguay and Uruguay (3.2 million km^2). These three hubs are mainly composed of maritime links, with the terrain hindering land links between non-adjacent countries.

Only 15% to 23% of total trade is between two South American countries, and the sample of products transported by land and sea are raw materials, with little processing. The poor physical integration means that the completion of gaps between sections and the building of link roads, many of which will be short but will link highways together, will have a significant combined effect on the region's competitiveness in the coming decades, and should boost regional trade among cities and countries linked by the main transport and communications corridors in each hub.

As of 2013, the IIRSA consists of 583 infrastructure integration projects requiring investment estimated at USD 155.65 million, or close to 4% of total South American GDP. By mid-2013, governments had already prioritised 97 projects due to be completed by 2020, worth 11% of the estimated total investment (Table 4.3).

Table 4.3. **Regional integration hubs, priority projects and exports**

Regional Integration Hubs	Priority projects	Amount (estimated investment in USD)	Main exports of the trade-hub area	Extra-regional trade in the hub
Andean (Colombia, Ecuador, Peru, Venezuela)	12	3 690 546 845	Crude oil and derivates, iron ores, soy beans, copper	91%
Capricorn (Argentina, Bolivia, Brazil, Chile, Paraguay)	18	4 232 983 784	Crude oil and derivatives, copper ores, gold, coal	84%
Paraguay-Paraná Waterway (Argentina, Bolivia, Brazil, Paraguay, Uruguay)	15	1 530 549 051	Refined copper, soy beans, crude oil, copper ores and concentrates, iron ores and concentrates	83%
Amazon (Brazil, Colombia, Ecuador, Peru, Venezuela)	27	3 884 604 239	Crude oil, iron ores and concentrates, soy beans, iron ores and concentrates, aeroplanes and other aircraft	95%
Guianese Shield (Brazil, Guyana, Suriname, Venezuela)	6	958 800 000	Soy beans, whether or not broken, crude oil, iron ores and concentrates, oilcake and flours, vegetable oil waste, aeroplanes.	98%
Central Interoceánico (Bolivia, Brazil, Paraguay)	7	460 200 000	Refined copper and concentrates, crude oil, soy beans, iron and concentrates	92%
Mercosur-Chile (Argentina, Bolivia, Brazil, Uruguay, Chile)	11	2 132 331 000	Refined copper, soy beans, oil, iron ores and concentrates, oilcake and flours, vegetable oil residues	84%
Peru-Brazil-Bolivia	1	85 350 000	Crude oil, iron ores and concentrates, soy beans, copper and gold	97%
Total	97	16 975 364 919		

Source: www.iirsa.org/proyectos in June 2013; UNASUR, União and FIESP (2012), *8 ejes de Integración de la Infraestructura de América del Sur*, Federação das Indústrias do Estado de São Paulo; UNASUR and ECLAC (2011), *Infraestructura para la Integración Regional*, United Nations.

Better logistics performance also helps integrate Latin American economies into the GVCs, which, led by multinationals, contribute to 80% of global trade (UNCTAD, 2013). The GVCs can only successfully involve the manufacturing industry if the necessary transport and logistics are in place. GVC goods normally cross many borders in the production process, so trade in parts and components is almost 50% more sensitive to improvements in logistics performance than is trade in final goods (Shepherd, 2011). The interdependencies between trade and investment reveal that provision of adequate logistics services is associated with greater foreign direct investment (FDI) in sectors that are more intensive in logistics inputs (Blyde and Molina, 2013). Though Latin America is not as integrated into international production systems as Asia and Europe, Chile has increased its trade links with Asia, while Mexico and some Central American countries have increased their trade with the United States, thanks in part to the North American Free Trade Agreement zone.

Measures to improve logistics in Latin America

While transport infrastructure is the main factor behind the low logistics performance, some "soft" solutions could improve logistics.

A series of policies is needed to improve both "soft" and "hard" aspects of logistics. Since eliminating the gap for hard components like transport infrastructure cannot be achieved in the short run, it is a priority to implement active policies to improve the transport of goods and services using existing infrastructure. Although the main cause of the logistics gap is the poor quality of transport infrastructure, other elements could make logistics more effective to facilitate trade. These "soft" aspects are linked to the institutional structure and governance regarding an integrated logistics policy, the provision of modern storage facilities, efficient customs and certification procedures, and the use of information and communication technologies for logistics, as well as the promotion of competition in the transport sector.[12] These elements can be used to encourage efficient use of available infrastructure and thus minimise logistics costs.[13] This section analyses the policies for developing transport infrastructure and presents several policy solutions that could improve short-term logistics performance using current transport infrastructure.

Developing transport infrastructure

Towards greater and better investment

Better provision of transport infrastructure is necessary to lower logistics costs and increase sustainable growth in the region. If Latin American economies could close the infrastructure gap with other middle-income countries, they could increase the rate of GDP growth by an estimated 2 percentage points a year (Calderón and Servén, 2010). To meet the infrastructure needs that will arise between 2006 and 2020, Latin America and the Caribbean countries should invest around 5.2% of regional GDP every year (Perrotti and Sánchez, 2011).[14]

It is essential to promote sub-national investments to provide opportunities to link with national and regional chains. It is crucial to include sub-national entities with less access to markets in the GVCs. For instance, investment and programmes to promote building bridges or renovating them to meet current needs (in terms of maximum axle weight, or the design of bridges for the new size of articulated lorries) could provide economic benefits to some regions.

To close the transport-infrastructure gap, greater investment in the sector should be accompanied by improvements to the institutional framework. Vertical and horizontal coherence and co-ordination among stakeholders improve how the transport sector operates and help promote the sector, particularly co-modal transport, which would enable a more efficient distribution of transport modes in terms of cost, energy consumption and negative externalities. The multiplicity of functions thus affects the efficiency of government and private action. These challenges are more important than the stability, adaptability and effectiveness of policies and more important than public-interest considerations. The main obstacles to proper co-ordination are a lack of incentives for co-operation and an unsuitable institutional structure. These obstacles are greatest in Colombia, El Salvador, Paraguay and Peru, which must prioritise an integrated policy for the different infrastructure sectors (OECD-ECLAC, 2011).

Investment must strike the right balance between building new infrastructure and maintaining existing infrastructure.

Prioritisation and planning need to be improved during the transport policy-making phase. During this phase technical capacities for designing suitable projects and a framework for policy implementation tend to be low (see Nieto-Parra, Olivera and Tibocha [2013] for the situation in Colombia). Additionally, improvements need to be made to the process of deciding which construction projects are carried out, striking the right balance between building new infrastructure and maintaining existing infrastructure (Agénor, 2009; Calderón and Servén, 2010). The overall cost of transport, investment and maintenance for a road that is not maintained is three to seven times more expensive than for a road that is perfectly maintained (OECD-ECLAC, 2011). Some countries are seeking to improve how projects are chosen and assessed by introducing national public-investment systems (see Carranza, Daude and Melguizo [2011] for the system in Peru).

The driving force of investment in co-modal transport

Improvements to the institutional framework can encourage investment in co-modal transport and environmentally sustainable development in the region. Integration or better co-ordination among the various institutions responsible for each mode of transport would increase the role of rail transport and inland waterways in the region,[15] which would have a tremendous impact on logistics costs. It would also reduce the negative externalities on the population and the environment, especially in saturated port areas. Some countries in the region, including Colombia, Costa Rica, the Dominican Republic and Mexico, have made improving multimodal transport a part of their development agendas. Integrated prices for rail and port services would improve the region's logistics. In countries such as Colombia, Costa Rica and Mexico, the lack of institutional incentives for co-operation is a major obstacle for linking primary roads with ports and ports with railways. Integrating freight-transport policies and organising co-modal transport to allow comparison of subsidies for investment in different modes of transport are major challenges for the region. The rail and waterway concession model could keep access open and finance public investment where there are major environmental externalities.

Pricing mechanisms could boost co-modal transport. Market distortions for some modes of transport (for instance, lorry companies pay little to maintain roads) adversely affect the allocation of resources to transport infrastructure. In the long run, effective price signalling (for example, through adjustments to fuel taxes and road tolls) would be useful to make investment subsidies in other modes of transport unnecessary. It would also encourage countries to move towards prioritising their different modes of transport in ways that are more efficient and environmentally sustainable. In Germany and Switzerland, for instance, road-haulage tolls based on distance, cargo weight and CO_2 emissions have encouraged haulage firms to use their lorries' carrying capacity in return journeys, thus making lorry freight more efficient, and encouraged the development of other modes of transport (McKinnon, 2006).

Developing stronger institutions is essential to improve co-ordination and national coherence and to promote co-operation with the private sector through modern frameworks whose primary focus is on the development of multimodal transport (Cipoletta, Pérez-Salas and Sánchez, 2010). Traditionally in Latin America, transport and transport policies have been analysed and implemented one mode of transport at a time, hindering the efficiency of services. However, there are some successful

examples of public-private partnership in the region, although most of these are in a specific sector, such as Uruguay's National Meat Institute (INAC), which is responsible for promoting, regulating and co-ordinating the storage and transport of meat. Some experiences in other countries, including Canada, Finland, Germany, Malaysia, Morocco, the Netherlands and South Korea, could also be useful for the region (Arvis et al., 2012; Cipoletta, Péres-Salas and Sánchez, 2010).

Co-ordinated efforts to develop maritime transport in the region are essential to improve competitiveness in the international market. Further development of the ports and container terminals is essential due to their position in the transport chain and their role as a logistics platform in trade. In particular, countries that export natural resources need to make improving maritime transport logistics a priority for government policy. Major port-expansion and canal-building plans in response to increased shipping activity and larger ships require regional co-ordination among the different countries to boost trade (Box 4.2). Meanwhile, some of these projects require risk and feasibility analysis to ensure they bring in the expected revenue and effectively reduce transport times.

Box 4.2. **Projects to increase maritime logistics capacities**

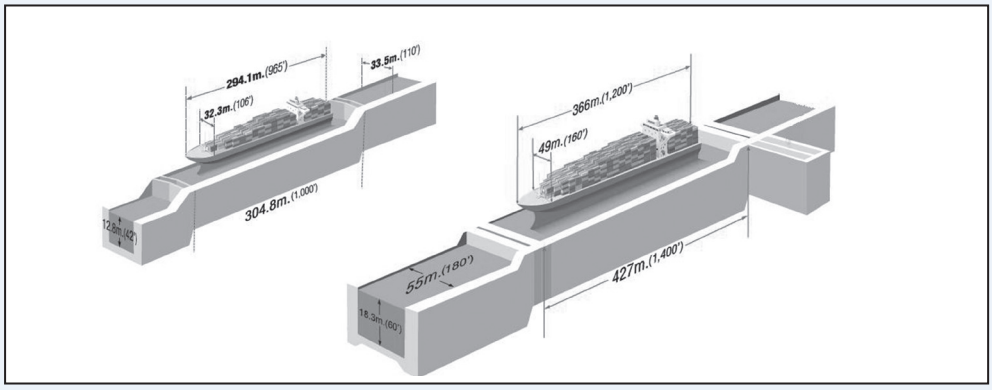
The last ten years have seen a substantial increase in international trade and maritime transport between Latin America and other emerging economies. Average annual growth in container movement is as high as 18% in countries like Colombia and Peru, more than twice the growth seen in the United States and Europe during the same period. Furthermore, vessels are becoming larger and larger, encouraging the expansion of logistics capacities in the region. According to ECLAC estimates, by 2016 a large proportion of maritime traffic in the region will be larger ships with a 13 000 TEU capacity. This box looks at some of the initiatives being developed and scheduled in the region to close the port and maritime infrastructure gaps in response to the additional demand.

Panama

Budget (in millions of euros) 3 971
Projected income in 2025 (in millions of euros per year) 4 690
Canal length (km)..... 80

Panama began expanding its canal in 2007 to make it more efficient and double its cargo capacity. The work was due to be completed in 2014. The expansion involves building two new lock complexes, making the canal deeper, raising the level of the water and digging new canals. A deeper canal will considerably increase its capacity, making it navigable to larger, post-Panamax ships. According to projections by the Panama Canal Authority, cargo volume is expected to increase by 3% per year, reaching 600 million tonnes a year by 2025, double the volume transported in 2005.

Figure 4.6. **Panamax vs. post-Panamax vessels**



Source: Wikimedia Commons, © Autoridad del Canal de Panamá.

Box 4.2. (contd.)

Dominican Republic

Because of the new dynamic that will be generated in the Caribbean's maritime industry once the expansion of the Panama Canal has been completed, the Dominican Republic recently began building the new Caucedo Logistics Centre. The project is being undertaken at the Caucedo Multimodal Port and will speed up the distribution, processing and shipment of goods to and from the Dominican Republic. The first stage, lasting three to five years, requires an estimated investment of USD 100 million and will generate 1 000 direct jobs. This project envisages foreign investors, including DP World (formerly Dubai Ports), a conglomerate that operates more than 65 marine terminals around the world and that handled 56 million containers in 2012.

Nicaragua

Budget (in millions of euros) 30 260
Projected income in 2020 (in millions of euros per year) 3 430
Canal construction (km) 286

Plans to build a second canal in the region were recently put forth. Work on the Inter-Oceanic Nicaragua Canal is scheduled to begin in 2014 and is expected to last 10-15 years. The proposal involves a canal between the Pacific and Atlantic oceans, two deepwater ports, and a dry canal for trains linking the two ends of the Nicaragua Canal. There are also plans to expand an international airport to increase the logistics capacity. The contract for the work was awarded to the Chinese firm HK Nicaragua Canal Development.

Other proposals in the region include a dry canal, inter-oceanic corridor and canal in Honduras, in inter-oceanic corridor in Guatemala and rail connections in Colombia and Mexico.

Ports

In addition to the proposed maritime connections, the larger vessels will make it necessary to adapt the region's ports by making them deeper and increasing their capacity. In Central America and the Caribbean, only three countries have direct services to and from ports in East Asia, Europe and North America and the capacity to receive large ships with a deep draught: Caucedo (Dominican Republic), Kingston (Jamaica); and the ports in Panama. Several projects are under way or due to begin in the next few years to increase the region's capacity. These include the expansion of the ports at Manaus (Brazil), Valparaíso (Chile), Cartagena (Colombia), Manta (Ecuador), La Unión (El Salvador) and Cortés (Honduras).

Source: www.pancanal.com; *El País*, "La conexión Pacífico-Atlántico", 22 June 2013; *La Prensa*, "Asamblea aprueba la construcción del Canal", 13 June 2013; *BNamericas*, "Puertos en América Latina: en aguas profundas", October 2012.

The effectiveness of private investment in infrastructure

Concessions can improve the services that the region provides and make the region more competitive. Because the finance needed is high, private investment has an important role to play in the construction of transport infrastructure. Private-sector involvement can also bring positive externalities. First, the concessions system can ensure there is a balance between initial investment and future maintenance costs in the planning of the entire project. Second, it can reduce the number of oversized projects that get built as a result of deficiencies in national investment systems. Finally, it transfers commercial risks to the private sector, which is better prepared to mitigate them.

Appropriate private-sector involvement in transport infrastructure can limit future fiscal costs and reduce logistics costs. Regulatory aspects (such as price caps and tenders) and institutional and political aspects (such as the quality of administration,

election cycles and the degree of independence of regulators) have been identified as determining factors of these renegotiations in the region (Guasch, Laffont and Straub, 2008; Bitran, Nieto-Parra and Robledo, 2013).

Effectively exploiting the benefits of public–private partnerships (PPPs) requires developing a strong capacity to assess, tender and manage concession contracts. A value-for-money assessment helps to determine which mode of financing is most appropriate for infrastructure works. Following a social-feasibility analysis, value-for-money assessments can be used to decide whether a concession contract would be more appropriate than public-funded work. While most OECD economies do a cost-benefit analysis or use a public-sector comparator, Latin American countries usually limit their analysis to comparing the results of tenders. This creates uncertainty regarding whether the private sector provides better value for money (OECD, 2008). Additionally, mechanisms must be put in place to limit the possibility of projects running over schedule or above budget. Finally, a change in fiscal-accounting procedures could improve how contractors are selected by preventing the use of PPPs purely because of tax incentives. Recently, some Latin American countries, including Colombia, El Salvador, Honduras, Mexico and Uruguay, have improved legislation for PPPs, but the current system can still be improved to reduce the possibility of future renegotiations and promote effective investment in infrastructure (Bitran, Nieto-Parra and Robledo, 2013; EIU, 2013).

Towards better logistics performance with existing transport infrastructure

Logistics policy co-ordination

Promoting a logistics policy must involve different public and private stakeholders, which must be co-ordinated effectively. Like countries in other regions, Latin American countries do not have an institution entirely and exclusively responsible for logistics operations. Good logistics performance requires the full co-ordination of various government institutions, such as the Ministry of Planning, Ministry of Transport, Ministry of Industry, Ministry of Trade, and customs and border authorities. Private institutions such as business associations for entrepreneurs in industry and services, logistics professionals, and academia (research centres and universities) must also take part in the logistics agenda. Co-ordination is therefore necessary between different stakeholders and institutions whose primary purpose is to ensure that the different aspects of logistics in a country are fully and coherently developed. One example is the National Institute of Logistics in Uruguay which brings together both public and private actors for promoting and further developing logistics capacities.

The recent addition of an integrated logistics policy to some development plans requires major implementation and follow-up efforts. The policy must be accompanied by capacity-building to ensure government resources are used efficiently and effectively. Countries like Colombia, Costa Rica, the Dominican Republic and Panama have begun drawing up logistics policies (Colombia and the Dominican Republic state specific logistics goals and action in their respective national development plans). Colombia's plan aims to draw up a national logistics policy, developing a national logistics research programme and setting up a national freight-logistics observatory. Other countries such as Chile, Panama, Peru, Brazil and El Salvador are in the process of designing a national development or logistics plan.

Institutions and governance are the bedrock of logistics performance

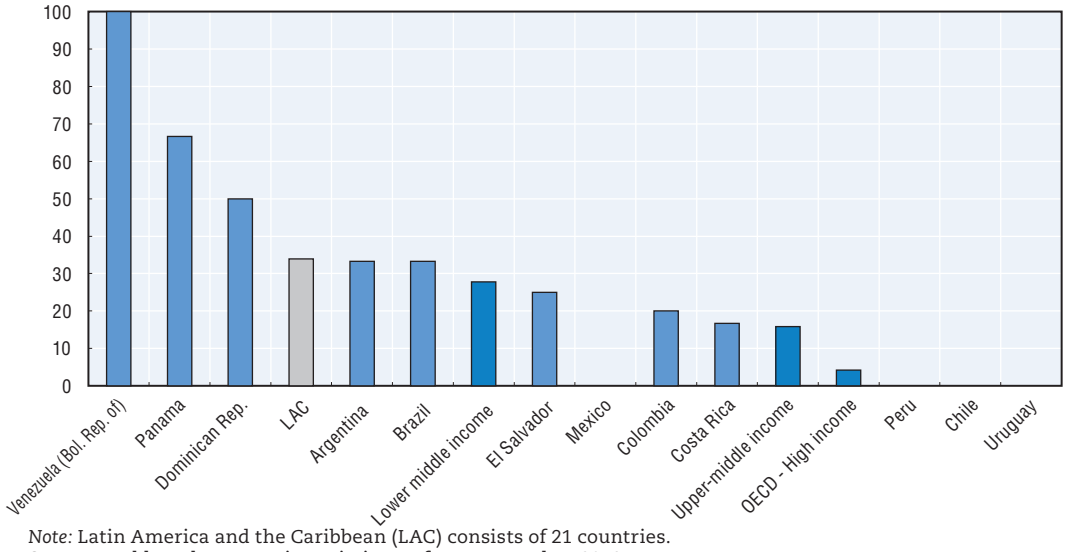
Effective logistics require good-quality public and private institutions as their foundations. Although the quality of institutions is not among the criteria used by the

LPI to measure logistics performance, institutions must perform well for goods to be sold and for the economy in general to function. In public institutions there is increasingly a link between logistics costs and a lack of judicial independence, too much corruption, inefficient governance and poor security. Similarly, in private institutions, corporate ethics, responsibility and accountability affect logistics performance. After controlling for GDP per capita, the partial correlations between logistics performance and the quality of public and private institutions are around 0.75.[16] Latin American countries' institutions are generally of much poorer quality than those of the OECD countries, so public and private action is needed to facilitate trade in the region.

The solicitation of informal payments results in delays in the delivery of goods in Latin America.

Good logistics performance in the region will require improvements to governance by means of anti-corruption and security policies. The main causes of delays in the delivery of goods include the solicitation of informal payments and criminal activities (e.g., stolen cargo). While in Latin America, 33% of surveyed logistics operators identified solicitation of informal payments as a key source of delays, in middle-income countries this figure was just 15%, and in high-income OECD countries it was 5% (Figure 4.7). Similarly, nearly 20% of respondents said criminal activities delay the delivery of goods (compared to 9% and 5% in middle-high income countries and high-income OECD countries). While in Chile and Uruguay, neither criminal activities nor solicitation of informal payments is identified as a source of delays, in Panama and Venezuela these illegal activities pose a challenge for improving the delivery of goods. Measures in OECD countries such as the Mail Fraud Statute in the United States make it easier to prosecute perpetrators of fraud and corruption. Similar policies could be adopted by certain countries in the region to prevent tax evasion and encourage domestic and international trade procedures to be conducted legally.

Figure 4.7. **Solicitation of informal payments (2012)**
(percentage of logistics operators surveyed)



Note: Latin America and the Caribbean (LAC) consists of 21 countries.
Source: World Bank, Domestic Logistics Performance Index, 2012.
StatLink http://dx.doi.org/10.1787/888932906996

Improvements to the security of logistics chains would reduce direct costs caused by theft or by losses during transfers and would lead to lower insurance premiums. In Central America, increases in crime and violence pushed up haulage companies' security costs by a quarter between 2008 and 2011, reaching 3-4% of their total costs (World Bank, 2012). In Mexico, an estimated 15-20% of logistics spending is invested in security, often without any clear improvements (Pérez-Salas, 2013). Institutional weaknesses and insecurity are among the main challenges the region must deal with (WEF, 2012). In a ranking of 144 countries, the ten countries with the highest levels of crime and violence include nine countries from the region. From least violent to most violent, these countries are Mexico, Colombia, Haiti, Trinidad and Tobago, Venezuela, Jamaica, Honduras, El Salvador and Guatemala.

Developing logistics training

The development of professional and educational structures in Latin America to manage logistics services in an integral, modern manner would benefit innovation and the development of value-added services in the freight industry. Thanks to logistics training, the region could begin to achieve the same levels of logistics performance as emerging and developed economies that have undertaken major reforms of their logistics industries.[17]

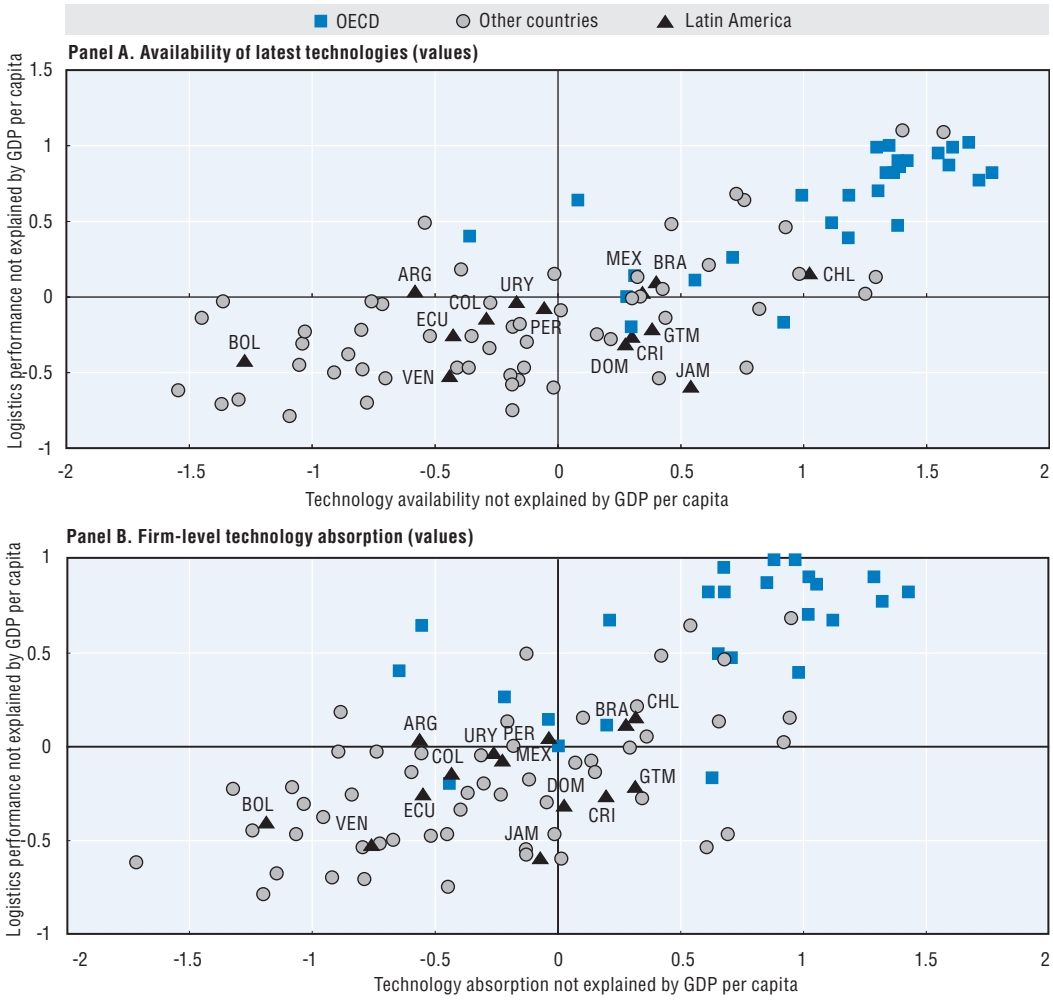
Education and training are essential ingredients to ensure that existing infrastructure in Latin American economies is put to best use. If there is access to training in logistics, existing transport infrastructure and technologies can be used efficiently to ensure freight transport is properly managed. Education curricula must be further adapted to new technologies, and interdisciplinary programmes that adopt a holistic approach to logistics and supply chain management should be promoted. The programmes should include material on integration, synchronisation, chain risks and sustainability. These learning and continuing-education programmes should enable countries to develop human capital in a way that serves labour skills, so links between business and academia are essential. Finally, in addition to trade-facilitation reforms, local teams should be given a greater capacity to develop strategies for the future. Customs management in particular requires training to ensure it benefits from sustained change (Moisé, 2013).

Good use of information technology and telecommunications

Measures to strengthen transport-infrastructure policies should be accompanied by best practices in ICTs. Greater and better investment in transport infrastructure is essential but not sufficient on its own. To ensure that existing infrastructure is used to its fullest, ICTs must be properly incorporated into the logistics process. After controlling for GDP per capita, there is a positive correlation between access to ICTs and logistics performance. The availability of the latest technologies and firm-level technology absorption are lower in Latin America than in the OECD countries (Figure 4.8). This combined with the infrastructure deficit in the region makes it vital to apply solutions that make the available infrastructure services more productive and more efficient. ICTs can improve operational connectivity and connectivity among modes of transport, which in turn can reduce the cost and time needed to trade goods in the region. Some government programmes, such as those of Colombia and Mexico, include making better use of ICTs to facilitate trade procedures.

It is essential to implement technology that enables better tracking and performance in the movement of goods.

Figure 4.8. **Access to technology and logistics performance: Partial correlations (2012)**



Note: The partial correlations used GDP per capita as a control variable. Outliers were identified and discarded using the standard DFBETA methodology. In the legends, Chile and Mexico are included as Latin American countries rather than as OECD countries.

Source: World Bank (*Logistics Performance Index*) and World Economic Forum (*Global Competitiveness Index*), 2012.

StatLink http://dx.doi.org/10.1787/888932907015

A major component of logistics services is a well-developed information system. Advances in the quality and coverage of ICTs in recent years mean that an increasing amount of information is stored and processed electronically. Telecommunications need to develop to a level where information systems work properly and are reliable. Such measures include customs automation, the ability to track and trace goods in transit at every stage of the process, risk analysis for trade in goods, the electronic submission of customs forms and documents, information management and terminal operations, and electronic single windows (Korinek and Sourdin, 2011; Elorza, 2012). However, these are

just some of the elements of a logistics chain that is constantly growing and becoming more complex, so for these systems to develop in an orderly fashion, structures are needed to co-ordinate the different national and sub-regional public and private initiatives. If the different parts of the logistics chain co-ordinate their technology soon, competitive improvements will be possible nationally, and countries will be in a better position to introduce low-carbon transport services or join the GVCs. It is essential to implement technology tools that enable better tracking of the movement of goods and implement business-data security (telematics, traceability), as well as systems to help prevent theft and damage to goods. For example, Mexico's logistics competitiveness agenda includes designing such policies.

Policies are needed to streamline technical and administrative procedures by reducing red tape for imports and exports. For example, some countries in the region, including Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, Panama and Peru, are operating single-window facilities for foreign trade (*ventanillas únicas de comercio exterior* [VUCEs]) as a policy tool to boost trade (Elorza, 2012). These VUCEs simplify the entire administration process, bringing together all the bodies involved in customs procedures in a single point of contact. Some of these VUCEs also allow the use of single foreign-trade forms (FUCEs), reducing the number of documents needed for border procedures. In addition to customs, another key aspect is the digitisation of certificates of origin, streamlining the process and allowing users to benefit from preferential customs processing (Box 4.3). The digitisation of this process in Latin America is important for boosting regional integration. Regarding trade facilitation more generally, the provision of information on customs procedures, appeals processes and the impartiality of procedures is also important to ensure efficient, predictable and transparent service.

Box 4.3. **ICTs enabling greater efficiency at the Colombian border**

Colombia has made its border procedures more efficient by introducing automation and incorporating ICTs into its integrated customs and certification processes. Colombia created a VUCE in 2004 within its Public Administration Renovation Programme as part of its strategy to make its economy more competitive and efficient. The Colombian VUCE brings together 18 institutions with more than 90 information flows and 50 digital operations in one online portal. By successfully adopting digital technology, Colombia has efficiently co-ordinated all parties involved in the customs process. The VUCE can be used for procedures related to formalities, certifications, permits and approvals required for imports and exports. It can also be used for health inspections and anti-drug controls, as well as risk management. The customs authorities use the FUCE to streamline documentation. All VUCE transactions are made with advanced electronic signatures and a computer system that is based on the concept of a hosted agency, using a standard document exchange.

In 2011 Colombia finished digitising certificates of origin as part of its trade-facilitation measures. Thanks to this digitisation, the time needed to apply for a certificate of origin takes just ten minutes, rather than three days. The adoption of ICTs and efforts to ensure effective co-ordination among those involved in VUCE operations has had significant effects. According to the World Bank's *Doing Business* report, the time required for export procedures was cut from 24 days to 14 days between 2007 and 2012. The next phase of improvement will be to ensure interoperability between the Colombian system and other systems in the region, creating better connectivity with Chile and Mexico.

Source: Elorza (2012); SELA (2011).

Promoting competition in the transport sector

Regulatory changes to encourage competition in the transport sector facilitate the use of different transport systems and reduce logistics costs. Measures to promote competition among different transport firms help reduce logistics costs. Between 2000 and 2006, the collusion of some 40 airlines increased the costs of Chilean exports. Eventually, the airlines were forced to pay more than 1 800 companies around USD 113 million in compensation. To prevent similar cost overruns, greater competition is needed among the small number of Latin American cargo airlines.

It is crucial to encourage the public use of private infrastructure, which in some countries in the region is used almost exclusively for transporting raw materials. Some measures adopted in the OECD countries can allow better use of infrastructure. For example, changes to Australian regulations in 2000 forced private railway companies such as the Fortescue Metals Group to provide access to third parties and to negotiate prices, which provided new competitors with access. For ports, concession contracts, regulations and tariffs must be designed to optimise access to and the use of the limited resources available, such as the land where the ports are located (Notteboom, 2007).

Conclusion

The cost and quality of logistics have fundamental implications for the region's sustainable economic growth. Countries improving their score by 1 in the Logistics Performance Index (which has a scale of 1 to 5) improve their labour productivity by about 35%. Furthermore, the share of logistics-intensive or time-sensitive exports in Latin America is on average three times that of the OECD economies, so the region's commercial and productive structure is highly sensitive to logistics performance. Trade policy should therefore include logistics as an input that is at least as important as tariff policy.

To reduce its high logistics deficit, the region needs to adopt a series of policies that will provide solutions for the short, medium and long term. Although the main factor behind the logistics gap is transport infrastructure, the necessary investment in this sector cannot happen immediately; a lengthy process is needed to identify the type of investment required and the sectors that need it. "Soft" solutions are therefore considered as means of using existing infrastructure effectively in the short and medium term. An integral logistics policy framework, better governance to boost transport, support for logistics education, more effective incorporation of ICTs for logistics, better customs procedures and measures to encourage competition in the transport sector are some of the factors that could reduce logistics costs while using existing transport infrastructure.

Notes

1. For this third measurement method, various institutions use a series of indicators of the perceived quality of logistics, such as the World Bank's *Logistics Performance Index* and the World Economic Forum's *Enabling Trade Index and Global Competitiveness Index*.
2. A simple statistical analysis finds a statistically significant positive correlation at the 1% level between the Logistics Performance Index on the one hand and labour productivity and sophistication of exports on the other. The regression of labour productivity (sophistication of exports) as a dependent variable covers the years 2007, 2010 and 2012 (year 2007) and represents a sample of about 300 observations (100 observations). The control variables included are related to institutions, the macroeconomic environment, education, health, the level of development of financial markets, goods market efficiency, innovation and business sophistication. The source for these variables is the World Economic Forum's Global Competitiveness Report.
3. The average confidence interval of this indicator, which ranges from 1 to 5, is 0.21, which is equivalent to 13 places in the LPI ranking (Arvis et al., 2012).
4. These costs exceed USD 1 800 per container for Colombia and USD 1 000 for Brazil according to data from the World Bank's *Doing Business 2012* report.
5. The average for all US trade partners is less than 70% according to US Department of Transportation data for 2009.
6. Based on 2011 data (http://www.aapa-ports.org/). The Brazilian port of Tubarão is the largest port in the region and the 25th largest in the world. Colón is larger in terms of container traffic. For more information see: www.cepal.org/perfil
7. Based on 2011 data (www.aci.aero).
8. Moreover, logistical deficiencies cause losses of close to 50% for perishable goods due to decomposition.
9. See OECD/ITF (2009) for a discussion of competition in the transport sector in OECD countries.
10. Differences in transport costs between Latin American and Dutch exports to the United States were found to be due not only to the type of goods exported but also largely due to port efficiency (Mesquita-Moreira, Volpe Martincus and Blyde, 2008).
11. This is especially conspicuous in Guatemala, where lorries return empty from more than 75% of deliveries (World Bank, 2012).
12. There are numerous soft elements, including cold-chain storage, lorry and container services, cargo consolidation, certification of origin, phytosanitary permits and traceability services.
13. For similar policy proposals in other regions (Asia-Pacific, North America and Europe) that have provided guidance for the implementation of these in the past, see OECD (2002).
14. Around USD 170 billion (2000 value). These authors estimate that if Latin America and the Caribbean do invest 5.2% of GDP, it would be divided between new infrastructure (52%) and capital needed for maintenance costs (48%).
15. In Colombia, for example, a single body – the Corporación Autónoma Regional del Río Grande de la Magdalena – is responsible for planning, regulating and managing transport on the River Magdalena (which carries 80% of the country's inland waterway freight but only 4% of total freight). Colombia's constitution requires this body to be independent from the Ministry of Transport. These arrangements mean there is no integrated policy between transport management on the Magdalena and other forms of transport in the country (Nieto-Parra, Olivera and Tibocha, 2013).
16. The years covered are 2007, 2010 and 2012. Logistics performance was measured using the World Bank's LPI and the quality of public and private institutions using the World Economic Forum's Global Competitiveness Index. Outliers were identified and discarded using the standard DFBETA methodology.
17. See Arvis et al. (2012) for some examples of policies in other regions.

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