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Latin American Industrial Competitiveness and the Challenge of Globalization

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Special Initiative on Trade and Integration

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This document is part of the first component of the Initiative.

C O N T E N T S

PREFACE

Contents

Manufacturing industry in Latin America and the Caribbean region (LAC) faces severe competitive stresses as it integrates into the global economy. It is not, on the whole, coping well. While it still has the highest regional level of manufacturing value added per capita in the developing world and was the first region there to liberalize trade and investment policies, over the past two decades it failed to rise to the challenge of international competition. It has fallen steadily behind the most dynamic region in the developing world, East and Southeast Asia (EA for short). LAC has barely retained its share of global production and exports in the face of the rapid and widespread incursion from EA, even in its traditional markets in North America. What is more significant, manufacturing in large parts of LAC have not matched EA in technological upgrading - a worrying portent in an era when technical progress is the main dynamo of growth. There *are* exceptions, but the main one (Mexico) is based on special factors that do not reflect underlying competitiveness; in other countries, despite recent improvements, industry is under-performing relative both to the competition and to its potential.

This paper examines these trends by *benchmarking industrial competitiveness in LAC and EA in the 1990s*. While the broad trends are known in the region, its full dimensions have not been explored. This paper uses various measures of competitive performance and capabilities to show the ramifications of LAC's lag with respect to EA. It does seek to *explain* regional differences in industrial performance - this would be a much larger and more complex exercise - but by benchmarking some important structural determinants of competitiveness it highlights factors that may have been neglected in recent analyses.

Many reasons have, of course, been advanced for LAC's under-performance. Within the region, most analysts trace it to three sets of factors: the legacy of the high, prolonged protection of the import substitution years, the damage to investment caused by decades of fiscal and macro mismanagement, and the weak "business environment" (a catch-all for low skill levels, weak infrastructure, poor governance, inadequate institutions and so on). While LAC has made substantial progress on all three fronts, significant deficiencies remain. Industrial productivity has improved significantly, at least in the large countries, but it has been restricted in scope and often has not resulted in higher output and export growth. Even in countries like Chile and Mexico where higher productivity *has* translated into output and export growth, there are doubts about their technological base and so their ability to sustain these gains.

We need then to look to other explanations. One must be differences in regional industrial strategy between LAC and EA. The differences are striking: to simplify, LAC failed to use import-substitution to build competitive capabilities and then liberalized much faster than EA, retaining fewer tools of industrial policy to strengthen domestic capabilities and seek and develop areas of dynamic comparative advantage. There was much greater emphasis in LAC than in EA on "government failure" and much greater reliance on free markets to drive industrial growth and competitiveness. There was a corresponding neglect in LAC of market deficiencies, precisely those that EA policymakers sought to address: scale economies, imperfect competition and information failures that hamper the flow of resources into sectors of future comparative advantage, missing and incomplete capital markets, deficient or asymmetric information, unpredictable learning costs,

externalities and so on (Lall [1996], Stiglitz [1996]). Even in improving human resources, building institutions, promoting technology and infrastructure - generic "market friendly" policies that LAC also espouses - EA was more selective, tying strategies to national industrial objectives. While this paper cannot analyze these issues in detail, most analysts would perhaps accept that both markets and governments can fail, and that the secret of success lies not so much on absolute choices between them but in improving both. The issue, in other words, is not so much whether to mount industrial policy but to what extent and how. There is little doubt that EA intervened more, and more effectively, than LAC.

LATIN AMERICAN INDUSTRIAL COMPETITIVENESS AND THE CHALLENGE OF GLOBALIZATION

Sanjaya Lall *
Manuel Albaladejo **
Mauricio Mesquita Moreira ***

Manufacturing in Latin America and the Caribbean region (LAC) faces severe competitive stresses as it integrates into the global economy. It is not, on the whole, coping well. Though it was the first region in the developing world - in the post-war era - to liberalize on international trade and investment flows and had the most advanced industrial base, it failed to tap fully the opportunities offered. As a result, it has steadily fallen behind the most competitive economies in the developing world, the Tigers of East Asia. What is behind LAC's under-performance? The dominant view in the region puts emphasis on the legacy of import substitution, macroeconomic mismanagement and on a costly "business environment". Although important, these factors do not seem to tell the whole story. The heavy emphasis on "government failures" has led policymakers to overlook key market failures that stand on the way to sustained productivity growth, increasing technological capability and greater competitiveness. This paper can be seen as a first step to redress the balance of the policy debate and focus on benchmarking competitive performance and capabilities in the 1990s in LAC and East Asia, letting the comparisons speak for themselves. While it is known in the region that its recent industrial record has been poor, the dimensions are not well analyzed or understood. This benchmarking exercise, using a simple framework to measure performance and capabilities, should prove instructive to policy analysis.

I. COMPETITIVENESS CONCEPTS AND SETTING

Contents

The concept of "competitiveness", while widely used, is controversial.[1] It comes from the business school literature, where it is the basis for corporate strategic analysis. Companies compete for markets and resources, measure competitiveness by relative market shares or profitability and use competitiveness strategy to improve their performance. National competitiveness is assumed to be similar: economies compete with each other, measure competitive performance by trade performance and can effectively mount competitiveness strategy. This may well make sense for specific activities: it is meaningful to say that the USA has become "less competitive" in making textiles and "more competitive" in making computers. But is it meaningful to say that the USA is becoming "less or more competitive" as a whole? Krugman [1994] argues that it is not. To him, "competitiveness is a meaningless word when applied to national economies. And the obsession with competitiveness is both wrong and dangerous" (*Op. cit* p. 44). He argues that proponents of competitiveness analysis misunderstand economic theory, or, even worse, understand but ignore it.

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[1] For a thorough discussion of these issues see Lall [2001a].

Krugman is right that "international trade is not a zero-sum game" and that all participants benefit in a general equilibrium setting (*Op. cit.* p. 34). To focus on the rise or fall of particular activities is then partial and misleading. Declining US competitiveness in textiles does not mean that the US *economy* is less competitive: the decline may show its changing endowments and be a necessary part of resource reallocation to new areas of comparative advantage. However, such standard trade theory applies fully only where its assumptions hold: with perfect competition and information, no uncertainty, full factor mobility (within countries), equal access to technology, no scale or agglomeration economies, no externalities and no learning costs, there is no way to define national competitiveness and no need for competitiveness strategy. However, if these assumptions are changed to take account of reality, the outcome is quite different. In an imperfect world of oligopolistic markets, differentiated products, scale and agglomeration economies, externalities, costly, uncertain learning processes, significant technological differences and so on, it cannot be assumed that trade optimizes allocation. In this setting, history, learning, size and externalities matter, and policies can make a significant difference. Competitive advantages can be created by national strategies to exploit static advantages and create new advantages.[2]

While competitiveness has always mattered for industrial growth, its nature has changed greatly, and is probably changing more rapidly today than before. Some two centuries ago, when modern industrialization started in the North, the competition facing industrial enterprises was relatively confined. It tended to come mainly from local enterprises and to some extent from a few overseas ones. Structural economic distance was great: transport and communication costs were high, trading links narrow, differences in national tastes significant and information barriers enormous. Policies reinforced economic distance between nations: governments used trade barriers, subsidies and national procurement to hold back foreign competition, particularly in early stages of industrialization (Chang [2002]).

Industrialization in developing countries in the immediate post-Second World War period also faced relatively confined competition. Economic distance was still large and policies to restrict foreign competition pervasive. It was not necessary to adopt best practice technical, managerial or organizational methods; older methods, making more appropriate products, were quite viable. Industrial value chains - the links in the stages of production from raw material procurement to design, manufacture and marketing - were still organized on largely national lines, with specialization according to industry rather than narrow function or process. The skills and institutions needed for industrialization, while advanced compared to agriculture, were still relatively narrow.

All this is changing. Among the many significant factors are the following:

- Economic distance is shrinking rapidly due to progress in information processing, transport and communications technologies. The "natural protection" that countries enjoyed earlier has been sharply reduced. International competition now appears far more quickly and intensely, and it appears from any part of the globe. In combination with liberalization (below), it changes radically the setting in which countries have to build new industries. On the other hand, it also offers enormous opportunities, opening up vast markets in developed and developing

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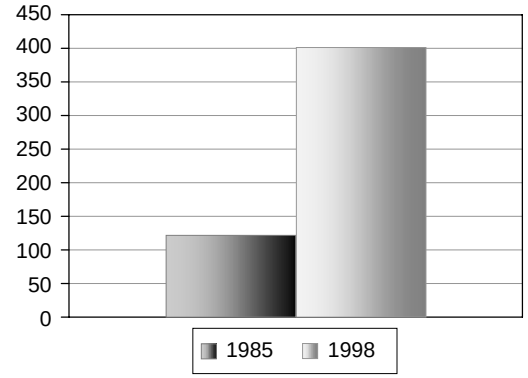
[2] For a classical discussion of trade under imperfect competition see Kierzkowski [1984]. For recent contribution for the competitive versus comparative advantage debate see Neary [2003].

countries. It allows enterprises to access foreign technologies, equipment, services and inputs more cheaply and consumers to buy international products.

- Rapid and pervasive technical change forces enterprises in all countries, regardless of income levels, to use new technologies (not just in products and processes but also in organizing firms, managing inter-firm relations and supply chains, linking to innovation sources and so on) to be viable. The ability of enterprises to compete depends on their ability to access new technology and, more importantly, on their ability to *efficiently use and keep up with* new technologies. Simply opening up to trade and technology flows does not ensure this ability: each economy has to upgrade its human capital and knowledge base, its production structures, infrastructure and institutions (particularly for ICTs). In short, it has to build new capabilities, and the capability building process is difficult and prone to market and institutional failures.

FIGURE 1
R&D PER CAPITA IN INDUSTRIALIZED COUNTRIES
(US$)



Source: UNIDO Database.

- Every country, again regardless of its development level, has to undertake constant effort to innovate (in rich countries) or to master new technologies (in developing ones). The rise in R&D spending in industrial countries over 13 years, from US$122 per capita in 1985 to US$422 in 1998, is staggering (Figure 1, UNIDO [2002]).

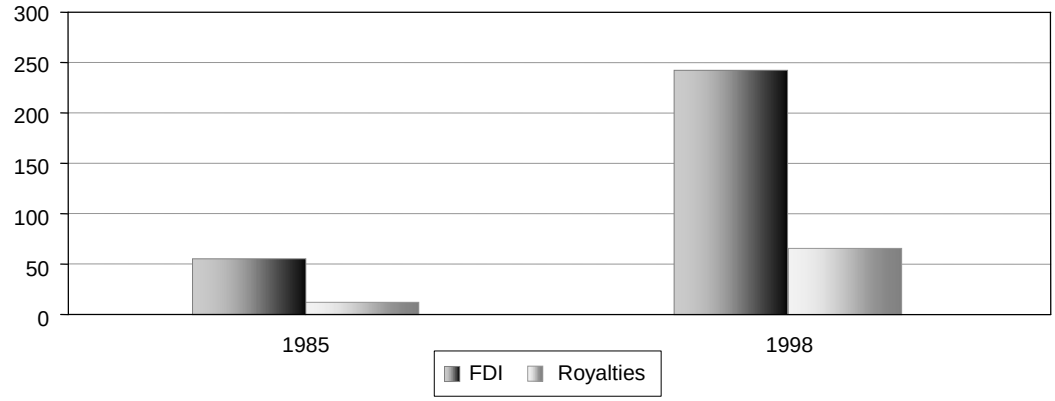
- Technical change affects all activities but it benefits some more than others. Innovation-based activities are gaining at the expense of others, in production and trade. Primary and resource based products are losing shares, while high technology products are gaining at the expense of all others (see below).

- Patterns of global trade and export activity in the developing world are changing in response to three (technology-based) factors, *innovation, technological capabilities* and *relocation* (to take advantage of falling transport/communication costs). Trade in some products like pharmaceuticals grows rapidly because of innovation: there is a stream of new products (and high income elasticity of demand, in turn associated with innovation), with some relocation

to developing countries in response to local capabilities, but little to benefit from low wages. Trade in electronics grows rapidly because of all three factors: rapid innovation, the growth of local capabilities (in some countries) and the relocation of labor-intensive processes. Within high-tech products, therefore, electronics exports from developing countries tend to grow much faster than those of pharmaceuticals. Exports of low technology products like apparel are driven primarily by relocation within slow-growing overall demand; local capabilities matter less since they are relatively easy to acquire. Products where neither innovation nor relocation is significant tend to grow slowly in trade, though of course there are exceptions, particularly for resource-based products like petroleum. For non-resource based products, however, the three drivers of competitiveness are important in determining how well countries or regions do today.

- Productive resources - capital, equipment, information, technology and high-level skills - move around the globe more rapidly and freely, both because of technical change and also because of liberalization. Figure 2, based on UNIDO [2002], shows per capita FDI and royalty and license payments by industrialized countries over 1985-1998, again showing a very rapid rise in a short period.

FIGURE 2
PER CAPITA DFI AND ROYALTIES PADI ABROAD
(US$)



Source: UNIDO Database.

- Resource mobility need not entail common ownership, but it often does: thus, the role of transnational companies (TNCs) has grown rapidly. ICTs and new organizational techniques allow TNCs to grow and spread their activities efficiently across greater distances. There is a trend to internalize the most valuable technologies, so that entering these activities necessarily involves entry by TNCs. At the same time, competitive pressures force TNCs to specialize more narrowly and hive off non-core activities to other firms. The process is very dynamic and yields unexpected results. For instance, many leading electronics firms are moving to innovation and marketing, leaving all production, procurement and logistics to unrelated firms (contract manufacturers).

- International value chains[3] are more tightly coordinated than before, within firms (by TNCs)[4] and externally (by contractual or informal relationships),[5] with functions and processes being subdivided across the globe to take advantage of fine differences in costs, logistics, markets and innovation.[6] The "fragmentation" process is cumulative, with first movers building advantages based on learning and agglomeration.

- Mobile resources need complementary (immobile) resources within host economies to be competitive. These encompass technologies, skills, suppliers, infrastructure and institutions and not just the primary resources or unskilled labor that were the traditional strengths of poor countries. Attracting mobile resources also increasingly needs sophisticated strategies for attracting, targeting and leveraging TNCs (Mathews and Cho [1999]). Countries that are able to develop these assets and strategies are the best placed to be competitive but assets and policy capabilities are unevenly distributed over the developing world. With globalization and liberalization they are growing more so as first movers get onto a virtuous circle of growth and development. Latin America is in danger of lagging seriously as its enterprises fail to enter this virtuous circle.

- For technological reasons integrated production networks *cannot* spread evenly over developing countries: most have strong scale and agglomeration economies and concentrate in the few locations that can provide the critical mass of skills, suppliers, services and institutions needed. This means that production is unlikely to cascade smoothly and continuously to new lower cost locations as wages rise in the incumbents: there may be large discontinuities in the process. Once established in particular countries, TNCs are likely to "stick" for long periods, at least until wage and congestion costs rise very high or the supply of skills run out.[7] In the low technology area, the main activity - clothing and apparel - may carry on spreading to new locations but the factor that drove its relocation, the Multi-Fiber Arrangement, will end in 2005. There is a risk that much of it will relocate to Asia, from which quota restrictions first drove it out.

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[3] "Value chains" are the entire range of activities in the sequence from raw material procurement to manufacture, delivery to final consumers and disposal after use. It includes product innovation, design, logistics, advertising and waste disposal services. Thus, the automobile value chain includes producers of inputs like steel, plastics, rubber and so on, through the main assemblers and their multitude of suppliers to auto retailers, service providers and recyclers. With liberalization and the linking of production across different countries (each taking on different processes and functions in a chain), the nature and organization of global value chains becomes increasingly important for industrial growth. All value chains are seeking to strengthen competitiveness by out-sourcing various functions, opening up enormous new opportunities for countries that can link up effectively to global chains.

[4] Thus, some 30-40% of the trade handled by TNCs is actually within the firm (between different affiliated companies) and is not transacted on open markets (UNCTAD [1999]).

[5] There is a tendency for lead firms to rely on a smaller number of "first tier" suppliers, which in turn deal with and coordinate second and third tier suppliers. The first tier suppliers, with contract manufacturers playing a growing role as suppliers of manufacturing services rather than parts and components, are generally major TNCs in their own right.

[6] In some low technology activities like apparel, lead coordinators are international buyers rather than TNCs. The role of direct ownership (i.e. of FDI) in coordinating globalised activities depends on the nature and pace of change of the technology and the availability of specialized suppliers; it is also changing rapidly over time as systems become more open.

[7] This is a real danger for countries without strong local industrial bases that have benefited greatly from TNC relocation. Examples are Malaysia, Thailand and the Philippines, where there is a strong challenge emerging from China, with lower wages, more low-level skilled labor, a large supply of technical manpower and a developed supplier base. See Lall [2001].

To round off the discussion, consider Table 1, which lays out the basic dimensions of industrial production and exports in the past two decades for industrialized countries and developing countries. Manufacturing activities are classified by technology: *RB indicates resource-based, LT low technology, MT medium technology and HT high technology* (Box 1). This classification is used throughout the paper to analyze competitiveness, as different technology groups have different growth prospects, development implications and capability needs.

Box 1
TECHNOLOGY CLASSIFICATION OF MANUFACTURING ACTIVITIES AND EXPORTS

Resource-based (RB) products include processed foods and tobacco, simple wood products, refined petroleum products, dyes, leather (not leather products), precious stones and organic chemicals. They may be simple and labor-intensive (e.g. simple food or leather processing) or capital, scale and skill-intensive (e.g. petroleum refining or modern processed foods). Competitive advantage here arises generally - but not always - from the availability of natural resources.

Low technology (LT) products include textiles, garments, footwear, other leather products, toys, simple metal products, simple plastics, furniture and glassware. These products tend to have stable, well-diffused technologies largely embodied in capital equipment, with low R&D expenditures and skill requirements, and low economies of scale. Labor costs tend to be a major element of cost and products to be undifferentiated, at least in the mass-produced (non-fashion) end of the scale. Barriers to entry are relatively low; competitive advantages in products of interest to developing countries come from price rather than quality or brand names. However, there is an important "high end" in LT where design, brands and quality matter more than price; high wages are not a competitive disadvantage here.

Medium technology (MT) products are heavy industry products like automobiles, industrial chemicals, machinery and standard electrical and electronic products. Such products have complex but not fast-changing technologies, with moderate R&D expenditure but advanced engineering and design and large scales of production. Barriers to entry tend to be high, not only because of large capital requirements, but also because of strong "learning" effects in operation, design, and, in certain products, product differentiation.

High technology products include complex electrical and electronic products, aerospace, precision instruments, fine chemicals and pharmaceuticals. The most innovative ones call for large R&D investments, advanced technology infrastructures and close interactions between firms, universities and research institutions. However, many HT activities, particularly in electronics, have simple assembly processes where low wages are an important competitive factor; the high value-to-weight ratio of these products allows the value chain to be segmented and located across long distances. In general, low technology industries spend less than 1% of sales on R&D, medium technology ones between 1 and 4% and high technology ones over 4%. Because of difficulties in classifying MVA, it was not possible to distinguish medium from high technology activities in production though it was possible in exports.

The global picture of production and trade by technology levels is as follows:

- Developing countries perform much better than industrialized ones in both production and trade.
- Manufactured exports grow much faster than MVA, a clear sign of the globalization of industry in response to liberalization and technological change.

- There is a general tendency for growth to rise with technological sophistication. Complex industrial activities (MHT) grow faster than others in both production and trade.

TABLE 1
RATES OF GROWTH OF MANUFACTURING VALUE ADDED AND MANUFACTURED EXPORTS BY TECHNOLOGICAL CATEGORIES (1980-2000)
(% per annum)

Activity	World	Industrialized countries	Developing countries
Manufacturing value added			
Total MVA	2.6	2.3	5.4
RB MVA	2.3	1.8	4.5
LT MVA	1.7	1.4	3.5
MHT MVA	3.1	2.6	6.8
Manufactured exports			
Total manufactured exports	7.6	6.6	12.0
RB exports	5.6	5.2	6.7
LT exports	7.4	8.4	11.4
MHT exports	8.4	7.3	16.5
o/w MT exports	*6.8*	*6.1*	*12.7*
HT exports	*11.5*	*9.9*	*20.2*

Note: MVA stands for manufacturing value added, RB for resource based, LT for low technology, MT for medium technology, HT for high technology and MHT for medium and high technology.

Source: Calculated from UNIDO and Comtrade data.

- Within the MHT category, it is possible to distinguish MT and HT in exports. High technology exports grow much faster than medium technology ones. While we cannot (for data reasons) separate MT from HT in MVA, this is also likely to apply to production. Data compiled by the National Science Board (NSB [2002]) show that HT production globally grew at over twice the rate of other manufacturing in 1980-1998 (6.0% and 2.7%), as did HT exports (8.7% and 4.0%).[8]

- In the other two categories, resource based MVA grow faster than LT MVA but RB exports grow much slower. As noted, LT exports were driven in the recent past by relocation of production from high to low wage sites; however, as the industry is growing slowly this process seems to be reaching maturity and export growth is likely to slow down.

- The export growth of developing relative to industrialized countries rises with technological complexity. The lead of developing countries is highest in HT (4.2 times), followed by MT (2.1), LT (1.4) and RB (1.3). Developing countries are apparently taking more advantage of structural change in trade, but a large part of the explanation for this lies not in the development of their capabilities in sophisticated capabilities but in the rise of integrated production systems in which simpler processes are relocated in low wage economies. However, there are some countries in EA and LAC that *have* developed significant local capabilities: for instance, Korea and Taiwan in electronics and Brazil and Mexico in automotive products.

[8] The NSB data pertain to 86 developed and developing countries that account for over 95% of world productive activity.

II. A RECENT "MAP" OF MANUFACTURING IN DEVELOPING REGIONS

Contents

2.1. Production

Manufacturing value added (MVA) in the developing world grew at over twice the rate of industrialized countries over 1980-2000, accelerating in the 1990s as compared to the 1980s while industrialized countries decelerated (Table 2). LAC was the slowest growing region over the period, just behind Sub-Saharan Africa (SSA). Its record in the 1990s was significantly better, but it still lagged other developing regions apart from SSA.

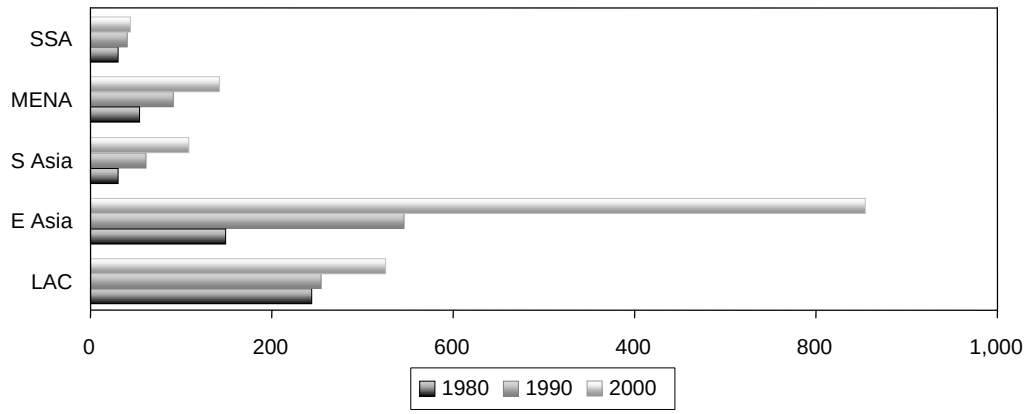
TABLE 2
RATES OF GROWTH OF MANUFACTURING VALUE ADDED
(Constant 1990 US$)

	1980-1985	1985-1990	1990-1995	1995-2000	1980-1990	1990-2000	1980-2000
World	2.3%	3.0%	1.7%	3.6%	2.7%	2.6%	2.7%
Industrialized	2.0%	2.9%	1.3%	2.8%	2.5%	2.0%	2.3%
Developing	3.6%	5.3%	6.9%	5.8%	4.4%	6.4%	5.4%
LAC	-0.3%	1.0%	2.0%	3.0%	0.3%	2.5%	1.4%
East Asia	7.9%	9.5%	11.3%	7.6%	8.7%	9.5%	9.1%
South Asia	6.6%	7.6%	7.0%	4.8%	7.1%	5.9%	6.5%
Mid-East & N Africa	6.1%	4.5%	3.8%	4.7%	5.3%	4.3%	4.8%
Sub-Saharan Africa	1.8%	2.5%	0.2%	2.3%	2.1%	1.2%	1.7%

Source: Calculated from UNIDO database.

Figure 3 shows the values of MVA (in billions of 1990 US dollars) for the main developing regions. In 1980, MVA in LAC was higher than in EA by nearly US$100 billion, and LAC accounted for 48% of total MVA in the developing world. By 1990 LAC had fallen behind East Asia and by 2000 its MVA was only 38% of East Asia's, and its share of developing world MVA had declined to 22%. In this period, East Asian share of developing world MVA had doubled from 29% to 58%.

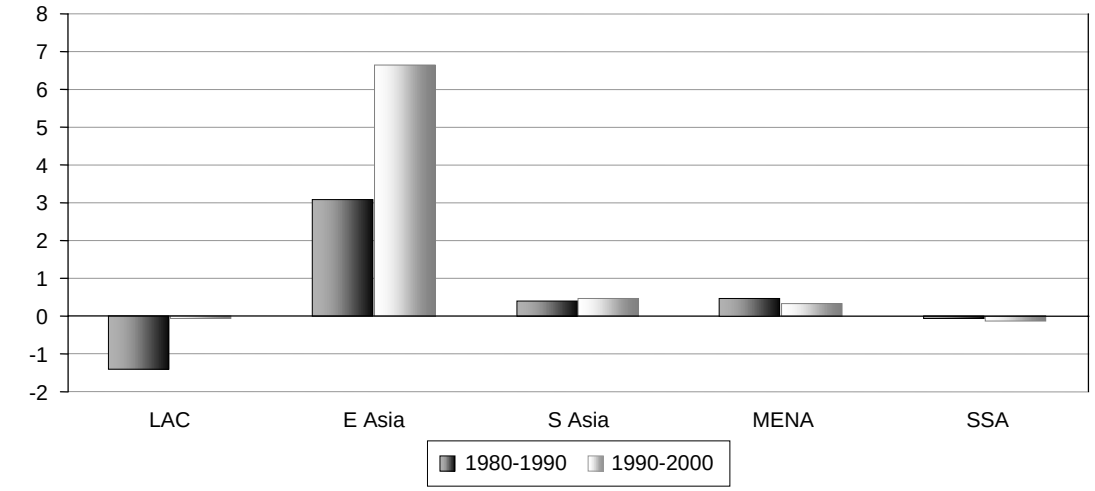
FIGURE 3
VALUE OF MVA IN DEVELOPING REGIONS
(US$ billion), 1990 prices



Source: UNIDO Database.

While the developing world raised its global share of MVA from 14% to 28% over 1980-2000, the main engine of growth there was East Asia. While South Asia and MENA (Middle East and North Africa) also raised their global MVA shares, LAC and SSA lost - and the erosion of LAC shares was higher than for SSA. In this sense LAC "de-industrialized" more than Africa; moreover, while most of its erosion was in the 1980s, its improved performance in the 1990s was not sufficient to offset a continued loss of share (Figure 4).

FIGURE 4
CHANGES IN SHARES OF GLOBAL MVA
(% points)



Source: UNIDO Database.

Despite its poor performance, *LAC remains the most industrialized region in the developing world as measured by per capita MVA* (Table 3). However, the value of MVA per capita in constant dollars has declined by 7.8% over the last 20 years. The improvement in the 1990s has not been sufficient to offset the damage wrought by the "lost decade" of the 1980s. Over the same period, East Asian MVA per capita has risen 4.3 times. However, as discussed later, these regional data for LAC mask significant differences between countries; once these are taken into account, the region's record appears gloomier.

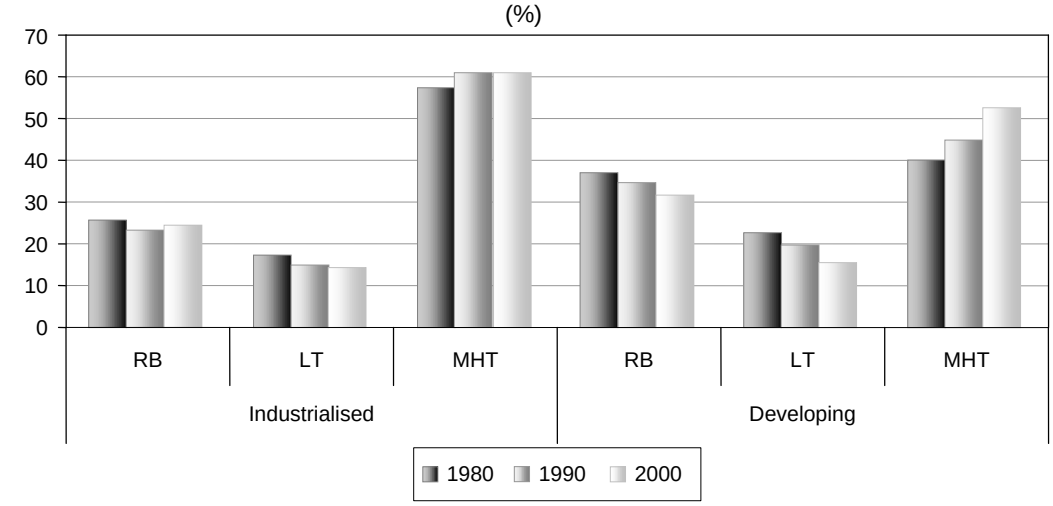
TABLE 3
PER CAPITA MVA
(1990 US$)

	1980	1990	2000
LAC	680.1	577.7	626.6
E Asia	107.2	210.3	461.6
S Asia	35.2	56.3	82.3
MENA	247.3	306.8	375.6
SSA	87.4	80.5	69.7

Source: UNIDO database.

The *technological structure of MVA* evolves over time - the deepening of technology is an inherent historical feature of industrial development over time (Chenery, *et al.* [1986]). In general, the share of "simple" and "light" low technology (LT) and resource based (RB) activities tends to fall relative to that of "complex" and "heavy" (medium and high technology, MHT) activities. In periods of rapid technical change, as in recent decades, this trend accelerates. During 1980-2000, the share of RB in global MVA declined from 27.6% to 26.6% in 2000 and of LT from 19.0% to 15.0%, while that of MHT rose from 53.5% to 58.4%. Developing countries, starting lower on the ladder but growing faster, upgraded more rapidly than industrialized ones (Figure 5). The share of LT activities fell faster than of RB activities; the former now only account for 16% of total MVA in the developing world. RB activities account for a larger share (32%) but a large part of this comes from petroleum processing. Annex Tables A1A and A1B show the value, growth and structure of MVA in the developing regions.

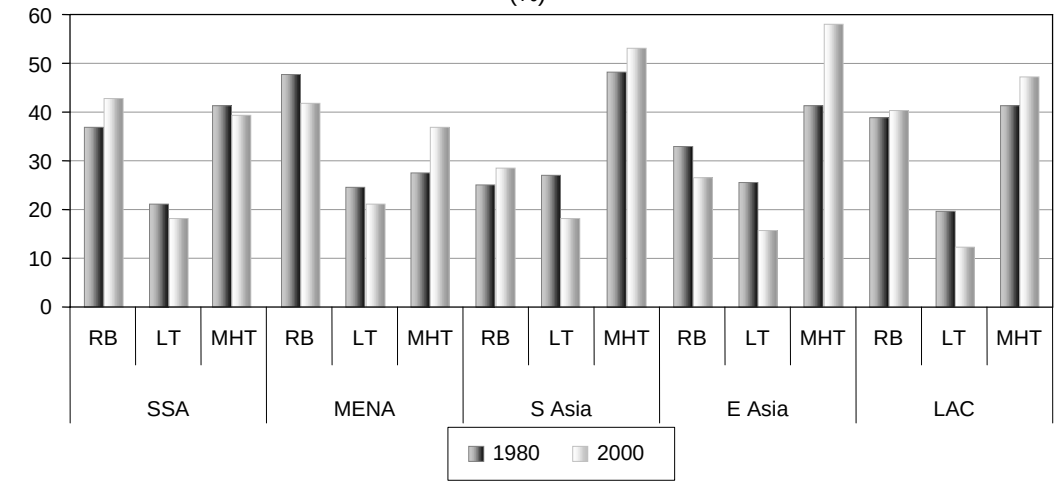
FIGURE 5
TECHNOLOGICAL STRUCTURE OF MVA
(%)



Source: UNIDO Database.

Latin America has a *mature industrial structure by developing world standards*, and has *upgraded it over time* (Figure 6). RB activities play a significant role, but not as much as in SSA or MENA. They are, however, far more important than in East Asia, where they lose ground rapidly. Moreover, their share has actually increased in LAC but fallen in East Asia. Low technology activities have lost shares in MVA in all regions; LAC has the lowest shares in all developing regions. Medium and high technology activities have raised their share in all regions except for SSA. The rise has been most rapid in East Asia, with MENA following. LAC has had a 6 percentage point rise in the share of MHT (compared to 16 points for East Asia and 10 for MENA). By 2000, the technological complexity of MVA in LAC (the share of MHT in the total) lags that of East and South Asia.

FIGURE 6
MVA STRUCTURES IN DEVELOPING REGIONS
(%)



Source: UNIDO Database.

2.2. Manufactured Exports

Manufactured exports grew nearly three times faster than MVA over 1981-2000;[9] the pace of globalization was particularly strong during 1985-95, when exports grew about 5 times faster than MVA. As with MVA, developing countries performed better than industrialized ones (Table 4 and Annex Table A3). The formers' performance was also more consistent, sustaining a 12% rate over the 1980s and the 1990s, while industrialized countries decelerated significantly over time.

East Asia was, expectedly, the overall leader. LAC came third, after EA and South Asia - this was better than its MVA performance, where it came last. LAC's export performance also improved over time more than MVA, the 1990s seeing a near-trebling of its export growth rate over the 1980s. This made LAC the fastest growing region in the developing world in the 1990s.

TABLE 4
RATES OF GROWTH OF MANUFACTURED EXPORTS
(% per annum, current US$)

	1981-1985	1985-1990	1990-1995	1995-2000	1981-1990	1990-2000	1981-2000
World	1.8%	14.7%	8.7%	4.2%	8.8%	6.5%	7.6%
Industrialized	1.4%	14.7%	6.9%	2.9%	8.6%	4.9%	6.6%
Developing	5.1%	17.3%	15.7%	7.8%	11.7%	11.7%	11.7%
LAC	4.8%	5.8%	18.9%	10.8%	5.3%	14.8%	10.2%
E Asia	6.0%	23.5%	16.0%	7.4%	15.4%	11.6%	13.4%
S Asia	5.2%	17.9%	13.1%	7.0%	12.1%	10.0%	11.0%
MENA	6.6%	7.3%	7.9%	6.2%	7.0%	7.1%	7.1%
SSA	-7.1%	8.7%	17.3%	6.1%	1.4%	11.5%	6.6%

Source: Calculated from UN Comtrade database.

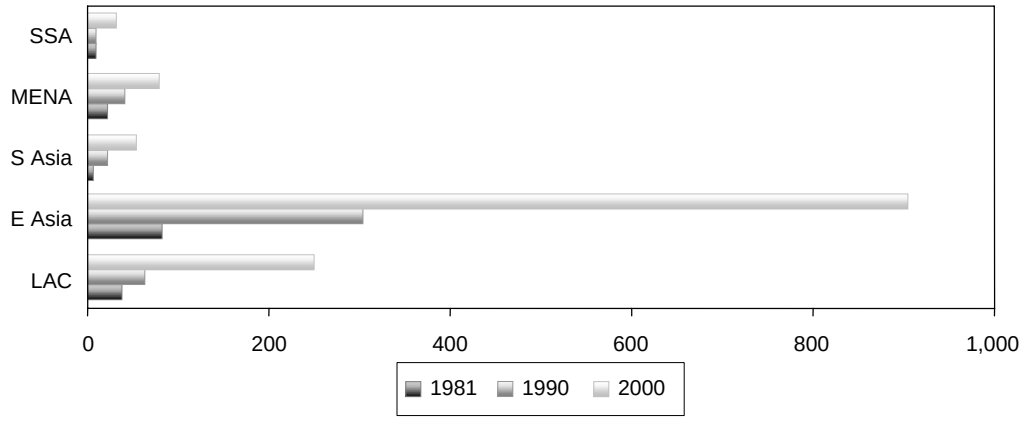
[9] The starting year for exports is 1981 rather than 1980 because of missing data for some countries in the latter year.

In export performance, therefore, LAC seems to have done well by liberalizing and globalizing (taking the 1990s as the period of the most intense liberalization). However, this result is subject to several *qualifications* (taken up at length later). Take some examples.

- Despite its lead in terms of industrial development (and its location advantages for export - proximity and historical links with the US the largest market for developing world exports), LAC's response has been much less vigorous than that of East Asia.
- Export success in LAC has been highly concentrated, with a few major success combined with many others losing market shares. This suggests that it was not liberalization as such that drove its export acceleration but other, more country specific, factors.
- The structure of exports in LAC is less conducive to long-term growth than in East Asia. As shown below, most of the growth was in RB, products growing slowly in world trade. Success in dynamic HT products was confined to a tiny few. In fact, the integrated production systems that drove export growth in East Asia largely bypassed LAC, even of they served US markets.
- The few outstanding successes in LAC in manufactured exports face severe competitive challenges. Export activity is often delinked from local industry and capabilities, and the competitive base will be eroded unless these links are greatly strengthened. While this is also true of some East Asian countries, others have built impressive local capabilities and even the weaker ones are acutely conscious of the need to develop local capabilities - and are investing in doing so more assiduously than the leaders in LAC.

However, growth rates can be misleading indicators of export performance if the initial base differs greatly. This is, for instance, particularly true of SSA and South Asia, where high growth rates mask low absolute values. Figure 7 shows the *values of manufactured exports* (in billions of current US dollars). The broad picture is similar to that for MVA, but the dominance of East Asia is now more pronounced. LAC starts the period with 47% of the export value of East Asia and ends with 28% (an improvement over the 21% for 1990). The LAC share of developing world manufactured exports falls from 24.5% in 1981 to 19% by 2000, while East Asia goes from 52% to 69%.

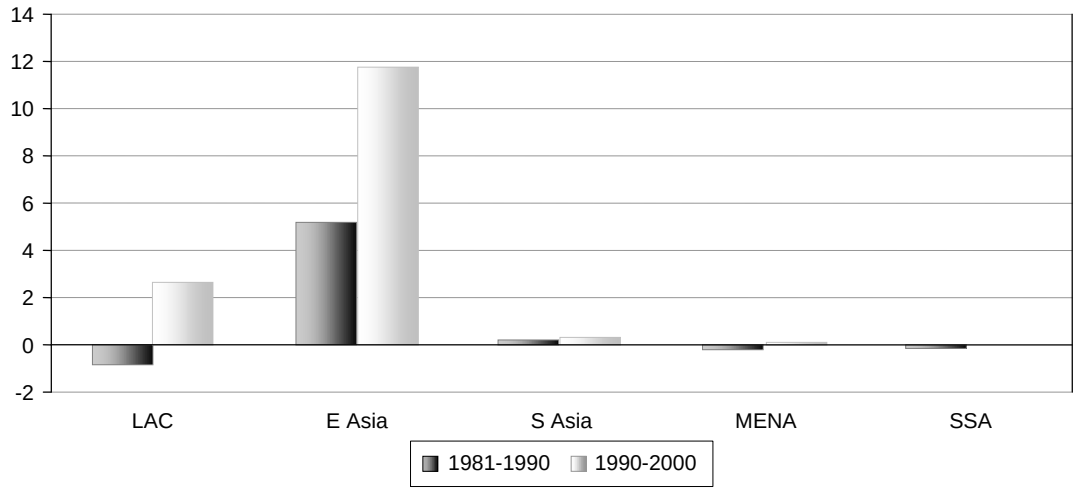
FIGURE 7
VALUES OF MANUFACTURED EXPORTS
(Current US$ billion)



Source: UNIDO Database.

World market shares are perhaps the best indicator of export competitiveness. The developing world raised its share from 13% to 27% over 1981-2000, while the industrialized world fell from 82% to 69% (transition economies declined marginally from 5% to 4%). LAC lost shares in the 1980s and recovered in the 1990s, but EA powered ahead of the rest, accounting for most of the increase in the developing world (Figure 8).

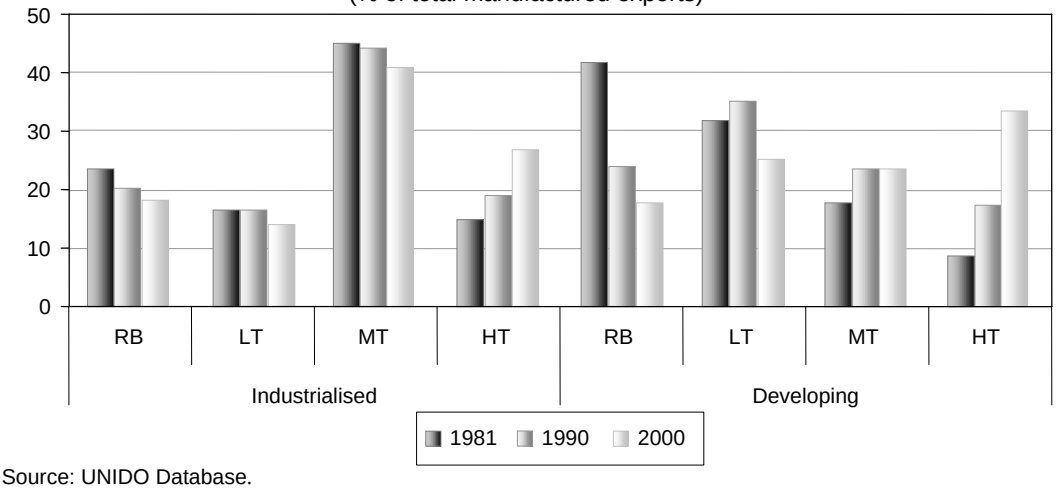
FIGURE 8
CHANGES IN WORLD MARKET SHARES FOR MANUFACTURED EXPORTS (%)



Source: UNIDO Database.

Now consider the *technological structure* of manufactured exports. Exports have, as noted, upgraded far more than MVA, with complex products rapidly increasing their share of the total. Though this is not shown here, primary products have lost position steadily, declining from 23% of total world exports in 1981 to 13% in 2000. Annex Table A4 shows the technology structure of manufactured exports for the world and main regions.

FIGURE 9
TECHNOLOGY STRUCTURE OF MANUFACTURED EXPORTS
(% of total manufactured exports)

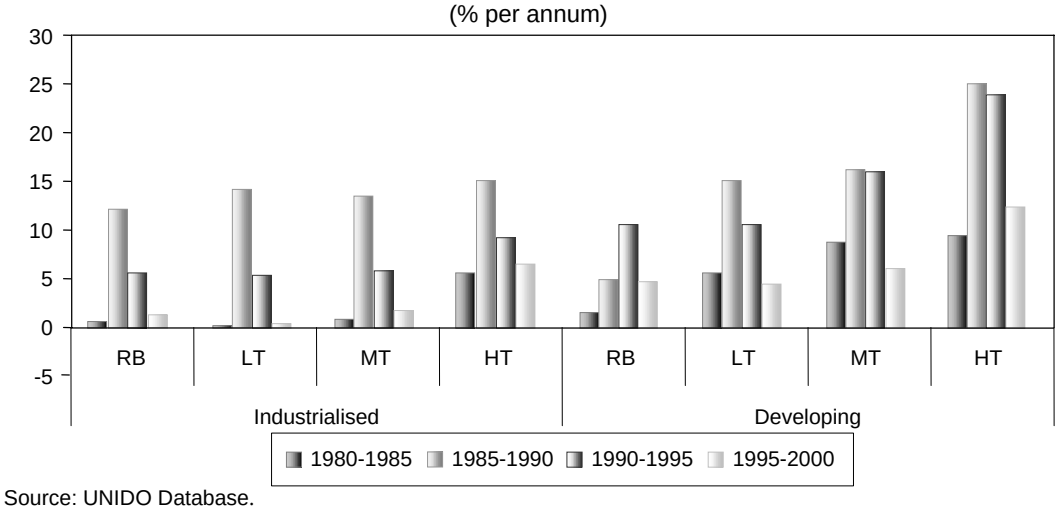


Source: UNIDO Database.

Upgrading within manufactures was led by HT rather than MT. As Figure 9 shows, MT (heavy industry) products accounted for the bulk of exports by industrialized countries (and so the world), but were not its most dynamic segment. RB manufactures were the largest category of developing world exports in 1981 but the smallest in 2000. LT products gained ground in the 1980s but lost in the 1990s. HT products are now the largest category for developing countries, from the smallest in 1981. For industrialized countries HT is still second but at current rates of growth it will soon be the largest.

Figure 10 shows the growth of exports by technology for industrialized and developing countries. Developing countries grew faster in every category and period (except for RB in the 1980s). In both groups, growth rates rose by level of technology. RB exports by developing countries, however, outpaced their LT exports in the 1990s, primarily because of fast growth in petroleum products.

FIGURE 10
GROWTH RATES OF MANUFACTURED EXPORTS BY TECHNOLOGY
(% per annum)



Source: UNIDO Database.

While export growth rates fell in the 1990s as compared to the 1980s, HT exports by developing countries bucked the trend and grew faster. The deceleration in growth rates was greatest in LT for both industrialized and developing countries, suggesting that the relocation of production that drove exports in this activity is maturing. Good "market positioning" for export growth thus dictates a shift up the technology ladder, particularly from LT into HT segments. As LT is also the slowest growing segment of MVA, this gives a rather worrying prognosis for the less industrialized countries whose natural entry point into globalized production lies in such products.

The dramatic rise of HT exports by the developing world has led to rapid upgrading of its export structure. Comparing the shares of MHT products in MVA and exports, we note two things (Figure 11). First, developing countries have raised the complexity of their exports much more and much faster than for MVA. Second, their upgrading in exports has been much faster than in industrialized countries. Given the general rise in the share of HT in trade, export success is now increasingly associated with the ability of countries to move into these products. This is as true of developing and industrialized countries (UNIDO [2002]), and the most competitive countries in the developing world are shifting rapidly into HT exports.

FIGURE 11
SHARE OF MHT IN MVA AND MFD. EXPORTS OF INDUSTRIALISED AND DEVELOPING COUNTRIES (%)

Source: UNIDO Database.

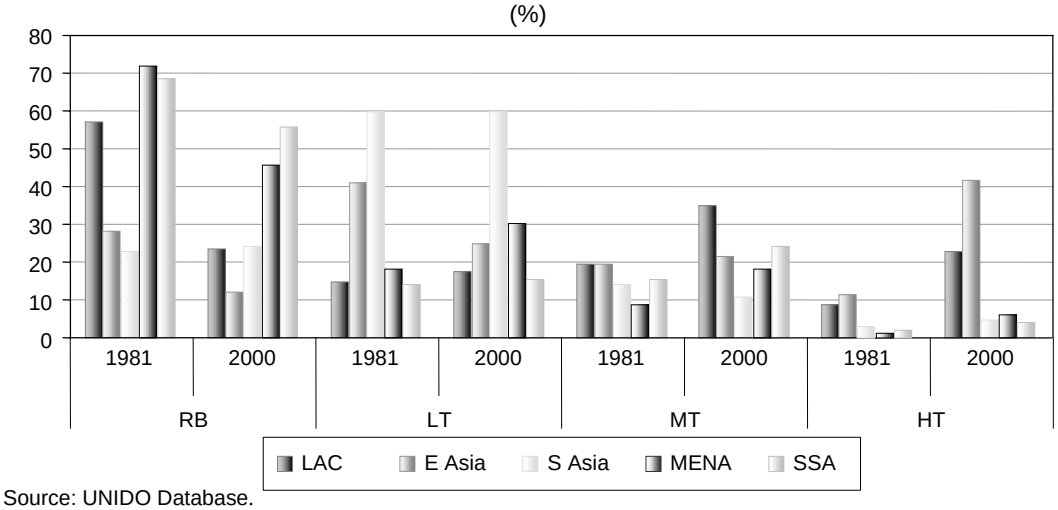
It may, at first sight, appear surprising that developing countries are such large HT exporters (providing 32% of world HT exports). Received trade theory - of any variety - predicts that the competitive edge of developing countries lies in labor intensive, low skill, technically simple products. Yet HT products are the largest segment of manufactured exports by developing countries. The reasons why exports of apparently advanced products have grown so rapidly from the developing world have been noted. First, some HT products - led by electronics - have relatively simple labor-intensive processes that can be sited in poor countries. Second, the growth of integrated production systems under the aegis of MNCs, impelled by falling transport and communication costs, has allowed this industry to globalize rapidly. Third, a few developing countries have built strong local capabilities in manufacturing HT products and have "plugged into" MNC systems at arm's length as independent suppliers.

In fact, export success in the developing world is highly concentrated (see below), and it is most concentrated in HT products (UNIDO [2002]). While MNCs are relocating labor-intensive facilities across the globe, they actually settle major facilities in a very few countries. Their location is not driven only by low wages - in fact, the largest exporters of MNC products are not the lowest wage countries - but by other factors. There is also strong cumulative and spillover effects of past export success, so that the same few countries appear as major exporters of all kinds of products. In this "path dependent" competitiveness scenario, it is East Asia that has provided the most - and the most dynamic - successful entrants, which are reaping the rewards of early entry. *Latin America has, with a few exceptions, largely missed out on the dynamics of export success*.

LAC upgraded its exports structure significantly. In 1981, its largest export category was RB and the smallest was HT (Figure 12). Over the period, RB declined significantly and lost share to all

other categories, though in 2000 it remained the second largest category. There was a large rise in the MT share (led by auto products), taking it to lead position. HT products also rose significantly, and finished the period with a share just behind RB.

FIGURE 12
STRUCTURE OF MANUFACTURED EXPORTS
(%)



Source: UNIDO Database.

East Asia shows a different pattern. Its RB exports also lose shares, but region never relied heavily on these products (however, it is the largest RB exporter in the developing world in absolute terms, with its RB exports in 2000, at US$107 billion, being 1.8 times larger than LAC's US$60 billion). East Asia started the period with heavy reliance on LT but sharply reduced this dependence over time, moving massively into HT. By 2000, its HT exports (US$378 billion) were 5.6 times larger than all other developing regions combined (US$67 billion, of which LAC accounts for US$58.1 billion). Its MT exports raised their share slightly - again, the values involved were large: US$195 billion compared to $88 billion for LAC and US$28 billion for the other three regions together.

South Asia, mainly dependent on LT and RB exports, is the only region where the RB share rises over time (due to booming cut diamond exports by India). MENA and SSA, as expected, rely mainly on RB products, though in both the RB share falls and that of LT rises. MT products are of growing importance to both regions but HT remains very small. In SSA, the bulk of MT and HT exports naturally come from South Africa - excluding South Africa, there are few sophisticated manufactured exports from the region.

Taking "complex" (MT and HT) products together, LAC shows significant upgrading in the technology structure of manufactured exports, nearly matching that of East Asia (Figure 13). Recall, however, that this does not give a true picture of the LAC region: a few successful exporters coexist with many less dynamic ones.

FIGURE 13
SHARE OF COMPLEX (MT + HT) PRODUCTS IN MANUFACTURED EXPORTS (%)

Source: UNIDO Database.

2.3. Leading Developing Country Exporters

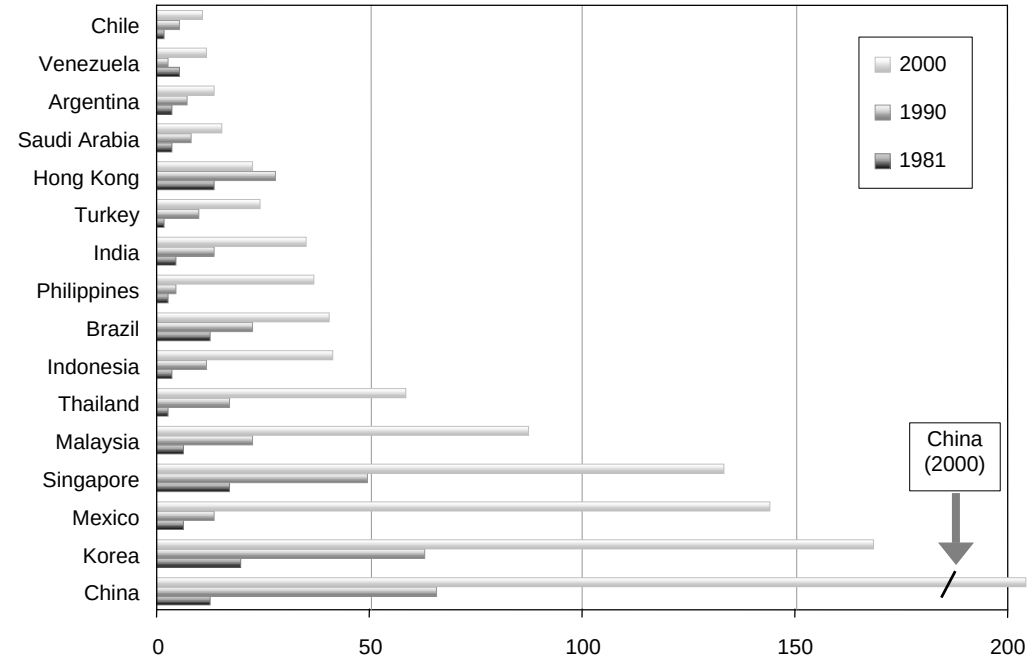
Export success in the developing world is highly concentrated. *In 2000, the top 10 countries provided 81% (and the top 20 for 90%) of developing country manufactured exports.* What is more, concentration is rising: in 1981, the top 10 and 20 exporters accounted, respectively, for 63% and 80% of the total. These trends raise discomforting issues in a period of liberalization and globalization. There was a widespread expectation that liberalization would lead to better growth and competitive performance in all developing countries. Domestic production would respond to new competitive incentives, foreign productive factors would spread to new sites, and there would be a more even spread of competitive performance between economies. The removal of policy induced "distortions" would, in other words, lead to better resource allocation - and better allocation would automatically lead to higher growth (and, implicitly, enhanced competitiveness) in low wage countries.

The trend to increasing divergence suggests, on the contrary, that important determinants of export success - capability building, agglomeration economies, ability to attract export-oriented FDI, institutional development and so on - are cumulative and path dependent. Exporters that are good at exporting some manufactures tend to become good at exporting others, and first movers often tend to increase their lead over others. Low wages are not *per se* the most important factor in expanding manufactured exports. Success can carry on breeding success - and, as in endogenous growth theory, the laggards may continue to fall further behind, with no inbuilt forces towards convergence.

Figure 14 shows the leading 16 exporters in the developing world that accounted for 88% of total manufactured exports. Five of these are Latin American and eight East Asian. There are significant

differences in performance between the LAC countries. Mexico is clearly in a different class from the others, with a performance similar to that of several East Asian Tigers. Brazil and Argentina, the other giants in the region, are much more sluggish; the former, in particular, was a relatively large exporter in 1981 (ranking 4th in the developing world). This leads us into a more detailed comparison of East Asian and Latin American performance, and a consideration of the differences within the LAC region.

FIGURE 14
LEADING 16 DEVELOPING COUNTRY EXPORTERS OF MANUFACTURES
(current US$ billion)



Source: UNIDO Database.

III. DELVING DEEPER IN THE OUTLIERS: MEXICO AND CHINA

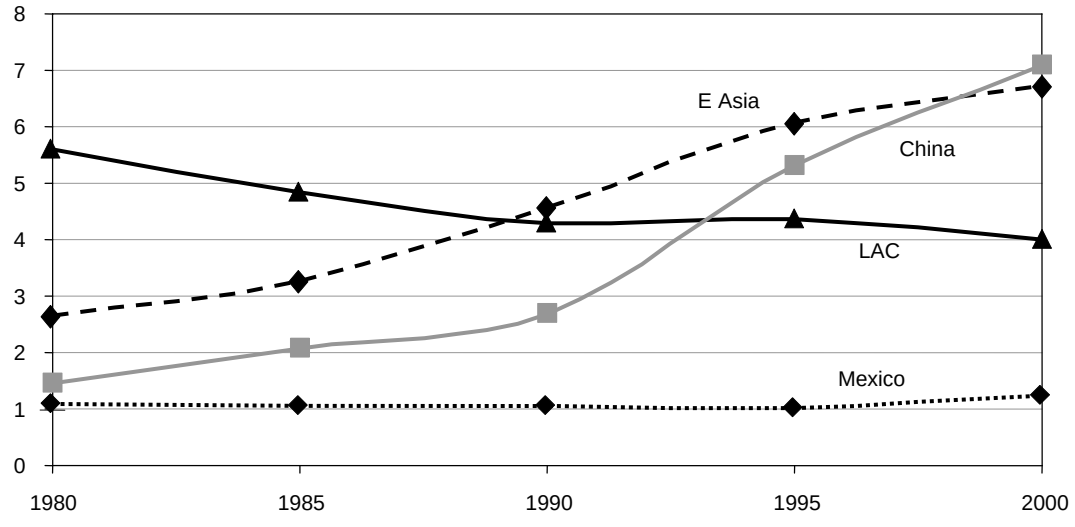
Contents

There are two important outliers, Mexico in LAC and China in EA, whose performance is so different from their neighbors' that it is necessary to separate them out. While both are dynamic exporters, they differ in their behavior and implications. China is an industrial giant whose production and exports are starting to dominate the region; however, its neighbors are also dynamic (and longer established) exporters and the impact of China has been to force them up the technology ladder (Lall and Albaladejo [2003]). Mexico is not as large in its context and its impact on regional production is relatively small. However, its export performance *is* significant, and, unlike China, is not typical of its neighbors. Mexico is gaining ground in all export categories, while the rest of LAC is doing poorly in LT and HT products.

MVA: Figure 15 shows global MVA shares of the outliers and the rest of region. LAC without Mexico loses shares except for 1990-1995, when it stays abreast of global growth. The late 1990s see a renewed decline in the wake of widespread liberalization. Mexico virtually stagnates till 1995, when its share starts to rise - a different response to liberalization, led presumably by its export surge.

East Asia - with or without China - grows strongly through the period, but after 1990s China expands much faster. The late 1990s see a slight slowing in the rest of the region's growth while China accelerates; by 2000, China's MVA is larger than the rest of East Asia.

FIGURE 15
WORLD MVA SHARES
(%)

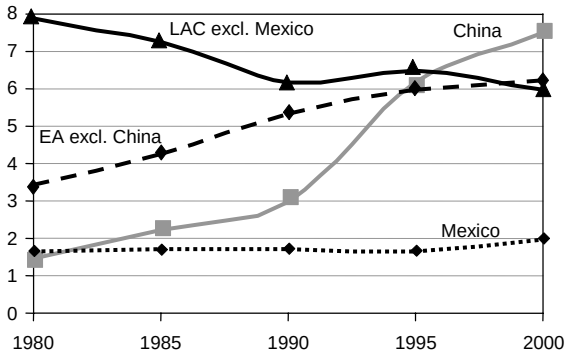


Source: UNIDO Database.

Figures 16 to 18 show the trends in MVA shares for RB, LT and MHT activities for the region with and without the outliers. The picture for LAC is fairly similar across the different categories of manufacturing: without Mexico, the region loses its share over time, while Mexico keeps up with world MVA until 1995, after which its share rises slightly. The highest decline by LAC

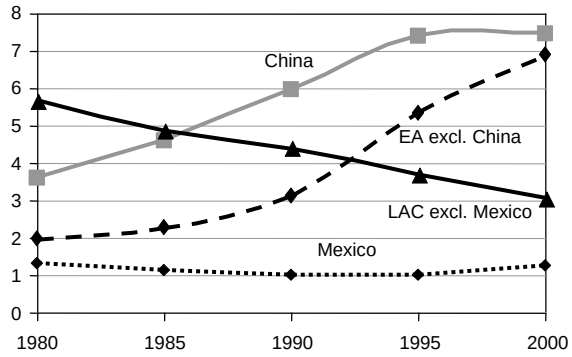
excluding Mexico is in LT activities, the lowest in MHT. In East Asia, there is a general rise in world MVA shares: China's greatest rise in share is in RB products, followed by MHT, while the rest of East Asia raises shares least in RB and most in MHT activities. Perhaps contrary to common perceptions, China's growth of LT MVA is relatively modest, and levels off after 1995.

FIGURE 16
WORLD SHARES OF RB MVA
(%)



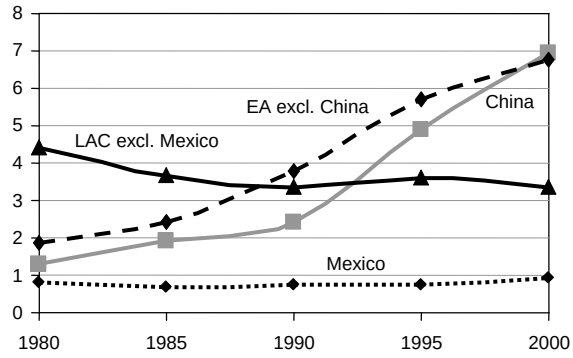
Source: UNIDO Database.

FIGURE 17
WORLD SHARES OF LT MVA
(%)



Source: UNIDO Database.

FIGURE 18
WORLD SHARES OF MHT MVA
(%)



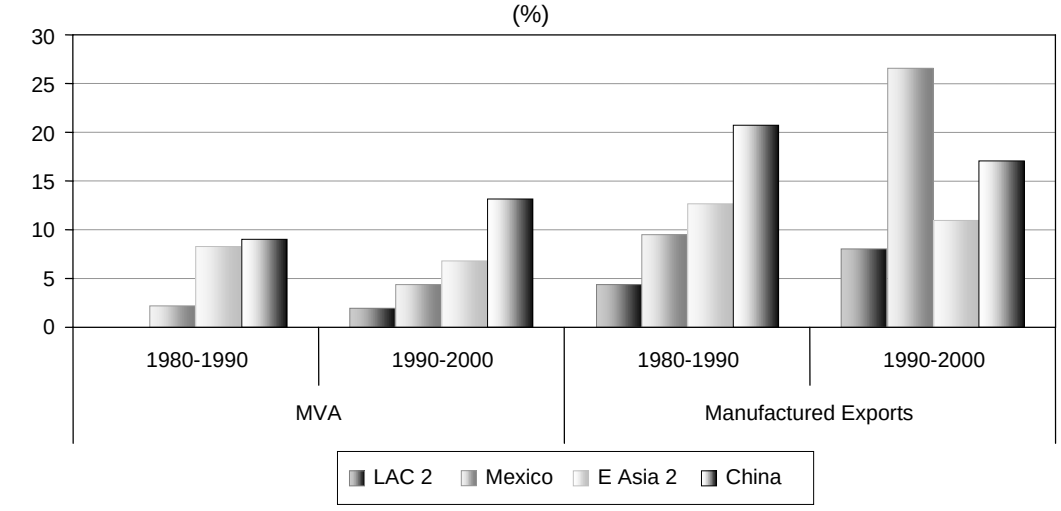
Source: UNIDO Database.

Manufactured exports: Exports have grown faster than MVA in the two regions and the outliers (Figure 19). LAC 2 (i.e. excluding Mexico) revives MVA and export growth in the 1990s compared to the 1980s but lags behind East Asia. Mexico shows a dramatic rise in export growth in the 1990s, performing better than China or EA 2 (East Asia excluding China). Within East Asia, China outpaces its neighbors.

The effect of this performance on world market shares for exports is shown in Figure 20. East Asia raises its already significant share of world exports of manufactures from 6.8% to 18.4%, while China goes from 1% to 6.5%. LAC 2 first loses share but then improves in the 1990s from 2.4% to 5.1%, while Mexico stagnates in the 1980s and then, galvanized by NAFTA, raises its share almost six-fold from 0.5% to 2.9%. To some extent, therefore, liberalization has stimulated

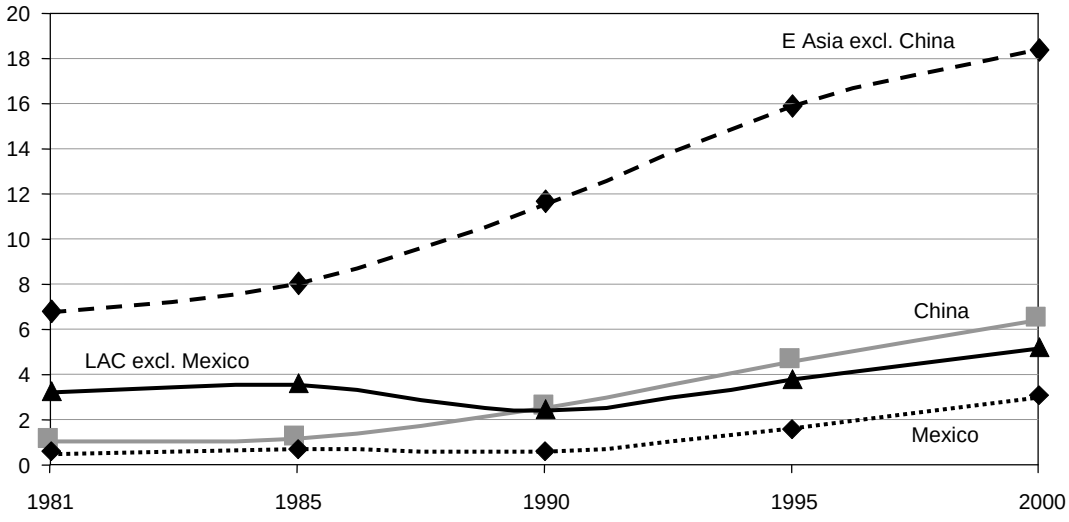
export growth in the LAC region as a whole, though the competitive response has been weak compared to EA.

FIGURE 19
GROWTH RATES OF MVA & MANUFACTURED EXPORTS
(%)



Source: UNIDO Database.

FIGURE 20
WORLD MARKET SHARES FOR MANUFACTURED EXPORTS
(%)

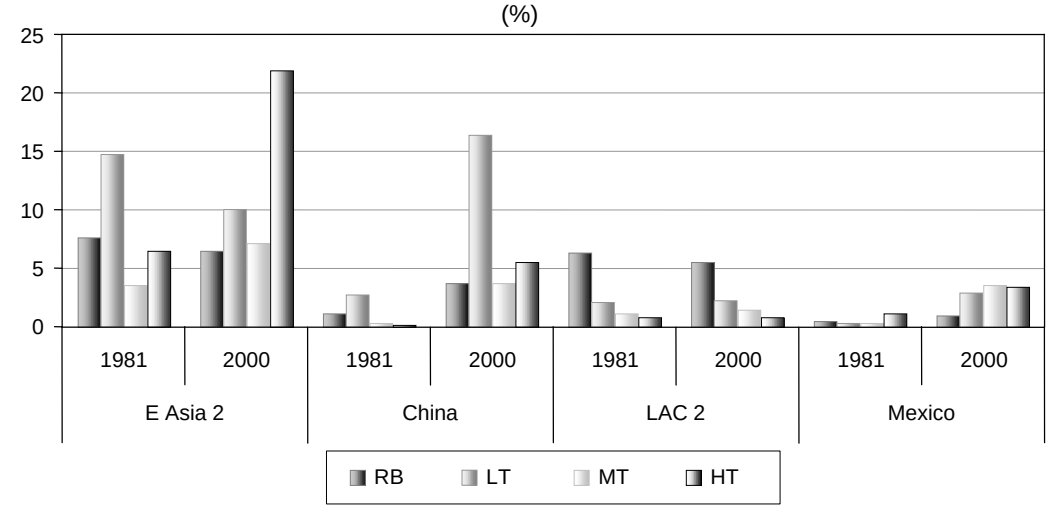


Source: UNIDO Database.

What of the technological structure of export growth in LAC and EA in the 1990s? Figure 21 shows world market shares for the four categories of manufactured exports, Figure 22 their export structures and Figure 23 changes in WMS for LAC only.

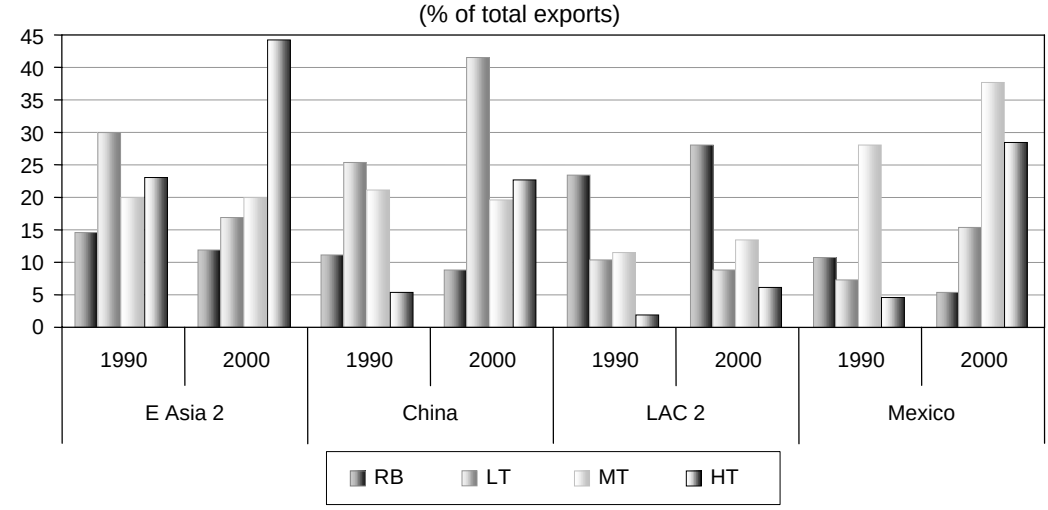
The main engine of export growth in EA 2 is HT, where the region holds a massive 23.3% of the world market by 2000. It also gains market share in MT products, losing shares in the simpler RB and LT categories, the former in the 1980s and the latter in the 1990s.

FIGURE 21
WORLD MARKET SHARES
(%)



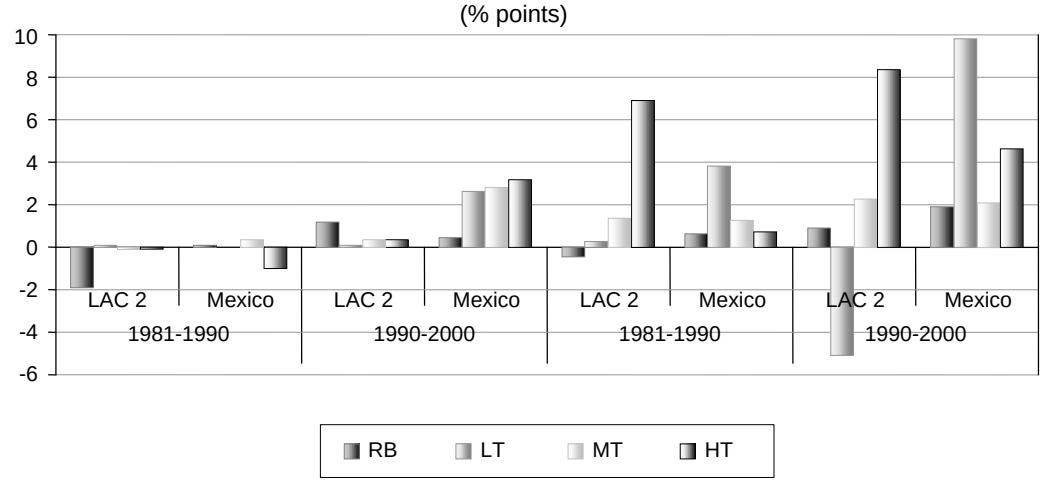
Source: UNIDO Database.

FIGURE 22
EXPORT STRUCTURES
(% of total exports)



Source: UNIDO Database.

FIGURE 23
CHANGES IN WMS BY TECHNOLOGY CATEGORIES
(% points)



Source: UNIDO Database.

China raises its world market shares in all categories, led by LT products. However, the rate of export growth is fastest in HT products, where by 2000 it accounts for 4.1% of the world market. Its market share gains accelerate over time, with every category capturing larger shares in the 1990s.

The structure of regional exports (Figure 22) shows a large and growing reliance by LAC2 on RB products, with MT the next largest category. HT is the smallest category for LAC2 through the period, though it gains in relative importance. The Mexican pattern is very different. RB loses share and by 2000, despite the large petroleum base, is the smallest category. All other categories raise their share (mainly at the cost of primary exports, not shown here) with the largest gain - nearly 24 percentage points - in HT products. Unlike the rest of LAC, there is also a rise in the share of LT products. Mexico has one of the highest growth rates for HT exports in the world in the 1990s, considerably faster than China, at 45% and 33% respectively.

LAC2 loses market share in RB and HT products, and gains marginally in LT and MT. By 2000, its shares of world exports of complex products remain tiny - only 0.8% for HT and 1.1% for MT. However, as Figure 23 shows, there is a significant turnaround in its export performance over the two decades. The 1980s see erosion of world shares in all categories except for LT, while the 1990s see growth in shares in all categories led by RB.

Mexico starts the period as a smaller exporter than LAC2 in all categories except for HT, and ends by being larger in all but RB. Again, its main spurt in market shares is in the 1990s; it loses shares in HT in the 1980s, followed by a massive expansion in the 1990s. By 2000, its share of global HT exports comes to 3.4% and of MT products to 3.5%.

Mexico and China show similarities in terms of export dynamism, but there are also important differences. Chinese export growth, for instance, is more closely related to MVA than is Mexico's. Much of Mexican export growth comes from *maquilas* or similar arrangements that link production

to the US market. Local content in *maquilas* is low (on average below 5%) and has grown slowly; domestic-oriented industry has also grown slowly. The result is that MVA growth (3.3% p.a. over 1980-2000) is less than one-fifth of its export growth (18.1%).

In China the drivers of export and MVA growth are different from each other, the former based on assembly in special economic zones (SEZ), the latter on domestic markets. However, in China the local content of exports, physical as well as technological, is rising rapidly; moreover, enterprises outside the SEZ are also very dynamic exporters (see Lall and Albaladejo [2003]). While it is exploiting its evident low wage advantages in LT products, China is also moving rapidly into sophisticated products by raising domestic technological and supply capabilities. Thus, while exports also grow faster than MVA in China, the difference is much smaller than in Mexico (11.1% for MVA and 18.3% for exports).

Another difference is the regional setting. China is part of an export-oriented region with strong competitive advantages in dynamic HT products, Mexico is not. A very large part of China's trade is with other developing neighbors, while Mexico is very heavily geared to the North American market. China is acting as an engine of growth of exports by its neighbors, running large and growing current trade deficits with them, particularly in HT products (*Ibidem*); Mexico is not playing any such role in LAC2. In other words, China is integrating closely into regional production systems both with advanced countries (Japan) and developing countries, while Mexico is integrating into advanced countries only. Finally, China is much more diversified in terms of export destinations than Mexico. In this the former may be less subject to the vicissitudes of particular markets than the latter.

To conclude this section, the competitive record of LAC looks considerably weaker without Mexico than with it. The 1980s were disastrous for the region. The 1990s saw some improvement in the export performance of LAC2, but this was largely concentrated in RB products (that are growing slowly in world trade and offer low spillover or technological benefits). MT and HT exports also grew but their performance was much weaker than in EA. Mexico, by contrast, took off after 1995 as a result of NAFTA, and enjoyed a boom in exports in all technological categories except RB (where trade privileges did not stimulate the relocation of manufacturing). However, Mexican export growth had relatively little effect on its MVA and even less on the competitiveness of the rest of LAC; it was driven by low wages in simple activities and by low wages *cum* established capabilities in automobiles and other engineering products. The Mexican low wage advantage is, however, inherently transitory. By the standards of China and other late Asian entrants Mexico is a high wage economy; its tariff and transport cost advantages will not be enough to offset this in light, low end activities as time passes. Whether Mexico can develop an advantage in more sophisticated products and so sustain rapid export growth depends on how quickly it can develop advanced skills and technological capabilities relative to the Asian Tigers, which are investing heavily in such capabilities.

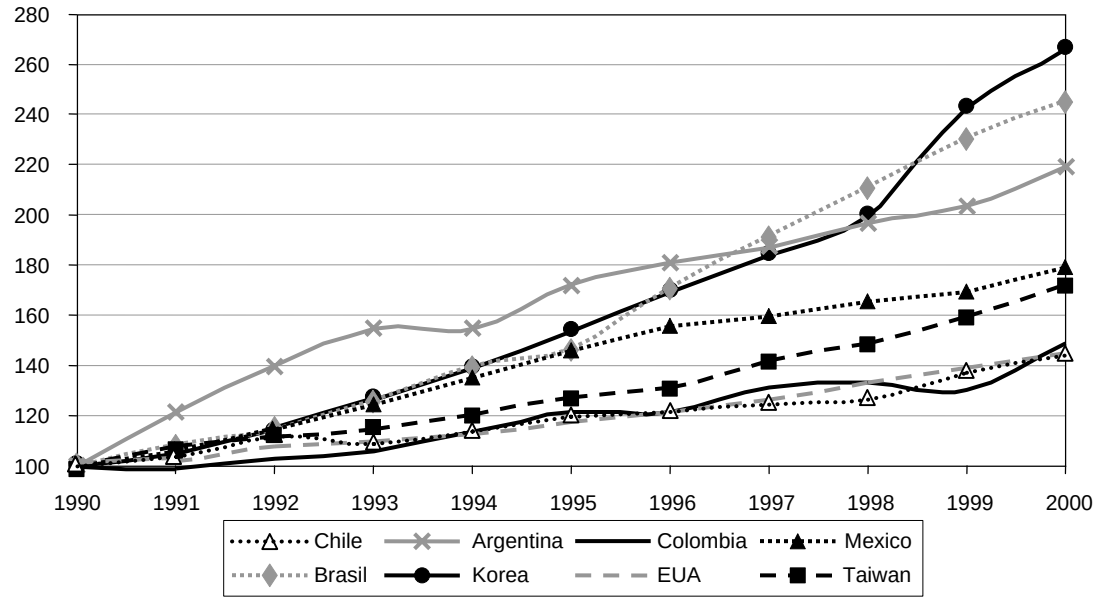
IV. WHAT ABOUT PRODUCTIVITY?

Contents

Productivity growth is at the heart of competitiveness. Some authors even argue that "True competitiveness, then, is measured by productivity. Productivity allows a nation to support high wages, a strong currency and attractive returns to capital and with then high standards of living. Productivity is the goal not exports per se" (Porter [2003]). That productivity growth lies behind the countries' welfare is known (in fact, it is something of a tautology); but what about *relative* productivity, which indicates change in competitiveness over time?

It is difficult to compare relative productivity across countries because of data problems.[10] The problems are particularly large for total factor productivity (TFP) measures, which seek to capture the contribution to output growth of all inputs combined. Most of the available evidence, based on national account data, is for the economy as whole and the picture that emerges is gloomy. The results for the 1990s suggest that the regional average TFP growth was negative or low, even by the region's standards (see e.g. IDB [2001]; Baier, Dwyer Jr. and Tamura [2002] and Loyaza, Fajnzylber, Calderón [2002]). The studies also show considerable heterogeneity in countries' TFP performance; in fact, most countries in LAC improved their performance *vis-à-vis* the 1980s. However, at the very least, the results suggest that for most of LAC the gains of the market-friendly reforms were not sufficient to offset other negative influences on productivity.

FIGURE 24
LABOUR PRODUCTIVITY* IN MANUFACTURING IN SELECTED LATIN AMERICAN COUNTRIES, KOREA, TAIWAN AND USA. 1990-2000 (1990=100)



Note: * For Argentina, Brazil, Mexico, Taiwan and USA physical output per hours worked. For the other countries, physical output per employee.

Source: Countries' Statistical Offices.

[10] This section draws on Lopez-Córdova and Moreira [2003].

At the sectoral level, particularly in manufacturing, the picture is brighter. Figure 24 shows that labor productivity (TFP figures are not available) in the largest countries grew substantially during the nineties, particularly in Argentina, Brazil and Mexico. These three countries outperformed the U.S. (though not Korea) by a large margin, reducing the productivity gap *vis-à-vis* best practice. However, this evidence has to be interpreted carefully. Labor productivity does not take into account other inputs and may reflect only greater capital intensity or better capacity utilization rather than greater efficiency or innovation. And the data only cover a handful of countries in the region.

Firm-level studies provide better insights into TFP growth, though for a small sample of countries. Studies from Mexico, Brazil and Chile show positive TFP growth in manufacturing as a result of intensified import competition. For Mexico, Tybout and Westbrook [1995], covering the first period of the trade liberalization (1986-1990), put annual TFP growth at 1.8%. López-Córdova and Moreira [2003] report a lower figure (1.2%) for the NAFTA period (1993-1999). For Brazil, Muendler [2002] estimates 0.4% annual TFP growth during 1986-1998, while Lopez-Córdova and Moreira [2003] suggest that TFP performance improved substantially in the second half of the 1990s, with annual TFP growth reaching 2.8%. Pavcnik's [2000] estimates for Chile point to an annual 2.8% TFP growth after the trade reforms of 1979-1986. To put things into perspective, similar plant-level studies on East Asia point to a 3.2% annual TFP growth in Taiwan (1981-1991, Aw, Chen and Roberts [2001]) and Korea (1990-1998, Hahn [2000]).

Although supporting the story told by the labor productivity data, these studies raise some concerns and leave some key questions unanswered. First, even though Chile and Brazil show the potential to match East Asian rates of productivity growth, the figures for Mexico are disappointing. Second, unlike Chile and Mexico, Brazil has yet to translate the productivity gains into higher output and export growth and so to take advantage of a virtuous cycle where higher productivity leads to higher output and vice versa (Verdoon's Law). Finally, it is not clear if the productivity gains reaped during the 1990's liberalization are once-for-all gains or if they reflect a long-term improvement in the countries' ability to innovate. Finally, the industrial composition of productivity gains needs to be further examined to see how far they raise LAC's dynamic export prospects.

V. LAC PERFORMANCE BY COUNTRY GROUPS

Contents

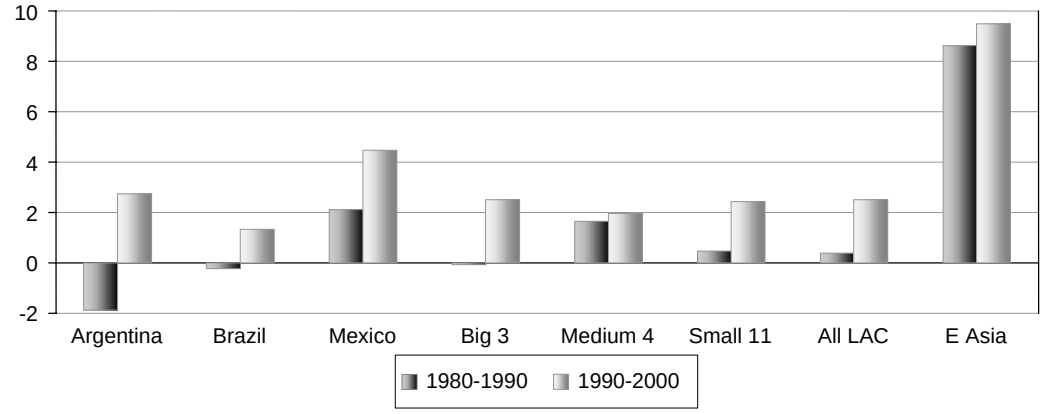
To consider variations in competitive performance within Latin America, we analyzed export data for *18 countries with substantial industrial sectors for 1990-2000*.[11] The countries are divided into three groups:

- The big three: Argentina, Brazil and Mexico.
- *The medium four:* Chile, Colombia, Peru and Venezuela.
- *The smaller eleven:* Bolivia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Nicaragua, Panama, Paraguay and Uruguay.

5.1. Manufacturing Value Added[12]

While manufacturing performance in LAC varies by country and size groups, growth in the 1990s has been generally higher than in the 1980s (Figure 25 and Annex Table A5).[13] While encouraging, the improvements pale in comparison to EA, which sustains growth rates of 9-10% per annum in both decades. The growth rate for LAC in the 1990s is below that of all other developing regions apart from SSA.

FIGURE 25
MVA GROWTH RATES IN 18 LAC ECONOMIES & EAST ASIA
(%)



Source: UNIDO Database.

The largest improvement in MVA growth within LAC in the 1990s is for the big three: Argentina and Brazil declined in the 1980s and recovered in the next decade, while Mexico improved its growth to 4.4%. The medium four had a small rise in growth, a reasonably consistent performance

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[11] Data used elsewhere in this paper for LAC as a whole include another 7 economies.

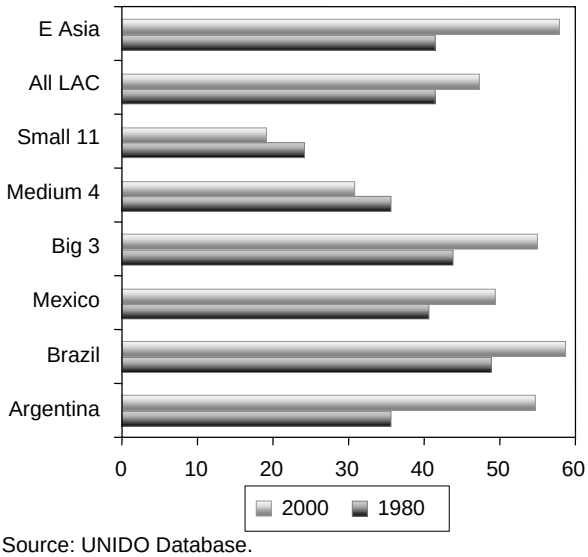
[12] MVA data, from UNIDO, are in constant 1990 prices.

[13] See Annex B for an aggregation by sub-regional trade agreements.

by Chile and a sharp improvement in Peru offsetting declining or negative growth in Colombia and Venezuela. Two of the smaller 11 economies, Jamaica and Uruguay, suffered declines in the 1990s, but others improved their performance. The fastest growing LAC economies in the 1990s are in this group - Costa Rica with 6.6% and El Salvador with 5.3%.

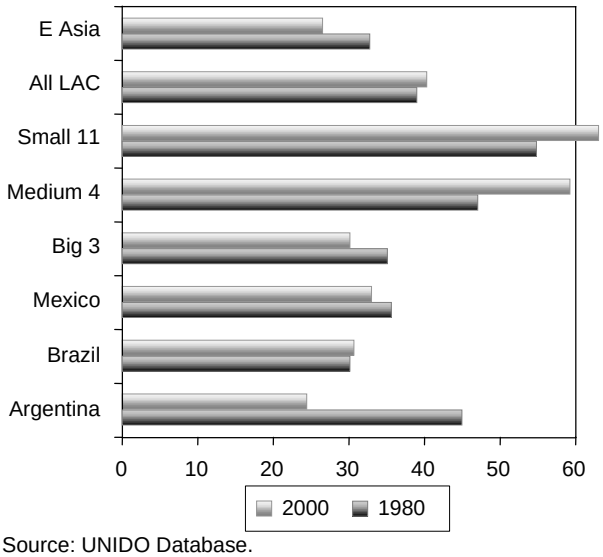
MVA structure varies according to the size, resource base and industrialization level of the country. As Figures 26 and 27 (and Annex Tables A5 and A6) show, the most advanced structures - those with high shares of MHT activities - are in the big three, led by Brazil. The least advanced are in the small 11; the medium 4 lie between the two. In contrast to the larger economies, however, both the latter groups *move down the technology scale* over the two decades. While the share of LT declines in most countries in the region (El Salvador, Jamaica and Panama, and, unexpectedly, Argentina are the exceptions), the main shift is *into RB activities*. Of the 18 economies, 13 derive over 50% of their MVA from RB, the exceptions being the big three plus El Salvador (driven by maquila operations in apparel) and Paraguay. The shift happens over both decades, but the decline in the MHT share in the small and medium sized economies appears to accelerate in the 1990s.

FIGURE 26
SHARE OF MHT IN MVA (%)



Source: UNIDO Database.

FIGURE 27
SHARE OF RB IN MVA (%)



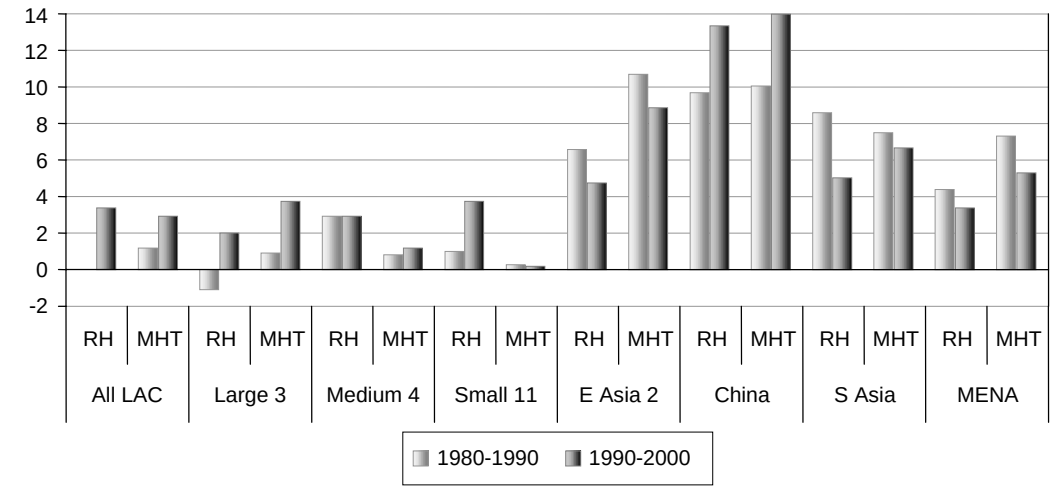
Source: UNIDO Database.

The EA picture is very different. The average contribution of RB to MVA is only 26.5% (29.3% for China) and declines over time as the region moves into complex activities. Despite its lead in LT exports, EA (including China) sharply reduces the share of LT activities in MVA. Moreover, these structural shifts do not imply a neglect of RB manufacturing: in fact, the growth rates of RB in EA2 and China (and also in South Asia and MENA) are higher than in LAC - it is only that growth in MHT in EA is far higher (Figure 28).

LAC's industrial performance in the 1990s is thus both disappointing and disturbing. It is disappointing in that *growth rates are so low*. It is particularly disappointing because higher growth may have been expected in the 1990s, for three reasons. First, there should have been a vigorous rebound from the stagnation of the previous decade. Second, the improved macroeconomic setting should have sparked greater industrial activity. And, third, widespread liberalization should have

led to greater efficiency, investment and so to export-led growth. The reality has been different: there *has* been some rise in growth, but it is relatively anemic.

FIGURE 28
GROWTH RATES OF RB & MHT MVA (%)



Source: UNIDO Database.

LAC's manufacturing performance is disturbing because *RB activities continue to dominate manufacturing* and there has been a *general downgrading of the technology structure* in small and medium sized economies. Moreover, the shift into RB is *not the result of rapid growth in RB activities* but of the *slow growth of MHT.* The three larger economies are better structured for industrial growth, but two of them seem unable to exploit their industrial capabilities in world markets.[14]

Part of the explanation clearly lies in factors stressed by the mainstream view outlined at the start. Part of the industrial structure inherited from import-substitution was in bad shape, out of line with countries' endowments and capabilities. There remained some anti-export bias in trade incentives, particularly in the Southern Cone. The macro environment fell short of optimal and education and infrastructure continued to lag (IDB [2001], World Bank [2003]). But it is not clear

[14] According to Katz (2002),"considering the region as a whole we notice that a small number of economic activities increased their relative share of GDP and international trade during the last two decades. They include: (a) non tradable industries such as telecommunications, energy, transport and water and sanitation services; (b) natural resource processing industries producing industrial commodities such as pulp and paper, iron and steel or vegetable oil; (c) assembly industries (*maquiladoras*) producing computers, TV and video sets and garments; and, finally (d) the automobile industry, which received preferential treatment from all of the governments in the region. In contrast to the above, most labor intensive industries producing shoes, garments or furniture for the domestic market, as well as those others engaged in the production of engineering and knowledge intensive products such as capital goods, machine tools or pharmaceutical raw materials, performed worse than average and therefore lost shares in GDP in most countries in the region…" There are also disturbing implications for technological development in the region. As Katz says, "These are sectors for which technology is mostly coming from abroad "embodied" in new machinery and equipment and in which domestic R&D and engineering efforts are rather scarce. It is important to understand that most of these natural resource processing industries operate on the basis of rich and highly idiosyncratic domestic primary resources…".

that these factors account fully for LAC's competitive and structural lags. The set of explanations to do with market failures in industrial and technological development, and the effectiveness of LAC *vis-à-vis* EA in remedying them, is missing. So are the *interactions* between the pace and nature of the trade and other reforms and the development of technological capabilities, and these are also important. The contrast with EA, which managed carefully the process of opening up and used a host of proactive policies to address market-failures in the technology and competitiveness process, is enormous (Lall [2003], Moreira [1995]). It would be unrealistic and harmful to deny the obvious policy implications.

As far as structural upgrading goes, it may be argued that the shift in LAC to RB activities is natural and desirable: import-substitution diverted resources from activities where it had endowment-based comparative advantages and the shift into RB is a desirable to this distortion. This has some validity, but it does not explain why several resource-rich East Asian economies diversified so much more rapidly into more technology-based activities. Comparative advantage is not, after all, entirely determined by inherited endowments - much of it is man-made - and exploiting natural resources should not hamper diversification into other, more dynamic, areas of comparative advantage. Moreover, the natural advantage argument does not explain why LAC had such a lackluster performance in RB activities. Nor does it explain why most countries in the region still specialize, as Katz [2002] put it, "in the "commodity" end of the value chain of each of these activities".

The technological stagnation in the production structure has disturbing implications for LAC's productivity and competitiveness. MHT activities offer better prospects for sustained productivity growth, greater innovation, faster technology diffusion, beneficial skill spillovers and the formation of dynamic clusters. More important for competitiveness, they also offer faster growing markets and enormous opportunities for countries to enter into "fragmented" production systems, of the type that dynamized export performance in EA.

5.2. Manufactured Export Performance

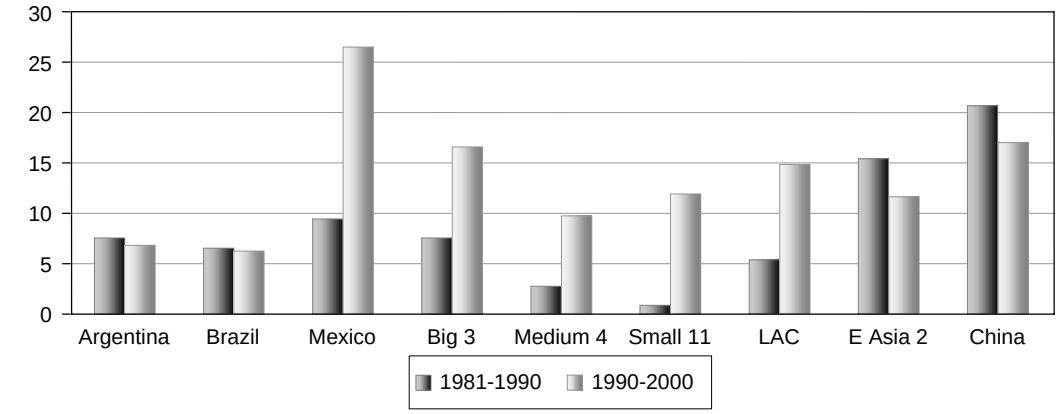
Growth rates

Manufactured exports from LAC grew faster than MVA, particularly in the 1990s. LAC saw a trebling of export growth (from 5.3% to 14.8% in the 1980s and 1990s, respectively), while EA suffered some deceleration (Figure 29). In the 1990s, LAC growth was higher than for EA2 (11.6%) though it did not match China (17.0%). The rise in growth applied to all size groups in LAC (for detailed data see Annex Table A3).

Now take differences by country. The rapid acceleration in exports by the big three was entirely due to Mexico. Argentina and Brazil had slight *declines* in export growth to (relatively modest) rates of around 6-7% per annum. In the medium 4, Venezuela accounted entirely for the rise in growth - the other three had falling growth rates for manufactured exports, in particular Chile (from 10.4% in the '80s to 7.4% in the '90s). The improvement was most widespread in the small 11, with all countries except for Jamaica enjoying faster growth. More impressive is the fact that five of these economies - C. Rica, Ecuador, El Salvador, Guatemala and Honduras - registered double-digit growth rates in the 1990s. Costa Rica achieved 23.6%, nearly matching Mexico's

26.5%. The driver of such stellar growth was the same in both economies - and in most of the Central American countries - offshore assembly by foreign companies aiming at the US market.

FIGURE 29
GROWTH RATES, ALL MFD EXPORTS, LAC 18 & EAST ASIA
(%)



Source: UNIDO Database.

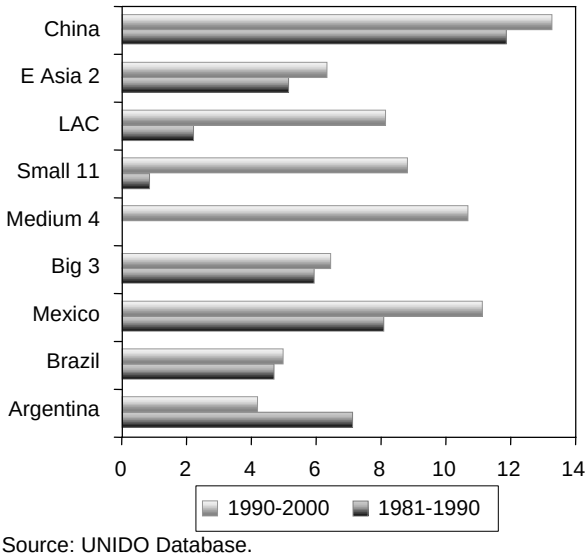
Figures 30 to 33 (see Annex Table A7 for more details) show export performance in the four technology categories for the LAC 18, EA2 and China (note that the scales differ by chart). For LAC as a whole, HT products are the fastest growing category in the 1990s, followed by MT and LT: RB products grow at 8.1%, compared to 33.5% for HT, 16.4% for MT and 13.0% for LT. Moreover, the spurt in HT growth occurs across all groups of countries. There are interesting differences by technology across the region.

- For the big 3, the largest improvement individually and collectively is in HT, but Mexico is the dominant engine of growth, reversing a decline in the 1980s to achieve a 44.5% growth rate in the 1990s. Mexico also accelerates impressively in LT products while growing rapidly in MT. Argentina slows down in RB and LT and Brazil in LT and MT, and both do poorly in the simple categories (RB and LT).
- The medium 4 have the lowest growth rates in LT in the 1990s, with a significant fall from the 1980s (Venezuelan LT exports decline slightly while Chile maintains a healthy 10.6% rate). Their rapid expansion in HT is from a tiny base. The next fastest growing category is RB, which also accounts for 73% of their total manufactured exports in 2000 (HT provide less that 2%).
- The small 11 have higher growth in complex (MT and HT) categories than simpler ones, but the small base in these exports may give a distorted picture of export dynamism. Many Central American economies have enjoyed rapid growth in *maquila* type LT exports, particularly of apparel, to the US market.
- Costa Rica is the outlier in this group. Its HT exports have taken off in the 1990s, and by 2000 they came to US$2 billion, 80% of total HT exports by the small economies and 18% for LAC excluding Mexico.[15]

[15] For an analysis of the success of Costa Rica in attracting the Intel semiconductor plant that provides almost all HT exports see Spar [1998] and Rodriguez-Clare [2001].

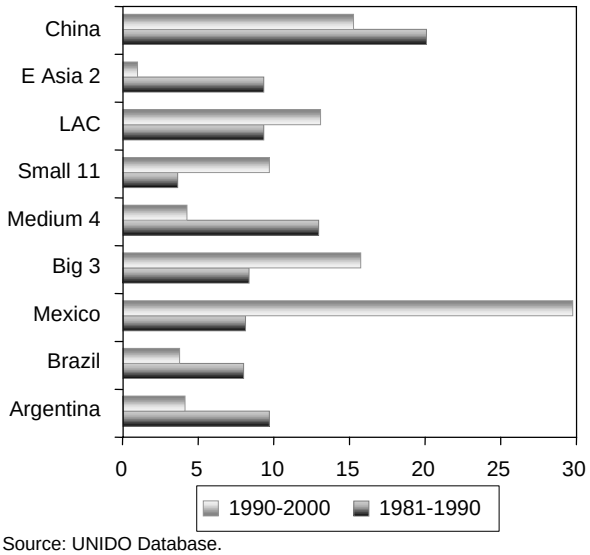
However, export growth rates may give a misleading impression of true competitiveness because of the "small base" problem (high rates for countries with small starting figures). The growth picture has therefore to be complemented by an analysis of the export structure and world market shares.

FIGURE 30
GROWTH OF RB EXPORTS (%)



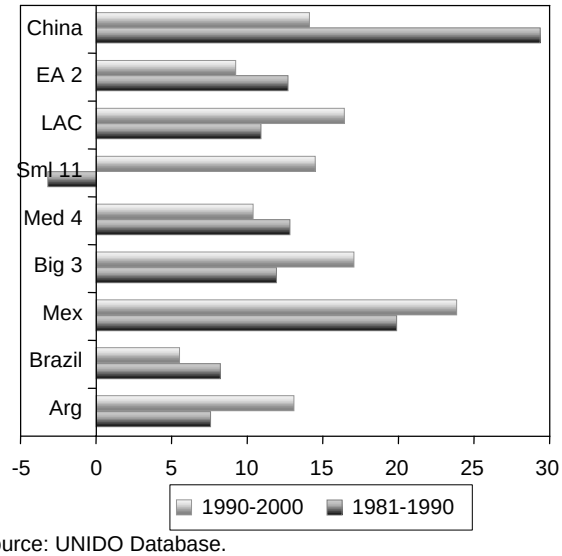
Source: UNIDO Database.

FIGURE 31
GROWTH OF LT EXPORTS (%)



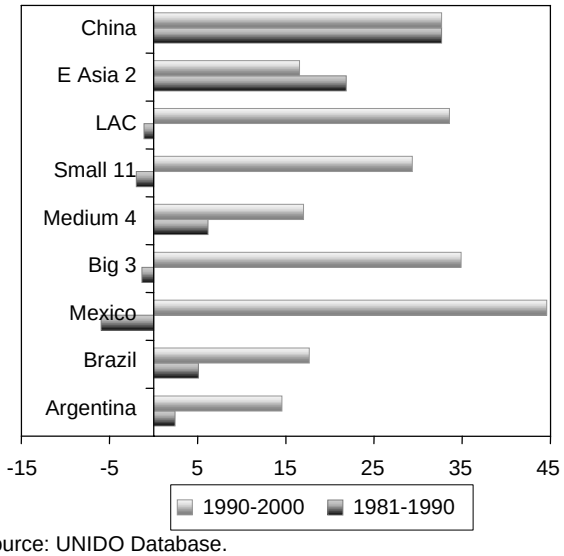
Source: UNIDO Database.

FIGURE 32
GROWTH OF MT EXPORTS (%)



Source: UNIDO Database.

FIGURE 33
GROWTH OF HT EXPORTS (%)



Source: UNIDO Database.

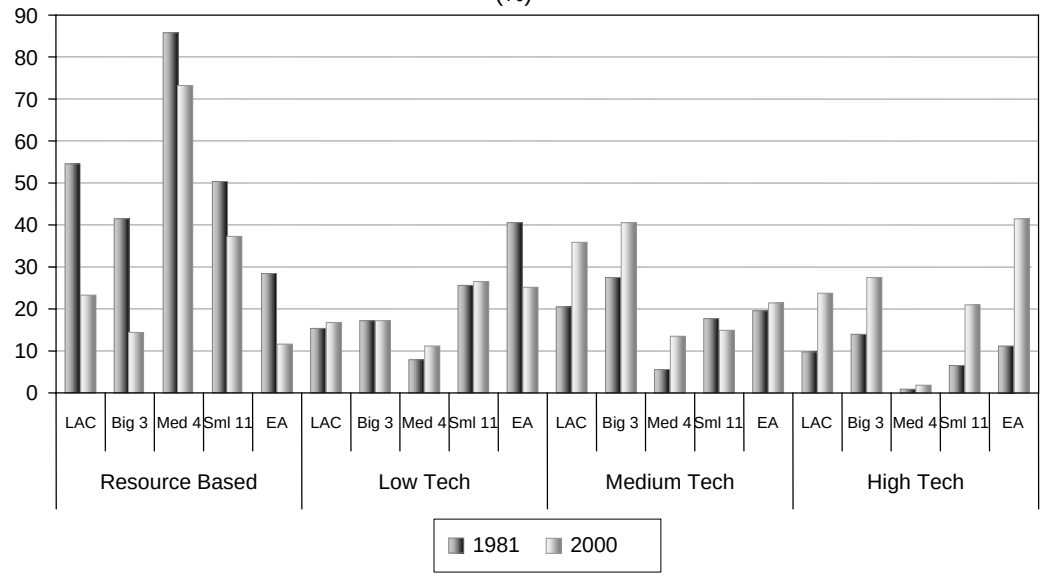
Export structure

Figure 34 shows the export structure for manufactured products for LAC and EA (including China). LAC as a region reduces the share of RB dramatically in its manufactured exports, with

corresponding rises in MT and HT products. This reflects mainly the changing export structure of the big 3, and within this group of the performance of Mexican exports. As Annex Table A8 shows, the Argentine and Brazilian structures remain strongly rooted in RB, with one-third or more of manufactured exports in this category (compared to 7% for Mexico). The medium 4 have nearly three-quarters of their manufactured exports in RB, with Chile and Venezuela having over 80% in this category; the share of HT exports is very low in this group. The small 11 also show high RB dependence. The large rise in the HT share is driven by Costa Rica; all other economies are tiny exporters of HT.

Figure 34 also shows that the big 3 in LAC have as complex an export structure as East Asia, though with a higher weight in MT than HT products. MT exports have played a significant role in Brazil and Mexico by 1990, while in Argentina these exports grew after 1990. As noted, HT exports took off in Mexico after the formation of NAFTA, while the auto industry, which leads MT exports, was reorganized earlier.

FIGURE 34
MANUFACTURED EXPORT STRUCTURE
(%)



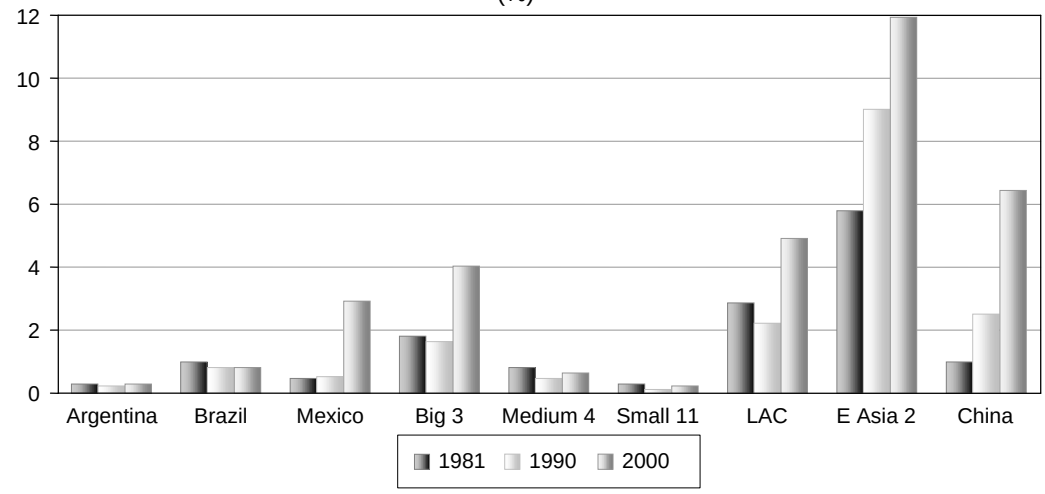
Source: UNIDO Database.

World market shares

The "acid test" of national competitive performance is, of course, world market shares (WMS). High rates of export growth (from a small base) may not prevent a country from losing WMS where world exports are growing rapidly - and this is happening in LAC. By this measure, *the majority of Latin American countries are suffering falling competitiveness over the 20 year period.* While LAC's WMS for manufactured exports rise in the 1990s (after declining in the 1980s), this is *due entirely to Mexico* (Figure 35). Argentina and Brazil lose competitiveness over the two decades; so do both smaller groups. Apart from Mexico, there are only 4 countries of the 18 that

raise WMS: Chile, Colombia, Costa Rica and El Salvador (their rise in shares are 0.05 percentage points or less). *The other 13 countries in LAC lose market share*.

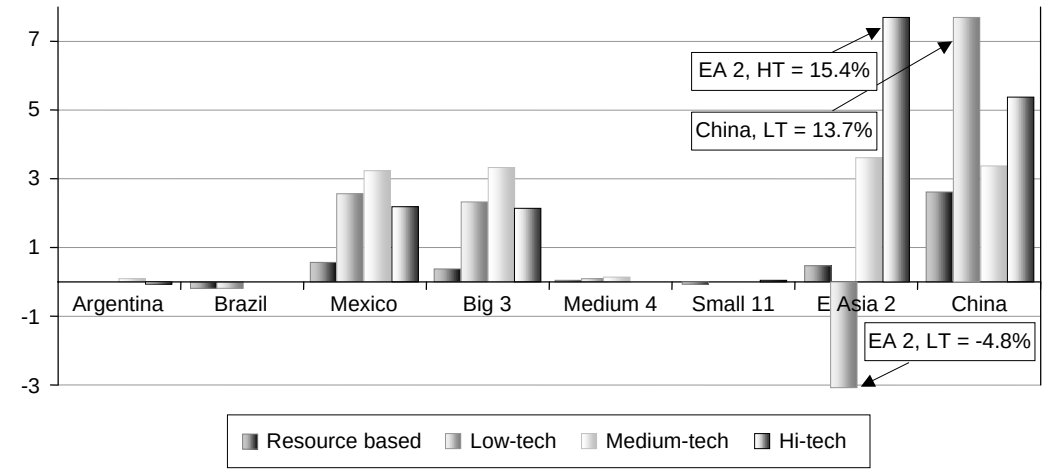
FIGURE 35
WORLD MARKET SHARES FOR TOTAL MANUFACTURED EXPORTS
(%)



Source: UNIDO Database.

Figure 36 shows WMS changes by technological category. Mexico dominates the regions' WMS performance in LT, MT and HT products. The other two large economies do poorly: Argentina shows a fractional rise in WMS in MT (autos) while Brazil has stagnant shares in MT and HT while losing shares in RB and LT. The medium 4 do well mainly in MT while lose shares marginally in all categories except for HT.

FIGURE 36
CHANGES IN WORLD MARKET SHARES IN LAC, 1981-2000
(% points)

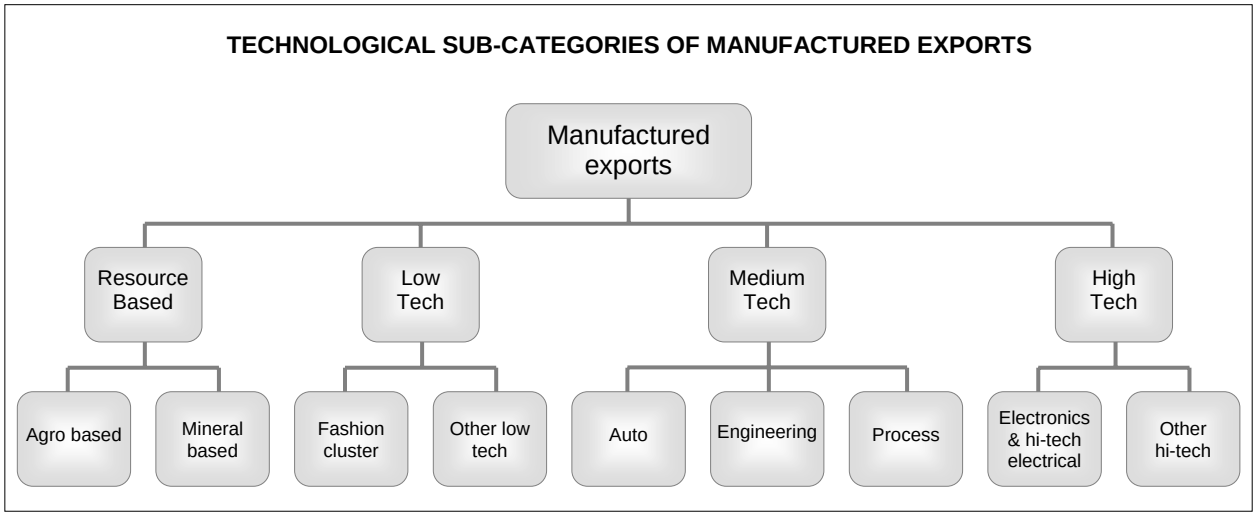


Source: UNIDO Database.

While the figure does not separate the two decades, there is a slight improvement in WMS performance in LAC in the 1990s - but it *is* slight, just offsetting the decline of the 1990s. As Annex Table A7 shows, the medium 4 group raises its RB WMS in the 1990s by 1 point and its MT WMS by marginally less. The small 11 raise their WMS in RB and HT (the latter entirely due to Costa Rica) by around 0.13 points but lose shares in LT. Argentina and Brazil lose WMS in both RB and LT in the '90s; Argentina manages a 0.13 point increase in MT and Brazil a 0.23 point increase in HT (aircraft). The overall result is disappointing.

5.3. LAC Export Performance by Finer Technological Categories

We now benchmark LAC export performance by technological sub-categories (see diagram below). These are of interest in that they show different sources of competitive advantage and the influence of different global value chains.



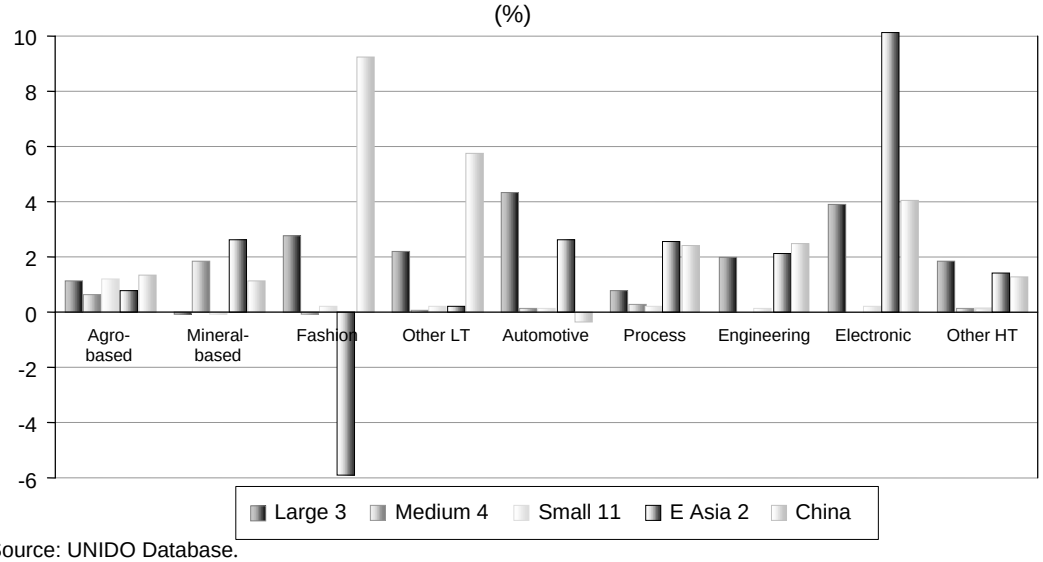
RB apart, the following differences may be borne in mind:

- In LT, the "fashion cluster" (textiles, apparel and footwear) is driven by the search for low wages with relatively simple skill needs; other LT products (plastics, simple metal products) need somewhat higher technological capabilities.
- In MT, the automotive industry is a distinct value chain, dominated by a handful of MNCs that locate in economies with mature industrial sectors and (because of high transport costs) fairly near major markets. The engineering subcategory (most industrial machinery and simple electronic and electrical products) needs strong technical and engineering capabilities, metal-working experience and a good local supply network. Process industries (heavy conversion and intermediate industries like iron & steel, synthetic fibers and chemicals, excluding pharmaceuticals) tend to be fairly self contained (they do not use extensive subcontracting), but also have long learning curves, advanced skill needs and large scales of operation.
- In HT (electronics, advanced electrical equipment, aerospace, pharmaceuticals, optical and measuring instruments), products have sophisticated, innovation-based core processes and

very high skill needs. However, some electronics products (office machines, semiconductors, telecom equipment and consumer products) have simple final assembly processes that can be located in low wage areas.

The detailed data for LAC and East Asian for these subcategories is shown in Annex Table A9 and A10, while Figure 37 shows relative changes in WMS for LAC and East Asia. In the 1990s, the large 3 LAC countries gain WMS in all subcategories except for mineral-based RB products; they perform best in auto, electronic and fashion products - with Mexico dominating. The medium 4 raise WMS most in mineral-based, followed by agro-based, RB products; they lose in fashion products. The small 11 do best in agro-based RB products and lose in mineral-based products.

FIGURE 37
CHANGES IN WMS FOR TECHNOLOGY SUBCATEGORIES, 1990-2000
(%)



Source: UNIDO Database.

In East Asia, the loss of WMS in LT by EA2 is confined to the fashion cluster, where China has a massive growth of textiles and apparel exports. This Chinese expansion does not, however, seem to affect LAC fashion exports in this period, presumably because of the protection given to Mexico and Caribbean basin exporters by US trade privileges. EA2 expands its WMS in auto exports quite significantly but not as much as the LAC 3; incidentally, this is the only segment where China loses market share.[16]

In engineering products, LAC 3 almost matches the EA 2 expansion, but here China registers the largest gains in WMS, with a mixture of machinery and process industry exports (Lall and Albaladejo [2003]). In electronics, EA 2 dominates WMS growth, with China also doing better than LAC 3. Finally, in other HT products, LAC 3 does better than EA2 and China, with Brazil as well as Mexico registering significant gains.

[16] Though this may well be reversed in the medium term as auto companies expand capacity in China and, after satisfying domestic demand, start to enter export markets.

VI. BENCHMARKING SOME DRIVERS OF INDUSTRIAL COMPETITIVENESS

6.1. Introduction

Contents

There are innumerable "drivers" of competitiveness, ranging from the social, historical and political to the purely economic. Within the economic category drivers are also numerous: they include macro management, the nature of the financial, institutional and legal systems, corporate and policy governance, trade and competition strategies, the strength of industry clusters and business networks, geographical location, physical infrastructure and so on. Given the amorphous and diffuse nature of "competitiveness" it is next to impossible to explain it fully in rigorous econometric terms. The well-known indices - like those of the World Economic Forum and the International Institute for Management Development - that benchmark national competitiveness suffer from many analytical and practical deficiencies (Lall [2001a]). While policymakers pay them a lot of attention, they are not objective or well-constructed enough to serve as guides to policy making.

In this section, we report comparative data on three structural drivers of industrial competitiveness: *skills, technological effort* and *inward FDI*, based mainly on UNIDO's *Industrial Development Report 2002/2003*.[17] The data for technological effort have been updated for LAC.

6.2. Skills

It is difficult to measure the stock of skills or current skill formation for a country as a whole. A significant part of skill creation is informal, the result of work experience, on-the-job experience and other forms of training that are not reported in the national statistics. It is even more difficult to compare skill formation across countries, since education and training systems differ, the quality and relevance of education vary and trained people migrate in and out to different extents. However, for understandable reasons most analyses regard skill formation as a critical variable in competitiveness and use simple proxies. The most common one is *enrollment rates in formal education* at some or all of the three levels.

We use *tertiary enrollments in technical subjects* (science, mathematics and computing, and engineering) as a percentage of the total population. While this measure emphasizes high level technical skills - in our view the most important component of skills needed for modern industry - the ranks it yields are very similar to those of enrollments at the secondary level or total years of schooling. Figure 38 shows recent data on tertiary technical enrollments in selected LAC and East Asian countries for 1985 and 1998.[18]

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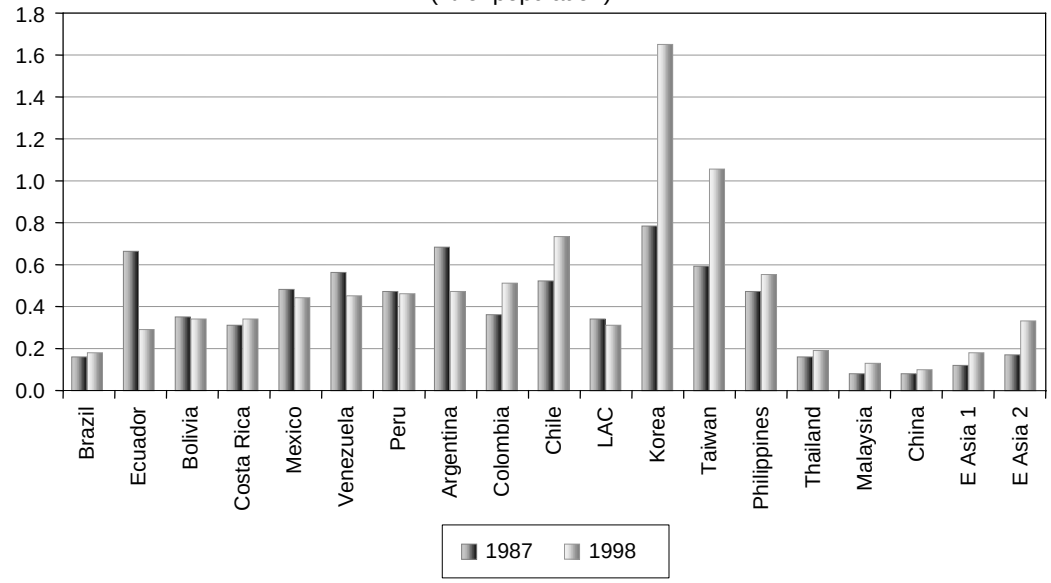
[17] UNIDO's *Industrial Development Report 2002/2003* constructed a "Scoreboard" that identified 5 drivers of competitive industrial performance: human capital, technological effort, inward FDI, licensing payments and ICT infrastructure. This Scoreboard was conceived and constructed by one of the present authors (Lall) and calculated in close collaboration with another (Albaladejo).

[18] UNESCO, the original source of these data, has not published the breakdown of tertiary enrollments since 1999. See its data at: *http://portal.unesco.org/uis/ev.php?URL_ID=5187&URL_DO=DO_TOPIC&URL_SECTION=201.*

FIGURE 38
TERTIARY ENROLLMENT IN TECHNICAL SUBJECTS, LAC AND EAST ASIA
(% of population)



Source: UNIDO Database.

The most striking impressions given by Figure 38 are:

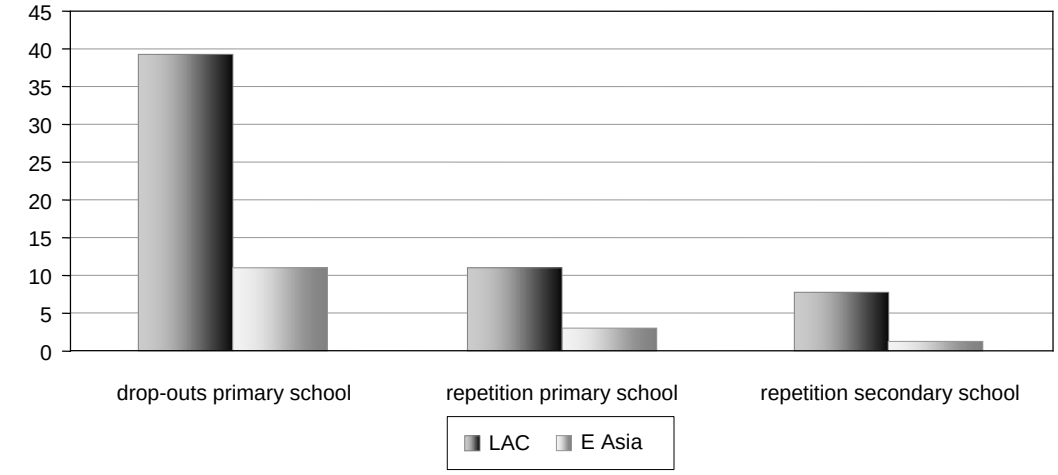
- LAC as a whole compares favorably with East Asia in terms of its technical skill base. However, this is mainly because of the weight of the new Tigers like Thailand, Malaysia and, particularly, China with its huge population and relatively low tertiary enrollments (EA 2 excludes China). The region is well behind first generation Tigers such as Korea and Taiwan that have built strong domestic capabilities and offer relevant role models for the more industrialized and high wage economies of LAC.

Over time the share of the population in LAC enrolled in tertiary technical subjects declines, with six of the ten countries in the figure sharing in this decline. Whether this reflects the impact of weak economic performance, sluggish industrial growth or a change in preferences within tertiary education is difficult to say. By contrast, the share in East Asia rises, even in high performing economies like Korea and Taiwan.

- There are large national variations in both regions, but more so in East Asia than in LAC. The best in LAC (Chile) is well behind the leader in Asia (Korea), which is also the leader in the world as a whole. The laggard in LAC, Brazil, is still ahead of major export-oriented economies like Malaysia and China.

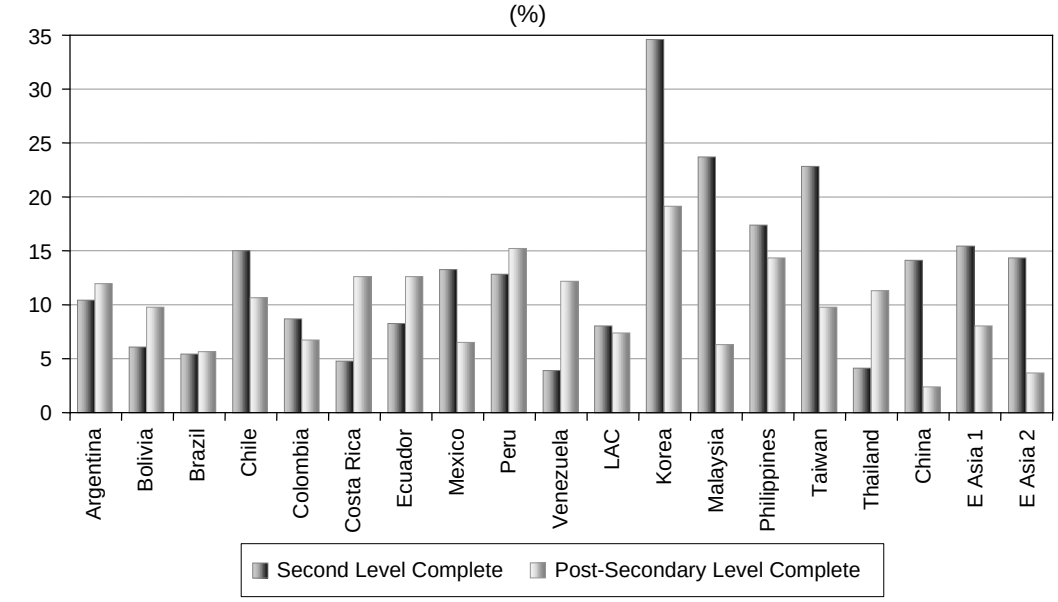
These figures on enrollment do not tell the whole story. First, they do not show the quality of the workforce in the two regions. Second, they say nothing about dropout rates. The evidence suggests that dropout and repetition ratios are considerably higher in LAC than in East Asia, particularly in primary and secondary education (Figure 39). This pattern is reflected in Figure 40.

FIGURE 39
DROP-OUT AND REPETITION RATES AT PRIMARY AND SECONDARY EDUCATION: LATIN AMERICA AND EAST ASIA, 1990
(% of enrollments)



Source: Barro and Lee [2000].

FIGURE 40
EDUCATIONAL ATTAINMENT OF THE POPULATION AGED 25 AND OVER, 2000
(%)



Source: Barro and Lee [2000].

The gap *vis-à-vis* East Asia in secondary education is substantial, even including China, suggesting a "missing middle" in the education of LAC's workforce. The picture for higher education is not as gloomy, but its quality may be questioned (IDB [2001] and Arellano [2002]). The sketchy evidence suggests a significant quality gap between LAC and EA. For instance, in an international study of student achievement in mathematics and science (TIMMS, eight-grade students), both Chile (1999), LAC's leader in education, and Colombia (1995) performed poorly, scoring well below the average. In mathematics, Chile scored 392 and Colombia 385, while Korea scored 587, Malaysia, 519 and Thailand, 467 (Arellano [2002]).

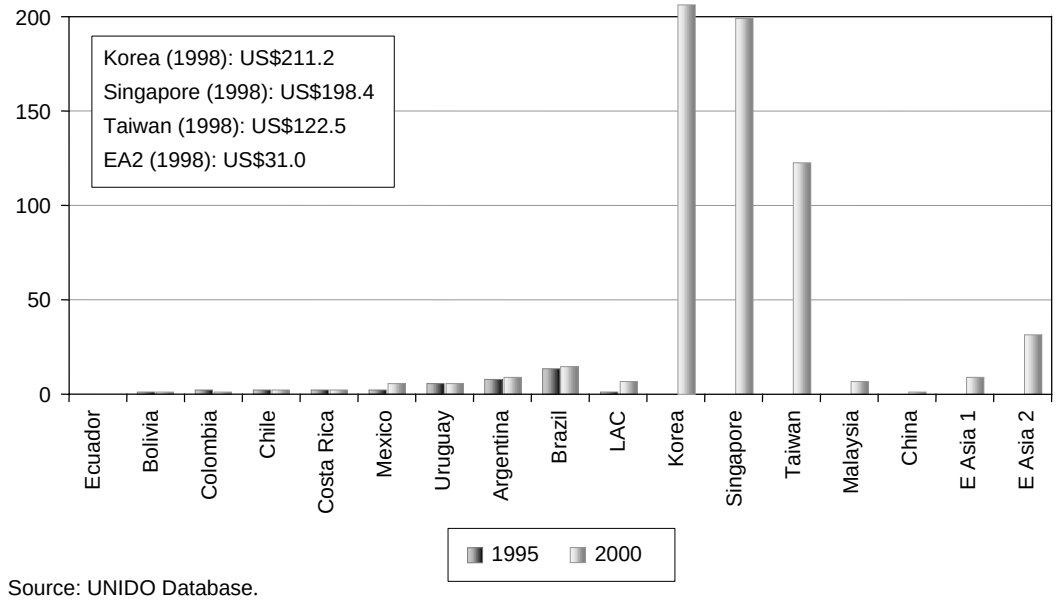
In a recent study, the World Bank ([2003] pp. 3-4) says the following about education in LAC:

> *"Over the course of the last two decades, the mean years of education of the adult population aged 25 and over has gone up by 1.7 years in the region (from 4.1 to 5.8 years). On average, however, Latin American adults have 1.4 fewer years of education, and East Asian adults have 0.4 more years of education than would be expected from their income levels. This gap in the stock of educational attainment is a reflection of relatively slow and sometimes inadequate education investments in the past. It is therefore particularly worrying to observe that the flow of new educated workers is also inadequate. The region has large deficits in enrollment, particularly at the secondary school level, as well as a problem with the quality of education. Latin America has an aggregate deficit of around 20 percentage points in net tertiary enrollment and 10 percentage points in gross tertiary enrollment given its average income level, while East Asia has surpluses of more than 17 and 5 percentage points, respectively… Finally, we discuss the quality of the students "produced" at each level of education as given by the performance of Latin American students and adults on standardized tests… Not only do Latin American countries (other than Cuba) underperform relative to an income-adjusted benchmark, they also underperform relative to much poorer countries."*

6.3. Technological Effort

Technological effort in industry is as difficult to measure as skills. It takes many different forms and many are informal and non-measurable. Input measures of effort like R&D do not capture the efficacy and impact of effort on competitiveness, and definitions of R&D vary across countries. Nevertheless, R&D is the only measure available for inter-country comparisons, and it does give a good picture of the advanced technological effort. For countries at the level of industrialization of Brazil, Mexico or Argentina, it is probably a good measure of the intensity of the effort relevant to competitiveness.

FIGURE 41
ENTERPRISE FINANCIAL R&D PER CAPITA IN LAC (1995-2000) AND EAST ASIA (1997-1998)
(US$)



Source: UNIDO Database.

Figure 41 shows *R&D financed by productive enterprises per capita* for the main R&D performing countries in LAC and comparators in East Asia (only data for 1998 are shown for the latter). Here the contrast in performance is much greater than for skills. While R&D rises in LAC, the intensity of effort is very low compared to East Asia. EA 2 (without China) spends about five times more on enterprise-financed R&D than LAC and the gap is likely to be rising sharply over time. The per capita figure for China is, of course, affected by the size of its non-urban population (a better deflator would be the industrial population).

Note the *lack of correlation* between R&D and competitiveness in the two outliers, Mexico and China: both are making huge WMS gains without investing in local technological effort. Exports of sophisticated manufactures in both depend for innovative inputs on foreign enterprises: this is an excellent way to launch export activity, but it is a transitory phase - as wages rise and technologies evolve, local technological and other inputs have to rise. In the long term, therefore, technology levels have to catch up with the technological structure of exports. There are major differences in this respect between Mexico and China. Mexico is a medium wage economy which has to quickly upgrade from simple assembly activities if it is to retain a competitive advantage, particularly as its trade privileges erode and the geographical "adjustment" of the US auto industry matures. China is a low wage economy that can sustain growth on simple activities for some time to come. Moreover, the Chinese labor force is highly productive and its education and training are improving rapidly. The Chinese government is using industrial policy (performance requirements, bargaining, and so on) to induce foreign investors to set up local R&D; its own enterprises are also investing heavily in technology. In conjunction with the understated value of Chinese per capita R&D, it is possible that Mexico is facing a far more serious technological upgrading challenge than China.

To quote once more from the World Bank ([2003] p. 5) study,

> *"…we focus on domestic spending on research and development (R&D) and payments for licensing, relative to benchmarks for countries of their levels of income, but also with respect to the performance of superstars such as Finland, Korea, Israel or Ireland, and to the extraordinary returns generated on innovation investments. The most striking result is the low level of R&D conducted by firms… Finally, though far more difficult to benchmark, the use of innovation-related resources and human capital is highly inefficient in the region. The overall coordination of universities, research centers, and the productive sector is poor, implying that the little R&D investment that is done is employed relatively inefficiently, with lower returns in terms of patents and impact on growth than in the case of comparable countries or the OECD. Thus, not only does Latin America lag in terms of the total amount of R&D relative to GDP, but a relatively large share of that R&D is undertaken by the public sector and has less spillover on private R&D than in other latitudes."*

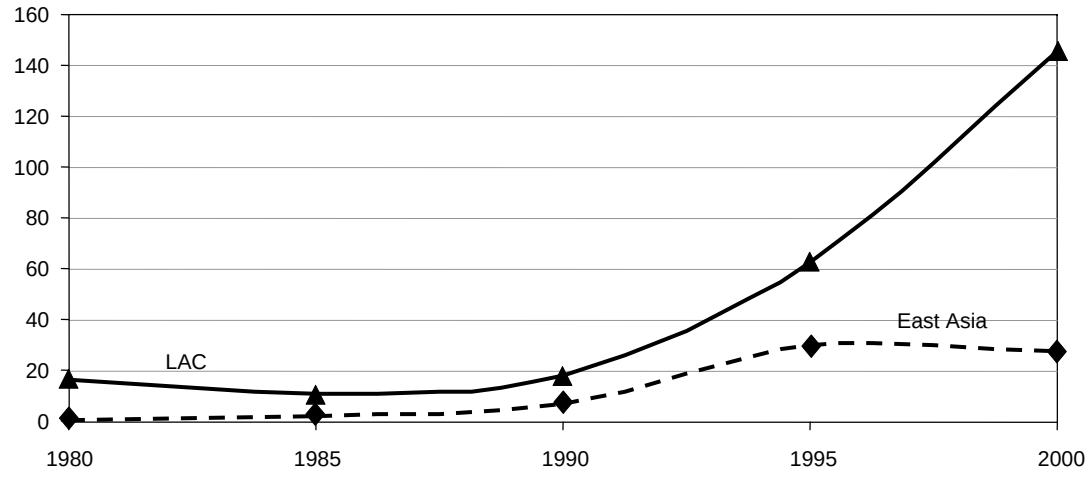
Thus, the data suggest that LAC *performs relatively poorly in terms of technological effort*, particularly in view of its skill base, and that *R&D does not feed into its competitive performance*. The largest R&D investor, Brazil, has clearly been unable to capitalize on it for export competitiveness; the next largest, Argentina, is even more a laggard. The country with the best skill endowments in the region, Chile, is a small R&D performer and a tiny player in global manufacturing. Since enterprise R&D is a reflection of how industrial firms respond to the environment facing them, it appears that there is something in the environment that, despite liberalization, holds back technological effort. Are the skills of the wrong kind? Is the incentive

structure facing firms wrong - has liberalization proceeded too fast and too far? Is there a binding financial constraint? Is the industrial structure biased towards activities that do not conduct R&D? These are vital issues for LAC competitiveness but lie beyond the scope of this paper.

6.4. Foreign Direct Investment

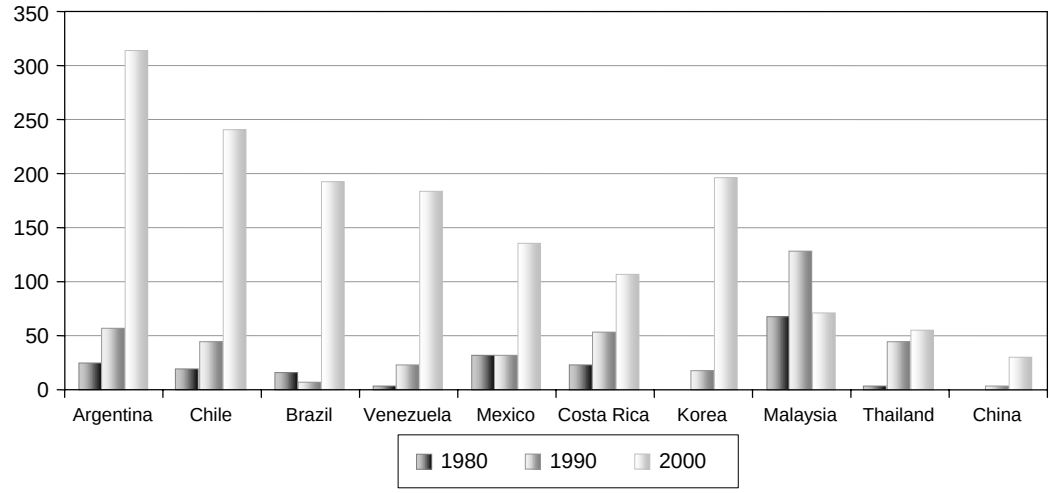
FDI flows into LAC have risen strongly in recent years, particularly in the 1990s (Figure 42), and the region continues to be a much bigger recipient than East Asia. The latter had a rise in the early 1990s but the financial crisis was a major setback. Figure 43 shows inflows into selected countries.

FIGURE 42
FDI PER CAPITA IN LAC AND EAST ASIA
(US$)



Source: UNCTAD.

FIGURE 43
FDI PER CAPITA IN SELECTED LAC AND EAST ASIAN COUNTRIES
(US$)



Source: UNCTAD.

However, these data are misleading from the viewpoint of industrial competitiveness. They are for *total* FDI rather than *manufacturing* FDI - it is not possible to get this breakdown for more than a few countries. However, the evidence suggests that *much of the recent FDI in LAC has gone into services rather than into manufacturing.* And, apart from Mexico and Costa Rica, *much of the manufacturing FDI has not gone into the kinds of export-oriented activities* that have propelled Asian exports by integrating them into dynamic GPNs (UNCTAD [2002]). And FDI has not been a driver of competitiveness in some Asian countries like Korea - before the financial crisis, it was a very low recipient (only US$0.20 per capita in 1980).

LAC is an attractive place for foreign investors, but most countries do not draw the investors that matter for industrial competitiveness. There is again the recurring puzzle of LAC competitiveness: its strong location and skill advantages, together with a conducive investment climate, are not producing the "right" competitive activities. Why do export-oriented MNCs look elsewhere? Is it just lower wages that take them to East Asia - or the combination of wages and industrial capabilities? If it is the latter, why does LAC lack the capabilities needed for export success? Or is it that it has given up the tools of *targeting* FDI used so commonly in countries like Singapore and Malaysia? Only CINDE in Costa Rica is reputed to be an effective FDI promotion and targeting agency in the region - but what holds back the others?

6.5. Technical Payments Overseas

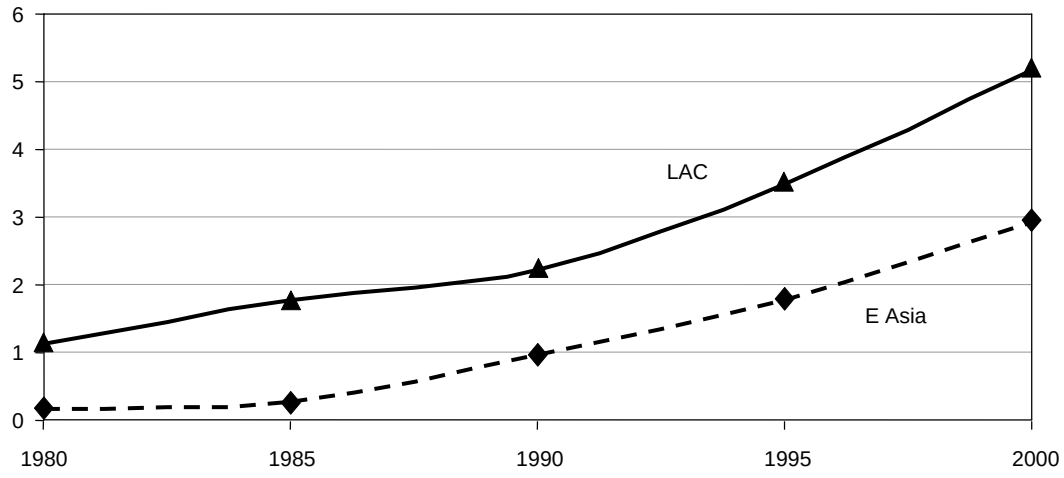
Arm's length purchases of know-how, patents, trademarks and licenses are other important means of technology transfer, which occur between independent firms and not between parent MNC and affiliates. The advantages of externalised technology transfer are similar to those happening within a firm, though the process tends to be, if anything, richer as the partnership is often founded upon equal conditions where independent firms can set up their own objectives. Externalised technology transfer is often measured by *payments abroad of technology licences and royalties*. Two main problems arise. First, royalties and technical fees are not necessarily for industrial technology; they could well be to obtain franchises or brand names in the service sector. Second, they often include non-arm's length transactions, that is, by affiliates to MNC parents. Despite all this, this indicator is the best proxy for technology purchases by local firms, and data are available for cross-country analysis.

Figure 44 shows the trends of royalty payments in Latin America and East Asia between 1980 and 1990. LAC spends more on buying foreign technology than East Asia, though this is distorted by the extremely low per capita spending of China. Yet this average conceals striking differences (Figure 45). In 2000, South Korea alone had higher levels of per capita royalty payments than Argentina, Brazil, Chile and Mexico put together. It is also interesting to note the stagnation of Argentina, Mexico and Chile in buying foreign technology during the 1990s. By contrast, most EA countries have sharply increased royalty payments per capita since the 1980s - Thailand, Philippines and China are clear examples.

But why has not high royalty payment levels in LAC led to enhanced industrial competitiveness? The relationship between increased royalty payments and technology transfer is far from straightforward. Royalty payments do not always feed into manufacturing activities, and if they do, they may have little to do with technology. For instance, franchises and branding in the service

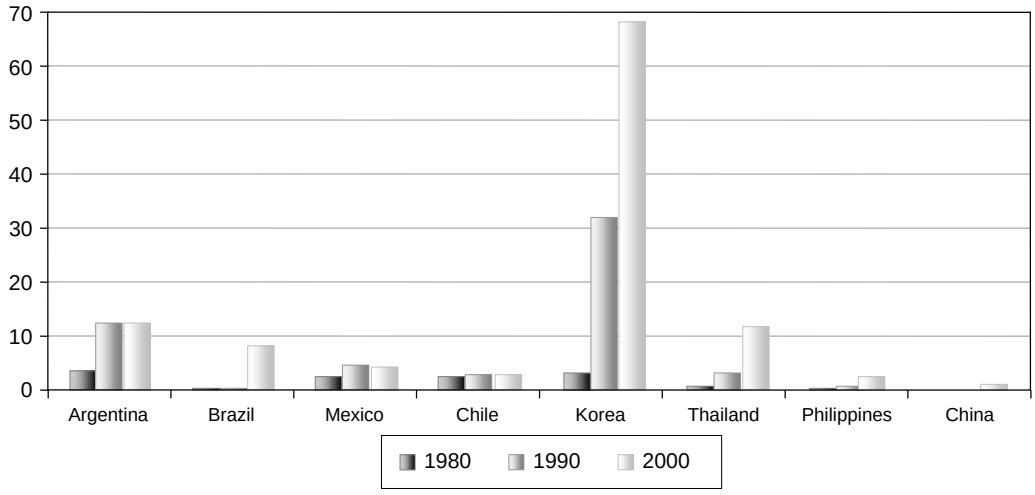
sector may distort the usefulness of royalty payments as an indicator of technology transfer. The low R&D levels and the limited FDI going to manufacturing would indeed suggest that royalty payments in LAC have not led to technological development of domestic companies. Yet this is a sweeping statement and further research is required to shed light on the issue.

FIGURE 44
ROYALTY PAYMENTS PER CAPITA
(US$)



Source: UNIDO Database.

FIGURE 45
ROYALTY PAYMENTS PER CAPITA FOR SELECTED LATIN AMERICAN AND EAST ASIAN COUNTRIES
(US$)



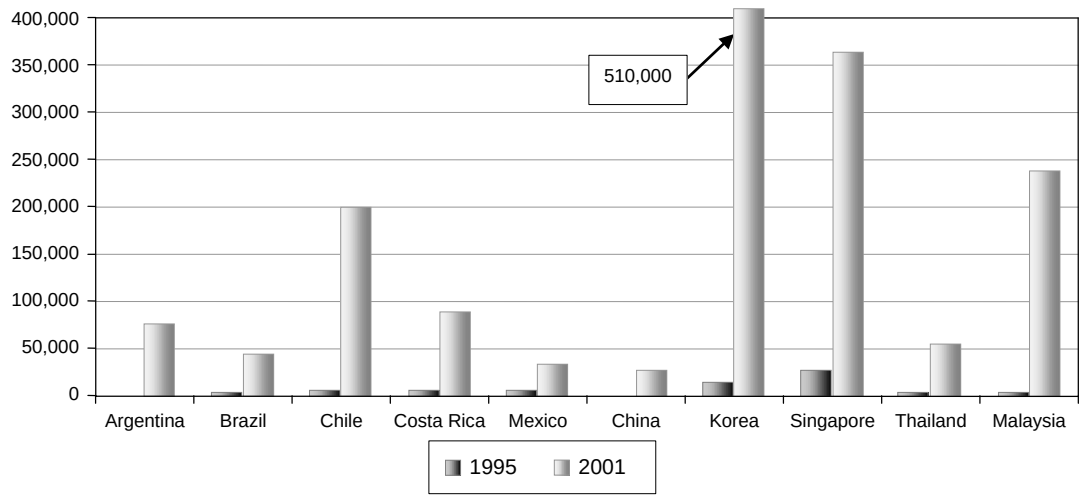
Source: UNIDO Database.

6.6. ICT Infrastructure

Information and communication technologies (ICTs) are at the heart of technical change both in industrialised and developing countries. As their potential benefits are being realised and their costs continue to fall, such technologies are being applied throughout all sectors of the economy. In the developing world, the spread of ICTs brings new opportunities to reduce the gap by shrinking economic distance and providing instant and economical access to information. They also allow enterprises to reach markets in new ways, inconceivable in earlier times. It is partly in response to this underlying economic reality that many governments in third world countries are developing national ICT strategies to build "knowledge societies" to support their development objectives. While general traditional infrastructure remains as a major factor in economic development, ICTs are growing their importance in industrial competitiveness, particularly in technology-intensive activities.

There are many ICT indicators but they are often highly correlated. For this paper we only use internet users and telephone subscribers to shed light on ICT development in LAC and EA. Figure 46 shows internet users per million people for selected LAC and EA countries. Although internet has boomed in both regions the differences are striking. Korea has more internet users than Argentina, Brazil, Chile, Costa Rica and Mexico put together. Singapore and Thailand are far more advanced than any of the strongest economies in LAC, and China, despite its massive population, is catching up fast and presents levels similar to Mexico.

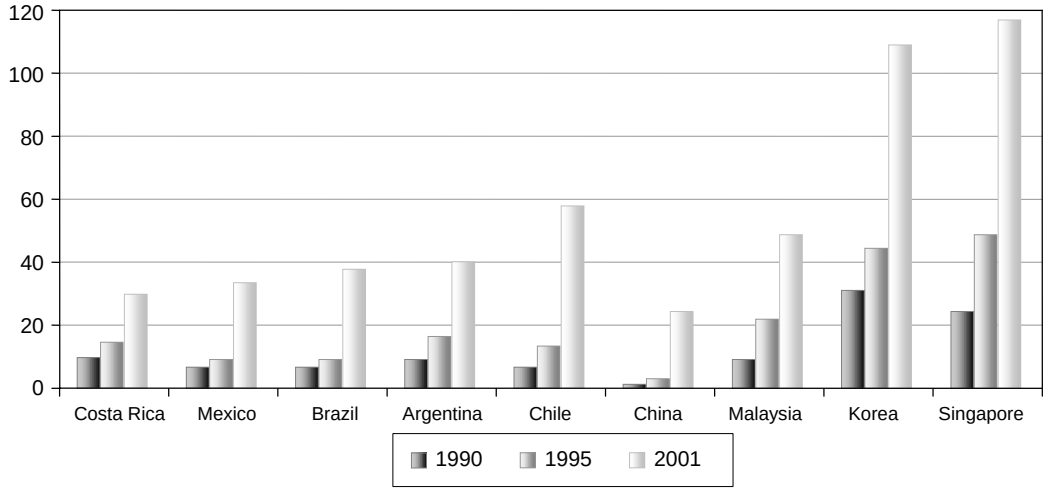
FIGURE 46
INTERNET USERS PER MILLION PEOPLE



Source: UNIDO Database.

Figure 47 gives the telephone subscribers per 100 inhabitants for the same countries. The differences are less marked. Chile is the regional leader followed by Argentina and Brazil. Yet, levels in Chile are almost half of those of Korea and Singapore. Note the rapid growth experienced by most countries in the second half of the 1990s. China's growth is particularly astonishing as it has increased fourfold the telephone subscribers per 100 inhabitants in 6 years.

FIGURE 47
TELEPHONE SUBSCRIBERS PER 100 INHABITANTS



Source: UNIDO Database.

VII. SUMMARY AND CONCLUSIONS

Contents

The recent competitive performance of the LAC region, as judged by East Asian benchmarks, has been weak. While there are some outstanding exceptions, in general the region is under-performing relative to its potential. LAC is the most industrialized region in the developing world and has the longest history of industrialization. It has a good base of natural resources and well-established entrepreneurial traditions. It is well located for export growth, with its proximity and close links with the US, the world's largest and most open market. It has three economies large enough to reap economies of scale domestically in heavy, capital-intensive industries. The 1990s were particularly propitious for industrial growth: there was ample "spare capacity" for growth after the lost decade, macro management had improved, policies on trade, technology and FDI were liberalized, the private sector was unshackled and many public enterprises privatized, and infrastructure and education were strengthened. But the outcome was disappointing. The drivers of competitiveness do not seem to offer a full explanation. LAC is lagging in some of the drivers with respect to the mature Asian Tigers but not overall, though the quality of human resources and low levels of R&D appear to be a problem. This problem, however, that has not stopped other Asian competitors with lower endowments from doing well by plugging into global production networks and building up from there.

The benchmarking exercise is useful because it highlights how another developing region, facing the same global markets and accessing the same technology and resource flows - and with relative handicaps in terms of location, natural resources and historic links with major markets - has fared much better. Manufacturing production has been sluggish in LAC, despite the improved environment. Not only has it grown slowly, its structure has generally moved down the technology scale. Resource based activities have done better than others, but not because they have grown particularly rapidly; on the contrary, their growth is well below that of other regions. The more technology-intensive activities, the drivers of sustained industrial growth today, have done poorly. And there is little sign of resurgence; stories abound in the region of the dissipation of engineering and innovation capabilities.

The picture for exports is brighter. Growth rates in all technological categories are higher in the 1990s than in the 1980s. The technological structure has upgraded, with HT growing faster than other categories. However, the picture has some darker patches. Export success is highly concentrated by country and industry. If world market shares are the criterion of competitiveness, in the region only Mexico emerges as a strong performer by East Asian standards. While several smaller economies raise WMS in the 1990s, it is not clear that this signifies a shift into higher competitiveness: taking the poor performance of the previous decade into account it may be that the '90s are a period of catching up, marking a return to the (insipid) long-run growth path. The most disturbing aspect of the analysis is the weak performance of the other two large economies, even in resource based industries where they have strong competitive positions.

Mexico's competitive surge is due more to the granting of trade privileges in the North American market rather than to structural improvements in its competitive capabilities, leading to a surge in low-level assembly activities with low local content. There *are* competitive gains in other activities, the main example being the auto industry, which has strong local roots and capabilities. However, other *maquila* operations remain shallow and vulnerable to competition from lower wage entrants, particularly China (on electronics, see below). Similar *maquila* activities in apparel in the Caribbean

region also face competitive threats as their trade privileges in the US market diminish or are abolished (with the MFA). It is not clear if they will be able to retain a strong export position against cheaper competitors in East and South Asia.

Finally, that exports are growing faster than MVA is a welcome sign of growing outward orientation and competitiveness, but it in some cases (like Mexico) it also signifies that part of export activity is shallow and de-linked from domestic production. RB activities are the fastest growing MVA segment but the slowest growing export segment; the reverse is true of MHT activities. In East Asia, exports appears much more linked to MVA in both growth and structure. It is worth pondering if this is a cause for concern in LAC competitiveness.

The most important and intriguing question raised by this mapping exercise is: what explains LAC's lagging performance? The literature and the ongoing policy debate suggest that there are four main stylized stories competing to explain LAC's predicament.

The first could be called the *"unfinished transition"* story, which argues that the region's problems can be traced to the incomplete transition to market-oriented openness. There are still several reforms to be fully implemented in many countries (e.g. trade and investment liberalization, further privatization) and others yet to be launched (e.g. labour market, intellectual property rights, anti-trust and fiscal reforms). This unfinished transition, coupled with low levels of education, constitute the main drag to the region's competitiveness and growth.

Whereas there is no doubt that the glass is half empty - LAC still has a long way to go to have a fully functioning open market economy (see Lora and Panizza [2002]) - it is also half full. Substantial reforms have been implemented over the last decade, but their impact on the region's competitive stance has so far been mixed. There is strong evidence that productivity growth in manufacturing, at least in the large countries, has responded vigorously, but this has not, on the whole, translated into higher output and export growth. Even in countries like Chile and Mexico where higher productivity did translate into higher output and higher world market shares abroad, there remain doubts about the strength of their technological capabilities (and so about the sustainability of their competitive gains). The transition is unfinished but the response to the progress made so far has not been encouraging. And, of course, the unfinished transition story finds it difficult to explain how EA was able to build up its competitiveness so dramatically while liberalizing much less than LAC.

The second story is about *endowments and geography.* This has two diametrically opposed versions. The pessimistic version argues that LAC has the wrong endowments to develop complex manufacturing activities. "LAC is far way, rich in natural endowments and has a tropical climate…" "…far away resource abundant tropical countries have great difficulties attracting manufacturing activities, other than mundane and labour intensive tasks like sewing hems on t-shirts" (Blum and Leamer [2004] p. 39). One can hardly dispute the fact the region is natural resource-intensive and that this may affect manufacturing competitiveness (for instance, by leading to relatively higher wages), but if this restriction were really binding countries such as Mexico, Brazil, Thailand and

Indonesia would not be significant exporters of manufacturing goods. Moreover, countries such as Canada, Finland, Sweden seem to have shrugged off the "natural resource curse" to become important exporters of complex manufacturing goods.

The optimistic version argues that resource endowments can be a blessing. Agriculture and mining are increasingly technology-intensive activities that promise much for resource-based industries; they could also lead the way to a growth of the "knowledge economy", a function previously believed to be served only by manufacturing (World Bank [2002, 2003]). So the root of LAC's competitive and growth problems do not lie in its endowments but in its long-standing policy bias against resource-based activities. The way forward is then to promote such activities.

This story also has some problems. While there was a substantial incentive bias in LAC against resource intensive activities during the ISI period, this was greatly reduced after trade liberalization in the late '80s and early '90s. As a result, most manufacturing investment, at least in the Southern cone, was direct to RB activities. It is also important to be aware of the shortcomings of a "resource-based" path to competitiveness and growth. First, the diversification from primary to resource-based manufacturing activities is not automatic. Middle-East countries and Venezuela are a powerful reminder that the Dutch disease can be a real threat and that Canada and Finland might be exceptions to the rule. Second, resource based activities might be an obstacle rather than a path to building a knowledge society. As Blum and Leamer ([2004] p. 5) put it "Natural resource rich communities invest their resources in land, permanent crops and extractive equipment and very little in human capital", a fact confirmed by fact content analyses (OECD [2001]).

The third story is about *institutions.* It argues that governments should aim for a fully-fledged market economy but retain the right to pick and choose their own set of "right" institutions (Rodrik [2003]). The recent success of China and India (which are liberalising slowly and cautiously) are cases in point; LAC is the counter-example. The implication is that the imposition of "Washington Consensus" institutions on LAC harmed competitiveness and growth. As with the other stories, this one may have some truth, particularly concerning the way that trade liberalization and privatisation of public utilities were implemented in some countries in the region. However, this analysis tends to leave policy makers out on a limb, with many important question unanswered. For instance, what are the criteria to define the "right" institutions? Is everything acceptable, even a banking system run by a communist party? How far should governments open their economies? Where should government intervene, how much and for how long? Without a theoretical base in the analysis of market failures, this line of argument does not offer useful lessons to policy makers.

The fourth story, while rarely recounted in academic papers, has a visible presence in the policy debate in LAC, particularly in the southern cone. It amounts to a revival of the *market and trade pessimism* of the 1950s that inspired early import substitution strategy. The basic premises seem to be that markets do not work, trade is biased against developing countries and governments can do it all. LAC's underperformance is the proof that market-oriented reforms were a failure; thus, the region should bring the "big state" back in and close their economies, particularly for North-South trade. While appealing in a populist sense, this story does not bear close scrutiny. First, even though industry in LAC is clearly underperforming, it is not facing the disaster and extinction predicted by supporters of the old ISI regime. Quite the contrary: there is strong productivity growth in the large and medium-sized countries and strong export growth in countries like Chile

and Mexico. Moreover, the days of stagnation, falling productivity and obsolete and overpriced products that marked the last decade of the ISI regime should not be forgotten.

What seems to be missing in all these stories is a clear assessment of the role of government in the transition towards an open market economy. East Asia shows that entering and tapping world markets can lead to rapid export and industrial growth, and that the best way to do this may not be an ideological opposition to government intervention. Market failures are a fact of life. They are particularly important for developing countries - in a sense the state of under-development is a massive market failure - and remedying the failures are a key to competitive development. Simply opening up the economy does not ensure that such factors as scale economies, missing markets, externalities, path dependence and information asymmetries are taken care of. As long as they exist, resources might not flow to the most productive industries because firms are not big enough, cannot get enough financing, do not have enough information or do not invest enough in human capital and technology. Most LAC governments, perhaps as a reaction to the bloated, inefficient state of the ISI era, have leaned towards an agenda that demonised active intervention; as a result, they have, in many ways, thrown the baby out with the bath water. In removing inefficient government interventions, they opened the door to damaging market failures. Even a cursory analysis of industry in LAC shows that firms suffer from several disadvantages. For instance, they do not have access to sufficient financing; they lack the incentives to invest in human capital and technology; they have to face uncompetitive practices in the world markets. These problems also lie behind LAC’s disappointing competitive performance and addressing them may require an agenda in which more, not less, government is essential.

Of course, there are obvious risks in bringing the state back in. LAC suffers from weak public institutions (a situation in part aggravated by the onslaught on the state). Its governments face severe fiscal constraints and have an uneven record of fighting corruption and regulatory capture. Their freedom of manoeuvre is limited by the international rules of trade and investment, and by regional and multilateral agreements. All this makes the design of optimal competitiveness policies a challenging task. But this study shows how rapidly the world is moving and doing nothing is not a real option. If done well, competitiveness strategy can have an extraordinarily high payoff.

ANNEX A

COUNTRY LEVEL STATISTICS

Contents

TABLE A1A

MANUFACTURING VALUE ADDED - WORLD AND REGIONS

(1990 US$ million)

	1980	1985	1990	1995	2000
World	*3,708,605*	*4,162,272*	*4,835,616*	*5,232,559*	*6,224,310*
Industrialized	*2,863,770*	*3,168,690*	*3,649,920*	*3,895,370*	*4,469,620*
Transition	*318,976*	*365,240*	*376,924*	*209,541*	*257,340*
Developing	*525,859*	*628,342*	*808,772*	*1,127,648*	*1,497,350*
LAC	246,870	242,590	255,460	281,230	325,810
o/w Mexico	40,540	43,090	50,000	52,930	77,250
East Asia	152,950	223,310	349,310	595,960	862,150
o/w China	53,563	84,840	128,290	276,500	438,260
South Asia	31,235	42,945	62,071	86,968	109,720
MENA	57,011	77,874	96,438	117,500	147,310
SSA	37,163	40,912	44,755	45,036	51,249

TABLE A1B

GROWTH RATES OF MVA

(%)

	1980-1985	1985-1990	1990-1995	1995-2000	1980-1990	1990-2000	1980-2000
World	*2.3*	*3.0*	*1.6*	*3.5*	*2.7*	*2.6*	*2.6*
Industrialized	*2.0*	*2.9*	*1.3*	*2.8*	*2.5*	*2.0*	*2.3*
Transition	*2.7*	*0.6*	*-11.1*	*4.2*	*1.7*	*-3.7*	*-1.1*
Developing	*3.6*	*5.2*	*6.9*	*5.8*	*4.4*	*6.4*	*5.4*
LAC	-0.3	1.0	1.9	3.0	0.3	2.5	1.4
o/w Mexico	1.2	3.0	1.1	7.9	2.1	4.4	3.3
East Asia	7.9	9.4	11.3	7.7	8.6	9.5	9.0
o/w China	9.6	8.6	16.6	9.6	9.1	13.1	11.1
South Asia	6.6	7.6	7.0	4.8	7.1	5.9	6.5
MENA	6.4	4.4	4.0	4.6	5.4	4.3	4.9
SSA	1.9	1.8	0.1	2.6	1.9	1.4	1.6

TABLE A2
TECHNOLOGICAL STRUCTURE OF MVA IN THE DEVELOPING WORLD (%)

		1980	1985	1990	1995	2000
Latin America	RB	38.7	38.6	37.2	40.8	40.7
	LT	19.9	18.3	17.5	14.1	11.9
	MHT	41.5	43.1	45.2	45.1	47.4
East Asia	RB	31.4	30.7	28.8	26.7	25.8
	LT	26.7	23.3	22.0	17.7	16.3
	MHT	41.9	46.1	49.2	55.6	58.0
South Asia	RB	25.0	28.7	28.7	26.4	26.5
	LT	26.6	20.0	21.2	19.1	19.2
	MHT	48.4	51.3	50.2	54.5	54.3
Middle East & North Africa	RB	49.1	46.5	44.7	43.3	40.9
	LT	22.3	21.5	20.9	20.4	21.2
	MHT	28.6	32.0	34.4	36.3	37.9
Sub-Saharan Africa	RB	36.0	42.7	40.0	40.0	40.2
	LT	20.6	17.4	20.6	19.2	18.6
	MHT	43.4	39.9	39.4	40.8	41.2

TABLE A3

MANUFACTURED EXPORTS - WORLD AND REGIONS (Current US$ million)

	1981	1985	1990	1995	2000
World	*1,233,505*	*1,325,673*	*2,635,466*	*4,004,899*	*4,924,765*
Industrialized	*1,009,958*	*1,066,296*	*2,117,224*	*2,958,514*	*3,406,680*
Transition	*61,946*	*62,207*	*80,608*	*139,753*	*196,339*
Developing	*161,601*	*197,171*	*437,635*	*906,632*	*1,321,746*
LAC	39,521	47,585	63,039	149,863	250,717
o/w Mexico	6,076	8,558	13,722	65,534	144,288
East Asia	83,571	105,351	303,075	635,854	906,608
o/w China	12,220	15,651	66,123	183,679	317,786
South Asia	7,395	9,045	20,623	38,218	53,710
MENA	21,733	28,099	40,015	58,618	79,343
SSA	9,035	6,730	10,207	22,647	30,444

GROWTH RATES OF MANUFACTURED EXPORTS (%)

	1980-1985	1985-1990	1990-1995	1995-2000	1980-1990	1990-2000	1980-2000
World	*1.8*	*14.7*	*8.7*	*4.2*	*8.8*	*6.5*	*7.6*
Industrialized	*1.4*	*14.7*	*6.9*	*2.9*	*8.6*	*4.9*	*6.6*
Transition	*0.1*	*5.3*	*11.6*	*7.0*	*3.0*	*9.3*	*6.3*
Developing	*5.1*	*17.3*	*15.7*	*7.8*	*11.7*	*11.7*	*11.7*
LAC	4.8	5.8	18.9	10.8	5.3	14.8	10.2
o/w Mexico	8.9	9.9	36.7	17.1	9.5	26.5	18.1
East Asia	6.0	23.5	16.0	7.4	15.4	11.6	13.4
o/w China	6.4	33.4	22.7	11.6	20.6	17.0	18.7
South Asia	5.2	17.9	13.1	7.0	12.1	10.0	11.0
MENA	6.6	7.3	7.9	6.2	7.0	7.1	7.1
SSA	-7.1	8.7	17.3	6.1	1.4	11.5	6.6

Source: Calculated from UN Comtrade.

TABLE A4
TECHNOLOGICAL STRUCTURE OF MANUFACTURED EXPORTS (%)

	RB		LT		MT		HT	
	1981	2000	1981	2000	1981	2000	1981	2000
World	*26.6*	*18.5*	*18.8*	*17.4*	*40.9*	*36.1*	*13.7*	*28.0*
Industrialized	*23.4*	*18.2*	*16.7*	*14.0*	*44.9*	*41.1*	*15.0*	*26.7*
Transition	*35.1*	*30.2*	*16.5*	*23.9*	*42.2*	*34.4*	*6.3*	*11.5*
Developing	*41.8*	*17.7*	*31.7*	*25.1*	*17.8*	*23.5*	*8.7*	*33.7*
LAC	56.9	23.8	14.9	17.8	19.3	35.3	8.9	23.2
o/w Mexico	27.4	6.7	15.2	17.6	23.5	43.3	33.9	32.5
East Asia	28.4	11.8	40.8	25.0	19.6	21.5	11.3	41.7
o/w China	29.0	10.6	53.9	44.3	14.3	20.9	2.9	24.1
South Asia	22.8	24.4	60.1	60.0	14.3	10.9	2.9	4.7
MENA	71.7	45.5	17.8	30.2	9.0	18.0	1.4	6.4
SSA	68.6	55.8	13.9	15.6	15.4	24.4	2.1	4.2

Source: Calculated from UN Comtrade.

TABLE A5
MVA VALUES AND GROWTH IN LAC 18

All manufacturing	Values (1990 US$ million)			Growth rates (%)		
	1980	1990	2000	1980-1990	1990-2000	1980-2000
Argentina	45,905.0	37,868.0	49,427.0	-1.9	2.7	0.4
Brazil	107,020.0	104,000.0	118,260.0	-0.3	1.3	0.5
Mexico	40,545.0	49,993.0	77,250.0	2.1	4.4	3.3
Total big 3	193,470.0	191,861.0	244,937.0	-0.1	2.5	1.2
Chile	4,379.0	5,613.4	8,789.6	2.5	4.6	3.5
Colombia	5,998.9	8,018.6	6,951.3	2.9	-1.4	0.7
Peru	9,299.5	7,811.6	11,132.0	-1.7	3.6	0.9
Venezuela	7,022.9	9,808.7	10,830.0	3.4	1.0	2.2
Total medium 4	26,700.3	31,252.3	37,702.9	1.6	1.9	1.7
Bolivia	883.3	825.7	1,156.6	-0.7	3.4	1.4
Costa Rica	892.0	1,106.4	2,100.6	2.2	6.6	4.4
Ecuador	1,976.4	2,068.4	2,536.0	0.5	2.1	1.3
El Salvador	1,145.2	1,156.9	1,931.8	0.1	5.3	2.6
Guatemala	1,167.0	1,151.0	1,510.0	-0.1	2.8	1.3
Honduras	330.8	443.3	642.0	3.0	3.8	3.4
Jamaica	611.5	824.5	680.5	3.0	-1.9	0.5
Nicaragua	248.1	187.3	225.2	-2.8	1.9	-0.5
Panama	468.5	502.2	663.0	0.7	2.8	1.8
Paraguay	735.0	909.6	980.9	2.2	0.8	1.5
Uruguay	2,864.1	2,600.5	2,434.1	-1.0	-0.7	-0.8
Total small 11	11,321.7	11,775.9	14,860.6	0.4	2.4	1.4

TABLE A5 (continued)

Resource based	Values (1990 US$ million)			Growth rates (%)		
	1980	1990	2000	1980-1990	1990-2000	1980-2000
Argentina	20,654.2	14,035.9	12,081.8	-3.8	-1.5	-2.6
Brazil	32,231.8	27,993.4	36,338.8	-1.4	2.6	0.6
Mexico	14,434.4	18,982.5	25,566.3	2.8	3.0	2.9
Total big 3	67,623.4	60,689.5	74,090.5	-1.1	2.0	0.5
Chile	2,040.0	3,148.0	5,502.1	4.4	5.7	5.1
Colombia	2,948.3	3,557.7	3,826.1	1.9	0.7	1.3
Peru	3,554.4	3,802.6	6,459.9	0.7	5.4	3.0
Venezuela	4,036.4	6,180.2	6,443.8	4.4	0.4	2.4
Total medium 4	12,574.1	16,730.2	22,296.9	2.9	2.9	2.9
Bolivia	525.2	669.0	888.7	2.4	2.9	2.7
Costa Rica	514.1	667.8	1,140.6	2.6	5.5	4.1
Ecuador	704.7	1,068.2	2,040.4	4.2	6.7	5.5
El Salvador	549.1	373.1	367.5	-3.8	-0.2	-2.0
Guatemala	178.2	408.0	778.1	8.6	6.7	7.6
Honduras	179.9	271.4	532.2	4.2	7.0	5.6
Jamaica	396.4	556.0	462.5	3.4	-1.8	0.8
Nicaragua	233.0	178.6	216.7	-2.6	2.0	-0.4
Panama	357.2	357.3	401.2	0.0	1.2	0.6
Paraguay	163.4	487.3	368.8	11.5	-2.7	4.2
Uruguay	1,540.6	1,286.0	1,662.0	-1.8	2.6	0.4
Total small 11	6,212.5	6,867.9	9,891.7	1.0	3.7	2.4

Low technology	Values (1990 US$ million)			Growth rates (%)		
	1980	1990	2000	1980-1990	1990-2000	1980-2000
Argentina	8,945.8	7,864.4	7,901.8	-1.3	0.0	-0.6
Brazil	22,475.4	20,877.7	11,084.2	-0.7	-6.1	-3.5
Mexico	9,666.8	8,974.9	8,812.5	-0.7	-0.2	-0.5
Total big 3	40,989.0	37,724.2	28,320.2	-0.8	-2.8	-1.8
Chile	582.4	561.2	381.6	-0.4	-3.8	-2.1
Colombia	1,358.6	1,704.9	1,180.1	2.3	-3.6	-0.7
Peru	1,735.5	1,191.0	1,224.2	-3.7	0.3	-1.7
Venezuela	978.3	850.0	465.8	-1.4	-5.8	-3.6
Total medium 4	4,637.4	4,251.2	3,166.2	-0.9	-2.9	-1.9
Bolivia	125.2	74.6	78.7	-5.0	0.5	-2.3
Costa Rica	164.4	154.3	140.3	-0.6	-0.9	-0.8
Ecuador	630.1	423.1	181.6	-3.9	-8.1	-6.0
El Salvador	321.4	306.7	505.4	-0.5	5.1	2.3
Guatemala	313.2	229.6	162.3	-3.1	-3.4	-3.2
Honduras	84.2	92.9	54.7	1.0	-5.1	-2.1
Jamaica	79.1	91.6	107.1	1.5	1.6	1.5
Nicaragua	6.8	4.9	3.5	-3.2	-3.4	-3.3
Panama	53.4	56.1	63.8	0.5	1.3	0.9
Paraguay	359.8	294.9	364.5	-2.0	2.1	0.1
Uruguay	663.8	605.5	295.7	-0.9	-6.9	-4.0
Total small 11	2,381.7	2,106.0	1,683.0	-1.2	-2.2	-1.7

TABLE A5 (continued)

Medium & High technology	Values (1990 US$ million)			Growth rates (%)		
	1980	1990	2000	1980-1990	1990-2000	1980-2000
Argentina	16,305.1	15,967.6	27,031.4	-0.2	5.4	2.6
Brazil	52,312.7	55,128.9	69,317.1	0.5	2.3	1.4
Mexico	16,443.8	22,035.7	38,066.5	3.0	5.6	4.3
Total big 3	84,857.6	93,447.4	134,691.8	1.0	3.7	2.3
Chile	1,756.6	1,904.2	2,690.0	0.8	3.5	2.2
Colombia	1,692.0	2,756.0	2,102.2	5.0	-2.7	1.1
Peru	4,009.6	2,818.1	2,927.4	-3.5	0.4	-1.6
Venezuela	2,008.2	2,778.5	3,871.9	3.3	3.4	3.3
Total medium 4	9,488.7	10,270.9	11,586.2	0.8	1.2	1.0
Bolivia	232.9	82.2	157.6	-9.9	6.7	-1.9
Costa Rica	213.4	284.3	693.7	2.9	9.3	6.1
Ecuador	641.6	577.1	272.9	-1.1	-7.2	-4.2
El Salvador	274.8	477.1	720.4	5.7	4.2	4.9
Guatemala	675.5	513.5	518.9	-2.7	0.1	-1.3
Honduras	66.7	79.1	30.5	1.7	-9.1	-3.8
Jamaica	136.0	176.9	129.6	2.7	-3.1	-0.2
Nicaragua	8.4	3.8	4.4	-7.5	1.3	-3.2
Panama	57.9	88.7	177.6	4.4	7.2	5.8
Paraguay	211.8	127.5	219.1	-4.9	5.6	0.2
Uruguay	659.7	709.0	495.3	0.7	-3.5	-1.4
Total small 11	2,727.5	2,801.9	2,845.0	0.3	0.2	0.2

TABLE A6
TECHNOLOGICAL STRUCTURE OF MVA IN LAC 18 (%)

	1980			1990			2000		
	RB	LT	MHT	RB	LT	MHT	RB	LT	MHT
Argentina	45.0	19.5	35.5	37.1	20.8	42.2	24.4	20.9	54.7
Brazil	30.1	21.0	48.9	26.9	20.1	53.0	30.7	10.7	58.6
Mexico	35.6	23.8	40.6	38.0	18.0	44.1	33.1	17.6	49.3
Total big 3	35.0	21.2	43.9	31.6	19.7	48.7	30.2	14.8	55.0
Chile	46.6	13.3	40.1	56.1	10.0	33.9	62.6	6.8	30.6
Colombia	49.1	22.6	28.2	44.4	21.3	34.4	55.0	14.7	30.2
Peru	38.2	18.7	43.1	48.7	15.2	36.1	58.0	15.7	26.3
Venezuela	57.5	13.9	28.6	63.0	8.7	28.3	59.5	4.7	35.8
Total medium 4	47.1	17.4	35.5	53.5	13.6	32.9	59.1	10.1	30.7
Bolivia	59.5	14.2	26.4	81.0	9.0	10.0	76.8	9.5	13.6
Costa Rica	57.6	18.4	23.9	60.4	13.9	25.7	54.3	12.7	33.0
Ecuador	35.7	31.9	32.5	51.6	20.5	27.9	80.5	8.8	10.8
El Salvador	47.9	28.1	24.0	32.3	26.5	41.2	19.0	43.7	37.3
Guatemala	15.3	26.8	57.9	35.4	19.9	44.6	51.5	14.1	34.4
Honduras	54.4	25.4	20.2	61.2	20.9	17.8	82.9	12.3	4.8
Jamaica	64.8	12.9	22.2	67.4	11.1	21.5	68.0	13.0	19.0
Nicaragua	93.9	2.7	3.4	95.3	2.6	2.1	96.2	1.8	1.9
Panama	76.2	11.4	12.4	71.2	11.2	17.7	60.5	12.7	26.8
Paraguay	22.2	49.0	28.8	53.6	32.4	14.0	37.6	40.1	22.3
Uruguay	53.8	23.2	23.0	49.5	23.3	27.3	68.3	11.4	20.3
Total small 11	54.9	21.0	24.1	58.3	17.9	23.8	66.6	14.3	19.1

Source: UNIDO database.

TABLE A7
MANUFACTURED EXPORTS BY LAC 18

All manufacturing	Values (Current US$ million)			Growth rates (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Argentina	3,578	6,867	13,309	7.5	6.8	7.2	0.29	0.26	0.27
Brazil	12,550	22,159	40,603	6.5	6.2	6.4	1.02	0.84	0.82
Mexico	6,076	13,722	144,288	9.5	26.5	18.1	0.49	0.52	2.93
Total big 3	22,204	42,748	198,200	7.5	16.6	12.2	1.80	1.62	4.02
Chile	2,214	5,377	11,017	10.4	7.4	8.8	0.18	0.20	0.22
Colombia	928	2,239	5,473	10.3	9.3	9.8	0.08	0.08	0.11
Peru	1,182	1,957	3,263	5.8	5.2	5.5	0.10	0.07	0.07
Venezuela	5,475	2,913	11,974	-6.8	15.2	4.2	0.44	0.11	0.24
Total medium 4	9,798	12,486	31,728	2.7	9.8	6.4	0.79	0.47	0.64
Bolivia	348	277	608	-2.5	8.2	3.0	0.03	0.01	0.01
Costa Rica	367	486	4,035	3.2	23.6	13.4	0.03	0.02	0.08
Ecuador	364	295	1,120	-2.3	14.3	6.1	0.03	0.01	0.02
El Salvador	160	198	925	2.4	16.7	9.7	0.01	0.01	0.02
Guatemala	443	486	1,291	1.0	10.3	5.8	0.04	0.02	0.03
Honduras	187	123	335	-4.6	10.6	3.1	0.02	0.00	0.01
Jamaica	181	293	420	5.5	3.7	4.5	0.01	0.01	0.01
Nicaragua	115	75	148	-4.7	7.1	1.3	0.01	0.00	0.00
Panama	654	657	1,411	0.1	7.9	4.1	0.05	0.02	0.03
Paraguay	161	146	288	-1.0	7.0	3.1	0.01	0.01	0.01
Uruguay	572	806	1,366	3.9	5.4	4.7	0.05	0.03	0.03
Total small 11	3,551	3,842	11,947	0.9	12.0	6.6	0.29	0.15	0.24

Resource based	Values (Current US$ million)			Growth rates (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Argentina	2,078	3,865	5,809	7.1	4.2	5.6	0.62	0.69	0.64
Brazil	5,425	8,204	13,322	4.7	5.0	4.8	1.63	1.47	1.46
Mexico	1,666	3,349	9,596	8.1	11.1	9.7	0.50	0.60	1.05
Total big 3	9,169	15,418	28,727	5.9	6.4	6.2	2.75	2.77	3.15
Chile	2,072	4,874	9,260	10.0	6.6	8.2	0.62	0.88	1.02
Colombia	332	879	1,921	11.4	8.1	9.7	0.10	0.16	0.21
Peru	822	1,375	2,254	5.9	5.1	5.5	0.25	0.25	0.25
Venezuela	5,183	1,322	9,849	-14.1	22.2	3.4	1.56	0.24	1.08
Total medium 4	8,409	8,450	23,284	0.1	10.7	5.5	2.53	1.52	2.55
Bolivia	312	245	251	-2.6	0.2	-1.1	0.09	0.04	0.03
Costa Rica	109	165	607	4.7	13.9	9.5	0.03	0.03	0.07
Ecuador	320	249	796	-2.8	12.3	4.9	0.10	0.04	0.09
El Salvador	30	53	311	6.5	19.4	13.1	0.01	0.01	0.03
Guatemala	178	242	508	3.5	7.7	5.7	0.05	0.04	0.06
Honduras	124	90	155	-3.5	5.5	1.2	0.04	0.02	0.02
Jamaica	129	168	212	3.0	2.3	2.6	0.04	0.03	0.02
Nicaragua	67	54	112	-2.2	7.5	2.8	0.02	0.01	0.01
Panama	227	354	906	5.1	9.9	7.6	0.07	0.06	0.10
Paraguay	139	83	156	-5.6	6.6	0.6	0.04	0.01	0.02
Uruguay	148	220	449	4.5	7.4	6.0	0.04	0.04	0.05
Total small 11	1,781	1,922	4,462	0.8	8.8	5.0	0.54	0.35	0.49

TABLE A7 (continued)

Low technology	Values (Current US$ million)			Growth rates (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Argentina	643	1,478	2,216	9.7	4.1	6.7	0.27	0.29	0.26
Brazil	2,278	4,533	6,545	7.9	3.7	5.7	0.97	0.88	0.76
Mexico	926	1,871	25,337	8.1	29.8	19.0	0.39	0.36	2.96
Total big 3	3,847	7,882	34,098	8.3	15.8	12.2	1.63	1.53	3.98
Chile	32	201	548	22.7	10.6	16.2	0.01	0.04	0.06
Colombia	416	900	1,483	8.9	5.1	6.9	0.18	0.17	0.17
Peru	263	484	810	7.0	5.3	6.1	0.11	0.09	0.09
Venezuela	59	711	643	31.9	-1.0	13.4	0.02	0.14	0.08
Total medium 4	770	2,295	3,484	12.9	4.3	8.3	0.33	0.44	0.41
Bolivia	19	31	144	5.2	16.8	11.2	0.01	0.01	0.02
Costa Rica	127	186	776	4.3	15.3	10.0	0.05	0.04	0.09
Ecuador	19	29	149	4.7	17.7	11.4	0.01	0.01	0.02
El Salvador	61	90	377	4.4	15.5	10.1	0.03	0.02	0.04
Guatemala	122	111	383	-1.0	13.2	6.2	0.05	0.02	0.04
Honduras	38	25	95	-4.2	14.0	5.0	0.02	0.00	0.01
Jamaica	31	102	161	14.0	4.7	9.0	0.01	0.02	0.02
Nicaragua	24	13	17	-7.2	3.2	-1.8	0.01	0.00	0.00
Panama	110	189	358	6.2	6.6	6.4	0.05	0.04	0.04
Paraguay	20	52	116	11.3	8.3	9.7	0.01	0.01	0.01
Uruguay	337	429	586	2.7	3.2	3.0	0.14	0.08	0.07
Total small 11	909	1,257	3,162	3.7	9.7	6.8	0.39	0.24	0.37

Medium technology	Values (Current US$ million)			Growth rates (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Argentina	679	1,304	4,434	7.5	13.0	10.4	0.13	0.12	0.25
Brazil	3,979	8,063	13,778	8.2	5.5	6.8	0.78	0.75	0.77
Mexico	1,428	7,318	62,427	19.9	23.9	22.0	0.28	0.68	3.51
Total big 3	6,085	16,686	80,639	11.9	17.1	14.6	1.19	1.55	4.53
Chile	97	254	1,085	11.3	15.6	13.6	0.02	0.02	0.06
Colombia	143	429	1,731	13.0	15.0	14.0	0.03	0.04	0.10
Peru	83	86	153	0.5	5.9	3.3	0.02	0.01	0.01
Venezuela	223	845	1,382	16.0	5.0	10.1	0.04	0.08	0.08
Total medium 4	545	1,614	4,351	12.8	10.4	11.6	0.11	0.15	0.24
Bolivia	17	1	54	-24.5	44.5	6.3	0.00	0.00	0.00
Costa Rica	94	88	649	-0.7	22.1	10.7	0.02	0.01	0.04
Ecuador	20	12	139	-5.9	28.2	10.7	0.00	0.00	0.01
El Salvador	22	36	158	5.6	15.8	10.9	0.00	0.00	0.01
Guatemala	83	74	299	-1.4	15.0	6.9	0.02	0.01	0.02
Honduras	24	6	77	-13.5	28.2	6.4	0.00	0.00	0.00
Jamaica	17	18	46	1.0	9.7	5.5	0.00	0.00	0.00
Nicaragua	22	7	16	-11.7	8.4	-1.6	0.00	0.00	0.00
Panama	264	68	68	-14.0	0.0	-6.9	0.05	0.01	0.00
Paraguay	1	11	9	27.1	-2.2	10.7	0.00	0.00	0.00
Uruguay	64	147	294	9.6	7.2	8.3	0.01	0.01	0.02
Total small 11	629	469	1,809	-3.2	14.5	5.7	0.12	0.04	0.10

TABLE A7 (continued)

High technology	Values (Current US$ million)			Growth rates (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Argentina	177	219	850	2.4	14.5	8.6	0.10	0.04	0.06
Brazil	869	1,360	6,959	5.1	17.7	11.6	0.51	0.28	0.50
Mexico	2,057	1,183	46,928	-6.0	44.5	17.9	1.20	0.24	3.40
Total big 3	3,103	2,761	54,736	-1.3	34.8	16.3	1.81	0.56	3.97
Chile	13	49	124	15.9	9.8	12.7	0.01	0.01	0.01
Colombia	37	32	338	-1.6	26.7	12.4	0.02	0.01	0.02
Peru	15	12	46	-2.5	14.8	6.2	0.01	0.00	0.00
Venezuela	10	36	100	14.9	10.8	12.8	0.01	0.01	0.01
Total medium 4	74	128	608	6.2	16.9	11.7	0.04	0.03	0.04
Bolivia	0	0	159	-6.8	133.5	51.2	0.00	0.00	0.01
Costa Rica	37	46	2,003	2.5	45.8	23.4	0.02	0.01	0.15
Ecuador	5	6	36	2.9	19.5	11.3	0.00	0.00	0.00
El Salvador	48	19	78	-9.8	15.3	2.7	0.03	0.00	0.01
Guatemala	60	60	102	0.0	5.5	2.9	0.03	0.01	0.01
Honduras	2	1	9	-11.2	30.7	8.8	0.00	0.00	0.00
Jamaica	3	4	0	2.2	-20.9	-10.7	0.00	0.00	0.00
Nicaragua	1	0	2	-12.6	18.7	2.7	0.00	0.00	0.00
Panama	54	47	80	-1.5	5.5	2.1	0.03	0.01	0.01
Paraguay	0	0	7	-11.1	45.9	15.4	0.00	0.00	0.00
Uruguay	23	11	38	-8.3	13.6	2.7	0.01	0.00	0.00
Total small 11	232	193	2,515	-2.0	29.2	13.4	0.14	0.04	0.18

Source: Calculated from UN Comtrade.

TABLE A8
STRUCTURE OF MANUFACTURED EXPORTS IN 18 LAC ECONOMIES (%)

	Resource Based			Low Tech			Medium Tech			High Tech		
	1981	1990	2000	1981	1990	2000	1981	1990	2000	1981	1990	2000
Argentina	58.1	56.3	43.6	18.0	21.5	16.6	19.0	19.0	33.3	5.0	3.2	6.4
Brazil	43.2	37.0	32.8	18.2	20.5	16.1	31.7	36.4	33.9	6.9	6.1	17.1
Mexico	27.4	24.4	6.7	15.2	13.6	17.6	23.5	53.3	43.3	33.9	8.6	32.5
Total big 3	41.3	36.1	14.5	17.3	18.4	17.2	27.4	39.0	40.7	14.0	6.5	27.6
Chile	93.6	90.6	84.1	1.4	3.7	5.0	4.4	4.7	9.8	0.6	0.9	1.1
Colombia	35.8	39.3	35.1	44.9	40.2	27.1	15.4	19.2	31.6	3.9	1.4	6.2
Peru	69.5	70.3	69.1	22.2	24.7	24.8	7.0	4.4	4.7	1.2	0.6	1.4
Venezuela	94.7	45.4	82.3	1.1	24.4	5.4	4.1	29.0	11.5	0.2	1.2	0.8
Total medium 4	85.8	67.7	73.4	7.9	18.4	11.0	5.6	12.9	13.7	0.8	1.0	1.9
Bolivia	89.6	88.5	41.2	5.6	11.0	23.8	4.9	0.5	8.8	0.0	0.0	26.2
Costa Rica	29.7	34.0	15.0	34.7	38.4	19.2	25.7	18.1	16.1	10.0	9.5	49.6
Ecuador	87.9	84.2	71.1	5.3	9.8	13.3	5.5	3.9	12.4	1.3	2.1	3.2
El Salvador	18.6	26.6	33 .6	37.8	45.4	40.8	13.9	18.4	17.1	29.7	9.6	8.5
Guatemala	40.2	49.7	39.3	27.5	22.9	29.6	18.8	15.1	23.1	13.5	12.3	7.9
Honduras	66.3	73.5	46.2	20.1	20.8	28.3	12.7	5.2	22.9	1.0	0.5	2.7
Jamaica	71.5	57.5	50.5	17.3	34.9	38.4	9.3	6.3	11.0	1.8	1.4	0.1
Nicaragua	58.2	73.0	75.9	21.4	16.8	11.6	19.3	9.7	10.9	1.2	0.5	1.5
Panama	34.7	53.8	64.2	16.8	28.7	25.4	40.3	10.3	4.8	8.2	7.1	5.7
Paraguay	86.5	56.5	54.1	12.4	35.8	40.2	0.8	7.6	3.1	0.3	0.1	2.6
Uruguay	25.8	27.2	32.8	58.9	53.2	42.9	11.2	18.2	21.5	4.0	1.3	2.8
Total small 11	50.2	50.0	37.3	25.6	32.7	26.5	17.7	12.2	15.1	6.5	5.0	21.1

Source: Calculated from UN Comtrade.

TABLE A9
WORLD MARKET SHARES IN LAC EXPORTS BY TECHNOLOGICAL SUBCATEGORIES (%)

Big 3	Mexico		Brazil		Argentina		Total big 3	
	1990	2000	1990	2000	1990	2000	1990	2000
Agro-based	0.38	1.20	1.91	2.21	0.91	0.90	3.19	4.31
Mineral-based	0.70	0.91	1.71	1.40	0.48	0.50	2.89	2.81
Fashion	0.24	3.18	1.10	0.97	0.37	0.33	1.71	4.48
Other LT	0.47	2.81	0.71	0.59	0.23	0.20	1.40	3.60
Automotive	1.30	5.17	0.72	0.91	0.07	0.36	2.09	6.43
Process	0.76	1.72	1.56	1.30	0.34	0.41	2.66	3.43
Engineering	0.16	2.11	0.30	0.30	0.05	0.06	0.51	2.48
Electronics	0.28	4.14	0.19	0.28	0.05	0.02	0.52	4.44
Other HT	0.17	1.07	0.47	1.22	0.04	0.19	0.68	2.49

Medium 4	Peru		Venezuela		Colombia		Chile		Total medium 4	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Agro-based	0.05	0.09	0.08	0.09	0.09	0.19	0.41	0.92	0.64	1.29
Mineral-based	0.40	0.26	0.21	1.87	0.24	0.25	0.41	0.72	1.25	3.10
Fashion	0.15	0.17	0.07	0.01	0.34	0.25	0.05	0.05	0.60	0.49
Other LT	0.05	0.04	0.20	0.12	0.05	0.11	0.03	0.08	0.33	0.35
Automotive	0.00	0.00	0.02	0.04	0.00	0.04	0.01	0.04	0.03	0.11
Process	0.03	0.03	0.26	0.29	0.13	0.28	0.08	0.18	0.49	0.77
Engineering	0.00	0.00	0.03	0.01	0.01	0.02	0.01	0.02	0.05	0.05
Electronics	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.02	0.02
Other HT	0.00	0.01	0.00	0.02	0.01	0.08	0.03	0.02	0.04	0.13

Small 11	Bolivia		Costa Rica		Ecuador		El Salvador		Guatemala	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Agro-based	0.039	0.040	0.052	0.132	0.037	0.125	0.013	0.055	0.088	0.119
Mineral-based	0.102	0.057	0.008	0.017	0.058	0.065	0.003	0.016	0.006	0.014
Fashion	0.013	0.018	0.036	0.121	0.006	0.018	0.024	0.043	0.027	0.028
Other LT	0.000	0.016	0.035	0.065	0.006	0.017	0.012	0.045	0.018	0.057
Automotive	0.000	0.002	0.000	0.000	0.000	0.011	0.000	0.000	0.001	0.002
Process	0.000	0.003	0.019	0.034	0.002	0.012	0.011	0.030	0.023	0.056
Engineering	0.000	0.004	0.008	0.064	0.001	0.004	0.002	0.004	0.002	0.006
Electronic	0.000	0.000	0.004	0.175	0.001	0.001	0.001	0.002	0.002	0.002
Other HT	0.000	0.047	0.022	0.053	0.001	0.009	0.010	0.018	0.035	0.026

Small 11	Honduras		Jamaica		Nicaragua		Panama		Paraguay	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Agro-based	0.022	0.038	0.056	0.049	0.018	0.025	0.025	0.032	0.024	0.038
Mineral-based	0.004	0.011	0.282	0.159	0.003	0.004	0.003	0.014	0.008	0.003
Fashion	0.006	0.010	0.038	0.040	0.001	0.003	0.012	0.008	0.023	0.026
Other LT	0.004	0.012	0.005	0.002	0.003	0.001	0.004	0.009	0.000	0.003
Automotive	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Process	0.002	0.014	0.006	0.011	0.003	0.002	0.003	0.003	0.003	0.002
Engineering	0.000	0.002	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.000
Electronic	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Other HT	0.000	0.001	0.002	0.000	0.000	0.000	0.005	0.005	0.000	0.001

Small 11	Uruguay		Total small 11	
	1990	2000	1990	2000
Agro-based	0.065	0.091	0.889	2.087
Mineral-based	0.019	0.021	0.795	0.664
Fashion	0.176	0.138	0.254	0.473
Other LT	0.009	0.016	0.135	0.331
Automotive	0.006	0.029	0.061	0.159
Process	0.045	0.024	0.106	0.278
Engineering	0.003	0.005	0.036	0.126
Electronic	0.001	0.000	0.009	0.180
Other HT	0.004	0.010	0.107	0.201

Source: Calculated from UN Comtrade.

TABLE A10
WORLD MARKET SHARES IN LAC EXPORTS BY TECHNOLOGICAL SUBCATEGORIES

Technological subcategories	Total					
	Value (US$ million)			**World Market Share** (%)		
	1990	2000	2001	1990	2000	2001
Agro-based	250,521,513	382,298,777	376,007,449	100	100	100
Mineral-based	286,230,355	534,961,417	492,013,140	100	100	100
Fashion	226,915,985	363,691,585	364,079,756	100	100	100
Other LT	274,773,113	485,559,699	472,808,558	100	100	100
Automotive	300,928,008	532,897,787	531,292,306	100	100	100
Processing	242,314,794	405,623,371	389,355,263	100	100	100
Engineering	497,336,447	855,651,262	836,746,455	100	100	100
Electronic	328,368,974	1,047,495,086	916,907,389	100	100	100
Other HT	151,645,410	332,159,201	357,314,594	100	100	100

Technological subcategories	Chile						Mexico					
	Value (US$ million)			**World Market Share** (%)			**Value** (US$ million)			**World Market Share** (%)		
	1990	2000	2001	1990	2000	2001	1990	2000	2001	1990	2000	2001
Agro-based	1,056,065	3,502,242	3,925,881	0.42	0.92	1.04	974,071	4,541,963	4,331,000	0.39	1.19	1.15
Mineral-based	3,817,733	5,758,014	5,618,645	1.33	1.08	1.14	2,375,174	5,053,921	4,659,285	0.83	0.94	0.95
Fashion	103,994	177,197	189,911	0.05	0.05	0.05	556,781	11,770,956	10,582,401	0.25	3.24	2.91
Other LT	96,879	370,674	410,261	0.04	0.08	0.09	1,314,581	13,565,706	13,680,306	0.48	2.79	2.89
Automotive	19,271	203,397	200,126	0.01	0.04	0.04	3,068,353	27,473,285	27,620,300	1.02	5.16	5.20
Processing	188,805	652,555	759,919	0.08	0.16	0.20	1,684,586	6,269,834	5,521,327	0.70	1.55	1.42
Engineering	45,518	229,138	265,506	0.01	0.03	0.03	2,564,283	28,676,691	27,363,471	0.52	3.35	3.27
Electronic	8,907	46,946	45,789	0.00	0.00	0.00	927,409	43,364,093	42,315,476	0.28	4.14	4.62
Other HT	39,646	76,670	84,191	0.03	0.02	0.02	255,738	3,564,012	4,240,302	0.17	1.07	1.19

Technological subcategories	Argentina						Brazil					
	Value (US$ million)			**World Market Share** (%)			**Value** (US$ million)			**World Market Share** (%)		
	1990	2000	2001	1990	2000	2001	1990	2000	2001	1990	2000	2001
Agro-based	2,319,504	3,436,610	3,230,284	0.93	0.90	0.86	4,877,654	8,388,634	8,987,403	1.95	2.19	2.39
Mineral-based	1,545,706	2,372,813	2,434,396	0.54	0.44	0.49	3,326,036	4,933,219	4,842,141	1.16	0.92	0.98
Fashion	843,749	1,238,201	1,218,975	0.37	0.34	0.33	2,514,877	3,603,765	3,746,200	1.11	0.99	1.03
Other LT	634,568	977,690	974,257	0.23	0.20	0.21	2,017,858	2,941,320	2,836,948	0.73	0.61	0.60
Automotive	174,310	1,941,828	1,972,192	0.06	0.36	0.37	1,564,829	4,332,021	4,304,070	0.52	0.81	0.81
Processing	749,767	1,506,278	1,749,311	0.31	0.37	0.45	3,432,150	4,725,764	4,208,504	1.42	1.17	1.08
Engineering	379,863	974,146	974,643	0.08	0.11	0.12	3,066,193	4,719,901	4,638,578	0.62	0.55	0.55
Electronic	155,252	214,000	211,259	0.05	0.02	0.02	643,378	2,899,419	3,091,490	0.20	0.28	0.34
Other HT	63,459	635,696	598,665	0.04	0.19	0.17	716,188	4,059,136	4,070,064	0.47	1.22	1.14

TABLE A10 (continued)

Technological subcategories	Paraguay						Uruguay					
	Value (US$ million)			**World Market Share** (%)			**Value** (US$ million)			**World Market Share** (%)		
	1990	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**
Agro-based	60,144	144,145	148,366	0.02	0.04	0.04	165,816	344,903	362,802	0.07	0.09	0.10
Mineral-based	22,396	11,646	12,195	0.01	0.00	0.00	53,788	103,653	97,991	0.02	0.02	0.02
Fashion	51,667	95,894	90,590	0.02	0.03	0.02	402,785	510,248	503,653	0.18	0.14	0.14
Other LT	629	20,082	18,997	0.00	0.00	0.00	26,376	75,342	76,086	0.01	0.02	0.02
Automotive	616	112	14	0.00	0.00	0.00	18,022	155,323	104,077	0.01	0.03	0.02
Processing	9,793	6,984	9,445	0.00	0.00	0.00	113,206	97,365	83,148	0.05	0.02	0.02
Engineering	747	1,841	3,896	0.00	0.00	0.00	15,398	41,551	35,054	0.00	0.00	0.00
Electronic	15	2,490	1,612	0.00	0.00	0.00	4,163	4,821	3,169	0.00	0.00	0.00
Other HT	156	4,961	7,353	0.00	0.00	0.00	6,429	33,203	32,249	0.00	0.01	0.01

Technological subcategories	Costa Rica						El Salvador					
	Value (US$ million)			**World Market Share** (%)			**Value** (US$ million)			**World Market Share** (%)		
	1990	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**
Agro-based	133,398	500,498	494,197	0.05	0.13	0.13	33,684	208,243	255,234	0.01	0.05	0.07
Mineral-based	31,862	106,330	110,608	0.01	0.02	0.02	18,961	102,755	113,147	0.01	0.02	0.02
Fashion	87,896	462,609	446,428	0.04	0.13	0.12	55,640	160,370	152,899	0.02	0.04	0.04
Other LT	98,549	313,739	372,635	0.04	0.06	0.08	33,991	216,847	227,553	0.01	0.04	0.05
Automotive	380	559	892	0.00	0.00	0.00	151	945	2,725	0.00	0.00	0.00
Processing	48,650	142,411	142,235	0.02	0.04	0.04	28,687	122,414	128,827	0.01	0.03	0.03
Engineering	39,117	505,913	622,032	0.01	0.06	0.07	7,552	34,742	37,010	0.00	0.00	0.00
Electronic	12,759	1,827,662	975,705	0.00	0.17	0.11	3,403	18,687	21,606	0.00	0.00	0.00
Other HT	33,259	174,929	227,712	0.02	0.05	0.06	15,481	59,793	58,444	0.01	0.02	0.02

Technological subcategories	Guatemala						Honduras					
	Value (US$ million)			**World Market Share** (%)			**Value** (US$ million)			**World Market Share** (%)		
	1990	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**
Agro-based	224,964	453,839	509,952	0.09	0.12	0.14	55,277	164,778	207,008	0.02	0.04	0.06
Mineral-based	16,780	54,135	63,259	0.01	0.01	0.01	34,939	68,310	17,943	0.01	0.01	0.00
Fashion	61,822	105,110	91,637	0.03	0.03	0.03	14,630	54,131	107,150	0.01	0.01	0.03
Other LT	49,384	277,656	291,516	0.02	0.06	0.06	10,850	84,627	63,793	0.00	0.02	0.01
Automotive	1,742	9,416	9,755	0.00	0.00	0.00	276	1,440	5,354	0.00	0.00	0.00
Processing	62,753	239,562	286,978	0.03	0.06	0.07	5,672	69,356	67,430	0.00	0.02	0.02
Engineering	9,159	49,694	49,797	0.00	0.01	0.01	452	25,378	12,803	0.00	0.00	0.00
Electronic	6,347	15,715	23,752	0.00	0.00	0.00	181	8,151	2,673	0.00	0.00	0.00
Other HT	53,528	86,128	74,478	0.04	0.03	0.02	434	4,926	2,911	0.00	0.00	0.00

Technological subcategories	Nicaragua						Panama					
	Value (US$ million)			**World Market Share** (%)			**Value** (US$ million)			**World Market Share** (%)		
	1990	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**
Agro-based	46,414	96,578	104,760	0.02	0.03	0.03	64,806	121,258	111,878	0.03	0.03	0.03
Mineral-based	7,958	15,600	14,877	0.00	0.00	0.00	8,164	65,581	73,854	0.00	0.01	0.02
Fashion	2,968	10,515	10,600	0.00	0.00	0.00	26,815	28,659	23,694	0.01	0.01	0.01
Other LT	9,555	6,703	13,078	0.00	0.00	0.00	12,143	45,128	40,205	0.00	0.01	0.01
Automotive	2	618	803	0.00	0.00	0.00	1,469	780	661	0.00	0.00	0.00
Processing	7,065	7,951	9,945	0.00	0.00	0.00	7,289	13,138	5,180	0.00	0.00	0.00
Engineering	140	7,616	12,962	0.00	0.00	0.00	5,164	62	750	0.00	0.00	0.00
Electronic	253	1,067	1,224	0.00	0.00	0.00	1,988	36	696	0.00	0.00	0.00
Other HT	151	1,173	1,496	0.00	0.00	0.00	7,656	16,420	15,405	0.01	0.00	0.00

TABLE A10 (continued)

Technological subcategories	Bolivia						Colombia					
	Value (US$ million)			**World Market Share** (%)			**Value** (US$ million)			**World Market Share** (%)		
	1990	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**
Agro-based	100,313	154,112	158,440	0.04	0.04	0.04	235,602	710,998	814,118	0.09	0.19	0.22
Mineral-based	144,817	96,508	74,188	0.05	0.02	0.02	643,303	1,209,670	1,155,553	0.22	0.23	0.23
Fashion	29,478	67,474	61,510	0.01	0.02	0.02	770,213	938,551	1,000,090	0.34	0.26	0.27
Other LT	1,103	76,991	71,157	0.00	0.02	0.02	129,311	544,658	664,466	0.05	0.11	0.14
Automotive	0	8,461	12,862	0.00	0.00	0.00	8,269	228,691	439,203	0.00	0.04	0.08
Processing	1,160	10,058	11,508	0.00	0.00	0.00	348,152	1,272,555	1,281,358	0.14	0.31	0.33
Engineering	191	35,271	61,708	0.00	0.00	0.01	72,645	230,191	303,429	0.01	0.03	0.04
Electronic	0	4,715	13,043	0.00	0.00	0.00	14,812	76,733	83,018	0.00	0.01	0.01
Other HT	33	154,548	25,933	0.00	0.05	0.01	16,763	260,910	310,039	0.01	0.08	0.09

Technological subcategories	Ecuador						Peru					
	Value (US$ million)			**World Market Share** (%)			**Value** (US$ million)			**World Market Share** (%)		
	1990	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**	**1990**	**2000**	**2001**
Agro-based	93,618	474,623	551,493	0.04	0.12	0.15	130,206	334,292	356,778	0.05	0.09	0.09
Mineral-based	154,951	321,519	204,394	0.05	0.06	0.04	1,244,936	1,919,408	1,729,130	0.43	0.36	0.35
Fashion	13,598	68,003	80,725	0.01	0.02	0.02	345,100	636,466	632,902	0.15	0.18	0.17
Other LT	15,470	80,693	101,121	0.01	0.02	0.02	138,753	173,969	190,490	0.05	0.04	0.04
Automotive	1,171	60,267	99,698	0.00	0.01	0.02	2,018	6,433	9,528	0.00	0.00	0.00
Processing	6,081	48,710	59,049	0.00	0.01	0.02	61,091	101,943	97,542	0.03	0.03	0.03
Engineering	4,374	30,318	41,910	0.00	0.00	0.01	23,273	44,578	96,887	0.00	0.01	0.01
Electronic	4,033	7,417	6,033	0.00	0.00	0.00	6,963	27,555	30,596	0.00	0.00	0.00
Other HT	2,040	28,494	33,232	0.00	0.01	0.01	4,703	18,701	11,463	0.00	0.01	0.00

Technological subcategories	Venezuela					
	Value (US$ million)			**World Market Share** (%)		
	1990	**2000**	**2001**	**1990**	**2000**	**2001**
Agro-based	215,095	338,306	311,062	0.09	0.09	0.08
Mineral-based	1,106,933	9,510,976	7,283,475	0.39	1.78	1.48
Fashion	155,383	51,807	57,175	0.07	0.01	0.02
Other LT	555,481	591,034	519,341	0.20	0.12	0.11
Automotive	70,910	221,544	212,282	0.02	0.04	0.04
Processing	559,048	1,043,989	1,071,963	0.23	0.26	0.28
Engineering	212,750	116,385	131,295	0.04	0.01	0.02
Electronic	30,290	27,895	45,735	0.01	0.00	0.00
Other HT	5,557	72,435	86,702	0.00	0.02	0.02

Contents

ANNEX B

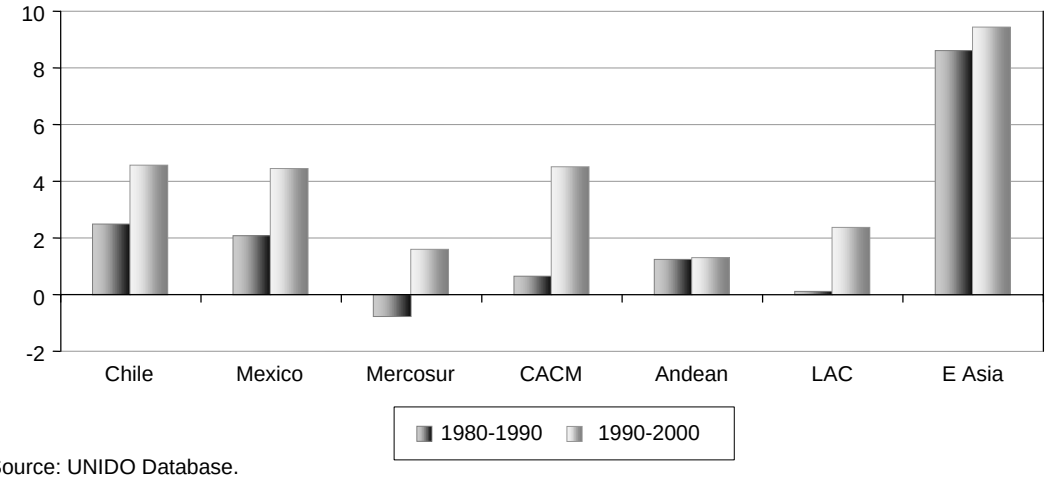
PERFORMANCE WITHIN LAC BY SUB-REGIONAL AGREEMENTS

To consider variations in competitive performance within Latin America's sub-regions, we analyze export data for *17 countries with substantial industrial sectors for 1990-2000.*[19] The countries are divided into 4 groups according to their membership of sub-regional trade agreements. Chile and Mexico are analyzed separately since they are involved in several trade agreements.

- *Mercosur:* Argentina, Brazil, Paraguay and Uruguay.
- *Andean Community:* Bolivia, Colombia, Ecuador, Peru and Venezuela.
- *Central America Common Market (CACM)*: Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama.
- Mexico.
- Chile.

While manufacturing performance in LAC varies by sub-region, growth in the 1990s has been generally higher than in the 1980s (Annex Figure B1 and Annex Table B1). This is encouraging, but the improvements pale in comparison to East Asia, which sustains growth rates of 9-10% per annum in both decades. And the LAC rates in the 1990s are also below those of all other developing regions apart from Sub-Saharan Africa. Figure shows that all sub-regions improved their performance in the 90s. Chile, Mexico and CACM are clearly ahead of the pack, with Costa Rica leading the Central American countries. In Mercosur, Argentina showed the best performance, whereas the manufacturing sector in Uruguay continued to shrink. The Andean Community trailed behind all the subregions, reflecting a dismal performance by Colombia and Venezuela.

FIGURE B1
MVA GROWTH RATES IN 18 LAC ECONOMIES & EAST ASIA (%)

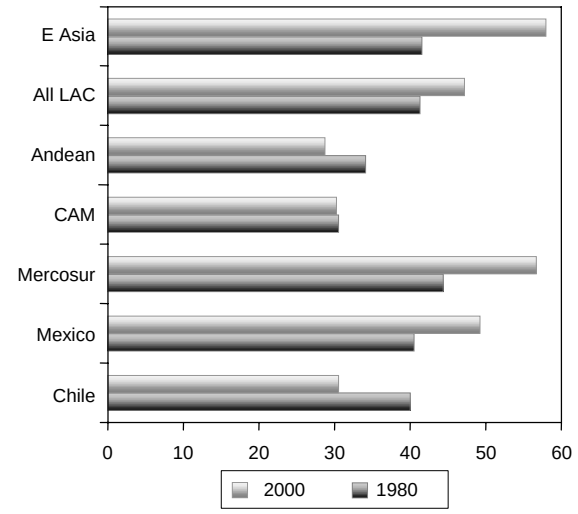


Source: UNIDO Database.

[19] Data used elsewhere in this paper for LAC as a whole include another 8 economies.

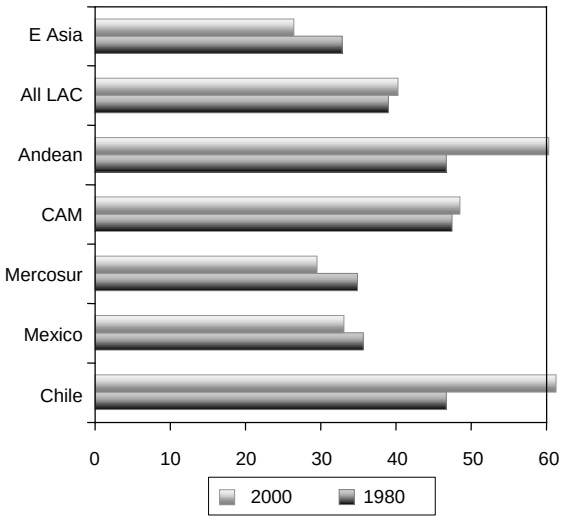
MVA structure in LAC's sub-regions varies according to their size, resource base and industrialization. As Figures B2 and B3 (and Annex Table B2) show, the most advanced structures (with high shares of MHT) are in Mercosur, led by Brazil, and Mexico. The least advanced are in the Andean Community; Chile and CACM lie between these two groups. Except for Mercosur and Mexico, all the other groups and Chile move down the technology scale over the two decades. This move reflects a shift is into RB activities since the share of LT declines in all subregions and countries. The Andean Community, CACM and Chile have by 2000 more than 50% of their MVA derived from RB.

FIGURE B2
SHARE OF MHT IN MVA (%)



Source: UNIDO Database.

FIGURE B3
SHARE OF RB IN MVA (%)

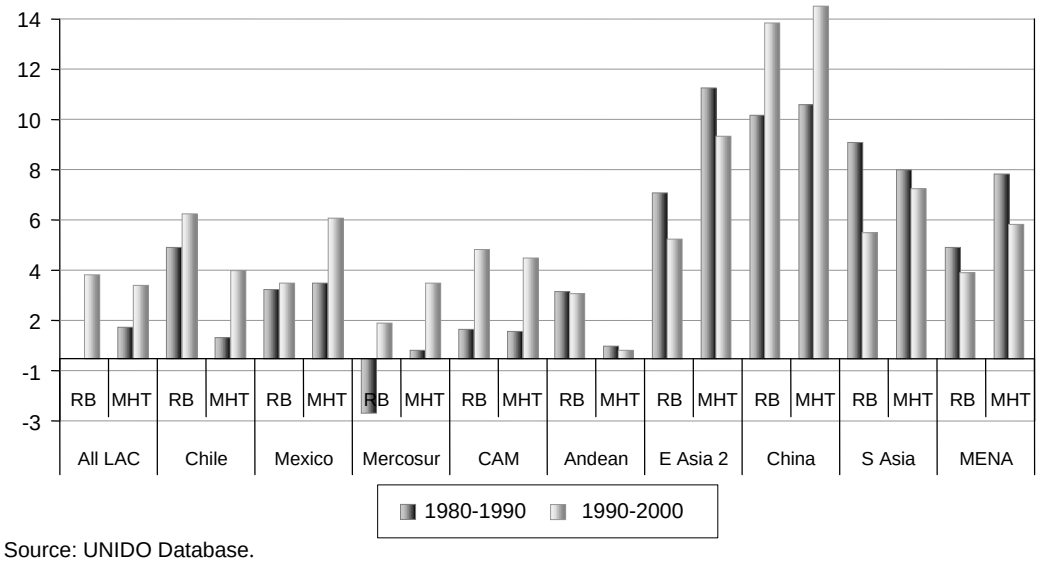


Source: UNIDO Database.

The East Asian picture is very different. The average contribution of RB to MVA is only 26.5% (29.3% for China) and the share declines over time as the region moves into complex activities. Despite its lead in LT exports, the region (including China) sharply reduces the share of LT activities in MVA. It is not the case that the structural shift leads to a neglect of RB manufacturing in Asia. In fact, the growth of RB activities in EA and China (and South Asia and MENA) is actually higher than in LAC - it is only that growth in MHT is far higher (Figure B4).

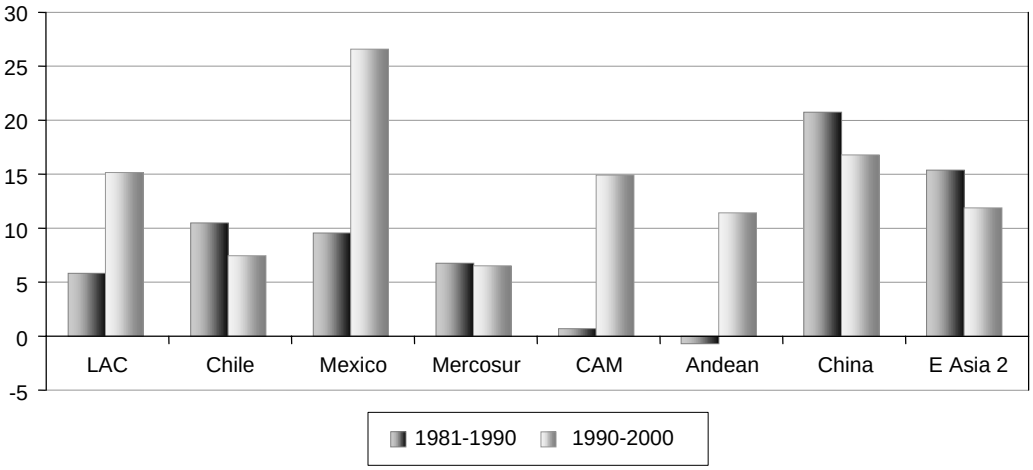
Figures B5 to B13 and Annex Tables B3 and B4 complement the sub-regional analysis presenting some of the data already discussed in the paper in a sub-regional format.

FIGURE B4
GROWTH RATES OF RB & MHT MVA (%)



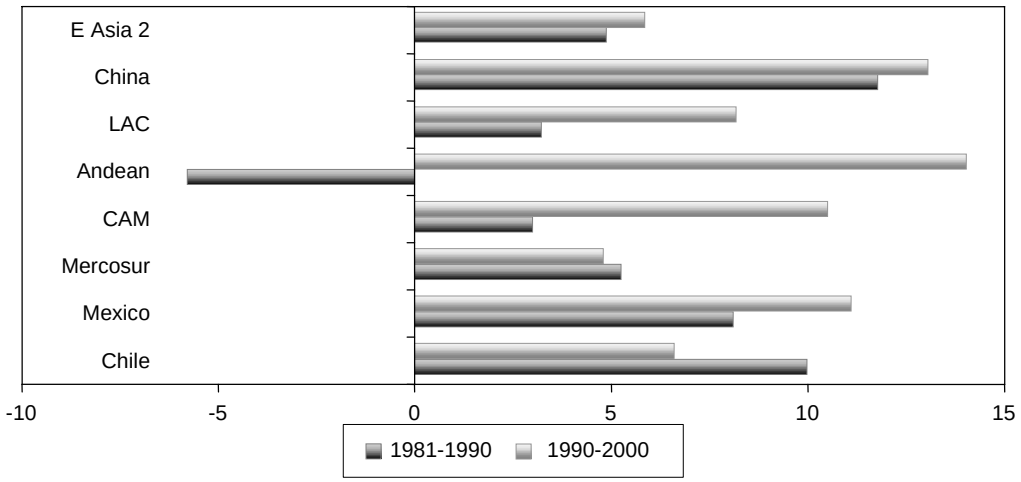
Source: UNIDO Database.

FIGURE B5
GROWTH RATES, ALL MFD EXPORTS, LAC 18 & EAST ASIA (%)



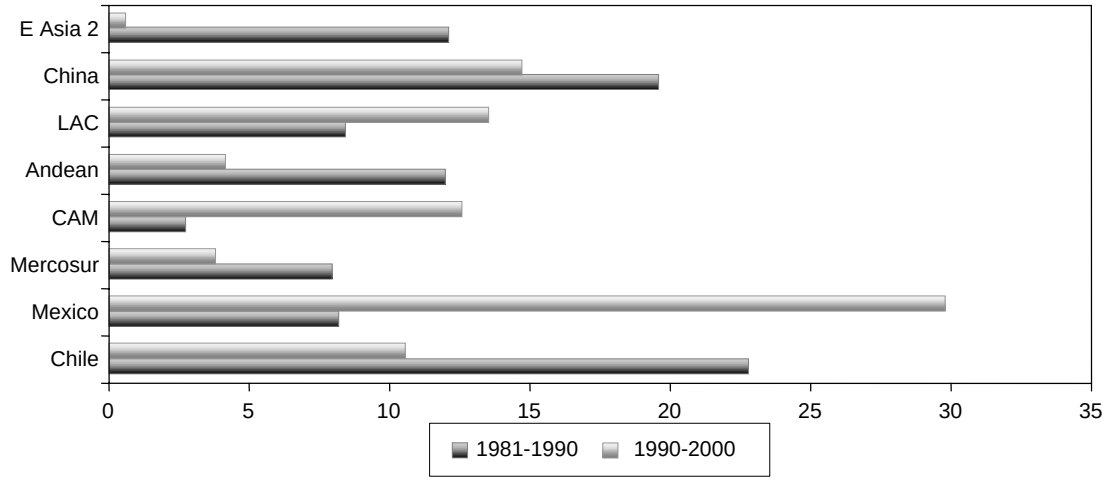
Source: Calculated from UNIDO and COMTRADE data.

FIGURE B6
GROWTH OF RB EXPORTS (%)



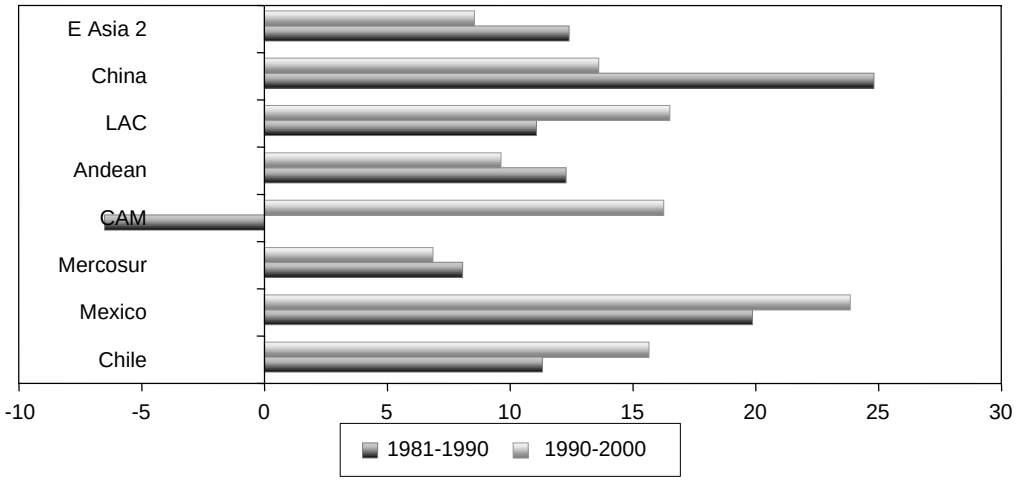
Source: Calculated from UNIDO and COMTRADE data.

FIGURE B7
GROWTH OF LT EXPORTS (%)



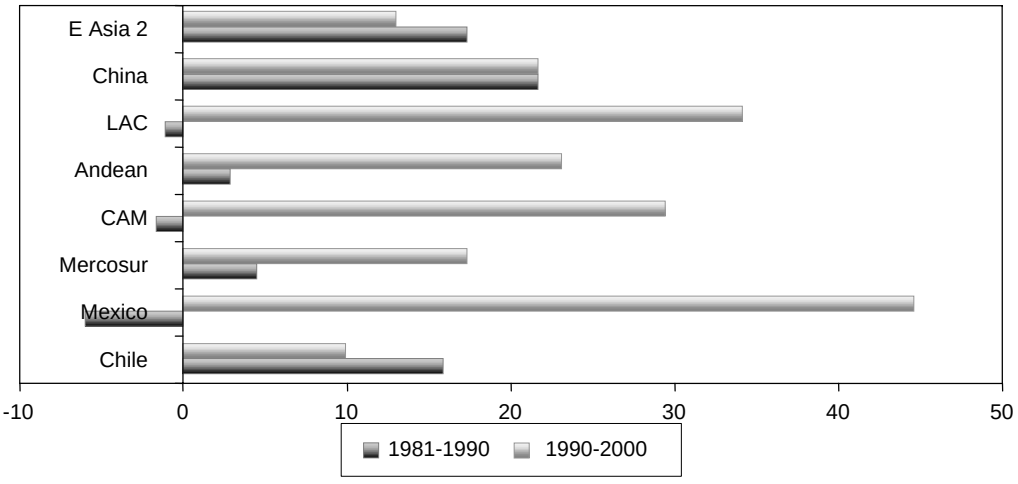
Source: Calculated from UNIDO and COMTRADE data.

FIGURE B8
GROWTH OF MT EXPORTS (%)



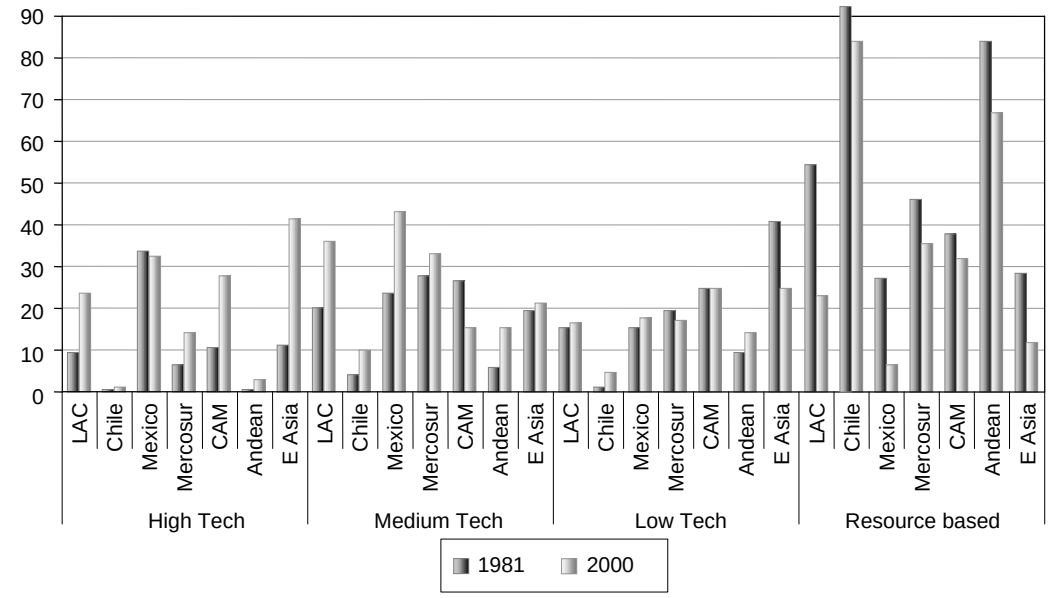
Source: Calculated from UNIDO and COMTRADE data.

FIGURE B9
GROWTH OF HT EXPORTS (%)



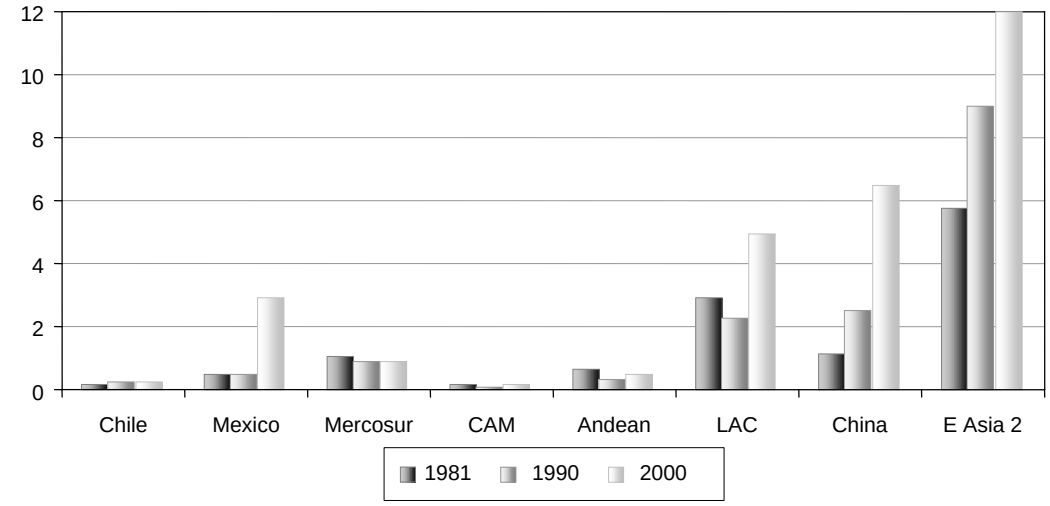
Source: Calculated from UNIDO and COMTRADE data.

FIGURE B10
MANUFACTURED EXPORT STRUCTURE
(%)



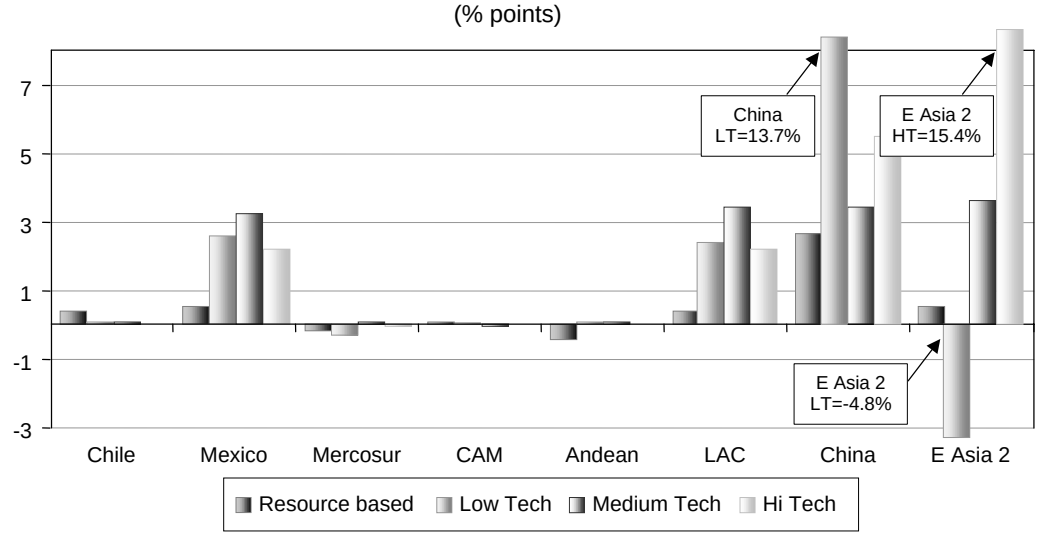
Source: Calculated from UNIDO and COMTRADE data.

FIGURE B11
WORLD MARKET SHARES IN ALL MANUFACTURED EXPORTS
(%)



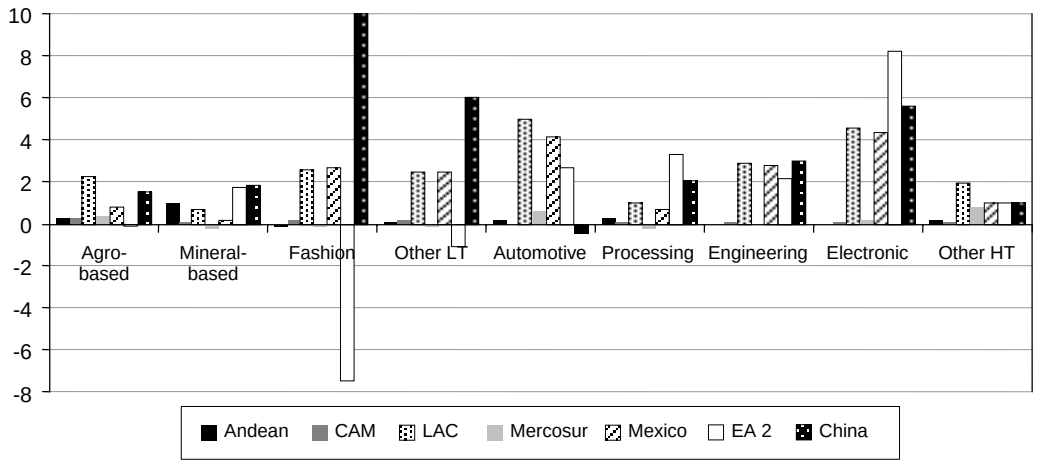
Source: Calculated from UNIDO and COMTRADE data.

FIGURE B12
CHANGES IN WORLD MARKET SHARES IN LAC, 1981-2000
(% points)



Source: Calculated from UNIDO and COMTRADE data.

FIGURE B13
CHANGES IN WMS FOR THECNOLOGY SUBCATEGORIES, 1990-2001
(%)



Source: Calculated from UNIDO and COMTRADE data.

TABLE B1
MVA VALUES AND GROWTH IN LAC 18

All manufacturing	Values (1990 US$ million)			Growth rates (%)		
	1980	1990	2000	1980-1990	1990-2000	1980-2000
Chile	4,379.0	5,613.4	8,789.6	2.51	4.59	3.55
Mexico	40,545.0	49,993.0	77,250.0	2.12	4.45	3.28
Argentina	45,905.0	37,868.0	49,427.0	-1.91	2.70	0.37
Brazil	107,020.0	104,000.0	118,260.0	-0.29	1.29	0.50
Paraguay	735.0	909.6	980.9	2.16	0.76	1.45
Uruguay	2,864.1	2,600.5	2,434.1	-0.96	-0.66	-0.81
Mercosur	156,524.1	145,378.1	171,102.0	-0.74	1.64	0.45
Costa Rica	892.0	1,106.4	2,100.6	2.18	6.62	4.38
El Salvador	1,145.2	1,156.9	1,931.8	0.10	5.26	2.65
Guatemala	1,167.0	1,151.0	1,510.0	-0.14	2.75	1.30
Honduras	330.8	443.3	642.0	2.97	3.77	3.37
Nicaragua	248.1	187.3	225.2	-2.77	1.86	-0.48
Panama	468.5	502.2	663.0	0.70	2.82	1.75
CAM	4,251.5	4,547.2	7,072.6	0.67	4.52	2.58
Bolivia	883.3	825.7	1,156.6	-0.67	3.43	1.36
Colombia	5,998.9	8,018.6	6,951.3	2.94	-1.42	0.74
Ecuador	1,976.4	2,068.4	2,536.0	0.46	2.06	1.25
Peru	9,299.5	7,811.6	11,132.0	-1.73	3.61	0.90
Venezuela	7,022.9	9,808.7	10,830.0	3.40	1.00	2.19
Andean	25,181.0	28,533.0	32,605.9	1.26	1.34	1.30
Jamaica	611.5	824.5	680.5	3.03	-1.90	0.54
LAC	230,880.5	234,064.7	296,820.0	0.14	2.40	1.26

Resource based	Values (1990 US$ million)			Growth rates (%)		
	1980	1990	2000	1980-1990	1990-2000	1980-2000
Chile	2,040.0	3,148.0	5,502.1	4.43	5.74	5.09
Mexico	14,434.4	18,982.5	25,566.3	2.78	3.02	2.90
Argentina	20,654.2	14,035.9	12,081.8	-3.79	-1.49	-2.65
Brazil	32,231.8	27,993.4	36,338.8	-1.40	2.64	0.60
Paraguay	163.4	487.3	368.8	11.55	-2.75	4.16
Uruguay	1,540.6	1,286.0	1,662.0	-1.79	2.60	0.38
Mercosur	54,589.9	43,802.7	50,451.4	-2.18	1.42	-0.39
Costa Rica	514.1	667.8	1,140.6	2.65	5.50	4.06
El Salvador	549.1	373.1	367.5	-3.79	-0.15	-1.99
Guatemala	178.2	408.0	778.1	8.63	6.67	7.65
Honduras	179.9	271.4	532.2	4.20	6.97	5.57
Nicaragua	233.0	178.6	216.7	-2.62	1.95	-0.36
Panama	357.2	357.3	401.2	0.01	1.16	0.58
CAM	2,011.4	2,256.2	3,436.4	1.16	4.30	2.71
Bolivia	525.2	669.0	888.7	2.45	2.88	2.66
Colombia	2,948.3	3,557.7	3,826.1	1.90	0.73	1.31
Ecuador	704.7	1,068.2	2,040.4	4.25	6.69	5.46
Peru	3,554.4	3,802.6	6,459.9	0.68	5.44	3.03
Venezuela	4,036.4	6,180.2	6,443.8	4.35	0.42	2.37
Andean	11,769.0	15,277.7	19,659.0	2.64	2.55	2.60
Jamaica	396.4	556.0	462.5	3.44	-1.82	0.77
LAC	84,844.7	83,467.1	104,615.1	-0.16	2.28	1.05

TABLE B1 (continued)

Low technology	Values (1990 US$ million)			Growth rates (%)		
	1980	1990	2000	1980-1990	1990-2000	1980-2000
Chile	582.4	561.2	381.6	-0.37	-3.78	-2.09
Mexico	9,666.8	8,974.9	8,812.5	-0.74	-0.18	-0.46
Argentina	8,945.8	7,864.4	7,901.8	-1.28	0.05	-0.62
Brazil	22,475.4	20,877.7	11,084.2	-0.73	-6.14	-3.47
Paraguay	359.8	294.9	364.5	-1.97	2.14	0.06
Uruguay	663.8	605.5	295.7	-0.92	-6.92	-3.96
Mercosur	32,444.9	29,642.5	19,646.2	-0.90	-4.03	-2.48
Costa Rica	164.4	154.3	140.3	-0.63	-0.95	-0.79
El Salvador	321.4	306.7	505.4	-0.47	5.12	2.29
Guatemala	313.2	229.6	162.3	-3.06	-3.41	-3.23
Honduras	84.2	92.9	54.7	0.99	-5.15	-2.13
Nicaragua	6.8	4.9	3.5	-3.18	-3.42	-3.30
Panama	53.4	56.1	63.8	0.51	1.28	0.90
CAM	943.3	844.5	929.9	-1.10	0.97	-0.07
Bolivia	125.2	74.6	78.7	-5.05	0.55	-2.29
Colombia	1,358.6	1,704.9	1,180.1	2.30	-3.61	-0.70
Ecuador	630.1	423.1	181.6	-3.91	-8.11	-6.03
Peru	1,735.5	1,191.0	1,224.2	-3.70	0.28	-1.73
Venezuela	978.3	850.0	465.8	-1.40	-5.84	-3.64
Andean	4,827.8	4,243.4	3,130.5	-1.28	-3.00	-2.14
Jamaica	79.1	91.6	107.1	1.47	1.58	1.53
LAC	48,465.2	44,266.5	32,900.7	-0.90	-2.92	-1.92

Medium/High technology	Values (1990 US$ million)			Growth rates (%)		
	1980	1990	2000	1980-1990	1990-2000	1980-2000
Chile	1,756.6	1,904.2	2,690.0	0.81	3.51	2.15
Mexico	16,443.8	22,035.7	38,066.5	2.97	5.62	4.29
Argentina	16,305.1	15,967.6	27,031.4	-0.21	5.41	2.56
Brazil	52,312.7	55,128.9	69,317.1	0.53	2.32	1.42
Paraguay	211.8	127.5	219.1	-4.95	5.56	0.17
Uruguay	659.7	709.0	495.3	0.72	-3.52	-1.42
Mercosur	69,489.2	71,933.0	97,063.0	0.35	3.04	1.68
Costa Rica	213.4	284.3	693.7	2.91	9.33	6.07
El Salvador	274.8	477.1	720.4	5.67	4.21	4.94
Guatemala	675.5	513.5	518.9	-2.71	0.11	-1.31
Honduras	66.7	79.1	30.5	1.72	-9.09	-3.84
Nicaragua	8.4	3.8	4.4	-7.47	1.33	-3.17
Panama	57.9	88.7	177.6	4.35	7.19	5.76
CAM	1,296.7	1,446.4	2,145.5	1.10	4.02	2.55
Bolivia	232.9	82.2	157.6	-9.90	6.73	-1.93
Colombia	1,692.0	2,756.0	2,102.2	5.00	-2.67	1.09
Ecuador	641.6	577.1	272.9	-1.05	-7.22	-4.18
Peru	4,009.6	2,818.1	2,927.4	-3.46	0.38	-1.56
Venezuela	2,008.2	2,778.5	3,871.9	3.30	3.37	3.34
Andean	8,584.2	9,011.9	9,332.0	0.49	0.35	0.42
Jamaica	136.0	176.9	129.6	2.67	-3.07	-0.24
LAC	97,570.6	106,331.1	149,296.9	0.86	3.45	2.15

TABLE B2
TECHNOLOGICAL STRUCTURE OF MVA IN LAC 18 (%)

	1980			1990			2000		
	RB	LT	MHT	RB	LT	MHT	RB	LT	MHT
Chile	46.6	13.3	40.1	56.1	10.0	33.9	62.6	4.3	30.6
Mexico	35.6	23.8	40.6	38.0	18.0	44.1	33.1	11.4	49.3
Argentina	45.0	19.5	35.5	37.1	20.8	42.2	24.4	16.0	54.7
Brazil	30.1	21.0	48.9	26.9	20.1	53.0	30.7	9.4	58.6
Paraguay	22.2	49.0	28.8	53.6	32.4	14.0	37.6	37.2	22.3
Uruguay	53.8	23.2	23.0	49.5	23.3	27.3	68.3	12.1	20.3
Mercosur	34.9	20.7	44.4	30.1	20.4	49.5	29.5	11.5	56.7
Costa Rica	57.6	18.4	23.9	60.4	13.9	25.7	54.3	6.7	33.0
El Salvador	47.9	28.1	24.0	32.3	26.5	41.2	19.0	26.2	37.3
Guatemala	15.3	26.8	57.9	35.4	19.9	44.6	51.5	10.7	34.4
Honduras	54.4	25.4	20.2	61.2	20.9	17.8	82.9	8.5	4.8
Nicaragua	93.9	2.7	3.4	95.3	2.6	2.1	96.2	1.5	1.9
Panama	76.2	11.4	12.4	71.2	11.2	17.7	60.5	9.6	26.8
CAM	47.3	22.2	30.5	49.6	18.6	31.8	48.6	13.1	30.3
Bolivia	59.5	14.2	26.4	81.0	9.0	10.0	76.8	6.8	13.6
Colombia	49.1	22.6	28.2	44.4	21.3	34.4	55.0	17.0	30.2
Ecuador	35.7	31.9	32.5	51.6	20.5	27.9	80.5	7.2	10.8
Peru	38.2	18.7	43.1	48.7	15.2	36.1	58.0	11.0	26.3
Venezuela	57.5	13.9	28.6	63.0	8.7	28.3	59.5	4.3	35.8
Andean	46.7	19.2	34.1	53.5	14.9	31.6	60.3	9.6	28.6
Jamaica	64.8	12.9	22.2	67.4	11.1	21.5	68.0	15.7	19.0
LAC	36.7	21.0	42.3	35.7	18.9	45.4	35.2	11.1	50.3

Source: UNIDO database.

TABLE B3
STRUCTURE OF MANUFACTURED EXPORTS IN 18 LAC ECONOMIES (%)

	Resource based			Low technology			Medium technology			High technology		
	1981	1990	2000	1981	1990	2000	1981	1990	2000	1981	1990	2000
Chile	93.6	90.6	84.1	1.4	3.7	5.0	4.4	4.7	9.8	0.6	0.9	1.1
Mexico	27.4	24.4	6.7	15.2	13.6	17.6	23.5	53.3	43.3	33.9	8.6	32.5
Argentina	58.1	56.3	43.6	18.0	21.5	16.6	19.0	19.0	33.3	5.0	3.2	6.4
Brazil	43.2	37.0	32.8	18.2	20.5	16.1	31.7	36.4	33.9	6.9	6.1	17.1
Paraguay	86.5	56.5	54.1	12.4	35.8	40.2	0.8	7.6	3.1	0.3	0.1	2.6
Uruguay	25.8	27.2	32.8	58.9	53.2	42.9	11.2	18.2	21.5	4.0	1.3	2.8
Mercosur	46.2	41.3	35.5	19.4	21.7	17.0	28.0	31.8	33.3	6.3	5.3	14.1
Costa Rica	29.7	34.0	15.0	34.7	38.4	19.2	25.7	18.1	16.1	10.0	9.5	49.6
El Salvador	18.6	26.6	33.6	37.8	45.4	40.8	13.9	18.4	17.1	29.7	9.6	8.5
Guatemala	40.2	49.7	39.3	27.5	22.9	29.6	18.8	15.1	23.1	13.5	12.3	7.9
Honduras	66.3	73.5	46.2	20.1	20.8	28.3	12.7	5.2	22.9	1.0	0.5	2.7
Nicaragua	58.2	73.0	75.9	21.4	16.8	11.6	19.3	9.7	10.9	1.2	0.5	1.5
Panama	34.7	53.8	64.2	16.8	28.7	25.4	40.3	10.3	4.8	8.2	7.1	5.7
CAM	38.1	47.3	31.9	25.0	30.3	24.6	26.4	13.8	15.5	10.4	8.5	27.9
Bolivia	89.6	88.5	41.2	5.6	11.0	23.8	4.9	0.5	8.8	0.0	0.0	26.2
Colombia	35.8	39.3	35.1	44.9	40.2	27.1	15.4	19.2	31.6	3.9	1.4	6.2
Ecuador	87.9	84.2	71.1	5.3	9.8	13.3	5.5	3.9	12.4	1.3	2.1	3.2
Peru	69.5	70.3	69.1	22.2	24.7	24.8	7.0	4.4	4.7	1.2	0.6	1.4
Venezuela	94.7	45.4	82.3	1.1	24.4	5.4	4.1	29.0	11.5	0.2	1.2	0.8
Andean	84.0	53.0	67.2	9.4	28.0	14.4	5.9	17.9	15.4	0.8	1.1	3.0
Jamaica	71.5	57.5	50.5	17.3	34.9	38.4	9.3	6.3	11.0	1.8	1.4	0.1
LAC	54.5	43.7	23.3	15.5	19.4	16.8	20.4	31.8	35.9	9.6	5.2	23.9

TABLE B4
MANUFACTURED EXPORTS BY LAC 18

All Manufacturing	Values (Current US$ million)			Growth rate (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Chile	2,214	5,377	11,017	10.4	7.4	8.8	0.18	0.20	0.22
Mexico	6,076	13,722	144,288	9.5	26.5	18.1	0.49	0.52	2.93
Argentina	3,578	6,867	13,309	7.5	6.8	7.2	0.29	0.26	0.27
Brazil	12,550	22,159	40,603	6.5	6.2	6.4	1.02	0.84	0.82
Paraguay	161	146	288	-1.0	7.0	3.1	0.01	0.01	0.01
Uruguay	572	806	1,366	3.9	5.4	4.7	0.05	0.03	0.03
Mercosur	16,861	29,978	55,567	6.6	6.4	6.5	1.37	1.14	1.13
Costa Rica	367	486	4,035	3.2	23.6	13.4	0.03	0.02	0.08
El Salvador	160	198	925	2.4	16.7	9.7	0.01	0.01	0.02
Guatemala	443	486	1,291	1.0	10.3	5.8	0.04	0.02	0.03
Honduras	187	123	335	-4.6	10.6	3.1	0.02	0.00	0.01
Nicaragua	115	75	148	-4.7	7.1	1.3	0.01	0.00	0.00
Panama	654	657	1,411	0.1	7.9	4.1	0.05	0.02	0.03
CAM	1,926	2,024	8,145	0.6	14.9	7.9	0.16	0.08	0.17
Bolivia	348	277	608	-2.5	8.2	3.0	0.03	0.01	0.01
Colombia	928	2,239	5,473	10.3	9.3	9.8	0.08	0.08	0.11
Ecuador	364	295	1,120	-2.3	14.3	6.1	0.03	0.01	0.02
Peru	1,182	1,957	3,263	5.8	5.2	5.5	0.10	0.07	0.07
Venezuela	5,475	2,913	11,974	-6.8	15.2	4.2	0.44	0.11	0.24
Andean	8,297	7,682	22,439	-0.9	11.3	5.4	0.67	0.29	0.46
Jamaica	181	293	420	5.5	3.7	4.5	0.01	0.01	0.01
LAC	35,554	59,076	241,875	5.8	15.1	10.6	2.88	2.24	4.91

High technology	Values (Current US$ million)			Growth rate (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Chile	13	49	124	15.9	9.8	12.7	0.01	0.01	0.01
Mexico	2,057	1,183	46,928	-6.0	44.5	17.9	1.20	0.24	3.40
Argentina	177	219	850	2.4	14.5	8.6	0.10	0.04	0.06
Brazil	869	1,360	6,959	5.1	17.7	11.6	0.51	0.28	0.50
Paraguay	0	0	7	-11.1	45.9	15.4	0.00	0.00	0.00
Uruguay	23	11	38	-8.3	13.6	2.7	0.01	0.00	0.00
Mercosur	1,070	1,589	7,854	4.5	17.3	11.1	0.63	0.32	0.57
Costa Rica	37	46	2,003	2.5	45.8	23.4	0.02	0.01	0.15
El Salvador	48	19	78	-9.8	15.3	2.7	0.03	0.00	0.01
Guatemala	60	60	102	0.0	5.5	2.9	0.03	0.01	0.01
Honduras	2	1	9	-11.2	30.7	8.8	0.00	0.00	0.00
Nicaragua	1	0	2	-12.6	18.7	2.7	0.00	0.00	0.00
Panama	54	47	80	-1.5	5.5	2.1	0.03	0.01	0.01
CAM	201	173	2,274	-1.7	29.4	13.6	0.12	0.04	0.16
Bolivia	0	0	159	-6.8	133.5	51.2	0.00	0.00	0.01
Colombia	37	32	338	-1.6	26.7	12.4	0.02	0.01	0.02
Ecuador	5	6	36	2.9	19.5	11.3	0.00	0.00	0.00
Peru	15	12	46	-2.5	14.8	6.2	0.01	0.00	0.00
Venezuela	10	36	100	14.9	10.8	12.8	0.01	0.01	0.01
Andean	66	85	679	2.8	23.1	13.0	0.04	0.02	0.05
Jamaica	3	4	0	2.2	-20.9	-10.7	0.00	0.00	0.00
LAC	3,410	3,083	57,859	-1.1	34.1	16.1	1.99	0.63	4.20

TABLE B4 (continued)

Medium technology	Values (Current US$ million)			Growth rate (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Chile	97	254	1,085	11.3	15.6	13.6	0.02	0.02	0.06
Mexico	1,428	7,318	62,427	19.9	23.9	22.0	0.28	0.68	3.51
Argentina	679	1,304	4,434	7.5	13.0	10.4	0.13	0.12	0.25
Brazil	3,979	8,063	13,778	8.2	5.5	6.8	0.78	0.75	0.77
Paraguay	1	11	9	27.1	-2.2	10.7	0.00	0.00	0.00
Uruguay	64	147	294	9.6	7.2	8.3	0.01	0.01	0.02
Mercosur	4,723	9,525	18,515	8.1	6.9	7.5	0.92	0.89	1.04
Costa Rica	94	88	649	-0.7	22.1	10.7	0.02	0.01	0.04
El Salvador	22	36	158	5.6	15.8	10.9	0.00	0.00	0.01
Guatemala	83	74	299	-1.4	15.0	6.9	0.02	0.01	0.02
Honduras	24	6	77	-13.5	28.2	6.4	0.00	0.00	0.00
Nicaragua	22	7	16	-11.7	8.4	-1.6	0.00	0.00	0.00
Panama	264	68	68	-14.0	0.0	-6.9	0.05	0.01	0.00
CAM	509	280	1,266	-6.5	16.3	4.9	0.10	0.03	0.07
Bolivia	17	1	54	-24.5	44.5	6.3	0.00	0.00	0.00
Colombia	143	429	1,731	13.0	15.0	14.0	0.03	0.04	0.10
Ecuador	20	12	139	-5.9	28.2	10.7	0.00	0.00	0.01
Peru	83	86	153	0.5	5.9	3.3	0.02	0.01	0.01
Venezuela	223	845	1,382	16.0	5.0	10.1	0.04	0.08	0.08
Andean	485	1,373	3,459	12.2	9.7	10.9	0.09	0.13	0.19
Jamaica	17	18	46	1.0	9.7	5.5	0.00	0.00	0.00
LAC	7,259	18,768	86,799	11.1	16.5	14.0	1.42	1.75	4.88

Low technology	Values (Current US$ million)			Growth rate (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Chile	32	201	548	22.7	10.6	16.2	0.01	0.04	0.06
Mexico	926	1,871	25,337	8.1	29.8	19.0	0.39	0.36	2.96
Argentina	643	1,478	2,216	9.7	4.1	6.7	0.27	0.29	0.26
Brazil	2,278	4,533	6,545	7.9	3.7	5.7	0.97	0.88	0.76
Paraguay	20	52	116	11.3	8.3	9.7	0.01	0.01	0.01
Uruguay	337	429	586	2.7	3.2	3.0	0.14	0.08	0.07
Mercosur	3,278	6,493	9,463	7.9	3.8	5.7	1.39	1.26	1.11
Costa Rica	127	186	776	4.3	15.3	10.0	0.05	0.04	0.09
El Salvador	61	90	377	4.4	15.5	10.1	0.03	0.02	0.04
Guatemala	122	111	383	-1.0	13.2	6.2	0.05	0.02	0.04
Honduras	38	25	95	-4.2	14.0	5.0	0.02	0.00	0.01
Nicaragua	24	13	17	-7.2	3.2	-1.8	0.01	0.00	0.00
Panama	110	189	358	6.2	6.6	6.4	0.05	0.04	0.04
CAM	482	614	2,006	2.7	12.6	7.8	0.20	0.12	0.23
Bolivia	19	31	144	5.2	16.8	11.2	0.01	0.01	0.02
Colombia	416	900	1,483	8.9	5.1	6.9	0.18	0.17	0.17
Ecuador	19	29	149	4.7	17.7	11.4	0.01	0.01	0.02
Peru	263	484	810	7.0	5.3	6.1	0.11	0.09	0.09
Venezuela	59	711	643	31.9	-1.0	13.4	0.02	0.14	0.08
Andean	777	2,154	3,230	12.0	4.1	7.8	0.33	0.42	0.38
Jamaica	31	102	161	14.0	4.7	9.0	0.01	0.02	0.02
LAC	5,525	11,435	40,744	8.4	13.5	11.1	2.34	2.22	4.76

TABLE B4 (continued)

Resource based	Values (Current US$ million)			Growth rate (%)			World Market Shares (%)		
	1981	1990	2000	1981-1990	1990-2000	1981-2000	1981	1990	2000
Chile	2,072	4,874	9,260	10.0	6.6	8.2	0.62	0.88	1.02
Mexico	1,666	3,349	9,596	8.1	11.1	9.7	0.50	0.60	1.05
Argentina	2,078	3,865	5,809	7.1	4.2	5.6	0.62	0.69	0.64
Brazil	5,425	8,204	13,322	4.7	5.0	4.8	1.63	1.47	1.46
Paraguay	139	83	156	-5.6	6.6	0.6	0.04	0.01	0.02
Uruguay	148	220	449	4.5	7.4	6.0	0.04	0.04	0.05
Mercosur	7,790	12,371	19,736	5.3	4.8	5.0	2.34	2.22	2.17
Costa Rica	109	165	607	4.7	13.9	9.5	0.03	0.03	0.07
El Salvador	30	53	311	6.5	19.4	13.1	0.01	0.01	0.03
Guatemala	178	242	508	3.5	7.7	5.7	0.05	0.04	0.06
Honduras	124	90	155	-3.5	5.5	1.2	0.04	0.02	0.02
Nicaragua	67	54	112	-2.2	7.5	2.8	0.02	0.01	0.01
Panama	227	354	906	5.1	9.9	7.6	0.07	0.06	0.10
CAM	734	958	2,599	3.0	10.5	6.9	0.22	0.17	0.29
Bolivia	312	245	251	-2.6	0.2	-1.1	0.09	0.04	0.03
Colombia	332	879	1,921	11.4	8.1	9.7	0.10	0.16	0.21
Ecuador	320	249	796	-2.8	12.3	4.9	0.10	0.04	0.09
Peru	822	1,375	2,254	5.9	5.1	5.5	0.25	0.25	0.25
Venezuela	5,183	1,322	9,849	-14.1	22.2	3.4	1.56	0.24	1.08
Andean	6,968	4,070	15,070	-5.8	14.0	4.1	2.09	0.73	1.65
Jamaica	129	168	212	3.0	2.3	2.6	0.04	0.03	0.02
LAC	19,360	25,790	56,473	3.2	8.2	5.8	5.81	4.63	6.20

Contents

ANNEX C

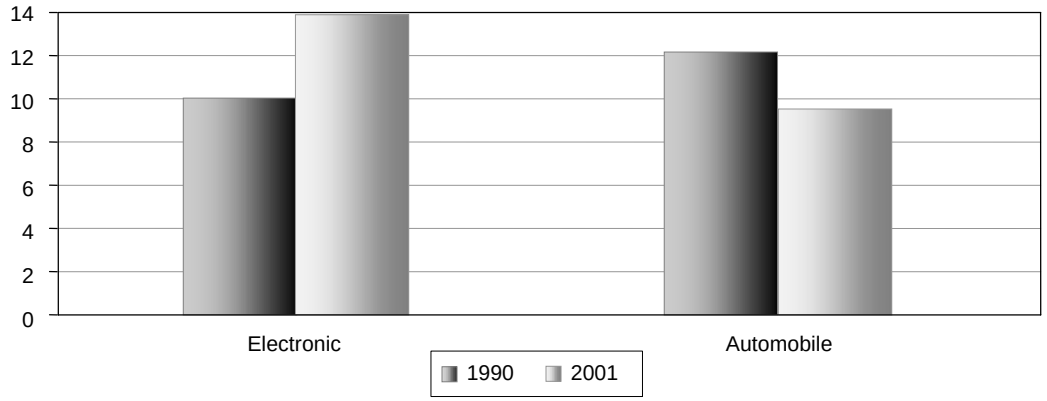
TWO GLOBAL PRODUCTION NETWORKS IN LAC AND EA: AUTOMOBILES & ELECTRONICS

C.1. Introduction

The automobile and electronics industries are of special interest to LAC and East Asia. Autos and related products are the single biggest manufactured export by LAC, and electronics are their counterpart in East Asia.[20] This section shows patterns of growth in these industries, distinguishing finished products from components.

Both industries are organized in integrated production systems (or "global production networks", GPNs) by TNCs.[21] Such GPNs are spreading to the developing world, at least in industries where processes are separable and have labor-intensive segments that benefit from lower wages. However, the factors influencing the location of production facilities differ. The auto industry tends to agglomerate in sites fairly close to major markets because of the transport costs involved, while electronics, which have a higher value-to-weight ratio, can be fragmented across long distances. Moreover, efficient auto production requires considerable metal-working and engineering capabilities and a large and efficient supplier network, while the simpler assembly in electronics has lower capability needs and is more self-contained, using largely imported components. There is also a large parts and components industry in autos dominated by TNCs that have an international spread matching the final assemblers.

FIGURE C1
WORLD MARKET SHARES OF ELECTRONICS AND AUTOMOBILE EXPORTS
(%)



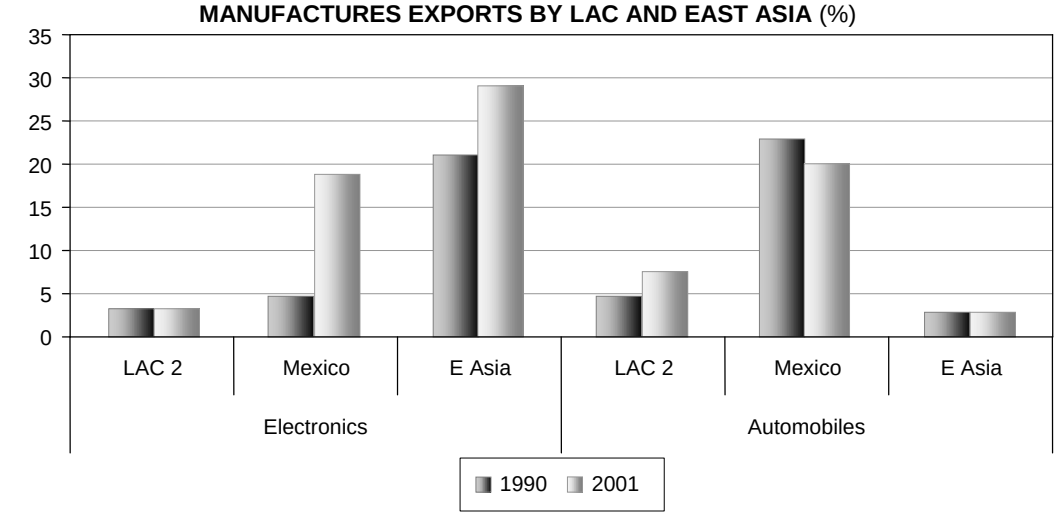
Source: UNIDO Database.

[20] This specialization is not static: autos are likely to become a more significant export for East Asia and electronics is already a growing one for Mexico (and Costa Rica).

[21] Global production networks (Ernst [2002]) are a manifestation of a larger phenomenon that has several names: "fragmentation" (Arndt and Kierzkowski [2001]), "international production sharing" (Ng and Yeats [1999]), "segmentation" (Lemoine and Unal-Kesenci [2002]), "international production systems" (UNCTAD [2002]) and so on. In distinction to traditional patterns of comparative advantage, where countries specialize in entire activities, new communication and transportation technologies allow formerly integrated processes to be divided and placed in different countries.

Since the electronics industry is more innovative and less mature, its growth rate (11.7% p.a. in the 1990s) has been much higher than in autos (5.9%).[22] The high value-to-weight ratio of electronics products has led it to spread far more production to developing countries than autos. Thus, in 2000 developing countries account for nearly 45% of world exports of electronics products and only 12% of world exports of auto products. Both offer enormous benefits for industrial development if producers are able to establish bases with significant local linkages. The auto industry has long been regarded as a "core" activity for industrial development, with extensive backward linkages and the potential for developing engineering capabilities. In more recent years, electronics has become more important as a technical "hub" in manufacturing and other activities.

FIGURE C2
SHARE OF ELECTRONICS AND AUTOMOBILES IN TOTAL MANUFACTURES EXPORTS BY LAC AND EAST ASIA (%)



Source: UNIDO Database.

Annex Figure C2 shows the share of the two industries in manufactured exports by LAC and East Asia. Electronics account for nearly 30% of East Asian exports by 2001, but were dominant by 1990. In Mexico, their share has risen nearly four-fold in the 1990s, but in the rest of LAC it has stagnated at around 3%. Auto products account for 7.6% of manufactured exports by LAC 2 and 20% of those by Mexico, rising in the former but declining in the latter. In East Asia, their share is constant at just below 3%. However, it is quite likely that China will emerge as a major international player in this industry in the medium term, as its rapidly expanding capacities meet domestic demand and improve productivity levels.

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[22] Electronics was the fastest growing industry in production during the 1990s globally and in developing countries. According to UNIDO data, global value added in "electrical machinery" (of which electronics is a major part) rose by 3.5% per year during 1990-2000, compared to 1.8% for all manufacturing. In the developing world, electrical machinery grew by 8.3% as compared to 4.4% for all manufacturing. In terms of size, electrical machinery was the largest industry in terms of value added in both developing countries and the world in 2000, up from sixth place in the former and fourth place in the latter in 1980. The transport equipment industry (of which automotives is a major component) grew at 2.6% in the world and at 6.4% in developing countries in the 1990s. In terms of size, it was the second largest industry in the world over 1980-2000, and rose from fifth to third place in the developing world. In 1990, World auto exports (US$320.6 billion) were 22% larger than electronics (US$261.6 billion). Over the decade, auto exports grew by 5.9% p.a. and electronics exports by 11.7%; by 2000 electronics exports (US$788.9 billion) were 38% larger than auto exports (US$570.4 billion).

C.2. Automobiles

Automobile exports are divided in the trade data into *finished products* and *parts and components* (Annex Table C1*)* for the two main products in the industry: *automobiles* and *car engines*. There is, however, no clear line between a "finished product" and a "part and component" - a car engine can be considered a *finished product* or a *part*.

TABLE C1
THE AUTOMOBILE INDUSTRY: FINISHED PRODUCTS AND PARTS & COMPONENTS IN SITC

Main Product	Finished or components and SITC number (Rev. 2)
Automobiles	Finished product: Passenger motor cars, for transport of passengers and goods (781); motor vehicles for transport of goods and materials (782); and road motor vehicles n.e.s (783) Parts and components: Parts & accessories of 722 (tractors), 781, 782 and 783 (784)
Car Engines	Finished product: Internal combustion piston engines for propelling vehicles (7132) Parts and components: Parts of internal combustion piston engines of 7132 (7139)

Annex Figure C3 shows the growth rates for world exports of MT products - which include automobiles, engineering and processing products - and for automobile and car engine products (finished and parts and components). Automobile industry exports slowed in the second half of the 1990s, with the auto-parts segment suffering the most. Finished automobiles maintained the highest growth rates.

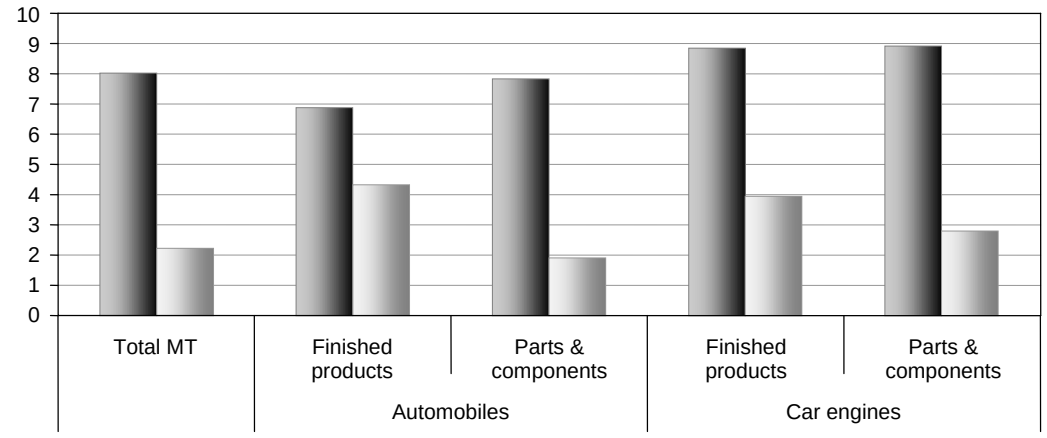
In the 1990s, the auto industry saw a significant shift in production facilities from developed to developing countries. While there were already far-flung assembly and production operations in the developing world, most of them had been set up to serve protected domestic markets. The shift in the 1990s was of a different kind, aimed at producing cost-efficient products for export markets. With liberalization, inefficient assembly operations were wound down in many sites, and a few were selected to develop regional or global platforms - this involved a massive restructuring of the industry and its supplier base. The process started earliest, and went furthest, in the big 3 LAC economies (Mortimore [1998, 2000]). The result was a rapid rise in the share of developing countries in auto exports (Annex Table C2).

Annex Figures C4 to C7 show the performance of LAC and East Asia. Annex Tables C5 to C8 provide the detailed data.

Finished automobiles: Mexico, Brazil and Argentina dominate the industry in LAC, accounting for 96% and 93% of the region's exports of finished products and parts/components in 2001. In finished automobile exports, LAC raises its world market share by more than 5 percentage points over 1990-2001. The main driver of this is Mexico, without which LAC's gain falls to less than

1% (Annex Figure C4). Exports are also highly concentrated in East Asia, with Korea accounting for 86% of the region's finished auto exports (Annex Table C5).

FIGURE C3
GROWTH OF WORLD MT EXPORTS, AUTOMOBILES AND CAR ENGINES (%)



Source: UNIDO Database.

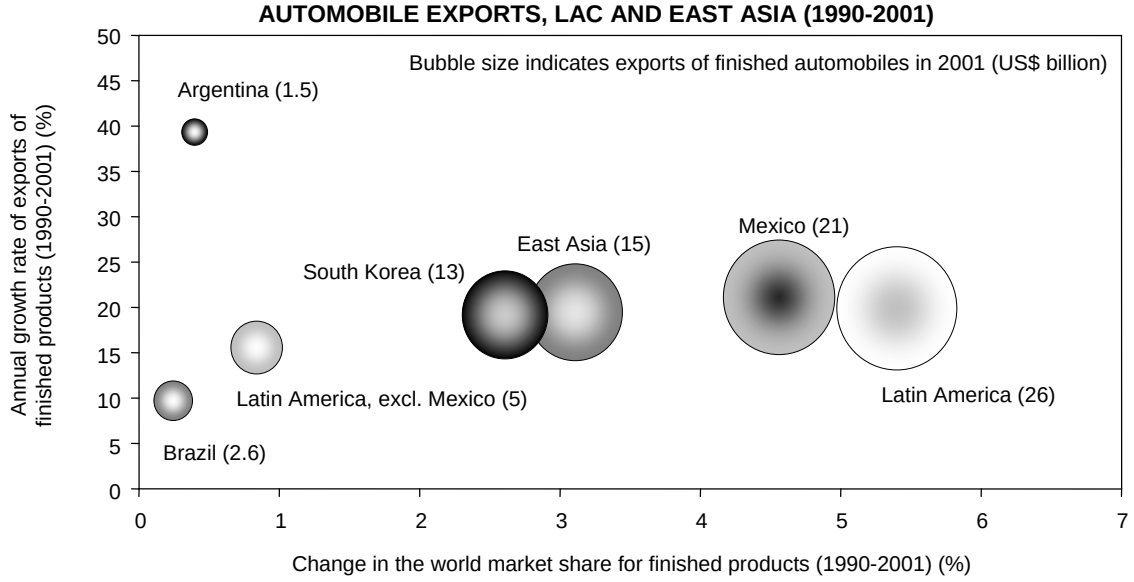
TABLE C2
DEVELOPED AND DEVELOPING COUNTRIES' EXPORT SHARES AND GROWTH RATES IN THE AUTOMOBILE INDUSTRY (%)

			World Market Shares			Growth rate
			1990	1995	2001	1990-2001
Automobiles	Finished products	Developed	89.04	83.87	84.80	5.0
		Developing	3.07	8.15	12.98	20.3
	Parts & components	Developed	89.24	88.91	84.30	4.1
		Developing	7.78	7.57	12.75	9.4
Car engines	Finished products	Developed	88.33	88.06	78.00	5.0
		Developing	11.27	11.25	13.35	7.8
	Parts & components	Developed	92.05	87.54	83.04	4.6
		Developing	6.39	10.19	14.61	13.8

Source: Calculated from UN Comtrade.

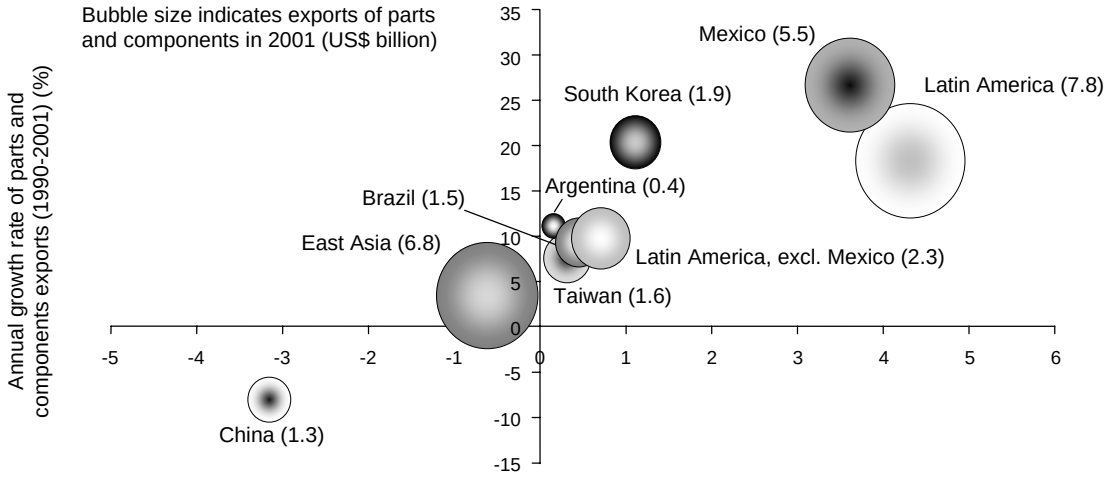
Parts and components of automobiles: The picture in the auto-parts industry is similar. LAC is very dynamic with Mexico, but otherwise its performance is weak. Mexico's exports grow at almost 30% between 1990 and 2001, while the rest of the region grows only at 10% (Annex Figure C3). East Asia loses market share, with China losing more than 3 percentage points. Again, Korea stands out, with annual growth of over 20%.

FIGURE C4
WORLD MARKET SHARES AND GROWTH RATES OF FINISHED AUTOMOBILE EXPORTS, LAC AND EAST ASIA (1990-2001)



Source: UNIDO Database.

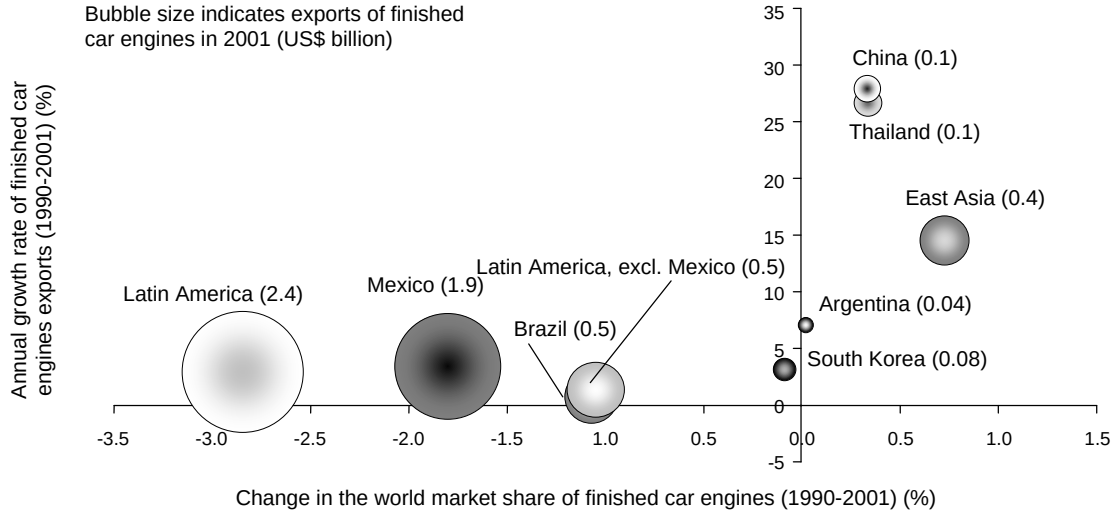
FIGURE C5
WORLD MARKET SHARES AND GROWTH RATES OF EXPORTS OF PARTS AND COMPONENTS OF AUTOMOBILES, LAC AND EAST ASIA (1990-2001)



Source: UNIDO Database.

Finished car engines: Export growth follows a different pattern here (Annex Figure C6). While LAC is still the dominant exporter, East Asia outperforms it in terms of WMS gains (LAC loses almost 3 percentage points of WMS). Mexico and Brazil are among the main losers.

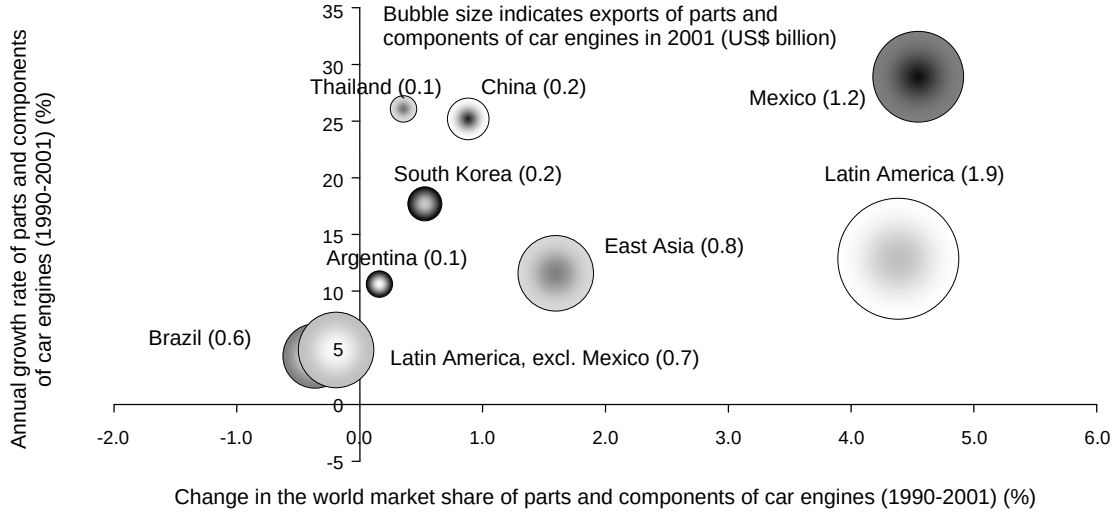
FIGURE C6
WORLD MARKET SHARES AND GROWTH RATES OF FINISHED CAR ENGINES, LAC & EAST ASIA (1990-2001)



Source: UNIDO Database.

Parts and components of auto engines: Mexico, the dominant player, gains WMS but other LAC exporters lose (Figure C7). Brazil, in particular, has a disappointing performance, with much lower growth than in Argentina, Korea, Thailand and China. Both LAC and East Asia run trade deficits in this segment of the industry.

FIGURE C7
WORLD MARKET SHARES AND GROWTH RATES OF EXPORTS OF PARTS AND COMPONENTS OF CAR ENGINES, LAC AND EAST ASIA (1990-2001)



Source: UNIDO Database.

The LAC auto industry has done well in world markets after its massive restructuring and upgrading. It may, however, face serious competitive challenges from EA in the foreseeable future, particularly if China decides to enter world markets in a significant way and Thailand further develops its position as an auto hub for the region. In the longer term, freer trade within EA will give rise to more powerful GPNs rationalizing production across the region. Given the logistics involved (the high transport cost of most auto products), the Mexican industry holds a fairly secure position in the North American market. The other exporters are perhaps less secure. Their export markets are mainly regional or European and their industries are not as integrated into global production systems as in Mexico.

Perhaps as a result, Argentina and Brazil have performed disappointingly in the 1990s. Brazil has done least well, particularly in the car engine industry where it has lost market share. East Asia puts up a more solid performance in the industry during the 1990s. Korea, with its mature and well-developed industry, has continued to grow. Taiwan has strengthened its position as a global supplier of parts and components. China and Thailand are new entrants that are most likely to threaten Latin America's dominance.

C.3. Electronics

Trade in electronics falls into five product categories: office machines, automatic data processing machines, telecom equipment, TV and radio receivers and semiconductors. Annex Table C3 shows the relevant classification.

TABLE C3
ELECTRONICS INDUSTRY, FINISHED PRODUCTS AND PARTS & COMPONENTS IN SITC

Main Product	Finished or components and SITC number (Rev. 2)
Office machines	Finished product: 751 Parts and components suitable for 751.1 and 751.8: 7591
Automatic data processing machines	Finished product: 752 Parts and components suitable for 751.2 and 752: 7599
Telecom equipment	Finished product: 7648 Parts and components of 764.1 and 764.2: 76491 and 76492
TV, Radio-broadcast receivers and gramophones	Finished products: 761, 762, 763 Parts and components of 764.1, 764.2 and 761/762: 76493, 76499
Thermionic, cold & photo-cathode valves	Finished products, semiconductors and piezo-electric crystals, mounted etc: 776-7768 Parts and components of 776: 7768

The electronics industry is the main part of global HT exports, and grew faster than the average of HT exports in the first half of the 1990s. In the second half, growth rates declined dramatically, a result of the recession in the late '90s that hit the industry particularly hard. As Annex Table C4 shows, exports by developing countries grew much faster than by industrial countries, and their market share now stands at nearly 45% for the industry as a whole.

TABLE C4
DEVELOPED AND DEVELOPING COUNTRIES' WORLD MARKET SHARES AND EXPORT GROWTH IN ELECTRONICS

		World Market shares			Growth rate
		1990	1995	2001	1990-2001
Finished products	Developed	71.6%	58.8%	52.9%	5.7%
	Developing	27.0%	39.8%	45.6%	14.0%
Parts & components	Developed	76.8%	65.9%	57.2%	6.8%
	Developing	21.6%	32.3%	41.3%	16.4%

Source: Calculated from UN Comtrade.

The pattern of location in the developing world in electronics has been the opposite of automobiles. As transport costs are much less and labor costs more significant in total costs than automobiles, the industry has looked to East Asia to serve markets in the North (mainly the US). Part of this is because East Asia offered lower wages than LAC in the 1960s and 1970s when electronics GPNs started to form, but part is due to the fact that countries like Korea and Taiwan developed significant capabilities in local enterprises that were then able to tap GPNs on the basis of OEM contracts rather than as foreign affiliates. In course of time, these local enterprises reached technological frontiers and established GPNs of their own, in the region and elsewhere. Countries like Singapore, and to a lesser extent Malaysia, used targeted industrial policy to raise the technological level of TNC activities and induce greater local content and R&D activity. Singapore is now one of the most sophisticated production centers for producer electronics in the world. China, the latest entrant, offers lower wages than established producers in the region and, with its large stock of technical skills and developed industrial base, is raising local content and technological activity much more rapidly than others.[23] The competitive threat to Mexico is thus not just from lower wages - it is also from higher levels of technological and supplier capabilities.

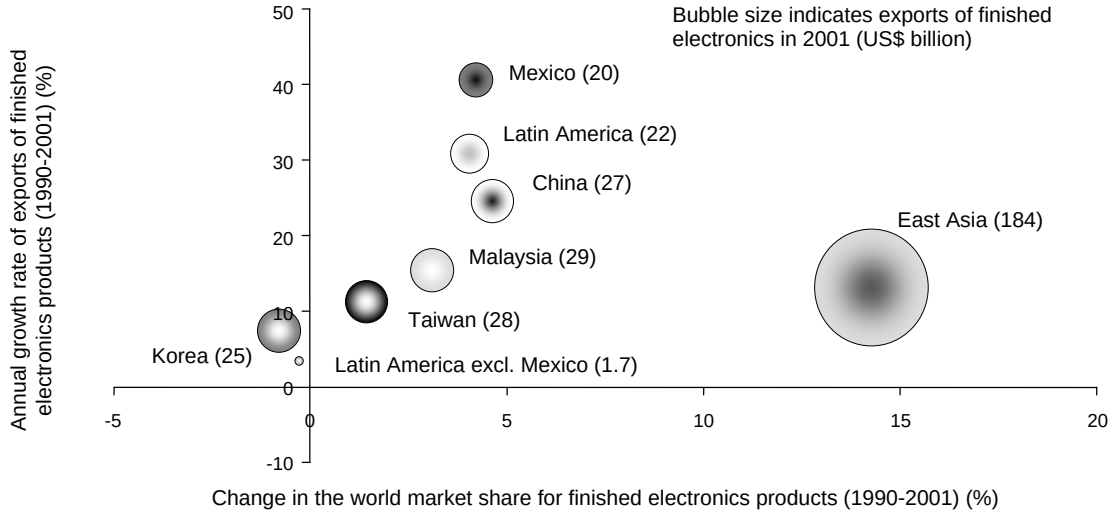
Annex Figure C8 shows the growth rates and the changes in world market share in finished electronic exports by LAC and EA. Between 1990 and 2001, EA gains 15 percentage points of WMS while LAC gains less than 5. And LAC's gain is due almost wholly to Mexico's export surge in the 1990s; excluding this, LAC loses market share. China is a dynamic new entrant into the industry, with its 2001 exports already exceeding those by Mexico. Anecdotal evidence suggests that Mexico still has very low local content in the industry, while China is rapidly increasing not just physical inputs but also sophisticated design and development in the industry. Annex Table C9 shows exports, imports, net trade and export growth rates in the industry for LAC and EA.

Exports of electronics parts and components boomed in East Asia during the 1990s, the region increasing its WMS by over 15 percentage points (Annex Figure C9). Again LAC excluding Mexico put a very disappointing performance. However, Mexico and, on a much smaller scale Costa Rica, excelled, with exports growing faster than East Asian countries. China emerged as a major

[23] However, till now China has complemented exports by other EA producers rather than taken market share from them, participating in the GPNs that manage the industry. Thus, it is strengthening the competitiveness of the region as a whole (Lall and Albaladejo [2003]).

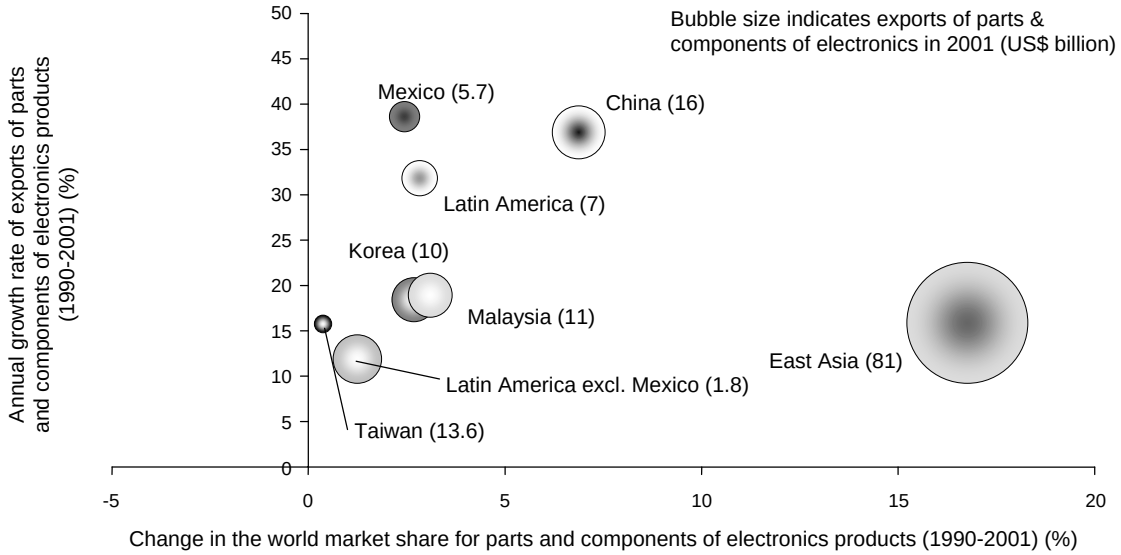
competitive force (particularly in telecoms), with the largest increase in market share in the developing world. Annex Table C10 gives the detailed trade data.

FIGURE C8
WORLD MARKET SHARES AND GROWTH RATES, FINISHED ELECTRONIC EXPORTS BY LAC AND EAST ASIA (1990-2001)



Source: UNIDO Database.

FIGURE C9
WORLD MARKET SHARES AND GROWTH RATES, ELECTRONICS PARTS AND COMPONENTS EXPORTS BY LAC AND EAST ASIA (1990-2001)



Source: UNIDO Database.

In sum, the globalization of electronics, the world's most dynamic export activity, has largely bypassed LAC. By missing the first wave of fragmentation in the industry, LAC gave EA the opportunity to build strong first mover advantages. The efficient use of industrial policy by Korea and Taiwan allowed them to build world class capabilities, while a similar experiment in Brazil failed because the strategy lacked certain critical elements. The efficient use of FDI strategy, along with complementary forms of industrial policy, by Singapore allowed it to tap FDI and become a global player, while the reliance on passive open door policies in LAC prevented it from attracting GPNs - Costa Rica is clearly the exception that proves the rule.

Mexico is the main outlier in LAC, but its competitive advantages are heavily dependent on NAFTA privileges (*maquilas* failed earlier to attract significant electronics FDI) and so remain vulnerable. China has such strong and broad advantages that it is now threatening Mexico. As *The Economist* [2003] notes,

> *"In the past two years it has become painfully clear that China is the favorite destination for the labor-intensive manufacturing that Mexico specialized in for the past three decades… The problem is simple. Labor costs in China, converted at the country's artificially low exchange rate, are about a quarter of the level in Mexico. The result: about 300 manufacturing plants have moved from Mexico to China in the past two years, reckons the Labor Ministry. Especially affected is electrical assembly. Those plants that stay have cut wages… Not only is Mexican labor being undercut, but so is its privileged access to the American market. China has joined the WTO, and the United States is negotiating a free-trade agreement with five Central American countries. The real problem is that Mexico has done nothing to offset the erosion of its competitive advantages by attacking its disadvantages… Not surprisingly, Mexico is dropping steadily down the international league tables of competitiveness… That shows up, too, in the relatively few links between the export manufacturing plants and the rest of the economy. Labor aside, only about 1% of the inputs of the export plants is produced in Mexico."*

The exclusion of much of LAC from GPNs is not just a feature of the electronics industry - it is also true of many other industries that are driving exports from EA. Apart from the automobile industry, which owes its existence to the import-substitution era, there are no other major export activities that have set up dynamic production systems in most of LAC. Given its relatively high wages, there are few prospects of doing so in the near future unless domestic capabilities are massively upgraded. Even in the auto industry, the sluggish performance of Argentina and Brazil raises questions about its future prospects. Once the structural adjustment with respect to the US is complete, the growth prospects for Mexico are also dubious.

TABLE C5
EXPORTS, IMPORTS, NET TRADE AND ANNUAL GROWTH OF FINISHED AUTOMOBILES FOR LATIN AMERICA AND EAST ASIA

	Exports (US$ million)		**Imports** (US$ million)		**Net trade** (US$ million)		**Annual growth (1990-2001)** (%)	
	1990	**2001**	**1990**	**2001**	**1990**	**2001**	**Exports**	**Imports**
Latin America	3,656	26,916	2,790	16,279	866	10,637	19.9	17.4
Latin America (excl. Mexico)	1,010	4,976	2,272	9,323	-1,263	-4,347	15.6	13.7
East Asia	2,217	15,722	6,632	8,751	-4,415	6,971	19.5	2.6
Argentina	40	1,543	22	894	18	649	39.4	39.8
Brazil	948	2,644	36	2,099	912	545	9.8	44.8
Mexico	2,646	21,939	420	6,635	2,226	15,305	21.2	28.5
China	46	200	723	1,749	-677	-1,549	14.3	8.4
Korea, Rep.	1,911	13,241	316	373	1,595	12,869	19.2	1.5
Malaysia	81	61	1,066	1,173	-985	-1,112	-2.6	0.9
Taiwan, China	36	147	1,662	939	-1,625	-791	13.5	-5.1
Thailand	45	1,920	603	312	-558	1,608	40.7	-5.8

Source: Calculated from UN Comtrade.

TABLE C6
EXPORTS, IMPORTS, NET TRADE AND ANNUAL GROWTH OF PARTS AND COMPONENTS OF AUTOMOBILES FOR LATIN AMERICA AND EAST ASIA

	Exports (US$ million)		**Imports** (US$ million)		**Net trade** (US$ million)		**Annual growth (1990-2001)** (%)	
	1990	**2001**	**1990**	**2001**	**1990**	**2001**	**Exports**	**Imports**
Latin America	1,243	7,880	4,134	14,721	-2,891	-6,842	18.3	12.2
Latin America (excl. Mexico)	826	2,300	1,083	3,500	-258	-1,199	9.8	11.2
East Asia	4,685	6,841	8,072	8,719	-3,388	-1,878	3.5	0.7
Argentina	133	427	145	800	-13	-374	11.2	16.8
Brazil	594	1,584	388	1,645	206	-61	9.3	14.0
Mexico	417	5,579	3,030	11,193	-2,613	-5,613	26.6	12.6
China	3,432	1,360	3,485	2,550	-53	-1,189	-8.1	-2.8
Korea, Rep.	247	1,906	484	1,195	-237	711	20.4	8.6
Malaysia	18	133	125	286	-107	-153	19.7	7.8
Taiwan, China	726	1,619	745	818	-19	801	7.6	0.9
Thailand	28	501	1,568	1,587	-1,540	-1,086	30.1	0.1

Source: Calculated from UN Comtrade.

TABLE C7
EXPORTS, IMPORTS, NET TRADE AND ANNUAL GROWTH OF FINISHED CAR ENGINES FOR LATIN AMERICA AND EAST ASIA

	Exports (US$ million)		**Imports** (US$ million)		**Net trade** (US$ million)		**Annual growth (1990-2001)** (%)	
	1990	**2001**	**1990**	**2001**	**1990**	**2001**	**Exports**	**Imports**
Latin America	1,750	2,466	174	2,611	1,576	-145	3.2	27.9
Latin America (excl. Mexico)	446	524	145	602	301	-78	1.5	13.8
East Asia	87	399	978	1,218	-891	-819	14.8	2.0
Argentina	22	49	6	198	16	-149	7.3	36.9
Brazil	423	472	55	311	368	161	1.0	17.1
Mexico	1,304	1,942	29	2,008	1,276	-66	3.7	47.2
China	8	119	55	372	-47	-253	28.1	19.0
Korea, Rep.	57	82	62	123	-4	-41	3.3	6.5
Malaysia	0	6	54	246	-54	-240	34.7	14.8
Taiwan, China	0	15	74	89	-74	-74	41.2	1.7
Thailand	9	124	386	178	-377	-53	26.7	-6.8

Source: Calculated from UN Comtrade.

TABLE C8
EXPORTS, IMPORTS, NET TRADE AND ANNUAL GROWTH OF PARTS AND COMPONENTS OF CAR ENGINES FOR LATIN AMERICA AND EAST ASIA

	Exports (US$ million)		**Imports** (US$ million)		**Net trade** (US$ million)		**Annual growth (1990-2001)** (%)	
	1990	**2001**	**1990**	**2001**	**1990**	**2001**	**Exports**	**Imports**
Latin America	512	1,985	560	2,511	-48	-526	13.1	14.6
Latin America (excl. Mexico)	437	750	418	902	19	-152	5.0	7.2
East Asia	243	823	1,287	2,635	-1,044	-1,813	11.7	6.7
Argentina	31	94	44	100	-13	-7	10.7	7.8
Brazil	399	641	145	437	254	204	4.4	10.6
Mexico	75	1,235	142	1,598	-67	-363	29.0	24.6
China	21	252	134	606	-113	-355	25.2	14.7
Korea, Rep.	29	180	257	494	-228	-314	17.9	6.1
Malaysia	2	17	81	78	-79	-60	21.6	-0.3
Taiwan, China	14	56	139	138	-124	-82	13.1	0.0
Thailand	8	101	181	396	-173	-295	26.2	7.4

Source: Calculated from UN Comtrade

TABLE C9
EXPORTS, IMPORTS, NET TRADE AND GROWTH OF FINISHED ELECTRONIC PRODUCTS FOR LATIN AMERICA AND EAST ASIA

	Exports (US$ million)		Imports (US$ million)		Net trade (US$ million)		Annual growth (1990-2001) (%)	
	1990	2001	1990	2001	1990	2001	Exports	Imports
Latin America	1,099	21,383	3,559	29,421	-2,461	-8,039	31.0	21.2
Latin America (excl. Mexico)	1,232	1,776	4,515	16,661	-3,283	-14,885	3.4	12.6
East Asia	47,780	184,886	33,131	147,447	14,649	37,438	13.1	14.5
Argentina	98	37	152	1,084	-54	-1,047	-8.6	19.5
Brazil	503	773	836	3,314	-334	-2,541	4.0	13.3
Costa Rica	0	52	47	1,056	-47	-1,004	100.1	32.7
Mexico	483	20,469	1,278	20,563	-796	-94	40.6	28.7
China	2,449	27,450	2,071	27,442	378	8	24.6	26.5
Korea, Rep.	11,802	25,681	5,055	19,023	6,747	6,658	7.3	12.8
Malaysia	6,149	29,501	2,090	12,482	4,059	17,019	15.3	17.6
Taiwan, China	8,919	28,774	5,474	23,605	3,445	5,169	11.2	14.2

Source: Calculated from UN Comtrade

TABLE C10
EXPORTS, IMPORTS, NET TRADE AND ANNUAL GROWTH OF ELECTRONICS PARTS AND COMPONENTS TRADE FOR LAC AND EAST ASIA

	Exports (US$ million)		Imports (US$ million)		Net trade (US$ million)		Annual growth (1990-2001) (%)	
	1990	2001	1990	2001	1990	2001	Exports	Imports
Latin America	339	7,028	2,092	12,698	-1,753	-5,670	31.7	17.8
Latin America (excl. Mexico)	364	1,829	2,248	8,507	-1,884	-6,679	15.8	12.9
East Asia	16,365	81,235	19,053	88,784	-2,687	-7,548	15.7	15.0
Argentina	19	30	128	609	-109	-579	4.4	15.3
Brazil	156	440	607	2,341	-451	-1,901	9.9	13.1
Costa Rica	0	805	15	226	-15	578	167.3	28.2
Mexico	157	5,712	961	8,331	-804	-2,620	38.7	21.7
China	507	16,166	1,466	17,147	-959	-981	37.0	25.1
Korea, Rep.	1,559	9,978	2,465	5,589	-906	4,390	18.4	7.7
Malaysia	1,698	11,342	3,483	14,008	-1,786	-2,666	18.8	13.5
Taiwan, China	4,013	13,684	1,431	3,112	2,582	10,572	11.8	7.3

Source: Calculated from UN Comtrade.

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