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### **Open Economies and Patterns of Trade**

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### **Macroeconomic Policy**

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## **Chapter Four**

### **Open Economies and Patterns of Trade**

**(with Maria Ángela Parra)**

This chapter takes up the relationship between foreign trade and growth in developing countries in the latter part of the twentieth century. Regional diversity was again the rule, with changing patterns of trade accompanying structural transformation. Fast-growing regions generally recorded increases in shares of manufactured exports with mid and high technological content, the most impressive being the Tigers and, in its speed of transformation, China. Recently in some countries, economic growth has been associated with specialization in dynamic services such as information and communications technologies, with India standing out in this regard. In the slow-growing regions on the other hand, trade diversification and technological upgrading were far less evident. The slow growers were also subject to terms-of-trade and other external shocks.

For orthodox economists, openness to trade is an important explanatory factor for economic growth. Higher growth rates are supposed to be spurred by “gains from trade” due to access to lower-cost foreign products and more efficient domestic resource allocation on the supply side. True to their mercantilist heritage, structuralists point out that exports can stimulate domestic production through the multiplier. Also, as discussed in Chapter 1, access to foreign exchange from exports can be used to import necessary products to satisfy

demand. Imported foreign technology can lead to better and more productive investment which taps potential increasing returns to scale.

In the discussion to follow, we first take up the changes in the pattern of trade in goods and services, and the evolution of the terms of trade of commodities. We then explore the links between specialization patterns and economic performance and conclude with some policy implications, which are developed further in the following chapters.

### ***Changing Patterns of Trade***

Over the long term, all countries included in Maddison's (2001) data set had positive growth rates in the value of merchandise exports. As a share of GDP, exports generally have increased since the nineteenth century (Figure 4.1). This process has been, of course, far from monotonic, with a general reversal during the inter-war period of the twentieth century and specific regional reversals in other periods.

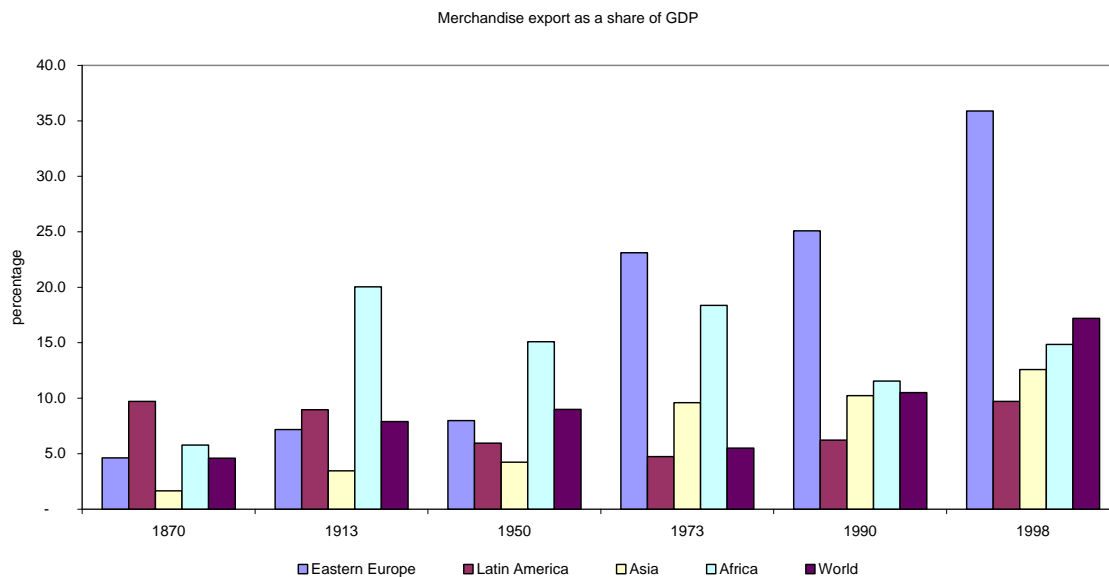


Figure 4.1: Merchandise Exports as Per Cent of GDP by regions.  
Source: Data on exports and GDP are from Maddison (2001). Regions are also defined according to Maddison (2001).

The usual long-run conclusion drawn is that there are positive effects of trade expansion on overall labor productivity. Over given periods, however, the relationship may not be present. For example, in the 1990s greater trade openness was *not* associated with faster economy-wide productivity in most countries. As emphasized in Chapter 1, not just openness to trade but a nation's "insertion" into the global economic system (aid and debt relationships, patterns of trade, commodity price shifts, and access to technology) strongly conditions its prospects.

Since the 1960s, growth in trade has been accompanied by a gradual change in the specialization patterns of developing countries away from primary commodities. This process accelerated after the 1980s but was very uneven across the developing world (Lall, 2001, ch. 4; Akyüz, 2003, ch. I; Ocampo and Vos, 2008, ch. III). Table 4.1 summarizes the patterns of transformation of the export structure in the different regions defined in the previous chapter. We use the late Sanjaya Lall's well-known classification of the technological and natural resource content of merchandise exports.

Period	1985	1990	1995	2000	2005	1985	1990	1995	2000	2005
	1986	1991	1996	2001	2006	1986	1991	1996	2001	2006
	<b>Tigers</b>					<b>Southeast Asia</b>				
Primary products	14%	7%	5%	4%	4%	57%	34%	23%	20%	21%
Resource based manufactures	20%	14%	10%	10%	14%	20%	21%	19%	15%	18%
Low-technology manufactures	23%	27%	17%	14%	11%	10%	24%	22%	19%	16%
Medium-technology manufactures	23%	25%	26%	25%	27%	5%	9%	13%	15%	19%
High-technology manufactures	17%	27%	40%	46%	42%	2%	10%	19%	29%	25%
Others	3%	1%	2%	1%	2%	5%	3%	4%	2%	1%
	<b>China</b>					<b>South Asia</b>				
Primary products	56%	19%	10%	7%	4%	30%	20%	18%	13%	12%
Resource based manufactures	15%	11%	11%	9%	8%	21%	19%	19%	21%	32%
Low-technology manufactures	21%	42%	46%	40%	31%	39%	47%	48%	48%	34%
Medium-technology manufactures	6%	21%	18%	20%	22%	6%	9%	10%	10%	15%
High-technology manufactures	1%	6%	14%	23%	34%	2%	3%	4%	5%	5%
Others	0%	2%	1%	1%	1%	1%	2%	1%	2%	1%
	<b>Semi-industrialized Latin America, South Africa and Turkey</b>									
	<b>Turkey</b>					<b>Andean countries</b>				
Primary products	44%	43%	29%	24%	30%	66%	67%	63%	55%	51%
Resource based manufactures	25%	20%	19%	16%	16%	27%	24%	21%	22%	29%
Low-technology manufactures	13%	14%	15%	14%	12%	4%	8%	7%	9%	6%
Medium-technology manufactures	14%	18%	26%	27%	25%	2%	1%	2%	3%	3%
High-technology manufactures	3%	3%	9%	16%	11%	0%	0%	1%	1%	1%
Others	1%	1%	1%	3%	5%	1%	0%	6%	10%	11%
	<b>Central America and Caribbean</b>									
	<b>Caribbean</b>					<b>Eastern Europe</b>				
Primary products	56%	44%	34%	29%	25%	28%	21%	12%	7%	7%
Resource based manufactures	27%	31%	21%	24%	26%	10%	19%	20%	15%	15%
Low-technology manufactures	8%	12%	15%	16%	18%	17%	23%	31%	26%	20%
Medium-technology manufactures	4%	6%	10%	13%	14%	28%	26%	29%	36%	39%
High-technology manufactures	4%	4%	3%	17%	16%	13%	6%	7%	14%	16%
Others	0%	3%	17%	1%	1%	5%	5%	1%	2%	3%
	<b>Former USSR</b>					<b>Representative Africa</b>				
Primary products	12%	18%	39%	44%	49%	67%	50%	55%	51%	41%
Resource based manufactures	19%	17%	19%	19%	23%	23%	28%	22%	19%	25%
Low-technology manufactures	2%	3%	8%	7%	5%	4%	12%	8%	6%	5%
Medium-technology manufactures	8%	3%	17%	14%	13%	3%	8%	4%	2%	4%
High-technology manufactures	60%	59%	3%	4%	2%	1%	1%	1%	1%	1%
Others	-	-	15%	11%	8%	1%	2%	11%	20%	24%
	<b>Other Africa</b>					<b>Middle East</b>				
Primary products	65%	90%	76%	90%	55%	70%	72%	68%	74%	77%
Resource based manufactures	18%	3%	14%	6%	28%	21%	15%	17%	13%	11%
Low-technology manufactures	5%	2%	4%	1%	2%	5%	6%	8%	6%	4%
Medium-technology manufactures	9%	3%	4%	2%	9%	4%	6%	6%	5%	6%
High-technology manufactures	1%	0%	0%	0%	1%	0%	1%	1%	1%	1%
Others	1%	1%	1%	1%	5%	0%	0%	0%	1%	1%

Table 4.1: Shares of commodities with different technological content in total exports

Source: Source: Authors' calculations based on UN-COMTRADE database. Classifications based on Lall (2001).

The rapidly growing regions in Asia had the most significant shifts in technological content – although less so in South Asia than in the other three. As noted above, the Tiger economies led in terms of technologically advanced exports, which reached 40% or more of total exports since the mid-1990s. Their medium technology exports largely maintained their share, whereas the low technology and natural resource-based components (both primary goods and resource-based manufactures) dropped off sharply.

Southeast Asia followed a similar but slower pattern of transformation. Reflecting its relatively richer endowment, as compared to other Asian regions, its resource-based exports held up much more than in the Tigers, and still represented close to two-fifths of total exports in the mid-2000s. The region saw, in any case, a sharp increase in the export share of mid and high-tech exports, which jointly increased from 7% in 1985/86 of total exports of goods to 44% in 2005/6. Some of these exports, particularly those of high technology, have a strong dependence on manufacturing assembly operations, with domestic value-added in the range of 10-20% of the value of exports.

Trade patterns also shifted to a significant degree towards manufactures and away from primary products in the South Asian countries, largely driven by trends in India. These economies remained, however, at the lower end of the technological content of exports, although gradually moving up and accompanied, in the case of India – though not the neighboring countries — by a boom of “dynamic services” (see below). In 2005/6 South Asia was still overwhelmingly specialized in exporting resource based or low-tech

commodities, which made up about 80% of its export basket of goods. This slower transformation also included limited expansion of assembly operations in India and Pakistan, which were more important in Sri Lanka and Bangladesh.

Compared to even its successful regional counterparts, the export transformation of China was particularly impressive. From a structure not very different from that of Southeast Asia in the mid-1980s, it moved to one closer to that of the Tigers two decades later. China's exports of high technology manufactures rose from 1% of the total in 1985/6 to 34% in 2005/6, whereas the share of mid-technology goods increased from 6 to 22%. Low-tech manufactures remained relatively important, however, indeed closer to the patterns of South Asia, whereas resource-based exports decreased sharply. Although the assembly activities peculiar to late twentieth century globalization constitute an important part of its export structure, the Chinese economy has clearly compensated for dependence on imported components with a broad industrial export dynamism, as reflected in its large manufacturing export surplus. There has been a growing deficit in mining (including energy) products, thus generating growing linkages with the natural resource based economies in other regions of the developing world.<sup>1</sup>

The semi-industrialized countries also recorded an increase in the share of manufacturing exports, but the speed of this transformation was slow relative to that of all the Asian regions. This trend did not offset the region's historical

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<sup>1</sup> Data from *World Trade Organization Statistics Database* show that the mining sector gained a significant share in imports, from 5% in 1980 to 13% by 2003, as a result of the energy supplies that China obtains abroad, while mining exports declined from 27% to 4% respectively for the same period.

pattern of specialization as a net importer of manufactured goods and a net exporter of agriculture and mining. Reflecting abundant natural endowments, 46% of the region's total exports were still resource-based in 2005/6. With some important exceptions (Mexico's incursion into high technology activities with a large assembly component), the mid tech manufactures were relatively more successful. Some of these industries – such as automobiles and process industries — had grown up under import substitution and made a successful transformation into export markets.

The smaller Andean economies remained poorly articulated into the global trading system. Table 4.1 shows that around 80% of the region's exports were still made up of primary commodities or natural resource based manufactures in the mid 2000s. In contrast, the Central America and the Caribbean economies fared better in exporting (largely assembled) manufactured goods as well as tourist services (see below). The surge in high technology exports in this group has a single explanation: Intel's production of computer chips in Costa Rica, with limited domestic content. More generally, the region remained a net importer of manufactures throughout the entire period, indicating that assembly exports did not generate the type of dynamic industrial linkages observed in the Asian economies undergoing similar transformations.

Central and Eastern European exports have been dominated since the 1980s by manufactures, basically as a consequence of the rapid industrialization policies followed after World War II based on the Soviet model and supported by the COMECON. This pattern of specialization implied a chronic deficit of mining



and energy products, fitting the energy-intensive nature of Soviet-style technologies. As a share in total exports, high tech products in Central and Eastern Europe were below that of the Tigers in the mid-1980s and also below those of China and Southeast Asia in the mid-2000s. This confirms the observation by Podkaminer (2005) that there was a structural mistake made during the “planned” years in that not enough attention was paid to specialization in high technology sectors. As in the semi-industrialized countries of Latin America, Turkey, and South Africa, it was more the mid-technology sectors that led the transformation of the export structure.

Whereas the transition implied for Central and Eastern Europe the deepening of the previous industrialization process, for the former USSR it implied a veritable “re-primarization” of its export structure. The data in Table 4.1 apply only to Russia and Ukraine but are representative for the former USSR as a whole. The Russian Federation has become primarily an exporter of mining, particularly energy related products (oil and natural gas), with the share of primary commodities increasing from 12% in 1985/86 to 49% in 2005/6 – or from 31% to 72% if natural resource based manufactures are included.

An even higher and stable dependence on exports of natural resources is typical of most of the selected Middle Eastern and North African economies. In total, about 90% of exports in this region are either primary commodities or natural resource based manufactures. It should be underlined that these results can be attributed to the large share of Saudi Arabia in region’s total exports. The aggregation then overshadows the trade patterns for smaller countries such as

Tunisia, Jordan, and Morocco, which now export mostly manufacturing products and tourist services.

Finally, we can look at how sub-Saharan Africa is performing in terms of integration into the global trading system. As can be observed in Table 4.1 the two sub-regions exported mostly resource-based and low-tech products. The larger medium-tech share in Other Africa is driven by Zimbabwe's exports (as of 2008 strongly affected by ongoing political turmoil) while the Representative Africa region records a slightly higher range of low-tech manufactures.

### ***Trade in Services***

With new information and communication technologies spreading worldwide, the transfer of some service activities across countries and continents has become feasible. The internet revolution of the 1990s played a crucial role in this regard. An important outcome has been the outsourcing of back-office services from developed to developing economies.

The most publicized case is that of India. An English-speaking, educated labor force attracted many multinational corporations which transferred part of their operations to take advantage of lower labor costs. An immediate question is whether these service activities can contribute, by themselves, to dynamic growth in the Hirschmanian sense of establishing linkages with other domestic sectors, and/or in the Kaldorian sense of inducing productivity change. More directly, in what way do the calling centers outsourced by US firms to Bangalore contribute to the establishment of new economic activities, besides those

resulting from the final demand by the employed labor? An industrial sector would do that through demand for intermediate inputs, raw materials or innovations encouraged by industrial policy. Can there be a similar developmental strategy based upon the service sector? Indeed, can the Indian IT sector advance beyond provision of call centers and back office services to production of innovative software? Anecdotal evidence suggests that on the whole it has not gone far in this direction.

Aside from service activities associated with information and communications technologies, there has also been a boom of other types of services. Tourism, an expanding service activity worldwide, has been dynamic in many developing countries. Again, to what extent do these services serve as a source of linkages and productivity growth? Banking, insurance and business consulting services have also boomed, but have remained highly concentrated in industrial countries.

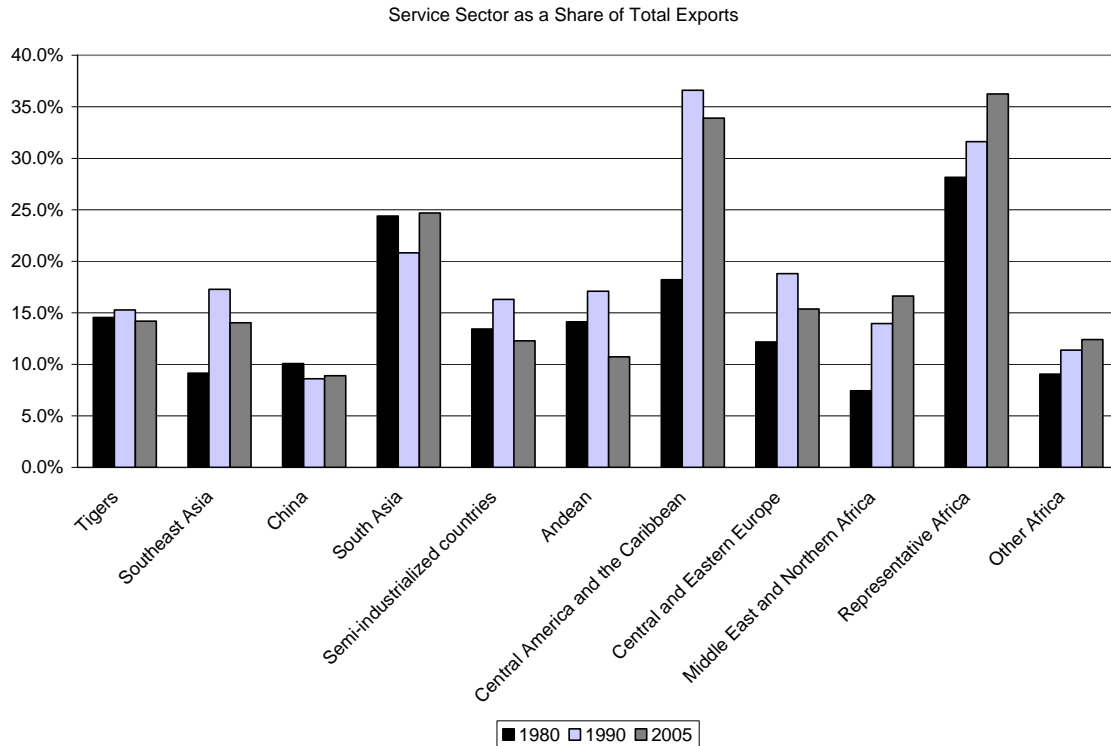


Figure 4.2 Share of service sector in total exports  
 Source: UNCTAD Handbook of Statistics 2007

Looking at the trends in the overall trade in services is one way to begin to address the questions raised above. Figure 4.2 shows that service exports have been modest. As a share of total exports of goods and services, the latter fluctuate between 9% and 16% for most regions, with China as the lowest. At the other end of the scale, South Asia, Central America and the Caribbean, and Representative Africa had service exports amounting to between 25% and 36% of the total exports.

Comparing Figure 4.2 with exports of services by type of activities in Table 4.2 shows that the Central American and Caribbean and the Representative Africa regions (mainly Kenya in the latter) had high contributions from tourism, which develops some linkages (demand for foodstuffs and some basic manufactures) but typically does not lead to significant technological learning. In

some cases, when most of the goods used to cater to travelers are imported, not even these linkages are present and tourism resembles assembly manufacturing in its low contribution to domestic value-added.

	1980	1985	1990	1995	2000	2005
<i>Tigers</i>						
Transportation	39%	34%	25%	33%	35%	36%
Travel	25%	30%	36%	27%	22%	18%
Other Services	36%	37%	39%	40%	43%	46%
<i>Southeast Asia</i>						
Transportation	16%	14%	14%	9%	17%	22%
Travel	40%	43%	57%	49%	65%	44%
Other Services	44%	43%	29%	42%	18%	34%
<i>China</i>						
Transportation	52%	43%	46%	18%	12%	21%
Travel	28%	32%	30%	46%	53%	39%
Other Services	20%	25%	24%	37%	35%	40%
<i>South Asia</i>						
Transportation	20%	21%	27%	31%	17%	16%
Travel	45%	25%	27%	29%	19%	16%
Other Services	36%	54%	46%	40%	64%	69%
<i>Semi-industrialized countries</i>						
Transportation	27%	32%	22%	22%	19%	20%
Travel	43%	41%	47%	41%	43%	54%
Other Services	30%	27%	31%	37%	39%	26%
<i>Andean</i>						
Transportation	32%	39%	40%	36%	22%	25%
Travel	39%	30%	31%	36%	50%	53%
Other Services	28%	31%	28%	28%	27%	21%
<i>Central America and the Caribbean</i>						
Transportation	20%	16%	13%	10%	11%	12%
Travel	46%	58%	57%	65%	71%	72%
Other Services	34%	26%	30%	25%	17%	16%
<i>Central and Eastern Europe</i>						
Transportation	51%	48%	38%	23%	23%	27%
Travel	20%	21%	22%	35%	49%	38%
Other Services	29%	30%	40%	42%	29%	35%
<i>Middle East and Northern Africa</i>						
Transportation	25%	na	na	Na	na	na
Travel	29%	na	na	Na	na	na
Other Services	45%	54%	53%	44%	43%	40%
<i>Representative Africa</i>						
Transportation	28%	29%	na	21%	26%	24%
Travel	26%	36%	na	58%	50%	55%
Other Services	46%	35%	37%	22%	25%	22%
<i>Other Africa</i>						

Transportation	66%	50%	28%	24%	17%	14%
Travel	10%	10%	8%	8%	9%	6%
Other Services	24%	39%	64%	68%	75%	80%

Table 4.2: Breakdown of exports of services

Source: UNCTAD Handbook of Statistics 2007

<sup>1</sup>1981 as starting year, <sup>2</sup> 1982 as starting year, 2003 as end year, <sup>3</sup>2003 as end year, <sup>4</sup> 1982 as start year, 2005 without Slovakia, <sup>5</sup> 2004 as the last year, <sup>6</sup> 1981 as starting year, and 1991 instead of 1990, <sup>7</sup> 2003 as last year, Cameroon, Cote d'Ivoire and Mozambique.

In contrast to these two regions, South Asia (basically India) recorded an increase in the share of its services other than travel and transportation. Table 4.3 adds one more piece of information: the rise of service sector share in exports in South Asia is mostly because of expansion of “dynamic” service exports associated with information and communications technologies. Such exports are dynamic in the sense that they generate high value-added and utilize skilled labor as compared to travel and transportation services. Indian experience suggests, in particular, that specialization in services with higher value-added can help growth and income per capita. Nevertheless, an overwhelming 93% of India’s labor force remains unemployed or underemployed in the agricultural and urban informal sectors.

<b>Region</b>	<b>Share in service exports</b>
Tigers	0.8%
Southeast Asia	0.6%
China	2.5%
South Asia*	39.8%
Semi-industrialized countries	1.2%
Andean	0.0%
Central America and the Caribbean**	2.5%
Central and Eastern Europe	2.3%
Middle East and Northern Africa	0.5%
Representative Africa	1.0%
Other Africa*	0.3%

\* 2003

\*\* 2004

Table 4.3: Exports of Information and Communications Services (as a % of total service exports), 2005

Source: UNCTAD Handbook of Statistics 2007

Elsewhere, the connection between exports of services and economic growth appears to be mixed. The fast growing countries, such as the Tigers and China, have consistently seen an expansion of exports in “other services,” mainly banking, insurance, and business services. Other services have also been increasing and make up 35% of total service exports in Central and Eastern Europe, with business related activities taking the dominant share. This is also true of some semi-industrialized countries – e.g., Brazil. However, given the low share of service exports in general in these economies, it is hard to argue that they have played an important role in their growth processes.

### ***Terms of Trade***

Failing to diversify exports toward products with higher domestic value-added and technological content always carries risks of the adverse terms of trade movements that affect primary commodities but increasingly also low-tech manufactures, which are associated with low demand elasticities and low wages in producing countries.<sup>2</sup> Such adverse shocks result, in turn, in declines in export

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<sup>2</sup> High-tech manufactures experiencing rapid technical change (e.g., computer chips) may also experience a fall in the terms of trade, but this is a different phenomenon to that experienced by resource based goods and low-tech manufactures, where low demand elasticities and cost factors not associated with productivity (low wages, in particular) play the leading role. A more similar issue to that underscored in the main text is that of mid or high-tech manufactures with blueprints that can be easily transferable and become subject to integrated production systems (e.g., computer assembly).

revenues and potential foreign exchange bottlenecks. Even favorable terms-of-trade shifts can set off Dutch disease and similar afflictions in primary goods exporters.

As discussed in Chapter 2, the economic slowdown in most developing countries that started in the second half of the 1970s and deepened during the lost decade of the 1980s was partially associated with falling terms of trade for non-manufactured products. Terms of trade for commodities fell by around 30% from the average of the first three and half decades following the Second World War. The collapse lasted about a quarter century. As export values plummeted, many economies went into recession or an outright growth collapse. The slowdown was worsened by a sudden cut-off in net financial transfers to the developing countries at the beginning of 1980s (especially in Latin America).

The downward trend in prices for primary commodities that began in the 1970s was not something new. Decades previously, in the late 1940s, two structuralist economists, Raúl Prebisch (1950) and Hans Singer (1950), put forth a theory on the effects of declining terms of trade for developing economies. They maintained that as economies around the world grow richer, the structure of their demand changes towards manufacturing products (and now, more recently, dynamic services). The use of synthetics to replace raw materials in the production of manufactured goods will bring about a further decline in the relative demand for primary commodities. Terms of trade will thereby move unfavorably, leading to declining net export values and adverse effects on growth.



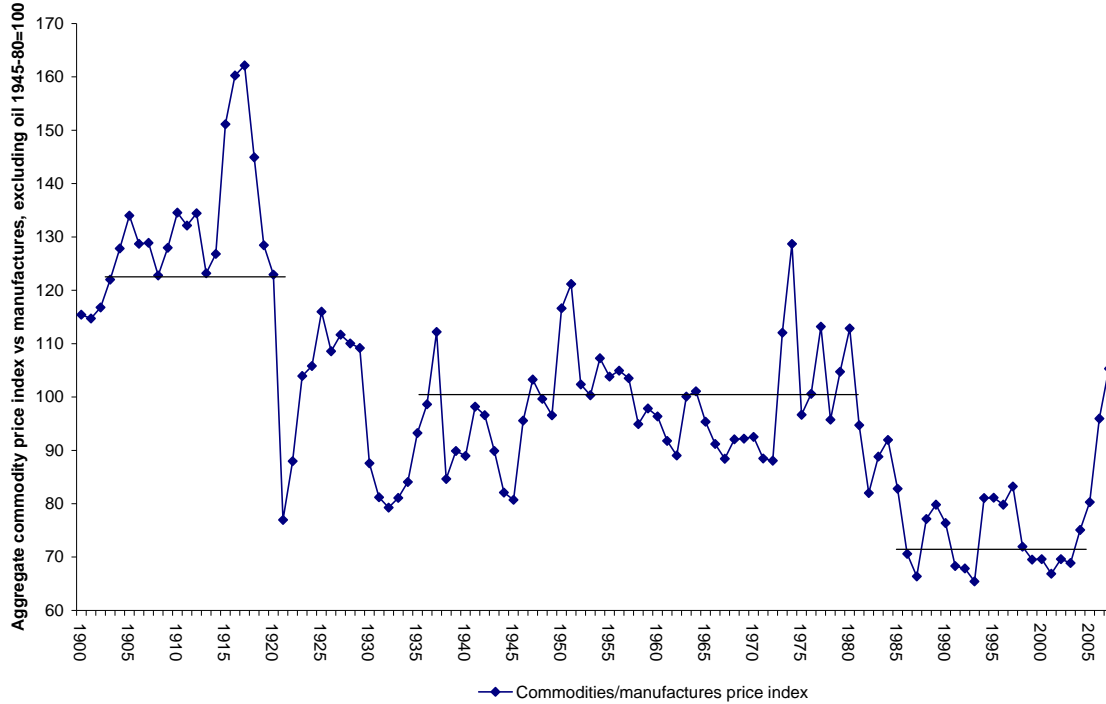


Figure 4.3: Ratio of aggregate non-oil commodity prices to manufacturing prices  
 Source: Grilli and Yang (1998), Ocampo and Parra (2003) and updating using the latter study.

Figure 4.3, updated from Ocampo and Parra (2003), confirms this view.

The figure presents the long-run trend of real prices for non-fuel primary commodities throughout the twentieth and early twenty-first centuries.<sup>3</sup>

Commodity prices are compared with the manufacturing unit value index developed by the United Nations and now regularly updated by the World Bank. Thus, the trends describe how prices of primary commodities fared relative to manufacturing products for the last century or so. Despite upward spikes early in the last century and in the 1920s, 1950s, and 1970s, the overall downward trend is quite clear. For the twentieth century as a whole, raw materials recorded a decline of more than 50% in their value relative to manufactures. Among different

<sup>3</sup> The indices that enter this figure were originally developed by Grilli and Yang (1988) for the period 1900-1986.

commodities, tropical agricultural products fared the worst, while metals did somewhat better (not shown here).

Another spike emerged in recent years, together with a boom in oil and other prices (as in the 1970s). These price hikes were propelled in part by the large increase in the demand for raw materials coming from the rapidly growing Chinese economy. Many low income primary product exporters (not to mention generously endowed Russia and the Persian Gulf countries, among others) saw handsome gains in the terms of trade and grew at relatively decent rates. Unfortunately, this boom came to end in mid-2008, an event that is likely to curtail economic expansion in much of the developing world.

The solution for ensuring long-term sustainable growth depends on developing countries' ability to diversify their exports towards products with more value-added and technological content. While many economies may not be ready to enter production of high-tech manufacturing, a niche is open for them in other industries where they can still take advantage of increasing returns to scale and avoid risks from unfavorable terms of trade shocks or from a decline in the world demand for primary products.

### ***Trade Specialization Patterns and Economic Performance***

The evidence of a strong association between the patterns of specialization in international trade and economic growth is compelling. Hausmann et al. (2007) use cross-country econometrics to argue that the “quality” or technological content of exports is a basic determinant of growth.

These authors measure quality by the income content of exports, estimated as a weighted average of the incomes of countries that typically export the same type of goods. Using a different methodology, Ocampo and Parra (2007) and Ocampo and Vos (2008, chapter III) come to a similar conclusion.

Table 4.4 uses the latter approach to show the association. We first identify the “dominant” pattern of a specialization – or rather, of the transformation of the export structure — of each country in a given period and then estimate the average per capita growth rates of countries with that specialization pattern. Sanyaja Lall’s classification of exports by technological and natural resource contents is again used here.

We use two alternative methodologies to determine which specialization pattern is dominant in a specific country and time period. The first (Panel A) is that used by Ocampo and Vos (2008, chapter III). It is based on the change in the share of a specific export category weighted by a measure of the “revealed comparative advantage” of the country in that category of goods at the end of the period (the share of the country in that category of exports in world markets relative to its overall share in world exports).<sup>4</sup> The second method (Panel B) also determines the change in the share of the specific export category multiplied by a dummy which indicates whether the country has a “revealed comparative

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<sup>4</sup> Formally, this index (T) is:  $T_{(\beta, \alpha, k-k+1)} = (CS_{\beta, \alpha, k+1} - CS_{\beta, \alpha, k}) * (TS_{\beta, \alpha, k+1})$ , where  $CS_{\beta, \alpha, k}$  is the share of category  $\alpha$  in total merchandise exports of country  $\beta$  in period  $k$ ; and  $TS_{\alpha, k+1}$  is the share of country  $\beta$ 's exports of category  $\alpha$  in developing countries' exports of category  $\alpha$  in period  $k+1$ . If we divide the second term by the country's share in world exports, we would have the commonly used measure of revealed comparative advantage in that category, but since this term is common to all categories we exclude it from the equation.

advantage” in that category of exports.<sup>5</sup> In both cases, the export category with the highest value of the estimated coefficient of specialization is taken as the “dominant” one during the period<sup>6</sup>.

Table 4.4 presents the averages of per capita GDP growth of each group of countries with similar “dominant” specialization patterns. Estimates are done by decade since the 1970s and two longer sub-periods. According to data availability, we include 93 countries in the analysis for 1970-2000 and 67 for periods ending on 2005-2006.

		1970-1980	1980-1990	1990-2000	2000-2006	1980-2006	1990-2006
High-Tech dominant	5	2.70	1.33	3.15	2.85	3.33	2.59
Medium-tech dominant	4	3.36	-1.36	2.06	3.25	1.22	2.48
Low-tech dominant	3	2.50	0.85	2.06	2.05	1.30	2.04
Natural resources based dominant	2	1.82	-1.05	0.65	2.71	1.13	1.92
Primary commodities dominant	1	-0.36	-0.53	0.59	2.07	0.88	1.45
No dominant pattern	0	0.77	-0.14	0.56	1.11	0.07	-0.40
Number of countries		92	93	80	67	67	67
Number of countries with dominant pattern		89	87	73	58	56	63

Table 4.4. A: According to the Trade Specialization Indicator (TSI). 1/

		1970-1980	1980-1990	1990-2000	2000-2006	1980-2006	1990-2006
High-Tech dominant	5	3.81	3.99	2.80	4.81	3.72	3.70
Medium-tech dominant	4	3.74	-2.33	1.33	3.07	0.61	2.68
Low-tech dominant	3	2.45	1.83	2.07	2.05	1.34	1.98
Natural resources based dominant	2	1.74	-0.84	0.53	2.14	0.81	1.97
Primary commodities dominant	1	-0.39	-0.63	0.04	2.60	0.80	1.54
Highest lost share in 1		2.15	0.10	1.14	0.39	1.10	0.54
Highest lost share in 2		2.29	-0.37	0.16	-0.01	0.50	-0.11
Highest lost share in 3, 4 or 5		2.81		9.31	2.75		3.08
Number of countries		91	92	92	66	66	66
Number of countries with only negative change		26	17	15	12	7	10
Number of countries without data		1	0	0	26	26	26

Table 4.4. B: According to the Revealed Trade Specialization Indicator (RTSI). 2/

Table 4.4: Average per capita GDP growth per group according to alternative indexes of dominant pattern of specialization

<sup>5</sup> Again, formally,  $R_{(\beta, \alpha, k-k+1)} = (CS_{\beta, \alpha, k+1} - CS_{\beta, \alpha, k}) * (DRCA_{\beta, \alpha, k+1})$ , where  $DRCA_{\beta, \alpha, k+1} = 1$  if  $RCA_{\beta, \alpha, k+1} > 1$  and 0 otherwise. This measure allows the identification of cases in which the dominant change in pattern was to move away from a sector in which a country had previously reached RCA, even if the country had not reached RCA in any new sector. That is shown in Table 4.4 as countries with only negative changes in  $CS_{\beta, \alpha}$ , classified according to the sector in which they had the strongest lost in share.

Sources: Authors' calculations based on UN. National Accounts Database for per capita GDP and UN-COMTRADE Database for trade classifications. See text for definitions and methodology.

1/ Index T is defined in footnote 4.

2/ Index R is defined in footnote 5. RCA is the revealed comparative advantage.

These exercises point to three main conclusions. The first is that growth is closely associated with the technological and natural resource content of exports. Countries with an export pattern dominated by high-tech grow the fastest over the long run, followed by exporters of either mid-tech or low-tech products. In contrast, exporters of natural resource-based manufactures and, in particular primary products consistently show the worst performance. Both methodologies confirm this conclusion, with the second accentuating the advantage of high-tech exports.

The second main conclusion is that high-tech and low-tech manufactures offer more stable growth patterns, while the other three categories (mid-tech and the two natural resource-based categories) are subject to stronger cyclical swings, largely associated with fluctuations in commodity prices. Growth in countries with these export patterns has been rapid when commodity prices have been good (the 1970s and the 2000s) and weak or negative when commodity prices have been poor (the 1980s in particular). This association of mid-tech exporters with commodity prices no doubt reflects the importance of the process industries included in that category, which may be seen as having increasing commodity characteristics.

The specific advantage of low-tech over mid-tech specialization patterns is clearly associated with greater stability of growth; during periods of high commodity prices mid-tech exporters actually grow faster. On the other hand, the

advantage of mid- over low-tech specialization is obviously technological. So, there is a trade-off between these two features, with the technological factor prevailing in 1990-2006 but not in the 1980-2006 period as a whole. In turn, although mid-tech exporters are also cyclically vulnerable, this specialization pattern is in the long run clearly superior to that based on natural resources (either manufactures or primary goods).

Finally, as a corollary of the previous patterns, growth tends to be more uniform in the developing world during periods of high commodity prices, such as the 1970s and the 2000s, though continued specialized in primary goods seems to be a disadvantage even in those decades according to most simulations. In the more recent period, as we have seen, a major channel has been the linkages with commodity exporting developing countries generated by Chinese growth. The expectation that a natural resource based specialization pattern will lead to fast and uniform growth in the developing world is thus dependent on commodity prices remaining strong – an expectation unfortunately ungrounded in history.

### ***A Primer on the Policy Implications***

The major policy implications of these empirical findings have already been sketched in Chapter 1 and the details are presented in the following chapters.

The high points is that sustained per capita income growth is impossible without productivity increases in at least some activities producing traded goods. As emphasized in Chapter 1, industrial and trade interventions have to be designed to support the transformation of the production and trade structures and, particularly, to promote production processes subject to increasing returns. The international policy environment under the fading Washington Consensus and the supervision of the World Bank and the World Trade Organization is less favorable to an aggressive policy approach than it was a few decades ago, but many possibilities still exist (see Chapters 8 and 9).

In terms of the shorter term macroeconomic dynamics, the management of shocks coming from trade is essential to guarantee stable growth over time under all specialization patterns, but particularly in those patterns that are subject to strong terms of trade shocks. The crucial links come through the current account, which can change dramatically and unexpectedly at any time. In a country with a small population, incapable of producing capital and many essential intermediate goods, the over-riding macroeconomic restriction during crises is “external strangulation”, in the sense of having low hard currency inflows from exports and/or capital inflows. Gap models as discussed in Chapter 7 provide a framework for analyzing the problem but are not a solution. Creating new sources of foreign exchange is basically the only way out.

At the other extreme, ample access to foreign exchange can cause its own problems – over-valuation, slow or aborted industrialization, Dutch disease and unsustainable economic expansion. The emphasis in this chapter has been

on impacts of price spikes for raw material exports, but potential problems go well beyond those posed by bonanzas. The root of the English “bonanza” is an old Spanish word for fair weather, which always comes to an end.