

## Chapter II

# Structural change and economic growth

An essential insight of classical development economics was that economic growth is intrinsically linked to changes in the structure of production. According to this view, industrialization is the driver of technical change, and overall productivity increases are mainly the result of the reallocation of labour from low- to high-productivity activities. The present chapter investigates to what extent this view is still relevant today and thus how the degree and nature of structural change explain the diverging growth trends between developing countries.

The first section presents alternative views of the growth process, underscoring the difference between the drivers of that process in developed countries and those in developing ones. The second section demonstrates that the fast-growing Asian regions were able to make large and speedy transitions out of agriculture and into industries and services, while economies with little structural change lagged behind. The traditional view that capital accumulation is important for growth still holds, as the subsequent section shows, although they do not stand in a one-to-one relationship. The structure of investment is also important, not only because industrialization requires more investment in the manufacturing sector, but also owing to the fact that important investments in financial and business services are needed to support industrial development. Further, low growth is associated with greater investment volatility. External shocks and erratic domestic policies are conducive to greater economic uncertainty, which hampers the long-term investment required to realize dynamic structural change, an issue that is explored in detail in chapter IV.

The final section analyses how employment and labour productivity have shifted along with patterns of growth and structural change in developing economies. Sustained increases in labour productivity and reallocation of labour from low- to high-productivity sectors are characteristics of the fast-growing economies. Yet, important employment shifts towards industrial and services sectors are also observed in those regions with low growth performance. In these cases, however, employment growth is not accompanied by higher productivity, indicating that labour is absorbed by low-productivity activities where it remains largely underutilized.

Owing to data limitations, the analysis in this chapter is restricted to a sample of 57 developing economies. They are grouped in 10 geographical country groups (with China as a single-country “group”) and an analytical group made up of eight semi-industrialized countries.<sup>1</sup>

<sup>1</sup> The ten geographical groups are the *first-tier newly industrialized economies* (3): Republic of Korea, Singapore and Taiwan Province of China; *China* (1); *South-East Asia* (5): Indonesia, Malaysia, Philippines, Thailand and Viet Nam; *South Asia* (4): Bangladesh, India, Pakistan and Sri Lanka; *low-to-middle-income Latin American countries* (3): Bolivia, Ecuador and Peru; *Central America and the Caribbean* (5): Costa Rica, Dominican Republic, El Salvador, Guatemala and Jamaica; *Central and Eastern Europe* (6): Bulgaria, Czech Republic, Hungary, Poland, Romania, and Slovakia; *Commonwealth of Independent States* (2): Russian Federation and Ukraine; *sub-Saharan Africa* (10): Cameroon, Côte d’Ivoire, Ethiopia, Ghana, Kenya, Mozambique, Nigeria, Uganda, United Republic of Tanzania and Zimbabwe; *Middle East and Northern Africa* (10): Algeria, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Morocco, Saudi Arabia, Syrian Arab Republic, Tunisia and Yemen. The group of *semi-industrialized countries* (8) is made up of: Argentina, Brazil, Chile, Colombia, Mexico, South Africa, Turkey and Venezuela (Bolivarian Republic of).

Economic growth in developing countries is about changing the structure of production

Again owing to data problems, the information for certain variables (the structure of employment) and some groups of countries covers shorter time periods.<sup>2</sup>

## Economic growth requires structural change

**For developing countries, growth and development are much less about pushing the technology frontier and much more about changing the structure of production**

Productivity growth in developed countries mainly relies on technological innovation. For developing countries, however, growth and development are much less about pushing the technology frontier and much more about changing the structure of production towards activities with higher levels of productivity. This kind of structural change can be achieved largely by adopting and adapting existing technologies, substituting imports and entering into world markets for manufacturing goods and services, and through rapid accumulation of physical and human capital. A few developing countries have been able to undertake original research and development in some fields, but technological innovation continues to be highly concentrated in the industrialized world.

These fundamental differences in the nature of the growth process between developed and developing countries remain subject to considerable debate among economists. Among the most important analytical developments in recent decades has been the explicit recognition by the so-called new growth theories of the role of external economies in human capital formation and technological innovation, dynamic economies of scale associated to learning by doing, and institutional factors in the growth process. These new insights have moved away from the more traditional perspective that accumulation of capital was the key to economic development. They also held the promise of a better linking of policies to economic growth performance.

Nonetheless, empirical studies based on these theoretical insights, largely relying on cross-country evidence, have left many questions unanswered. In particular, the analyses failed to identify meaningful criteria for determining which of the close to 150 variables found statistically significant in various studies should be considered the core determinants of economic growth. Aside from such inconclusiveness, there was a failure by this literature to grasp the importance of context-specific factors, particularly those associated with institutional development (see chap. V). Also, it has poorly captured the fact that the growth impact of policies tends to differ across countries and time periods (an issue that is called non-linearity). The main focus has been on domestic factors, with the external factors that explain why growth successes and failures cluster in specific time periods and regions being ignored (see chap. I). Even more important for the theme of this chapter, the main emphasis of such studies has been on aggregate growth and, to a large extent, on a search for explanatory factors of technological progress, assuming that factors of production are fully utilized and use the best technology available in the country. In other words, the focus has been on the core business of the growth process in developed countries, rather than on that in developing economies where underutilization of labour (and sometimes other factors of production) and the coexistence of modern and traditional production technologies are the rule rather than the exception.

<sup>2</sup> Available international data sets (such as the United Nations Common Database, the World Bank World Development Indicators database, and the labour statistics databases of the International Labour Organization) do not provide consistent and comparable investment and employment data series prior to 1990 for a sufficiently large number of countries. Hence, part of the empirical analysis in the second and third sections had to be limited by and large to patterns observed in the 1990s and beyond.

On the other hand, economists who follow the tradition of classical development thinking have held that economic growth in developing countries is about structural change towards high-productivity sectors and that industrialization plays a key role in that process (Ros, 2000). According to this view, the development of the modern industrial sector will contribute more in *dynamic* terms to overall output growth, because of its higher productivity growth which results from increasing returns to scale<sup>3</sup> and gains from innovations and learning by doing.<sup>4</sup> The underemployed labour force of the rural sector, but increasingly also of the urban informal sector, provides a fairly elastic supply of labour that allows this process to take place without facing significant labour supply constraints.

Early empirical studies had already showed the importance of industrial development for higher long-term economic growth, indicating that it has indeed been an observed “regularity” in development patterns (Kuznets, 1966; Chenery and Taylor, 1968; and Chenery, 1979). Modernization of agriculture is also essential to facilitating a dynamic transformation from an agricultural to a modern industrial society (see chap. V). As economies moved up the ladder of development, services sectors would gain importance. Modern service sectors are also a source of productivity gain and are essential for the achievement of industrialization. As international trade for services grows, they also offer a new opportunity for export development (see chap. III).

Notions similar to those of classical development thinking are also embedded in the early, non-neoclassical growth theories of Verdoorn (1949) and Kaldor (1957, 1978), among others. Kaldor (1978) suggested that productivity and output growth reinforced each other. The positive effect of productivity increases on output growth has been extensively discussed in the economics literature. The reverse causality whereby productivity growth itself depends on how fast the overall economy is growing has received much less attention. In this view, productivity is determined endogenously in expanding production sectors. Learning by doing, innovations and sectoral linkages are all factors that influence productivity positively when growth accelerates. Indeed, as the economy expands, these factors become more important for productivity growth as more resources become available for investment in new technology and for the training of workers. Learning by doing and experience accumulated during the production process by both entrepreneurs and labourers are also essential for productivity growth and these factors become increasingly important when growth is dynamic.

If resources initially are not fully utilized—because of un- and underemployment—not only will growth lead to better utilization of existing resources, but productivity growth will also accelerate as resources are shifted from low- to high-productivity activities, an idea consonant with classical development thinking. Inversely, slow economic growth will lead to increasing underutilization of resources and hence to adverse effects on productivity. In this sense, the association that is usually established between slow productivity performance and slow economic growth may have its basis not in a lack of technological change, but rather in the growing underutilization of resources that characterizes a low-growth environment, reflecting the reverse causality mentioned above. In other words, if resources are not fully utilized or are underutilized, weak productivity performance may be the *result* rather than a determinant of low output growth.

Building upon these foundations, one can develop a broader perspective on structural change and growth. In this view, dynamic structural change involves more than just growth of

<sup>3</sup> Characteristic of the industrial production process is the use of large-scale machinery with whose help the costs per unit of production decrease as output expands. In the economic jargon, this mechanism is known as economies of scale. The potential for increasing returns to scale and productivity growth in the industrial sector can also be the result of better organization of production, for instance, by having workers specialize in performing smaller tasks which increases their potential for greater output.

<sup>4</sup> This notion can be found in the late eighteenth century in the writings of Adam Smith and was developed further in the early twentieth century by Alwyn Young (Young, 1928).

The importance of industrial development was central to classical development thinking

Productivity and output growth reinforce each other

Less unemployment can lead to higher productivity growth

The degree and nature of structural change explain the diverging growth trends among developing countries

industry and modern services. It is about the ability to constantly generate new activities as well as about the capacity of the new activities to absorb surplus labour and to promote the integration of production sectors within the *domestic* economy (that is to say, to strengthen domestic linkages) (see, for example, Ocampo, 2005b). From this angle, the industrial sector tends to have larger potential to induce deeper domestic integration by processing raw materials and semi-industrial inputs and requiring a number of ancillary services. The degree of integration of the domestic economy further influences the size of the domestic market as well as the degree of technological and other spillover effects that exports and foreign direct investment (FDI) can create for domestic economic activity and in this way, it influences the extent to which a country is able to benefit from international trade and investment. In this sense, only when it is based on or can help create strong *domestic* linkages, will integration into the world economy generate rapid technological progress and contribute to high and sustained growth. These issues are dealt with more extensively in chapter III.

## Patterns of growth and structural change, 1970-2003<sup>5</sup>

Developing economies grow faster as the importance of the industrial and services sectors increases and that of agriculture decreases

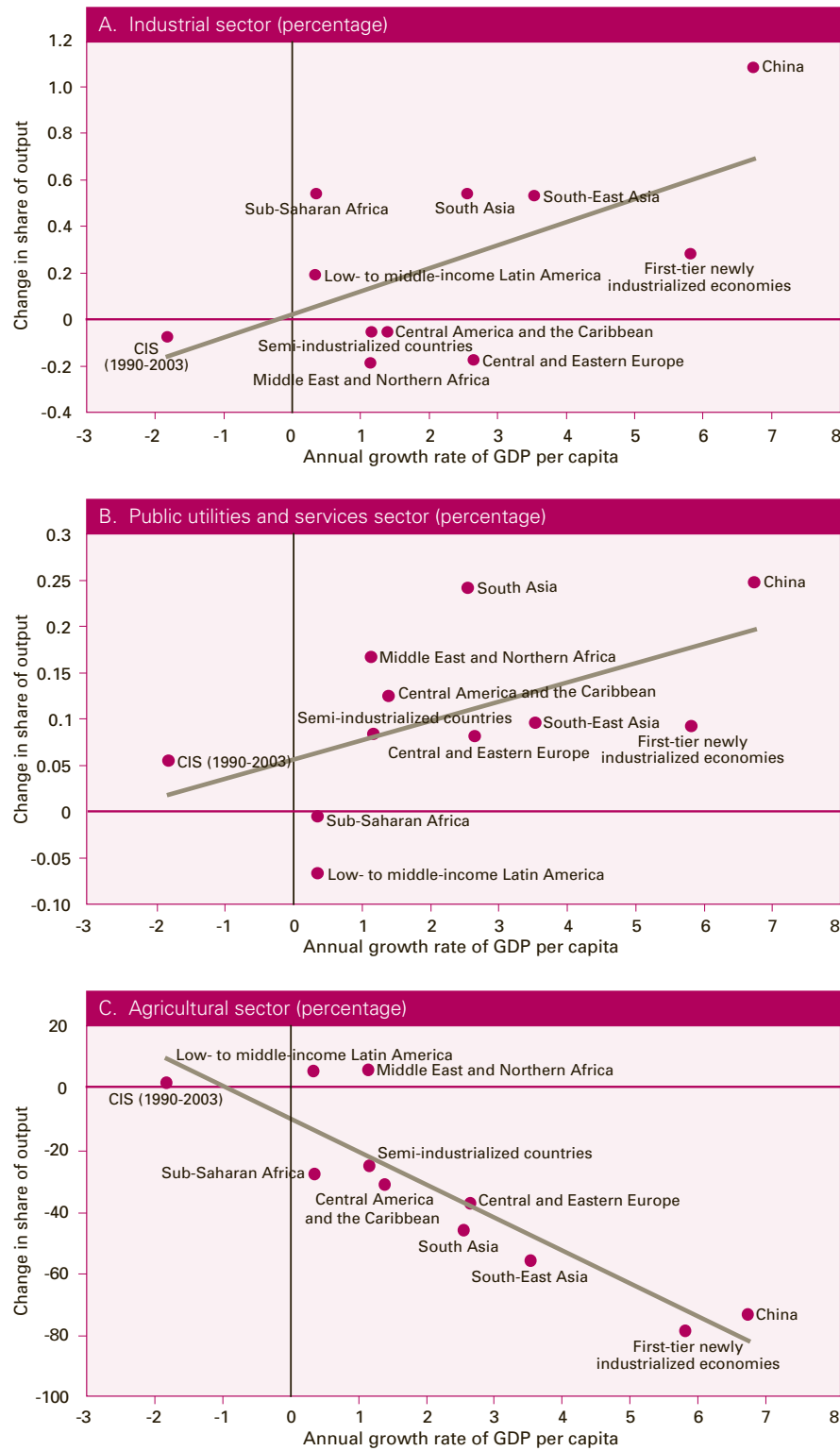
Developing economies grow faster as the importance of the industrial and services sectors increases and that of agriculture decreases (see figures II.1 and II.2). Fast growth in China, South-East Asia and South Asia was associated with a rapid decline in the importance of agriculture and strong expansions of industry and services during 1970-2003. In contrast, sluggish long-term growth after the 1970s in the semi-industrialized countries and in Central America and the Caribbean as well as in countries in the Middle East and the Commonwealth of Independent States (CIS) was associated with a process of deindustrialization (of variable intensity). In these groups, growth was generally concentrated in the services sector with the share of agriculture in output also declining or remaining stagnant.

Clearly, also, the relationship between structural change and economic growth is not exactly the same everywhere. Rapid economic growth in the first-tier newly industrialized economies was accompanied by much less structural change directed towards industry than was growth in, for instance, the South Asian countries. This can be attributed largely to the fact that much industrialization had taken place in the first-tier newly industrialized economies prior to 1970, the starting year of the period of this analysis. Also, the expansion of services was more dynamic in South Asia relative to South-East Asia. The economies in sub-Saharan Africa and in low- to middle-income Latin America managed to increase the share of industrial output, but showed little or no per capita income growth at all. For the period from 1990 to 2003, the countries in Central and Eastern Europe showed (on average) moderate growth despite deindustrialization, with services playing the leading role in the growth process.

These aggregate patterns may further hide important differences across regions and countries. The Asian countries followed a dynamic pattern of structural change. China is the most important case in point. Starting around 1978, its economic system went through a gradual change from Soviet-style central planning towards greater market orientation. Despite its large population, China witnessed an impressive and rapid change in the sectoral composition of output. Between 1970 and 2003, the share of manufacturing and mining in overall output increased from 28 per cent to 60 per cent, while the share of agriculture dropped from 49 to 12 per cent. A reform of rural institutions (see chap. V) and aggressive investment policies inducing infrastructure development in support of export industries promoted this vast transformation of

The economy of China underwent an impressive and rapid structural change

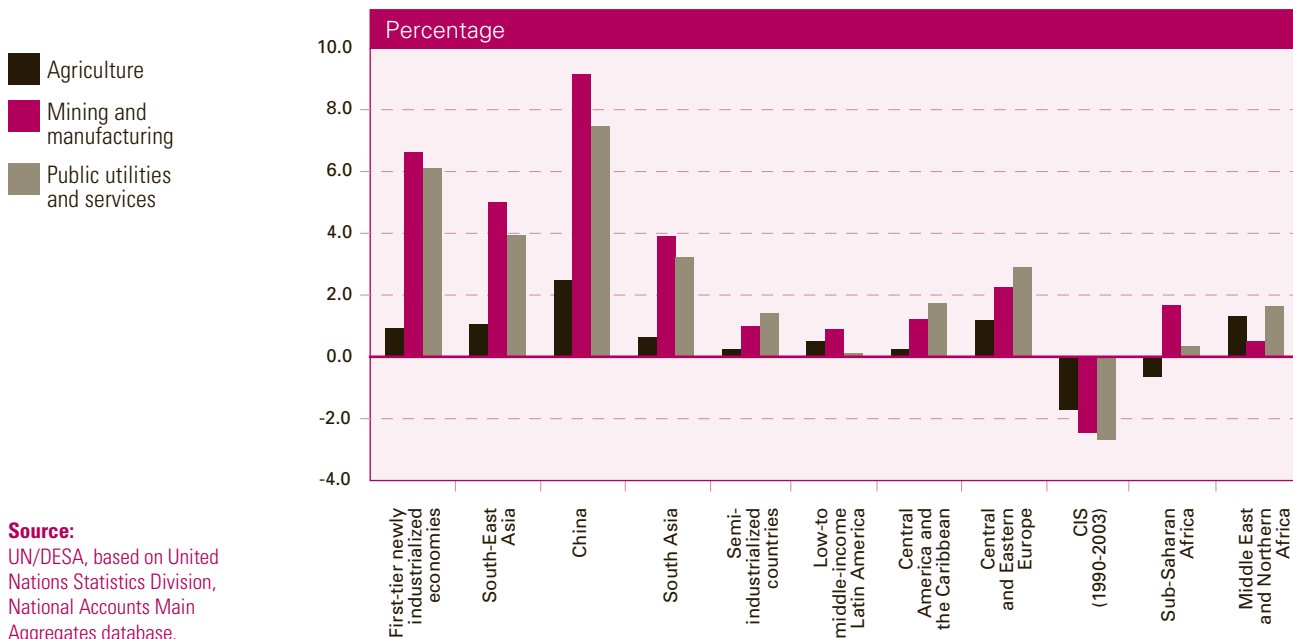
Figure II.1.  
**Economic growth and structural changes in the industrial sector, the public utilities and services sector, and agriculture, selected regions and country groups, 1970-2003**



**Source:**  
 UN/DESA, based on United Nations Statistics Division, National Accounts Main Aggregates database.

Figure II.2.

**Annual growth rates of output per capita in agriculture, mining and manufacturing, and the public utilities and services sectors, selected regions and country groups, 1970-2003**



the Chinese economy. The land reform and infrastructure development lifted the main binding constraints on agriculture growth and helped unleash previously untapped economic forces. Add to these trends a policy of gradual opening to world markets and one finds much similarity with the type of export-led growth strategy followed by the first tier newly industrialized economies.

**The first-tier newly industrialized economies switch to high-tech manufacturing during the 1980s**

The first-tier newly industrialized economies, as indicated, had witnessed substantial industrial growth in the 1960s following initially a strategy of import substitution. The industrial sector had already grown to significant proportions by the 1970s when growth became export-oriented. It should be noted, though, that import substitution policies were maintained for the development of new sectors. By the mid-1980s, these economies had switched to high-tech manufacturing production (see chap. III) and strengthened the development of modern services. The success of the first-tier newly industrialized economies in making this more recent dynamic structural change was fostered to some extent by external events. Among such events, the substantial appreciation of the yen against the United States dollar owing to the Plaza Accord of 1985 was particularly relevant to the support of export growth in these economies. As the Asian first-tier newly industrialized economies had pegged their exchange rates to the dollar, the appreciation of the yen increased their competitiveness vis-à-vis Japan in markets for technologically more advanced products and attracted Japanese investors to their export industries. This phenomenon conforms to the flying geese model created for the region.

**South Asia, and particularly India, showed an early shift towards services**

South Asia showed less dynamism and structural change relative to the first-tier newly industrialized economies in East Asia. The share of manufacturing and mining peaked at 22 per cent of total output in the region in the 1990s, up from 14 per cent in 1970. The pattern for the region largely reflected what had happened in India. Most recently, India's growth has been driven by a fast-growing service sector. By the traditional standards of patterns of structural change, this trend implies a premature shift into services given the relatively low income level of the country. However, services have become increasingly tradable (that is to say, exportable)



activities, building on advanced communications technology. India has been able to move into this new activity drawing on a large pool of underemployed skilled labour (see box III.3).

The relatively strong growth performance of the Latin American countries during the 1950s and 1960s had been built on a strategy of import-substituting industrialization. The limits of this strategy, which had become visible in most countries of the region since the 1960s, led many of them to encourage, in a parallel fashion, export diversification and regional integration. Emerging balance-of-payments problems could be temporarily resolved through the easy access to low-cost commercial bank loans in the 1970s. Industrial growth, however, came to a halt in most countries during the 1970s and the decades that followed. Premature trade liberalization (for instance, in several of the Southern Cone countries) led to strong declines in industrial output in the 1970s. Elsewhere, industrial development was strongly affected by the lack of foreign financing and the stabilization policies in the aftermath of the debt crisis of the early 1980s.

Subsequent trade and financial reforms turned exports into the engine of growth in most Latin American countries during the 1980s and, particularly, the 1990s. Export growth, however, was not built on dynamic industrialization. It was based instead on either a continued—and, in some cases, deepening—reliance on exports of primary products, particularly in South America, or on assembling manufacturing processes, for example, in Mexico and Central America (see chap. III; Vos and Morley, 2006; United Nations, Economic Commission for Latin America, 2004; and Ocampo, 2004). Recurrent financial crises led to more volatile growth and deficient long-term investment for dynamic structural change (see chap. IV). As a result, the share of manufacturing and mining in total output declined during 1970–2003. The growth of the services sector in the region has been associated not so much with a dynamic transition as with the process of deindustrialization, which pushed excess workers into the (informal) low-productivity tertiary sector.

The countries in Central and Eastern Europe and CIS had witnessed fast growth of gross domestic product (GDP) per capita during the 1960s and 1970s, showing average annual rates of 6.2 and 4.4 per cent, respectively, according to available data. Industry became the mainstay of economic growth. The centrally planned investment process focused in particular on the development of heavy industries which involved massive reallocations of labour from agriculture but eventually failed to produce sustained growth. A description of the case of Poland by Podkaminer (2006, p. 311) possibly applies to the entire region: “*Structurally*, the priorities of the development policy were grossly mistaken, as they stipulated the preferential treatment of agriculture, mining and ‘heavy’ branches of manufacturing (metallurgy, shipbuilding, heavy armaments such as tanks, basic chemicals such as fertilizers) at the expense of services and technologically advanced high-skill branches.”

In the 1980s, all of the problems that had been accumulating over time surfaced in full force. The countries in the region were faced with huge amounts of sunk capital invested in highly inefficient industrial giants incapable of producing competitive goods that were sellable in the international markets. At the same time, the buffering effect of the Council for Mutual Economic Assistance on the oil trade was gradually phased out and Central and Eastern Europe had to pay much higher prices for oil imported from the former Soviet Union. The manufacturing, mining, construction and transportation sectors, which had been the driving forces of growth during the previous decades, shrank in absolute terms, especially during the second half of the 1980s. With the fall of the Berlin Wall in 1989, a difficult transition process to a market-based economy was initiated and led to a sharp and prolonged output decline, a phenomenon that came to be known as the “transformational recession” (Kornai, 1993; 1994). Agriculture and manufacturing were the sectors most adversely affected by the breakdown of the central planning system. The shock of the transition was most pronounced in the Russian Federation and Ukraine

**Stagnating industrial growth in Latin America**

**Deindustrialization characterized structural change in Central and Eastern Europe and the former Union of Soviet Socialist Republics during the transition to a market economy**

**Growth performance in the Middle East and Northern Africa is largely explained by developments in the oil market**

owing to the output collapse in the first part of the 1990s, when the share of the manufacturing and mining sectors decreased from 35 to 30 per cent. Manufacturing and mining started to recover at the end of the century and their share reached 33 per cent by 2003; but this recovery was in part driven by rising oil and gas exploitation spurred by high energy prices.

Most countries in the Middle East and Northern Africa show continued high dependence on the extraction of oil and minerals. The regional average is strongly influenced by developments in the Islamic Republic of Iran and Saudi Arabia, as these two economies account for approximately 50 per cent of the region's GDP and 30 per cent of its population. Growth performance and patterns of structural change are largely explained by developments in the oil market. The rapid increase in the region's output during the 1970s had been caused by the two major increases in oil prices orchestrated by the Organization of the Petroleum Exporting Countries (OPEC). The 1980s, in contrast, were years of economic stagnation. The price of crude oil fell in real terms and returned to levels near those prevailing before the first oil shock. After a temporary increase in 1990, oil prices continued a declining trend up to 1999, pushing many of the oil-exporting countries of the region into deep recessions and generating high levels of unemployment. Thereafter, oil prices rose sharply again and have spurred strong economic recovery.

Structural change in the oil-exporting countries was shaped by these trends in oil markets. Extraction of hydrocarbons dominated total output but their share decreased from 35 to 22 per cent between 1970 and 2003. The share had been at an all-time low of 16 per cent in the mid-1980s as a consequence of lower oil prices. The share of the manufacturing sector had increased to 12 per cent of total output by 2003, up by 4 percentage points from a meagre 8 per cent in 1970. Tunisia was an exception in the region, as it witnessed a much stronger development of the manufacturing industry. It is also one of the few African countries that managed to achieve sustained economic growth throughout the period.

**The countries in sub-Saharan African economies show a lack of structural change**

The countries in sub-Saharan Africa included in the sample have not been able to break away from their low-growth development trap. This is also visible in the lack of structural change that took place in these economies. Agriculture remains the mainstay of these economies, but per capita output of the sector declined during the period 1970-2003 (figure I.2). In most countries, market-oriented structural adjustment policies adopted in the 1980s and 1990s failed to improve growth performance and, in fact, produced very little structural change. The policies insufficiently addressed the problems of poor infrastructure and human capital development, as well as the lack of well-functioning market institutions. As these binding constraints on growth were not lifted, the economies failed to diversify and continued to be highly vulnerable to external shocks, declining terms of trade and, in many instances, domestic conflict and civil strife (see chap. V). The relatively high average growth rates in manufacturing and mining recorded for the region as a whole were largely driven by Nigeria's oil sector, and had little to do with emerging manufacturing sector growth. When including Nigeria, the share of industry had reached 35 per cent by the end of the period. If Nigeria is excluded, mining and manufacturing activities generated only 17 per cent of output in the remaining countries of the region.

## **Investment patterns and structural change**

Capital accumulation is no longer viewed—as in some of the early theories of economic development—as the only driving force of economic growth. This does not mean, however, that investment is not important. Capital investment is essential to economic development and growth, as it is a major carrier of technological change and productivity increases. It also plays a crucial role



in the development of infrastructure and the construction of urban centres, where manufacturing and services cluster. In combination with other factors, capital accumulation also sets off structural changes. Economic transformation thus will require changes in patterns of accumulation as new resources are invested in new sectors of the economy, thus increasing their contribution to overall output.

Higher economic growth and convergence are closely associated with increases in investment per capita, although the relationship is not one-to-one. The first-tier newly industrialized economies and China, which had experienced the most dynamic structural change, as mentioned earlier, recorded the largest increases in investment. In per capita terms, the volume of fixed investment multiplied, respectively, 15.6 and 12.3 times between 1970 and 2003 (see table II.1). Investment growth has been much lower in the other regions. Investment levels doubled in South Asia and tripled South-East Asia, while they were virtually stagnant in Latin America, sub-Saharan Africa, Central and Eastern Europe and the CIS countries, as well as in the Middle East and Northern Africa.

**Higher economic growth and convergence are associated with increases in investment per capita**

**Table II.1.**  
**Levels of per capita investment, selected regions and country groups, 1960-2003**

	Average gross fixed capital formation per inhabitant (1990 United States dollars)				
	1960s	1970s	1980s	1990-2003	-fold increase
First-tier newly industrialized economies <sup>a</sup>	218	589	1 356	3 392	15.6
China <sup>a</sup>	20	37	75	244	12.3
South-East Asia <sup>b</sup>	103	184	174 <sup>c</sup>	315	3.1
South Asia	36	40	53	85	2.3
Semi-industrialized countries	608	855	794	766	1.3
Low- to middle-income Latin America	..	341	328	333	1.0
Central America and the Caribbean	171	282	249	367	1.3
Central and Eastern Europe	..	..	..	673	..
CIS	..	..	..	435	..
Sub-Saharan Africa	..	..	67	50	0.7
Middle East and Northern Africa	..	498	397	330	0.7

**Source:** UN/DESA, based on United Nations Statistics Division, Common Database.

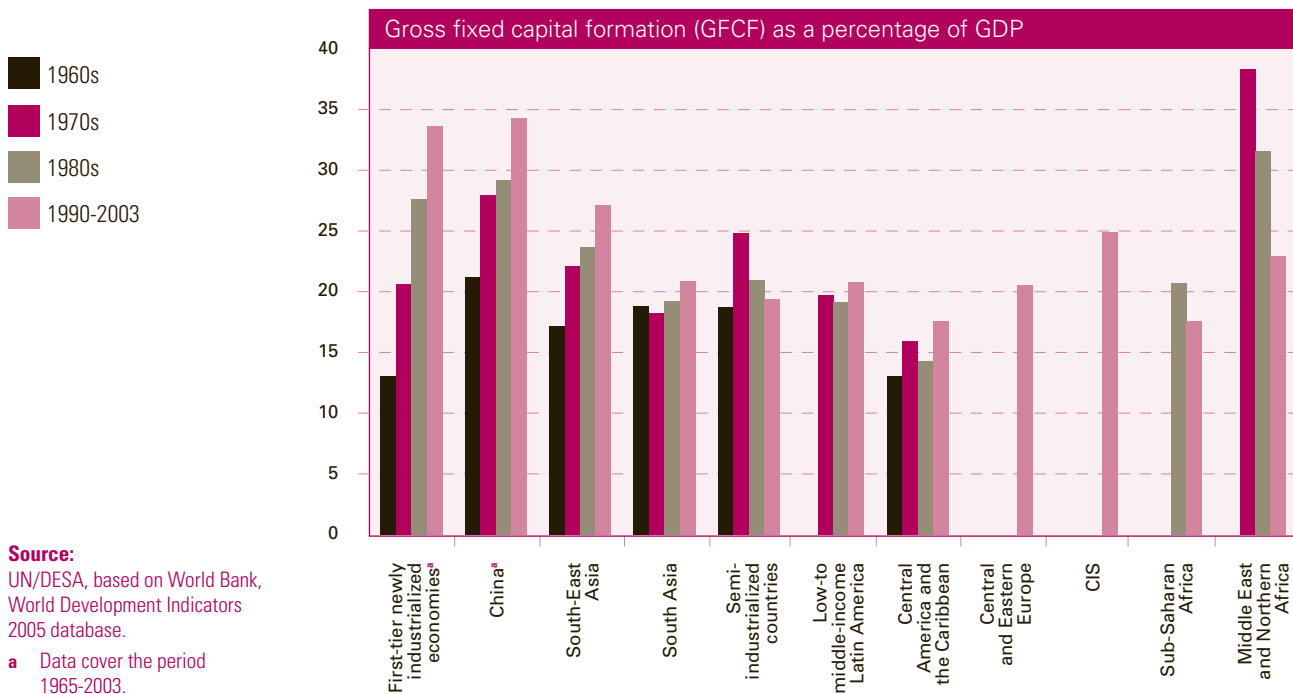
<sup>a</sup> Data starting from 1965.

<sup>b</sup> Excluding Indonesia for the 1960s and 1970s.

<sup>c</sup> Excluding Indonesia, South-East Asia's average is \$279.

A comparison between first-tier newly industrialized economies and the group of semi-industrialized countries (mostly in Latin America) provides some further insight into the magnitude of economic divergence that occurred not only at the level of income but also in relation to a wide range of indicators. In the 1960s, the level of average investment per capita in the first-tier newly industrialized economies had been just about one third that of semi-industrialized countries. In the 1990s, the first-tier newly industrialized economies registered investment levels four times higher. Such catching up (though not yet overtaking) with respect to the rest of Latin American and the Caribbean (that is to say, the countries not included in the group of semi-industrialized countries) is also exemplified by China, South-East Asia and South Asia.

Figure II.3.

**Average investment rate for selected periods and regions, 1960-2003**

**Investment levels collapsed in sub-Saharan Africa and the Middle East and Northern Africa**

**Lower growth is also associated with higher investment volatility**

**Capital accumulation is a catalyst of structural change**

When taken as a share of GDP, investment also showed strong and sustained increases for groups of Asian countries. This held to a lesser extent for South Asia (figure II.3). In the 1990s, gross fixed capital formation rates of the first-tier newly industrialized economies and China climbed to 34 per cent of GDP and reached 27 per cent of GDP in South-East Asia. In contrast, in the same period, the gross fixed investment rate remained practically stagnant at about 19 per cent for the semi-industrialized countries and increased only slightly (from lower levels) in the rest of Latin America and the Caribbean. Investment levels decreased in sub-Saharan Africa and the region of the Middle East and Northern Africa. Investment in the economies in transition of Central and Eastern Europe and the former Soviet Union followed a somewhat different pattern as analysed in box II.1.

Poorer growth performance is associated not only with little structural change and lower investment, but also with higher investment volatility. When measured by the coefficient of variation (that is to say, the standard deviation divided by the mean for the period), investment volatility is shown to be much higher in countries with low income growth and much less pronounced in countries with a strong growth performance (see figure II.4). A simple linear regression between these two variables yields a correlation coefficient of 71 per cent. Economic instability and investment uncertainty are no doubt detrimental for long-term economic growth. Chapter IV explores the options available to Governments in developing countries for conducting macroeconomic policies that effectively reduce economic volatility and create a more conducive environment for investment in long-term development.

Capital accumulation is a catalyst of structural change. Figure II.5 shows that changes in the share of agricultural and industrial output are strongly associated with investment growth, which is consistent with the arguments put forward in this chapter. Capital accumulation took place at a rapid pace in the successful Asian countries and was directed towards their industrial sectors. As shown in the next section, industry was also the main contributor to overall labour

## Box II.1

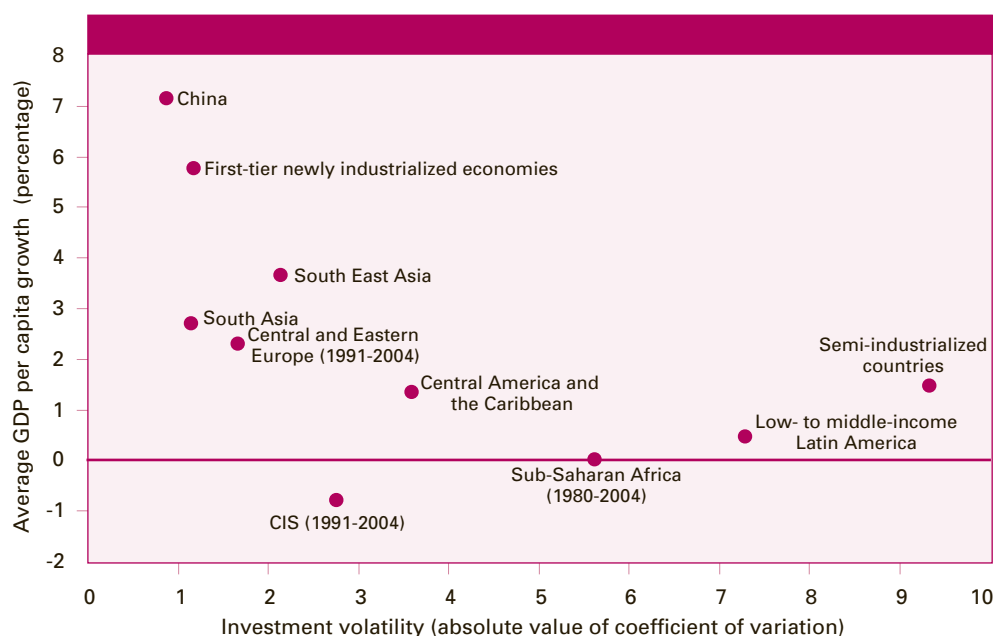
### Investment growth and collapse in the economies in transition

Central and Eastern Europe and the Commonwealth of Independent States (CIS) are special cases in terms of investment trends because of the profound institutional changes undergone by these regions. The patterns of capital accumulation in their economies have gone through several different phases since the start of their economic and political transformation. During the early phases of transition, the dynamics of aggregate investment were marked by a combination of profound negative shocks. The deep and prolonged transformational recession experienced by all countries at the onset of transition burdened most firms with excess capacity as huge sunk capital costs surfaced in consequence of the knock-on effect of economic liberalization.

The inherited structure of the centrally planned economies, which were all “over-industrialized”, and the fact that the industrial structure was heavily concentrated in large State-owned firms, further compounded the problem. As production facilities were generally obsolete, active restructuring and new productive investment by firms were called for if they were to survive and grow under the new market environment. Yet, in the early phases of transition, equity and debt security markets were practically non-existent; the only available source of external funding for most firms was domestic bank lending. The emerging financial markets (markets for commercial credit were the first to emerge) were inefficient and performed under considerable information asymmetries, as firms had no proper track record of creditworthiness. These market imperfections erected additional barriers to access to credit by the enterprise sector, further limiting the firms’ capacity to invest. As a result, aggregate investment in virtually all transition economies experienced a prolonged downturn.

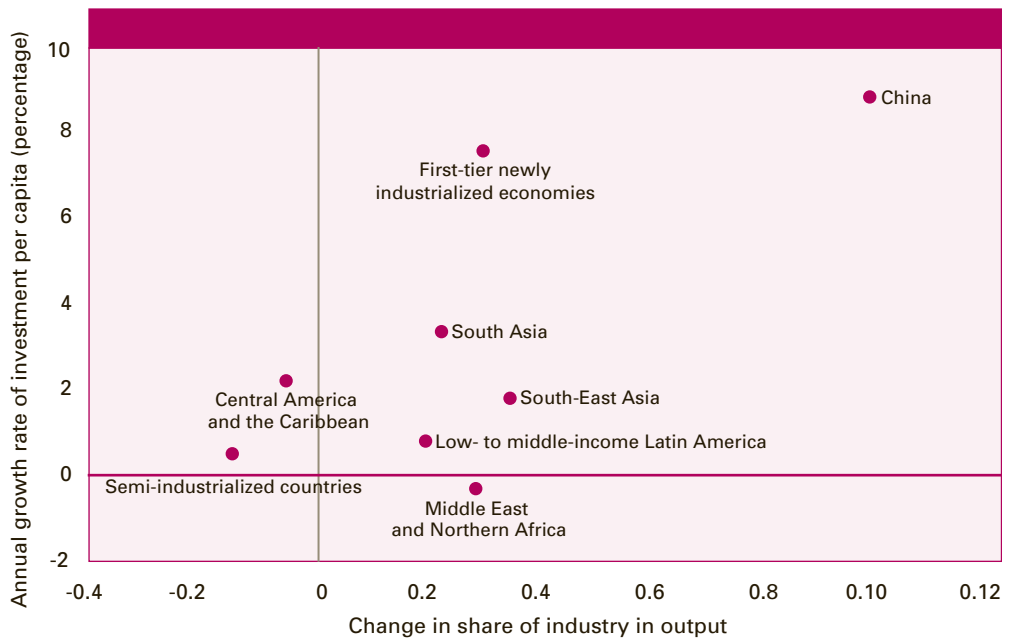
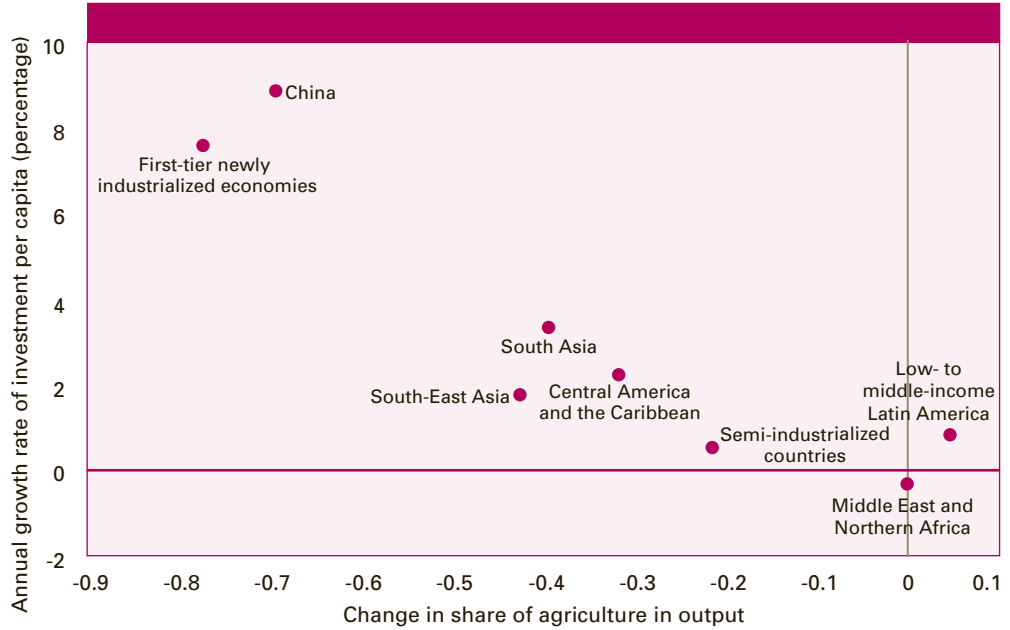
Around the mid-1990s, investment rates in most countries in Central and Eastern Europe had recovered from their collapse in the initial years of transition. Investment growth was helped by a recovery in domestic saving and new inflows of foreign direct investment, largely owing to the possibility of accession to the European Union (EU). There was no sustained recovery of investment in CIS, as investor confidence in these economies was hurt once more by the Russian financial crisis of 1998. In more recent years, growth and investment recovered on account of high oil prices.

Figure II.4.  
**Volatility in growth rate of investment per capita and  
growth rate of GDP per capita: the impact of investment  
volatility on economic performance, 1970-2004**



**Source:**  
UN/DESA, based on World Bank,  
World Development Indicators  
2005 database.

Figure II.5.  
**Annual growth rate in investment per capita versus change in the shares of agriculture and industry in total output, selected regions and country groups, 1970-2003**



**Source:** UN/DESA, based on World Bank, World Development Indicators 2005 database for investment, and United Nations Statistics Division, National Accounts Main Aggregates database.

**Note:** For China, first-tier newly industrialized economies, Central America and the Caribbean, and low- to middle-income Latin America, 1970-2003; for South-East Asia, South Asia, and the Middle East and Northern Africa, 1980-2003.

productivity growth brought about by technological change and development of new production activities through new capital investment.

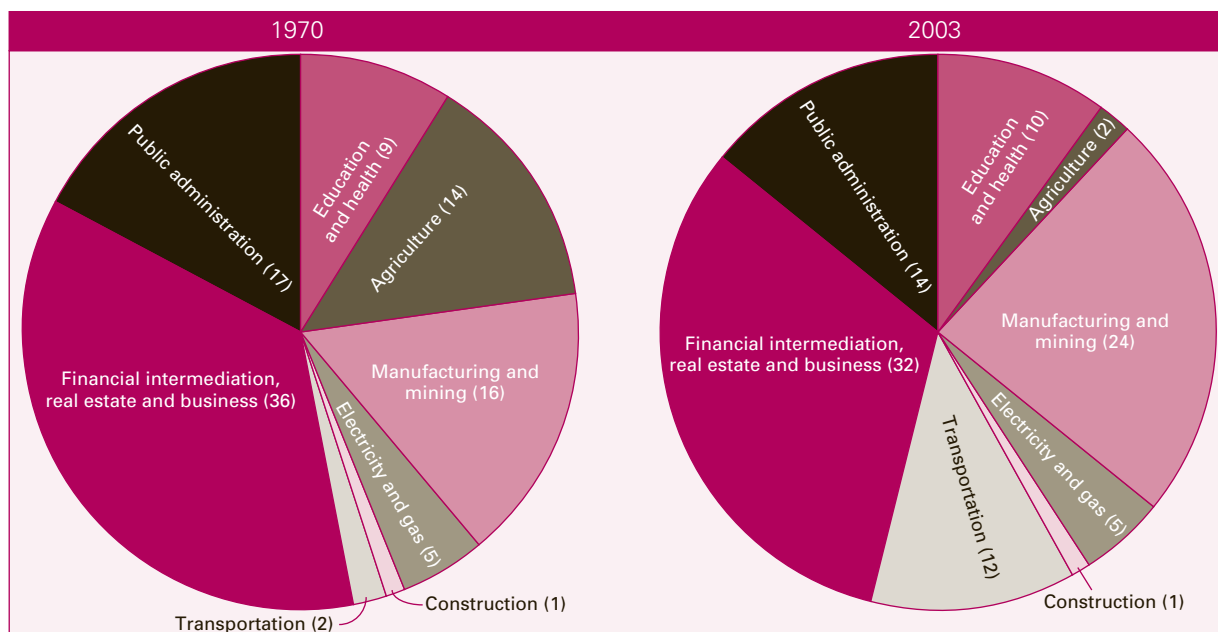
The composition of investment also matters for growth performance. A review of empirical studies by the United Nations Conference on Trade and Development (UNCTAD) (2003) suggests that investment in machinery and equipment contributes more strongly to growth than does investment in construction. Comparable data on the composition of investment by commodity—for example, machinery and buildings—are scarce and hence evidence is somewhat dispersed. Also, as argued in chapter IV, the “optimal” composition of investment also depends on the level of development of the economy, with investments in infrastructure exercising significant growth effects at relatively lower income levels. Indivisibilities in the construction of infrastructure may require high levels of such investment, especially at low levels of development. This implies that at lower stages of development, countries should deploy relatively higher shares of construction investment.

Investment data by sector of destination are even less readily available. Yet, it is possible to argue that the anticipated structural change in developing countries implies that much of investment will initially move into the industrial sector. At higher stages of development, economies are likely to invest in (a technologically advanced) manufacturing sector and financial and business-oriented service sector. For instance, in developed economies, such as the United States of America and Japan, where the service sector provides over 60 per cent of output, most of investment is expected to go towards services. In other advanced countries (such as the United Kingdom of Great Britain and Northern Ireland and also in the Republic of Korea) about 60 per cent of investment goes to the manufacturing and financial intermediation, real estate and business services sectors.

Analysis of such investment patterns over time for the country groupings used in this chapter is constrained by lack of data. Data are available, however, for a few countries and those data may be illustrative of investment patterns of a larger group of countries. The Republic of Korea is a case in point. Figure II.6 shows that over time allocation of investment resources in the

Investments in financial and business services are supportive of industrial growth

Figure II.6.  
**Sector investment as a percentage share of gross fixed capital formation, Republic of Korea, 1970 and 2003**



Source: UN/DESA, based on data from National Statistical Office, Republic of Korea.

economy of the Republic of Korea had moved away from primary sectors, such as agriculture, towards industry and higher value added economic activities. The share of investment in agriculture had decreased from 14 per cent in total gross fixed capital formation in 1970 to 2 per cent in 2003, while the share of the industrial sector jumped from 16 per cent in 1970 to 24 per cent in 2003. Throughout the entire period, the share of other sectors in investment was relatively stable. It is worth pointing out, however, that since the early 1970s, the financial intermediation, real estate and business services sectors had been receiving a considerable share of investment. This fact signals the importance of the development of both financial and business services not only at an advanced stage, but also at the beginning of a sustainable growth process.

## Employment, productivity and structural change

**Labour productivity growth can be achieved through technological progress and/or by moving resources from low- to higher-productivity sectors**

For the economy as a whole, labour productivity growth can be achieved through technological progress and/or by moving resources from low- to higher-productivity sectors. As mentioned earlier, the type of productivity growth achieved by the latter approach tends to be more important for the developing countries. The introduction of new technology and a structural shift of the economy may, however, cause employment problems if output is not increased (since, by definition, the higher-productivity sectors use less workers per unit of output). Hence, sufficient dynamism (output growth) in the higher-productivity sectors will be required in the process of structural change if remunerative jobs are to be generated for all workers and the creation of unemployment is to be prevented.

**The growth process in the developed countries also entailed a dramatic change in the employment structure, involving a shift from the primary sectors into industry and, subsequently, into services**

According to data available in Maddison (2001), the growth process in the developed countries also entailed a dramatic change in the employment structure, involving a shift from the primary sectors into industry and, subsequently, into services. For example, the share of employment in agriculture had been 37 per cent in the United Kingdom and 70 per cent in the United States in 1820. By 1998, the share had decreased to 2 per cent and 3 per cent, respectively. However, these employment shifts lagged considerably behind the structural change in output as labour productivity in agriculture and other primary sectors tends to grow more slowly than that in industry, particularly in the early stages of development.

In countries without a labour surplus and where the agricultural sector had access to capital and technological knowledge, the lag in productivity growth between agriculture and industry was not observed. This was the case, for example, in Argentina, Canada and New Zealand, where land was not a constraint. In many other developing countries, however, a relatively slow rise in agricultural productivity might well also have reflected rapid population growth and the lack of employment opportunities elsewhere, both of which may imply growing underutilization of labour in the rural sector.

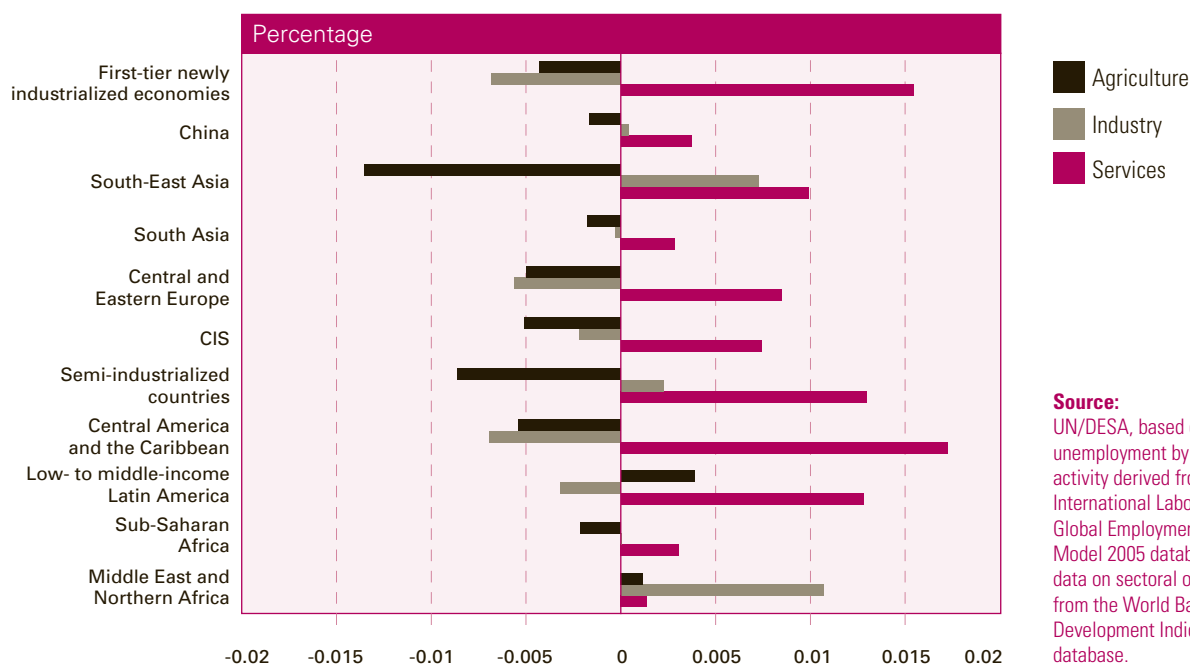
Considering these notions about the link between productivity and employment growth, the present section identifies which sectors of the economy have contributed the most to gains in productivity and employment. Based on a simple decomposition of economy-wide labour productivity and employment by sectors, it is possible to identify the contribution of individual sectors to overall productivity and employment growth for the countries and regions selected. In the decomposition, aggregate productivity growth equals the sum of the productivity changes in each sector of the economy, weighted by sectoral output shares, plus the reallocation of labour from low- to high-productivity sectors (see appendix to this chapter for details on the estimation method). It is important to note that the decomposition is applied to three relatively aggregate sectors: agriculture, industry (that is to say, manufacturing and mining) and services



(which also include construction and public utilities). Hence, resource shifts that have taken place *within* these sectors are not accounted for. This is an important limitation, as high- and low-productivity units of production coexist in all of these broadly defined sectors. This is particularly important in the case of services, which is the most important generator of employment in most economies today (see figure II.7). In this sector, low-productivity activities typically

Figure II.7.

### Contribution of the agriculture, industry and service sectors to job creation, selected regions and country groups, from 1991 to 2003-2004



**Source:** UN/DESA, based on data on unemployment by economic activity derived from International Labour Office, Global Employment Trends Model 2005 database, and from data on sectoral output derived from the World Bank, World Development Indicators 2005 database.

comprise informal trade and domestic service and these exist next to high-productivity activities such as modern financial and business services. Also, due to data limitations, much of the analysis is restricted to the patterns of change in labour productivity for the period from 1991 to 2003-2004.<sup>6</sup> Figures II.8 and II.9 show the results for all country groupings considered in this chapter. A longer time series, however, is available for Asian countries. These findings are presented in box II.2.<sup>7</sup>

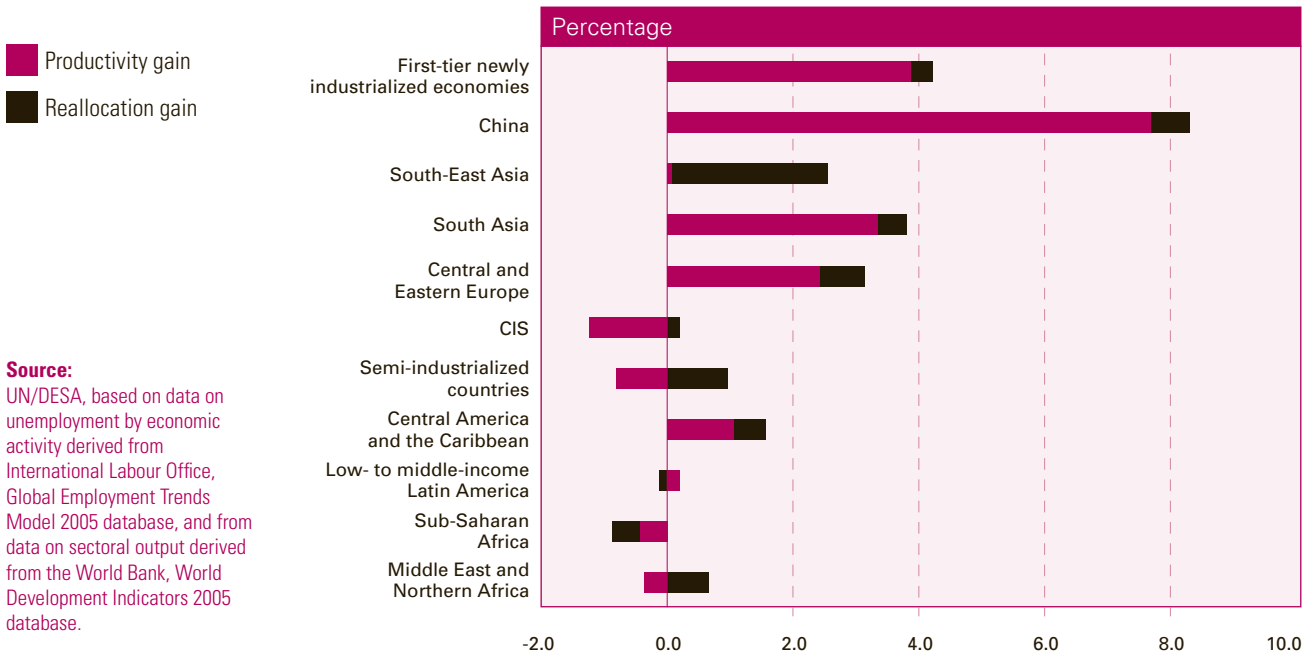
The most successful countries are characterized by faster productivity growth (figure II.8). In all these cases, industrial development has been a major driver of overall labour productivity growth (figure II.9, part A). Labour reallocation among the broadly defined sectors, which measures the degree to which the mobility of workers directed towards higher-productivity sectors contributes to overall productivity growth, has been important in some cases (South-East Asia and semi-industrialized countries in particular), but rather modest in others. This reflects the fact that in many slow-growth countries, the reallocation of labour has been dominated by employment problems in urban areas. In these countries, the insufficient dynamism of the indus-

**Labour reallocation from low- to high-productivity sectors has been important in some cases, but only modest in others**

<sup>6</sup> The data are derived from International Labour Office, Global Employment Trends Model 2005 database (GET).

<sup>7</sup> Data availability allows comparison starting from 1979 for China, first-tier newly industrialized economies and South-East Asia and from 1981 for South Asia excluding India. For the latter, data are available only from 1991 onward.

Figure II.8.  
**Annual growth rate in labour productivity for selected country groups and regions, from 1991 to 2003-2004**



**Source:**

UN/DESA, based on data on unemployment by economic activity derived from International Labour Office, Global Employment Trends Model 2005 database, and from data on sectoral output derived from the World Bank, World Development Indicators 2005 database.

**The services sector in some regions is the “employer of last resort”, causing low overall productivity growth**

**Asian regions showed both strong labour productivity and strong employment growth during structural change**

trial and modern services sectors pushed redundant workers into informal sector employment, slowing down productivity growth, particularly in the services sector.

This means that, in slowly growing economies, *intra*sectoral allocation effects dominate *inter*sectoral reallocation effects, and are reflected particularly in the rate of productivity gains (or losses) in the services sector, which is determined by whether employment is generated in high- or low-productivity services (figure II.9, part B). The services sector operates in these cases as the “employer of last resort” rather than as a dynamic contributor to productivity growth. Slow productivity growth in services is then the best measure of the lack of dynamism of the growth process. This is the dominant pattern. In some other cases, however, agriculture also serves as the residual employer. Under these circumstances, there is neither significant reallocation of labour nor strong productivity performance. The low- to middle-income Latin American countries are the best example of such a pattern (see figure II.9, part C). In low-income countries, particularly in sub-Saharan Africa, very low levels of productivity in traditional agriculture are matched by significant underemployment of labour in both urban and rural areas, leading to low overall levels of productivity.

Figures II.8 and II.9 show that the three Asian regions and China outpaced all other regions in terms of annual labour productivity growth, experiencing high growth rates of labour productivity in all sectors together with positive and significant reallocation effects. Strong employment growth in high-productivity sectors was thus matched by a dynamic reallocation of labour from low- to high-productivity activities. South-East Asia to some extent forms an exception to this pattern, although it should be noted that the average productivity performance for the region during the 1990s had been heavily influenced by the deep recession experienced by Indonesia during the Asian crisis. China, the first-tier newly industrialized economies and South-East Asia, in contrast with other regions, combined strong productivity growth and net employment creation for the economy as a whole (figure II.10). Also, when looked at over the longer run, the performance of the Asian economies in this sense has been most impressive (see box II.2).

Figure II.9.  
**Contribution of the industrial sector, the public utilities, construction and services sectors, and the agricultural sector to economy-wide labour productivity growth, selected regions and country groups, from 1991 to 2003-2004**



**Source:** International Labour Office, Global Employment Trends Model 2005 database, for employment; and World Bank, World Development Indicators 2005 database, for output.

## Box II.2

## Productivity growth and structural change in Asia

Available and comparable data for selected Asian economies allow for a longer-run analysis of productivity growth and sectoral shifts in employment. The interest in taking a closer look at the performance of Asian economies comes also from their impressive performance in terms of labour productivity growth and sectoral shifts in employment.

China recorded the strongest performance in the region: labour productivity growth averaged 6.7 per cent annually during the period 1979-2002 (see table). The momentum in labour productivity growth coincided with the reform of rural institutions of 1978 which had introduced the household responsibility system and provided farmers with user rights to collectively owned land. The reform also allowed them to sell part of their produce on the free market (see chap. V). This institutional change led to a sharp increase in productivity in the agricultural sector in the first half of the 1980s.

Taking a gradualist approach, the Chinese authorities opened the economy to foreign capital and technology, which contributed to productivity growth and increasing labour demand in the rest of the economy. Labour productivity growth was strong in all sectors, especially in manufacturing. Substantial reallocation of labour from low- to high-productivity sectors—along traditional lines of development—contributed further to overall productivity growth. For the entire period 1979-2002, growth of jobs exceeded that of the workforce by 1.3 percentage points (see figure). While employment increased in all sectors, growth was strongest in the service sector which also witnessed the largest labour reallocation effects on productivity growth.

## Decomposition of labour productivity, developing Asia, 1979-2002

## Percentage

	Average annual productivity growth rate			Reallocation effect			Overall annual average
	Agriculture	Manufacturing	Services	Agriculture	Manufacturing	Services	
First-tier newly industrialized economies	0.2	1.4	1.9	0.3	0.0	0.4	4.3
China	1.3	3.3	1.6	-0.4	0.3	0.6	6.7
South-East Asia	0.2	0.7	0.4	-0.4	0.4	1.3	2.6
South Asia	-0.2	0.3	0.4	-1.0	0.1	1.1	0.7

**Sources:** International Centre for the Study of East Asian Development (<http://www.icsead.or.jp>), for employment data; United Nations National Accounts database, for data on sectoral output.

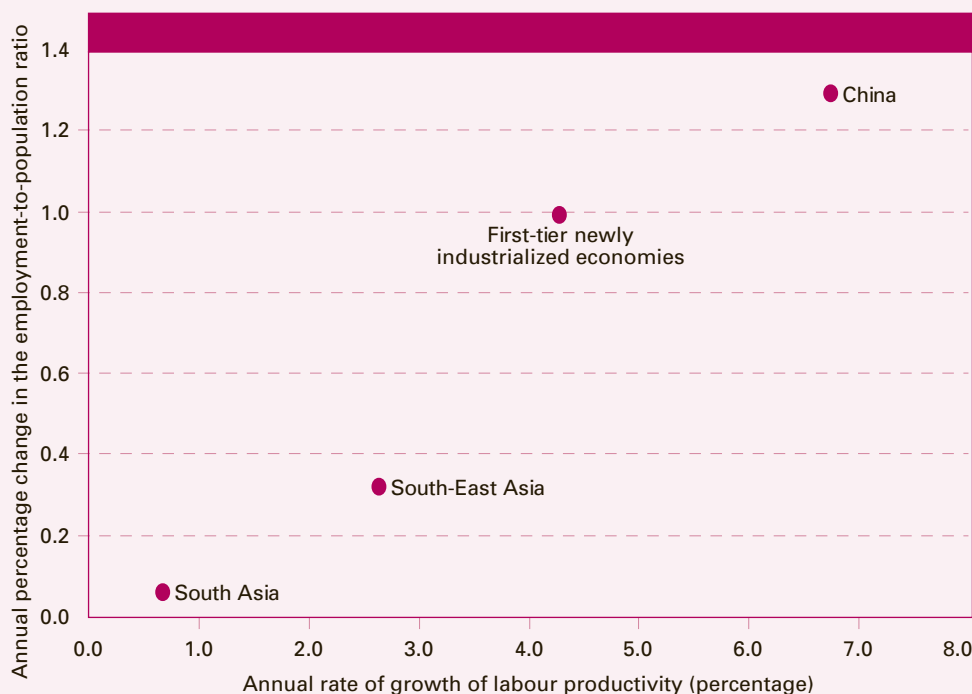
**Note:** See appendix for calculation methodology.

Successful growth in the first-tier-newly industrialized economies was also supported by a long-term development strategy that emphasized the need for simultaneous structural changes and improvements on all levels of economic activity. Sustained productivity increases and, particularly during the 1980s and 1990s, economic transformation towards more capital- and skill-intensive sectors were accompanied by major improvements in human capital. The average years of schooling in the region increased from 6.5 years in 1975 to over 10 years in 2000. The employment rate (that is to say, the share of employed workers in the total population) increased over the entire period despite the fact that agriculture—and in the 1990s also the manufacturing industry—contributed negatively to job creation. Workers were increasingly being pulled into the strongly expanding services sector, where the creation of many new jobs occurred simultaneously with significant gains in labour productivity brought about also by advances linked to technological change and investment.

Labour productivity growth was less spectacular—albeit still strong—in South-East Asia. The annual rate of increase of labour productivity averaged 2.6 per cent during the period 1979-2002. Job creation outpaced population growth by only 0.24 percentage points. Industrial productivity growth was higher than in other sectors, while the services sector took care of most of the job creation in the region. As a result, the industrial sector did not play the leading role in driving aggregate productivity as it did in China. Structural change led agriculture to consistently shed labour while the other sectors created jobs.

## Box II.2 (cont'd)

### Annual rate of growth of labour productivity, and annual percentage change in the employment-to-population ratio, developing Asia, 1979-2002



#### Sources:

International Centre for the Study of East Asian Development (<http://www.icsead.or.jp>); United Nations Statistics Division.

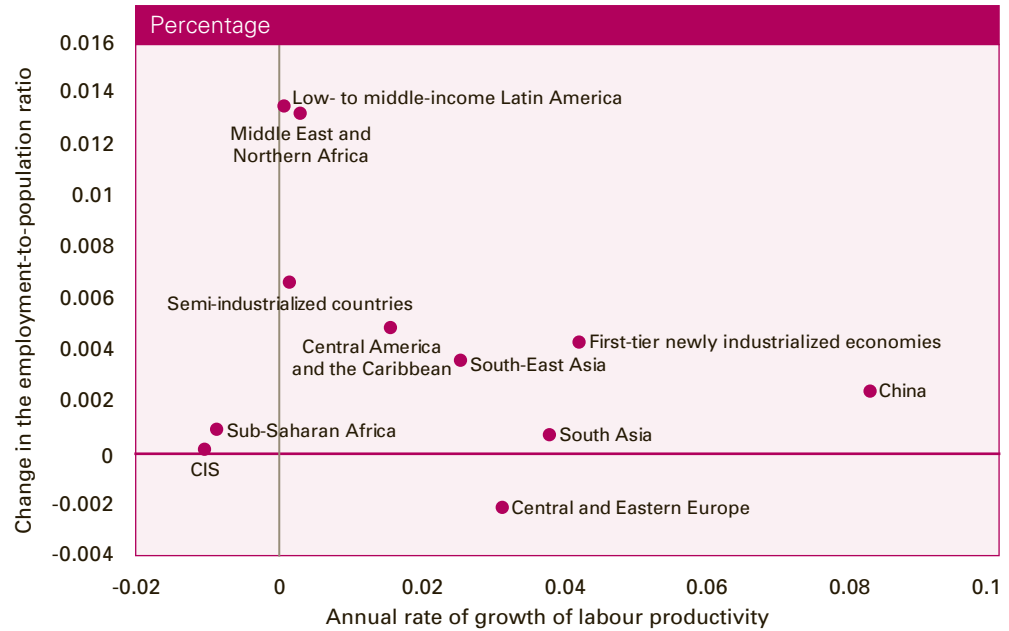
Turning to South Asia, available data suggest that labour productivity growth picked up in the region, especially during the 1990s. This recent development was the result in part of positive spillover effects from growth in China and the industrial restructuring in the first-tier newly industrialized economies as labour-intensive manufacturing, particularly textiles, moved to the region. The rapid expansion of the tradable service sector was the other major development underlying the improved productivity performance by the region during the 1990s. At the same time, India went through a process of deindustrialization, which led some observers to question the sustainability of India's growth process. Dasgupta and Singh (2005) observe, for instance, that "economic history indicates that for developing countries at India's level of per capita income, economic growth has normally been led by the manufacturing sector". In fact, available data indicate that very few jobs were being created by the economy at large throughout the 1990s, despite high levels of GDP growth. As a result, labour underutilization remains high, particularly in the case of unskilled workers, as the expanding services sector creates jobs mainly for higher-skilled workers (see box III.3).

Countries in Central and Eastern Europe and Central America and the Caribbean displayed patterns intermediate between those of Asia and those of regions where overall productivity performance was very poor. These regions witnessed modest productivity growth during 1991-2003, but much weaker or hardly any net job creation. This was particularly true in Central and Eastern Europe, where productivity growth picked up in the second half of the 1990s as a result of the economic recovery and investments in new technologies supported by inflows of FDI. Labour productivity growth was mainly driven by technological change in industry, but the rate of employment in that sector fell by 0.15 per cent per year. Economy-wide employment in Central and Eastern Europe fell at a rate of 0.75 per cent per year during 1991-2003, mainly because of the massive layoffs and enterprise restructuring in the industrial and agricultural sectors. Nonetheless, the employment-to-population ratio improved (see figure II.10) because of the decline in the population in the period following the fall of the Berlin Wall.

**Productivity growth has been modest in Central and Eastern Europe and Central America and the Caribbean**

Figure II.10.

**Annual rate of growth of labour productivity, and annual percentage change in the employment-to-population ratio, selected regions and country groups, from 1991 to 2003-2004**

**Source:**

International Labour Office, Global Employment Trends Model 2005 database, for employment; and World Bank, World Development Indicators 2005 database, for output.

**In the poorer Latin American countries, productivity growth occurred at the expense of job creation**

**In the semi-industrialized countries and the Middle East and Northern Africa, jobs were created in sectors with little or no productivity growth**

With the exception of Costa Rica, the countries in Central America and the Caribbean did not succeed either in adding many jobs in the industrial sector which, for the entire region, shed labour at an annual rate of 0.8 per cent, leading to a significant drop in the share of manufacturing in total employment. Overall, however, employment in the region increased as the service sector absorbed the unemployed workers from the rest of the economy and indeed helped to create a modest overall increase in employment. This led, however, to a reduction in the productivity in the service sector, which counteracted the rapid gains of industrial productivity.

For the low- to middle-income Latin American countries, productivity growth in industry also took place to the detriment of job creation. In fact, labour productivity increased in the industrial sector essentially because employment decreased faster than output. Aggregate labour productivity growth for the region as a whole was almost nil as a result of negative productivity performance in the agriculture and service sectors, which had absorbed most of the workers shed by the industrial sectors, and indeed helped to create a net addition of employment. As indicated previously, this was the only region where agriculture played an important role in helping to absorb surplus labour displaced by the industrial sector (see figure II.9, part C). Overall, employment increased but was unaccompanied by productivity growth (see figure II.7).

In the semi-industrialized countries and the economies of the Middle East and Northern Africa, the sectors absorbing most workers showed stagnant or negative productivity growth. Sectoral productivity declined in both industry and services in the semi-industrialized countries, contributing negative 0.1 and negative 0.9 percentage points, respectively, to aggregate (economy-wide) productivity growth. Intersectoral labour reallocation compensated in part for this drop in productivity and explains why aggregate productivity did not drop during the period. Employment generation was dynamic overall in these two regions (see figure II.10), but most



jobs were generated in the service sectors, particularly in informal activities.<sup>8</sup> Chile is an exception to this pattern. The Chilean economy recorded a strong labour productivity growth rate of 3.1 per cent per year, which was mainly driven by productivity improvements in both industry (1.4 per cent) and services (1.4 per cent).

The least desirable situation is one where neither net employment generation nor productivity growth takes place. In this case, both sectoral contributions to productivity growth and reallocation effects tend to be negative. This situation characterizes the growth processes in CIS and sub-Saharan Africa (see figure II.10). The Russian Federation and Ukraine had suffered an acute collapse in both output and employment in the first half of the 1990s. Nevertheless, output had decreased faster than employment, which led to an absolute decrease in labour productivity. Output growth recovered somewhat more recently, leading to positive labour productivity growth for the entire period. In sub-Saharan Africa, most employment (70 per cent) remains stuck in the low-productivity agricultural sector. The labour reallocated from rural to urban activities was directed into equally relatively low-productivity services and industrial activities, giving rise to both negative productivity growth in those sectors as well as negative overall reallocation effects. Nonetheless, differences in productivity levels across sectors remain huge. Output per worker in the agricultural sector is nine times less than that in the other sectors of the economy.

**In sub-Saharan Africa, most employment remains stuck in the low-productivity agricultural sector**

## Conclusions

Diverging patterns of growth among developing countries are also visible in differences in terms of structural change. An examination of the patterns of structural change over the past four decades indicate that the fast-growing East and South Asian economies were clearly characterized by dynamic transformations. Economies with relatively little structural change lagged behind, particularly those in sub-Saharan Africa. Sluggish long-term growth in the middle-income countries of Latin America and the Caribbean as well as in countries in Central and Eastern Europe, the Middle East and the former Soviet Union has been associated with a process of deindustrialization. In these countries, growth—and particularly employment growth—has been concentrated in low-productivity services, with agriculture and industry remaining nearly stagnant. Fast growth in East and South Asia, in contrast, has been associated with a rapid decline in the importance of agriculture and strong expansions of both the industrial and modern service sectors.

These fast-growing economies also show sustained increases in labour productivity and labour has moved from low- to high-productivity sectors, including modern service sectors. In the regions with low-growth performance, the employment shift to the service sector has been rather pronounced. However, in contrast with the service sectors of Asia, those of sub-Saharan Africa, Latin America and the former Soviet Union have shown declining productivity, as many workers have sought employment in services with low productivity and weak linkages with the more dynamic sectors of the economy, owing to lack of job creation in other parts of the economy.

**The fast-growing economies in East and South Asia have shown sustained increases in labour productivity and labour has moved from low- to high-productivity sectors**

Dynamic structural change involves strengthening economic linkages *within* the economy—in other words, integrating the *domestic* economy—and productivity improvements in all major sectors. The degree of integration of the domestic economy also influences how much countries are able to gain from international trade and investment. The following chapters explore how the external environment, macroeconomic policies and governance structures have shaped these differences in patterns of structural change.

**Dynamic structural change involves strengthening economic linkages *within* the economy**

<sup>8</sup> The share in employment of the service sectors increased from 50 to 61 per cent during the first half of the 1990s. According to Stallings and Weller (2001), about 60 per cent of the new jobs created in Latin America during the 1990s were low-paid, low-productivity jobs in the informal sector. The jobs created outside the informal sector were mostly in commerce and, to a lesser extent, in financial and business services.

## Technical note on the decomposition of labour productivity growth and of the employment-to-population ratio

The decomposition of labour productivity is used here to trace the contribution of the agriculture, industry and service sectors to economy-wide labour productivity growth. The approach follows Syrquin (1986). In figure II.9, the sum of the productivity growth rates of each sector and their respective reallocation effects should add up to aggregate labour productivity growth. The relevant identity for decomposing labour productivity growth is  $\sum_i X_0^i = X_0$ , with the  $X_0^i$  term representing output levels by sector ( $i = 1, 2, \dots, n$ ).

Let  $\theta_0^i = X_0^i / X_0$  be the share of sector  $i$  in real output in period zero. Similarly, for employment:  $\varepsilon_0^i = L_0^i / L_0$  with  $\sum_i L_0^i = L_0$ . The level of labour productivity in sector  $i$  is  $X_0^i / L_0^i$  and its growth rate is defined as  $\xi_L^i = (\hat{X}^i - \hat{L}^i)$ . After a bit of manipulation, the following exact expression for the rate of growth of economy-wide labour productivity is obtained:

$$\xi_L = \sum_i [\theta_0^i (\hat{X}^i - \hat{L}^i) + (\theta_0^i - \varepsilon_0^i) \hat{L}^i]$$

Labour productivity growth,  $\xi_L$ , can be decomposed into two parts. One is the sum of the weighted average of sectoral rates of productivity growth as conventionally measured, that is to say,  $\sum_i \theta_0^i (\hat{X}^i - \hat{L}^i)$ . The weights are the output shares,  $\theta_0^i$ . The second term  $\sum_i (\theta_0^i - \varepsilon_0^i) \hat{L}^i$ , captures the “reallocation effects”. If  $\theta_0^i > \varepsilon_0^i$ , then the output share of sector  $i$  is larger than its employment share, implying that the sector has a relatively high average labour productivity. Employment growth in that sector (or a negative  $\hat{L}^i$  in a sector with  $\theta_0^i < \varepsilon_0^i$ ) will increase aggregate productivity growth.

A second exercise (reported in figure II.10 and box II.2) decomposes the growth in the economy-wide employment-to-population ratio into the growth rates of the ratio for each sector and the sectoral employment shares. The employment ratio of a particular sector will rise if the sector’s output per capita exceeds labour productivity growth in the sector. The original insight is from Passinetti (1981). Strong economic performance is characterized by both sustained productivity growth *and* a rising employment/population ratio overall. To observe the details, one can start with the identity  $\phi_0 = L_0 / P_0 = \sum_i (L_0^i / X_0^i) (X_0^i / P_0)$  in which  $P_0$  is the population and  $\phi_0$  is the share of the population employed at the beginning of the period. Labour-output ratios (the inverse of the average productivity levels) for each sector are defined as  $b_0^i = L_0^i / X_0^i$  and sectoral output levels per capita are  $\chi_0^i = X_0^i / P_0$ . The growth rate of the share of the employed population,  $\hat{\phi}$ , can be expressed as  $\hat{\phi} = \sum_i \varepsilon_0^i (\hat{\chi}^i + \hat{b}^i)$  with  $\varepsilon_0^i$  being the sectoral employment

shares. Each sector's growth rate of labour productivity is  $\xi_L^i = (\hat{X}^i - \hat{L}^i)$  so that the growth rate of the labour/output ratio becomes  $\hat{b}^i (1 + \hat{X}^i) = -\xi_L^i (1 + \hat{L}^i)$ . A final expression for  $\hat{\phi}$  is obtained as:  $\hat{\phi} = \sum_i \varepsilon_0^i (\hat{\chi}^i - \xi_L^i)$ . In other words, the growth rate of the employment/population ratio is a weighted average of differences between sectoral growth rates of output per capita and productivity. Sectors with higher shares of total employment  $\varepsilon_0^i$  contribute more strongly to the average. One might expect that  $\hat{\chi}^i > \xi_L^i$  in the case of a "dynamic" sector and that the inverse will hold in the case of a "declining" or "mature" sector.

