

# **Growth Amid Change in Developing Asia**

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# Preface

This volume contains an essay originally published in *Asian Development Outlook 2007* (ADB, Manila, 2007; available: <http://www.adb.org/Documents/Books/ADO/2007/default.asp>). It augments that publication's contents by providing an extensive, new empirical appendix. Data in the appendix and in other parts of the essay are downloadable from: <http://www.adb.org/documents/books/growth-amid-change/>.

A central premise of this essay, by Jesus Felipe and Frank Harrigan, is that economies that successfully sustain growth do so by continuously adapting and changing their form. Incrementally, but steadily, they latch on to and master new and more productive activities, reaping gains along the way.

At one level, the transformations associated with sustained fast growth are well known. They entail a shift of output from agriculture to both industry and services. Indeed to date, there has been no economy in developing Asia that has sustained fast growth and economic catch-up that has not also successfully industrialized. Even Hong Kong, China, which is a highly developed service economy, experienced a manufacturing boom in the 1960s and 1970s. Historically, those economies that have failed to industrialize have been unable to sustain fast growth. One reason for this would appear to be that industry has been where opportunities for productivity growth have been located. While services have played an important role in mopping up surplus labor from agriculture, this has often meant employment in low-productivity, informal activity.

A distinctive feature of successful industrialization in developing Asia is that it has been associated with incessant upgrading to higher-productivity and technologically more complex activities. This upgrading has been incremental, not the outcome of any great leaps. Three intriguing features emerge from Asia's experience. First, over an extended range of incomes, successful industrialization has been associated with greater output diversity rather than specialization (as the theory of comparative advantage would suggest). Second, sustained fast growth has been closely identified with increasing sophistication and complexity of a country's export basket. Third, successful industrialization has been married to vigorous services growth, and complementarities between the two have become more important with the successive refinement of tasks.

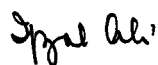
Looking ahead, the essay notes that there are still enormous opportunities for growth and catch-up with rich countries. Most economies in developing Asia remain far away from the Organisation for Economic Co-operation and Development productivity frontier and many still have a large reservoir of surplus labor in agriculture that could be transferred to other, more productive parts of the economy (the "Baumol bonus"). But will industrialization still be necessary, or can services be the new engine of growth?

Certainly, high-productivity tradable services activity has been a boon to countries like India and the Philippines, generating additional income

and foreign exchange earnings. However, it would seem that there are limits on how quickly this sector can continue to expand, as well on the reach of associated benefits. Both in India and the Philippines, the supply of workers with the required language and technical skills is subject to constraints, and this is already pushing up costs. Connections between the educated elite who find employment in these high-end activities and the rest of the economy are also weak. The essay speculates that for those countries where scale permits, progress will require the development of increasingly productive industrial *and* services sectors. Developing Asia must “walk on two legs.”

So how can countries learn and incubate change and how might governments help? Ultimately, prescriptions must be sensitive to context but some generally agreed organizing principles emerge. Government can—indeed must—play an instrumental role in providing the hardware and software that businesses require if they are to create incomes, jobs, and wealth. Without decent physical infrastructure, business costs may be insurmountable or it may be impossible to produce on an efficient scale. Industry in particular suffers when infrastructure is poor. And if laws and courts fail to adequately protect property or uphold contracts, or if bureaucrats prey on businesses, or workers lack the basic competencies and skills needed to be productive, investors will be less likely to take the bets that are needed if an economy is to move ahead. Successful imitation, an important pathway for learning, is more likely in economies that are open to trade and investment than those that are closed.

Beyond this, there is a more proactive role for government. In a sense, government can act as a venture capitalist, assisting potentially profitable but risky start-up activities that might not otherwise get off the ground. Left to itself, the market may undersupply experiments that are necessary for learning and for diversification, and that seed future growth. But such publicly supported “bets” must have strict performance criteria, avoid moral hazard and leakages, and embed exit clauses that will limit exposure to failures. Since the public sector alone is unlikely to have the information that is needed to “guide” exploration and innovation, the private sector and government must work together in identifying opportunities and finding approaches that work. These are some of the ingredients of a market-supporting, industrial policy.



IFZAL ALI  
Chief Economist  
Economics and Research Department

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# Introduction

Most economies in developing Asia and the Pacific present two main differences between today and three decades ago. The first relates to size: they have grown significantly. The second relates to their look and form: they have changed (Appendix table 1).

Economies that sustain rapid growth do not simply replicate themselves on a larger scale. Countries become different as they grow, not only in terms of what they produce, but also how they produce. And the ways in which they change matter for growth. Growth occurs through diversification and the birth and expansion of new economic activities and assimilation of better methods of organization and production. Countries that do not change cannot sustain rapid growth.

At the dawn of the industrial revolution, today's industrial countries were largely agrarian. They followed a path of population migration from countryside to town, and resources moved out of agriculture and into industry and services: they changed. The celebrated "logistic model of growth" (Kuznets 1966, 1971; Chenery 1977) captures these features but suggests that transformation is almost automatic—ingrained in technological progress and in the way needs and tastes change with rising incomes.

This essay asks what has been the experience of growth and change in developing Asia over the last 35 years, and sifts for clues about how future growth can be sustained. Developing Asia's experience certainly confirms that change is deeply ingrained in growth and that change has been evolutionary rather than revolutionary. Countries that have grown have changed their form continuously, not by great leaps. And countries that have struggled tend to display structural inertia. Reversals have also occurred.

The newly industrialized economies (NIEs) of developing Asia—Hong Kong, China; Republic of Korea (hereafter Korea); Singapore; and Taipei, China—are approaching completion of the catch-up process, i.e., they are reaching rich-country per capita income levels. On past trends, their productivity levels and incomes will soon converge on levels seen in the countries of the Organisation for Economic Co-operation and Development (OECD). The NIEs now face the challenges that economic maturity brings.

Other countries, like Malaysia and Thailand, are closing the gap, but still have to navigate more changes if they are to sustain progress. In the People's Republic of China (PRC) and India, as well as in other countries like Cambodia and Pakistan, the pace of change is quickening and incomes are rising, but many potential challenges still lie ahead.

But some early starters in the catch-up process have suffered reversals. The Philippines has gone back down to a lower gear: low productivity levels and modest per capita income growth appear to be linked to a lack of structural dynamism. And Indonesia serves as

a warning about complacency over rapid growth: the 1997–98 Asian crisis has left scars on the economy's productivity levels and economic structure that are yet to fully heal. The young countries of Central Asia also face enormous challenges, though their natural resource industries present opportunities, provided that rents are invested sensibly. Their proximity to large markets in the PRC and the Russian Federation may also help. But for small countries that are also often handicapped by geography, options are more limited. They will have to incubate their own models of economic growth and change, drawing largely on local resources and capabilities.

Looking ahead, twin challenges present themselves. Developing Asia needs to grow and create wealth to tackle poverty and other forms of human deprivation. But at the same time, developing Asia must create jobs for those who are at present unemployed or underemployed—on some estimates as many as 500 million workers. New workers who are about to enter the labor force will also need decent jobs. The thesis of this chapter is that arrangements that instigate and propagate changes in an economy's shape are instrumental for growth and the creation of jobs.

Before this chapter looks ahead, the next section, *Looking back*, distills some stylized facts about shifts of economic structure in developing Asia over the past 35 years. Change is measured in terms of: movements in the composition of output and employment; the speed and breakdown of labor productivity growth; the pace of technological transformation; and developing patterns of specialization and diversification. In most countries the profile of economic activity has moved from agriculture to industry and services. But there seems to be much greater complexity about the way in which patterns of industrial diversification and specialization evolve that may be linked to the sustainability of growth.

In the following section, *Looking ahead*, productivity growth in developing Asia is extrapolated from past experience. This exercise sizes up the extent to which productivity gaps with OECD might be closed in the next two decades. Dimensions of the future unemployment and underemployment challenge are also sketched.

*Walking on two legs* considers possible broad strategies for future growth and job creation. For most countries, both industrial and services development are likely to have an important role to play (Panagariya 2006). Complementarities between industry and services are stressed, as is the role of services as a provider of jobs. The idea that high-productivity services offer an opportunity to bypass industrialization is examined, as is the role of complexity and diversity in spawning growth.

In the last section, *Incubating change*, linkages to policy are considered. Some of the ingredients needed to lubricate change are old and constitute part of reasonably orthodox approaches. Others have a more catalytic character and take as their point of departure the realization that markets do a better job at allocation than they do in creating demands and providing incentives for experimentation and creation.



## Looking back

This section presents stylized facts about structural change in developing Asia over the past 35 years. It views the region's transformation through: movements in the composition of output and employment; the speed and breakdown of labor productivity growth; the pace of technological change; and developing patterns of specialization and diversification. These multiple changes are linked in subtle ways. Differences and changes in labor productivity provide incentives for resources to shift across sectors. Productivity growth, in turn, is linked to the underlying pace of technological progress and upgrading, but also to the mix of output and the creation of new activities, reflected in emerging patterns of specialization and diversification.

With regard to the data, those for industry and manufacturing are generally much better than for services or agriculture. Also, because of variable availability of data, country samples and time periods sometimes differ. This is seen perhaps most clearly for the Central Asian republics: since they were not independent states 35 years ago, information on their experiences is limited. Small economies in the Pacific and in other places are ill-served by data, too. Throughout, incomes are measured at market exchange rates in constant prices, using the World Development Indicators of the World Bank.

### Movements of output and employment shares

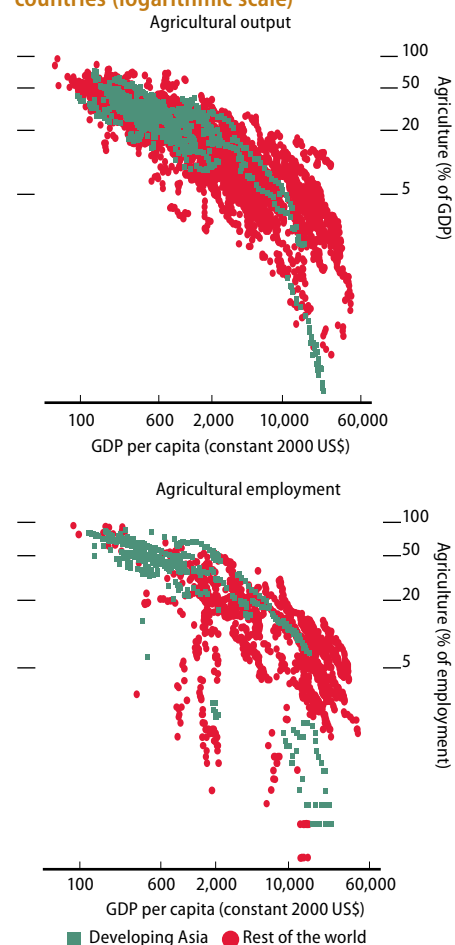
Figures 1, 2, and 3 summarize graphically movement of output and employment across agriculture, industry, and services in developing Asia over the period 1970–2004, as per capita incomes change. Developing Asia's experience is set against the background of broad international patterns over the same period.

These data reveal a number of interesting features.

Most immediately, evolving patterns of specialization in developing Asia generally conform to wider international patterns of structural differentiation and change over the same period. But developing Asia's patterns depart from wider global averages in two ways. First, high-income countries in developing Asia tend to have smaller agricultural output and employment shares than high-income countries elsewhere. This is largely a function of differences in geography and agro-climatic conditions. Second, and perhaps more interestingly, developing Asia tends to be more industrialized than other parts of the global economy for given levels of per capita income. This is particularly true at lower levels of per capita income. But developing Asia also has a number of countries that have low industrial shares for their income levels (low, middle, and high). This reflects the presence of countries where industrialization has stalled or been retarded; the microeconomies of the Pacific that have virtually no industry but mid-level incomes; and the highly advanced service economy of Hong Kong, China.

Looking at the “cross-section dynamics,” the data broadly confirm

**Figure 1 Agricultural output and employment shares vs per capita GDP, all countries (logarithmic scale)**



*Notes:* Both axes are logarithmic scales. The years of data for each country vary with availability of data. The earliest is 1965 for output shares and 1970 for employment shares; the latest for both is 2004.

*Sources:* Asian Development Bank, *Statistical Database System*, downloaded 14 September 2006; Directorate General of Budget, Accounting, and Statistics (various years), *Statistical Yearbook of the Republic of China*; National Bureau of Statistics (various years), *China Statistical Yearbook*; Sundrum (1997) and Chadha and Sahu (2002), cited in Anant et al. (2006); World Bank, *World Development Indicators* online database, downloaded 4 August 2006.

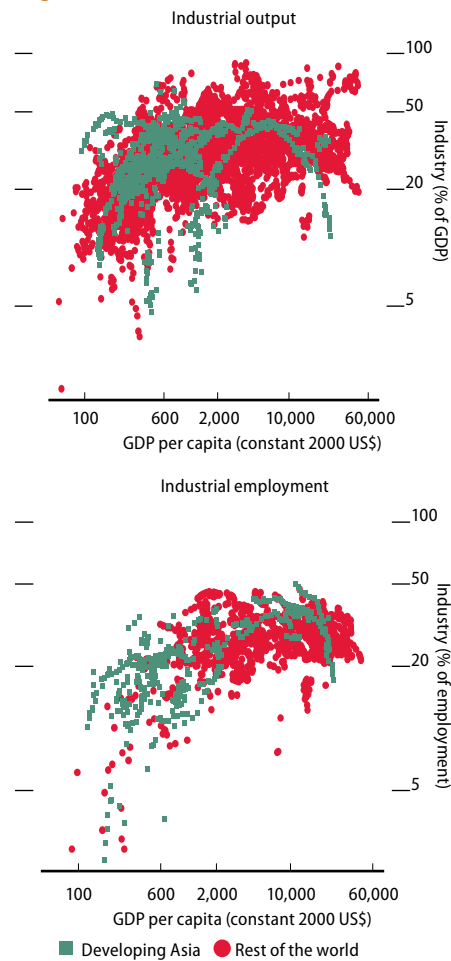
[Click here for figure data](#)

that agricultural output and employment shares tend to be smaller at higher per capita incomes, while the shares of industry and services tend to be larger. The rate at which agriculture shares taper off with larger income seems to accelerate. The rise in services shares is broadly monotonic and shows no systematic inclination to quicken at higher income levels. The rate of increase of industrial output and employment shares slows at higher incomes, and in a number of countries industry shares are smaller at higher per capita income levels. Although broadly consistent with Kuznets' stylized description of structural change, there is no evidence in either the international data or in the data for developing Asia of a sequence in which industrial shares expand ahead of services. Broadly, changes in industry and services shares of output and employment appear to move in close step at low and middle levels of per capita income. But in countries where industrialization has lagged, many more workers move directly from agriculture to services.

The data also clearly show that there is much greater “inertia” in the movement of employment shares than in output shares. For given levels of income, agricultural employment shares tend to be much larger than output shares, and employment shares in industry and output tend to be lower than output shares, more so for industry than services. This pattern can also be detected in the broader international experience. Output shares moving ahead of employment shares is precisely what would be expected if differences in (labor) productivity growth are to create the incentives for workers to move out of agriculture and into industry and services. These observations also mean that looking at economic structure through the lens of output and through the lens of employment may paint quite different pictures.

Finally, by comparing the evolution of shares for different countries at matching income levels, it becomes clear that with the passage of time, the speed of structural change has accelerated. This point is obvious when the experiences of the fast-growing economies of East Asia are compared with those of rich industrialized countries. East Asia compressed into the space of little more than a generation changes that took well over

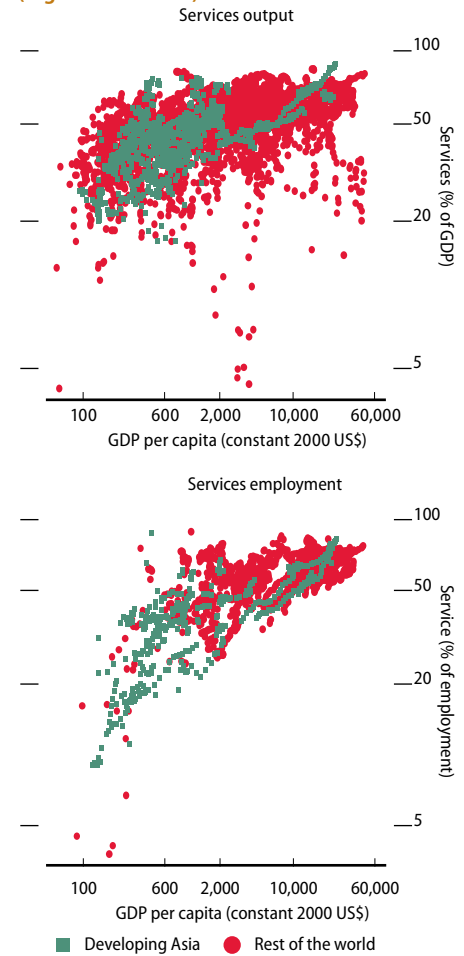
**Figure 2 Industrial output and employment shares vs per capita GDP, all countries (logarithmic scale)**



Notes and sources: See Figure 1.

[Click here for figure data](#)

**Figure 3 Services output and employment shares vs per capita GDP, all countries (logarithmic scale)**



Notes and sources: See Figure 1.

[Click here for figure data](#)

a century for older “industrialized” countries. Late starters have the advantage that they can copy those ahead and advance at a quicker pace. More recent comparisons suggest that this acceleration has continued. For example, higher industry shares are now being seen at lower per capita incomes than before.

These stylized facts, generated from a cross-country panel, are not necessarily a good guide to the evolution of economic structure in any particular country. The experience of developing Asia shows enormous variation both across countries and over time. As there are so many factors that could influence the pace and direction of structural change, explaining why some countries change quickly while others do not, and why they lean in a particular direction, requires in-depth study at a country level (Appendix tables 2, 3, and 4).

## Dimensions of labor productivity growth

Differences in labor productivity (as well as returns to capital) across sectors are important catalysts of structural change. Aggregate labor productivity movements for selected countries in developing Asia are shown in Figure 4 and are compared with labor productivity for OECD, which approximates the productivity frontier. Aggregate labor productivity movements reflect the confluence of many factors as well as all the background conditions (“social capabilities”) that influence them. As resources are reallocated across sectors, aggregate productivity changes occur. But changes in aggregate productivity will also depend on how productivity evolves at the sector level, i.e., on what products are produced and how they are produced.

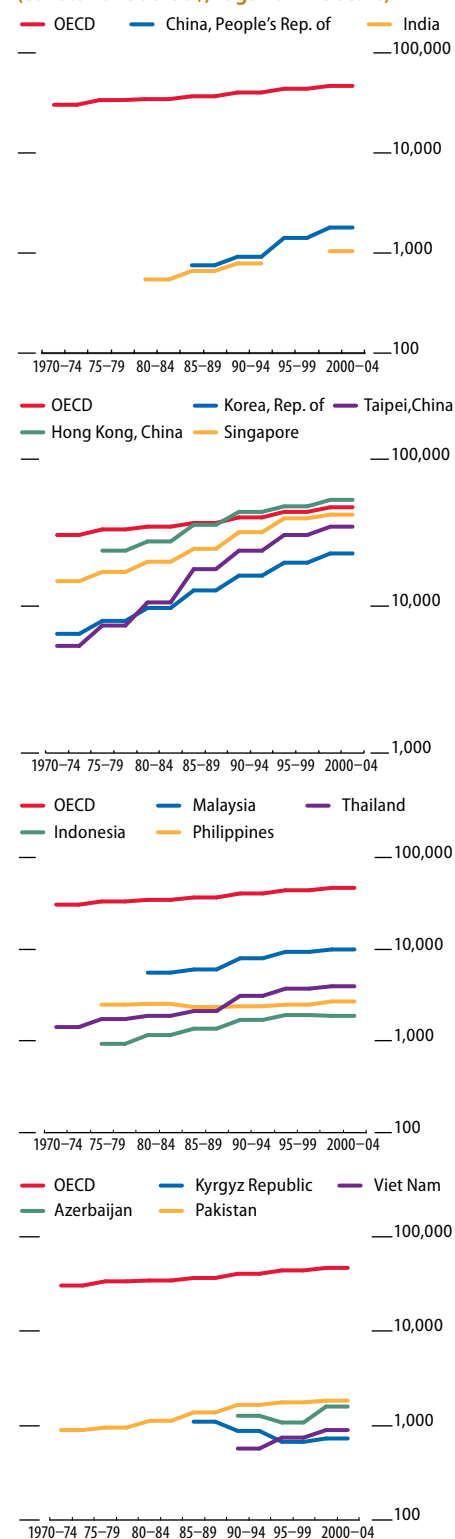
Box 1 explains concepts of productivity convergence and catch-up. Two broad classes of country can be identified in Figure 4: those that are catching up or converging on the OECD frontier, and those that are making little headway in closing the gap. Among the catching-up countries themselves there are those that have progressed quickly and have substantially closed the gap and those where the gap is closing but is still wide. The NIEs have substantially closed the gap, though the Korea and Taipei,China still trail a little.

Relative and level measures can produce different pictures. Take Malaysia, the economy with the highest level of labor productivity outside OECD and the NIEs. Between 1980–1984 and 2000–2004 Malaysia’s relative productivity improved from 16% of the OECD average to 21%. Malaysia is indeed “catching up.” But over the same period, the *level* productivity gap with OECD widened, from \$28,823 in 1980–1984 to \$36,904 in 2000–2004. Once Malaysia’s relative productivity gets to about one third of the OECD average, the level gap will, though, start to close.

In a number of other countries too, including PRC, India, and Thailand, catch-up is occurring as level differences in productivity become wider. But again, if the current trajectories continue into the future, level gaps must eventually close.

But in some countries convergence is not occurring. Over the sample period, the Kyrgyz Republic and the Philippines fall into this category, and have lost ground in relative as well as level terms. In the postcrisis period, Indonesia, which had been converging, begins to

**Figure 4 Total labor productivity (constant 2000 US\$, logarithmic scale)**



Note: The 1980–84, 1985–89, 1990–94, and 2000–04 data for India refer only to 1983, 1988, 1994, and 2000 figures, respectively. The 2000–04 figures for PRC, Indonesia, Kyrgyz Republic, and Pakistan refer only to 2000–02. The 1985–89 figure for Indonesia pertains only to 1989. The 1975–79 figure for the Philippines refers only to 1978. The 1970–74 figure for Pakistan refers only to 1973–74.

Source: Staff estimates.

[Click here for figure data](#)

fall further behind. Pakistan, too, has made little headway in closing labor productivity gaps. Unless these trends are reversed, level gaps in productivity levels will widen indefinitely. There is no evidence in these data that countries that start the period with lower initial levels of labor productivity catch up fastest.

Comparing aggregate labor productivity growth over time and across countries gives some broad clues as to how countries are faring, but for a more refined understanding it is necessary to drill beneath the aggregate numbers to see what is happening at the level of individual sectors (and the manufacturing subsector). Figures 5, 6, and 7 present comparable data for labor productivity gaps in industry, manufacturing, and services.

Trends in industrial labor productivity correlate quite closely with the aggregate picture but also show up some important differences. In particular, industrial catch-up for the PRC is proceeding much faster than it is for India. Within the NIEs, Singapore's industry now matches OECD productivity levels. Industrial productivity gaps for the ASEAN-4 countries are generally much smaller than the aggregate productivity gaps, and for Malaysia and Thailand are converging with the frontier. Again in Indonesia and the Philippines, industrial productivity gaps have widened over the sample period. Earlier gains by Indonesia fall away at the start of the 1990s. For the remaining countries, the relative industrial productivity gap has narrowed in Azerbaijan, Pakistan, and Viet Nam. After a relapse and a widening of the gap, the Kyrgyz Republic closed the gap a little between 2000 and 2004.

For manufacturing, the story for the NIEs barely changes. They have caught up steadily with OECD and gaps are now small, with Singapore in fact showing higher labor productivity levels than the OECD average. In the case of the PRC and India, the labor productivity gap is less for India than for the PRC, the reverse of what was observed for industry, but the PRC is catching up with India. Though manufacturing labor productivity gaps between India and OECD have been cut, catch-up has decelerated. Among the ASEAN-4, the gap is least for Malaysia and largest for Indonesia. The gap for the Philippines widens over the sample period. In Indonesia, manufacturing labor productivity stagnates in the postcrisis years, and the gap begins to widen. In Pakistan, too, there is evidence of stagnating labor productivity. The gaps are wide for other countries, but are closing in relative terms.

The story is more complicated in services and the data are possibly less reliable, given the well-known difficulties of measuring services output, and hence labor productivity. In OECD, the data suggest that services labor productivity growth is slower than in industry and manufacturing. In most of developing Asia, services productivity is also lower than in industry or manufacturing. Perhaps this reflects a high incidence of underemployment or disguised unemployment in the services sector as well as underlying technological conditions.

Among the NIEs, Hong Kong, China now has levels of services labor productivity higher than OECD. Taipei, China is very close to the OECD frontier, but Korea seems to lag a long way behind and the gap is not closing quickly. The fragmentary data for the PRC and India suggest that services labor productivity is lower in the PRC than in India. Catch-up with OECD is glacial. In the ASEAN-4, Malaysia is the only country that

### Box 1 Convergence and catch-up

Figures 4–7 show the trajectory of labor productivity in logarithmic scale. The vertical distance between two points in this space measures the ratio of productivity levels. The gap is closing when the ratio of levels (with OECD in the denominator) approaches 1 in value.

Productivity convergence in this relative sense does not necessarily mean that, in level terms, productivity gaps are closing. *Relative convergence* requires that labor productivity in the low-productivity country grows more quickly than productivity in OECD. *Level convergence* requires that the differences in their productivity levels close. If relative convergence continues, level convergence must eventually follow.

The conditions are linked as follows:

Relative convergence:

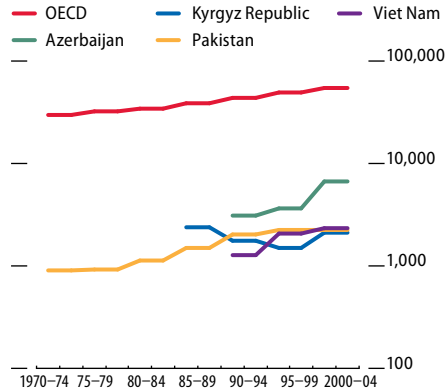
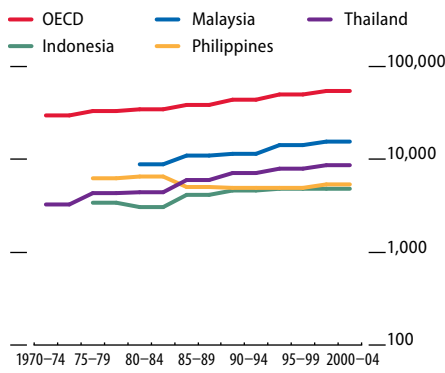
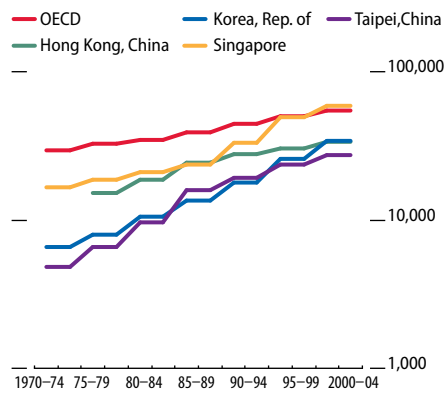
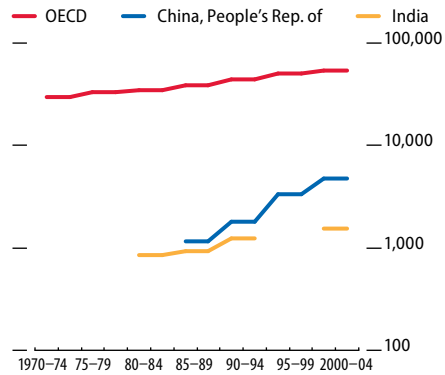
$$g_i - g_j > 0$$

Level convergence:

$$\left(\frac{Y_i}{Y_j}\right) \cdot g_i - g_j > 0$$

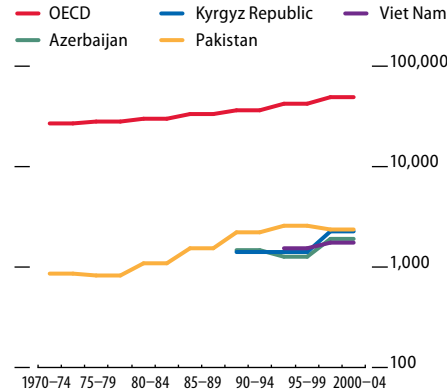
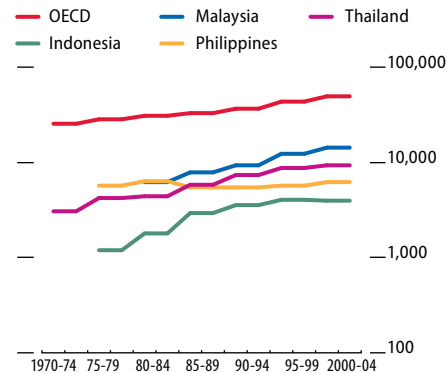
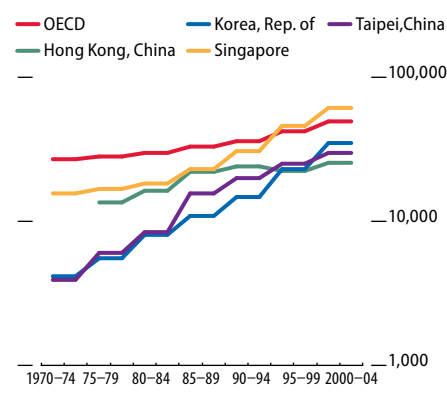
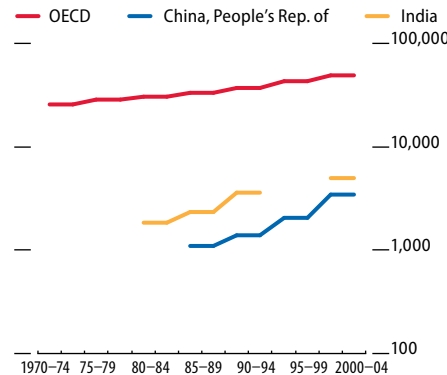
where  $g$  is growth of labor productivity,  $Y$  is the level of labor productivity,  $i$  is the catch-up country, and  $j$  is the frontier.

**Figure 5 Industrial labor productivity (constant 2000 US\$, logarithmic scale)**



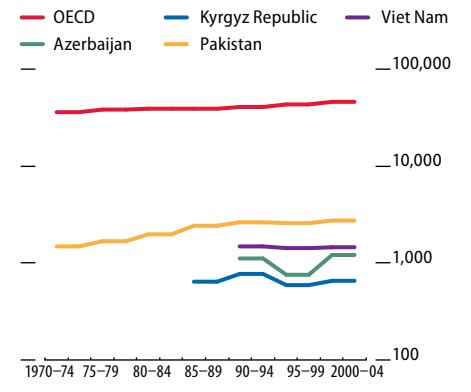
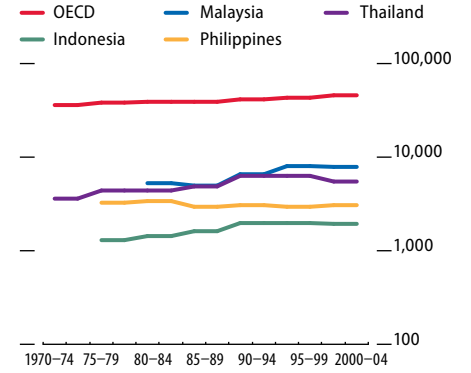
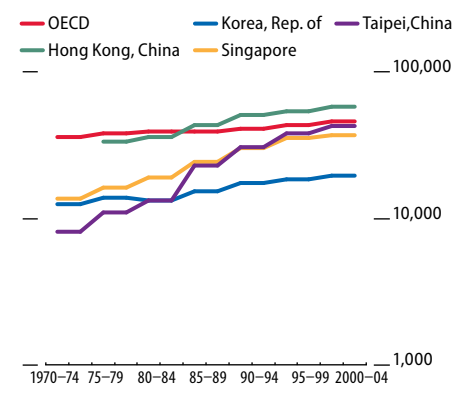
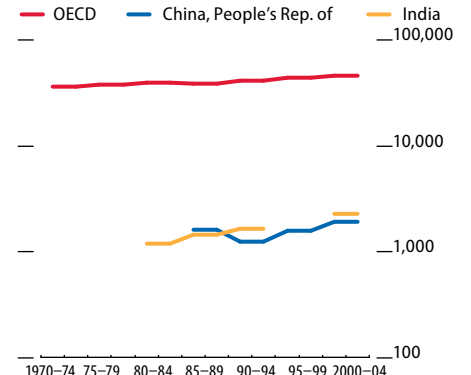
Note: See Figure 4 for the years of data for each country.  
Source: Staff estimates.  
[Click here for figure data](#)

**Figure 6 Manufacturing labor productivity (constant 2000 US\$, logarithmic scale)**



Note: See Figure 4 for the years of data for each country.  
Source: Staff estimates.  
[Click here for figure data](#)

**Figure 7 Services labor productivity (constant 2000 US\$, logarithmic scale)**



Note: See Figure 4 for the years of data for each country.  
Source: Staff estimates.  
[Click here for figure data](#)

appears to be catching up, but has seen stagnation over the last decade. Earlier gains by Thailand would appear to have been partially given up. And it is difficult to detect any evidence of convergence for Indonesia (from 1990 on) and the Philippines. Among the remaining countries, only Pakistan has made headway.

The links between aggregate labor productivity growth and the sector components shown in Figures 4 to 7 are shown in Figure 8. However, sector contributions to the total depend not just on by how much their own productivity grows but also on their share in total output. More complicated decompositions also take into account shifts in employment across sectors.

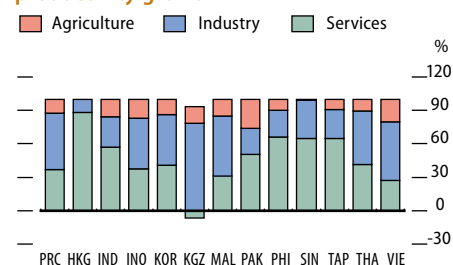
It is immediately clear that the contribution of agriculture to aggregate labor productivity growth has been uniformly small. This is due both to the comparatively low output share of agriculture and to small labor productivity gains. For the Kyrgyz Republic, the data measure contributions to a fall in aggregate labor productivity (see Figure 4). The services contribution (which is a negative number) actually represents an improvement in its productivity. After the dissolution of the former Soviet Union, employment in the industry and services sectors of the Kyrgyz Republic contracted and many workers moved back to the farm. In the PRC, Indonesia, Korea, Malaysia, Thailand, and Viet Nam, industrial productivity growth dominates aggregate advances over the respective sample periods. But in Hong Kong, China; India; Kyrgyz Republic (where it is the only positive component); Pakistan; Philippines; Singapore; and Taipei, China, services make the largest contribution. This is because services have a large share in output in these economies, dilating the impact of modest gains in labor services productivity.

Labor productivity growth can be further broken down into within-sector and between-sector components. As workers move out of agriculture and into higher (labor) productivity activities in industry and services, aggregate productivity is lifted. This shift effect is commonly referred to as “Baumol’s structural bonus.” Box 2 explains how to measure the bonus, and Figure 9 shows the breakdown of productivity growth into the bonus and within-sector productivity growth.

As seen in the figure, for most countries the contribution of within-sector labor productivity growth to aggregate labor productivity growth dominates the bonus that occurs as employment is reallocated from agriculture to industry and services. Yet the latter is by no means insignificant, accounting for more than 20% of the aggregate gains in productivity in six countries (the Kyrgyz Republic effect is negative). In Thailand, the structural reallocation effect (i.e., the bonus) outweighs within-sector productivity gains. As there is still a large reservoir of workers in agriculture in many of Asia’s developing countries, and as Baumol’s structural bonus is still largely untapped, it represents a potentially large source of future productivity gains.

Baumol’s structural bonus is made up of the contributions of migration from agriculture to industry and from agriculture to services. This is shown in Figure 10. In developing Asia, the transfer of workers from agriculture to services has provided the largest gains. This is an important finding that helps explain the dynamics of employment in labor-surplus economies. In many countries of developing Asia,

**Figure 8 Sector contributions to total labor productivity growth**

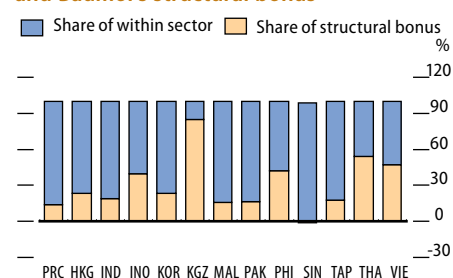


Note: Time period: PRC: 1987–2002; Hong Kong, China: 1978–2004; India: 1983–2000; Indonesia: 1976–2002; Korea: 1970–2004; Kyrgyz Republic: 1987–2002; Malaysia: 1980–2004; Pakistan: 1973–2002; Philippines: 1971–2004; Singapore: 1970–2003; Taipei, China: 1965–2004; Thailand: 1971–2004; Viet Nam: 1991–2004.

Source: Staff estimates.

[Click here for figure data](#)

**Figure 9 Within-sector productivity growth and Baumol’s structural bonus**

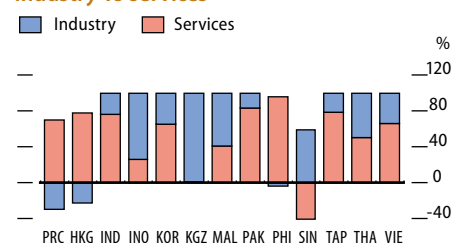


Note: See Figure 8.

Source: Staff estimates.

[Click here for figure data](#)

**Figure 10 Baumol’s structural bonus: industry vs services**



Note: See Figure 8.

Source: Staff estimates.

[Click here for figure data](#)

## Box 2 Baumol's Structural Bonus and the decomposition of productivity growth

Following Chenery et al. (1986), the economywide growth rate of labor productivity can be decomposed into two parts: one, the sum of the growth rates of labor productivity *within* sectors (weighted by the sector's share in output); two, the effect of labor reallocation *between* sectors of different productivity, calculated as the sum of the changes in the employment shares of the sectors (industry and services) receiving employment moving out of agriculture multiplied by the differential in labor productivity with respect to agriculture. That is:

$$\hat{q} = \sum k_i \hat{q}_i + (\lambda'_I - \lambda^0_I) \frac{(q_I - q_A)}{q} + (\lambda'_S - \lambda^0_S) \frac{(q_S - q_A)}{q}$$

where  $\lambda_i = L_i / L$ ,  $q_i = Q_i / L_i$ ,  $q = Q / L$ , and  $k_i = Q_i / Q$ .  $L$  is labor,  $Q$  is output,  $'$  denotes end-of-period values,  $^0$  start-of-period values,  $\hat{\phantom{x}}$  time rates of change, and the suffixes sectors ( $A =$  agriculture,  $I =$  industry,  $S =$  services) (Appendix table 5).

The effect of the transfer of labor on productivity is what Baumol et al. (1985; 1989) call the "structural bonus." Backward economies with a large pool of employment in low-productivity activities (normally agriculture) experience a bonus from structural change. This occurs because the transfer of labor from low- to high-productivity activities automatically increases the productivity *level* of the economy (i.e., a composition effect). This happens even if this transfer of resources is mainly a shift from agriculture to services (where productivity might not be significantly higher).

However, as the logistic pattern of structural change drives resources toward services, and given that productivity growth in this sector is usually slower than in industry, countries eventually experience a "structural burden." That is, as the share of labor in services increases, the aggregate rate of growth of the economy decreases.

agriculture, not industry, has supplied abundant labor to services. Had the transfer of workers been from agriculture to industry, the structural bonus would have been larger.

In some countries, industry appears to contribute negatively to aggregate productivity growth through the reallocation effect. This reflects the movement of workers out of industry, most probably to services. The shrinking employment share in Hong Kong, China reflects the maturation of the economy. For the PRC, it reflects a base period (1987) when that economy still had a large number of workers employed by inefficient industrial state-owned enterprises (SOEs), who subsequently lost their jobs as these SOEs were downscaled or closed. The negative contribution of services in Singapore is an artifact of a calculation that divides a positive number for the services bonus by a total structural bonus that is negative (see the equation for Figure 9 in Box 2). A negative reallocation effect occurs in Singapore because of a falling share of industrial employment.

## Technological upgrading

Shifts in labor productivity reflect, among other things, underlying changes in the technological makeup of output. Development—viewed through the prism of structural change—occurs through the creation and subsequent expansion of new activities typically characterized by higher productivity levels and, often, by increasing returns to scale. So how did the technological makeup of output change?

Table 1 shows a classification of 3-digit manufacturing subsectors (United Nations Industrial Development Organization [UNIDO] Industrial Statistics [INDSTAT] International Standard Industry Classification [ISIC] Revision 2) according to the scope they offer for economies of scale and their level of technological sophistication. No comparable data are available for other sectors of the economy. (It should be noted, though, that the UNIDO INDSTAT data are spotty for some countries and years, and that some changes in the composition of manufacturing goods are abrupt, and difficult to explain. This is most likely a question of data quality, including shifts in sector classifications at the country level.)

The classification of the degree of economies of scale follows that of Pratten (1988), while the measure of technology level follows that of OECD (1997; see also Ng 2002). Pratten (1988) based his classification on detailed engineering and cost data. The level of technological sophistication captures direct and indirect dependence on research and development (R&D) inputs.

The classification into four manufacturing subsector groups in Table 1 is similar to that used by Antweiler and Trefler (2002) and by Kochhar et al. (2006). The first group consists of those activities that exhibit relatively low economies of scale and low technology levels; the second, of those that have low economies of scale and medium technology, or medium economies of scale and low technology; the third, of those that exhibit medium economies of scale and medium technology levels; and the fourth, of those that exhibit either high economies of scale and medium technology, medium economies of scale and high technology, or high economies of scale and high technology (Appendix table 6).

To construct an index that captures these facets of technology, scores were assigned to sectors in each of the four groups. Those in the first group were given a score of 1, the second 2, the third 3, and the fourth 4. A country index was then calculated by weighting scores by the share of each sector in total *output* (value added) in manufacturing. A minimum value of 1 is seen when all activities are in group 1, and a maximum value of 4 when all activities are in group 4. Figure 11 presents the results, graphing derived scores against per capita incomes.

The technology and scale scores for the NIEs rise strongly with per

**Table 1 Classification of manufacturing subsectors by economies of scale and technology**

Group 1: Low economies of scale/Low technology		
Wearing apparel	Low	Low
Footwear	Low	Low
Furniture	Low	Low
Textiles	Low	Low
Wood products	Low	Low
Leather products	Low	Low
Food products	Low	Low
Beverages	Low	Low
Tobacco	Low	Low
Group 2: Low economies of scale/Medium technology or medium economies of scale/Low technology		
Other manufactured products	Low	Medium
Plastic products	Low	Medium
Rubber products	Low	Medium
Printing and publishing	Medium	Low
Paper products	Medium	Low
Group 3: Medium economies of scale/Medium technology		
Fabricated metal products	Medium	Medium
Pottery and china	Medium	Medium
Glass products	Medium	Medium
Nonmetallic mineral products	Medium	Medium
Iron and steel	Medium	Medium
Group 4: Medium or strong economies of scale/Medium or strong technology (excluding medium economies of scale/medium technology)		
Professional equipment	Medium	High
Electrical machinery	Medium	High
Nonelectrical machinery	Medium	High
Petroleum and coal products	High	Medium
Nonferrous metal	High	Medium
Petroleum refining	High	Medium
Transport equipment	High	High
Other chemicals	High	High
Industrial chemicals	High	High

Source: Ng (2002).



capita income, though that for Hong Kong, China is the lowest, in part because it has long since been a services-dominated economy. Singapore has the highest score, consistent with its ranking for labor productivity measured against the OECD average, and has, for decades, pursued policies to upgrade the technical sophistication of its manufacturing base. The pace of upgrading for Korea and Taipei, China has been slower than for Singapore. Only in the early 1990s did they reach levels that Singapore had passed in the late 1970s, but in more recent times this gap has narrowed.

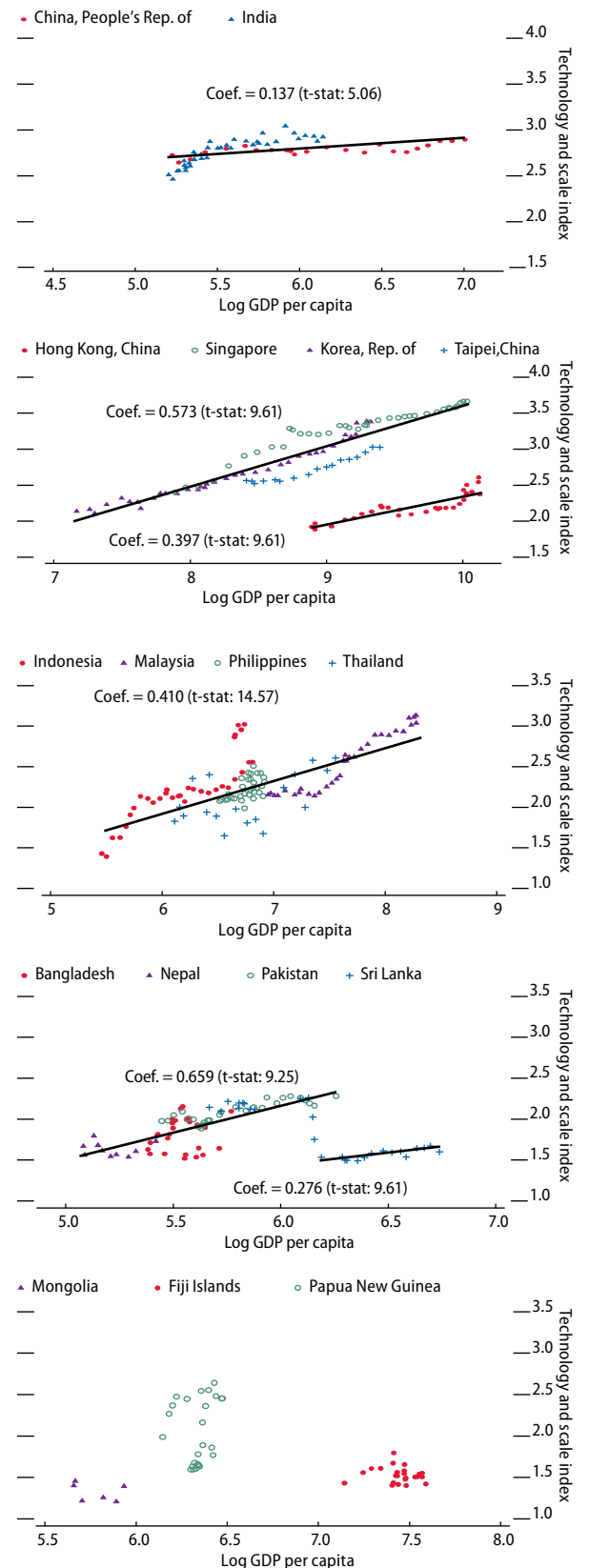
The PRC and India's scores also display rising trends, but at a slower pace than those of the NIEs. Nevertheless, the scores of these two countries are very high given their per capita income. Comparable values for the NIEs were only attained at considerably higher levels of per capita income. The PRC has only recently achieved Korea's 1960s' per capita income level, yet its score is comparable to that of Korea in the 1980s and early 1990s. Much the same is true for India, and its incomes trail those in the PRC. The PRC's successful participation in international production networks (or global value chains) during the last decade has been instrumental in the country's recent technological upgrading (Box 3).

The technology and scale scores of the ASEAN-4 countries also rise with per capita income levels. But in the Philippines there is no discernable pattern as observations are tightly clustered around comparatively stagnant income levels. Indonesia's and Malaysia's scores move up more quickly than those of Thailand, but Malaysia still has higher scores than Indonesia. The technology and scale scores of the South Asian countries (other than India) and other countries included in Figure 11 show no steady increase.

Figure 12 shows the evolution of shares in the four groups of products for Korea, Malaysia, Philippines, and Taipei, China using the scale and technology classification of Table 1. For Korea, increasing sophistication (i.e., a greater share of manufacturing subsector group 4) is more readily apparent than for Taipei, China, where the share of manufacturing in GDP has been shrinking. Malaysia and the Philippines provide stark contrasts: Malaysia's upgrading has been prodigious; in the Philippines, the technological profile of manufacturing industry is static.

The same exercise was repeated using employment shares. Broadly the results are comparable, except for the PRC. For the PRC, the value of the technology and scale scores derived using employment data drift down. The reason for this is that the PRC's base share in high-technology groups is artificially inflated by the strong presence of SOEs in heavy industry in the 1980s. As moribund SOEs were closed, employment shares declined. Also, it would appear that within manufacturing in the PRC, growth in labor productivity has been much quicker in

**Figure 11 Technology and scale index of developing economies in Asia: Manufacturing value added**



Source: Staff estimates.

[Click here for figure data](#)

### Box 3 Technological catch-up in the PRC's global value chains

Technological upgrading in the global value chains (GVCs) of the People's Republic of China (PRC) is notable for three things: it is considerable, it has occurred with great speed, and it has come through a wider variety of channels than seen until now in other Asian countries. Unlike the newly industrialized economies (and the Southeast Asian countries), the PRC boasts an enormous internal market that foreign firms are keen to enter and exploit.

As McDougall (2006) notes, the growth of electronics exports, the PRC's largest export segment, began after manufacturing plants from Taipei, China as well as their suppliers relocated across the straits in the 1990s. Assembly was located first, then the component-input industries, and most recently design work. Today, most of the PRC's electronics export industries are supported by local firms making plastic molding and machine tools for manufacturing. For example, Flextronics, a large multinational corporation (MNC) employs around 41,000 people in the PRC and has hired large numbers of PRC engineers to design the products they assemble.

Roberts (2006) reports that by 2006 there were around 450 integrated circuit design companies in the PRC, up from 400 in 2005, 20% of which employed "returnees" from the US. These companies are mostly homegrown, small firms and few have revenues of more than \$50 million. However, they testify to the growing influence of the PRC's design capability in the electronics industry, reminiscent of Taipei, China design developments in the early 1990s.

Virtually all leading US electronics makers are developing strategies to cope with "the PRC factor", which basically means taking advantage of the PRC's low labor, engineering, and design costs to compete with other MNCs in the US market—and to gain entry into the PRC domestic market. Engardio and Roberts (2004) examine the case of the US market for telecommunications networking gear. 3Com, from Massachusetts, aims to expand market share by selling products similar to the market leader's at very low cost via a new joint venture in the PRC. In networking, the PRC's engineering costs are currently around 25% of US levels.

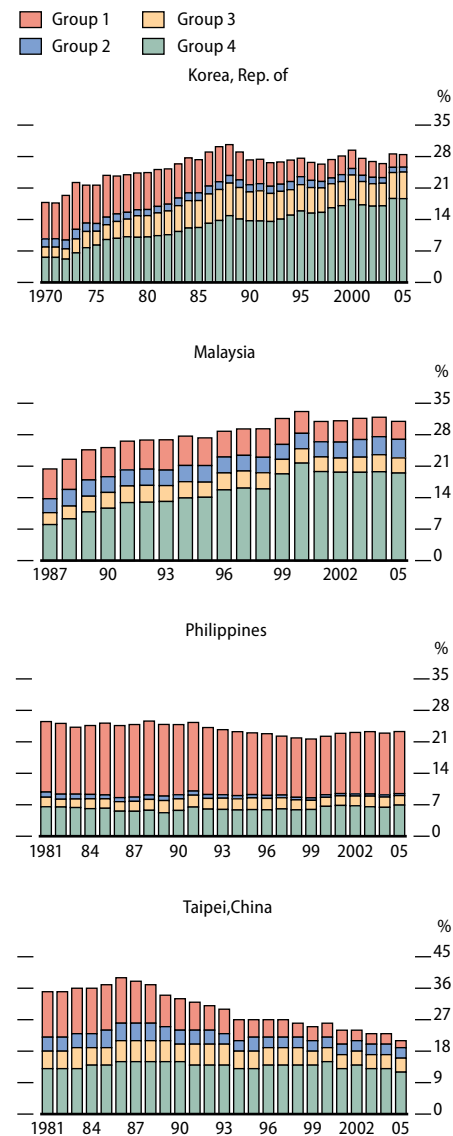
Local firms are also rapidly entering the market, imitating the operations of MNCs. For example, SMI, a PRC-owned chipmaker, now processes 12-inch silicon wafers, only around two generations (or 5 years) behind Intel Corporation, the US leader in the field.

The PRC's local firms are also supplying autoparts to MNCs within the PRC. The Wanxian Group in Hangzhou began as a tiny farm machinery shop in 1969. Today, it is a vast conglomerate that supplies global car manufacturers operating in the PRC. Since 1995 the firm has purchased 10 US auto part makers acquiring skills, technology, management, and access to overseas markets.

Sleigh and von Lewinski (2006) describe efforts by local firms to move into own-brand and services-led production. They stress the growth in the local market in the PRC, where retail sales have grown to more than \$827 billion in 2005. On the MNC front, R&D centers located in the PRC grew from just one in the early 1990s to more than 750 in 2005. The PRC's overall spending on R&D rose from 1% of GDP in the late 1990s to around 1.5% in 2005 and was forecast to reach 2.5% by 2020. Einhorn (2006) shows that foreign firms as diverse as Intel, Google, and Dow Chemicals are increasing their R&D in the country. Firms based in the PRC applied for around 130,000 patents in 2004, six times more than in 1995, making it number five globally.

As McGregor (2004) illustrates, the largest electronics producer in the PRC is in fact a European firm, Philips of Holland. Philips in the PRC generated an estimated \$2.5 billion in local revenues in 2004, plus \$4.5 billion in export sales. As with other electronics giants, its global manufacturing has been increasingly outsourced to the PRC (including 100% of its audio products).

Figure 12 Shares of manufacturing groups in GDP based on technology and scale



Note: Groups as defined in Table 1.

Source: Staff estimates.

[Click here for figure data](#)

the high-technology sectors. Their output shares have risen, but their employment shares have declined.

Summing up, there is strong evidence that manufacturing in several economies (especially Korea; Malaysia; Singapore; Taipei,China; and to a lesser extent Thailand) in developing Asia has undergone important transformations and shifted output to more technology- and scale-intensive subsectors. In some other economies (the PRC and India, for example), the shift to more technology- and scale-intensive subsectors is taking place more slowly, but has started at a very low income base. In yet other countries, the evidence is lacking (Appendix table 7).

## Patterns of specialization and diversification

Having linked the movement of output and employment to productivity gains and changes in technology, this subsection asks how these have been reflected in evolving patterns of specialization. The theory of comparative advantage predicts that as countries open up to trade, they will specialize in those activities that use intensively those factors that are in abundant supply.

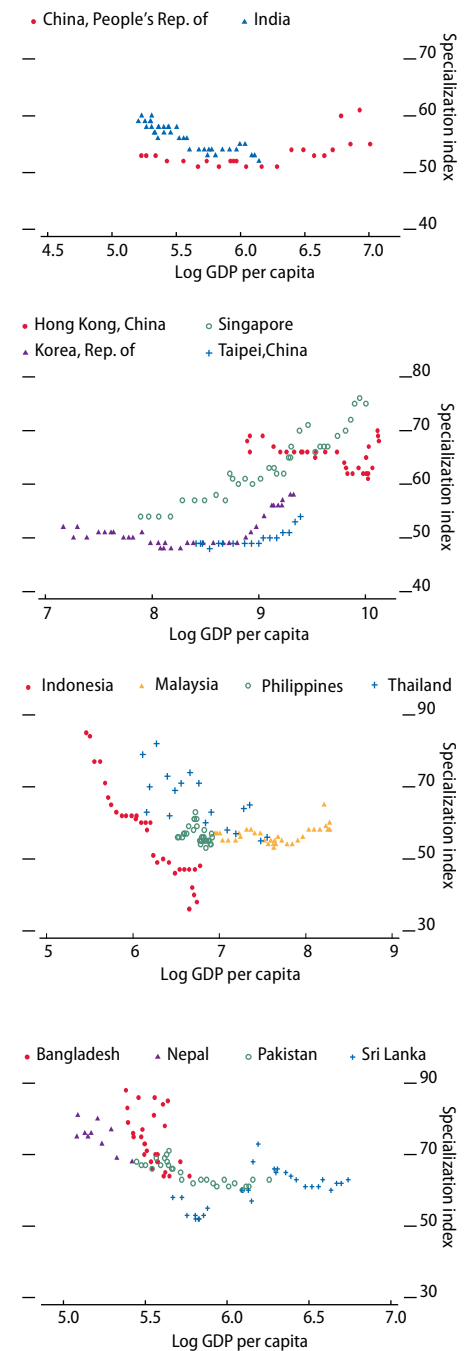
Figure 13 graphs an index of output specialization against per capita income. Lower values indicate greater diversification. At the UNIDO 3-digit level, country experiences appear to vary widely. Increasing diversification (not specialization) is apparent as incomes rise at low levels in Bangladesh, India, Indonesia, Nepal, Pakistan, and Thailand. There is no economy that becomes more specialized within comparable low income ranges. Increasing specialization is only detected at higher income levels in Korea; Malaysia; Singapore; and Taipei,China.

Compared to the PRC at similar income levels, India has a more specialized pattern of manufacturing output, and is marginally more technologically sophisticated (Figure 11). Kochhar et al. (2006) have also shown that India has a more skill-based and capital-intensive pattern of production than the PRC (Appendix table 8).

Some differences appear when specialization and diversification are viewed through the optic of employment rather than output. Employment measures for both the PRC and India indicate a trend toward diversification. In terms of employment, Thailand exhibits increasing specialization rather than diversification. While the trend toward specialization remains in Malaysia and Singapore, the index is static in Korea, meandering around a stable average (Appendix table 9).

Imbs and Wacziarg (2003), present evidence that suggests that, at low levels of per capita income, economies tend to diversify and subsequently, as their income rises, they then specialize (i.e., show lower diversification). Graphically, this would be represented as a U-shape. Rodrik (2006) has interpreted Imbs and Wacziarg (2003)'s findings as suggesting that whatever is driving economic development, it is not comparative advantage. Individual country experiences in developing Asia do not directly fit the U-shaped pattern of specialization for value added (or employment) suggested by Imbs and Wacziarg (2003). But this is not surprising as data are being viewed over a comparatively short time frame. But if the data for all countries are combined (Figure 14), a distinctive U-shaped pattern emerges.

**Figure 13 Specialization index of developing economies in Asia: Manufacturing value added**



Note: The degree of specialization was constructed using UNIDO 3-digit manufacturing data. If the shares of all sectors are equal, the degree of specialization is zero; and if only one sector exists, then the value of the indicator is 100. The degree of specialization  $h$  is defined as

$$h = 100 \times \left( 1 + \frac{\sum_i (s_i \ln s_i)}{h_{\max}} \right)$$

where  $h_{\max} = \ln(\text{number of sectors})$  and where  $s_i(t)$  is the share of the  $i$ -th branch in total manufacturing value added in year  $t$  and  $0 \leq h \leq 100$ .

Source: Staff estimates.

[Click here for figure data](#)

Viewed through a wide-angle lens, it is noticeable that the PRC and India are unusually diversified for their levels of per capita income. But significant diversification might be expected in giant countries. Indonesia, another large country, is also more diversified than “average”.

However, outliers with higher than “expected” degrees of specialization are not small countries and include, for example, Bangladesh and Thailand.

It would appear that diversification at low levels of income and specialization at higher levels have been features of developing Asia’s experience of change. One way to represent these “dynamics” is through an evolutionary process of differentiation, selection, and amplification (Beinhocker 2006). Rodrik (2004) interprets this and Imbs and Wacziarg’s findings as suggesting that low-income countries start the development process by attempting mastery over a broader range of activities. But as Rodrik points out, not all countries have proven to be equally good at this. It should be noted that the incomes in Figure 14 are calculated at market exchange rates, not purchasing power parity prices, and this may explain why the turning point is observed at a much lower level of income than in Imbs and Wacziarg. Given that principles of comparative advantage do not chime readily with developing Asia’s experience, the structure of Asia’s exports is now examined more closely.

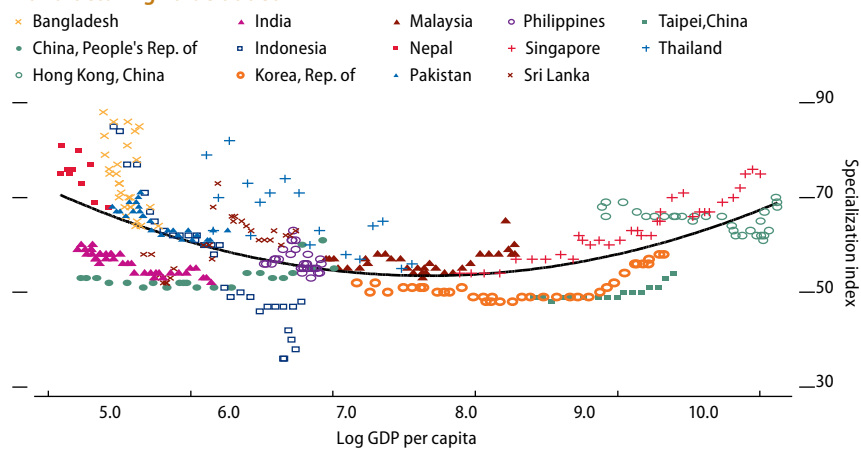
## Export complexity and diversification

Linked to the idea that comparative advantage may not be a particularly good predictor of how output structures evolve, Hausmann et al. (2005a) have argued that specialization patterns are partly indeterminate and may be shaped by idiosyncratic and country-specific elements. Specifically, there would appear to be a strong relationship between the level of a country’s income and the sophistication or complexity of its “export package”. Does the experience of developing Asia fit with these ideas?

The sophistication or complexity of a country’s export basket is associated with the income or productivity characteristics of countries around the world that export similar goods. So if a country’s export basket has a high share of goods that rich countries specialize in, it attracts a high score. Conversely, export baskets overweight in goods that poor countries specialize in attract a low score. Measurement issues are explained in Box 4 (Appendix table 10).

Figure 15 graphs the country scores. Unsurprisingly, the results show that the NIEs have the highest scores, followed by Malaysia, Thailand, PRC, Philippines, India, and Indonesia. Moreover, the scores of all these countries have increased over the years, indicating an increasing level of

**Figure 14 Combined specialization index of developing economies in Asia: Manufacturing value added**



Note: The estimated regression line is:

$$\text{Specialization} = 203.653 - 39.163 \text{ GDP per capita}(\log) + 2.554 (\text{GDP per capita}(\log))^2$$

t-stat: (17.78) (-12.39) (12.13)

R<sup>2</sup>: 0.30; No. of observations: 387

Source: Staff estimates.

[Click here for figure data](#)

### Box 4 Measuring export sophistication

The measure of export complexity or sophistication is developed in two steps. First, a commodity-specific index is constructed. This is a weighted average (where the weights represent the revealed comparative advantage of a country for a particular good) of the per capita GDPs of the countries exporting that commodity. So a high value of the index means that countries exporting that good have high income/productivity levels.

Second, an overall index is constructed as a weighted average of the commodity scores in the export basket, where the weights are the value shares of goods in the country’s total exports. A high value for the overall index means that a country is exporting goods that are predominantly exported by high income/productivity countries.

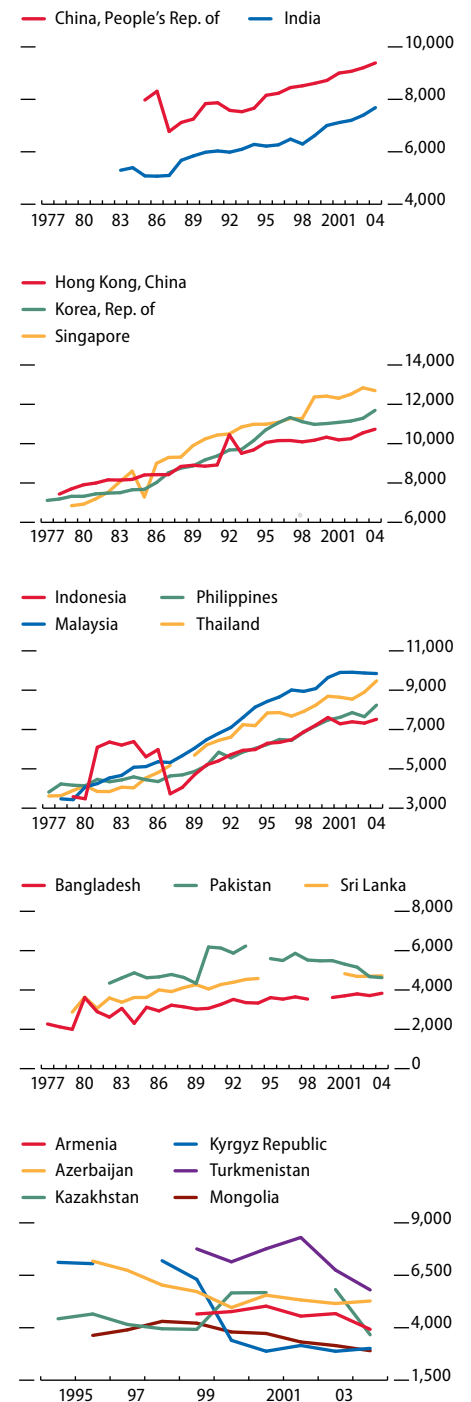
To construct these indexes, export data are used from the United Nations Commodity Trade Statistics Database (COMTRADE) at the 5-digit level (SITC Revision 2; 1,800 commodities) for the years 1977 to 2004. Per capita GDP is from the *World Development Indicators* database. Per capita GDP at constant 2000 US dollars is used. The average product weights for 2002–2004 are used to construct the overall index for all possible countries in developing Asia over the period 1977–2004.

Table 2 Export diversification, 1986–2004

	1986	2004
<b>China, People's Rep. of</b>		
Share of top 10 exports (%)	59.9	8.9
Export commodity score of top 10 exports	6,862	6,727
Overall export complexity score	8,309	9,389
<b>India</b>		
Share of top 10 exports (%)	53.1	23.9
Export commodity score of top 10 exports	4,034	5,469
Overall export complexity score	5,069	7,684
<b>Newly industrialized economies</b>		
<b>Hong Kong, China</b>		
Share of top 10 exports (%)	27.7	16.9
Export commodity score of top 10 exports	7,260	9,680
Overall export complexity score	8,425	10,733
<b>Korea, Rep. of</b>		
Share of top 10 exports (%)	34.8	20.6
Export commodity score of top 10 exports	8,584	10,285
Overall export complexity score	8,022	11,694
<b>Singapore</b>		
Share of top 10 exports (%)	32.0	18.9
Export commodity score of top 10 exports	8,330	13,624
Overall export complexity score	8,997	12,696
<b>ASEAN-4</b>		
<b>Indonesia</b>		
Share of top 10 exports (%)	62.3	29.9
Export commodity score of top 10 exports	4,314	8,668
Overall export complexity score	5,979	7,521
<b>Malaysia</b>		
Share of top 10 exports (%)	64.7	26.9
Export commodity score of top 10 exports	4,770	6,819
Overall export complexity score	5,360	9,846
<b>Philippines</b>		
Share of top 10 exports (%)	49.5	32.1
Export commodity score of top 10 exports	3,428	7,445
Overall export complexity score	4,352	8,240
<b>Thailand</b>		
Share of top 10 exports (%)	56.1	17.2
Export commodity score of top 10 exports	4,629	7,806
Overall export complexity score	4,811	9,472
<b>Other South Asia</b>		
<b>Bangladesh</b>		
Share of top 10 exports (%)	73.6	59.2
Export commodity score of top 10 exports	2,499	3,791
Overall export complexity score	2,934	3,833
<b>Pakistan</b>		
Share of top 10 exports (%)	62.8	49.7
Export commodity score of top 10 exports	5,014	3,458
Overall export complexity score	4,664	4,628
<b>Sri Lanka</b>		
Share of top 10 exports (%)	42.7	34.7
Export commodity score of top 10 exports	3,032	4,462
Overall export complexity score	4,004	4,718
<b>The Pacific</b>		
<b>Fiji Islands</b>		
Share of top 10 exports (%)	76.8	58.3
Export commodity score of top 10 exports	6,268	3,704
Overall export complexity score	3,798	3,016

Note: Data are staff calculations from the United Nations Commodity Trade Statistics Database (COMTRADE) at the 5-digit level (SITC Revision 2; 1,800 commodities).

Figure 15 Overall Asian export complexity scores



Note: The vertical axis measures the complexity or sophistication of a country's exports. This measure is referred to as EXPY in Box 6 below.

Source: Staff estimates.

[Click here for figure data](#)

complexity or sophistication in their export basket. For Bangladesh the trend is flat, and for Mongolia, Pakistan, and countries in Central Asia the index trends down.

This index of the complexity or sophistication of the export basket depends on how the underlying components are changing: whether individual exports are becoming more or less sophisticated over time, and on how the composition of a country's export basket shifts. Between 1986 and 2004, a clear pattern emerges of export diversification in all countries, but there are distinct differences across economies (Table 2 above). In the high-income economies, such as Hong Kong, China; Korea; and Singapore, the shift toward diversification as measured by the fall in the share of the top 10 exports in the total is modest. But the structure of exports in these countries was already quite diversified in the base period (1986). There is only modest diversification, too, in Bangladesh, Pakistan, Philippines, and Sri Lanka. But in these countries, the structure of exports is comparatively specialized. By comparison, PRC, Malaysia, Thailand, as well as India and Indonesia, show much greater diversification over the period, converging on the levels seen in higher-income countries. The Indonesian data in the early 1980s were probably influenced by oil-price shocks. To some degree, these patterns shadow the trend seen in the manufacturing output data (Figure 13 above).

## Summary

Developing Asia's experience of change is complex. The evidence presented in this section indicates that there have been multiple transformations, some more obviously linked to productivity growth and economic catch-up with rich countries than others.

Essentially, output and employment in developing Asia have moved as per capita incomes have risen in much the same way as in other parts of the world. But on balance, developing Asia is a bit more industrialized and industrialization has begun at lower income levels than in other regions. Output shifts are much more advanced than employment shifts. Viewed through the lens of output, Asia is a services and industrial economy; through the lens of employment, it is still an agrarian economy and, increasingly, a services economy. In some countries, employment has shifted from agriculture directly to services, bypassing industry.

Developing Asia's performance on productivity growth is mixed. Some countries have come close to bridging the gap with the OECD frontier, others have made considerable progress, and yet others are now showing promise. But there are also countries where productivity is stagnant and where the gaps with OECD—and with other countries in developing Asia—are getting wider. At a sector level, gaps are biggest in services and least in manufacturing. Advances in productivity have been largest in industry and least in agriculture. The reallocation of workers from agriculture to industry and services has indeed provided a “structural bonus,” but to date it has been modest.

The countries that have been most successful in closing productivity gaps are those where manufacturing industry displays evidence of increasing technological sophistication. Increasing diversity rather than specialization appears to be associated with growth in productivity at

low- and middle-income levels. Those economies that have been most successful in closing the gap with the OECD frontier have (other than Hong Kong, China) progressively specialized within manufacturing. There is also evidence of greater complexity and diversity in the export baskets of those countries that are furthest advanced in catch-up.

Critically, the analysis of this section suggests that developing Asia has enormous potential for catch-up growth. Agriculture still has a large reservoir of workers, and a large untapped “structural bonus” remains in play, which can boost productivity growth. In the next section, these ideas are taken up in the context of the challenges ahead.

## Looking ahead

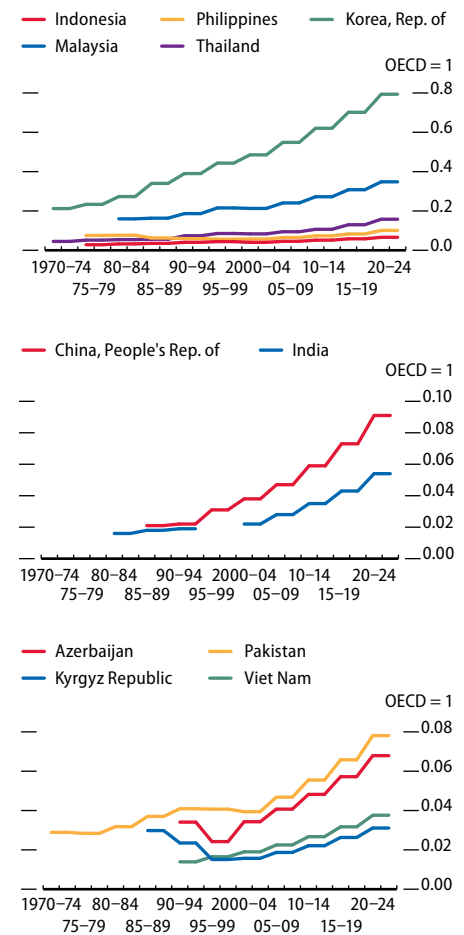
Developing Asia has an unrivalled record of growth and economic catch-up. It has, compared to other parts of the developing world, deftly navigated difficult changes and transformations. Yet this aggregate picture masks individual country examples of stunted growth, reversals, and weak performance. Such a record can also breed a sense of complacency among economic decision makers about the future. Even where countries are catching up, there is no guarantee that the process will continue indefinitely, and the gaps to be closed are daunting. Much more is still to be done in terms of the transfer of labor and other resources across sectors; technological upgrading; and building a competitive edge in new activities. Change will be needed to sustain and accelerate momentum, and complexity is likely to increase. These linked evolutions will not happen automatically. They require societies to develop and deploy effectively a broad range of capabilities.

This section approaches the challenge of catch-up by looking ahead to see where developing Asia could be in two decades. How much of the remaining productivity gap could be closed? But it also considers what the future might hold for job creation. Successful catch-up requires not just closing the gap on labor productivity, but also creating sufficient new jobs to absorb the new workers. Unless developing Asia can create jobs for its burgeoning labor force, growth could come unstuck. The social fabric could also be at risk.

## Closing the productivity gap

Figure 16 shows the historical evolution of labor productivity to 2000–2004, and then extrapolates ratios out to 2020–2024. These are not forecasts, just a way of focusing attention of the magnitude of the productivity gaps that remain to be closed. In all panels, the ratio of a country’s labor productivity to that in OECD is measured. OECD productivity is assumed to continue to grow as in the past, at a rate of about 1.5% a year. Economies in developing Asia are assumed to spurt, and to grow somewhere between 4% and 6%. This is an optimistic range.

**Figure 16 Evolution of labor productivity in developing Asia relative to OECD**



Note: See Figure 4 for years of data.

Source: Staff estimates.

[Click here for figure data](#)

Korea, Malaysia, and Thailand are set to grow at 4%, the PRC and India at 6%, and all others at 5%. These rates are at the upper bounds of those that have been observed in the historical data and anticipate (slow) convergence within the region. No trajectories are shown for Hong Kong, China; Singapore; or Taipei, China because it can be reasonably assumed that they will complete the catch-up process before 2024, and indeed may overtake OECD productivity levels. Korea's trajectory is shown alongside ASEAN-4 countries.

On the basis of these assumptions, Korea's aggregate labor productivity may reach 80% of the OECD average within two decades. (For the period 2000–2004, it was just slightly less than half the OECD average.) By 2025, this would place productivity in Korea where Singapore was relative to OECD in 1990–1994, or in level terms where Singapore might be expected to reach sometime during 2005–2009. It is clear that even on optimistic assumptions the dynamics of catch-up evolve slowly. Each year the frontier itself moves away, “taxing” catch-up by 1.5 percentage points.

By 2025, these simple extrapolations place Malaysia's productivity at about 35% of the OECD average, with a still-substantial gap to bridge. This compares with where Korea was in about 1985–1989 in relative terms, and would be in 2000–2004 in terms of productivity levels. On the same metric, by 2025 Thailand would reach where Malaysia was in relative terms in 1985–1989 and in level terms where Malaysia was in around the mid-1990s. This would seem to point to a gap of about 20 years between Malaysia and Korea, and a gap of about 30 years between Thailand and Malaysia. Of course, this calculation is somewhat artificial because it assumes fast convergence for all countries from 2004.

The calculations are revealing about the PRC and India and underline the fact that behind these countries' gigantic size and torrid growth, there is still a yawning gap with OECD, and indeed with other countries in developing Asia. Even at an accelerated growth rate of 6%, 1–2 percentage points higher than assumed for other countries, neither the PRC nor India would have 10% of OECD's labor productivity by 2025. By that year, in terms of level productivity these calculations place the PRC where Malaysia was around 1987, and India where Thailand was around 1997. These would be considerable achievements, but still serve as stark reminders of the gaps that remain. In 2000–2004, labor productivity in the PRC compares with where Thailand was at the end of the 1970s. For India the comparison—still with Thailand—is the 1960s.

The numbers tell a compelling story about how large the gaps are for other countries, too. Take Viet Nam, one of the fastest-growing economies in Southeast Asia. Even if the growth of its labor productivity outruns its historical advantage, by 2025 it will have attained a level of productivity that compares approximately with Indonesia in around 2005. And if Pakistan could engineer a productivity U-turn, and emulate the performance of the fast-growing economies of the region, by 2025 its productivity levels would compare with those of Thailand in around 2005.

These comparisons—based as they are on optimistic assumptions about future labor productivity growth—size up the challenge for developing Asia and place in context aspirations for growth. But a bigger challenge still is lurking: creating sufficient jobs for developing Asia's



Table 3 Estimated unemployment

Subregion/economy	Rate (%)			Number (millions)	
	1996		Latest year		Latest year
<b>East Asia</b>					
China, People's Rep. of	3.0	4.2	2005	8.400	2005
Hong Kong, China	2.8	5.6	2005	0.200	2005
Korea, Rep. of	2.0	3.7	2005	0.887	2005
Mongolia	6.7	3.3	2005	0.033	2005
Taipei, China	2.6	4.1	2005	0.428	2005
<b>Southeast Asia</b>					
Cambodia	0.9	1.8	2001	0.116	2001
Indonesia	4.9	10.3	2005	10.854	2005
Lao People's Dem. Rep. <sup>a</sup>	3.6	5.1	2003	0.136	2003
Malaysia	2.5	3.5	2005	0.367	2005
Philippines	7.4	10.3	2005	3.766	2005
Singapore	1.7	3.1	2005	0.101	2005
Thailand	1.1	1.4	2005	0.496	2005
Viet Nam <sup>b</sup>	3.5	2.1	2005	0.900	2005
<b>South Asia</b>					
Bangladesh	3.5	4.3	2003	2.000	2003
India <sup>c</sup>	6.0	7.3	2000	9.050	2000
Maldives <sup>a</sup>	0.8	2.0	2001	0.002	2001
Nepal		1.8	1999	0.180	1999
Pakistan	5.4	7.7	2005	3.600	2005
Sri Lanka	11.3	7.7	2005	0.623	2005

a 1995. b 1998. c 1994.

Source: ADB (2006).

burgeoning labor force. If fast labor productivity growth comes at the expense of jobs, then growth might prove difficult to sustain as social cleavages widen. The challenge is to lift productivity *and* create jobs.

## Prospects for jobs

Historically, the NIEs followed a pattern of development in which fast economic growth was accompanied by rapid expansion of labor-intensive activities and the creation of jobs in the organized sector, particularly in manufacturing. By creating formal sector jobs, poverty was quickly reduced and economic gains were widely spread.

The patterns of development observed now in the PRC and India, and elsewhere, do not readily conform to this “model”. In both countries, open unemployment rates have risen and, at least in India, there are high levels of underemployment and informality. Estimates of open unemployment are given in Table 3.

Various elements are probably contributing to these trends on unemployment. Structural factors may play a role. In India for example, high-end services have contributed significantly to growth, but provide few jobs. Manufacturing activities are also comparatively sophisticated, and presumably capital intensive, for India's level of per capita income. But many other factors are also likely to be playing a role, including labor market regulation, bad infrastructure that raises business costs, and the poor quality of India's education system.

In the PRC too, open unemployment is rising despite impressive growth. Again, institutional features of the economy may help explain

this, but structural influences may also be present. The technological sophistication of manufacturing is far above what was observed in countries like Korea at comparable levels of income. The specialization that comparative advantage would seem to predict does not appear to be present (see the previous section, *Looking back*), and output structures, at least in manufacturing, are becoming increasingly diversified at low income levels.

Countries that are growing more slowly are also having a tough time creating *decent* jobs. Indonesia and the Philippines see a large exodus of workers abroad each year. Similarly, a lack of decent employment opportunities at home spurs high levels of emigration from Bangladesh, the countries of Central Asia, Nepal, Pakistan, Sri Lanka, and the Pacific island countries. Emigration and jobs overseas would appear to be an important “safety valve” for many young Asians, but deprives countries of expensive human capital.

Reliable estimates of underemployment are hard to come by, but Table 4 provides some information. “Underemployment” is, by its very nature, difficult to measure. Available estimates tend to focus on “time-based” underemployment, that is, on workers who would willingly work more hours or more frequently. For example, a construction or farm worker wanting to work 45 hours a week but finding employment for only 20 hours is underemployed in a time-based sense. Some indication of the extent of this type of underemployment can be gleaned from labor force surveys. These calculations suggest that time-based underemployment is prevalent. For example, in 2003, 34% of those in work in Indonesia were involuntarily working less than 35 hours a week. Although this type of underemployment in the Philippines has been falling since 2000, it remains substantial, at 17% of total employment. In South Asia, too, a significant proportion of workers seems to be

**Table 4 Time-based underemployment rates (%)**

Country	As share of labor force	As share of employed
Bangladesh	35.4	–
Cambodia	–	29.6
Indonesia	–	34.0
Nepal	27.4	–
Pakistan	21.9	–
Philippines	–	17.0
Thailand	3.8	4.0
Viet Nam	–	11.0, 56.0

– = data not available.

Notes: Years of data vary for each country, but are within 1999–2004.

Viet Nam data are urban and rural, respectively.

Source: Felipe and Hasan (2006).

**Table 5 Employment elasticities and GDP growth**

Subregion/economy	Estimates in Felipe and Hasan (2006)				Estimates in Kapsos (2006)					
	Employment elasticities		Real GDP growth (%)		Employment elasticities			Annual GDP growth (%)		
	1980s	1990s	1980–1990	1990–2000	1991–1995	1995–1999	1999–2003	1991–1995	1995–1999	1999–2003
<b>East Asia</b>										
China, People's Rep. of	0.330	0.129	6.7	8.8	0.14	0.14	0.17	12.7	8.3	8.1
Korea, Rep. of	0.223	0.225	8.8	6.3	0.30	0.17	0.38	7.7	3.4	5.6
Taipei, China	0.242	0.139	8.3	6.5	–	–	–	–	–	–
<b>Southeast Asia</b>										
Indonesia	0.435	0.379	5.9	4.7	0.37	-0.08	0.43	7.6	-0.3	4.1
Malaysia	0.683	0.406	5.5	7.2	0.31	0.51	0.67	9.5	3.7	4.6
Philippines	0.535	0.731	1.6	3.3	0.99	0.69	0.76	2.8	3.4	4.4
Singapore	0.375	0.711	6.8	9.2	0.21	0.54	0.62	9.6	5.4	2.8
Thailand	0.315	0.193	7.3	5.3	0.09	0.14	0.38	8.6	-0.6	4.8
<b>South Asia</b>										
Bangladesh	0.550	0.495	5.0	4.9	0.38	0.48	0.06	4.6	5.0	5.3
India	0.384	0.312	6.1	5.8	0.40	0.43	0.36	6.3	6.3	5.3
Pakistan	0.406	0.553	7.5	3.9	0.49	0.96	0.63	4.5	3.0	3.9

– = data not available.

Sources: Tables 3.6 and 3.7 in Felipe and Hasan (2006) and Appendix Table A4.2.5 in Kapsos (2006).

underemployed in the time-based sense. (Estimates of time-based underemployment for the PRC are not considered reliable.)

A simple way of looking at the impact of GDP growth on jobs is to calculate “employment elasticities”. If jobs grow at the same rate as output, the employment elasticity has a value of 1. But if growth is entirely attributable to improvements in labor productivity, the employment elasticity is 0. Values between 0 and 1 are compatible with job creation and improved labor productivity, but growth that is labor intensive (values closer to 1) necessarily curbs gains in labor productivity (values closer to 0).

Table 5 above presents empirical estimates of employment elasticities for a sample of developing countries in Asia. As the estimates are all greater than 0 and less than 1, growth in this sample has been associated both with job creation and labor productivity gains (see *Looking back*). But the responsiveness of employment to economic growth has varied widely across countries and over time. Economic growth has had least traction on job creation in East Asia and most in Southeast Asia. Estimated elasticities for the PRC are consistently on the low side and suggest that labor productivity gains have been an important part of its growth experience (see the previous subsection, *Closing the productivity gap*). In South Asia, the responsiveness of new jobs to growth generally lies in between the estimates for East Asia and Southeast Asia.

What do these employment elasticities suggest about developing Asia’s capacity to create jobs? As the rate of labor force growth slows in most countries, estimated employment elasticities suggest that developing Asia should be able to create sufficient jobs for new workers, *provided that growth does not stall and that growth continues to create jobs as it has in the past.*

**Table 6 Labor force growth, output growth, and employment**

Subregion/economy	Estimated employment elasticity	Estimated standard deviation	Projected annual labor force growth, 2005–2015	Base employment rate	Implied output growth to absorb new workers <sup>a</sup>	Forecast GDP growth, 2007
<b>East Asia</b>						
China, People’s Rep. of	0.22	0.029	0.69	95.8	2.77–3.61	10.0
Hong Kong, China	0.29	0.022	0.87	94.4	2.79–3.25	5.4
Korea, Rep. of	0.32	0.012	0.40	96.3	1.21–1.30	4.5
Taipei, China	0.25	0.010	0.28	95.0	1.07–1.17	4.3
<b>South Asia</b>						
Bangladesh	0.50	0.034	2.27	95.7	4.29–4.93	6.5
India	0.31	0.013	1.80	95.7	5.54–6.02	8.0
Pakistan	0.41	0.049	2.66	92.3	5.79–7.37	6.8
Sri Lanka	0.37	0.082	0.80	92.3	1.77–2.78	6.1
<b>Southeast Asia</b>						
Cambodia	0.86	0.043	2.26	98.2	2.50–2.77	9.5
Indonesia	0.41	0.028	1.35	90.4	3.09–3.53	6.0
Malaysia	0.48	0.016	2.11	96.5	4.25–4.55	5.4
Philippines	0.84	0.085	2.18	92.6	2.36–2.89	5.4
Singapore	0.40	0.016	1.29	94.7	3.10–3.36	6.0
Thailand	0.35	0.039	0.78	98.6	2.01–2.50	4.0
Viet Nam	0.34	0.012	1.86	97.9	5.29–5.67	8.3

<sup>a</sup> Range is obtained by applying estimates at mean less one standard deviation and mean plus one standard deviation.

Source: Staff estimates.

Table 6 illustrates this point by comparing upper- and lower-bound estimates of employment elasticities with projected labor force growth rates. These calculations suggest that if India can grow at 6%, it can create sufficient jobs for new workers. And even if labor intensity of growth is diluted, emulating say the experience of the PRC, India could still absorb all new workers in jobs if it could grow at 8%. But this is probably close to India's current potential growth rate, and leaves little room for slowdowns or, for that matter, crises.

In the PRC, slowing labor force growth should ease the challenge of job creation. If the historical relationship between income growth and job creation is a good guide, the PRC can create enough jobs for all its new workers if it grows by just 4% each year. This is well below the 10% growth that the PRC has enjoyed over the past decade and above the 8% target that the PRC authorities have set for the medium term. Again, even if labor productivity growth was to spurt (say, halving the employment elasticity), growth of 6% would still generate new jobs sufficient for labor force entrants.

**Table 7 Unemployment scenarios for developing Asia**

Subregion/ economy	Projected labor force, 2015 (000)	Optimistic scenario			Pessimistic scenario		
		\$2-a-day poverty with more equal distribution, benchmark growth at 2015 (000)	Number of under- employed (000)	Under- employment rate, 2015	\$2-a-day poverty with less equal distribution, low growth at 2015 (000)	Number of under- employed (000)	Under- employment rate, 2015
<b>Central Asia</b>							
Azerbaijan	4,536.37	451	122	2.69	949	256	5.65
Kazakhstan	7,819.62	2	1	0.01	280	79	1.01
Kyrgyz Republic	2,860.08	144	42	1.48	1,073	316	11.03
Tajikistan	3,408.32	669	188	5.53	864	243	7.14
Turkmenistan	2,779.56	0	0	0	634	179	6.43
Uzbekistan	15,084.12	7,654	2,156	14.29	14,937	4,208	27.89
<b>East Asia</b>							
China, People's Rep. of	842,387.62	97,770	40,738	4.84	236,935	98,723	11.72
Mongolia	1,702.05	1,081	318	18.68	1,415	416	24.45
<b>South Asia</b>							
Bangladesh	85,322.35	85,702	22,553	26.43	116,987	30,786	36.08
India	550,808.90	630,782	146,693	26.63	791,019	183,958	33.40
Nepal	14,642.32	15,495	3,522	24.05	20,567	4,674	31.92
Pakistan	75,443.71	108,141	18,645	24.71	135,967	23,443	31.07
Sri Lanka	10,133.34	1,460	521	5.15	3,193	1,140	11.25
<b>Southeast Asia</b>							
Cambodia	8,829.80	9,563	2,277	25.79	11,316	2,694	30.51
Indonesia	121,641.86	56,503	18,834	15.48	100,137	33,379	27.44
Lao People's Dem. Rep.	3,630.00	3,449	676	18.63	4,291	841	23.18
Malaysia	13,187.04	50	14	0.11	1,594	455	3.45
Philippines	42,450.87	25,829	6,457	15.21	36,777	9,194	21.66
Thailand	40,140.82	5,886	2,102	5.24	11,171	3,990	9.94
Viet Nam	53,026.42	17,494	4,859	9.16	25,749	7,153	13.49
<b>Total</b>			270,720.06			406,127.32	

Note: In the optimistic scenario, recent growth averages are assumed to continue into the future, but track down a little in the PRC. It is also assumed that the distribution of personal consumption converges on the historically observed distribution that would generate the smallest headcount poverty figure. In the pessimistic scenario, growth is clipped by 1 percentage point in each country, and the distribution of consumption reverts to the historically observed distribution that would generate the largest headcount poverty figure.

Source: Staff estimates based on ADB (2005a).

However, not all countries have such a favorable alignment of growth prospects, labor absorption capacity (i.e., aggregate employment elasticities), and expected flows of new workers into the labor force. In Bangladesh, Malaysia, and Pakistan, the labor force is set to expand quickly, and fast growth will be needed to create sufficient new jobs. This could also be a predicament in parts of Central Asia and the Pacific islands. In the Philippines, although the labor force is also set to expand quickly, economic growth has been highly labor intensive in the past. If labor productivity there were to pick up, unless it is accompanied by faster economic growth, this would pose difficulties for future job creation. In some countries, outmigration may continue to release pressures.

There is a crucial rider to these calculations: they tell us nothing about the *quality* of the jobs being created. As the definition of employment includes workers who are underemployed, it is entirely possible that only modest rates of open unemployment could coexist with extensive and chronic underemployment. Indeed, poverty data and migration statistics strongly suggest that jobs may be of low quality, and that underemployment could pose a significant challenge for developing Asia well into the future.

One way to think about prospects for *underemployment* is to make the link to poverty incidence. Table 7 (above) illustrates two projections based on this approach. One paints an optimistic scenario for poverty reduction, which is based on fast growth that is broadly inclusive. The other is based on a less sanguine outlook for growth and income distribution (ADB 2005a).

The optimistic projection for poverty suggests that it may be possible to cut underemployment by 150 million workers between 2005 and 2015. In the pessimistic scenario, projected numbers barely change relative to 2005. The presence of such a large pool of unproductive workers would constitute a tragic underutilization of resources and would pose a clear danger to social stability. In countries like India, failure to tackle the underlying causes of underemployment could yet turn a potential “demographic dividend” into a “demographic curse”.

## Summary

The challenge for developing Asia is to catch up with OECD productivity levels and to create jobs. Although in a narrow arithmetic sense, faster labor-productivity growth means the creation of fewer jobs for a given rate of output growth, this entails a fallacy: output growth is unlikely to be independent either of productivity growth or, in the long run, of the capacity of an economy to create decent jobs for its workers.

Asia’s stellar economic growth disguises wide variation and distracts attention from the full extent of the gap that is still to be bridged. Many countries still have a long road to travel. For most, attaining OECD productivity levels is a distant ambition if only in the sense that, if the past is any guide, it will take the best part of this century to achieve it. For some countries, closing the productivity gap will require a complete turnaround in performance. For others, it will mean sustaining rapid

growth for decades to come—itself a difficult challenge. And if there are unpleasant shocks, gaps could easily widen, rather than narrow.

The prospects for job creation are tightly linked to those for productivity catch-up. But what is the likely location of productivity gains and job creation? Is it industry or services that is going to play the most important role in the decades ahead? These questions are examined in the next section.

## Walking on two legs

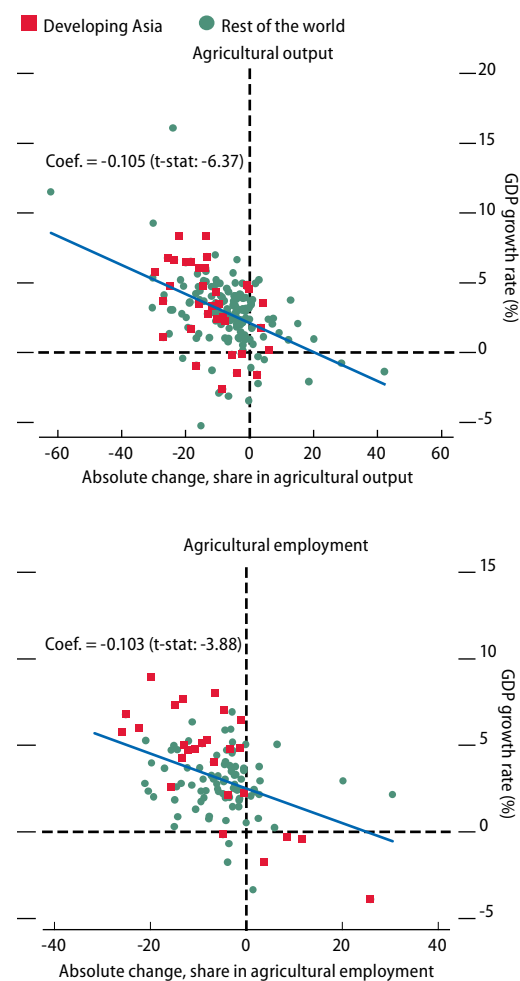
Even after countries begin to industrialize and workers move off the farm to find jobs in industry and services, agriculture continues to play an important role. Although agricultural productivity growth may not be able to match that in the other two sectors, modest gains provide a basis for industrialization by ensuring a steady supply of affordable agricultural produce to urban workers, as well as livelihoods for the large numbers of workers who remain. In some economies (such as Taipei, China and Korea) land reforms and policies that support rural livelihoods (e.g., the FELDA scheme in Malaysia) have played an important role both in supporting the broad expansion of agrarian and rural incomes, and in regulating the flow of workers out of agriculture. In turn, rising rural incomes have helped constitute a market base that allows industries to expand.

The transfer of agricultural land to industrial and commercial uses is also another important part of the overall process of change and growth. But as the experience of the PRC and India attests, this process can be politically and economically fraught if rights are unclear and institutions are weak or badly governed. Lifting agricultural productivity growth and ensuring an orderly and politically acceptable distribution of land are important challenges, and no state can afford to neglect them.

But from the perspective of economic catch-up and the creation of jobs, agriculture is not where developing Asia's future lies. That future lies elsewhere. Figure 17 shows the historical relationship between changes in agricultural output and employment shares and GDP growth. The historical pattern is striking. Growth is strongly and inversely correlated with agricultural output and employment shares in developing Asia and in the rest of the world. In only a handful of cases is positive growth associated with increasing agricultural shares in output and employment, and these are for countries with extensive and productive agricultural land frontiers, which is not a feature of most countries in developing Asia.

But how relevant are “old models” of industrialization and growth for understanding how developing Asia might evolve? Are service activities going to take on new significance and become the locomotive that moves developing Asia forward? Or do industry and manufacturing incubate

**Figure 17 Change in agricultural output and employment shares vs output growth**



*Notes:* The initial and final years for each country vary with availability of data. For output, period covered is anywhere between 1970 and 2004. For employment, period covered is anywhere between 1980 and 2004. Changes in shares are measured in percentage points. For example, a change of -10 percentage points could mean that the share of agriculture in total output over the period fell from 25% to 15%. Positive change in the share indicates that the share at the end of the period was higher.

*Source:* Staff estimates.

[Click here for figure data](#)

dynamism in a way that is unique? These are some of the questions considered in this section.

## Growth and structural transformation

The starting point is to consider the ways in which the evolution of economic structure has in the past been linked to economic growth. Is growth uniquely associated with the expansion of industrial or manufacturing output shares? Figure 18 shows the relationship between economic growth and changes in the shares of industrial output and employment over the past 35 years for a broad sample of countries in the international economy.

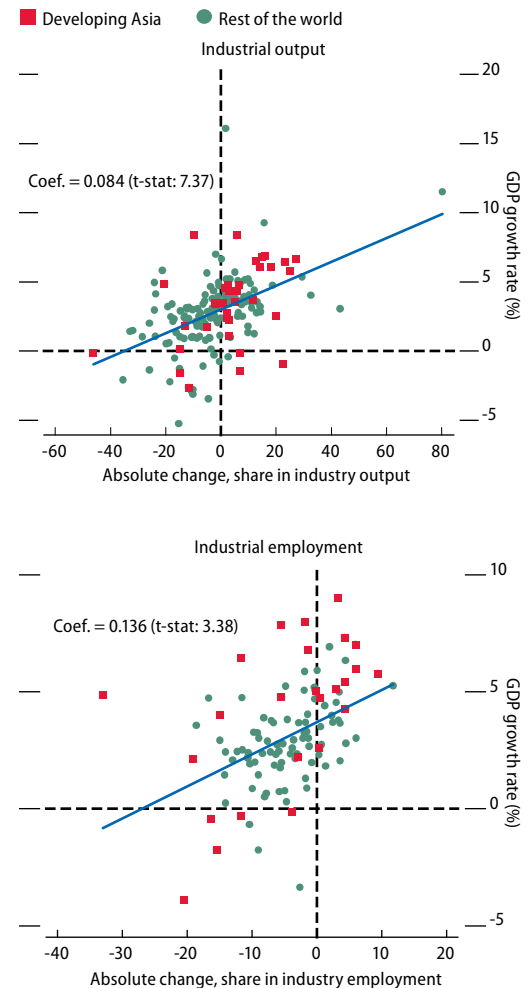
The data in the figure appear to provide compelling evidence that industry “matters.” Those countries that have increased their industry shares most have, on average, grown more quickly. Likewise, those countries where employment shares in industry have risen most have enjoyed faster GDP growth. In developing Asia, many countries have sustained growth and expanded their industrial output shares, including Cambodia, PRC, India, Indonesia, Korea, Lao PDR, Malaysia, Sri Lanka, Thailand, and Viet Nam. But others that grew had declining industrial output shares. In general, growth was slower in these economies, which include several Central Asian economies (e.g., Armenia, Kazakhstan, and Uzbekistan) and Hong Kong, China. In the case of Hong Kong, China, a hallmark of its development has been the shift to highly productive services. In Central Asia, declining industrial output shares reflect the retirement of moribund activities that were a creation of the earlier Soviet planning model.

Data for manufacturing output shares tell a similar story (employment data are unavailable). Figure 19 documents the positive correlation between the change in manufacturing output shares and overall output growth. Countries in the first quadrant with the highest increases in the manufacturing share and in the output growth rate are Cambodia, Indonesia, Korea, Lao PDR, Malaysia, and Thailand.

In the PRC, the manufacturing share in total output has been traditionally much higher than anywhere else in developing Asia, although it declined with respect to the average of the 1980s. It still accounts for over one third of total output, only matched in developing Asia by Malaysia, Tajikistan, and Thailand. The share of manufacturing employment, on the other hand, has declined from about 15% in the 1980s to 11% now, a result of the restructuring of heavy industries that were owned by the state. The share of India’s manufacturing output is significantly lower than the PRC’s, and over the sample period hovered around 15–16%, while the share of manufacturing employment has been at around 11%. In recent years (2005–2006), the tempo of activity in Indian manufacturing has picked up. Box 5 illustrates how the size of manufacturing industries might be measured and gauged in an international perspective.

It would seem that industry, and manufacturing in particular, has had an important role to play in growth in developing Asia. The countries that have grown most quickly also tend to be “overrepresented” in manufacturing. It is also the case that countries

**Figure 18 Change in industrial output and employment shares vs output growth**

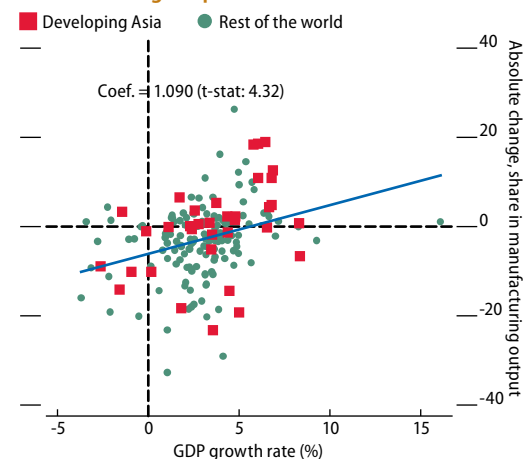


Note: See note to Figure 17.

Source: Staff estimates.

[Click here for figure data](#)

**Figure 19 Output growth vs change in manufacturing output share**



Source: Staff estimates.

[Click here for figure data](#)

### Box 5 Benchmarking manufacturing shares in developing Asia

To gauge if the manufacturing share in total output is “high” or “low” compared to broader international averages, a regression was estimated of the countries’ sector shares in 2000 on per capita income, per capita income squared, population, and trade openness (exports plus imports over GDP).

The following results were obtained.

Regression:

$$\ln M_i = -4.628 + 0.71 \ln y - 0.039 (\ln y)^2 + 0.289 \ln Tr + 0.180 \ln P$$

$$\text{t-stat: } (-4.05)^{***} \quad (2.97)^{***} \quad (-2.55)^{**} \quad (2.76)^{***} \quad (5.92)^{***}$$

where:  $M_i$  manufacturing output share,  $y$  = per capita GDP,  $P$  = population, and  $Tr$  = trade ratio. \*\*\* is significant at 1% and \*\* is significant at 5%.

This equation implies that the relationship between per capita income and the manufacturing share is hump-shaped. The implied sector elasticities with respect to per capita income vary from about 0.37 for the poor countries to about -0.11 for the rich countries. The turning point (i.e., per capita GDP at which the manufacturing share peaks) was estimated at about \$9,998 (in 2000 US\$), corresponding to a manufacturing share of about 25.3% (fixing the population at 100 million and the average openness share at 78%).

The box table shows observed and predicted manufacturing shares for developing Asian countries. Countries can be broadly divided into three groups:

- (i) those whose shares are very well predicted, that is, what broad international experience suggests they would be given per capita income, population, and trade openness;
- (ii) those whose share is smaller; and
- (iii) those that have much larger shares than their attributes would suggest.

The Philippines falls into the first category, but yet is unusual because all other countries in East and Southeast Asia fall into the third category and have much larger shares in manufacturing than international norms would suggest. In South Asia, outside India, shares are generally close to what the larger international sample would predict.

But in India, the actual share of manufacturing in output is much smaller than the fitted value. The PRC’s share is, not surprisingly, much larger. In Central Asia, actual manufacturing shares are low, a legacy of the Soviet planning system and the subsequent closure of moribund heavy industries. The Pacific shows no particular pattern.

#### Predicted vs actual manufacturing output shares

	Predicted	Actual
China, People’s Rep. of	27.31	34.50
India	19.55	15.85
<b>Newly industrialized economies</b>		
Hong Kong, China	21.72	5.39
Korea, Rep. of	22.04	29.42
Singapore	21.68	28.73
Taipei, China	20.82	23.76
<b>ASEAN-4</b>		
Indonesia	21.90	27.75
Malaysia	25.51	32.60
Philippines	21.53	22.23
Thailand	23.93	33.59
<b>Other Southeast Asia</b>		
Cambodia	11.84	16.86
Lao PDR	8.95	17.00
Viet Nam	17.96	18.56
<b>Other South Asia</b>		
Bangladesh	13.54	15.23
Bhutan	7.75	8.06
Nepal	10.18	9.44
Pakistan	14.31	14.81
Sri Lanka	15.37	16.83
<b>Central Asia and Mongolia</b>		
Armenia	9.83	24.07
Azerbaijan	11.99	5.64
Kazakhstan	16.48	17.66
Kyrgyz Rep.	9.29	19.46
Mongolia	9.92	6.13
Tajikistan	9.86	33.66
Turkmenistan	13.67	10.85
Uzbekistan	12.20	9.44
<b>The Pacific</b>		
Fiji Islands	10.98	14.62
Kiribati	5.05	0.90
Papua New Guinea	13.00	8.36
Samoa	7.16	14.82
Tonga	5.99	5.16

Source: Staff estimates.



### Box 6 The structure of exports and growth

Building on the stylized facts presented in the section *Looking back*, it is of interest to see whether there is a systematic relationship between the composition of the export basket and GDP growth. Sophisticated and complex export packages as defined in the earlier analysis (see Box 4) are likely to have a large share of manufactures in them. Following Hausmann et al. (2005a), output growth was regressed on the logarithm of initial GDP per capita, Hausmann's measure of export sophistication ("EXPY"), and the change in industry's share in total output. The regressions include observations for countries in developing Asia only.

Results are shown in the box table. Ordinary least squares (OLS) and instrumental variable (IV) estimates are shown. Instruments used were the logarithm of population and the logarithm of land area. Two types of equation were estimated, cross-sectional and 5-year panels. Except for the cross-sectional regressions with the instrumental variable estimator, estimates are generally statistically significant and suggest that export composition does materially affect growth. This is true whether or not there is a control for industrialization.

Taking the midpoint of the range of estimated coefficient values and the logarithm of EXPY, the results imply that a 10% increase in the measure of export sophistication at the beginning of the period raised subsequent growth by about a half percentage point, an estimate that is close to that of Hausmann et al. (2005a). From this, it would seem that export structure matters for growth in developing Asia.

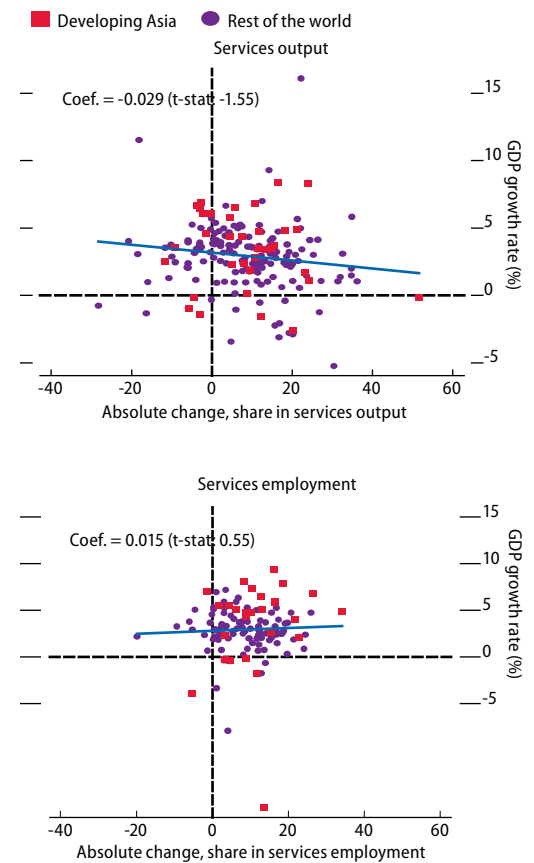
In the section *Looking back*, it was shown that export sophistication is associated with greater diversification of the export basket, yet high-income economies in developing Asia show increasing specialization within manufacturing. These observations warrant further attention, but possibly reflect fast growth in countries that have diversified successfully and where specialization may occur at higher income levels.

#### Growth and export performance

	Cross-section		Five-year panel	
	OLS	IV	OLS	IV
Initial GDP per capita (log)	-0.011 (1.87)*	-0.001 (0.04)	-0.007 (1.86)*	-0.009 (1.79)*
Initial EXPY (log)	0.054 (2.66)**	-0.024 (0.24)	0.040 (3.54)***	0.049 (2.80)***
Observations	23	23	67	60
R-squared	0.34	nil	0.16	0.16
Controlling for the change in industry output shares				
Initial GDP per capita (log)	-0.011 (1.89)*	-0.001 (0.07)	-0.005 (2.48)**	-0.015 (2.90)***
Initial EXPY (log)	0.056 (2.85)**	-0.020 (0.16)	0.032 (5.01)***	0.067 (4.01)***
Change in industry output shares	0.001 (0.50)	-0.001 (0.21)	0.007 (5.43)***	0.005 (4.14)***
Observations	23	23	61	57
R-squared	0.35	nil	0.30	0.31

Notes: 1. Instruments are the logarithms of population and land area. 2. Absolute value of t statistics in parentheses. 3. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. 4. Panel results correspond to an unbalanced panel. Time periods vary, depending on data availability. The earliest is 1977–2004. 5. The dependent variable is output growth.

Figure 20 Change in services output and employment shares vs output growth



Note: See note to Figure 17.

Source: Staff estimates.

[Click here for figure data](#)

that have developed complex export baskets, which tend to have a high share of manufactured exports, have also grown quickly (Box 6 above). But it is also important to ask what the relationship between growth and service shares looks like. In the section *Looking back*, it was shown that

### Box 7 Benchmarking services

In order to estimate the relative size of developing Asia's services sector, cross-sectional estimates of the output and employment shares were obtained for the year 2000. They were derived from regressions on the sector shares on income per capita, its square, and population. The elasticities obtained are positive at low income levels and decline toward zero at high levels. The estimates indicate that services shares increase with income per capita, and then tend to stabilize at about 63–65% at high levels of per capita income.

The box table provides the predicted and actual output and employment shares. These patterns to some extent mirror those for manufacturing. Compared to international norms, India is overrepresented in services output and the PRC is underrepresented. Except for the Philippines and Hong Kong, China, the economies of East and Southeast Asia have services output shares that are lower than would be predicted by their income and population characteristics. Korea's services share is the lowest among the NIEs and is significantly lower than the predicted share. Services output shares in South Asia tend to be higher than would be suggested by their characteristics.

A comparison of employment shares with international norms provides some intriguing results. Although as expected, the PRC has a lower share of services employment than international norms, so, too, does India. India's heralded services economy is an output phenomenon, not an employment one.

The contrast between services sector productivity in Korea and Taipei, China is also striking, with Korea having services sector employment shares that are close to predicted and that are far above output shares; the reverse is true for Taipei, China. The Philippines is a services economy whether viewed through the lens of output or employment. While Indonesia's output shares are lower than the predicted norm, its employment share is larger, suggesting that a significant number of workers may be in low-productivity service activities. Finally, Thailand's actual share of services employment is very low compared to what might be expected, both by its output share and by broader international norms. This probably reflects a high level of productivity in Thailand's tourism sector.

The estimated regression equations are:

Output:

$$\ln S_i = 2.416 + 0.338 \ln y - 0.015 (\ln y)^2 - 0.010 \ln P$$

$$t\text{-stat: } (4.00)^{***} \quad (2.34)^{**} \quad (-1.57) \quad (-0.82)$$

where:

$S_i$  = services output as % of GDP

$y$  = GDP per capita

$P$  = population

Employment:

$$\ln S_i = 0.420 + 0.828 \ln y - 0.040 (\ln y)^2 - 0.029 \ln P$$

$$t\text{-stat } (0.61) \quad (5.25)^{***} \quad (-4.19)^{***} \quad (-2.66)^{***}$$

where:

$S_i$  = services output as % of GDP (services employment as % of total employment)

$y$  = GDP per capita

$P$  = population

“\*\*\*” and “\*\*” mean significant at 1% and 5%, respectively.

#### Predicted versus actual output and employment shares, services

Developing Asia	Output		Employment	
	Predicted	Actual	Predicted	Actual
China, People's Rep. of	46.17	39.25	36.91	27.50
India	41.44	48.78	29.51	22.20
<b>Newly industrialized economies</b>				
Hong Kong, China	65.05	85.70	69.48	79.40
Korea, Rep. of	61.05	54.39	63.04	61.26
Singapore	65.15	62.83	70.37	65.53
Taipei, China	62.58	68.93	65.73	54.97
<b>ASEAN-4</b>				
Indonesia	45.91	38.47	37.04	41.20
Malaysia	56.67	40.47	56.72	49.45
Philippines	47.84	51.97	40.62	46.55
Thailand	52.27	48.99	48.44	33.53
<b>Other Southeast Asia</b>				
Cambodia	40.20	39.11	28.51	17.74
Viet Nam	41.67	38.73	30.43	22.30
<b>Other South Asia</b>				
Bangladesh	40.68	49.20	28.78	24.50
Maldives	55.62	-	57.42	60.55
Pakistan	43.39	51.21	33.02	33.53
<b>Central Asia</b>				
Armenia	46.15	39.04	38.70	38.87
Azerbaijan	46.08	37.52	38.29	48.10
Kyrgyz	40.38	32.21	28.99	36.46
Mongolia	43.12	48.95	33.57	37.24
Uzbekistan	44.46	42.51	35.22	45.30
<b>The Pacific</b>				
Papua New Guinea	46.17	28.00	38.58	23.02

- = data not available.

Source: Staff estimates.

resources move out of agriculture into both industry and services. Figure 20 above shows the links between growth and changes in services shares in output and employment.

The relationship between services share in output and growth is negative, but not significant. Larger shares of services are, in a broad international panel, associated with slower growth. But this is not surprising, since the panel includes rich countries. These move at the pace of the frontier, where services are a big part of the economy. In developing Asia, a pattern of slowing growth is readily evident as incomes in the NIEs escalate toward the OECD frontier. There is basically no systematic relationship between growth of output and services share in employment. Most observations are clustered in the first quadrant because most countries have growth and most countries have seen their share of services employment rise.

How does developing Asia's services share stack up when measured against international norms? Box 7 above reports the results of an exercise to answer this question.

Cutting output growth into the contributions that have been made by agriculture, industry, and services throws up some interesting results, which are shown in Table 8. The table identifies the periods for which the calculations have been undertaken.

These data are broadly consistent with what has already been discovered. Across developing Asia, both industry and services have made important contributions to output growth. Although agricultural contributions are lower, they are not insignificant in lower-income countries. Other things held equal, the contribution of services tends to be larger in higher-income countries. But services also play an important role in countries where industrialization has been slow to start or has got stuck. This seems to be the case in South Asia (as a subregion), and in the Philippines. In the Pacific islands, services activity has also played this residual role.

To complete the picture, Figure 21 identifies which sectors have been important from the perspective of creating jobs. Even in countries where services have not been particularly important from the perspective of output growth, services have figured prominently in the creation of jobs. In Malaysia, for example, both industry and services have created jobs,

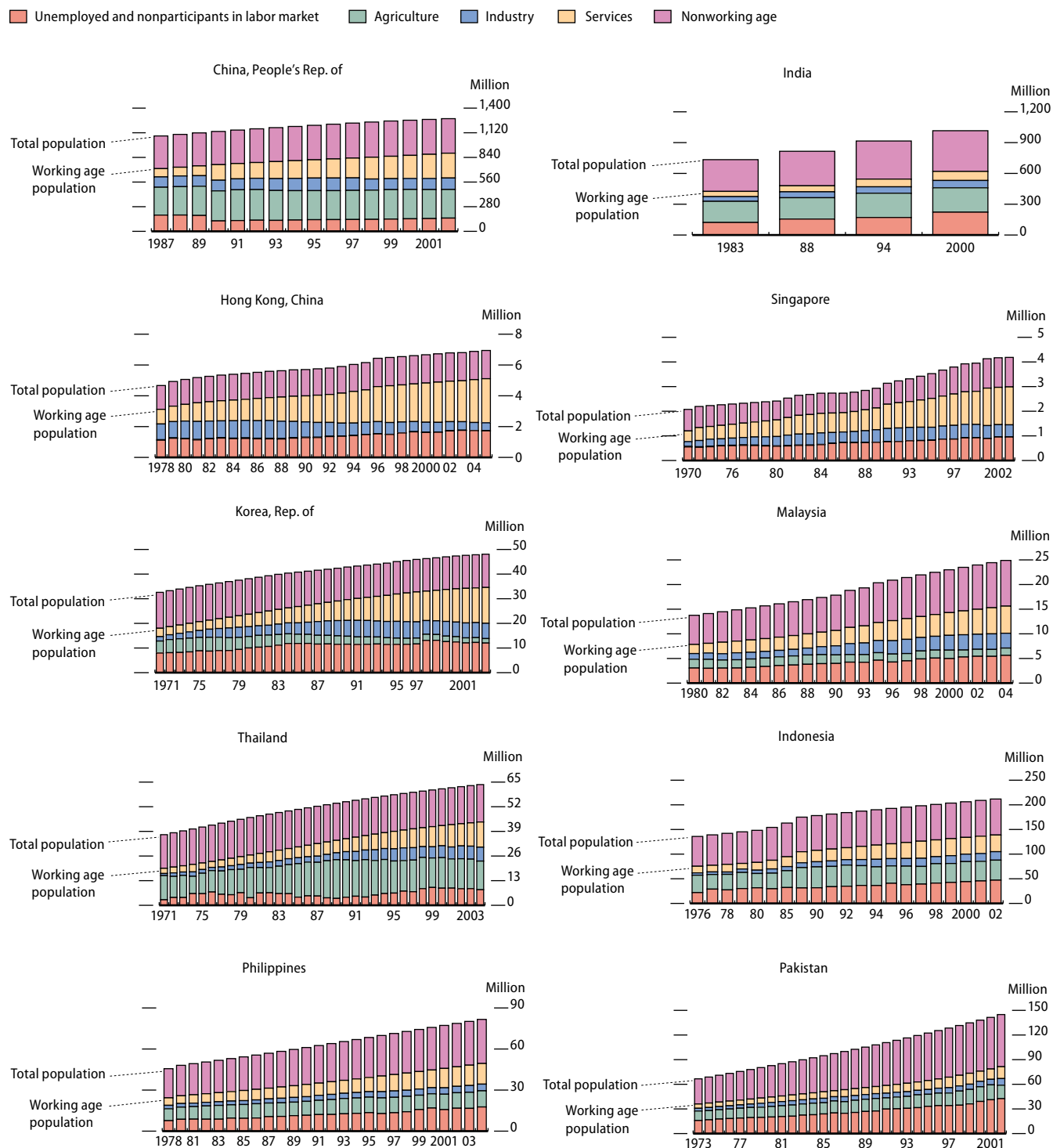
**Table 8 Sector contributions to total output growth (%)**

	Agriculture	Industry	Services	Period
China, People's Rep. of	9.39	<b>49.70</b>	40.91	1970–2004
India	14.73	27.92	<b>57.35</b>	1970–2004
<b>Newly industrialized economies</b>				
Hong Kong, China	-0.01	-12.56	<b>112.56</b>	2000–2004
Korea, Rep. of	2.02	46.26	<b>51.72</b>	1970–2004
Singapore	-0.07	33.97	<b>66.10</b>	1995–2004
Taipei, China	0.67	28.92	<b>70.41</b>	1970–2004
<b>ASEAN-4</b>				
Indonesia	12.05	<b>46.68</b>	41.27	1970–2004
Malaysia	5.97	<b>51.34</b>	42.70	1970–2004
Philippines	11.54	29.74	<b>58.72</b>	1970–2004
Thailand	5.95	<b>47.40</b>	46.65	1970–2004
<b>Other Southeast Asia</b>				
Cambodia	19.04	<b>47.12</b>	33.84	1993–2004
Lao PDR	<b>39.00</b>	37.05	23.95	1989–2004
Viet Nam	14.97	<b>46.75</b>	38.28	1985–2004
<b>Other South Asia</b>				
Bangladesh	17.51	33.06	<b>49.43</b>	1980–2004
Bhutan	24.88	<b>48.18</b>	26.93	1980–2003
Nepal	34.58	25.39	<b>40.03</b>	1973–2004
Pakistan	19.21	25.59	<b>55.20</b>	1970–2004
Sri Lanka	11.53	26.88	<b>61.58</b>	1970–2004
<b>Central Asia</b>				
Armenia	-6.84	<b>72.98</b>	33.86	1990–2004
Azerbaijan	11.84	<b>84.21</b>	3.95	1992–2004
Kazakhstan	-45.06	-11.86	<b>156.92</b>	1992–2004
Kyrgyz Republic	-20.81	<b>104.36</b>	16.44	1990–2004
Mongolia	6.75	32.66	<b>60.58</b>	1981–2004
Tajikistan	11.84	<b>84.21</b>	3.95	1985–2003
Turkmenistan	-39.10	<b>185.90</b>	-46.79	1987–2001
Uzbekistan	<b>72.06</b>	3.68	24.26	1987–2004
<b>The Pacific</b>				
Fiji Islands	9.57	23.09	<b>67.34</b>	1970–2002
Samoa	-11.39	21.15	<b>90.24</b>	1994–2004
Timor-Leste	15.58	-2.37	<b>86.79</b>	1999–2004
Vanuatu	10.00	4.40	<b>85.60</b>	1979–2001

Note: Figures in bold denote the sector with the largest contribution to overall output growth.

Source: Staff estimates.

**Figure 21 Employment and population**



Note: Nonworking age refers to population below 15 and above 64.

Sources: Staff estimates based on employment data from International Labour Organization, *LABORSTA Labour Statistics Database*, downloaded 9 August 2006 and Anant et al. 2006; population data from World Bank, *World Development Indicators* online database, downloaded 13 December 2006.

[Click here for figure data](#)

but the services sector has created more of them. Likewise in Korea, despite industry's fast output growth, the majority of jobs is in services, and the employment share in industry is falling. This contrasts with India, where output growth of services has been prodigious, but its record in creating jobs has been poor.

## Growth episodes and sector shares

Clearly, industrialization and growth of output are closely associated (as shown earlier). But has industrialization been a prerequisite for output growth? To look at this question, an event analysis is undertaken in which episodes of growth are compared with preceding and concurrent evolutions in the pattern of output.

The methodology followed is similar to that of Hausmann et al. (2005b). First, growth is defined in terms of a moving average that is calculated as the annual (exponential) growth rate over a 7-year period (i.e., from  $t+1$  to  $t+7$ ; from  $t+2$  to  $t+8$ , etc.). Using these moving averages, growth episodes are identified. Definitions of "rapid growth," "growth acceleration," and "sustained growth" are given in Box 8.

Table 9 identifies all cases in developing Asia of "rapid growth" and "growth accelerations" since the mid-1960s (depending on data availability). The number of episodes of rapid growth in the region

### Box 8 Growth definitions

The following definitions are broadly modeled on those used by Hausmann et al. (2005b).

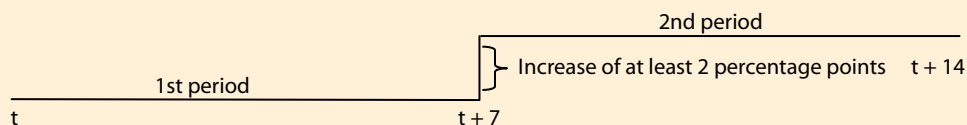
Annual growth is calculated as the exponential growth rate estimated for every rolling 7-year period. For example, a country that has level GDP data for 20 years ( $t=0,19$ ) will have 13 annual growth estimates, covering  $t$  to  $t+7$ ,  $t+2$  to  $t+8$ ,...  $t+12$  to  $t+19$ .

The exponential growth rate is calculated as:  $g = \ln(p_n/p_0)/7$

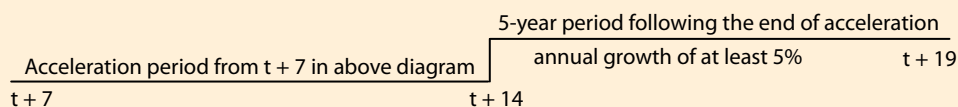
where:  $p_{t+n}$  is output at the end of the 7-year period  
 $p_0$  is output at the start of the 7-year period

Rapid growth is three consecutive average annual growth rates (as defined above) of at least 5%. For example, the sequence 5%, 6%, and 5.5% during three consecutive 7-year periods constitutes a rapid growth episode; while the sequence 4%, 15%, 9% does not.

Growth acceleration is the difference of at least 2 percentage points in the annual growth rates between two 7-year periods, where the first period is from  $t$  to  $t+7$  and the second period is from  $t+7$  to  $t+14$  (see diagram below).



Sustained growth is seen if growth satisfies two conditions: (i) a growth acceleration (as defined above); and (ii) annual growth of at least 5% during the 5-year period following the end of the acceleration.



	Period covered	Number of rapid growth episodes	Average growth during rapid growth episode (%)	Number of growth accelerations (years)	Year	Growth before acceleration (%)	Growth after acceleration (%)	Growth acceleration (percentage points)
China, People's Rep. of	1965–2004	28	8.84	2	1981	6.36	10.87	4.51
					1991	8.50	10.73	2.23
India	1965–2004	15	5.57	1	1982	3.55	5.84	2.29
<b>Newly industrialized economies</b>								
Hong Kong, China	1965–2004	21	7.52	1	1975	7.47	9.76	2.29
Korea, Rep. of	1965–2004	24	7.72	1	1984	6.44	8.75	2.31
Singapore	1965–2004	28	7.76	1	1987	6.08	9.17	3.09
Taipei, China	1970–2004	22	9.33	1	1984	8.16	12.01	3.85
<b>ASEAN-4</b>								
Indonesia	1965–2004	24	7.00	1	1988	5.24	7.85	2.61
Malaysia	1965–2004	22	7.32	1	1987	4.50	8.95	4.45
Philippines	1965–2004	8	5.62	1	1987	0.15	3.11	2.96
Thailand	1965–2004	24	7.31	1	1986	5.30	9.68	4.38
<b>Other Southeast Asia</b>								
Cambodia	1993–2004	3	6.82					
Lao PDR	1984–2004	9	6.13	1	1991	4.26	6.33	2.07
Viet Nam	1984–2004	11	7.20	1	1991	4.63	8.03	3.40
<b>South Asia</b>								
Bangladesh	1965–2004			1	1975	-0.09	3.80	3.89
Bhutan	1980–2004	13	6.59	0				
Maldives	1995–2004	1	6.96					
Nepal	1965–2004			1	1983	2.34	5.29	2.95
Pakistan	1965–2004	12	6.18	1	1977	3.53	6.66	3.13
Sri Lanka	1965–2004	8	5.19	0				
<b>Central Asia and Mongolia</b>								
Armenia	1990–2004	3	7.46	1	1997	-7.83	8.13	15.96
Azerbaijan	1990–2004	1	9.56	1	1997	-11.43	9.56	20.99
Kazakhstan	1990–2004			1	1997	-6.66	7.19	13.85
Kyrgyz Rep.	1986–2006			1	1995	-8.53	4.65	13.18
Mongolia	1981–2004	1	5.56	1	1994	-1.99	5.56	7.55
Tajikistan	1985–2004			1	1996	-16.52	6.67	23.19
Turkmenistan	1987–2001			1	1994	-4.71	4.46	9.17
Uzbekistan	1987–2004			1	1996	-2.48	4.14	6.62
<b>The Pacific</b>								
Fiji Islands	1965–2004	4	6.11	1	1988	-0.82	3.68	4.50
Kiribati	1970–2004	1	5.46	3	1980	-9.06	0.61	9.67
					1985	-9.33	1.89	11.22
					1992	1.89	6.34	4.45
Marshall Islands	1982–2004	2	7.03	1	1997	-2.33	1.40	3.73
Micronesia	1986–2004			0				
Papua New Guinea	1965–2004	5	5.91	2	1985	0.87	3.99	3.12
					1990	1.33	6.36	5.03
Samoa	1978–2004			1	1994	-0.47	4.48	4.95
Solomon Islands	1967–2004	12	6.98	1	1975	-1.02	9.51	10.53
Tonga	1981–2004			0				
Vanuatu	1979–2004			1	1990	0.81	5.32	4.51
<b>Total</b>		<b>302</b>		<b>34</b>				
<b>Average</b>			<b>7.30</b>					<b>6.55</b>

Source: Staff estimates.

has been high, a total of 302, with an average growth rate of 7.3%. The countries with the highest number of rapid growth episodes are the PRC and Singapore, with 28 each. The other NIEs and the ASEAN-4 countries (except the Philippines) have more than 20 such episodes. The number of growth accelerations is obviously much smaller, but nevertheless high, a total of 34, with the average acceleration being 6.55 percentage points. Accelerations often correspond with “take-offs” in economic growth (e.g., Other Southeast Asian countries), growth recoveries (e.g., Malaysia after its 1985–86 recession), or natural resource discoveries (e.g., Azerbaijan).

Although the fastest accelerations are seen in Azerbaijan and Tajikistan, of more than 20 percentage points, some of the very high accelerations in the Central Asian republics are really “bounces” after contractions (and the one-time events surrounding the breakup of the ex-Soviet Union). This is also the case for some Pacific islands (e.g., Kiribati,

**Table 10 Sustainability of growth accelerations**

	Average growth rate in the 7-year period preceding the start of the growth acceleration		
	$g \leq 0$	$0 < g < 5$	$g \geq 5$
Annual growth rate in the 5-year period following the end of the growth acceleration	Nonsustained growth $g \leq 0$		Papua New Guinea (1990), Vanuatu
	Nonsustained growth $0 < g < 5$	Bangladesh, Fiji Islands, Kiribati (1980, 1985)	India, Kiribati (1992), Malaysia, Papua New Guinea (1985), Philippines
	Sustained growth $g \geq 5$	Solomon Islands	Lao PDR, Nepal, Pakistan, Viet Nam
			Indonesia, Thailand
			PRC (1981, 1991); Hong Kong, China; Korea; Singapore; Taipei, China

Note: The table contains information about 24 episodes of growth acceleration. The other 10 cases could not be classified according to the annual growth rate after the acceleration for lack of data (eight Central Asian republics including Mongolia; Marshall Islands; and Samoa).

Source: Staff estimates.

Solomon Islands). Apart from these two “special cases,” PRC, Malaysia, and Thailand had growth accelerations of over 4 percentage points.

The average growth acceleration for those countries whose growth before the acceleration was positive (so eliminating Bangladesh, Central Asia, and the Pacific countries with contraction before the acceleration) is 4.28 percentage points. Most countries in developing Asia have experienced at least one instance of growth acceleration in the last few decades (Kiribati with three, and PRC and Papua New Guinea with two each). Bhutan, Micronesia, Sri Lanka, and Tonga did not have any.

Of the 24 growth accelerations for which the exercise could be undertaken, 13 were of nonsustained growth, and 11 had sustained growth. Of these 11, six (the NIEs and the PRC twice) also had rapid growth during the 7-year period preceding the growth acceleration. Information on these is shown in Table 10.

Have changes in the structure of output been uniquely identified with these episodes of rapid growth, accelerating growth, or sustained growth? Clues may be provided by comparing *levels* and *changes* in the shares of output before and around these episodes. The first row of Table 11 records shares of industry, manufacturing, and services around the time of the growth episodes, and the second row, the shares immediately before the

Table 11 Sector shares, rapid growth, growth accelerations, and sustained growth

	Industry			Manufacturing			Services		
	Rapid growth	Growth accelerations	Sustained growth episodes	Rapid growth	Growth accelerations	Sustained growth episodes	Rapid growth	Growth accelerations	Sustained growth episodes
$\bar{s}_t^m$ (around)	34.57	29.29	33.20	21.72	17.45	24.34	43.21	43.18	37.26
$\bar{s}_s^m$ (before)	33.27	29.25	32.94	21.23	18.65	24.44	42.26	42.61	35.82
t-stat	7.93	-0.02	0.61	3.91	-1.46	-0.12	7.02	0.43	2.39
Degrees of freedom	246	26	6	252	24	7	246	26	6
Is difference statistically significant?	YES	NO	NO	YES	NO	NO	YES	NO	YES

Note:  $s_t^m$  = share of sector value-added at time  $t$ .

$$\text{Average share around episode: } \bar{s}_t^m = \frac{s_{t-1}^m + s_t^m + s_{t+1}^m}{3}$$

$$\text{Average share before episode: } \bar{s}_s^m = \frac{s_{t-1}^m + s_{t-2}^m + s_{t-3}^m + s_{t-4}^m + s_{t-5}^m}{5}$$

$$\text{Test: } d = \bar{s}_t^m - \bar{s}_s^m; H_0: d = 0 \Leftrightarrow \bar{s}_t^m = \bar{s}_s^m$$

The paired t-test has  $N-1$  degrees of freedom.

Source: Staff estimates.

episode. The third row presents  $t$ -statistics, where the null is that the shares in both periods are equal.

The results of Table 11 show that episodes of rapid growth are preceded by rising industry, manufacturing, and services shares in aggregate output. The share of industry rises by 1.3 percentage points, that of services by about 1 percentage point, and that of manufacturing by 0.5 percentage points. Though modest, these differences are statistically significant. But there is no readily detectable link between growth accelerations and changes in output shares. However, sustained growth is associated with an increase in the share of services, and not with changes in either industry or manufacturing shares.

It is difficult to draw strong conclusions from these findings. As both industry and services shares rise during episodes of rapid growth, this implies that agriculture shares fall prior to rapid growth episodes (confirming the relationship shown in Figure 1 above). The relationship between services and sustained growth probably reflects the fact that the share of services in output expanded over a wide range of per capita incomes in the NIEs during a period in which they also grew quickly.

Another way to dissect the data is to split observations into episodes: rapid growth and nonrapid growth; episodes of growth accelerations and no growth accelerations; and episodes of sustained growth and growth that was not sustained. These episodes can then be cross-tabulated with changes in the shares of industry, manufacturing, and services output. So, for example, the number of episodes of rapid growth with increasing industry shares can be compared with the number of rapid episodes where there was no increase in industry



**Table 12 Rapid growth and changes in sector shares**

	Industry			Manufacturing			Services		
	No increase in share	Increase in share	Total number of cases	No increase in share	Increase in share	Total number of cases	No increase in share	Increase in share	Total number of cases
Nonrapid growth	100 <i>76.5</i>	96 <i>119.5</i>	196	96 <i>82.7</i>	101 <i>114.3</i>	197	44 <i>52.2</i>	152 <i>143.8</i>	196
Rapid growth	73 <i>96.5</i>	174 <i>150.5</i>	247	93 <i>106.3</i>	160 <i>146.7</i>	253	74 <i>65.8</i>	173 <i>181.2</i>	247
Total number of cases	173	270	443	189	261	450	118	325	443
Chi-square test statistic			$\chi^2 = 21.15$			$\chi^2 = 6.51$			$\chi^2 = 3.15$

Note: The test for independence between rows and columns is a chi-square with one degree of freedom. The critical value is 3.841.

Source: Staff estimates.

shares. Likewise, episodes in which growth was not rapid can also be split into those cases associated with expansion of industry shares and with nonexpansion of industry shares.

Table 12 provides a breakdown for episodes of rapid and nonrapid growth. In each cell, two numbers are presented. The top number is the number of counts for events identified in the corresponding row and column. So, for example, there were 73 cases of rapid growth where there was no preceding increase in industry's share in output. But there were also 174 cases of rapid growth where industry's share did rise. The numbers in italics at the bottom of each cell refer to the number of observations that would be predicted if rapid growth and changes in industry shares were (statistically) independent of each other. So, randomly, there would be 96.5 expected occurrences of rapid growth and no increase in industry's share.

By comparing the number of actual with expected observations it is possible to test whether changes in sector shares and growth are independent or not. In the case of rapid growth events, the chi-square rejects the null hypothesis of independence for industry and manufacturing output shares. Moreover, by comparing the cell counts with their expected values, it can be confirmed that rejection occurs because there is a positive association between an increase in industry's (manufacturing's) share and rapid growth. In the case of services, however, the null hypothesis cannot be rejected, suggesting that there is no systematic relationship between increases in the share of services and subsequent episodes of rapid growth.

Similar tests conducted on growth accelerations and episodes of sustained growth (for which sample sizes are much smaller) failed to reject the null of non-association for changes in industry, manufacturing, and services shares.

Finally, a probit regression was estimated. In this equation, the dependent variable is a dummy variable that takes the value of one at the time of rapid growth and zero otherwise. Dependent variables were changes in manufacturing (or industry) and services shares. The results indicate that a rise in the manufacturing share increased the probability of rapid growth by 3.7%. (The coefficient of services is negative but insignificant.)

The data show that expansion of industrial and manufacturing output shares is also positively associated with growth. The complexity and sophistication of a country's export basket, which is likely to be positively influenced by a heavy weight for manufacturing goods, is a statistically significant predictor of subsequent growth. This analysis leans to the conclusion that rapid output growth is more closely tied to expanding industry and manufacturing shares than to services shares. However, growth accelerations and sustained growth are not systematically correlated with changes in output shares at all.

The role of services would appear to have been more complicated. Services shares have risen in both slow- and fast-growing economies. Successful episodes of industrialization are likely to have been supported by the parallel development of efficient services infrastructure (see below). For slow-growing countries, services may have played an important role in mopping up surplus labor released from agriculture.

What roles might be played by industry and services in moving ahead?

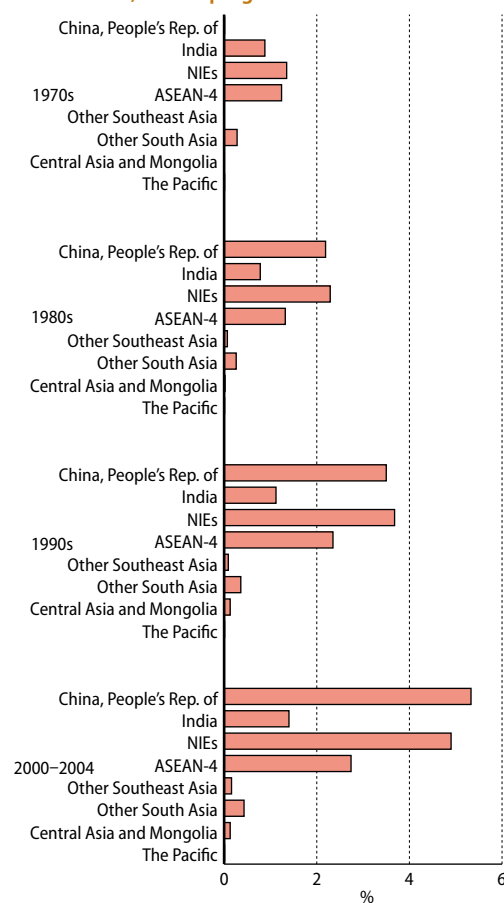
## Industry

Developing Asia's success in industrialization—in particular the development of a vibrant manufacturing sector that competes on a global scale—is unrivalled. Figure 22 illustrates vividly how developing Asia's manufacturing industry has ascended in global markets from the 1970s when its share was still miniscule. The PRC, NIEs, and ASEAN-4 in particular have seen significant growth. Other Southeast Asian economies are now just beginning to register on the global scene. Fears that the PRC would close opportunities for other countries have proven unfounded. Instead, its emergence has helped forge new patterns of production and specialization with East and Southeast Asia that build on complementarities, and a refined division of tasks (see the chapter, *Trade and structural change in East and Southeast Asia*, in Part 1 of *Asian Development Outlook 2007*). Engaging in these complex production networks requires that countries continue to look outward but build internal capabilities that will enable repositioning and rebalancing as circumstances change. Different paths are possible. Some countries may focus on the production of intermediate goods, as in Singapore, or on the development and branding of final goods, which is more akin to what Korea has done.

But not all countries have fared equally well. In South Asia, India's emergence in global manufacturing has been sedate, and it has lost ground to the NIEs and ASEAN-4 and long since been overtaken by the PRC. More generally, growth of industry and manufacturing in South Asia has been listless when measured on a global scale. Within ASEAN, the Philippines has also become bogged down, and Indonesia has lost much of its momentum following the Asian crisis.

The development of a vibrant industrial and manufacturing base is likely to be an essential ingredient in development strategies for some time to come. As before, success will pivot on acquiring those capabilities needed for continuous upgrading. Indeed, the premium

Figure 22 Share of global manufacturing value added, developing Asia



Source: World Bank, *World Development Indicators* online database, downloaded 4 August 2006.

[Click here for figure data](#)

## Box 9 Stunted industrialization in India and the Philippines

### India

For its size and income levels, India's manufacturing base is small by international norms. While India adopted ambitious industrialization plans after independence, and the country indeed went through a period of rapid industrialization, the process stalled. Although the signs have recently been encouraging, it is yet to be seen whether recent gains in industrial output can be sustained.

A number of explanations for the comparatively low share of industry in India's aggregate output have been advanced. One explanation focuses on heavy regulatory burdens imposed by elaborate administrative and regulatory machinery. The "reservation system" was introduced in 1967, reserving 47 items for production by the small-scale sector. This number increased in time and reached its peak in 1984, affecting a total of 873 items.

The rationale for the protection of small enterprises was their large contribution to manufacturing output and employment. However, the logic of this policy has come progressively under serious questioning. The relatively high number of items, it has been argued, has hobbled exploitation of economies of scale that are crucial for growth of industry and manufacturing. Since 1984, the number has been progressively reduced and as of January 2007 it affects 239 items.

Extensive labor laws, in particular the Industrial Disputes Act, make it very difficult to lay off workers in large firms, even when losses are incurred or demand declines, or to employ short-term contract labor. This discourages new hires by employers, biases technology toward capital intensity, and inhibits entry and exit of firms. Even if some firms can "get round" these regulations, they are likely to deter investment by others. Large-scale and foreign firms, which may also have to deal with strict codes in their own countries, may be placed at a disadvantage.

While there is ample evidence that is consistent with the idea that heavy regulation has retarded Indian industrialization and growth (for example, Besley and Burgess 2004, Kochhar et al. 2006), some commentators have suggested that regulations may matter less in practice than on paper (Bardhan 2006, Roy 2004, Deshpande 2004). Nevertheless, detailed micro evidence such the World Bank's *Doing Business* survey suggests that firms in India face holdups, as well as other blockages that add to costs.

But no one would claim that regulation alone is to blame. There are other handicaps. India suffers from financing constraints for small firms. As small firms often incubate jobs, this harms employment growth. India is also beset by acute infrastructure deficiencies. Roads, power, ports, and irrigation are undersupplied and in poor condition. This raises costs, reduces reliability of supply, and lengthens the time it takes to get goods from the factory door to the market, whether in India, or abroad. *Asian Development Outlook 2006* highlighted how trade costs place Indian industry at a severe disadvantage compared to East and Southeast Asia.

Many of the factors that hobble industry do not seem to constrain services to the same extent. In India, services activity is not nearly so heavily regulated as industry and is outside the net of the reservation system. Neither is services activity as heavily dependent on infrastructure as industry. Indeed, some services can be sent to customers at a touch of a button without the need for good roads or ports (though power of course is needed).

### Philippines

The Philippines, like India, has a disappointing track record on industry. Although the share of industry in aggregate output is roughly what would be predicted by its size and per capita income, industry shares are far below those in other economies of East and Southeast Asia (outside Hong Kong, China), where industry and manufacturing seem to have played such an important role in economic modernization. The Philippines has trailed far behind. What explains this?

In the 1950s, a sophisticated manufacturing sector emerged in the Philippines, supported by protection and a well-developed human capital base (Hill 2003). The problems for manufacturing began subsequently. A combination of factors appear to have played a part, including a period of costly and badly directed interventions, a tendency to focus on protecting rents rather than improving efficiency, poor physical infrastructure, and, to a lesser extent than in India, some problems with labor market regulation. High levels of corruption, disputed property rights, and difficulties with contract enforcement have also played their part (ADB 2005b). These facets of everyday economic life seem to reflect deeply embedded institutional difficulties, including a high concentration of wealth and a political system based on patron-client relations (World Bank 2005, p.3).

on the self-adapting capabilities may increase if the life cycle of some activities is shortened, either as a result of more intensive competition in international markets, or an acceleration of technological progress.

Protectionism presents a potent risk as scale economies, diversity, and technological upgrading depend critically on big markets.

Drawing on past experience, a stylized trajectory for industrialization is still likely to involve: first, establishing a narrow base in a labor-intensive manufacturing industry, such as garments or footwear; then, diversifying into new and gradually more sophisticated activities; before eventually specializing in areas where a competitive advantage has been built and consolidated. What precisely a country will produce at any particular point in time, and how it will migrate to new activities and change its basket of manufactured goods and exports, seem to depend on country-specific and idiosyncratic factors (Hausmann et al. 2005a). There is striking evidence that participating in export markets that are expanding quickly on a global scale and in which the rich industrialized countries are also participating can sustain growth (see e.g., *Trade and structural change in East and Southeast Asia* and Hausmann et al. 2005a). But policy has an important role to play in at least two ways: removing blockages to doing business and investment, and incubating conditions in which the private sector can experiment and learn what it can do profitably. Box 9 above sets out some blockages that have hindered industrialization in India and the Philippines in the past. Prospects will depend on easing these constraints not necessarily all at one time, but in a manageable sequence in which the largest obstacles are identified and tackled first (Hausmann et al. 2005a).

Of course, experiences and opportunities differ widely. In Central Asia, reversals in industrialization are rooted in severe distortions

### Box 10 Structural corrections and jobs in Central Asia

In the post-Soviet era, industry has contracted and has not been a source of new jobs in Central Asia. Industrial activity and related service activities have become increasingly focused on natural resource subsectors, which are typically characterized by low labor intensity.

Manufacturing activity has been virtually stagnant. Industry's poor record on formal employment also reflects a heavy regulatory burden that has led to greater informality. Many new enterprises do not register formally, and some existing enterprises cross over from the formal to the informal economy.

This leads to underreporting of formal employment. Indeed, this phenomenon fits in with survey findings that new private enterprises find the business environment more difficult than state or privatized firms, particularly with regard to regulations, institutions, property rights, and taxation.

Circumstances in agriculture and services have moved more quickly. Land reforms have accelerated the restructuring of collective farms and a shift toward private and household farms. In most places, the ascendancy of private and household farming, as well as greater freedom in farm decision making, have been accompanied by a

shift to new agricultural activities that focus on higher valued-added production. In services, new activities have mushroomed, particularly in retail trade, catering to consumers' pent-up demand. Services have become an important employer.

The combined impact of these structural changes on net job creation during the transition has been negative, according to the World Bank (2005), especially in the formal sector. Many workers still hold low-productivity jobs in unstructured and unprofitable enterprises in the informal sector, as well as in subsistence agriculture.

Labor demand, which plummeted with the breakup of the Soviet Union, remains anemic. Workers who cannot find jobs have responded by moving into agriculture and into services, with part of the labor force slipping into informal activity.

The challenge for policy makers in Central Asia is to create productive employment in the formal economy by accelerating industrial restructuring of state and privatized enterprises, forging stronger linkages between sectors (for example, private agro-industries and agro-services), and improving the business environment for new enterprises.

created by pre-independence, Soviet central planning. What presents as “deindustrialization” in the statistics, reflects the correction of earlier distortions (Fardmanesh and Tan 2005). The flow of workers from feeble state-owned industries into agriculture and newer activities, particularly natural resource exploitation, was needed to stop economic and financial hemorrhaging. This restructuring process has been painful and protracted and is still ongoing in most Central Asian economies. Resources and services linked to natural resource industries have been a bright spot. But Central Asia has struggled to create jobs (Box 10 above).

The Pacific islands’ circumstances are special. Most are microeconomies that face the twin handicaps of remoteness and small size. Only Fiji Islands, Papua New Guinea and, possibly, Timor-Leste, have population bases that can reasonably support anything more than a narrow set of economic activities. But tourism and niche sectors, such as mineral water or high-end garments, can help in some places, like Fiji Islands. Careful development and husbanding of natural resources, including marine resources, may create a basis for improved livelihoods, especially in those islands that are too remote to build a significant tourist industry. If population growth rates do not fall, outmigration is also likely to remain an important safety valve. Perhaps the major blockage in the Pacific are ineffective and often parasitical public sectors. Redirecting resources, including remittance income, in a way that would help build a more self-reliant private sector would be a major step forward, and would help create the jobs that young people need. Tapping into the resourcefulness and experience of citizens living overseas might also help revitalize economies.

Other small countries, like Mongolia and Nepal, wrestle with their own challenges. For these countries too, large-scale industrialization is not a realistic option. But minerals, agriculture, and agroprocessing present Mongolia with some options. Nepal’s unique attractions as a tourist destination, as well as its proximity to India’s large market, also create opportunities.

But what is the future role of services? Do countries like India and the Philippines have to worry about industry? Can they not bypass industry and anchor their future growth on services?

## Services

Certainly, one of the main features of developing Asia’s past has been the rise of services, whether measured in terms of output or employment. This is true across the board, irrespective of initial starting points. Possibly, the rising share of services in output is exaggerated by relative price changes that favor services as incomes grow—Kravis et al. (1983) observed that when measured in constant prices, output shares of services do not increase—but there can be no doubt about the vital role of services as a provider of jobs (Appendix table 11).

For quite some time, the expansion of services in most of developing Asia has been centered on low-productivity activities. For example, at low income levels, “old services” (Katouzian 1970), such as domestic service (for example, servants and cooks), employ large numbers. But as incomes rise, these types of services gradually fade and services activity becomes

more diversified. In the process, workers find different, more productive, and better remunerated jobs. But labor productivity gaps between the services sector in developing Asia and OECD suggest that changes in the services mix still have a long way to go. The potential of these changes to fire growth should not be underestimated.

There are vital complementarities between industrialization and services growth. If services fail to grow in the right way this in itself can constrain industrialization. A wide range of services grows rapidly as industry and manufacturing expand. These include activities like banking, finance, transportation, and wholesale and retail trade. Industry benefits from these and other services through at least three channels (Eswaran and Kotwal 2002). First, the appearance and growth of modern services permits even greater task specialization within industry and an unbundling (or “splintering,” per Bhagwati 1984) of noncore activities (like market research and accounting services) that used to be carried out in-house. By focusing on core competencies, industrial and manufacturing productivity is increased.

Second, the appearance and expansion of a vibrant services sector lower the costs of industrial production, both by creating greater variety and competition and by allowing exploitation of economies of scale in provision of services. Indeed, Wirtz (2000) anticipates a future in which there will be very few “true” production or manufacturing jobs left.

Third, as industry advances, it creates a demand for intangible and knowledge services and requires access to a pool of scientific, technical, and managerial workers. This stimulates the development of specialized services in education and other areas, such as engineering design and management consultancy.

But this picture of a mutually supportive expansion of industry and services is not being seen in all countries. In economies that do not successfully industrialize, labor force data suggest that low-productivity services are acting almost as a residual sector, or the reservoir that absorbs surplus labor (see the chapter, *Education and structural change in four Asian countries*, in Part 3 of *Asian Development Outlook 2007*). For example in the Philippines, the number of domestic servants in 2004 was about 1,036,000, or about 11.6% of total female nonagricultural employment, up from 602,000, or 10.3% of the labor force in 1991. Trends like these, and similar ones in India are symptomatic of deeper structural problems for the creation of more-productive jobs.

But ironically, both India and the Philippines also offer successful examples of the development of higher-productivity service activities, including those in the business process outsourcing (BPO) sector. Some commentators have claimed that this success is the flip-side of failed industrialization. Box 11 describes the kinds of business process activities that are being outsourced in global markets.

To understand what the BPO sector (including IT outsourcing) offers from a broad development perspective an important starting point is to actually measure it. Box 12 presents some facts about the IT and BPO sectors of India and the Philippines.

Given past success, what potential does India’s BPO sector hold for the future? Can India leapfrog industrialization? If, as some believe, task fragmentation has barely got under way, and global market potential

### Box 11 Types of business process outsourcing services

The most common services provided by firms in business process outsourcing are as follows:

**Call centers.** Offer inbound and outbound voice operation services for sales, customer service, technical support, and others.

**Back office.** Services related to finance and accounting (e.g., bookkeeping, accounts maintenance, claims processing, and asset management) and human resource administration (e.g., payroll processing, benefits administration, and human-resources data management).

**Data transcription.** Provision of transcription services for interpreting oral dictation of, among others, health professionals, dictations during legal proceedings, and other data-encoding services.

**Animation.** Process of giving the illusion of movement to cinematographic drawings, models, or inanimate objects in two or three dimensions (2D, 3D).

**Software development.** Covers analysis and design, prototyping, programming and testing, customization, reengineering and conversion, installation and maintenance, education and training of systems software, “middleware”, and applications software.

**Engineering development.** Includes engineering design for civil works, building and building components, shipbuilding, and electronics.

**Digital content.** Creation of products that are available in digital form, such as music, information, and images that are available for download or distribution on electronic media.

Sources: DTI (2006); Locsin (2006); The Computer Language Company Inc. (2006).

### Box 12 Information technology and business process outsourcing sectors of India and the Philippines

Today, India has about 46% of the global market for business process outsourcing (BPO) services (Kaka et al. 2006) and the sector employs about 700,000 people in the information technology (IT) and BPO segments (out of a total labor force of about 460 million). The outsourcing BPO sector produced revenues of around \$17 billion for India in 2005 (and \$36 billion adding IT-based services, software and hardware not exported, representing over a fifth of India's total exports of goods and services and about 4.5% of GDP). McKinsey and NASSCOM forecast that by 2010, IT/BPO exports will reach \$60 billion, or 40% of all Indian exports (*The Economist*, 3 June 2006).

India has profited from being a pioneer in the industry. In the early 1990s, companies such as Wipro, Infosys, TCS, and HCL emerged to provide low-cost business solutions for US-based companies, which were then constrained by the IT resource shortage occurring during the early period of the Internet boom (Schaaf 2005). The sector clearly is important from an output and foreign exchange perspective, but employs less than 0.25% of the Indian labor force.

The emergence of the sector in India appears to have had elements that were both spontaneous and idiosyncratic, and others that reflected conscious policy actions. Pack and Sagi (2006) observe that the software sector in India developed out of a group of highly educated English-speaking students who were trained in elite Indian institutes of technology, and the entrepreneurial abilities of a group of residents who partnered with the Indian expatriate community in Silicon Valley.

The departure of IBM from India in 1977 gave impetus to the development of a local software sector, and subsequently the "year 2000" problem and the euro zone's move to a single currency provided substantial business in adapting existing computer systems.

The Indian software segment benefited from all these idiosyncratic events. Having gained experience and a reputation for reliability, the industry has been able to build momentum. Others observe that the sector benefited

from the formation of the Software Technology Parks of India in 1990, streamlined procedures, extension services, and fiscal advantages (NeoIT 2004).

In 2005, the Philippine BPO sector generated \$2.4 billion in total revenues, about 2.4% of total GDP (from about 0.075% in 2000) and employed a total of 163,000 workers (out of a total labor force of about 36 million). As of the first quarter of 2006, at least 600 firms were considered part of the BPO industry.

The biggest activity is the call center industry, worth \$1.8 billion in revenues in 2005 (75% of the total), which grew from four centers in 2000 to 114 as of the first quarter of 2006. In 2005, call centers employed 112,000 workers, equivalent to nearly 70% of total employment in the BPO sector.

After call centers, the next biggest BPO subsectors in terms of total revenues and employment (2005) are software development and back-office operations. Software development generated \$204 million and provided direct employment to 12,000 workers; back-office operations accounted for 14% of total BPO employment.

Government support for the BPO industry is quite evident. Coinciding with the surge of the BPO industry, in 2001 the Government formed the Information Technology and E-Commerce Council to serve as the highest policy-making body. It provides policy directions on information and communications technology. In 2005, the Government launched the Philippine Cyberservices Corridor stretching over 600 miles, which is said to be capable of providing a variety of BPO services.

The Government is also allocating P26 billion for cyber corridor projects. In May 2006, it announced that it had earmarked about half of the P500 million "Training for Work Scholarship Program" for the IT industry to provide educational grants for training BPO applicants. The program issues training certificates to "near-hires," i.e., applicants whose qualifications fall just slightly below a hiring company's skill requirements.

*Source:* Magtibay-Ramos et al. (2007).

is as large as some conjecture, market size seems unlikely to offer any constraints. But constraints seem much more likely to surface on the supply side. Most immediately, the number of employable workers with appropriate skills (professional and linguistic) is limited, as many firms are now finding out (Rai 2006; *New York Times*, 16 February 2006), and salaries for highly skilled graduates are shooting up. Media reports also suggest that, outside the metropolitan areas of India, service export firms are finding it difficult to find the workers they need.

Indeed, there is a risk that India cannot meet the growing demand for BPO specialists because of the low quality of education of many of

its universities. Only 10–20% of new graduates seem to have the requisite training for international business activity (Schaaf 2005). But it is not just a question of fixing the tertiary education system, the real problems lie much deeper—namely, in a woefully inadequate primary schooling system that fails to equip students with the basic skill set that they need so as to benefit from a socially relevant education. Clearly, reforming India's school system will take time.

Other reasons, too, suggest limits to the difference that the BPO sector can make to India's development. The benefits of the BPO sector are certainly welcome: well-paid jobs, vital fiscal revenues, and balance-of-payments support are enormously helpful. Through these indirect channels as well, the BPO sector may provide some of the resources needed for infrastructure and other necessary investments. They also help broaden a middle-class income base that allows activities serving these markets to germinate and grow.

Yet in a country where the majority of the population still depends on agriculture for their livelihoods, high-productivity service activities are unlikely to make much of an impression. The workers who benefit from BPO jobs are part of a small, educated elite, who have few immediate connections to India's urban and rural poor. To address the needs of the masses, India needs, on the one hand, more productive agriculture, and, on the other, job creation both in labor-intensive industry and in lower-productivity services.

A similar story emerges from a closer look at the Philippines BPO sector. They bring tangible and welcome benefits, but their positive features need to be kept in perspective. It is highly unlikely that the advent of BPO services signals a paradigm shift that will put the Philippine economy on a higher trajectory.

By 2010, it is estimated that the Philippines BPO sector could create between 500,000–600,000 jobs (Magtibay-Ramos et al. 2007). As the sector pays comparatively well, and wages are largely consumed, possibly another 300,000 jobs in retail trade and in other areas could be created by BPO activities. As the sector is largely geared to exports, it also generates significant foreign exchange earnings.

Drilling deeper, and looking at the structure of the sector, 70% of the workers in BPO activities are employed in call centers, which is the least knowledge-intensive part of the industry. Just 13% of total revenues are IT-related, contrasting with India's 70%. While these features hint at untapped opportunities for progression into higher-end, more productive segments of the BPO industry, realizing them will depend critically on a supply of workers with quite different skills from those currently employed in call centers. A significant finding of the 2006 Workforce Development Summit held in March 2006, in Manila is that there are mismatches between labor supply and industrial demand. Most applicants for jobs do not have the skills required for the positions available. Communication skills, proficiency in English, computer literacy, and analytical skills are lacking. These gaps can be closed, but this will take time. (See also the chapter *Education and structural change in four Asian countries*.)

Given fast labor-force growth, and an industry sector with a shrinking share of output, low investment rates, and a poor record in



job creation, expectations about the broader impact of BPO services on development in the Philippines need to be kept realistic. Addressing constraints that hobble industry and manufacturing is likely to have larger and wider benefits.

## Summary

“Walking on two legs,” with both industry and services moving forward, has been an important element of sustained growth in the past, and there is no reason to believe that the future will be materially different. As economies grow, industry and services mutually support one another. Where industry struggles, services appear to have played an important role in absorbing workers released from agriculture, but these services jobs have largely been in low-productivity areas.

The reasons for retarded industrialization vary from place to place, and over time. India and the Philippines illustrate some of the factors that may be involved. Poor physical infrastructure appears to be one element in common. Regulatory and institutional failures are another. But blockages like these are not immovable, and India’s recent progress in industry and manufacturing is, hopefully, durable. Barriers and the strategies for breaking them down will depend on country context.

Asia has long been a services economy, and services are likely to continue to play an important role in the future. The largest productivity gap is in services and, if it could be closed more quickly, this would give a fillip to growth. But this is likely to require a profound change in the mix of services output and employment and a shift toward higher-productivity activities.

Enclaves of high-productivity services have been germinating in the IT and BPO sectors, and these bring tangible and valuable benefits. However, it seems unlikely that these activities can support the creation of jobs in highly populous countries that, viewed through an employment lens, are still predominantly agrarian. There are few trickle-down effects. Besides, there are acute constraints in the supply of workers with the right kinds of skills.

In the concluding section, some general principles to guide policies are set out.

## Incubating change and growth

This chapter began with the observation that growth occurs through change. The evidence presented in subsequent sections has validated this perspective. What economies look like is not a consequence of autonomous and self-regulating processes of growth. Rather, growth materializes from the “granular” details of what countries produce and how they produce. The quest to identify “leading sectors” is perhaps

pointless. Activities across an economy interact with and adapt to each other in complex ways.

Opportunities for productivity growth and catch-up can occur virtually anywhere. However, historically, and certainly in developing Asia, the most fertile areas have been in industry and manufacturing. All countries in developing Asia that are closing the productivity gap with OECD have three achievements in common: they have raised the share of industrial output; diversified their manufacturing base; and upgraded, both in terms of technology and the complexity of the export basket they produce. But services, too, have played a critical role. In countries that are moving ahead, services and industry have supported one another. Where industrialization has struggled, services have been an important buffer by providing low-productivity jobs for workers released from agriculture.

It is perilous to predict the future, and it may not be like the past. Nevertheless, to the extent that growth occurs through imitation and catch-up, the potential for future growth is still enormous. Baumol's "structural bonus" is in large measure still to come: there are hundreds of millions of agricultural workers who will move to more productive activities in industry and services. Raising agricultural productivity will ease this transition.

Services also provide opportunities for growth, but claims by some commentators that countries can safely bypass industry and leap straight into highly productive tradable services appear exaggerated. Yes, there appear almost limitless opportunities for task fragmentation and growth of trade in services tasks on a global scale. And there is no question that these new activities provide tangible benefits. But in countries like India and the Philippines, binding supply constraints now seem to be surfacing and the connectivity between high-productivity, tradable services, and the remainder of the economy seems too weak to generate trickle-down growth and the jobs that benefit the poor. There is also much in the experience of India that appears fortuitous and idiosyncratic and that may not be easy to imitate elsewhere. For those with limited education and skills, it is the creation of low- and medium-productivity jobs in industry and in services that will make the difference.

So what do countries need to do to develop the systems that can instigate and adapt to the changes that are ultimately required to grow and create jobs? While advice and approaches must be sensitive to country context, some organizing principles suggest themselves. These may guide design and practice, but do not constitute an agenda or blanket solutions.

First, mechanisms to mobilize savings and translate them into high rates of investment are needed. High investment spending is required to build, create variety in, and upgrade the activities, products, and services that mold an economy's look. As experimentation and trial and error are important parts of these processes, growth will inevitably entail waste as well as creation, and both will expend resources.

Second, high levels of investment are needed to provide the physical infrastructure that supports business and improvements in the quality of life. Good infrastructure allows firms to grow and to operate on a scale that allows efficiencies to be reaped. Developing Asia's experience suggests that industry prospers where physical infrastructure supports

its expansion; but where infrastructure services are lacking, industry struggles and can get left behind. Infrastructure connects and expands markets and provides services vital for building an educated and healthy labor force. Services may do better in an environment where infrastructure is sparse, but services on their own are unlikely to support sustained rapid growth.

Third, a versatile labor force equipped with relevant skills is also part of the recipe. Institutions that can mediate tensions and provide insurance against risks are an important part of the fabric of countries that sustain growth and that have resilience to shocks. Among other things, markets need to be complemented by affordable social protection programs and opportunities for new learning. Taxing rents to pay for these services is one way of balancing growth and equity.

Fourth, as it is business that creates wealth, impediments to business shrink (potential) wealth. A large library of micro evidence and data is now available, to identify what adds to business costs and what gets in the way of business expansion. A predictable and stable policy environment, secure property rights (including intellectual property rights), consistency in contract enforcement, regulation that balances public and private interests, a level playing field, and efficient administrative processes are all part of the “social technologies” (Nelson 2005) that lubricate business. But in many countries, too much grit remains in the cogs to get the machinery working smoothly.

Fifth, imitation is an important part of success. The celebrated “flying geese” model of development is based on leader-follower principles. But to be a successful follower, countries have to be receptive to ideas, to new arrangements and designs, and to new ways of organizing and producing. For example, the presence of multinational companies in East and Southeast Asia has provided an important catalyst for change that can be seen in patterns of production and trade. Openness to trade does more than prize open a little more consumer surplus—it also provides access to complex technologies and products, adds to diversity, and can be a stimulus for the creation of new activities through multinational and other forms of investment.

Embedded within these broad principles are many possible operational approaches. Yet the idea that change and structure are instrumental to growth raises the question of whether it is possible to agitate the pace and direction of development at a more refined (or granular) level. After all, “markets” do not exist independently of an economy: they are built or developed as other elements of the institutional fabric evolve. There may be little scope for “big pushes” (Easterly 2005), but many small nudges may still have a very useful role.

Rodrik (2004) observes that the sort of diversification that has presented itself in the data for developing Asia, and that appears to be important for growth, cannot occur if markets alone are left to incubate new activities. Markets do not create adequate demand for innovation for two main reasons: there can be no information about activities that do not yet exist; and markets cannot profitably supply the upstream and downstream “infrastructure” ahead of the birth of the new activities that will ultimately provide revenue streams.

The solution to these failures, the argument runs, lies in strategic

private-public sector collaboration and support to *new* activities, products, or services (but not to established activities or to broader sectors). In this relationship, the government is not the leader and the private sector is not the follower—both are partners in gathering information and finding solutions that work. The operational processes that promote learning and that nurture innovation and change might contain many different elements, and will have to be learned and modified as circumstances change. But success will rest on designs that reward performance, minimize risks of moral hazard, build on capabilities, balance public sector autonomy with private sector self-interest, and abandon failed experiments.

## References

- Anant, T.C.A., R. Hasan, P. Mohapatra, R. Nagaraj, and S.K. Sasikumar. 2006. "Labor Markets in India: Issues and Perspectives." In J. Felipe and R. Hasan (eds.) *Labor Markets in Asia: Issues and Perspectives*, pp. 205-305. London: Palgrave Macmillan for ADB.
- Antweiler, Werner, and Daniel Treffer. 2002. "Increasing Returns and all that: A View from Trade." *American Economic Review*, Vol. 92, No. 1 (March): 93-119.
- Asian Development Bank (ADB). 2005a. *Key Indicators 2005*. Manila.
- . 2005b. *Philippines: Moving Toward a Better Investment Climate*. Manila.
- . 2006. *Key Indicators 2006*. Manila.
- Bardhan, Pranab. 2006. "Awakening Giants, Feet of Clay: A Comparative Assessment of the Rise of China and India." Paper presented at the International Conference on the Dragon and the Elephant: China and India's Economic Reforms. Shanghai, 1-2 July 2006.
- Baumol, William J., Sue Ann Batey Blackman, and Edward Wolff. 1985. "Unbalanced Growth Revisited: Asymptotic Stagnancy and New Evidence." *American Economic Review*, Vol. 75, No. 4 (September): 806-817.
- . 1989. *Productivity and American leadership: The Long View*. Cambridge: MIT Press.
- Beinhocker, E. D. 2006. *The Origin of Wealth*. Boston, MA: Harvard Business School Press.
- Besley, Timothy, and Robin Burgess, 2004. "Can Labor Regulation Hinder Economic Performance? Evidence from India." *Quarterly Journal of Economics*, Vol. 119, No. 1 (February): 91-134.
- Bhagwati, Jagdish. 1984. "Splintering and Disembodiment of Services and Developing Nations." *World Economy*, Vol. 7, No. 2 (June): 133-143.
- Chadha, G.K., and P.P. Sahu. 2002. "Post-reform Setbacks in Rural Employment Issues that Need Further Scrutiny." *Economic and Political Weekly*. 25 May: 1998-2026.
- Chenery, Hollis B. 1977. "Transitional Growth and World Industrialization." In Bertil Ohlin, Per-Over Hesselborn, and Per Magnus Wijkman (eds.) *The International Allocation of Economic Activity*, pp. 457-490. New York: Holmes & Meir Publishers, Inc.
- Chenery, H.B., S. Robinson, and M. Syrquin. 1986. *Industrialization and Economic Growth*. Oxford: Oxford University Press.
- Computer Language Company, Inc. 2006. The Free Dictionary. Available: <http://computing-dictionary.thefreedictionary.com/digital+content>, downloaded 1 September 2006.

- Department of Trade and Industry (DTI). 2006. "IT and IT-Enabled Services." Available: <http://www.dti.gov.ph/contentment/9/16/119/422.jsp>. Downloaded 16 September 2006.
- Deshpande, L.K. 2004. *Liberalization and Labor: Labor Flexibility in Indian Manufacturing*. Institute of Human Development. New Delhi.
- Easterly, W. 2005. "Reliving the '50s: The Big Push, Poverty Traps, and Takeoffs in Economic Development," Working Paper No. 65, Center for Global Development.
- Einhorn, B. "China." *Business Week*, 6 November, p.44.
- Engardio, P. and Roberts, D. 2004. "The China Price," *Business Week Online* 6 December.
- Eswaran, Mukesh, and Ashok Kotwal. 2002. "The Role of the Service Sector in the Process of Industrialization." *Journal of Development Economics*, 68: 401-420.
- Fardmanesh, Mohsen, and Li Tan. 2005. "From Command to Market: A Performance Perspective for Transition Economies." Economic Growth Center. Yale University, New Haven.
- Felipe, Jesus, and Rana Hasan. 2006. "Labor Markets in a Globalizing World." In Jesus Felipe and Rana Hasan (eds.) *Labor Markets in Asia: Issues and Perspectives*, pp. 63-142. London: Palgrave Macmillan for ADB.
- Hausmann, Ricardo, and Dani Rodrik. 2002. "Economic Development as Self-Discovery." National Bureau of Economic Research Working Paper 8952, Cambridge, MA.
- Hausmann, Ricardo, Jason Hwang, and Dani Rodrik. 2005a. "What You Export Matters." John F. Kennedy School of Government. Available: <http://ksgnotes1.harvard.edu/Research/wpaper.nsf/rwp/RWP05-063>.
- . 2005b. "Growth Accelerations." John F. Kennedy School of Government. Available: [http://ksghome.harvard.edu/~drodrik/growth\\_accelerations\\_aug05.pdf](http://ksghome.harvard.edu/~drodrik/growth_accelerations_aug05.pdf).
- Hill, Hal. 2003. "Industry." In Arsenio Balisacan and Hal Hill (eds.) *The Philippine Economy: Development, Policies and Challenges*. Quezon City: Ateneo de Manila University Press.
- Imbs, Jean, and Roman Wacziarg. 2003. "Stages of Diversification." *American Economic Review*, Vol. 93, No. 1 (March): 63-86.
- Kaka, N. F., S. S. Kekre, and S. Sarangan. 2006. "Benchmarking India's Business Process Outsourcers." *The McKinsey Quarterly*, July.
- Kapsos, Steven. 2006. "The Employment Intensity of Growth: Trends and Macroeconomic Determinants." In J. Felipe and R. Hasan (eds.) *Labor Markets in Asia: Issues and Perspectives*, pp.143-201. London: Palgrave Macmillan for ADB.
- Katouzian, M.A. 1970. "The Development of the Service Sector: A New Approach." *Oxford Economic Papers*, Vol. 22, No. 3 (November): 362-382.
- Kravis, Irving B., Alan W. Heston, and Robert Summers. 1983. "The Share of Services in Economic Growth." In F. Gerard Adams and Bert G. Hickman (eds.) *Global Econometrics*, pp.188-218. Cambridge, MA and London: MIT Press.
- Kochhar, Kalpana, Utsav Khumar, Raghuram Rajan, Arvind Subramanian, and Ioannis Tokatlidis. 2006. "India's Pattern of Development: What Happened, What Follows?" International Monetary Fund Working Paper 06/22. International Monetary Fund: Washington, DC.
- Kuznets, Simon. 1966. *Modern economic growth*. Yale University Press: New Haven.
- . 1971. *Economic Growth of Nations*. Cambridge, MA: Belknap Press.
- Locsin, A. M. 2006. "Services at its Best. The Philippine ITES-BPO Industry." Paper presented at the Aspect Customer Experience Conference, 23 August, Queensland.
- Magtibay-Ramos, Nedelyn, Gemma Estrada, and Jesus Felipe. 2007. "An Analysis of the Philippine Business Process Outsourcing Industry." ERD Working Paper Series No. 93, March. Asian Development Bank, Manila.

- McDougall, P. 2006. "IBM Expands India And China Operations In Quest For Growth". *Project Management*, 6 November.
- McGregor, R. 2004. "Philips on Track to Double Revenues in China", *Financial Times*, 3 September, p.26.
- NeoIT. 2004. Research Summary: Mapping Offshore Markets Update 2004. Offshore Insights White Paper Series No. 2(6), California.
- Nelson, Richard R. 2005. *Technology, Institutions, and Economic Growth*. Cambridge, MA: Harvard University Press.
- Ng, Thiam Hee. 2002. "Factor Endowments and the Distribution of Industrial Production Across the World." Statistics and Information Working Paper 6, UNIDO, Vienna. February.
- OECD. 1997. *Science, Technology and Industry: Scoreboard of Indicators 1997*. OECD: Paris.
- Pack, Howard, and Kamal Sagi. 2006. "Is There a Case for Industrial Policy? A Critical Survey." *World Bank Research Observer*, Vol. 21: 267-297.
- Panagariya, Arvind. 2006. "Transforming India." Paper presented at the Conference "India: an Emerging Giant", 13-15 October, Columbia University.
- Pratten, C. 1988. "A Survey of Economies of Scale." In Commission of the European Communities, *Research on the Cost of Non-Europe*, Vol. 2. Brussels.
- Rai, Saritha. 2006. "India's Outsourcing Industry is Facing a Labor Shortage", *New York Times*, 16 February.
- Roberts, W. 2006. "First Class to China", *Electronic Business*, 9 January.
- Rodrik, Dani. 2004. "Industrial Policy for the Twenty-First century." John F. Kennedy School of Government. Available: <http://ksghome.harvard.edu/~drodrik/UNIDOSep.pdf>.
- . 2006. "Industrial Development: Stylized Facts and Policies." (August draft) John F. Kennedy School of Government. Available: <http://ksghome.harvard.edu/~drodrik/industrial%20development.pdf>.
- Roy, S. Dutta 2004. "Employment Dynamics in Indian Industry: Adjustment Lags and the Impact of Job Security." *Journal of Development Economics*, Vol. 73, No. 1: 233-256.
- Schaaf, J. 2005. "Outsourcing to India: Crouching Tiger Set to Pounce." Deutsche Bank Research, Frankfurt.
- Sleigh, A. and H. von Lewinski. 2006. "Moving up the Value Chain", *Outlook* No 3. Accenture Report.
- Sundrum, R.M. .1987. *Growth and Income Distribution in India*. New Delhi: Sage.
- United Nations. Commodity Trade Statistics Database (COMTRADE). New York.
- United Nations Industrial Development Organization (UNIDO). 2005. Industrial Statistics (INDSTAT) 2005 Database: 3-digit Level of International Standard Industry Classification (ISIC) Code Revision 2. Strategic Research and Economics Branch, UNIDO, Austria.
- Wirtz, Jochen. 2000. "Growth of the Service Sector in Asia." *Singapore Management Review*, Vol. 22, Issue 2: 37-54.
- World Bank. 2005. *Enhancing Job Opportunities in Eastern Europe and the Former Soviet Union*. Washington, DC.

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Appendix table 1 Annual total GDP growth and sectoral growth by decade

	1970s				1980s				1990s				2000–2004			
	Total	Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total	Agriculture	Industry	Services
China, People's Rep. of	5.90	2.39	8.22	5.79	9.23	5.14	10.05	11.93	9.53	4.23	12.10	8.91	8.76	3.28	9.77	9.36
India	2.52	0.31	3.84	4.45	5.71	4.18	6.57	6.28	5.53	2.95	5.60	7.34	5.56	1.68	6.09	7.30
<b>Newly industrialized economies</b>																
Hong Kong, China	8.73	-	-	-	6.97	-	-	-	3.66	-	-	-	3.40	-0.43	-3.47	4.40
Korea, Rep. of	7.95	3.69	13.57	6.32	7.32	1.58	8.98	7.23	5.96	0.96	6.41	5.76	5.23	0.09	6.95	4.17
Singapore	8.40	2.75	9.13	8.38	7.18	-3.74	6.17	7.75	7.32	-3.49	8.13	7.14	3.98	-1.44	2.82	4.66
Taipei, China	8.98	2.21	12.34	8.89	12.17	2.81	12.55	13.00	6.29	-2.4	4.20	7.64	3.36	-0.07	3.11	3.56
<b>ASEAN-4</b>																
Indonesia	7.48	4.15	9.80	8.41	6.14	4.01	7.08	6.62	4.51	2.06	5.67	4.53	4.54	3.41	4.06	5.50
Malaysia	7.56	4.96	8.29	8.63	5.65	3.46	6.44	6.01	6.88	0.11	8.06	7.74	5.08	3.67	5.52	4.86
Philippines	5.81	3.93	7.89	5.02	1.89	1.50	0.58	3.41	2.71	1.45	2.40	3.63	4.24	2.91	3.65	5.19
Thailand	6.80	4.06	9.40	6.63	7.02	4.39	8.67	6.82	4.94	0.42	6.91	4.50	4.97	3.39	6.12	4.13
<b>Other Southeast Asia</b>																
Cambodia	-	-	-	-	-	-	-	-	7.11	4.59	12.60	6.51	6.57	1.59	15.92	5.06
Lao PDR	-	-	-	-	3.86	3.86	6.14	2.74	6.18	4.86	11.24	5.44	5.78	3.56	9.82	5.89
Viet Nam	-	-	-	-	4.36	3.03	5.19	5.53	7.14	3.82	9.96	7.39	6.89	3.71	9.59	6.10
<b>Other South Asia</b>																
Bangladesh	0.82	-0.31	1.26	2.15	3.17	1.58	4.41	3.72	4.69	3.32	6.75	4.15	5.28	3.55	6.83	5.35
Bhutan	-	-	-	-	7.13	4.84	14.89	6.59	6.21	3.33	8.28	7.25	6.24	-	-	-
Maldives	-	-	-	-	-	-	-	-	-	-	-	-	6.48	-	-	-
Nepal	3.59	1.09	6.17	4.63	3.95	3.47	7.30	3.46	4.75	2.42	6.97	5.97	3.43	3.73	2.33	3.16
Pakistan	4.04	1.84	5.40	6.05	6.62	4.24	7.86	6.52	3.88	4.05	4.56	4.43	4.05	2.04	4.67	4.57
Sri Lanka	4.15	2.36	3.39	5.00	4.04	2.25	4.11	5.12	5.12	2.49	6.54	5.43	3.88	0.35	3.27	5.41
<b>Central Asia and Mongolia</b>																
Armenia	-	-	-	-	-	-	-	-	-4.99	0.10	-13.74	-10.47	9.40	3.65	10.19	12.23
Azerbaijan	-	-	-	-	-	-	-	-	-7.04	-4.26	-4.67	-6.05	10.05	7.66	10.48	8.71
Kazakhstan	-	-	-	-	-	-	-	-	-5.05	-7.41	-10.56	-1.83	9.83	3.58	11.79	9.51
Kyrgyz Rep.	-	-	-	-	7.75	7.18	10.14	5.38	-4.05	0.70	-11.13	-2.08	4.77	3.92	4.03	6.28
Mongolia	-	-	-	-	5.80	2.52	6.89	7.99	1.38	2.64	-0.14	-1.29	4.27	-6.00	7.42	6.39
Tajikistan	-	-	-	-	2.11	-1.60	5.56	3.48	-10.51	-7.98	-10.23	-4.60	9.29	-	-	-
Turkmenistan	-	-	-	-	3.06	5.41	-3.05	7.33	-4.31	-3.92	-5.06	-4.00	-	-	-	-
Uzbekistan	-	-	-	-	5.75	2.85	8.82	1.27	-0.37	1.05	-3.07	-1.36	4.55	5.84	3.24	4.51
<b>The Pacific</b>																
Fiji Islands	5.52	3.35	3.93	7.50	0.65	2.07	0.19	0.99	2.84	0.04	4.12	3.43	2.22	-	-	-
Kiribati	-	-	-	-	-4.67	0.15	-5.24	-1.01	5.15	-1.52	8.44	5.37	1.73	-	-	-
Marshall Islands	-	-	-	-	8.24	-	-	-	-0.68	-	-	-	1.35	-	-	-
Micronesia	-	-	-	-	2.31	-	-	-	1.06	-	-	-	2.10	-	-	-
Papua New Guinea	3.03	-	-	-	1.74	2.09	0.36	2.41	4.48	3.24	7.70	1.54	0.17	-	-	-
Palau	-	-	-	-	-	-	-	-	0.78	-	-	-	1.81	-	-	-
Samoa	-	-	-	-	-0.31	-	-	-	2.76	0.26	-0.56	12.64	3.16	-4.83	5.67	4.85
Solomon Islands	5.29	-	-	-	5.65	-	-	-	3.14	-	-	-	-3.29	-	-	-
Timor-Leste	-	-	-	-	-	-	-	-	-	-	-	-	3.37	1.60	-0.51	5.64
Tonga	-	-3.73	11.70	4.58	2.33	0.79	3.14	2.41	2.04	1.77	3.02	2.25	3.16	-	-	-
Vanuatu	-	-	-	-	1.30	0.58	1.26	1.66	3.72	1.97	0.93	4.75	0.08	-	-	-
<b>Total</b>	<b>5.60</b>	<b>2.05</b>	<b>8.07</b>	<b>5.85</b>	<b>6.90</b>	<b>4.09</b>	<b>7.90</b>	<b>7.76</b>	<b>6.62</b>	<b>3.12</b>	<b>8.53</b>	<b>6.80</b>	<b>6.58</b>	<b>2.70</b>	<b>7.89</b>	<b>6.92</b>

- = data not available.

Notes: Annual growth was calculated using exponential growth rate. The 1970s figure for Nepal refers only to 1973–1979. The 1980s figure for the Lao PDR refer only to 1984–1989; for Kyrgyz Rep., Turkmenistan, and Uzbekistan, 1987–1989; for Tajikistan, 1985–1989; and for Kiribati, 1982–1989. The 1990s figure for Cambodia and Solomon Islands refer only to 1993–1999; and for Azerbaijan, 1992–1999.

Sources of basic data: Directorate General of Budget, Accounting, and Statistics, available: <http://eng.stat.gov.tw>, downloaded 13 September 2006; World Bank, *World Development Indicators* online database, downloaded 4 August 2006.

[Click here for data](#)

Appendix table 2 Output and employment shares by sector and decade (A-Agriculture, I-industry, S-services)

	Output shares									Employment shares											
	1970s			1980s			1990s			2000–2004			1980s			1990s			2000–2004		
	A	I	S	A	I	S	A	I	S	A	I	S	A	I	S	A	I	S	A	I	S
China, People's Rep. of	32.33	44.54	23.13	29.31	44.60	26.09	20.33	45.50	34.17	13.63	45.61	40.76	63.87	20.24	15.89	54.15	22.63	23.22	49.78	21.95	28.28
India	42.28	22.43	35.30	34.61	26.14	39.25	29.42	26.92	43.65	23.13	26.56	50.31	67.00	15.50	17.50	63.30	16.70	20.00	59.80	18.00	22.20
<b>Newly industrialized economies</b>																					
Hong Kong, China	-	-	-	0.52	30.28	69.20	0.16	18.06	81.78	0.08	12.87	87.05	1.35	44.60	54.05	0.55	28.28	71.17	0.25	18.85	80.90
Korea, Rep. of	26.16	29.82	44.02	13.43	39.20	47.37	6.64	41.39	51.98	4.19	39.64	56.17	26.78	31.12	42.10	12.97	32.88	54.15	9.68	27.65	62.67
Singapore	-	-	-	-	-	-	0.18	34.75	65.07	0.12	35.09	64.79	0.84	36.08	63.08	0.26	31.80	67.94	0.25	27.11	72.64
Taipei, China	11.60	40.58	47.82	6.13	42.98	50.89	3.16	34.16	62.68	1.79	27.29	70.92	16.98	41.97	41.05	10.79	38.82	50.39	7.33	35.72	56.95
<b>ASEAN-4</b>																					
Indonesia	34.02	30.07	35.91	23.18	38.12	38.70	17.91	41.77	40.32	15.72	44.94	39.35	55.90	11.46	32.64	46.73	12.58	40.69	44.62	13.70	41.68
Malaysia	27.39	33.09	39.52	20.30	39.00	40.70	13.15	42.54	44.31	9.06	49.07	41.87	31.64	24.14	44.22	20.35	31.60	48.05	15.50	31.88	52.62
Philippines	29.49	34.53	35.99	23.87	36.81	39.33	20.35	32.49	47.16	14.50	32.07	53.43	49.59	14.50	35.90	43.05	15.92	41.03	36.82	15.78	47.39
Thailand	25.67	27.57	46.76	17.92	31.99	50.08	10.38	39.73	49.89	9.58	42.73	47.69	65.42	12.05	22.53	54.62	16.95	28.44	46.42	19.07	34.51
<b>Other Southeast Asia</b>																					
Cambodia	-	-	-	-	-	-	46.60	15.94	37.47	35.17	26.28	38.54	-	-	-	76.37	4.36	19.28	72.09	9.47	18.44
Lao PDR	-	-	-	60.55	13.42	26.03	56.52	19.15	24.33	49.86	25.00	25.14	-	-	-	85.40	3.50	11.10	-	-	-
Myanmar	42.71	12.60	44.70	50.54	11.98	37.48	60.05	9.68	30.27	54.87	11.89	33.25	66.07	10.52	23.41	67.08	10.25	22.67	-	-	-
Viet Nam	-	-	-	41.43	26.30	32.27	30.24	28.90	40.86	23.02	38.58	38.40	-	-	-	69.31	12.38	18.48	62.75	14.35	22.90
<b>Other South Asia</b>																					
Bangladesh	-	-	-	31.60	21.17	47.24	27.13	23.94	48.93	23.03	26.10	50.87	68.24	16.19	15.56	67.04	11.71	21.25	64.75	10.74	24.50
Bhutan	-	-	-	51.02	20.41	28.57	40.04	31.09	28.88	34.56	37.65	27.79	-	-	-	-	-	-	-	-	-
Maldives	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.61	24.04	51.35	16.53	22.92	60.55
Nepal	67.44	10.11	22.46	56.02	14.20	29.78	43.49	20.92	35.59	40.40	22.10	37.50	-	-	-	79.56	3.65	16.79	-	-	-
Pakistan	33.78	22.79	43.43	28.55	23.27	48.19	26.13	24.36	49.50	24.04	23.31	52.65	52.07	20.03	27.90	47.71	18.59	33.71	46.33	18.95	34.72
Sri Lanka	28.97	26.08	44.96	27.23	27.02	45.75	23.64	26.36	49.99	19.46	26.72	53.82	50.14	19.71	30.15	42.04	22.69	35.26	36.15	24.58	39.27
<b>Central Asia and Mongolia</b>																					
Armenia	-	-	-	-	-	-	34.41	36.53	29.06	25.52	36.00	38.47	-	-	-	37.32	23.81	38.87	46.39	14.73	38.87
Azerbaijan	-	-	-	-	-	-	26.60	35.60	37.80	14.84	50.14	35.02	34.37	30.37	35.25	38.08	19.84	42.08	40.31	11.18	48.51
Kazakhstan	-	-	-	-	-	-	14.61	34.82	50.57	8.71	39.01	52.28	-	-	-	23.15	26.80	50.04	35.43	16.53	48.03
Kyrgyz Rep.	-	-	-	32.72	-	-	40.76	27.48	31.75	37.08	25.34	37.58	35.55	26.46	38.00	43.13	18.71	38.16	49.59	11.95	38.46
Mongolia	-	-	-	17.36	27.30	55.34	33.73	24.90	41.37	23.12	24.36	52.52	-	-	-	47.09	21.84	31.07	45.92	14.43	39.64
Tajikistan	-	-	-	32.06	40.11	27.83	31.19	36.43	32.37	25.90	37.29	36.81	-	-	-	57.76	19.96	24.77	-	-	-
Turkmenistan	-	-	-	27.77	37.06	35.17	23.49	45.50	31.01	23.23	44.45	32.33	-	-	-	44.77	-	-	-	-	-
Uzbekistan	-	-	-	29.34	35.54	35.13	32.79	30.11	37.10	33.37	23.29	43.34	-	-	-	42.50	20.94	36.56	34.40	20.30	45.30
<b>The Pacific</b>																					
Fiji Islands	24.72	21.88	53.40	20.38	20.97	58.66	19.05	25.68	55.27	16.02	26.27	57.71	-	-	-	2.22	35.39	62.35	-	-	-
Kiribati	19.06	52.28	28.66	29.66	7.81	62.53	21.29	6.38	72.32	15.46	10.75	73.79	-	-	-	9.61	13.86	76.53	-	-	-
Marshall Islands	-	-	-	-	-	-	14.45	14.59	70.96	10.93	20.82	68.25	-	-	-	-	-	-	-	-	-
Micronesia	-	-	-	44.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Papua New Guinea	32.45	28.00	39.55	32.21	27.48	40.32	28.75	37.02	34.22	27.94	43.39	28.68	-	-	-	-	-	-	73.33	3.65	23.02
Palau	-	-	-	-	-	-	11.14	11.06	77.80	3.07	13.79	83.14	-	-	-	-	-	-	-	-	-
Samoa	-	-	-	-	-	-	19.63	26.94	53.43	14.52	26.61	58.86	-	-	-	-	-	-	-	-	-
Solomon Islands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.68	13.65	59.15	-	-	-
Timor-Leste	-	-	-	-	-	-	43.15	16.77	40.08	27.20	16.21	56.60	-	-	-	-	-	-	-	-	-
Tonga	44.65	12.29	43.06	37.91	14.20	47.89	33.63	14.79	51.58	28.14	15.80	56.06	-	-	-	37.13	-	-	-	-	-
Vanuatu	21.95	6.05	72.00	22.70	9.30	68.00	16.84	10.40	72.76	14.18	8.89	76.92	-	-	-	-	-	-	-	-	-

- = data not available.

Notes: The main data source is the *World Bank World Development Indicators*. Agriculture includes agriculture, fishery and forestry. Industry includes manufacturing, mining, construction and utilities. Services include transport, trade, finance, public administration and others. Sector shares are computed in nominal terms. It is important to add that some problems were found upon checking the quality of data of this database. Data review was done by calculating the number of cases where the change between two consecutive years in the share (both output and employment, for each sector) was larger (i.e., increase in the share) or smaller (i.e., decrease in the share) than five percentage points. Except in extreme circumstances, e.g., wars or natural disasters, sector shares cannot change by this much between 2 years. However, there were plenty of such cases found for output, and substantially fewer for employment in this database.

Sources: Asian Development Bank, Statistical Database System, downloaded 14 September 2006; Directorate General of Budget, Accounting, and Statistics (various years), *Statistical Yearbook of the Republic of China*; National Bureau of Statistics (various years), *China Statistical Yearbook*; Sundrum (1997) and Chadha and Sahu (2002), cited in Anant et al. (2006); World Bank, *World Development Indicators* online database, downloaded 4 August 2006.

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Appendix table 3 Manufacturing output shares by decade

	1970s	1980s	1990s	2000–2004
China, People's Rep. of	37.27	36.26	32.90 <sup>h</sup>	34.50 <sup>l</sup>
India	15.32	16.43	16.58	15.71
<b>Newly industrialized economies</b>				
Hong Kong, China	-	21.18	9.43	4.32
Korea, Rep. of	21.61	27.51	27.14	27.82
Singapore	24.84 <sup>a</sup>	26.09	26.11	27.39
Taipei, China	32.43	34.95	27.11	22.80
<b>ASEAN-4</b>				
Indonesia	10.42	15.35	23.72	29.04
Malaysia	16.82	20.42	27.05	31.21
Philippines	25.72	25.03	23.29	22.94
Thailand	18.98	23.32	29.55	34.00
<b>Other Southeast Asia</b>				
Cambodia	-	-	11.08	19.40
Lao PDR	-	9.27 <sup>d</sup>	14.20	18.67
Myanmar	9.64	9.07	6.90	8.49 <sup>m</sup>
Viet Nam	-	19.69 <sup>e</sup>	15.23	19.94
<b>Other South Asia</b>				
Bangladesh	-	13.76	14.87	15.73
Bhutan	-	5.29	10.39	7.79 <sup>m</sup>
Nepal	4.11	5.24	8.77	8.85
Pakistan	15.89	15.98	16.44	15.99
Sri Lanka	19.02	15.39	15.68	15.90
<b>Central Asia and Mongolia</b>				
Armenia	-	-	27.56	22.68
Azerbaijan	-	-	14.08	7.87
Kazakhstan	-	-	13.30 <sup>i</sup>	16.33
Kyrgyz Rep.	-	-	20.04	16.19
Mongolia	-	31.04	18.70	6.37
Tajikistan	-	27.70 <sup>e</sup>	25.43	32.35
Turkmenistan	-	-	26.30 <sup>j</sup>	15.47 <sup>m</sup>
Uzbekistan	-	25.06 <sup>f</sup>	11.96 <sup>j</sup>	9.40
<b>The Pacific</b>				
Fiji Islands	11.79	10.59	14.44	15.02 <sup>n</sup>
Kiribati	1.62 <sup>b</sup>	1.16	0.98	0.89 <sup>n</sup>
Marshall Islands	-	-	1.63	4.54 <sup>o</sup>
Micronesia, Fed. States of	-	0.40 <sup>g</sup>	-	-
Papua New Guinea	7.26	10.06	8.89	8.50 <sup>m</sup>
Palau	-	-	0.97	1.19 <sup>n</sup>
Samoa	-	-	17.10 <sup>j</sup>	15.37
Timor-Leste	-	-	2.78 <sup>k</sup>	3.29
Tonga	6.63 <sup>a</sup>	5.42	4.85	4.61
Vanuatu	3.90 <sup>c</sup>	4.45	4.88	4.21 <sup>o</sup>

- = data not available.

Notes: a. 1975–1979 average. b. 1978–1979 average. c. 1979. d. 1989. e. 1985–1989 average. f. 1987–1989 average. g. 1983. h. 1990–1992 average. i. 1992–1999 average. j. 1994–1999 average. k. 1999. l. 2000. m. 2000–2003 average. n. 2000–2002 average. o. 2000–2001 average.

Sources of basic data: Asian Development Bank, Statistical Database System, downloaded 14 September 2006; Directorate General of Budget, Accounting, and Statistics, available: <http://eng.stat.gov.tw>, downloaded 13 September; World Bank, *World Development Indicators* online database, downloaded 4 August 2006.

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**Appendix table 4 Manufacturing employment shares by decade**

	Manufacturing as % of total employment		
	1980s	1990s	2000–2004
China, People's Rep. of	15.11 <sup>a</sup>	13.47	11.16 <sup>g</sup>
India	11.05 <sup>b</sup>	10.92 <sup>b</sup>	11.22 <sup>b</sup>
<b>Newly industrialized economies</b>			
Hong Kong, China	35.89	19.02	10.20 <sup>h</sup>
Singapore	27.91	24.53	18.31 <sup>i</sup>
Korea, Rep. of	23.93	23.40	19.44
Taipei, China	33.41	28.66	27.40
<b>ASEAN-4</b>			
Indonesia	9.68 <sup>c</sup>	11.73	13.15 <sup>g</sup>
Malaysia	15.95	22.59	21.94
Philippines	9.93	10.06	9.65
Thailand	8.87	12.33	14.58
<b>Other DMCs</b>			
Azerbaijan	-	9.36 <sup>e</sup>	5.44 <sup>g</sup>
Kyrgyz Rep.	-	20.11	19.19
Pakistan	13.66	10.99	12.66
Viet Nam	-	8.32 <sup>f</sup>	10.33
<b>OECD</b>	21.58 <sup>d</sup>	19.20 <sup>d</sup>	16.89 <sup>d</sup>

- = data not available.

Notes: a. 1987–1989. b. For India, the figure for each decade refers only to a single year, as follows: 1983, 1993/94, 1999/2000. c. The average for the years 1980, 1982, 1985, and 1989. d. For OECD, the number of countries covered each decade are: 18 for the 1980s; 20 for the 1990s; 21 for 2000–2004. e. 1992–1999. f. 1996–1999. g. 2000–2002. h. 2000–2001. i. 2001–2003.

Sources of basic data: International Labour Organization, LABORSTA Labour Statistics Database, downloaded 9 August 2006; General of Budget, Accounting, and Statistics (various years), *Statistical Yearbook of the Republic of China*; Sundaram and Tendulkar (2002).

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Appendix table 5 Decomposition of labor productivity growth

	China, People's Rep. of 1987–2002	Hong Kong, China 1978– 2004	India 1983– 2000	Indonesia 1976–2002	Korea. Rep. of 1970– 2004	Kyrgyz Rep. 1987–2002	Malaysia 1980– 2004	Pakistan 1973– 2002	Philippines 1971–2004	Singapore 1970– 2003	Taipei, China 1965– 2004	Thailand 1971–2004	Viet Nam 1991–2004
Average annual growth rate of labor productivity ( $\hat{q}$ )													
Total	0.0606	0.0326	0.0374	0.0327	0.0353	-0.0970	0.0283	0.0255	0.0076	0.0327	0.0422	0.0335	0.0476
Agriculture	0.0344	-0.0061	0.0183	0.0254	0.0387	-0.0536	0.0286	0.0221	0.0040	0.0244	0.0361	0.0231	0.0361
Industry	0.0863	0.0327	0.0346	0.0132	0.0424	-0.0170	0.0285	0.0257	0.0064	0.0363	0.0403	0.0220	0.0520
Services	0.0176	0.0236	0.0376	0.0250	0.0155	0.0286	0.0171	0.0197	0.0033	0.0311	0.0385	0.0097	-0.0047
Manufacturing		0.0296		0.0438	0.0495		0.0408	0.0291	0.0086	0.0387	0.0435	0.0265	
Change in the labor share ( $\lambda - \lambda^0$ )													
Agriculture	-0.1593	-0.0122	-0.0820	-0.2164	-0.4236	0.1878	-0.2241	-0.1523	-0.1327	-0.0320	-0.3989	-0.3443	-0.1676
Industry	-0.0452	-0.3541	0.0280	0.0990	0.0999	-0.1433	0.0600	0.0406	-0.0031	-0.0601	0.1292	0.1365	0.0529
Services	0.2045	0.3663	0.0540	0.1174	0.3236	-0.0445	0.1641	0.1116	0.1357	0.0921	0.2697	0.2078	0.1146
Manufacturing		-0.3730	0.0000	0.0655	0.0584	-0.0945	0.0422	0.0136	-0.0196	-0.0405	0.1103	0.0974	0.1170
Productivity differential with agriculture ( $q_i - q_A$ )													
Industry	2587	9116	825	3517	14770	1479	8615	671	3946	24221	11038	6067	1419
Services	1344	30529	1371	1050	8365	46	2168	1221	2023	11021	19330	4041	1246
Manufacturing		4256		2107	14624	485	6864	694	4655	26193	11950	6437	601
Weighted average of sector growth rates (average annual) of labor productivity growth (within-sector) ( $k_i \hat{q}_i$ )													
Agriculture	0.0072	0.0000	0.0059	0.0056	0.0048	-0.0162	0.0042	0.0068	0.0007	0.0003	0.0043	0.0036	0.0097
Industry	0.0342	0.0069	0.0087	0.0055	0.0129	-0.0069	0.0127	0.0053	0.0020	0.0126	0.0103	0.0075	0.0175
Services	0.0070	0.0185	0.0160	0.0091	0.0088	0.0084	0.0069	0.0096	0.0017	0.0199	0.0240	0.0049	-0.0019
Total	0.0483	0.0253	0.0306	0.0202	0.0266	-0.0147	0.0239	0.0217	0.0044	0.0328	0.0386	0.0160	0.0253
Reallocation effects (average annual) (structural bonus) ( $(\lambda_i - \lambda_i^0)(q_i - q_A)/q$ )													
Industry	-0.0059	-0.0031	0.0017	0.0098	0.0029	-0.0815	0.0027	0.0007	-0.0001	-0.0016	0.0018	0.0093	0.0078
Services	0.0138	0.0107	0.0055	0.0035	0.0053	-0.0008	0.0019	0.0035	0.0033	0.0011	0.0066	0.0094	0.0148
Total	0.0080	0.0076	0.0072	0.0132	0.0082	-0.0823	0.0046	0.0042	0.0032	-0.0005	0.0085	0.0187	0.0225
Total productivity growth	0.0563	0.0329	0.0378	0.0334	0.0347	-0.0970	0.0284	0.0259	0.0076	0.0324	0.0471	0.0347	0.0479

Notes: The formula used is:  $\hat{q} = \sum k_i \hat{q}_i + (\lambda_i - \lambda_i^0) \frac{(q_i - q_A)}{q} + (\lambda_s - \lambda_s^0) \frac{(q_s - q_A)}{q}$ , where  $\hat{q}$  is the growth rate of overall labor productivity;  $\hat{q}_i$  is the growth rate of the sector labor productivities;  $(q_i - q_A)/q$  is the difference between the levels of labor productivity in industry and agriculture divided by the overall level of productivity;  $(q_s - q_A)/q$  is the difference between the levels of labor productivity in services and agriculture divided by the overall level of productivity;  $\lambda$  denotes the employment shares of each sector; and  $k$  the respective output shares. The first term of the decomposition represents the component of overall growth that is due to the growth of labor productivity within each sector (weighted by the output shares). The remaining two terms represent the effect of the relocation of labor across sectors of unequal productivity (measured with respect to the productivity of the agriculture sector).

The discrepancy between the first and last rows (Total productivity growth) is simply due to the fact that total productivity growth in the last row is calculated through the decomposition, hence it involves rounding off.

Source: Staff estimates.

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Appendix table 6 Share of world manufacturing by type of technology and decade

	N	1970s	N	1980s	N	1990s	N	2000/03
<b>1. Low economies of scale/low technology</b>								
<b>World</b>								
Developing Asia	14	4.86	19	10.40	17	12.26	11	12.75
OECD	22	81.91	23	75.73	23	73.40	17	78.40
Latin America	20	4.35	22	5.11	21	7.41	8	3.08
Sub-Saharan Africa	31	1.80	31	1.82	23	1.08	5	0.12
Rest of the World	20	7.08	30	6.94	33	5.85	25	5.66
Total	107	100.00	125	100.00	117	100.00	66	100.00
<b>Developing Asia</b>								
China, People's Rep. of	-	-	1	3.63	1	3.78	1	6.74
India	1	0.77	1	0.69	1	0.68	1	0.91
Newly industrialized economies	4	2.31	4	3.66	4	4.28	3	3.26
ASEAN-4	4	1.42	4	1.97	4	2.97	2	1.51
Other Southeast Asia	0	0.00	1	0.01	1	0.02	2	0.17
Other South Asia	3	0.32	5	0.41	4	0.51	2	0.16
Central Asia and Mongolia	-	-	-	-	1	0.02	-	-
The Pacific	2	0.03	3	0.04	1	0.01	-	-
Total	14	4.86	19	10.40	17	12.26	11	12.75
<b>2. Low economies of scale/medium technology or medium economies of scale/low technology</b>								
<b>World</b>								
Developing Asia	14	2.51	19	6.08	17	8.23	11	8.42
OECD	22	91.58	23	88.27	23	84.97	17	86.56
Latin America	20	1.88	22	2.13	21	3.81	8	1.65
Sub-Saharan Africa	30	0.97	31	0.93	23	0.51	5	0.07
Rest of the World	20	3.07	30	2.59	33	2.49	25	3.30
Total	106	100.00	125	100.00	117	100.00	66	100.00
<b>Developing Asia</b>								
China, People's Rep. of	-	-	1	1.91	1	1.87	1	3.47
India	1	0.35	1	0.31	1	0.34	1	0.53
Newly industrialized economies	4	1.62	4	2.87	4	3.82	3	3.35
ASEAN-4	4	0.47	4	0.92	4	2.10	2	0.99
Other Southeast Asia	-	-	1	0.01	1	0.01	2	0.04
Other South Asia	3	0.06	5	0.06	4	0.09	2	0.04
Central Asia and Mongolia	-	-	-	-	1	0.00	-	-
The Pacific	2	0.01	3	0.01	1	0.00	-	-
Total	14	2.51	19	6.08	17	8.23	11	8.42
<b>3. Medium economies of scale/medium technology</b>								
<b>World</b>								
Developing Asia	14	2.14	19	7.77	17	10.82	11	11.34
OECD	22	88.70	23	81.84	23	77.79	17	80.96
Latin America	19	2.30	22	3.35	21	5.23	8	2.01
Sub-Saharan Africa	29	1.37	30	1.34	23	0.76	4	0.03
Rest of the World	20	5.49	29	5.70	33	5.40	25	5.66
Total	104	100.00	123	100.00	117	100.00	65	100.00
<b>Developing Asia</b>								
China, People's Rep. of	-	-	1	3.64	1	3.95	1	6.20
India	1	0.60	1	0.69	1	0.74	1	0.90
Newly industrialized economies	4	1.06	4	2.47	4	4.55	3	3.58
ASEAN-4	4	0.42	4	0.82	4	1.43	2	0.59
Other Southeast Asia	-	-	1	0.01	1	0.01	2	0.06
Other South Asia	3	0.06	5	0.13	4	0.14	2	0.02
Central Asia and Mongolia	-	-	-	-	1	0.00	-	-
The Pacific	2	0.01	3	0.01	1	0.00	-	-
Total	14	2.14	19	7.77	17	10.82	11	11.34
<b>4. Medium or strong economies of scale/medium or strong technology (excluding medium economies of scale/medium technology)</b>								
<b>World</b>								
Developing Asia	14	2.19	18	6.07	17	9.41	11	11.33
OECD	22	90.90	23	86.76	23	81.96	17	82.68
Latin America	20	1.56	22	2.36	21	4.62	8	1.39
Sub-Saharan Africa	30	0.71	31	0.77	23	0.36	4	0.01
Rest of the World	20	4.64	30	4.04	33	3.64	25	4.58
Total	106	100.00	124	100.00	117	100.00	65	100.00
<b>Developing Asia</b>								
China, People's Rep. of	-	-	1	2.51	1	2.57	1	4.89
India	1	0.55	1	0.55	1	0.59	1	0.69
Newly industrialized economies	4	1.21	4	2.38	4	4.74	3	4.78
ASEAN-4	4	0.35	4	0.54	4	1.42	2	0.93
Other Southeast Asia	-	-	-	-	1	0.01	2	0.02
Other South Asia	3	0.07	5	0.09	4	0.09	2	0.01
Central Asia and Mongolia	-	-	-	-	1	0.00	-	-
The Pacific	2	0.01	3	0.00	1	0.00	-	-
Total	14	2.19	18	6.07	17	9.41	11	11.33

- = data not available.

Source: United Nations Industrial Development Organization Industrial Statistics International Standard Classification Revision 2 (2005).

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Appendix table 7 Share of manufacturing subsector by decade

	Food and beverages	Textiles	Apparel, leather, and footwear	Wood and wood products	Paper and paper products	Printing and publishing	Industrial chemicals	Petroleum and coal products	Rubber and plastic products	Nonmetal mineral products	Basic metals	Metal products	Non-electrical machinery	Electrical machinery	Transport equipment	Others	Total
<b>1970s</b>																	
China, People's Rep. of	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
India	11.19	20.53	0.99	0.68	2.57	2.03	14.79	2.60	2.46	3.80	11.78	3.16	7.67	7.23	7.38	1.14	100.00
<b>Newly industrialized economies</b>																	
Hong Kong, China	5.18	17.96	26.60	1.93	1.27	3.70	1.66	0.00	9.22	0.94	1.15	7.50	2.19	11.41	2.60	6.68	100.00
Korea, Rep. of	18.41	14.43	5.76	2.81	2.17	2.03	9.45	5.51	4.28	5.29	6.62	3.05	3.26	8.17	5.96	2.80	100.00
Singapore	6.87	2.59	3.77	4.19	1.06	3.66	5.02	16.79	3.60	2.97	2.03	4.84	7.53	19.00	12.70	3.39	100.00
Taipei,China	16.42	7.98	5.05	3.27	2.14	5.26	6.28	5.19	4.76	5.20	4.20	4.77	9.50	9.04	4.91	6.02	100.00
<b>ASEAN-4</b>																	
Indonesia	39.41	14.68	1.50	3.77	1.61	1.55	11.21	0.00	4.42	6.84	0.71	3.37	1.46	4.10	4.98	0.39	100.00
Malaysia	25.06	5.38	1.52	12.66	0.85	4.32	6.28	3.09	12.23	4.93	2.94	3.79	2.86	9.74	3.29	1.08	100.00
Philippines	37.22	7.56	2.69	4.46	3.85	1.46	12.30	7.65	3.26	4.39	3.47	2.51	1.35	3.11	4.08	0.65	100.00
Thailand	41.63	15.63	0.59	3.61	1.47	1.41	5.26	6.29	2.94	7.93	2.42	3.01	0.71	2.06	4.63	0.39	100.00
<b>Other Southeast Asia</b>																	
Myanmar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viet Nam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Other South Asia</b>																	
Bangladesh	31.44	37.26	1.64	0.30	2.27	0.68	13.59	0.43	0.50	1.80	3.85	1.22	0.57	2.05	1.38	1.03	100.00
Bhutan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nepal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pakistan	30.45	27.78	2.04	0.26	1.61	1.22	11.20	5.27	1.80	4.43	3.06	1.62	1.84	3.31	2.99	1.11	100.00
Sri Lanka	28.06	13.86	6.66	1.78	3.59	0.84	8.80	5.36	6.31	8.48	1.59	4.01	3.29	4.29	1.83	1.24	100.00
<b>The Pacific</b>																	
Cook Islands	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fiji Islands	63.14	0.00	2.03	8.64	1.74	3.25	2.57	0.00	1.98	5.26	0.00	5.68	1.44	0.89	3.01	0.37	100.00
Papua New Guinea	36.90	0.17	0.59	15.86	1.14	3.29	5.23	0.00	0.75	2.61	0.39	5.79	8.27	2.06	13.67	3.28	100.00
Tonga	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>1980s</b>																	
China, People's Rep. of	12.36	12.33	3.07	1.45	2.05	1.18	11.45	4.79	3.69	6.89	9.54	4.36	13.81	5.94	3.88	3.20	100.00
India	11.81	14.18	1.40	0.53	1.81	1.88	14.82	3.85	3.17	4.80	12.18	2.88	8.50	8.41	8.50	1.32	100.00
<b>Newly industrialized economies</b>																	
Hong Kong, China	5.52	14.77	24.59	1.29	1.67	4.93	1.61	0.02	8.46	1.01	0.69	7.02	4.05	13.74	2.36	8.26	100.00
Korea, Rep. of	13.13	10.35	5.88	1.58	2.26	2.29	8.78	3.95	5.31	4.66	7.59	4.44	5.32	12.95	8.23	3.26	100.00
India	5.32	0.84	3.36	1.99	1.45	4.15	9.12	9.46	2.69	2.29	1.43	6.11	10.01	29.95	8.92	2.92	100.00
Taipei,China	10.95	7.66	6.79	2.83	2.72	3.08	7.86	6.41	7.37	3.77	5.92	4.30	5.82	12.47	6.00	6.04	100.00
<b>ASEAN-4</b>																	
Indonesia	26.90	11.40	2.45	10.71	1.71	1.56	11.09	0.00	5.37	5.20	7.26	4.68	1.19	3.45	6.57	0.46	100.00
Malaysia	20.23	3.67	2.48	7.81	1.28	3.67	11.72	2.76	8.68	6.40	3.60	3.38	2.80	15.81	4.12	1.59	100.00
Philippines	35.76	5.44	5.27	4.32	2.69	1.39	11.46	10.10	3.35	3.26	4.64	1.96	1.22	5.69	2.48	0.96	100.00
Thailand	33.40	10.37	3.03	1.94	1.56	7.13	5.83	5.52	6.31	7.50	3.96	2.64	0.27	4.85	4.38	1.30	100.00
<b>Other Southeast Asia</b>																	
Myanmar	34.13	0.00	0.00	15.65	0.00	0.00	0.00	0.00	19.13	4.68	19.64	1.89	0.00	0.00	0.00	4.88	100.00
Viet Nam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Other South Asia</b>																	
Bangladesh	23.96	31.36	4.96	0.87	2.50	1.13	17.46	4.38	0.57	2.00	3.53	1.40	1.30	2.42	1.41	0.77	100.00
Bhutan	19.64	5.27	0.00	19.85	0.29	1.09	22.86	0.00	2.49	27.99	0.00	0.51	0.00	0.00	0.00	0.00	100.00
Nepal	41.30	15.96	8.10	2.48	1.13	0.94	6.05	0.00	2.21	13.00	3.02	2.83	0.00	2.24	0.00	0.75	100.00
Pakistan	30.94	18.14	2.37	0.39	1.15	1.06	14.29	6.01	1.80	7.75	6.20	1.06	2.14	3.26	2.89	0.55	100.00
Sri Lanka	49.60	7.84	9.30	1.60	1.98	1.52	4.36	5.74	5.06	6.46	0.85	1.50	0.92	1.12	0.69	1.46	100.00
<b>The Pacific</b>																	
Cook Islands	10.95	7.66	6.79	2.83	2.72	3.08	7.86	6.41	7.37	3.77	5.92	4.30	5.82	12.47	6.00	6.04	100.00
Fiji Islands	59.99	3.03	1.67	8.30	2.15	4.18	4.45	0.00	2.41	4.58	0.00	4.97	0.86	0.28	2.43	0.71	100.00
Papua New Guinea	52.67	0.13	0.59	17.35	1.22	2.71	3.20	0.00	0.97	3.18	0.55	7.37	5.22	0.53	4.29	0.00	100.00
Tonga	69.24	0.00	4.01	8.66	0.69	3.17	1.61	0.00	0.00	5.36	0.00	5.12	0.00	0.66	0.87	0.61	100.00

Appendix table 7 (cont'd)

1990s																	
China, People's Rep. of	14.66	8.02	4.48	1.31	1.95	1.14	11.44	3.62	3.43	7.34	10.24	3.34	9.19	10.35	6.35	3.15	100.00
India	12.08	9.97	2.79	0.39	1.80	1.58	19.14	4.49	3.28	4.66	12.17	2.52	7.39	7.30	8.69	1.75	100.00
Newly industrialized economies																	
Hong Kong, China	10.44	13.06	16.00	0.52	2.20	11.43	2.36	0.10	3.90	1.87	0.87	5.08	8.97	12.25	3.72	7.24	100.00
Korea, Rep. of	9.34	6.01	4.52	1.86	2.29	2.52	8.89	3.58	4.78	4.73	6.89	5.00	8.93	16.85	11.68	2.11	100.00
Singapore	3.70	0.33	1.31	0.93	1.34	4.51	10.03	5.82	2.97	1.93	0.67	6.29	27.32	22.92	7.05	2.86	100.00
Taipei, China	9.22	6.43	3.89	1.96	2.20	1.32	9.04	7.21	7.11	4.53	7.06	6.74	4.79	17.35	7.61	3.54	100.00
ASEAN-4																	
Indonesia	20.05	10.29	7.11	8.77	3.92	1.81	9.83	0.13	4.48	2.91	7.60	3.74	1.55	6.09	10.64	1.08	100.00
Malaysia	9.75	3.01	2.16	6.95	1.59	2.63	9.31	2.69	7.93	5.26	3.08	4.02	5.07	29.41	5.15	1.99	100.00
Philippines	33.25	3.39	6.30	1.92	2.01	1.54	13.09	7.58	3.39	4.40	5.07	1.72	1.34	10.06	3.68	1.26	100.00
Thailand	15.52	9.24	7.32	1.56	1.09	15.42	2.31	8.89	2.99	6.00	3.00	2.06	10.96	6.69	5.16	1.80	100.00
Other Southeast Asia																	
Myanmar	36.20	0.00	1.39	9.96	0.00	0.00	23.28	0.00	5.99	8.20	9.92	0.35	0.00	0.00	0.00	4.74	100.00
Viet Nam	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other South Asia																	
Bangladesh	25.08	16.72	21.60	0.76	1.75	2.11	12.81	0.51	0.54	4.92	2.86	1.20	0.33	4.04	4.27	0.50	100.00
Bhutan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nepal	32.26	26.25	11.07	2.62	1.14	0.97	4.80	0.03	2.56	9.92	2.39	3.61	0.01	1.82	0.00	0.54	100.00
Pakistan	22.89	25.06	2.80	0.37	1.54	2.00	15.50	3.26	1.42	7.76	5.13	0.81	2.09	5.43	3.05	0.88	100.00
Sri Lanka	40.00	8.87	20.25	0.99	1.40	1.13	5.26	1.56	6.41	4.49	0.95	1.05	1.63	1.39	1.98	2.63	100.00
Central Asia and Mongolia																	
Mongolia	36.80	17.58	21.14	4.28	0.00	1.59	1.14	0.00	0.00	3.98	0.15	2.41	0.00	0.64	0.00	10.29	100.00
The Pacific																	
Cook Islands	9.22	6.43	3.89	1.96	2.20	1.32	9.04	7.21	7.11	4.53	7.06	6.74	4.79	17.35	7.61	3.54	100.00
Fiji Islands	48.73	12.67	0.96	10.44	3.37	5.76	5.41	0.00	2.33	3.70	0.00	3.66	0.99	0.00	1.07	0.92	100.00
Papua New Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonga	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2000-03																	
China, People's Rep. of	14.30	6.25	4.73	1.35	2.16	1.07	11.59	3.95	3.57	5.48	9.40	3.20	7.34	15.63	7.59	2.38	100.00
India	13.22	9.01	2.78	0.52	2.33	1.53	20.77	5.61	3.63	5.68	10.19	2.66	6.81	5.87	7.18	2.20	100.00
Newly industrialized economies																	
Hong Kong, China	9.31	11.19	8.89	0.19	1.29	19.87	3.68	0.00	1.78	3.00	1.09	2.62	5.57	19.54	5.36	6.63	100.00
Korea, Rep. of	8.19	4.81	3.12	1.44	2.25	2.47	9.53	2.48	4.17	4.00	6.48	4.06	11.28	19.76	14.06	1.91	100.00
Singapore	2.34	0.18	0.76	0.70	0.78	3.54	17.35	4.20	2.86	1.03	0.29	5.37	21.95	26.08	8.16	4.42	100.00
Taipei, China	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ASEAN-4																	
Indonesia	21.25	8.84	7.17	8.67	5.51	1.53	11.01	0.09	4.45	0.04	4.68	2.50	2.90	8.30	11.93	1.15	100.00
Malaysia	8.39	2.18	1.75	5.75	2.11	1.99	8.08	8.63	6.96	4.91	2.64	3.17	9.10	27.11	4.98	2.25	100.00
Philippines	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thailand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Southeast Asia																	
Myanmar	59.85	0.00	1.25	0.89	0.00	0.00	0.00	0.00	6.54	0.37	12.20	2.80	5.07	3.16	5.71	2.15	100.00
Viet Nam	30.19	4.55	16.42	2.36	1.75	2.21	6.26	0.41	3.42	10.57	2.17	2.62	2.37	5.81	6.92	1.97	100.00
Other South Asia																	
Bangladesh	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bhutan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nepal	45.42	10.48	8.78	1.50	1.46	2.12	10.40	0.00	3.98	6.43	2.26	5.23	0.07	1.57	0.07	0.21	100.00
Pakistan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sri Lanka	38.57	10.48	20.81	0.64	1.95	0.68	3.76	3.11	7.12	4.30	0.21	0.75	1.71	1.64	2.29	1.96	100.00

- = data not available.

Source: United Nations Industrial Development Organization Industrial Statistics International Standard Classification Revision 2 (2005).

[Click here for data](#)

Appendix table 8 Value-added share by manufacturing subsectors

## a. India and China, People's Rep. of

	India		China, People's Rep. of				
	1970	2000	1980		2000		
Textiles	20.3	Industrial chemicals	13.0	Nonelectrical machinery	15.1	Electrical machinery	15.7
Iron and steel	9.9	Textiles	9.7	Textiles	15.1	Industrial chemicals	12.0
Food products	9.7	Food products	9.5	Industrial chemicals	8.0	Nonelectrical machinery	7.3
Transport equipment	7.1	Iron and steel	8.2	Iron and steel	7.4	Transport equipment	6.8
Nonelectrical machinery	6.8	Other chemicals	8.1	Fabricated metal	5.5	Iron and steel	6.7
Industrial chemicals	6.8	Nonelectrical machinery	6.8	Nonmetallic minerals	5.0	Textiles	6.5
Other chemicals	6.8	Transport equipment	6.6	Petroleum refining	4.8	Food products	6.4
Electrical machinery	6.3	Electrical machinery	5.7	Food products	4.2	Tobacco	4.8
Fabricated metal	3.5	Nonmetallic minerals	4.9	Tobacco	4.0	Nonmetallic minerals	4.2
Nonmetallic minerals	3.3	Petroleum refining	4.8	Electrical machinery	3.6	Petroleum refining	4.0
Share of top 5	53.9	Share of top 5	48.5	Share of top 5	51.2	Share of top 5	48.4
Share of top 10	80.5	Share of top 10	77.3	Share of top 10	72.8	Share of top 10	74.4
Standard deviation	4.5	Standard deviation	3.6	Standard deviation	3.9	Standard deviation	3.7
Specialization index	57.2	Specialization index	53.0	Specialization index	53.3	Specialization index	55.0

## b. Newly industrialized economies

	Taipei, China		Korea, Rep. of				
	1973	1996	1970		2000		
Electrical machinery	13.3	Electrical machinery	21.2	Textiles	13.9	Electrical machinery	23.8
Textiles	12.8	Industrial chemicals	8.0	Tobacco	9.1	Transport equipment	14.9
Petroleum refining	7.8	Transport equipment	7.5	Food products	8.6	Nonelectrical machinery	12.8
Food products	6.6	Fabricated metal	7.3	Beverages	8.1	Food products	6.3
Wearing apparel	5.5	Petroleum refining	6.4	Petroleum refining	7.1	Industrial chemicals	6.2
Industrial chemicals	5.0	Textiles	5.9	Industrial chemicals	6.0	Iron and steel	5.9
Plastic products	4.9	Iron and steel	5.9	Transport equipment	5.1	Fabricated metal	4.6
Iron and steel	4.9	Plastic products	5.3	Other chemicals	4.8	Other chemicals	4.6
Transport equipment	4.6	Food products	4.9	Nonmetallic minerals	4.7	Plastic products	3.3
Wood products	4.4	Nonelectrical machinery	4.6	Electrical machinery	4.0	Nonmetallic minerals	3.0
Share of top 5	45.9	Share of top 5	50.3	Share of top 5	46.7	Share of top 5	64.0
Share of top 10	69.6	Share of top 10	77.0	Share of top 10	71.3	Share of top 10	85.4
Standard deviation	3.4	Standard deviation	4.2	Standard deviation	3.3	Standard deviation	5.4
Specialization index	50.6	Specialization index	54.0	Specialization index	50.9	Specialization index	70.1
	Hong Kong, China		Singapore				
	1973	2000	1970		2000		
Textiles	27.2	Electrical machinery	21.5	Petroleum refining	18.6	Electrical machinery	31.1
Wearing apparel	19.9	Printing and publishing	17.4	Transport equipment	14.1	Nonelectrical machinery	22.4
Electrical machinery	9.3	Textiles	10.7	Electrical machinery	11.3	Other chemicals	12.3
Plastic products	9.2	Wearing apparel	9.7	Food products	6.7	Transport equipment	6.2
Fabricated metal	7.1	Nonelectrical machinery	7.6	Fabricated metal	6.4	Fabricated metal	5.4
Printing and publishing	3.8	Food products	7.4	Wood products	5.3	Petroleum refining	4.5
Transport equipment	3.4	Transport equipment	4.5	Rubber products	5.0	Printing and publishing	3.6
Other manufactures	3.3	Industrial chemicals	3.8	Printing and publishing	4.5	Professional equipment	3.3
Food products	2.5	Other manufactures	3.4	Beverages	3.1	Plastic products	2.4
Nonelectrical machinery	1.5	Professional equipment	3.4	Other chemicals	3.0	Industrial chemicals	1.9
Share of top 5	72.7	Share of top 5	66.9	Share of top 5	57.1	Share of top 5	77.4
Share of top 10	87.3	Share of top 10	89.4	Share of top 10	78.0	Share of top 10	93.1
Standard deviation	6.3	Standard deviation	5.5	Standard deviation	4.4	Standard deviation	7.2
Specialization index	68.6	Specialization index	72.1	Specialization index	56.9	Specialization index	77.6

c. ASEAN-4								
	Malaysia				Indonesia			
	1970		2000		1970		2000	
Food products	15.5	Electrical machinery	28.8	Food products	35.2	Transport equipment	20.1	
Rubber products	14.0	Petroleum refining	8.9	Tobacco	28.4	Food products	16.7	
Wood products	12.5	Nonelectrical machinery	8.7	Textiles	11.7	Electrical machinery	16.6	
Tobacco	6.6	Food products	7.1	Other chemicals	4.7	Industrial chemicals	10.6	
Printing and publishing	6.2	Industrial chemicals	5.9	Fabricated metal	3.3	Wearing apparel	6.2	
Nonmetallic minerals	5.9	Transport equipment	3.9	Nonmetallic minerals	3.1	Other chemicals	6.2	
Other chemicals	5.8	Wood products	3.9	Beverages	1.9	Fabricated metal	5.1	
Petroleum refining	4.9	Plastic products	3.8	Footwear	1.7	Plastic products	3.7	
Fabricated metal	3.8	Rubber products	3.3	Industrial chemicals	1.4	Iron and steel	3.7	
Beverages	3.7	Fabricated metal	3.2	Rubber products	1.3	Rubber products	3.5	
Share of top 5	54.8	Share of top 5	59.5	Share of top 5	83.2	Share of top 5	70.1	
Share of top 10	79.0	Share of top 10	77.5	Share of top 10	92.6	Share of top 10	92.2	
Standard deviation	4.2	Standard deviation	5.5	Standard deviation	8.4	Standard deviation	5.7	
Specialization index	56.6	Specialization index	60.0	Specialization index	85.1	Specialization index	77.6	
	Philippines				Thailand			
	1970		1997		1970		1994	
Food products	23.9	Food products	18.5	Other chemicals	23.9	Nonelectrical machinery	17.4	
Other chemicals	8.3	Electrical machinery	10.1	Tobacco	23.5	Petroleum refining	11.5	
Beverages	8.0	Other chemicals	10.1	Textiles	13.3	Wearing apparel	9.4	
Petroleum refining	7.1	Beverages	9.4	Fabricated metal	8.4	Food products	9.3	
Tobacco	6.8	Petroleum refining	7.6	Beverages	7.6	Textiles	8.0	
Textiles	6.5	Wearing apparel	5.6	Rubber products	5.7	Electrical machinery	5.5	
Industrial chemicals	4.4	Tobacco	5.1	Wood products	4.6	Transport equipment	5.4	
Wood products	4.0	Transport equipment	3.9	Nonmetallic minerals	4.5	Printing and publishing	4.6	
Electrical machinery	3.6	Iron and steel	3.8	Printing and publishing	3.2	Beverages	3.9	
Transport equipment	3.4	Textiles	3.2	Glass products	2.9	Nonmetallic minerals	3.7	
Share of top 5	54.2	Share of top 5	55.8	Share of top 5	76.6	Share of top 5	55.5	
Share of top 10	76.2	Share of top 10	77.4	Share of top 10	97.5	Share of top 10	78.6	
Standard deviation	4.7	Standard deviation	4.2	Standard deviation	6.8	Standard deviation	4.1	
Specialization index	56.8	Specialization index	55.0	Specialization index	82.1	Specialization index	55.6	



## d. Other South Asia

	Bangladesh		1997	Nepal			
	1970			1986		2002	
Textiles	45.5	Wearing apparel	19.5	Food products	32.5	Food products	20.1
Food products	15.3	Textiles	11.6	Tobacco	14.8	Tobacco	13.4
Tobacco	13.9	Tobacco	10.8	Textiles	13.5	Beverages	11.9
Other chemicals	8.4	Nonmetallic minerals	9.6	Nonmetallic minerals	12.4	Textiles	10.5
Industrial chemicals	2.6	Food products	9.6	Other chemicals	4.5	Other chemicals	10.3
Iron and steel	2.5	Transport equipment	8.7	Wearing apparel	4.1	Wearing apparel	7.5
Other manufactures	1.9	Other chemicals	6.8	Beverages	2.9	Nonmetallic minerals	6.4
Paper products	1.8	Electrical machinery	6.7	Fabricated metal	2.7	Fabricated metal	5.2
Transport equipment	1.1	Industrial chemicals	3.2	Iron and steel	2.3	Plastic products	3.3
Electrical machinery	1.0	Printing and publishing	2.9	Wood products	2.0	Printing and publishing	2.1
Share of top 5	85.7	Share of top 5	61.0	Share of top 5	77.6	Share of top 5	66.2
Share of top 10	94.0	Share of top 10	89.3	Share of top 10	91.5	Share of top 10	90.8
Standard deviation	9.1	Standard deviation	4.9	Standard deviation	7.0	Standard deviation	5.2
Specialization index	84.8	Specialization index	63.8	Specialization index	81.4	Specialization index	68.3
	Pakistan		1996	Sri Lanka		2000	
	1970			1970			
Textiles	36.0	Textiles	23.5	Tobacco	10.9	Wearing apparel	18.5
Food products	15.3	Food products	15.2	Textiles	10.5	Food products	16.6
Tobacco	8.1	Industrial chemicals	8.5	Other chemicals	10.3	Tobacco	13.2
Petroleum refining	7.9	Other chemicals	7.7	Food products	9.6	Textiles	10.5
Other chemicals	5.2	Electrical machinery	7.7	Nonmetallic minerals	7.4	Beverages	8.8
Nonmetallic minerals	4.1	Nonmetallic minerals	7.2	Beverages	5.9	Rubber products	5.4
Industrial chemicals	3.7	Tobacco	6.2	Fabricated metal	5.6	Petroleum refining	3.1
Electrical machinery	3.4	Iron and steel	4.2	Wearing apparel	5.5	Other chemicals	3.1
Iron and steel	2.4	Transport equipment	3.5	Nonelectrical machinery	5.3	Nonmetallic minerals	2.8
Rubber products	2.1	Petroleum refining	3.1	Rubber products	4.8	Transport equipment	2.3
Share of top 5	72.5	Share of top 5	62.6	Share of top 5	48.7	Share of top 5	67.6
Share of top 10	88.1	Share of top 10	86.6	Share of top 10	75.8	Share of top 10	84.2
Standard deviation	7.2	Standard deviation	5.3	Standard deviation	3.5	Standard deviation	5.1
Specialization index	70.5	Specialization index	63.3	Specialization index	52.3	Specialization index	62.6

## e. The Pacific

	Papua New Guinea		1989	Fiji Islands		1994	
	1970			1970			
Transport equipment	20.4	Food products	43.1	Food products	52.2	Food products	42.6
Wood products	20.3	Wood products	14.5	Fabricated metal	7.6	Textiles	13.8
Beverages	10.8	Fabricated metal	7.1	Beverages	7.1	Wood products	9.7
Nonelectrical machinery	10.3	Beverages	6.9	Nonmetallic minerals	6.8	Beverages	6.1
Professional equipment	7.5	Transport equipment	4.5	Wood products	4.6	Printing and publishing	5.1
Food products	6.7	Tobacco	4.5	Printing and publishing	4.2	Paper products	3.8
Tobacco	5.7	Nonelectrical machinery	4.2	Furniture	4.2	Fabricated metal	3.2
Electrical machinery	3.9	Printing and publishing	2.6	Other chemicals	3.0	Other chemicals	3.1
Fabricated metal	3.1	Furniture	2.3	Transport equipment	2.0	Nonmetallic minerals	3.0
Other chemicals	3.0	Nonmetallic minerals	1.8	Tobacco	1.9	Plastic products	2.0
Share of top 5	69.3	Share of top 5	76.2	Share of top 5	78.2	Share of top 5	77.3
Share of top 10	91.7	Share of top 10	91.6	Share of top 10	93.5	Share of top 10	92.5
Standard deviation	5.7	Standard deviation	8.4	Standard deviation	9.8	Standard deviation	8.3
Specialization index	78.9	Specialization index	85.9	Specialization index	95.6	Specialization index	93.6

Source: Staff estimates.

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Appendix table 9 Employment share by manufacturing subsectors

a. India and China, People's Rep. of							
India				China, People's Rep. of			
	1970		2000		1977		2000
Textiles	28.6	Textiles	16.6	Nonelectrical machinery	27.0	Nonelectrical machinery	11.0
Food products	14.0	Food products	16.1	Textiles	11.3	Industrial chemicals	10.9
Transport equipment	8.1	Other chemicals	6.3	Iron and steel	8.5	Textiles	10.8
Iron and steel	7.5	Tobacco	6.2	Industrial chemicals	7.8	Electrical machinery	9.5
Nonelectrical machinery	6.4	Iron and steel	6.1	Electrical machinery	6.5	Transport equipment	6.8
Electrical machinery	4.6	Nonelectrical machinery	5.8	Food products	6.4	Nonmetallic minerals	6.6
Nonmetallic minerals	3.8	Transport equipment	5.7	Nonmetallic minerals	5.8	Iron and steel	5.9
Fabricated metals	3.6	Nonmetallic minerals	4.7	Transport equipment	5.0	Food products	5.8
Other chemicals	3.5	Electrical machinery	4.4	Other chemicals	2.5	Wearing apparel	4.8
Printing and publishing	3.3	Wearing apparel	4.2	Nonferrous metal	1.9	Fabricated metals	3.6
Share of top 5 industries	64.6	Share of top 5	51.4	Share of top 5	61.1	Share of top 5 industries	49.1
Share of top 10	83.4	Share of top 10	76.2	Share of top 10	82.8	Share of top 10	75.9
Standard deviation	5.8	Standard deviation	4.2	Standard deviation	5.5	Standard deviation	3.5
Specialization index	64.1	Specialization index	55.8	Specialization index	62.5	Specialization index	55.5
b. Newly industrialized economies							
Taipei, China				Korea, Rep. of			
	1973		2000		1970		2000
Electrical machinery	12.9	Fabricated metals	11.8	Textiles	24.7	Electrical machinery	16.2
Plastic products	8.0	Plastic products	7.4	Food products	8.6	Nonelectrical machinery	12.5
Food products	7.8	Nonelectrical machinery	7.1	Wearing apparel	5.9	Transport equipment	11.5
Wearing apparel	6.3	Textiles	7.0	Other manufactures	5.8	Textiles	8.7
Wood products	5.6	Transport equipment	5.5	Electrical machinery	4.7	Fabricated metals	6.8
Nonelectrical machinery	4.7	Food products	3.8	Transport equipment	4.4	Food products	6.0
Fabricated metals	4.5	Iron and steel	3.4	Wood products	4.2	Wearing apparel	5.4
Other manufactures	4.4	Other manufactures	3.1	Fabricated metals	4.1	Plastic products	4.6
Transport equipment	3.8	Industrial chemicals	3.0	Nonmetallic minerals	3.9	Printing and publishing	3.2
Nonmetallic minerals	3.4	Wearing apparel	3.0	Printing and publishing	3.5	Iron and steel	3.0
Share of top 5 industries	40.6	Share of top 5 industries	38.8	Share of top 5 industries	49.6	Share of top 5 industries	55.7
Share of top 10	61.2	Share of top 10	55.1	Share of top 10	69.7	Share of top 10	77.8
Standard deviation	3.1	Standard deviation	2.8	Standard deviation	4.6	Standard deviation	4.1
Specialization index	38.8	Specialization index	34.4	Specialization index	53.8	Specialization index	55.1
Hong Kong, China				Singapore			
	1970		2000		1970		2000
Textiles	23.2	Printing and publishing	18.5	Transport equipment	13.0	Electrical machinery	23.2
Wearing apparel	20.2	Textiles	13.7	Electrical machinery	10.9	Nonelectrical machinery	21.3
Plastic products	12.9	Wearing apparel	13.0	Wearing apparel	8.0	Fabricated metals	11.4
Electrical machinery	8.9	Electrical machinery	10.4	Wood products	7.4	Transport equipment	11.0
Fabricated metals	8.5	Food products	8.9	Food products	7.2	Plastic products	5.6
Other manufactures	7.2	Nonelectrical machinery	6.9	Fabricated metals	6.9	Printing and publishing	4.9
Printing and publishing	3.4	Other manufactures	4.8	Other manufactures	6.4	Other chemicals	3.8
Transport equipment	2.5	Fabricated metals	4.7	Textiles	5.6	Food products	3.5
Rubber products	2.2	Transport equipment	4.2	Printing and publishing	5.6	Professional equipment	2.8
Food products	2.0	Plastic products	3.0	Rubber products	5.2	Wearing apparel	2.5
Share of top 5 industries	73.8	Share of top 5 industries	64.5	Share of top 5 industries	46.4	Share of top 5 industries	72.4
Share of top 10	91.0	Share of top 10	88.0	Share of top 10	76.2	Share of top 10	89.9
Standard deviation	6.1	Standard deviation	5.0	Standard deviation	3.5	Standard deviation	6.0
Specialization index	70.3	Specialization index	64.5	Specialization index	52.5	Specialization index	71.1

## c. ASEAN-4

	Malaysia		Indonesia	
	1970	2000	1970	2000
Wood products	20.3	Electrical machinery 26.2	Textiles 29.5	Textiles 15.8
Food products	12.6	Wood products 8.1	Tobacco 27.4	Food products 13.5
Rubber products	12.5	Nonelectrical machinery 8.0	Food products 19.1	Wearing apparel 11.5
Printing and publishing	7.6	Food products 7.7	Other chemicals 4.2	Wood products 9.4
Fabricated metals	5.5	Plastic products 6.1	Fabricated metals 2.8	Footwear 6.2
Textiles	5.1	Wearing apparel 4.7	Printing and publishing 2.5	Tobacco 5.9
Nonmetallic minerals	4.4	Rubber products 4.7	Nonmetallic minerals 2.2	Electrical machinery 5.5
Nonelectrical machinery	4.2	Furniture 4.3	Wood products 1.5	Furniture 4.6
Other chemicals	3.2	Fabricated metals 4.3	Other manufactures 1.3	Plastic products 3.8
Transport equipment	3.2	Transport equipment 3.6	Rubber products 1.2	Rubber products 3.3
Share of top 5 industries	58.4	Share of top 5 industries 56.0	Share of top 5 industries 83.0	Share of top 5 industries 56.3
Share of top 10	78.6	Share of top 10 77.7	Share of top 10 91.6	Share of top 10 79.4
Standard deviation	4.6	Standard deviation 5.1	Standard deviation 7.9	Standard deviation 4.2
Specialization index	57.3	Specialization index 58.1	Specialization index 83.3	Specialization index 58.4
	Philippines		Thailand	
	1970	1997	1970	1994
Food products	20.4	Food products 17.9	Textiles 20.8	Wearing apparel 28.9
Textiles	13.4	Wearing apparel 16.7	Food products 16.1	Textiles 16.5
Wood products	9.9	Electrical machinery 12.4	Wood products 9.8	Food products 12.5
Wearing apparel	6.4	Textiles 6.9	Tobacco 7.7	Fabricated metals 5.7
Tobacco	5.8	Fabricated metals 3.6	Rubber products 5.5	Electrical machinery 5.2
Other chemicals	4.2	Other chemicals 3.5	Other chemicals 5.1	Transport equipment 3.2
Fabricated metals	4.1	Other manufactures 2.9	Nonmetallic minerals 4.9	Nonmetallic minerals 3.1
Printing and publishing	4.0	Wood products 2.9	Transport equipment 4.4	Other manufactures 2.8
Beverages	3.9	Beverages 2.8	Beverages 3.8	Rubber products 2.3
Electrical machinery	3.4	Plastic products 2.8	Fabricated metals 3.6	Plastic products 2.3
Share of top 5 industries	55.9	Share of top 5 industries 57.5	Share of top 5 industries 59.9	Share of top 5 industries 68.9
Share of top 10	75.6	Share of top 10 72.4	Share of top 10 81.8	Share of top 10 82.5
Standard deviation	4.5	Standard deviation 4.5	Standard deviation 4.9	Standard deviation 6.2
Specialization index	55.8	Specialization index 55.4	Specialization index 62.2	Specialization index 64.0

<b>d. Other South Asia</b>							
	<b>Bangladesh</b>				<b>Nepal</b>		
	<b>1970</b>		<b>1997</b>		<b>1986</b>		<b>2002</b>
Textiles	63.3	Wearing apparel	52.8	Nonmetallic minerals	32.5	Nonmetallic minerals	29.8
Food products	12.8	Textiles	25.0	Textiles	17.7	Textiles	17.6
Other chemicals	6.5	Food products	6.4	Food products	17.6	Food products	16.0
Tobacco	2.0	Transport equipment	1.8	Tobacco	6.5	Wearing apparel	10.6
Fabricated metals	1.9	Printing and publishing	1.7	Wearing apparel	6.2	Other chemicals	4.0
Paper products	1.5	Other chemicals	1.7	Other chemicals	3.8	Fabricated metals	2.7
Transport equipment	1.5	Nonmetallic minerals	1.7	Fabricated metals	2.9	Plastic products	2.6
Printing and publishing	1.2	Fabricated metals	1.1	Wood products	2.6	Printing and publishing	2.2
Nonelectrical machinery	1.2	Footwear	0.9	Printing and publishing	2.0	Wood products	2.0
Industrial chemicals	1.1	Electrical machinery	0.8	Furniture	1.8	Furniture	2.0
Share of top 5 industries	86.5	Share of top 5 industries	87.8	Share of top 5 industries	80.5	Share of top 5 industries	78.1
Share of top 10	93.1	Share of top 10	94.0	Share of top 10	93.6	Share of top 10	89.6
Standard deviation	12.0	Standard deviation	10.7	Standard deviation	7.3	Standard deviation	6.9
Specialization index	95.6	Specialization index	92.4	Specialization index	84.1	Specialization index	75.5
	<b>Pakistan</b>			<b>Sri Lanka</b>			
	<b>1970</b>		<b>1996</b>	<b>1970</b>		<b>2000</b>	
Textiles	50.2	Textiles	41.9	Textiles	15.2	Wearing apparel	31.5
Food products	8.6	Food products	13.9	Food products	12.2	Food products	15.8
Fabricated metals	4.3	Iron and steel	5.9	Wearing apparel	9.6	Textiles	15.0
Transport equipment	4.1	Other chemicals	5.4	Nonmetallic minerals	8.6	Rubber products	5.0
Electrical machinery	3.9	Electrical machinery	3.6	Nonelectrical machinery	7.3	Tobacco	4.4
Other chemicals	3.4	Industrial chemicals	3.6	Other chemicals	7.0	Nonmetallic minerals	3.4
Iron and steel	3.2	Nonelectrical machinery	3.1	Fabricated metals	6.7	Other manufactures	3.0
Nonelectrical machinery	3.1	Nonmetallic minerals	2.8	Paper products	5.0	Footwear	2.0
Nonmetallic minerals	2.8	Transport equipment	2.5	Rubber products	4.4	Printing and publishing	1.9
Tobacco	2.5	Wearing apparel	2.4	Electrical machinery	2.9	Plastic products	1.8
Share of top 5 industries	71.2	Share of top 5 industries	70.6	Share of top 5 industries	52.9	Share of top 5 industries	71.7
Share of top 10	86.2	Share of top 10	85.0	Share of top 10	78.9	Share of top 10	83.9
Standard deviation	9.3	Standard deviation	8.1	Standard deviation	4.0	Standard deviation	6.7
Specialization index	76.2	Specialization index	71.7	Specialization index	54.4	Specialization index	68.3

Source: Staff estimates.

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Appendix table 10 Exports of selected countries and commodity-specific complexity index

1986	% of total exports	2004	% of total exports
<b>China, People's Rep. of</b>			
Footwear with outer soles of leather, of rubber or plastic	12.3	Blooms, billets, slabs and sheet bars, of iron or steel—of other than high carbon or alloy steel	1.0
Toys, nes; working models for recreational purposes	9.3	Other articles of iron or steel, nes	1.0
Brush-making hair, etc., and waste	6.7	Carnival and entertainment articles, Christmas adornments, etc.	0.9
Tungsten ore and concentrate	6.2	Base metal domestic articles, nes, and parts thereof, nes—of iron or steel	0.9
Edible nuts, fresh or dry, nes	5.9	Other cargo vessels	0.9
Gut, bladders, and stomachs of animals (other than fish)	4.9	Precious metal jewellery (except watches and watches cases)	0.9
Rosin and resin acids, and derivatives; rosin spirits and oils	3.9	Men's and boys' outerwear, textile fabrics not knitted or crocheted—trousers, breeches and the like—of cotton	0.8
Locks and padlocks, and parts thereof, of base metal	3.8	Domestic electric room fans and vented hoods	0.8
Felspar, leucite, nepheline and nepheline syenite; fluor spar	3.6	Other ferro-alloys	0.8
Other base metals, nes, and cermets, unwrought; waste and scrap	3.3	Outerwear knitted or crocheted, not elastic nor rubberized—jerseys, pullovers, slip-overs, cardigans, etc.—of cotton	0.8
% share of top 10 exports	59.9	% share of top 10 exports	8.9
Average export complexity index of the top 10 exports	6,862	Average export complexity index of the top 10 exports	6,727
<b>India</b>			
Diamonds cut or otherwise worked, but not mounted or set	25.2	Rice, semi-milled or milled (unbroken)	3.7
Cashew nuts, fresh or dried	4.3	Medicaments (including veterinary medicaments)—containing other substances	3.2
Women's, girls', infants' outerwear, textile, not knitted or crocheted blouses—of cotton	4.1	Other sheet and plates, of iron or steel, worked—of other than high carbon or alloy steel (excluding tinned)	3.1
Coffee, not roasted; coffee husks and skins	3.8	Other organic compounds	3.0
Under-garments of textile fabrics, not knitted or crocheted—men's and boys shirts—of cotton	3.3	Under-garments, knitted or crocheted—of cotton, not elastic nor rubberized—other cotton under-garments	2.7
Carpets, carpeting and rugs, knotted—of wool or fine animal hair	2.9	Women's, girls', infants' outerwear, textile, not knitted or crocheted—blouses—of cotton	1.9
Other woven fabrics, less 85% of cotton, bleached, etc, finished	2.7	Iron or steel coils for re-rolling—of other than high carbon or alloy steel	1.7
Rice, semi-milled or milled (unbroken)	2.6	Other furnishing articles of cotton	1.6
Antiques of an age exceeding 100 years, nes	2.4	Under-garments of textile fabrics, not knitted or crocheted—men's and boys' shirts—of cotton	1.6
Goat and kid skin leather	1.8	Fabrics, woven, 85% plus of continuous synthetic textile materials	1.5
% share of top 10 exports	53.1	% share of top 10 exports	23.9
Average export complexity index of the top 10 exports	4,034	Average export complexity index of the top 10 exports	5,469
<b>Hong Kong, China</b>			
Toys, nes; working models for recreational purposes	6.1	Static converters, rectifiers and rectifying apparatus	2.0
Watches	5.1	Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted—of cotton	2.0
Other woven fabrics, 85% plus of cotton, bleached, etc, finished	2.7	Handbags	1.8
Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted	2.5	Dictating machines and other sound recorders and reproducers, nes	1.8
Outerwear knitted or crocheted, not elastic nor rubberized—other, clothing accessories, nonelastic, knitted or crocheted—of synthetic fibres	2.2	Parts, nes, of the apparatus falling within heading 7641	1.8
Outerwear knitted or crocheted, not elastic nor rubberized—jerseys, pullovers, slip-overs, cardigans, etc.—of other fibres	2.2	Outerwear knitted or crocheted, not elastic nor rubberized—other, clothing accessories, nonelastic, knitted or crocheted—of cotton	1.6
Men's and boys' outerwear, textile fabrics not knitted or crocheted—trousers, breeches and the like—of cotton	2.1	Footwear with outer soles and uppers of rubber or plastic	1.5
Parts, nes, of electrical and electronic apparatus	1.9	Other articles, nes, of plastic	1.5

Other articles, nes of plastic	1.5	Under-garments, knitted or crocheted—of cotton, not elastic nor rubberized—other cotton under-garments	1.5
Fabrics, woven, 85% plus of continuous synthetic textile materials	1.4	Outerwear knitted or crocheted, not elastic nor rubberized—other, clothing accessories, nonelastic, knitted or crocheted—of synthetic fibres	1.5
% share of top 10 exports	27.7	% share of top 10 exports	16.9
Average export complexity index of the top 10 exports	7,260	Average export complexity index of the top 10 exports	9,680
<b>Korea, Rep. of</b>			
Footwear with outer soles of leather, of rubber or plastic	8.8	Other sheet and plates, of iron or steel, worked—of other than high carbon or alloy steel (excluding tinned)	2.5
Other cargo vessels	5.4	Other machinery, mechanical appliances having individual functions	2.2
Fabrics, woven, 85% plus of continuous synthetic textile materials	5.1	Fabrics, woven, 85% plus of continuous synthetic textile materials	2.2
Toys, nes; working models for recreational purposes	3.0	Sheet, plates, rolled of thickness less 3mm, of iron or steel—of other than high carbon or alloy steel	2.2
Outerwear knitted or crocheted, not elastic nor rubberized—jerseys, pullovers, slip-overs, cardigans, etc.—of synthetic fibres	2.7	Other polycarboxylic acids, and their derivatives	2.1
Television image and sound recorders or reproducers	2.5	Alkyds and other polyesters—in primary forms	2.0
Prepared media for sound or similar recording	2.0	Polyethylene—in primary forms	1.9
Electro-thermic domestic appliances, nes	2.0	Iron or steel coils for re-rolling—of stainless or heat resisting steel	1.9
Under-garments of textile fabrics, not knitted or crocheted—mens and boys shirts—of synthetic fibres	1.9	Television image and sound recorders or reproducers	1.8
Iron or steel coils for re-rolling—of other than high carbon or alloy steel	1.6	Mechanical shovels and excavators, self-propelled	1.8
% share of top 10 exports	34.8	% share of top 10 exports	20.6
Average export complexity index of the top 10 exports	8,584	Average export complexity index of the top 10 exports	10,285
<b>Singapore</b>			
Natural rubber (other than latex)	6.4	Gramophone records, recorded tapes and other sound recorded media	3.4
Electronic components, parts nes	5.1	Electrical condensers	2.1
Parts, nes of the apparatus of the heading 761, 762, 7643 and 7648	3.6	Polyethylene—in primary forms	2.1
Coffee, not roasted; coffee husks and skins	3.1	Other electrical appliances and apparatus, nes	1.9
Other cargo vessels	2.9	Medical, surgical and veterinary instruments and appliances	1.8
Fatty acids; acid oils from refining	2.7	Prepared media for sound or similar recording	1.7
Outerwear knitted or crocheted, not elastic nor rubberized—other, clothing accessories, nonelastic, knitted or crocheted—of synthetic fibres	2.5	Styrene	1.5
Other heterocyclic compounds; nucleic acids	2.1	Parts, nes, of and accessories for apparatus falling in heading 763	1.5
Wood of nonconiferous, sawn lengthwise, sliced or peeled	1.8	Television image and sound recorders or reproducers	1.5
Polyethylene—in primary forms	1.7	Other chemical products and preparations, nes	1.5
% share of top 10 exports	32.0	% share of top 10 exports	18.9
Average export complexity index of the top 10 exports	8,330	Average export complexity index of the top 10 exports	13,624
<b>Malaysia</b>			
Sawlogs and veneer logs, of nonconiferous species—in the rough	17.4	Parts, nes, of electrical and electronic apparatus,	3.9
Natural rubber (other than latex)	15.5	Television image and sound recorders or reproducers	3.8
Liquefied gaseous hydrocarbons, nes	11.3	Electronic components, parts nes	3.3
Wood of nonconiferous, sawn lengthwise, sliced or peeled	7.3	Natural rubber (other than latex)	3.2
Electronic components, parts nes	4.2	Articles of apparel, clothing accessories of plastic or rubber—of unhardened vulcanized rubber, including gloves	2.7
Natural rubber latex; pre-vulcanized natural rubber latex	3.9	Furniture, nes of wood	2.7
Parts, nes, of the apparatus of the heading 761, 762, 7643 and 7648	1.8	Precious metal jewelry (except watches and watches cases)	1.9
Oilcake and other residues (except dregs)—of palm nuts, kernels	1.1	Wood of nonconiferous, sawn lengthwise, sliced or peeled	1.9

Special purpose vessels, floating docks, etc.	1.1	Electrical condensers	1.8
Articles of apparel, clothing accessories of plastic or rubber— of unhardened vulcanized rubber, including gloves	1.0	Fatty acids; acid oils from refining	1.7
% share of top 10 exports	64.7	% share of top 10 exports	26.9
Average export complexity index of the top 10 exports	4,770	Average export complexity index of the top 10 exports	6,819
<b>Thailand</b>			
Rice, semi-milled or milled (unbroken)	13.6	Precious metal jewelry (except watches and watches cases)	3.1
Roots and tubers, with high starch or insulin, fresh or dried	13.2	Parts, nes, of electrical and electronic apparatus	2.3
Natural rubber latex; pre-vulcanized natural rubber latex	11.9	Alkyds and other polyesters—in primary forms	2.2
Precious metal jewelry (except watches and watches cases)	4.0	Natural rubber latex; pre-vulcanized natural rubber latex	1.7
Other electrical appliances and apparatus, nes	2.8	Polyethylene—in primary forms	1.4
Fruit and nuts, prepared, preserved, nes	2.8	Electric motors (including ac/dc motors), other than direct current	1.3
Rice broken	2.3	Furniture, nes, of wood	1.3
Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted	2.2	Television image and sound recorders or reproducers	1.3
Footwear with outer soles of leather, of rubber or plastic	1.6	Fruit and nuts, prepared, preserved, nes	1.3
Flours of leguminous, fruits, roots and tubers	1.5	Footwear with outer soles of leather, of rubber or plastic	1.3
% share of top 10 exports	56.1	% share of top 10 exports	17.2
Average export complexity index of the top 10 exports	4,629	Average export complexity index of the top 10 exports	7,806
<b>Indonesia</b>			
Coffee, roasted	19.7	Liquefied gaseous hydrocarbons, nes	5.6
Natural rubber (other than latex)	16.2	Copper ores and concentrates	5.4
Wood of nonconiferous, sawn lengthwise, sliced or peeled	6.0	Television image and sound recorders or reproducers	3.8
Mineral tar oils, etc., nes	5.1	Footwear with outer soles of leather, of rubber or plastic	3.0
Copper ores and concentrates	4.1	Furniture, nes, of wood	2.6
Urea	3.0	Other paper and paperboard, in rolls or sheets, nes	2.2
Nickel matte, sinters, etc.	2.4	Nickel matte, sinters, etc	2.2
Improved wood, in sheets, blocks or the like	2.2	Chemical wood pulp, soda or sulphate—bleached or semi- bleached (other than dissolving grades)	1.8
Women's, girls', infants' outerwear, textile, not knitted or crocheted—blouses—of man-made fibres	1.9	Chairs and other seats, whether or not convertible into beds	1.7
Fabrics, woven, less 85% of discontinuous synthetic fibres— mixed mainly or solely with cotton	1.8	Printing paper and writing paper, in rolls or sheets—coated, impregnated, surface-coloured, decorated or printed	1.5
% share of top 10 exports	62.3	% share of top 10 exports	29.9
Average export complexity index of the top 10 exports	4,314	Average export complexity index of the top 10 exports	8,668
<b>Philippines</b>			
Refined copper, (including alloys except master alloys), unwrought	8.8	Refined copper, (including alloys except master alloys), unwrought	5.6
Ores and concentrates of precious metals	7.1	Electronic components, parts nes	5.6
Coffee, not roasted; coffee husks and skins	6.0	Parts, nes of electrical and electronic apparatus	4.6
Fruit and nuts, prepared, preserved, nes	5.1	Oxygen-function aldehyde	3.2
Wood of nonconiferous, sawn lengthwise, sliced or peeled	4.9	Under-garments, knitted or crocheted-- of cotton, not elastic nor rubberized—men's and boys, shirts	2.7
Copper ores and concentrates	4.5	Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted—of cotton	2.7
Oilcake and other residues (except dregs)—of coconut (copra)	3.8	Other light petroleum oils	2.2
Basketwork, wickerwork and articles of plaiting materials, nes	3.8	Fruit and nuts, prepared, preserved, nes	2.1
Furniture, nes, of other materials; parts, nes	3.4	Piezo-electric crystals, mounted	2.1
Fatty alcohols	2.0	Other base metals, nes, and cermets, unwrought; waste and scrap	1.4
% share of top 10 exports	49.5	% share of top 10 exports	32.1
Average export complexity index of the top 10 exports	3,428	Average export complexity index of the top 10 exports	7,445
<b>Bangladesh</b>			
Under-garments of textile fabrics, not knitted or crocheted— mens and boys shirts—of other fibres	28.5	Under-garments, knitted or crocheted—of cotton, not elastic nor rubberized—other cotton under-garments	17.8
Goat and kid skin leather	8.1	Under-garments of textile fabrics, not knitted or crocheted— mens and boys shirts—of cotton	10.3

Yarn of jute or of other textile bast fibres of heading 264.0	7.4	Under-garments, knitted or crocheted—of cotton, not elastic nor rubberized—men's and boys, shirts	6.1
Vegetables, fresh or chilled, nes	5.6	Men's and boys' outerwear, textile fabrics not knitted or crocheted—trousers, breeches and the like—of cotton	5.3
Other light petroleum oils	5.5	Articles, nes, elastic or rubberized	4.3
Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted	4.4	Under-garments of textile fabrics, not knitted or crocheted—mens and boys shirts—of other fibres	3.6
Women's, girls', infants' outerwear, textile, not knitted or crocheted— blouses—of cotton	4.3	Outerwear knitted or crocheted, not elastic nor rubberized— other, clothing accessories, nonelastic, knitted or crocheted— of cotton	3.4
Under-garments of textile fabrics, not knitted or crocheted— men's and boys' shirts—of cotton	3.6	Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted—of cotton	3.0
Women's, girls', infants' outerwear, textile, not knitted or crocheted—blouses—of other fibres	3.4	Outerwear knitted or crocheted, not elastic nor rubberized— jerseys, pullovers, slip-overs, cardigans, etc.—of synthetic fibres	2.9
Men's and boys' outerwear, textile fabrics not knitted or crocheted—other outer garments—of other fibres	2.9	Men's and boys' outerwear, textile fabrics not knitted or crocheted—other outer garments—of the fabrics of headings 65732, 65733 and 65739	2.5
% share of top 10 exports	73.6	% share of top 10 exports	59.2
Average export complexity index of the top 10 exports	2,499	Average export complexity index of the top 10 exports	3,791
<b>Pakistan</b>			
Rice, semi-milled or milled (unbroken)	15.4	Other woven fabrics, less 85% of cotton, bleached, etc., finished	8.2
Other woven fabrics, 85% plus of cotton, bleached, etc., finished	9.9	Bed linen of cotton	7.8
Carpets, carpeting and rugs, knotted—of wool or fine animal hair	9.6	Cotton yarn—measuring, per single yarn, from 14 to 40 km/kg, not for retail	7.5
Bed linen of cotton	6.2	Rice, semi-milled or milled (unbroken)	5.9
Other woven fabrics with 85% or more of grey cotton, not mercerized	5.9	Toilet and kitchen linen of cotton	4.4
Toilet and kitchen linen of cotton	4.1	Under-garments, knitted or crocheted—of cotton, not elastic nor rubberized—men's and boys, shirts	3.9
Goat and kid skin leather	3.4	Other woven fabrics with 85% or more of grey cotton, not mercerized	3.6
Fabrics, woven, less 85% of continuous synthetic textile materials	3.0	Outerwear knitted or crocheted, not elastic nor rubberized— other, clothing accessories, nonelastic, knitted or crocheted— of cotton	3.0
Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted	2.7	Men's and boys' outerwear, textile fabrics not knitted or crocheted—trousers, breeches and the like—of cotton	2.8
Medical, surgical and veterinary instruments and appliances	2.7	Knitted or crocheted textile articles, nes, not elastics, etc	2.6
% share of top 10 exports	62.8	% share of top 10 exports	49.7
Average export complexity index of the top 10 exports	5,014	Average export complexity index of the top 10 exports	3,458
<b>Sri Lanka</b>			
Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted	6.9	Under-garments, knitted or crocheted—of cotton, not elastic nor rubberized—other cotton under-garments	5.0
Diamonds cut or otherwise worked, but not mounted or set	5.8	Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted—of cotton	4.5
Coconuts, fresh or dried (excluding copra)	5.6	Brassieres	4.2
Men's and boys' outerwear, textile fabrics not knitted or crocheted—other outer garments—of other fibres	4.7	Tires, nes, tire cases, interchangeable tire treads and tire flaps	3.7
Under-garments of textile fabrics, not knitted or crocheted— men's and boys' shirts—of other fibres	3.7	Men's and boys' outerwear, textile fabrics not knitted or crocheted—trousers, breeches and the like—of cotton	3.6
Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted—of cotton	3.5	Womens, girls, infants outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted	3.4
Women's, girls', infants' outerwear, textile, not knitted or crocheted—blouses—of other fibres	3.5	Under-garments of textile fabrics, not knitted or crocheted— mens and boys shirts—of cotton	3.0



Women's, girls, infants outerwear, textile, not knitted or crocheted—blouses—of man-made fibres	3.2	Refined copper, (including alloys except master alloys), unwrought	2.7
Women's, girls, infants outerwear, textile, not knitted or crocheted—blouses—of cotton	3.0	Outerwear knitted or crocheted, not elastic nor rubberized—other, clothing accessories, nonelastic, knitted or crocheted—of cotton	2.4
Coir (coconut fibres) and coir waste	2.9	Women's, girls', infants' outerwear, textile, not knitted or crocheted—other outer garments of textile fabrics, not knitted, crocheted	2.2
% share of top 10 exports	42.7	% share of top 10 exports	34.7
Average export complexity index of the top 10 exports	3,032	Average export complexity index of the top 10 exports	4,462
<b>Fiji Islands</b>			
Gold, nonmonetary, unwrought or semi-manufactured	54.8	Gold, nonmonetary, unwrought or semi-manufactured	14.2
Ginger (except in sugar or in syrup)	4.4	Women's, girls', infants' outerwear, textile, not knitted or crocheted—suits and costumes—of cotton	11.0
Other woven fabrics, 85% plus of cotton, bleached, etc., finished	3.5	Water, ice and snow	8.4
Balloons and airships	3.5	Men's and boys' outerwear, textile fabrics not knitted or crocheted—other outer garments—of cotton	6.4
Sweetened forage; other preparation for animal feeding, nes	3.0	Men's and boys' outerwear, textile fabrics not knitted or crocheted—other outer garments—	4.6
Pastry, biscuits, cakes etc., with or without cocoa	1.7	Roots and tubers, with high starch or insulin, fresh or dried	3.4
Wood of coniferous, planed, tongued, grooved, etc.	1.6	Pulpwood in chips or particles	3.1
Wood of coniferous, sawn lengthwise, sliced or peeled	1.6	Under-garments, knitted or crocheted—of other fibres, not elastic nor rubberized—of other fibres, nes	3.1
Fish (excluding cod) dried, salted or in brine	1.4	Footwear with outer soles of leather, of rubber or plastic	2.1
Prepared cereal, roasted, puffed, etc.	1.4	Outerwear knitted or crocheted, not elastic nor rubberized—other, clothing accessories, nonelastic, knitted or crocheted—of cotton	2.0
% share of top 10 exports	76.8	% share of top 10 exports	58.3
Average export complexity index of the top 10 exports	6,268	Average export complexity index of the top 10 exports	3,704

nes = not elsewhere specified.

Source: Staff estimates.

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**Appendix table 11 Services sector, share of output (%)****a. Korea, Rep. of**

Services subsector	1970–1975	1976–1980	1981–1985	1986–1990	1991–1995	1996–2000	2001–2005	Change between 1970–1975 and 2001–2005
Wholesale and retail trade	15.87	13.56	12.17	11.59	8.99	7.38	7.19	-8.68
Restaurants and hotels	2.54	1.97	1.93	2.33	2.76	2.71	2.81	0.28
Transport and storage	5.64	5.89	6.28	5.04	4.80	4.65	4.60	-1.04
Post and telecommunications	0.83	1.18	1.89	2.02	1.91	2.23	2.81	1.98
Financial intermediation	2.13	3.68	3.71	5.36	6.46	7.27	8.47	6.34
Real estate and renting	3.58	3.23	4.20	4.57	6.29	7.83	7.29	3.71
Business activities	1.27	1.63	2.27	3.23	4.40	5.25	5.34	4.07
Government services	5.69	5.67	5.73	4.96	5.42	5.68	6.04	0.35
Education	3.60	4.16	4.73	4.65	4.89	5.17	5.52	1.92
Health and social work	0.74	0.78	1.52	1.87	1.92	2.28	3.02	2.28
Other services	2.75	2.20	2.48	2.67	3.24	3.39	3.48	0.74
Total	44.63	43.95	46.91	48.28	51.07	53.86	56.57	11.94

**b. Malaysia**

Services subsector	1987–1990	1991–1995	1996–2000	2001–2005	Change between 1987–1990 and 2001–2005
Wholesale and retail trade	10.54	13.00	12.50	11.33	0.79
Hotels and restaurants	1.59	1.99	2.21	2.30	0.71
Transport, storage and communications	6.23	6.40	6.67	6.77	0.54
Finance, real estate, insurance, and business services	3.74	5.58	5.83	5.88	2.14
Ownership of dwellings	4.02	4.09	4.12	3.76	-0.27
Government services	10.02	7.94	6.64	7.28	-2.74
Other Services	5.80	6.17	5.05	4.40	-1.40
Total	41.95	45.18	43.02	41.71	-0.23

**c. Philippines**

Services subsector	1981–1985	1986–1990	1991–1995	1996–2000	2001–2005	Change between 1981–1985 and 2001–2005
Wholesale and retail trade	13.00	14.32	14.05	13.68	14.12	1.13
Transportation and storage	4.18	4.03	4.06	3.43	3.93	-0.24
Communication	0.84	1.12	1.21	1.79	3.31	2.48
Finance and insurance	3.29	3.48	3.98	4.65	4.46	1.18
Real estate	1.25	1.02	1.08	1.07	0.81	-0.44
Ownership of dwelling	4.11	4.69	5.43	5.82	5.41	1.30
Government services	4.92	6.22	7.34	9.59	8.48	3.56
Other private services	6.39	7.30	8.44	10.40	12.75	6.36
Total	37.97	42.19	45.57	50.42	53.28	15.31

<b>d. Singapore</b>										
Services subsector	1960–1965	1966–1970	1971–1975	1976–1980	1981–1985	1986–1990	1991–1995	1995–2000	2001–2005	Change between 1960–1965 and 2001–2005
Wholesale and retail trade	27.95	26.10	23.03	20.49	14.86	13.69	14.30	13.73	14.90	-13.05
Hotels and restaurants	3.87	3.67	3.60	3.85	3.92	3.60	3.13	2.56	2.11	-1.76
Transportation and communications	12.62	11.06	11.19	13.99	13.76	14.18	13.32	12.37	12.47	-0.15
Financial services	2.60	4.72	3.15	2.55	3.30	4.48	5.12	5.74	6.56	3.96
Business Services	8.35	9.32	9.43	8.90	11.90	11.67	13.26	14.87	14.20	5.85
Owner occupied dwellings	3.28	2.86	3.11	2.75	3.19	4.47	4.52	5.05	4.35	1.07
Other services	18.04	15.41	11.69	10.51	10.58	11.31	10.70	10.79	12.30	-5.74
Total	76.73	73.14	65.75	63.02	61.50	63.41	64.36	65.11	66.91	-9.82

<b>e. Taipei, China</b>							
Services Subsector	1981–1985	1986–1990	1991–1995	1996–2000	2001–2005	Change between 1981–1985 and 2001–2005	
Wholesale trade	5.74	5.61	6.69	8.30	9.58	3.84	
Retail trade	6.00	5.97	6.27	6.80	7.39	1.39	
Accommodation and eating-drinking places	1.10	1.48	1.70	1.94	2.09	0.98	
Transportation and storage	4.24	4.33	4.11	4.12	3.89	-0.35	
Communication	1.65	1.62	1.86	2.10	2.53	0.87	
Finance and insurance	5.82	7.31	8.47	9.81	10.62	4.80	
Real estate, rental and leasing	5.33	5.74	7.74	8.66	8.44	3.11	
Professional, scientific and technical services	0.89	0.96	1.43	1.93	2.34	1.46	
Educational services	0.60	0.73	0.99	1.44	1.86	1.27	
Health care and social welfare services	0.89	1.31	1.99	2.47	2.98	2.09	
Cultural, sporting and recreational services	0.82	0.91	1.16	1.38	1.52	0.71	
Government services	10.76	9.95	11.06	10.82	11.40	0.64	
Other services	6.42	7.32	7.50	6.89	7.16	0.74	
Total	50.25	53.24	60.98	66.65	71.80	21.55	

<b>f. Thailand</b>										
Services subsector	1950–1959	1960–1969	1970–1975	1976–1980	1981–1985	1986–1990	1991–1995	1996–2000	Change between 1950–1959 and 1996–2000	
Transportation and communications	4.37	6.16	5.46	5.21	6.41	7.50	7.26	7.75	3.38	
Wholesale and retail trade	15.97	16.89	18.84	18.70	18.01	17.07	17.13	16.85	0.87	
Ownership of dwellings	4.89	6.44	5.13	3.77	3.84	3.61	2.56	2.49	-2.40	
Government	4.51	4.35	4.38	4.21	4.63	3.83	3.62	4.04	-0.47	
Banking, insurance and real estate	0.62	1.66	2.63	2.85	3.20	4.29	6.84	5.20	4.58	
Others	13.31	12.27	12.82	13.10	14.44	13.77	12.71	13.91	0.59	
Total	43.67	47.76	49.27	47.85	50.53	50.07	50.12	50.23	6.56	

Sources of basic data: CEIC Data Company Ltd.; Directorate General of Budget, Accounting, and Statistics, available: <http://eng.stat.gov.tw>, downloaded 13 September 2006.

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