Part 3

Growth amid change

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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.

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 part of *Asian Development Outlook 2007* 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

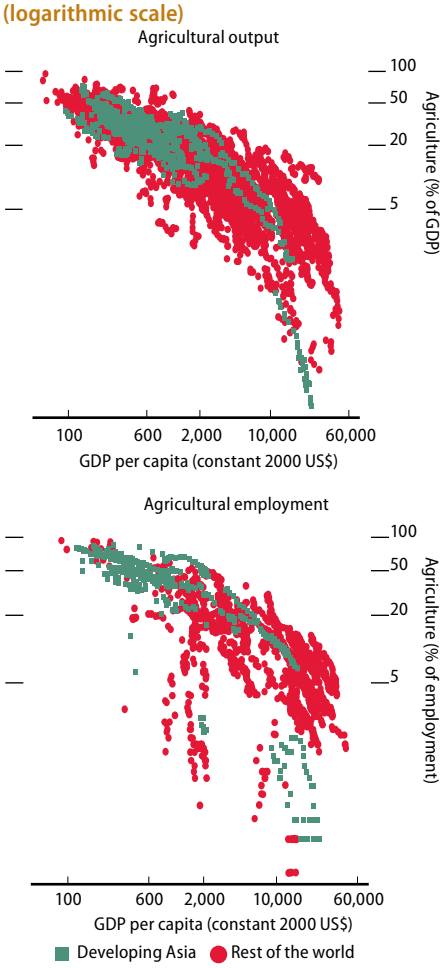
Figures 3.1.1, 3.1.2, and 3.1.3 summarize graphically movement of output and employment across agriculture, industry, and services in developing Asia over the period 1970–2004, as per capita incomes change. Developing Asia's experience is set against the background of broad international patterns over 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 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

3.1.1 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; 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. Data for Taipei,China were downloaded from http://eng.stat.gov.tw/public/Data/782317221171.xls and http://eng.dgbas.gov.tw/public/data/dgbas03/bs2/yearbook_eng/yo25l.pdf on 2 October 2006.

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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 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.

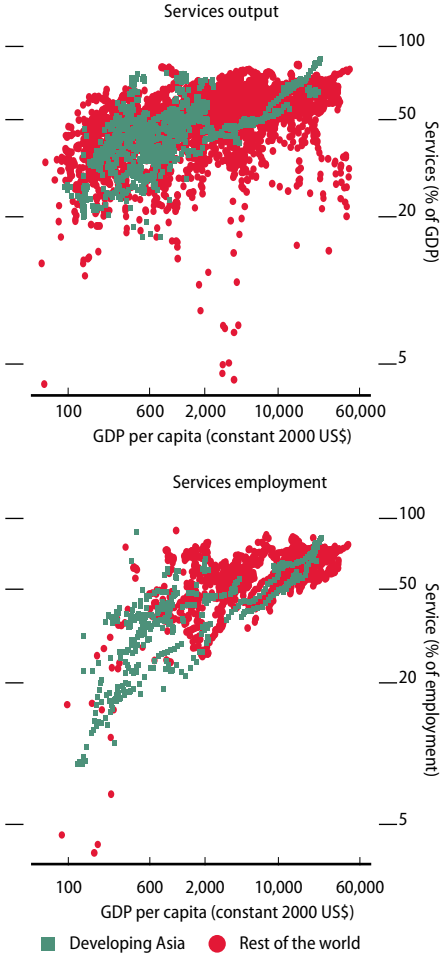
These stylized facts, generated from a cross-country panel, are not

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

Notes and *sources:* See Figure 3.1.1.

Click here for figure data

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



Notes and *sources:* See Figure 3.1.1.

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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.

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 3.1.4 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 3.1.1 explains concepts of productivity convergence and catch-up. Two broad classes of country can be identified in Figure 3.1.4: 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.

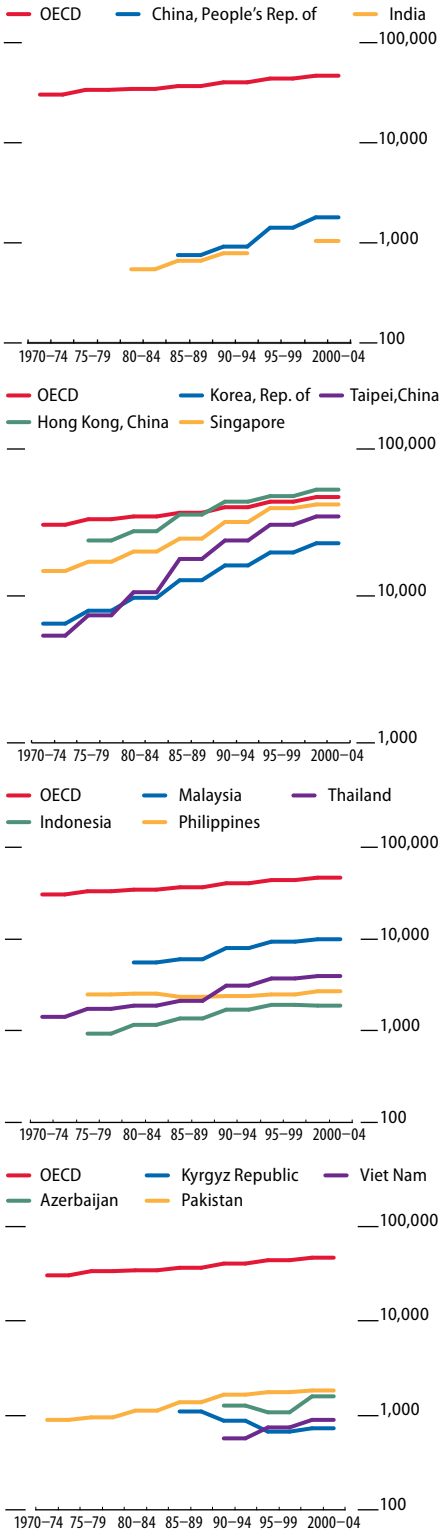
Relative and level measures can produce different pictures. Take Malaysia, the economy with the highest level of labor productivity outside OECD and the NIEs. Between 1980–1984 and 2000–2004 Malaysia's relative productivity improved from 16% of the OECD average to 21%. Malaysia is indeed "catching up." 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 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

3.1.4 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.

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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 3.1.5, 3.1.6, and 3.1.7 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 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

3.1.1 Convergence and catch-up

Figures 3.1.4–3.1.7 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:

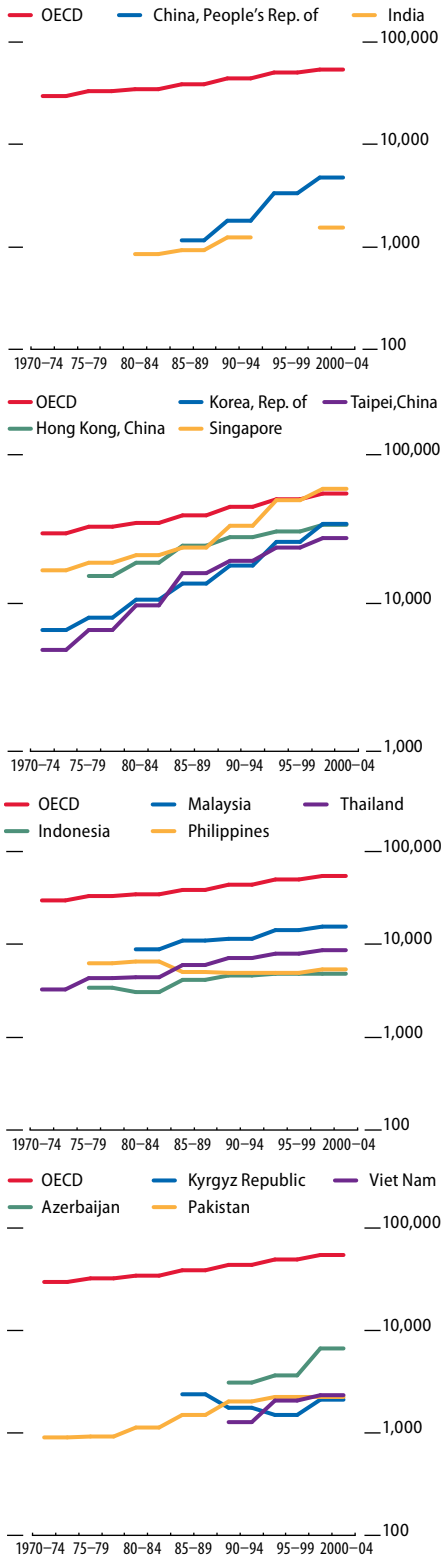
Relative convergence:
$g_i - g_j > 0$

Level convergence:

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

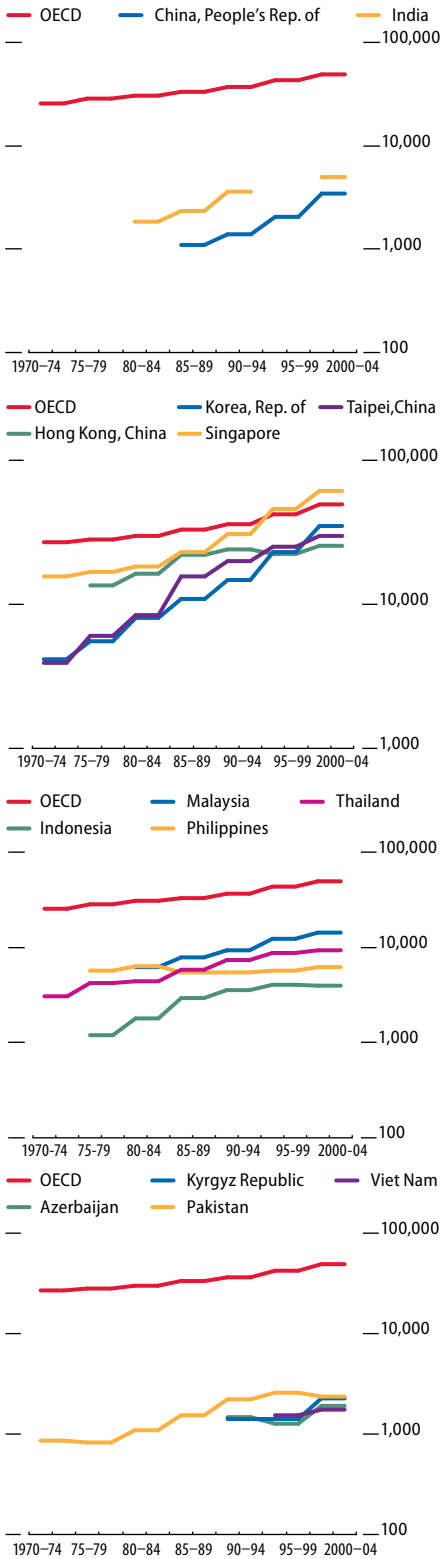
where g is growth of labor productivity, Y is the level of labor productivity, i is the catch-up country, and j is the frontier.

3.1.5 Industrial labor productivity (constant 2000 US$, logarithmic scale)



Note: See Figure 3.1.4 for the years of data for each country.
Source: Staff estimates.
Click here for figure data

3.1.6 Manufacturing labor productivity (constant 2000 US$, logarithmic scale)



Note: See Figure 3.1.4 for the years of data for each country.
Source: Staff estimates.
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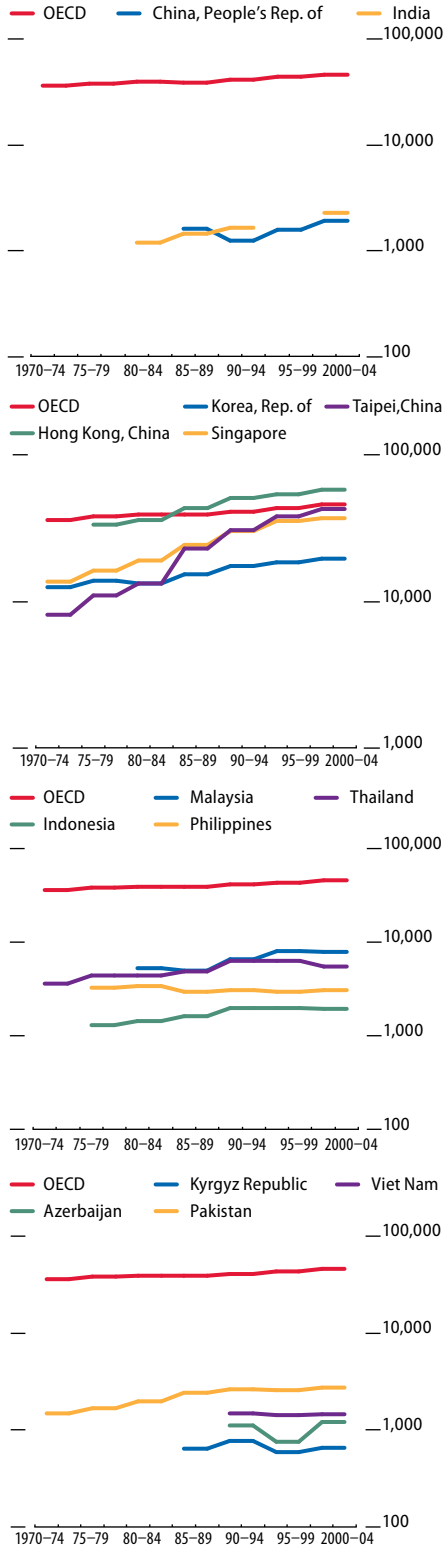
3.1.7 Services labor productivity (constant 2000 US$, logarithmic scale)



Note: See Figure 3.1.4 for the years of data for each country.
Source: Staff estimates.
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components shown in Figures 3.1.5 to 3.1.7 are shown in Figure 3.1.8. 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 3.1.4). 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.

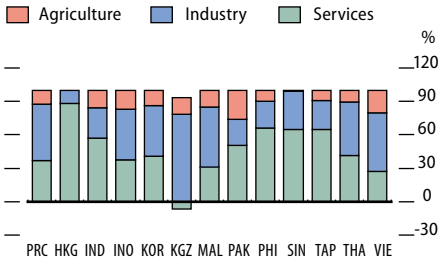
Labor productivity growth can be further broken down into within-sector and between-sector components. As workers move out of agriculture and into higher (labor) productivity activities in industry and services, aggregate productivity is lifted. This shift effect is commonly referred to as "Baumol's structural bonus." Box 3.1.2 explains how to measure the bonus, and Figure 3.1.9 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 3.1.10. 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, 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

3.1.8 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.

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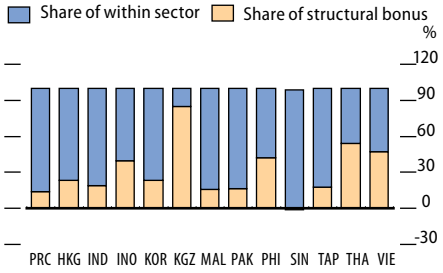
3.1.9 Within-sector productivity growth and Baumol's structural bonus



Note: See Figure 3.1.8.

Source: Staff estimates.

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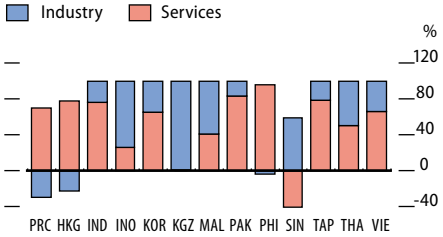
3.1.10 Baumol's structural bonus: industry vs services



Note: See Figure 3.1.8.

Source: Staff estimates.

Click here for figure data

3.1.2 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:

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

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, $\hat{}$ time rates of change, and the suffixes sectors (A = agriculture, I = industry, S = services).

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.

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 3.1.9 in Box 3.1.2). 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 3.1.1 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 3.1.1 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.

3.1.1 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).

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 3.1.11 presents the results, graphing derived scores against per capita incomes.

The technology and scale scores for the NIEs rise strongly with per 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 3.1.3).

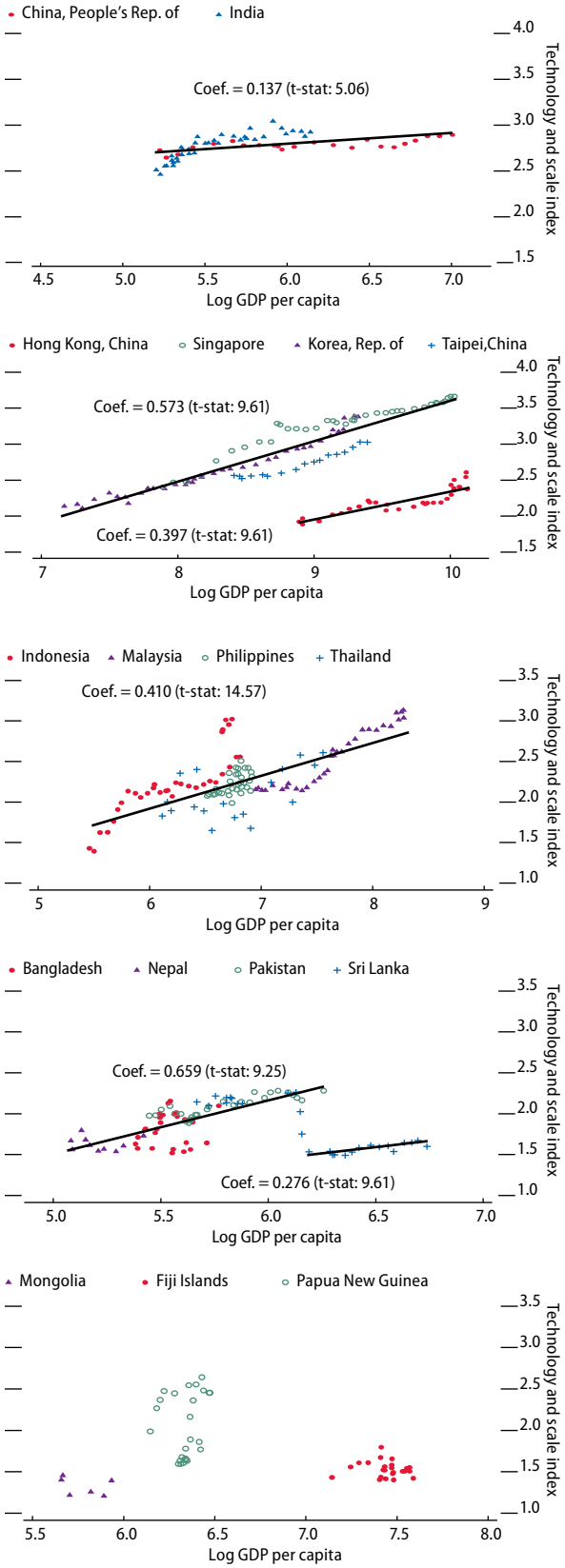
The technology and scale scores of the ASEAN-4 countries also rise with per capita income levels. But in the Philippines there is no discernable pattern as observations are tightly clustered around comparatively stagnant income levels. Indonesia's and Malaysia's scores move up more quickly than those 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 3.1.11 show no steady increase.

Figure 3.1.12 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 3.1.1. 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 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

3.1.11 Technology and scale index of developing economies in Asia: Manufacturing value added



Source: Staff estimates.

Click here for figure data

3.1.3 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.

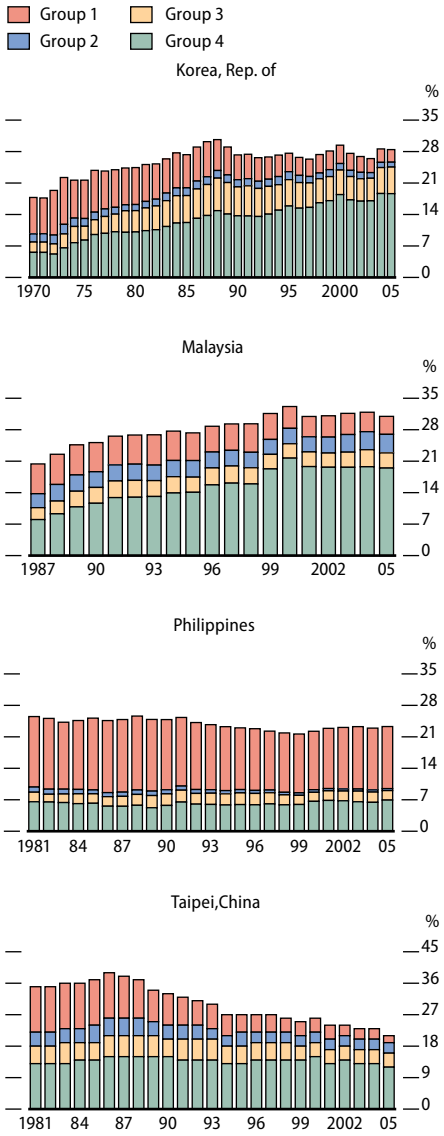
Local firms are also rapidly entering the market, imitating the operations of MNCs. For example, SMI, a PRC-owned chipmaker, now processes 12-inch silicon wafers, only around two generations (or 5 years) behind Intel Corporation, the US leader in the field.

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).

3.1.12 Shares of manufacturing groups in GDP based on technology and scale



Note: Groups as defined in Table 3.1.1.
Source: Staff estimates.
Click here for figure data

slowly, but has started at a very low income base. In yet other countries, the evidence is lacking.

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 3.1.13 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 3.1.11). Kochhar et al. (2006) have also shown that India has a more skill-based and capital-intensive pattern of production than the PRC.

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.

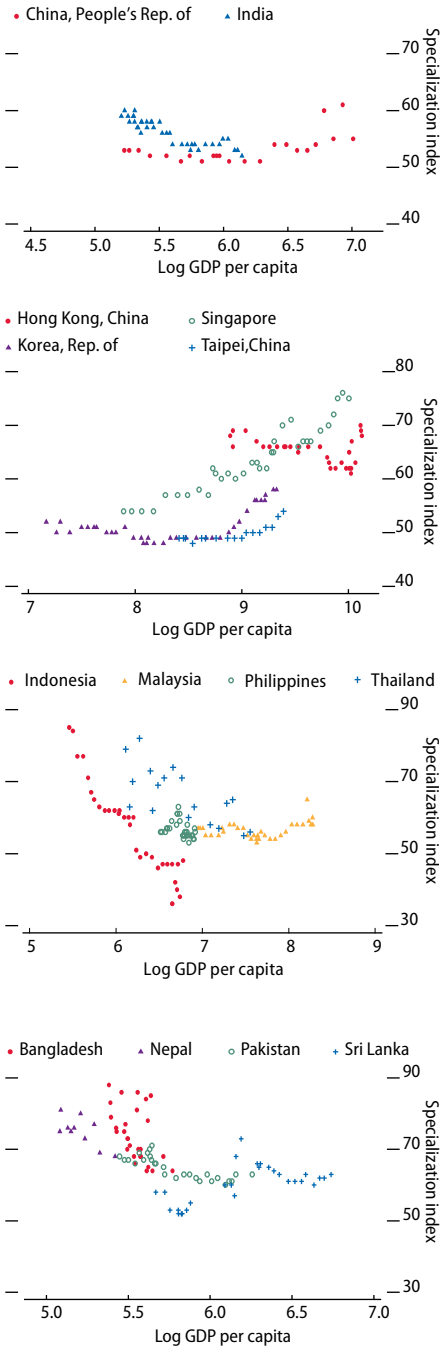
Imbs and Wacziarg (2003), present evidence that suggests that, at low levels of per capita income, economies tend to diversify and subsequently, as their income rises, they then specialize (i.e., show lower diversification). Graphically, this would be represented as a U-shape. Rodrik (2006) has interpreted 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 3.1.14), a distinctive U-shaped pattern emerges.

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

3.1.13 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

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

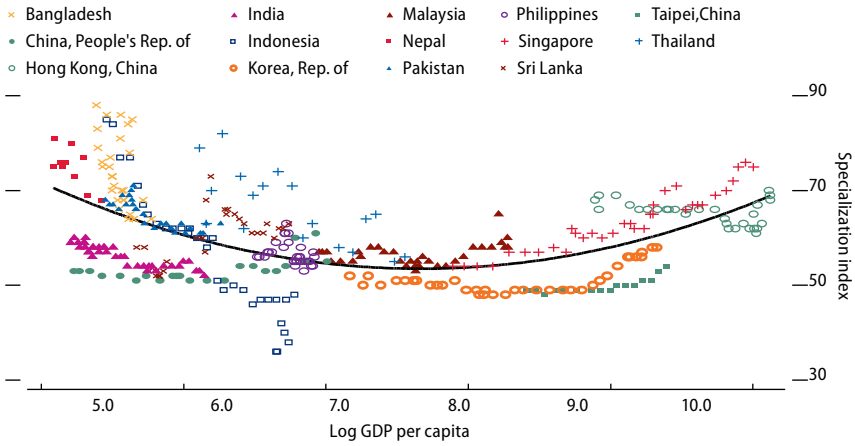
where h_{max} = ln (number of sectors) and where $s_i(t)$ is the share of the i-th branch in total manufacturing value added in year t and $0 \le h \le 100$.

Source: Staff estimates.

Click here for figure data

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 3.1.14 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.

3.1.14 Combined specialization index of developing economies in Asia: Manufacturing value added



Note: The estimated regression line is:

Specialization = 203.653 - 39.163 GDP per capita(log) + 2.554 (GDP per capita(log))^2

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

R^2: 0.30; No. of observations: 387

Source: Staff estimates.

Click here for figure data

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 3.1.4.

Figure 3.1.15 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 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 3.1.2).

3.1.4 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.

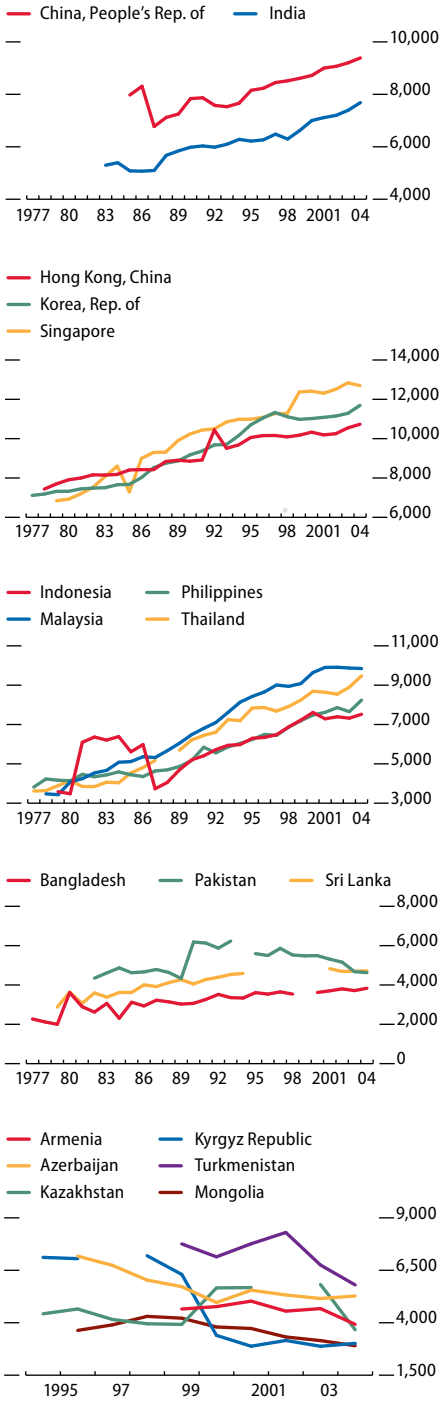
To construct these indexes, export data are used from the United Nations Commodity Trade Statistics Database (COMTRADE) at the 5-digit level (SITC Revision 2; 1,800 commodities) for the years 1977 to 2004. Per capita GDP is from the *World Development Indicators* database. Per capita GDP at constant 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.

3.1.2 Export diversification, 1986–2004

	1986	2004
China, People's Rep. of		
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
India		
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
Newly industrialized economies		
Hong Kong, China		
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
Korea, Rep. of		
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
Singapore		
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
ASEAN-4		
Indonesia		
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
Malaysia		
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
Philippines		
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
Thailand		
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
Other South Asia		
Bangladesh		
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
Pakistan		
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
Sri Lanka		
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
The Pacific		
Fiji Islands		
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).

3.1.15 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 3.1.6 below.

Source: Staff estimates.

Click here for figure data

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 3.1.13 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.

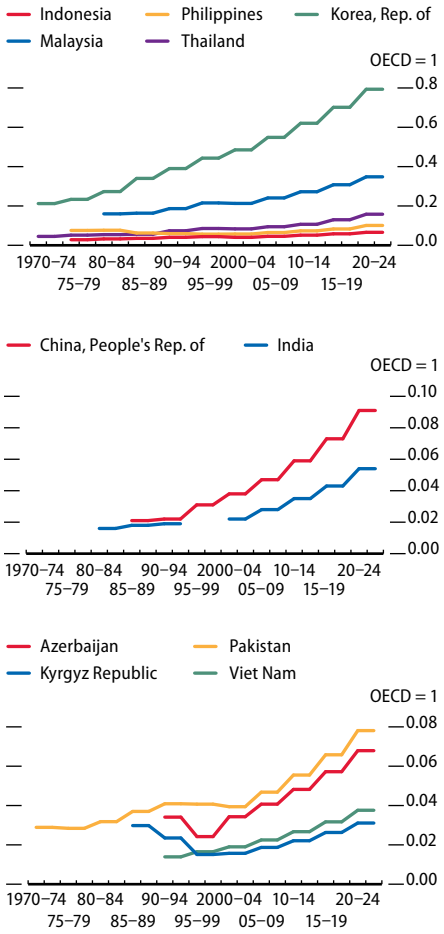
Closing the productivity gap

Figure 3.1.16 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. 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

3.1.16 Evolution of labor productivity in developing Asia relative to OECD



Note: See Figure 3.1.4 for years of data.
Source: Staff estimates.
Click here for figure data

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 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 3.1.3.

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

3.1.3 Estimated unemployment

Subregion/economy	Rate (%) 1996	Rate (%) Latest year		Number (millions) Latest year	
East Asia					
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
Southeast Asia					
Cambodia	0.9	1.8	2001	0.116	2001
Indonesia	4.9	10.3	2005	10.854	2005
Lao People's Dem. Rep. [a]	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 [b]	3.5	2.1	2005	0.900	2005
South Asia					
Bangladesh	3.5	4.3	2003	2.000	2003
India [c]	6.0	7.3	2000	9.050	2000
Maldives [a]	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).

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

3.1.4 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).

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 3.1.5 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

3.1.5 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
East Asia										
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	-	-	-	-	-	-
Southeast Asia										
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
South Asia										
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).

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 3.1.6 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.

3.1.6 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[a]	Forecast GDP growth, 2007
East Asia						
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
South Asia						
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
Southeast Asia						
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

[a] Range is obtained by applying estimates at mean less one standard deviation and mean plus one standard deviation.

Source: Staff estimates.

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

3.1.7 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
Central Asia							
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
East Asia							
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
South Asia							
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
Southeast Asia							
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
Total			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).

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 *under*employment is to make the link to poverty incidence. Table 3.1.7 (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

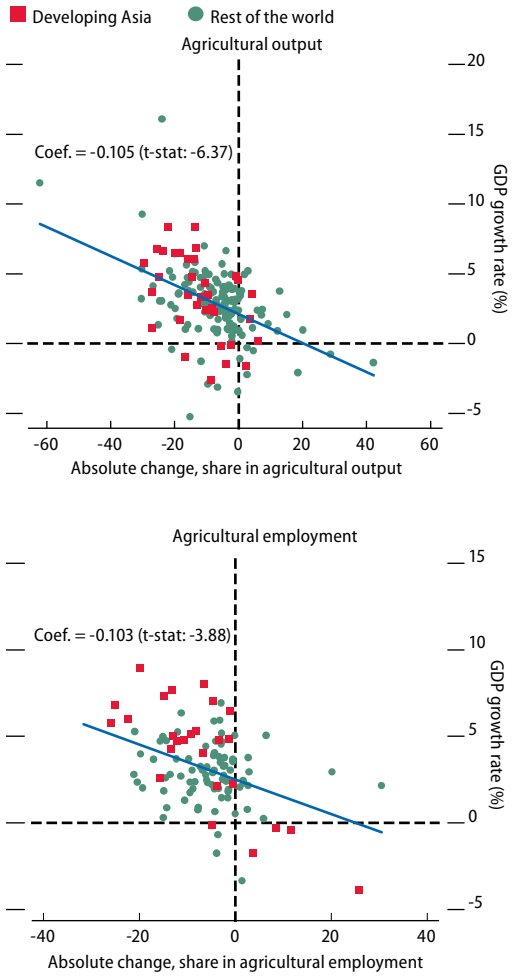
Even after countries begin to industrialize and workers move off the farm to find jobs in industry and services, agriculture continues to play an important role. Although agricultural productivity growth may not be able to match that in the other two sectors, modest gains provide a basis for industrialization 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 3.1.17 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 dynamism in a way that is unique? These are some of the questions considered in this section.

3.1.17 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

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 3.1.18 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.

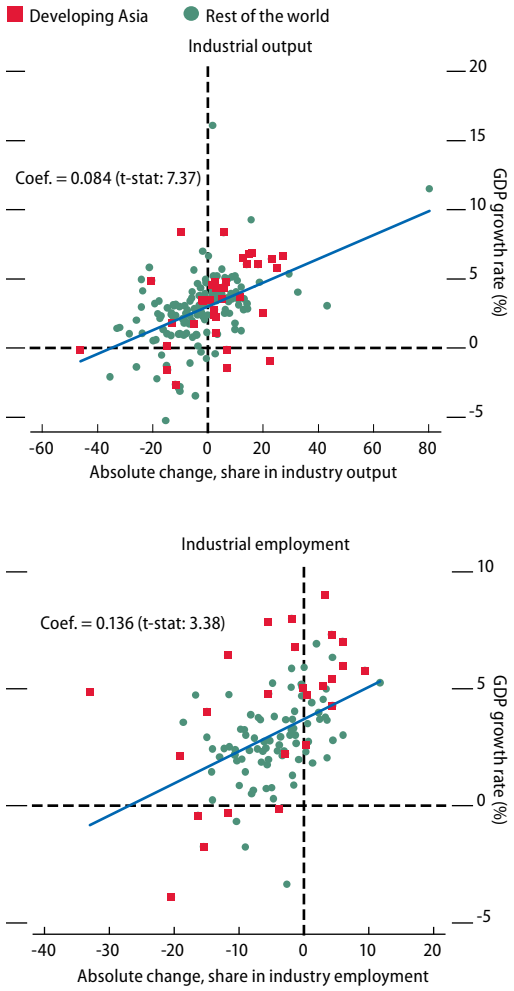
Data for manufacturing output shares tell a similar story (employment data are unavailable). Figure 3.1.19 documents the positive correlation between the change in manufacturing output shares and overall output growth. Countries in the first quadrant with the highest increases in the manufacturing share 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 3.1.5 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 that have developed complex export baskets, which tend to have a high share of manufactured exports, have also grown quickly (Box 3.1.6). 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 resources move out of agriculture into both industry and services. Figure 3.1.20 shows the links between growth and changes in services shares in output and employment.

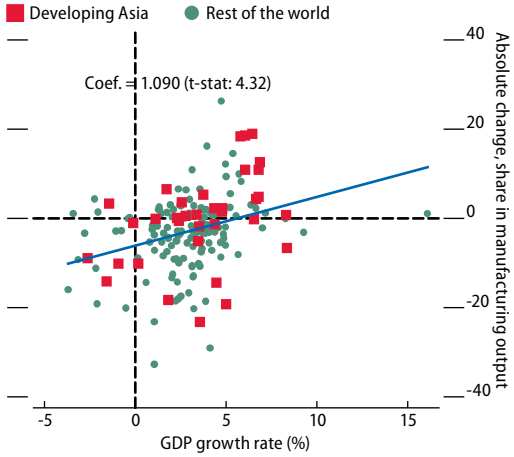
The relationship between services share in output and growth is negative, but not significant. Larger shares of services are, in a broad international panel, associated with slower growth. But this is not surprising, since the panel includes rich countries. These move at the pace of the frontier, where 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

3.1.18 Change in industrial output and employment shares vs output growth



Note: See note to Figure 3.1.17.
Source: Staff estimates.
Click here for figure data

3.1.19 Output growth vs change in manufacturing output share



Source: Staff estimates.
Click here for figure data

3.1.5 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:

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

t-stat: (-4.05)*** (2.97)*** (-2.55)** (2.76)*** (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
Newly industrialized economies		
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
ASEAN-4		
Indonesia	21.90	27.75
Malaysia	25.51	32.60
Philippines	21.53	22.23
Thailand	23.93	33.59
Other Southeast Asia		
Cambodia	11.84	16.86
Lao PDR	8.95	17.00
Viet Nam	17.96	18.56
Other South Asia		
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
Central Asia and Mongolia		
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
The Pacific		
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.

3.1.6 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 3.1.4) 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.

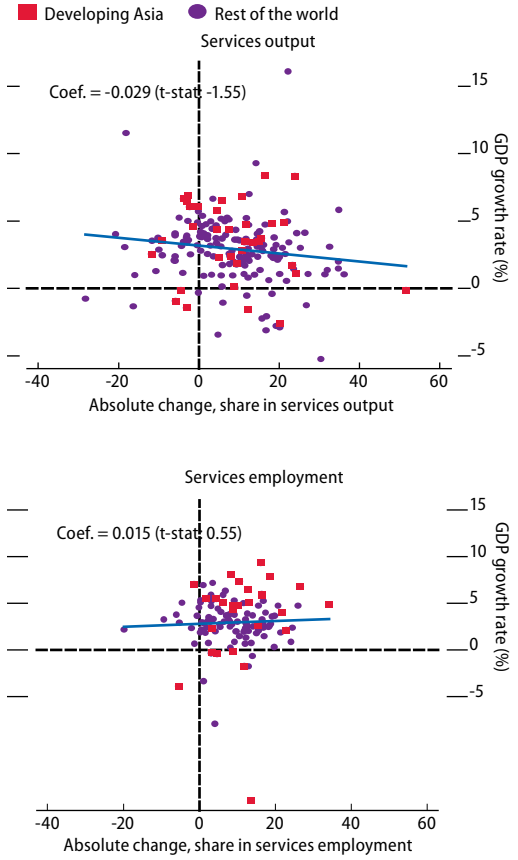
In the section *Looking back*, it was shown that export sophistication is associated with greater diversification of the export basket, yet high-income economies in developing Asia show increasing specialization within manufacturing. These observations warrant further attention, but possibly reflect 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	-0.001	-0.007	-0.009
	(1.87)*	(0.04)	(1.86)*	(1.79)*
Initial EXPY (log)	0.054	-0.024	0.040	0.049
	(2.66)**	(0.24)	(3.54)***	(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	-0.001	-0.005	-0.015
	(1.89)*	(0.07)	(2.48)**	(2.90)***
Initial EXPY (log)	0.056	-0.020	0.032	0.067
	(2.85)**	(0.16)	(5.01)***	(4.01)***
Change in industry output shares	0.001	-0.001	0.007	0.005
	(0.50)	(0.21)	(5.43)***	(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.

3.1.20 Change in services output and employment shares vs output growth



Note: See note to Figure 3.1.17.

Source: Staff estimates.

Click here for figure data

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

3.1.7 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-stat: (4.00)*** (2.34)** (-1.57) (-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-stat (0.61) (5.25)*** (-4.19)*** (-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

	Output		Employment	
Developing Asia	**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
Newly industrialized economies				
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
ASEAN-4				
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
Other Southeast Asia				
Cambodia	40.20	39.11	28.51	17.74
Viet Nam	41.67	38.73	30.43	22.30
Other South Asia				
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
Central Asia				
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
The Pacific				
Papua New Guinea	46.17	28.00	38.58	23.02

- = data not available.

Source: Staff estimates.

against international norms? Box 3.1.7 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 3.1.8. 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 3.1.21 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, 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.

3.1.8 Sector contributions to total output growth (%)

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

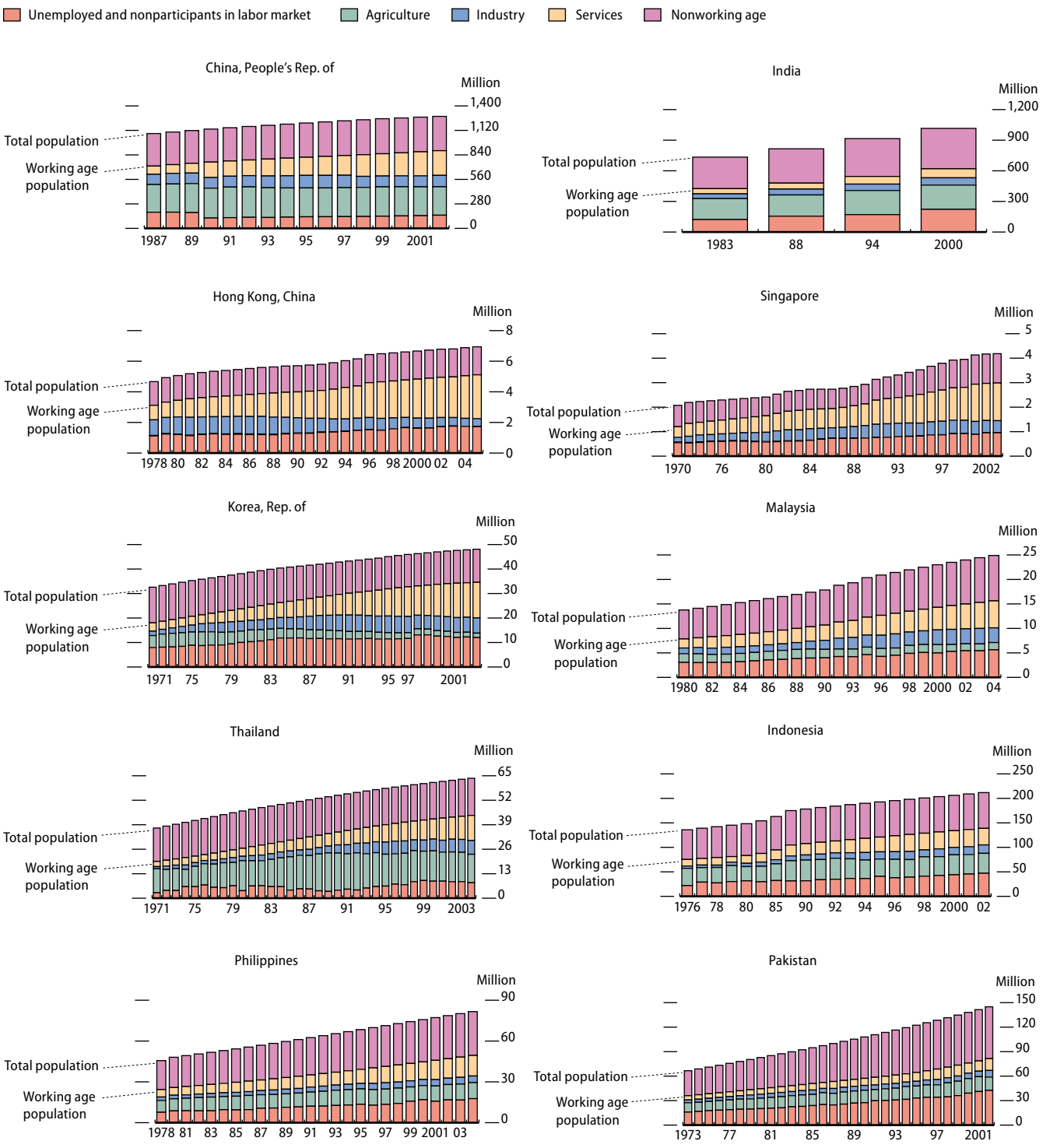
Note: Figures in bold denote the sector with the largest contribution to overall output growth.
Source: Staff estimates.

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

3.1.21 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

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 3.1.8.

Table 3.1.9 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 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,

3.1.8 Growth definitions

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

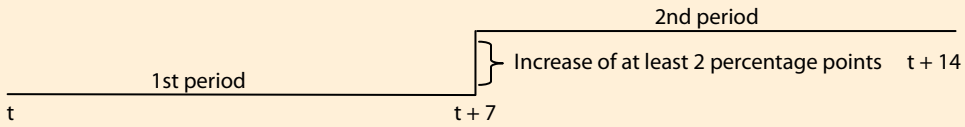
Annual growth is calculated as the exponential growth rate estimated for every rolling 7-year period. For example, a country that has level GDP data for 20 years (*t*=0,19) will have 13 annual growth estimates, covering *t* to *t*+7, *t*+2 to *t*+8,… *t*+12 to *t*+19.

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

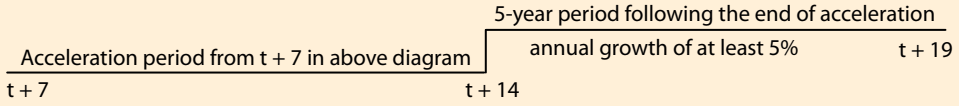
where: p_{t+n} is output at the end of the 7-year period
p_0 is output at the start of the 7-year period

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 to *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.



3.1.9 Episodes of rapid growth and growth acceleration in developing Asia

	Period covered	Number of rapid growth episodes	Average growth during rapid growth episode (%)	Number of growth accele-rations (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
Newly industrialized economies								
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
ASEAN-4								
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
Other Southeast Asia								
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
South Asia								
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				
Central Asia and Mongolia								
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
The Pacific								
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
Total		302		34				
Average			7.30					6.55

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 3.1.10

3.1.10 Sustainability of growth accelerations

Annual growth rate in the 5-year period following the end of the growth acceleration	Average growth rate in the 7-year period preceding the start of the growth acceleration			
		$g \leq 0$	$0 < g < 5$	$g \geq 5$
	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	Indonesia, Thailand
	Sustained growth $g \geq 5$	Solomon Islands	Lao PDR, Nepal, Pakistan, Viet Nam	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.

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 3.1.11 records shares of industry, manufacturing, and services around the time of the growth episodes, and the second row, the shares immediately before the episode. The third row presents *t*-statistics, where the null is that the shares in both periods are equal.

The results of Table 3.1.11 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

3.1.11 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
$\overline{S}_1^m$ (around)	34.57	29.29	33.20	21.72	17.45	24.34	43.21	43.18	37.26
$\overline{S}_5^m$ (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*.

Average share around episode: $\overline{S}_1^m = \frac{S_{t-1}^m + S_t^m + S_{t+1}^m}{3}$

Average share before episode: $\overline{S}_5^m = \frac{S_{t-1}^m + S_{t-2}^m + S_{t-3}^m + S_{t-4}^m + S_{t-5}^m}{5}$

Test: $d = \overline{S}_1^m - \overline{S}_5^m$; $H_0 : d = 0 \equiv \overline{S}_1^m = \overline{S}_5^m$

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

Source: Staff estimates.

(confirming the relationship shown in Figure 3.1.1 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 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 3.1.12 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.

3.1.12 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 *76.5*	96 *119.5*	196	96 *82.7*	101 *114.3*	197	44 *52.2*	152 *143.8*	196
Rapid growth	73 *96.5*	174 *150.5*	247	93 *106.3*	160 *146.7*	253	74 *65.8*	173 *181.2*	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.

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

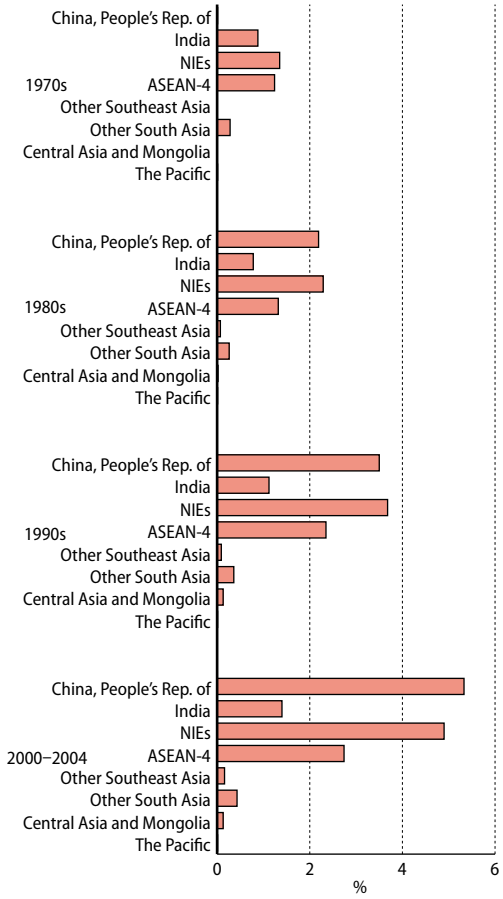
Developing Asia's success in industrialization—in particular the development of a vibrant manufacturing sector that competes on a global scale—is unrivalled. Figure 3.1.22 illustrates vividly how developing Asia's manufacturing industry has ascended in global markets from the 1970s when its share was 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). 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 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*

3.1.22 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

3.1.9 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).

structural change in East and Southeast Asia, in Part 1, 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 3.1.9 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 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 3.1.10).

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,

3.1.10 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 unrestructured 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.

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.

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). 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 3.1.11 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 3.1.12 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 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.

3.1.11 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).

3.1.12 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).

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.

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Education and structural change in four Asian countries

Introduction

Education is widely acknowledged to facilitate improvements in health outcomes, family planning, gender equality, and political empowerment. And since employers usually reward education well, access to decent education is also critical for ensuring equality of opportunity.

Rather than revisiting these issues (World Bank 2006 surveys them well), this chapter of *Asian Development Outlook 2007* (*ADO 2007*) examines the role of education as a contributor to change in the structure of the macroeconomy. Education can facilitate economic transformation in at least two ways. First, education can be an important input into production, raising worker productivity in any given activity. Thus, higher levels of education should make it easier for an economy to engage in new activities. Second, it can act as a catalyst to change—empowering entrepreneurs to develop or adopt new technologies, or to introduce new economic activities.

This chapter looks at the first of these two roles of education in facilitating change. It uses large microeconomic datasets (see *Bibliography and References*) designed to capture the aggregate employment structure from four countries—India, Indonesia, Philippines, and Thailand. It documents what workers of different education levels do for a living, what they are paid for doing it, and how these have changed over the past decade or so. One object of the enquiry is to establish whether the numbers of workers recently trained in each country's schools and colleges are adequate to meet the demands of a changing economy. Another objective is to see whether rising education levels in these countries can be linked to the changing structure of employment, trade liberalization, and technological changes. A third is to see whether the more educated countries transformed their employment structures faster.

The results show that the four countries are creating educated workers faster than they are creating jobs in the sectors that historically hired them. This may be a positive development if countries have managed with too little educated labor in the past. But, as an empirical fact, it is leading to rising education levels across the board, including in some sectors and jobs that do not pay a premium for education, that cannot be required to compete with foreign workers, or that have not seen big changes in technology. As a consequence of this (and of historical conditions), in every job examined, education levels rank the same way across the four countries: Filipino workers are always the most educated, followed by Indonesians, Thais, and then Indians. These results suggest that in many

situations, education is being acquired for reasons independent of the "requirements" of the jobs currently available.

Generalizing a little across the four countries, the economywide wage returns to basic education (the percentage increase in wages associated with completing an extra year of schooling) have fallen in every country at almost every level of the primary and secondary school system. This is, of course, consistent with the increase in enrollment and graduation rates over time. In contrast, and despite a growing supply of college-educated workers, the returns to tertiary education are rising. This implies a polarizing wage distribution. Worryingly, with the returns to basic education falling, the power of existing basic education systems to combat wage inequality has been reduced.

The results suggest that these shifts in returns are rooted in the emerging pattern of employment—a point reinforced by the analysis in the chapter *Growth amid change*, in Part 3 of *ADO 2007*. While the output of the much vaunted "knowledge economy" steams ahead (particularly in India), the employment shares of these nontraditional services are growing slowly, if at all, and from a low base. Thus the bulk of newly educated workers continue to find employment in traditional services, agriculture, construction, and where possible, manufacturing. Such workers are increasingly unemployed as well, and with greater frequency at higher education levels.

Unfortunately, the returns to basic education in agriculture (which outside the Philippines employs the majority of workers) and industry are generally only modest. In fact the returns to education in industry have fallen in all four countries, in some cases to very low levels. *Growth amid change* argues that industrialization is a prerequisite for growth that cannot be bypassed. The results from the current chapter suggest that industrial expansion is not being held back by a limited supply of basic education. On a more positive note, the returns to education in the aggregate services sector remain high.

Generalization, however, is fraught with difficulty, as some trends vary by country. The supply of secondary-educated workers is increasing very slowly in India, but racing ahead in the other three countries. Industry's employment share has grown recently in India and Thailand, but fallen in Indonesia and the Philippines. Manufacturing labor productivity has been stagnant since the 1970s in the Philippines (see Part 3), but only stalled in the aftermath of the Asian crisis in Indonesia. In India and Thailand, industrial labor productivity has been rising. With so many important differences, it is not obvious that returns are falling for the same reason in each country. Rigorously explaining trends and drawing general lessons is therefore very difficult. Furthermore, India and Thailand, where more jobs are being created that pay a high premium for education, will secure greater benefits from additional educated workers than will the Philippines.

Regardless of what may (or may not) be driving them, the trends themselves have implications. Falling returns to education indicate that if a lack of educated workers constrained productivity initially, then this constraint has loosened. And it has loosened most obviously in agriculture, industry, and lower-status services. Also, the results show quite clearly that as the supply of basic education expanded, jobs did

not grow organically to absorb the educated. Moreover, employment structures have clearly transformed fastest in the less-educated countries - India and Thailand. Of course the reasons for this could be legion, and cannot be ascertained with a sample of only four countries. But whatever the reasons, there is little evidence from these four examples that higher basic education levels bring structural change in their wake.

The leap from these results to policy is a long one. For one thing, education is obviously intended to do much more than raise wages and facilitate new economic activities. The results of this chapter also show that the wage premiums are sensitive to a wide variety of conditions that can change rapidly for reasons independent of the school system, so long-term state and individual education investment decisions should not be based entirely on current economic conditions. Nevertheless, a realistic sense of what the current employment structure is, and how it has been changing, are important for grounding education policy planning empirically.

Conclusive empirical research in education economics is always difficult, principally because crucial variables are always unmeasured, and some may be unmeasurable. The data used in this chapter do not capture school quality or skills. Datasets measuring skills and school quality exist, but were not designed to capture employment structure, and so cannot be used in a study of structural change. Therefore, while better education probably has a major role to play in facilitating change, the issue cannot be analyzed using the data available.

Given that increasing the quantity of educated workers is not a priority for facilitating transformation, but that improving the quality of education might be, it is vital that governments and development agencies working in the field focus on systematically measuring education quality to work out whether interventions have the desired results. Similarly, labor force surveys need to collect data on school attributes so that the labor market outcomes of differently educated workers can be more fully analyzed.

Education and economic growth

Models of education and growth can be divided roughly into two (Aghion and Howitt 1998). The first type of model considers education to be an input into production, much like equipment or labor (e.g., Mankiw, Romer, and Weil 1992). In this view, economies with greater numbers of educated workers should produce more output. Subject to certain technical assumptions, economies that accumulated more education should have grown faster and obtained higher income levels, other things being equal. Treating education as an input, and by introducing various market failures that could lead to underinvestment in education, numerous growth theorists have attempted to explain divergences in the growth paths of economies in terms of the growth of their education stock. Such market failures derive from spillovers of productivity between workers (Lucas 1988) and the difficulties with financing education given that it cannot be used as collateral for borrowing (Ljungqvist 1993; Galor and Zeira 1993; Azariadis and Drazen 1990).

None of these education-as-input models pay much attention to *why* education influences productivity, *what* workers might produce, *who*

should be educated, or *what types* of education to invest in. The central issues are the amount of human capital and output, not their composition or application. They are therefore fairly blunt in their policy implications. Most of them imply that subsidizing education can stimulate growth.

The second type of model considers education to be integral to an economy's capacity for technological innovation and adaptation. Thus, an economy that is far from some global technological frontier but that has a reasonable supply of educated scientists and managers will be able to catch up more quickly in technological terms, generating higher growth en route.

Nelson and Phelps (1966) are explicit that what matters for growth is not a high level of universal education, but having crucial personnel with the necessary education. According to these writers, to be crucial to transformation, a worker must be engaged in a nonroutine task, face new technological choices, and be in an organizational position to innovate. Presumably this implies the ability to redirect capital to new activities. In this view, productivity increases because education enables well-placed personnel to introduce new technologies, activities, and outputs.

Romer (1990) takes a more inclusive view of the role of education in transformation. In his model, the more education that is applied to research and development (R&D), the faster new activities are generated, and the higher the rate of growth. As educated labor could be attracted to pursuits other than R&D, countries with higher levels of universal education can engage in more R&D and grow faster. Romer's work on R&D is widely thought to describe conditions in advanced economies relatively well, while Nelson and Phelps' model of technology adoption and adaptation is a more apt description of developing economies' experiences.

Turning from models to data, there is substantial microeconomic evidence in favor of the view that the value of education in development depends on the scope for technology adoption. Studies of technology adoption are littered with evidence that more-educated workers have adopted new profitable technologies more readily. One particularly arresting and relevant example concerns the Green Revolution period in India. Foster and Rosenzweig (1996) observed that: more-educated households turned to high-yielding crop varieties (HYVs) more rapidly; those states that adopted HYVs experienced faster agricultural growth; returns to primary education expanded significantly during this time; and these returns increased faster in areas that grew faster. These results, and others like them (see also evidence presented in Rosenzweig 1995), point to a two-way causal relationship between education and growth, conditional on the availability of new and better technology.

As argued above, most of the education-as-input models predict that, other things being equal, output growth rates should correlate positively with the human capital *growth rate*. In contrast, Nelson and Phelps, and Romer predict that higher initial *levels* of education capital would drive subsequent output growth. So what do the data suggest? Notwithstanding some serious econometric problems with cross-country growth regressions, it is worth reviewing the evidence—limited and hotly debated as it is.

First, surprisingly, growth rates of education attainment are often

found to be *negatively* correlated with growth in GDP per worker. This regularity was reported by Pritchett (1996), Benhabib and Spiegel (1994), and Islam (1995). Given that models linking education to productivity growth are motivated by microeconomic evidence that employers are willing to pay more for educated workers, and that this willingness has been shown to reflect the greater cognitive skills of the educated (Glewwe 2002) this result appears paradoxical. For if education renders individual workers more productive, then surely across-the-board increases in education should render the aggregate labor force more productive as well? As these expected aggregate productivity improvements did not materialize, then "Where has all the education gone?" asks Pritchett. This extraordinarily important and startling paradox has sparked intense debate on how to measure education-growth relationships.

Nelson and Phelps, and Romer's views appear to survive empirical scrutiny. Several studies have found positive relationships between initial education levels and subsequent output growth. Benhabib and Spiegel (1994) show that even after correcting for income levels and education levels, those countries that were further from the world technological frontier, grew faster. Moreover, this rate of arguably technology-driven convergence is more rapid in countries with higher education levels. Bils and Klenow (2000) calibrate a growth model to see if it can explain the education–growth linkage. Critically, they find that most of the causality from education to growth must be explained by education's influence on technology.

Nevertheless, econometric problems preclude a neat conclusion of this debate. For example, Krueger and Lindahl (2001) have argued that the lack of a measurable relationship between education expansion and growth may simply reflect a failure to measure human capital stocks accurately. Hanushek and Woessmann (2007) review studies with more refined data, and conclude that both the level and growth rate of education attainment matter for growth. Moreover, they develop a dataset drawn by pooling the results of several international standardized tests of skills, and using it, find that growth is robustly related to the quality of education.

One important caveat on these results, entered quite convincingly by Bils and Klenow, is that the association between education and growth could be explained by reverse causality, as richer countries—or those anticipating more investment, higher returns to education, and faster growth—invest in more schooling. To date though, no microeconomic evidence on this question of reverse causality has been drawn from the developing world.

A rather different view of the role of education in growth comes from Lewis (2004), who argues that "public debate on education is confused" (p. 243), essentially because the role of education in development is misunderstood. He defines education as "the means through which societies acquire political philosophies based on individual rights." Any impact of such education on growth is likely to be long term. On the other hand, trainability, Lewis feels, or the capacity to learn to use new production technologies, is what matters for rapid labor productivity growth. In short, therefore, he argues, education is not a constraint on the ability of current workforces to be trained in operations with much higher productivity levels.

A brief overview of education outcomes and policy in four countries

Of the four countries studied in this chapter, India is the least educated. Thais are slightly less educated than Indonesians, and Filipinos are the most highly educated (Figure 3.2.1). Three of the four countries have aggressively pursued increases in education levels, especially at the secondary level, during the period under consideration. Around 9% of Thai secondary education is privately provided. The corresponding figure is 20% for the Philippines, down from 32% in the mid-1990s, and roughly 40% for India and Indonesia (Table 3.2.1).

3.2.1 Private school enrollment as percentage of total

	Secondary				Tertiary		
	India	Indonesia	Philippines	Thailand	Indonesia	Philippines	Thailand
1994	-	42.4	32.0	6.9	-	-	-
1995	-	-	30.8	6.2	-	-	-
1996	-	-	29.5	6.0	-	-	-
1997	-	-	-	-	-	-	-
1998	-	-	28.0	-	-	-	-
1999	-	-	26.3	-	-	73.1	-
2000	42.4	-	-	-	-	-	19.5
2001	42.6	42.7	22.7	6.7	62.8	68.7	18.9
2002	42.0	42.7	21.5	-	62.7	67.2	18.8
2003	41.9	42.9	20.5	8.2	61.1	66.4	-
2004	-	42.9	19.7	8.8	65.2	65.7	18.5
2005	-	-	-	12.9	-	-	16.9

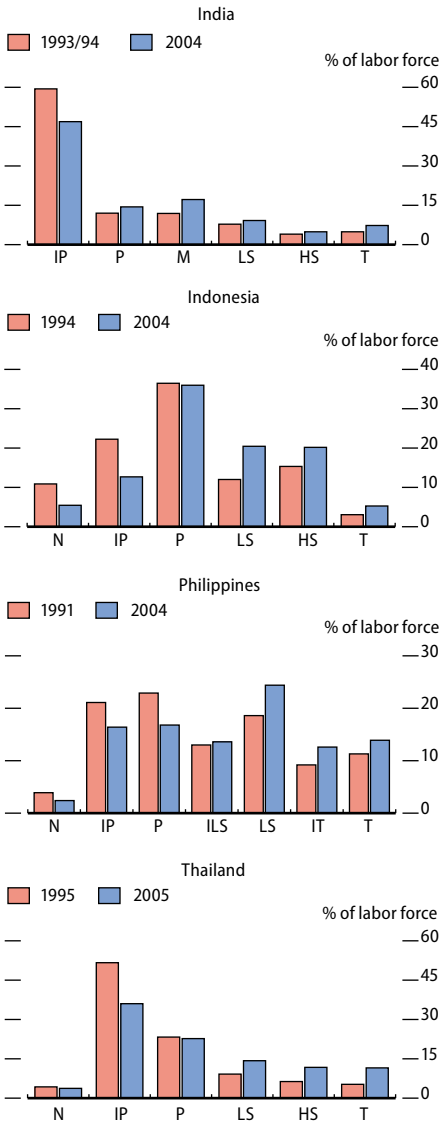
- = data not available.

Source: World Bank, available: http://genderstats.worldbank.org/edstats/query/default.htm, downloaded 17 January 2007.

Indonesia's Government undertook a sharp increase in primary school building in the mid-1970s, backed by oil revenues. This included the abolition of fees for grades 1–3 in 1976 and grades 4–6 in 1978. This led to a substantial increase in enrollment rates (Duflo 2001). Notwithstanding these gains in primary attendance, lower and upper secondary enrollment rates actually contracted during the fifth Five-Year Plan (1989–1994), reflecting perceptions of low returns to secondary education and high out-of-pocket costs (Booth 1999). Lower secondary education was therefore declared compulsory in the mid-1990s, though 10 years on, schools are still being created to accommodate the increased attendance (Sugiyarto, Oey-Gardiner, and Triaswati 2006). Around 40% of secondary education in Indonesia therefore remains privately provided. For tertiary education, the figure rises to 65% (Table 3.2.1).

Similarly, the constitution of the Philippines (1987) committed the state to providing quality affordable education at all levels to all people, and Republic Act 6655 (1988) followed this up with a concrete policy of free secondary education. These changes do not appear to have led to an acceleration in graduation rates, which were already high. However, private secondary school attendance has fallen (Table 3.2.1). The 1974 Bilingual (English-Tagalog Program) Education Policy and its renewal in 1987 permitted the use of the "local vernaculars….as auxiliary to the media of instruction, but only when necessary to facilitate understanding

3.2.1 Education profile of the labor force



N = none; IP = incomplete primary; P = primary; ILS = incomplete lower secondary; LS = lower secondary; HS = higher secondary; IT = incomplete tertiary; T = tertiary.

Note: Labor force refers to employed and unemployed persons 15 years old and above.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Indonesia SAKERNAS 1994, 2004; Philippine Labor Force Survey, 1991, 2004, October rounds; Thailand Labor Force Survey, 1995, 2005, October rounds.

Click here for figure data

of concepts being taught in English and Filipino" (Quisumbing 1989, p.311). The policy has resulted in a sharp decline in English proficiency across cohorts.

Education policy in the Philippines since the late 1970s has been driven by an explicit government policy to promote international migration as a solution to the local job creation problem, and a source of income (recorded transfers from migrants are as high as 10% of GDP) (Felipe and Lanzona 2006). Private vocational colleges, many of which operate as little more than "diploma mills," often connected to overseas employment agencies, have mushroomed. In combination with a trend toward opening state colleges (there were 19 in 1987, but 111 in 2006), this private-education expansion has led to a sharp rise in tertiary education, 66% of which is privately provided, and a polarization in quality. Moreover, the cost of the expansion into secondary and tertiary education, exacerbated by population pressure, has added to huge strains on education budgets and has drawn resources away from basic education (Maglen and Manasan 1998). Nevertheless, in the context of high unemployment, successive generations of Filipinos have continued to acquire increasing levels of education.

Thailand has historically had a difficult time expanding access to education, especially in rural areas. In the early 1990s, as low-skill industry boomed and as companies attempted to move up the value chain, limited availability of (especially) secondary graduates was viewed as a serious problem, and returns to education in the industry sector were high (Booth 1999; and Table 3.2.7 below). The Government responded. The 1997 constitution created a right to 12 years of free, quality basic education. The Education Act (1999) then extended mandatory schooling levels from 6 to 9 years. Together with rising income levels, which may have driven demand for secondary education, as well as tightening urban-rural linkages, such legislation led to significant expansions in secondary graduation rates in the 1990s and early 2000s. Education in Thailand remains mostly a public undertaking (Table 3.2.1).

Education policy in India has followed a different route. While by law education is free and compulsory up to the age of 14, in reality, only 53% of the labor force had completed primary school in 2004. The chief cause appears to be the abysmal quality of the primary education system (PROBE 1999, Pratham 2005). Primary enrollment rates have been extraordinarily low, particularly in rural areas, and among socially marginalized communities in both rural and urban settings. A sharp quality divide has emerged between public and private education, and a boom in urban working class incomes during the last decade has led to even tighter bottlenecks in admission to private education. Attempts to circumvent the quality problems in mainstream basic education through the promotion of vocational training also seem to have failed (Anant et al. 2006).

Meanwhile, India has cultivated a specialty in high-quality tertiary education. Graduates from elite, publicly supported science and technology institutes command impressive salaries, and aspirations to enter these institutions are high. Good private schools and colleges are also—increasingly—oversubscribed, as evidenced by the soaring "donations" for admissions through the 1990s. Given overwhelming evidence that

the small number of high-quality tertiary institutions is becoming a bottleneck, the Government is under increasing pressure to liberalize tertiary education—particularly rules governing foreign participation. Instead, it has responded with an ambitious plan to double the number of places at central government universities in order to accommodate further expansions in affirmative action for disadvantaged groups (Hasan and Mehta 2006). Notwithstanding the importance of tertiary institutions for Indian output, enrollment rates are currently around 14%, and only around 7% of the Indian labor force is college educated.

Changes in employment structure and education intensity

Figure 3.2.2 shows the education profiles of workers in agriculture, industry, and services. They very clearly show that agriculture hires the least-educated workers, and services the most-educated. Industry employs the modestly schooled.

With these trends in mind, it is useful to examine how the rise in education levels relates to changes in the structure of employment. Table 3.2.2 depicts the first, most aggregate pass at this for each of the four countries. The labor force is split into those working in the three major sectors of the economy and the unemployed. (Later on in this section a more disaggregated approach is taken, but with little change in the results.) Each country's employment profile was observed at two points in time between 10 and 13 years apart.

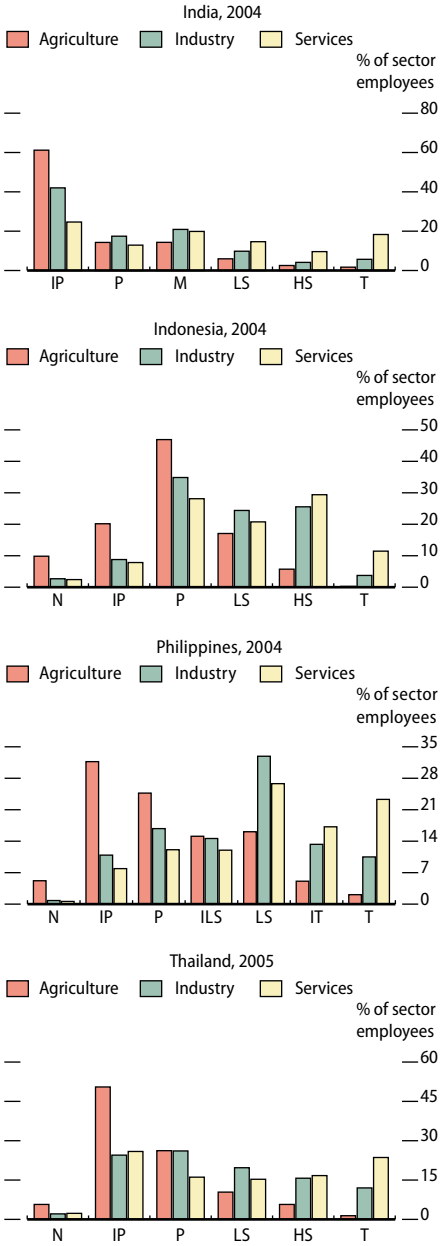
The first three columns depict the proportions of each country's labor force in each activity in the initial and final years, and how they have changed. (Note that unemployment rates are comparable over time but not across countries.) The table shows unemployment rising rapidly in every country. Trends in agricultural, industrial, and services employment shares, however, are country specific.

Agriculture's employment share has been declining very rapidly in those countries that reached their land frontiers before the 1990s. The Philippines ran out of new arable land in the 1970s. Thailand did so by 1980, as did most regions of India. In contrast, Indonesia, which is still clearing forests for agriculture, experienced only a small decline in agriculture's employment share. The Indonesian figures also reflect a return of low-skilled labor to agricultural activity in the wake of the Asian crisis of 1997–98. Thailand, with its more sophisticated arrangements for reallocating capital, has come back from the crisis sooner than Indonesia, and agricultural employment has continued to contract.

Industrially, India has had some recent success, while Thailand has been industrializing for some time now. Industrial employment in Indonesia and the Philippines has been shrinking. *Growth amid change* (Part 3) shows that this deindustrialization is occurring at very low levels of industrial development, which raises alarm bells, especially in the Philippines, where deindustrialization cannot be explained in terms of the crisis alone.

Services employment is rising everywhere, though most in the

3.2.2 Education distribution by sectors



N = none; IP = incomplete primary; M = middle; P = primary; ILS = incomplete lower secondary; LS = lower secondary; HS = higher secondary; IT = incomplete tertiary; T = tertiary.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Round 60, January–June 2004; Indonesia SAKERNAS 2004; Philippine Labor Force Survey, October 2004; Thailand Labor Force Survey, October 2005.

Click here for figure data

3.2.2 Education intensification and structural change, lower secondary

India	Employment share (%)			Education intensity (%)			Between sector	Within sector	Contribution by sector	Contribution by sector (%)
	1993/94	2004	Change	1993/94	2004	Change				
Aggregate	100.0	100.0	0.0	16.7	21.5	4.8	1.8	3.0	4.8	100.0
Agriculture	59.3	51.3	-8.0	6.8	10.2	3.4	-0.5	1.7	1.2	24.6
Industry	15.1	19.0	3.9	18.4	19.6	1.2	0.7	0.2	0.9	19.8
Services	21.9	24.7	2.8	38.0	42.6	4.6	1.1	1.1	2.2	46.1
Unemployed	3.8	5.1	1.3	41.2	39.3	-1.9	0.5	-0.1	0.5	9.5
Percentage of intensification due to between- and within-sector effects							37.3	62.7		
Indonesia	**Employment share (%)**			**Education intensity (%)**			**Between sector**	**Within sector**	**Contribution by sector**	**Contribution by sector (%)**
	1994	2004	Change	1994	2004	Change				
Aggregate	100.0	100.0	0.0	30.4	45.9	15.5	1.5	14.0	15.5	100.0
Agriculture	42.9	40.5	-2.4	12.1	23.1	11.0	-0.3	4.5	4.2	26.9
Industry	18.2	16.8	-1.3	34.1	53.7	19.6	-0.5	3.3	2.8	18.3
Services	34.3	36.2	1.8	45.5	61.6	16.1	0.8	5.8	6.7	42.9
Unemployed	4.6	6.5	1.9	74.4	81.4	7.0	1.4	0.5	1.8	11.9
Percentage of intensification due to between- and within-sector effects							9.6	90.4		
Philippines	**Employment share (%)**			**Education intensity (%)**			**Between sector**	**Within sector**	**Contribution by sector**	**Contribution by sector (%)**
	1991	2004	Change	1991	2004	Change				
Aggregate	100.0	100.0	0.0	39.1	50.9	11.7	3.4	8.3	11.7	100.0
Agriculture	41.3	33.1	-8.2	17.1	23.2	6.2	-1.4	2.0	0.6	5.4
Industry	14.6	13.7	-0.9	46.5	56.7	10.3	-0.4	1.4	1.0	8.3
Services	35.1	42.3	7.2	57.5	67.3	9.8	4.1	4.2	8.3	70.6
Unemployed	9.0	10.9	1.9	56.7	63.5	6.8	1.1	0.7	1.8	15.7
Percentage of intensification due to between- and within-sector effects							29.0	71.0		
Thailand	**Employment share (%)**			**Education intensity (%)**			**Between sector**	**Within sector**	**Contribution by sector**	**Contribution by sector (%)**
	1995	2005	Change	1995	2005	Change				
Aggregate	100.0	100.0	0.0	20.2	36.5	16.3	2.8	13.6	16.3	100.0
Agriculture	51.4	42.0	-9.4	6.7	17.5	10.7	-0.6	4.5	3.9	23.7
Industry	19.5	21.6	2.2	28.4	46.6	18.3	0.6	4.0	4.6	27.9
Services	28.0	35.0	7.0	38.8	51.9	13.1	2.7	4.6	7.3	44.8
Unemployed	1.1	1.4	0.2	27.6	65.4	37.9	0.1	0.5	0.6	3.5
Percentage of intensification due to between- and within-sector effects							17.0	83.0		

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Indonesia SAKERNAS 1994, 2004; Philippine Labor Force Survey, 1991, 2004, October rounds; Thailand Labor Force Survey, 1995, 2005, October rounds.

Philippines and Thailand. In India, where industrial employment surged, services employment rose only slightly, challenging the view from value-added data that India is becoming a services economy. Low net exit from agriculture in Indonesia has been associated with limited services growth.

The next three columns of the table depict measures of education intensity—the share of workers in each sector holding at least a lower secondary (LS) certificate—and how they have shifted. Consistent with Figure 3.2.2, services are always the most intensive users of LS graduates, followed by industry, and then agriculture. Also, the unemployed are more likely to have completed LS than the employed.

In Indonesia, Philippines, and Thailand, LS intensities are rising rapidly economywide. India is focusing on raising primary completion rates and LS prevalence has grown much less. Not having many primary graduates to push up the ladder further, limits scope for LS expansion in India. Perhaps most important, education intensity has risen in every section of the labor force.

The seventh column asks what increase in the labor force share of LS educated workers would be required algebraically to support the observed

change in employment structure, without raising LS prevalence within sectors. In India, for example, with 38% of service workers having LS education initially, 2.8% growth in the services employment share would have required a further 1.1% of the labor force to pass LS (1.1% = 38% x 2.8% x 100). Adding this 1.1% to the corresponding projected changes in the other three sectors implies that to accommodate its employment shift between these four sectors without increasing LS-intensity within sectors, India would have required only a 1.8% increase in LS graduates. The remaining 3% increase in graduates' share in the labor force (or 62.7% of the 4.8 point intensity increase between 1993/94 and 2004) is accounted for by increases in intensity *within* each sector.

The penultimate column shows that, of the 4.8 point increase in LS graduates, 2.2% of the labor force (or 46.1% of the increase in graduates) were absorbed in services. Given that the sector employs only 24.7% of the labor force, services disproportionately absorbed the increase in LS educated workers. So did unemployment.

This last trend, whereby services and unemployment disproportionately absorb LS graduates, is common to all countries. Industry also absorbs its fair share of LS graduates in India and Thailand.

Country experiences differ. In rapidly educating and glacially transforming Indonesia, structural change accounts for less than a tenth of the increase in education. That figure rises to 17% in Thailand, where rapidly rising employment in industry and services helped absorb some of the educated entrants. The extraordinarily large increase in education among Thailand's unemployed is also noteworthy. In the Philippines, nearly 30% of the observed intensification can be algebraically attributed to structural change, as workers shifted out of both (education unintensive) agriculture and industry, and into services and unemployment. As the country deindustrialized, services absorbed 70% of new graduates.

These differences notwithstanding, what remains remarkable is the much larger portion of the education expansion that is *not* attributable to structural change at the four-sector level. A possible explanation is that four sectors is not enough, and this analysis masks subsectoral shifts in the composition of economic activity. Perhaps education-intensive *subsectors* have been growing. Therefore, a more disaggregated look at the data is warranted. (Unfortunately, incompatibility of sector classifications

3.2.3 Contribution of structural change to Education intensification in the services sector, lower secondary, Philippines

	Employment share (%)			Education intensity (%)		
	1991	2004	Change	1991	2004	Change
Retail trade	32.7	33.5	0.7	45.5	61.0	15.4
Transportation and storage	12.2	15.4	3.1	49.1	57.2	8.1
Personal and household services	17.8	14.2	-3.6	34.2	48.1	13.9
Public administration and defense	11.1	9.6	-1.5	84.7	84.0	-0.7
Education	8.1	6.4	-1.7	96.8	98.3	1.6
Hotels and restaurants	3.7	5.3	1.6	59.6	76.6	17.0
Business services	2.5	4.0	1.5	83.5	92.7	9.2
Health, social work, and other social and community services	3.4	3.1	-0.3	83.6	87.9	4.3
Wholesale trade	3.0	2.9	-0.1	55.9	60.5	4.7
Recreational and cultural services	1.9	2.0	0.1	55.8	65.6	9.9
Communications	0.6	0.9	0.3	94.8	96.4	1.6
Banking institutions	1.2	0.8	-0.3	95.4	97.5	2.1
Nonbank financial intermediation	0.3	0.8	0.6	90.4	95.1	4.7
Real estate	0.6	0.7	0.1	79.6	90.8	11.1
Insurance	0.6	0.3	-0.3	96.2	93.5	-2.7
Sanitary and similar services	0.1	0.2	0.0	70.0	22.4	-47.6
Extraterritorial organizations and bodies	0.2	0.0	-0.2	82.9	100.0	17.1
Services sector as a whole	100.0	100.0		57.3	67.3	10.0
Increase in lower secondary intensity necessary to accommodate shifting labor force shares between sectors						-0.2
As percentage of observed increase in intensification						-1.9
Increase in lower secondary intensity due to rising intensity within sectors						10.2
As percentage of observed increase in intensification						101.9

Source: Philippine Labor Force Survey, 1991, 2004, October rounds.

between survey years precludes a much more detailed analysis of the Indonesian experience.)

Noting that an 86% of the increase in educated Filipino workers was absorbed into services and unemployment, Table 3.2.3 disaggregates services to shed light on why 10% more service workers now have LS degrees. The results are stark. If education intensities in the 17 services subsectors remained unchanged, while employment shares moved as they have, the share of service workers with LS education would have *fallen* by 0.2 percentage points. This happens for two reasons. First, the changes in employment shares (third column) are not large, indicating very little structural change within services. Second, while employment shares in a few LS-intensive subsectors (e.g., "business services," "hotels and restaurants") have increased, unintensive sectors (e.g., "transportation") have grown as well. Thus *the entire* increase in education intensity in services is algebraically attributable to intensification *within* these 17 subsectors.

Together with Table 3.2.2, these results show that, other than a push out of agriculture into services and unemployment, there have been precious few changes in the structure of the Philippine economy that could absorb the surge in educated workers.

In Thailand and India, all sectors absorbed significant numbers of the educated, so it is more useful to disaggregate their entire employment structure, not just the services sector. Table 3.2.4 shows that in Thailand, even after disaggregating the labor force into 23 subsectors, transformation only explains 21% of the proliferation of LS graduates. Although some education intensive subsectors of the economy (e.g., "manufacturing and repair," "hotels and restaurants") grew, they were initially not sufficiently large or education intensive to absorb the increase in educated workers. Similarly in India, a 25 subsector decomposition (Table 3.2.5) only raises the fraction of intensification explained by structural change from 37% to 39%. Thus, education levels rose in almost every subsector in both countries.

Indian and Thai employment data share other important features. Manufacturing's employment share is growing. Construction is booming, at least in India, while the apparent construction slowdown in Thailand is relative to the pre-Asian crisis building

3.2.4 Decomposing Education intensification into 23 subsectors, lower secondary, Thailand

	Employment share (%)			Education intensity (%)		
	1995	2005	Change	1995	2005	Change
Agriculture, hunting, and forestry	50.3	40.8	-9.5	6.6	17.4	10.8
Fishing	1.1	1.2	0.1	12.7	20.3	7.6
Mining and quarrying	0.1	0.1	0.0	26.6	39.8	13.3
Manufacturing and repair	13.3	16.2	2.9	31.0	51.7	20.7
Electricity, gas, and water supply	0.5	0.3	-0.2	77.2	74.9	-2.3
Construction	5.6	5.0	-0.6	18.2	29.0	10.9
Retail trade	9.9	10.3	0.3	31.4	47.8	16.4
Transportation	2.8	2.6	-0.2	27.5	44.7	17.2
Personal and household services	1.8	1.8	0.0	15.2	32.8	17.5
Public administration and defense	3.0	3.1	0.1	69.2	81.3	12.1
Education, science, and research	2.7	3.2	0.5	37.5	38.6	1.1
Hotels and restaurants	3.2	6.3	3.1	32.1	39.9	7.8
Health and medical services	0.9	1.4	0.5	79.5	86.1	6.6
Social work, and other social and community services	0.1	0.3	0.3	37.4	71.4	34.0
Wholesale trade	1.6	2.5	0.9	31.8	48.7	16.9
Recreational, cultural, and sporting activities	0.3	0.6	0.3	36.8	64.7	27.9
Warehousing	0.0	0.1	0.1	46.0	65.7	19.7
Communication	0.2	0.2	0.1	89.7	89.1	-0.6
Financial intermediation	0.6	0.7	0.1	85.5	93.5	8.0
Real estate	0.1	0.3	0.1	73.9	58.9	-14.9
Business activities including renting	0.6	1.4	0.8	61.3	68.5	7.3
Insurance	0.2	0.3	0.1	78.4	85.4	7.1
Sanitary and similar activities	0.1	0.2	0.1	14.5	30.4	15.9
Unemployed	1.1	1.4	0.3	27.6	65.4	37.9
Aggregate	100.0	100.0	0.0	20.1	36.5	16.3
Increase in lower secondary intensity necessary to accommodate shifting labor force shares between sectors						3.4
As percentage of observed increase in intensification						21.1
Increase in lower secondary intensity due to rising intensity within sectors						12.9
As percentage of observed increase in intensification						78.9

Source: Thailand Labor Force Survey, 1995, 2005, October rounds.

boom. Wholesale trade is on the rise. Growth of India's transport sector in this context probably reflects demand-side factors, rather than just growing labor supply (as it does in the Philippines). Even in Thailand, where transport's employment share fell slightly, crudely disaggregating the employment data shows a falling share of taxi drivers, and a rising share of truck drivers.

Furthermore, there is credible evidence of falling education intensity within some large subsectors in India. One positive sign is the 2.5 point reduction in the proportion of workers in household and personal services with LS degrees. This subsector, which includes most of the traditional trades—hair-dressing, house cleaning, child care, etc.—is probably a residual category housing many of the disguised unemployed. De-intensification in this sector might indicate that secondary graduates are finding more remunerative employment.

Perhaps the most surprising result in India is the de-intensification of business services and IT-enabled services. The sector contains a large and diverse set of services besides IT, and has doubled its employment in absolute terms. Indeed, one common feature of transformation is that firms outsource a number of activities, leading to growth in separate low-skill business services such as photocopying, renting of equipment, filing, etc. If growth of low-skill complementary services indeed explains the de-intensification of business services, this puts the promise of job growth led by the high-tech business services sector into perspective. This sector must have employed far less than 0.9% of India's labor force in 2004.

Also in contrast to the hype about India's high-end service economy, labor force *shares* in most "knowledge economy" subsectors (including education, science, and research; financial intermediation; business services; insurance) are much larger in Thailand than in India. On recent trends, this is unlikely to change.

Finally, the above tables help to examine the role of increased international competition between workers in driving demand for education. This role is often championed by the media. From the disaggregated analyses of each country, it can be seen that the majority of additional educated workers are absorbed in the nontraded services sector

3.2.5 Decomposing Education intensification into 25 subsectors, lower secondary, India

	Employment share (%)			Education intensity (%)		
	1993/94	2004	Change	1993/94	2004	Change
Agriculture, hunting, and forestry	58.8	50.9	-8.0	6.9	10.2	3.3
Fishing	0.5	0.4	0.0	3.7	8.1	4.4
Mining and quarrying	0.8	0.9	0.1	14.5	15.2	0.7
Manufacturing	10.4	11.7	1.3	20.3	23.1	2.8
Utilities	0.4	0.3	-0.1	47.5	51.0	3.5
Construction	3.5	6.1	2.6	10.5	12.1	1.6
Retail	5.9	5.2	-0.6	26.0	31.7	5.7
Transportation	2.7	3.8	1.0	22.6	24.4	1.8
Household and personal services	2.7	2.1	-0.6	11.3	8.7	-2.5
Public administration and defense	3.2	2.1	-1.1	60.8	65.5	4.7
Education, science, and research	1.8	2.4	0.6	83.8	86.3	2.5
Hotels and restaurants	0.9	1.3	0.5	13.8	20.2	6.4
Health and medical	0.5	0.7	0.2	69.6	77.7	8.1
Social work and other community services	0.3	0.4	0.1	30.7	39.7	9.0
Wholesale trade	1.2	2.8	1.7	38.3	42.7	4.5
Recreational and cultural services	0.2	0.2	0.0	37.8	39.9	2.1
Warehousing	0.0	0.0	0.0	28.3	49.0	20.8
Communications	0.2	0.4	0.2	71.9	76.5	4.6
Financial intermediation	0.5	0.5	0.0	87.1	82.8	-4.4
Real estate	0.0	0.1	0.0	56.1	64.3	8.2
Business services	0.3	0.9	0.6	75.3	70.1	-5.2
Insurance	0.1	0.1	0.1	86.9	91.9	5.0
Sanitary and similar services	0.1	0.1	0.0	11.6	12.4	0.8
Extraterritorial organizations and bodies	0.0	0.0	0.0	62.9	35.6	-27.3
Repair	1.0	1.3	0.3	23.7	29.3	5.6
Unemployment	3.8	5.1	1.3	41.2	39.3	-1.9
Aggregate	100.0	100.0	0.0	16.7	21.5	4.8
Increase in lower secondary intensity necessary to accommodate shifting labor force shares between sectors						1.9
As percentage of observed increase in intensification						39.4
Increase in lower secondary intensity due to rising intensity within sectors						2.9
As percentage of observed increase in intensification						60.6

Source: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004.

and in unemployment—i.e., they are not in competition with foreign workers. Further, even in India and Thailand, where industry is absorbing educated workers, this is not sufficient to posit a link between trade and education. Specifically, in India, industrial workers have become less educated than the labor force at large during the very time when trade has been liberalized and industrial exports have been growing. And, as the next section shows, returns to education in Indian and Thai industry have also been falling during this time.

Returns to education

The above results are insufficient for drawing economic conclusions regarding the need for educated workers. True, education levels are rising in almost every subsector of the economy. But this could simply reflect a shortage of educated workers in the first place. To understand whether educated workers are over- or undersupplied, the discussion now turns to an analysis of the relative prices (wages) of workers of different education levels.

To do so, Box 3.2.1 introduces two important terms—the Mincerian and full rate of return—and explains how each of them could be interpreted to assess whether the labor force is "overeducated" relative to the job opportunities available.

Table 3.2.7 presents Mincerian returns to years of different levels of schooling for workers in two experience brackets—those who left school 10–15 years before the sample was drawn ("midcareer workers"), and those who did so 20–25 years before ("senior workers"). These returns are calculated from median wages paid to employees in each education category. Returns to education for all employees are presented first, followed by the returns among agricultural, industrial, and services sector workers. Returns for each experience bracket are provided from the initial survey year (10–13 years before) and the final survey year (2004 or 2005). There are several gaps in the table corresponding to returns that could not be estimated because there were too few sector workers with the necessary education and experience levels in the sample.

Several trends are apparent in the Mincerian returns. They are lower at lower levels of the school system, probably because private costs of basic education are lower as well. Moreover, returns to basic education (primary, middle, and sometimes LS school) have fallen in most sectors. Nowhere is this clearer than in the industry sector, where the returns to basic education are now moderately low. The immediate implication of falling returns is that if the supply of educated workers has been a constraint on industrial growth, this bottleneck is easing. One interpretation of this result is that the expansion of supply of suitably educated workers for industrial jobs has reduced scarcity. A possible complementary explanation is that, consistent with the writings of Harry Braverman (1974), industrialization and the splitting of the industrial supply chain across ever-more workers have led to tasks being fragmented to an extent where mental acuity and flexibility no longer matter as much.

In contrast with basic education, tertiary returns have risen. This is consistent with many studies documenting a polarizing income distribution in Asia.

3.2.1 Mincerian returns vs. full returns to education

The Mincerian return (Mincer 1958) to a particular education qualification is the percentage difference in wages earned by two workers who differ only in that one has the qualification and the other does not. The full (private) rate of return captures this wage premium, aggregated over the workers' careers, but also factors in the direct costs (fees, uniforms, books, etc.) of obtaining the qualification. Given that wages rise slowly over a worker's career, and that schooling is relatively expensive, the full rate of return is usually lower than the Mincerian return (for illustration, see Psacharopoulos and Ng 1994; for emphasis, see McEwan 1999).

Thus, if Mincerian returns are zero, full rates of return are usually negative. Or, if the Mincerian return is smaller than the return to other forgone investments in the economy, the full rate of return is likely to be below the opportunity cost of investment as well. In such a circumstance, the workforce may be said to be "overeducated" (Harberger 1965). Whereas a growing body of work on overeducation provides several other, generally weaker definitions of the phenomenon (McGuinness 2006), given the variety of other roles served by education in development, this chapter uses the definition least likely to take issue with investments in schooling economically.

This brief overview of the relationship between Mincerian and full returns was necessary, because while the results in the previous section imply that it will be useful to ask whether investments in education are paying off, good estimates of the direct cost of schooling are lacking. In the following section, any situation wherein the Mincerian return is less than the real cost of funds is taken to be indicative of "overeducation." The return on a 10-year bond, corrected for expected inflation (box table) is taken as an estimate of the economywide real cost of funds. The economic cost of funds for education investment would certainly be higher than these rates, as sovereign loans carry lower rates of interest than private ones, especially private loans to finance education. Using these rates therefore deliberately biases the study against finding evidence of overeducation.

A cautionary word: overeducation may be short term, while investments in schooling are not, so the distance from such results to education policy should not be traversed in a single bound. Further, several benefits of education are not captured in wages, implying that private returns underestimate the social returns. Conversely, if talent is not observable, academic credentials may be used to dispense better jobs or promotions, in which case the private returns overstate the true social returns of education.

While the evidence from a very limited set of developing countries suggests that this type of "credentialism" is not empirically important for determining wages (Glewwe 2002), the issue could well be important in extreme environments where unemployment is high and education levels are rising fast. Thus, the following analysis of wage returns should only be taken as a crude indicator of where overeducation is occurring.

Rather than drawing education policy conclusions from this, it is hoped that the results will draw attention to other distortions that may be preventing the full benefits of schooling from being realized.

Estimated cost of funds, %

	Period bond rate observed	Annual inflation in year of observation	10-year bond rate	Minimum real cost of funds
India	June 2004	6.4	5.9	-0.5
Indonesia	August 2004	6.1	6.1	0.0
Philippines	October 2004	6.0	13.5	7.0
Thailand	October 2005	4.5	6.1	1.5

Sources: Asian Development Outlook database; CEIC Data Company Ltd.; Money Market Association of the Philippines, available: http://www.mart.com.ph; Bloomberg; all downloaded 26 February 2007.

Returns in services are higher than in industry and agriculture. This suggests that the concentration of more-educated workers in services is not entirely residual. In contrast, comparing the returns between agriculture and industry does not yield obvious trends.

Finally, returns to higher secondary and tertiary education, and in the Philippines, LS education, have mostly held up much better for senior workers than their midcareer counterparts. These effects are most pronounced in industry and services (except in Thailand). Combined with falling returns to basic education and rising returns to tertiary, this yields a picture highly evocative of Nelson and Phelps' view of the links between education and structural change. Highly skilled workers in senior positions who can introduce new ideas and technologies are rewarded well for their education, while more junior workers are not.

3.2.7 Returns to education by sector, cohort, and country

	All sectors				Agriculture				Industry				Services			
	Initial		Subsequent		Initial		Subsequent		Initial		Subsequent		Initial		Subsequent	
	MC	S	MC	S	MC	S	MC	S	MC	S	MC	S	MC	S	MC	S
India	1993/94		2004		1993/94		2004		1993/94		2004		1993/94		2004	
Middle	9.1	10.1	6.3	12.3	0.0	2.3	3.4	0.0	11.1	11.9	7.3	3.6	5.2	13.1	8.7	14.5
Secondary	14.5	26.4	10.1	23.3	0.0	10.1	3.6	0.0	11.2	20.3	2.8	14.5	16.7	12.8	10.3	18.6
Higher secondary	22.5	7.3	14.6	16.0			0.0		12.8	3.3	8.0	6.9	16.3	5.9	18.4	13.1
Postsecondary	15.9	15.4	29.6	20.1					18.6	17.4	28.9	23.3	13.9	15.2	20.5	20.5
Indonesia	1994		2004		1994		2004		1994		2004		1994		2004	
Primary school	3.1	12.2		5.8		6.0		6.6		5.3				17.4		
Junior high school	11.6	14.0	11.2	18.6	12.0	26.6	10.1	21.6	7.4	11.9	7.7	6.8	11.6	9.1	14.1	21.1
Senior high school	11.9	14.9	10.9	19.7	10.1		14.5	10.1	10.8	18.6	10.1	12.6	11.7	13.5	13.0	14.5
Tertiary	9.3	10.3	12.5	5.7					24.8	25.7	17.0	18.9	8.4	9.0	12.5	5.7
Philippines	1991		2004		1991		2004		1991		2004		1991		2004	
Elementary graduate	3.7		7.0	12.2												
High school graduate	16.1	10.4	7.5	9.8	5.7	0.0	4.7	2.0	9.3	2.6	3.6	5.7	24.3	17.2	10.1	10.9
College graduate	12.6	11.6	18.9	22.2					11.0	17.0	11.1	18.9	16.0	10.4	19.6	21.3
Thailand	1995		2005		1995		2005		1995		2005		1995		2005	
Elementary	7.4	10.6	11.0	6.2		7.0		3.1		10.0	3.8	4.2	7.6	11.4	11.3	5.8
Lower secondary	7.7	26.8	5.3	13.4	5.3		-1.4	12.6	5.4	21.3	3.7	7.1	11.1	25.0	8.4	15.5
Upper secondary	13.8	8.7	9.5	17.0			8.1	9.0	15.9	36.5	5.3	14.5	9.6	8.7	8.5	16.5
Postsecondary	16.1	15.6	19.4	28.7					13.6	7.4	23.3	36.1	16.7	14.7	17.2	24.6

- = insufficient sample size for calculation of returns.

MC = midcareer workers; S = senior workers.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Indonesia SAKERNAS 1994, 2004; Philippine Labor Force Survey, 1991, 2004, October rounds; Thailand Labor Force Survey, 1995, 2005, October rounds.

Turning next to country specifics, consider India, where returns to basic education in agriculture, which employs a large majority of the primary educated, are very low. Indeed, given the low Mincerian returns, the full returns to education in India's agricultural sector are probably negative (the direct costs of schooling in India are reported to be high relative to the incomes of the poor)—a certain indicator of over-education. Overeducation in the context of rampant illiteracy implies only that the problem originates outside the education system. While India's public schools are in a sorry state, especially in rural areas, these startling results cannot be ascribed to school quality. Economywide returns to basic education in India were much higher in 1993/94, but have fallen since then. Problems detailed in PROBE (1999) indicate that quality has been a problem for a lot longer. It is therefore more likely that the low returns in agriculture reflect the well-documented stagnation of agricultural productivity. Reasons for this stagnation, and what to do about it, are presented in the chapter on India in Part 2 of *ADO 2007*.

As in other countries, India's returns to basic education in industry have fallen (as well as in agriculture), further dragging down the overall returns. Economywide, only returns to college and, for older workers,

higher secondary education, have grown. However, returns at some levels of education and experience are rising in the services sector.

The Indonesian story is complicated by reverse migration. Less-educated workers in Indonesia were disproportionately pushed out of industry into lower-productivity agricultural jobs, driving up the returns to schooling. This was probably especially relevant for senior workers, among whom job stability would be positively correlated with education. This exemplifies the idea that if job security is tied to education, high returns in a turbulent environment do not necessarily reflect a real scarcity of educated workers. Conversely, education expansion may have exerted pressure in the other direction, driving returns down. The inability to track changes in Indonesian employment structure at a more disaggregate level precludes a more detailed interpretation of these results.

Returns to LS schooling fell sharply in the Philippines, albeit from a high base. In contrast, tertiary education has become more valued over time. Certainly, falling returns to LS schooling are consistent with the increased supply of educated workers, deindustrialization, and structural stagnation in services described in the previous section. Moreover, the next section shows that in some of the faster growing services occupations, returns to education are approximately zero.

It is also useful to note that in the Philippines there has been a substantial increase in education requirements for access to jobs. A survey compiled by the Bureau of Labor and Employment Statistics shows that LS or college degrees are now required for entry to every formal sector job in the country. An obvious interpretation is that as education levels rose, education criteria for the same old jobs became tighter, and the returns (probably associated with rank in the company hierarchy) simply migrated up the education ladder. This view sits well with the findings of the Philippine Presidential Commission on Educational Reform 2000 Report, which lamented that: "The country has too long suffered the imbalance of an overly credential-conscious society, which puts a premium more on diplomas than knowledge or skills, and values prestige institutions granting degrees more than the competence that the degree itself embodies."

It is important to note that according to the Commission on Higher Education, 66% of college education in the Philippines in 2003/04 was privately provided, and therefore unsubsidized. This may help to explain why wage returns to college have not been driven down by supply.

The real cost of funds in the Philippines in 2004 was roughly equal to the LS Mincerian returns in 2004, so overeducation is likely, especially in agriculture and industry. Having said this, the high cost of funds at that time was due to the Philippine Government's poor external debt position, which is now on the mend. Thus overeducation could be temporary. However, unless long-term stagnation within and outside agriculture is reversed, returns could fall well below the cost of funds.

Finally, in Thailand, where secondary education was made free of charge in the period considered, the supply of LS graduates has boomed and returns have fallen. While midcareer workers are too old to have taken advantage of these public subsidies, they are probably more readily replaceable by younger workers than the older cohorts. Thus it seems

reasonable that the entry of large numbers of new graduates would have driven down their returns on LS schooling. However, most college schooling is still not subsidized in Thailand, and returns to college are therefore still rising, particularly as the services sector takes off. There is also no apparent bottleneck in the supply of industrial workers with basic education. The somewhat low returns to basic education are compensated for by a low cost of funds, so it is not clear whether Thai workers are overeducated.

A look at some telling occupations

An earlier section (*Changes in employment structure and education intensity*) showed that the availability of secondary-educated workers has expanded far faster than structural change would require algebraically, so that education levels within almost every subsector of the economy have risen. It also finds many of the newly educated employed in sectors that are shown to have very low returns. The previous section (*Returns to education*) went on to show many bottlenecks due to the limited availability of workers with basic education easing. However, it is premature to conclude that more education is not necessary. It remains possible that rising education levels within subsectors result from technological changes.

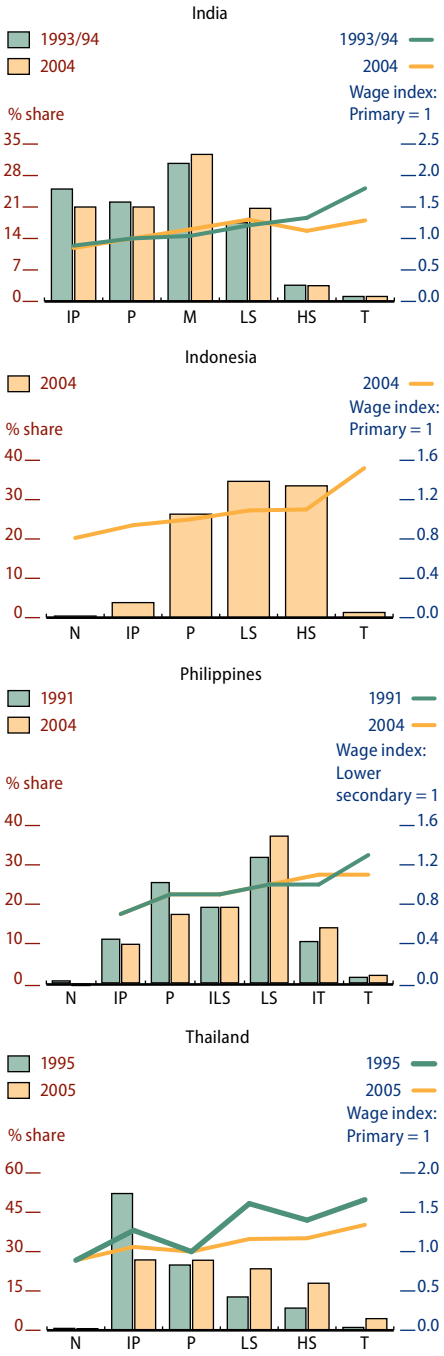
Figures 3.2.3–9 show how the distribution of education and the wage returns have altered among employees within several occupations in the four countries. Table 3.2.8 provides estimates of the relative importance of these activities over time.

While much could be said about the details of these figures, three points stand out. First, within any given occupation, education levels differ tremendously across countries. Consider drivers (Figure 3.2.3), the median among whom have around 6 years of education in Thailand, 7 years in India, 9 in Indonesia, and 10 in the Philippines. Similar discrepancies are observed in all occupations, with Indian and Thai workers always having the lowest education levels, Indonesians occupying the middle, and Filipinos always being the most educated. Given the broad similarity of technologies utilized by drivers and household helpers across countries, it is difficult to conceive of good reasons why demand for education in these activities should vary so much. It seems likely that these are residual categories into which workers of any education category may fall, rather than face unemployment. The detailed examination of wages in these jobs, below, reinforces this interpretation.

Second, the wage returns align with the more aggregate results from the previous section. Education wage premiums in most of these services sector occupations have fallen in the Philippines and Thailand, but appear to have held firm in India.

Third, the first four occupations in Table 3.2.8 are clearly not what one has in mind when one speaks of the "knowledge economy." Yet to be sure, they account for a substantial, and in the Philippines and India—a growing—share of nonagricultural employment. The case that transformation requires more education across the board must hinge on some notion that these rather significant sources of employment will be phased out soon.

3.2.3 Education profile and wage indexes of male drivers



N = none; IP = incomplete primary; M = middle; P = primary; ILS = incomplete lower secondary; LS = lower secondary; HS = higher secondary; IT = incomplete tertiary; T = tertiary.

Note: Limited to commercial drivers and to those reporting wages.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Indonesia SAKERNAS 1994, 2004; Philippine Labor Force Survey, 1991, 2004, October rounds; Thailand Labor Force Survey, 1995, 2005, October rounds.

Click here for figure data

3.2.8 Prevalence of selected occupations

Occupation	India		Indonesia	Philippines		Thailand	
	1993/94	2004	2004	1991	2004	1995	2005
Male drivers [a]	2.6	4.1	3.0	14.4	17.5	13.2	10.9
Female household servants [b]	6.5	9.9	4.7	10.3	11.6	2.7	1.8
Male security guards [a]	1.3	1.2	1.4	-	-	1.6	1.2
Retail sales staff	2.1	2.8	-	2.6	3.4	2.4	7.4
Directors and managers, financial [c]	0.3	0.3	-	-	-	-	-
Bookkeepers and cashiers [c]	0.8	0.6	1.4	-	-	3.3	1.9
Clerical workers [c]	4.3	3.5	-	3.8	4.4	0.3	0.6
Engineers and engineering technicians [c]	0.9	0.9	-	-	-	0.4	1.0

- = no directly comparable data available.

[a] % of total male nonagricultural employment. [b] % of total female nonagricultural employment. [c] % of total nonagricultural employment.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Indonesia SAKERNAS 2004; Philippine Labor Force Survey, 1991, 2004, October rounds; Thailand Labor Force Survey, 1995, 2005, October rounds.

With regard to the details of jobs, it can be seen that drivers (Figure 3.2.3 above) account for an arrestingly high percentage of nonagricultural male employment in both the Philippines and Thailand. For this large portion of the Southeast Asian male labor force, technology is not propelling rising education levels, as it simply has not changed. Jeepneys, buses, motorized tricycles, and taxis have not evolved much, if at all, over the sample period. Further, the returns to education among drivers are extremely low. Indeed, when one considers that less-educated drivers reside disproportionately in rural areas with lower costs of living, the real return to education for drivers in India, Philippines, and Thailand could be around zero. In other words, these men did not acquire their education in the aspiration of becoming drivers. Yet in these three countries, drivers are significantly more educated now than they used to be. Furthermore, if it is presumed that productivity differentials between drivers will be reflected in wage differences, then the zero premium on schooling indicates that there is nothing intrinsic to the technologies operated by drivers that requires education.

Female household helpers are considered next (Figure 3.2.4). Filipino maids earned essentially no wage premium on schooling in 1991 or in 2004, while returns to LS education and below for Indian maids have also flattened to zero. Yet education levels among maids of both nationalities have risen—especially in the Philippines. The interpretation is exactly the same as for drivers.

In Thailand too, the wage premium for education among maids has fallen to nearly zero. Yet in contrast with the Philippine case, the education level of Thai maids has fallen, suggesting that the more-educated maids are finding better-paid employment.

Some tasks that underwent technological change are examined next, including retail sales, bookkeeping, and secretarial work. In each of these, economists would predict a return to education, because more-educated workers can negotiate new technologies more easily. As expected, in each of these professions, the wage premiums on secondary school are higher than those earned by drivers, maids, and security guards.

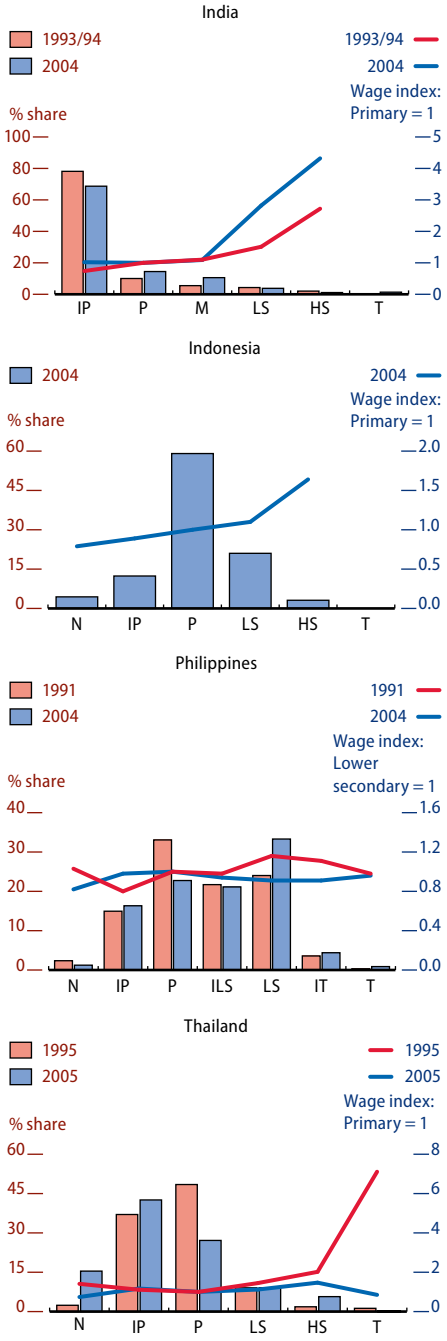
The above analysis suggests that workers of different education levels can be easily interchanged with each other, as education profiles of occupations vary greatly across countries. Countries with higher education levels in aggregate ended up with more-educated workers in

every occupation. Some of these jobs, which are large employers, have not experienced technological change, and others do not even pay a premium for more-educated workers, implying that workers did not obtain their education in order to get these jobs. Finally, education indeed reaps a higher premium in those occupations that have encountered technological change.

Some will argue, rightly, that the analysis focuses disproportionately on lower-status or mechanical jobs, to the exclusion of more "cerebral" professions. One argument for looking at these professions is that the flowering of supply chains and just-in-time inventory management may have increased the cognitive complexity of management jobs. Casual empiricism also confirms that the value of education in these professions is climbing. However, the focus of the analysis was determined by a noteworthy statistical constraint. For most of the cerebral occupations scrutinized (e.g., bank managers, software technicians, pure engineers, and retail sales managers) the samples were too thin to be statistically useful for estimating education profiles or wage premiums. There is nothing intrinsic to the sampling schemes employed by the labor force surveys that would cause these professions to be undersampled. There are simply very few people employed in such activities in the four sample countries.

A further feature of many of the cerebral professions is that education requirements are mandated by law or regulations (doctors, lawyers, nurses, engineers, bureaucrats, etc.). In this context there is very little scope for examining education intensification or changes in wage profiles within these groups, as Figure 3.2.9 shows clearly.

3.2.4 Education profile and wage indexes of female household helpers



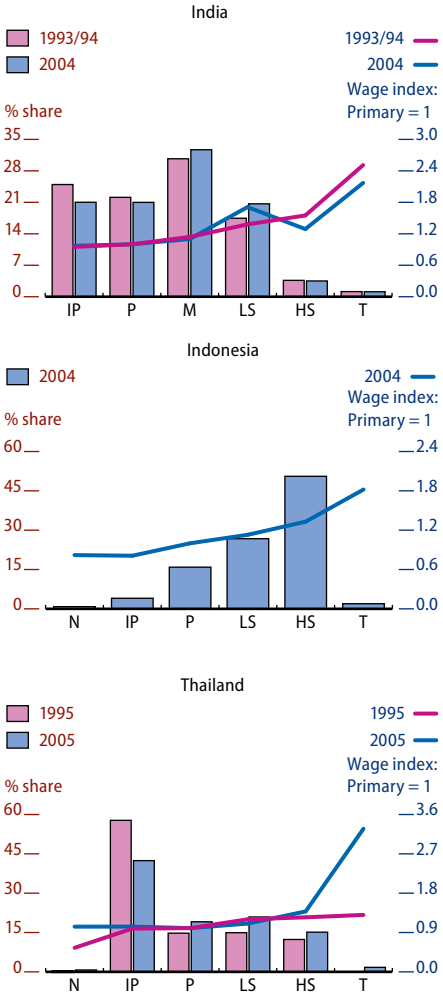
N = none; IP = incomplete primary; M = middle; P = primary; ILS = incomplete lower secondary; LS = lower secondary; HS = higher secondary; IT = incomplete tertiary; T = tertiary.

Note: Limited to those reporting wages.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Indonesia SAKERNAS 1994, 2004; Philippine Labor Force Survey, 1991, 2004, October rounds; Thailand Labor Force Survey, 1995, 2005, October rounds.

Click here for figure data

3.2.5 Education profile and wage indexes of male security guards



N = none; IP = incomplete primary; M = middle; P = primary; LS = lower secondary; HS = higher secondary; T = tertiary.

Note: Limited to those reporting wages.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Indonesia SAKERNAS 1994, 2004; Thailand Labor Force Survey, 1995, 2005, October rounds.

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Conclusions

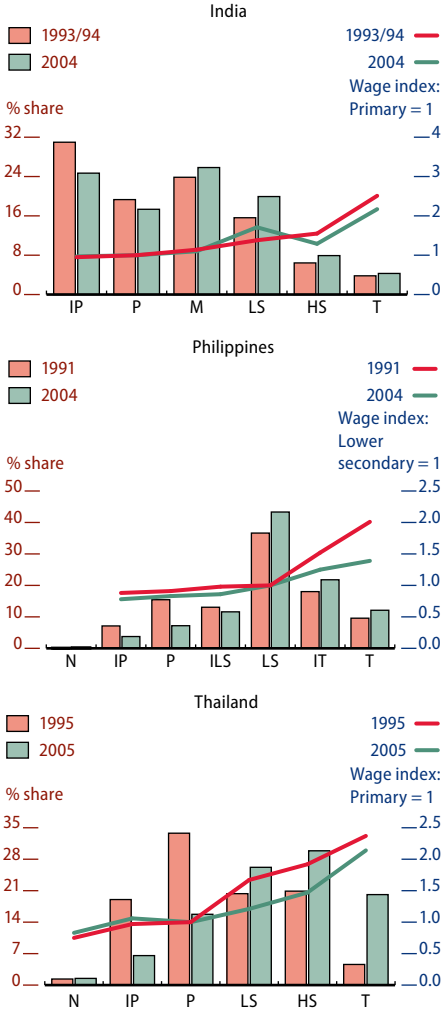
This chapter has examined the evolving distribution of education, wages, and employment in four Asian countries. It found education levels running ahead of employment growth in sectors that have traditionally hired the educated. Education levels rose in almost all sectors and occupations. This result is normatively ambiguous. Education levels may have risen within activities because they were too low from a productivity perspective to begin with. In this view, rising education levels should have increased productivity. Alternatively, education levels may have risen simply because education has become cheaper, unemployment is high, incomes are rising—or any number of other reasons unrelated to the productivity benefits of education.

It was therefore important to distinguish between two sets of explanations of education intensification: that it has been driven by productivity imperatives; or by something other than productivity imperatives. Under the assumption that worker productivity is reflected in wages, wage returns to education in specific sectors and occupations were therefore examined.

The returns to basic education have fallen, and now lie below the cost of funds in several sectors and occupations. Moreover, the sector this occurs in varies by economy. There is evidence that Filipino and Indian agricultural workers are overeducated, as are Filipino and (perhaps) Thai industrial workers. Furthermore, there are particular groups of workers, including Indian agricultural laborers, and drivers and maids everywhere, who receive a negligible return on their schooling. In the Philippines, where job creation has been anemic, the education levels and employment shares of drivers and maids are increasing. This is a sure sign that marginal educated workers reap no rewards for their schooling.

However, the point of this discussion is not that education subsidies need to be scaled back. Overeducation can be resolved relatively quickly through declines in the cost of funds, and more occasionally by dramatic technological shifts. Rather, the point is that severe distortions must

3.2.6 Education profile and wage indexes of retail sales staff



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Note: Limited to those reporting wages.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Philippine Labor Force Survey, 1991, 2004, October rounds; Thailand Labor Force Survey, 1995, 2005, October rounds.

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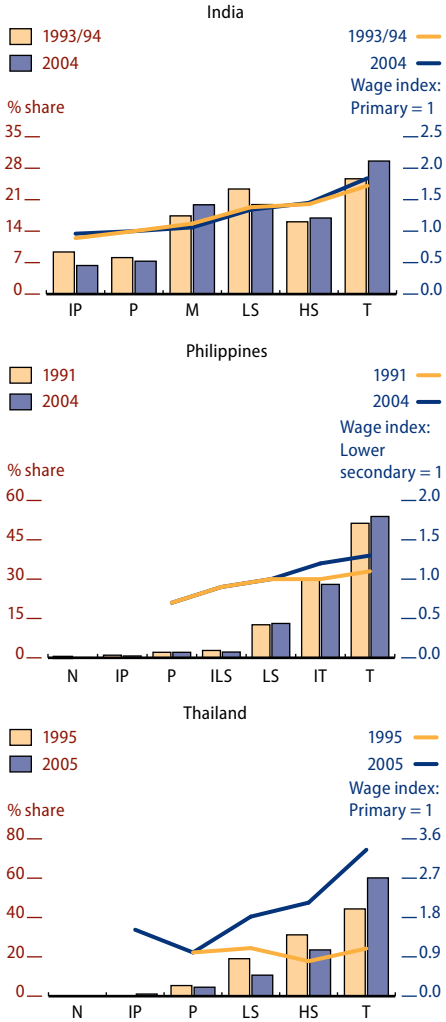
3.2.7 Education profile and wage indexes of clerical workers



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Note: Limited to those reporting wages.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Philippine Labor Force Survey, 1991, 2004, October rounds; Thailand Labor Force Survey, 1995, 2005, October rounds.

Click here for figure data

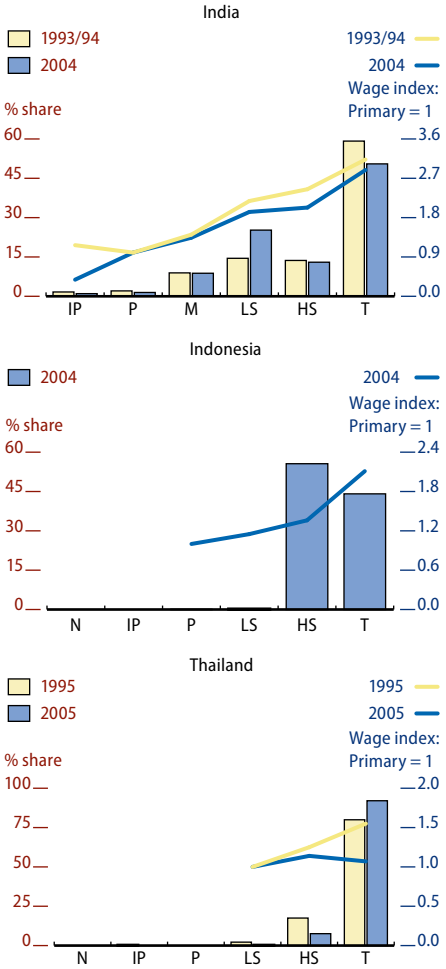
be hindering job creation and economic dynamism, thereby muting the pecuniary benefits of schooling.

It is often argued that it is in fact the limited supply of educated workers itself that is the constraint on economic dynamism. Surely growth of Filipino call centers and of IT-enabled services in India is hindered by a shortage of suitably educated workers? After all, call center managers informally interviewed for this work believe the employment opportunities in the sector to be substantial, if education bottlenecks can be overcome. This is certainly possible, and job creation in the sector would indeed bring benefits. However, there are at least three reasons against forging education policy based on the conclusion that raising target schooling levels will unleash transformation through high-end services.

First, as shown in this chapter, the employment shares of these sectors are extremely small, so projecting their capacity to create a large number of jobs involves tremendous out-of-sample extrapolation. Magtibay-Ramos et al. (2007) argue that to meet the forecast of the business process outsourcing (BPO) industry (and subsequently the Government) of 1 million BPO jobs in the Philippines by 2010, over one quarter of all new jobs would have to be in the industry—a historically unusual figure. Furthermore, other constraints, lurking just out of sight, may become apparent as the sectors expand. This is indeed one of the key lessons of the young literature on binding constraints to growth.

Second, the economic cost of bottlenecks should be considered. Certainly in India's high-end services, salaries have sky-rocketed to industrial-economy levels, and job retention is becoming harder as workers leave one job in the sector for more remunerative options elsewhere in the sector. In the Philippines call center business, the impact of education bottlenecks on productivity growth is much less clear. Call center salaries for college graduates range from $250 to $400 a month—or around two or three times GDP per capita—an attractive number, but perhaps less so for graduates of the nations' top universities.

3.2.8 Education profile and wage indexes of bookkeepers/cashiers



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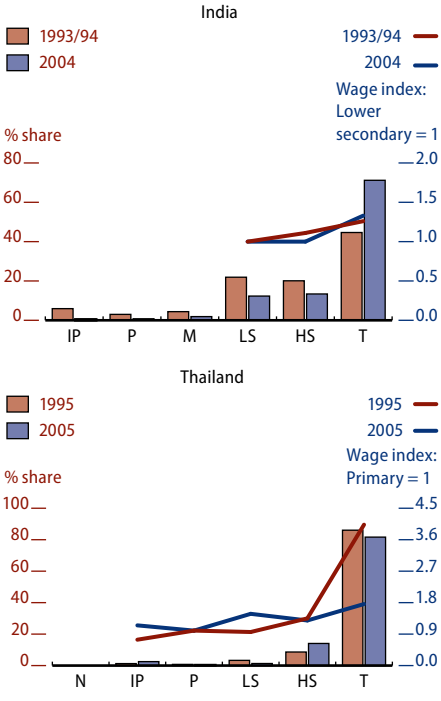
Note: Limited to those reporting wages.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Indonesia SAKERNAS 1994, 2004; Thailand Labor Force Survey, 1995, 2005, October rounds.

Click here for figure data

3.2.9 Education profile and wage indexes of engineers and engineering technicians



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Note: Limited to those reporting wages.

Sources: India National Sample Survey Organisation, Socio-economic Survey, Schedule 10, 1993/94, 2004; Thailand Labor Force Survey, 1995, 2005, October rounds.

Click here for figure data

As constraints on growth go, this is not particularly expensive. Moreover, employers report rising rates of absenteeism and that worker retention is becoming a problem. Anecdotally speaking, employees frequently leave the profession in favor of less remunerative jobs that do not require them to work the "graveyard shift." Thus, the wages paid by the sector overstate the welfare improvement for workers.

Third, it is not obvious that the skills required in all of these professions are best obtained through general education. Several call center managers have expressed the view that their employees probably learned their English outside the classroom. Reports are starting to trickle in that firms in both countries are entertaining reasonable alternatives to college-educated workers. Some are establishing in-house training programs and report being satisfied with the results, while others are seeking high school graduates with the requisite skills. Despite the sector's growth potential, these trends cast doubt on the relevance of this potential for education policy.

This chapter has therefore argued that policy advisers should price constraints to growth via the return to education before forging conclusions on education policy. This being done, it takes no issue with the view that some select groups of educated workers are in short supply and that this is a constraint to growth.

One final issue concerns the quality of education. Results from the labor force surveys are only representative of the quality of education typically available in each country. Certainly, raising the quality of education might increase the returns to schooling and probably would be helpful for igniting growth. Lacking data on school quality, this chapter cannot speculate on these issues. It is certainly possible—even likely—that higher-quality education will precipitate higher rates of investment and job creation, particularly in industry and services. This point made, and given that returns to the types of basic education available have fallen fast, this chapter concludes that it is mainly by measuring and credibly delivering improvements in quality that basic education projects could contribute directly to structural change and growth.

These caveats notwithstanding, the employment numbers provided are quite sobering, and caution against mechanically raising general education targets in the hope of generating growth. Certainly other reasons exist for raising education levels. But expectations of the contribution of education to structural change must be rooted firmly in a thoughtful, empirical understanding of what workers are likely to do with their education. The evidence provided suggests that when economies or sectors stagnate, the availability of jobs and new technologies may do more for many than more time in the classroom.

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Datasets used and sources

Country	Source	Date
India	Socio-Economic Survey, Schedule 10, National Sample Survey Organisation, India	1993/94 (Round 50), 2004 (Round 60)
Indonesia	SAKERNAS, Badan Pusat Statistik, Indonesia	1994, 2004
Philippines	Labor Force Survey, National Statistics Office, Philippines	1991, 2004 October rounds
Thailand	Labor Force Survey, National Statistics Office, Thailand	1995, 2005 October rounds

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