CHAPTER 3

ASIA RISING: PATTERNS OF ECONOMIC DEVELOPMENT AND GROWTH

Asia's striking growth performance has long attracted the interest of both policymakers and researchers. For several decades, growth has been very strong in the region as a whole—even spectacular in the newly industrialized economies (NIEs)[1] and, more recently, China. Between 1981 and 2001, the number of people living in extreme poverty declined dramatically in East Asia (by over 400 million in China alone). At the same time, given the presence of both early and late developers, Asia continues to display wide disparities in per capita income, ranging from over $33,000 in Singapore to $2,000 in Bangladesh. Average income levels in developing Asia as a whole are still well below those in other regions.

This chapter looks at relative growth performance across Asia, with a focus on the following questions:

- To what extent is the development path blazed by Japan, and later the NIEs, now being followed by the ASEAN-4,[2] China, India, and the newly emerging economies, such as Vietnam? Are there systematic differences between East Asia and the rest of Asia? Or between Asia and other regions of the world?[3]
- What have been the sources of growth differences, both within Asia, and compared with other regions? What has been the role of policies in achieving strong outcomes in Asia?
- How can Asia's exceptionally high growth rates be sustained? What policy measures would help to maintain strong growth? Have the reforms introduced after the Asian financial crises already had a detectable impact on growth and productivity?

Overall, the chapter finds that Asia's remarkable growth performance reflects strong total factor productivity (TFP) growth, as well as rapid accumulation of both physical and human capital. In turn, these accomplishments were driven by a more favorable institutional and policy environment than observed in other developing economies, including in particular greater trade openness, macroeconomic stability, financial development, and in many cases educational attainment. Looking ahead, further improvements in policies and institutional quality would help to sustain high sectoral productivity growth rates and facilitate the continued shift of resources from agriculture to industry and services, hence supporting sustained rapid growth, convergence toward advanced-economy income levels, and the elimination of poverty across the region.

Asia's Economic Success

Asia's real income per capita rose sevenfold between 1950 and 2005 (Figure 3.1), significantly reducing its gap relative to the United States. Asia's success stands in marked contrast with the failure of Latin America and other developing economies to catch up with advanced economies.

Note: The principal authors of this chapter are Florence Jaumotte, Hélène Poirson, Nikola Spatafora, and Khuong Vu, with support from Christian De Guzman and Patrick Hettinger.

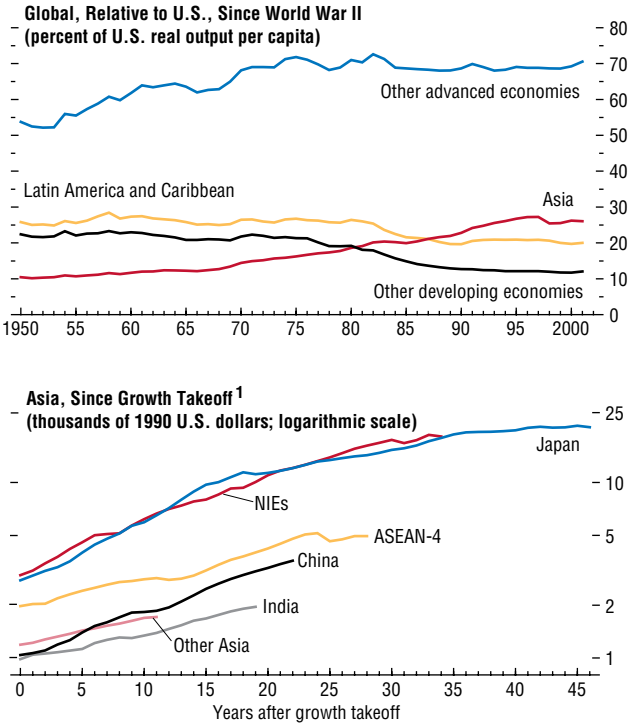
[1]Comprising Hong Kong SAR, Korea, Singapore, and Taiwan Province of China.

[2]The group consists of the following four members of the Association of South-East Asian Nations: Indonesia, Malaysia, the Philippines, and Thailand.

[3]The chapter focuses on the following Asian countries and subregions: Japan; the NIEs; the ASEAN-4; China; India; and "Other Asia" (Bangladesh, Cambodia, Lao P.D.R., Myanmar, Pakistan, Sri Lanka, and Vietnam). "Asia" is defined as comprising all the above countries; "developing Asia," all the above countries except Japan and the NIEs; "East Asia," all the above countries except Japan, India, Pakistan, and Sri Lanka. Asia as a whole is contrasted with the following regions: advanced economies excluding Asia; Latin America and the Caribbean; and other developing economies. All regional and subregional averages refer to unweighted means, unless otherwise noted.

Figure 3.1. Output Per Capita

Asia's real income per capita rose sevenfold between 1950 and 2005. As a result, its income gap relative to the United States was significantly reduced.



Sources: Maddison (2003); and IMF staff calculations.

[1]The growth takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, 1982 for India, and 1990 for other Asian economies.

Within Asia, there have been significant, well-known differences across countries in the timing of their initial "takeoff" into sustained growth and, more broadly, the start of their "integration" into the world economy.[4] Later developers, including China, appear to have started their takeoff at lower income levels than Japan or the NIEs. At the same time, the overall pace of growth in later developers does not appear significantly different from that experienced by Japan and the NIEs at similar stages of the integration process.

A similar story emerges when looking at broader development indicators. Asia's share of world trade more than doubled during 1970–2005, whereas Latin America's decreased (Figure 3.2). Within Asia, all regions have captured a rising share of world trade, but the rapid expansion in China's trade over the past decade stands out, even though it started from a very low base. Asia has also enjoyed an especially rapid increase over the last half century in levels of educational attainment.

Declining dependency ratios (a measure of the nonworking age population to total population) have certainly been supportive of growth in Asia, but not significantly more so than in other developing regions (Figure 3.2). However, the heterogeneity within Asia is very striking. In the NIEs and China, population aging will likely cause dependency ratios to start rising again within the next five years, whereas in India the demographic transition started only relatively recently.

Strong policy frameworks have been a key element behind Asia's success stories.[5] Over the last several decades, Asian fast developers have been characterized by a broadly stable macro-

[4]This chapter defines the growth takeoff as occurring in 1955 for Japan; 1967 for the NIEs; 1973 for ASEAN-4; 1979 for China; 1982 for India; and 1990 for Other Asia. The first four dates follow Chapter II of the April 2004 *World Economic Outlook*; the dating for India follows Hausmann, Pritchett, and Rodrik (2005); the dating for Other Asia is somewhat arbitrary, but in any case data for much of this group are not available before 1990.

[5]See World Bank (1993) for a fuller discussion of the policy record, including industrial policy.

economic environment. Inflation has been contained within relatively narrow bands, with the exception of the periods following the oil-price shocks and the 1997 Asian Crisis. Related to this, while some high-performing Asian economies ran substantial fiscal deficits, their high savings and rapid growth enabled them to avoid inflationary debt financing. More broadly, Asia has benefited from continued institutional strengthening, financial development, and in many cases more open trade policies.

Nevertheless, while considerable progress has been made, many developing Asian countries still have far to go before their income and development levels approach those in advanced economies. Indeed, almost 700 million Asians, or 20 percent of the total population, still live in extreme poverty, a substantial proportion of them in rural areas (Chen and Ravallion, 2004). To get a sense of whether and to what extent Asia's growth is indeed likely to be sustained over the long run, the chapter undertakes a systematic analysis of this growth performance. It first examines the sources of growth, and then considers the role that policies have played in achieving these outcomes.

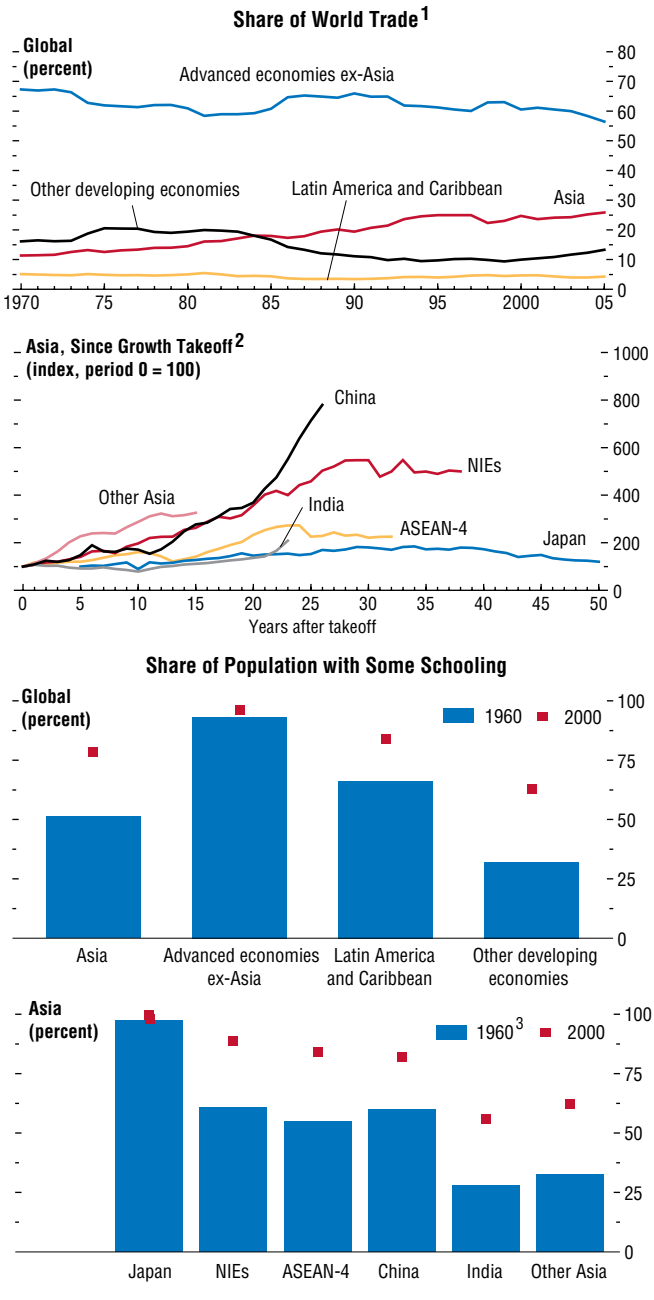
Perspiration or Inspiration?

Asia's strong growth performance can be analyzed in terms of demographic developments, the movement of labor and capital from low- to high-productivity sectors, within-sector factor accumulation, and technological progress. To the extent that growth reflects increases in total factor productivity as well as, say, capital accumulation, it is more likely to prove sustainable over the long term. To explore this issue, the respective contributions of the various sources of growth are calculated using different growth accounting exercises, first at the aggregate level and then at the sectoral level. The findings are then related to policy variables to help understand what underlies the observed trends.

As a first step, growth in output per capita is decomposed into changes in (1) labor productivity (output per worker); (2) participation

Figure 3.2. Selected Indicators

Asia's share of world trade more than doubled during 1970–2005. Asia also enjoyed a very rapid increase in levels of educational attainment.



Sources: World Bank, *World Development Indicators* (2006); CEIC; United Nations, *World Population Prospects: The 2002 Revision* (2003); Barro and Lee (2000); and IMF staff calculations.

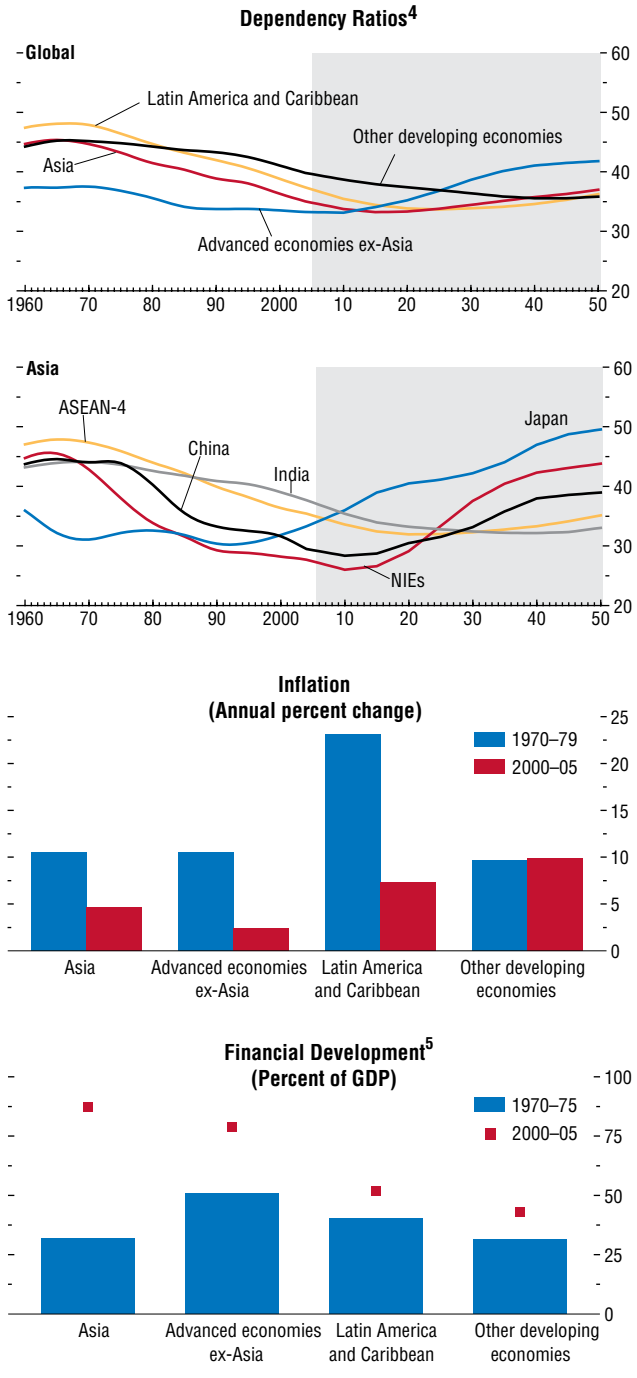
[1] Defined as (total exports + total imports)/(world exports + world imports).

[2] The growth takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, 1982 for India, and 1990 for other Asian economies. For this figure, for Japan, Period 5 = 100, reflecting data availability.

[3] For China, the bar represents the 1975 value, reflecting data availability.

Figure 3.2. Selected Indicators *(concluded)*

Declining dependency ratios have been supportive of growth in Asia (except Japan), but this trend will soon be reversed in the newly industrialized economies (NIEs) and China.



[4]Defined as 100 - (ratio of working-age (15–64) population to total population).
[5]As measured by stock of broad money (M2).

rates;[6] and (3) the age structure of the population.[7] The results show that, during 1970–2005, growth differences—both across regions and within Asia—were driven mainly by labor productivity (Figure 3.3). That said, in both Asia and Latin America, demographic developments provided an important boost to growth. In a few countries, such as Indonesia, Korea, and Taiwan Province of China, the demographic growth impact amounted to more than 1 percentage point per year.

Next, growth in labor productivity can be decomposed into (1) capital deepening (i.e., increases in physical capital per worker); (2) rising labor quality; and (3) growing TFP.[8] The results indicate that, during 1970–2005, Asia enjoyed both faster physical capital accumulation and faster TFP growth than other developing economies; in contrast, Asia's catch-up with advanced economies largely reflected capital accumulation. More specifically, physical capital accumulation contributed 1.75 to 3 percentage points to growth in fast-developing Asian countries, much more than observed in other regions (Figure 3.3). Rising education levels were also important, boosting Asian growth on average by ½ percentage point. TFP contributed 0.75 to 2 percentage points to growth in India, Japan, the NIEs, and Thailand.[9] In Japan,

[6]Defined as the ratio of labor force to working-age population. "Working age" is defined throughout this chapter as ages 15–64 inclusive.

[7]Specifically, the ratio of working-age population to total population, or one minus the total dependency ratio.

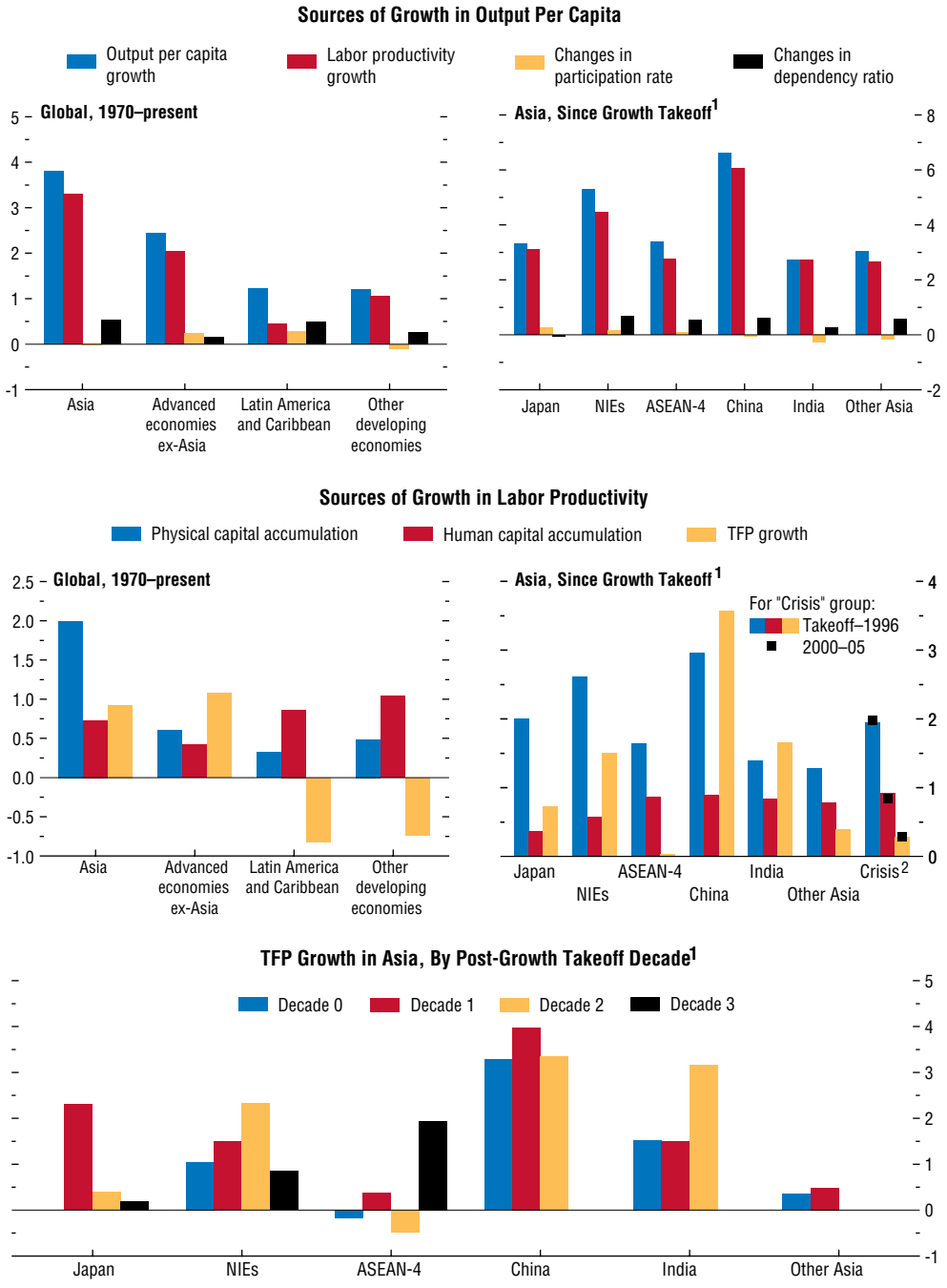
[8]See Jorgenson, Ho, and Stiroh (2005) and Jorgenson (forthcoming) for a discussion and summary of the relevant growth-accounting methodology. In line with much of the literature, the capital share in income is assumed equal to 0.35. The main results are robust to estimating its value. Estimates of physical capital are based on Nehru and Dhareshwar (1993) updated as in Fajnzylber and Lederman (1999) using *World Economic Outlook* data on gross fixed capital formation. Estimates of human capital are based on Barro and Lee (2000).

[9]Our results for the NIEs are broadly similar (over comparable periods) to those reported in Young (1995) with the exception that TFP growth for Singapore through 1990 is estimated at over 1 percentage point, rather than 0.2 percentage points. Sarel (1996) discusses the sensitivity of the estimates to alternative assumptions.

Figure 3.3. Growth Decompositions

(Percentage points, per year)

During 1970–2005, growth differences—both across regions and within Asia—were driven mainly by labor productivity. In particular, physical capital accumulation boosted growth in fast-developing Asian countries by 1.75 to 3 percentage points, much more than observed in other regions. Rising education levels were also important. Total factor productivity (TFP) contributed 0.75 to 2 percentage points to growth in Japan, the newly industrialized economies (NIEs), Thailand, and India.



Source: IMF staff calculations.

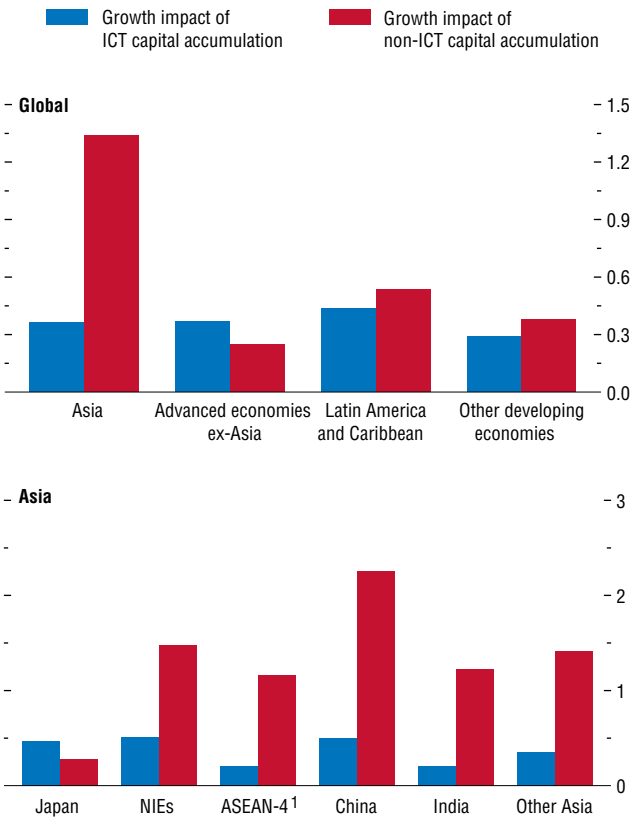
[1]The growth takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, 1982 for India, and 1990 for other Asian economies. Each decade corresponds to 10-year periods following the takeoff years stated above.

[2]The crisis countries group consists of Indonesia, Korea, Malaysia, the Philippines, and Thailand.

Figure 3.4. Information and Communications Technologies (ICT) Investment and Labor Productivity Growth, 1989–2005

(Percentage points, per year)

Economy-wide investment in ICT capital is having an impact on Asian growth, averaging about ½ percentage point in the newly industrialized economies (NIEs) and China. However, the impact of non-ICT capital accumulation remains much larger.



Source: IMF staff calculations.
[1]ASEAN-4 includes Indonesia, Malaysia, the Philippines, and Thailand.

TFP growth declined steadily after the initial takeoff; Box 3.1 analyzes in greater detail the determinants of, and future prospects for, Japanese productivity growth. In the ASEAN-4, low average TFP growth masks significant cross-country heterogeneity, with the Philippines having performed relatively poorly (see also IMF, 2005a, 2006a). In China, strikingly, both capital accumulation and TFP growth were substantially higher than in other Asian fast developers, both when compared over the same period, and at similar stages of their integration process.[10]

The growth literature has recently devoted much attention to the impact of investment in information and communications technology, or ICT (see, for instance, Jorgenson and Vu, 2005). Key questions are whether the accelerated decline in ICT prices that characterized the 1990s led to a surge of investment in ICT equipment and software, and whether this had a significant impact on productivity. These issues are analyzed using a smaller cross-country data set covering the period 1989–2005.[11] The results suggest that economy-wide investment in ICT capital indeed had an impact on growth, averaging about ½ percentage point in the NIEs and China (Figure 3.4). However, Asia does not stand out along this dimension, and the impact of non-ICT capital accumulation is much larger.[12]

Regarding the effects of the Asian Crisis, growth rates have typically recovered to pre-crisis levels.[13] In contrast, investment rates

[10]Estimates for TFP growth in China may be influenced by inaccurate investment price deflators. See also Young (2003) for a discussion of Chinese statistics.

[11]This is an updated version of the dataset in Jorgenson and Vu, 2005.

[12]The ICT revolution can also affect aggregate productivity more directly, through TFP growth in ICT-producing sectors themselves. These sectors account for 10 percent or more of total value added in several Asian countries, including Korea, Malaysia, the Philippines, Singapore, and Taiwan Province of China. However, it did not prove possible to estimate TFP growth within these sectors.

[13]See, for instance, Cerra and Saxena (2003). Studies of a broader sample of financial and currency crises also typically find that such crises do not have long-term effects on growth (Barro, 2001; and Park and Lee, 2001).

Box 3.1. Japan's Potential Output and Productivity Growth

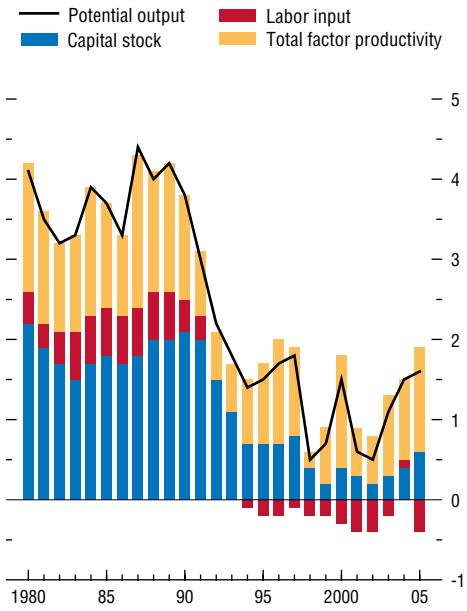
After four decades of rapid growth, Japan's economy stagnated in the 1990s, following the collapse of the asset-price bubble. Japan's economic revival over the past four years raises the question of whether the country's potential output growth has now begun to recover as structural adjustments to the imbalances of the so-called "bubble" years have strengthened fundamentals. At the same time, an aging population weighs against strong growth of potential output. With Japan's birth rate well below the population's replacement rate, the working-age population has been contracting since 2000, and the elderly dependency ratio (the share in the working-age population of people at least 65 years old) is now the highest among industrial countries. With a declining labor force, per capita income growth will depend critically on higher productivity.[1]

What Is Potential Output Growth in Japan?

There are a plethora of studies on Japan's potential output growth. Depending on the methodology used, results differ markedly in terms of the estimated potential output growth and the contributions of key factors.[2] Estimates of potential output growth prepared by official agencies range between 1½ and 2 percent. A recent IMF staff study (IMF, 2006b) seeks to get a new handle on the determinants of Japan's potential growth, taking into account gains from past structural reforms as well as capital deepening and embodied technical change. The key results are as follows.

- Potential output growth has increased steadily since 2001 to over 1½ percent in 2005, from less than 1 percent a year at the end of the 1990s (first figure). Nonetheless, it remains well below levels attained during the 1980s, when it was close to 4 percent a year.
- The improvement in potential output growth is mainly attributable to a rise in total factor productivity (TFP) growth—the outcome of an improved use of resources and increased competition. TFP growth has increased to 1¼ percent a year in 2005, from less than ¼ percent in 1998.
- The contribution of the capital stock, on the other hand, has declined since the collapse of investment in the early 1990s: growth in the capital stock now accounts for just over ½ percentage point of potential output growth, down from more than 2 percentage points in the early 1990s. This decline partly reflects adjustments in the corporate sector that have delayed new investment and disposed of old capital stock.

Contributions to Annual Potential Output Growth
(Percent)



Source: IMF staff calculations.

Note: The principal authors of this box are Papa N'Diaye and Dan Citrin.

[1]A recent government-sponsored report, "Japan's 21st Century Vision," sets out the importance of raising productivity and reaping the benefits of globalization to avoid deteriorating living standards.

[2]See, for example, Hayashi and Prescott (2002); and Fukao and others (2003).

Box 3.1 *(concluded)*

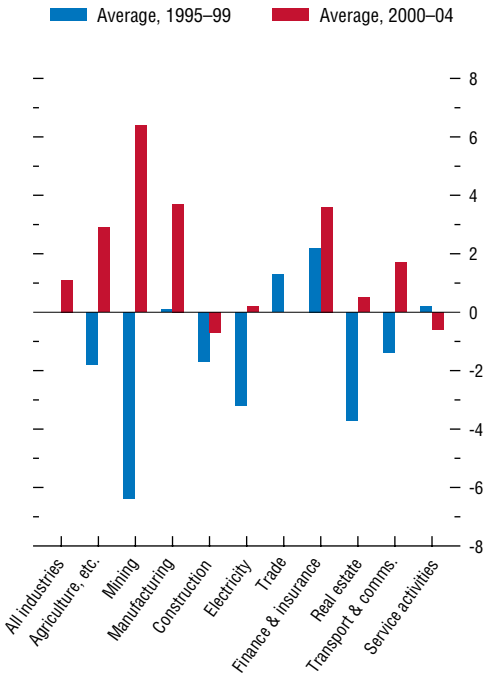
- Finally, labor inputs continue to contribute negatively to potential output growth, reflecting a shrinking working-age population as well as a plateau in the labor force participation rate and a secular rise in structural unemployment. The negative contribution of employment has, however, been partly offset by a positive contribution of the number of hours worked, as a result of the recent pickup in full-time job growth.

How Broad-Based Was the Recovery in TFP Growth?

The recent pickup in TFP growth reflects improvements across most sectors of the Japanese economy, particularly manufacturing (see second figure).

- TFP growth in the manufacturing sector averaged 3¾ percent a year between 2000 and 2004, up from virtually zero on average between 1995 and 1999. Within the manufacturing sector, there have been large improvements in TFP growth in information technology (IT)-related sectors such as "electrical machinery, equipment and supplies," "precision instruments," and "machinery." These developments are consistent with the findings by Jorgenson and Motohashi (2005) that the IT sector's contribution to aggregate productivity growth has increased since the mid-1990s.
- Both the real estate sector and the finance and insurance industry also contributed significantly to the rise in productivity growth. For example, TFP growth in the real estate industry rose to an average of ½ percent a year during 2000–04, compared with –3¾ percent during 1995–99. However, gains in aggregate TFP growth have been somewhat limited by developments in the wholesale and retail construction, and "other services" sectors, which now account for just over a third of total output and about 50 percent of total employment (broadly speaking, these sectors have suffered from over-regulation or excess capacity).

Contribution of TFP Growth to Sectoral Real GDP Growth
(Percentage points)



Source: IMF staff calculations.

What Is the Likely Impact of Reforms Undertaken in Recent Years?

The empirical evidence suggests that the recent improvement in TFP stems at least in part from greater product market competition (notably in tradables), higher openness, and increased research and development (R&D) intensity (see table). Econometric estimates imply that reducing markups by 1 percentage point stimulates TFP growth by about the same amount; raising import penetration by 10 percentage points increases TFP growth by about ¼ percentage point; and increasing R&D intensity by 1 percentage point raises TFP growth by broadly the same amount.

Determinants of Potential Output and Non-Accelerating Inflation Rate of Unemployment (NAIRU)

Explanatory Variables	Dependent Variable	
	TFP	NAIRU
Total factor productivity (TFP) at ($t-1$)	1.00 (. . .)	. . .
Change in R&D intensity	1.08 (2.0)*	. . .
Competition[1]	–1.12 (–4.8)*	. . .
Import penetration[2]	0.02 (2.8)*	. . .
NAIRU at ($t-1$)	. . .	1.00 (. . .)
Change in replacement ratio	. . .	0.03 (2.5)*
Share of old in labor force	. . .	0.10 (3.0)*

Source: IMF staff estimates.

Note: Reported coefficients refer to selected coefficients of a simultaneous system of equations estimated over the period 1964:Q1–2005:Q4; figures in parenthesis are *T*-statistics; * denotes statistical significance at the 5 percent level.

[1]Markup as measured by operating profits over sales net of cost of sales.

[2]Ratio of imports to domestic demand.

These results suggest that going forward, the removal of lingering product market distortions—for example, cutting excessive domestic regulation (especially in the retail sector), strengthening the anti-trust framework, and further liberalizing trade (specifically, agricultural)—together with R&D investment could significantly boost TFP, and hence potential output growth. Further efforts to liberalize the labor market to reduce structural unemployment could also provide substantial gains to potential output growth. Structural unemployment appears to be in part related to the generosity of the unemployment insurance system (the level of out-of-work benefits relative to in-work wages and salaries) and the aging of the labor force, which worsens skills mismatches, increases rigidities through seniority-based pay scales and lower reallocation of workers, and reduces participation.

Combining product and labor market reforms with a moderate increase in women's participation rate over five years could raise potential growth over the same period by ½ percent a year.[1] Of this ½ percentage point increase in potential output growth, a ¼ percentage point would stem from higher TFP growth, and the remainder from rising labor inputs.

[1]Women's participation rate is assumed to increase by 2¾ percentage points, to 64 percent. The average for the United States and the United Kingdom is 69 percent.

in those countries most severely impacted by the crisis are still below pre-crisis levels (IMF, 2005b), suggesting that increases in TFP may now be playing a more important role. That said, the empirical results in this chapter indicate that it is still too early to detect any statistically significant post-crisis shift in trend TFP growth.[14]

[14]It bears emphasizing that the available data are plagued by severe measurement problems, especially with respect to capital stocks. For instance, it remains unclear to what extent the effective write-off of capital after the financial crises of the mid-1990s is reflected in the national accounts, an issue that may be especially relevant for the ASEAN-4.

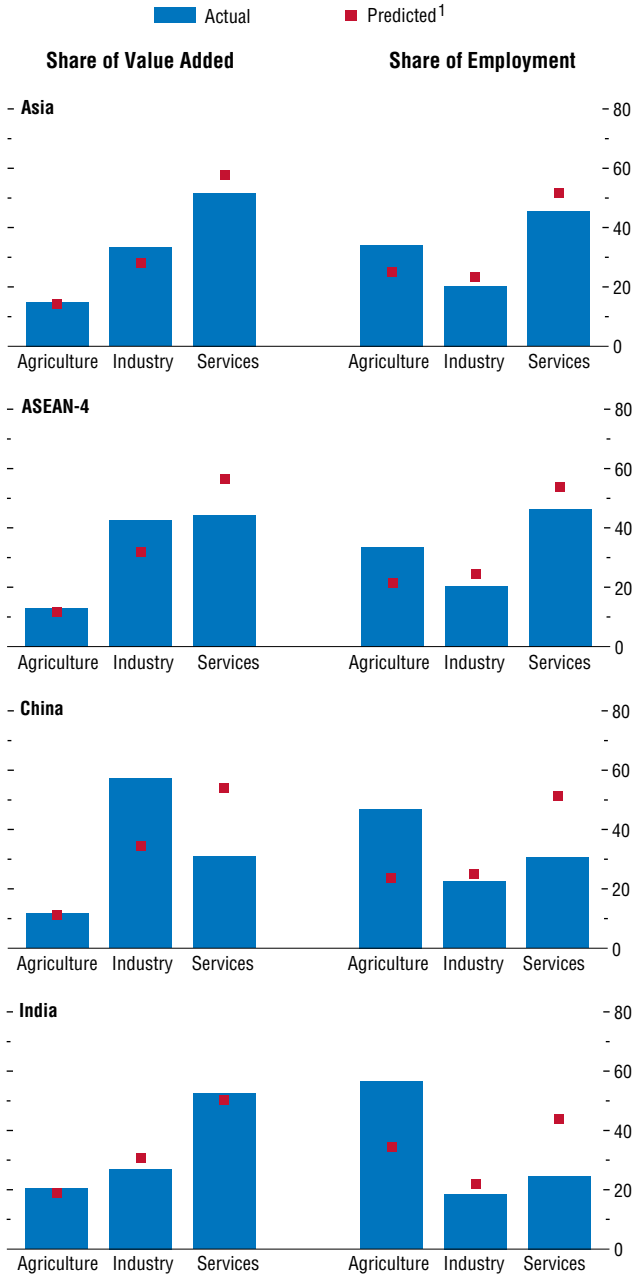
Sectoral Effects: Cross-Sector Shifts or Within-Sector Growth?

This section gauges to what extent strong Asian productivity growth reflects sectoral shift and composition effects, as opposed to pure within-sector productivity growth. The sectoral shift effect refers to the increase in average labor productivity that results as labor and capital move over time from lower- toward higher-productivity sectors, in response to economic incentives and policies. The sectoral composition effect captures the higher aggregate productivity growth that follows from having a higher share of sectors with intrinsically high productivity growth. Importantly, sectoral shifts are not mechanical processes: their speed and

Figure 3.5. Sectoral Shares of Value Added and Employment for Asia

(Percent, latest available year)

The share of industry in value added is higher than predicted in developing Asia, especially in ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand) and China, reflecting strong productivity in this sector. On the other hand, the share of employment in agriculture is very high across developing Asia and much more so than predicted by fundamentals, suggesting low productivity in this sector. India stands out with a relatively high productivity in services.



Sources: World Bank, *World Development Indicators* (2006); and IMF staff calculations.
[1]Based on a regression including initial income per capita, country size, and population. The predicted value is calculated as the difference between the actual share and the value of the dummy variable for the region/country.

extent reflect the willingness and ability of labor and capital to move toward higher-productivity uses, all of which are strongly affected by the policy environment.

The analysis is performed at two levels of aggregation. First, a distinction is made between agriculture, industry, and services, using data from the *World Development Indicators* (World Bank, 2006). The second decomposition focuses on sectoral effects within manufacturing (the main component of industry), and draws a distinction between high-skill and low-skill subsectors (here, the UNIDO Industrial Database is the main source of data). Throughout, the focus is on labor productivity, rather than TFP, owing to the limited data available on sectoral capital stocks.

Across Agriculture, Industry, and Services

Asia currently stands out as having a relatively high share of value added in industry, and a low share in services (Figure 3.5 and Appendix 3.1).[15] This holds true whether Asia is compared to the United States, to Latin America, or to the levels predicted on the basis of its fundamental characteristics.[16] However, there is significant variation within Asia. Japan and the NIEs are advanced economies and they share the sectoral composition of similarly placed economies in other regions. In contrast, China and to a lesser extent the ASEAN-4 are characterized by an exceptionally high share of value added in industry and an exceptionally low share in services, compared to both other countries and predicted levels; the opposite holds true for India.

In addition, developing Asia in general, and China and India in particular, have a much higher employment share in agriculture (and a correspondingly lower share in services) than

[15]Services include wholesale and retail trade; hotels and restaurants; transport; telecommunications; financial and insurance services; other business services; and community, social, and personal services.

[16]Including income per capita, country size, and population. See Appendix 3.1 for details.

predicted based on fundamental characteristics. Combining the information on value added and employment suggests relatively low agricultural productivity throughout developing Asia. In contrast, productivity levels are relatively high in industry for China and the ASEAN-4 and in services for India.

Although still large, the relative importance of agriculture has in fact declined sharply in Asia over the last three decades (Figure 3.6).[17] The shift was larger than observed in other regions, and proved especially strong in China, the ASEAN-4, Korea, and Taiwan Province of China. For instance, agriculture accounted for about a third of Korea's and Taiwan Province of China's economies in the 1960s, but less than one-tenth by the 1980s. Throughout developing Asia, the movement of labor into the services sector was at least as large as that toward industry. Also, while in most of Asia the share of industry in total employment is still growing, in Japan and the NIEs a movement from industry to services is well under way.

The effect of sectoral shifts on aggregate productivity depends on the intersectoral differences in productivity levels. For the world as a whole, labor productivity in nonagricultural sectors is about three times higher than in agriculture; in Asia, the differential is even larger, consistent with the finding that agricultural productivity is lower than predicted (Figure 3.6).[18] As a result, the shift from agriculture to industry and services has had a significant positive effect on Asian productivity levels (see below). Intersectoral productivity differentials remained high at the end of the period; indeed, they have widened over time in both China and India, reflecting strong productivity growth in, respectively, industry and services. This suggests further potential growth benefits from future intersectoral resource movements.

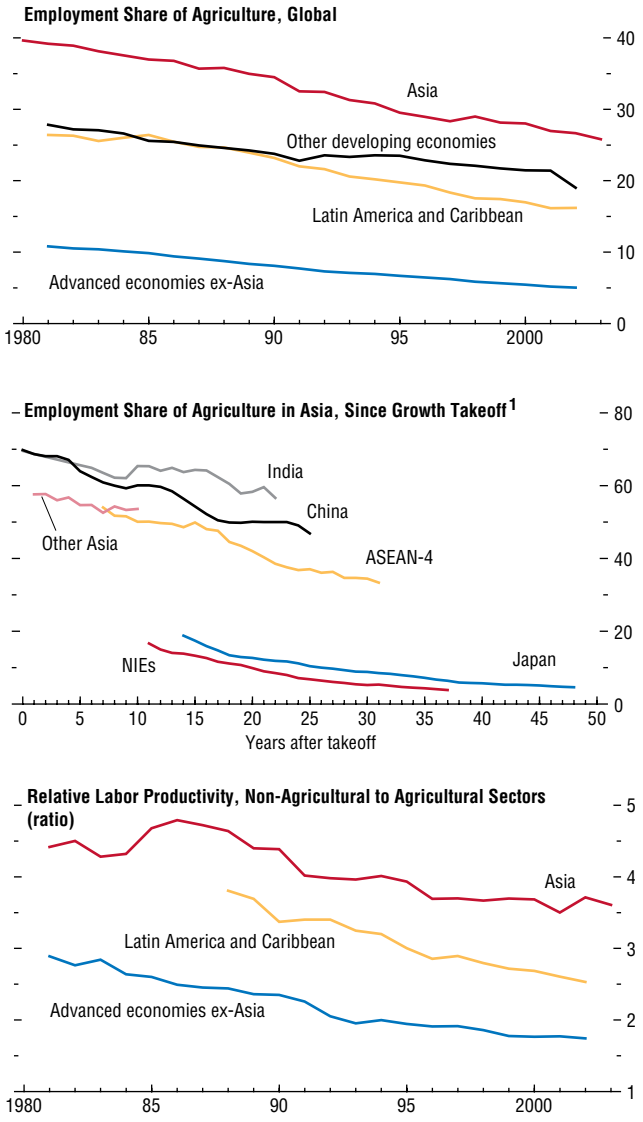
[17]The employment share of agriculture declined by an average 0.6 percentage point per year.

[18]While the measurement of productivity, especially in services, is subject to many caveats, these intersectoral gaps appear sufficiently large to reflect real productivity differences.

Figure 3.6. Employment and Labor Productivity in the Agricultural Sector Over Time

(Percent of total employment unless otherwise noted)

The agricultural sector's share of total employment has generally decreased over time in all regions, but the decline has been faster in Asia, which started from a higher level. Despite some convergence, productivity in non-agricultural sectors remains well above that of agriculture, particularly in Asia.

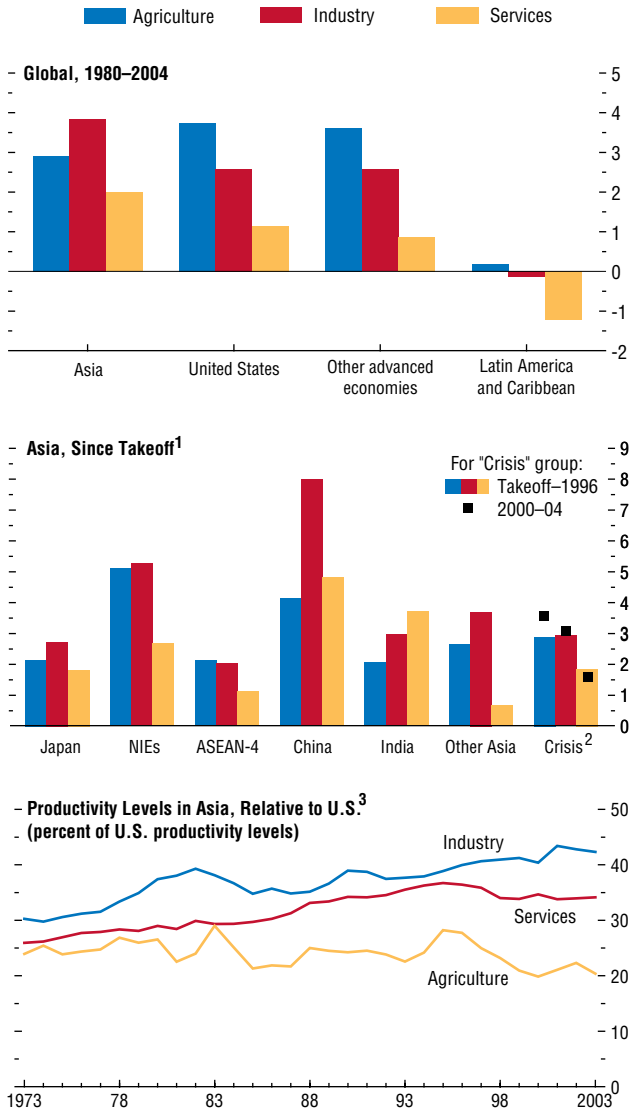


Sources: World Bank, *World Development Indicators* (2006); and IMF staff calculations.
[1]The growth takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, 1982 for India, and 1990 for other Asian economies.

Figure 3.7. Productivity Growth by Sector

(Annual percent change unless otherwise noted)

Across all regions, productivity growth in both industry and agriculture exceeded that in services. Asian productivity growth in industry and (until recently) in services far exceeded that in other regions of the world, implying a catch-up in sectoral productivity toward U.S. levels.



Sources: World Bank, *World Development Indicators* (2006); and IMF staff calculations.

[1]Not all years since takeoff have available data. The takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, 1982 for India, and 1990 for other Asian economies.

[2]Crisis countries consist of Indonesia, Korea, Malaysia, the Philippines, and Thailand.

[3]Sample includes China, India, Japan, Korea, Pakistan, the Philippines, Singapore (except for agriculture, which has a marginal role in this country), and Thailand. Productivity levels are adjusted based on economy-wide PPP factors; this may overstate productivity in industry, while understating productivity in services.

Turning to sectoral composition, its effect on aggregate productivity depends on the sector-specific rates of productivity growth (Figure 3.7). A general pattern, observed across all regions of the world during 1980–2004, is that productivity growth in both industry and agriculture exceeded that in services. For Asia, three other facts stand out.

First, productivity growth was highest in industry—with the exception of India, where productivity grew most rapidly in services. A number of reasons have been put forward for India's performance, including advances in communications technology, which have allowed India to exploit its comparative advantage in services (especially its plentiful supply of trained English-speaking personnel); the successful deregulation of services sectors such as communications;[19] privatization and opening up to foreign direct investment (FDI); and financial sector reforms (Gupta, 2005; and Kochhar and others, 2006).

Second, productivity growth in Asia in both industry and (until recently) services far exceeded that in other regions of the world, consistent with Asia's faster aggregate productivity growth, and implying a catch-up in sectoral productivity toward U.S. levels. Within Asia too, countries with higher productivity growth in one sector tended to have higher productivity growth in other sectors. This suggests that growth is importantly influenced by country-specific factors, which affect similarly the performance of all sectors of an economy.

Third, after the initial takeoff, productivity growth eventually decelerated, especially in services—although this process has not yet begun in China nor India (Figure 3.8). Indeed, while Asian countries on average continue catching up to advanced-economy industrial productivity levels, in services this process may be coming to a

[19]Productivity levels in the less protected software and telecommunications sectors are about 40–50 percent of U.S. levels. In contrast, productivity levels in the more sheltered retail and retail banking sectors are only, respectively, 6 and 12 percent of U.S. levels. See McKinsey Global Institute (2001 and 2006).

halt before full convergence has been achieved, and in agriculture little catch-up has been observed since the end of the Green Revolution. To offset this, as discussed later in this chapter, determined policy action is needed to tackle barriers to productivity growth.

The gap in average labor productivity growth between any given country and, say, the United States can be decomposed into three components, reflecting differences in sectoral shifts; sectoral composition; and within-sector productivity growth (see Appendix 3.1). Such a decomposition suggests that sectoral shifts have in general helped Asia catch up to U.S. productivity levels, both because labor moved out of agriculture at a faster rate in Asia, and because the initial intersectoral productivity differentials were higher in Asia (Figure 3.9).[20] Specifically, sectoral shifts boosted productivity growth in Asia relative to the United States by ½ percentage point per year, out of a total observed differential of 2 percentage points. Regression analysis confirms the potentially large productivity-enhancing effect of employment moving from agriculture to other sectors,[21] in line with existing estimates for developing countries.[22] All Asian subregions except Japan benefited substantially over the last three decades from sectoral shifts, especially China. By contrast, in Latin America, sectoral shifts were too weak to help promote convergence toward the United States.

Turning to the sectoral composition effect, this is positive, though relatively modest, for both Asia and Latin America, reflecting the smaller share of services (where productivity has

[20]In the United States, most of the reallocation occurred from industry to services.

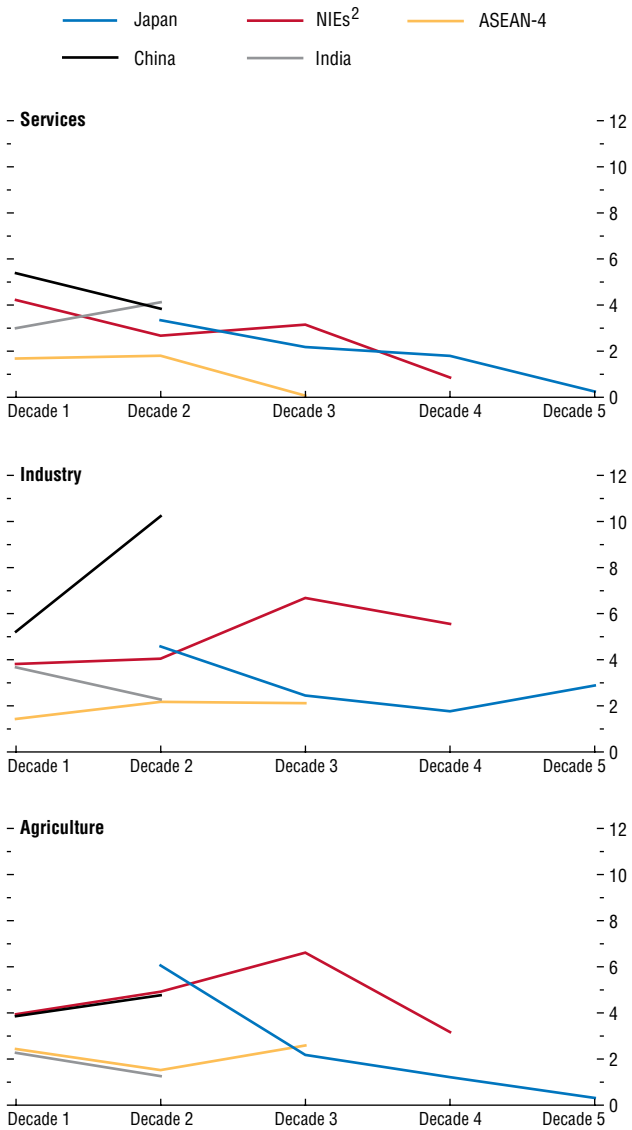
[21]Over a broad panel, a 1 percentage point reduction in the average annual change in the agricultural employment share is associated with a 1.5 percentage points increase in average annual labor productivity growth (after controlling for initial productivity and the initial agricultural share in employment).

[22]See, for instance, Poirson (2000 and 2001), and Bloom, Canning, and Malaney (1999). Dekle and Vandenbroucke (2006) find also that labor reallocation from the public to the private nonagricultural sector has played an important role in China's growth in recent years.

Figure 3.8. Sectoral Productivity Growth Since Takeoff[1]

(Annual percent change)

After the initial takeoff, productivity growth eventually decelerated, especially in services, bringing the catch-up process in this sector to a halt before full convergence has been achieved.



Sources: World Bank, *World Development Indicators* (2006); and IMF staff calculations.

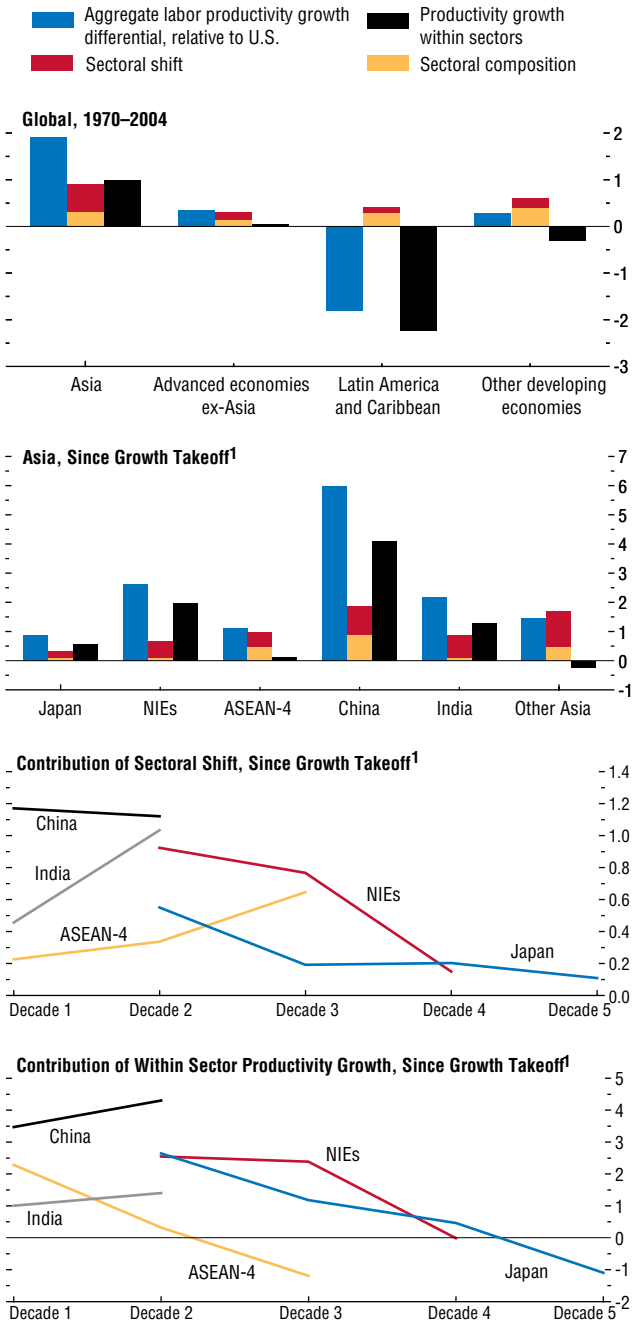
[1]Not all years since takeoff have available data. The takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, and 1982 for India.

[2]Taiwan Province of China and Hong Kong SAR are excluded because data are only available from Decade 2 onwards. The broad patterns are robust to including these two latter economies in the group. Singapore is also excluded from the panel on agriculture, owing to the sector's marginal role in that country.

Figure 3.9. Contributions to Average Labor Productivity Growth Differential with the United States

(Percentage points, per year)

Asia's gradual convergence toward U.S. productivity levels reflects mainly strong productivity growth within both industry and services, with a significant contribution also from sectoral shift and composition effects.



Sources: World Bank, *World Development Indicators* (2006); and IMF staff calculations.
[1]The growth takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, 1982 for India, and 1990 for other Asian economies.

grown relatively slowly) in these countries than in the United States. Within Asia, the composition effect was especially large in China and the ASEAN-4, reflecting the very high share of industry in their value added.

Altogether, sectoral shift and composition effects account for about 40 percent of Asia's productivity catch-up toward U.S. levels. Thus, the greater part of Asia's catch-up reflects strong productivity growth within both industry and services. Conversely, Latin America's relative stagnation and divergence from the United States largely reflect lagging productivity growth within both industry and services. The key question, to which we return, is what are the deeper fundamentals, including policy variables, that explain these differences in outcomes.

Within Manufacturing

A similar analysis was performed to determine to what extent shift and composition effects affected productivity within the manufacturing sector. For this purpose, manufacturing was divided into skill-intensive and nonskill-intensive sectors.[23] Asia, and in particular the NIEs, China, and India, stand out as having a relatively large share of manufacturing value added and employment in skill-intensive sectors. This holds compared to both Latin America and (in most cases) the levels that would be predicted based on fundamentals such as income per capita, country size, and population (Figure 3.10).[24] Since the

[23]Specifically, the 28 manufacturing subsectors in the UNIDO database were aggregated into skill-intensive versus nonskill-intensive sectors. Each aggregate contained 14 subsectors. The definition of skill intensity was based on the income share of skilled labor, calculated using the input-output matrix for South Africa (Kochhar and others, 2006).

[24]Hausmann, Hwang, and Rodrik (2005) and Rodrik (2006) also find that China and India export an abnormally high share of products that are typically produced by higher-income countries. Note also that when population is not included as a control, the difference between Asia's actual and predicted skill-intensive employment share rises to 10 percentage points.

mid-1960s,[25] the rate at which labor has moved from nonskill to skill-intensive sectors has been about the same as in the United States and other advanced economies, and much higher than in Latin America (although the magnitudes involved are much smaller than is the case for the shift out of agriculture). The data confirm that both productivity levels and productivity growth are higher in skill-intensive than in nonskill-intensive sectors.[26]

Aggregate manufacturing productivity grew faster in Asia than in the United States. However, the differential was smaller than in the case of overall productivity; indeed, manufacturing productivity in the ASEAN-4 and India actually grew more slowly than in the United States (Figure 3.11). Most of Asia's catch-up in manufacturing productivity was attributable to high productivity growth within skill-intensive sectors. The contribution of sectoral shifts was generally small.[27] Driving this, both the magnitude of labor shifts across manufacturing subsectors and the productivity differentials between these subsectors were smaller than between agriculture and the nonagricultural sector. The contribution from sectoral composition was actually negative and quite significant for Asia, at close to ½ percentage point per year. This result was driven mostly by Indonesia and Other Asia, where the share of skill-intensive, high productivity-growth sectors is substantially smaller than in the United States. Unlike Asia, Latin America experienced a decline over time in manufacturing productivity relative to the United States, above all because of slower productivity growth within nonskill-intensive sectors, combined with a relatively large share of such sectors in overall manufacturing.

[25]For China, reliable data are only available since 1990.

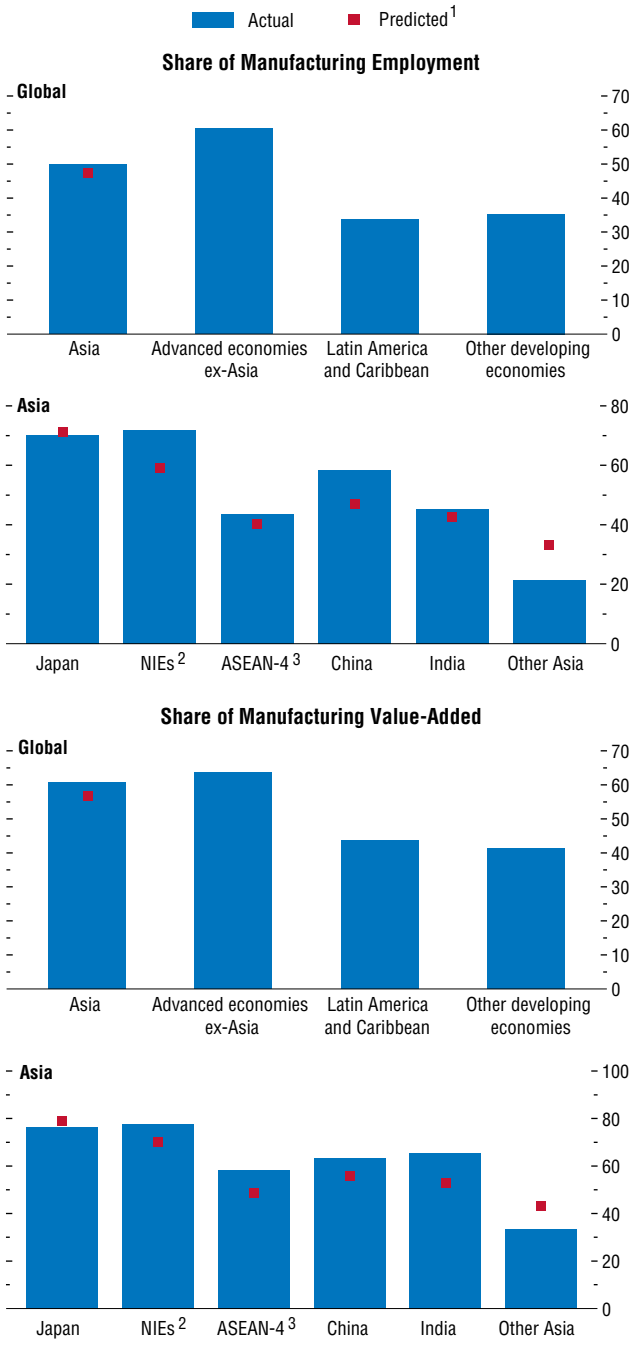
[26]The average gap over the period amounts to, respectively, 35 percent and 0.6 percentage points per year.

[27]This holds even when the analysis is carried out on the full 28 subsector dataset, rather than on just the two broad aggregate sectors.

Figure 3.10. Skill-Intensive Manufacturing Sectors: Employment and Value-Added Shares

(Percent, latest available year)

Asia stands out as having a large share of manufacturing value-added and employment in skill-intensive sectors. This holds compared both to Latin America and, in some instances, to the levels that would be predicted based on fundamentals.

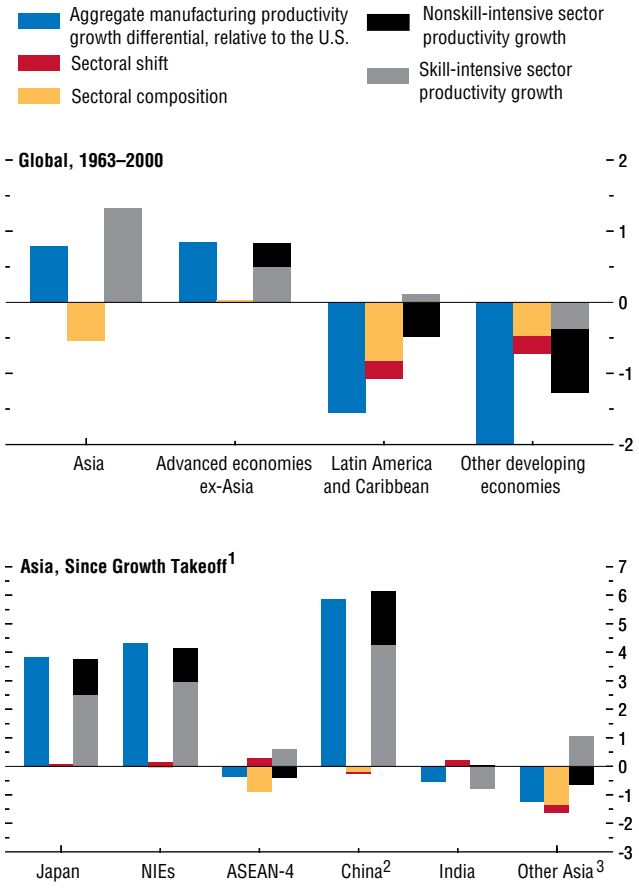


Sources: World Bank, *World Development Indicators* (2006); and IMF staff calculations.
[1]Based on a regression including initial income per capita, country size, and population.
[2]Newly industrialized economies.
[3]ASEAN-4 includes Indonesia, Malaysia, the Philippines, and Thailand.

Figure 3.11. Contributions to Average Manufacturing Productivity Growth Differential with the United States

(Percentage points, per year)

Most of Asia's catch-up in manufacturing productivity was attributable to high productivity growth within skill-intensive sectors. The contribution from sectoral composition was actually negative, driven by the lower share of value added in skill-intensive sectors vis-à-vis the United States.



Sources: World Bank, *World Development Indicators* (2006); UNIDO, Industrial Statistics database; and IMF staff calculations.

[1]The growth takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, 1982 for India, and 1990 for other Asian economies.

[2]Data for China start in 1990.

[3]Other Asia includes only Bangladesh, Pakistan, and Sri Lanka.

Policy Determinants of Productivity Growth

The analysis so far suggests that Asia's strong productivity performance has in good part reflected differences in within-sector productivity growth rates. Further, those countries that have performed well across countries in a sector also have tended to perform well in other sectors, and this is not purely related to catch-up effects. All this is consistent with a significant role for country-specific factors, such as strong institutions and favorable macroeconomic policies—an issue now examined in greater detail. Intersectoral resource movements have also contributed significantly to Asia's growth, and this section goes on to examine how the policy environment has facilitated such shifts of resources.

In recent years, the large empirical literature on cross-country differences in output growth (see, for instance, *World Economic Outlook*, April 2003, Chapter III; and Bosworth and Collins, 2003) has emphasized the key role of institutional quality and human capital. The empirical literature on determinants of TFP growth across broad samples of countries is more limited,[28] and has generally emphasized the importance of trade openness.[29]

The data set used in this chapter is consistent with these conclusions. Over the period 1965–2005, cross-country differences in productivity growth, as proxied by either labor productivity or TFP growth, were closely related to variables that capture key aspects of the policy environment (see Figure 3.12). In particular, countries with higher productivity growth also

[28]There is, however, a substantial literature on the determinants of productivity differences across industrial countries, as well as national studies on the sources of inter-industry productivity differences.

[29]For instance, Edwards (1998) uses alternative openness indicators to demonstrate that more open countries experience faster TFP growth; Coe, Helpman, and Hoffmaister (1997) show that developing countries that trade with R&D intensive industrial countries have higher productivity growth; and Miller and Upadhyay (2000) find that human capital boosts TFP in low-income countries only when these countries achieve certain levels of openness.

tended to have relatively strong institutions, a better-developed financial system, a generally more favorable business climate (as indicated by lower costs of starting a business), better infrastructure, less restrictive trade policies, higher education levels, and a lower initial share of agricultural employment.[30]

Figure 3.12 also shows that Asia performs better than Latin America and other developing countries on most of these indicators, especially with regard to institutional quality, trade openness, and financial sector development, suggesting they have been important factors behind its strong productivity growth. That said, the quality of Asia's institutions, business climate, infrastructure, and policies do not yet match those of advanced economies. In addition, regional aggregates mask significant intraregional variations: for instance, the quality of infrastructure is much higher in Japan and the NIEs than elsewhere in Asia. In this context, it is worth underscoring that the quality of a country's institutions are not a given, and can be strengthened by reforms, even within relatively short periods.[31]

A more formal econometric analysis of the determinants of aggregate productivity growth confirms these broad correlations (see Appendix 3.1). Interestingly, the significance of the

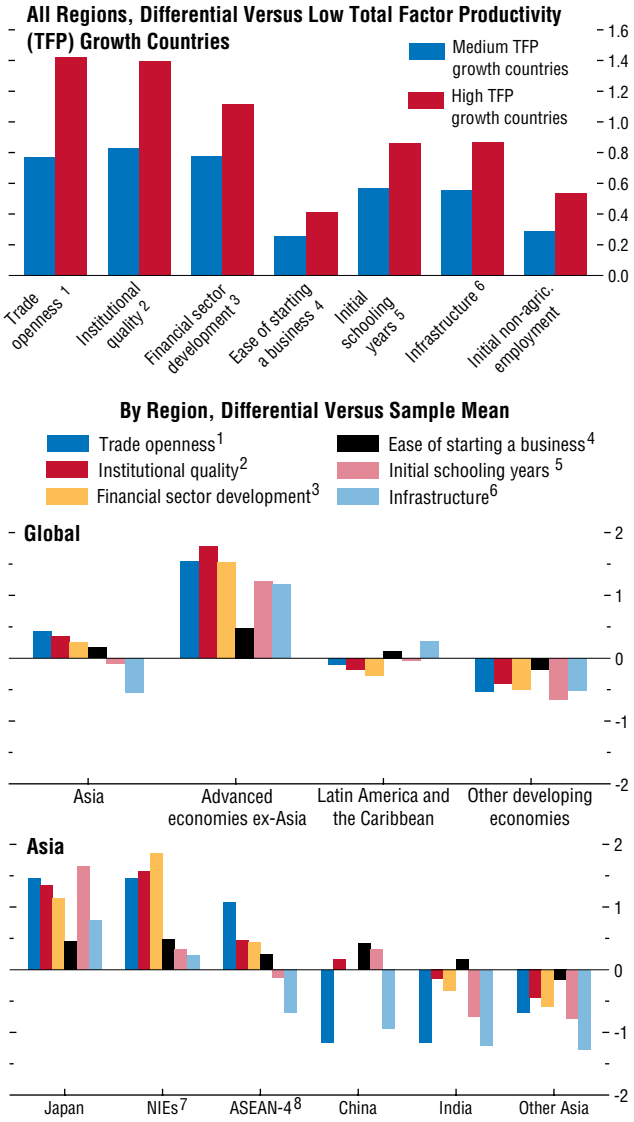
[30]Throughout, institutional quality is measured by the Kaufmann-Kraay-Mastruzzi index of government effectiveness. The entrepreneurial climate is proxied by the cost of starting a business (as a share of per capita income) from the World Bank's Doing Business database. Education levels are measured by average educational attainment, from Barro and Lee (2000). Trade openness is measured by the Welch-Wacziarg index (countries are considered closed if any of the following hold: an export-marketing board exists; the economy is considered socialist; the period-average tariff rate exceeds 40 percent; the share of goods subject to nontariff barriers exceeds 40 percent; or the local-currency black market premium exceeds 20 percent).

[31]For instance, the Korean civil service was radically transformed during the 1960s, through, among other moves, the introduction of merit-based systems in recruitment and promotion, eventually becoming a well-regarded bureaucracy by the 1970s (World Bank, 1993, Box 4.4). See Chapter III, "Building Institutions," of the September 2005 *World Economic Outlook,* for a broader discussion of institutional change.

Figure 3.12. Determinants of Productivity Growth, 1965–2005

(Level expressed as multiple of sample standard deviations)

Countries with higher productivity growth tend to have relatively strong institutions, a more favorable business climate, better infrastructure, less restrictive trade policies, higher education levels, and a lower initial share of agricultural employment.



Sources: Barro and Lee (2000); Wacziarg and Welch (2003); Kaufmann, Kraay, and Mastruzzi (2005); World Bank, Doing Business Database; Calderón and Servén (2004); Beck, Demirgüç-Kunt, and Levine (2000); and IMF staff calculations.

1 Fraction of the sample period in which a country is considered as open according to the Wacziarg and Welch indicator.

2 Kaufmann and Kraay government effectiveness measure for 1996.

3 Private credit extended by deposit money banks and other financial institutions as a percent of GDP for 2004. No data for China or Taiwan Province of China.

4 Defined as the negative of the cost of starting a business, from the World Bank, Doing Business Database.

5 Initial average schooling years in 1960 (for China, 1975).

6 Infrastructure defined as main telephone lines per 1,000 workers (in logs) for 1960.

7 Newly industrialized economies.

8 Indonesia, Malaysia, the Philippines, and Thailand.

openness and initial schooling variables weakens after controlling for institutions, confirming earlier results from the literature. As argued in Chapter III of the September 2005 *World Economic Outlook,* openness and educational quality may affect growth outcomes in part precisely through their impact on institutional quality. Turning to within-sector productivity growth, similar determinants emerge for industry as at the aggregate level, while in services the cost of starting a business appears especially important, suggesting that fixed costs act more as a barrier to entry in this sector given the typically smaller scale of operations.

Some of these same factors are also important in facilitating shifts of labor from agriculture toward nonagricultural sectors, another source of aggregate productivity growth. Most prominently, trade liberalization has a statistically and economically significant impact on the magnitude of shifts in employment toward nonagricultural sectors, especially among Asian countries, and this effect is quite robust to the introduction of other determinants (see Figure 3.13, as well as Appendix 3.1). For instance, trade openness played an important role in encouraging the movement of labor out of the agriculture sector in Japan, the NIEs, and the ASEAN-4, whereas relatively low openness to trade in China and India significantly slowed this process. This suggests that trade openness may boost productivity to a large extent through its impact on sectoral reallocation.

Greater financial development has also promoted the movement of labor toward industry and services, especially by alleviating liquidity constraints facing current and potential entrepreneurs (see Rajan and Zingales, 1998). This factor helped support the structural transformation process in Japan and the NIEs, but less so elsewhere. Investments in human as well as physical capital also played a role (albeit more limited) in supporting migration out of agriculture (see Poirson, 2000 and 2001). Physical capital accumulation is associated with increases in the relative labor productivity of industry; similarly, higher education levels increase an individual's capacity to make the transition to the modern economy. Finally, and not surprisingly, the greater the initial share of employment in agriculture, the larger the scope for labor to shift.

As discussed, productivity growth in Asia has been relatively slow in service sectors. Indeed, productivity in services relative to the United States has stagnated in recent years. Empirical studies suggest that deregulation and further opening to foreign competition would be particularly beneficial in unlocking these sectors' growth potential (see Nicoletti and Scarpetta, 2003; Conway and others, forthcoming; as well as Box 3.1 for Japan; and the previous discussion of India). Priorities include steps to promote greater competition in infrastructure-related services, such as telecommunications; further opening the retail and financial sectors to foreign competition (McKinsey Global Institute, 2001 and 2006); and lifting restrictions on entry into social services, including health and education. Increasing the transparency and consistency of regulation and streamlining administrative procedures would also prove advantageous. For instance, in India, where regulation of some sectors is decentralized, harmonizing regulations across states would facilitate greater private sector participation.

Much effort has recently been devoted to improving the quality of Asian corporate governance. As emphasized in Box 3.2, better governance may be expected to yield significant benefits in terms of growth and productivity, particularly for those industries that rely most heavily on external finance (see Khatri, Leruth, and Piesse, 2002). Yet, while reforms in the past few years have led to important improvements, the region still lags significantly behind advanced-economy standards.

Cross-country data sets can, admittedly, only provide crude indications of the factors behind individual countries' performance.[32] For exam-

[32]Among other issues, cross-country panel data for most institutional measures are not widely available, making it difficult to relate productivity growth to the change in (as opposed to level of) institutional quality.

ple, while the cross-country analysis above does not explain well China's remarkable productivity growth, more detailed, country-specific studies confirm a strong link to its post-1979 reforms. These involved, among other moves, the substantial development of property rights, whose impact was most dramatically felt in agriculture; the opening of markets; the removal of barriers to capital and labor mobility; and the setting up of Special Economic Zones (see Tseng and Rodlauer, 2003, in particular Chapter II; and the April 2005 *World Economic Outlook*). In contrast, slow TFP growth in the ASEAN-4, and especially in the Philippines, may have reflected, among other things, weaknesses in the quality of institutions and of infrastructure (IMF, 2005a and 2006a). As for Japan, Box 3.1 suggests that the reduction of lingering product market distortions (e.g., cutting excessive domestic regulation of the retail sector and further liberalizing agricultural trade), together with efforts to liberalize labor markets and boost R&D investment, could significantly boost TFP growth.

Looking ahead, late developers (such as the ASEAN-4, China, and India) will continue to enjoy favorable catch-up effects for the foreseeable future. Nevertheless, this analysis suggests that continued convergence toward advanced-economy income and productivity levels will require further structural reforms to maintain and indeed improve the favorable business climate. In particular, this will require improved corporate governance, as well as further upgrading of education levels and continued trade liberalization, so as to both underpin strong within-sector productivity growth and create incentives for further labor reallocation toward higher-productivity sectors.

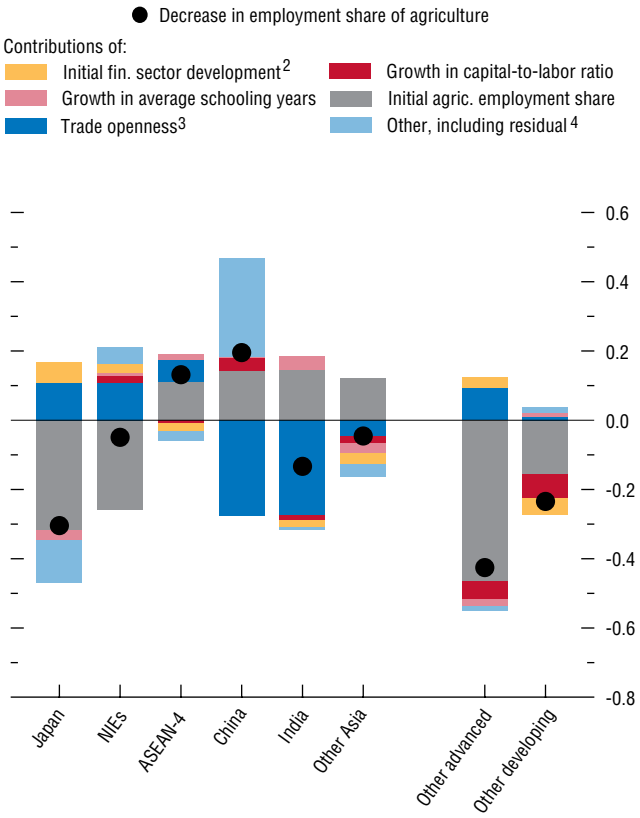
Conclusions

Asia has enjoyed a remarkable growth performance since the end of World War II. Both income per capita and labor productivity in most sectors have rapidly increased toward advanced-economy levels. An analysis of this striking record highlights several key lessons,

Figure 3.13. Determinants of Labor Shifts from Agriculture[1]

(Difference from Asia average; annual average; percentage points)

The magnitude of labor shifts out of agriculture is to a large extent determined by the initial employment share of the sector and trade openness. Financial development and capital accumulation also play a role in the structural transformation process.



Source: IMF staff calculations.

[1]Contributions are calculated based on regression analysis (see Appendix Table 3.2). For Asian subgroups, the labor shift is examined for the period following the growth takeoff. The takeoff is defined as occurring in 1955 for Japan, 1967 for the newly industrialized economies (NIEs), 1973 for the ASEAN-4 (Indonesia, Malaysia, the Philippines, and Thailand), 1979 for China, 1982 for India, and 1990 for other Asian economies. For other advanced economies and other developing economies, the labor shift is examined over the full sample period, 1970–2004.

[2]Private credit extended by deposit money banks and other financial institutions as a percent of GDP in initial year (not available for China).

[3]Fraction of the sample period in which a country is considered as open according to the Wacziarg and Welch indicator.

[4]The residual for China includes any effect of financial sector development.

Box 3.2. The Evolution and Impact of Corporate Governance Quality in Asia

In the aftermath of the East Asian financial crisis of 1997–98, many Asian countries implemented new laws and regulations aimed at strengthening corporate governance.[1] However, assessing the evolution of corporate governance quality using measures of *de jure* changes is difficult for two reasons. First, actual improvements may not necessarily immediately follow the enactment of new rules because of lags in implementation and/or enforcement. Second, firms can choose to implement measures strengthening their corporate governance *prior to* or *independently of* the enactment of new rules whenever the benefits of good corporate governance, especially in terms of easier and less costly access to finance, are critical for their growth prospects.[2] The relevant question, then, is whether corporate governance quality in Asia has *actually* improved. And, do improvements in corporate governance contribute to growth?

A study by De Nicolò, Laeven, and Ueda (2006) addresses these questions by constructing a time series of a composite Corporate Governance Quality (CGQ) index for Asian countries and other major emerging markets and advanced economies for the period 1994–2003. The CGQ index is a simple average of three indicators, called *Accounting Standards, Earning Smoothing*, and *Stock Price Synchronicity*. These indicators are constructed from accounting and market data for samples of nonfinancial companies listed in domestic stock markets and are standardized so that they vary between zero and unity. Larger values denote better corporate governance quality.

The *Accounting Standards* indicator is a simple measure of the amount of accounting information disclosed by each country's 10 largest firms (by asset size). Specifically, it measures the fraction of variables reported out of 40 key accounting items, selected based on data availability among those identified by the Center for International Financial Analysis and Research (CIFAR, 1993). The *Earning Smoothing* indicator is a measure of "earnings opacity" proposed by Leuz, Nanda, and Wysocki (2003) and Bhattacharya, Daouk, and Welker (2003) and tracks the extent to which managers may conceal the true performance of firms. Specifically, it equals the rank correlation between cash flows (before any accounting adjustments) and profits (after accounting adjustments) across a set of firms in each year. The *Stock Price Synchronicity* indicator is a measure proposed by Morck, Yeung, and Yu (2000), who find that stock price movements are more correlated in countries where corporate governance is poor and financial systems are less developed. The latter two measures can be viewed as indicators capturing different, albeit complementary, dimensions of firm transparency.[3]

As shown in the first figure, the aggregate CGQ index has improved in most Asian countries since the 1997–98 crisis, although in some countries the changes are small or indeed negligible.[4] As shown in the second figure, a similar pattern characterizes the evolution of each component of the index: some countries exhibit notable improvements in all dimensions, while others record negligible improvements (or even a worsening) in some dimensions. Overall, the most notable improvements appear to be in the *Earnings Smoothing* and *Stock Price Synchronicity* indicators, rather than in the *Accounting Standards* dimension.

Note: The main authors of this box are Gianni De Nicolò, Luc Laeven, and Kenichi Ueda.

[1]See OECD (2003). For reviews of the literature on corporate governance, see Becht, Bolton, and Roell (2003); and Berglöf and Claessens (2006).

[2]Corporate governance quality may be viewed partly as an "endogenous" firm-level choice, as pointed out by Himmelberg, Hubbard, and Palia (1999); and Coles, Lemmon, and Meschke (forthcoming).

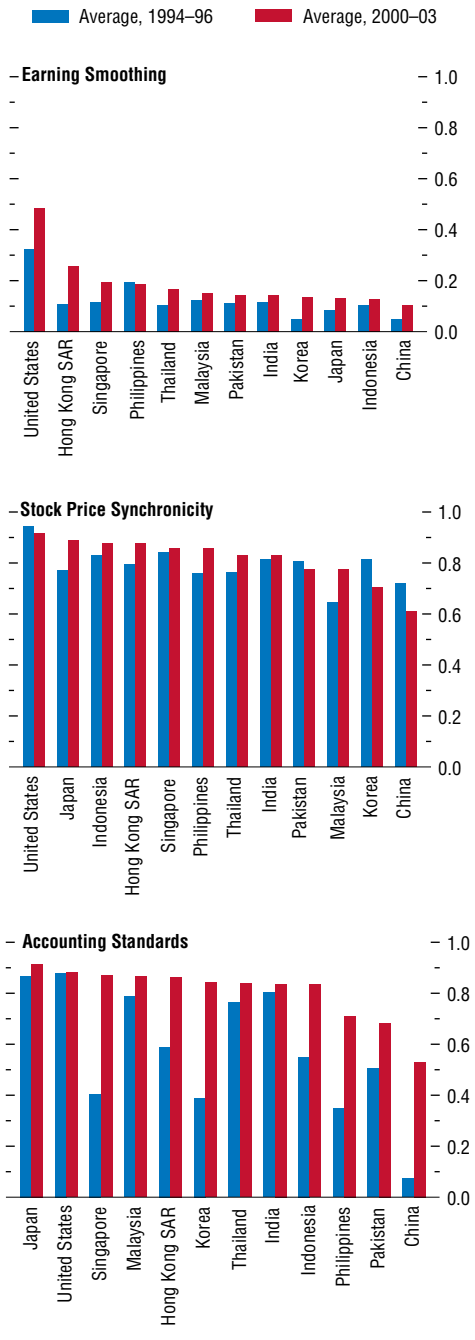
[3]The correlation between the three measures is low, ranging between 0.15 and 0.35.

[4]As the CGQ index measures corporate governance quality at the country level, it records not only improvements taking place in existing firms, but also those due to the exit of poorly governed firms, which may have occurred during episodes of severe financial stress, such as the Asian Crisis.

Corporate Governance Quality Index

Source: IMF staff calculations.

Indicators of Corporate Governance Quality



Source: IMF staff calculations.

A critical question is whether improvements in corporate governance quality have "real" effects. Aggregate economic activity and industry growth may be affected through several channels. For example, improvements in the quality of corporate governance may affect growth by lowering firms' cost of funds and increasing the supply of credit, thereby encouraging investment. Industries that rely more on outside finance are likely to benefit most from this channel. Better governed firms may align managers' and stakeholders' interests more closely, providing stronger incentives for managers to attain improvements in firms' productivity.

De Nicolò, Laeven, and Ueda (2006) assess the relevance of these effects indirectly through

Box 3.2 *(concluded)*

Aggregate Economic Activity, Industry Growth, and Corporate Governance Quality

(Dependent variable)

	Change in GDP Growth in Year *t* (1)	Change in TFP Growth in Year *t* (2)	Industry Sales Growth (3)
Change in the Corporate Governance Index	0.209**	0.154**	. . .
in year *t* – 1	(0.079)	(0.061)	. . .
Share in industry sales	. . .	. . .	–0.786**
			(0.311)
Change in CGQ Index	. . .	. . .	0.770
* Financial Dependence	. . .	. . .	(1.175)
Number of countries	40	40	36
Number of observations	311	311	610
Number of industries			36
R-squared (overall)	0.0431	0.0243	0.55
R-squared (within)	0.0048	0.0001	. . .
R-squared (between)	0.0421	0.0235	. . .

Source: De Nicolò, Laeven and Ueda (2006).

Notes: Regressions (1) and (2) are country fixed effects panel regressions over 1996–2004. Regression (3) is a cross-country regression with country and industry fixed effects of the type introduced by Rajan and Zingales, (1998), with data averaged over 1994–2003. White's heteroskedasticity-consistent standard errors are reported between brackets. *, **, and *** denote significance at, respectively, the 10 percent, 5 percent, and 1 percent level.

cross-country panel regressions, covering both advanced economies and emerging markets, that relate the CGQ index to measures of output growth, total factor productivity (TFP) growth, and industry growth. As shown in the table, their results indicate that improvements in corporate governance quality indeed have a positive and significant effect on GDP and TFP growth, as well as on the relative growth of those industries dependent on external finance, consistent with the notion that well-governed firms are better able to attract outside financing. For instance, a one standard deviation increase in the CGQ index boosts subsequent GDP growth by 0.9 percentage point (or half the sample standard deviation of GDP growth). The impact on TFP growth is of a similar magnitude. Further, industry-level sales growth depends positively on the interaction between the CGQ index and a measure of the industry's dependence on external finance,[5] showing that "financially dependent" industries benefit relatively more from improvements in corporate governance.[6]

In sum, improvements in corporate governance quality appear to yield tangible benefits in terms of growth and productivity, particularly for those industries that rely most on external finance. Thus, effective implementation of corporate governance reform appears to be an important contributing factor to economic growth. Those Asian countries that effectively improved their corporate governance appear to have reaped these benefits. There remains, however, considerable scope to strengthen corporate governance in Asia further.

[5]Defined as the share of investment not financed by operating cash flow (see Rajan and Zingales, 1998).

[6]The relevant coefficient is not measured with precision, that is, it is not statistically significant. However, a similar regression where each component of the CGQ index enters separately yields an economically and statistically significant effect of the *Stock Price Synchronicity* indicator on the growth of those industries most dependent on external finance (see De Nicolò, Laeven, and Ueda, 2006)

both for Asian countries aiming to continue converging toward advanced-economy income levels, and for other developing economies seeking to emulate their success.

First, in most of Asia growth has benefited from rapid increases in TFP, as well as fast accumulation of both physical and human capital. In turn, these developments reflected a stronger institutional and policy environment (including with respect to financial development, the business climate, and in many cases trade openness) than observed in other developing economies. Looking ahead, late developers in Asia, and indeed other parts of the world, can draw important lessons from these aspects of the experience of fast-growing Asian economies. In particular, the findings in this chapter underline the importance of fostering higher standards of education, so as to support skill- and innovation-based industries and move up the value-added

chain, as well as of continuing to strengthen the quality of corporate and financial-sector governance. Related to this, financial development also plays a critical part in the growth process. Within Asia, financial systems, still heavily centered on banks, will need to be broadened and deepened, for instance, through efforts to develop the corporate bond market; among other things, this will facilitate the financing of required infrastructural improvements.

Second, Asia's long-run macroeconomic achievements have also depended importantly on policies that encouraged resource shifts from low- to high-productivity sectors. This applied both to the overall shift from agriculture toward industry and services and to the continuing move within manufacturing toward higher value-added products. Looking ahead, a continuing shift of labor away from the still-large agricultural sector will, especially in lower-income countries, provide an important channel to boost growth and reduce rural poverty. Further efforts to increase trade openness, ensure widespread access to education and health care, and encourage entrepreneurship will help these countries sustain this vital transition. More generally, ensuring significant structural flexibility, including in labor markets, while establishing effective social safety nets will prove increasingly important as Asia strives to maintain its competitive edge, provide growing employment in industry and services, and make significant inroads into poverty eradication.

Third, in Asia (as in many advanced economies) there remains a persistent gap in productivity growth rates between industry and services, partly reflecting the sheltered nature of many service sectors. Further, over time Asian service-sector productivity growth has decelerated markedly, in many cases stalling convergence toward advanced-economy productivity levels; this can be viewed as an indication of missed opportunities. As economies grow wealthier and become ever more focused on services, it will prove increasingly important to encourage competition and productivity growth in this sector, including by removing barriers to entry, streamlining regulations, and strengthening human capital.

Appendix 3.1. Methods and Additional Results

The main authors of this appendix are Florence Jaumotte and Hélène Poirson.

This appendix presents the methodology underlying the results presented in this chapter, as well as some additional results for the effects of institutions and policies on productivity growth.

Sectoral Structure: Actual Versus Predicted

This section presents the methodology used to evaluate the structure of Asian economies and, in particular, to determine whether the relative importance of agriculture, industry, and services is in line with what would be predicted based on fundamentals, such as GDP per capita and the size of the economy. Following Kochhar and others (2006) the actual share of each sector in value added (or, alternatively, employment) is regressed on a set of fundamental determinants and a dummy variable for Asia or the Asian subregions. Fundamentals included are the logs of output per capita (in PPP U.S. dollars), geographic size, and population. The cross-country regressions are estimated by ordinary least squares (OLS)[33] using the latest available data for the sectoral shares and a broad sample of advanced and developing economies. The predicted value for the sectoral share of value added is then calculated as the difference between the actual share and the value of the dummy variable for that region. Table 3.1 shows for each region, both globally and within Asia, the actual shares of agriculture, industry, and services in value added and in employment in the latest available year, as well as the difference between the actual and the predicted values. A similar analysis is performed for the respective

[33]Using a generalized linear model, and imposing that the share be between 0 and 100, yields similar results.

Table 3.1. Sectoral Shares in Value Added and Employment[1]

(Level in latest available year, percentage points)

Region/Country	Actual			Actual Minus Predicted		
	Agriculture	Industry	Services	Agriculture	Industry	Services
			Value added share			
Asia	15	33	52	1	**5****	**–6*****
Advanced economies ex-Asia	3	28	69	. . .	. . .	. . .
Latin America and the Caribbean	11	30	59	. . .	. . .	. . .
Other developing economies	18	29	53	. . .	. . .	. . .
Japan	1	32	67	0	2	–2
Newly industrialized economies (NIEs)	1	29	69	0	2	–2
ASEAN-4[2]	13	43	44	1	**11*****	**–12*****
China	12	57	31	0	**23*****	**–23*****
India	21	27	52	2	–4	2
Other Asian economies	27	27	46	1	2	–3
			Employment share			
Asia	34	20	45	**9****	–3	**–6***
Advanced economies ex-Asia	5	25	70	. . .	. . .	. . .
Latin America and the Caribbean	15	22	63	. . .	. . .	. . .
Other developing economies	28	24	47	. . .	. . .	. . .
Japan	5	29	66	–3	2	1
NIEs	4	25	71	–4	–3	7
ASEAN-4[2]	33	20	46	**12****	–4	**–8***
China	47	23	31	**23*****	–2	**–21*****
India	57	19	25	**22*****	–3	**–19*****
Other Asian economies	54	16	30	**14****	–2	**–12*****

Source: World Bank, *World Development Indicators*.

[1]Unweighted country average. *** denotes significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level. Predicted value is based on a regression of the actual share on fundamentals and a dummy variable for the region. It is calculated as the difference between the actual value and the value of the dummy variable. Predicted shares need not sum to unity since equations for each sector are estimated independently.

[2]Comprising Indonesia, Malaysia, the Philippines, and Thailand.

shares of skill- and nonskill-intensive sectors in manufacturing, as presented in the chapter.

Sectoral Decomposition: Methodology

This section describes the methodology used to isolate the contributions of sectoral effects and within-sector productivity growth to aggregate labor productivity growth. The analysis focuses on two types of sectoral effects:

- *The sectoral reallocation effect.* When a country reallocates labor from a low-productivity to a high-productivity sector, this contributes to raising its aggregate labor productivity (and hence temporarily boosts labor productivity growth).
- *The sectoral composition effect.* When a country has a higher value added share of high-productivity growth sectors, this will also raise its aggregate labor productivity growth.

Denoting labor productivity by y, the employment shares by s, the value added shares by s^Y, sectors by j, and first difference by d, aggregate labor productivity growth for any given country and year can first be decomposed as follows:

$$\frac{dy_t}{y_{t-1}} = \sum_j ds_{j,t} \frac{y_{j,t}}{y_{t-1}} + \sum_j \frac{dy_{j,t}}{y_{j,t-1}} s^Y_{j,t-1}.$$

The first term on the right is the sectoral reallocation effect, where the change in the employment share of a sector is weighted by its productivity (scaled by initial aggregate productivity), while the second term is the contribution of within-sector productivity growth, as measured by the sector's productivity growth weighted by the initial value added share of the sector. Other studies that have used similar decompositions include Denison (1962 and 1967) and, more recently, Bloom, Canning, and Malaney (1999), and Dekle and Vandenbroucke (2006).

In order to isolate a sectoral composition effect, the chapter further introduces a cross-country dimension, by focusing on the differential in aggregate labor productivity growth between the examined country and a comparator country, say the United States. In this case, the second term, the contribution of within-sector productivity growth, can be further decomposed into a sectoral composition effect and a new cross-country measure of the contribution of within-sector productivity growth:

$$\frac{dy_t}{y_{t-1}} - \frac{dy_{US,t}}{y_{US,t-1}} = \left[\sum_j ds_{j,t}\,\frac{y_{j,t}}{y_{t-1}} - \sum_j ds_{US,j,t}\,\frac{y_{US,j,t}}{y_{US,t-1}}\right] + \left[\sum_j \left(s^Y_{j,t-1} - s^Y_{US,j,t-1}\right)\left(\frac{1}{2}\right)\left(\frac{dy_{j,t}}{y_{j,t-1}} + \frac{dy_{US,j,t}}{y_{US,j,t-1}}\right)\right] + \left[\sum_j \left(\frac{dy_{j,t}}{y_{j,t-1}} - \frac{dy_{US,j,t}}{y_{US,j,t-1}}\right)\left(\frac{s^Y_{j,t-1} + s^Y_{US,j,t-1}}{2}\right)\right].$$

The first term is now simply the difference between the sectoral reallocation effects of the country and the United States; this is called the "sectoral reallocation" effect in the chapter. The second term is the sectoral composition effect, measured by the difference between the sector's value added shares in the examined country and the United States, weighted by the average productivity growth of the sector in the two countries. Finally, the last term measures the contribution from within-sector productivity growth, as the difference between the sector's productivity growth in the examined country and the United States, weighted by the average sector's share in value added in the two countries.

This decomposition is carried out for each year of the sample period[34] and then a geometric average of the contributions is calculated for the whole period. The average annual contributions are rescaled to add up to the average aggregate labor productivity growth. It should be noted that the use of average labor productivity (instead of marginal productivity) to evaluate the effect of the reallocation of employment from one sector to the other (the first term) rests on the simplifying assumption that the ratio of marginal labor productivity to average labor productivity is the same in all sectors. Some other studies have used alternative (regression-based) approaches to circumvent the absence of data on marginal labor productivity when estimating the sectoral reallocation effect (e.g., Poirson, 2000 and 2001). Although samples and data sources are different, the order of magnitude obtained in these studies for the sectoral reallocation effect is broadly comparable to the one obtained in this chapter.

[34]This implicitly rebases the sectoral structure in each year, allowing a more precise decomposition of the respective contributions of sectoral effects and productivity than if only the initial and end points of the sample were used.

Econometric Analysis of the Determinants of Productivity Growth

The analysis uses a standard growth model to capture the effects of institutions and policies on cross-country variation in labor productivity and TFP growth. It also examines the determinants of within-sector productivity growth (in industry and services) and of labor shifts from agriculture to nonagricultural sectors, since these are the main sources of labor productivity growth. Throughout, institutions are measured by the Kaufmann-Kraay-Mastruzzi index of government effectiveness. The cost of starting a business, as a share of per capita income, is taken from the World Bank's Doing Business database. The measure of trade openness is the fraction of years where the country was considered as open according to the Welch-Wacziarg index, and reflects the policy stance. Financial sector development is proxied by the ratio of private sector credit to GDP, and education by the Barro-Lee measure of average schooling years. The initial level of the productivity gap (relative to the United States) is included to capture possible convergence effects (see Barro, 1997). The initial share of employment in agriculture is also introduced to control for sectoral composition effects. Other fundamentals (such as the quality of macroeconomic policies and foreign direct investment) were not significant

Table 3.2. Determinants of Productivity Growth[1]

Variable	Aggregate Labor Productivity Growth	TFP Growth	Industry Labor Productivity Growth	Services Labor Productivity Growth	Labor Shifts from Agriculture[2]
			Policy variables and initial conditions		
Initial productivity gap (ln)	**–1.9*** **	**–0.8*** **	**–1.9*** **	**–1.2*** **	. . .
Initial employment share in agriculture (in percent)	**–1.0*** **	**–0.4** **	. . .	. . .	**0.28*** **
Initial average years of education	0.2	0.1	**1.1*** **	**0.7*** **	. . .
Trade openness	**0.8*** **	**0.9*** **	**0.7** **	**0.5***	**0.12*** **
Initial financial sector development (ln)	**0.5*** **	0.2	**0.5***	0.3	**0.06** **
Growth in average schooling years	. . .	. . .	. . .	. . .	0.04
Growth in capital-to-labor ratio	. . .	. . .	. . .	. . .	**0.04***
R-squared	0.67	0.62	0.55	0.36	0.79
Observations/countries	77	67	58	58	55
			Adding institutional quality and the cost of starting a business		
Initial productivity gap (ln)	**–1.8*** **	**–0.7*** **	**–2.0*** **	**–1.5*** **	. . .
Initial employment share in agriculture (in percent)	**–0.8*** **	–0.2	. . .	. . .	**0.30*** **
Initial average years of education	–0.1	–0.2	0.4	–0.1	
Trade openness	**0.5** **	**0.6** **	0.5	0.2	**0.15*** **
Initial financial sector development (ln)	0.2	0.0	0.0	–0.1	**0.07** **
Cost of starting new business (in percent of GDP per capita)	**–0.4***	–0.2	**–0.7***	**–0.7*** **	–0.04
Institutional quality	**0.6***	**0.6***	**1.0** **	**1.1*** **	–0.04
Growth in average schooling years	. . .	. . .	. . .	. . .	0.05
Growth in capital-to-labor ratio	. . .	. . .	. . .	. . .	0.03
R-squared	0.73	0.66	0.68	0.65	0.80
Observations/countries	74	65	57	57	53

Source: IMF staff estimates.

[1]The coefficients denote the impact on the dependent variable (in percentage points) of a one standard deviation increase in its determinants. The estimates are based on weighted least squares regressions (with robust errors) using as dependent variable the average annual value over 1965—2005 of the variable in the given column. *** denotes coefficients significant at the 1 percent level, ** at the 5 percent level , and * at the 10 percent level.

[2]Labor shifts from agriculture are defined as minus the change in agriculture's employment share. The specification includes both the initial employment share and its square, and the coefficient shown is the sum of the coefficients on the variable and on its square.

once these main determinants were controlled for, and were thus omitted from the regressions. The specification for intersectoral labor shifts is broadly similar, but includes the rates of accumulation of physical and human capital, in line with previous studies (see Poirson, 2000 and 2001).[35] The dataset covers the period 1965–2005 and the model is estimated by weighted least squares (with robust standard errors), with each country's variance assumed to be inversely proportional to the number of years for which the country's data are available. Initial levels of financial sector development and education are used to minimize endogeneity problems, while for institutions and the cost of starting a business, values are only available for the end of the sample period.

The results broadly indicate that initial income, openness, education, financial sector development, and institutions have a strong and significant impact on productivity growth consistent with the empirical literature on TFP and growth per capita differences across countries (Table 3.2 and Figure 3.14). The first panel of the table shows results for a basic model that omits institutions and the cost of starting a

[35]It also includes the square of the initial employment share in agriculture (to capture possible nonlinearities), but excludes the initial aggregate productivity gap (relative to the United States) and initial education (which was not significant).

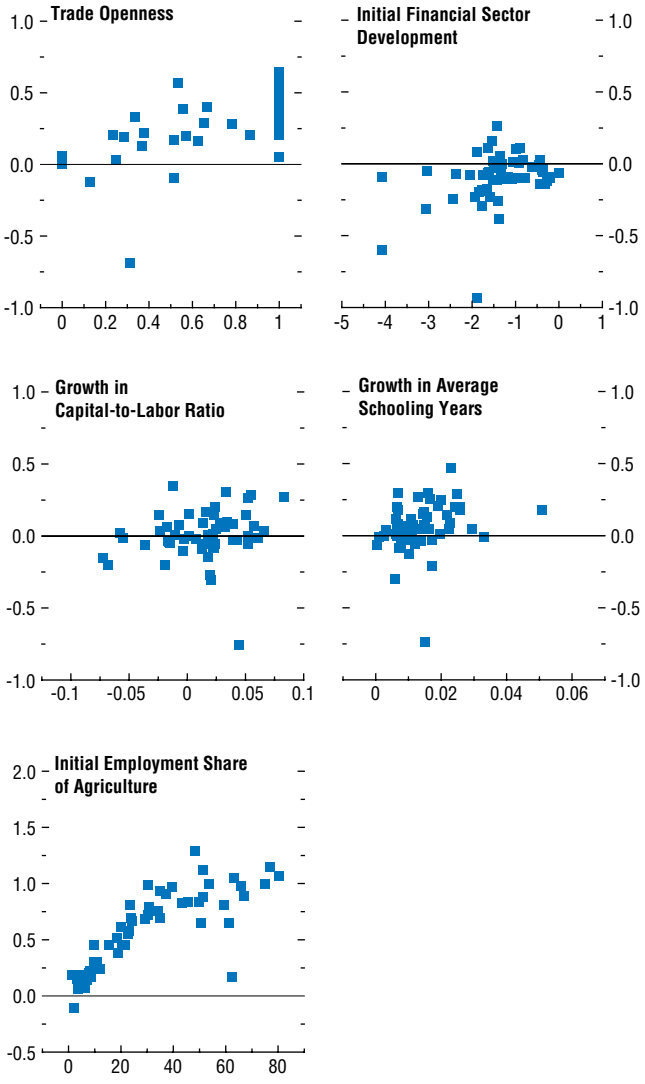
business. These suggest that strong productivity growth relies importantly on:

- *A convergence effect* (proxied by low initial labor productivity relative to the United States). The catch-up effect is indicated by a negative and significant coefficient on the initial productivity gap in all regressions. The negative coefficient on initial agricultural employment in the regression for labor productivity growth suggests that countries with a larger initial share of agricultural employment tend to experience slower aggregate productivity growth. Unsurprisingly, the initial employment share in agriculture is also a major determinant of the magnitude of labor shifts.
- *Trade openness and financial sector development.* Both variables are strongly significant determinants of aggregate productivity growth. Their effects work mostly through stimulating labor shifts out of agriculture and boosting industry productivity growth. The effects of these variables are not estimated precisely in the services productivity growth equation: in the case of trade openness, this might reflect the fact that the indicator used in the regressions is not a good proxy of the degree of openness in the services sector.
- *Education.* Initial education levels are most significant, both economically and statistically, in the regressions for within-sector productivity growth. For labor shifts from agriculture, the small and only weakly significant effects from human and physical capital accumulation may reflect that these variables are themselves endogenous to other determinants of labor shifts, and have little separate effect.

In the second panel of Table 3.2, the model is augmented with the measures of institutions and business climate. The results underscore the importance of these variables. Institutional quality has an economically and statistically significant effect on productivity growth at the aggregate and sectoral levels.[36] However,

[36]No significant effect of institutional quality on intersectoral labor shifts was found and the coefficient has the wrong sign.

Figure 3.14. Partial Correlations Between Labor Shift from Agriculture and Its Determinants [1]
(Unexplained sectoral shift on y-axis) [2]



Source: IMF staff calculations.
[1]Based on the specification in column 5 of Table 3.2 (top panel). Labor shifts from agriculture are defined as minus the change in agriculture's employment share.
[2]The unexplained sectoral shift is the part of the change in the employment share of agriculture not explained by other regressors.

controlling for institutions weakens the significance of the openness and initial schooling variables (in line with earlier results from the literature and subject to the earlier caveat about possible endogeneity of the institutional variable).

The cost of starting a business exerts a negative effect on productivity growth, especially in services. Controlling for the cost of starting a business tends to lower the significance of financial sector development in the productivity growth regressions. In the equation for labor shifts, no significant effect of start-up costs is found. However, a more general specification allowing for an interaction term between the cost of starting a business and financial sector development suggests that the latter matters to the extent that it reduces the negative effects of start-up costs.

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