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Introduction

During a 13-year period extending from roughly 1995 to 2008, the world economy experienced an upheaval resulting from a great burst of globalization that brought the 20th century to a close. The new century is being ushered in by a second upheaval following a severe financial crisis that plunged the global economy into recession in 2008–09. Through an analysis of industrial trends, patterns, and national manufacturing capabilities that emerged after 1985, this volume examines the consequences of the first upheaval for Asia's industrial geography and explores the likely outcomes of the second upheaval for industrial development and trade across the Asia region.

The first upheaval witnessed a massive migration of manufacturing industries and certain business services from advanced countries to developing economies. This migration transformed East and parts of South Asia into the industrial heartland of the world. The second upheaval, which could continue for a decade or more, will most likely consolidate Asia's industrial preeminence; in addition, it could result in the redistribution and concentration of industrial activities in the two most populous and fastest-growing economies in Asia—China and India. The growth of Asia's share of global manufacturing activities and major business services is already tilting the balance of economic power in Asia's favor (Grether and Mathys 2006). In 1973, one-quarter of purchasing power parity (PPP) adjusted world gross domestic product (GDP) came from Asia while 51 percent came from the West. By comparison, as of 2003, Asia's share had risen to 43 percent, surpassing the West's 40 percent share (see table 1.1).[1]

[1]Using nominal exchange rates, East Asia's share of global GDP in 2006 was 20 percent compared to 31 percent for Europe and 32 percent for North America. This provides another perspective on the relative weights of the different regions (Cohen-Setton and Pisani-Ferry 2008).

Table 1.1 Shares of World GDP, 1820–2030

	1820	1950	1973	2003	2030
Western Europe	23.0	26.2	25.6	19.2	13.0
United States	1.8	27.3	22.1	20.7	17.3
Other Western offshoots[a]	0.1	3.4	3.3	3.1	2.5
West	**25.0**	**56.8**	**50.9**	**40.4**	**32.8**
China	32.9	4.6	4.6	16.8	23.8
India	16.0	4.2	3.1	6.1	10.4
Japan	3.0	3.0	7.8	6.1	3.6
Other Asia[b]	7.4	6.8	8.7	13.6	15.4
Latin America	2.1	7.8	8.7	7.7	6.3
Eastern Europe and former USSR	9.0	13.1	13.8	6.1	4.7
Africa	4.5	3.8	3.4	3.2	3.0
Rest	**75.0**	**43.2**	**49.1**	**59.6**	**67.2**
Asia as % of world	**59.3**	**14.9**	**24.2**	**42.6**	**53.3**

Source: Maddison 2008.
a. Australia, Canada, and New Zealand.
b. Includes Bangladesh and Pakistan from 1950.

A continuing increase in Asia's share will have major implications for the rest of the world, especially if China and India are the principal gainers. This increase is therefore one of the issues that we explore in this book. The second issue concerns the shape of Asian industrial geography in the coming decade. If the two Asian giants become the industrial equals of the United States, Germany, and Japan, such parity will have ramifications for trade and growth worldwide, for the future of development in China and India, and for industrialization elsewhere in East and South Asia.

The focus of this volume is on China and India. We see them as the principal beneficiaries of the first upheaval, roughly bookended by the crises of 1997–98 and of 2008–09, and as being among the prime movers whose economic footprints will expand most rapidly in the coming decades. If these two countries do come close to realizing their considerable ambitions, their neighbors in Asia and their trading partners throughout the world must be ready for major adjustments. The changes in industrial geography and in the pattern of trade since the mid-1990s have already been far-reaching. Nothing on a comparable scale occurred during the preceding two decades of the 20th century. These developments offer instructive clues concerning the possible direction of changes in the future. However, in the interest of manageability, our analysis is centered on the dynamics of industrialization, as these have a large bearing on the course of development. Within this context, reference is made to trade, foreign direct investment, and the building of technological capabilities, which together constitute a major subset of the factors responsible for

the shape not only of the industrial geography of the past but also of the industrial geography yet to come.

The striking feature of development in South and East Asia in the second half of the 20th century is the degree to which Japan dominated the industrial landscape and how the Japanese model[2] triggered the first wave of industrialization in four East Asian economies[3]—the Republic of Korea; Taiwan, China; Hong Kong, China; and Singapore. These four so-called tiger economies were the early starters, and each has become a mature industrial economy. Indeed, Hong Kong, having transferred almost all of its manufacturing activities to the Pearl River Delta,[4] has morphed into a postindustrial economy.

China Awakens

A first wave of industrialization in East Asia commenced with the revival of Japan's industry, beginning in the mid-1950s, and the rapid technological progression of Japanese firms in the two subsequent decades. Ten years later, Japan was joined by the economies of Hong Kong, China; the Republic of Korea; Singapore; and Taiwan, China. From the 1970s onward, industrial change stirred and quickly gathered momentum in Malaysia and Thailand, and to a lesser degree in Indonesia and the Philippines. These four countries constituted the second wave of "fast followers"[5] in Asia, their industrialization guided and partially financed by foreign direct investment (FDI) that resulted in a base of exporters oriented mainly toward markets in the United States and Japan. China entered the fray in the 1980s following a landmark decision by the government in 1978[6] to rapidly modernize

[2]The course and pace of industrialization in Korea and Taiwan, China, was influenced by development during the period when both economies were Japanese colonies.

[3]The so-called flying geese model, first described by Akamatsu (1962), has been elaborated and formalized by numerous commentators (see Kasahara 2004; Kojima 2000; and Kojima and Ozawa 1985). According to Ozawa (2003), the performance of the East Asian economies depended upon the global environment created and maintained by the United States for trade, investment, and structural upgrading. Japan both benefited from the Pax Americana and went on to complement the pull exerted by the U.S. economy by serving as an "industrial upgrading intermediary for the East Asian regions and an augmentor of industrial capacity through its FDI and technology transfer to neighboring countries" (p. 705).

[4]Hong Kong, China, is now the services-providing hub of the Shenzhen–Hong Kong urban region, with only 4 percent of its GDP sourced from manufacturing. On Hong Kong, China's transformation, see Berger and Lester (1997); Enright, Scott, and Dodwell (1997); and Tao and Wong (2002).

[5]See Mathews and Cho (2000).

[6]At the now almost legendary Third Plenum of the Eleventh Central Committee held in December 1978. This was followed by gradual reform of state-owned enterprises (SOEs). For details on SOE reform, see Yusuf, Nabeshima, and Perkins (2005).

the economy, but it was not until the mid-1990s that China emerged as a significant exporter and recipient of FDI (see figure 1.5 on page 11 and figure 1.8 on page 18). The remarkable aspect of China's industrial development and prowess as a trading nation is the sheer speed with which it came out of a state of economic backwardness, social turmoil associated with the aftermath of the Cultural Revolution, and political disarray following the death of Mao Zedong and the arrest of the Gang of Four[7] in 1976. Once the government committed itself to reform and catching up with its neighbors, the country's latent entrepreneurial talent and neglected potential for industrialization were mobilized at incredible speed. This was achieved with the help of organizational resources, the calibrated application of market-based incentives,[8] the opening of the economy to FDI and to trade via the special economic zones (SEZs) and the Foreign Trade Corporations, and most important, heavy and sustained investment in both production facilities and the infrastructures undergirding industrial development. A little more than a decade after China began adopting market institutions and incentives and promoting exports, it was hard on the heels of Asia's front-running tiger economies.

India Gathers Speed

After a long spell of sluggish growth at a rate of just 3 percent per year, the pace of India's growth quickened in the early 1980s (to 5.5 percent between 1980 and 1991) in response to a dribble of reforms emanating from the Congress-led government under Indira Gandhi (Panagariya 2008a; Virmani 2004). These reforms intensified following the balance of payment (BOP) crisis of 1991.[9] But it was not until almost the end of the 1990s that India's strengthening economic performance came to international notice, and that because of a fortunate conjuncture of circumstances: India's slowly accumulating capabilities in the information and communication

[7]The so-called Gang of Four was a group of individuals who were most closely associated with Mao in the last few years of his life and were responsible for interpreting and implementing his instructions. They were Jiang Qing, Zhang Chunqiao, Yao Wenyuan, and Wang Hongwen. The Gang was arrested in October 1976, less than a month after Mao's death on September 9th, 1976.

[8]A relaxation of controls over the production and pricing of some commodities and the instituting of a dual pricing system were among the earlier reforms. The growth impetus provided by economic opening and institutional reforms is analyzed by Ding and Knight (2008).

[9]Commentators differ in the significance they assign to the limited reforms introduced in the early 1980s and the modest growth acceleration that resulted. Liberalizing policies and devaluation following the crisis of 1991 also raised growth to only about 6 percent. After 2003, growth surged to 9 percent (Rodrik and Subramanian 2004; Bhalla 2004; Panagariya 2008b).

Table 1.2 GDP Growth
annual %

Country	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
China	9.3	7.8	7.6	8.4	8.3	9.1	10.0	10.1	10.4	11.6	13.0	9.6
India	4.1	6.2	7.4	4.0	5.2	3.8	8.4	8.3	9.4	9.7	9.1	7.1

Source: World Development Indicators Database.

technology (ICT) sector[10] and in information technology–enabled services (ITES) were suddenly in great demand because of the assumed threat to computer systems posed by the start of the year 2000 (Y2K) and by the adoption of the Euro as the common European currency. Both generated an urgent need for software writing and debugging—skills that India had been nurturing domestically and via its diaspora of professionals. This demand was reinforced by the advent of business services outsourcing models embraced by U.S. corporations, which are always eager to pare their costs and capitalize on the opportunities presented by ICT for off-shoring back-office functions. The off-shoring of these functions was followed by that of others, such as code writing, personnel management, and research.[11] India's location in an advantageous time zone, offering the capability of handing off tasks at the end of the working day in the United States, compounded the attraction of lower costs. Catalyzed by these developments in ITES and business process outsourcing (BPO) services, India's growth accelerated to more than 7 percent per year between 1997 and 2007 (see table 1.2). Even though India's manufacturing sector accounted for just 15 percent of GDP in 2000, and its exports mainly comprised resource-based products and light manufactures, the spillover effects from the IT sector embellished its reputation as an exporting economy with substantial human capital resources, and India was quickly inducted into the ranks of late industrializers. If China constituted the third wave of industrializing Asian economies, the entry of India can be considered the fourth wave, which also included another rapidly growing late starter, Vietnam.

First China, then India, generated ripples and radically altered the parameters governing the pace and composition of development in all other countries. By

[10]These grew out of the excellence of India's Institutes of Technology (the first was established in 1950), the expanding diaspora of highly skilled professionals, a few strategic investments by multinational corporations (MNCs) that mapped out the possibilities starting in the mid-1980s, the light regulation of the ICT sector, and the fortuitous creation of information technology (IT) infrastructure and institutions in a small number of cities containing entrepreneurial firms and skilled workers.

[11]IT expanded the spectrum of tradable services and enlarged the export options available to developing countries. Offshored services now include legal, architectural, and medical services and the number of tradable services continues to expand.

2008 China had achieved a GDP ranking surpassed only by the United States and Japan. In exports, it overtook first the United States and then Germany to become the world's leading exporter in 2009; and in 2010, it edged out Japan to become the world's second largest economy. All of this was achieved by an economy with an 11th-place GDP ranking in 1990, based on nominal exchange rates. India had a 12th-place GDP ranking in 1990 based on nominal exchange rates, and it maintained this position in 2008. Measured by purchasing power, however, China's GDP ranks second and India's moves up to fourth.[12] Moreover, China and India are on track to widen their lead over other economies because they have proven unusually resilient in the face of the global recession. Whereas most other economies contracted during 2009, or at best barely grew, the large domestic market and the stimulus measures introduced by China and India[13] enabled these two countries to expand by over 9 percent and over 6 percent, respectively. And even if the growth of world trade during the medium term remains sluggish, the two are better positioned than the majority of their competitors to maintain relatively high rates of GDP growth on the strength of domestic demand, and to continue enlarging their shares of global trade.

The Puzzle of Growth Miracles

Economists have been struggling to come to terms with the phenomena presented by the performance of the two countries. Backward-looking cross-country analysis suggests that growth accelerations[14] tend to be self-limiting, with countries regressing to a global norm (Easterly and others 1993). The correlation of growth rates between successive decades is weak (Durlauf, Kourtellos, and Tan 2008). Only a very few economies have avoided this tendency to oscillate around a global mean. Almost all are in East Asia,[15] and several have approached but not equaled the rates China has been able to sustain over a quarter of a century. India is not in the same league yet, but its GDP growth since 1980 handily exceeds the global average for developing countries, and during 2003–08 its performance almost equaled China's.

Recent economic history recognizes a small number of "growth miracles," including Germany in the 1960s through the 1970s, Japan from the 1950s through

[12]See Maddison (2009).

[13]The magnitude of the stimulus ranged from 5.9 percent of GDP in China, to 4.2 percent of GDP in the Russian Federation, 3.5 percent of GDP in Korea and 2.0 percent of GDP in the U.S. (see Pisani-Ferry 2010).

[14]Growth accelerations have proven difficult to predict. A handful of sustained efforts at reform have led to long-term acceleration, but most such episodes soon peter out (Hausmann, Pritchett, and Rodrik 2004).

[15]Botswana is the lone exception.

the 1970s, and Korea from the mid-1960s through the 1980s. By juxtaposing the performance of China and India with that of Germany, Japan, and Korea,[16] we can gain a sense of how the two ongoing Asian economic miracles compare with earlier episodes and also find evidence to support the thesis of our study, which is that economic performance on this grand scale reconfigures industrial geography even as it transforms the pattern of trade.

Before the East Asian tiger economies burst upon the world stage, it was the performance of Germany and Japan that was the stuff of economic legend. These were the economies with the highest growth rates in the latter half of the 1950s and 1960s, and it was their nonpareil performance that underpinned the growth model of the immediate postwar era. Both Germany and Japan were reconstructing at great speed in the 1950s, restoring infrastructure and productive capacity destroyed during the Second World War by drawing upon the institutions and, more important, the human resources[17] that had survived the savage conflict.[18] During 1948–55, Germany benefited from the resources and industrial technology transferred via the Marshall Plan and through the provision of Mutual Security Assistance (Giersch, Pague, and Schmieding 1993; DeLong and Eichengreen 1993; and Comin and Hobijn 2010). This, in conjunction with reforms and the absorption of almost 10 million refugees, helped to sustain GDP per capita growth rates at an average of 6.5 percent during 1955–59 at a time when global GDP per capita growth averaged 2.5 percent.[19] Until the eve of the first oil crisis in 1973, Germany's per capita growth was robust, averaging 3.7 percent from 1960 through 1973. In only two years—1963 and 1967—did it slow significantly (see figure 1.1). Growth was propelled by a healthy level of investment, ranging between 26 and 30 percent from 1965 to 1972 (figure 1.3), supported by domestic savings that were approximately equivalent (see figure 1.4). Exports, mainly of manufactures as Germany regained its industrial vigor, provided additional demand push and rose steadily to reach almost 25 percent of GDP by 1975 (figure 1.5). Domestic-resource mobilization thus made a vital contribution at a time when international capital transfers were seriously hamstrung by the global scarcity of capital and regulatory constraints on its mobility.

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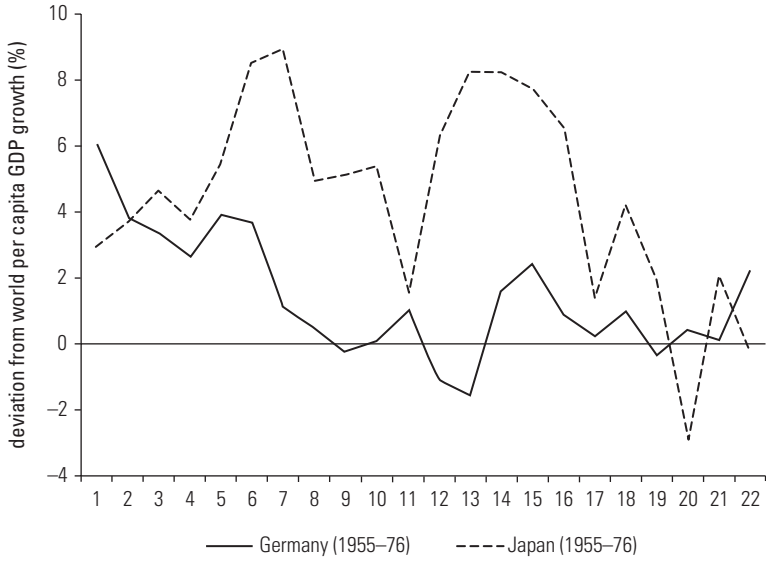
[16]On this comparison, see also Winters and Yusuf (2007).

[17]Maddison (2006) remarks that when he visited Japan in 1961, GDP was rising by 1 percent every month.

[18]See Soete (1985). As David Weinstein (1995) has established in the case of Japan, the postwar distribution of industry mimicked the prewar industrial geography, reflecting the persistence of institutions and the rootedness of skills and infrastructures. Germany's metallurgical and engineering industries were gravely damaged. Other industries were less affected, as was the overall level of the capital stock. Overall, the war destroyed about a quarter of Germany and Japan's capital stock (Wolf 1993).

[19]Both Japan and Germany benefited from the virtual elimination of military spending that had annexed almost a quarter of GDP.

Figure 1.1 Per Capita GDP Growth of Germany and Japan (Deviation from World per Capita GDP Growth)



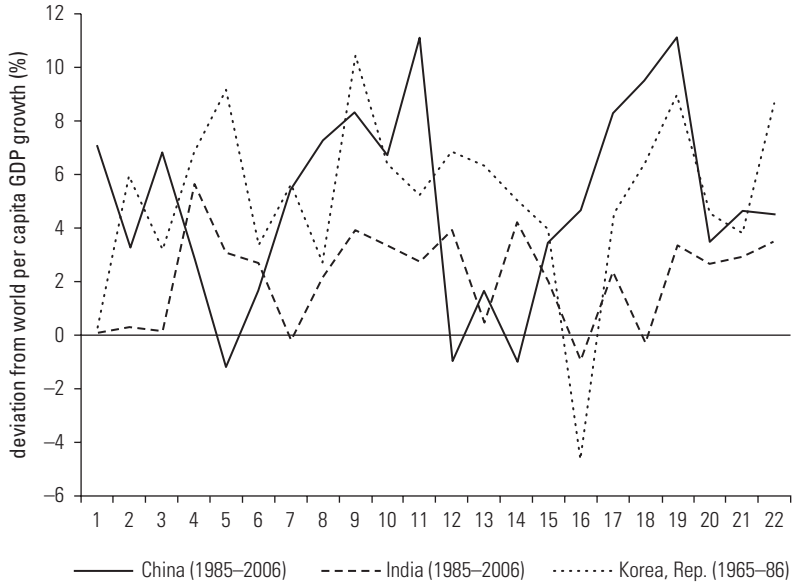
Source: Maddison 2009.

By the mid-1970s Germany had rejoined the ranks of the advanced industrial nations by effectively leveraging and augmenting its stock of human capital and technological capabilities—an amazing achievement, given the scale of destruction during wartime and the economic dislocation associated with the division of the country into two parts.

Japan's revival was assisted by the demand for resource-based industrial products such as petrochemicals, steel, and non-ferrous metals and for a variety of manufactures generated by the Korean War of 1951–53, but that is only part of the story. In spite of severe losses—human and structural—Japan also emerged from the Second World War with its base of skills and knowledge substantially undiminished.[20] It also embraced reconstruction and reindustrialization with equal fervor, raising the ratio of investment to GDP from negligible levels in the late 1940s to an average of 36 percent between 1960 and 1973 (see figure 1.3). This was well above the rate achieved by Germany and was reflected in Japan's growth in per capita GDP, which averaged 8.7 percent—5 percentage points higher than for Germany (see figure 1.1).

[20]In the immediate postwar years, Japan also had to absorb nearly 6 million of its nationals who were repatriated from China, Korea, and Taiwan, China.

Figure 1.2 Per Capita GDP Growth of China, India, and the Republic of Korea (Deviation from World per Capita GDP Growth)



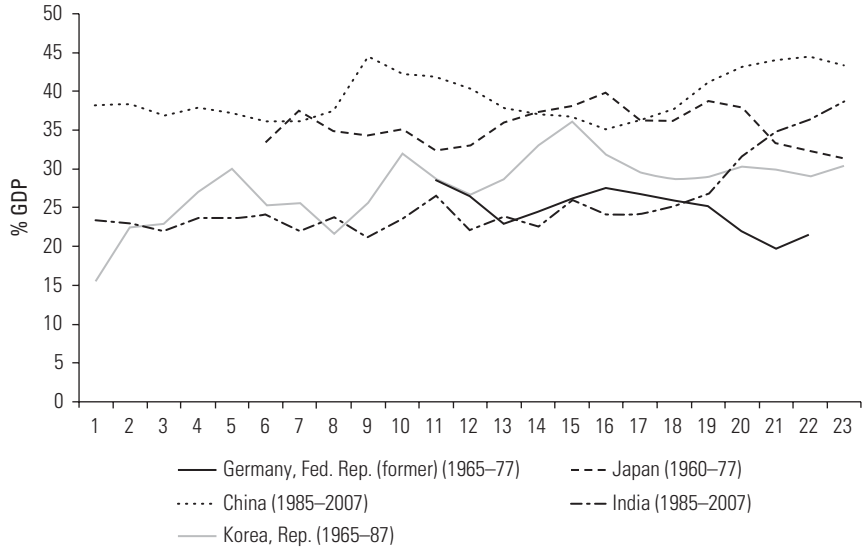
Source: Maddison 2009.

Japan's savings, much like Germany's, were on par with investment. The country's development was mostly financed from domestic sources except during the very early stages. To earn the needed foreign exchange, Japan depended upon exports of manufactures, starting with light consumer items and, in the 1960s, diversifying rapidly into consumer electronics, transport equipment, capital goods, and industrial raw materials. As Japan narrowed technology gaps and the quality of its products (such as cameras and radios) improved and acquired brand recognition, the leading Japanese firms and trading companies that spearheaded the export drive deepened their penetration of markets in developing and developed countries. Japan's ratio of exports climbed steadily to about 10 percent of GDP in 1960 and kept pace with the growth of the economy thereafter (figure 1.5).

Enter Korea

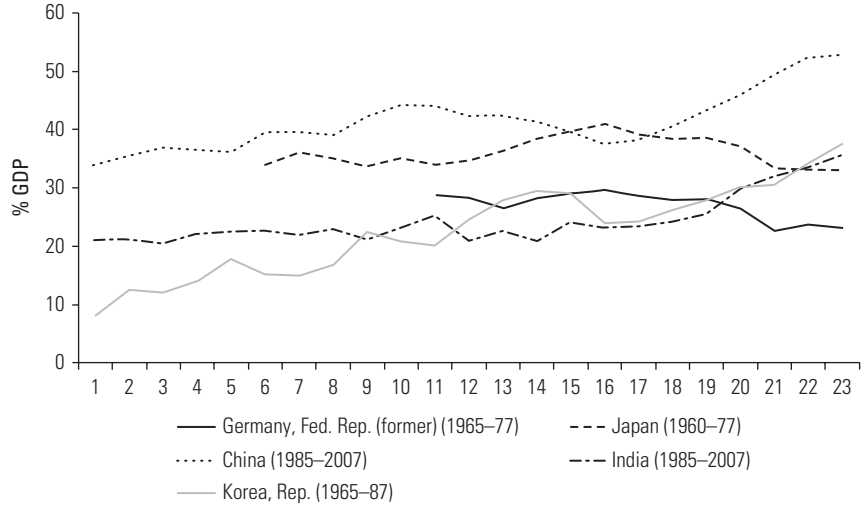
Korea joined the list in the mid-1960s, about a decade after the emergence of Germany and Japan. Korea also had been ravaged by the war of 1951–53, and the wounds ran deep. Unlike the other two countries, Korea was not well endowed with human capital, technological capacity, or an established business infrastructure,

Figure 1.3 Gross Capital Formation



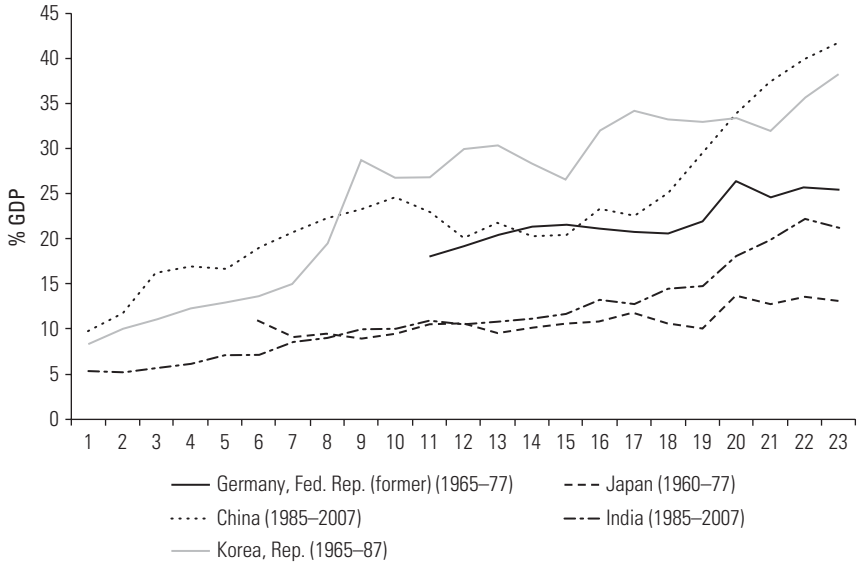
Source: Maddison 2009.

Figure 1.4 Gross Domestic Savings



Source: Maddison 2009.

Figure 1.5 Exports of Goods and Services



Source: Maddison 2009.

but the nucleus of business organizations created in the 1920s and 1930s under Japanese occupation survived. Koreans were quick to learn; and the government, firmly committed to industrialization, mobilized the country's material and entrepreneurial resources through a combination of leadership, exhortation, directed credit and other incentives, the setting and close monitoring of production and exports targets,[21] and frequent reminders of the external threat. Spurred by exports and capital formation, growth reached an average per capita rate of 7.8 percent during 1965–75 and 6 percent during 1976–85 (see figure 1.2). Exports, a mere 8 percent of GDP in 1965, averaged 32.7 percent of GDP during 1984–85 (see figure 1.5). Domestic savings also rose in Korea, but not as steeply as in Japan; the country relied to a greater degree on foreign assistance than did either Japan or Germany, and on overseas borrowing to bridge the gap between investment and domestic savings (see figure 1.3 and figure 1.4). However, by the 1990s, domestic savings and investment were in balance.

This brief overview of the fast-paced development of Germany, Japan, and Korea over a period of two decades underscores the contribution of investment

[21] President Park Chung-hee actively supervised the enforcement of the export targets through monthly meetings with industrial leaders.

financed by domestic savings. In Korea's case, this was supplemented by foreign borrowing. In all three countries, growth was led by the manufacturing sector and resulted from the pyramiding of manufacturing capabilities. Export demand helped the country to realize scale economies, induced technological change, and increased productivity. Both Germany and Japan were soon able to move beyond the assimilation of technology to introduce their own innovations—a few of which proved to be highly disruptive to the status quo.[22] What has not yet been emphasized is the role of the government in guiding, coordinating, and financing the activities of the key players, public and private; in supplying the needed infrastructure services; in building a system for producing skills of the appropriate type and quality; in promoting technology acquisition so as to narrow gaps in quality and productivity; and in stimulating innovation through increased research. Governments worked closely with the business community and, in the case of Germany and Japan, with the labor unions to help them strengthen their competitiveness vis-à-vis other firms in international markets. Large firms, mostly conglomerates, were the driving forces in the three economies and key to the creation of brand image and export success. In Germany and Japan, midsize companies (called the *Mittelstand* in Germany) also contributed significantly.[23] They acquired considerable political muscle in both countries; in Germany they had government backing—and were the beneficiaries of support from specialized banking institutions. Small and medium-sized firms had a lower industrial profile in Korea, despite government efforts to encourage the entry of firms into the small and medium enterprise (SME) sector through targeted financing, industrial extension and vocational training schemes.

China Sets a New Benchmark

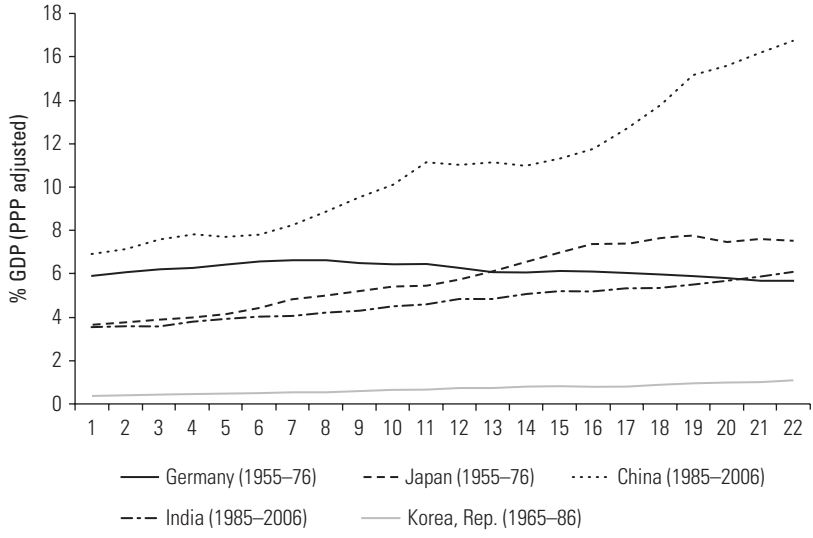
These three countries constituted the economic outliers until China began casting off the shackles of a planned autarchic system to draw abreast with its East Asian neighbors. China has now dramatically raised the bar. Between 1985 and 2006, China's per capita GDP rose at an average rate of 7 percent per year, and its share of global GDP (at nominal exchange rates) increased from 2.5 percent in 1985 to 6 percent in 2007, equal to that of Germany (see figure 1.7). By 2008 it had climbed to 8 percent, exceeding the share of Japan. The PPP-adjusted share of global GDP presents an even more striking picture. China started out in

[22]The transistor radio, the pocket calculator, the Walkman, and subcompact cars being among the best known.

[23]From European experience and other research on exporting firms, it appears that the top 10 percent of exporting firms account for between 70 percent and 96 percent of exports. On balance, these are medium or large firms that are more productive than the average firm, and they tend to export a number of products each to several locations (Mayer 2007).

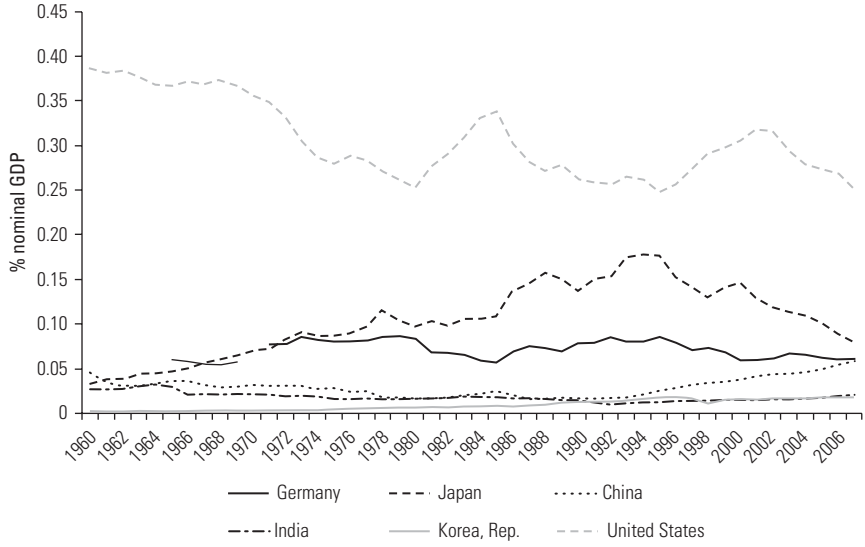
1985 with a larger share of GDP compared with the other countries—about 7 percent. This increased steadily to 17 percent in 2006, whereas Japan's share after 20 years of rapid growth was 7.5 percent in 1976. Germany's share, after first rising, had gradually dipped below 6 percent by 1976, and Korea's share had risen to just over 1 percent of global GDP in 1986 following two decades of development (see figure 1.6). Whether nominal GDP or PPP-adjusted GDP is used as the yardstick, China's economic performance is unprecedented. This is mirrored in trade statistics (see table 1.3). Among large countries (and even including not-so-large ones), China has a share of trade (exports plus imports) relative to GDP that is the highest, at 74 percent in 2007. Japan's share was 27 percent in 2005; Korea's was higher—90 percent in 2007—but it is a smaller economy. In 1985 the ratio of exports and imports to China's GDP was 24 percent—an increase in openness that was nothing short of spectacular for an economy that, less than a decade earlier, had been one of the world's most isolated. Although China started out in the early 1980s as an exporter of raw materials, foodstuffs, energy, and processed materials, its export composition changed radically, and over 93 percent of its exports are now manufactures. More than the three other countries, China has depended on manufacturing to achieve growth. Value added by manufacturing (in total GDP) was a little less than 35 percent in 1985 and almost 33 percent in 2005. It was 22 percent in Japan and 28 percent in Korea (table 1.4).

Figure 1.6 Share of World GDP



Source: Maddison 2009.

Figure 1.7 Global Share of Nominal GDP



Source: World Development Indicators Database.

Table 1.3 Trade
% GDP

Country/economy	1980	1985	1990	1995	2000	2005	2007
Singapore	—	—	—	—	—	448.3	433.0
Malaysia	111.0	103.2	147.0	192.1	220.4	212.1	200.1
Taiwan, China	104.1	93.0	86.5	92.8	105.3	124.2	139.8
Thailand	54.5	49.2	75.8	90.4	124.9	148.2	139.0
Korea, Rep.	72.0	63.4	57.0	58.8	78.5	82.2	90.4
Philippines	52.0	45.9	60.8	80.5	108.9	99.3	84.8
China	21.7	24.0	34.6	43.9	44.2	69.3	74.2
Sri Lanka	87.0	64.0	68.2	81.6	88.6	73.6	68.8
Indonesia	54.4	42.7	49.1	54.0	71.4	64.0	54.7
Bangladesh	23.4	18.8	19.7	28.2	33.2	39.6	46.5
India	15.6	13.1	15.7	23.1	27.4	42.5	45.7
Pakistan	36.6	33.2	38.9	36.1	28.1	35.3	35.3
Japan	28.4	25.3	20.0	16.9	20.5	27.3	33.6

Source: World Development Indicators Database.
Note: — = not available.

Table 1.4 Manufacturing Value Added
% GDP

Country/economy	1980	1990	2000	2005	2007
Thailand	21.5	27.2	33.6	34.7	34.8
China	40.2	32.7	32.1	32.8	34.0
Malaysia	21.6	24.2	30.9	29.6	28.0
Korea, Rep.	24.5	27.3	29.4	28.4	27.9
Indonesia	13.0	20.7	27.8	27.4	27.0
Singapore	28.9	27.3	27.7	27.1	25.5
Taiwan, China	35.3	31.2	23.8	23.2	24.1
Philippines	25.7	24.8	22.2	23.2	22.0
Japan	—	—	22.2	21.6	21.2
Pakistan	15.9	17.4	14.7	18.6	19.0
Sri Lanka	17.8	14.8	16.8	19.5	18.5
Bangladesh	13.8	13.1	15.2	16.5	17.8
India	16.7	16.7	15.6	15.8	16.3

Source: World Development Indicators Database.
Note: — = not available.

India in the Global Scales

Compared to China and the three other countries, India is still in a catch-up phase. Its share of global GDP at nominal exchange rates was 1.85 percent in 1985 and 2.16 percent in 2007 (see figure 1.7). The PPP-adjusted share of global GDP was 3.5 percent in 1985 and 6.1 percent in 2006, or about one-third of China's share (figure 1.6). Perhaps the feature that most differentiates India from China and the three other economies is the low ratio of manufacturing value added in GDP—just 16.3 percent, a value that remained unchanged between 1985 and 2007 (see table 1.4). This is one of the reasons that India's exports rose from 0.5 percent in 1985 to only 1.4 percent of global trade in 2007 (table 1.5), although the ratio of trade to GDP increased sharply—from 13 percent in 1985 to 46 percent in 2007 (see table 1.3).

Savings, Investment, Technology, and Growth: A Comparison

The data on trade and manufacturing reveal the unusual nature of China's performance and the lesser, but still impressive, scale of India's growth. Additional insight comes from the time series on investment and savings. China has been a champion investor since 1985. The ratio of investment to GDP was 38 percent in the mid-1980s—greater than in Germany, Japan, and Korea at any time during

Table 1.5 Global Share of Exports of Goods and Services
percent

Country/economy	1980	1990	2000	2005	2007
China	0.9	1.6	3.5	6.4	7.7
Japan	6.2	7.3	6.4	5.0	4.7
Korea, Rep.	0.9	1.7	2.6	2.6	2.5
Singapore	—	—	—	2.2	2.1
Taiwan, China	0.9	1.7	2.2	1.8	1.6
India	0.5	0.5	0.8	1.2	1.4
Malaysia	0.6	0.8	1.4	1.2	1.2
Thailand	0.3	0.7	1.0	1.0	1.0
Indonesia	1.1	0.7	0.8	0.7	0.7
Philippines	0.3	0.3	0.5	0.4	0.4
Bangladesh	0.0	0.0	0.1	0.1	0.1
Pakistan	0.1	0.1	0.1	0.1	0.1
Sri Lanka	0.1	0.1	0.1	0.1	0.1

Source: World Development Indicators Database.
Note: — = not available.

their high-growth years—and 43 percent in 2007 (see figure 1.3). Amazingly, savings have handily outperformed investment, rising from 34 percent in 1985 to 52 percent in 2007 and 2008 (see figure 1.4). Research has struggled to explain this unmatched savings performance of households and the business sector alike. The rate of household saving (almost 28 percent) in 2008 is linked to the increase in disposable incomes; to the limited availability of financing for consumer durables; to precautionary motives sharpened by concerns over the adequacy of social security and medical insurance; to the need to make provisions for education and marriage; and, for some households, to the pressure exerted by low interest rates on savings deposits (Prasad 2009).

Domestic investments have been supplemented by FDI; this has provided capital for certain segments of industry with limited access to financing (Huang 2005), facilitated technology transfer,[24] and helped connect Chinese firms to international production networks. As a share of GDP, FDI in China was 0.54 percent in 1985 and oscillated between 3 percent and over 4 percent between 2000 and 2007. This is far

[24]There is a sizable literature on the spillovers from FDI, which broadly makes the case for technology transfer more in the vertical dimension than the horizontal. The contribution of FDI to the growth of China's industrial regions and productivity are empirically examined by Tuan and Ng (2007) and Tuan, Ng, and Zhao (2009). Mutually advantageous spillover between foreign and local firms are highlighted by Wei, Yingqi, Liu, and Wang (2008).

above the levels attained by Germany, Japan, Korea, and India. It is only in the past few years that the ratio of FDI to GDP in India has begun approaching that of China. In 2007 India was in second place, with an FDI-to-GDP ratio of almost 2 percent (figure 1.8).

India's accelerating rate of growth is also closely linked to buoyant investment. The rate of investment to GDP was 23 percent in 1985 and 39 percent in 2007 (figure 1.3). Since 1998 it has been on an upward trend, buttressed by sharply rising domestic savings (figure 1.4). Depending upon how the domestic and global macroeconomic and climate environments evolve over the next decade, the demand for infrastructure and from the manufacturing sector can sustain high rates of growth fueled by surging investment.

It is notable that over a long period of time—extending from 1860 to the present—leading economies such as the United States and the United Kingdom have deviated relatively little from their trend growth rates of per capita GDP, averaging 1.9 percent annually for the United States and 1.4 percent for the United Kingdom (see figure 1.9). Germany, Japan, and Korea stand out because their growth rose above long-term trends for significant stretches of time, beginning in the 1960s (see Figure 1.9). The long-run growth rates for Germany, Japan, and Korea are 1.8 percent, 3.4 percent, and 6.3 percent, respectively. In Korea, growth dipped below the trend rate during an economically and politically stressful period starting in 1979[25] and extending into the early 1980s, after which the economy quickly regained its stride. However, both Japan and Korea have been in a below-trend mode and may be facing an enduring trend deceleration.[26] China, with a long-term growth rate of 5 percent, is consistently surpassing its growth trend, which began in the late 1990s (see figure 1.7). Whether India can match China's performance (or possibly raise the bar yet again) remains to be seen. Currently, India's long-run trend rate of per capita income growth is 2.6 percent. Per capita income growth edged above the trend line in the late 1990s and has remained above it ever since. Whether India can equal or improve on China's record will depend upon how its economy fares in the aftermath of the 2008–09 crisis and the period of slower growth of the global economy that is forecast; we will discuss this issue later in this volume.

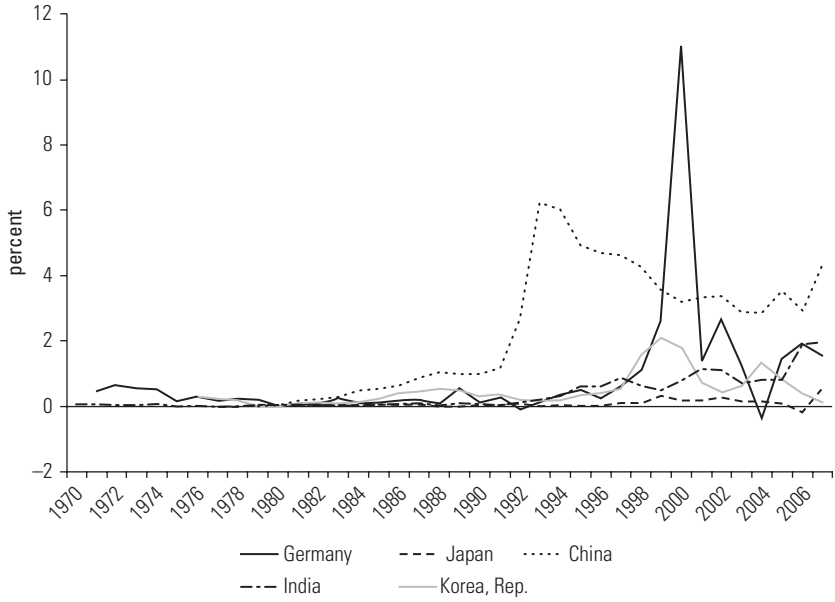
Thus far, we have concentrated on a handful of the determinants and handmaidens of growth: investment, trade, the manufacturing sector, and domestic savings. But growth in the leading economies is also tied to gains in productivity arising from technological progress and innovation.[27] Because increased human

[25]President Park was assassinated in October 1979.

[26]Both countries are attempting to reverse deceleration by trusting in research and development (R&D) to deliver the kind of innovation that will sustain a high rate of productivity growth.

[27]Comin and Hobijn (2010) underscore the role of total factor productivity (TFP) in explaining the differences in the levels of GDP among countries. They also draw attention to the technical assistance provided by the U.S. to Germany and Japan after the second World War that assisted these countries to catch up.

Figure 1.8 Share of FDI in GDP



Source: World Development Indicators Database.

capital contributes to technological advance, and patents are a frequently cited indicator of innovation, we have inserted measures of tertiary-level education and of patents granted to residents of Germany, Japan, and Korea into our charts tracking long-run GDP growth to see if there is an apparent correlation. As can be seen from the figures, the spread of tertiary education appears to be unrelated to the acceleration of growth in Germany, Japan, and Korea (see figure 1.9). Patenting began increasing in the 1960s in Japan and, to a lesser extent, in Germany once their national innovation systems were restored after the disruption caused by the war. In Korea, patenting gained momentum after 2000, 35 years into an era of rapid growth (see figure 1.10). The implication is that the long spell of "miraculously" high growth was mainly a function of capital investment in productive assets and infrastructure; technological catch-up with the frontrunner (the United States) through absorption of both embodied and disembodied technologies; and, in the earlier years of productivity, gains arising from the transfer of resources from the rural sector to the urban economy. The deepening of human capital certainly contributed to the closing of the technology gap. Whether tertiary education and innovation supported growth during the past decade in Germany and Japan is less clear; however, it is likely that they are enabling these two countries and Korea to sustain the competitiveness of their vital export-oriented manufacturing industries. Recent estimates of the sources of growth by Jorgenson and Vu

Figure 1.9 Per Capita GDP Growth and Labor Force with Tertiary Education

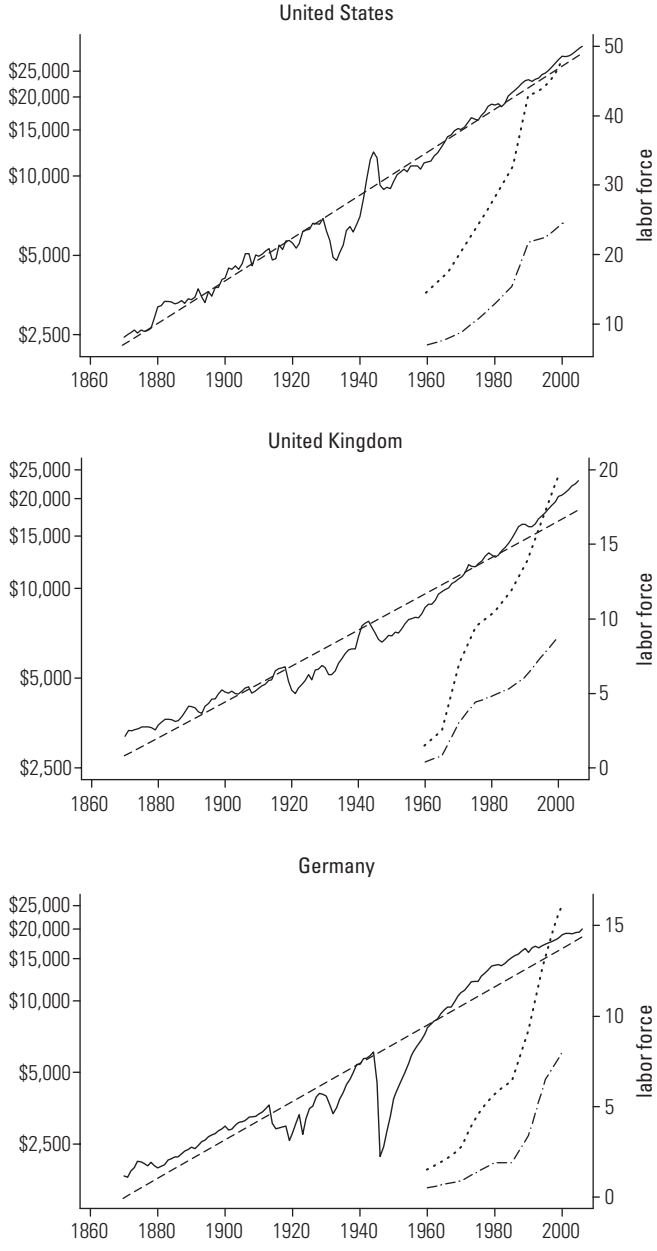


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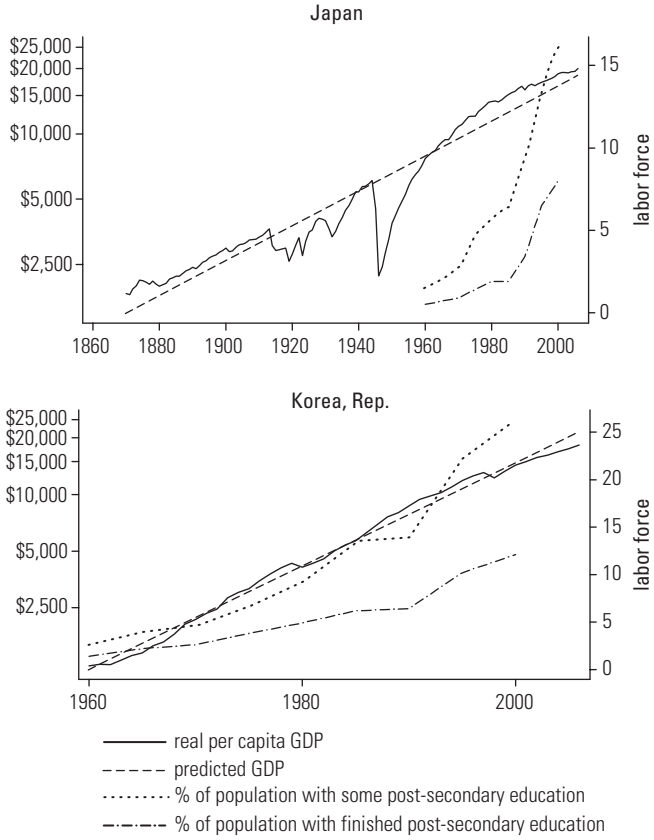
Figure 1.9 ***(continued)***

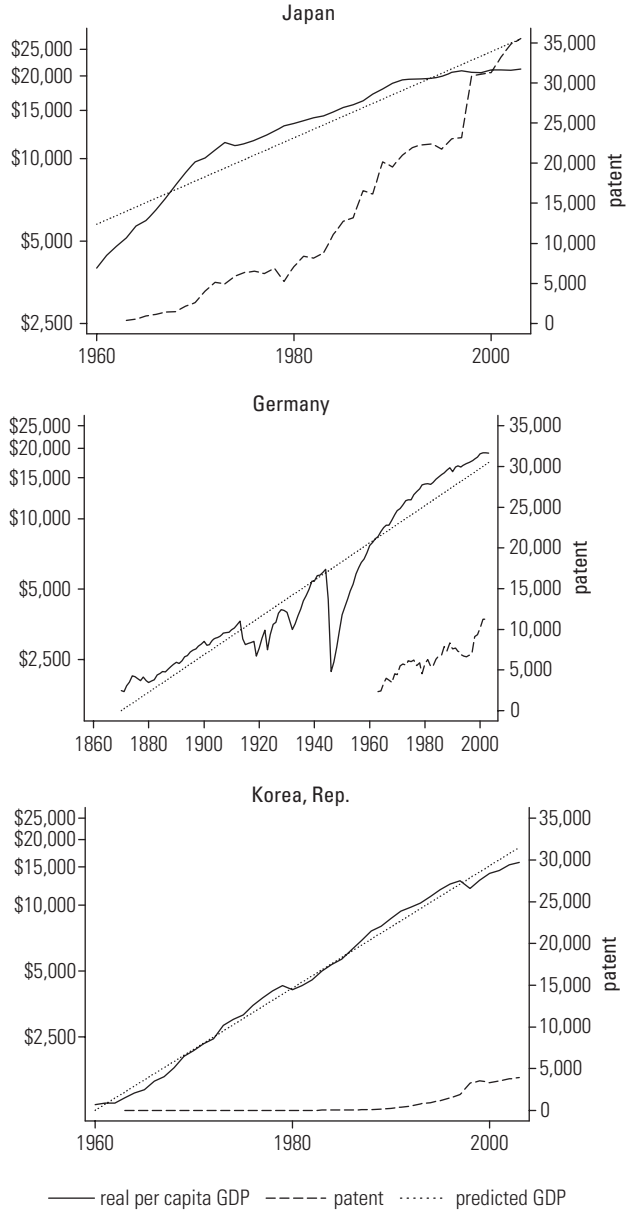


Source: Barro and Lee 2000; Maddison 2006.

(2009) reaffirm the leading role of capital for 14 major economies from 1989 to 2006. Between 1989 and 1995, capital was the source of 54 percent of the growth in these economies. Total factor productivity (TFP) or the aggregated gains in productivity from all sources including capital and labor, provided less than one-fifth. Between 2000 and 2006, the contribution of capital had declined to 41 percent; however, it was larger than the 36 percent contributed by TFP.

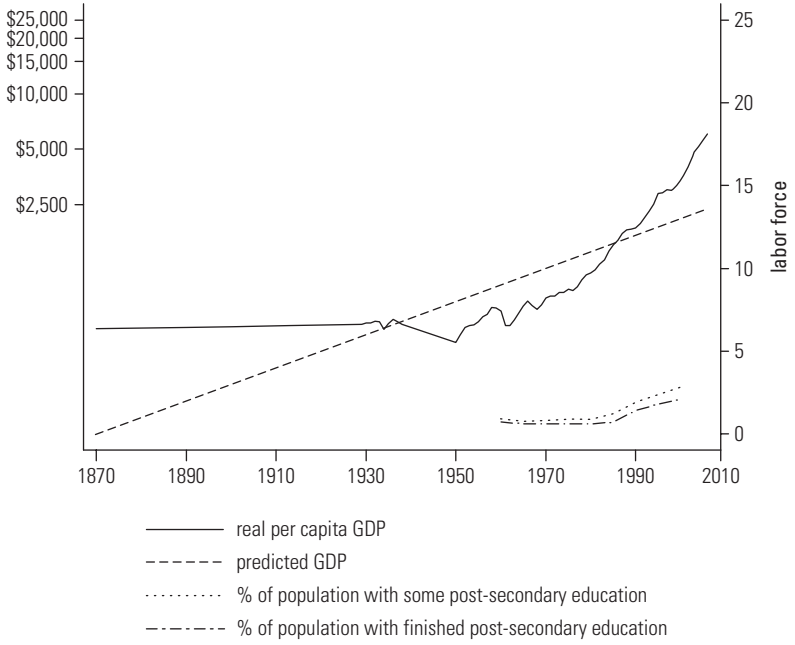
For China (figure 1.11), the quickening in tertiary education and patenting are fairly recent phenomena, becoming noticeable in the last decade—that is, since the end of the 1990s, with patenting taking off after 2001. The growing supply of skills in China has contributed to the assimilation of technology in manufacturing and in key services. The available supplies during 1985–2000 were adequate to

Figure 1.10 Per Capita GDP Growth with Patents



Source: Barro and Lee 2000; Maddison 2006.

Figure 1.11 Per Capita GDP Growth and Labor Force with Tertiary Education: China



Source: Barro and Lee 2000; Maddison 2006.

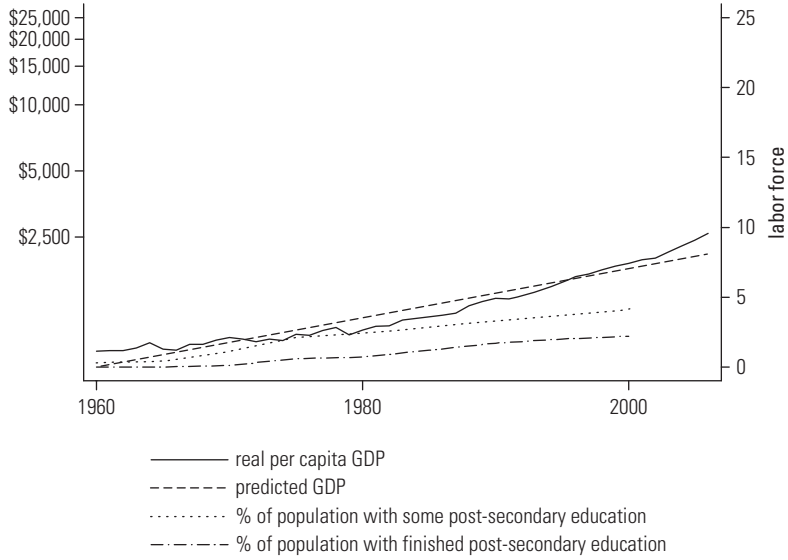
accommodate the codified technologies being imported. As for the future, tertiary-level skills, continuing technological assimilation, and innovation seem poised to increase their contribution to productivity.

India's overall growth of per capita GDP has no relation to changes in the supply of tertiary-level skills and the flow of patenting (figure 1.12), both of which are only now beginning to pick up. However, it is clear that the quality of India's slender stock of high-level manpower (Altbach 2006) is behind the success of its IT industry and its islands of advanced manufacturing capabilities, which together have catalyzed India's export gains and rapid growth.

In a Class of Its Own

The Chinese economy is in a class by itself. To a lesser degree, India is also, although it trails China by a wide margin. Neither Germany, Japan, nor Korea turned in an economic performance comparable to what China has done for more than 30 years. Only Japan's GDP achieved a scale equivalent to that of

Figure 1.12 Per Capita GDP Growth and Labor Force with Tertiary Education: India



Source: Barro and Lee 2000; Maddison 2006.

China. Tables 1.6 and 1.7 show the income levels of all five countries in 1950 and how much these levels had risen by 1999. Korea leads by a wide margin, with a 39-fold increase, followed by China. In this company, Germany's less than sixfold increase seems minuscule, and India also has a long way to go. Although both Germany and Japan were major trading nations in the mid-1970s, their impact on the industrial geography of the surrounding countries was relatively modest. It should be remembered that in the 1960s and 1970s there were many barriers to trade and labor mobility, countries were partially insulated from competition, and capital flows were severely circumscribed by controls. By the time the Chinese economy began its remarkable ascent, globalization[28] was tearing down barriers to trade and the international circulation of capital. China was quick to profit from such openness and, through a series of measures packed into less than

[28]The dismantling of barriers to trade began in earnest with the Kennedy Round of trade negotiations completed in 1964 and continued with the Tokyo and Uruguay Rounds, the last finalized in 1994. The United States and European countries began to gradually lift capital controls in the 1980s, and industrializing began joining in during the 1990s.

Table 1.6 Per Capita Income in 1950
international dollars of 1990

Country	Per capita income
Germany	3,881
Japan	1,926
Korea, Rep.	770
India	619
China	439

Source: Fogel 2009.

Table 1.7 Expansion Multiples of GDP, 1950–99
ratio of GDP in 1999 to GDP in 1950

Country	Ratio
Korea, Rep.	38.93
China	25.59
Japan	16.09
India	8.11
Germany	5.50

Source: Fogel 2009.

15 years, has become more open to trade than Japan or the United States.[29] China's readiness to exploit the opportunities presented by the global integration of trade, the integration of financial markets, and the huge increase in FDI has accelerated the pace of export-oriented industrialization.[30] The off-shoring of production by firms in the advanced countries along with China's own capacity to reinvent itself as an open, quasi-capitalist economy in a matter of years have greatly magnified its impact on the global economy in general—and Asian countries in particular. China has emerged as a formidable competitor for other industrializing Asian nations across a wide range of manufactured products, straddling the full span of technologies and labor intensities. China's cost-effective mastery of assembly line–type operations and its growing readiness to invest overseas also make it an expanding market for the products and resources of other countries, as well as a source of FDI in extractive industries and in light manufacturing. As China's economic size has expanded, so too has its influence on the industrial

[29]The ratio of trade to GDP in China on the eve of reform was a little over 10 percent (Ding and Knight 2008).

[30]China's exports surged noticeably once it became a member of the WTO in 2001.

geography of the Asian region. Unless the process of trade and capital integration slows drastically[31] or is reversed, China's influence relative to that of Japan and the United States will continue to grow. It will be especially prominent with respect to the industrialization of Asian countries.

India, a smaller and less industrialized economy with a modest volume of manufactured exports, has thus far had a negligible influence on the industrial contours of other Asian nations. It was slower to embrace globalization and to tear down the high tariff walls. India's tense relations with its immediate neighbors have hampered the economic integration of the South Asia region, with implications for intra-industry trade and the scale and composition of industry both in India and in the rest of South Asia. Relative to the manufacturing sectors of other fast-growing economies, India's is small, and much of it serves the domestic market. This has prevented India from emulating East Asian rates of growth. The experience of other high-achieving economies suggests that the manufacturing sector in India might have to almost double its share of GDP, or at the very least exceed 25 percent of GDP, for growth rates in the high single digits to be sustained. The domestic market could absorb the bulk of the increased production; however, exports also would need to play a vital role. This would be predicated on the expansion of the global market and, most important, the Asian regional trading regime. Side by side with China's growth, a double-digit growth in India's manufacturing (were it to materialize) would have far-reaching implications for the industrial prospects of India's trading partners. The gains for other countries will be a function of India's openness, the flowering of intra-industry trade, effective behind-the-border trade facilitation, and a dismantling of regulations that currently limit access by foreign producers to Indian markets. As with Japan, if effective openness materializes slowly, the opportunities for other countries to benefit from India's industrialization will be constrained.

These factors (and others, to be examined in later chapters) will compose the forces shaping Asia's industrial geography. The remainder of the book is divided into five chapters. Chapter 2 encapsulates the story of China's industrialization. It delineates the key features of China's industrial sector and trends in subsectoral growth. It shows how the composition of the sector of value added is changing and examines how industrialization is reflected in the mix and growth of exports. The latter part of Chapter 2 covers the same ground for India.

Chapter 3 examines how the comparative advantages of China and India are evolving and identifies factors that will affect competitiveness and openness to imports.

Chapter 4 discusses how China and India have affected industrialization in other Asian countries over the past decade and examines how the industrial structures,

[31]Integration is being promoted through numerous regional trading arrangements, which reached a total of 166 in mid-2009, with many more in the pipeline. See "The Noodle Bowl" (2009) and Desker (2004).

exports, and comparative advantages of other Asian countries are developing. We also discuss possible directions of diversification. We build upon this analysis to look toward the future to suggest how the dynamics of industrialization and trade in Asia could determine the industrial geography of the region under plausible assumptions.

Chapter 5 examines five factors that are likely to influence the industrial geography in Asia, and the final chapter concludes with the industrial strategies needed in Asian countries to sustain and improve their prosperity.

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