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# The Services Sector in Asia: Is It an Engine of Growth?

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## Abstract

The underdeveloped services sector in Asia has the potential to become a new engine of economic growth for developing Asia, which has traditionally relied on export-oriented manufacturing to power its growth. The central objective of this paper is to empirically analyze the prospects for the services sector as a future engine of growth. Our analysis of 12 Asian countries indicates that the services sector has already contributed substantially to the region's growth in the past. Furthermore, somewhat surprisingly in light of the difficulty of achieving productivity gains in services, we also find that services labor productivity grew at a healthy pace in much of the region. Overall our analysis provides substantial cause for optimism about the role of the services sector as an engine of growth in Asia. However, some Asian countries where the services sector is currently struggling, such as Korea and Thailand, will find it more challenging to develop the sector.

**JEL codes:** O14, O40, O47

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## I INTRODUCTION

Developing Asia has been the star performer of the world economy for the past few decades. In the 1960s newly industrialized economies (NIEs) such as Hong Kong, Korea, Singapore, and Taiwan kicked off the region's tectonic transformation from a group of typical struggling developing countries into the most dynamic component of the global economy. The NIEs followed the Japanese blueprint of export-oriented industrialization and were in turn followed by member countries of the Association of Southeast Asian Nations (ASEAN) such as Indonesia, Malaysia, and Thailand. The region's two giants—China and India—were the next to emerge, powered by market-oriented economic reforms and opening up of their economies to foreign trade and investment. Yet other Asian countries such as Vietnam are now following in the footsteps of China and India. Sustained rapid growth has moved developing Asia from the sidelines of the global economy to the front and center. The region has outperformed not only the maturing advanced economies but also other parts of the developing world, and continues to do so. An important by-product of the region's stellar growth performance has been an unprecedented reduction in poverty.

Broadly speaking, economic growth comes from accumulation of productive factors—i.e., capital and labor—and productivity growth. It is true that productivity growth has contributed substantially to developing Asia's economic growth in the past.[1] In particular, the reallocation of surplus rural workers from low-productivity agriculture to high-productivity manufacturing boosted economywide productivity and growth. However, much of Asia's growth was also driven by factor accumulation. Favorable demographic trends led to a rapid growth of the labor force. Heavy investments in education and flexible labor market enabled Asia to fully take advantage of favorable demographics. In addition to rapid expansion of the labor force, high saving and investment rates allowed Asian countries to quickly accumulate physical capital. In some countries such as Malaysia and Singapore, large inflows of foreign direct investment (FDI) further augmented the stock of physical capital. The consequent explosion of machines, factories, buildings, roads, and ports greatly expanded Asia's productive capacity. In short, both factor accumulation and productivity growth played major roles in the region's growth.

Going forward, a number of considerations suggest that the services sector will become a more important source of growth for Asia.[2] For one, there is a well-established positive relationship between the share of services in GDP (or employment) and GDP per capita.[3] The share of services is higher in

1. In an influential paper, Young (1995), based on primal growth accounting, argued that the rapid growth of East Asian countries was primarily due to rapid accumulation of capital. However, Hsieh (2002) found, on the basis of dual estimates, that the growth rate of total factor productivity in East Asian countries is significantly higher than that estimated by Young.

2. The importance of the services sector for the growth of Asian countries has been emphasized in various studies such as World Bank (2010) and ADB (2007).

3. See, for example, Fuchs (1981).

richer countries than in poorer countries, and the share of services rises as a country's GDP per capita rises over time. Many Asian countries are at or approaching income levels where the share of services tends to increase. This fact alone implies a larger future role for the services sector in the economy and in economic growth. Furthermore, while the services sector has grown in both absolute and relative terms across Asia, a wide range of internal barriers—e.g., excessive regulation—and external barriers—e.g., barriers to imports and FDI—prevent it from fulfilling its full potential. Therefore, removing those barriers will allow the services sector and the economy as a whole to grow faster. On the demand side, there is a growing appetite for a wide range of services, from tourism to health care to financial services, among Asia's fast-expanding middle class.

The global financial and economic crisis of 2008–09 will add further momentum to the shift from manufacturing to services in Asia. The crisis originated in the advanced economies and hit those economies harder than developing countries. Furthermore, the postcrisis recovery has been visibly firmer in the developing countries than in the advanced economies. The upshot for Asia is a less benign external environment in which the advanced countries have weaker growth prospects and hence appetite for imports. Therefore, manufacturing exports to the United States, European Union, and Japan will become a less forceful engine of growth for the region in the post–global crisis period. Aside from a less favorable global environment, more fundamental factors are at work as well. More specifically, manufacturing is maturing in some Asian countries and manufacturing productivity has reached high levels, which implies that the scope for manufacturing-led growth will be more limited than in the past. At the same time, it should be noted that in other countries such as India and the Philippines, there is still plenty of room for manufacturing to grow.

Its high investment rates in the past have left Asia with a large stock of physical capital. Diminishing marginal returns to capital imply that although investment will continue to make a sizeable contribution to growth, productivity growth is likely to play a relatively bigger role in the future. Given the growing weight of services and given the growing weight of productivity growth in economic growth, productivity growth of services industries will be pivotal for Asia's future growth. At a broader level, the central objective of this paper is to empirically examine the prospects for the services sector to serve as an engine of growth for Asia. The rest of the paper is organized as follows. Section 2 looks at the evolution of the services sector in major Asian countries. Section 3 investigates the relationship between per capita GDP and the share of services in GDP and employment. Section 4 assesses the role of the services sector as an engine of growth by examining the contribution of services sector to overall growth, labor productivity in services relative to manufacturing, and determinants of labor productivity in services. Section 5 concludes the paper.

## II EVOLUTION OF THE SERVICES SECTOR IN ASIAN COUNTRIES OVER TIME

In this section, we look at how the services sector has evolved in 12 major Asian economies. More specifically, we look at the share of services in total output and employment. The 12 countries are China, Hong Kong, India, Indonesia, Korea, Malaysia, Pakistan, the Philippines, Singapore, Taiwan, Thailand, and Vietnam. The data are collected from the World Bank's *World Development Indicators*. In advanced economies, the sectoral composition of employment tends to be as follows: The share of the services sector in employment is greater than the share of the manufacturing sector in employment, which, in turn, is greater than the share of the agriculture sector in employment. Hong Kong, Korea, Malaysia, Singapore, and Taiwan all fit this pattern. The shares of the three sectors in GDP are also in the same order except Malaysia.[4]

Typically, at the beginning of the industrialization process—for example, in Korea or Malaysia—the employment share of agriculture decreases and the employment shares of both industry and services increase as industrialization proceeds. Surplus workers from rural areas migrate to cities and find work in factories and shops. Subsequently the share of industry in employment starts to stagnate but the share of services in employment continuously rises as the economy moves into the postindustrial phase. GDP shares show quite similar but slightly different pattern. The GDP share of agriculture continuously declines. At the beginning of industrialization the GDP share of industry increases much more rapidly than the GDP share of services, and then the former starts to stagnate and the latter rises rapidly. The sectoral employment and GDP share movements described above are typical during the process of industrialization and deindustrialization. However, while the experiences of Asian countries generally fit the above pattern, that is not always the case. We now take a closer look at the sectoral movements in employment and GDP for each of the 12 countries (see figure 1).

**China.** The employment share of agriculture has steadily decreased and the employment shares of both industry and service have increased. The employment share of the services sector has increased even more rapidly than the employment share of industry at the early stage of industrialization. Despite rapid industrialization, the employment share of industry (27.2 percent in 2008) has not yet reached the level Korea experienced at the peak (36 percent in 1991), and the employment share of agriculture is still largest. Hence it is likely that the industrialization process will continue for a while. However, the GDP shares tell a somewhat different story. The industry GDP share has been largest since 1969. In recent years it is around 46 to 48 percent. By way of comparison, in Korea the industry GDP share peaked at 42.6 percent in 1991. The services GDP share is increasing but still lower than the industry GDP share. Can China continue to industrialize? How far will the industry GDP share increase? How much of the

4. For Malaysia, the share of the services sector in GDP is approximately the same as the share of the manufacturing sector in GDP.

remaining work force in the agricultural sector will be absorbed by the industry sector? Or can they be mostly absorbed by the services sector? These are some interesting and important questions.

**Hong Kong.** As one might expect from a city-state, agriculture plays no role in either employment or GDP. There is a very clear trend in the share of services versus industry in both employment and GDP. There is a secular rise in services' share of both employment and GDP, and a corresponding secular fall in industry's share of both. The shift of labor and output from manufacturing to services mirrors the hollowing out of the territory's manufacturing base as a result of its relocation to China.

**India.** For India, the employment shares are reported in only two years, 2000 and 2005. From the limited data, we can still detect a tendency of the employment share of agriculture to decline, and the employment shares of both industry and services to rise. However, the employment share of agriculture is much higher than the shares of the other two sectors, reflecting the continued importance of agriculture in the Indian economy. The employment share of services is a bit higher than the employment share of industry. On the other hand, the GDP share of services is much higher than that of industry. The GDP share of agriculture has steadily decreased since the mid-1970s. The GDP shares of both industry and services have increased since the mid-1970s but the GDP share of services has increased even more rapidly. This shows the importance of the services industry for the growth performance in India. The question is, can the services sector continue to be an engine of growth in India in the future?

**Indonesia.** The employment share of agriculture did not change much until the early 1990s and then it started to decline rapidly until the late 1990s. The employment shares of both industry and service started to increase in the early 1990s. Since the late 1990s, however, the employment share of the three sectors has remained fairly stable. On the other hand, the GDP share of industry increased most drastically before the 1980s. The GDP share of services increased but not as much as the GDP share of industry.

**Korea.** Korea shows a typical pattern of industrialization and deindustrialization. The GDP share of industry has not decreased much, staying around 40 percent, while its employment share has decreased continuously to 25 percent since the early 1990s. On the other hand, while the employment share of services has continuously increased, the GDP share of services has not since the early 2000s. Overall, Korea is a high-income economy in which the manufacturing sector continues to play a major role.

**Malaysia.** The employment shares show the typical movements of ups and downs resulting from industrialization and deindustrialization. The employment share of industry increased from the late 1980s and then started to decrease from the late 1990s. The employment share of services increased rapidly from the late 1990s. On the other hand, however, only the GDP share of industry increased rapidly while the GDP share of service decreased until the mid 1970s. Since then, though, the shares of both industry and service have increased at the same pace.

**Pakistan.** Pakistan does not show any signs of industrialization: The employment share of industry has not changed much and is at around 20 percent. The employment share of agriculture has declined modestly and the decrease has been mostly absorbed by services. The GDP shares also show the same pattern. While the GDP share of industry has increased modestly, the decrease of the GDP share of agriculture has been mostly absorbed by the GDP share of services. Is industrialization missing in Pakistan? Can the services sector be an engine of growth even without industrialization?

**Philippines.** The employment shares show the same pattern as in Pakistan. The GDP shares also show a similar pattern as in Pakistan. There are some differences though. The GDP share of industry initially increased until the early 1980s, then decreased. Since the early 1980s, the GDP share of services has been increasing very rapidly. Overall, the patterns are consistent with the general perception of the Philippines as a country that has failed to develop a strong manufacturing base.

**Singapore.** The employment share of agriculture is minimal. The employment share of industry has been decreasing since the early 1990s and the decrease has been absorbed by the services sector. The GDP share of industry did not decrease much until the mid-2000s and then started to decrease slowly. The enduring strength of the industry sector, which contrasts sharply with its hollowing out in Hong Kong, is partly due to government efforts to maintain a vibrant manufacturing base.

**Taiwan.** Taiwan seems to be a typical case of industrialization and deindustrialization. The employment share of industry is over 35 percent. The GDP share of industry fell sharply from the peak of about 48 percent to about 30 to 32 percent in the early 2000s and has remained at that level. More recently, while the employment share of the services sector continuously increased, its GDP share has not. Notwithstanding the relocation of many manufacturing firms to China, manufacturing remains an important part of the economy.

**Thailand.** The employment share of agriculture has been continuously decreasing. The employment shares of both industry and services increased until the mid-1990s. The employment share of services has been increasing even more rapidly since then, but the employment share of industry has not changed much. Since Thailand has a strong agricultural sector and is a major food exporter, the employment share of agriculture is still the largest. The employment share of services is slightly lower and the employment share of industry is much lower, at around 20 percent. On the other hand, the GDP share of services has not changed much and even decreased recently. The decrease in the GDP share of agriculture is mostly offset by the GDP share of industry. This suggests that the services sector is dragging the growth performance of Thailand.

**Vietnam.** The data for sectoral employment shares are available only for 2005–10 and show a very similar pattern to India. It seems that Vietnam is still in the midst of industrialization in the sense that the decrease in the GDP share of agriculture is mostly offset by the GDP share of industry. The GDP share of the services sector has been decreasing since the mid-1990s, which is somewhat surprising. The services sector remains very much underdeveloped.

Overall, the evolution of services' share in GDP and employment over time in Asian countries largely mirrors the international historical experience. Quite clearly, the services sector is playing a large and growing role in GDP and employment across the whole region. At the same time, our review of country experiences reveals a great deal of heterogeneity in the relative importance of services among Asian countries, as highly emphasized by Ghani (2010). To some extent such heterogeneity is rooted in the wide range of income and development levels in Asia. As explained in section 3 below, the share of services in GDP and employment tends to rise with per capita income. However, income and development levels can explain only part of the intra-Asian heterogeneity. For example, India's services sector is larger than other countries at a similar income level whereas the reverse is true for China. Furthermore, there is also a great deal of heterogeneity with respect to the growth rate of the share of services in GDP and employment. For example, in 1980 the share of services in employment was similar in Indonesia and the Philippines but by 2010 it was noticeably higher in the Philippines.

Tables 1 and 2 show the sectoral real GDP growth rates and labor productivity growth rates, respectively, in three subsample periods: period 1 (1960–80), period 2 (1980–2000), and period 3 (2000–2010). On average, the real GDP growth rate of the services sector was lower than that of the industry sector during the first two periods. But in the second period, the gap between the two narrowed sharply and they were quite comparable. In fact, by the third period, the services sector outgrew the industry sector. While it is widely argued that productivity growth in services is inherently difficult to achieve, table 2 shows that some countries have in fact been able to achieve substantial gains. Furthermore, the gap between the average labor productivity growth rate of the services and industry sectors narrowed sharply in period 3.

We now examine individual countries. While China is experiencing industrialization, the growth rate of GDP in the services sector is quite comparable to that in the industry sector. Table 2 suggests that the growth of the services sector, particularly in the last period (2000–2010), is mainly due to labor productivity growth. In Hong Kong, the growth of the economy is mainly due to the growth of the services sector. The other sectors are small and show even negative growth rates. India is rapidly growing, particularly in the last subsample period. The GDP growth rate of the services sector is higher than that of the industry sector. The labor productivity growth rate of the services sector is much higher than that of the industry sector. Figure 1 suggests that the driving engine of growth in Indonesia is the industry sector. Interestingly, however, the GDP growth rate as well as the labor productivity growth rate of the services

sector is higher than those of the industry sector in the last subsample period. In Korea, the services sector real GDP growth rate is particularly low. The labor productivity growth rate of the services sector is even more problematic.

In Malaysia, the services sector GDP growth rate is quite comparable to that of the industry sector. In fact, in the last subsample period, the services sector growth rate was much higher than the industry sector growth rate. The labor productivity growth rate of the services sector was lower in the 1980–2000 period than for industry but similar in the last subsample period. In Pakistan, while the services sector GDP growth rate has always been lower than the industry sector GDP growth rate, the two were comparable in the last two subsample periods. The labor productivity growth rate of the services sector was lower in the second subsample period but higher than that of the industry in the last subsample period. In the Philippines, the services sector growth rate was lower than the industry sector growth rate in the first subsample period but higher in the last two subsample periods. The labor productivity growth rates were both negative in the second subsample period, but they were positive and comparable in the last subsample period.

In Singapore, the growth rate of the services sector was much lower than that of the industry sector in the first subsample period but slightly higher in the last two subsample periods. The labor productivity growth rate of the services sector was comparable to that of the industry sector in the second subsample period but much lower in the last subsample period. In Taiwan, the services sector growth rate was high in the second subsample period but much lower in the last subsample period. The labor productivity growth rate also showed the same pattern. In Thailand, the services sector growth rate was lower than the industry sector growth rate in all three subsample periods. The gap between the two was even wider for labor productivity growth. In Vietnam, the services sector growth rate was quite high in the last two subsample periods even though it was lower than the industry sector growth rate. The labor productivity growth rate was reported only for the last subsample period and was quite high.

One interesting feature of the services sector is that a growing range of services are increasingly tradable as a result of technological advances, especially in information and communication technology. The share of services sector output that is exported is reported in table 3. In most Asian countries, there is a tendency in the share of services sector output that is exported to increase over time. Some exceptions are China (2000–2009), Indonesia (2000–2009), Malaysia (2000–2009), Pakistan (1990–2000), the Philippines (1990–2000), Singapore (1990–2000), and Vietnam (2000–2009). In general, city-states with sophisticated services sectors, such as Hong Kong and Singapore, export a large share of their services output. Large countries such as China, India, Indonesia, and Pakistan have a lower share. India has a pretty large share compared with other large countries. Korea has a low share compared with other mid-sized countries. Somewhat surprisingly, Asian countries have a large share compared with South American countries and developed countries. Eastern European countries have a relatively large share as well.

## III PER CAPITA GDP AND THE SHARE OF THE SERVICES SECTOR IN GDP AND EMPLOYMENT

According to a well-known stylized fact, as per capita income increases, the shares of services in both employment and GDP rise. This relationship is often characterized as linear or quadratic (for example, see Kongsamut, Rebelo, and Xie 1999 and Buera and Kaboski 2009). However, more recently, Eichengreen and Gupta (2009) argue there are two distinct waves of services sector growth. According to them, the services sector's share of output begins to rise at relatively modest incomes but at a decelerating rate as growth proceeds, which they call the first wave, and then it begins to rise again in a second wave at higher income levels. The first wave is characterized by the rise of the traditional services—lodging, meal preparation, housecleaning, beauty and barber shops—while the second wave is dominated by modern services—banking, insurance, computing, communication, and business services.

The two waves of services sector growth can be characterized by a quartic relationship. Following Eichengreen and Gupta (2009), we estimate a quartic relationship between the services sector's share of GDP and per capita GDP as follows:[5]

$$\frac{S_{it}}{GDP_{it}} = \text{constant} + \sum_{T=1}^{2} \theta_T D_T + \alpha_1 Y_{it} + \alpha_2 Y_{it}^2 + \alpha_3 Y_{it}^3 + \alpha_4 Y_{it}^4 + \epsilon_{it}$$

where $S_{it}$, $GDP_{it}$, and $Y_{it}$ are the services sector value added, GDP, and log per capita GDP, respectively, for country *i* at time *t*. $D_T$ is a period dummy: $D_1$ for 1970–89 and $D_2$ for 1990–2010. The period dummies are included to allow for different intercepts for different time periods. Our sample, collected from the *World Development Indicators*, covers 157 countries from 1960 to 2010. Since employment data are available from 1980, we include only $D_2$ in the regression of the employment share equation.

Table 4 reports two estimation results: without period dummies (column 1) and with period dummies (column 2). We include country fixed effects. In both cases, all the per capita GDP terms of the first to the fourth orders are highly significant, confirming the quartic relationship. When we include the two period dummies in the second column, their coefficients are positive and significant, suggesting different intercepts in different subsample periods. In fact, the more recent the subsample period is, the higher is the intercept.

Figure 2 shows the actual shares of the services sector in GDP in the 12 Asian countries and compares them with the typical pattern in different subperiods, predicted by the quartic line fitted on the basis of the estimation in column II, table 4. Those estimation results allow for different period dummies.[6] In the figures we also denote the 95 percent confidence bands by grey lines. If an observation lies above

5. While Eichengreen and Gupta (2009) cover 1950–2005 for over 80 countries, our sample covers 1960–2010 and 157 countries.

6. In order to save space, we provide figures only for periods 1 and 2.

the fitted line, the share of services in GDP is higher than in other countries with similar per capita GDP, and the reverse is true for observations below the fitted line. We can observe a number of distinct patterns among Asian countries, implying a high degree of heterogeneity across the region. The share of the services sector in GDP lies below the predicted line in both periods 1 (1970–89) and 2 (1990–2010) for China, Indonesia, Korea, Malaysia, and Vietnam. The share of the services sector in GDP lies above the predicted line in both periods 1 and 2 for Hong Kong. The share of the services sector in GDP lies below the predicted line in period 1 but above it in period 2 for India and the Philippines. The share of the services sector in GDP lies above the predicted line in period 1 but below it in period 2 for Singapore and Thailand. Pakistan's services sector lies more or less on the predicted line. In Taiwan, the services sector lies below the predicted line in period 1 but on the predicted line in period 2.

Table 5 reports the same regression results except that the dependent variable is the share of the services sector in employment rather than GDP. The results indicate that there is also a similar quartic relationship between the share of the services sector in employment and per capita GDP.

Figure 3 shows the actual shares of the services sector in employment in the 12 Asian countries and compares them with the typical pattern in different subperiods, predicted by the quartic line fitted on the basis of the estimation in column II, table 5. If an observation lies above the fitted line, the share of services in GDP is higher than in other countries with similar per capita GDP, and the reverse is true for observations below the fitted line. A number of different patterns emerge and again, Asian countries are characterized by a great deal of heterogeneity. The share of services sector in employment lies below the predicted line in both periods 1 (1970–89) and 2 (1990–2010) for China, Indonesia (recently approached the predicted line), Pakistan, Taiwan, and Thailand. The services sector lies on the predicted line in period 1 but above it in period 2 for Hong Kong. India and Vietnam have data for only a few years in period 2 and they both lie below the predicted line. Korea, Malaysia, the Philippines (recently above the predicted line) and Singapore (at the beginning slightly above the predicted line) lie more or less on the predicted line. The services sector lies below the predicted line in period 1 but on the predicted line in period 2 for Taiwan.

The above findings can be used to interpret the relative performance of the services sector. For example, if the share of the services sector in a country's employment is on the predicted line, but its share of GDP lies below the predicted line, we can interpret that, compared with other countries with the same level of per capita GDP, its services sector workforce produces less GDP. This indicates that its services sector performs poorly. According to this line of reasoning, our findings suggest that there are broadly three groups of countries.[7] The services sector performs better than the international norm in Hong Kong,

7. Our classification is based on relative labor productivity of the services sector comparing countries with similar per capita GDP. Another possible interpretation of the graphs is that if both employment and GDP shares of the services

India, and Pakistan. The services sector performs more or less in line with the international norm in China, the Philippines, and Vietnam. This is also arguably the case for Indonesia, Singapore, and Taiwan. Finally, the services sector performs worse than the international norm in Korea and Thailand, and arguably in Malaysia as well. As noted earlier, while the relative importance of services is high and growing across Asia, the region's services sector is marked by a great deal of heterogeneity. Such heterogeneity extends to the performance of services sector.

## IV CAN THE SERVICES SECTOR BE AN ENGINE OF GROWTH FOR ASIA?

In this section, we empirically examine the prospects for the services sector to become an engine of growth for Asia. To do so, we investigate (1) contribution of agriculture, industry, and services sectors to GDP growth, (2) productivity of the services sector relative to the industry sector, and (3) determinant of services sector productivity.

### Sectoral Contribution to GDP Growth

We focus on the three most recent decades: 1980s, 1990s, and 2000s. The sectoral contribution in each decade is calculated by dividing the log difference in the sectoral value-added by the log difference in the aggregate GDP. The first three columns in each decade panel (1980s, 1990s, and 2000s) in table 6 sum up to 100 percent. The last column in each decade panel is the aggregate GDP growth rate in each decade. Overall, the services sector makes the biggest contribution to GDP growth. In the 1980s, the services sector made the biggest contribution to growth in the Philippines (81.7 percent), Singapore (71.2 percent), Taiwan (67.9 percent), Korea (55.3 percent), Pakistan (53.2 percent), and Thailand (51.0 percent). In the 1990s, services made the biggest contribution in Taiwan (77.8 percent), Singapore (64.0 percent), India (61.1 percent), the Philippines (58.3 percent), Korea (57.2 percent), and Pakistan (51.6 percent). In the 2000s, services made the highest contribution in Hong Kong (107.3 percent), Singapore (69.1), Malaysia (67.0 percent), India (65.7 percent), the Philippines (62.8 percent), Indonesia (56.4 percent), and Pakistan (55.3 percent). In general, the services sector's contribution tends to be larger for more advanced economies. As the economy grows, the services sector becomes larger and hence the overall growth depends more on the performance of the services sector. In this sense, the performance of Korea's services sector is noticeably weak relative to its per capita GDP. On the other hand, the performance of the services sector in India and Pakistan is noticeably strong relative to their per capita GDP.

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sector lie below the predicted line, the smaller size itself is also an indication of less development. However, since the size of the services sector depends on a number of country-specific characteristics such as natural resource endowment, it may be misleading to solely rely on size without controlling for such characteristics.

## Labor Productivity in the Services versus Industry Sector

In the literature, a number of arguments have been made for why labor productivity growth is low in the services sector:[8] (1) Services are intensive in labor rather than capital, making it difficult to achieve innovation, which is embodied in capital; (2) services sector firms are too small to devote adequate resources to research and development or to risk new production techniques; (3) international competition is weak because most services are nontradable; and (4) a lot of employment in services reflects underemployment of individuals who cannot find jobs in other places. Hence it has been long argued that as economies become more services oriented, growth slows down. As the manufacturing sector matures and resources are reallocated to the services sector, achieving productivity growth and hence economic growth becomes more challenging. This line of reasoning underlies the widely held notion that services cannot be a driver of growth for developing economies. However, we saw earlier that in a number of Asian countries, labor productivity growth rate of the services sector is quite high.

Table 7 shows that the labor productivity of both manufacturing and services sectors increases as per capita GDP increases. Columns I to III are pooled ordinary least squares (OLS) estimation results of regressing the labor productivity of manufacturing and services sectors and their relative labor productivity on per capita GDP. The coefficient of the log per capita GDP is slightly higher when the dependent variable is the log labor productivity of the services sector (column I) rather than the log labor productivity of the industry sector (column II). Figures 4a and 4b show the actual log labor productivity of the services sector and the industry sector, respectively, as well as the estimated trends. When we regress the labor productivity of the services sector relative to that of the industry sector on per capita GDP, the coefficient is positive and significant (column III). The results seem to suggest that labor productivity in services grows faster than that in industry, which is counterintuitive.

However, the above OLS estimation has limitations. In particular, other control variables are not included in the regression. In columns IV to VI, we report the results of panel estimation with fixed effects. Panel estimation with fixed effects eliminates unobserved but time-invariant country-specific variables and hence focuses on the time series variations within countries. Now the results are reversed. The coefficient of the log per capita GDP is much lower when the dependent variable is the log labor productivity of the services sector rather than the log labor productivity of the industry sector (columns IV and V). The coefficient is also negative and significant when the dependent variable is the relative productivity of the services sector (column VI). Hence the panel estimation results indicate that in general labor productivity grows more slowly in the services sector than in the industry sector.

8. See, for example, Eichengreen, Perkins, and Shin (2012) and other studies cited therein.

## Determinants of Services Sector Productivity

These findings suggest that the labor productivity in the services sector is not entirely determined by the per capita GDP. In this section, we empirically examine the more general determinants of labor productivity in the services sector based on the equation typically adopted in the empirical growth literature.[9]

We divide the sample into five-year periods: 1975–80, 1980–85, 1985–90, 1990–95, 1995–2000, 2000–2005, and 2005–10. We calculate the growth rate of five-year average labor productivity in the services sector. We then regress the growth rate of five-year average labor productivity on explanatory variables at the initial year of each period. We use the initial-year explanatory variables to avoid endogeneity problems. The specification of the empirical model is as follows:

$$g_{it,t+5} = c_0 + c_1 Y_{it} + c_2 Trade_{it} + c_3 Service\ Trade_{it} + c_4 Urban_{it} + c_5 Democracy_{it} + c_6 Proximity_i + c_7 Nontropic_i + c_8 AGE_{it} + c_9 Latitude_i$$

$g_{it,t+5}$ : the growth rate of five-year average labor productivity for country $i$ from $t$ to $t+5$

$Y_{it}$ : log per capita income for country $i$ at $t$

$Trade_{it}$ : log total trade (percent of GDP) for country $i$ at $t$

$Service\ Trade_{it}$ : log trade in services (percent of GDP) for country $i$ at $t$

$Urban_{it}$ : urban population (percent of total population) for country $i$ at $t$

$Democracy_{it}$ : institutionalized democracy score for country $i$ at $t$

$Proximity_i$ : log distance from UK or US (minimum) for country $i$

$Nontropic_i$ : land outside the tropics (percent of total) for country $i$

$AGE_{it}$ : aged dependency ratio (over 65 as percent of working-age population) for country $i$ at $t$

$Latitude_i$ : latitude of country centroid for country $i$

The explanatory variables are the same as those used by Eichengreen and Gupta (2009).[10] While they used the share of the services sector in GDP as the dependent variable, we use labor productivity growth in the services sector as the dependent variable. We use the institutionalized democracy score from the Polity IV data series; distance, from CEPII; nontropical area and latitude, from Gallup, Sachs, and Mellinger (1999); governance indicators from the World Bank; and aggregate governance indicators

9. A number of empirical studies investigate the determinants of growth. See, for example, Barro and Sala-i-Martin (2003) and other studies cited therein.

10. We do not include one explanatory variable, governance, that is used in Eichengreen and Gupta (2009) due to the fact that the governance data are available only from 1996.

and all other data from the *World Development Indicators*. See Eichengreen and Gupta (2009) for a more detailed description and rationale of the explanatory variables.

Table 8 reports the results. We report panel estimation with random effects (column I) and panel estimation with fixed effects (column II). In column II, the coefficients of the proximity (log difference from UK or US) and nontropical area (land outside the tropics) and latitude are not reported because those variables are not time-varying.

We now interpret the results of the random effects estimation (column I). The coefficient of the initial per capita GDP is negative and highly significant. This means that the lower the initial level of per capita GDP, the higher is the subsequent growth rate of labor productivity in the services sector. This result is consistent with other studies found in the empirical growth literature where the explanatory variable is typically the growth rate of output instead of the labor productivity. The coefficient of total trade as percentage of GDP is negative and significant at 10 percent. This looks implausible but a possible explanation is as follows: In general, industry products are more tradable than services and hence trade is more beneficial for the industry sector than the services sector. In contrast the coefficient of services trade as a percentage of GDP is positive and significant at 1 percent. This implies that trade in services only contributes to the growth of labor productivity in the services sector.[11] This is plausible since import of services exposes domestic services firms to foreign competition and forces them to become more efficient. Likewise, exporting services requires services firms to be able to compete in foreign services markets.

The coefficient of urban population is also positive and significant at 5 percent, whereas the coefficient of aged dependency is negative and significant at 1 percent. The other coefficients are not significant.

The results of the fixed effects estimation (column II) are very consistent with the results of the random effects model. The only exception is that the coefficient of urban population becomes insignificant. But it is still positive and its *t*-value is pretty high (1.38). The consistency between the results of the random effects and fixed effects models gives us some confidence about the robustness of our empirical findings.

## V CONCLUDING OBSERVATIONS

The central objective of this paper was to empirically examine the prospects for the services sector to act as an engine of growth in Asia. While there are differences across the 12 Asian countries, their overall experiences are consistent with well-established international historical patterns of sectoral shares of GDP

11. Francois (1990) demonstrated that liberalizing trade in services yields efficiency gains for both importing and exporting countries due to increased division of labor.

and employment. As a country industrializes, the shares of industry and services sectors in both GDP and employment rise whereas the share of agriculture falls. As the country deindustrializes and moves into the postindustrial phase, the share of services rises while the shares of both industry and agriculture fall. Interestingly and significantly, we find that a number of Asian countries have been able to achieve substantial labor productivity gains in the services sector, which contradicts the conventional wisdom of labor productivity growth being difficult to achieve in services. Combined with significant real output growth in the services sector comparable to that of the industry sector, this suggests that services has already been a major source of growth in Asia. Another promising sign is that the share of services-sector output that is exported tends to rise over time in most Asian countries.

Our analysis of the well-known relationship between per capita GDP and the share of services in GDP/employment indicates that some countries' services sector share is higher than that predicted by their per capita GDP while it is lower in other countries. However, the broader, more fundamental trend is an increase in the share of services as income rises. When we computed the contribution of agriculture, industry, and services to GDP growth, we find that in general the services sector made the biggest contribution. One highly significant finding is that the lower the per capita GDP, the greater the scope for labor productivity growth in the services sector. Since the income level of much of Asia remains relatively low notwithstanding the region's rapid growth, this implies that there is still a lot of room for services productivity growth. An equally significant result is that services trade seems to have a significant and positive effect on services productivity growth. We also find that the share of services sector output that is exported has been increasing over time and that it is higher than South American countries and developed countries.

Overall, our evidence suggests that the services sector has already contributed substantially to Asia's productivity and GDP growth in the past. Since the fast-growing region is rapidly becoming richer and services tend to become more important as income level rises, services are set to play an even bigger role in the future. The popular perception of Asia's services sector lagging its manufacturing sector—i.e., world-class manufacturing and third-class services—is further cause for optimism about the future prospects of the services sector. That is, if even a relatively underdeveloped services sector contributes significantly to growth, then clearly a more developed services sector can contribute even more. More fundamentally, a wide range of internal impediments—e.g., excessive regulation and state monopolies—and external impediments—e.g., barriers to services trade and FDI—shackle Asia's services sector. Removing those obstacles will unleash the full potential of Asia's services sector to generate jobs and growth. In fact, some Asian countries such as India and the Philippines have already begun to capitalize on this potential by exporting services.

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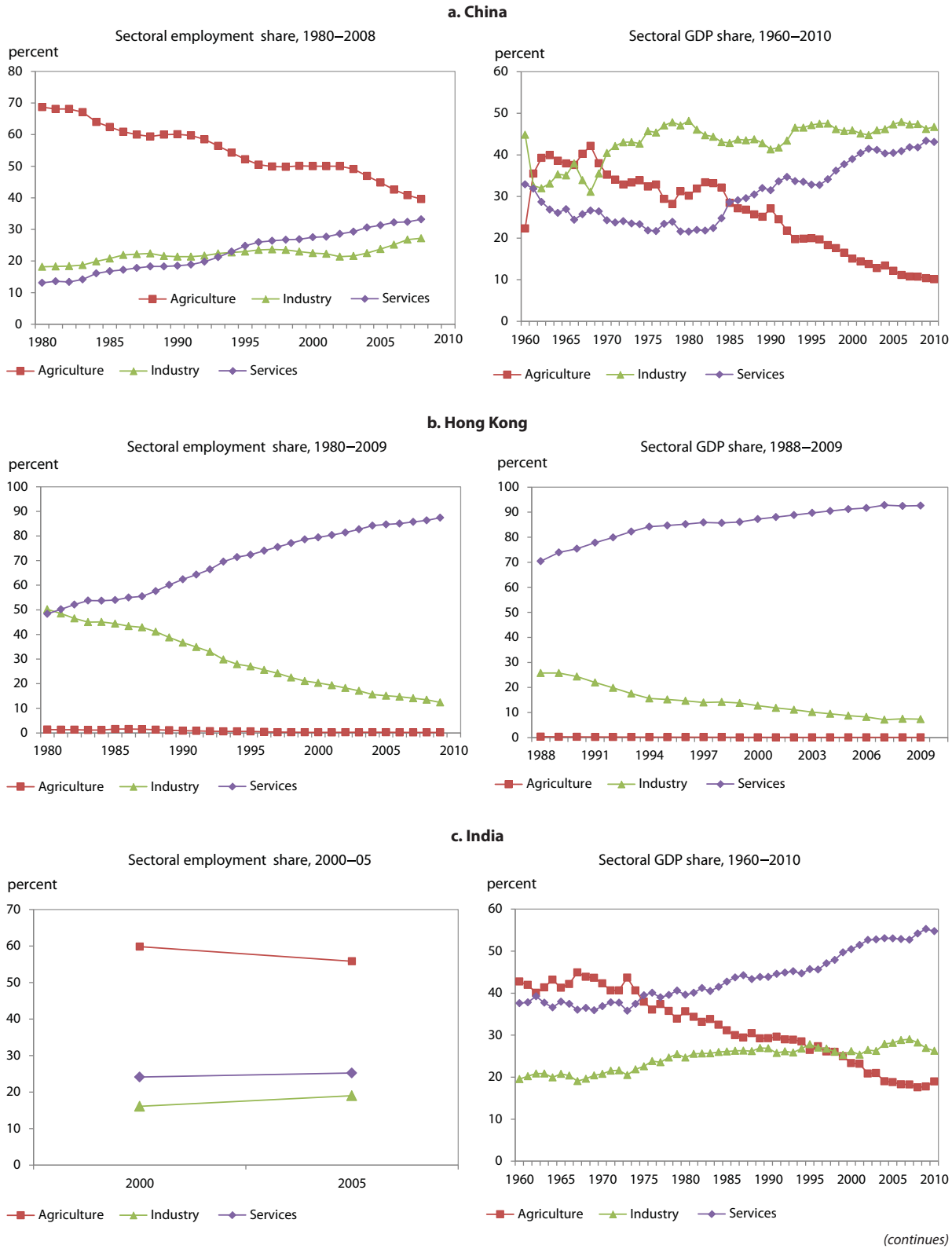
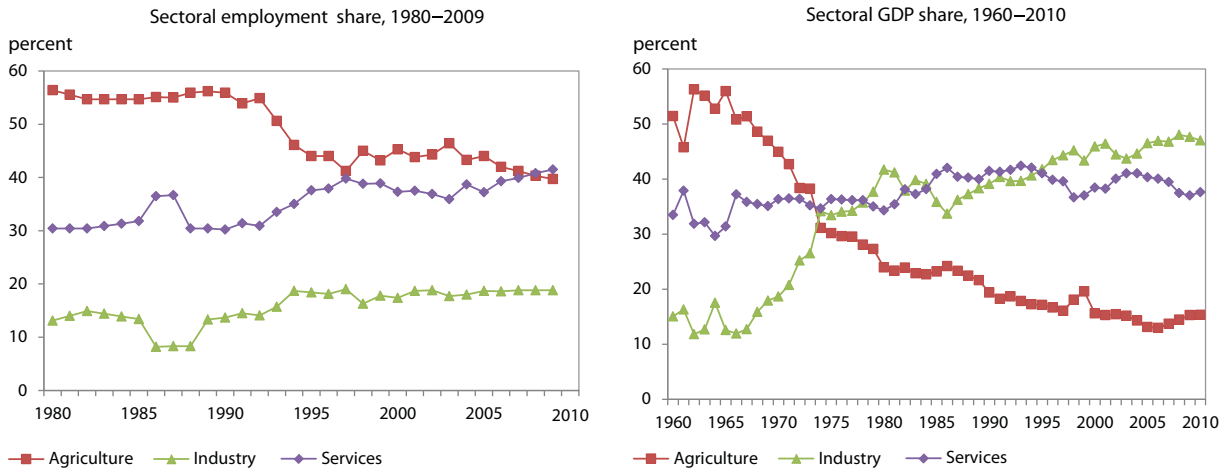
## Figure 1 Sectoral employment and GDP shares



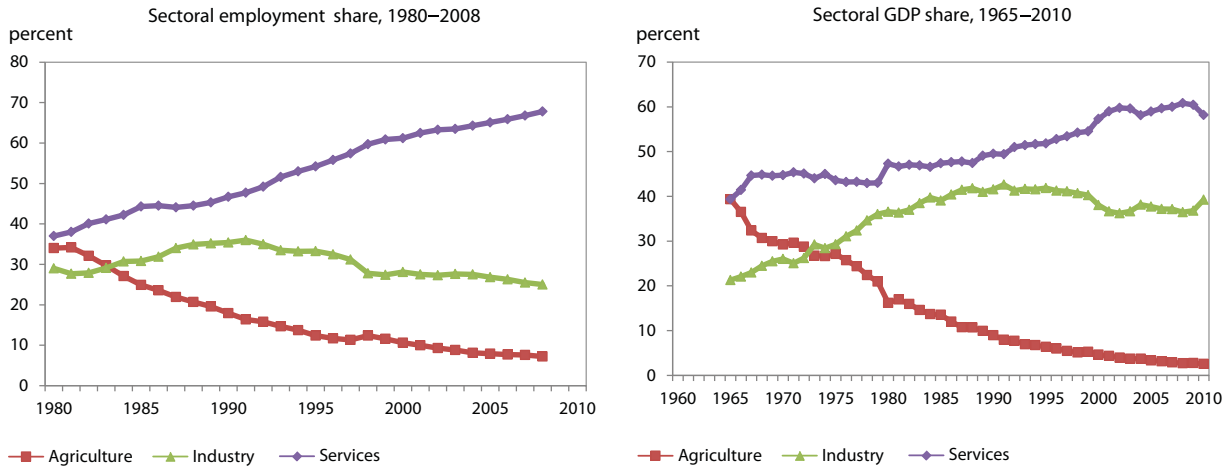

*(continues)*

**Figure 1 Sectoral employment and GDP shares** *(continued)*

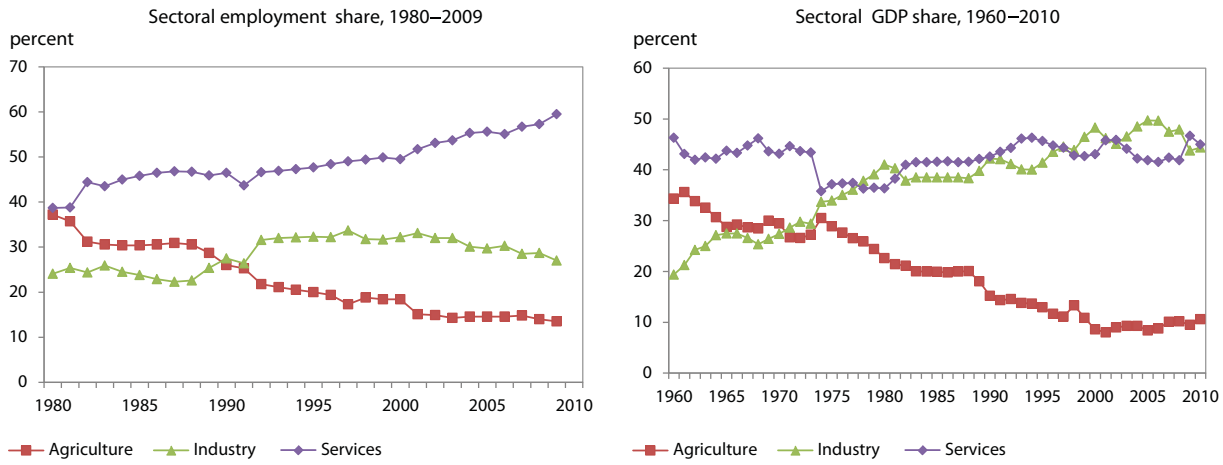
**d. Indonesia**




**e. Korea**



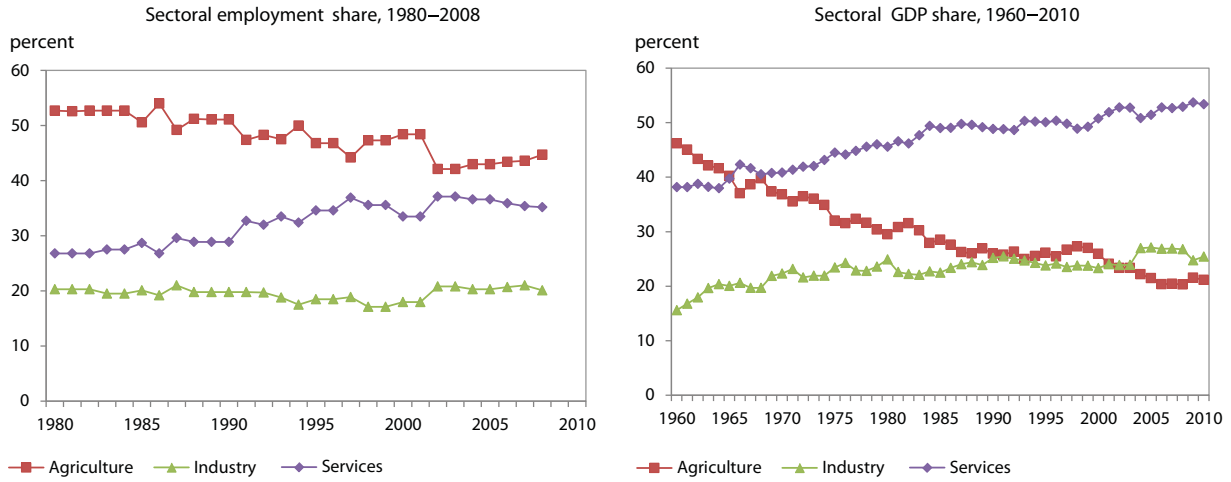

**f. Malaysia**



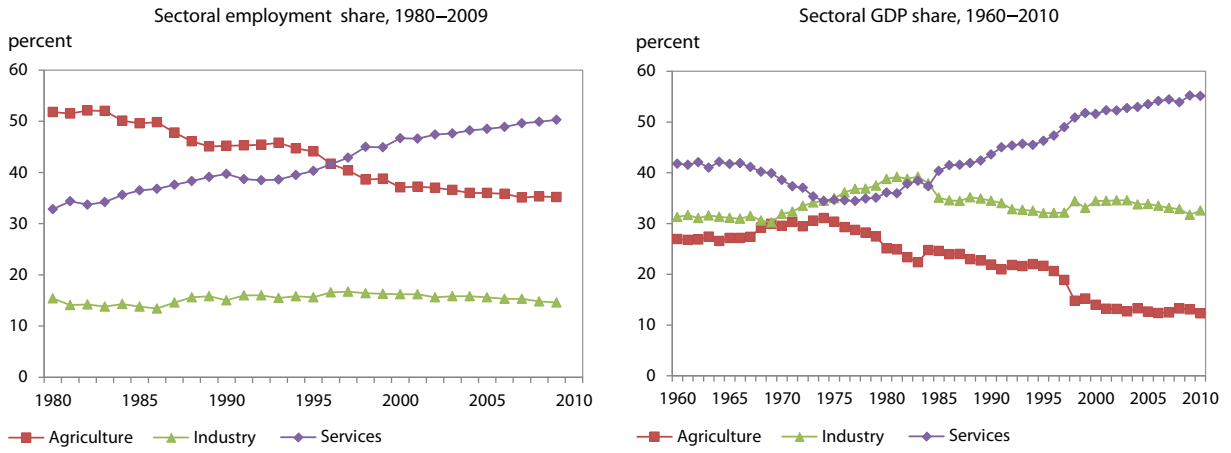

*(continues)*

**Figure 1 Sectoral employment and GDP shares** *(continued)*

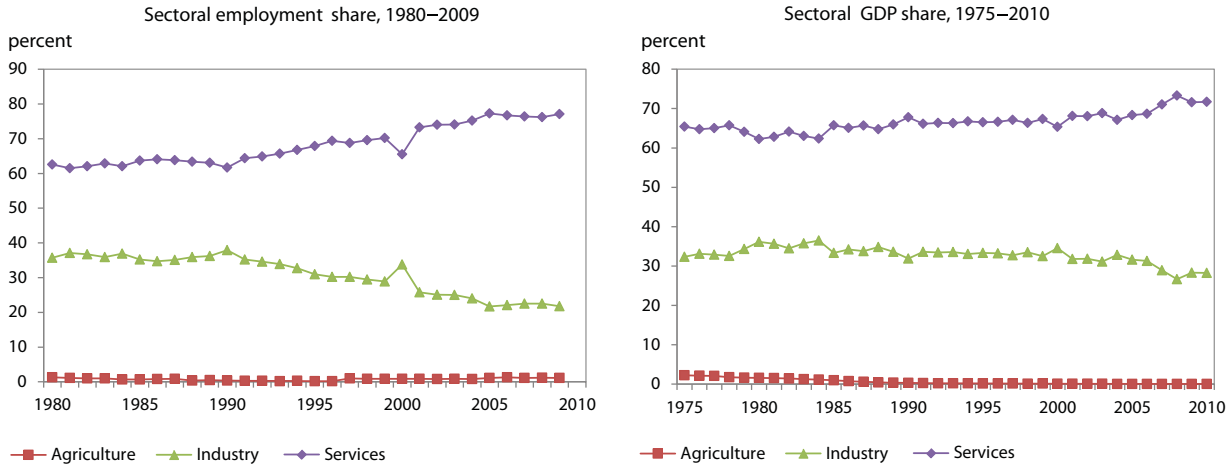
**g. Pakistan**




**h. Philippines**



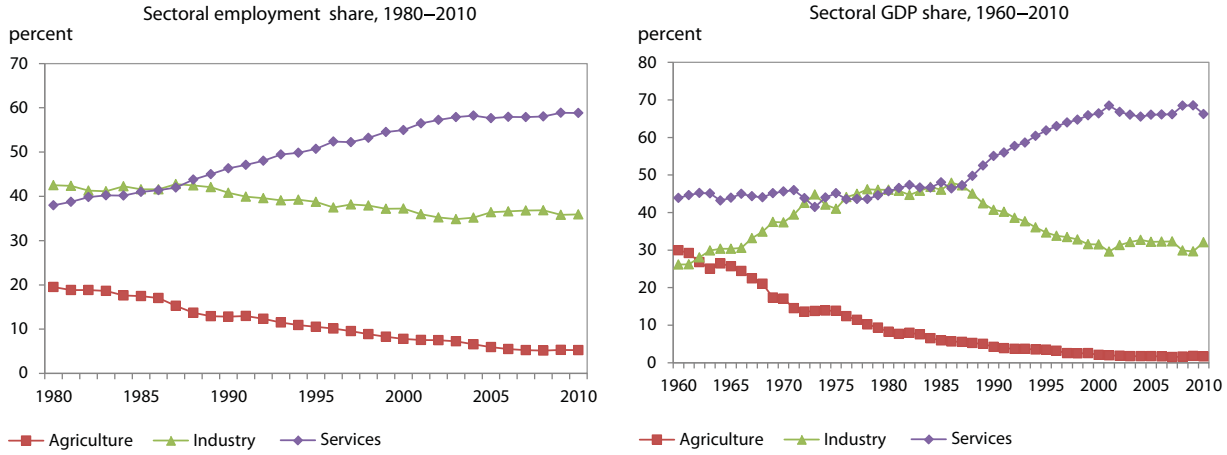

**i. Singapore**



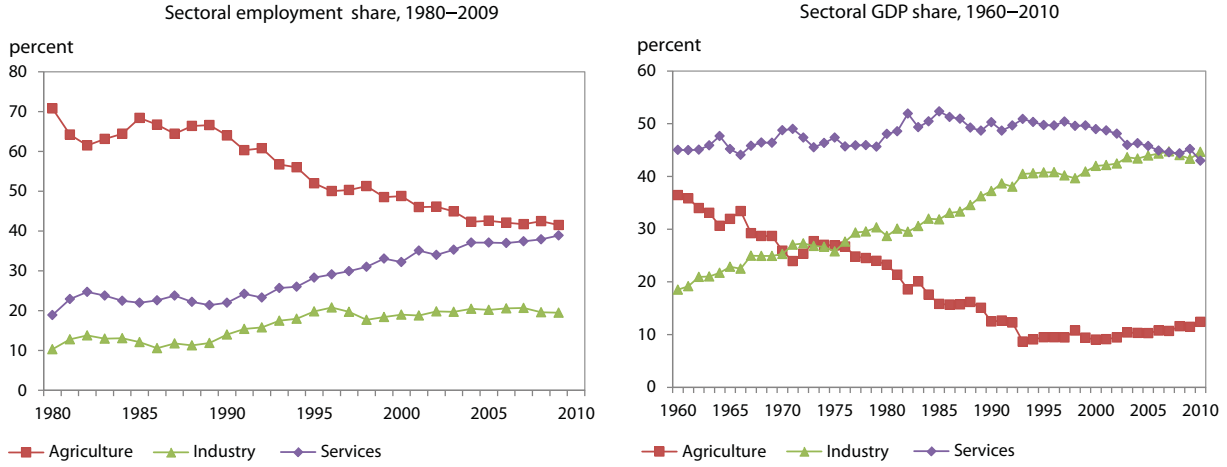

*(continues)*

**Figure 1 Sectoral employment and GDP shares** *(continued)*

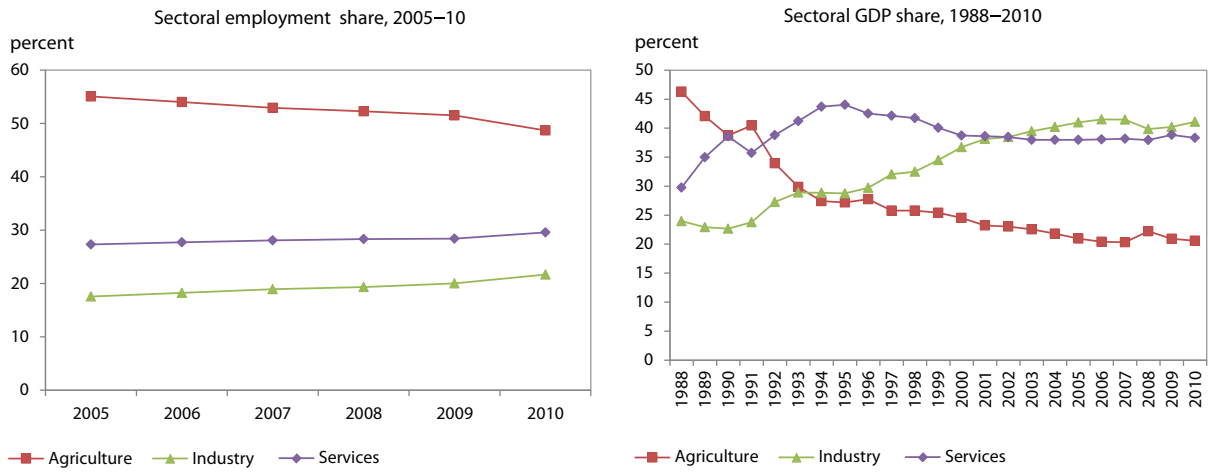
**j. Taiwan**




**k. Thailand**




**l. Vietnam**




*Sources:* World Bank, *World Development Indicators*; national sources for Taiwan and Vietnam.

**Table 1 Sectoral real GDP growth rate, 1960–2010** (percent)

| | Period 1 (1960–80) | | | | Period 2 (1980–2000) | | | |
|---|---|---|---|---|---|---|---|---|
| **Country** | **Agriculture** | **Industry** | **Services** | **Aggregate** | **Agriculture** | **Industry** | **Services** | **Aggregate** |
| China | 3.82 | 6.41 | 0.57 | 3.23 | 4.88 | 10.89 | 10.95 | 9.40 |
| Hong Kong | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| India | 2.68 | 5.99 | 5.43 | 4.32 | 3.02 | 5.67 | 6.74 | 5.35 |
| Indonesia | 3.59 | 8.36 | 5.89 | 5.88 | 2.78 | 6.18 | 5.42 | 5.21 |
| Korea | 2.79 | 12.03 | 6.01 | 6.62 | 2.40 | 8.31 | 6.63 | 6.87 |
| Malaysia | 4.59 | 8.05 | 8.90 | 7.55 | 2.01 | 7.60 | 6.54 | 6.37 |
| Pakistan | 3.59 | 8.11 | 6.26 | 5.52 | 4.13 | 5.77 | 5.40 | 5.12 |
| Philippines | 4.06 | 6.56 | 4.76 | 5.28 | 1.57 | 1.44 | 3.10 | 2.25 |
| Singapore | 2.01 | 9.16 | 7.84 | 8.25 | –4.29 | 6.87 | 7.52 | 7.24 |
| Taiwan | 3.56 | 11.81 | 9.35 | 9.26 | 0.48 | 4.87 | 8.02 | 6.63 |
| Thailand | 4.61 | 9.92 | 7.40 | 7.31 | 2.67 | 7.89 | 5.47 | 5.96 |
| Vietnam | n.a. | n.a. | n.a. | n.a. | 3.65 | 8.67 | 6.74 | 6.40 |
| Average | 3.53 | 8.64 | 6.24 | 632.00 | 2.12 | 6.74 | 6.59 | 6.07 |

| | Period 3 (2000–10) | | | |
|---|---|---|---|---|
| | **Agriculture** | **Industry** | **Services** | **Aggregate** |
| China | 4.11 | 10.86 | 10.52 | 9.95 |
| Hong Kong | –3.71 | –2.77 | 4.28 | 3.04 |
| India | 2.94 | 7.63 | 8.89 | 7.43 |
| Indonesia | 3.39 | 3.99 | 6.77 | 5.08 |
| Korea | 1.35 | 5.32 | 3.59 | 4.20 |
| Malaysia | 2.89 | 2.85 | 6.35 | 4.51 |
| Pakistan | 2.63 | 5.91 | 5.00 | 4.67 |
| Philippines | 2.81 | 4.10 | 5.43 | 4.65 |
| Singapore | –4.31 | 5.08 | 5.78 | 5.54 |
| Taiwan | 0.03 | 5.80 | 2.85 | 3.76 |
| Thailand | 2.07 | 5.18 | 3.70 | 4.22 |
| Vietnam | 3.52 | 8.70 | 7.09 | 6.99 |
| Average | 1.47 | 5.22 | 5.85 | 5.34 |

n.a. = not available

Note: Agriculture refers to International Standard Industrial Classification (ISIC) divisions 1 to 5 and includes forestry, hunting, and fishing. Industry refers to ISIC divisions 10 to 45, which comprise mining, manufacturing, construction, electricity, water, and gas. Services refer to ISIC divisions 50 to 99, which cover wholesale and retail trade, transportation, and government, financial, professional, and personal services. Data are from the *World Development Indicators* database except for Taiwan and Vietnam, for which we rely on national sources. We use 2000 market prices for all countries except for Taiwan and Vietnam, for which 2006 and 1994 market prices are used, respectively. Due to the lack of the data for Vietnam, the second period average is calculated by using 1988–2000 data.

*Sources:* World Bank, *World Development Indicators*; Central Bank of China; and State Bank of Vietnam.

**Table 2 Sectoral labor productivity growth rate, 1980–2010** (percent)

| | Period 2 (1980–2000) | | | | Period 3 (2000–10) | | | |
|---|---|---|---|---|---|---|---|---|
| **Country** | **Agriculture** | **Industry** | **Services** | **Aggregate** | **Agriculture** | **Industry** | **Services** | **Aggregate** |
| China | 4.52 | 7.88 | 5.30 | 7.46 | 6.10 | 7.93 | 8.07 | 9.54 |
| Hong Kong | n.a. | n.a. | n.a. | n.a. | –0.24 | 1.67 | 1.88 | 2.34 |
| India | n.a. | n.a. | n.a. | 4.46 | 2.05 | 2.02 | 5.41 | 4.90 |
| Indonesia | –1.66 | 0.98 | –4.98 | –1.43 | 3.25 | 1.40 | 3.83 | 3.34 |
| Korea | 6.14 | 6.38 | 2.03 | 4.78 | 5.59 | 5.74 | 1.57 | 3.32 |
| Malaysia | 0.50 | 1.79 | 0.91 | 1.68 | 4.26 | 2.05 | 2.10 | 2.08 |
| Pakistan | 1.52 | 5.43 | 1.64 | 2.82 | –1.81 | 3.54 | 4.39 | 2.24 |
| Philippines | 0.71 | –1.35 | –1.21 | –0.29 | 1.13 | 1.89 | 1.84 | 1.75 |
| Singapore | –7.36 | 4.17 | 4.54 | 4.40 | –8.58 | 5.29 | 0.78 | 1.88 |
| Taiwan | 3.27 | 3.70 | 4.33 | 4.78 | 3.00 | 5.16 | 1.17 | 2.75 |
| Thailand | 2.01 | 3.29 | 1.05 | 3.88 | 2.94 | 2.71 | 0.08 | 2.44 |
| Vietnam | n.a. | n.a. | n.a. | 4.46 | 3.00 | 0.73 | 3.10 | 4.38 |
| Average | 1.07 | 3.59 | 1.51 | 3.36 | 1.72 | 3.34 | 2.85 | 3.41 |

n.a. = not available

Note: See note to table 1. Since the employment data start from 1980, we do not report statistics for period 1. Due to the lack of data, for some countries, the latest available year is used instead of 2010. In addition, period 3 average is obtained by using 2005–10 data for Vietnam and 2000–2005 data for India.

*Sources:* World Bank, *World Development Indicators*; Central Bank of China; State Bank of Vietnam.

**Table 3 Export ratio of the services industry**
(percent)

| | Services exports/services, value added | | |
|---|---|---|---|
| **Country** | **1990** | **2000** | **2009** |
| 11 Asian countries | | | |
| China | 5.2 | 6.5 | 6.0 |
| Hong Kong | — | 28.1 | 46.7 |
| India | 3.7 | 7.8 | 13.0 |
| Indonesia | 5.2 | 8.2 | 7.3 |
| Korea | 8.6 | 11.5 | 16.1 |
| Malaysia | 20.6 | 34.5 | 32.2 |
| Pakistan | 8.2 | 3.9 | 4.8 |
| Philippines | 16.8 | 8.1 | 11.9 |
| Singapore | 51.0 | 49.7 | 75.6 |
| Thailand | 15.0 | 23.1 | 25.2 |
| Vietnam | — | 22.4 | 15.3 |
| South American countries | | | |
| Argentina | 3.1 | 2.7 | 6.4 |
| Brazil | 1.8 | 2.6 | 2.9 |
| Chile | 12.9 | 10.8 | 10.6 |
| Mexico | 5.3 | 3.8 | 3.0 |
| Eastern Europe | | | |
| Czech Republic | — | 22.9 | 19.8 |
| Hungary | 21.9 | 23.1 | 23.2 |
| Developed countries | | | |
| France | 10.0 | 9.4 | 7.8 |
| Germany | 6.6 | 7.1 | 10.8 |
| United Kingdom | 9.6 | 12.8 | 15.7 |
| United States | 3.9 | 4.1 | 5.2 |

Note: Due to the lack of data, data for 2008 instead of 2009 are used for Hungary and the United States. The data are from World Bank, *World Development Indicators*.

## Table 4 Relationship between services sector GDP share and log per capita GDP

| Variable | I | II |
|---|---|---|
| Log per capita income | 361.920*** | 414.668*** |
| | [4.631] | [5.472] |
| Log per capita income, squared | –62.647*** | –72.132*** |
| | [–4.252`] | [–5.050] |
| Log per capita income, cube | 4.703*** | 5.453*** |
| | [3.865] | [4.623] |
| Log per capita income, quartic | –0.126*** | –0.149*** |
| | [–3.381] | [–4.132] |
| Dummy for 1970–89 | | 1.069*** |
| | | [2.927] |
| Dummy for 1990–2005 | | 4.929*** |
| | | [12.604] |
| Country fixed effects | yes | yes |
| Observations | 5,402 | 5,402 |
| Number of countries | 157 | 157 |
| R-squared | 0.199 | 0.249 |

Dependent variable: Services/GDP (in percent)

Note: *t*-statistics are in brackets. *** indicates coefficient is significant at 1 percent level. Column I shows the quartic relationship with a common intercept for all years. Column II allows the intercepts to differ in periods 1970–89 and 1990–2010. Data on per capita income after 1980 are from World Bank, *World Development Indicators* and before 1980 are from Maddison (2003). Data on the services sector share of GDP are from the *World Development Indicators*.

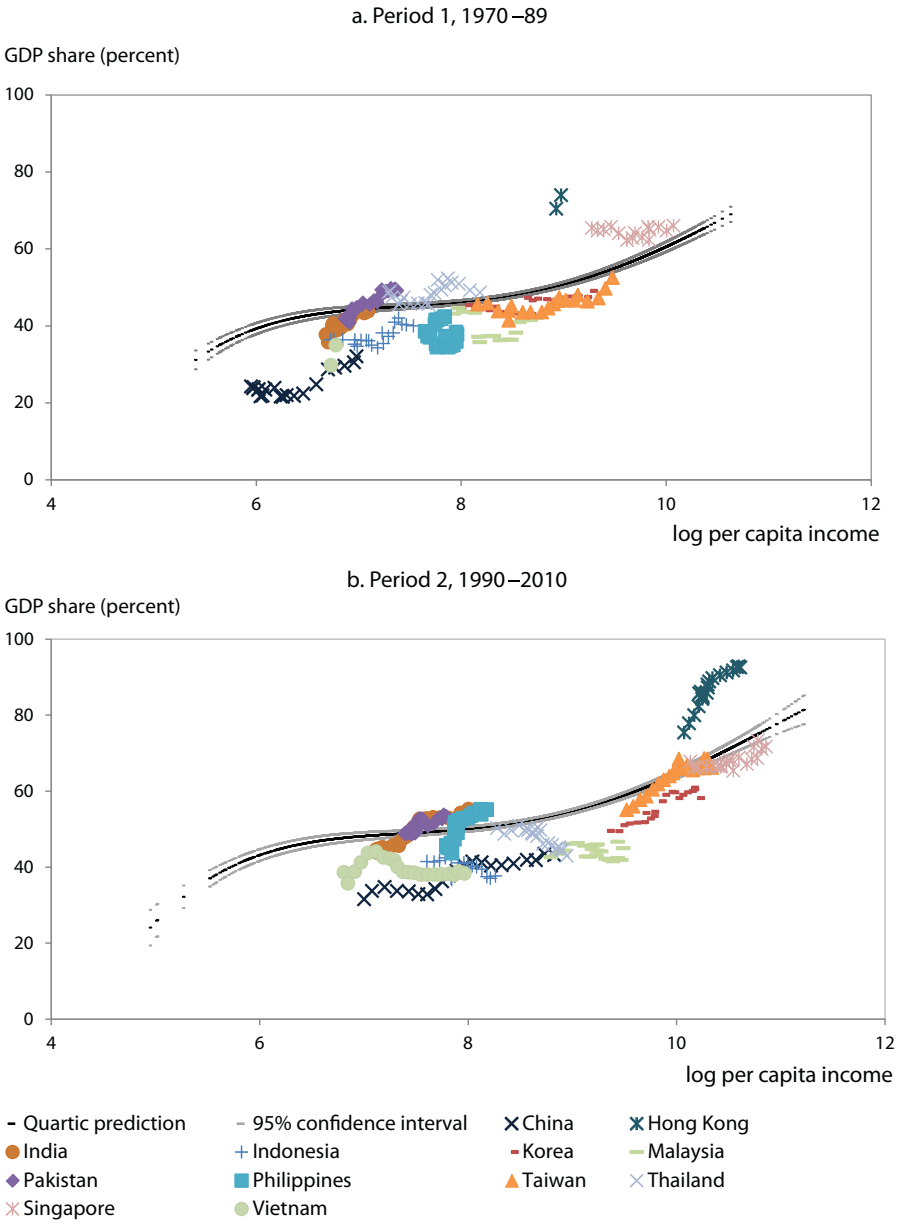
## Table 5 Relationship between services sector employment share and log per capita GDP

| Variable | I | II |
|---|---|---|
| Log per capita income | 1,432.620*** | 1,013.291*** |
| | [5.722] | [4.173] |
| Log per capita income, squared | –248.977*** | –177.987*** |
| | [–5.708] | [–4.210] |
| Log per capita income, cube | 18.957*** | 13.694*** |
| | [5.659] | [4.220] |
| Log per capita income, quartic | –0.529*** | –0.386*** |
| | [–5.532] | [–4.169] |
| Dummy for 1990–2005 | | 4.345*** |
| | | [13.117] |
| Country fixed effects | yes | yes |
| Observations | 2,222 | 2,222 |
| Number of countries | 139 | 139 |
| R-squared | 0.393 | 0.439 |

Dependent variable: Employment in services/total employment (in percent)

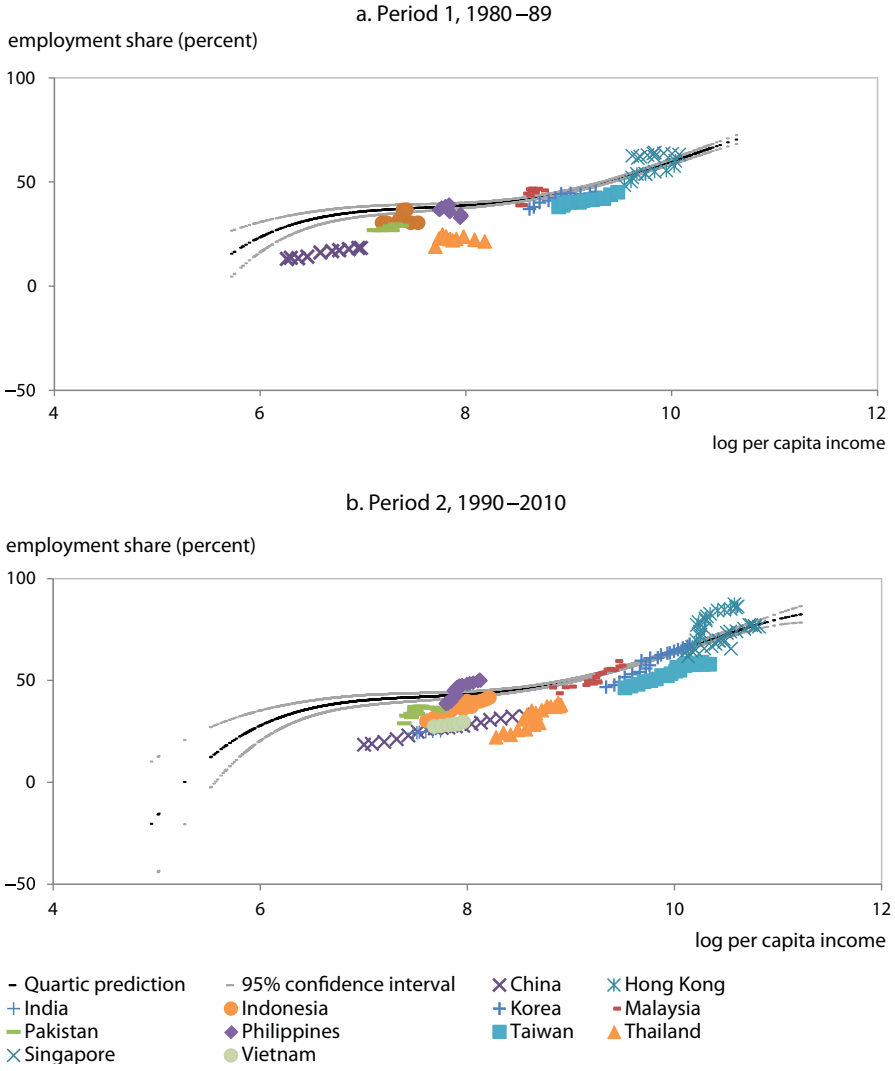
Note: Data on the services sector share of employment are from World Bank, *World Development Indicators*. For others, see note to table 4.

**Figure 2 Services sector GDP share and per capita GDP for 12 Asian countries**




Note: The figure shows the estimated relationship and 5 percent confidence interval for two periods based on the regression in column II, table 4. The actual GDP share of the individual Asian country's services sector is also plotted.

**Figure 3 Services sector employment share and per capita GDP for individual countries**




Note: The figure shows the estimated relationship and 5 percent confidence interval for two periods based on the regression in column II, table 5. The actual employment share of the individual Asian country's services sector is also plotted. The employment data for India and Vietnam are not available in period 1.

**Table 6 Sectoral contributions to GDP** (percent)

| | 1980s | | | | 1990s | | | |
|---|---|---|---|---|---|---|---|---|
| **Country** | **Agriculture** | **Industry** | **Services** | **Aggregate** | **Agriculture** | **Industry** | **Services** | **Aggregate** |
| China | 21.3 | 35.4 | 43.4 | 8.9 | 7.6 | 52.4 | 40.1 | 9.9 |
| Hong Kong | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. | n.a. |
| India | 21.3 | 29.0 | 49.7 | 5.3 | 13.2 | 25.8 | 61.1 | 5.4 |
| Indonesia | 12.7 | 45.2 | 42.1 | 6.2 | 8.1 | 55.0 | 36.9 | 4.2 |
| Korea | 3.2 | 41.5 | 55.3 | 8.1 | 1.7 | 41.1 | 57.2 | 5.6 |
| Malaysia | 9.6 | 47.2 | 43.2 | 5.8 | 1.4 | 54.7 | 43.9 | 6.9 |
| Pakistan | 18.8 | 28.0 | 53.2 | 5.9 | 26.1 | 22.4 | 51.6 | 4.3 |
| Philippines | 10.7 | 7.7 | 81.7 | 1.7 | 10.3 | 31.4 | 58.3 | 2.8 |
| Singapore | –0.4 | 29.2 | 71.2 | 7.5 | –0.1 | 36.1 | 64.0 | 7.0 |
| Taiwan | –0.1 | 32.4 | 67.7 | 7.2 | –0.1 | 22.3 | 77.8 | 6.1 |
| Thailand | 6.9 | 42.0 | 51.0 | 7.6 | 3.8 | 53.5 | 42.6 | 4.3 |
| Vietnam | n.a. | n.a. | n.a. | n.a. | 16.1 | 46.6 | 37.3 | 7.3 |
| Average | 10.4 | 33.8 | 55.8 | 6.4 | 8.0 | 40.1 | 51.9 | 5.8 |

| | 2000s | | | |
|---|---|---|---|---|
| | **Agriculture** | **Industry** | **Services** | **Aggregate** |
| China | 4.5 | 52.8 | 42.7 | 10.0 |
| Hong Kong | –0.1 | –7.2 | 107.3 | 3.0 |
| India | 7.2 | 27.1 | 65.7 | 7.4 |
| Indonesia | 9.5 | 34.1 | 56.4 | 5.1 |
| Korea | 1.3 | 51.2 | 47.6 | 4.2 |
| Malaysia | 5.1 | 28.0 | 67.0 | 4.5 |
| Pakistan | 13.1 | 31.6 | 55.3 | 4.7 |
| Philippines | 7.7 | 29.5 | 62.8 | 4.7 |
| Singapore | –0.1 | 30.9 | 69.1 | 5.5 |
| Taiwan | 0 | 50.2 | 49.8 | 3.8 |
| Thailand | 4.0 | 54.3 | 41.7 | 4.2 |
| Vietnam | 10.2 | 50.3 | 39.5 | 7.0 |
| Average | 5.2 | 36.1 | 58.7 | 5.3 |

n.a. = not available

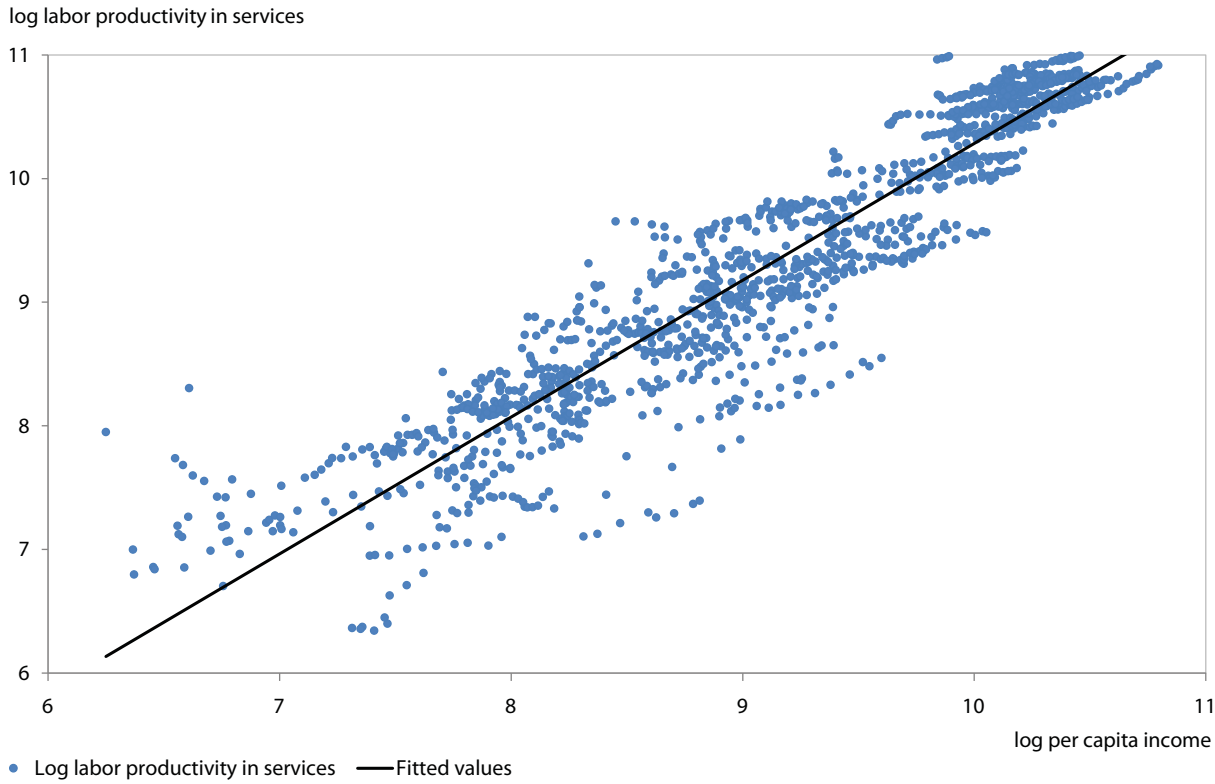
Note: The sectoral contribution in each decade is calculated by dividing the log difference in the sectoral value added by the log difference in the aggregate GDP. The first three columns in the three panels (1980s, 1990s, and 2000s) sum up to 100 percent. The last column in each panel is the aggregate GDP growth rate in each decade. Data are from World Bank, *World Development Indicators*.

**Table 7 Relationship between log labor productivity and log per capita GDP**

| Variable | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| Dependent variable | Log labor productivity in services | Log labor productivity in industry | Log relative labor productivity | Log labor productivity in services | Log labor productivity in industry | Log relative labor productivity |
| Log per capita income | 1.106*** [104.957] | 1.058*** [90.972] | 0.048*** [4.663] | 0.493*** [35.052] | 0.916*** [56.101] | –0.423*** [–21.732] |
| Country fixed effects | | | | yes | yes | yes |
| Observations | 1,469 | 1,469 | 1,469 | 1,469 | 1,469 | 1,469 |
| Number of countries | 94 | 94 | 94 | 94 | 94 | 94 |
| R-squared | 0.882 | 0.849 | 0.015 | 0.472 | 0.696 | 0.256 |

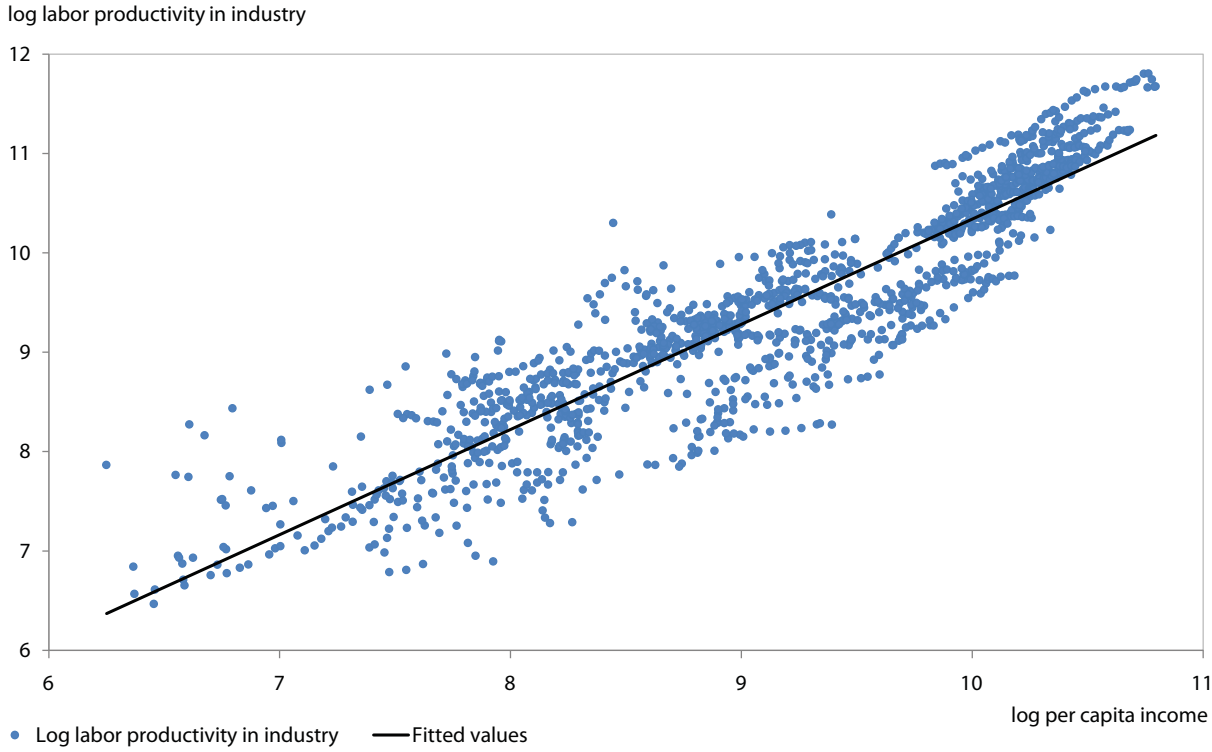
Note: *t*-statistics are in brackets. *, **, *** indicate coefficient is significant at 10, 5, and 1 percent levels, respectively. Columns I, II, and III are pooled ordinary least squares (OLS) estimation. Columns IV, V, and VI are panel fixed effects estimation. Data are from World Bank, *World Development Indicators*.

**Figure 4a Log labor productivity in services and log per capita income**




Note: The linear prediction line is derived from the regression in column I , table 7. Data are from World Bank, *World Development Indicators*.

**Figure 4b Log labor productivity in industry and log per capita income**




Note: The linear prediction lines is derived from the regression in column II, table 7. Data are from World Bank, *World Development Indicators*.

## Table 8 Determinants of labor productivity in the services sector

| Variable | I | II |
|---|---|---|
| Log per capita income | –0.024*** | –0.040*** |
| | [–5.174] | [–3.262] |
| Log trade (percent of GDP) | –0.015* | –0.027* |
| | [–1.861] | [–1.897] |
| Log trade in services (percent of GDP) | 0.019*** | 0.026** |
| | [2.898] | [2.123] |
| Urban population (percent of total) | 0.000** | 0.001 |
| | [2.161] | [1.380] |
| Institutionalized democracy score | –0.001 | 0.001 |
| | [–0.831] | [0.588] |
| Log distance from UK or US (minimum) | 0.005 | |
| | [1.160] | |
| Land outside the tropics (percent of total) | 0.01 | |
| | [1.307] | |
| Age dependency ratio (percent of working-age population) | –0.001*** | –0.001** |
| | [–4.230] | [–2.597] |
| Latitude of country centroid | 0 | |
| | [1.537] | |
| Observations | 266 | 266 |
| Number of countries | 73 | 73 |
| R-squared | 0.083 | 0.098 |

Dependent variable: Average five-year growth rate of labor productivity

Note: *t*-statistics are in brackets. *, **, *** indicate that the coefficient is significant at 10, 5, and 1 percent levels, respectively. The results are based on panel estimation with random effects (column I) and fixed effects (column II). Institutionalized democracy score is from the Polity IV data series; distance, from CEPII; nontropical area and latitude, from Gallup, Sachs, and Mellinger (1999); governance indicators, from World Bank, Aggregate Governance Indicators; and all other data, from World Bank, *World Development Indicators*.