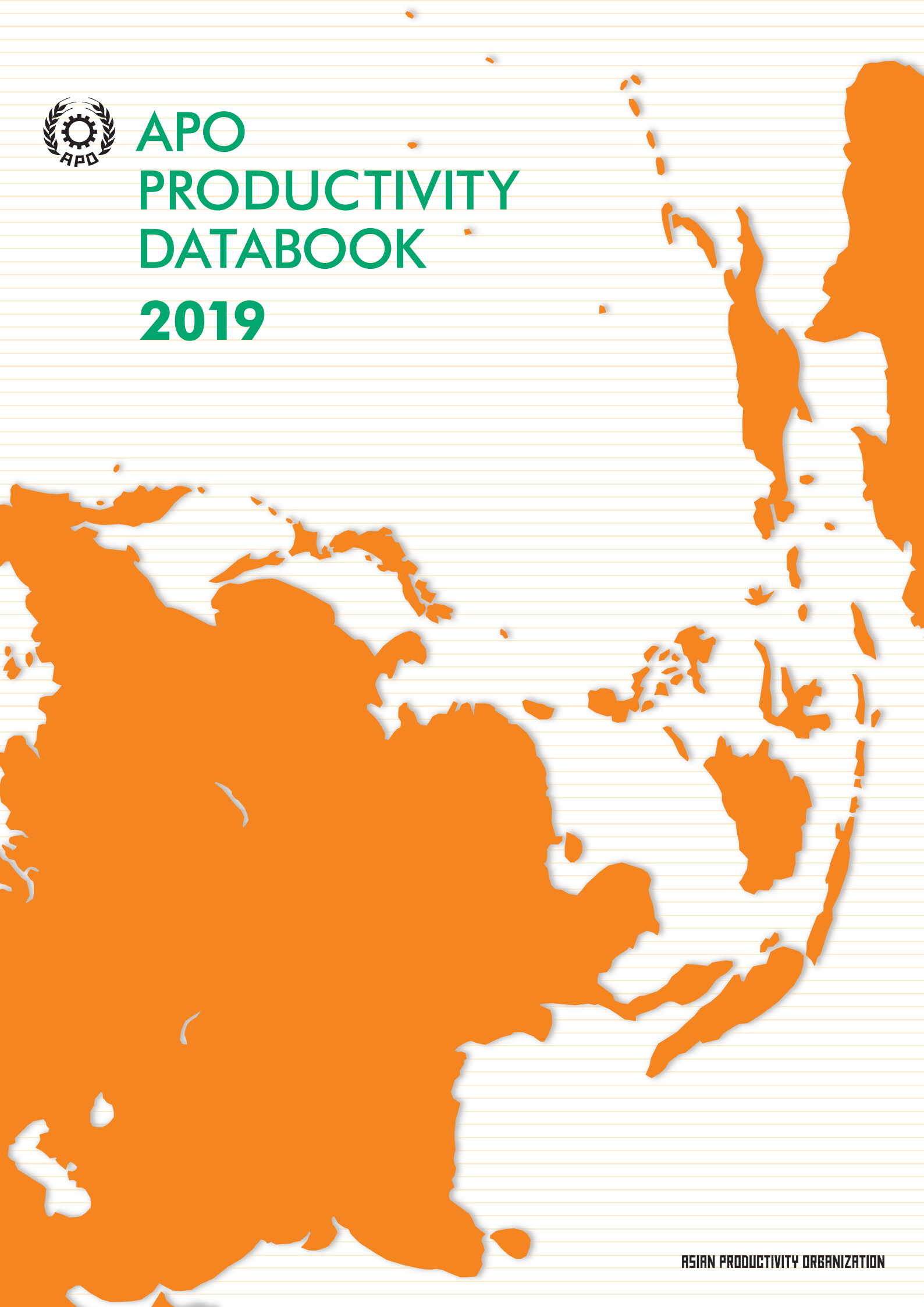
APO PRODUCTIVITY DATABOOK 2019



ASIAN PRODUCTIVITY ORGANIZATION

APO PRODUCTIVITY DATABOOK 2019

ASIAN PRODUCTIVITY ORGANIZATION

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Contents

Boxes

Tables

Figures

Abbreviations

ADB	Asian Development Bank
APO	Asian Productivity Organization
APO20	20 member economies of the Asian Productivity Organization: Bangladesh, Cambodia, Republic of China, Fiji, Hong Kong, India, Indonesia, Islamic Republic of Iran, Japan, the Republic of Korea, the Lao PDR, Malaysia, Mongolia, Nepal, Pakistan, the Philippines, Singapore, Sri Lanka, Thailand, and Vietnam
ASEAN	Association of Southeast Asian Nations, which consists of 10 countries of Brunei, Cambodia, Indonesia, the Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam. The ASEAN is separated to two groups in Databook, i.e., the ASEAN6 and CLMV.
ASEAN6	Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand
Asia24	APO20 plus Bhutan, Brunei, China, and Myanmar
Asia30	Asia24 plus GCC countries
CLMV	Cambodia, the Lao PDR, Myanmar, and Vietnam
CPI	consumer price index
COE	compensation of employees
ESRI	Economic and Social Research Institute, Cabinet Office of Japan
EU	European Union
EU15	15 member economies of the European Union prior to enlargement: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom
EU28	European Union: the EU15 plus Bulgaria, Republic of Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, and Slovenia
FDI	foreign direct investment
FISIM	financial intermediation services indirectly measured
GCC	Gulf Cooperation Council: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the UAE
GDP	gross domestic product
GFCF	gross fixed capital formation
GNI	gross national income
ICP	International Comparisons Program
ILO	International Labour Organization
IMF	International Monetary Fund
ISIC	International Standard Industry Classification of All Economic Activities
IT	information technology
KEO	Keio Economic Observatory, Keio University
LDCs	less developed countries
NPISHs	non-profit institutions serving households
OECD	Organisation for Economic Co-operation and Development
PPP	purchasing power parity
QALI	quality adjusted labor inputs
QNA	quarterly national accounts
RCEP	Regional Comprehensive Economic Partnership
ROC	Republic of China
R&D	research and development
SNA	System of National Accounts
TFP	total factor productivity
TPP	Trans-Pacific Partnership
UAE	United Arab Emirates
UN	United Nations
UNSD	United Nations Statistics Division
US	United States
WTO	World Trade Organization

Foreword

Asian economies are unequivocally at the epicenter of economic gravity. Deepening interconnections among major players in the global economy have resulted in more economic cooperation and thus opportunities for prosperity and higher economic output in the Asia-Pacific. However, recent trade-related tensions have cast a shadow over economic prospects worldwide, which will inevitably affect Asian economies. The 2019 edition of the APO Productivity Databook is published as an ongoing effort to support member governments in coping more effectively with current challenges, while helping them to make timely policy responses to the changing situation and maintain their growth trajectories.

The newest edition of the APO Productivity Databook, as an annual analytical report on recent and long-term productivity and economic performance in the Asia-Pacific, details the diverse stages and pace of economic development of member countries as well as reference economies. Productivity measurement based on official data enables relevant comparisons of the quality of economic growth and productivity gains achieved. It also supports the monitoring of national productivity performance, which is at the core of public policy formulation. International comparisons and analyses are the basis for evidence-based policy advisory services offered by the APO to member countries.

For the second year, mid-term projections of future economic growth and labor productivity in the Asia-Pacific through 2030 were developed to assist in setting updated target levels. Highlights of the analyses were newly included in each chapter, making it easier for policymakers to use the publication. Other innovative elements of the 2019 edition include 20 country profiles and five regional profiles with productivity indicators for APO members and other economies in the Asia-Pacific. Moreover, the total factor productivity (TFP) estimates in this edition were improved based on considerations of land capital and labor quality changes. TFP estimates were expanded to cover a wider range of economies.

The APO is grateful for the collaborative efforts of the Keio Economic Observatory research team of Keio University, Tokyo. The inputs of all contributors who helped develop the productivity database and databook were valuable. The APO will continue working with its members and their national statistics offices to improve data quality. It is hoped that the 2019 APO Productivity Databook will be a useful reference on current and future productivity status in the region, thus contributing to better policymaking in the APO membership and other economies in an increasingly interconnected world.

Dr. AKP Mochtan
Secretary-General
Asian Productivity Organization
Tokyo, September 2019

1 Introduction

1.1 Databook 2019

In this twelfth edition in the *APO Productivity Databook* series, a useful reference is provided for the quality of economic growth and productivity, which are comparable across countries at different development stages in Asia. Productivity gains enable an economy to produce more for the same amount of inputs, or to consume less to produce the same amount of outputs. These gains are the only route to sustainable economic growth in the long run. Thus, it follows that monitoring and improving national productivity capability are important targets of public policy. Additionally, we develop the projections of economic growth and labor productivity improvements of Asian countries through 2030.

Asia is a diverse regional economy in which countries have embarked on their own journey of economic development at different times and different paces. In this edition of the Databook, baseline indicators on economic growth and productivity are calculated for 30 Asian economies, representing the 20 Asian Productivity Organization member economies (APO20) and the 10 non-member economies in Asia. The APO20 consists of Bangladesh, Cambodia, the Republic of China (ROC), Fiji, Hong Kong, India, Indonesia, the Islamic Republic of Iran (Iran), Japan, the Republic of Korea (Korea), the Lao People's Democratic Republic (Lao PDR), Malaysia, Mongolia, Nepal, Pakistan, the Philippines, Singapore, Sri Lanka, Thailand, and Vietnam. The 10 non-member economies in Asia are: the Kingdom of Bhutan (Bhutan), Brunei Darussalam (Brunei), the People's Republic of China (China), Myanmar, and the Gulf Cooperation Council (GCC) consisting of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE). In addition, Australia, the European Union (EU), Turkey, and the United States (US) are included as reference economies. This edition covers the period from 1970 to 2017.

This is a joint research effort between the APO and the Keio Economic Observatory (KEO), at Keio University, Tokyo, since September 2007. In this edition of the Databook, the growth accountings are developed for the 24 Asian economies (Asia24) – the APO20 plus Bhutan, Brunei, China, and Myanmar – along with the US as a reference economy. In the Asia24, the sources of economic growth in each economy are further decomposed to factor inputs of capital and labor and total factor productivity (TFP). It is a notable achievement that the estimates on TFP for Bhutan are newly included in this edition of the Databook, by extending the growth accounting framework developed at KEO within the project of UNDESA (2016).

The productivity measures in the Databook are based on the official data and our own estimates collated for the APO Productivity Database 2019. In the Asia24, the System of National Accounts 2008 (2008 SNA) by United Nations (2009) has been introduced in 16 economies, partially or fully. Because the varying SNA adaptions among the economies can result in discrepancies between data definitions and coverage, data harmonization is necessary for comparative productivity analyses. The Databook attempts to reconcile these national account variations which are based on the different concepts and definitions. This is done by following the 2008 SNA and providing harmonized estimates for better international comparison.

To analyze the overall productivity performance, as well as productivity subsets (e.g., capital productivity and labor productivity), the Databook constructs the estimates of capital services, which provides an appropriate concept of capital as a factor of production, as recommended in the 2008 SNA. To take the composition change of assets into account, the current database classifies 15 types of assets, including IT capital and R&D. Four types of land are newly considered as capital inputs in this edition, based on the land database which has been developed at KEO since 2017 covering the Asia24 economies. A consideration of land capital makes major revisions to growth accountings in some Asian economies like Hong Kong, Japan, Korea, Singapore, and ROC.

Another major revision in this edition is a consideration of labor quality changes in growth accounting for the Asia24 economies. At KEO, the project to develop a comprehensive labor database on number of workers, hours worked per worker, and hourly wages (which are cross-classified by gender, education attainment, age, and employment status), has been conducted since 2013. The first report of this data (the Asia QALI Database) was reported in Nomura and Akashi (2017) for six South Asian countries. The use of the Asia QALI Database enables us to identify the impact of labor quality changes from the TFP estimates. It should be noted that the TFP estimates in this edition, which are measured with considerations of land capital and labor quality changes, are not directly comparable with the estimates in the past editions.

The structure of the Databook is as follows. The recent trends in global and regional economic growth and the summary of findings are presented in Chapter 2. In order to understand the dynamics of the long-term economic growth within Asia, Chapter 3 details countries' diverse development efforts and achievements through cross-country level comparisons of GDP. Decompositions of GDP, which is defined by three approaches in SNA – production by industry, expenditure on final demand, and income to factor inputs – are valuable in understanding the structure and, in turn, the behavior of an economy. Chapter 4 presents the demand side decomposition, analyzing the sources of countries' expenditure growth.

In Chapter 5, the supply side decompositions of economic growth and productivity improvement are analyzed in each country and region. This chapter also provides data on energy productivity performance to reflect the impending need to improve energy efficiency as a policy target for pursuing sustainable growth. The different compositions of economic activity among countries is one of the main sources of the vast gap in average labor productivity at the aggregate level. The industry structure is presented in Chapter 6. Chapter 7 analyzes the income side of GDP by measuring the growth of real income and evaluating an improvement, or deterioration, in the terms of trade.

Finally, Chapter 8 profiles of productivity indicators for the APO20 economies and five regions. This is a new inclusion in response to reader request. In addition to the printed pages here, some figures and tables published in the past editions have been updated with current data and can be found in the Online Appendix of APO Productivity Databook 2019, which will be in public at the APO website.

The official national accounts and metadata information used for constructing the APO Productivity Database 2019 has been collected by the national experts in APO member economies and research members at KEO. The names of these contributors are listed in Section 1.2. The submitted data was then examined and compiled at KEO, where further information was collected on labor, production, prices, trades, and taxes, as required. Readers should consider that international comparisons of economic performance are never a precise science. Instead, they are fraught with measurement and data comparability issues. Operating within a reality of data issues, some of the adjustments in the Databook are necessarily conjectural, while others are based on assumptions with scientific rigor. Despite best efforts in harmonizing data, some data uncertainty remains.

This edition effectively reflects the revisions to the official national accounts and other statistical data published through May 2019 and the population prospects published in June 2019 by the United Nations (2019). The project was managed by Koji Nomura (Keio University), under the consultancy of Professor Dale W. Jorgenson (Harvard University) and Professor W. Erwin Diewert (University of British Columbia), and with coordination by Huong Thu Ngo (APO). The text, tables, and figures of this edition were authored by Koji Nomura and Fukunari Kimura (Keio University), with support from research assistants Hiroshi Shirane, Shiori Nakayama, Naoyuki Akashi, Kei Okamoto, and Takahisa Saruta. The

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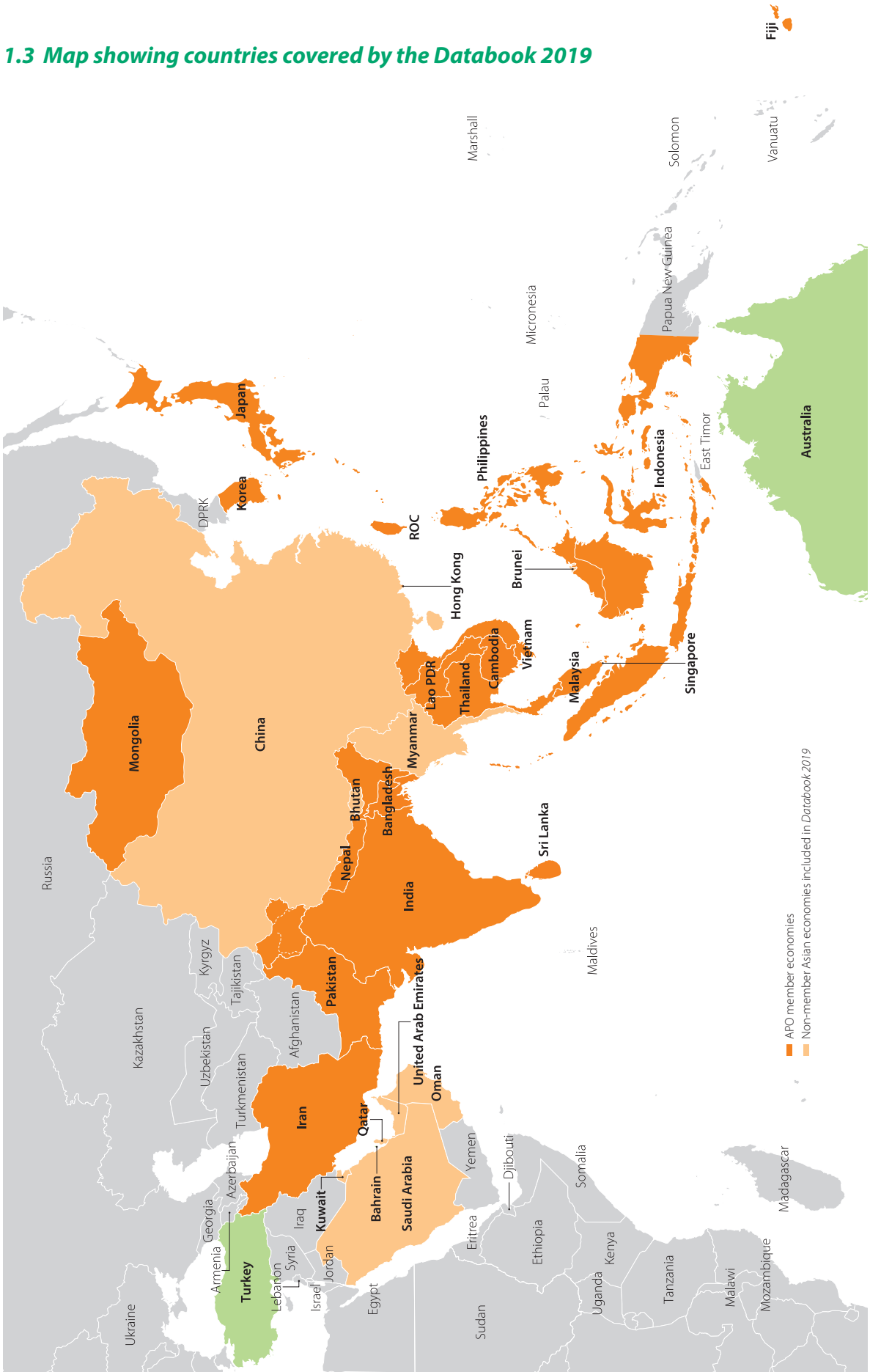
1.3 Map showing countries covered by the Databook 2019



2 Economic Trends

Although the worldwide trade turmoil introduced uncertainty for the future, 2018 ended with a sustained growth in the world economy. The US economy continued to show a good performance, and the EU was on track for recovery. Steady economic growth was achieved in most of the Asian developing economies. Since 2012, after bouncing back from the "trade collapse" due to the Global Financial Crisis, a period of so-called "slow trade" followed, in which the growth of international trade became slower than the growth of the gross national product in the world. However, the trend ended in 2016 with a recovery of trade growth, together with increases in resource prices from the bottom.

As 2018 drew to an end, international trade showed signs of contraction due to the trade turmoil. Worry has mounted about the future of international trade due to the US Trump Administration administering aggressive trade policies in 2018. The US-China trade war was escalated, which gradually degraded the rule-based international trade regime. The growth performance of Asia was still overall strong. In Asia 30 and East Asia, the average annual growth of GDP at constant prices in 2015–2017 was 5.3% and 5.2%, respectively. The growth slowdown in China has proceeded gradually. Latecomers in ASEAN, India, and other Asian developing countries sustained rapid growth.

Advanced economies remain in good shape. The US economy performed well – the average annual growth of GDP at constant prices in 2015–2017 in the US was 1.9%. The unemployment rate dropped to 3.6% in April 2019, which is very low by the US standard. Tax cuts by the Trump Administration have created an optimistic atmosphere for investors at least in the short run. The European economy also presented significant recovery. The economic growth of Northern and Eastern Europe was encouraging. The average annual growth rate of GDP in 2015–2017 in EU15 and EU28 was 2.1% and 2.2%, respectively. The Japanese economy also performed well, though its potential growth rate stayed on the low side. The annual growth of GDP in 2015–2017 in Japan was 1.3%, with an unemployment rate was as low as 2.4% in April 2019.

Although the growth slowdown continued, China achieved 6.6% in the average annual growth of GDP in 2015–2017. Drastic reform in the domestic economy continues. Korea, heavily depending on the Chinese economy, also slowed down with the Chinese economy, having still 3.0% growth in 2015–2017. Latecomers in ASEAN, Cambodia, Laos, and Myanmar, have continuously grown in the past two decades, reaching $1,440, $2,470, and $850 in the per capita GDP using exchange rate in 2017, respectively. To achieve sustained economic growth these countries must engage in international production networks more deeply. "Thai plus one" investment in machinery parts producers that set up fragmented satellite factories off Thailand showed recent signs of slowing. Vietnam achieved deeper involvement in international production networks and had $2,420 per capita GDP using exchange rate in 2017. However, the ratio of manufacturing value added to GDP was17.0% in 2017, and the development of supporting industry and industrial agglomeration is for a near-term hope.

The Philippines and Indonesia are in the process of forming efficient industrial agglomeration with $3,010 and $3,930 in the per capital GDP using exchange rate in 2017. Thailand, Malaysia, and Singapore reached $6,760, $9,820, and $60,000 in the per capita GDP using exchange rate in 2017, though they struggled with the industrial upgrading and the formation of new development strategies. Although the South Asian countries have not fully taken advantage of international production networks, some have been successful in hooking up with slow global value chains in labor-intensive industries such as garment and footwear. The per capita GDP using exchange rate in 2017 in Nepal, Bangladesh, Pakistan, and India was $1,040, $1,520, $1,510, and $1,940, respectively.

Now the major focus of concern is on the trade turmoil. This would seriously affect not only the US and China but also other countries, especially newly developed and developing countries. In the following, the context of the current trade turmoil is summarized, and its potential effects on newly developed and developing countries are discussed.

A series of US trade policies under the Trump Administration are problematic from the viewpoint of the rule-based trading regime. The revision of their existing free trade agreements (FTAs) such as the South Korea-US FTA (KORUS) and the North American FTA (NAFTA) includes several measures inconsistent with the spirit of the World Trade Organization (WTO). The usage of Section 232 of the US Trade Expansion Act of 1962 and Section 301 of the US Trade Act of 1974 is another concern. Not only these unilateral measures by the US but also several retaliation or counterbalancing measures by other countries are prone to being inconsistent with the WTO policy discipline.

Starting in June 2018, the US-China trade war has escalated. A series of tit-for-tat tariff impositions were implemented, and now a large portion of bilateral trade between the US and China facing tariffs. The Huawei issue is potentially more dangerous because it is unclear why Huawei is excluded from the business. The direct effect of the trade war on the US and Chinese economies is obvious. Both economies will suffer. China has a bilateral trade surplus and a high trade GDP ratio, and thus the downward trend of economic growth may be accelerated. The US economy cannot stay immune. Users of Chinese products including consumers will increasingly feel the cost.

One must also consider the effect on the third-party countries. This effect would be the opposite to a case of regional economic integration. Consider a simple model with three countries, A, B, and C. If country A and country B form a free trade agreement (FTA), what happens to country C? One possible effect is trade diversion. Because of the FTA, exports by country C may be replaced by the trade between country A and country B and thus may be reduced; this effect is negative for country C though such an effect would be small empirically. Second, the FTA may expand the economic activities as a whole, and thus country C may also get some benefits. This is so-called a trade creation effect. In the case of the US and China trade war, exactly the opposite would happen. The third-party countries such as ASEAN may have a slight positive trade diversion effect but it is likely to suffer from a negative trade creation effect due to the contraction of the world economy. Indeed, we are observing some positive trade diversion effects in ASEAN. Vietnam is attracting some investment diverted from China. Thailand is receiving foreign direct investment by Chinese firms. The third-party countries do not have to be hesitant in taking advantage of such trade diversion effects because the utilization of such opportunities is actually good for the world economy. However, such positive effects are likely to be small at the macro level.

Recent economic forecasts by international organizations such as the International Monetary Fund (IMF) and the WTO seem to keep a conservative tone. Due to the current trade turmoil, the world trade as well as the world economy may slow down its growth, though the magnitude of the negative force would be relatively small. However, we must be careful that such forecasts do not fully reflect dynamic effects. With the enhanced uncertainty, investment necessary for reformulating global value chains may move slowly. East Asia heavily depends on international production networks, or the second unbundling, which is not favorable to uncertainty. Overall negative effects in the dynamic context may be significant. If such negative shocks affect asset markets, the trade turmoil may trigger another major economic crisis.

Another concern is in the context of longer term, i.e., possible collapse or weakening of a rule-based trading regime. A rule-based trading regime consists of three elements: the multilateral channel centered by the WTO; regional trade agreements such as FTAs and customs unions; and individual country's trade policy. The WTO is imposing a certain level of policy discipline on the other two channels by showing what can be done and what should not take place. Such a function of the WTO has recently shown a sign of serious weakening. Some trade economists imagine the worst scenarios including "the WTO minus one ("one" is certainly the US)" or "the world without the WTO."

There are two major issues on the WTO. The first is a very urgent one, the Appellate Body issue. The Appellate Body is the upstairs portion of the WTO two-tier dispute settlement system. Although it is

supposed to have seven judges, there are only three judges now, and the terms of two of the three will expire in December 2019. For the Appellate Body to function, there must be at least three judges. The US has been blocking new or repeated appointments of judges. If the US does not do appointments, the Appellate Body will stop operating at the end of this year, which would substantially weaken the dispute settlement system.

The second issue is with the WTO as a negotiating forum. The failure of the Doha Development Agenda put old issues such as agriculture on the shelf, and it is now very difficult to get an agreement from all members on the initiation of new rule making. "Multilateral," which means including all WTO members, is certainly an ideal approach for rule making, but we have found serious difficulties in this channel. Therefore, some flexibility must be introduced in the negotiation format, which includes multilateral with different speed, plurilateral (which means only a subset of WTO members would participate) or gathering of like-minded countries.

New rule making is urgent at two fronts. One is the rule to incorporate newly developed countries into the rule-based trading regime. China and other newly developed countries by now have become very influential in the world economy, and we must accommodate them in the ordered system. The other is the rule to respond to digital technology.

The weakening of the rule-based trading regime may last long-term. Even if President Trump is not reelected, some fundamental conditions would remain. The first is that populism and protectionism are deeply rooted and are likely to stay for long in some developed countries. The second is the rise of newly developed countries. The third is persistent global imbalances, which may trigger some political action. The fourth is the weakening of the WTO. These conditions are likely to stay far beyond the US President.

The implication for the newly developed and developing countries is profound. For example, consider a tariff. Roughly speaking, 75% of the world trade is under the most-favored-nations (MFN) tariffs guaranteed by the WTO. The remaining 25%, are under FTAs, customs unions, the generalized system of preferences, and others. Of the MFN tariff-based trade, 60% are with zero tariff. Most of the newly developed and developing countries heavily depend on MFN tariffs. Once we lose the WTO and power politics dominates trade policy, we may not be able to rely on MFN tariffs anymore. Many newly developed and developing countries have been riding on the coattails of the multilateral trade system and have sat back in the discussion on the WTO reform. The sense of urgency is now essential on this issue.

Meanwhile, as a partial countermeasure, mega-FTA initiatives without the US have shown progress. The Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP or TPP11) signed by 11 countries in March 2018 was validated by six signatories on December 30, 2018. Vietnam followed after a delay. CPTPP sets the high standard of trade and investment liberalization as well as presenting a starting point of new international rule making. A number of countries including Colombia, Thailand, Indonesia, and the United Kingdom formally (or informally) announce their interest in the accession to CPTPP. The Japan-EU Economic Partnership Agreement was also signed in July 2018 and went into effect on February 1, 2019. Negotiations over the Regional Comprehensive Economic Partnership (RCEP) by ten countries in ASEAN, China, Japan, South Korea, Australia, New Zealand, and India are in the works, though different levels of ambition on liberalization have made a quick agreement difficult so far.

Mega-FTAs can be policy channels for deeper liberalization and more advanced rulemaking than a multilateral channel. They also show the intention of supporting the rule-based trading regime. If the WTO would wither substantially, mega-FTAs might become a partial substitute of it in order to keep a stable and predictable trade environment. Newly developed and developing countries must become more proactive in engaging mega-FTA initiatives.

Lastly, regulations on the flow of data and data-related businesses have also become a source of international friction. Big players in the world, the US, the EU, and China, seem to be developing quite different policy systems, and experts fear possible division of the cyberspace with firewalls in the near future.

Currently, the policy regime is highly fragmented across countries. One issue is that data-related policies lack consideration on economic efficiency. The examples are policies related to privacy protection and cybersecurity. Those are of course very important, but we should reconcile those values with economic efficiency. Another issue is that policy purposes are not often explicitly stated, and thus the economic reasoning of policy is unclear. For example, policies on large internet platformers tend to pursue multiple objectives including competition policy, cybersecurity, privacy protection, taxation, and others. At the end, it becomes difficult to properly assess the policies. Consequently, some protectionism tends to sneak in such policies as a hidden intention.

In this regard, G20 Japan 2019 adopted an important concept "Data Free Flow with Trust (DFFT)." It sets the free flow of data as a logical starting point and tries to organize a series of policies that address various economic and social concerns for nurturing "trust." One important step is to recognize the benefit from the flow of data for economic development. Digital technology has two faces: information technology (IT) and communication technology (CT). IT represented by robots, artificial intelligence, industry 4.0 basically speeds up data processing, reduces the number of tasks, replaces humans with machines, and thus generates concentration forces for economic activities. We may observe so-called "reshoring," which means that production blocks would go back from newly developed and developing countries to advanced countries. On the other hand, CT such as the internet, smartphones, and 4G/5G overcomes geographical distance, encourages the division of labor, and therefore generates dispersion forces. As for IT, newly developed and developing countries may have hard time keeping and attracting production blocks in their territory unless they make a substantial effort to seek the complementarity between robots and local resources. On the other hand, CT has already penetrated their economy and society. CT facilitates their access to information, match-making opportunities, and B-to-B/B-to-C/C-to-C transactions. Although the provision of internet platforms requires a certain level of human resources such as entrepreneurs and computer programmers, anybody can become an internet user. CT would potentially generate opportunities to make economic growth inclusive. The key is the flow of data. Data-related policies, particularly in newly developed and developing countries, are still immature and fragmented. The construction of a proper policy framework is an urgent agenda item for those countries.

It is important to have the free flow of data as a starting point and rightly appreciate economic benefits from it. Then, the issue is how to achieve "trust"; think of the real concern if the flow of data is free. One of the typical concerns is economic. Once market failure occurs, we may need to consider policies to mitigate the market distortion. This category of policies includes competition policy, consumer protection, intellectual property protection, and others. Another concern is social. We certainly have values different from economic efficiency, and policies to reconcile them. This includes privacy protection, cybersecurity, and other social consideration. Additionally, a series of policies to incorporate data-related businesses into regulatory framework are needed, which includes taxation, regulation on e-payments, fintech, and matching services, system of information disclosure, and due process for governments to step into private information. In this way, data related policies can be properly planned and implemented.

Although numerous difficult issues remain, we can logically approach the construction of a policy package with the concept of DFFT. The initiative for e-commerce by like-minded countries under the WTO must be supported. In parallel, other various international forums must be utilized to promote proper policy formulation related to data flows and data-related businesses.

3 Economic Growth

Highlights

- The economic scale of the Asia30 is 27.6 trillion US dollars in 2017 in terms of exchange-rate-based GDP, which is 42% larger than the US (Table 8). Japan was the largest economy in Asia until 2010, when China overtook Japan's position to become the largest economy in Asia (Figure 3).
- In terms of PPP-based GDP, the Asia30 is 2.7 times that of the US in 2017 (Figure 5). In this measure, China has overtaken Japan as the largest Asian economy since 1999 and the US since 2013. India surpassed Japan, replacing it as the second largest economy in Asia in 2009. In the same period, the ASEAN also surpassed Japan (Table 9).
- The economic growth rate of the Asia30 is 5.3% per year on average in 2015–2017 (Figure 6 and Table 10). The growth in China and India account for 50% and 22% of this regional growth, respectively. (Figure 7).
- Average per capita GDP of the Asia30 is $13,900 in 2017, which is still 23% of the US level (Table 13). Chinese per capita GDP has increased to $16,800 in 2017, 21% greater than the Asia30 average. The regional averages of the ASEAN6, South Asia, and CLMV are $14,700, $6,630, and $6,100, respectively, in 2017 (Figure 11). A huge per capita GDP gap between most of the Asian countries and the US is predominantly explained by their inferior performance of labor productivity (Figure 14).

In the past quarter of a century, the story of the world economy belonged to Asia, featuring its steady rise in economic prowess (Figure 1). It is no surprise that the center of gravity in the global economy is gradually shifting towards Asia. In 2017, the Asian economy contributed 48% (42% for the Asia24) of world output, compared with the US and the EU28, each accounting for 15% and 16%, respectively, as shown in Figure 2. According to our projection for the Asia24 economy and that in IMF (2019) for the rest of the world, the Asian share in world output will continue to rise, reaching 52% (46% for the Asia24) by 2024.[1] In contrast, the output shares of each of the US and the EU28 will shrink by a similar extent to 14–15%.

To better understand the dynamics of the long-term economic growth within the region, the remainder of this chapter details countries' diverse development efforts and achievements, through cross-country level comparisons of GDP and other related performance indicators. To facilitate international level comparisons, harmonized GDP for each of the individual countries is expressed in its equivalent, in a common currency unit, customarily in the US dollar, using a set of conversion rates between the individual national currencies. The choices for conversion rates are exchange rate and PPP.

3.1 Economic Scale and Growth

Figure 3 presents the time-series level comparison of Japan, China, and the EU, based on GDP at current market prices using exchange rates,[2] relative to the US. A snapshot-level comparison of all Asian countries is provided in Table 8 in Appendix 10 (p. 163). By this measure, in 2017 the Asia30 was 42% and

1: Our projection of economic growth for the Asia24 are provided in Box 6. Based on our baseline projection, the Asia24 will increase its GDP by 4.7% per year in 2017–2024, lower than the IMF forecast of 5.1% per year in the same period.

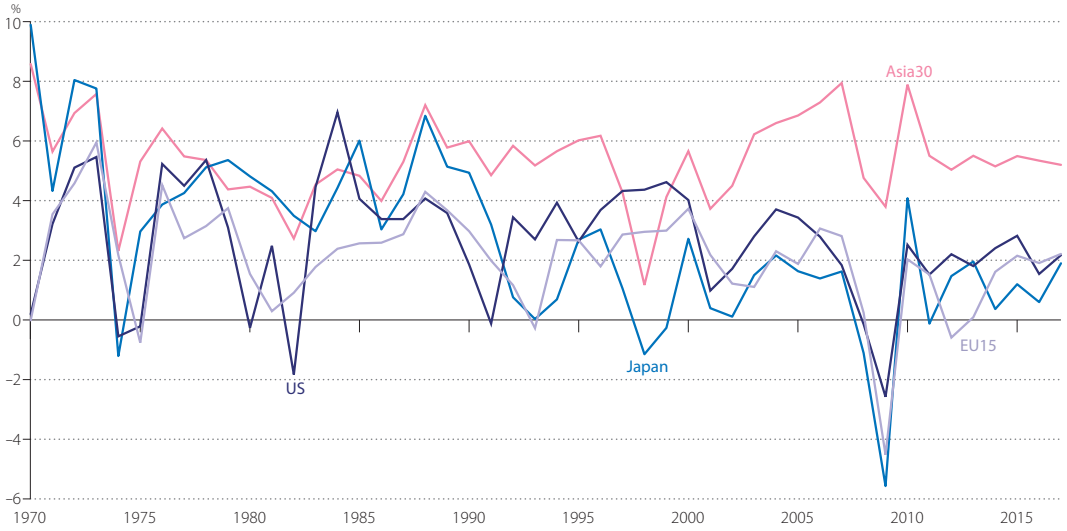


Figure 1 GDP Growth of Asia, the EU, Japan, and the US
——Annual growth rate of GDP at constant market prices in 1970–2017

Sources: Official national accounts in each country, including author adjustments.

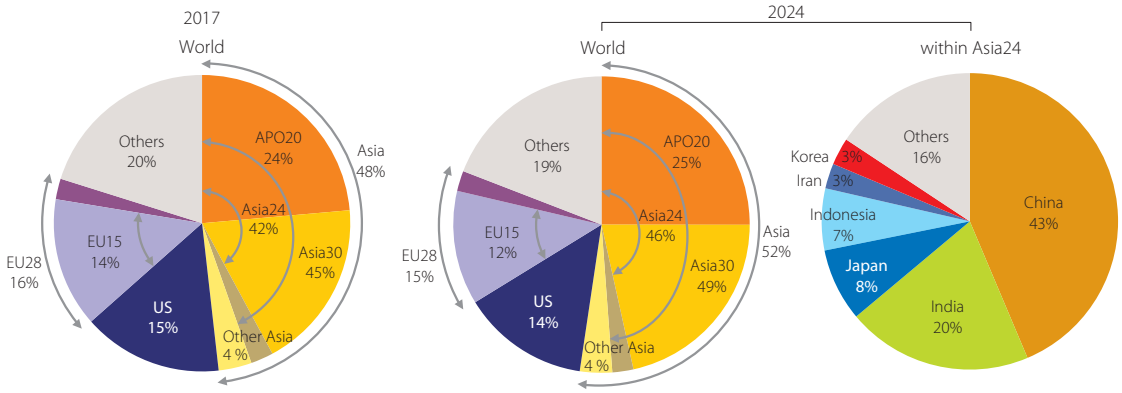


Figure 2 Asia in World GDP in 2017 and Projection for 2024
——Share of GDP using constant PPP

Sources: Our estimates for the Asia24 economies (Box 6) and IMF (2019) for the rest of the world.

48% larger than the US and the EU15, respectively. Japan was the largest economy in Asia until 2010 when China finally overtook Japan's position to become the second-largest economy in the world, next to the US. The turn of Japan's fortune came in the mid-1990s. Thereafter, stagnation in Japan, combined with vibrant growth in developing Asia, resulted in the rapid erosion of Japan's prominence in the regional economy.

2: The exchange rates used in this *Databook* are the adjusted rates, which are called the Analysis of Main Aggregate (UNSD database) rates in the UN Statistics Division's National Accounts Main Aggregate Database. The AMA rates coincide with the IMF rates (which are mostly the annual average of market, or official exchange rates) except for some periods in countries with official fixed exchange rates and high inflation, when there could be a serious disparity between real GDP growth and growth converted to US dollars based on IMF rates. In such cases, the AMA adjusts the IMF-based rates by multiplying the growth rate of the GDP deflator relative to the US.

Comparisons based on exchange rates, however, appear arbitrary as movements in exchange rates can be volatile and subject to short-term or substantial fluctuations of speculative capital flows and government intervention. Furthermore, comparisons based on exchange rates typically underestimate the size of a developing economy and, in turn, the perceived welfare of its residents. The scale of economy ranking changes dramatically when international price differences are taken into account.[3]

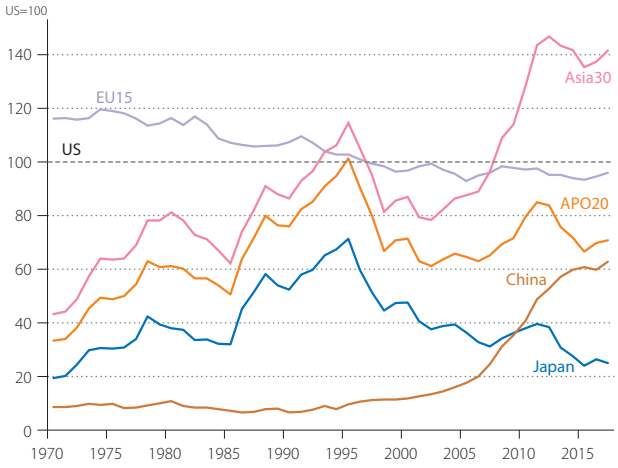


Figure 3 GDP using Exchange Rate of Asia and the EU, Relative to the US

——Index of GDP at current market prices in 1970–2017, using annual exchange rate

Sources: Official national accounts in each country, including author adjustments.

Figure 4 shows the extent to which the exchange rates have failed to reflect countries' price differentials properly, relative to the US, based on the PPP estimates of the 2011 International Comparisons Program (ICP) round, published in April 2014. Except for Japan and Australia, exchange rates systematically underrepresent the relative purchasing power in 2011 for all the countries covered in this report. Thus, the exchange-rate-based GDP considerably underestimates the economic scales in real terms for those countries. By considering the international price differentials, PPP rectifies the trade sector bias, and in turn the relative size of economies can be more adequately measured.

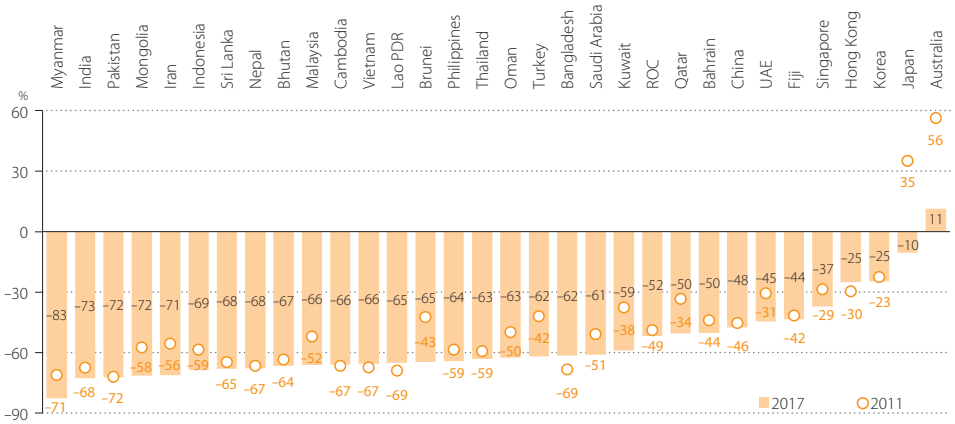


Figure 4 Price Differentials of GDP

——Price Level Index for GDP defined as the ratio of PPP for GDP to exchange rate (reference country=US) in 2011 and 2017

Sources: PPP by World Bank (2014) and AMA rates by United Nations Statistics Division (UNSD).

3: This is because exchange rates embody the trade sector bias (i.e., it is more influenced by the prices of traded than non-traded goods and services) and thus do not necessarily succeed in correcting the price differentials among countries. As developing economies tend to have relatively lower wages and, in turn, lower prices for non-traded goods and services, a unit of local currency has greater purchasing power in the local economy than reflected in its exchange rate.

By correcting international price differentials, the Asia30 has been expanding rapidly. Figure 5 presents the level comparisons of real GDP for Asian regions, using PPP as conversion rates, while Table 9 in Appendix 10 (p. 164) presents cross-country comparisons. Based on GDP using constant PPP, the weight of the world economy is even more tilted toward Asia in Figure 5 than portrayed by GDP using exchange rates in Figure 3. This reflects the fact that nearly all Asian countries increase in relative size after international price differentials have been properly considered. The size of the Asia30 was 2.7 times that of the US in 2017, having overtaken it in 1975. Figure 5 also shows the rapid expansion of the relative size of the South Asian economy (consisting of Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka), 82% of which was accounted for by India in 2017. The ASEAN also showed strength in their catch-up effort.

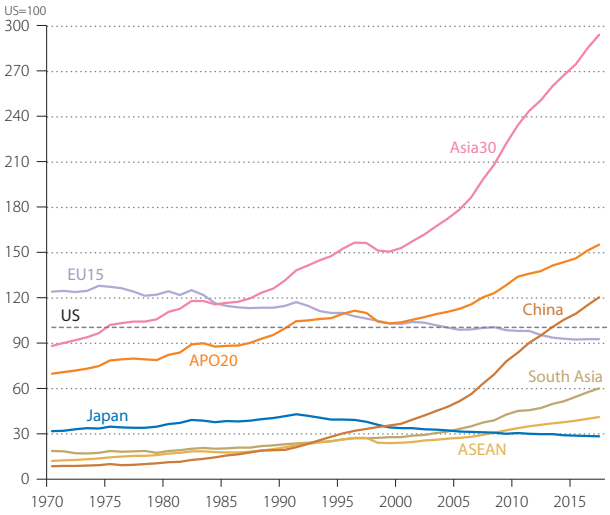


Figure 5 GDP of Asia and the EU, Relative to the US
——Index of GDP at constant market prices in 1970–2017, using 2011 PPP

Sources: Official national accounts in each country, including author adjustments.

Figure 6 shows regional comparisons of real GDP growth, while Table 10 in Appendix 10 (p. 165) presents cross-country comparisons. The change of guards in Asia is clearly illustrated in Figure 7, which presents the country contributions to gross regional products in the Asia30. China and India have emerged as the driving force, propelling Asia forward since 1990. The growth in China and India accounts for 72% of the regional growth in 2015–2017.

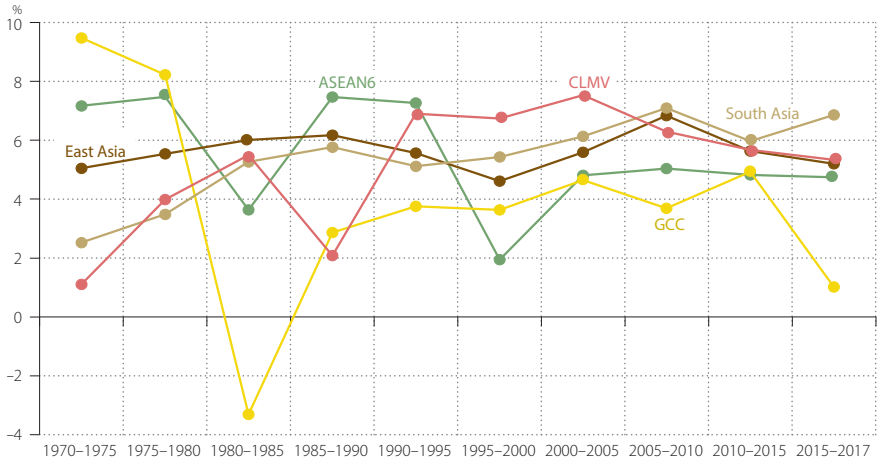


Figure 6 GDP Growth by Region
——Annual growth rate of GDP at constant market prices in 1970–2017, using 2011 PPP

Sources: Official national accounts in each country, including author adjustments.

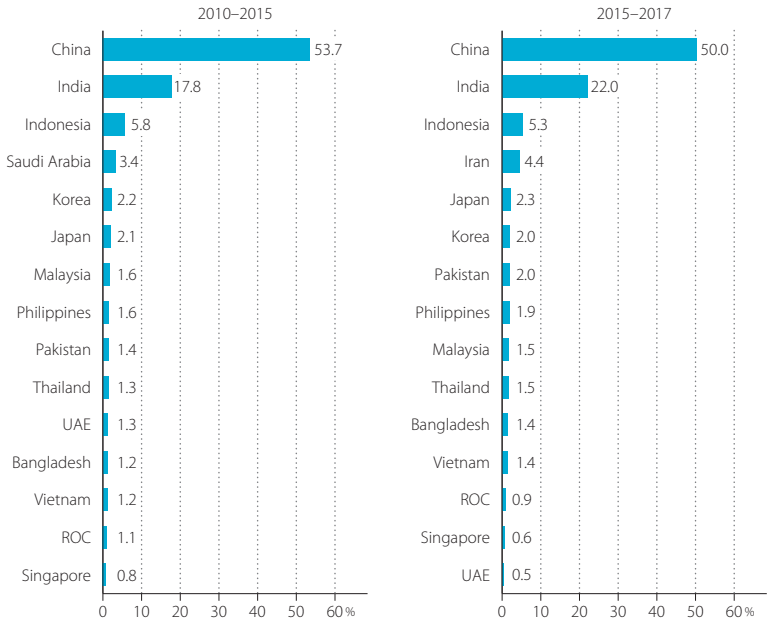


Figure 7 Country Contributions to GDP Growth of Asia
——Contribution share to the growth of gross regional products (the Asia30 growth=100) in 2010–2015 and 2015–2017

Sources: Official national accounts in each country, including author adjustments.
Note: Only top fifteen countries are presented.

3.2 Catching Up in Per Capita GDP

Figure 8 presents the share of the current world population, illustrating that Asia is the most populous region in the world. In 2017, the population of Asia accounted for 60% of the world's population (56% for the Asia30). In addition, there is a significant difference in the population among Asian economies, as shown in Table 11 in Appendix 10 (p. 166). The population of seven countries populations was in excess of 100 million in 2017, but the populations were less than 10 million in 12 economies of the Asia30. Performance comparisons based on the whole-economy GDP in Section 3.1 do not take into account the population, which can exaggerate the wellbeing of countries with large populations. Based on per capita GDP, which adjusts for the differences in population, China and India, two rising giants in the Asian economy, remain substantially less well-off in light of the US standard. Conversely, the Asian Tigers (Hong Kong, Korea, Singapore, and the ROC) thrive.

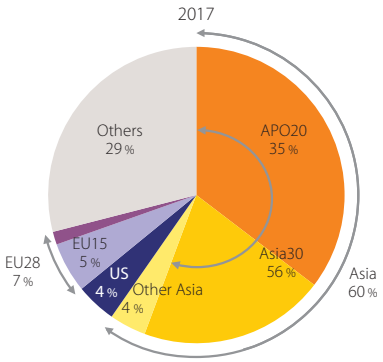


Figure 8 Asia in World Population
——Share of number of populations in 2017

Source: IMF (2019).

Figure 9 shows comparisons of per capita current-price GDP, using exchange rates as conversion rates, among Japan and the Asian Tigers, relative to the US. A snapshot-level comparison is also presented in Table 12 in Appendix 10 (p. 167). It is worth noting that snapshot comparisons can appear arbitrary due to the volatile nature of exchange rates.

The views found in Table 12 are considerably revised when focusing on production or real income per capita, using PPP as the conversion rate. In terms of per capita GDP at constant prices using PPP in Figure 10 and Table 13 in Appendix 10 (p. 168), Japan was the highest among Asian countries until it was overtaken by Singapore in 1980. The result highlights the outcome of the dramatic development effort made by the Asian Tigers, as shown in Figure 10.

The relative performance of China and India, the two most populous countries in the world (1.39 billion and 1.34 billion in 2017, respectively, as presented in Table 11 in Appendix 10, p. 166), is diminished in this measure due to their population. Their per capita GDP is 28% and 12% of the US in 2017, respectively, as shown in Figure 11. The income gap between the US and most Asian countries is still sizable (the level achieved by the Asia30 was 23% of the US),[4] indicating a significant opportunity for catch-up.

Table 13 in Appendix 10 (p. 168) also presents individual figures for seven oil-rich economies (the six GCC countries and Brunei). At first glance, figures in 1970, and those to a lesser extent in 1990, suggest these economies had remarkably higher per capita GDP than those of Japan and the US. However, the measurement of GDP as an indicator of production is misleading for these countries, as it erroneously includes proceeds from the liquidation of a natural resource stock as part of the income flow. In other words, GDP overestimates income from the oil-exporting economies because it does not account for depletion of their natural resource assets. To give a rough

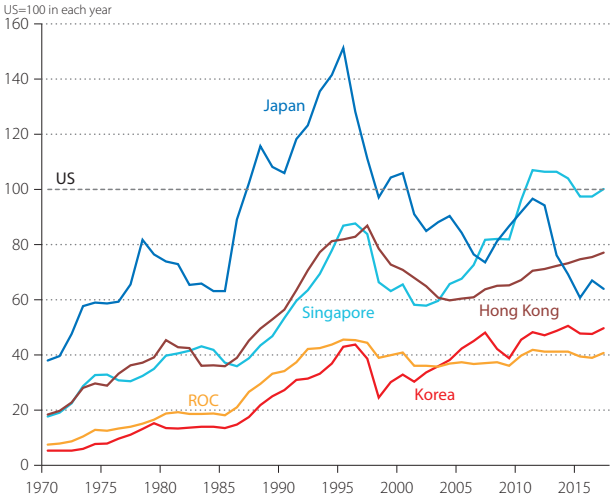


Figure 9 Per Capita GDP using Exchange Rate of Japan and the Asian Tigers, Relative to the US
——Index of GDP at current market prices per person in 1970–2017, using annual average exchange rate

Sources: Official national accounts in each country, including author adjustments.

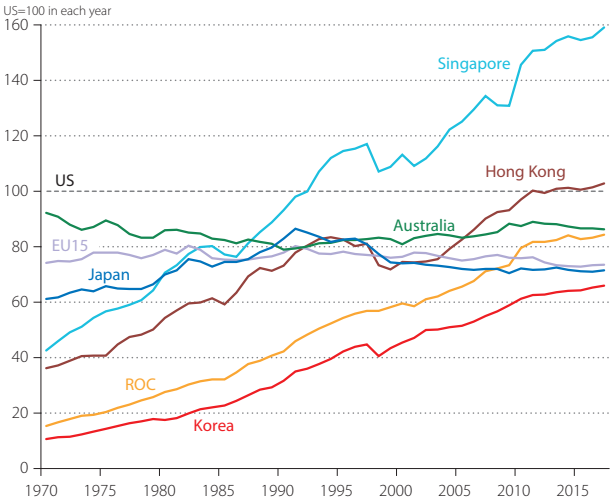


Figure 10 Per Capita GDP of Japan and the Asian Tigers, Relative to the US
——Index of GDP at constant market prices per person in 1970–2017, using 2011 PPP

Sources: Official national accounts in each country, including author adjustments.

4: Per capita GDP may have underestimated the welfare of people in some countries. In the ROC, Hong Kong, and Japan, for example, GNI is consistently higher than GDP although the fluctuations are within +6%. The Philippines is the exception where the divergence between GNI and GDP has been increasing and has become significant for the past two decades, and GNI was more than 30% higher than GDP in the 2010s (See Figure 71 in Section 7.1, p. 87).

indication of the extent of distortion, Figure 12 provides comparisons of per capita GDP excluding production of the mining sector (e.g., crude oil and natural gas). The non-mining GDP per person in GCC economies, such as the UAE, Bahrain, and Kuwait, is almost identical to Japan's level, although total GDP per capita is much larger. In Iran and Malaysia, the dependence on the mining sector is more moderate than those in GCC in this period. In Myanmar, however, the mining sector accounts for more than half of the current GDP.

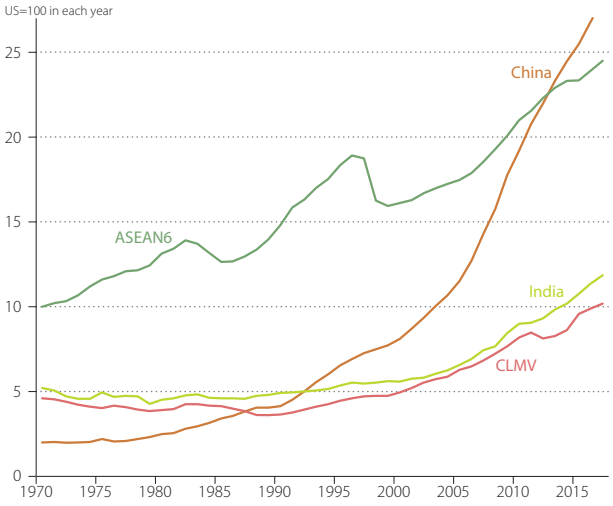


Figure 11 Per Capita GDP of China, India, and the ASEAN, Relative to the US
——Index of GDP at constant market prices per person in 1970–2017, using 2011 PPP

Sources: Official national accounts in each country, including author adjustments.

Catching up with the per capita GDP level of advanced economies is a long-term process that could take several decades to accomplish. Empirical evidence suggests there may be a negative correlation between per capita GDP level and the speed of catching up, with some exceptions. With the possibility of adopting successful practices and technologies from the more advanced economies, less advanced economies are poised to experience faster growth in per capita GDP, enabling themselves to catch up to average income levels. However, as their income levels approach those of the more advanced countries, their economic growth rates are expected to gradually decline over time. Figure 13 plots countries' initial per capita GDP levels against their respective average growth rates per year between 1970 and 2017.

Table 1 summarizes Figure 13 by grouping countries with four levels of per capita income groups. The speed of catch-up with the US is defined as the difference in the average annual growth rate of per capita real GDP between each country and the US. It shows that many Asian countries have managed to close the gap in per capita real GDP with the US over the last four decades, although some are more successful than others. One can see the initial economic level does not fully explain the catch-up process. If it did, the table would have been populated diagonally from the bottom left corner to top right corner.

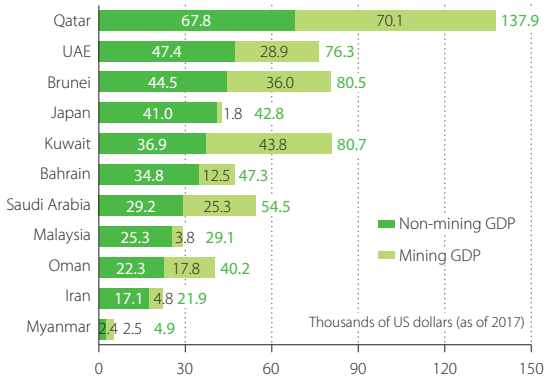


Figure 12 Per Capita Non-Mining GDP of Resource-Rich Countries and Japan
——GDP at constant market prices per person in 2017, using 2011 PPP, reference year 2017

Sources: Official national accounts in each country, including author adjustments.

Table 1 Country Groups Based on the Initial Economic Level and the Pace of Catching Up
——Level and average annual growth rate of per capita GDP at constant market prices, using 2011 PPP

Per capita GDP level in 1970, relative to the US	Average annual rate of catch-up to the US during 1970–2017					
	(A6) <–1%	(A5) –1% ≤–< 0%	(A4) 0% ≤–< 1%	(A3) 1% ≤–< 2%	(A2) 2% ≤–< 3%	(A1) 3% ≤
(B1) 60% ≤	Bahrain, Brunei, Kuwait, Qatar, Saudi Arabia	Australia, EU15, UAE	Japan, Oman			
(B2) 20% ≤–< 60%		Iran	Turkey		Hong Kong, Singapore	
(B3) 10% ≤–< 20%		Fiji	Philippines	Mongolia	Malaysia, Thailand	ROC, Korea
(B4) 0% ≤–< 10%			Bangladesh, Cambodia, Nepal, Pakistan	India, Lao PDR, Myanmar, Sri Lanka	Bhutan, Indonesia, Vietnam	China

Sources: Official national accounts in each country, including author adjustments.
Note: The annual catch-up rates are based on the difference in the growth of per capita GDP at constant prices between each country and the US during 1970–2017.

3.3 Sources of Per Capita GDP Gap

To further understand the diverse performance in the Asian group, per capita GDP can be broken into two components: labor productivity (defined as real GDP per worker in this section); and the employment rate (defined as the ratio of workers relative to the population). Figure 14 shows the percentage point differences in per capita GDP decomposed into the contributions by the labor productivity gap and the employment rate gap, relative to the US in 2017.[5] Most of the Asian countries display a huge per capita GDP gap with the US. This is predominantly explained by their inferior performance of labor productivity. Many countries in East Asia have employment rates higher than the US, with the effect of narrowing the gap. Figure 15 focuses on explaining a country's per capita GDP growth by its components: namely labor productivity growth; and the change in the employment rate for the period 2010–2017, respectively.[6] For most countries, labor productivity explains a larger share of per capita GDP growth than employment.

In Muslim countries like Iran, Pakistan, and Turkey, the employment rate is significantly less than the US, further reinforcing the poor economic performances of these countries (Figure 14). It is no coincidence they are among the countries with the lowest shares of female workers in total employment, at 16%, 21% and 31% in 2017, respectively, as shown in Figure 16. In many Asian countries the shares of female employment have increased over the four decades.

5: The gap of country x's per capita GDP relative to the US is decomposed into the sum of the gap of labor productivity and employment rate with respect to the US, as in:
$\underbrace{\ln\left(GDP_x^t / POP_x^t\right) - \ln\left(GDP_{US}^t / POP_{US}^t\right)}_{\text{Gap of per capita GDP}} = \underbrace{\ln\left(GDP_x^t / EMP_x^t\right) - \ln\left(GDP_{US}^t / EMP_{US}^t\right)}_{\text{Gap of labor productivity}} + \underbrace{\ln\left(EMP_x^t / POP_x^t\right) - \ln\left(EMP_{US}^t / POP_{US}^t\right)}_{\text{Gap of employment rate}}$
where POP_x^t is population of country x in period t and EMP_x^t is the number of employment of country x in period t.

6: Country x's per capita GDP is decomposed into the product of its labor productivity and employment rate, as in:
$\underbrace{\ln\left(GDP_x^t / POP_x^t\right)}_{\text{Per capita GDP}} = \underbrace{\ln\left(GDP_x^t / EMP_x^t\right)}_{\text{Labor productivity}} + \underbrace{\ln\left(EMP_x^t / POP_x^t\right)}_{\text{Employment rate}}$ where POP_x^t is population of country x in period t and EMP_x^t is the number of employment of country x in period t.

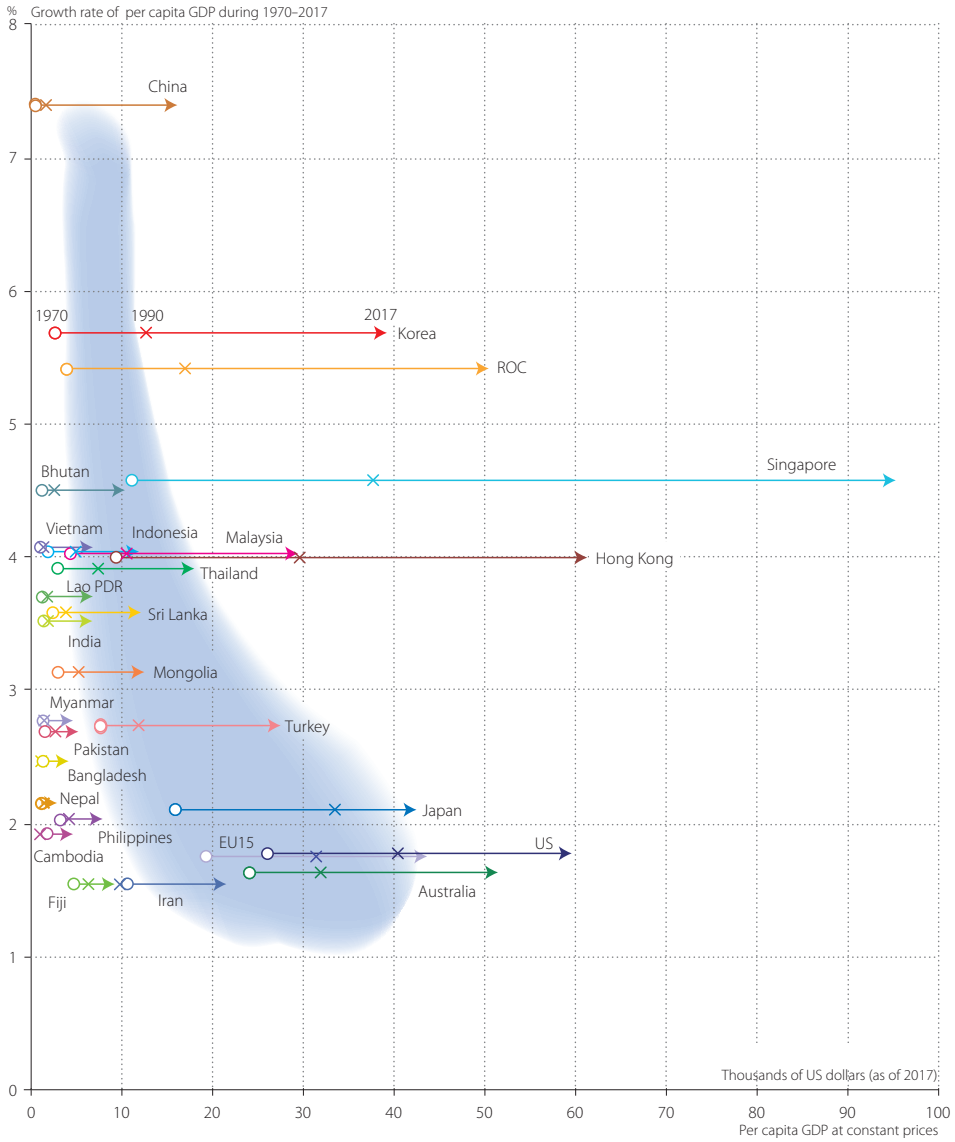


Figure 13 Initial Level and Growth of Per Capita GDP
——Level and average annual growth rate of GDP at constant market prices in 1970–2017, using 2011 PPP, reference year 2017

Sources: Official national accounts in each country, including author adjustments.

Figure 17 shows cross-country comparisons of employment rates in 1970, 2000, and 2017, based on the labor statistics of each country. Employment consists of employees, own-account workers, and contributing family workers. The fastest catch-up countries are also countries with the largest surge in employment rates over the past four decades: China, Korea, Cambodia and the ROC. Some of the countries in Group–A2 (Table 1) also experienced significant improvements in employment rates (for example, Indonesia and Vietnam). While there are exceptions, generally countries that have failed to catch up also tend to make less vigorous improvements over the period, and therefore continue to have lower employment rates.

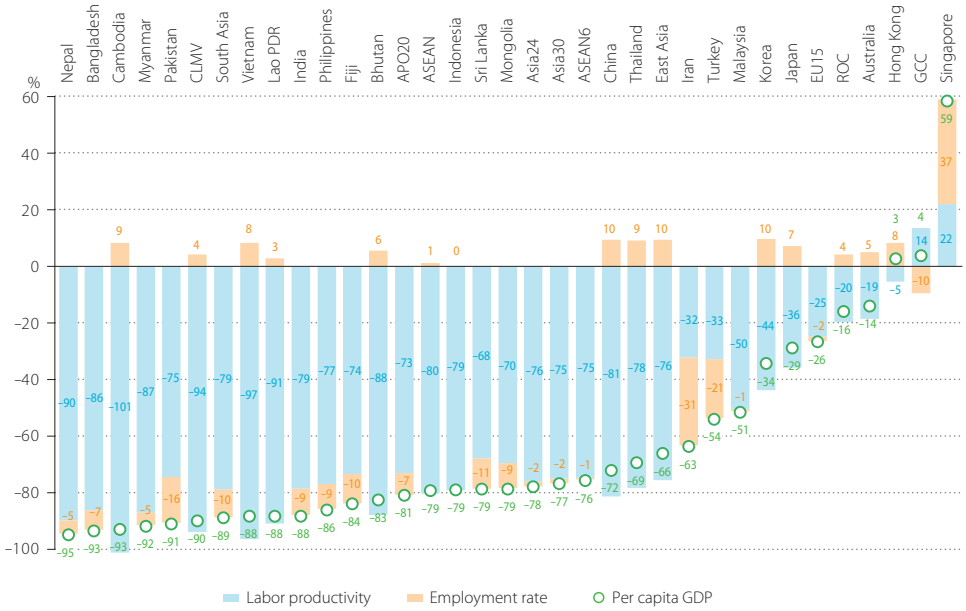


Figure 14 Sources of Per Capita GDP Gap
——Percentage point differentials in per capita GDP at constant prices in 2017, relative to the US

Sources: Official national accounts in each country, including author adjustments.

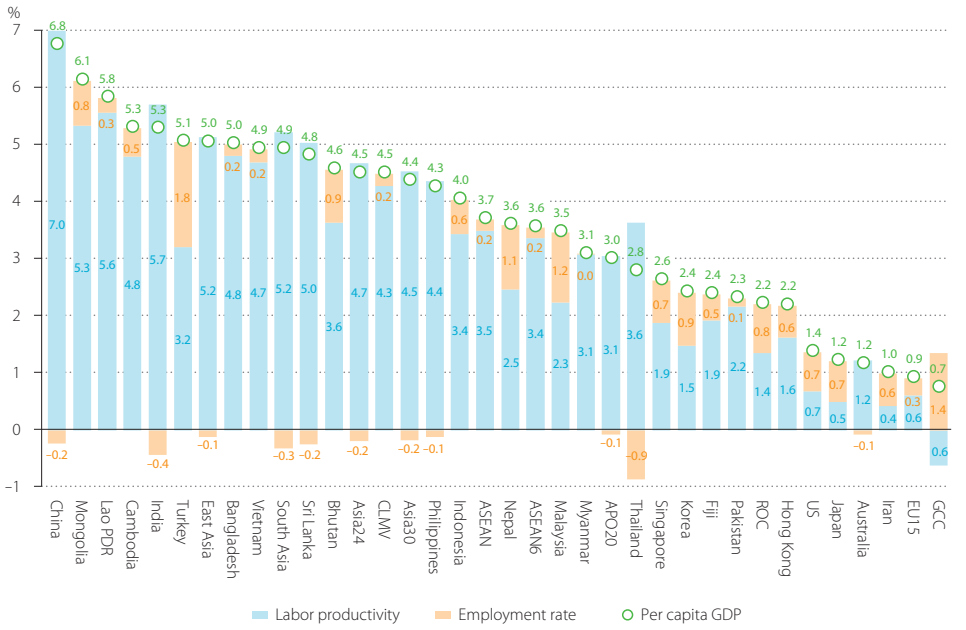


Figure 15 Sources of Per Capita GDP Growth
——Average annual growth rate of per capita GDP at constant prices in 2010–2017

Sources: Official national accounts in each country, including author adjustments.

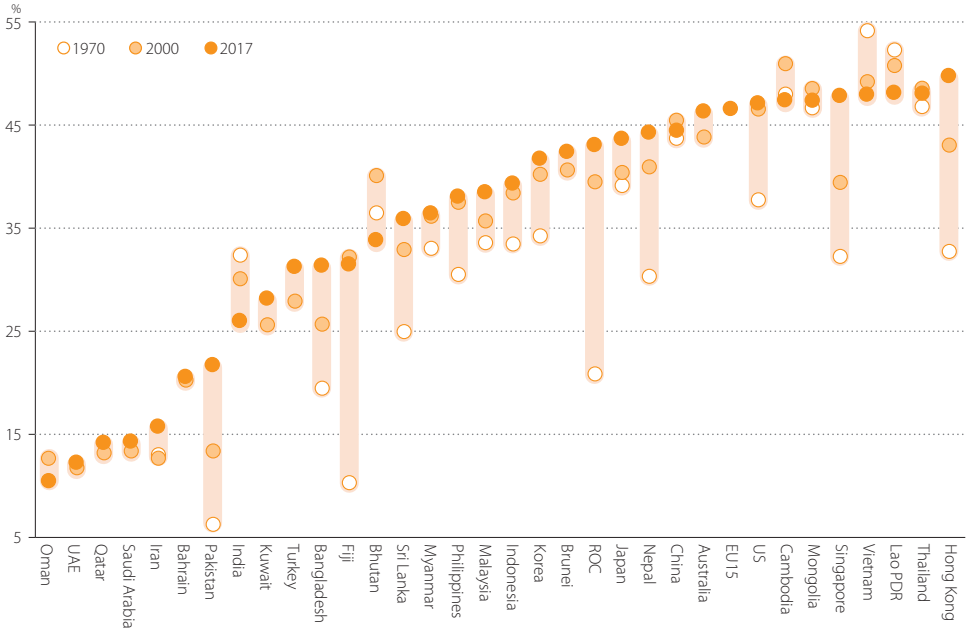


Figure 16 Female Employment Share
——Ratio of female workers to total employment in 1970, 2000, and 2017

Sources: Population census and labor force survey in each country, including author adjustments; ILOSTAT database for GCC countries, Australia, Brunei, and Turkey; The EU Labour Force Survey (Eurostat) for the EU15.

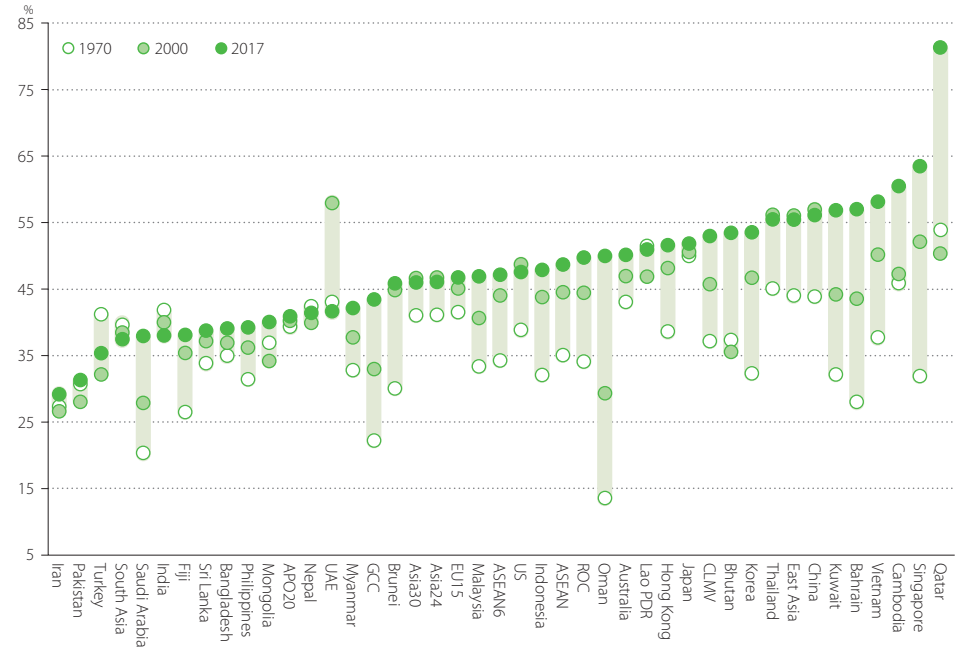


Figure 17 Employment Rate
——Ratio of employment to total population in 1970, 2000, and 2017

Sources: Employment and population data by national statistical offices in each country, including author adjustments.
Note: The starting period for Turkey is 1988.

Box 1 Population and Demographic Dividend

According to the United Nations (2019), the world's population is estimated to reach 7.6 billion in 2017, of which Asian countries account for 60%. The region is by far the most populous in the world. China and India each account for 18.8% and 17.8% of the world's population, respectively. It has been observed that falling fertility rates and rising living standards go hand in hand, although the direction of causality is less certain. The evolution of the demographic structure implies dynamics in a society that are not captured by the overall population size or growth. As people's economic behavior, aspirations, and needs vary at different stages of life, changes in a country's age structure can have a significant impact on its economic growth via supply-side and demand-side impacts (see Cooley and Henriksen, 2018).

The world's fertility rate is converging to the replacement level (the level at which a country's population stabilizes). According to the UN, the number of children a woman is expected to have in her reproductive years has dropped by more than half, from about 5.0 to 2.5 in the last 65 years, compared to the replacement level of 2.2 children, one of them a girl. There is regional divergence in this trend. In the last 65 years, the total fertility rate dropped from about 6.8 children to 2.4 in Central America, and from about 5.6 children to 1.7 (below the replacement level), in East Asia. In comparison, some parts of Africa have seen only a modest drop in total fertility, which today remains at more than five children per woman. What is even more staggering is the pace of change. For example, it took Britain over 130 years (1800–1930) to halve its fertility rate, while it took Korea only 20 years to achieve it. This is echoed around the world. This widespread social revolution has been heralded by a complex mix of economic and social development. Economic growth, greater access for women to education, income-earning opportunities, and sexual and reproductive health services, all have been contributing factors to this trend. Coupled with changes in the mortality rate, such a trend can dramatically alter the age profile of a country's population, bringing with it economic implications.

The growth rate of the world's population has slowed from its peak of around 2.0% in the 1970s to today's 1.1% per year. With falling fertility rates, the UN projects the world's population growth rate will decelerate to 0.50% per year by 2050 and further to 0.03% by 2100. Even so, the world population will still increase by one-third from today's 7.6 billion to 9.7 billion in 2050 and a further 12% to 10.9 billion by 2100. These estimates are based on the medium-fertility variant, but with only a small variation in fertility, particularly in the more populous countries, the total could be higher (10.6 billion by 2050 and 15.6 billion in 2100) or lower (8.9 billion in 2050 and 7.3 billion in 2100). Figure B1.1 depicts this shift in the distribution of the world population with the share from the more developed regions gradually declining from 17% in 2015 to 13% in 2050 and 11% in 2100, compared with 32% in 1950. Conversely, the share of the least developed countries is depicted as rising from today's

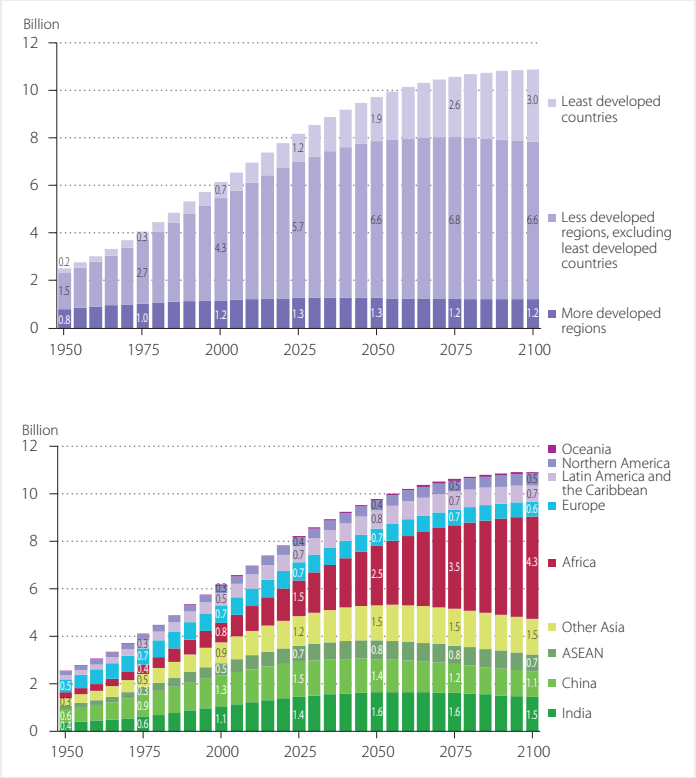


Figure B1.1 Distribution of the World's Population in Different Regions in 1950–2100

Source: United Nations (2019).

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13% to a projected 19% in 2050 and 28% in 2100, up from 8% in 1950.

According to the projection, Asia's share will decline from its 60% today to 54% in 2050 and 43% in 2100, while Africa's share will rise from today's 16% to 26% and 39%, respectively. Figure B1.2 shows the current population size of individual Asian countries compared with the 1970 level and its 2050 projection. As can be seen from the chart, China's population is expected to stabilize around the current level. China has socially engineered the change with its one-child policy, which has made its current population 300–400 million lower than it would have been otherwise. In less than two decades, India is projected to overtake China as the most populous country in the world.

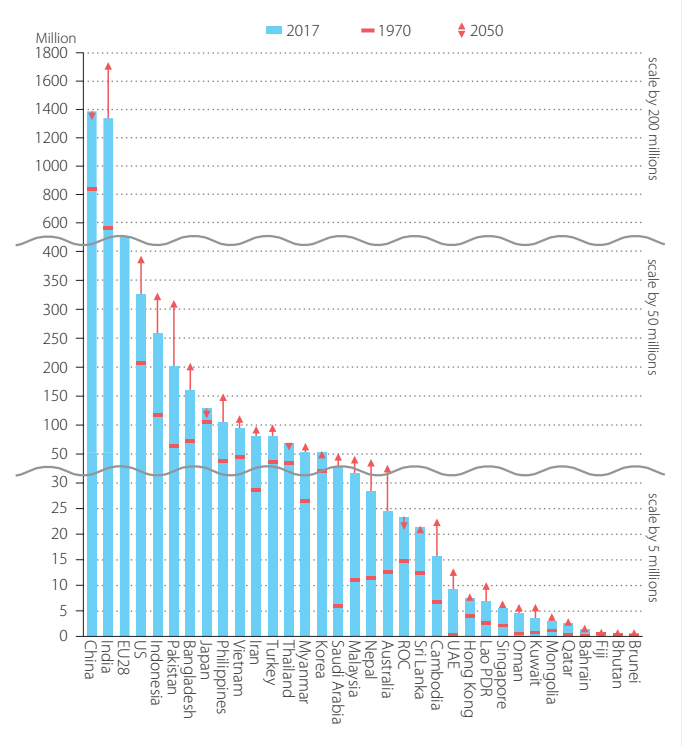

Figure B1.2 Asian Countries' Population Size and Projection in 1970, 2017, and 2050

Source: United Nations (2019).

Figure B1.3 shows the demographic make-up of countries in 2017 (the population proportions of the under-15 and over-65 age groups, which together make up the dependent population). Ranking the countries by the share of old-age population filters the rich economies to the top end. These economies also have a relatively low share of the young-age group compared to less developed countries. This suggests that demographic transition tends to run parallel with economic progress, although the direction of causation is not certain. As countries move from high to low mortality and fertility rates, the demographic transition produces a "boom" generation that is larger than those immediately before and after it. As this boom generation gradually works through a nation's age structure, it produces a demographic dividend of economic growth as people reach their prime.

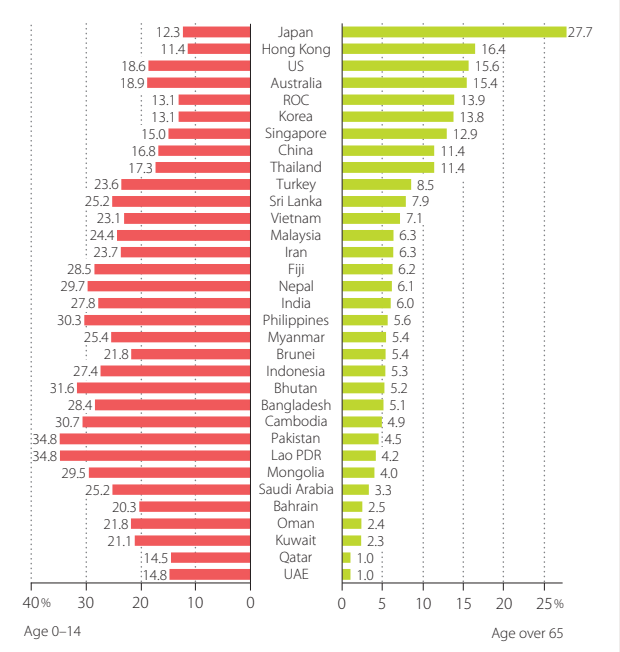

Figure B1.3 Proportion of the Dependent Population in 2017

Sources: Population census and official national accounts in each country.

Using demographic data since 1950 and UN projections up to 2100, Figures B1.4 and B1.5 track changes in the ratio of the working population (aged 15–64) to dependent population (aged under 14 and over 65) by country and by country

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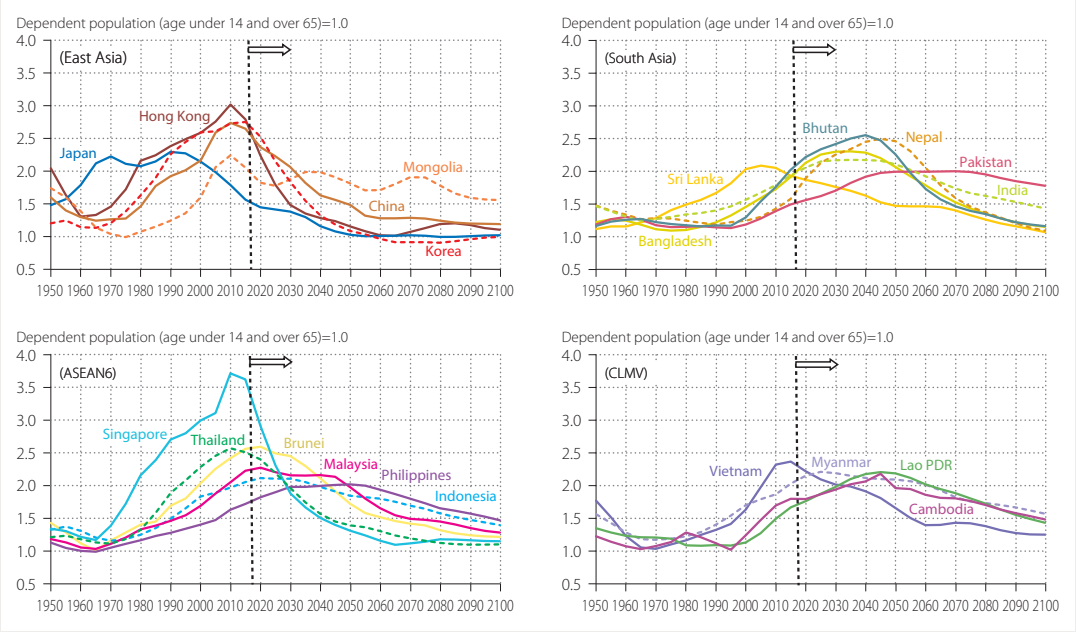

Figure B1.4 Demographic Dividend by Country in 1950–2100

Source: United Nations (2019).

group, respectively. The higher the ratio, the more favorable its demography for economic growth. Japan could have capitalized on the demographic dividend in the 1960s, when its GDP growth was over 10% on average per year for ten years. Similarly, China, Hong Kong, Korea, Singapore, and Thailand are poised for the prospect of such demographic dividend in the 2000s and 2010s, whereas, based on projections, some ASEAN countries, such as Myanmar and Indonesia will have to wait for such opportunity until the 2020s and 2030s, and South Asian countries (except Sri Lanka) until the late 2030s and 2040s.

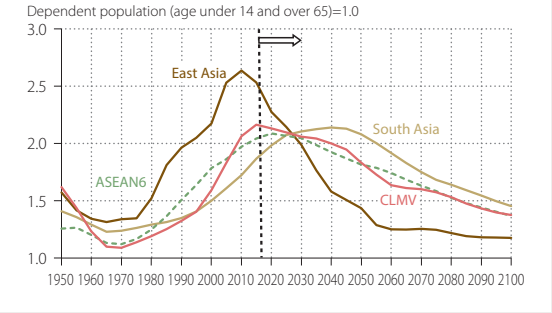

Figure B1.5 Demographic Dividend by Country Group in 1950–2100

Source: United Nations (2019).

The reaping of this dividend, however, is far from automatic. A favorable demography can work wonders to produce a virtuous cycle of wealth creation only if it is combined with appropriate health, labor, financial, human capital, and growth-enhancing economic policies. The presence of these complementary factors cannot be taken for granted but needs to be cultivated in order to earn the demographic dividend. As the analysis of the Databook shows, the contribution of labor to economic growth has been smaller than those of capital and TFP for most countries (Figure 40 in Section 5.3, p. 54). This means that countries should not be afraid of aging too much if fairly high growth rates of capital and TFP are maintained. Nevertheless, understanding the demographic shift and its implications is highly relevant for economic projections, providing valuable foresight for economic policy making. In our projection of economic growth by 2030 (Box 6), the changes in demographic structure play an important role to forecast not only hours worked for the whole economy, but also quality changes in labor inputs.

4 Expenditure

Highlights

- The Asia30 invested 34% of its GDP in 2017, compared with 21% for the US. East Asia has the highest investment ratio (38%) among the Asian regions (Figure 18), driven by China's higher investment share of 44% (Figure 19). The consumption ratio of the Asia30 has dropped to 50% of GDP in 2017 from 54% in 2000 (Figure 18 and Table 14).
- As a composition of investment, the expansions of IT capital and R&D are becoming more significant in some Asian countries. In region, the shares of IT investment and R&D for the Asia24 are 5.2% and 4.8% in 2017, respectively, compared to 17% and 14% of the US (Figure 25).
- Net export shares in GDP are unremarkably large in Singapore and ROC, at 24.4% and 12.7% in 2017, respectively. In contrast, it peaked at 8.7% in 2007 in China and 12.2% in 2005 in Hong Kong. Since then, they have shrunk to 1.9% and 1.1% in 2017, respectively (Figure 26).
- The growth of household consumption is the main engine of demand-side economic growth, contributing 51% of the regional growth of the Asia30 in 2010–2017. Investment is another engine, contributing 30% of the Asia30 growth (Figure 20).

GDP is defined by three approaches in SNA: production by industry; expenditure on final demand; and income to factor inputs. In this chapter, the economic insights are drawn from analyzing the expenditure side of GDP.

4.1 Final Demands

Figure 18 shows comparisons of final demand shares of nominal GDP among country groups, covering (1) household consumption, including consumption of non-profit institutions serving households (NPISHs), (2) government consumption, (3) investment or, in national accounts terminology, gross fixed capital formation (GFCF) plus changes in inventories, and (4) net exports (exports minus imports).[7] One can see that country groups display distinctive features in their final demand composition, reflecting their development stage and economic makeup.

Over the past four decades, the share of household consumption has been stable for mature economies. In economies undergoing rapid transformation, however, it is more volatile and largely trends downward (Figure 18 and Table 14). Within Asia, all regions except GCC display a decline in household consumption ratios. South Asia maintains the highest share, despite its fall from 76% in 1970 down to 64% in 2017. The rapid decreasing trends are also found in CLMV. In contrast, the US household consumption share has been climbing.[8]

7: The country comparisons are presented in Table 14 in Appendix 10 (p. 169). In theory, three approaches to measure GDP are accounting identities and should yield the same result, but in practice, they differ by statistical discrepancies. Based on our Metadata Survey 2019 on national accounts for APO member economies, Japan is an exceptional country that determines GDP from its expenditure-side measurement (the expenditure-side estimate is based on the commodity flow data, in which the data on production/shipment in the detail product classification are used as the controlled totals.). In other countries, GDP is estimated from the production side (value added in industries). Some countries record statistical discrepancy as the difference in the estimates between production-based GDP and the sum of final expenditures. In this Databook, statistical discrepancy is mainly attributed to household consumption when data is recorded. Readers should keep in mind that it can have some impact on the share of final demand.

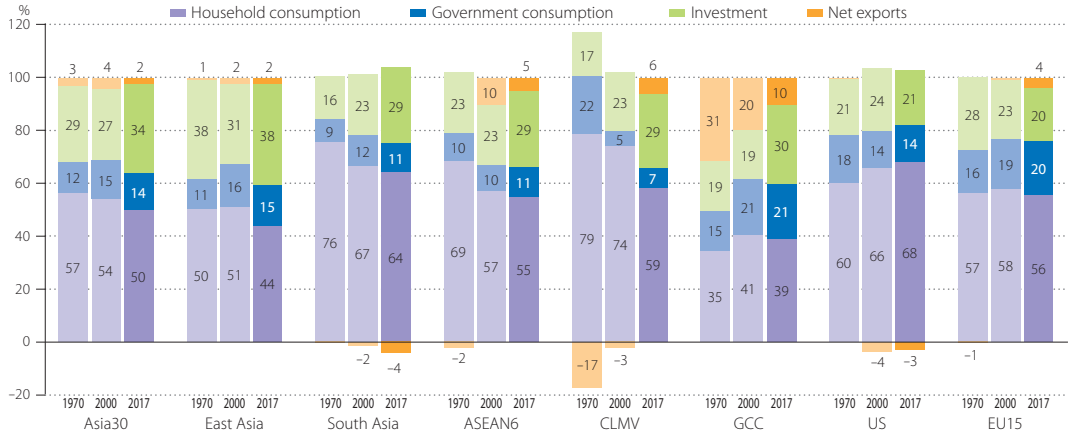

Figure 18 Final Demand Shares by Region
——Share of final demands with respect to GDP at current market prices in 1970, 2000, and 2017

Sources: Official national accounts in each country, including author adjustments.
Note: Final demand shares in country groups are computed by using the PPPs for GDP. Household consumption includes consumption of NPISHs. Investment includes GFCF plus changes in inventories.

Overall, Asian countries invest significantly more than the US and the EU15 as a share of GDP. In 2017 investment accounted for 21% and 20% of final demand in the US and the EU15, respectively, compared with 34% for the Asia30. East Asia has the highest investment ratio among the Asian regions in the entire period of our observation. Compared to other components of final demand, the contribution of net exports to the Asian economy has always been more volatile.

The regional averages disguise the great variation displayed by individual countries. Figure 19 shows the cross-country comparisons of final demand share in current-price GDP in 2017. Countries are arranged in descending order of their household consumption shares. Although most countries fall to the right of the US, there are a handful of Asian countries that have a higher consumption ratio than the US. Bangladesh, Cambodia, Nepal, Pakistan, the Philippines, and Sri Lanka fell to the left of the US in 2017, regardless of much lower per capita GDP level in these countries.

Figure 20 shows the decomposition of the average annual economic growth by final demand for the period 2010–2017.[9] While the growth of household consumption is the main engine of economic growth in many countries, investment growth contributes 30% of the growth of the Asia30. The large contribution of investment has sustained in China at 45% in 2010–2017. Bhutan is another country with a strong driver of investment at 46% of average annual growth (6.6%) in 2010–2017. This is due to massive investment in hydropower plants, mainly financed by India.

8: It is worth noting that the GDP share of government consumption in the EU15 was higher than the average of the Asia30 by 6.2 percentage points in 2017 (Table 14 in Appendix 10, p. 169). In fact, when it comes to welfare measurement, actual individual consumption, as opposed to household consumption, is preferred because the former takes into account expenditures by NPISHs and government expenditures on individual consumption goods and services (such as education and health) in addition to household consumption.

9: The Törnqvist quantity index is adopted for calculating the growth of real GDP. Using this index, the growth of real GDP into the products of contributions by final demands can be decomposed:
$\underbrace{\ln\left(GDP^{t} / GDP^{t-1}\right)}_{\text{Real GDP growth}} = \underbrace{\sum_i (1/2)\left(s_i^{t} + s_i^{t-1}\right) \ln\left(Q_i^{t} / Q_i^{t-1}\right)}_{\text{Contribution of final demand } i}$ where Q_i^t is quantity of final demand i in period t and s_i^t is expenditure share of final demand i in period t. Thus, the real GDP growth may diverge from the official estimates or those presented in Table 10 (Appendix 10, p. 165).

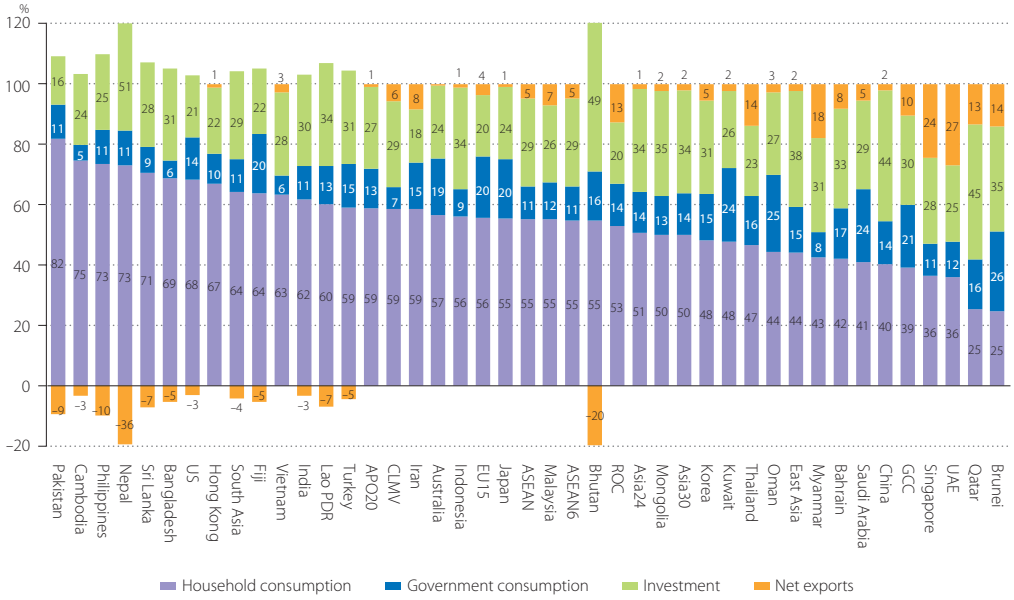

Figure 19 Final Demand Shares in GDP by Country
——Share of final demands with respect to GDP at current market prices in 2017

Sources: Official national accounts in each country, including author adjustments.
Note: Household consumption includes consumption of NPISHs. Investment includes GFCF plus changes in inventories.

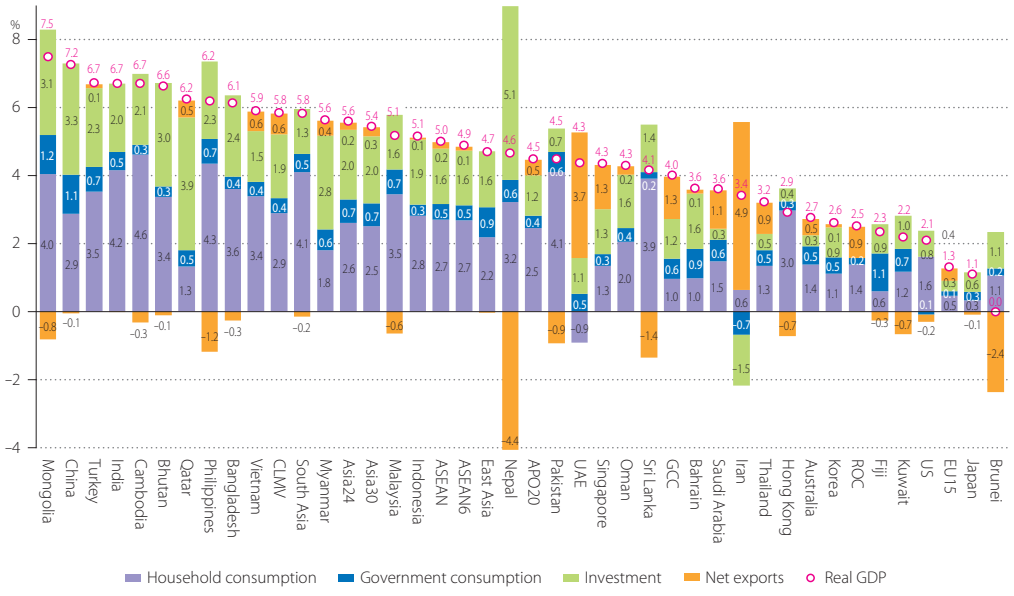

Figure 20 Final Demand Contributions to Economic Growth
——Average annual growth rate of constant-price GDP and contributions of final demands in 2010–2017

Sources: Official national accounts in each country, including author adjustments.

4.2 Demand Compositions

The high consumption rate in these countries could be partly explained by the difference in demographic structure. Figure 21 shows that countries with a high proportion of dependent population (aged under 14 and over 65) tend to have a high household consumption share in their GDP. This is reflected by higher propensity to consume by individuals in the dependent population, and their savings-consumption choices. These countries, i.e., Bangladesh, Cambodia, Nepal, Pakistan, and the Philippines, have higher shares of dependent population with over 34% in 2017. The variation of consumption rates is also related to the income level. Countries with a low income will struggle to defer consumption. It is no coincidence that countries clustered on the left of Figure 19 tend to be those in the bottom income groups in terms of per capita GDP in Figure 14 in Section 3.3 (p. 28).

The decomposition of household consumption reveals a huge diversity of consumption patterns among individual countries, partly reflecting their income levels and partly the idiosyncratic characteristics of the society. Figure 22 illustrates the cross-country version of Engel's Law, which states that basic necessities will account for a high proportion of household consumption for a lower per capita income group, and vice versa. More specifically, countries where food and non-alcoholic beverages account for a large proportion of consumption tend to have low income (i.e., in Group–D5 or Group–D6 in Table 2 in Section 6.1, p. 68). The other end of the spectrum is occupied by the rich Asian countries, namely, the Asian Tigers and Japan. Besides food and non-alcoholic beverages, housing/utilities and transportation are the other two large spending categories. In rich economies, these two categories account for larger shares in

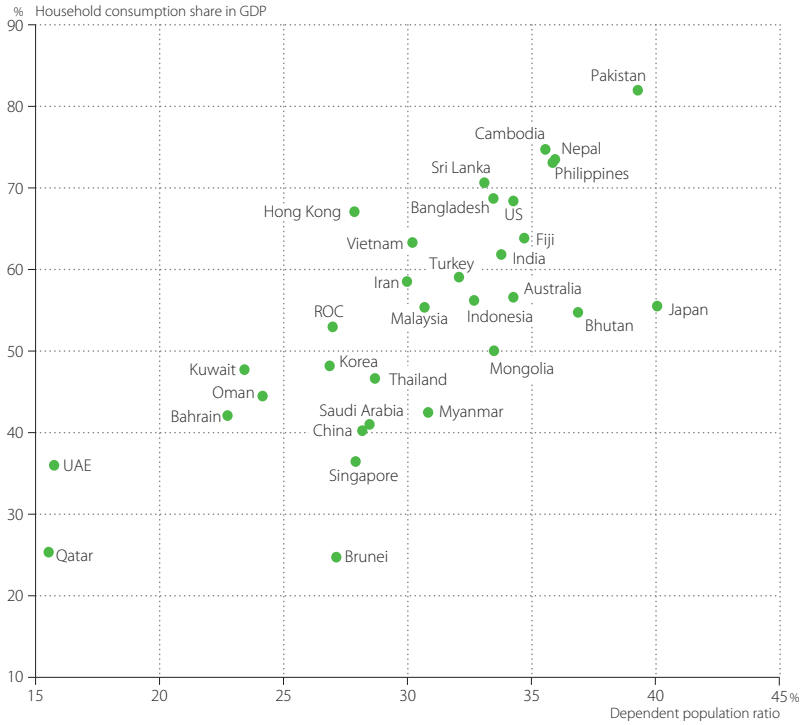

Figure 21 Dependent Population Ratio and Consumption Share
——Share of dependent population to total population and consumption share in GDP at current market prices in 2017

Sources: Population data by national statistical office in each country; World Bank (2018); official national accounts in each country with author estimates.
Note: Dependent population is defined as persons aged under 14 and over 65.

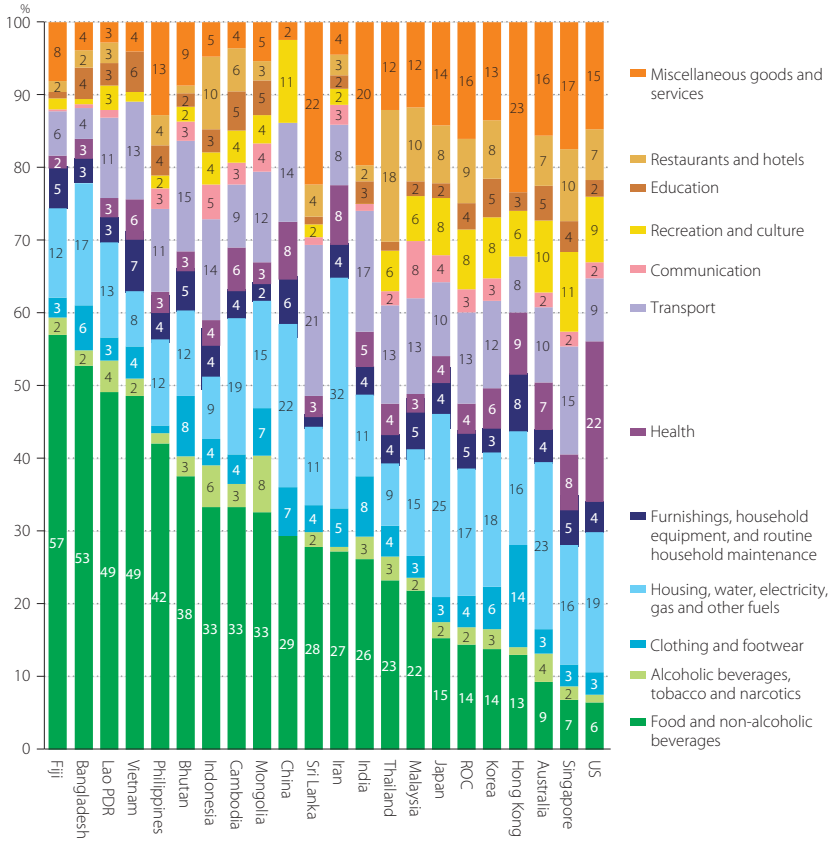

Figure 22 Household Consumption by Purpose
——Shares of household consumption at current prices by purpose in 2017

Sources: Official national accounts in each country.
Note: For data of Hong Kong, transportation includes communication; recreation and culture includes hotels; miscellaneous goods and services include restaurants. For data of China, food and non-alcoholic beverages includes alcoholic beverages, tobacco and narcotics; transportation includes communication; recreation and culture includes education. For data of Vietnam, transportation includes communication. For Fiji, the Lao PDR, and Vietnam, the observation periods are 2009, 2005, and 2016, respectively.

household consumption than food and non-alcoholic beverages. Idiosyncratic spending, such as education in Korea, Mongolia, and Vietnam accounting for 5–6% of household consumption, and health in the US, accounting for 22% of consumption, are not reflected in other countries.

The role of foreign direct investment (FDI) differs considerably among Asian countries. Figure 23 shows the FDI inflows as a percentage of GFCF in 2010 and 2017, for the Asian economies with the US and some EU countries for comparison. In almost half of the Asia30 (13 countries), the FDI inflows are over a 10% share of GFCF. In particular, they are outstanding in the two global cities of the Asian Tigers, Hong Kong (141% of GFCF) and Singapore (70%). The FDI inflows are extremely low in Japan at 0.9%, indicating that a domestic reform for lowering barriers to entry should be considered for encouraging international investment.

It is an important policy target for low-income countries to create a business-enabling environment, just as it is important for middle-income countries to improve various business environments. Based on the EIU's (Economist Intelligence Unit, *The Economist*) ranking 2014–2018 (covering 82 countries in the

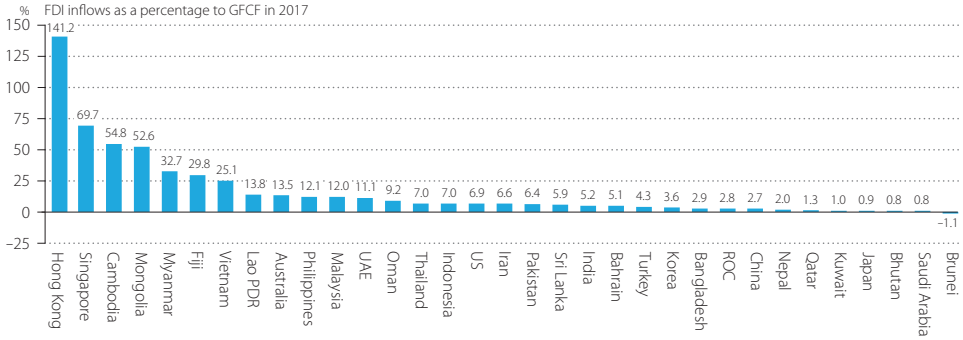

Figure 23 FDI Inflows
——FDI inflows as a percentage of GFCF, an average of the ratios in 2017

Sources: United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2017* and APO Productivity Database 2019.

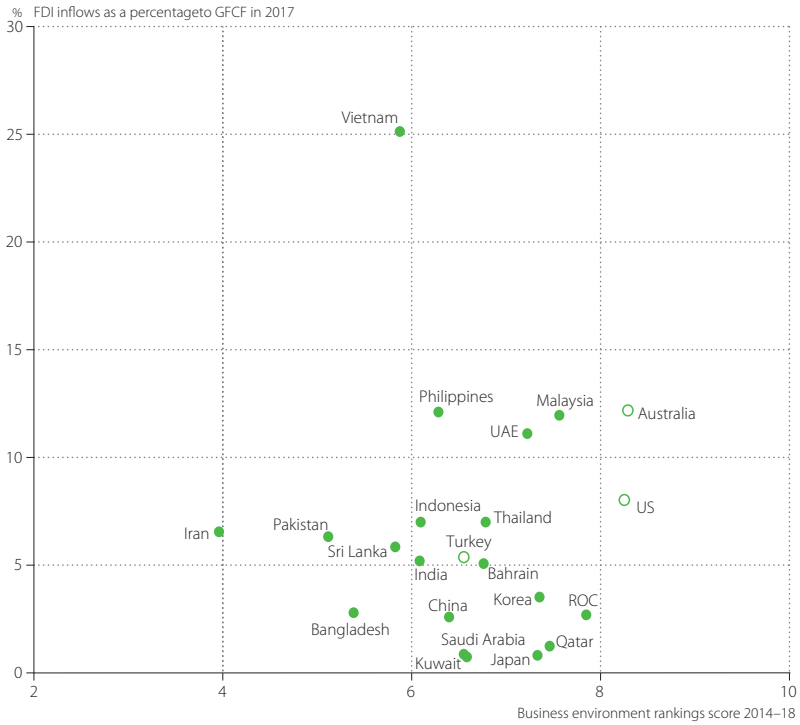

Figure 24 FDI Inflow Ratio and Business Environment
——FDI inflows as a percentage of GFCF in 2017 and business environment score

Sources: United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2017*; The Economist Intelligence Unit (2014) and APO Productivity Database 2019.

world),[10] Singapore (1st) and Hong Kong (3rd) are in the top 10% of the covered countries. In contrast, Bangladesh (69th), Pakistan (74th), and Iran (81th) are in the bottom 10%. Figure 24 plots this business environment score and the FDI inflows ratio in the countries presented in Figure 23, excluding the countries in which the FDI inflows ratio is over 26%. Nepal is not covered in EIU (2014). In World Bank (2019), Nepal is evaluated inferior to India, Bhutan, and Sri Lanka for conducting business. In Iran, Pakistan, Bangladesh, Sri Lanka, and Nepal, improving business environment is a necessary condition for

attracting FDI. Although Japan is one of the countries with the lowest FDI ratio in Figure 23, this does not seem to be captured in rankings in business environment.

Figure 25 focuses on investment components, showing the nominal GFCF share of seven types of assets for Asia24 economies and regions in 2017.[11] For most countries, investment is still very much construction-based (i.e., in dwellings, non-residential buildings, and other structures). However, the expansion of IT capital is becoming more significant in some countries like Singapore, Thailand, Brunei, and Japan – even at the current price comparisons.[12] The ROC, Japan, Korea, the US, and Singapore invested in R&D by more than 13% of total investment in 2017. Among the Asian Tigers, however, Hong Kong had a smaller share of R&D in GFCF (4%) in 2017.

Figure 26 plots the long-term trend of net export share in GDP from 1970 to 2017. Net exports, which were previously a significant drag on Singapore and Korea in the 1970s, have improved their position rapidly. The shares of net exports in Singapore and ROC are unremarkably large, at 24.4% and 12.7% in 2017, respectively. In contrast, shares of net exports peaked at 8.7% in 2007 in China and 12.2% in 2005 in Hong Kong. Since then, they have declined to 1.9% and 1.1% in 2017, respectively. Japan had enjoyed

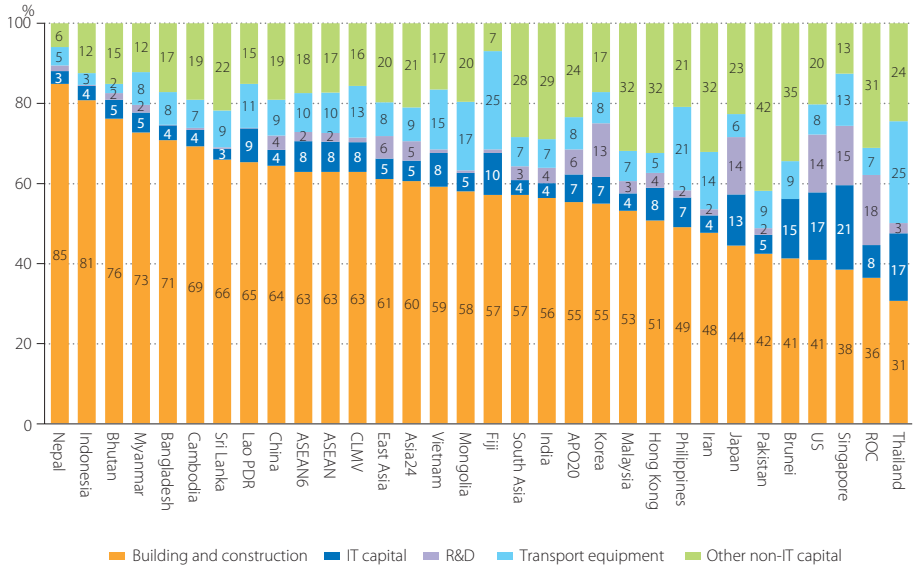

Figure 25 Investment Shares by Type of Asset
——Shares of GFCF at current purchaser's prices by type of produced assets in 2017

Sources: Official national accounts in each country and APO Productivity Database 2019.
Note: Numbers in parentheses of the assets are corresponding to the code of produced assets, defined in Table 4 in Appendix 3 (p. 152).

10: The EIU's business rankings model examines 10 separate criteria or categories, covering the political environment, the macroeconomic environment, market opportunities, policy towards free enterprise and competition, policy towards foreign investment, foreign trade and exchange controls, taxes, financing, the labor market and infrastructure. Each category contains a number of indicators that are assessed by the EIU for the last five years and the next five years. The number of indicators in each category varies from 5 (foreign trade and exchange regimes) to 16 (infrastructure), and there are 91 indicators in total. Each of the 91 indicators is scored on a scale from 1 (very bad for business) to 5 (very good for business).

11: The investment data by type of assets includes our own estimates for the countries where data is not available. Although our GFCF estimates are constructed based on 11 classifications of assets (see Table 3 in Appendix 2, p. 151), they have been aggregated into five assets for the purposes of this table. The IT capital is defined as IT hardware, communications equipment, and computer software.

12: The real-term comparisons are conducted at the flow and stock levels in Chapter 5 (p. 43).

a trade surplus for most of the period compared, but recently its trade balance has turned negative amounting to –0.5% in 2011 deepening to –2.5% in 2014, due to the shutdown of its nuclear power plants resulting from the Great East Japan Earthquake.

As a decomposition of net exports, Figure 27 presents the export and import shares in GDP in 2017. In 2017 the shares in Singapore exports were at 170%, and 189% in Hong Kong, reflecting their port function in Asia. This explains why the total values of exports and imports are exceptionally high, relative to the size of GDP in these economies.[13] About two-thirds of countries realized a trade surplus. However, Nepal and Bhutan, whose currencies are pegged to the Indian rupee, are suffering serious trade deficits by 36% and 20% in 2017, respectively.

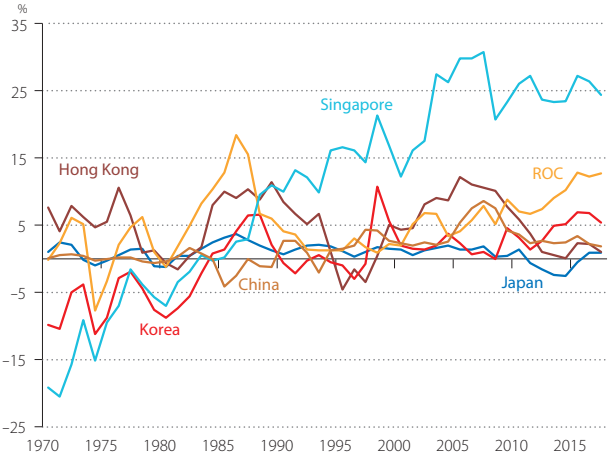

Figure 26 Net Export Share in GDP of the Asian Tigers, China, and Japan
——Share of net exports with respect to GDP at current market prices in 1970–2017

Sources: Official national accounts in each country, including author adjustments.

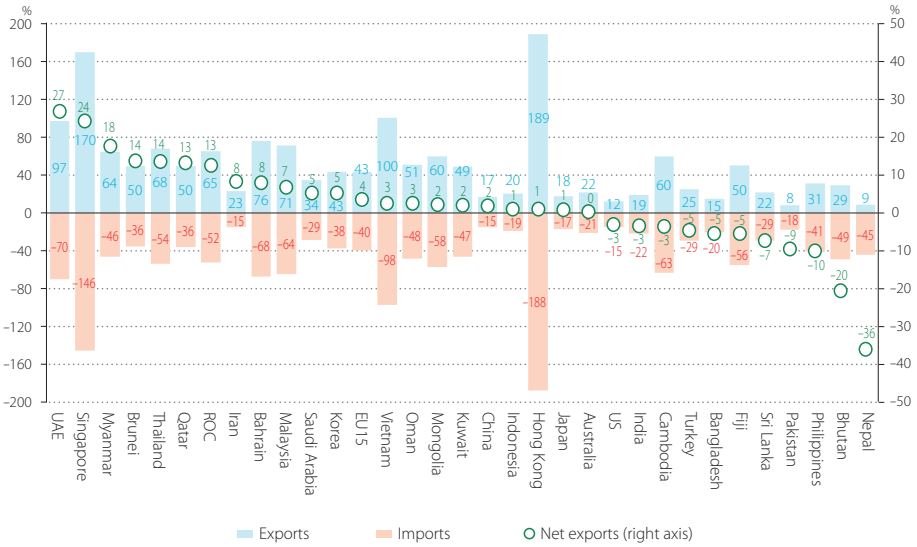

Figure 27 Export and Import Shares in GDP
——Shares of exports and imports with respect to GDP at current market prices in 2017

Sources: Official national accounts in each country, including author adjustments.

13: The 2008 SNA requires that the trade values should be recorded to reflect a change in ownership of goods, rather than accounting for goods moved for processing without incurring actual transactions. Singapore and Hong Kong already introduced the 2008 SNA. However, the revisions from the 1993 SNA on the export and import data were very minor.

Box 2 Size of the Informal Sector

The definition of the "informal sector" varies depending on the purposes and the context of discussion. One statistical definition of the informal sector is provided by the 15th ICLS resolution of the International Labour Organization (ILO) in 1993 as follows:

> The in*formal sector units are divided into two subsets:*
> *(a) Informal own-account enterprises. These are household enterprises owned and operated by own-account workers, either alone or in partnership with members of the same or other households, which may employ contributing family workers and employees on occasional basis but do not employ employees on a continuous basis.*
> *(b) Enterprises of informal employers. These are household enterprises owned and operated by employers, either alone or in partnership with member of the same or other households, which employ one or more employees on a continuous basis. Enterprises may be considered informal if they meet one of the following criteria: (a) small size of the enterprise in terms of employment, (b) non-registration of the enterprise, and (c) non-registration of its employees* (ILO, 2013, pp. 249–250).

Examples of the informal sector include unpaid work in a family enterprise, casual wage labor, home-based work, and street vending.

The informal sector in less developed countries (LDCs) is vast. Compared with workers in the formal sector, those in the informal sector are typically paid poorly and supply labor in low-quality working conditions without legal protection or official social protection. Some part of the informal sector exists for tax evasion, but the dominant portion in LDCs provides "the only opportunity for many poor people to secure their basic needs for survival" (ILO, 2013, p.3). Encouraging labor movements from the informal sector to the formal sector is one of the most important developmental issues in many LDCs.

How far the informal sector is counted in the national accounts depends on the country. The size of the informal sector is not directly comparable across countries. However, we can loosely grasp the significance of the informal sector by looking at "the number of employment" and "the number of employees."

The number of employment is estimated to be consistent with the national accounts, which tries to capture economic activities of the whole economy, though some part of workers in the informal sector would be missing. On the other hand, the data for the number of employees seems to be drawn from official labor surveys and thus is likely to exclude most of the employment in the informal sector. Therefore, a difference between the number of employment and the number of employees is loosely regarded as employers/self-employed workers in the formal sector and workers in the informal sector. Although statistical problems are evident, particularly for the treatment of the employment data in the agricultural sector, we can still clearly see that the number of employees is substantially lower than the number of employment in LDCs.

Figure B2 plots the ratio of the number of employees to the number of employment (the vertical axis) against

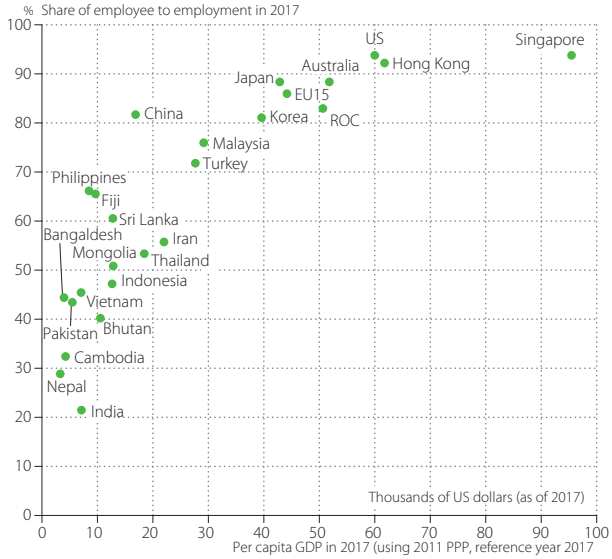

Figure B2 Employee Share and Per Capita GDP Level
——Share of employee and per capita GDP level in 2017

Sources: Official national accounts in each country, including author adjustments; APO Productivity Database 2019.

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PPP-adjusted per capita GDP (the horizontal axis) in 2017 for several countries. Employee ratios tend to be higher as countries have higher income. However, even among LDCs, employee ratios have substantial variation; low in most of the South Asian countries while relatively high in the ASEAN Member States.

The policy implication is profound. First, LDCs with low employee ratios are likely facing difficulties in encouraging labor movements from informal to formal sectors. The reasons could be on the demand side, the supply side, or the combination of both. The growth of the formal sector, particularly the manufacturing sector and modern services sectors, may not create enough jobs. The gap of human capital between informal and formal sectors may be too large. Urban living conditions may be too harsh and expensive to attract rural people to urban areas. Governments must find and resolve bottlenecks to make labor movements smoother.

Second, raising minimum wage is recently a popular policy in many countries including Thailand, Indonesia, and Cambodia, but may deter labor movements from informal to formal sectors. Minimum wages are typically enforced only in the formal sector, and wage levels in the informal sector remain low. Raising minimum wages too high may reduce the labor demand in the formal sector, make labor movements more difficult, and in the end negatively impact people in the informal sector. Although the betterment of labor conditions is certainly important, raising minimum wages too high may cause adverse effects for economic development.

5 Productivity

Highlights

- **In labor productivity, based on GDP at constant basic prices per hour worked, the US has sustained a sizeable gap over even the highest Asian performers (Figure 30 and Table 16). In 2017, the productivity gap between the US and the Asian leader, Singapore, remained at 9% (Figure 29).**
- **In 2015–2017, the labor productivity of the Asia24 grew by 5.0% per year on average, slightly improved from 4.8% in 2010–2015. China experienced a slowdown in labor productivity growth to 6.5% from 7.3% over the same periods. The main drivers of productivity resurgence in the Asia24 were Vietnam, Thailand and India (Figure 32 and Table 17).**
- **TFP growth recovered to 1.8% in 2015–2017 in the Asia24, which was double the 0.9% in 2010–2015. The resurgence of TFP growth in South Asia was outstanding, increasing from 0.7% to 2.1% over the same periods. The main driver was India, in which the speed of TFP growth more than tripled from 0.8% to 2.5% (Figure 37).**
- **The regional economic growth of the Asia24 has been predominantly explained by the contribution of capital input, representing 67% (64% for non-IT and 3% for IT capital) of economic growth achieved in 2010–2017. The role of TFP growth is also significant, contributing 21% of its regional economic growth in the same period, slightly higher than 20% in the US (Figure 40).**
- **Capital deepening is the key mechanism of labor productivity growth in the Asia24, accounting for 62% (59% for non-IT and 3% for IT capital) in 2010–2017. In the same period, the contributions of labor quality and TFP are 14% and 24%, respectively. In the ASEAN, where the growth of regional TFP in 2010–2017 was negligible, the contribution of labor quality was significant, contributing 64% of the regional improvement in labor productivity (Figure 48).**

Labor productivity can be measured in several ways, depending on the definitions of output and labor input measures. Section 5.1 presents the labor productivity measure in terms of GDP per worker.[14] As workers in high-performing Asian countries tend to work longer hours on average than those in the US, as shown in Figure 82 in Appendix 6 (p. 157), the worker-based labor productivity gaps in this instance cast the Asian countries in a particularly favorable light. Section 5.2 shifts the focus to alternative estimates of labor productivity measure, namely GDP per hour worked.

The sources of economic growth in each economy are further decomposed to factor inputs of labor, capital, and total factor productivity (TFP), based on the growth accounting framework.[15] In Sections 5.3 and 5.4, capital input is included as another key factor of production[16]; and the TFP estimates are presented for 24 Asian economies and the US.[17] Readers should keep in mind that the TFP estimates in this edition are not directly comparable with those measured in the past Databook series, since some improvements in measuring capital and labor inputs are newly included in this edition. See Box 3 for the sources of our

14: GDP is valued at basic prices in this chapter, as opposed to GDP at market prices used in the previous chapters. GDP at basic prices is defined as GDP at market prices, minus net indirect taxes on products. As most Asian countries do not provide official estimates for GDP at basic prices in their national accounts, they are calculated based on available tax data. See Appendix 2 for the methods employed for our calculations.

15: The growth accounting approach is based on the microeconomic production theory and the nominal accounting balance of input and output of production. See OECD (2001) for a presentation of definitions, theoretical foundations, and a number of practical issues in measuring productivity.

16: The measurement of capital stock of produced assets, land stock, and capital services are presented in Appendixes 3–5, respectively.

revisions on the estimates of TFP growth. Finally, Section 5.5 presents the estimates of energy productivity, which is becoming an important policy target for pursuing sustainable growth of the Asian countries. The details of long-term estimates of growth accounting for the Asia24 economies and regions are provided in the country profiles of Chapter 8.

5.1 Per-Worker Labor Productivity

Figure 28 presents the cross-country comparisons of per-worker labor productivity levels in 2017, measured as GDP per worker in US dollars as of 2017. On this measure, Singapore is the leading economy, 15% larger than the US level.[18] Hong Kong and the ROC follow at some distance. Japan took the fourth place, with productivity levels at 36% below the US. Iran, Korea, and Malaysia followed. It is worth noting that Iran has the lowest employment rate in Asia, as presented in Figure 17 in Section 3.3 (p. 29), bringing about higher performance in labor productivity. Thereafter, many countries among the Asia group followed with labor productivity levels at less than 25% of the US, pulling down the average performance of the group to 23% for the Asia24, 25% for the ASEAN6, and 9% for CLMV. Bringing up the rear were China and India, with productivity levels that were 21% and 14% of the US level, respectively.

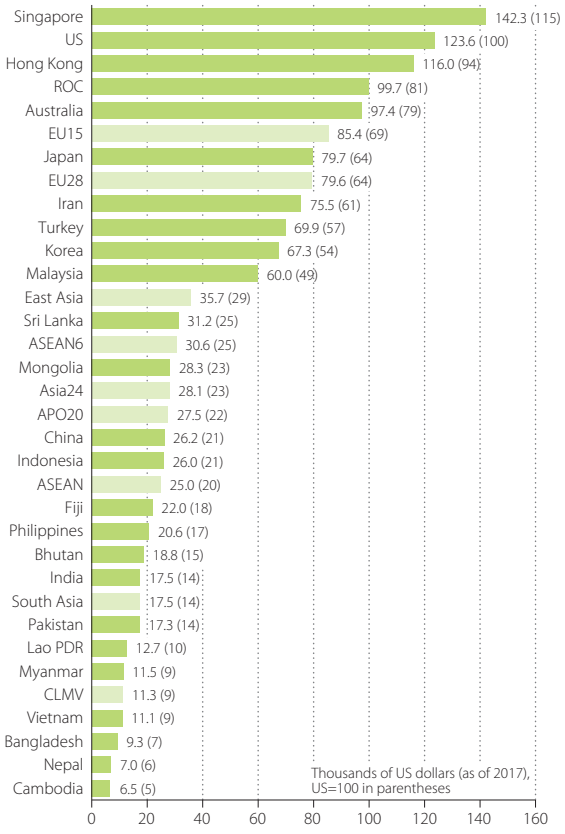

Figure 28 Per-Worker Labor Productivity Level
——GDP at constant basic prices per worker in 2017, using 2011 PPP, reference year 2017

Source: APO Productivity Database 2019.

The growth comparison of per-worker labor productivity is presented in Table 15 in Appendix 10 (p. 170). In this measure, the regional performance has been steady at 4–6% since 2000. China has sustained rapid productivity growth in the past two decades. Its growth accelerated to an average of 10.3% per year in 2005–2010 from 8.6% per year in 2000–2005 and slowed to 6.5% in 2015–2017. This contrasts with India's resurgence at 7.0%, 4.7%, and 6.7% over the same periods. Labor productivity growth in Bangladesh and Vietnam have become significant in recent years.

17: In this edition of Databook, the growth accounting was newly developed for Bhutan.
18: Cross-country level productivity comparisons are notoriously difficult to make and hence subject to much data uncertainty. Estimates should therefore be taken as indicative for broad groupings rather than precise ranking.

5.2 Per-Hour Labor Productivity

The per-worker based labor productivity gaps presented in Section 5.1 are most likely conservative estimates, since workers in high-performing Asian countries tend to work longer hours than those in the US, on average. To adjust for this discrepancy, total hours worked are constructed in the Asia QALI Database for the 24 Asian countries, although the quality of the estimates may vary considerably across countries.[19] Figure 29 shows how the productivity gap with the US in 2017 varies depending on which measure of labor productivity is used.[20] The productivity gap with the US widens for all Asian countries except Japan when the differences in working hours are taken into account. The choice of labor productivity measure makes a significant difference for the previously high-performing countries relative to the US, such as Singapore (from 15% higher to 9% lower) and Hong Kong (from 6% lower to 22% lower).

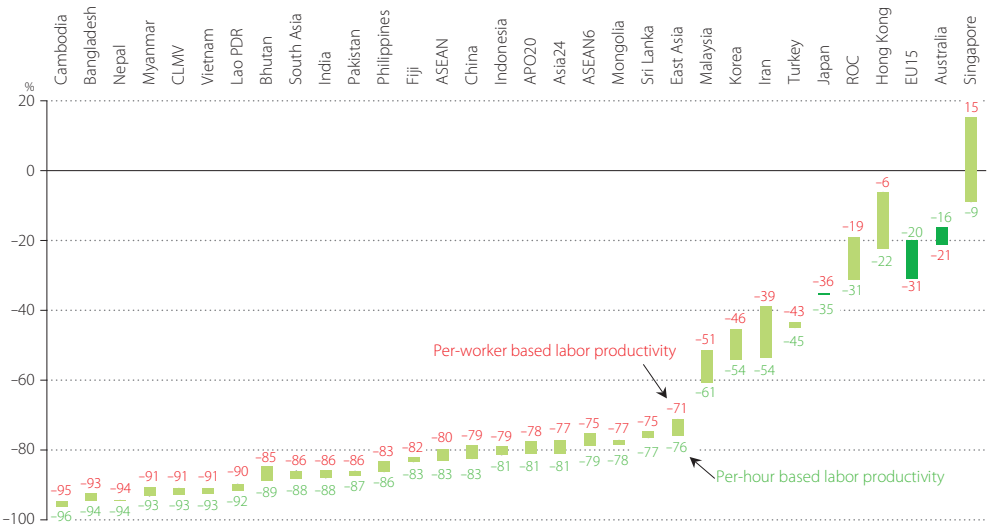

Figure 29 Per-Worker and Per-Hour Labor Productivity Gap, Relative to the US
——Indices of GDP at constant basic prices per worker and hour in 2017, using 2011 PPP

Source: APO Productivity Database 2019.
Note: Light green is used for the countries in which per-hour labor productivity is lower than per-worker labor productivity.

Based on GDP at constant basic prices per hour worked, US labor productivity has sustained a sizeable gap over even the Asian high performers, as presented in Figure 30 and Table 16 in Appendix 10 (p. 171). The gap between the US and the Asian leader, Singapore, has been narrowing slowly and the productivity gap of 9% still remains in 2017. Hong Kong and the ROC have improved by six and ten times in this period and have overcome Japan in 2007 and 2010, respectively. They were ahead of Korea, despite Korea's effort in catching up with Japan by 2.5% per year on average over the whole observation period (1970–2017). If Korea can maintain this effort at the same pace, it would take 15 years to finally draw level with Japan.

19: Cross-country comparisons of hours worked are notoriously difficult, not least because harmonized data is rarely readily available. In the countries studied, three published their total hours worked as part of their official statistics, but not for the whole period studied in this report, and the publications may have been constructed based on different methodologies. It is therefore important to bear in mind the data limitations. See Appendix 6 for an explanation of the estimation procedure of total hours worked.
20: The labor productivity gap for country *x* is country *x*'s labor productivity divided by the US's labor productivity in Figure 29.

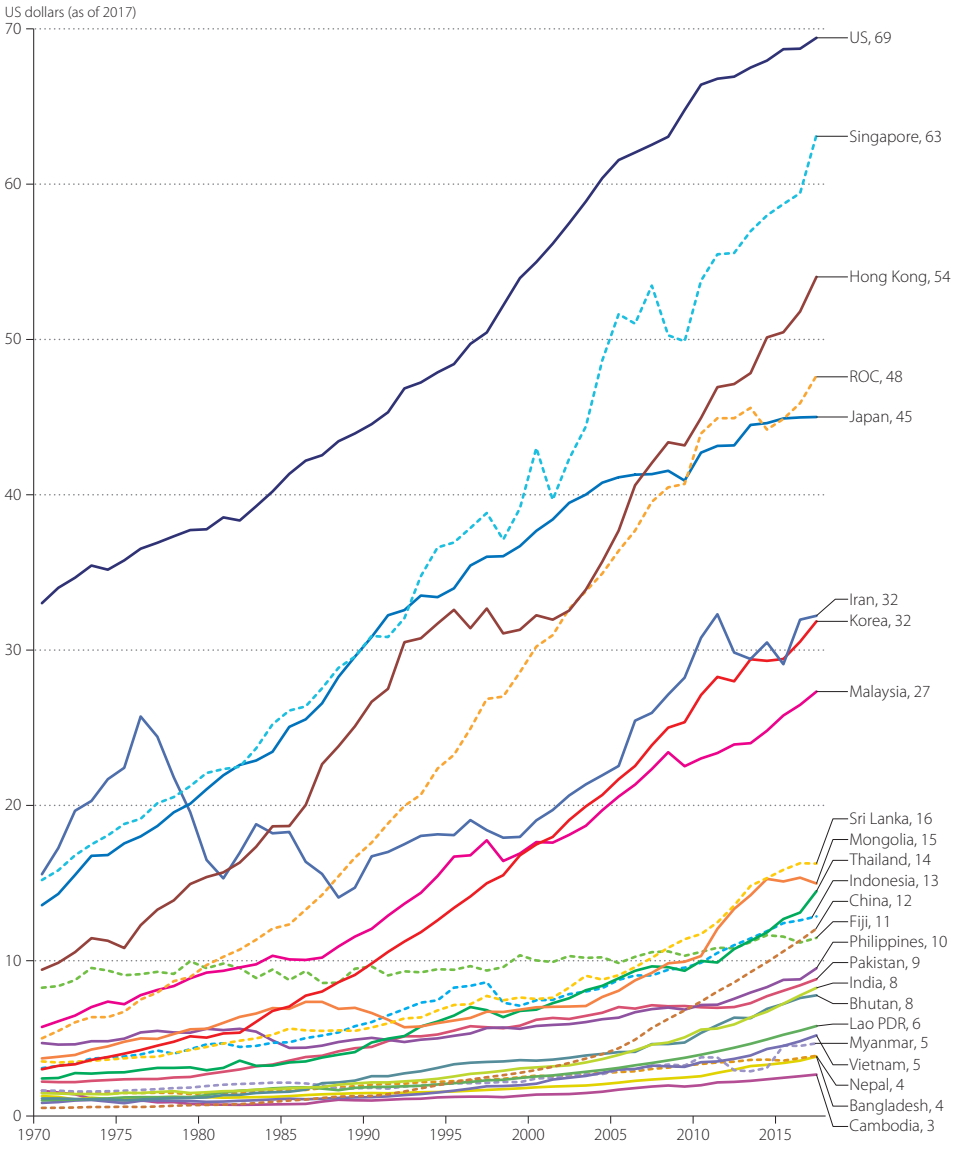

Figure 30 Per-Hour Labor Productivity Level in the Long Run
——GDP at constant basic prices per hour in 1970–2017, using 2011 PPP, reference year 2017

Unit: Thousands of US dollars (as of 2017).
Source: APO Productivity Database 2019.

The average growth rates of hourly labor productivity performances for the Asia24 economies and regions are compared in Figure 31. In the Asia24 as a region, the labor productivity growth has been accelerated to 4.8% per year in the recent period 2010–2017, compared to the past two-decade averages of 4.1% in 1990–2010 and 2.7% in 1970–1990. Figure 32 and Table 17 in Appendix 10 (p. 172) focus on more recent productivity performances. As a region, labor productivity growth in the most recent period 2015–2017 was very strong at 5.0% per year. Although it is below the highest record of the regional productivity growth (5.7% in 2005–2010), which was accelerated by an extremely high performance of China (10.5%), it improved from 4.8% in the early 2010s. The main drivers of the recent productivity performances are Vietnam, Thailand, and India.

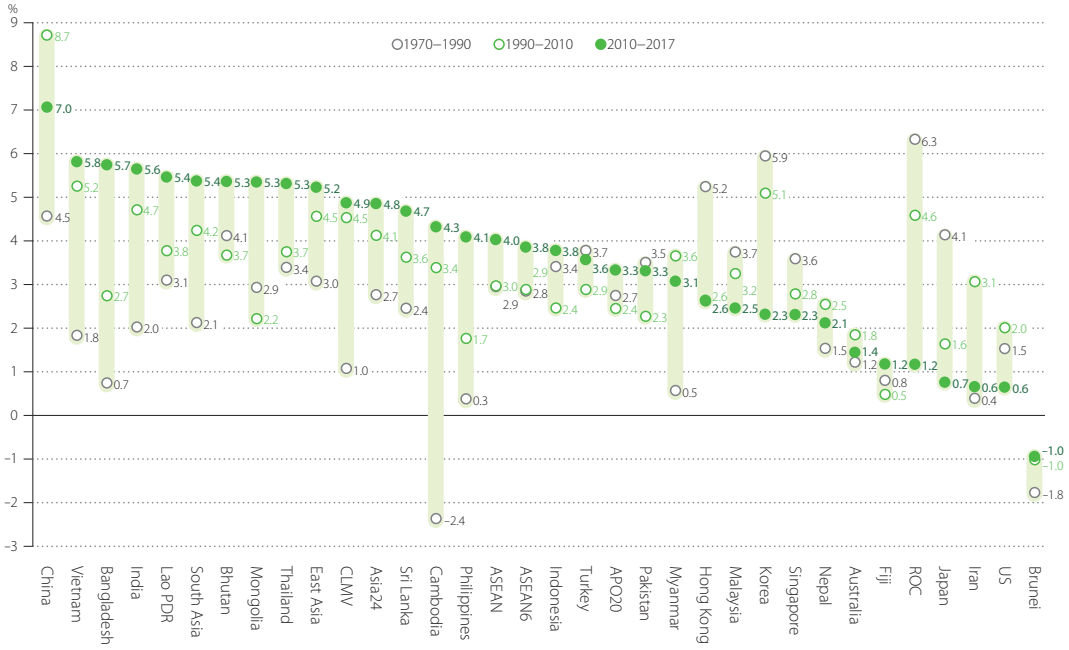

Figure 31 Labor Productivity Growth in the Long Run
——Average annual growth rate of GDP at constant basic prices per hour in 2010–2017, 1990–2010, and 1970–1990

Source: APO Productivity Database 2019.
Note: The starting periods for Australia and Turkey are 1978 and 1988, respectively.

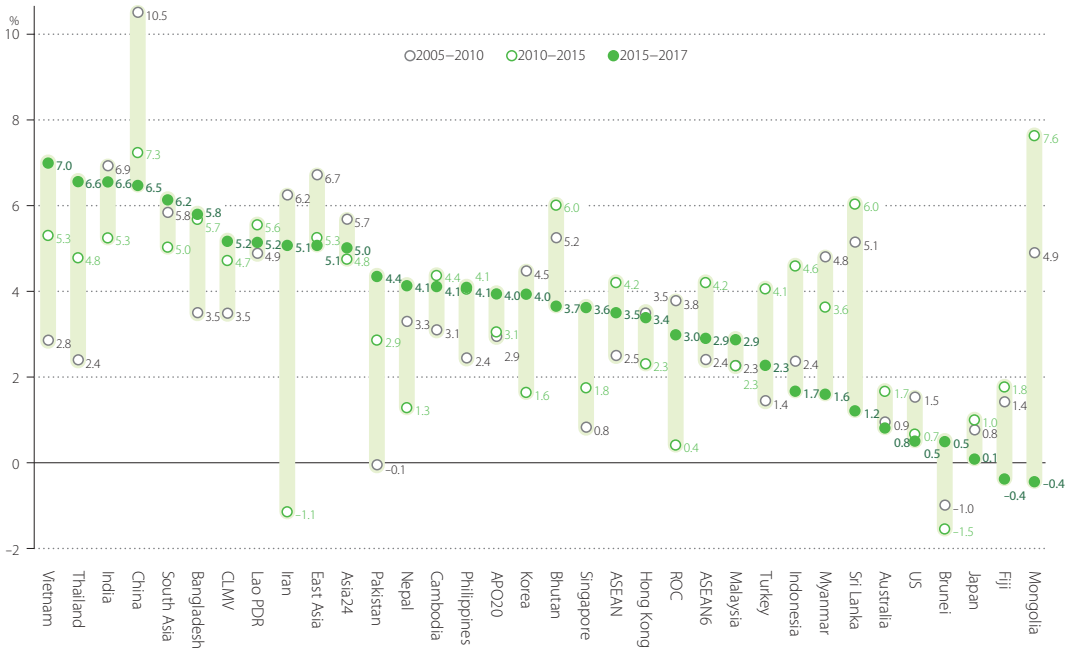

Figure 32 Labor Productivity Growth in the Recent Periods
——Average annual growth rate of GDP at constant basic prices per hour in 2015–2017, 2010–2015, and 2005–2010

Source: APO Productivity Database 2019.

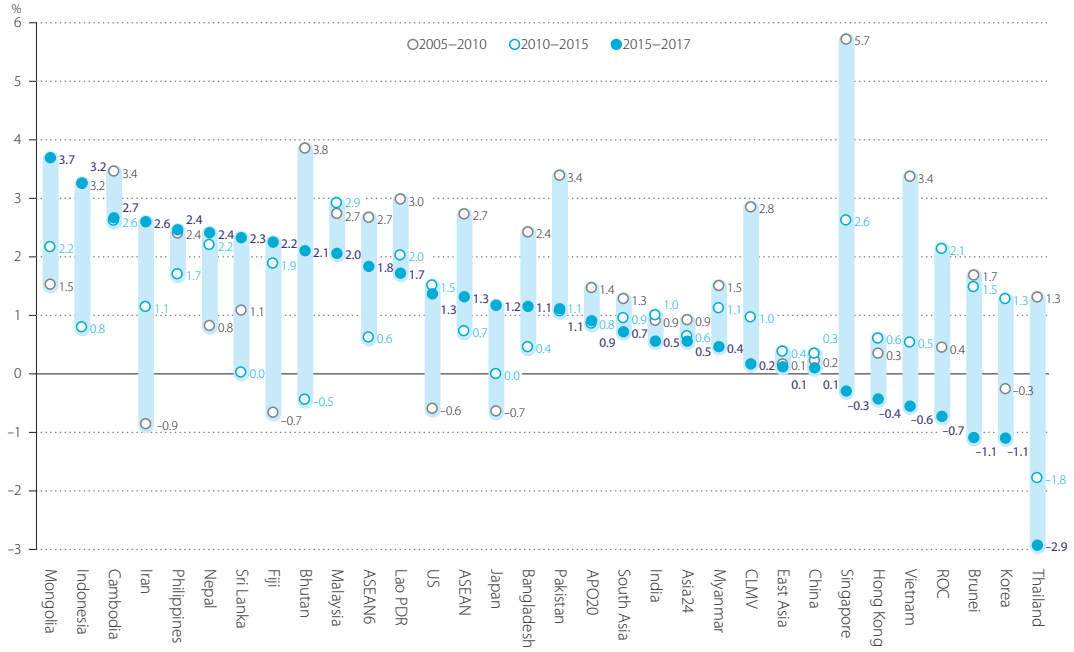

Figure 33 Hours Worked Growth in the Recent Periods
——Average annual growth rate of hours worked in 2015–2017, 2010–2015, and 2005–2010

Source: APO Productivity Database 2019.

Figure 33 presents the growth of hours worked for the Asia24 economies in 2015–2017, compared with those in 2010–2015 and 2005–2010. Over these sub-periods, hours worked growth in the Asia24 slowed to 0.5% in 2015–2017, from 0.9% in 2005–2010 and 0.6% in 2010–2015. The change in growth rates varies widely by country. Singapore, Thailand, and Vietnam experienced a continuous slowdown in hours-worked growth over these sub-periods. In Contrast, the growth of hours worked recovered in 2015–2017 in Japan, Bhutan, Sri Lanka, from negative or zero growth in the 2010–2015.

Table 17 in Appendix 10 (p. 172) illustrates the growth rate of per-hour labor productivity since 1990. The growth patterns of individual countries generally follows their counterparts closely in per-worker productivity growth, as shown in Table 15 (p. 170). In some countries the two measures diverge greatly and are not at all consistent through the periods compared.[21] This contrast was particularly stark in the first half of the 1990s, when Japan's hourly productivity growth was 1.9% compared with 0.7% in per-worker productivity growth. However, the divergence narrowed to almost zero in the period 2015–2017.

One can identify where countries are today in terms of their hourly productivity performance against a backdrop of Japan's historical experience. Figure 34 traces the long-term path of Japan's per-hour labor productivity for the period 1885–2017 along the green line, expressed as relative to Japan's 2017 level (set equal to 1.0).[22] A structural break is observed during World War II when output collapsed. Countries'

21: For Brunei, both measures give the same productivity growth. This is a result of a statistical construct in our current Asia QALI Database rather than the underlying trend.
22: While mindful that level comparisons of productivity among countries and over periods are subject to a great degree of data uncertainty, they should provide a rough sketch of the productivity divergence in Asia.

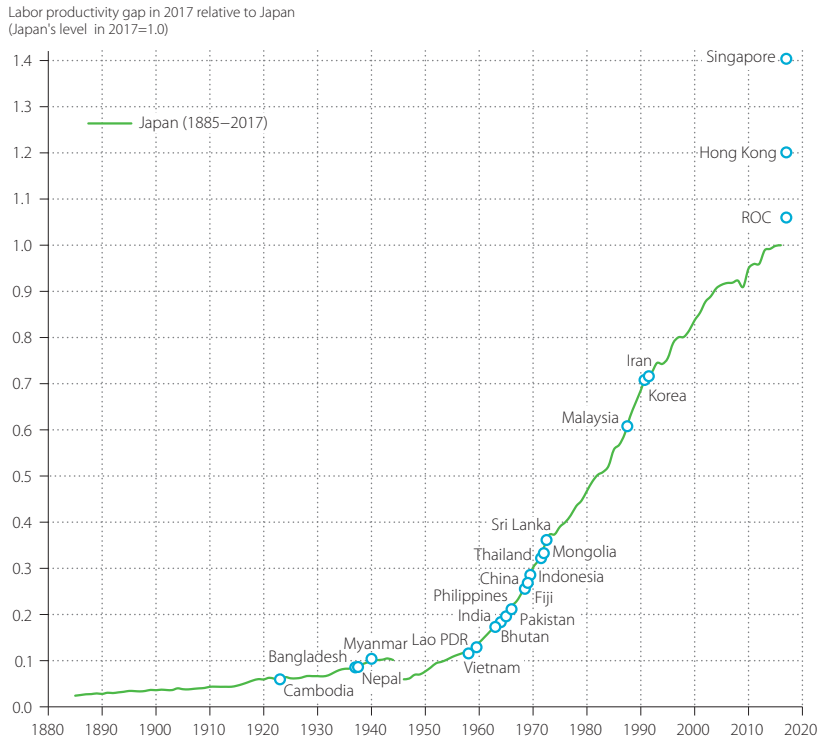

Figure 34 Historical Labor Productivity Trend of Japan and Current Level of Asia
——Index of GDP at constant basic prices per hour worked for Japan in 1885–2017 and for Asian countries in 2017, using 2011 PPP

Sources: For historical data of Japan, the sources of GDP are Ohkawa, Takamatsu, and Yamamoto (1974) during 1885–1954 and the JSNA by ESRI, Cabinet Office of Japan, during 1955–2017 (including author adjustments). Hours worked data is based on KEO Database, Keio University, during 1955–2017. During 1885–1954, the average hours worked per person are assumed to be constant. For the labor productivity level of Asian countries in 2017, it is based on the APO Productivity Database 2019.

relative hourly productivity levels against Japan in 2017 are then mapped against Japan's growth (as circles). Here, corresponding year can be located when Japan's hourly productivity level was the closest to the country in question. Cambodia, with the lowest hourly productivity in 2017, sees levels corresponding to Japan in the middle 1920s. Even if they manage Japan's long-term productivity growth of 2.8% on average per year, this means it will take them about a century to catch up with the Asian leader's current position (Singapore, Hong Kong, the ROC, and Japan). Most Asian countries are clustered around Japan's level between the 1960s and the early 1970s. Among them, China led the catch-up effort in 2000–2017, with productivity growing almost three times faster than Japan's long-term average, followed by India, Vietnam, and the Lao PDR (Table 17 in Appendix 10, p. 172).

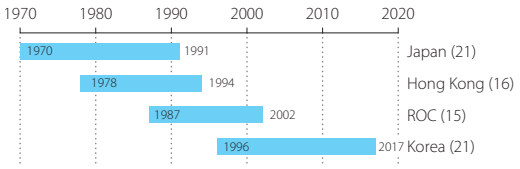

Figure 35 Time Durations Taken to Improve Labor Productivity by Japan and the Asian Tigers

Source: See Figure 34.

The productivity leaders are the Asian Tigers, of which Singapore, Hong Kong, and the ROC have already surpassed Japan. Figure 35 compares the time span taken by each country to raise its labor productivity from 30–70% of Japan's level today (unit of measurement on the y-axis of Figure 34). What Japan

had achieved in the 21 years from 1970 to 1991, Hong Kong, the ROC, and Korea managed to achieve in 16, 15, and 21 years, respectively (Figure 35). Although the speed of catch-up for latecomers is increasing somewhat, most Asian countries will take a long time to catch up with the leaders, currently clustered near Japan's 1960–1970 levels (Figure 34).

5.3 Total Factor Productivity

Labor productivity in the previous sections is only a one-factor or partial-factor productivity measure and does not provide a full perspective of production efficiency. An observation of low labor productivity could suggest production inefficiency, but it could also reflect different capital intensities in the chosen production method, under the relative labor-capital price faced by the economy concerned. By observing movements in labor productivity alone, it is not easy to distinguish which is the case. In populous Asian economies, which are relatively plentiful in low-skilled labor, production lines may be deliberately organized in a way to utilize this abundant, and hence relatively cheap, resource. It follows that the chosen production method is most likely (low-skilled) labor-intensive and with little capital, manifested in low labor productivity and high capital productivity. Therefore, economists analyze TFP, which is GDP per unit of combined inputs, to arrive at an overall efficiency of a country's production.

Measuring capital input is a key factor for determining TFP. It is defined by capital services – the flow of services from productive capital stock, as recommended in the 2008 SNA.[23] The required basis for estimating capital services is the appropriate measure of capital stock. The SNA recommends constructing the national balance sheet accounts for official national accounts. However, this is not a common practice in the national accounts of many Asian countries.[24] Even where estimates of net capital stocks are available for the entire economy, assumptions and methodologies can differ considerably among countries. In response to this challenge, harmonized estimates for capital stocks and capital services have been constructed and compiled within the APO Productivity Database, built on the same methodology and assumptions. In this methodology, changes in the quality of capital are incorporated into the measurement of capital services in two ways: changes in the composition are captured by explicitly differentiating assets into 15 types; and an appropriate and harmonized deflator is used for IT capital to reflect the rapid quality change embodied in IT-related assets (see Appendix 3).[25]

The TFP estimates in this edition of the Databook are not directly comparable with those in the past Databook, since they reflect two improvements in measuring capital inputs – a consideration of land as a factor of production (see Appendix 4) and measuring labor inputs as a measurement of labor quality changes (see Appendix 6). These revisions are expected to improve the TFP estimates (see Box 3 for the sources of our revisions on the TFP estimates). With these improvements, the APO Productivity Database 2019 estimates capital services, hours worked, labor qualities, and TFP for the Asia24 economies.[26] In addition, the regional growth accounts are developed for some country groups – Asia24, APO20, East Asia, South Asia, CLMV, and ASEAN6.[27]

23: See the chapter on capital services and the national accounts of the 2008 SNA (United Nations, 2009). The second edition of the *OECD Capital Manual* (2009) provides a comprehensive framework for constructing prices and quantities of capital services. In the APO Productivity Database 2019, the Törnqvist index is used for aggregating 15 types of capital inputs (11 types of produced assets provided in Table 3 in Appendix 3 and 4 types of land provided in Appendix 4). Inventory stocks and natural resources are not considered in the current database.

24: Based on our metadata survey, half of APO member economies do not develop the balance sheet accounts within the official national accounts; these countries are Bangladesh, the ROC, Indonesia, the Lao PDR, Mongolia, Nepal, Sri Lanka, and Vietnam (but the National Wealth Survey is available in the ROC for some selected years).

25: IT capital is defined as a composite asset of IT hardware (computers and copying machines), communications equipment, and computer software.

Cross-country comparisons of TFP growth for the Asia24 economies and regions and the US are shown in Figure 36 for the period 2010–2017, compared with the past two-decade averages in 1970–1990 and 1990–2010. Taking the US as the reference economy, with TFP growth of 0.4% on average per year in 2010–2017, 17 Asian economies achieved higher TFP growth than the US. The Asia24 experienced a slowdown of TFP growth at 1.1% per year in 2010–2017, from 1.5% in 1990–2010. By country, there was a considerable decline in TFP growth in China (2.5% from 4.0% over the same periods), India (1.3% from 2.0%), ROC (1.1% from 1.9%), and Korea (0.5% from 1.6%). In contrast, the TFP growth accelerated in CLMV from 0.2% in 1990–2010 to 0.8% in 2010–2017. The main driver was Vietnam, in which the speed of TFP growth tripled from 0.6% to 1.8%.

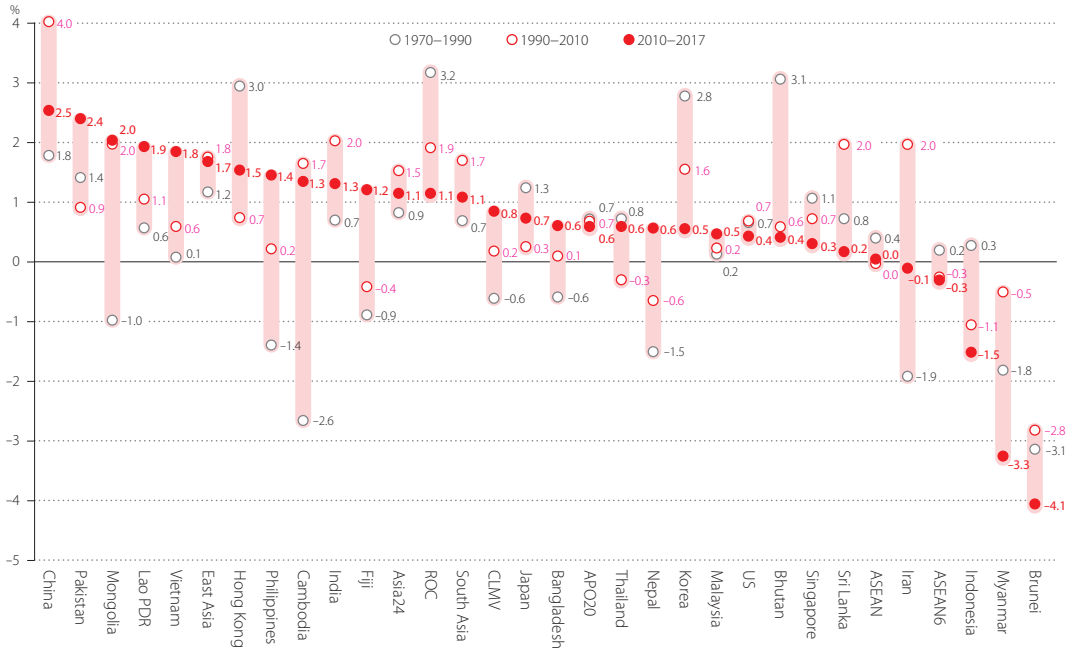

Figure 36 TFP Growth in the Long Run
——Average annual growth rate of total factor productivity in 2010–2017, 1990–2010, and 1970–1990

Source: APO Productivity Database 2019.

TFP growth in more recent periods are provided in Figure 37 and Table 18 (Appendix 10, p. 173) for the Asia24 economies. In the most recent period 2015–2017, many Asian countries recovered TFP growth, compared to those in the early 2010s. In the Asia24, the TFP growth doubled from 0.9% on average in 2010–2015 to 1.8% in 2015–2017. The recovery in South Asia from 0.7% to 2.1% over the same periods

26: In measuring TFP, income generated from domestic production should be separated into labor and capital compensations. The national accounts readily provide the estimates of compensation of employees as a component of value added in many countries; compensation for the self-employed is not separately estimated but is combined with returns to capital in mixed income, except China, where labor remuneration in the national accounts includes labor income for the self-employed (Holz, 2006). The assumption on wages for self-employed and contributing family workers is presented in Appendix 6. See Box 4 for sensitivity of our assumptions to the TFP results.

27: In Databook, the country aggregations of capital and labor inputs are based on the estimates of PPP for capital and labor inputs, respectively, which are the updates of the estimates developed in Nomura (2018). In most Asian countries, the PPP for output underestimates the PPP for capital input, indicating the capital prices are higher than the output prices and overestimates the PPP for labor inputs, indicating the labor prices are lower than the output prices. Note that, in Sections 5.3 and 5.4, Bhutan is newly included in the country groups: the Asia24 and South Asia, in this edition.

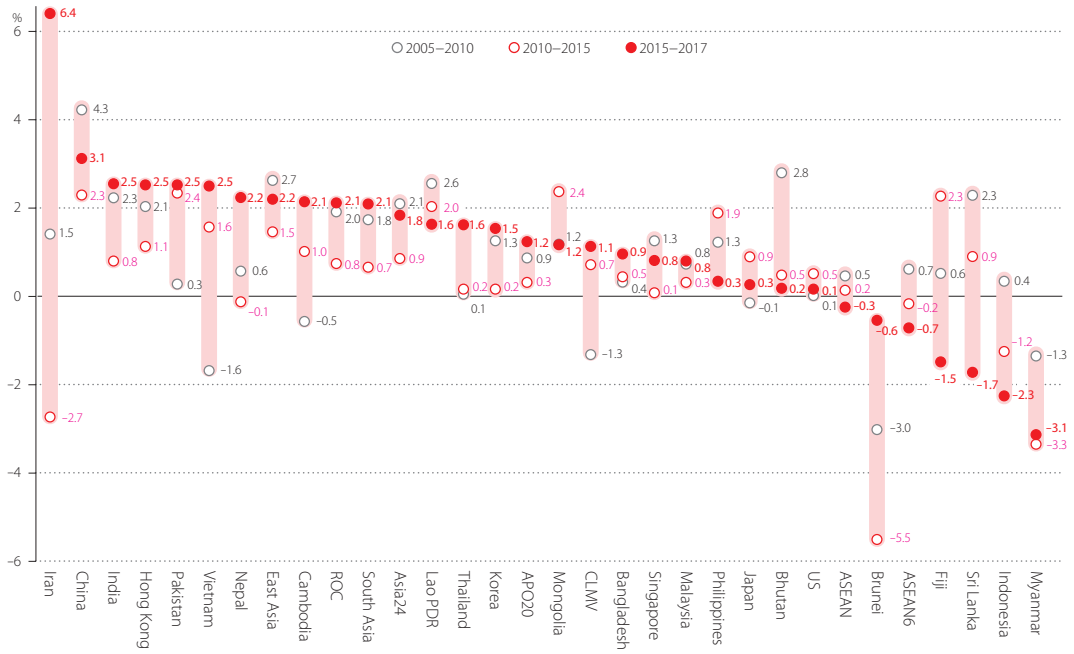

Figure 37 TFP Growth in the Recent Periods
——Average annual growth rate of total factor productivity in 2015–2017, 2010–2015, and 2005–2010

Source: APO Productivity Database 2019.

was outstanding. The main driver of the recent recovery of TFP growth in South Asia was India, in which the speed of TFP growth more than tripled from 0.8% to 2.5%.

The long-term trends of TFP index in our entire observation period are compared for the Asia24 economies in Figure 38. There is a wide range in TFP growth in the long run. While the TFPs of China and ROC more than tripled (3.9 times and 3.0 times, respectively) and those in Korea and Hong Kong more than doubled (2.5 times and 2.4 times, respectively) in the past half a century, seven countries failed to improve their TFP.

There is policy significance in identifying the drivers behind the rapid economic growth in the Asian countries. If growth has been driven by capital accumulation more than assimilation of existing technologies from the advanced economies, the Asian model may prove to be too expensive for many less well-off countries to emulate. According to our findings for the period 2010–2017 (Figures 39 and 40), it is true that capital accumulation plays a much more significant role in the economic growth of most Asian countries than in the US, explaining 67% of economic growth achieved in the Asia24. Capital accumulation appears to be a necessary step to economic growth, especially in the early and middle stages of development. In Japan, Hong Kong, and ROC, however, TFP growth became the dominant driver in this period.

Figure 41 places our estimates among those of OECD (2019) for 17 other OECD countries to give readers a wider perspective for the two periods 2000–2010 and 2010–2017. For harmonized comparison with OECD's TFP estimates, our estimates are measured excluding the impacts of land capital and labor quality changes, only in Figures 41 and 42.[28] Though growing at a more subdued pace, the contribution made by TFP in the slower-growing, mature economies should not be underestimated. Figure 42 plots per capita GDP levels in 2017 and the TFP contribution shares in the period 2010–2017, for the 24 Asian countries (as dots) with comparison of OECD countries (as white circles). There are no significant

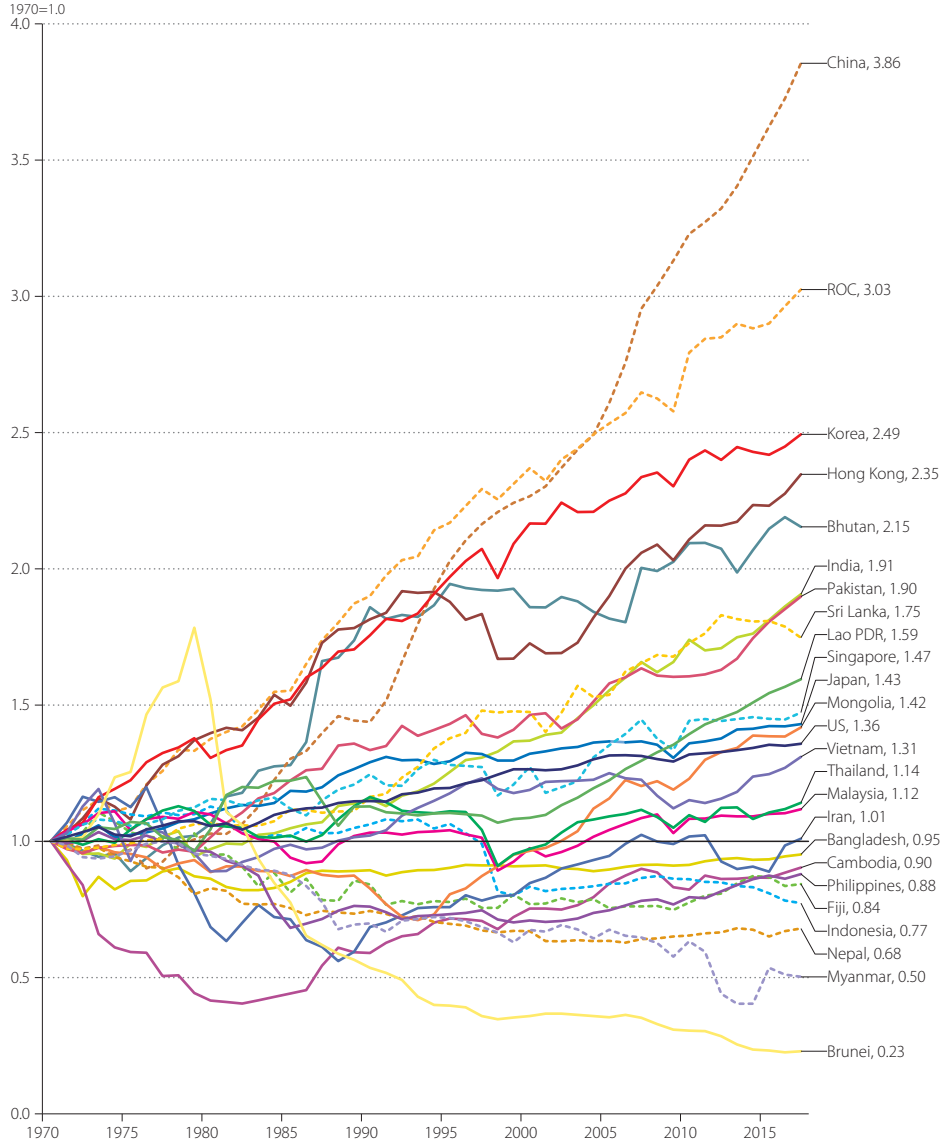

Figure 38 TFP Index in the Long Run
——Index of total factor productivity in 1970–2017

Source: APO Productivity Database 2019.

differences in the roles of TFP contribution to economic growth between the mature OECD economies and the middle-income Asian countries.

28: The multi-factor productivity in the OECD Productivity Database (OECD, 2019), referred to as TFP in this report, defines total input as the weighted average of the growth rates of total hours worked and capital services. Although our estimates are adjusted to be comparable with them, there are two differences in assumptions. First, capital services of residential buildings are included in our estimates of capital input in order to be consistent with output that includes the imputed cost of owner-occupied housing. Second, the compensation of capital is defined in our estimates as the residual of the value added and the compensation of labor (compensations for employees, self-employed persons, and contributing family workers), whereas the OECD defines it as the imputed value of capital services based on the assumptions of an ex-ante rate of returns on capital. Thus, although both apply the same Törnqvist index, the weights to aggregate labor and capital can differ. Other than these, our methodology and assumptions in measuring capital services are designed to be largely consistent with the OECD methodology, and the impact of the differences in assumptions on the volume estimates of capital services is judged to be limited.

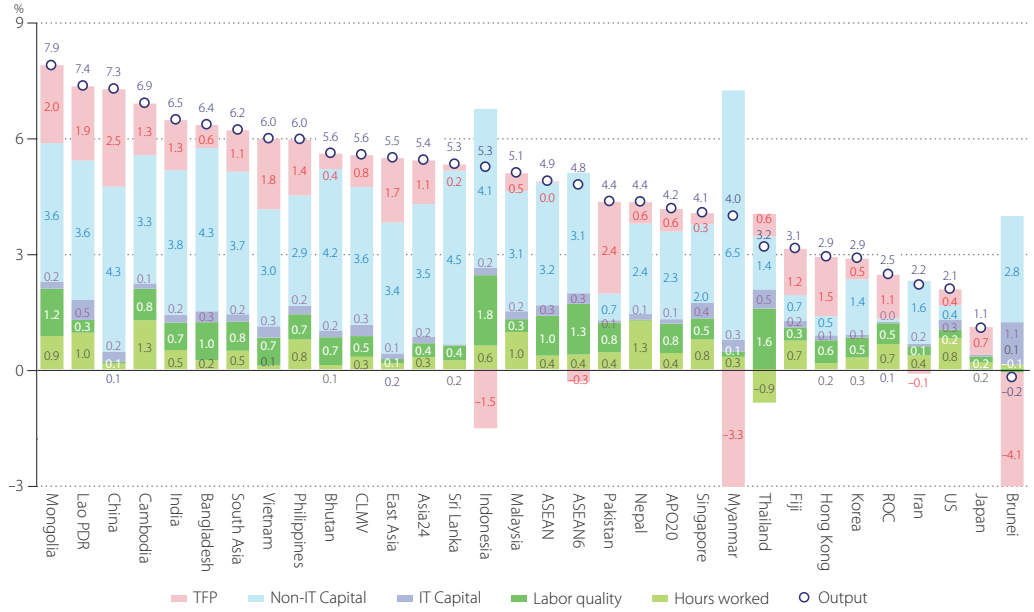

Figure 39 Sources of Economic Growth
——lverage annual growth rate of constant-price GDP and contributions of labor, capital, and TFP in 2010–2017

Source: APO Productivity Database 2019.

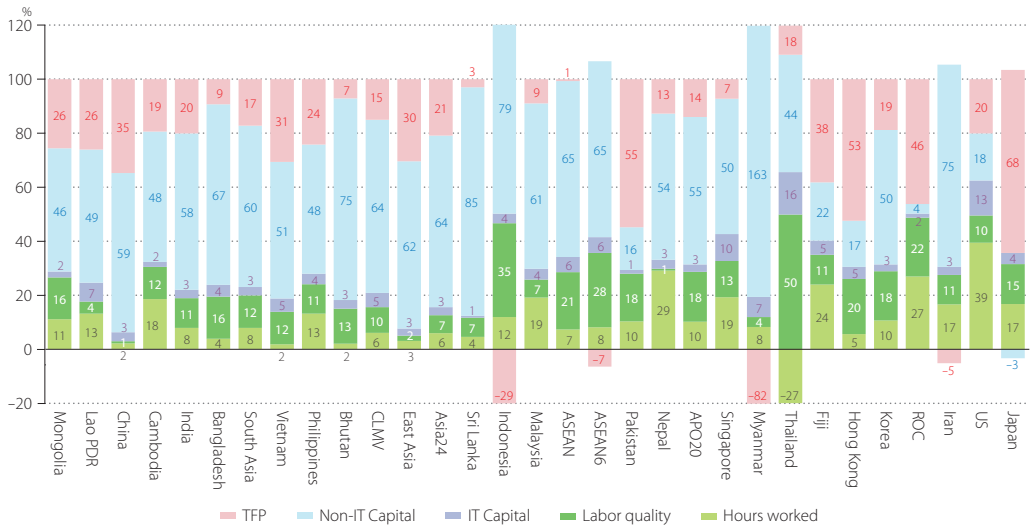

Figure 40 Contribution Shares of Economic Growth
——Average contribution shares of labor, capital, and TFP in 2010–2017

Source: APO Productivity Database 2019.

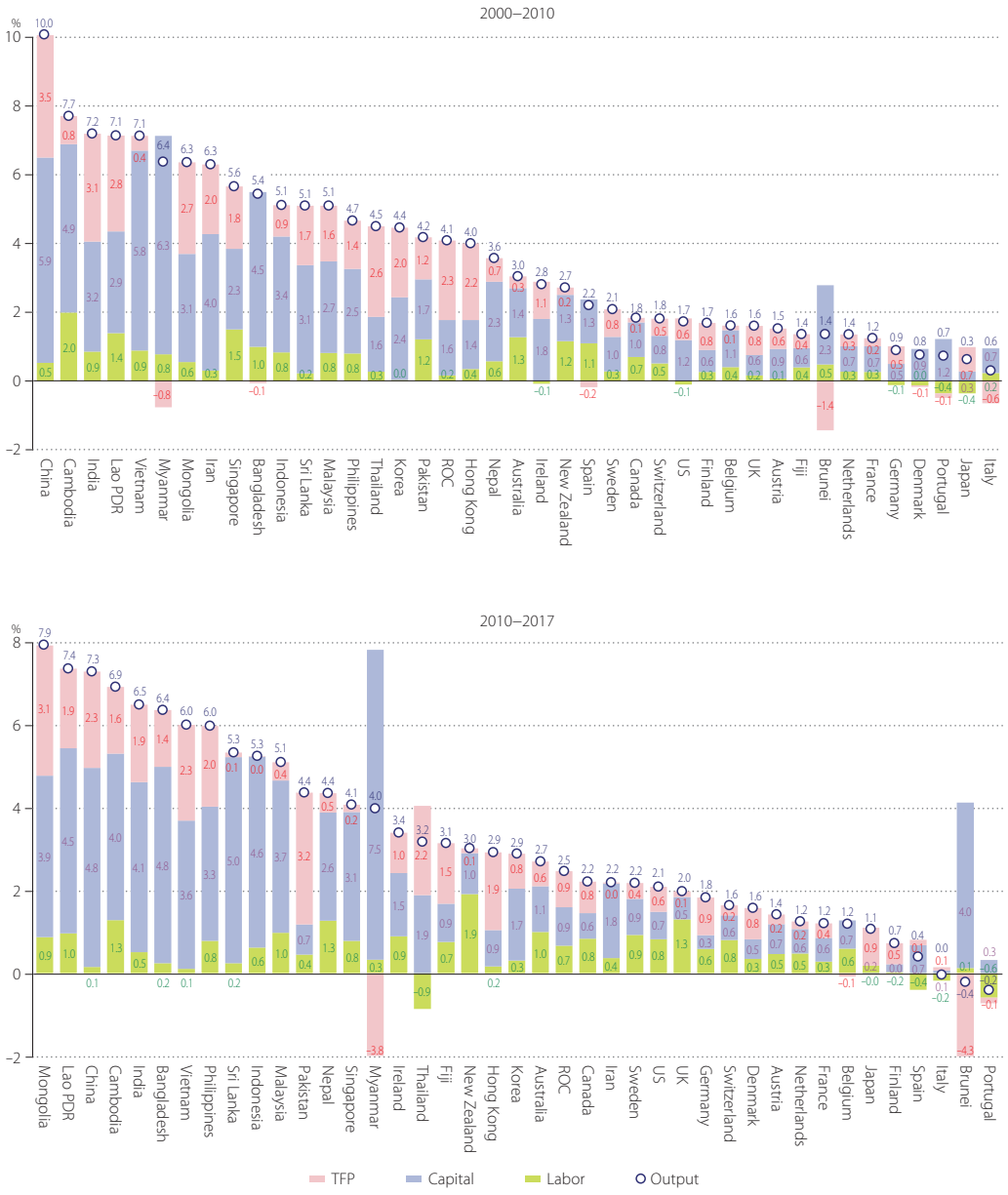

Figure 41 Comparison of Sources of Economic Growth with OECD Countries
——Average annual growth rate of constant-price GDP and contributions of labor, capital, and TFP in 2000–2010 and 2010–2017

Sources: APO Productivity Database 2019 for the Asia24 economies and the US. OECD Stat (Dataset: Multi-Factor Productivity) and OECD (2019) for OECD countries (except Japan, Korea, and the US).
Note: The impacts of labor quality changes are included in TFP and land stock is not included in capital inputs. The ending year for Ireland is 2014 and the ending year for Portugal and Spain are 2016.

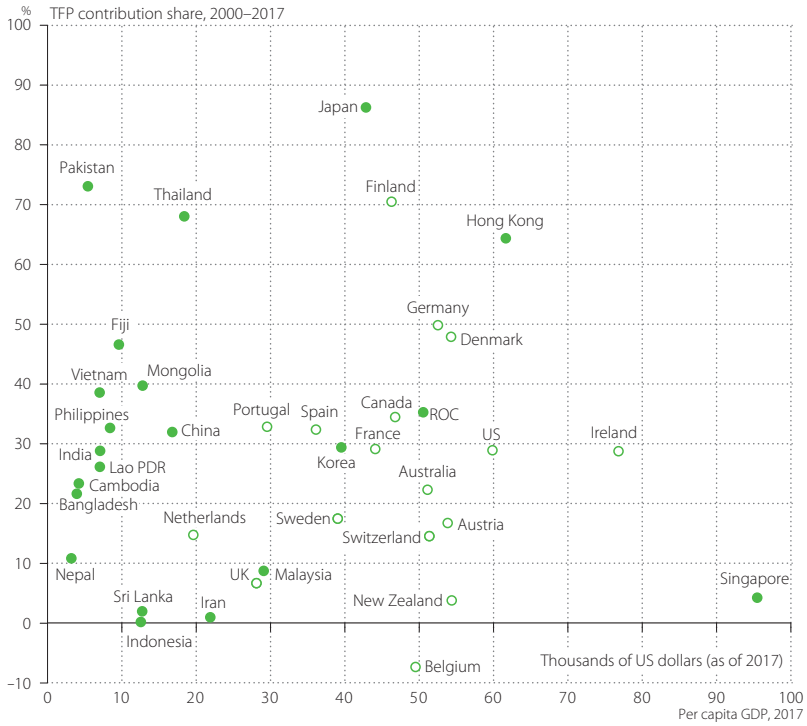

Figure 42 Comparison of TFP Contribution Shares with OECD Countries
——Average contribution share of TFP in economic growth in 2010–2017

Sources: APO Productivity Database 2019 for the Asia24 economies and the US. OECD Stat (Dataset: Multi-Factor Productivity) and OECD (2019) for OECD countries (except Japan, Korea, and the US).
Note: The impacts of labor quality changes are included in TFP and land stock is not included in capital inputs. The ending year for Ireland is 2014 and the ending year for Portugal and Spain are 2016.

Tracking the size and growth of IT capital has become a standard practice in productivity research, following attempts to establish the driving force behind productivity resurgence in developed economies. This started with the US in the 1990s. Unlike technological advancements in the past, which were largely confined to manufacturing, IT is a technology that can permeate the economy and bring about significant production gains in, for example, wholesale and retail, banking and finance, and transportation and telecommunications (service sectors that have traditionally struggled with slow productivity growth). Given the share of the service sector in the economy (Table 21 in Appendix 10, p. 180), the potential and implications for economic development and productivity gains therefore could be immense. A frequent question asked by policymakers and researchers is how best to capitalize on the productivity potential invited by this IT revolution. As with non-IT capital, it involves a process of accumulation and assimilation. IT capability becomes a factor which determines an economy's long-term growth prospects.[29]

Japan has been leading Asian countries in terms of IT capital contribution to economic growth. Japan's shift in capital allocation took off in earnest in the mid-1990s with the contribution of IT capital to capital input growth rising from a low of 16% in 1993, to a height of over 40% in the late 1990s, as shown in Figure 43. This was a period when Japan's overall investment growth slowed significantly after the economic collapse of the early 1990s. After years of excesses, Japan shifted away from non-IT to IT capital as a profitable investment. In contrast, the US started its shift toward IT capital much earlier than

29: The 2008 SNA formally acknowledges the IT sector's importance to the modern economy and has made it more identifiable and separable in industry classification and asset type.

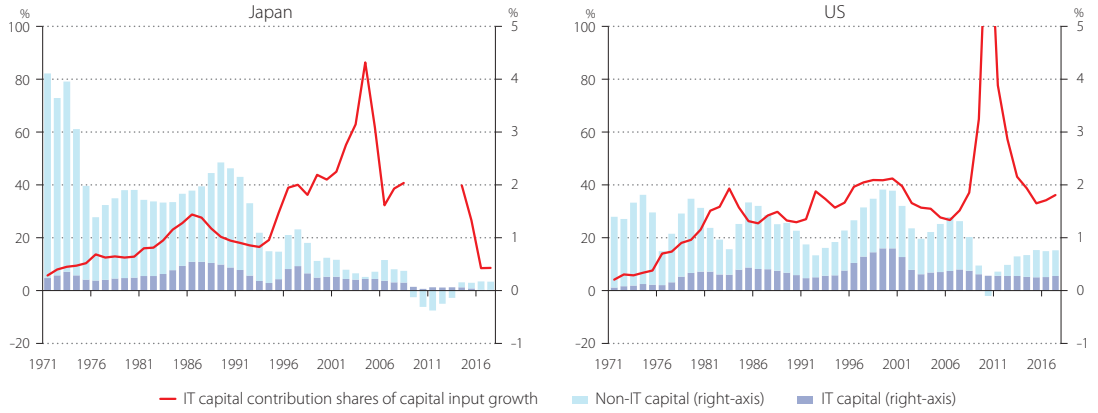

Figure 43 IT Capital Contribution Shares in Japan and the US
——IT capital contribution shares in annual growth rate of capital input in 1970–2017

Source: APO Productivity Database 2019

any Asian economy and over a longer period. Since 1981, IT capital has accounted for over 25% of US capital input growth, reaching a height of over 40% in the late-1990s and the late-2000s.[30]

A similar allocation shift to IT capital is also found in the Asian Tigers (Figure 44).[31] In the Asian Tigers, the contribution share of IT capital to total capital input peaked at about 30% at the turn of the millennium, from a share of 10% or below before 1995. China was a late-comer in terms of investing in IT capital with a surge in its contributions only taking off around 2000 and peaking at 18% in the early 2000s. There has not been as big a drive in IT pickups in India as in other Asian countries.

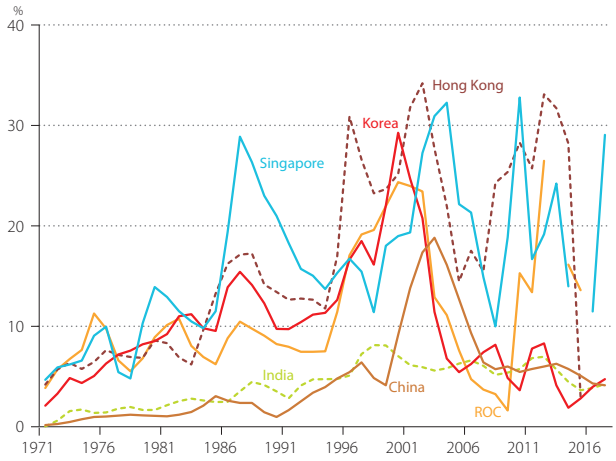

Figure 44 IT Capital Contribution Share in the Asian Tigers, China, and India
——IT capital contribution shares in annual growth rate of capital input in 1970–2017

Source: APO Productivity Database 2019.

30: In recent years, the slowdown in total capital growth has concentrated more on non-IT capital, resulting in spikes in the contribution of IT capital in Japan and the US.
31: The 2008 SNA formally acknowledges the IT sector's importance to the modern economy and has made it more identifiable and separable in industry classification and asset type.

5.4 Sources of Labor Productivity Growth

Although TFP more accurately measures how efficiently an economy utilizes its factor inputs, labor productivity and its drivers are of interest because of the close link to GDP per capita. Within the same growth accounting framework, average per-hour labor productivity growth at the aggregate level can be broken down into effects of capital deepening (as measured by capital input per hour worked), which reflects the capital–labor substitution, labor quality changes (as measured by quality-adjusted labor input per hour worked), and TFP. In other words, these factors are key in fostering labor productivity.

Capital deepening existed in 2015–2017 – albeit to various degrees – in almost all of the countries compared (except Japan, Iran, and Mongolia), as presented in Figure 45. In the Asia24, the speeds of capital deepening were stable at 6–7% per year in the 2000s. Experience of countries suggests that capital deepening is an accompanying process of rapid economic development. The relatively early starters (Japan and the Asian Tigers) underwent more rapid capital deepening than the other countries compared; and in the earlier, rather than the latter, period. The reverse is true for the emerging Asian economies, where concerted efforts were made to increase capital intensity in the latter period. China, Myanmar, India, and Vietnam moved up to occupy the top spots in 2015–2017.

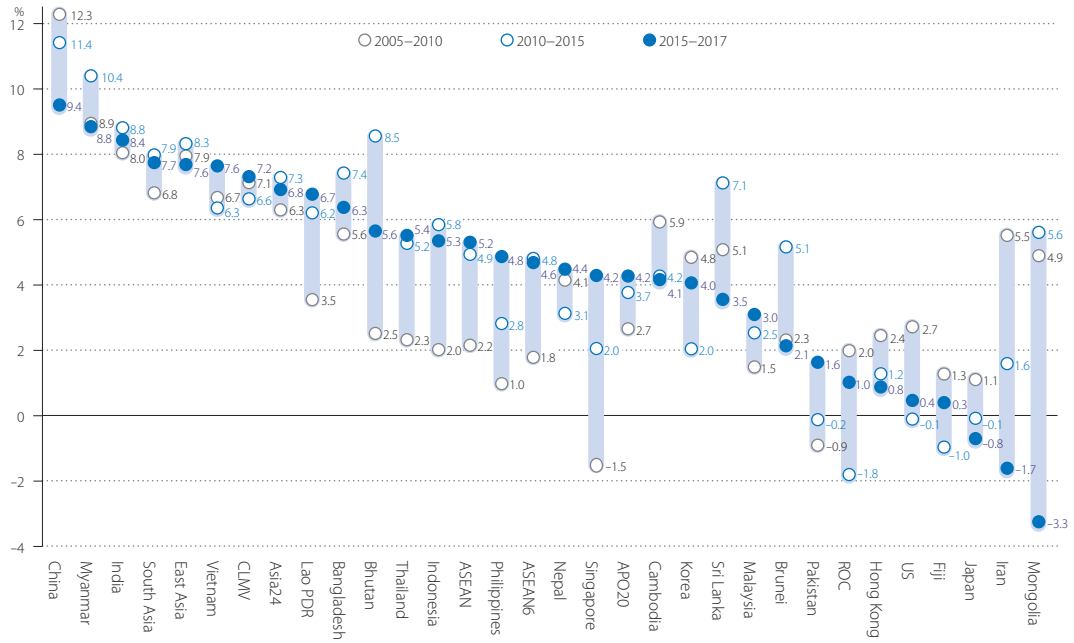

Figure 45 Capital Deepening
——Average annual growth rate of capital input per hour worked in 2015–2017, 2015–2010, and 2005–2010

Source: APO Productivity Database 2019.

Figure 46 Capital Productivity Growth
——Average annual growth rate of constant-price GDP per capital input in 2015–2017, 2015–2010, and 2005–2010

Source: APO Productivity Database 2019.

While labor productivity steadily improved for all countries as shown in Figure 32 in Section 5.2 (p. 47), the growth rate of capital productivity (as the other measure of partial productivity) remained negative for many countries regardless of the observation periods, shown in Figure 46. Although rates of capital deepening in China and India were outstanding, at 9.4% and 8.4% per year, on average in 2015–2017, their capital productivity experienced the sharpest decline of 2.9% and 1.8% per year, respectively.

Labor productivity growth can be decomposed into contributions from capital deepening, labor quality, and TFP growth. Capital deepening should raise labor productivity, all other things being equal. According to our findings for the period 2010–2017 (Figures 47 and 48), it remains the prime engine of labor productivity growth, explaining 62% (59% for non-IT and 3% for IT capital) in the Asia24. The contribution of improvement in labor quality is more moderate at 14% in the Asia24, than 24% of the TFP contribution. However, the role of labor quality changes is more significant in emerging Asian countries. In the ASEAN with almost zero growth of regional TFP in 2010–2017, the contribution of labor quality was the prime engine contributing 64% of the regional improvement in labor productivity. In South Asia, the labor quality changes explain 26% of labor productivity improvement, which is larger than the TFP's contribution of 20%.

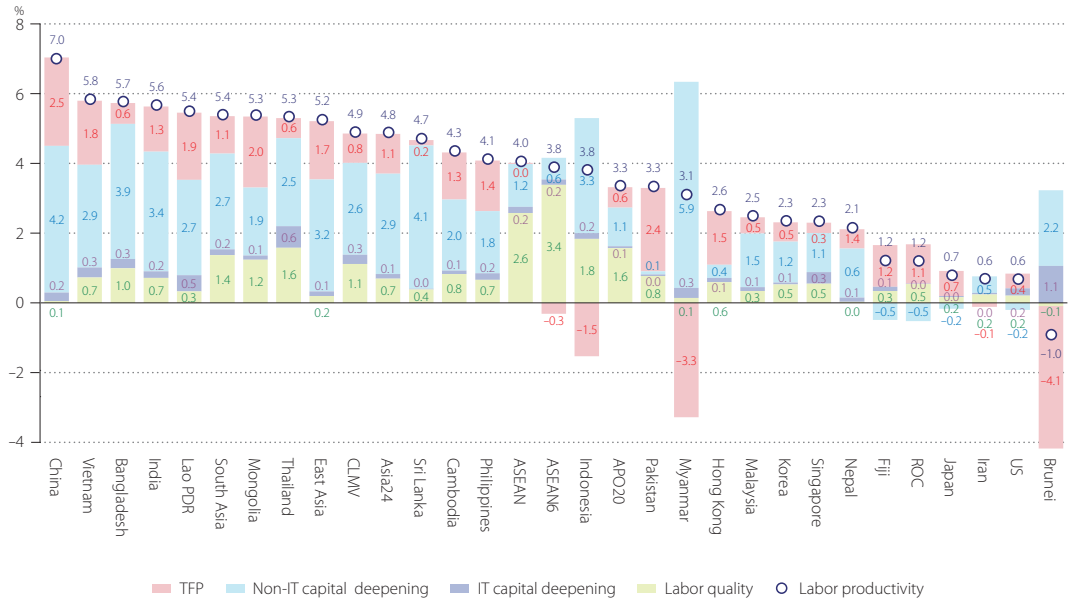

Figure 47 Sources of Labor Productivity Growth

——Decompositions of average annual growth rate of constant-price GDP per hour in 2010–2017

Source: APO Productivity Database 2019.

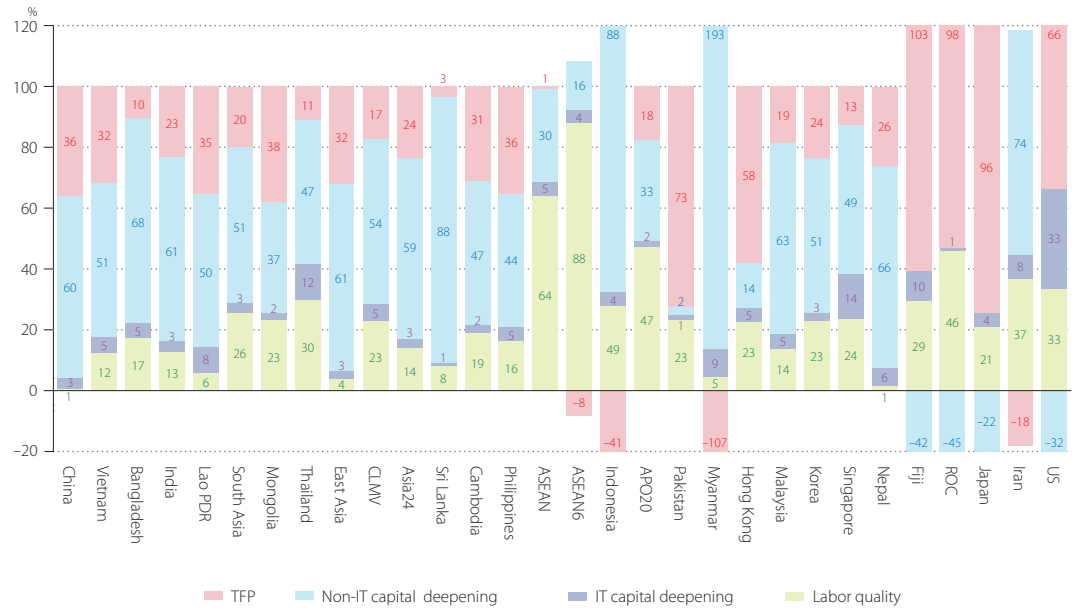

Figure 48 Contribution Shares of Labor Productivity Growth

——Contribution shares of capital deepening, labor quality, and TFP in 2010–2017

Source: APO Productivity Database 2019.
Note: The countries with a negative growth of labor productivity are excluded.

5.5 Energy Productivity

In the Asia30, to produce 44% of the world output in 2016, 43% of world energy was consumed and 50% of world CO2 was emitted (Figure 49), compared to 16%, 12%, and 10% in the EU28. This implies that Asia has lower energy productivity (defined as a ratio of output per energy consumption) and higher carbon intensity of energy at the aggregate level, compared to the EU28. It is vital to improve energy productivity and carbon intensity in the growing economies of Asia in order to reduce CO2 emissions in the world in the long run.

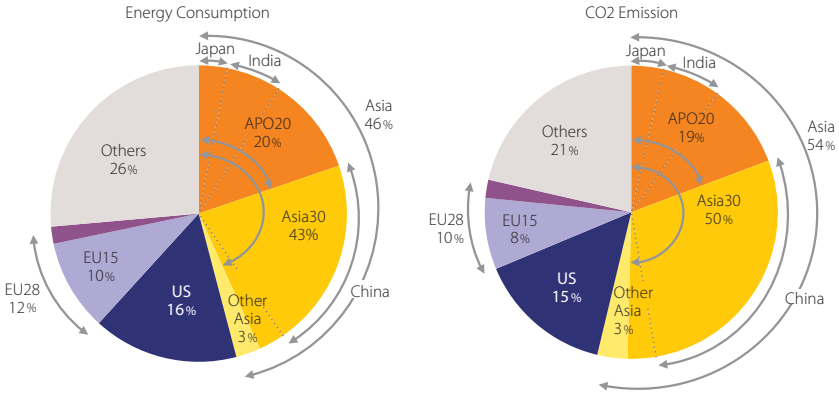

Figure 49 Asia in World Energy Consumption and CO2 Emission
——Share of final energy consumption and CO2 emission in 2016

Sources: IEA, CO2 *Emissions from Fuel Combustion 2018*; IEA, *Energy Balances of OECD Countries 2018*; IEA, *Energy Balances of Non-OECD Countries 2018*.

There is considerable diversity in energy productivity among countries. Figure 50 compares energy productivity trends of Japan, China, the Asia30, and the EU15 in 1970–2016, relative to the US. Although Japan's energy productivity level is constantly higher in the whole periods of our observation, it is almost equivalent to the EU15 from the late 2000s. The level of Chinese energy productivity was only 25% of that of the US in 1970. However, China succeeded to improve energy productivity along with the economic growth since the 1990s, closing the gap to the US at 22% in 2016.

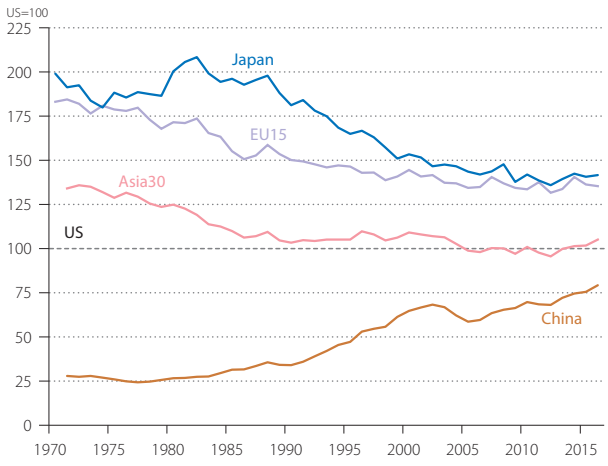

Figure 50 Energy Productivity of Japan, China, and the EU, Relative to the US
——Index of GDP at constant market prices, using 2011 PPP, per energy consumption in 1970–2016

Sources: Official national accounts in each country, including author adjustments; IEA, *Energy Balances of OECD Countries 2018*; IEA, *Energy Balances of Non-OECD Countries 2018*.

The energy productivity measure reflects not only the difference in energy efficiencies of industries and households, but also the difference in industry and production structure of the economy. Thus, the energy productivity at the aggregate

level is highly dependent on the development stage of the economy. Figure 51 placed countries on the two partial productivity indicators of labor and energy, measured in 2016. Less-developed countries with lower labor productivity (such as the Philippines, Sri Lanka, and Bangladesh) tend to have higher energy productivity. One of the effective strategies to improve labor productivity in such countries is to expand the manufacturing sector. This frequently follows the deterioration in energy productivity. As a next stage of economic growth, well-developed countries will be able to pay more attention to improving energy productivity by abolishing implicit or explicit subsidies on energy prices, especially in electricity prices, and levying heavier taxes on energy consumptions. The C-shape dynamics found between labor and energy productivities corresponds to the so-called Environmental Kuznets curve, as an inversed U-shape relationship between environmental quality (at the y-axis) and economic development (at the x-axis).

Figure 52 decomposes the sources of CO2 emission growth (from fuel combustion) in the Asian countries during 2000–2016, based on the so-called Kaya identity. The growth in CO2 emissions is decomposed to three components: changes in real GDP; carbon intensity of energy; and energy intensity of GDP (the inverse of energy productivity). In many countries, the production expansion (real GDP growth) is the most significant factor to explain the growth of CO2 emissions. With an exception of Thailand, energy productivity has improved in many Asian countries in this period. However, these improvements are not enough to offset an expansion of energy consumption (except in Hong Kong and Japan).

On the other hand, in many Asian economies, the carbon intensity of energy has increased, mainly due to an expansion of coal consumption. Japan achieved some improvement in energy efficiency in this period,

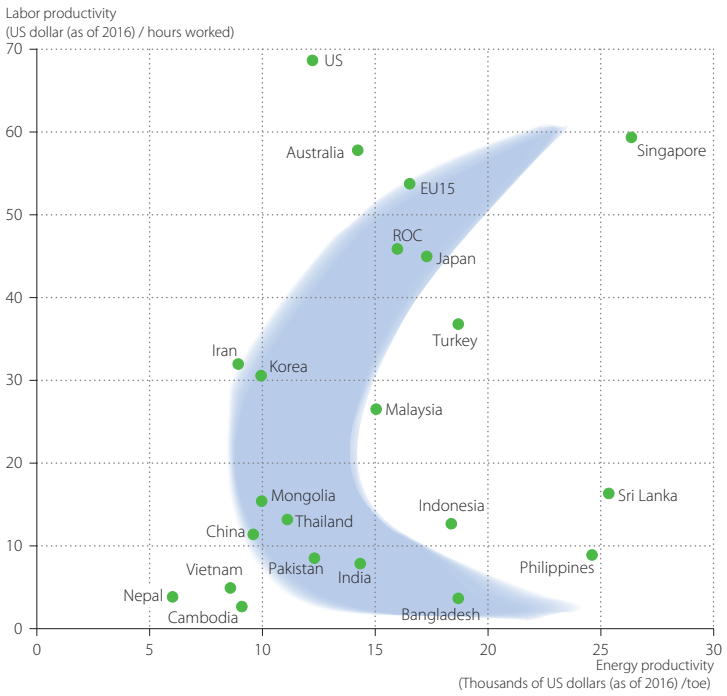

Figure 51 Labor Productivity and Energy Productivity
——Per-hour labor productivity level and energy productivity level in 2016

Sources: Official national accounts in each country, including author adjustments; IEA, *Energy Balances of OECD Countries 2018*; IEA, *Energy Balances of Non-OECD Countries 2018*; APO Productivity Database 2019.

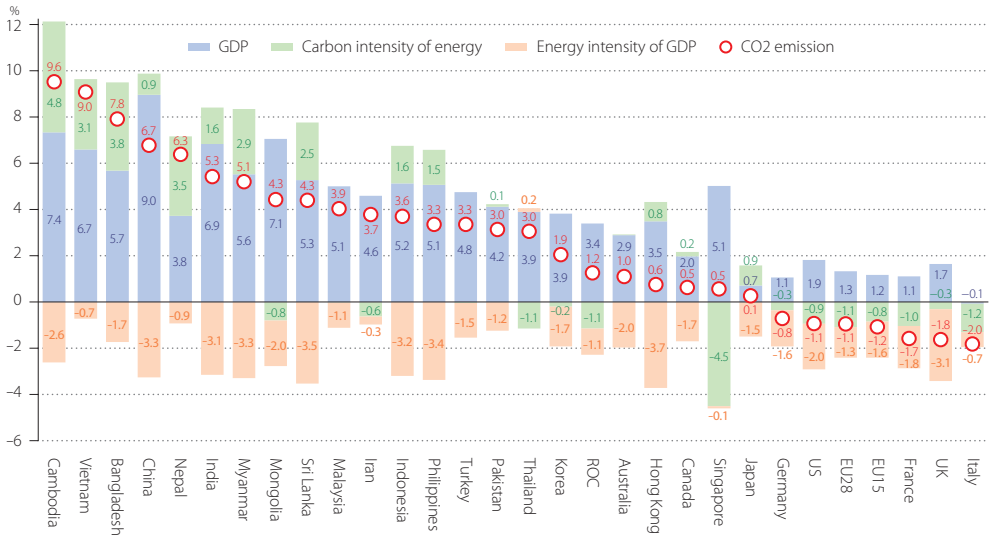

Figure 52 Sources of CO2 Emission Growth
——Average annual growth rate of CO2 emission in 2000–2016

Sources: Official national accounts in each country, including author adjustments; IEA, *Energy Balances of OECD Countries 2018*; IEA, *Energy Balances of Non-OECD Countries 2018*; IEA, *CO2 Emissions from Fuel Combustion 2018*.

but the carbon intensity of energy had to be increased due to a very low operation rate of nuclear power plants after the Fukushima Daiichi nuclear disaster in March 2011.[32] Singapore realized a significant improvement in carbon intensity of energy by the shift from oil to LNG in electricity power generation.[33] This helped to offset the increases in CO2 emission accompanied by strong economic growth, regardless of very minor improvement in energy productivity. In this period, a decoupling in the growth of GDP and CO2 emission is apparent in a few developed countries, especially in the EU. However, this may be due mainly to the shift in energy-consuming production to the Asian countries, in which more energy was required, and more CO2 was emitted to produce the same output. For sustainable growth of the world economy, improvements in energy productivity and carbon intensity of energy are recognized as one of the important policy targets in Asia.

32: According to the FEPC (The Federation of Electric Power Companies of Japan), the rate of utilized capacity of nuclear power plants was 67% in the fiscal year 2010 (the share of nuclear in power generation was 29%), but after the disaster, 24% in 2011, 3.9% in 2012, 2.3% in 2013, 0.0% in 2014.

33: In Singapore, the share of natural gas in electricity power generation reached to 95% in 2014 from 19% in 2000, compared to the decrease in the share of oil in power generation from 80% in 2000 to 0.7% in 2014 (IEA, *Energy Balances of Non-OECD Countries 2018*).

Box 3 Revisions on TFP Estimates

The TFP estimates in this edition are not directly comparable with those measured in the past Databook series, since our improvements in measuring capital and labor inputs are included in this edition. The first improvement is a consideration of land as a factor of production, based on the land database which has been developed at KEO since 2017 covering the Asia24 economies (see Appendix 4). The second improvement is a consideration of labor quality changes, which are measured based on the Asia QALI Database developed at KEO (see Appendix 6). The impact of labor quality changes has been included in TFP growth in the past editions of Databook, although it is separately measured in this edition.

Figure B3 presents the sources of the difference in the estimates of TFP growth between in Productivity Database 2018 and in 2019 for the period 2010–2016. Data shows the estimated growth rates of labor quality and hours worked. An inclusion of land as capital revised the TFP growth upwardly. Since the internal rate of return is endogenously solved with a consideration of land with produced assets as discussed in Appendix 5, the impact on the estimate of aggregate capital service input is not simple. However, in many countries, the inclusion of land revised the growth of aggregate capital input downwardly in this observation period.

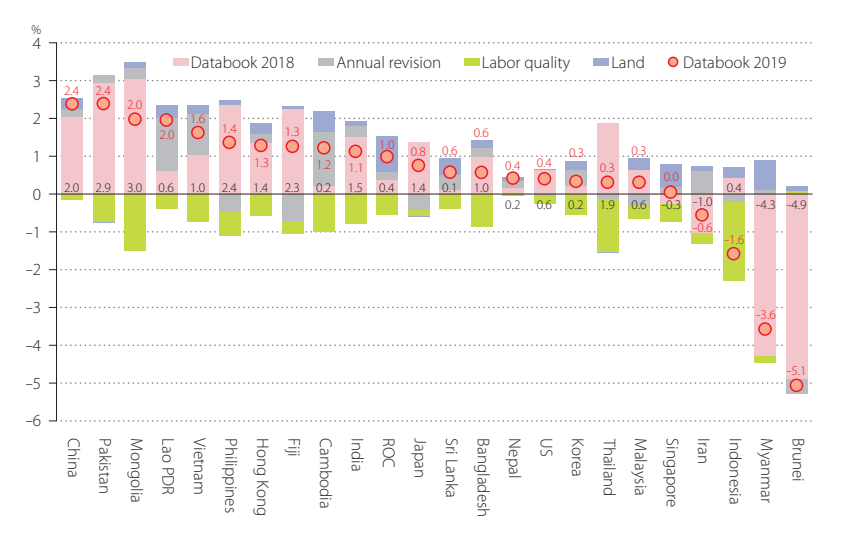

Figure B3 Revisions on TFP Estimates
——Average annual growth rate of total factor productivity in 2010–2016

Sources: APO Productivity Database 2018 and 2019.

In contrast, a consideration of labor quality changes revised the TFP growth downwardly in many countries in this period, since the quality improvement in aggregate labor input is significant (e.g., a decrease in the share of low-skilled workers in total employment). The other factor "annual revision" includes the revisions in the official national accounts and our improvement on the measures of capital and labor inputs. The annual revisions in Database 2019 also have a considerable impact in some countries.

Box 4 Sensitivity of TFP Estimates

TFP computations, based on the growth accounting framework, depends on data that is sometimes difficult to observe. One difficulty is calculating the compensation for the self-employed and unpaid family workers. Appendix 6 presents the assumption on measuring the labor compensation for total employment. The future review on this assumption affects TFP estimates directly through the revision of factor income shares and indirectly through the estimates of the ex-post rate of return and thus the aggregate measure of capital services.

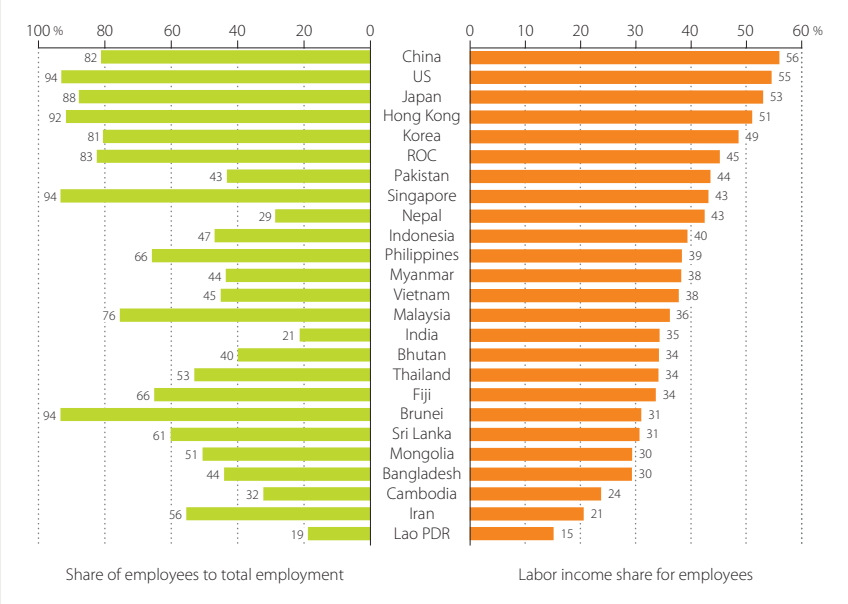

Figure B4.1 Labor Income Share for Employees in 2017

Sources: Official national accounts in each country, including author adjustments; Asia QALI Database 2019.

The right panel of Figure B4.1 presents the labor income share (the ratio of compensation of employees to the basic-price GDP) based on the official national accounts (including author adjustments in basic-price GDP for some countries) in the Asia24 economies and the US in 2017. The left panel of the figure illustrates the

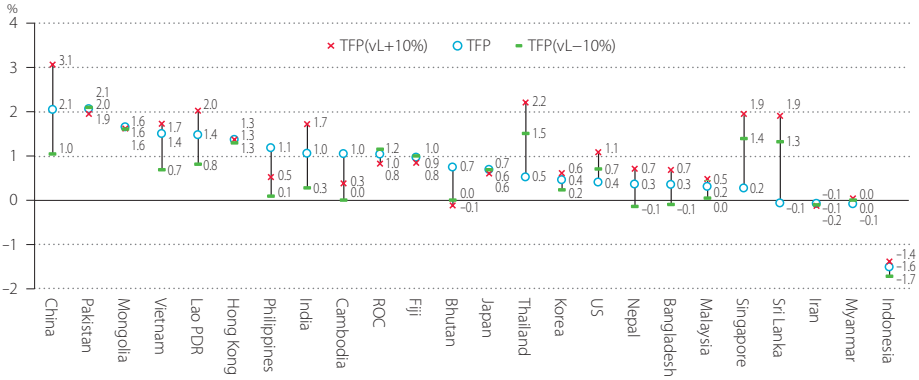

Figure B4.2 Sensitivity of TFP Estimates by the Change of Labor Share
——Average annual growth rates of total factor productivity in 2010–2017

Source: APO Productivity Database 2019.

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employee share to total employment. There is a significant divergence in labor income share for employees among the Asian countries. This does not necessarily reflect differences in the number of employees in total employment. Although Malaysia and the Philippines have a high employee share of 76% and 66%, the labor income share is only 36% and 39% in 2017, respectively.

Figure B4.2 illustrates the sensitivity of TFP estimates by changing the factor income share during the period from 2010 to 2017. In general, the growth rate of capital input is higher than that of labor input, therefore the higher income shares of labor results in higher estimates of TFP growth. In other words, labor productivity (Figure 32 in Section 5.2, p. 47) is improved much faster over a given period than capital productivity (Figure 46 in Section 5.4, p. 59), the growth of which tends to be frequently negative. The TFP estimate reflects the improvement of labor productivity more when the labor share increases. In Malaysia, with TFP growth of 0.2% on average during the period 2010–2017, the true estimate could be 0.5% if the current labor share were underestimated by 10%.

6 Industry Perspective

Highlights

- **While Asian countries are diversifying away from agriculture, the sector still dominates employment, accounting for 32% of total employment in 2017 in the Asia24, down from 62% in 1980. Its share in total value added decreased more moderately, from 17% to 9% over the same period. Shifting out of agriculture into more efficient sectors will boost economy-wide productivity (Figure 60 and Table 21).**
- **Manufacturing is a significant sector, accounting for over 20% of total value added in seven Asian countries in 2017 (Table 21). It is particularly prominent at 29% in China, where 3.1% of TFP growth was measured in 2015–2017 (Figure 37). Manufacturing is dominated by machinery and equipment in most Asian economies, while Bangladesh and Cambodia concentrate on light manufacturing, such as textiles and the food industry (Figures 55 and 67).**
- **In labor productivity growth by region, contribution of manufacturing sector is significant at 34% in East Asia in 2010–2017, but still moderate in CLMV at 16% and South Asia at 11% (Figure 69). In South Asia, 62% of the labor productivity growth is explained by improvement in the service sector, compared to 29% in East Asia and 31% in CLMV.**

Industry decomposition gives insight into the source of a country's economic dynamics which, in turn, determines its overall performance and characteristics, its strengths, and its vulnerabilities. On one hand, a broad industry base reflects diversification and sophistication in the economy, and in turn is more resourceful in weathering economic shocks. On the other hand, reliance on a narrow industry base leaves an economy more vulnerable to shocks and more susceptible to volatility. The different composition of economic activities among countries is also one of the main sources of the huge gap in average labor productivity at the aggregate level. By analyzing the industry structure of the Asian economies, one can clearly trace the path of economic development and identify countries' respective stages based on their characteristics.[34]

6.1 Output and Employment

Table 1 in Section 3.2 (p. 26) introduced a country grouping according to stages of development from the point of the view of the long run economic growth from 1970 (as measured by per capita GDP relative to the US). Table 2 regroups countries based on the same set of criteria as in Table 1, but applies it to 2017 income levels and focuses on more recent catch up to the US from 2010.

Countries at the lower rungs of the development ladder tend to have a greater agriculture sector as a share of value added.[35] Figure 53 shows the industry composition of the Asian economies and regions in 2017,[36] and indicates a broad, negative correlation between the share of the agriculture sector and the relative per

34: Constructing the industry origins of labor productivity growth requires confronting a large volume of data from different sources. Issues of data inconsistency arising from fragmentation of national statistical frameworks can present enormous hurdles to researchers in this field. The industry data in this chapter is mainly based on official national accounts. Where back data is not available, series are spliced together using different benchmarks and growth rates. Data inconsistencies in terms of concepts, coverage, and data sources have not been fully treated although levels of breakdown are deliberately chosen to minimize the potential impact of these data inconsistencies. In this sense, the industry data in the APO Productivity Database should be treated as a work in progress and it is difficult to advise on data uncertainty. Readers should bear these caveats in mind in interpreting the results.

Table 2 Country Groups Based on the Current Economic Level and the Pace of Catching Up
——Level and average annual growth rate of per capita GDP at constant market prices, using 2011 PPP

Per capita GDP level in 2017, relative to the US	Average annual rate of catch-up to the US during 2010–2017					
	(C6) <–1%	(C5) –1% ≤–< 0%	(C4) 0% ≤–< 1%	(C3) 1% ≤–< 2%	(C2) 2% ≤–< 3%	(C1) 3% ≤
(D1) 100% ≤	Brunei, Kuwait, Qatar		Hong Kong	Singapore, UAE		
(D2) 70% ≤ - <100%	Oman	Australia, Bahrain, EU15, Japan, Saudi Arabia	ROC			
(D3) 40% ≤ - < 70%		EU28		Korea	Malaysia	Turkey
(D4) 20% ≤ - < 40%		Iran		Thailand	Indonesia	China, Mongolia, Sri Lanka
(D5) 10% ≤ - < 20%				Fiji	Philippines	Bhutan, India, Lao PDR, Vietnam
(D6) < 10%			Pakistan	Myanmar	Nepal	Bangladesh, Cambodia

Sources: Official national accounts in each country, including author adjustments.
Note: The annual catch-up rates in column are based on the estimates in 2010–2017.

capita GDP against the US.[37] The changes in the industry shares of value added are presented in Table 21 in Appendix 10 (p. 180).

To foster productivity in less-developed countries, it is important to adopt existing technologies from the advanced economies. In this view of assimilation, manufacturing is a key sector in driving countries to make a leap in economic development. It accounts for 20% more of total value added in seven of the Asian countries compared in Figure 53. Figure 54 compares our estimates of TFP growth during 2010–2017 and the shares of manufacturing in 2017. A positive correlation between them, which was observed in the past decades, is less clear in the 2010s. Regardless of larger share of manufacturing, TFP growth is stagnated in Korea and Thailand.

Figure 55 shows the breakdown of the manufacturing sector, comprising nine sub-industries, for 17 selected Asian countries and the US in 2017.[38] Countries are sorted based on the size of the share of machinery

35: In Chapter 5, GDP is adjusted to be valued at basic prices (if the official estimates at basic prices are not available, they are our estimates). However, the definition of GDP by industry differs among countries in this chapter due to data availability. GDP is valued at factor cost for Fiji and Pakistan; at basic prices for Bangladesh, Cambodia, Hong Kong, India, Korea, the Lao PDR, Mongolia, Nepal, Singapore and Vietnam; at producers' prices for Iran, the ROC and the Philippines; and at market prices for Indonesia, Japan, Malaysia, Sri Lanka, and Thailand.

36: The nine industries are 1–agriculture; 2–mining; 3–manufacturing; 4–electricity, gas, and water supply; 5–construction; 6–wholesale and retail trade, hotels, and restaurants; 7–transport, storage, and communications; 8–finance, real estate, and business activities; and 9–community, social, and personal services. Cambodia, Iran, and Nepal use the International Standard Industry Classification of All Economic Activities (ISIC) Rev.3. Other Asian economies already have switched to the ISIC Rev.4. See the Online Appendix for the concordances between the industry classification used in the Databook and the ISIC Rev.3 and Rev.4, respectively.

37: The regional averages as industry share of value added are based on a country's industry GDP, using the PPPs for GDP for the whole economy without consideration of the differences in relative prices of industry GDP among countries.

38: Manufacturing consists of nine sub-industries: 3.1–food products, beverages, and tobacco products; 3.2–textiles, wearing apparel, and leather products; 3.3–wood and wood products; 3.4–paper, paper products, printing, and publishing; 3.5–coke, refined petroleum products, chemicals, rubber, and plastic products; 3.6–other non-metallic mineral products; 3.7–basic metals; 3.8–machinery and equipment; and 3.9–other manufacturing. See Appendix 11 for the concordance with ISIC, Revisions 3 and 4.

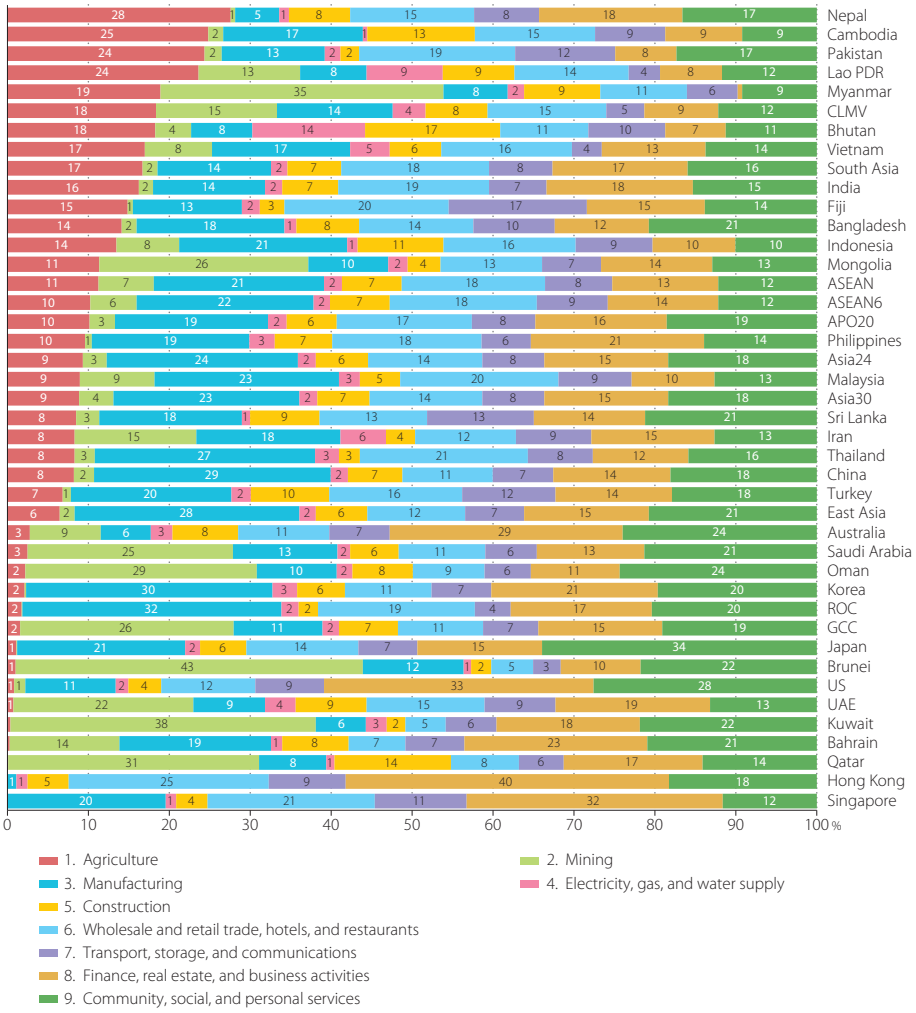

Figure 53 Industry Shares of Value Added
——Shares of industry GDP in aggregate GDP at current prices in 2017

Sources: Official national accounts in each country, including author adjustments.

and equipment in manufacturing GDP. The dominance of machinery and equipment in Asian manufacturing is apparent. At the other end are countries dominated by light manufacturing; e.g., the food products, beverages, and tobacco products sector.

Figure 56 shows how the share of the agriculture industry in total value added dropped over time in the Asian economies with per capita GDP lower than 40% of the US level in 2017. This could reflect the actual decline in agricultural output and/or the relatively rapid expansion in other sectors. Despite the broad spread, the downward trend is unmistakable. The share of the agriculture sector displays a long-term declining trend in all countries, albeit at different paces and at different starting times.

Despite the relative decline of agriculture's share in total value added, employment in the sector for Asia still accounted for 32% of total employment in 2017. Figure 57 shows industry shares in total employment by country and region and ranks them by size of employment in the agriculture sector.

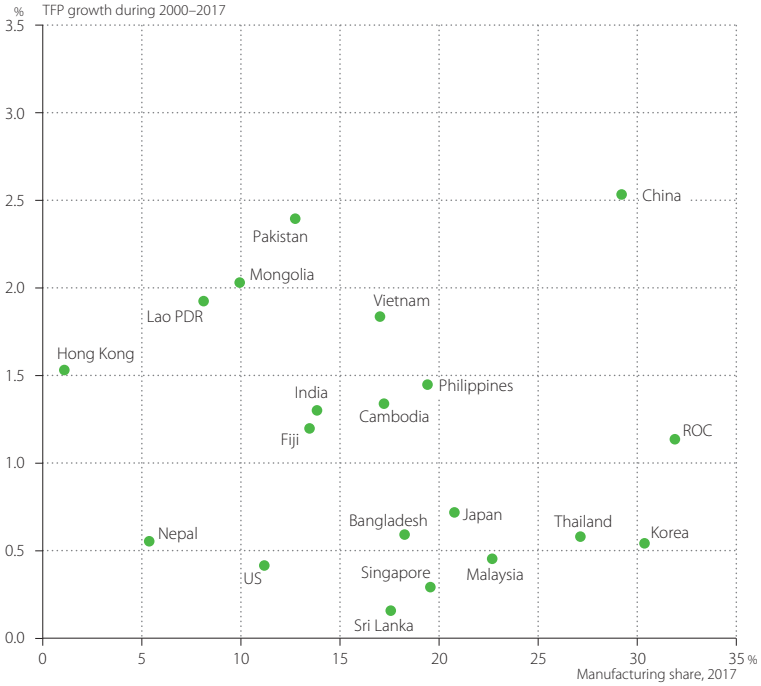

Figure 54 Manufacturing GDP Share and TFP Growth
——GDP share of manufacturing in 2017 and average annual TFP growth rate in 2010–2017

Sources: Official national accounts in each country, including author adjustments; APO Productivity Database 2019.
Note: Countries with negative TFP growth are excluded.

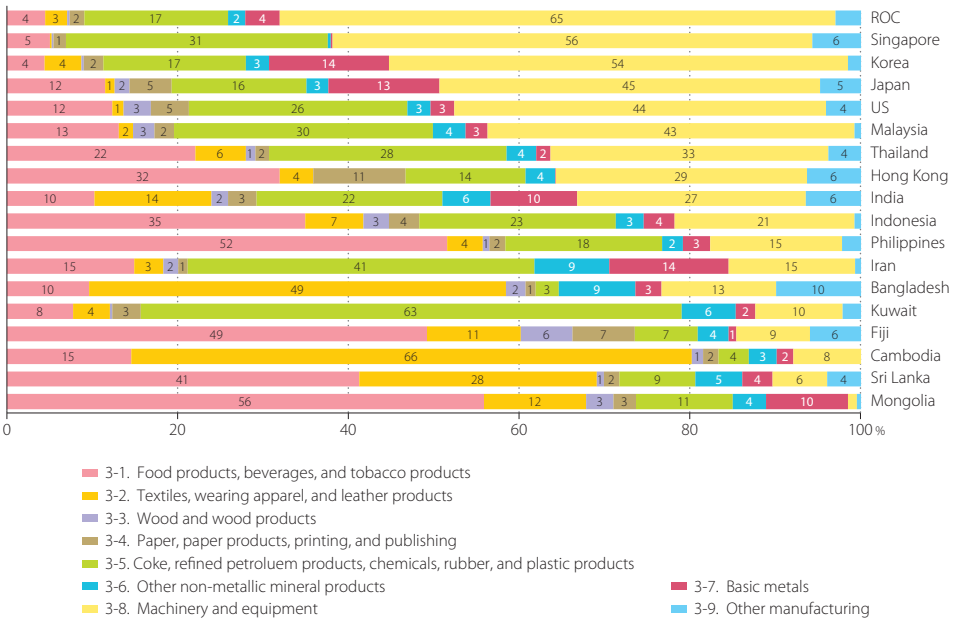

Figure 55 Industry Shares of Value Added in Manufacturing
——Shares of sub-industry GDP in aggregate GDP at current prices in 2017

Sources: Official national accounts in each country, including author adjustments.

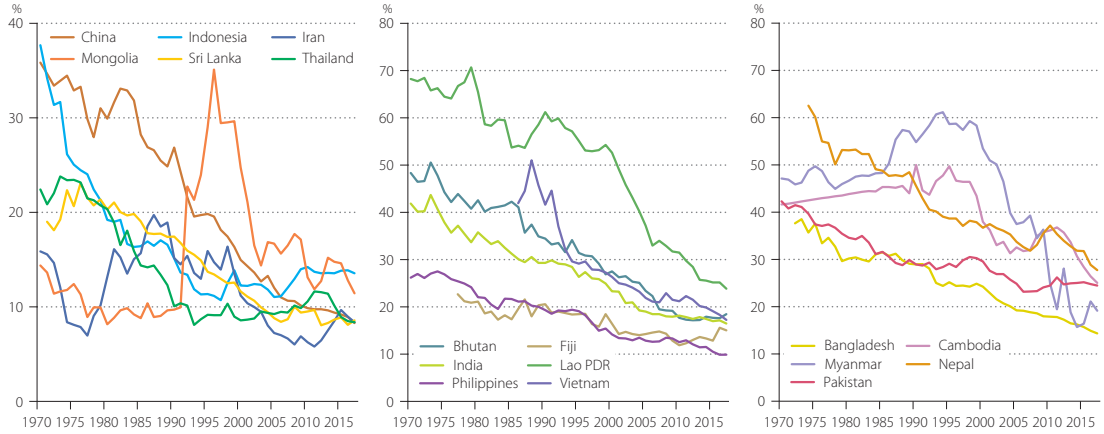

Figure 56.1: Group-D4 (20%≤...<40%) Figure 56.2: Group-D5 (10%≤...<20%) Figure 56.3: Group-D6 (<10%)

Figure 56 Trend of Value-added Share in Agriculture
——Share of agriculture sector GDP in aggregate GDP at current prices in 1970–2017

Sources: Population census and labor force survey in each country, including author adjustments.
Note: Countries are grouped according to the levels of per capita income in 2017, relative to the US, defined in Table 2 (p. 68).

Figure 58 traces the historical trajectory of Japan's employment share of agriculture for the period 1885–2017 and the countries' levels in 2017, mapped against Japan's experience (as circles). Large shares of agriculture employment – over 30% in 9 countries – correspond to Japan's level at the end of the 1950s and the onset of high economic growth. This may indicate room for improving labor productivity and per capita income, if more productive industries are developed and jobs are created.

The trend of employment share over time (Figure 59) suggests that the relative decline in the share of agriculture in total value added has been accompanied by a downward trend in its share in total employment.[39] This trend is unmistakable in most of the countries plotted in Figure 59.[40] Between 1970 and 2017, the employment share in agriculture dropped from 81% to 26% in China and from 77% to 32% in Thailand.

Comparisons of the value-added and employment shares reveal some interesting facts. Agriculture is the only industry sector that consistently has a disproportionately higher employment share than justified by its share in value added across all economies in Asia, except Fiji. This suggests that agriculture is still highly labor-intensive and/or there may be a high level of underemployment in the sector, both of which imply that the labor productivity level is low compared to other industry sectors.[41] Thus, countries with a sizeable agriculture sector often have low per capita GDP. In these cases, shifting out of agriculture will

39: Nepal's employment-by-industry figures are constructed by interpolating benchmark data taken from its labor force survey as well as its population census. Figure 59 indicates that its share of agriculture has increased since 2001. This reflects the employment share of agriculture at 61% in the population census of 2001 and its share of 70% in the labor force survey of 2008.
40: However, the decline in a share does not always reflect an actual fall in employment for the agriculture sector; rather, it could reflect total employment rising faster than employment in agriculture. Countries that have been experiencing a consistent fall in actual employment in the agriculture sector are, for example, the ROC, Hong Kong, Japan, and Korea, whereas in Cambodia, India, Iran, Nepal, and Pakistan, actual employment has been rising. Other countries such as Thailand, Indonesia, Singapore, Malaysia, and Vietnam have no established trend in employment growth. China, however, has seen actual employment in agriculture falling since the turn of the millennium.
41: Gollin, Parente, and Rogerson (2004) and Caselli (2005) demonstrate the negative correlation between employment share of agriculture and GDP per worker. They show that the agriculture sector was relatively large in less well-off countries and agricultural labor productivity was lower than that in other sectors.

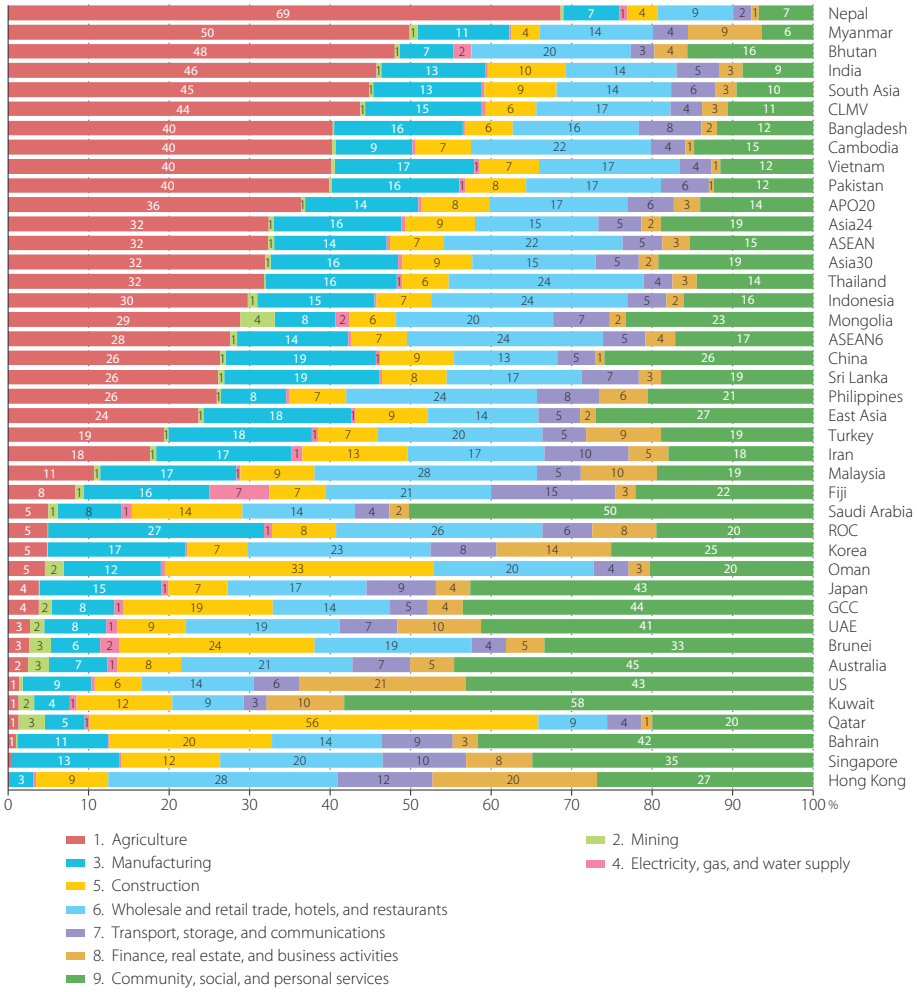

Figure 57 Industry Shares of Employment
——Shares of number of employment by industry in 2017

Sources: Population census and labor force survey in each country, including author adjustments

help boost economy-wide labor productivity. The US is an exception, where its agricultural value-added share and employment share are similar at 1%, as shown in Figure 60; suggesting that labor productivity in this sector is higher than that experienced in Asian countries.[42] The reverse is true for the sector of finance, real estate, and business activities, which often generate a much greater value-added share than suggested by its employment share. In 2017, the sector accounted for 33% of total value added generated by 21% of employment in the US, and 15% and 2% in the Asia24, respectively (see Figures 53 and 57).

When the number of underemployed workers (known as labor surplus) in each country is estimated based on the simple assumption that the employment share would be equivalent to the value-added share of

42: Jorgenson, Nomura, and Samuels (2016) indicates agriculture sector is one of the industries, which realized a high TFP growth constantly in the US (1.0% on average per year in 1970–2012), compared to its stagnation in Japan's agriculture (–0.1%), reflecting differences in the scale of individual production units, as well as massive public investments (including research and development) in new agricultural technology in the US.

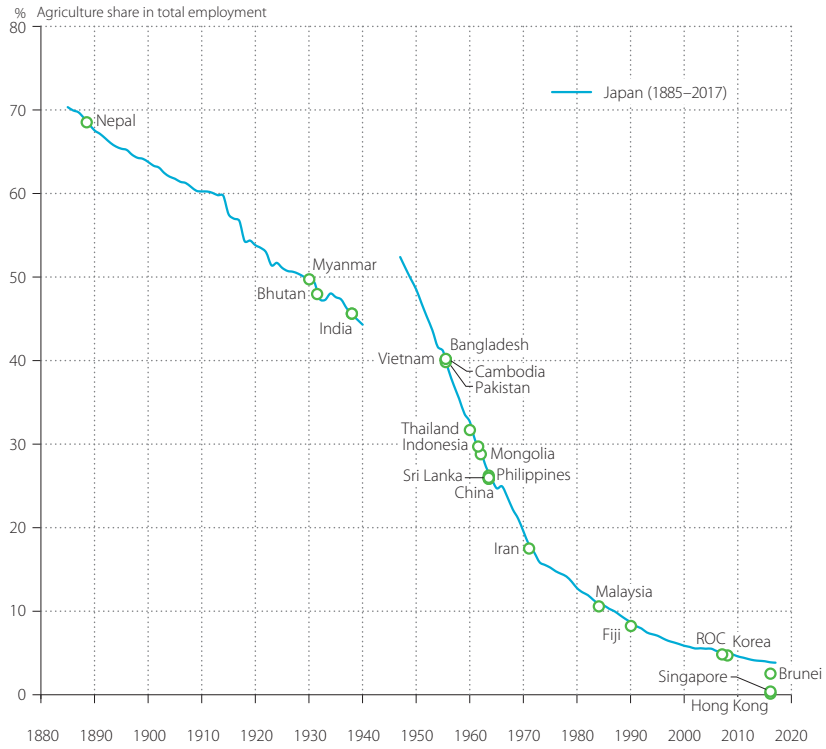

Figure 58 Historical Employment Share of Agriculture in Japan and Current Level of Asia

——Shares of number of employment in agriculture for Japan in 1885–2017 and for Asian countries in 2017

Sources: Population census and labor force survey in each country, including author adjustments. The sources of historical data of Japan are Ohkawa, Takamatsu, and Yamamoto (1974) during 1885–1954 and population censuses since 1920.

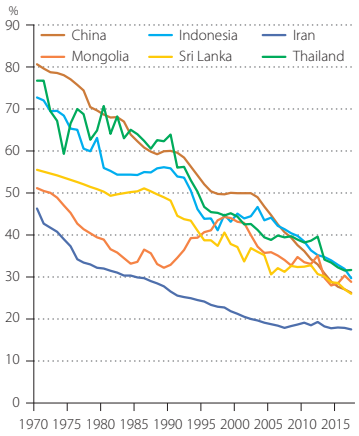

Figure 59.1: Group-D4 (20%≤...<40%)

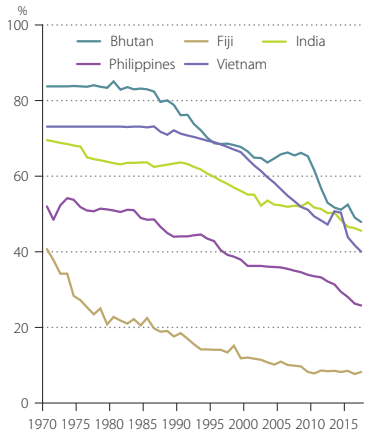

Figure 59.2: Group-D5 (10%≤...<20%)

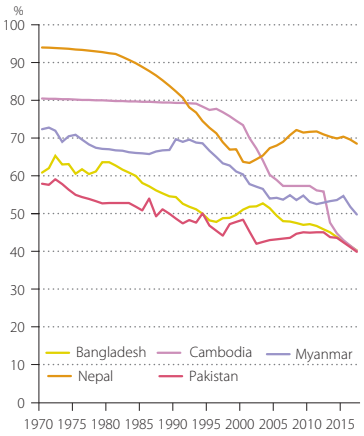

Figure 59.3: Group-D6 (<10%)

Figure 59 Trends of Employment Share in Agriculture

——Share of number of employment in agriculture in 1970–2017

Sources: Population census and labor force survey in each country, including author adjustments.
Note: Countries are grouped according to the levels of per capita income in 2017, relative to the US, defined in Table 2 (p. 68).

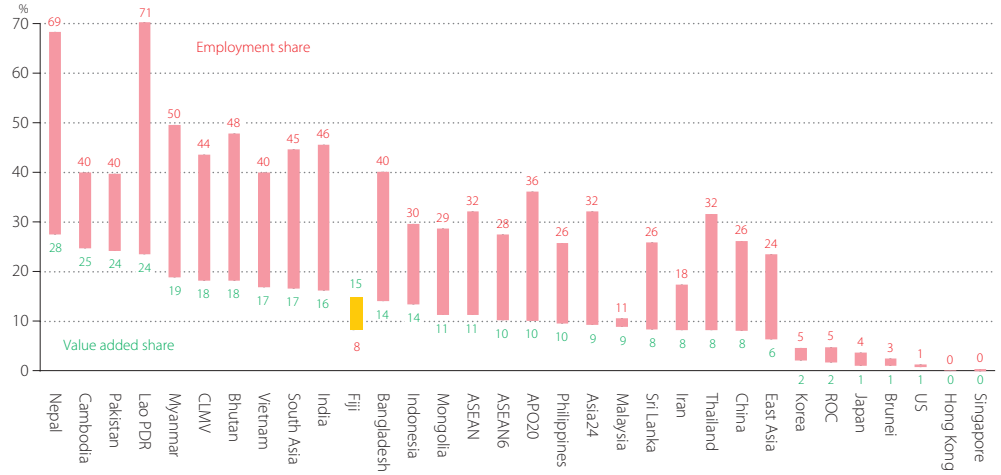

Figure 60 Value Added and Employment Shares of Agriculture
——Shares of industry GDP in aggregate GDP at current prices and employment in 2017

Sources: Official national accounts, population census and labor force survey in each country, including author adjustments.

agriculture in the status of zero labor surplus,[43] the number of labor surplus reaches 376 million persons for the Asia24 in 2017. Figure 61 presents the country contributions and regional totals (right chart) of the estimated labor surplus.

It is the manufacturing sector that largely absorbs workers who have been displaced from the agriculture sector, especially in the initial stages of economic development. Figure 62 traces the trajectory of growth rates of GDP and employment in combination with manufacturing for Asian countries and the US over

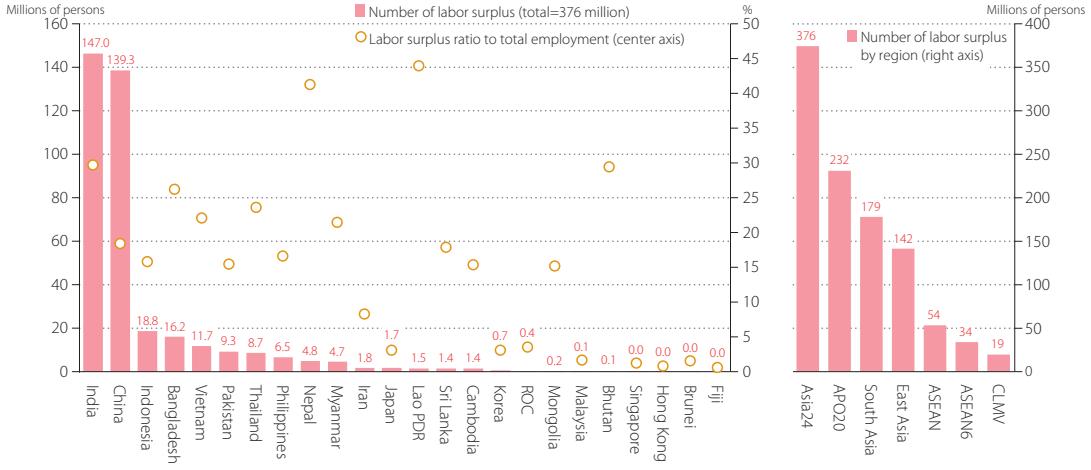

Figure 61 Labor Surplus
——Number and ratio of labor surplus in 2017

Sources: Our estimates.

43: In this calculation the mining sector is excluded in the totals in both of employment and value added.

the past four decades. Each dot represents the average annual growth rate in the 1970s, 1980s, 1990s, and 2000s. The growth rate in the 2010s (2010–2017) is illustrated by an arrow. If manufacturing GDP and employment grow at the same rate, a dot will be on a 45-degree line through the origin running from the lower left to upper right quadrants. In Japan, despite positive gains in manufacturing GDP, the overall growth in manufacturing employment was negative – except during the 1980s.

In Korea and the ROC, expansions of manufacturing output could allow for increases of employment in the 1970s and the 1980s (Figure 62.1). However, since the 1990s manufacturing has not been an absorption sector of employment, regardless of the sound expansion of production in this sector. The experiences of Singapore, Indonesia, and Thailand are closer to the 45-degree line through the origin, which implies well-balanced growth of output and employment in the manufacturing sector. The job creation role of manufacturing has remained in these countries, but it is diminishing rapidly (Figure 62.3).

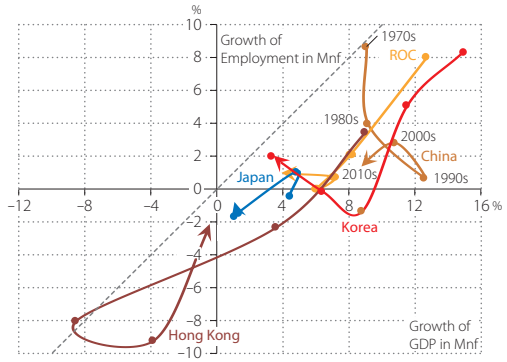

Figure 62.1: East Asia

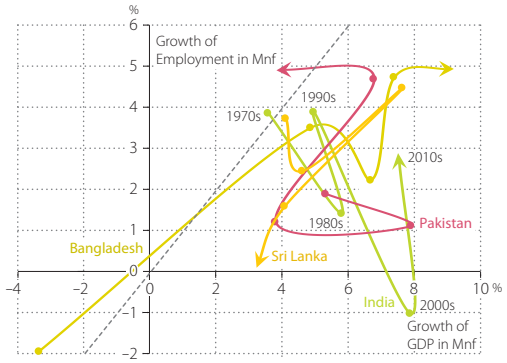

Figure 62.2: South Asia

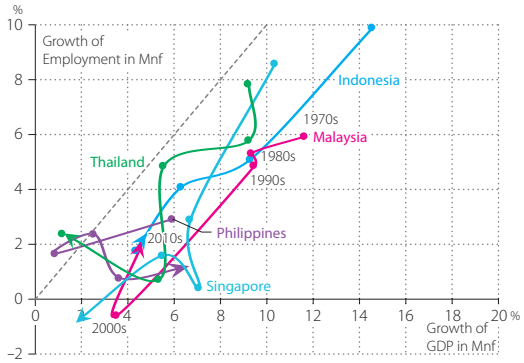

Figure 62.3: ASEAN6

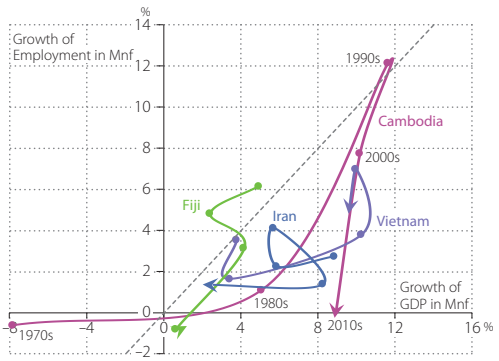

Figure 62.4: CLMV and Other Asian

Figure 62 Job Creation in Manufacturing
——Average annual growth rates of constant-price GDP and number of employment in 1970–2017

Sources: Population census and labor force survey and official national accounts in each country, including author adjustments.
Note: Each dot represents the average annual growth rate in manufacturing (mnf) in the 1970s, 1980s, 1990s, and 2000s. The arrows indicate the rate in the 2010s (2010–2017).

6.2 Industry Growth

Industry origins of economic growth by country and region for the period 2010–2017 are shown in Figure 63. China and India have been the two main drivers among the Asian economies, accounting for 50% and 22% during 2015–2017, respectively, as shown in Figure 7 in Section 3.1 (p. 23). However, looking at the industry composition, the origins of economic growth in China and India are quite different. China's economic growth has been fueled by industry sector expansion; whereas India's economic growth has been led by service sector expansion. This also indicates that the nature of growth in China may have started shifting more toward services in recent years.

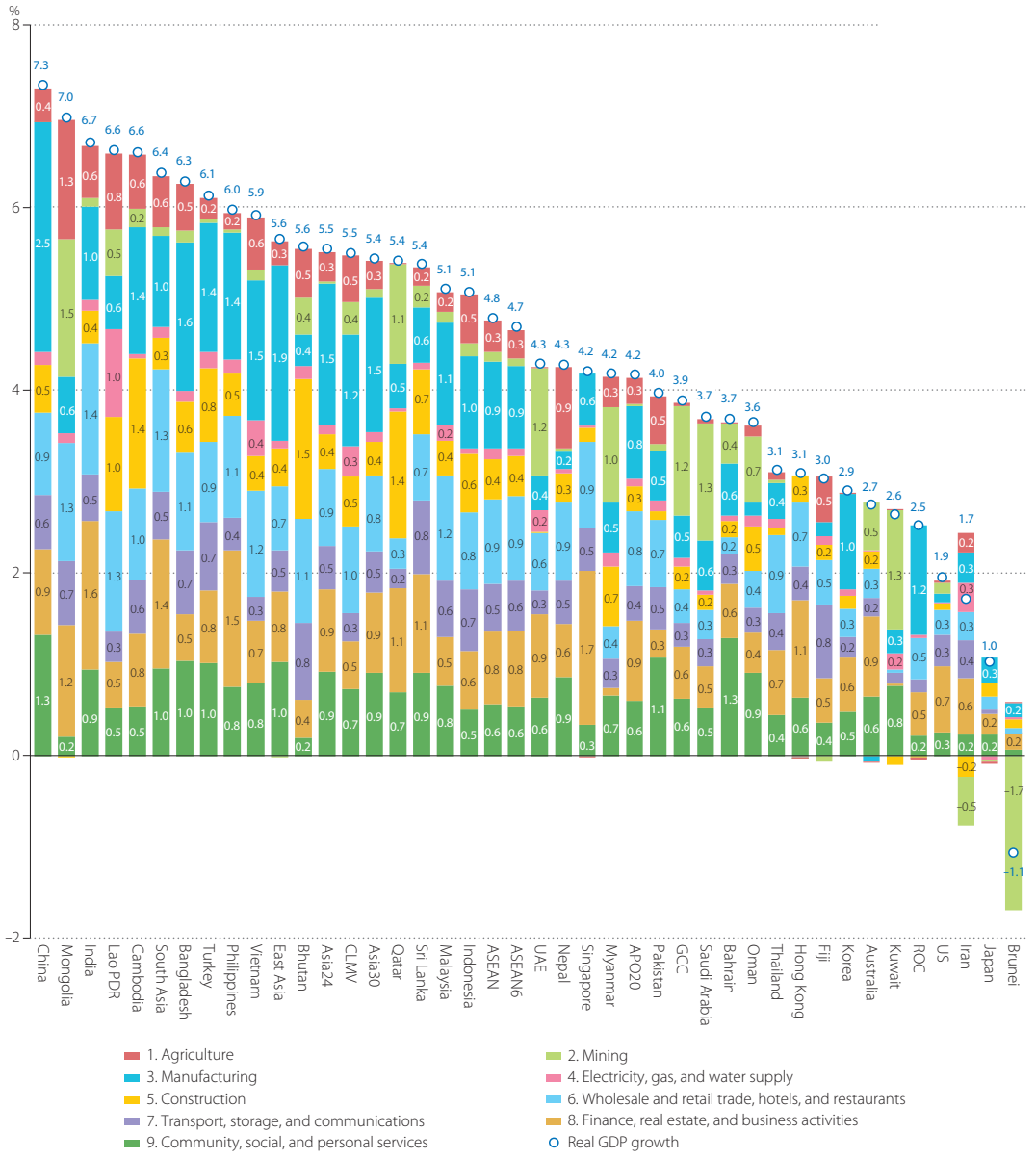

Figure 63 Industry Origins of Economic Growth
——Industry decomposition of average annual growth rate of constant-price GDP in 2010–2017

Sources: Official national accounts in each country, including author adjustments.

Figure 64 contrasts industry contributions to economic growth among regions.[44] Even within such a short period, one can see that the industry structure of growth is changing. The first striking feature is the dominance of manufacturing in Asian countries. Between 2010 and 2017, its contribution to economic growth in the Asia24 was 28% compared to 5% in the US. This, however, masks a divergence within Asia. In the earlier period, manufacturing accounted for 34% of growth in East Asia but 16% in South Asia, although the differential is narrowing somewhat.

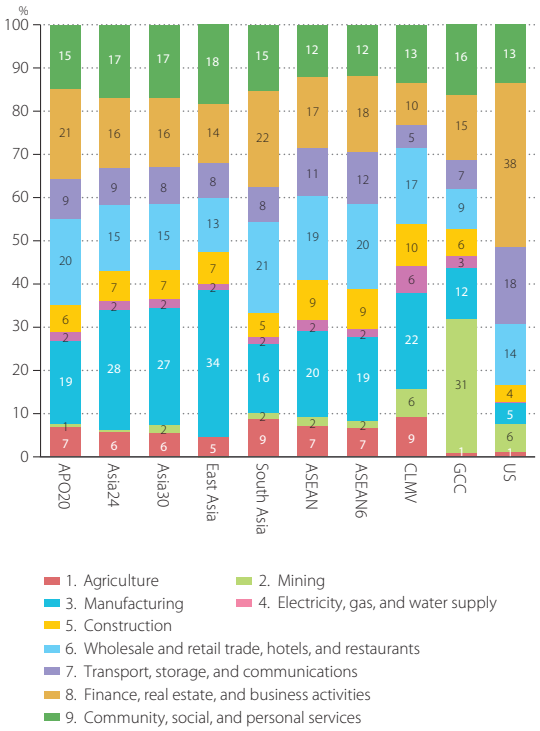

Figure 64 Industry Origins of Regional Economic Growth

——Contribution shares of industry GDP growth in aggregate GDP by region in 2010–2017

Sources: Official national accounts in each country, including author adjustments.

In 2010–2017, manufacturing has sustained its significance in ROC, Korea, and China, contributing 48%, 36%, and 34% to economic growth, respectively, as shown in Figure 65.[45] Its contribution is modest in Singapore at 14%. In Hong Kong, it has been a drag on economic growth in the past decade or so.

The service sector plays an equal, if not more important, role in Asian economic growth. Services made the substantial contribution to economic growth in all Asian countries (Figure 66). The story behind India's recent growth has been one of services. Modern information and communication technology have allowed India to take an unusual path in its economic development, bypassing a stage when manufacturing steers growth. Within the service sector, contribution is quite evenly spread among the sub-sectors, more recently the iron/steel and motor vehicle sectors have been intensively developed. For further improvement in per capita GDP and to capitalize on the demographic dividend (see Box 1), expansion of labor-intensive manufacturing may be required in India for greater job creation.

Economic growth in the Asian Tigers was also dominated by the service sector, albeit more so in Hong Kong and Singapore than in the ROC and Korea, where manufacturing remained a significant force. The service sector accounted for 52% of growth in the ROC for the period 2010–2017, 56% in Korea, 82% in Singapore, and 91% in Hong Kong, counterbalancing zero contribution by manufacturing (Figures 65 and 66).

44: Asian averages are calculated using the Törnqvist index to aggregate the growth rates of industry GDP of each country based on the two-period average of each country's shares of industry GDP to the gross regional products as weights.

45: The Törnqvist quantity index is adopted for calculating the growth of real GDP. Using this index, the growth of real GDP into the products of contributions by industries can be decomposed:
$\underbrace{\ln\left(GDP^{t}/GDP^{t-1}\right)}_{\text{Real GDP growth}} = \underbrace{\Sigma_j (1/2)\left(s_j^{t}+s_j^{t-1}\right)\ln\left(Q_j^{t}/Q_j^{t-1}\right)}_{\text{Contribution of an industry } j}$ where Q_j^t is real GDP of an industry j in period t and s_j^t is the nominal GDP share of an industry j in period t.

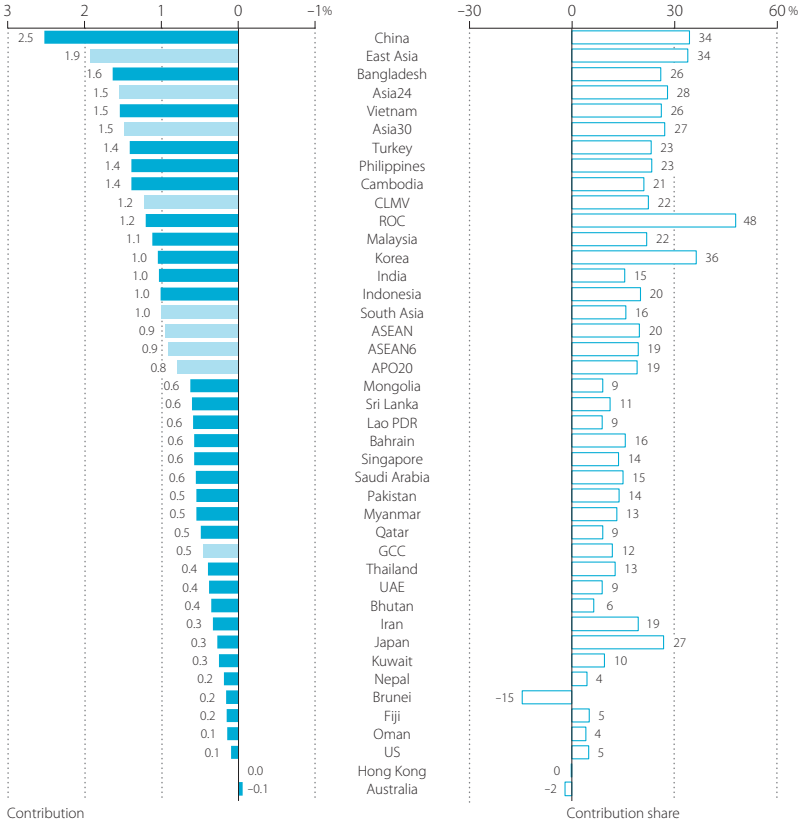

Figure 65 Contribution of Manufacturing to Economic Growth
——Average annual contributions and contribution shares in 2010–2017

Sources: Official national accounts in each country, including author adjustments.

For some Asian countries, agriculture is still the principal sector. The five countries in which the agriculture sector has the largest share in total value added are Nepal, Cambodia, Pakistan, the Lao PDR, and Bhutan, as shown in Figure 53. For the period 2010–2017, agriculture in Nepal had the highest contribution to economic growth among all Asian countries, accounting for 21% of growth (Figure 63). Figure 67 illustrates the sub-industry origins of average annual growth of manufacturing GDP for selected Asian countries in 2010–2017.[46] Manufacturing in Asia has been dominated by 3-8 (machinery and equipment), but the expansion of 3-2 (textiles, wearing apparel, and leather products) has a significant impact in Bangladesh and Cambodia.

46: The Törnqvist quantity index is adopted for calculating the growth of real GDP of manufacturing. Using this index, the growth of real GDP of manufacturing into the products of contributions by sub-industries of manufacturing can be decomposed:

$$\underbrace{\ln\left(GDP^{t}/GDP^{t-1}\right)}_{\text{Real GDP growth of manufacturing}} = \sum_{j} \underbrace{(1/2)\left(s_j^{t}+s_j^{t-1}\right)\ln\left(Q_j^{t}/Q_j^{t-1}\right)}_{\text{Contribution of a sub-industry } j}$$

where Q_j^t is real GDP of a sub-industry j in period t and s_j^t is the nominal GDP share of a sub-industry j in period t.

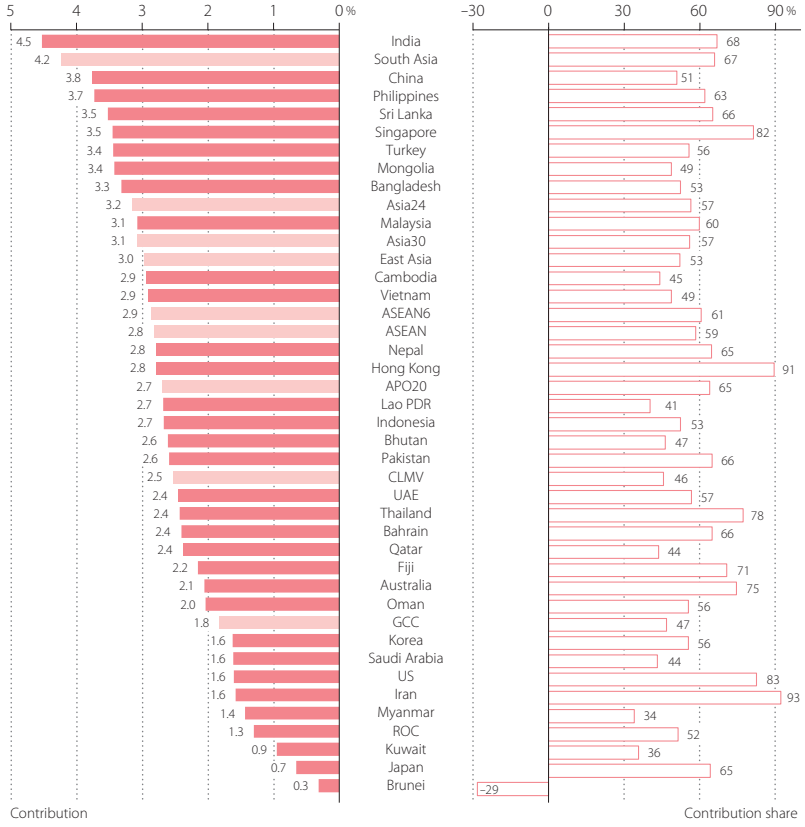

Figure 66 Contribution of Service Sector to Economic Growth
——Average annual contributions and contribution shares in 2010–2017

Sources: Official national accounts in each country, including author adjustments.

6.3 Labor Productivity by Industry

This section analyzes the industry sources of labor productivity growth in Asia.[47] Figure 68 shows the industry origins of average labor productivity growth per year in 2010–2017.[48] Positive labor productivity growth was achieved across all sectors for the Asia24. If one focuses on the regional economy, the findings highlight the fact that service industries no longer hamper an economy's productivity performance but are as capable as manufacturing in achieving productivity growth. In fact, there are no significant differences between manufacturing and non-manufacturing sectors in the Asia24; i.e., manufacturing (at 4.5% on

47: The data presented in this chapter is subject to greater uncertainty than those in previous chapters and the quality across countries is also more varied. Employment data of the less developed countries often lacks frequency as well as industry details. Neither does the industry classification of employment data necessarily correspond to those of industry output data. Consequently, the quality of labor productivity estimates at the industry level is compromised. Furthermore, estimates of the manufacturing sector should be of better quality than those of the service sector as many countries have occasional manufacturing censuses, but do not have a similar census covering the service sector.

48: Not all Asian countries are included, as employment by industry sector is not available for some countries. Labor productivity growth in Table 22 is defined simply as per-worker GDP at constant prices by industry (v_j). The industry decomposition of labor productivity growth for the whole economy (v) in Figure 68 (industry contribution in Table 22) is based on the equation $v = \sum_j \overline{w}_j v_j^*$ where the weight is the two-period average of value-added shares. In this decomposition, the number of workers as a denominator of labor productivity (v_j^*) is adjusted, weighting the reciprocal of the ratio of real per-worker GDP by industry to its industry average. Thus, the industry contribution ($\overline{w}_j v_j^*$) is emphasized more in industries in which the per-worker GDP is higher than the industry average, in comparison with the impact ($\overline{w}_j v_j$) of using the non-adjusted measure of labor productivity.

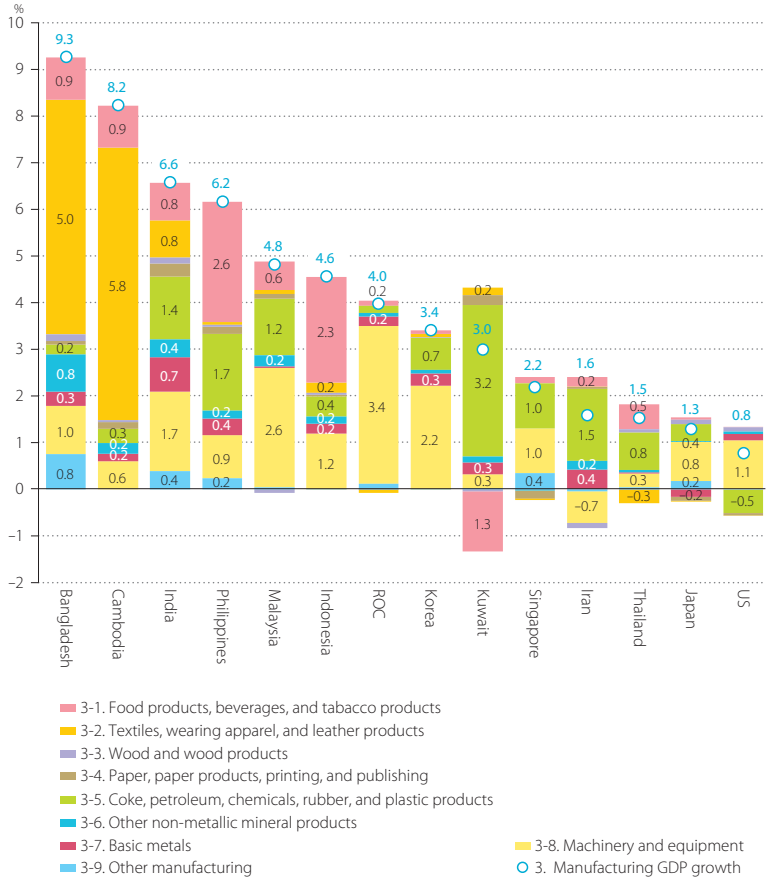

Figure 67 Industry Origins of Output Growth in Manufacturing
——Sub-industry contributions in average annual growth rate of constant-price manufacturing GDP in 2010–2017

Sources: Official national accounts in each country, including author adjustments.

average per year), agriculture (5.5%), construction (4.8%), electricity (4.5%), and transport, storage, and communications (3.4%), as provided in Table 22 in Appendix 10 (p. 181).

The manufacturing sector has been a major driving force behind productivity growth in most Asian countries, as shown in Figure 69. Contributions from manufacturing were 79% in Japan, 69% in the ROC, and 55% in Korea in 2010–2017. In CLMV and South Asia, the contribution of manufacturing in their improvement in regional labor productivity is still moderate at 16% and 11%, respectively in the same period.

Traditionally, it has been difficult for the service sector to realize productivity growth, but modern advancements in information and communication technology have changed this. Many IT-intensive users are in this sector, which is capable of capturing the productivity benefits arising from IT utilization. The growing importance of these services is observed when explaining the productivity growth in Western economies of recent decades. In Asia, the contribution from services matches that of manufacturing. Among the four industries in the service sector, three are potentially IT-employing industries: wholesale and retail trade, hotels, and restaurants; transport, storage, and communications; and finance, real estate, and business activities.

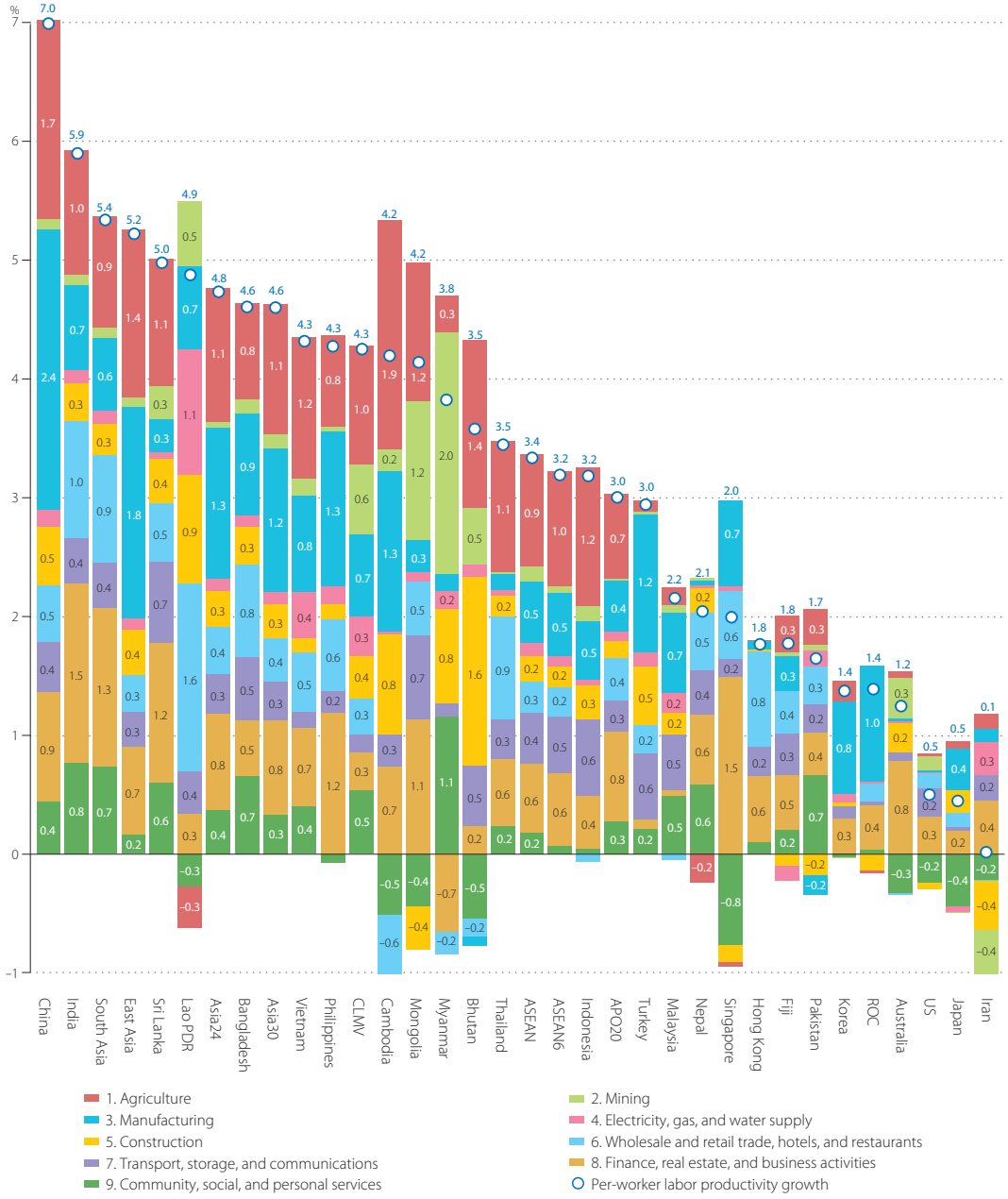

Figure 68 Industry Origins of Labor Productivity Growth
——Average annual growth rate of constant-price GDP per worker and industry contributions in 2010–2017

Source: APO Productivity Database 2019.

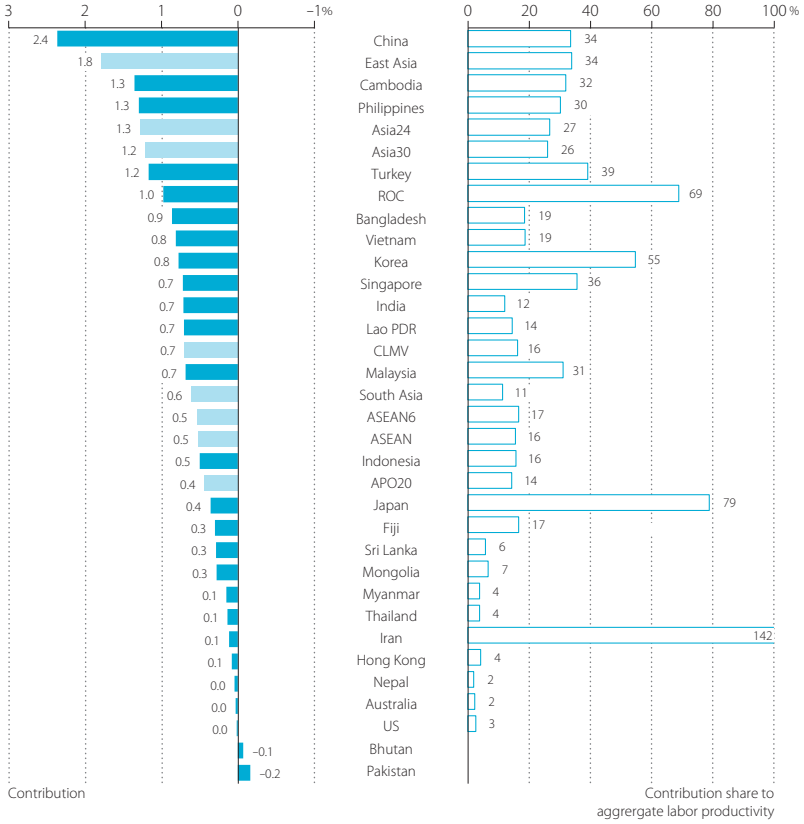

Figure 69 Contribution of Manufacturing to Labor Productivity Growth
——Average contribution of manufacturing in growth of constant-price GDP per worker in 2010–2017

Source: APO Productivity Database 2019.

Figure 70 presents the contribution of services in labor productivity growth by country in 2010–2017. Services were contributing at least one-third or more to labor productivity growth in most Asian countries. By region, contribution of services in labor productivity improvement is significant at 62% in South Asia, compared to 29% in East Asia and 31% in CLMV. The contribution was predominant in Nepal, Hong Kong, Pakistan, and Fiji.

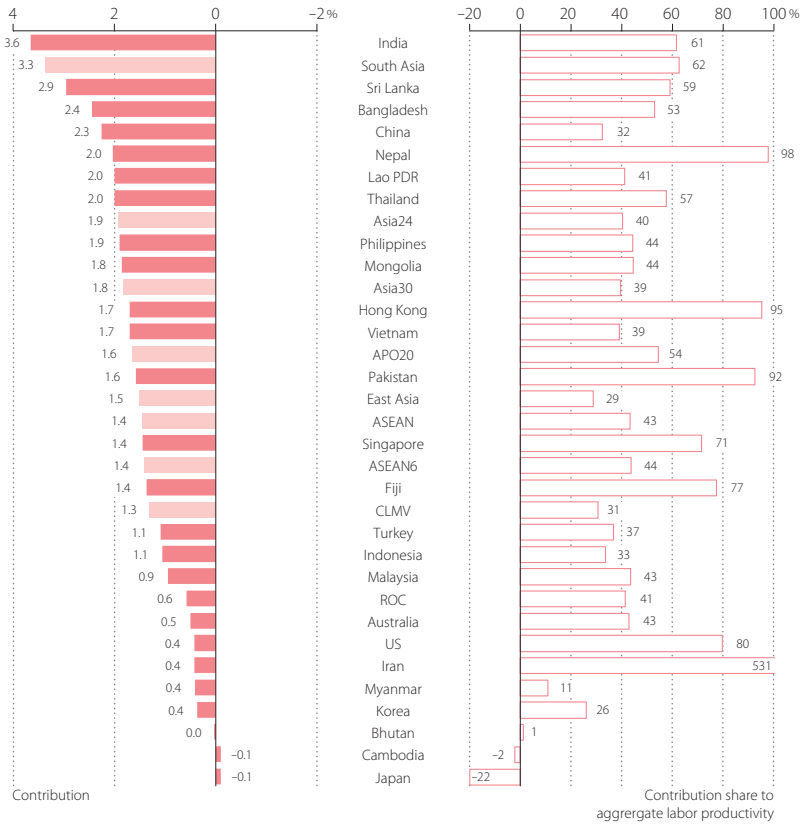

Figure 70 Contribution of Service Sector to Labor Productivity Growth
——Average contribution of service sector in growth of constant-price GDP per worker in 2010–2017

Source: APO Productivity Database 2019.

Box 5 Premature Deindustrialization

Deindustrialization, or the shrinkage of the manufacturing sector, has been a major concern in advanced economies for reasons, Rodrik (2016) calls "premature deindustrialization." He claims that many developing economies in recent periods are starting to have a declining share of the manufacturing sector without experiencing full industrialization. Premature deindustrialization may harm developing economies during its economic development because the manufacturing is a dynamic sector typically at the center of sustained economic growth and technological progress (Figure 54). The sector also has created massive jobs for relatively poor people (Figure 62). Additionally, it generates flows of labor from rural to urban, and from informal to formal sectors, as well as nurturing human capital. Early servicification of the economy without a mature manufacturing sector may jeopardize a smooth transition from developing to developed economies.

Rodrik points out that premature deindustrialization is serious particularly in Latin America and Sub-Saharan Africa. How about in Asia? Figure B5.1 plots GDP shares of the manufacturing sector in Asian economies, placing the peak of each country's inverse U shape at the center. A typical image of the up and down is drawn by the US and Japan with peaks above 30% in 1946 and 1970 respectively. The peaks in manufacturing GDP are faster than those in manufacturing employment shares, which are 1970 in the US and 1976 in Japan. China, the ROC, and Korea also reach their peaks above 30% in 1978, 1986, and 2011, respectively,

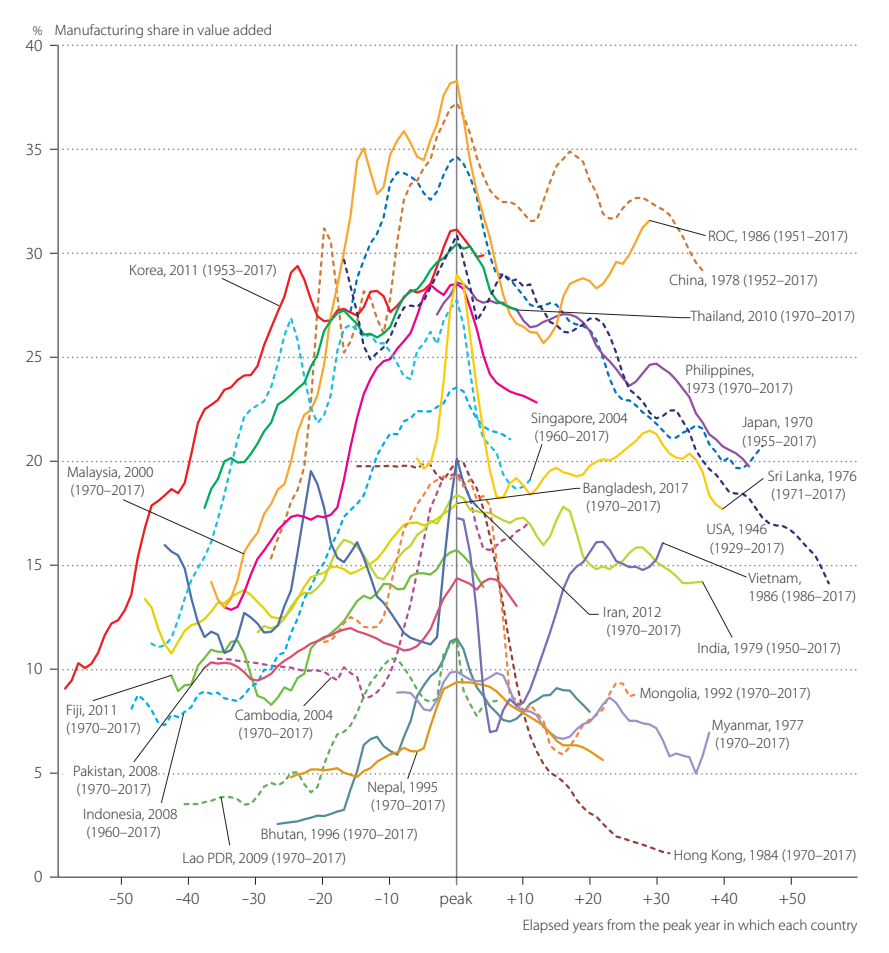

Figure B5.1 Country Peaks in Manufacturing GDP Share
——GDP share of manufacturing in 1970–2017

Sources: Official national accounts in each country, including author adjustments; APO Productivity Database 2019.
Note: The lines present the trends based on the three-year moving averages.

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and remain high. Malaysia, Singapore, and Thailand show a similar pattern with the peaks in 2000, 2004, and 2010, respectively.

The Philippines somehow reached its peak in 1973 and recently holds around 20%. Indonesia is also just above 20%. Although these are respectable figures, some more room for industrialization may be suggested. However, Cambodia, Bangladesh, India, Pakistan, and Vietnam are struggling somewhere below 20%. Obviously, these countries are not fully industrialized yet, needing further effort to promote the sector.

On the other hand, the recent IMF (2019, Chapter 3) suggests that service sectors can potentially drive economy-wide productivity growth, and that the decline in manufacturing jobs has contributed little to the rise in labor income inequality in advanced economies. Figure B5.2 indicates that less and middle-income Asian countries with low and stagnated share of manufacturing GDP seem to have succeeded to improving their per capita income level. However, it is quite uncertain if these countries could continue to grow by skipping the intermediate stage of mature industrialization.

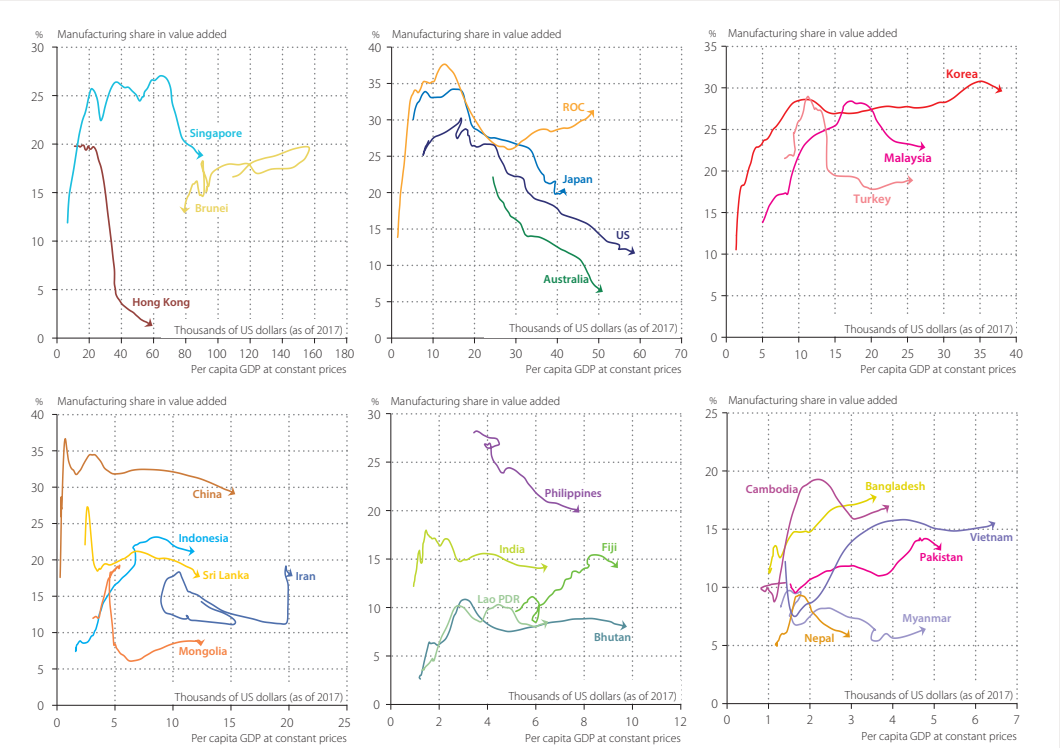

Figure B5.2 Manufacturing GDP Share and Per Capita GDP
——Five-year moving averages of shares of manufacturing GDP and per capita GDP in 1970–2017

Sources: Official national accounts in each country, including author adjustments; APO Productivity Database 2019.

7 Real Income

Highlights

- **Real GDP could systematically underestimate (or overestimate) growth in real income if terms of trade improve (or deteriorate) in some resource-rich countries, where trading gain has made it possible to sustain a rise in purchasing power with little real GDP growth in countries (Figure 73 and Table 23). The positive trading gain effects which oil-rich countries experienced in the 2000s were negative in 2010–2017: e.g., –3.8 percentage points in Kuwait and –2.0 percentage points in Saudi Arabia. In contrast, the trading gain effects in Korea and the ROC turned positive to 0.4 and 0.2 percentage points per year in 2010–2017, respectively (Figure 72).**
- **Net primary income from abroad as a percentage of GDP has risen strongly in the Philippines, from 1.5% in 1990 to 32.7% in 2017. In Bangladesh, it increased from 1.9% to its peak of 8.5% in 2012 (Figure 71).**
- **Five resource-rich countries have been enjoying a trading gain over 1.0% per annum in 2000–2017. Among them, only Myanmar managed to achieve a growth in labor productivity. In contrast, export-oriented, high-productivity Asian countries have been facing a deteriorating trading gain position as a price of their own success (Figure 74).**

The constant-price GDP captures real production, not real income. An improvement in the terms of trade, which is defined as the relative price of a country's exports to imports, explicitly raises real income and, in turn, welfare (see Diewert and Morrison, 1986 and Kohli, 2004). In many ways, a favorable change in the terms of trade is synonymous with technological progress, making it possible to get more for less. That is, for a given trade balance position, a country can either import more for what it exports, or export less for what it imports.

7.1 Real Income and Terms of Trade

By focusing on production, the real GDP concept does not capture the beneficial effect of the improvement in the terms of trade. In contrast, real income focuses on an economy's consumption possibilities, and in turn captures the impact of a change in the relative price of exports to imports. Real income growth attributed to changes in the terms of trade can be significant when there are large fluctuations in import and export prices and the economy is highly exposed to international trade, as is the case with many Asian economies shown in Figure 27 in Section 4.2 (p. 40).

The distinction between real income and real GDP lies in the differences between the corresponding deflators. Real GDP is calculated from a GDP deflator aggregating prices of household consumption, government consumption, investment, exports, and imports,[49] while real income is calculated from the prices of domestic expenditure, consisting of household consumption, government consumption, and investment. Therefore, real income can be understood as the amount of domestic expenditure that can be purchased with the current income flow.[50] As such, real income captures the purchasing power of the income flow. Furthermore, the Databook adopts the concept of gross national income (GNI) instead of GDP in its estimation of real income, to consider net income transfer from abroad. Applying the method

49: The weight for import price changes is negative. Thus, if import prices decrease, this tends to raise the GDP deflator.
50: This definition of real income is the same as in Kohli (2004 and 2006). An alternative definition is nominal GDP deflated by the price of household consumption.

proposed by Diewert and Morrison (1986), the annual growth rate of real income can be fully attributed to three components: annual growth rate of real GDP; real income growth attributed to changes in prices of exports and imports (referred to as the trading gain);[51] and the effect of net income transfer.[52]

Figure 71 plots the time series of net primary income from abroad as a percentage of GDP for some selected countries. The role of net primary income from abroad has been shifting from negative to positive in Hong Kong, with the transition taking place in the mid-1990s leading up to the handover of Hong Kong from British rule to China in 1997. Since then, net primary income from abroad has been positive. Net primary income from abroad has risen strongly in the Philippines. It rose from 1.5% in 1990 to 32.7% in 2017 in the Philippines, providing a long-term significant contribution to the purchasing power of Filipinos,

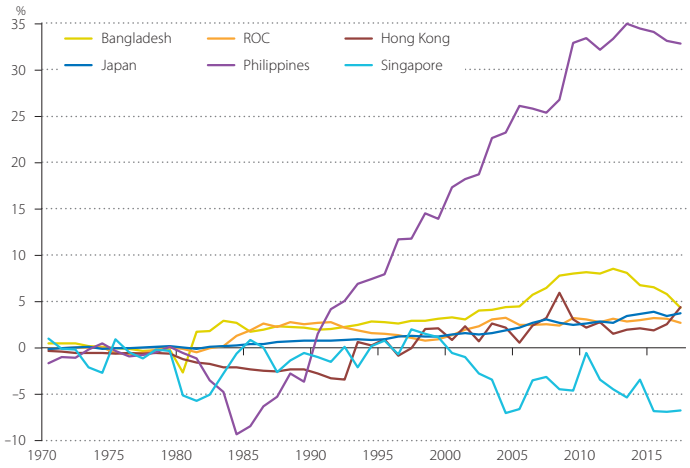

Figure 71 Effect of Net Income Transfer on GDP
——Share of net income transfer in GDP at current market prices in 1970–2017

Sources: Official national accounts in each country, including author adjustments.

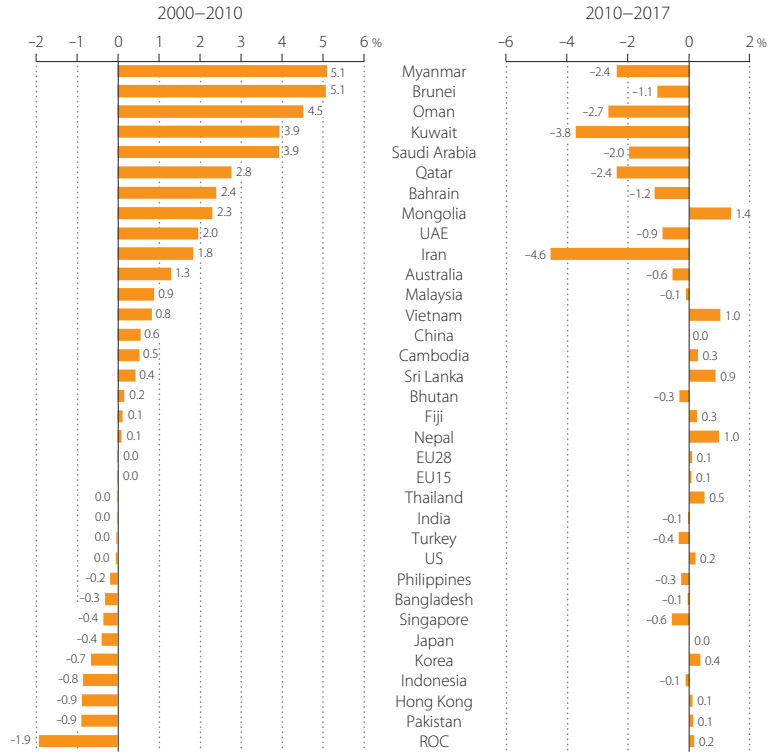

Figure 72 Trading Gain Effect
——Average annual contribution to real income growth in 2000–2010 and 2010–2017

Sources: Official national accounts in each country, including author adjustments.

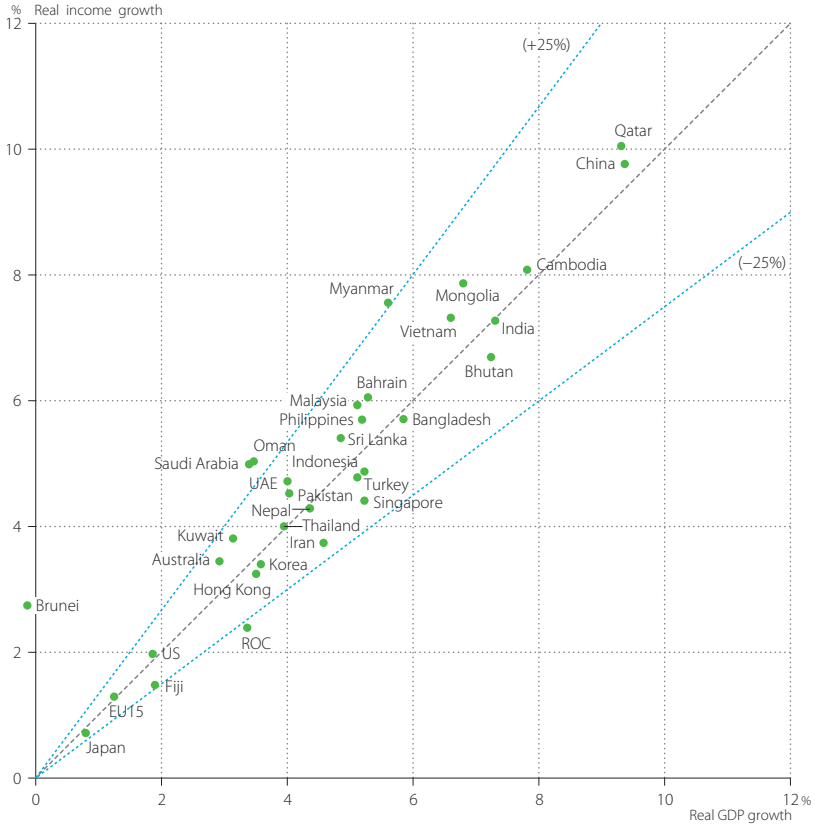

Figure 73 Real Income and GDP Growth
——Average annual growth rate of constant-price GDP and real income in 2000–2017

Sources: Official national accounts in each country, including author adjustments.

with remittances from many overseas workers. A similar, but moderate, trend can be found in Bangladesh. Singapore's net primary income from abroad displayed the largest fluctuations, ranging from +2.0% in 1997 to –7.0% in 2004, but overall, it has been more negative than positive.

The price changes of crude oil in the recent decade have a great impact on trading gains in Asian countries. Figure 72 compares the trading gain effects in the periods 2000–2010 and 2010–2017. The positive trading gain effects which oil-rich countries experienced in the 2000s were negative in the period 2010–2017: e.g., –3.8 percentage points in Kuwait and –2.0 percentage points in Saudi Arabia. In contrast, the trading gain effects in Korea and the ROC turned positive at 0.4 and 0.2 percentage points per year, respectively.

51: The term "trading gain" is used by some authors (Kohli, 2006). This term is adopted in this report.
52: Real income growth can be decomposed into two components as follows:

$$\underbrace{\ln\left(\frac{GNI^t}{GNI^{t-1}}\right)-\ln\left(\frac{P_D^t}{P_D^{t-1}}\right)}_{\text{Real income growth}}=\underbrace{\ln\left(\frac{GNI^t/GDP^t}{GNI^{t-1}/GDP^{t-1}}\right)}_{\text{Income transfer effect}}+\underbrace{\ln\left(GDP^t/GDP^{t-1}\right)-(1/2)\sum_i\left(s_i^t+s_i^{t-1}\right)\ln\left(P_i^t/P_i^{t-1}\right)}_{\text{Real GDP growth}}+$$

$$\underbrace{(1/2)\left(s_X^t+s_X^{t-1}\right)\left(\ln\left(P_X^t/P_X^{t-1}\right)-\ln\left(P_D^t/P_D^{t-1}\right)\right)-(1/2)\left(s_M^t+s_M^{t-1}\right)\left(\ln\left(P_M^t/P_M^{t-1}\right)-\ln\left(P_D^t/P_D^{t-1}\right)\right)}_{\text{Real income growth attributed to changes in the terms of trade (=trading gain)}}$$

where P_i^t is price of final demand i in period t and s_i^t is expenditure share of final demand i in period t. D is domestic expenditure, X is export, and M is import. Note that the real GDP growth based on this formulation may differ from that used in other chapters, since the implicit Törnqvist quantity index is adopted for calculating it.

Over a long period of time the trading gain effect is, on average, small, but over a shorter period could be very significant. Combining both the trading gain effect and net primary income from abroad, real income growth for most of the countries compared fell within the margin of ±25% of real GDP growth in the long run, as shown in Figure 73 and Table 23 in Appendix 10 (p. 182). In larger economies, as the US, the EU15, China, India, and Japan, real income growth was almost equivalent to the real GDP growth on average in 2000–2017. Brunei, Myanmar, Oman, and Saudi Arabia appear to be the outliers in this period.

7.2 Trading Gain and Productivity Growth

When the trading gain is highly favorable, it can breed a sense of complacency with productivity performances suffering as a result. Resource-rich economies are susceptible to this pitfall because they are poised to reap some extremely positive trading gains when commodity prices turn in their favor over a sustained period. Just as commodity prices can rise, so too can they fall. This is when countries' real income growth could suffer if fundamentals for real GDP growth are weak.

Figure 74 plots the labor productivity growth and the trading gain effect in 2000–2017. In general, a resource-rich country can suffer from "Dutch disease," which is a phenomenon in where a country's currency is pushed up by the commodity boom, making other parts of its economy less competitive and

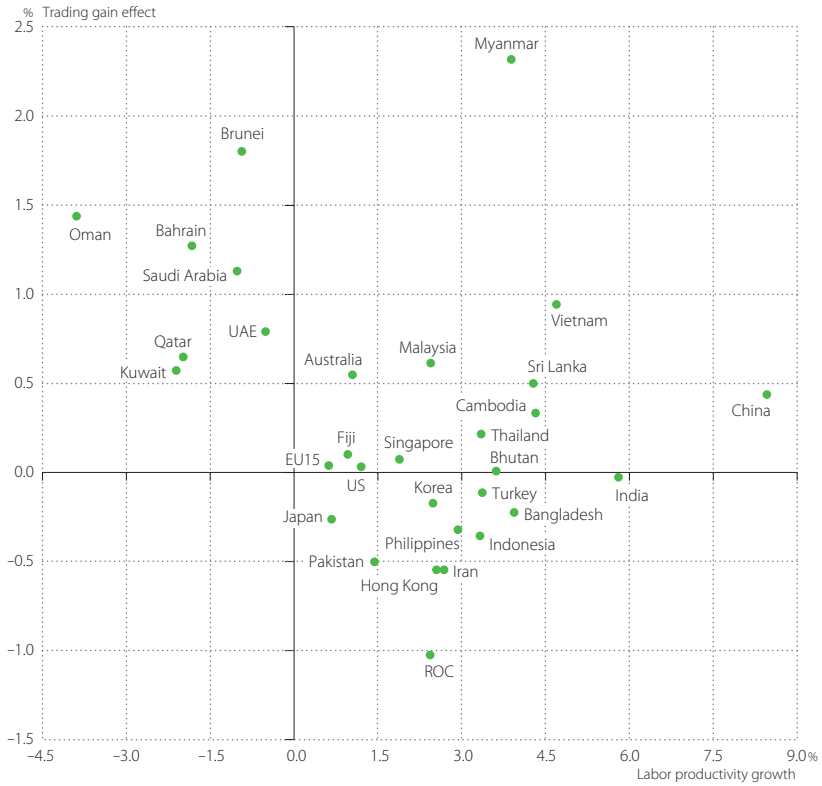

Figure 74 Trading Gain Effect and Labor Productivity Growth
—Average annual rates of trading gain and the growth of constant-price GDP per hour worked in 2000–2017

Sources: Official national accounts in each country, including author adjustments; APO Productivity Database 2019.

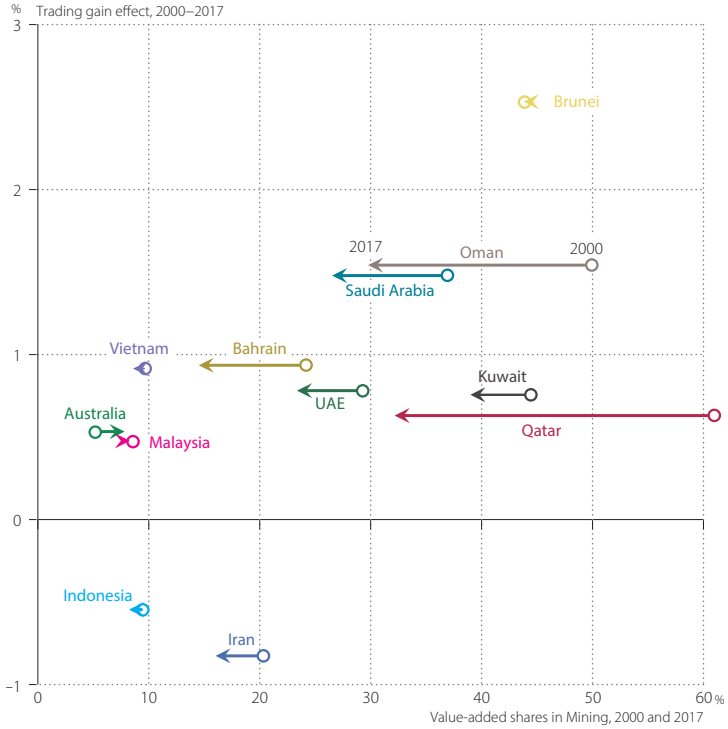

Figure 75 Trading Gain Effect and Value-added Share in Mining Sector
—Average annual rates of trading gain in 2000–2017 and the changes of mining GDP share from 2000 to 2017

Sources: Official national accounts in each country, including author adjustments; APO Productivity Database 2019.

potentially increasing the country's dependence on natural resources.[53] This is how resource abundance can easily lead to resource dependence.

Figure 75 illustrates trading gain effects and changes in value-added shares of the mining sector from 2000 to 2017 in some selected countries. It indicates that large trade gainers typically have dominant mining sectors, such as petroleum and natural gas. Provided resource prices continually rise, these countries continue to gain from the positive terms-of-trade effects. However, if resource prices fall, or natural reserves are depleted, then the story of the Dutch disease may appear. Richness in natural resources may become a curse if they do not have competitive industries other than mining. A way to counteract Dutch disease is broad-based, robust productivity growth and industry diversification. Figure 75 shows some of the trading gainers (i.e., Brunei and the GCC countries) actively reduced their share of the mining sector over time, which could reflect the intention of developing industries other than mining. However, Figure 74 shows that labor productivity growth rates in these countries remained low, or even negative. Even if they wanted to start industrialization, their high income and strong local currency would not allow them to easily develop a manufacturing sector or an internationally competitive service industry. Another concern is their heavy dependence on foreign workers, both skilled and unskilled.

53: The term was originated by The Economist in 1977 (*The Economist*, 26 November 1977, "The Dutch Disease.") to describe the overall decline of the manufacturing and the subsequent economic crisis in the 1960s in the Netherlands after the discovery of the large natural gas field in the North Sea in 1959.

On the other side of coin are the resource/energy-importing economies. Most of these suffered from negative trading gain effects, losing a part of their economic growth due to resource price hikes, particularly in the 2000s (Table 23 in Appendix 10, p. 182). However, it has strengthened their competitiveness in manufacturing and other productive activities for the future. Figure 74 also shows that many Asian countries have succeeded in achieving high growth of labor productivity while having to accept a deteriorating trading gain over the long run. These countries are typically resource importers whose voracious demand for commodities pushes up their import prices. Meanwhile, export prices tend to fall because of their achievement in productivity improvement, resulting in unfavorable movements in terms of trade. This is particularly the case in countries where economic growth is highly dependent on export promotion. In such instances, a negative trading gain is partially a side-effect of productivity success. Although the trading gain effect partly negates their real GDP growth, they are better positioned than before their development took off, and without productivity improvements.

Box 6 Forecasting Asian Economic Growth

The growth accounting has been developed in the Databook to evaluate the quality of economic growth in each country and region in Asia. The similar framework can be used to forecast the economic growth, based on future scenarios on population and technology. The mid-term projections on labor input and economic growth are developed for 24 Asian economies through 2030.

Our scenario on population is based on the projection in United Nations (2019), in which the annual projections are provided by gender and age, as presented in Box 1. This is divided to the estimates in different categories of education attainment, based on the projections developed in Wittgenstein Centre Data (Lutz, Butz, and KC, 2014), in each class of gender and age. The employment rate in each class of population by gender, age, and, education are developed in our Asia QALI Database (Appendix 6). The employment rates in the recent period 2015–2017 are assumed to be constant for the future in each class of population. Using these population and the employment rates, the employment by gender, age, and, education is estimated for the period 2018–2030.

The number of employment in each class is divided into the estimates in different categories of employment status, i.e., own-account workers, contributing family workers, and employees, based on the current composition in 2017, which is provided in the Asia QALI Database. As the future scenario on employee share, it is assumed to be gradually increased by 1–3% per year until 2030, based on the past trend in each country. Based on these scenarios, the projections on the number of employment cross-classified by gender, age, education, and employment status are developed until 2030 in each country. The estimated average growth rates of total employment per year are presented in Figure B6.1 for the two periods 2017–2020 and 2020–2030.

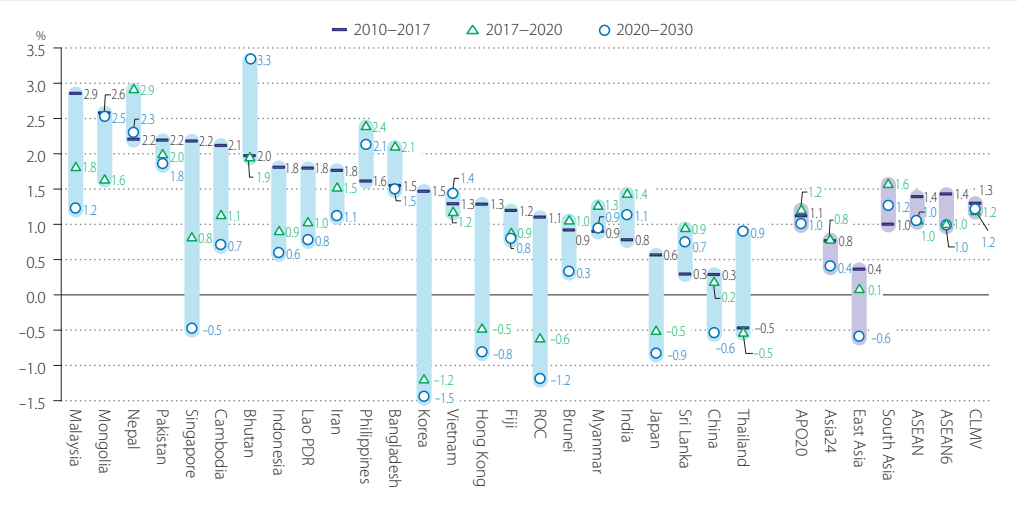

Figure B6.1 Projection of Change in Total Employment until 2030

Unit: Percentage (average annual growth rate).
Source: Our estimates based on United Nations (2019), Lutz, Butz, and KC (2014), and Asia QALI Database 2019.

Based on this future scenario on employment, hours worked and labor quality are projected until 2030. In each country, the average hours worked per worker are benchmarked at the elementary level of employment by the recent estimates in 2017, which is developed in the Asia QALI Database, and assumed to be slightly decreased based the past trend. The relative wage structure cross-classified by gender, age, education, and status is also provided in 2017 by the Asia QALI Database. Based on these data, labor quality changes are estimated until 2030. The estimates of average annual growth rates of labor quality in each country are presented in Figure B6.2. In some countries like Indonesia and Thailand, the quality changes are expected to decrease considerably from 2010–2017 (in Asia QALI Database). However, the estimates of labor quality in 2010–2017 are exceptionally high reflecting the rapid changes in employment status and education attainment and our estimates until 2020 and 2030 are getting close to the long-term trends in these countries. In the Asia24, the labor

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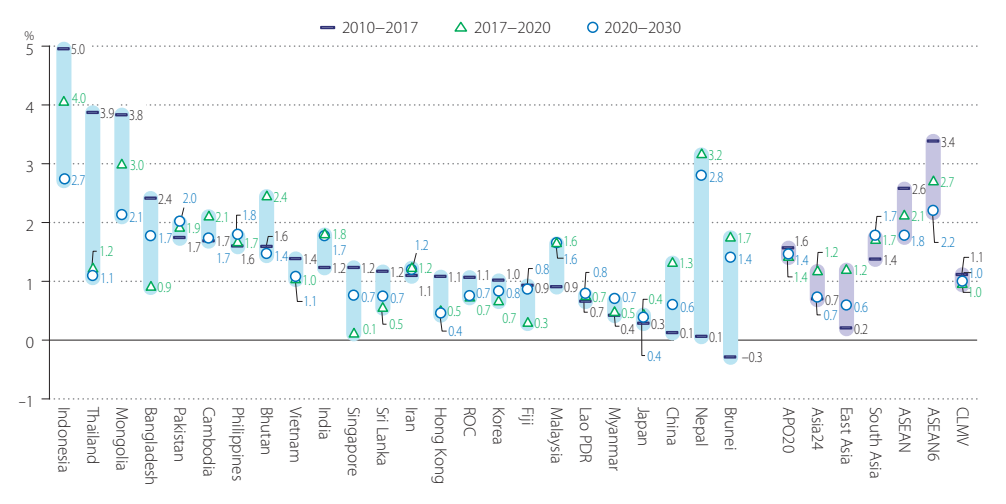

Figure B6.2 Projection of Labor Quality Change until 2030

Unit: Percentage (average annual growth rate).
Source: Our estimates based on Asia QALI Database 2019.

quality changes are estimated as stable at 1.2% in 2017–2020 and 0.7% in 2020–2030, compared to the past achievement (0.7%) in 2010–2017, with the deteriorations in the Asian Tigers and the ASEAN expected to be offset by the improvements in China and South Asia.

There is a significant uncertainty in future capital accumulation. As a baseline scenario, GFCF shares are assumed to follow the long-term trend of Japan. The dotted line in Figure B6.3 presents the past GFCF share since 1885 and the line presents the ten-year moving average. The current levels of GFCF shares in Asian counties are plotted in the years, in which the per hour labor productivities are equivalent between them and Japan (see Figure 34 in Section 5.2, p. 49). Based on these historical trends, the future GFCF rates are assumed in each country. The investment this year is estimated by depending on GDP and determines the beginning-of-the-period capital stock level next year, which provides capital services to be used in next year's production.

Another uncertain source of economic growth is TFP growth. As a base line scenario, the TFP growth in 2010–2017 estimated in APO Productivity Database 2019 is used to provide a benchmark estimates at present. In some countries, however, the past achievements reflect the events that will not be repeated in the future. In these cases, the benchmark estimates of TFP growth are set to be zero in the baseline scenario. In each Asian country, the future change in TFP is assumed to follow the long-term trend of Japan. In 2017–2018, the actual GDP growth is observed in the quarterly national accounts (QNA) in Asia countries. The TFP growth in 2017–2018 is adjusted so that the projection of economic growth is to be equivalent to the actual GDP estimates in QNA. The benchmark estimate of labor share is provided in the APO Productivity Database 2019 (see Appendix 6) and is assumed to be time-invariant in each country.

The baseline estimates of economic growth are presented in Figure B6.4. In the Asia24, the recent economic growth in 2010–2017 (5.4% per year on average) is projected to be slightly decreased to 4.9% in 2017–2020, and to 4.0% in 2020–2030. The main source of this slowdown of Asian growth is the deceleration of Chinese economic growth, which are projected to be decreased from 7.3% to 6.1% and 4.0%, respectively. The Indian growth is expected to be somewhat increased from the recent performance (6.5%) to 6.6% in 2017–2020. However, in the following decade it is expected to slow down again to 5.7%. Although other South Asian countries like Bangladesh, Pakistan, and Nepal are expected to improve their economic performances until 2030, the regional growth of South Asia is projected to decelerate from 6.4% in 2017–2020 to 5.7% in 2020–2030. In the ASEAN, although CLMV is projected to sustain the current pace to grow until 2030, as the ASEAN's regional growth is projected to slow down to 4.3% in the 2020s.

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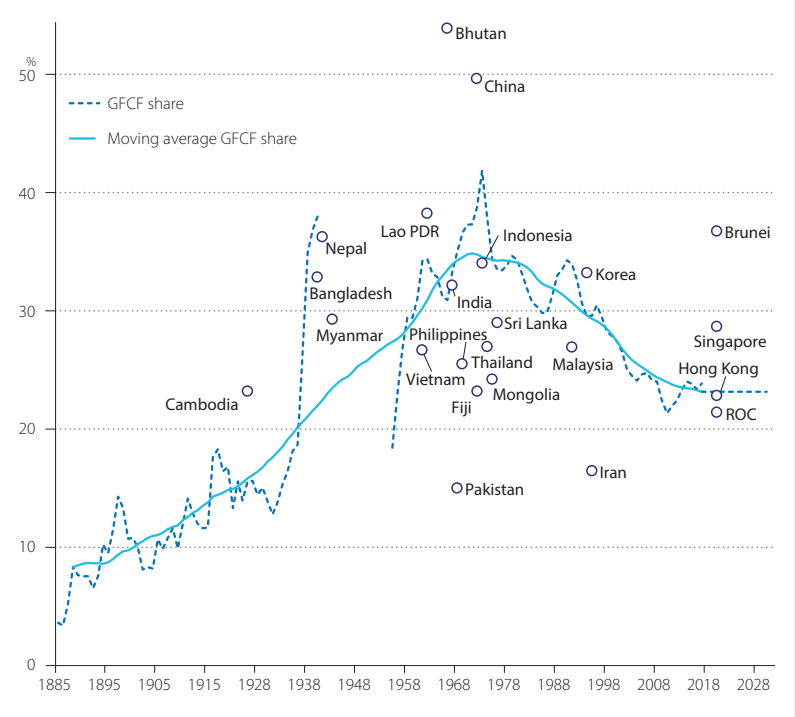

Figure B6.3 Historical GFCF Shares of Japan and Current Level of Asia
——Shares of GFCF in GDP at market prices for Japan in 1885–2017 and for Asian countries in 2017

Source: Our estimates based on APO Productivity Database 2019.

In terms of per-hour labor productivity growth, the current speed of improvement (4.8% per year in 2010–2017) is projected to slow down to 4.3% in 2017–2020 and 3.8% in 2020–2030 in the Asia24, as shown in Figure B6.5. Only in CLMV, the regional performance of labor productivity improvement is expected to hold at 4.9% and 5.0%, respectively, compared with 4.9% on average in 2010–2017.

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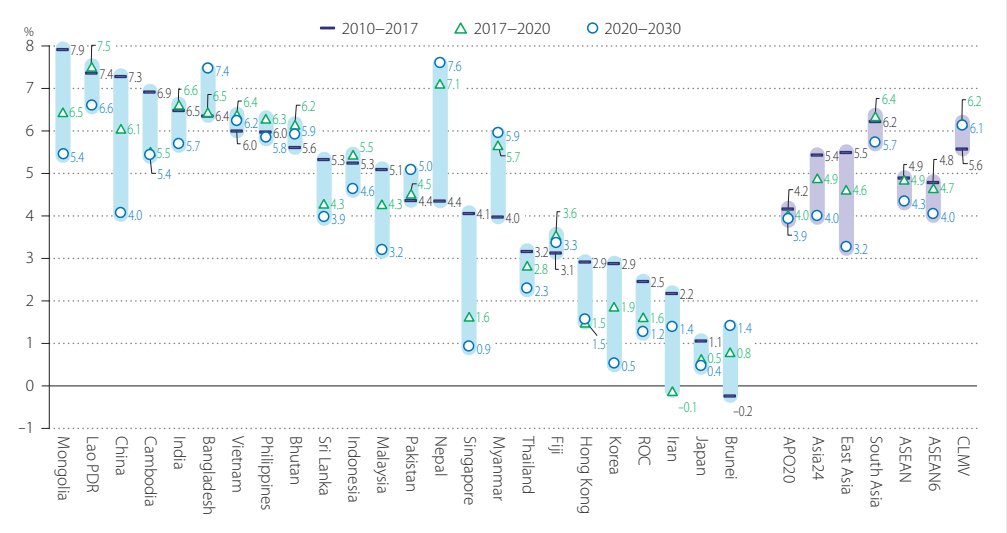

Figure B6.4 Projection of Economic Growths until 2030

Unit: Percentage (average annual growth rate).
Source: Our estimates based on APO Productivity Database 2019 and Asia QALI Database 2019.

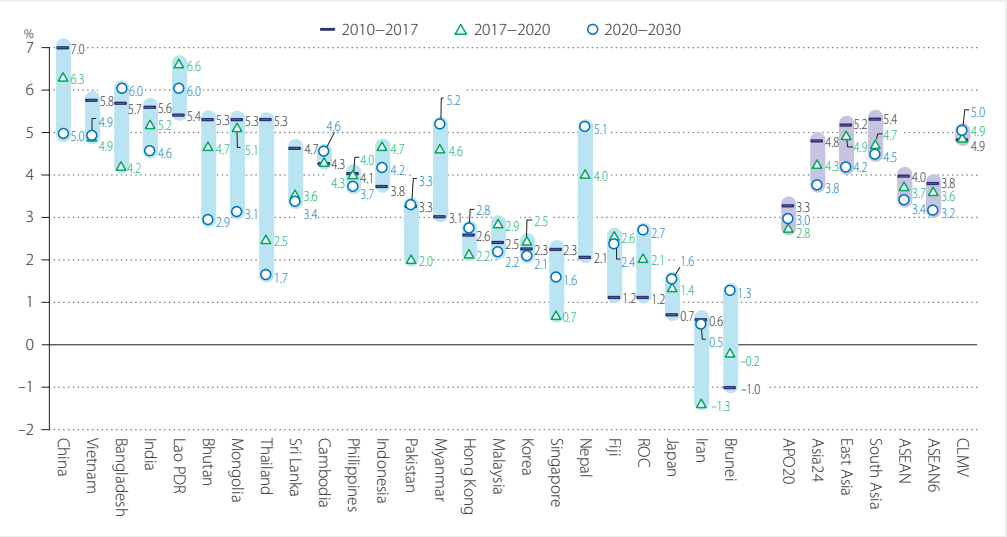

Figure B6.5 Projection of Per-Hour Labor Productivity Growths until 2030

Unit: Percentage (average annual growth rate).
Source: Our estimates based on APO Productivity Database 2019 and Asia QALI Database 2019.

8 Country Profiles

Bangladesh

Key Indicators

GDP in 2017	638	Billions of US dollars (as of 2017)
Per capita GDP in 2017	3.9	Thousands of US dollars (as of 2017)
(exchange rate based)	1.5	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	3.8	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	7.9	US dollars(as of 2017)
Energy productivity levels in 2016	18.7	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	136.0	g-CO2 per US dollar (as of 2017)

Investment share in 2017	30.5	%
ICT investment share in GFCF in 2017	3.7	%
Agriculture share in GDP in 2017	14.2	%
Manufacturing share in GDP in 2017	18.3	%
Agriculture share in employment in 2017	40.3	%
Female employment share in 2017	31.2	%
Average schooling years of workers in 2017	5.6	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	0.8	4.0	5.1	5.4	6.4	6.1	7.0	6.5	7.4
Labor input growth	2.5	2.4	3.3	2.5	3.0	2.7	3.9	3.1	3.1
Labor quality growth	1.1	0.4	0.4	0.3	2.4	2.3	2.7	0.9	1.7
Hours worked growth	1.4	2.0	2.9	2.2	0.6	0.4	1.1	2.2	1.4
IT capital input growth	9.4	12.2	14.8	14.3	21.3	22.3	18.7	9.8	13.1
Non-IT capital input growth	2.1	4.9	6.3	7.8	7.4	7.5	7.1	7.3	7.7
Labor productivity growth	–0.6	2.0	2.2	3.3	5.7	5.7	5.8	4.2	6.0
Capital productivity growth	–2.1	–5.0	–6.4	–7.8	–7.7	–7.8	–7.4	–0.9	–0.4
TFP growth	–1.5	0.4	0.2	0.0	0.6	0.5	0.9	0.8	1.5

Production

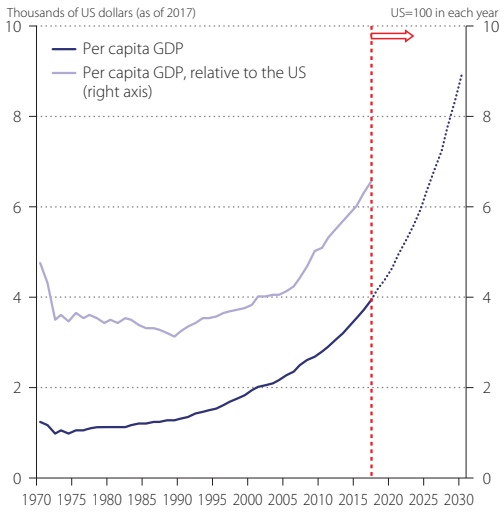

Figure 1 Per Capita GDP

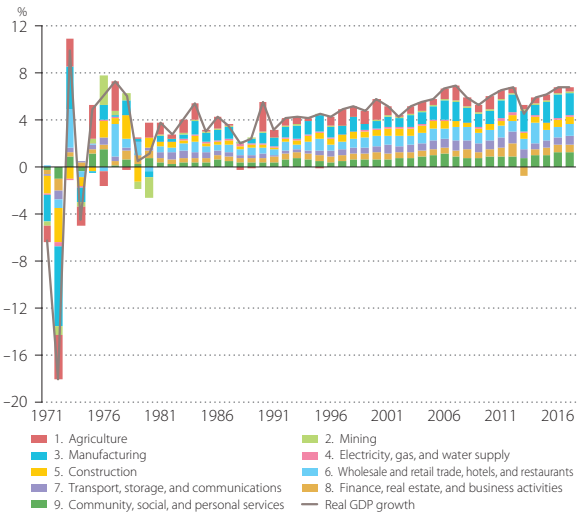

Figure 2 Industry Origins of Economic Growth

Labor

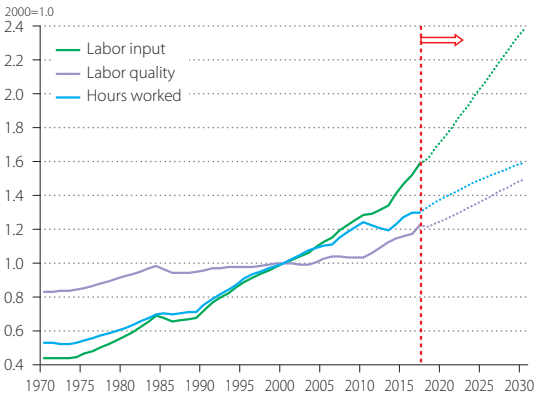

Figure 3 Labor Inputs

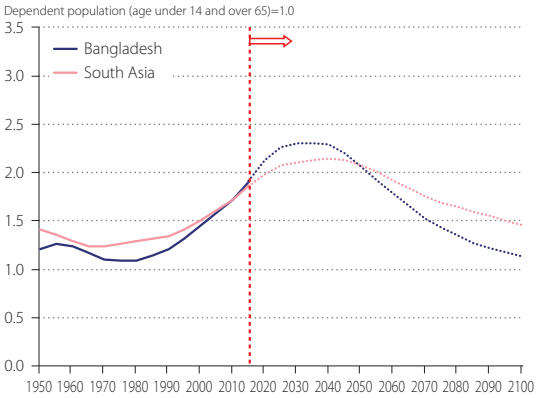

Figure 4 Demographic Dividend

Productivity

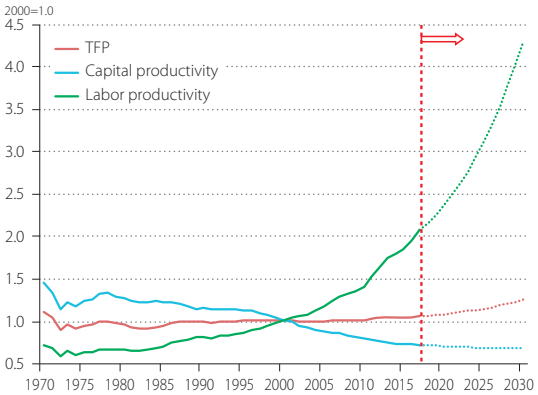

Figure 5 Productivity Indicators

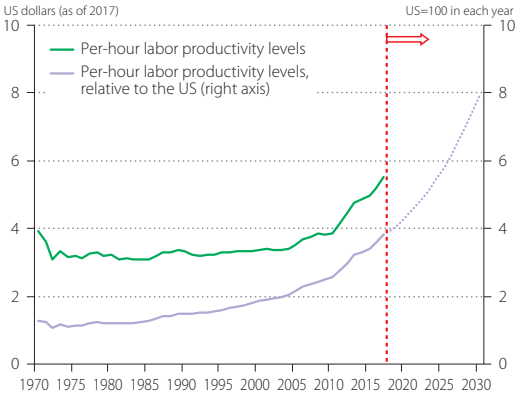

Figure 6 Labor Productivity Level

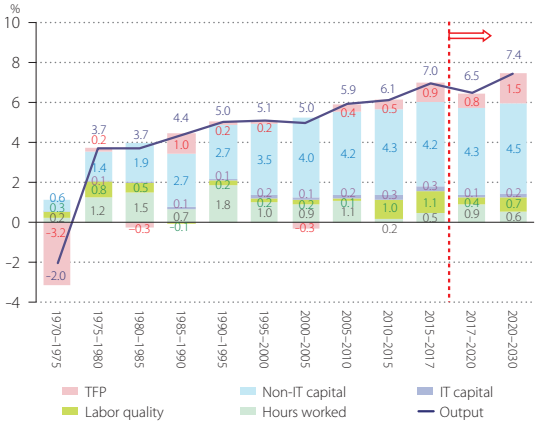

Figure 7 Decomposition of Economic Growth

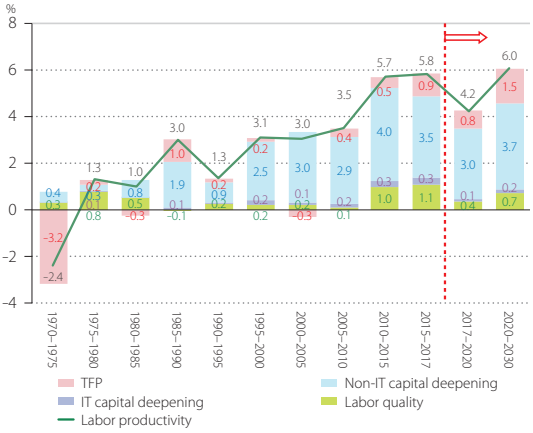

Figure 8 Decomposition of Labor Productivity Growth

Cambodia

Key Indicators

GDP in 2017	66	Billions of US dollars (as of 2017)
Per capita GDP in 2017	4.2	Thousands of US dollars (as of 2017)
(exchange rate based)	1.4	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	2.7	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	2.9	US dollars(as of 2017)
Energy productivity levels in 2016	9.2	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	159.9	g-CO2 per US dollar (as of 2017)

Investment share in 2017	23.6	%
ICT investment share in GFCF in 2017	4.4	%
Agriculture share in GDP in 2017	24.9	%
Manufacturing share in GDP in 2017	17.3	%
Agriculture share in employment in 2017	40.2	%
Female employment share in 2017	47.2	%
Average schooling years of workers in 2017	4.7	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	2020–2030
GDP growth	–7.4	5.3	7.0	7.7	6.9	7.0	6.8	5.5	5.4
Labor input growth	1.2	2.7	4.3	5.0	4.3	5.0	2.5	3.3	2.5
Labor quality growth	0.8	0.4	0.5	0.9	1.7	2.4	–0.1	2.1	1.7
Hours worked growth	0.4	2.3	3.8	4.1	2.6	2.6	2.7	1.2	0.8
IT capital input growth	9.3	8.2	21.8	17.7	12.3	12.9	10.9	9.9	11.4
Non-IT capital input growth	1.6	1.0	4.6	8.3	6.7	6.7	6.6	4.8	5.0
Labor productivity growth	–7.8	3.0	3.2	3.6	4.3	4.4	4.1	4.3	4.6
Capital productivity growth	–0.1	0.1	–4.1	–8.3	–6.7	–6.8	–6.7	0.6	0.2
TFP growth	–8.8	3.5	2.4	0.9	1.3	1.0	2.1	1.4	1.5

Production

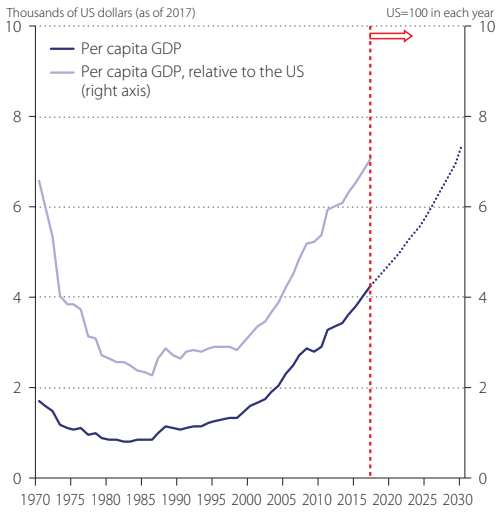

Figure 1 Per Capita GDP

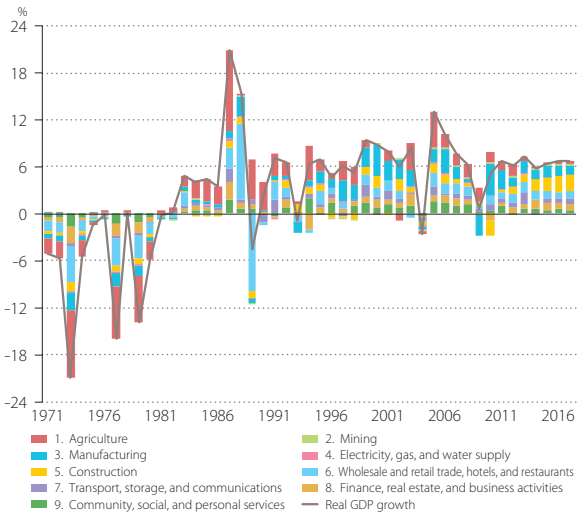

Figure 2 Industry Origins of Economic Growth

Labor

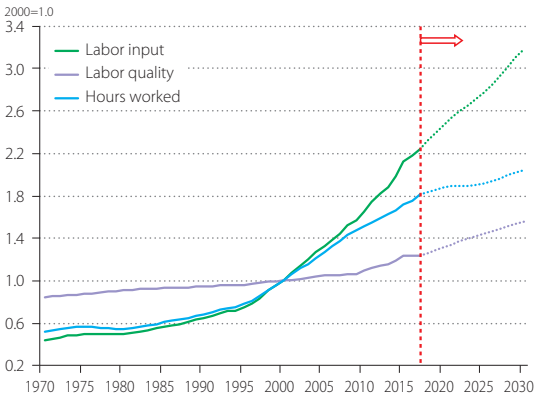

Figure 3 Labor Inputs

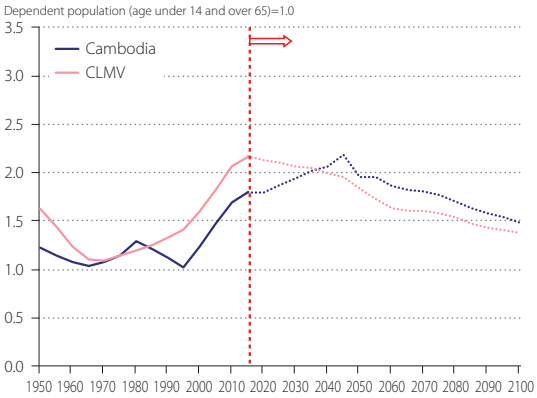

Figure 4 Demographic Dividend

Productivity

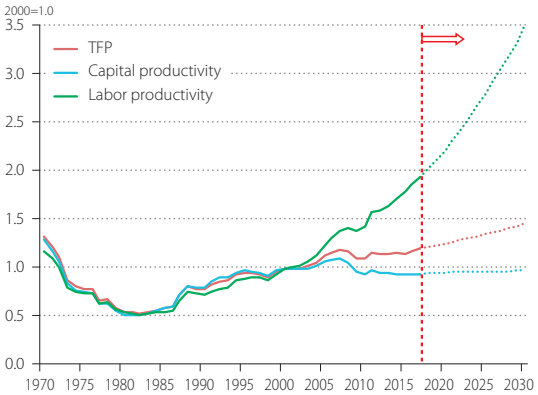

Figure 5 Productivity Indicators

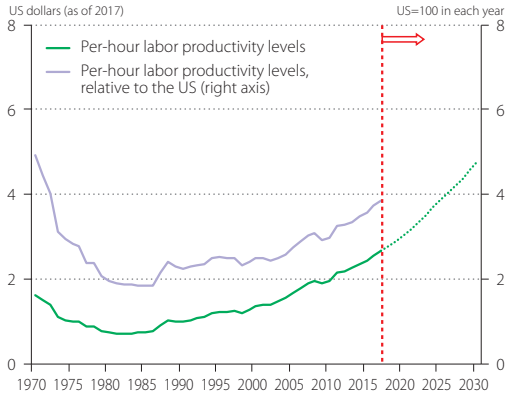

Figure 6 Labor Productivity Level

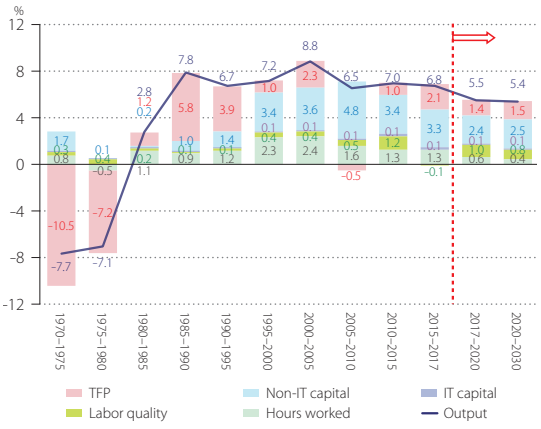

Figure 7 Decomposition of Economic Growth

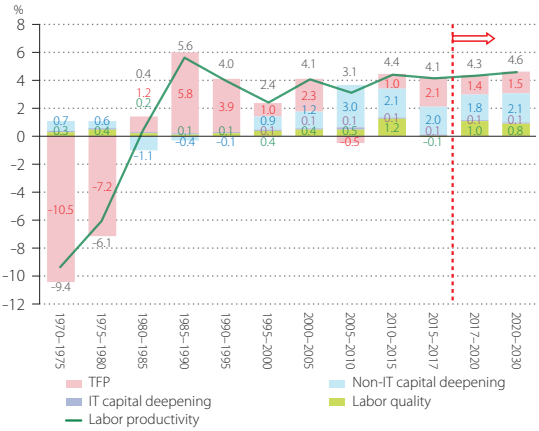

Figure 8 Decomposition of Labor Productivity Growth

ROC

Key Indicators

GDP in 2017	1,193	Billions of US dollars (as of 2017)
Per capita GDP in 2017	50.6	Thousands of US dollars (as of 2017)
(exchange rate based)	24.4	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	47.7	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	102.5	US dollars(as of 2017)
Energy productivity levels in 2016	16.0	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	228.8	g-CO2 per US dollar (as of 2017)

Investment share in 2017	20.2	%
ICT investment share in GFCF in 2017	8.2	%
Agriculture share in GDP in 2017	1.8	%
Manufacturing share in GDP in 2017	32.0	%
Agriculture share in employment in 2017	4.9	%
Female employment share in 2017	42.9	%
Average schooling years of workers in 2017	13.0	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	9.9	7.9	6.5	4.1	2.5	2.5	2.3	1.6	1.2
Labor input growth	4.1	2.8	2.1	2.0	2.4	3.3	0.1	0.3	–0.7
Labor quality growth	0.8	0.8	1.0	1.6	1.1	1.1	0.9	0.7	0.7
Hours worked growth	3.3	2.0	1.1	0.3	1.3	2.1	–0.7	0.7	0.7
IT capital input growth	22.0	17.0	20.0	4.8	1.7	1.9	1.3	2.2	2.4
Non-IT capital input growth	10.2	7.2	6.9	2.9	0.2	0.2	0.2	0.9	0.9
Labor productivity growth	6.7	5.9	5.4	3.7	1.2	0.4	3.0	2.1	2.7
Capital productivity growth	–10.5	–7.5	–7.6	–3.0	–0.2	–0.3	–0.2	0.7	0.3
TFP growth	3.2	3.2	2.2	1.6	1.1	0.8	2.1	1.0	1.1

Production

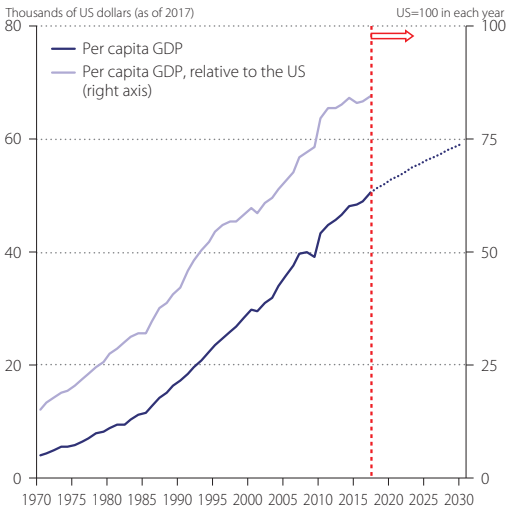

Figure 1 Per Capita GDP

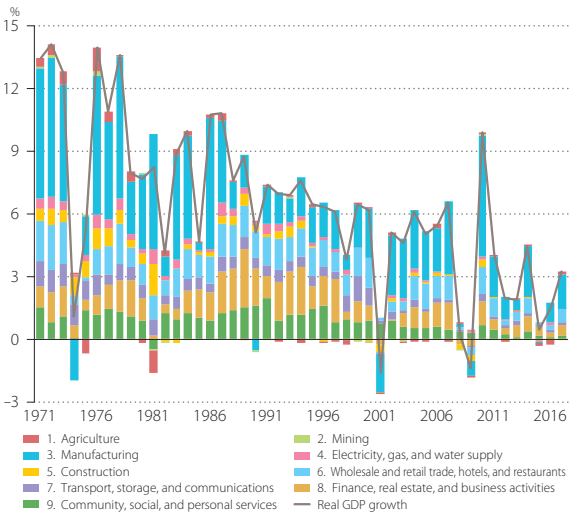

Figure 2 Industry Origins of Economic Growth

Labor

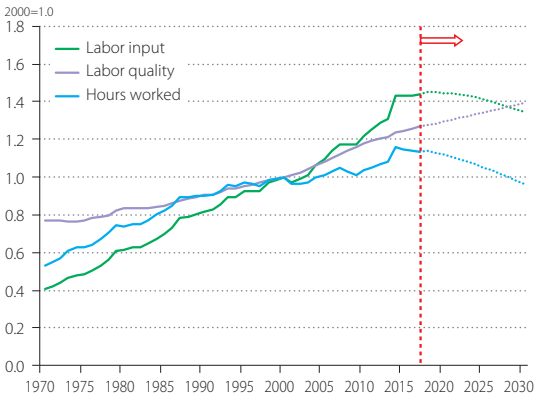

Figure 3 Labor Inputs

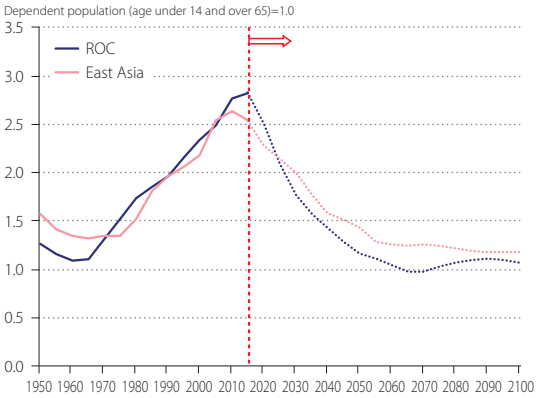

Figure 4 Demographic Dividend

Productivity

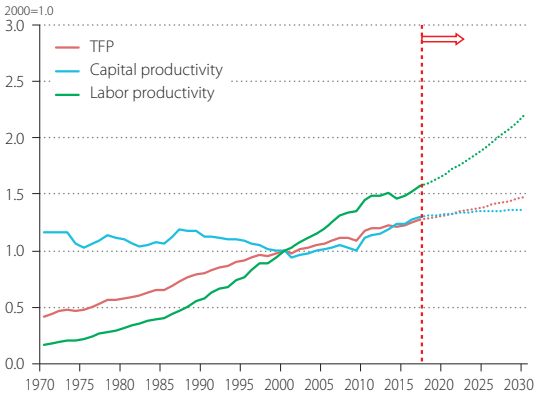

Figure 5 Productivity Indicators

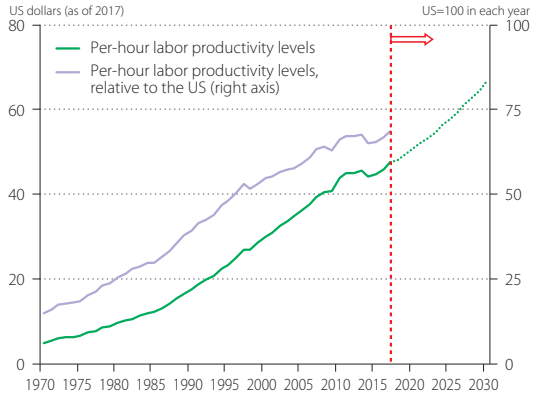

Figure 6 Labor Productivity Level

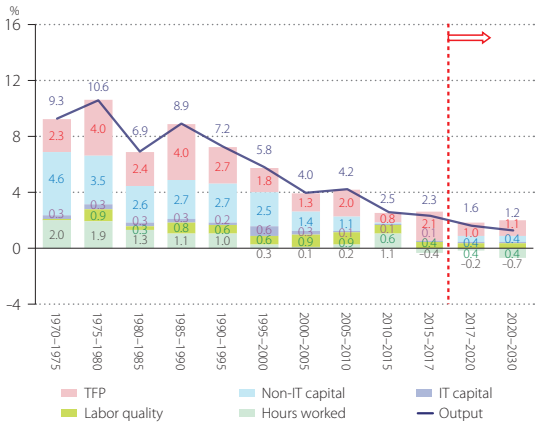

Figure 7 Decomposition of Economic Growth

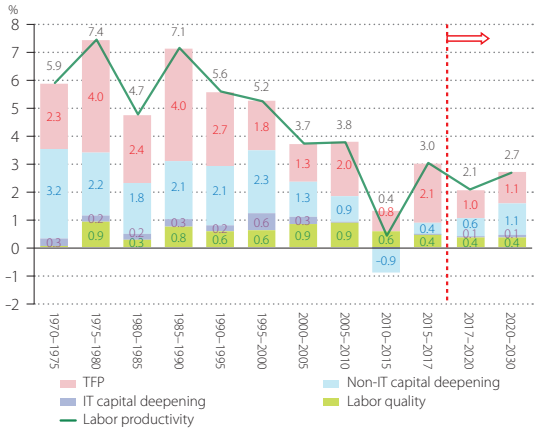

Figure 8 Decomposition of Labor Productivity Growth

Fiji

Key Indicators

GDP in 2017	8.7	Billions of US dollars (as of 2017)
Per capita GDP in 2017	9.6	Thousands of US dollars (as of 2017)
(exchange rate based)	5.4	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	11.5	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	38.0	US dollars(as of 2017)
Energy productivity levels in 2016	n.a.	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	326.5	g-CO2 per US dollar (as of 2017)

Investment share in 2017	21.9	%
ICT investment share in GFCF in 2017	10.5	%
Agriculture share in GDP in 2017	14.9	%
Manufacturing share in GDP in 2017	13.5	%
Agriculture share in employment in 2017	8.3	%
Female employment share in 2017	31.3	%
Average schooling years of workers in 2017	10.6	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	2020–2030
GDP growth	4.7	2.2	2.4	1.4	3.1	3.6	1.9	3.6	3.3
Labor input growth	5.5	4.4	4.0	1.7	2.9	2.2	4.7	1.3	1.8
Labor quality growth	2.2	2.2	2.0	0.8	0.9	0.3	2.5	0.3	0.8
Hours worked growth	3.2	2.1	2.0	0.8	2.0	1.9	2.2	1.0	1.0
IT capital input growth	6.6	11.5	4.2	4.5	5.8	4.0	10.4	6.7	3.9
Non-IT capital input growth	4.8	2.2	2.7	0.7	1.1	0.7	2.2	3.0	2.9
Labor productivity growth	1.4	0.1	0.4	0.5	1.2	1.8	–0.4	2.6	2.4
Capital productivity growth	–4.8	–2.4	–2.7	–0.9	–1.3	–0.8	–2.5	0.4	0.4
TFP growth	–0.5	–1.2	–0.9	0.1	1.2	2.3	–1.5	1.1	0.8

Production

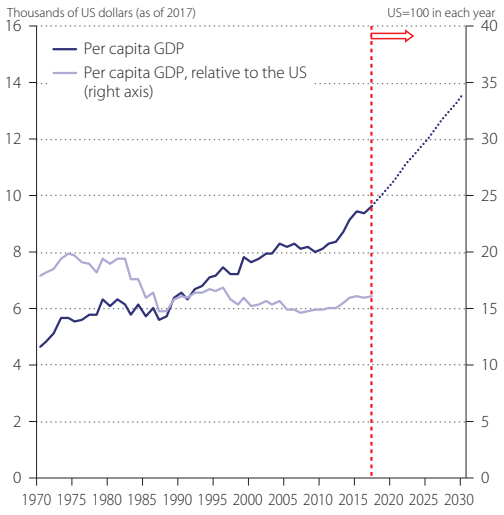

Figure 1 Per Capita GDP

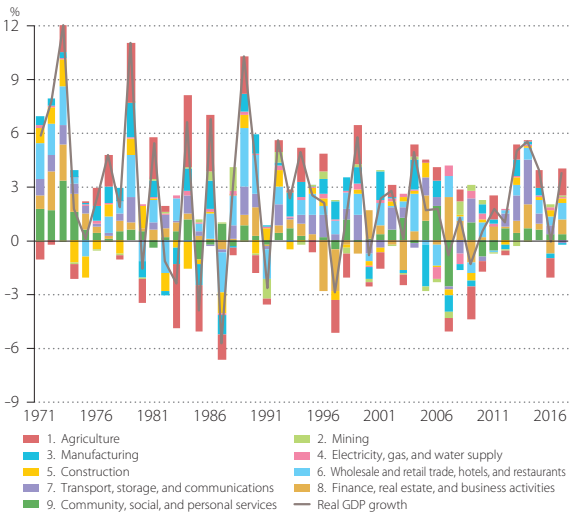

Figure 2 Industry Origins of Economic Growth

Labor

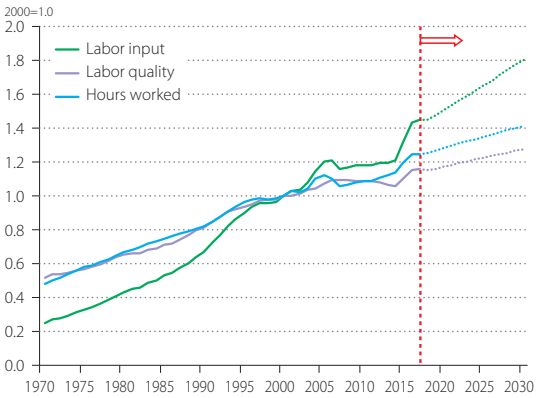

Figure 3 Labor Inputs

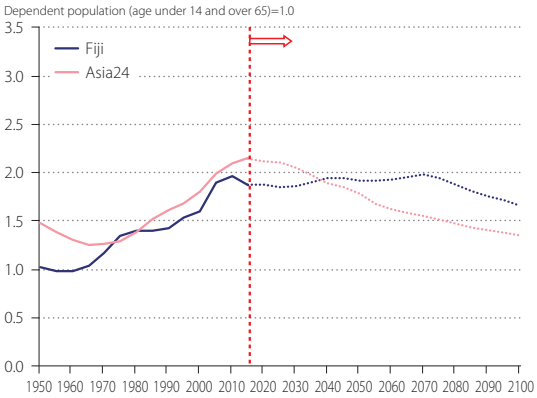

Figure 4 Demographic Dividend

Productivity

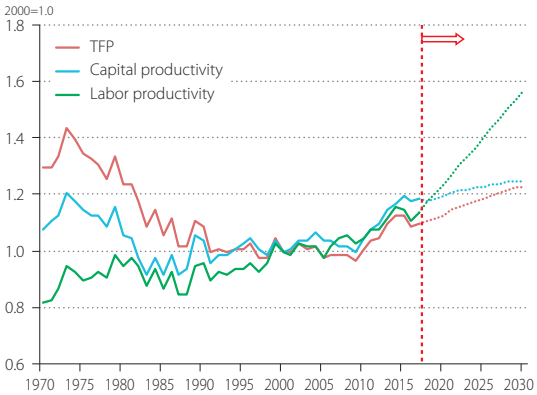

Figure 5 Productivity Indicators

Figure 6 Labor Productivity Level

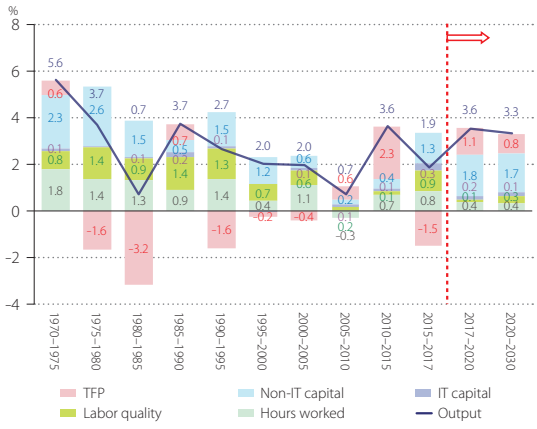

Figure 7 Decomposition of Economic Growth

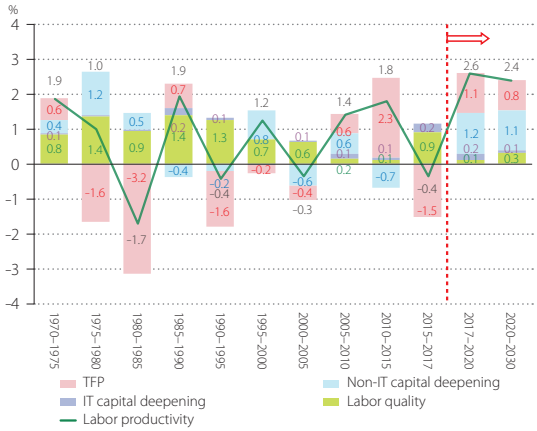

Figure 8 Decomposition of Labor Productivity Growth

Hong Kong

Key Indicators

GDP in 2017	456	Billions of US dollars (as of 2017)
Per capita GDP in 2017	61.7	Thousands of US dollars (as of 2017)
(exchange rate based)	46.2	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	54.0	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	111.7	US dollars(as of 2017)
Energy productivity levels in 2016	46.5	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	105.5	g-CO2 per US dollar (as of 2017)

Investment share in 2017	22.0	%
ICT investment share in GFCF in 2017	8.3	%
Agriculture share in GDP in 2017	0.1	%
Manufacturing share in GDP in 2017	1.1	%
Agriculture share in employment in 2017	0.2	%
Female employment share in 2017	49.6	%
Average schooling years of workers in 2017	12.3	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	8.6	6.5	3.9	4.0	2.9	2.9	3.0	1.5	1.5
Labor input growth	4.5	2.6	3.3	1.2	1.4	1.7	0.5	–0.2	–0.8
Labor quality growth	0.8	1.6	1.3	0.5	1.1	1.1	1.0	0.5	0.4
Hours worked growth	3.7	1.0	2.0	0.7	0.3	0.6	–0.4	–0.7	–1.2
IT capital input growth	19.4	18.4	17.6	7.7	3.5	6.2	–3.2	–0.3	4.2
Non-IT capital input growth	5.8	4.8	4.7	2.4	1.2	1.5	0.6	0.8	0.7
Labor productivity growth	4.9	5.5	1.9	3.3	2.6	2.3	3.4	2.2	2.8
Capital productivity growth	–6.0	–5.2	–5.4	–2.9	–1.4	–1.8	–0.3	0.8	0.5
TFP growth	3.3	2.6	–0.5	2.0	1.5	1.1	2.5	1.3	1.5

Production

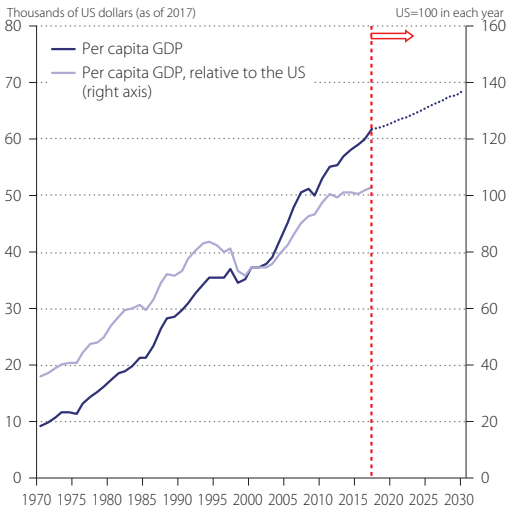

Figure 1 Per Capita GDP

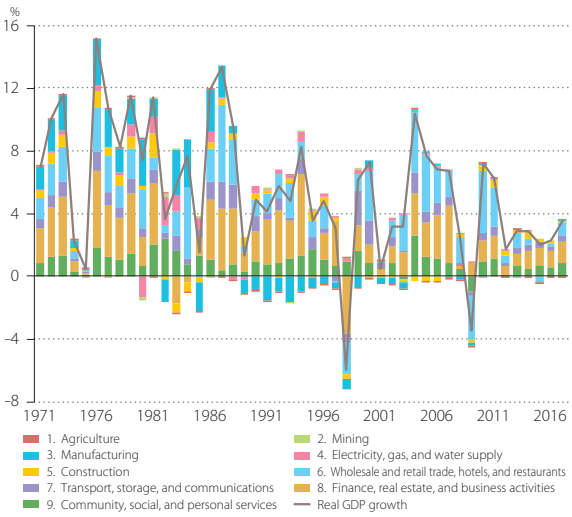

Figure 2 Industry Origins of Economic Growth

Labor

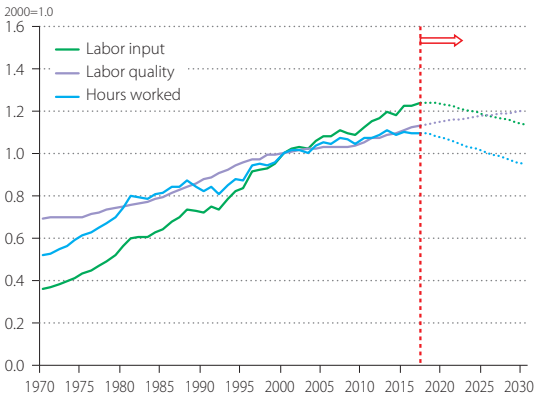

Figure 3 Labor Inputs

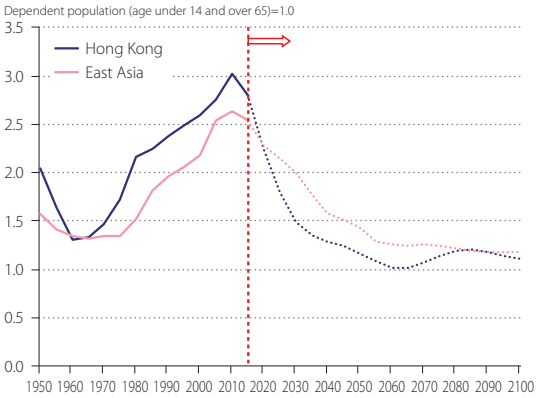

Figure 4 Demographic Dividend

Productivity

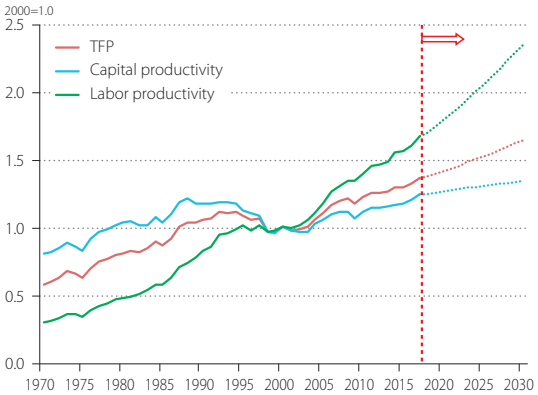

Figure 5 Productivity Indicators

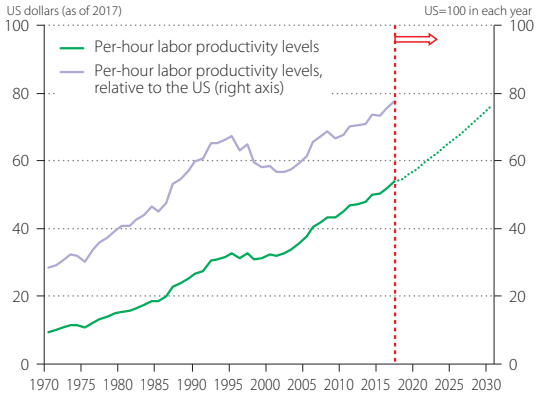

Figure 6 Labor Productivity Level

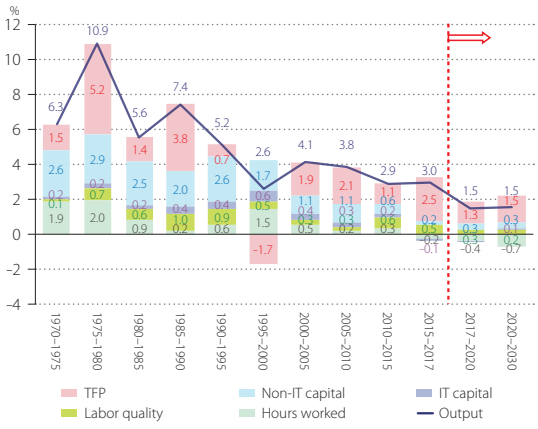

Figure 7 Decomposition of Economic Growth

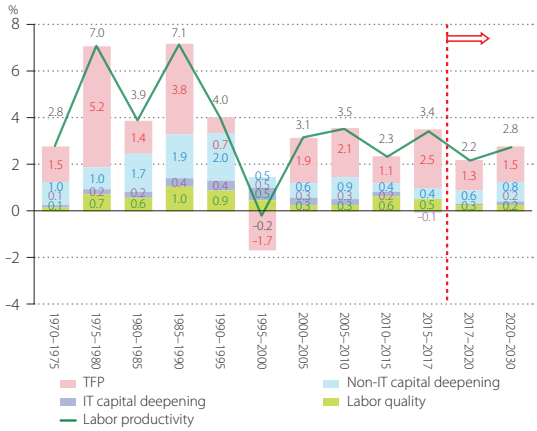

Figure 8 Decomposition of Labor Productivity Growth

India

Key Indicators

GDP in 2017	9,511	Billions of US dollars (as of 2017)
Per capita GDP in 2017	7.1	Thousands of US dollars (as of 2017)
(exchange rate based)	1.9	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	8.3	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	18.7	US dollars(as of 2017)
Energy productivity levels in 2016	14.4	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	252.2	g-CO2 per US dollar (as of 2017)

Investment share in 2017	30.3	%
ICT investment share in GFCF in 2017	3.7	%
Agriculture share in GDP in 2017	16.3	%
Manufacturing share in GDP in 2017	13.9	%
Agriculture share in employment in 2017	45.7	%
Female employment share in 2017	25.8	%
Average schooling years of workers in 2017	6.2	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	3.0	5.4	5.3	7.2	6.5	6.2	7.1	6.6	5.7
Labor input growth	3.0	3.1	2.7	3.0	2.1	2.4	1.3	3.2	2.8
Labor quality growth	0.6	1.2	1.0	1.5	1.2	1.4	0.8	1.8	1.7
Hours worked growth	2.4	2.0	1.7	1.4	0.9	1.0	0.5	1.4	1.1
IT capital input growth	8.9	15.7	16.3	15.7	15.8	17.3	12.2	10.3	9.8
Non-IT capital input growth	3.8	4.8	5.1	7.1	9.3	9.5	8.8	8.3	7.0
Labor productivity growth	0.5	3.4	3.6	5.8	5.6	5.3	6.6	5.2	4.6
Capital productivity growth	–3.8	–4.9	–5.3	–7.3	–9.5	–9.7	–8.8	–1.7	–1.4
TFP growth	–0.3	1.7	1.7	2.4	1.3	0.8	2.5	1.2	1.0

Production

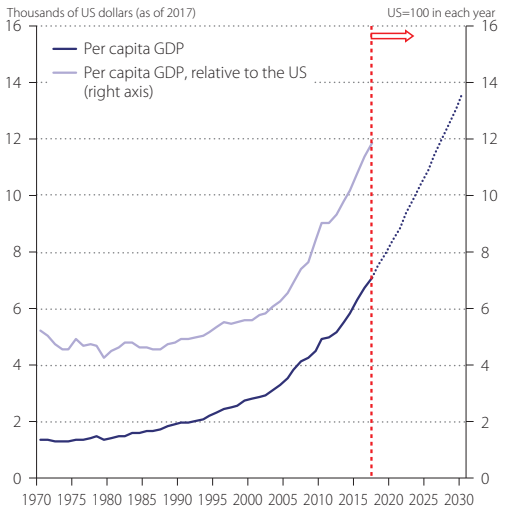

Figure 1 Per Capita GDP

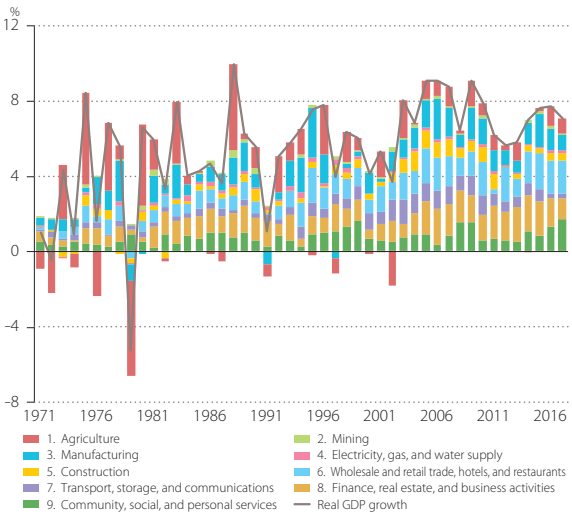

Figure 2 Industry Origins of Economic Growth

Labor

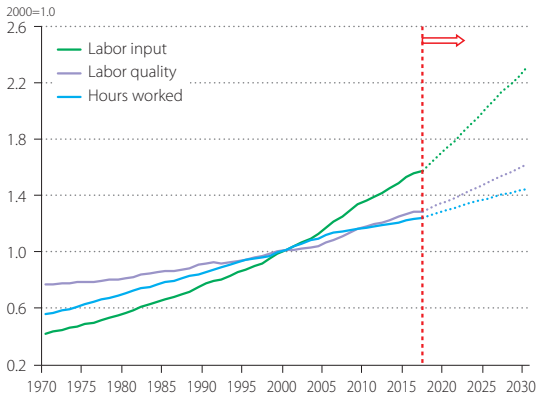

Figure 3 Labor Inputs

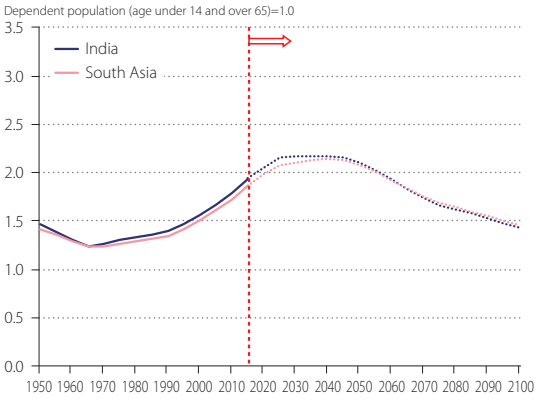

Figure 4 Demographic Dividend

Productivity

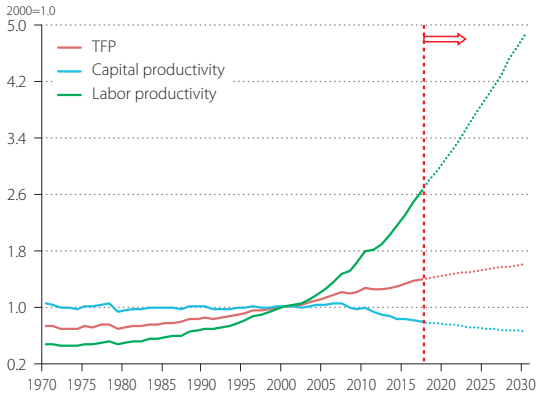

Figure 5 Productivity Indicators

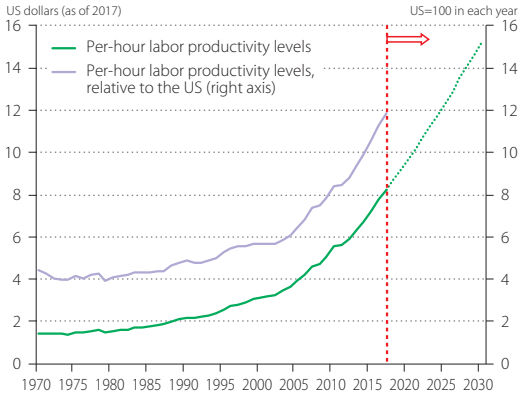

Figure 6 Labor Productivity Level

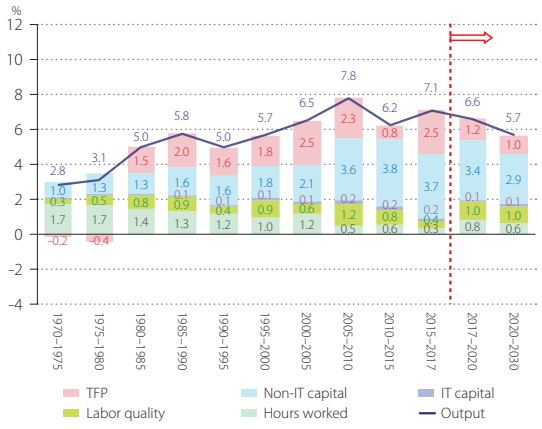

Figure 7 Decomposition of Economic Growth

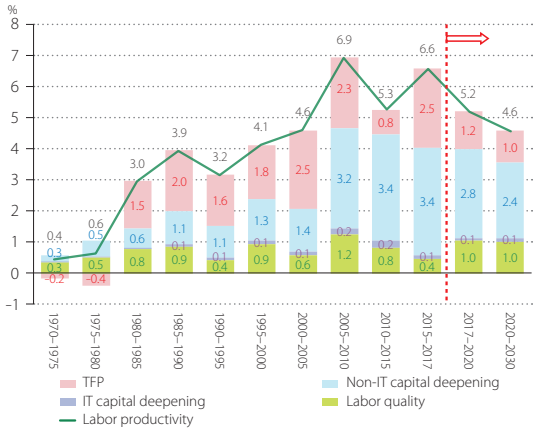

Figure 8 Decomposition of Labor Productivity Growth

Indonesia

Key Indicators

GDP in 2017	3,252	Billions of US dollars (as of 2017)
Per capita GDP in 2017	12.6	Thousands of US dollars (as of 2017)
(exchange rate based)	3.9	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	12.9	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	46.4	US dollars(as of 2017)
Energy productivity levels in 2016	18.4	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	150.0	g-CO2 per US dollar (as of 2017)

Investment share in 2017	33.5	%
ICT investment share in GFCF in 2017	3.6	%
Agriculture share in GDP in 2017	13.5	%
Manufacturing share in GDP in 2017	20.7	%
Agriculture share in employment in 2017	29.8	%
Female employment share in 2017	39.1	%
Average schooling years of workers in 2017	8.7	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	8.0	6.1	4.1	5.1	5.3	5.4	4.9	5.5	4.6
Labor input growth	5.9	5.8	6.3	5.1	6.4	6.8	5.6	4.8	3.2
Labor quality growth	1.9	2.4	4.2	2.8	5.0	6.0	2.4	4.0	2.7
Hours worked growth	4.0	3.4	2.1	2.3	1.5	0.8	3.2	0.8	0.4
IT capital input growth	24.0	18.7	12.2	13.7	12.4	12.3	12.6	7.2	5.4
Non-IT capital input growth	7.2	7.0	6.5	4.4	7.0	6.4	8.4	7.5	5.9
Labor productivity growth	4.1	2.7	2.1	2.8	3.8	4.6	1.7	4.7	4.2
Capital productivity growth	–7.2	–7.1	–6.6	–4.6	–7.1	–6.5	–8.5	–2.0	–1.3
TFP growth	1.2	–0.6	–2.4	0.3	–1.5	–1.2	–2.3	–0.9	–0.2

Production

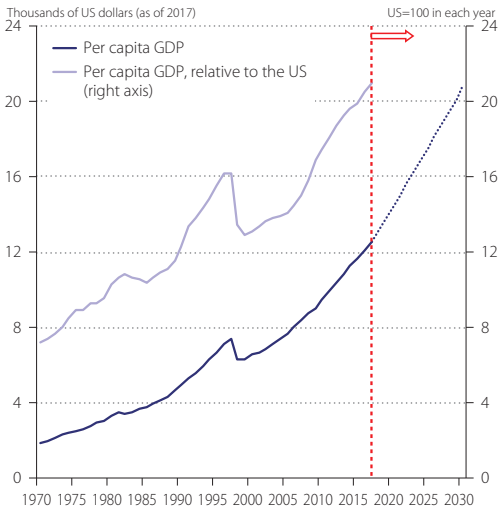

Figure 1 Per Capita GDP

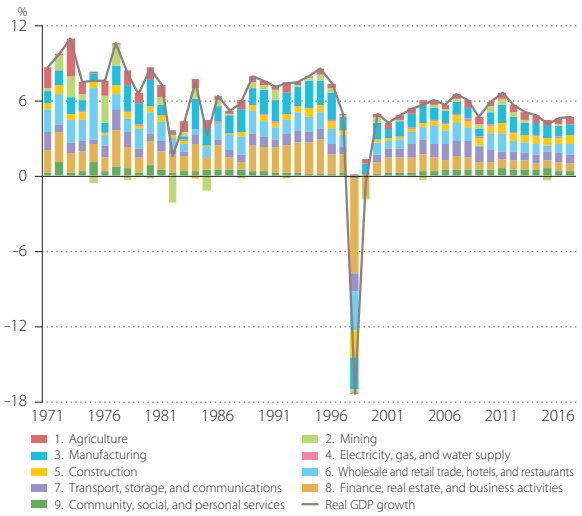

Figure 2 Industry Origins of Economic Growth

Labor

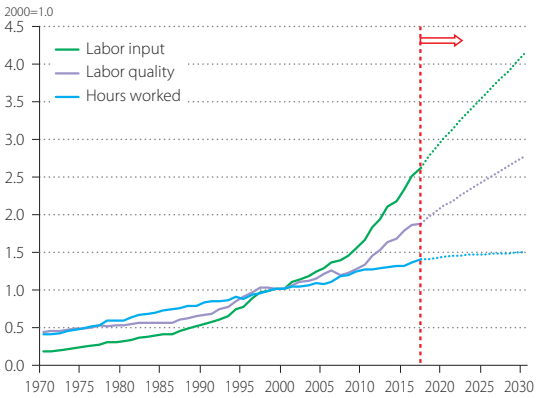

Figure 3 Labor Inputs

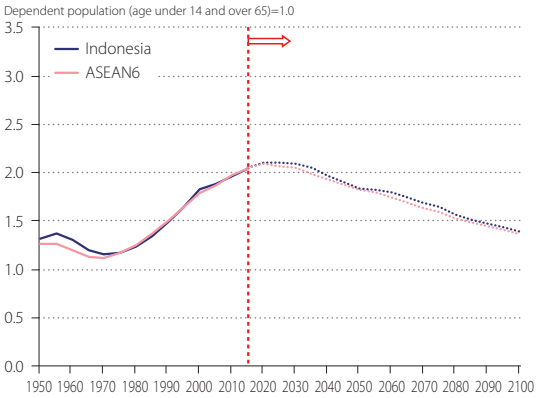

Figure 4 Demographic Dividend

Productivity

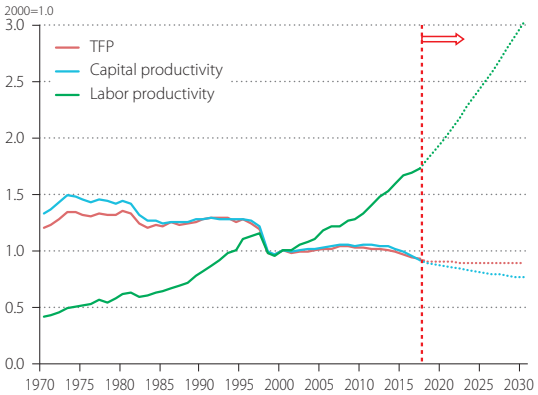

Figure 5 Productivity Indicators

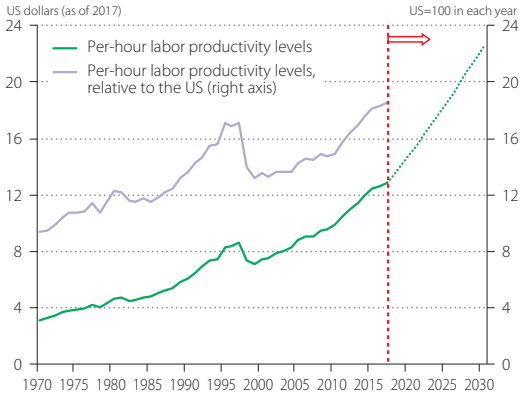

Figure 6 Labor Productivity Level

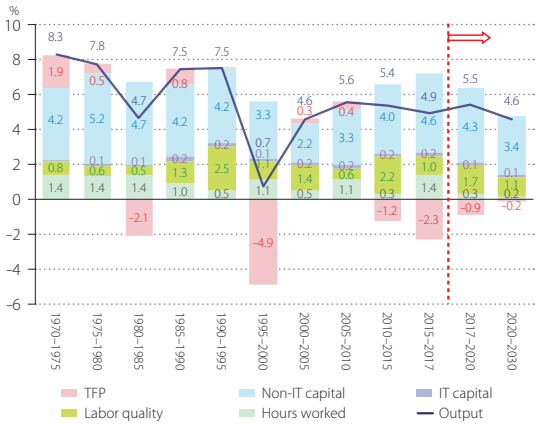

Figure 7 Decomposition of Economic Growth

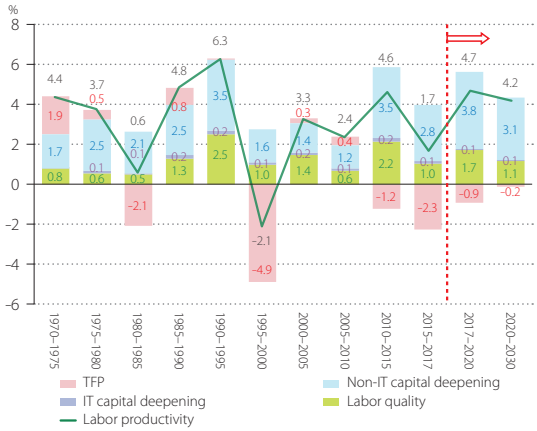

Figure 8 Decomposition of Labor Productivity Growth

Iran

Key Indicators

GDP in 2017	1,772	Billions of US dollars (as of 2017)
Per capita GDP in 2017	21.9	Thousands of US dollars (as of 2017)
(exchange rate based)	6.3	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	32.2	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	49.5	US dollars(as of 2017)
Energy productivity levels in 2016	9.0	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	332.6	g-CO2 per US dollar (as of 2017)

Investment share in 2017	17.7	%
ICT investment share in GFCF in 2017	4.4	%
Agriculture share in GDP in 2017	8.3	%
Manufacturing share in GDP in 2017	17.8	%
Agriculture share in employment in 2017	17.6	%
Female employment share in 2017	15.5	%
Average schooling years of workers in 2017	9.8	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	3.3	2.6	4.0	6.3	2.2	0.0	7.7	–0.1	1.4
Labor input growth	3.9	3.6	4.5	3.4	2.6	2.7	2.5	2.5	2.0
Labor quality growth	1.2	1.1	1.8	2.0	1.1	1.5	0.0	1.2	1.2
Hours worked growth	2.7	2.5	2.7	1.5	1.5	1.1	2.6	1.2	0.9
IT capital input growth	12.5	12.2	10.7	19.0	6.9	9.2	1.1	4.8	2.3
Non-IT capital input growth	8.5	2.0	1.0	4.4	2.1	2.6	0.9	1.7	1.2
Labor productivity growth	0.6	0.1	1.3	4.8	0.6	–1.1	5.1	–1.3	0.5
Capital productivity growth	–8.4	–2.0	–1.1	–4.6	–2.2	–2.7	–0.8	–1.8	0.2
TFP growth	–3.8	0.0	2.1	1.8	–0.1	–2.7	6.4	–2.0	0.0

Production

Figure 1 Per Capita GDP

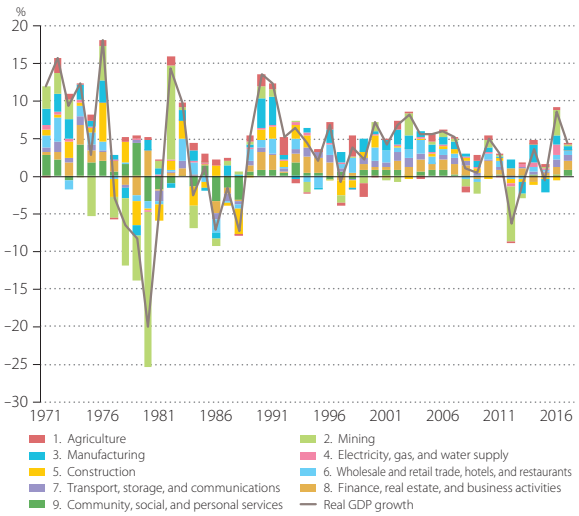

Figure 2 Industry Origins of Economic Growth

Labor

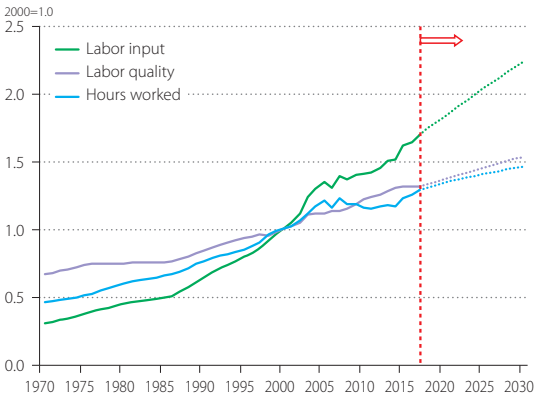

Figure 3 Labor Inputs

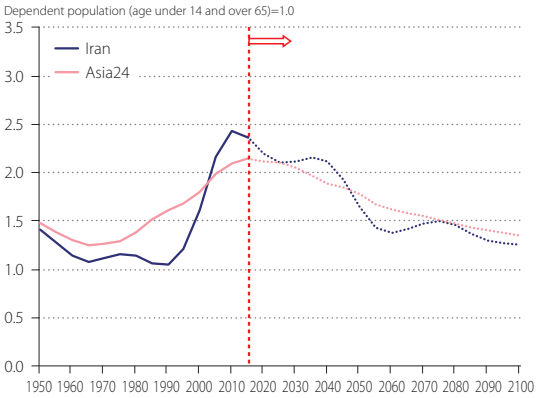

Figure 4 Demographic Dividend

Productivity

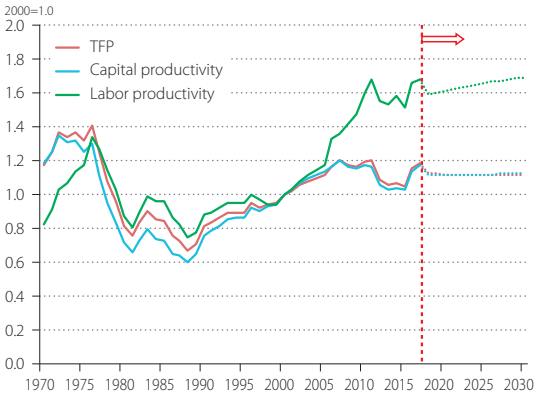

Figure 5 Productivity Indicators

Figure 6 Labor Productivity Level

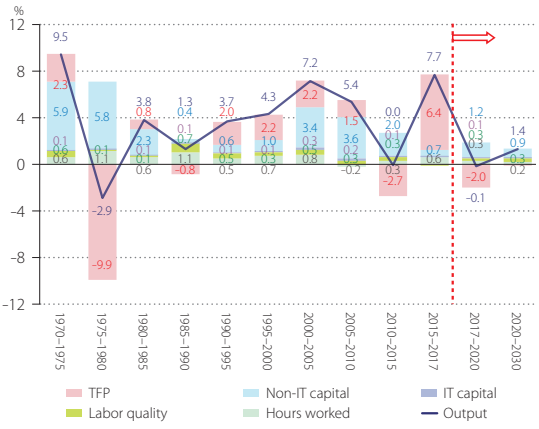

Figure 7 Decomposition of Economic Growth

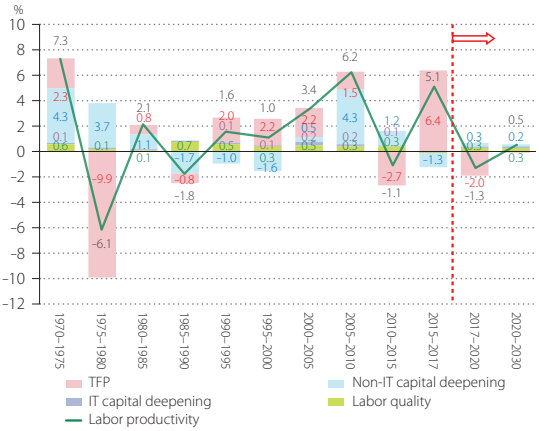

Figure 8 Decomposition of Labor Productivity Growth

Japan

Key Indicators

GDP in 2017	5,427	Billions of US dollars (as of 2017)
Per capita GDP in 2017	42.8	Thousands of US dollars (as of 2017)
(exchange rate based)	38.4	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	45.0	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	134.1	US dollars(as of 2017)
Energy productivity levels in 2016	17.3	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	225.0	g-CO2 per US dollar (as of 2017)

Investment share in 2017	23.9	%
ICT investment share in GFCF in 2017	12.9	%
Agriculture share in GDP in 2017	1.2	%
Manufacturing share in GDP in 2017	20.8	%
Agriculture share in employment in 2017	3.8	%
Female employment share in 2017	43.5	%
Average schooling years of workers in 2017	13.2	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	4.6	4.6	1.3	0.6	1.1	1.0	1.3	0.5	0.4
Labor input growth	1.7	1.8	0.0	0.1	0.6	0.2	1.5	–0.4	–0.8
Labor quality growth	1.6	1.0	0.7	0.7	0.3	0.3	0.3	0.4	0.4
Hours worked growth	0.2	0.7	–0.7	–0.6	0.3	0.0	1.2	–0.9	–1.1
IT capital input growth	12.7	16.0	8.2	4.1	1.2	1.5	0.4	0.9	1.0
Non-IT capital input growth	6.0	4.0	2.0	0.3	–0.1	–0.3	0.4	0.2	0.2
Labor productivity growth	4.4	3.8	2.0	1.3	0.7	1.0	0.1	1.4	1.6
Capital productivity growth	–6.3	–4.8	–2.5	–0.6	0.0	0.1	–0.4	0.2	0.1
TFP growth	1.0	1.6	0.2	0.3	0.7	0.9	0.3	0.6	0.7

Production

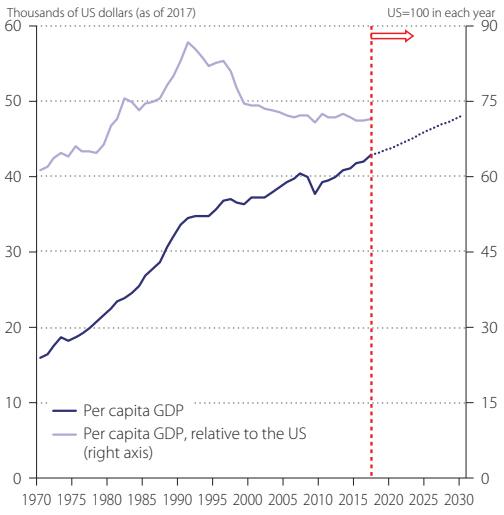

Figure 1 Per Capita GDP

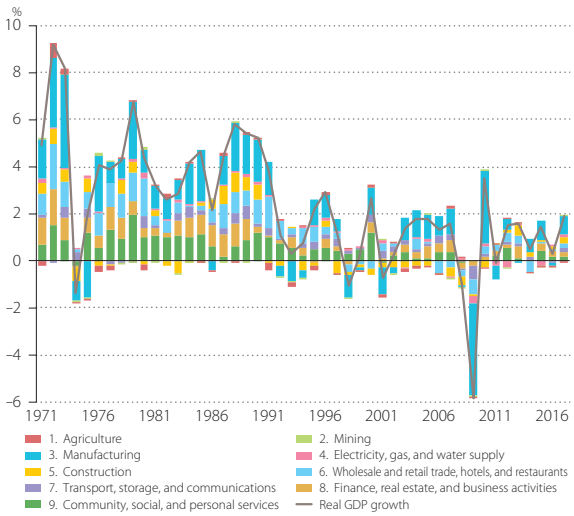

Figure 2 Industry Origins of Economic Growth

Labor

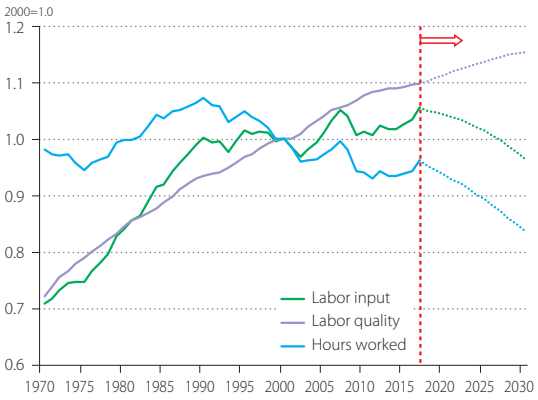

Figure 3 Labor Inputs

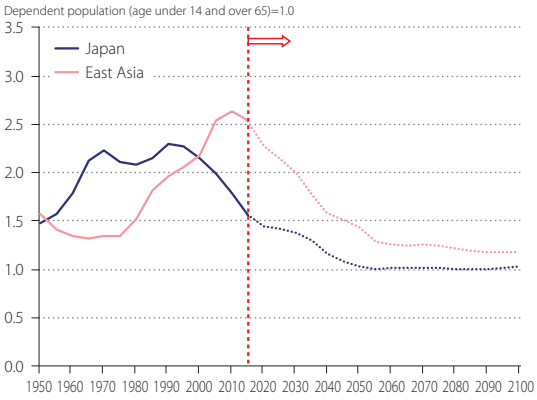

Figure 4 Demographic Dividend

Productivity

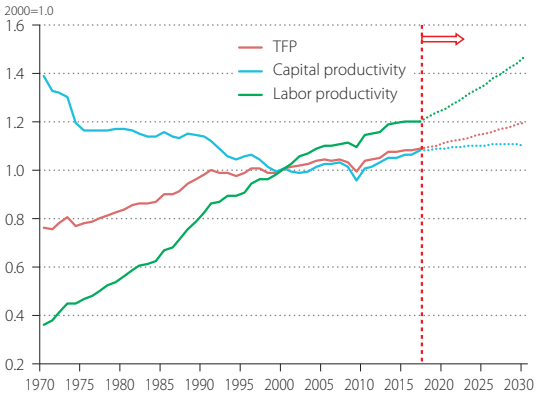

Figure 5 Productivity Indicators

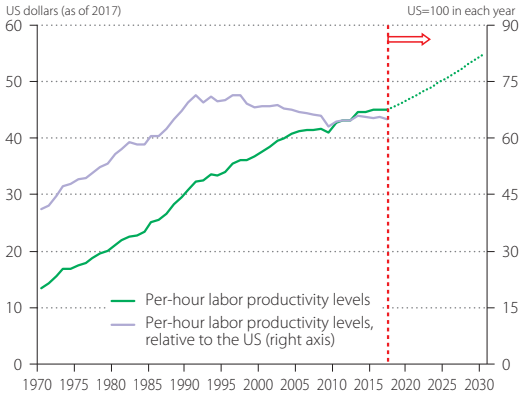

Figure 6 Labor Productivity Level

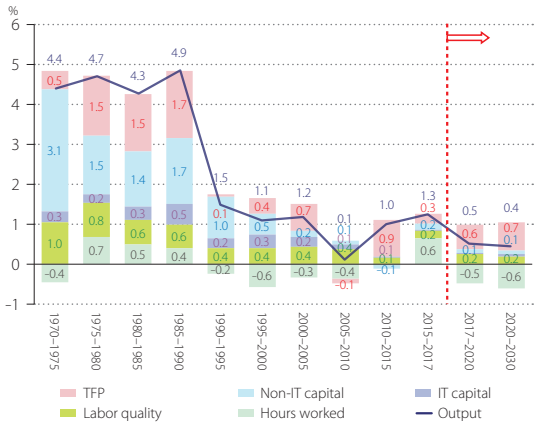

Figure 7 Decomposition of Economic Growth

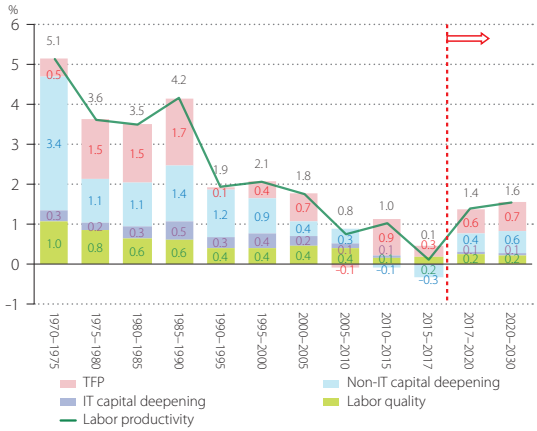

Figure 8 Decomposition of Labor Productivity Growth

Korea

Key Indicators

GDP in 2017	2,035	Billions of US dollars (as of 2017)
Per capita GDP in 2017	39.6	Thousands of US dollars (as of 2017)
(exchange rate based)	29.8	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	31.8	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	112.4	US dollars(as of 2017)
Energy productivity levels in 2016	10.0	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	329.6	g-CO2 per US dollar (as of 2017)

Investment share in 2017	31.1	%
ICT investment share in GFCF in 2017	6.6	%
Agriculture share in GDP in 2017	2.2	%
Manufacturing share in GDP in 2017	30.4	%
Agriculture share in employment in 2017	4.8	%
Female employment share in 2017	41.6	%
Average schooling years of workers in 2017	13.2	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	2020–2030
GDP growth	8.8	9.4	6.7	4.3	3.0	3.0	3.0	1.9	0.5
Labor input growth	4.0	5.4	3.0	2.0	1.6	2.3	–0.1	0.1	–0.8
Labor quality growth	0.7	2.7	2.1	1.9	1.0	1.0	1.0	0.7	0.8
Hours worked growth	3.3	2.7	0.9	0.1	0.6	1.3	–1.1	–0.6	–1.6
IT capital input growth	25.5	20.4	17.4	6.1	2.7	2.8	2.5	2.3	1.1
Non-IT capital input growth	7.4	7.0	6.1	4.9	3.2	3.3	2.9	2.5	1.2
Labor productivity growth	5.2	6.6	5.8	4.4	2.3	1.6	4.0	2.5	2.1
Capital productivity growth	–7.6	–7.5	–6.7	–5.0	–3.1	–3.2	–2.8	–0.6	–0.7
TFP growth	2.7	3.0	2.1	1.0	0.5	0.2	1.5	0.7	0.3

Production

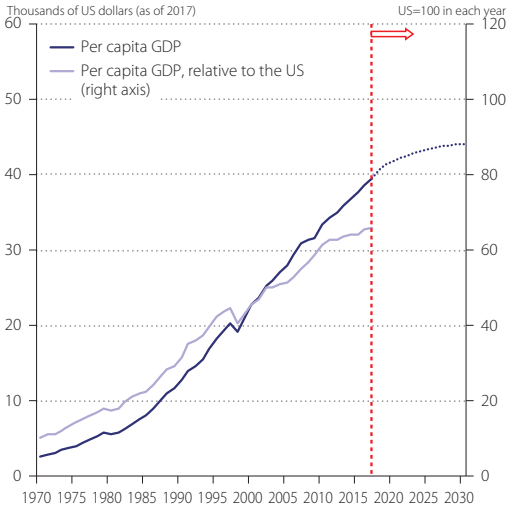

Figure 1 Per Capita GDP

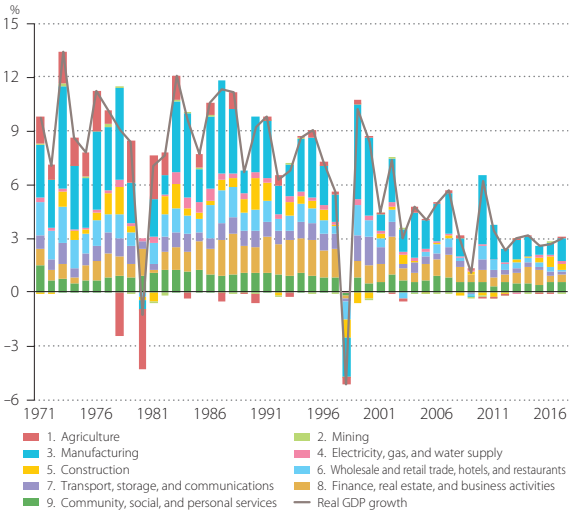

Figure 2 Industry Origins of Economic Growth

Labor

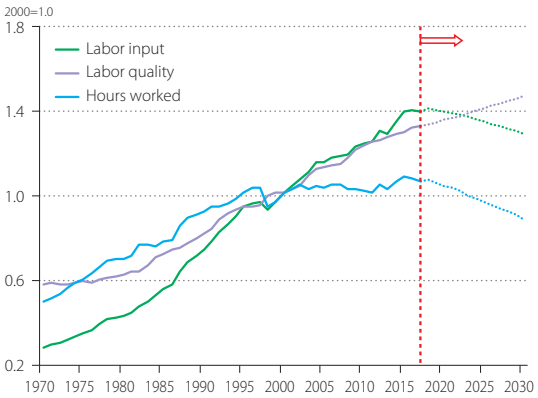

Figure 3 Labor Inputs

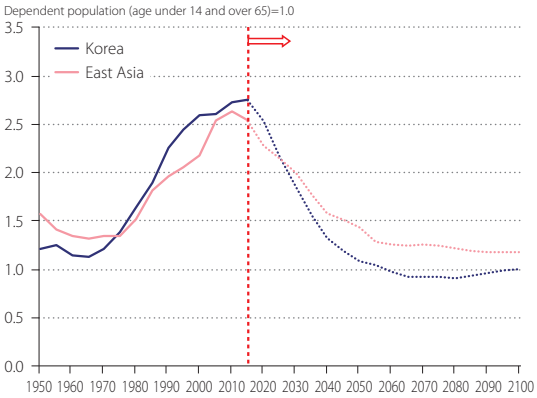

Figure 4 Demographic Dividend

Productivity

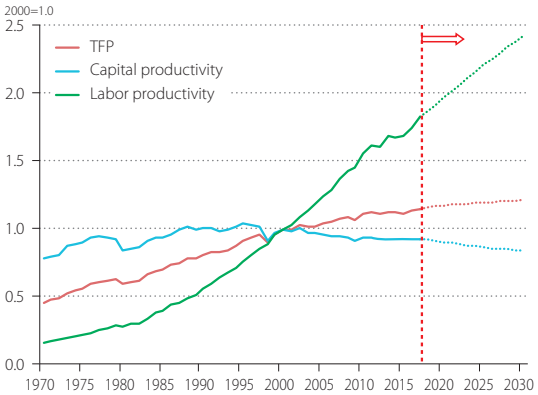

Figure 5 Productivity Indicators

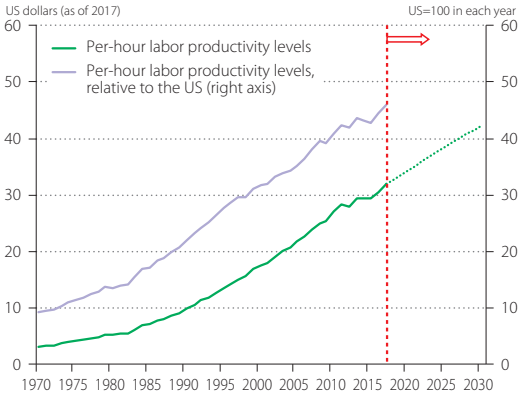

Figure 6 Labor Productivity Level

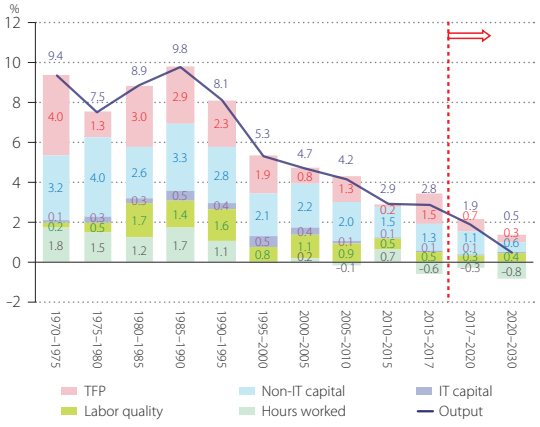

Figure 7 Decomposition of Economic Growth

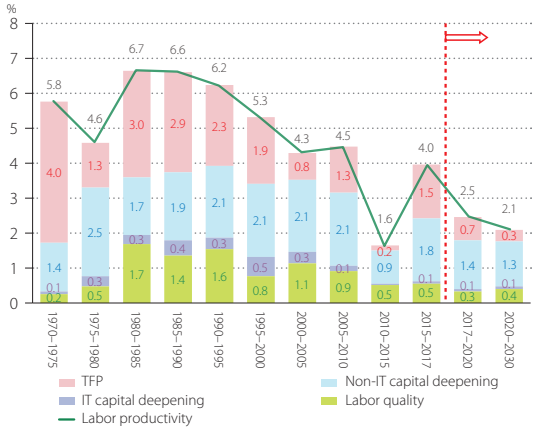

Figure 8 Decomposition of Labor Productivity Growth

Lao PDR

Key Indicators

GDP in 2017	49	Billions of US dollars (as of 2017)
Per capita GDP in 2017	7.1	Thousands of US dollars (as of 2017)
(exchange rate based)	2.5	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	5.8	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	10.6	US dollars(as of 2017)
Energy productivity levels in 2016	n.a.	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	n.a.	g-CO2 per US dollar (as of 2017)

Investment share in 2017	34.2	%
ICT investment share in GFCF in 2017	8.3	%
Agriculture share in GDP in 2017	23.7	%
Manufacturing share in GDP in 2017	8.1	%
Agriculture share in employment in 2017	70.5	%
Female employment share in 2017	48.0	%
Average schooling years of workers in 2017	5.9	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	2020–2030
GDP growth	3.5	5.8	6.0	7.1	7.4	7.6	6.9	7.5	6.6
Labor input growth	1.1	3.0	3.6	3.7	2.6	2.9	1.8	1.6	1.3
Labor quality growth	0.4	0.5	0.7	1.0	0.7	0.9	0.1	0.7	0.8
Hours worked growth	0.7	2.5	2.9	2.7	1.9	2.0	1.7	0.9	0.5
IT capital input growth	10.1	15.9	14.0	16.3	16.9	21.3	5.9	9.1	12.4
Non-IT capital input growth	4.6	6.2	8.6	5.3	7.7	7.4	8.6	9.4	8.1
Labor productivity growth	2.8	3.3	3.1	4.4	5.4	5.6	5.2	6.6	6.0
Capital productivity growth	–4.5	–6.2	–8.6	–5.6	–8.2	–8.1	–8.3	–1.8	–1.8
TFP growth	0.4	0.8	–0.4	2.5	1.9	2.0	1.6	1.9	1.6

Production

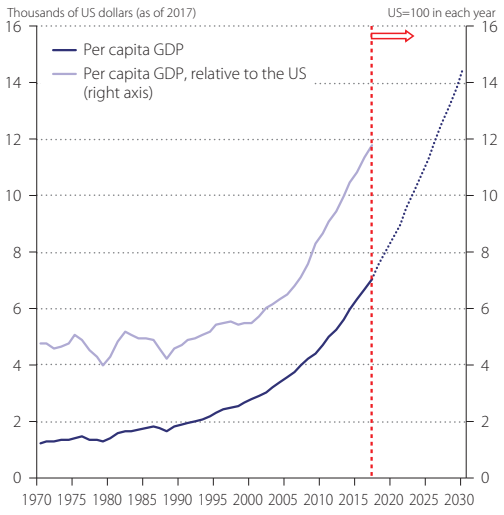

Figure 1 Per Capita GDP

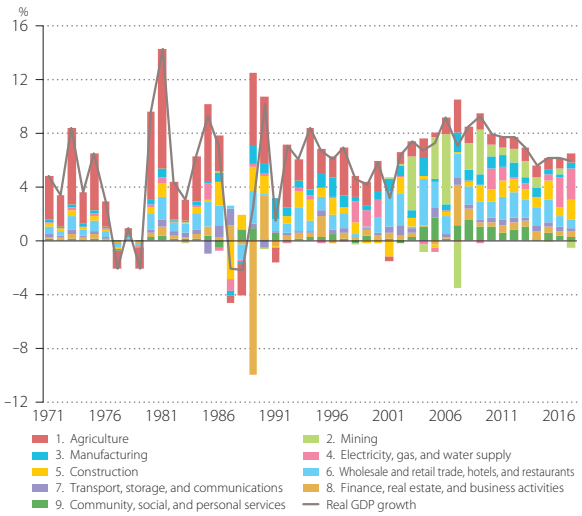

Figure 2 Industry Origins of Economic Growth

Labor

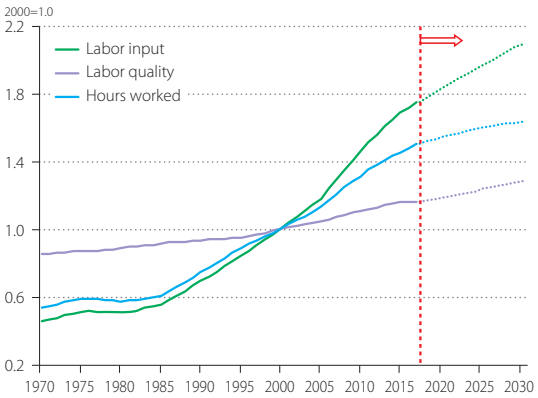

Figure 3 Labor Inputs

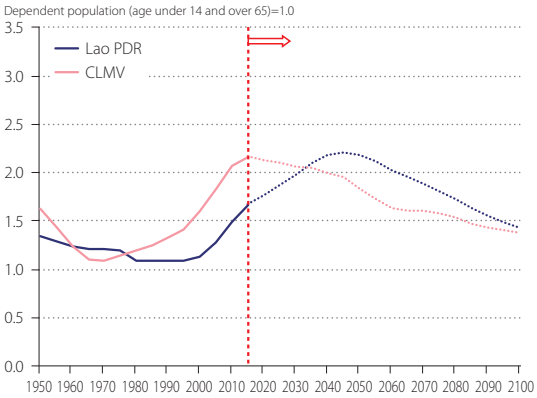

Figure 4 Demographic Dividend

Productivity

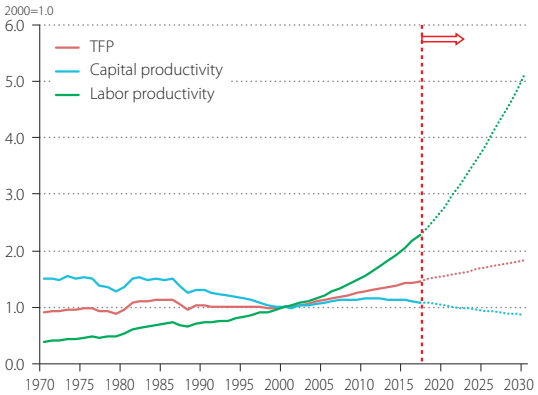

Figure 5 Productivity Indicators

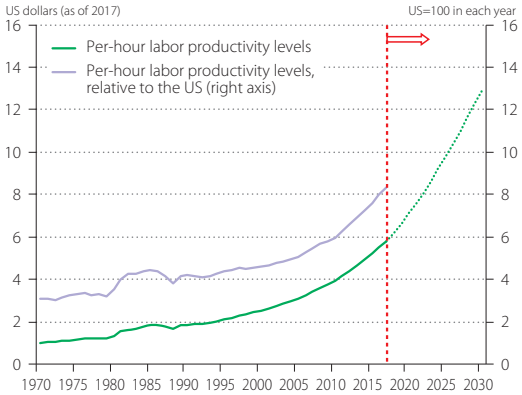

Figure 6 Labor Productivity Level

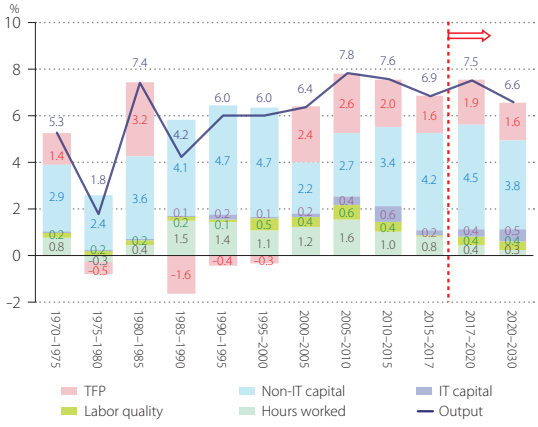

Figure 7 Decomposition of Economic Growth

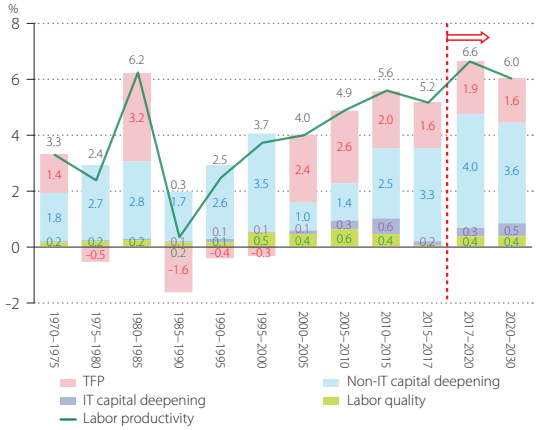

Figure 8 Decomposition of Labor Productivity Growth

Malaysia

Key Indicators

GDP in 2017	933	Billions of US dollars (as of 2017)
Per capita GDP in 2017	29.1	Thousands of US dollars (as of 2017)
(exchange rate based)	9.8	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	27.3	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	55.9	US dollars(as of 2017)
Energy productivity levels in 2016	15.1	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	255.9	g-CO2 per US dollar (as of 2017)

Investment share in 2017	25.6	%
ICT investment share in GFCF in 2017	4.4	%
Agriculture share in GDP in 2017	9.0	%
Manufacturing share in GDP in 2017	22.7	%
Agriculture share in employment in 2017	10.7	%
Female employment share in 2017	38.3	%
Average schooling years of workers in 2017	10.0	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	2020–2030
GDP growth	8.0	6.0	7.1	5.1	5.1	5.2	4.9	4.3	3.2
Labor input growth	4.9	5.4	5.8	4.4	3.6	3.9	2.7	3.1	2.6
Labor quality growth	1.7	2.0	2.5	2.0	0.9	1.0	0.6	1.6	1.6
Hours worked growth	3.2	3.3	3.3	2.4	2.7	2.9	2.0	1.4	1.0
IT capital input growth	15.9	19.6	22.7	15.9	5.8	7.9	0.7	–4.0	1.9
Non-IT capital input growth	8.2	7.2	8.2	3.1	5.2	5.2	5.3	4.4	3.2
Labor productivity growth	4.8	2.7	3.8	2.7	2.5	2.3	2.9	2.9	2.2
Capital productivity growth	–8.2	–7.3	–8.6	–3.7	–5.2	–5.3	–5.0	0.2	0.1
TFP growth	0.9	–0.6	–0.6	1.1	0.5	0.3	0.8	0.6	0.3

Production

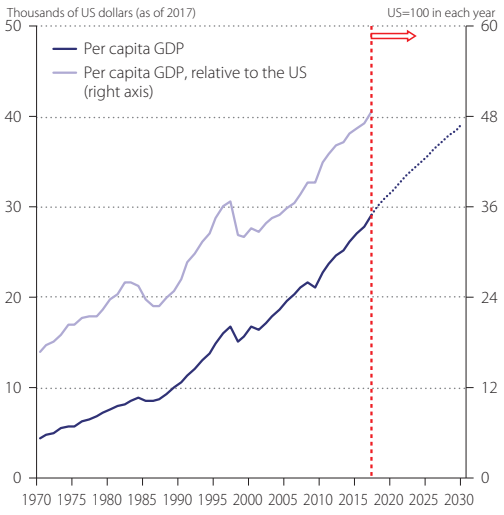

Figure 1 Per Capita GDP

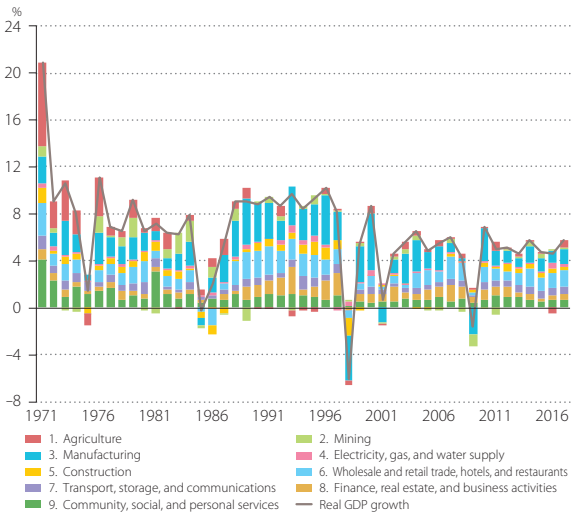

Figure 2 Industry Origins of Economic Growth

Labor

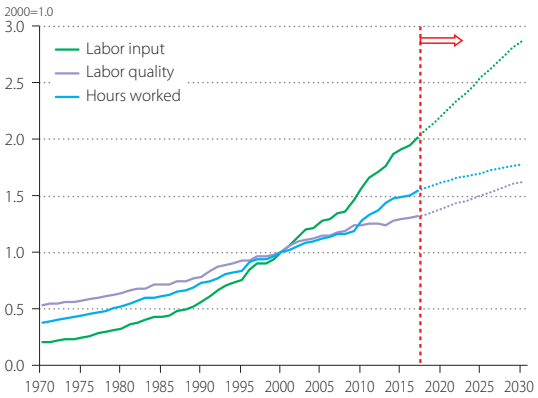

Figure 3 Labor Inputs

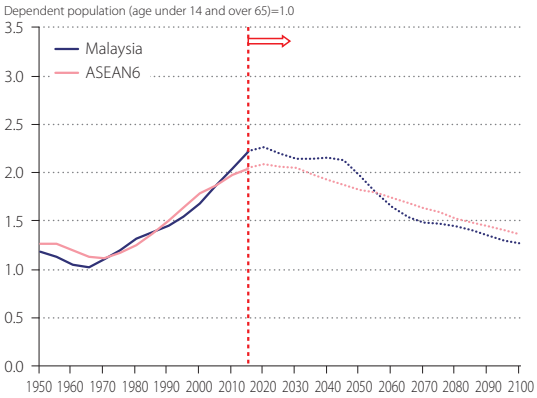

Figure 4 Demographic Dividend

Productivity

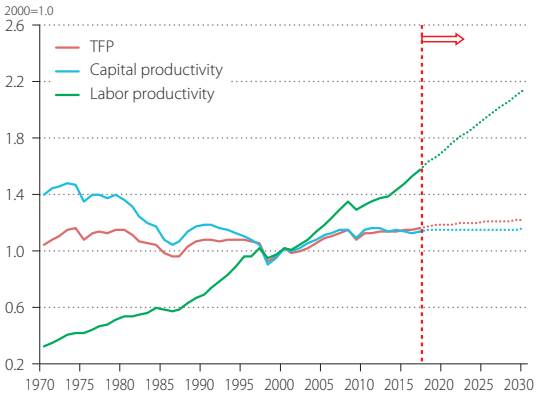

Figure 5 Productivity Indicators

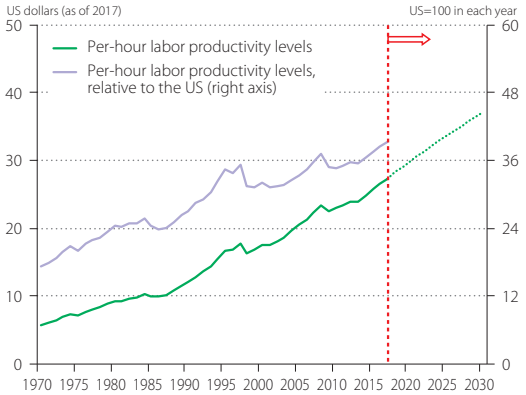

Figure 6 Labor Productivity Level

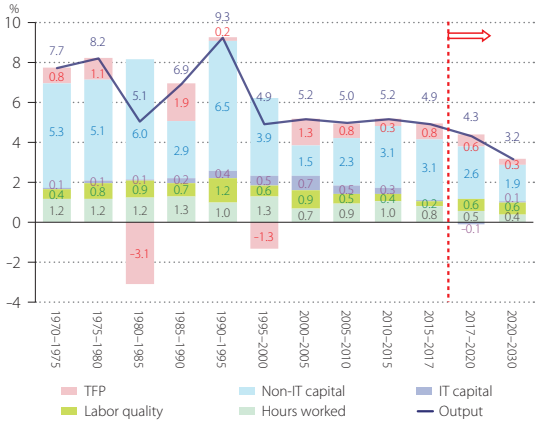

Figure 7 Decomposition of Economic Growth

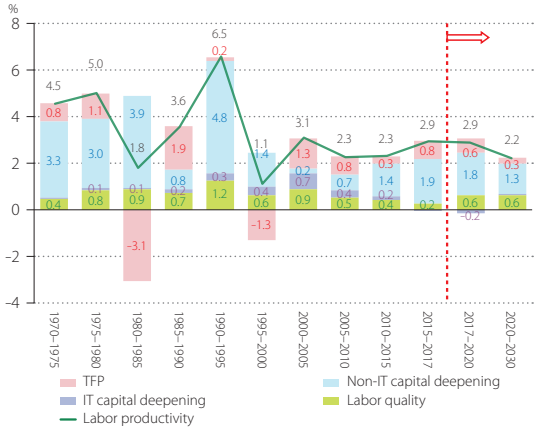

Figure 8 Decomposition of Labor Productivity Growth

Mongolia

Key Indicators

GDP in 2017	40	Billions of US dollars (as of 2017)
Per capita GDP in 2017	12.8	Thousands of US dollars (as of 2017)
(exchange rate based)	3.6	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	15.0	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	28.2	US dollars(as of 2017)
Energy productivity levels in 2016	10.0	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	540.4	g-CO2 per US dollar (as of 2017)

Investment share in 2017	34.8	%
ICT investment share in GFCF in 2017	4.7	%
Agriculture share in GDP in 2017	11.4	%
Manufacturing share in GDP in 2017	10.0	%
Agriculture share in employment in 2017	28.9	%
Female employment share in 2017	47.3	%
Average schooling years of workers in 2017	12.0	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	6.0	5.2	0.9	6.3	7.9	9.8	3.3	6.5	5.4
Labor input growth	6.1	4.7	–2.5	4.3	6.4	6.8	5.5	4.3	4.4
Labor quality growth	4.3	1.2	–2.8	1.8	3.8	4.6	1.8	3.0	2.1
Hours worked growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IT capital input growth	26.2	13.6	8.6	17.8	7.4	11.2	–2.0	5.9	10.3
Non-IT capital input growth	7.7	6.4	0.0	3.6	5.6	7.6	0.4	3.3	3.7
Labor productivity growth	4.1	1.6	0.6	3.9	5.3	7.6	–0.4	5.1	3.1
Capital productivity growth	–7.8	–6.4	–0.1	–3.9	–5.5	–7.6	–0.3	3.1	1.5
TFP growth	–1.2	–0.7	1.5	2.4	2.0	2.4	1.2	2.8	1.4

Production

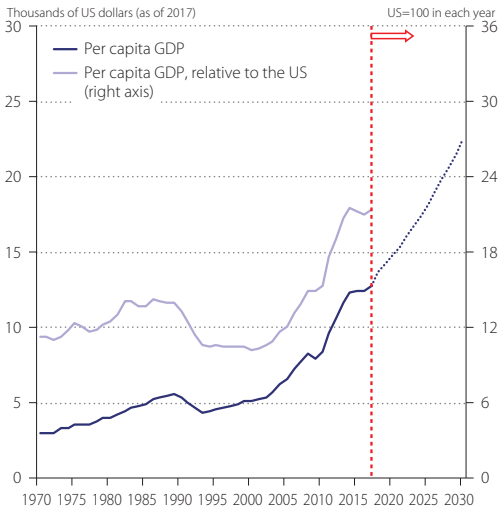

Figure 1 Per Capita GDP

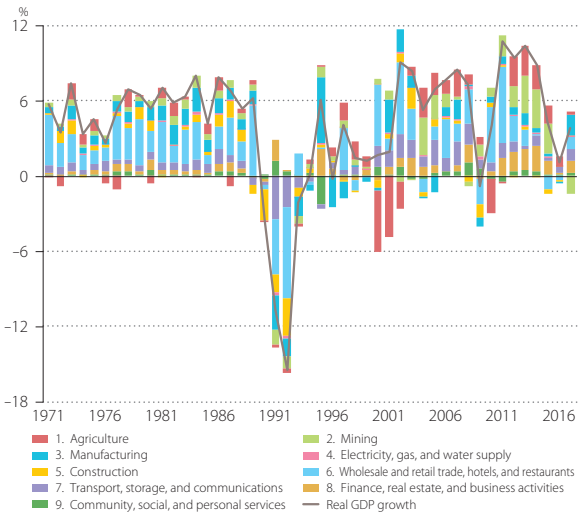

Figure 2 Industry Origins of Economic Growth

Labor

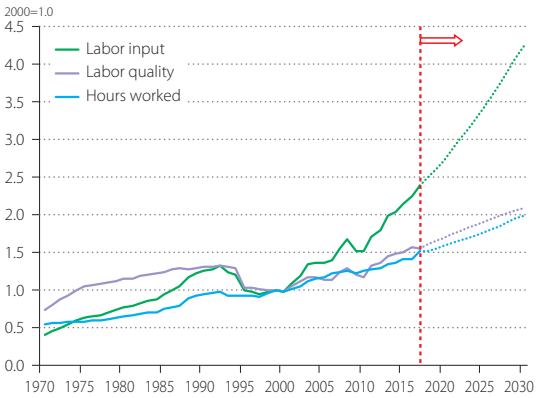

Figure 3 Labor Inputs

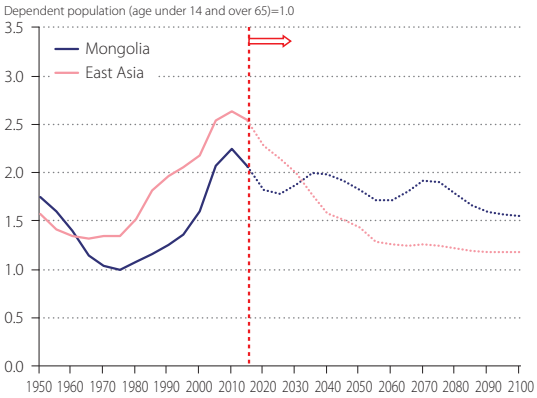

Figure 4 Demographic Dividend

Productivity

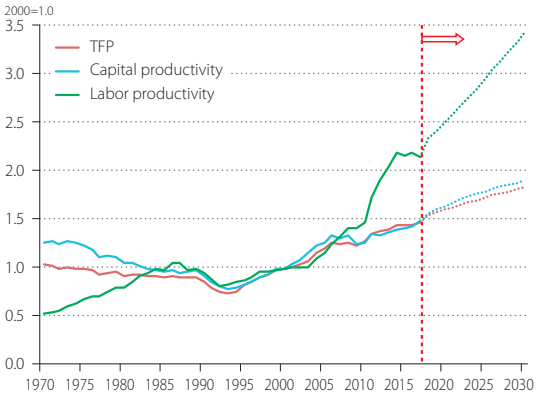

Figure 5 Productivity Indicators

Figure 6 Labor Productivity Level

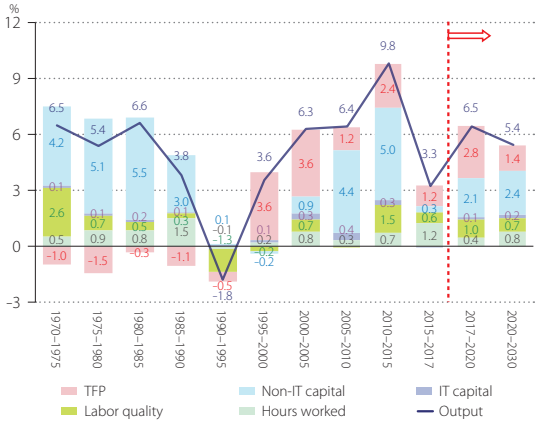

Figure 7 Decomposition of Economic Growth

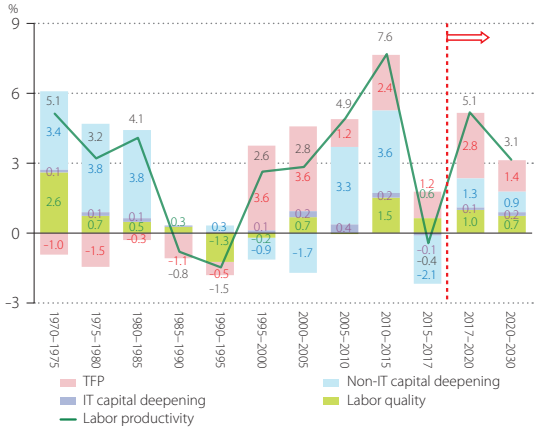

Figure 8 Decomposition of Labor Productivity Growth

Nepal

Key Indicators

GDP in 2017	92	Billions of US dollars (as of 2017)
Per capita GDP in 2017	3.2	Thousands of US dollars (as of 2017)
(exchange rate based)	1.0	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	3.9	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	9.9	US dollars(as of 2017)
Energy productivity levels in 2016	6.1	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	110.3	g-CO2 per US dollar (as of 2017)

Investment share in 2017	51.4	%
ICT investment share in GFCF in 2017	3.3	%
Agriculture share in GDP in 2017	27.6	%
Manufacturing share in GDP in 2017	5.4	%
Agriculture share in employment in 2017	68.6	%
Female employment share in 2017	44.1	%
Average schooling years of workers in 2017	4.9	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	3.0	4.5	4.8	3.8	4.7	3.8	6.9	7.1	7.6
Labor input growth	3.5	4.5	5.7	2.9	2.3	2.3	2.3	6.2	5.2
Labor quality growth	0.4	3.1	3.4	1.8	0.1	0.1	–0.1	3.2	2.8
Hours worked growth	3.1	1.4	2.3	1.0	2.2	2.2	2.4	3.1	2.4
IT capital input growth	20.7	9.1	11.7	12.1	15.2	15.9	13.5	10.2	10.8
Non-IT capital input growth	6.4	7.1	6.1	4.8	5.5	5.1	6.6	7.2	7.5
Labor productivity growth	–0.1	3.1	2.5	2.5	2.1	1.3	4.1	4.0	5.1
Capital productivity growth	–6.5	–7.1	–6.1	–4.8	–5.7	–5.2	–6.7	–0.2	0.0
TFP growth	–1.9	–1.1	–1.0	–0.2	0.6	–0.1	2.2	0.4	1.3

Production

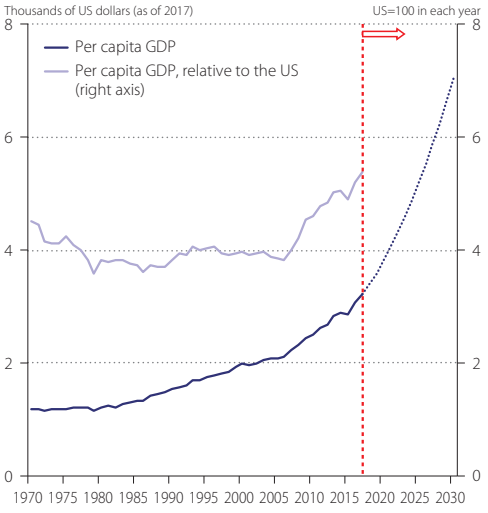

Figure 1 Per Capita GDP

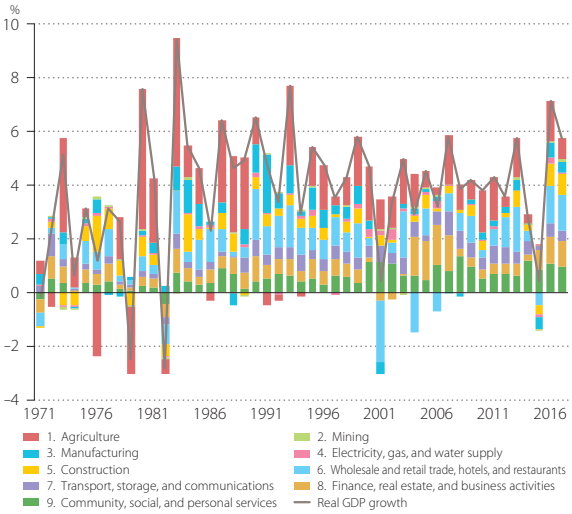

Figure 2 Industry Origins of Economic Growth

Labor

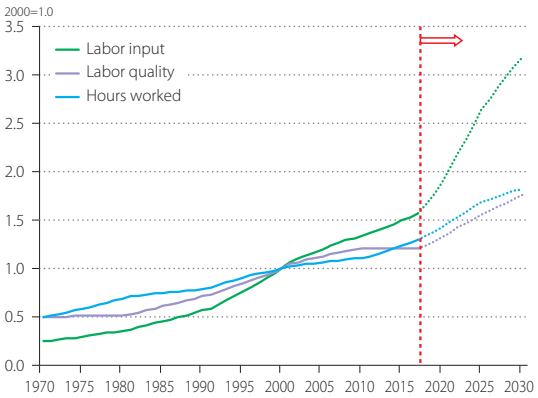

Figure 3 Labor Inputs

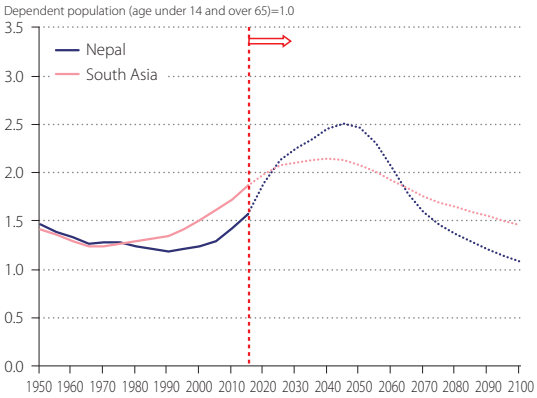

Figure 4 Demographic Dividend

Productivity

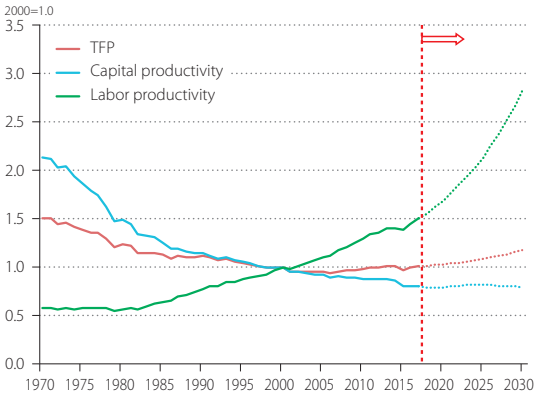

Figure 5 Productivity Indicators

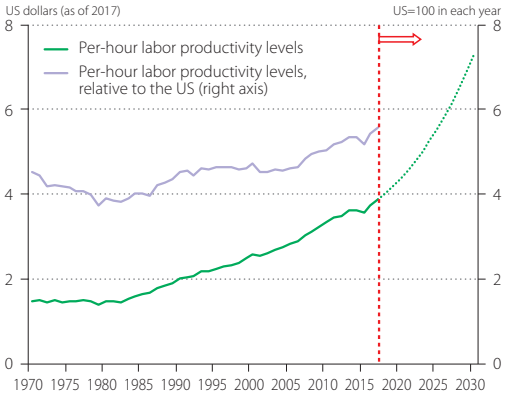

Figure 6 Labor Productivity Level

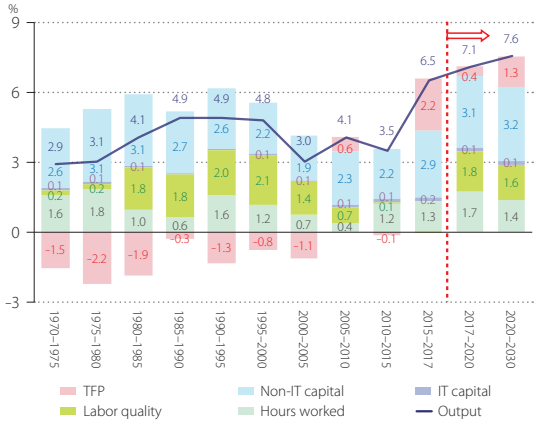

Figure 7 Decomposition of Economic Growth

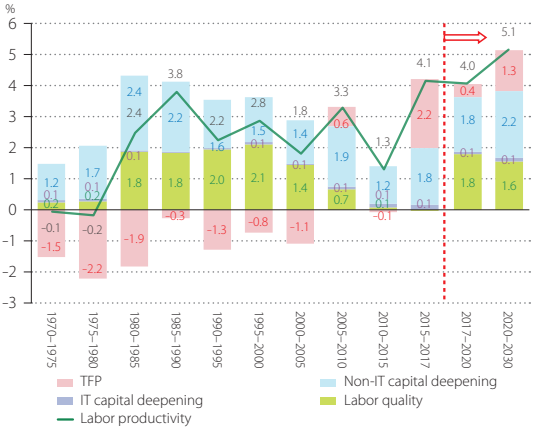

Figure 8 Decomposition of Labor Productivity Growth

Pakistan

Key Indicators

GDP in 2017	1,091	Billions of US dollars (as of 2017)
Per capita GDP in 2017	5.4	Thousands of US dollars (as of 2017)
(exchange rate based)	1.5	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	8.8	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	7.8	US dollars(as of 2017)
Energy productivity levels in 2016	12.4	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	152.0	g-CO2 per US dollar (as of 2017)

Investment share in 2017	16.1	%
ICT investment share in GFCF in 2017	4.6	%
Agriculture share in GDP in 2017	24.4	%
Manufacturing share in GDP in 2017	12.8	%
Agriculture share in employment in 2017	39.9	%
Female employment share in 2017	21.5	%
Average schooling years of workers in 2017	5.0	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	2020–2030
GDP growth	4.7	7.4	5.2	4.2	4.4	3.9	5.5	4.5	5.0
Labor input growth	4.6	3.5	3.2	3.9	2.8	2.6	3.3	4.4	3.7
Labor quality growth	1.9	1.0	1.3	0.9	1.7	1.6	2.2	1.9	2.0
Hours worked growth	2.7	2.5	1.9	3.0	1.1	1.1	1.1	1.9	2.0
IT capital input growth	5.1	14.3	5.8	13.2	6.0	4.7	9.1	8.5	7.8
Non-IT capital input growth	4.6	6.1	5.4	2.7	1.3	0.8	2.5	3.3	3.9
Labor productivity growth	2.0	5.0	3.3	1.2	3.3	2.9	4.4	2.0	3.3
Capital productivity growth	–4.6	–6.1	–5.4	–2.8	–1.4	–0.9	–2.6	1.2	1.0
TFP growth	0.1	2.7	0.9	0.9	2.4	2.4	2.5	0.7	1.2

Production

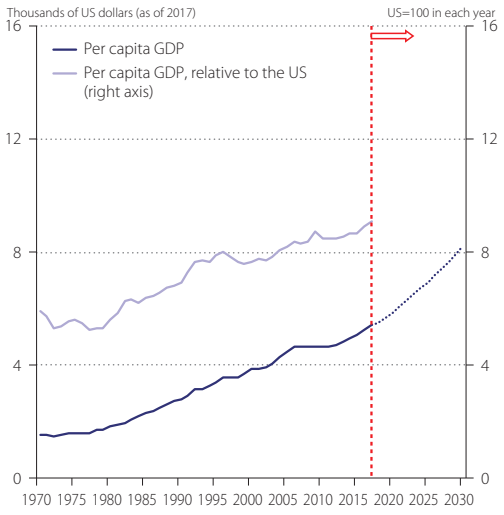

Figure 1 Per Capita GDP

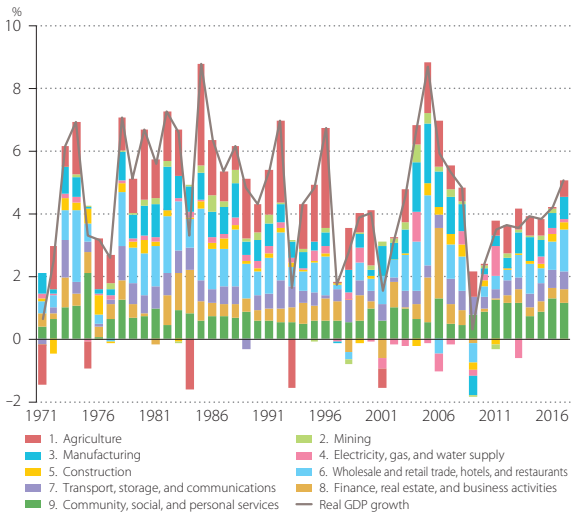

Figure 2 Industry Origins of Economic Growth

Labor

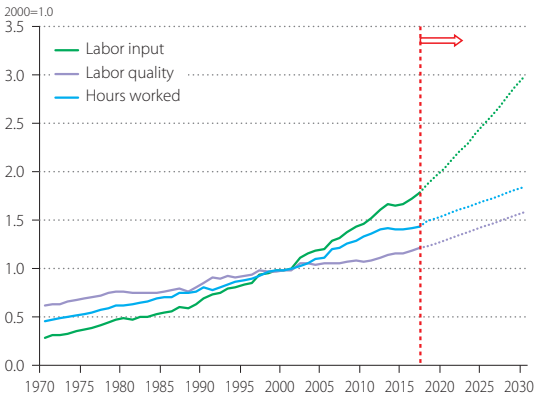

Figure 3 Labor Inputs

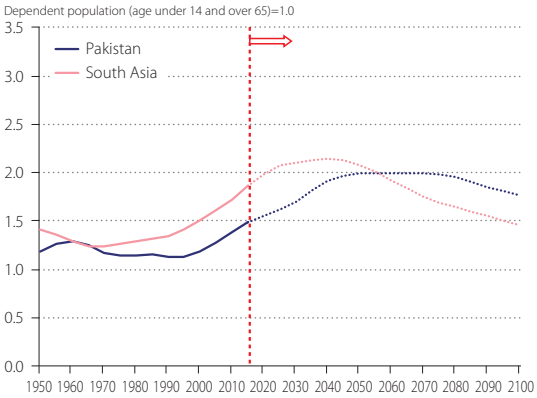

Figure 4 Demographic Dividend

Productivity

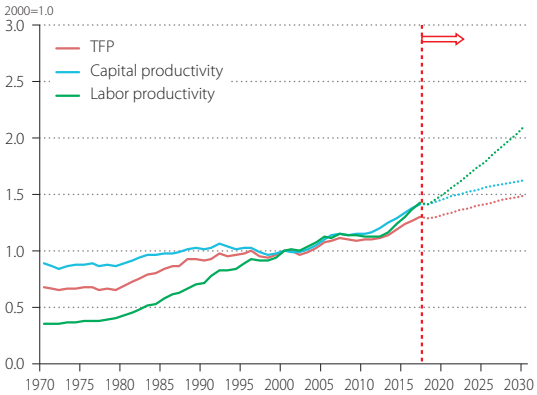

Figure 5 Productivity Indicators

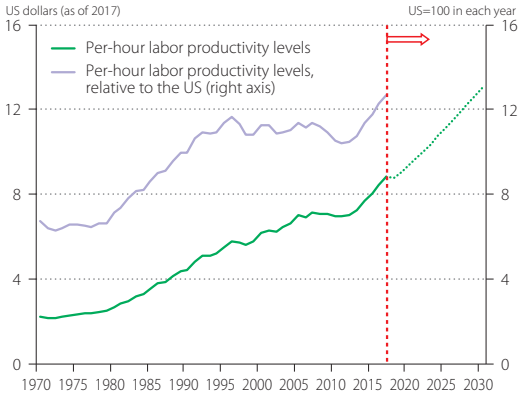

Figure 6 Labor Productivity Level

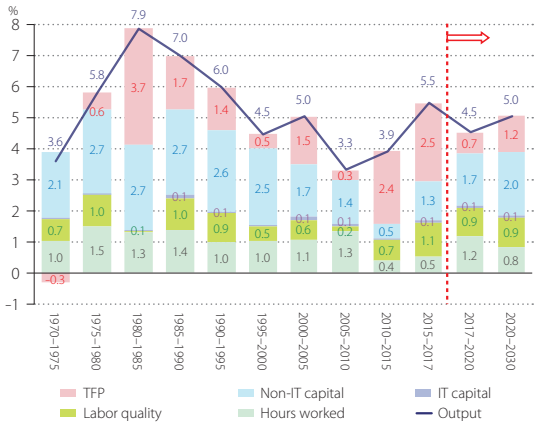

Figure 7 Decomposition of Economic Growth

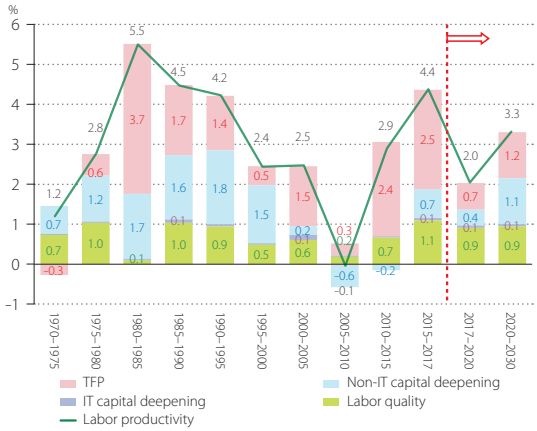

Figure 8 Decomposition of Labor Productivity Growth

Philippines

Key Indicators

GDP in 2017	877	Billions of US dollars (as of 2017)
Per capita GDP in 2017	8.4	Thousands of US dollars (as of 2017)
(exchange rate based)	3.0	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	9.5	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	19.9	US dollars(as of 2017)
Energy productivity levels in 2016	24.6	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	147.2	g-CO2 per US dollar (as of 2017)

Investment share in 2017	25.1	%
ICT investment share in GFCF in 2017	7.4	%
Agriculture share in GDP in 2017	9.7	%
Manufacturing share in GDP in 2017	19.5	%
Agriculture share in employment in 2017	25.9	%
Female employment share in 2017	37.9	%
Average schooling years of workers in 2017	6.0	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	5.8	2.0	3.4	4.7	6.0	5.7	6.6	6.3	5.8
Labor input growth	5.3	5.1	3.5	3.5	3.5	3.0	4.8	3.9	3.9
Labor quality growth	1.3	2.0	1.6	1.0	1.6	1.3	2.4	1.7	1.8
Hours worked growth	4.0	3.1	2.0	2.6	1.9	1.7	2.4	1.7	1.8
IT capital input growth	7.5	9.4	14.9	9.6	10.6	7.5	18.6	11.3	8.3
Non-IT capital input growth	6.8	3.7	4.1	3.1	5.1	4.4	6.8	5.4	5.2
Labor productivity growth	1.8	–1.1	1.4	2.1	4.1	4.1	4.1	4.0	3.7
Capital productivity growth	–6.7	–3.8	–4.4	–3.4	–5.2	–4.4	–7.2	0.7	0.5
TFP growth	–0.4	–2.4	–0.7	1.1	1.4	1.9	0.3	1.4	1.1

Production

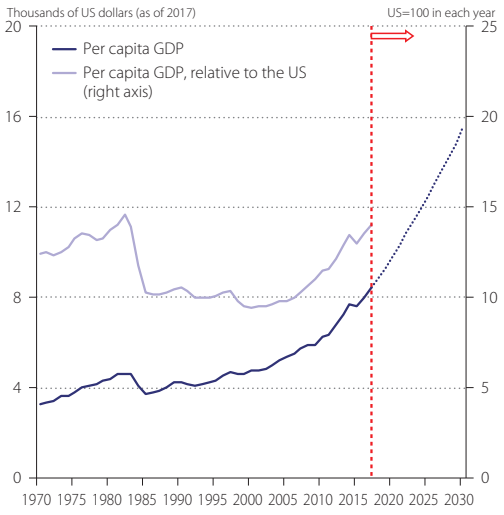

Figure 1 Per Capita GDP

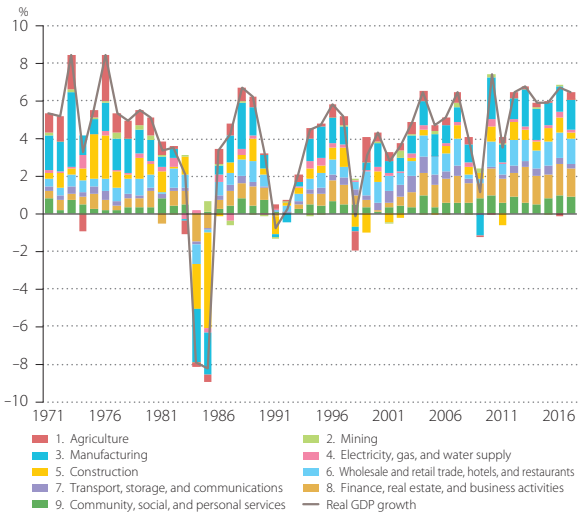

Figure 2 Industry Origins of Economic Growth

Labor

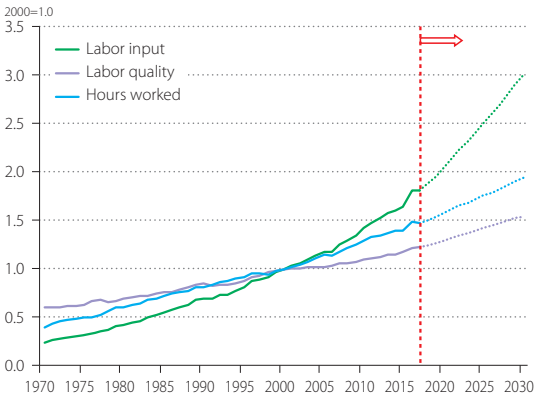

Figure 3 Labor Inputs

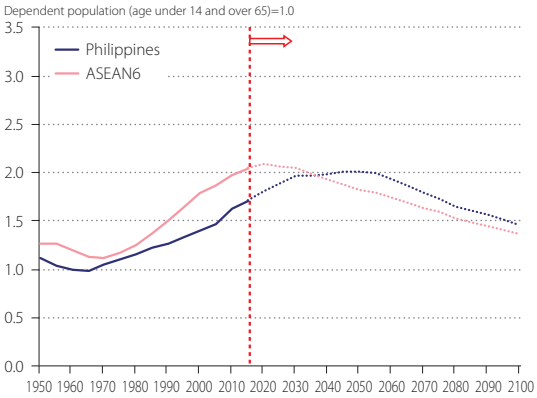

Figure 4 Demographic Dividend

Productivity

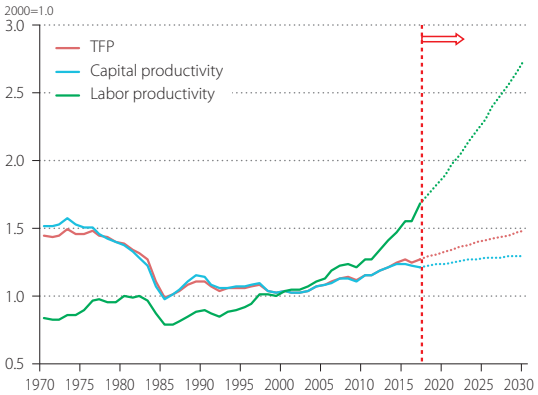

Figure 5 Productivity Indicators

Figure 6 Labor Productivity Level

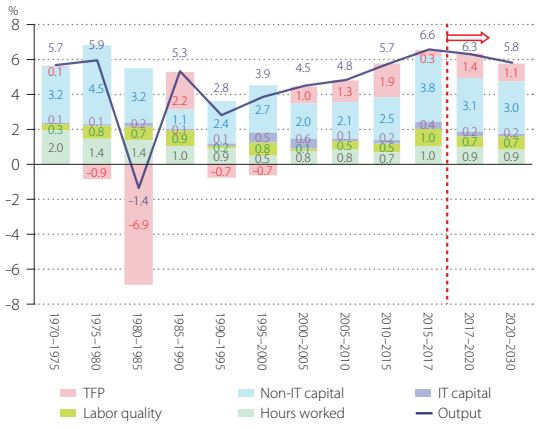

Figure 7 Decomposition of Economic Growth

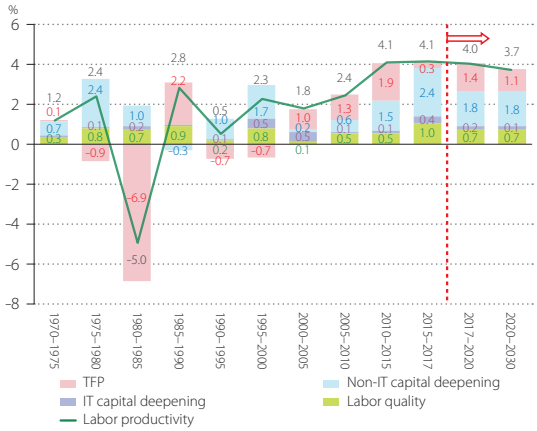

Figure 8 Decomposition of Labor Productivity Growth

Singapore

Key Indicators

GDP in 2017	536	Billions of US dollars (as of 2017)
Per capita GDP in 2017	95.5	Thousands of US dollars (as of 2017)
(exchange rate based)	60.0	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	63.2	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	157.9	US dollars(as of 2017)
Energy productivity levels in 2016	26.4	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	93.2	g-CO2 per US dollar (as of 2017)

Investment share in 2017	28.5	%
ICT investment share in GFCF in 2017	21.1	%
Agriculture share in GDP in 2017	0.0	%
Manufacturing share in GDP in 2017	19.6	%
Agriculture share in employment in 2017	0.5	%
Female employment share in 2017	47.6	%
Average schooling years of workers in 2017	10.9	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	8.7	7.4	6.9	5.6	4.1	4.4	3.3	1.6	0.9
Labor input growth	6.0	6.2	6.5	5.0	3.0	3.9	0.9	1.0	0.0
Labor quality growth	1.1	2.1	2.9	1.6	1.2	1.2	1.2	0.1	0.7
Hours worked growth	4.9	4.1	3.6	3.4	1.8	2.6	–0.3	0.1	0.7
IT capital input growth	18.1	20.9	13.8	10.1	9.7	9.4	10.5	11.5	7.1
Non-IT capital input growth	8.2	6.5	6.2	3.4	4.0	4.2	3.4	1.5	0.6
Labor productivity growth	3.7	3.4	3.3	2.2	2.3	1.8	3.6	0.7	1.6
Capital productivity growth	–8.5	–7.2	–6.7	–3.9	–4.4	–4.6	–3.9	–0.6	–0.2
TFP growth	1.4	0.7	0.2	1.2	0.3	0.1	0.8	–0.1	0.3

Production

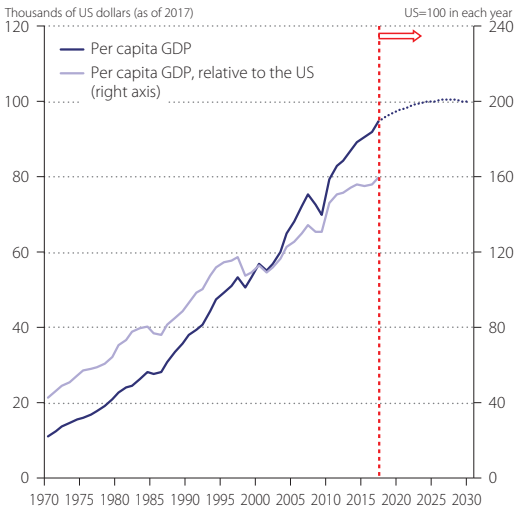

Figure 1 Per Capita GDP

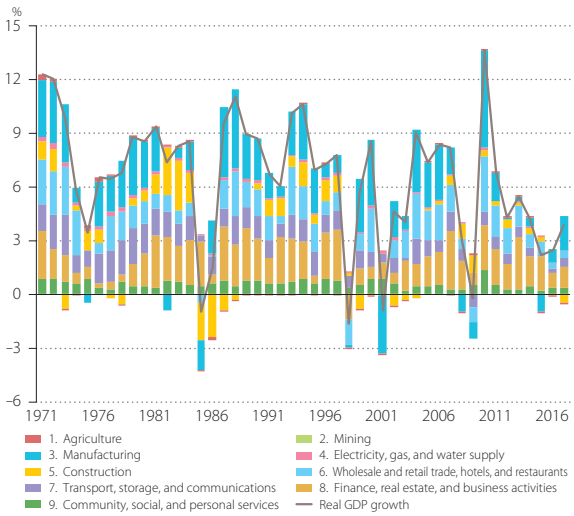

Figure 2 Industry Origins of Economic Growth

Labor

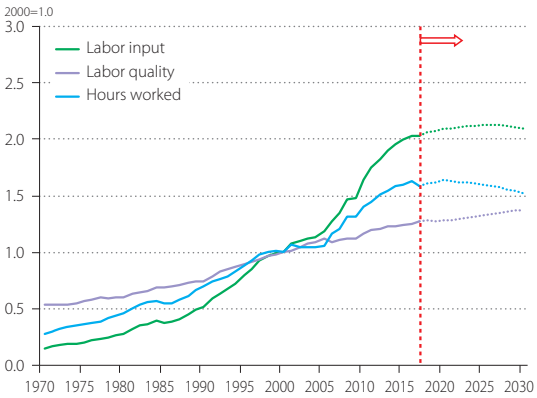

Figure 3 Labor Inputs

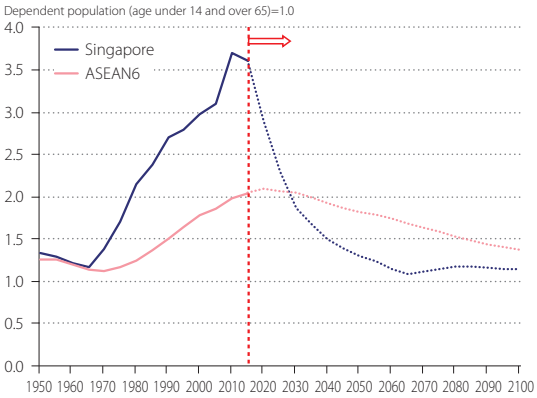

Figure 4 Demographic Dividend

Productivity

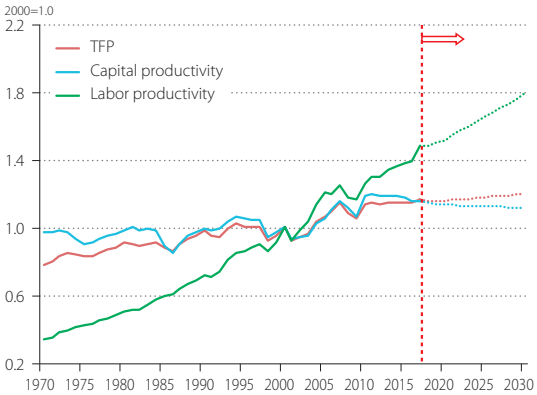

Figure 5 Productivity Indicators

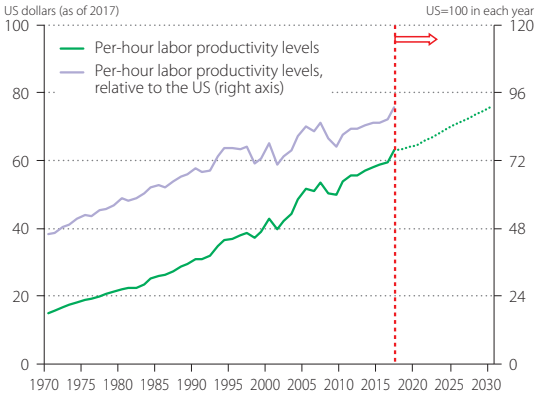

Figure 6 Labor Productivity Level

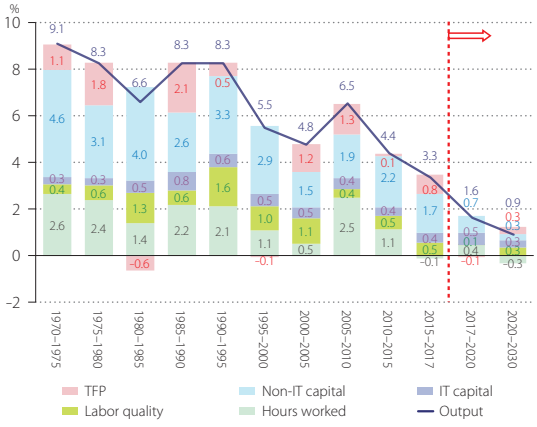

Figure 7 Decomposition of Economic Growth

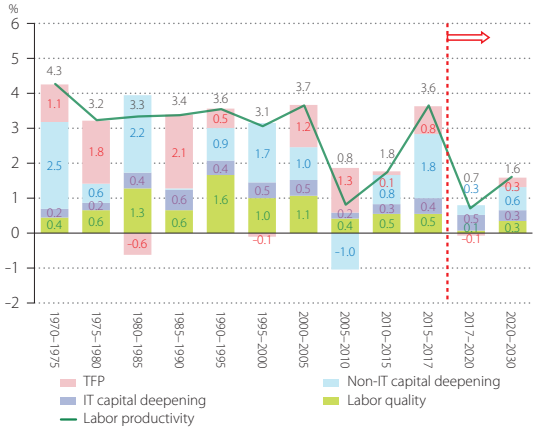

Figure 8 Decomposition of Labor Productivity Growth

Sri Lanka

Key Indicators

GDP in 2017	273	Billions of US dollars (as of 2017)
Per capita GDP in 2017	12.7	Thousands of US dollars (as of 2017)
(exchange rate based)	4.1	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	16.3	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	32.9	US dollars(as of 2017)
Energy productivity levels in 2016	25.4	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	84.0	g-CO2 per US dollar (as of 2017)

Investment share in 2017	28.1	%
ICT investment share in GFCF in 2017	2.6	%
Agriculture share in GDP in 2017	8.5	%
Manufacturing share in GDP in 2017	17.6	%
Agriculture share in employment in 2017	26.1	%
Female employment share in 2017	35.7	%
Average schooling years of workers in 2017	11.4	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	4.1	4.2	5.1	5.1	5.3	6.1	3.5	4.3	3.9
Labor input growth	2.4	2.9	3.3	1.4	1.8	0.9	4.3	1.3	1.3
Labor quality growth	0.6	1.2	1.0	0.7	1.2	0.9	1.9	0.5	0.7
Hours worked growth	1.8	1.7	2.3	0.7	0.7	0.0	2.3	0.5	0.7
IT capital input growth	21.0	3.8	11.4	16.8	3.2	3.4	2.7	3.8	3.9
Non-IT capital input growth	4.4	3.6	2.0	4.8	6.8	7.2	5.9	6.8	5.1
Labor productivity growth	2.4	2.5	2.8	4.4	4.7	6.0	1.2	3.6	3.4
Capital productivity growth	−4.5	−3.5	−2.2	−5.1	−6.7	−7.0	−5.8	−2.5	−1.2
TFP growth	0.6	0.9	2.4	1.6	0.2	0.9	−1.7	−0.6	0.1

Production

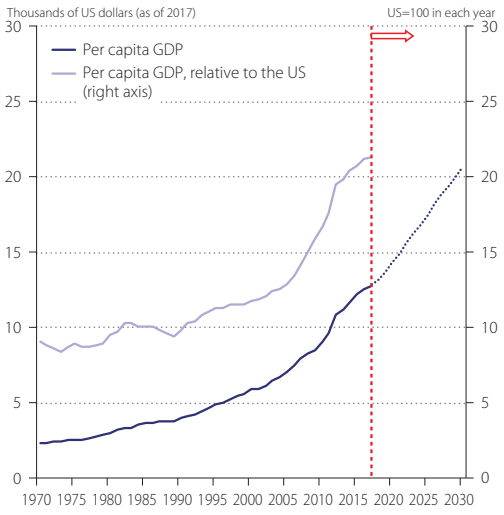

Figure 1 Per Capita GDP

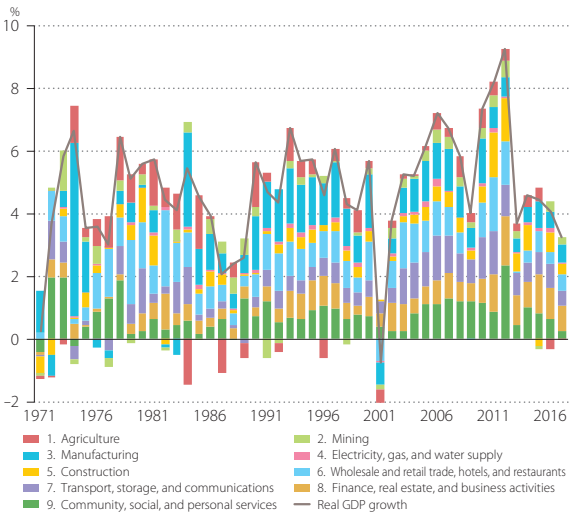

Figure 2 Industry Origins of Economic Growth

Labor

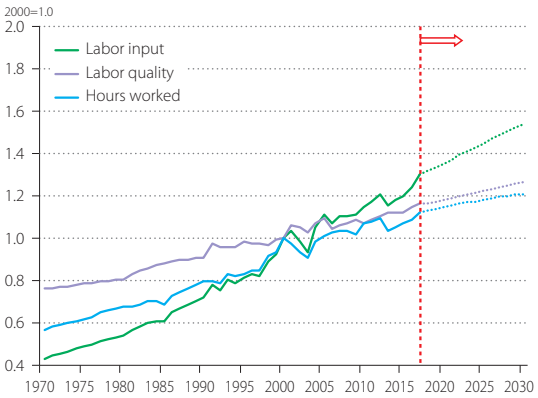

Figure 3 Labor Inputs

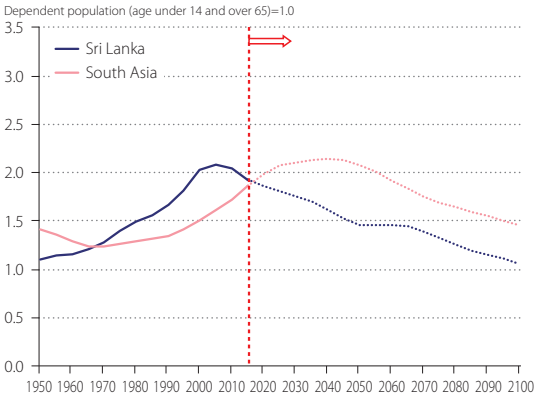

Figure 4 Demographic Dividend

Productivity

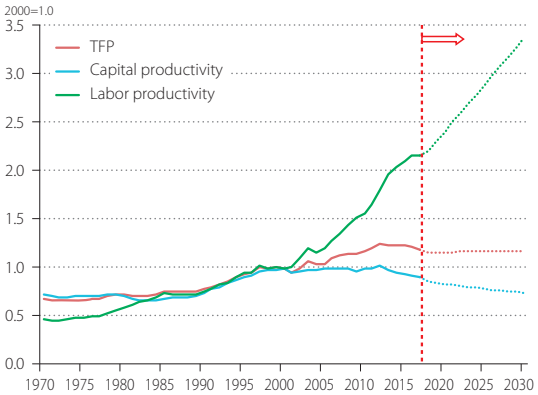

Figure 5 Productivity Indicators

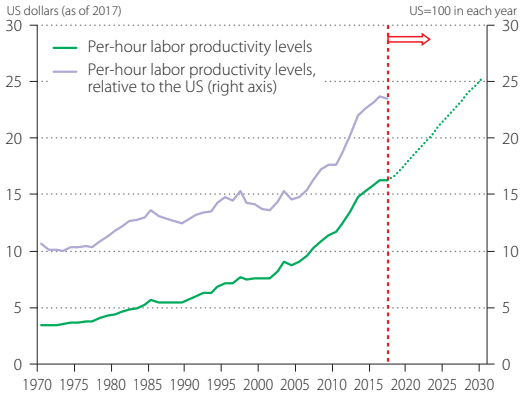

Figure 6 Labor Productivity Level

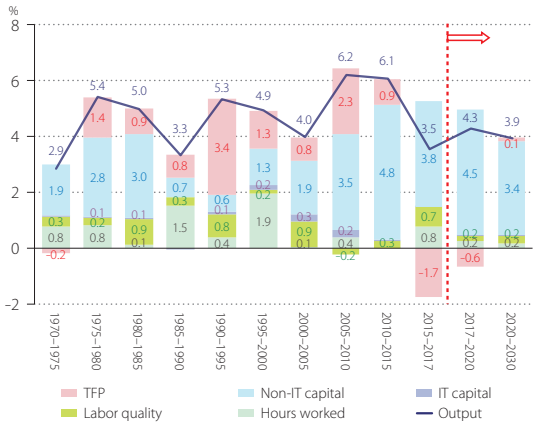

Figure 7 Decomposition of Economic Growth

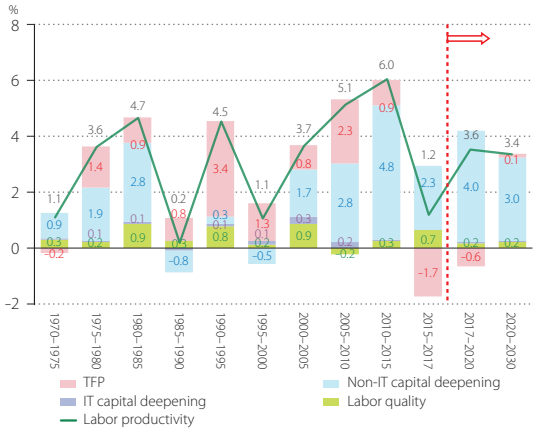

Figure 8 Decomposition of Labor Productivity Growth

Thailand

Key Indicators

GDP in 2017	1,248	Billions of US dollars (as of 2017)
Per capita GDP in 2017	18.4	Thousands of US dollars (as of 2017)
(exchange rate based)	6.8	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	14.5	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	37.7	US dollars(as of 2017)
Energy productivity levels in 2016	11.2	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	224.7	g-CO2 per US dollar (as of 2017)

Investment share in 2017	23.3	%
ICT investment share in GFCF in 2017	16.9	%
Agriculture share in GDP in 2017	8.3	%
Manufacturing share in GDP in 2017	27.2	%
Agriculture share in employment in 2017	31.8	%
Female employment share in 2017	48.1	%
Average schooling years of workers in 2017	8.9	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	6.5	7.6	4.4	4.5	3.2	3.0	3.6	2.8	2.3
Labor input growth	7.0	6.6	5.2	4.1	1.7	1.9	1.3	1.6	1.7
Labor quality growth	2.5	3.8	4.5	3.4	3.9	3.7	4.3	1.2	1.1
Hours worked growth	4.5	2.8	0.7	0.7	–2.1	–1.8	–2.9	1.2	1.1
IT capital input growth	14.6	18.4	11.8	14.3	9.2	11.6	3.1	4.4	4.6
Non-IT capital input growth	4.8	6.2	6.6	1.9	2.6	2.6	2.4	2.0	1.7
Labor productivity growth	2.0	4.7	3.7	3.8	5.3	4.8	6.6	2.5	1.7
Capital productivity growth	–4.9	–6.5	–6.8	–2.6	–3.1	–3.4	–2.5	0.6	0.3
TFP growth	0.6	0.9	–1.8	1.2	0.6	0.2	1.6	0.9	0.4

Production

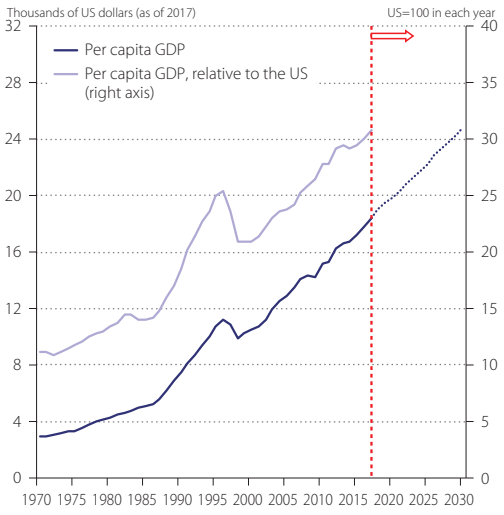

Figure 1 Per Capita GDP

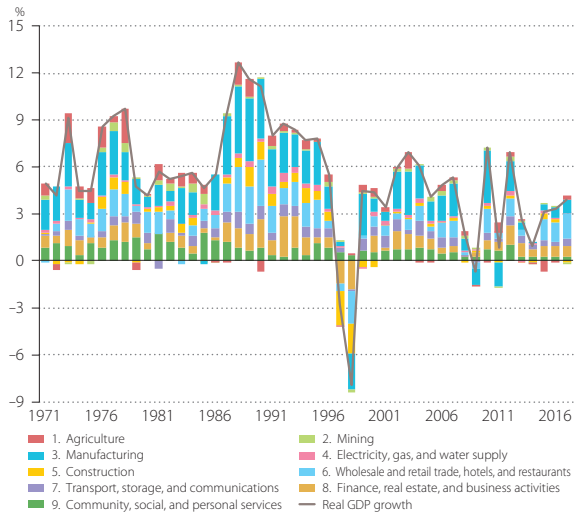

Figure 2 Industry Origins of Economic Growth

Labor

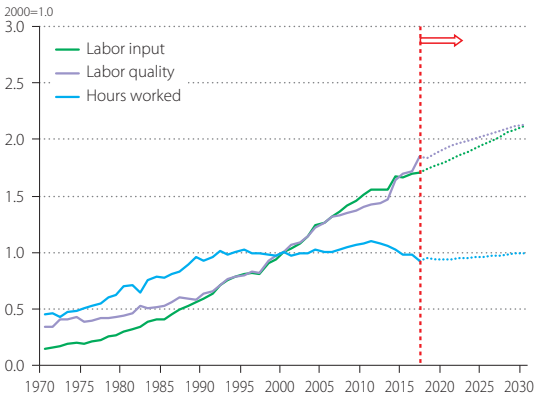

Figure 3 Labor Inputs

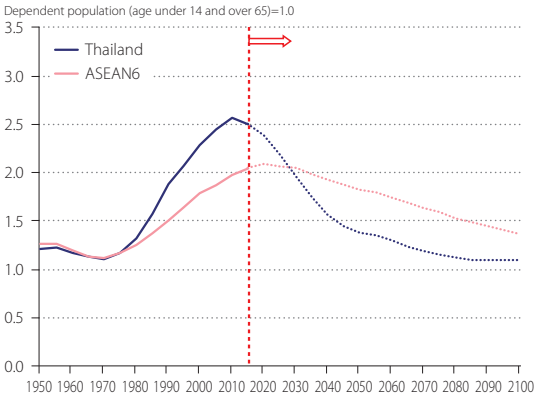

Figure 4 Demographic Dividend

Productivity

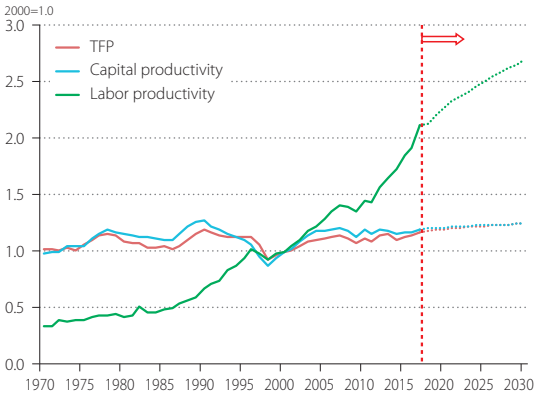

Figure 5 Productivity Indicators

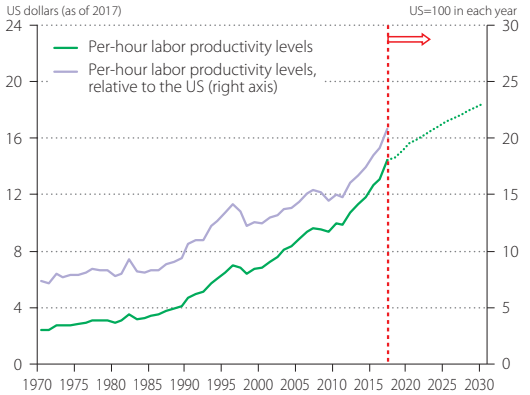

Figure 6 Labor Productivity Level

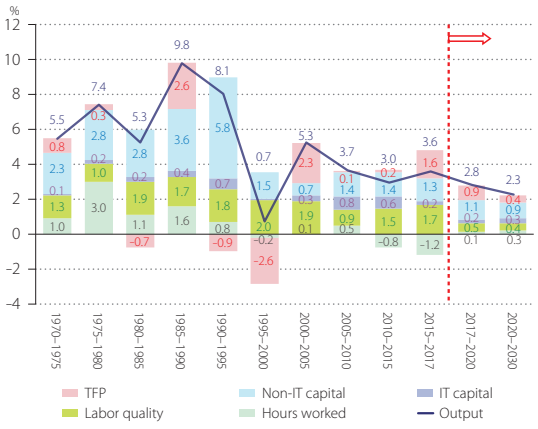

Figure 7 Decomposition of Economic Growth

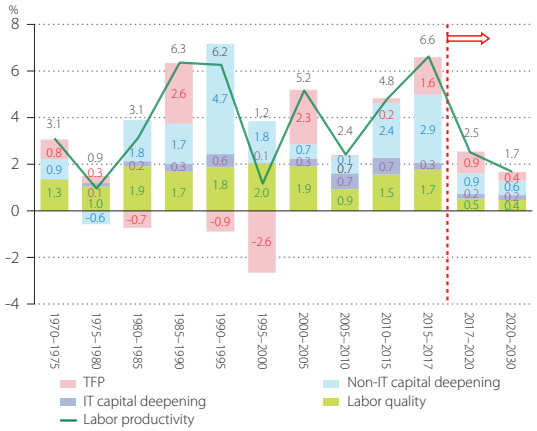

Figure 8 Decomposition of Labor Productivity Growth

Vietnam

Key Indicators

GDP in 2017	659	Billions of US dollars (as of 2017)
Per capita GDP in 2017	7.0	Thousands of US dollars (as of 2017)
(exchange rate based)	2.4	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	5.2	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	9.5	US dollars(as of 2017)
Energy productivity levels in 2016	8.6	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	333.5	g-CO2 per US dollar (as of 2017)

Investment share in 2017	27.5	%
ICT investment share in GFCF in 2017	8.8	%
Agriculture share in GDP in 2017	17.0	%
Manufacturing share in GDP in 2017	17.0	%
Agriculture share in employment in 2017	40.2	%
Female employment share in 2017	47.8	%
Average schooling years of workers in 2017	8.6	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	2020–2030
GDP growth	2.7	5.3	7.7	7.1	6.0	5.8	6.4	6.4	6.2
Labor input growth	3.1	3.6	2.9	4.7	1.6	1.7	1.3	2.5	2.3
Labor quality growth	1.2	1.1	0.6	2.7	1.4	1.2	1.9	1.0	1.1
Hours worked growth	1.9	2.5	2.3	2.0	0.2	0.5	–0.6	1.0	1.1
IT capital input growth	7.1	13.4	13.2	18.7	15.3	15.3	15.5	14.0	9.4
Non-IT capital input growth	4.4	4.0	9.4	9.5	6.5	6.5	6.6	6.4	6.8
Labor productivity growth	0.8	2.8	5.4	5.1	5.8	5.3	7.0	4.9	4.9
Capital productivity growth	–4.4	–4.0	–9.4	–9.7	–6.8	–6.8	–6.9	–0.3	–0.7
TFP growth	–1.2	1.4	1.5	–0.3	1.8	1.6	2.5	1.9	1.7

Production

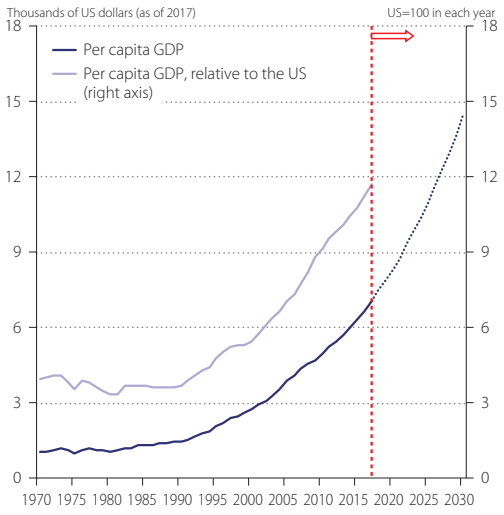

Figure 1 Per Capita GDP

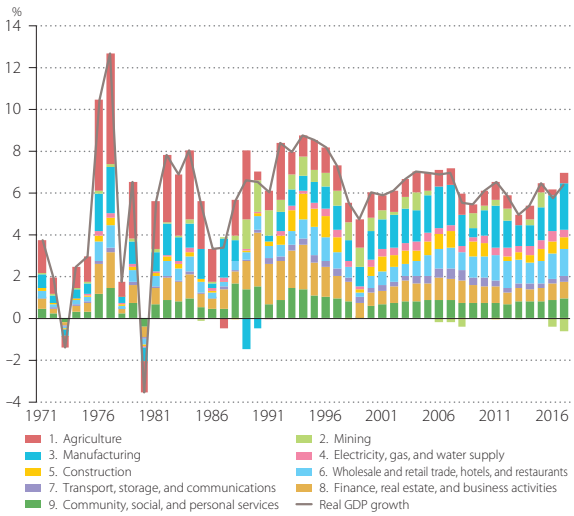

Figure 2 Industry Origins of Economic Growth

Labor

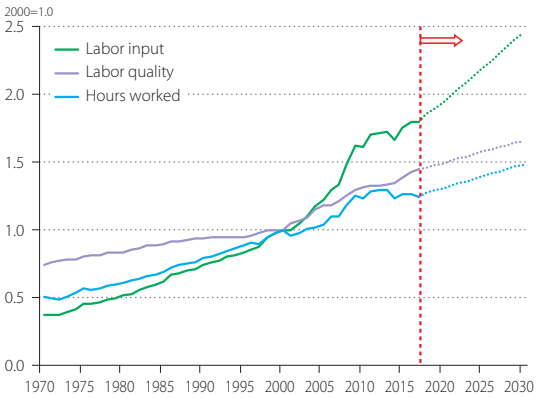

Figure 3 Labor Inputs

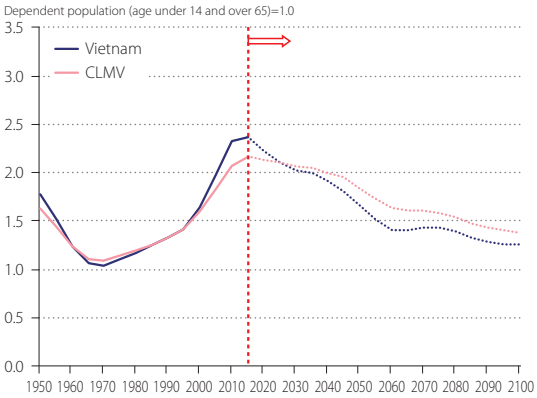

Figure 4 Demographic Dividend

Productivity

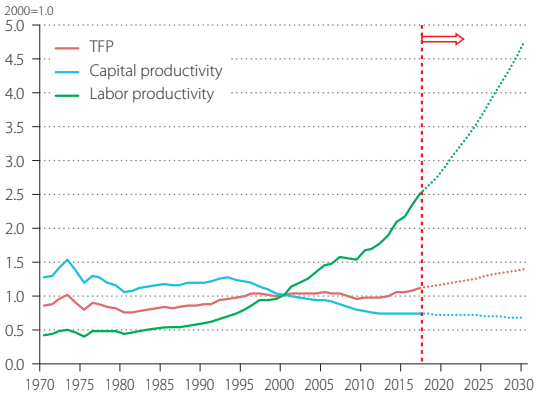

Figure 5 Productivity Indicators

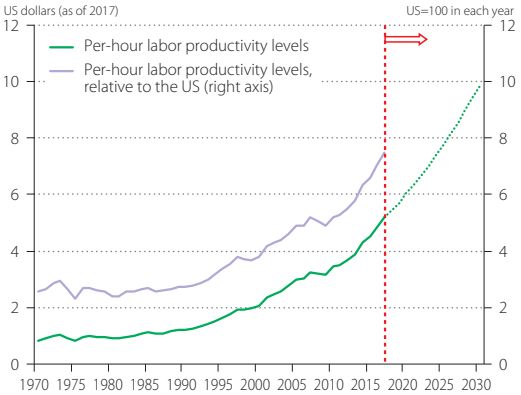

Figure 6 Labor Productivity Level

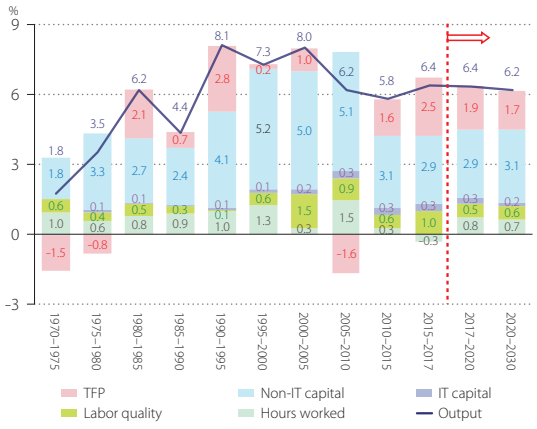

Figure 7 Decomposition of Economic Growth

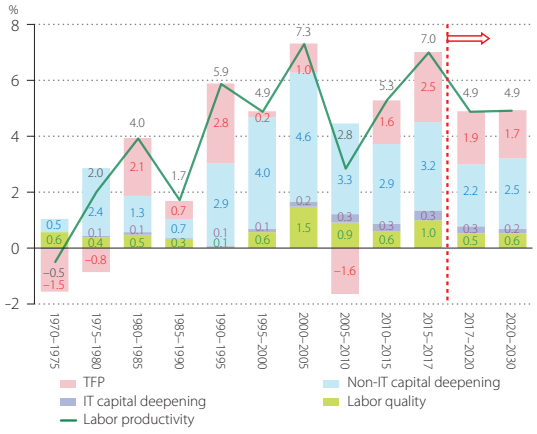

Figure 8 Decomposition of Labor Productivity Growth

APO20

Key Indicators

GDP in 2017	30,158	Billions of US dollars (as of 2017)
Per capita GDP in 2017	11.5	Thousands of US dollars (as of 2017)
(exchange rate based)	5.3	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	13.1	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	31.9	US dollars(as of 2017)
Energy productivity levels in 2016	14.8	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	n.a.	g-CO2 per US dollar (as of 2017)

Investment share in 2017	27.1	%
ICT investment share in GFCF in 2017	6.9	%
Agriculture share in GDP in 2017	10.2	%
Manufacturing share in GDP in 2017	18.9	%
Agriculture share in employment in 2017	36.3	%
Female employment share in 2017	n.a.	%
Average schooling years of workers in 2017	n.a.	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	4.8	5.2	3.8	4.3	4.2	3.9	4.9	4.0	3.9
Labor input growth	3.0	3.2	2.7	2.8	2.4	2.5	2.1	2.7	2.4
Labor quality growth	0.6	1.1	1.0	1.3	1.6	1.7	1.2	1.4	1.4
Hours worked growth	2.4	2.1	1.7	1.5	0.9	0.8	0.9	1.3	0.9
IT capital input growth	13.0	16.2	9.9	6.3	5.0	5.3	4.2	5.0	4.6
Non-IT capital input growth	5.9	4.7	4.1	3.4	4.7	4.5	5.2	5.9	5.3
Labor productivity growth	2.3	3.1	2.1	2.8	3.3	3.1	4.0	2.8	3.0
Capital productivity growth	–6.1	–5.1	–4.4	–3.6	–4.7	–4.5	–5.0	–2.1	–1.7
TFP growth	0.3	1.2	0.3	1.1	0.6	0.3	1.2	0.5	0.7

Production

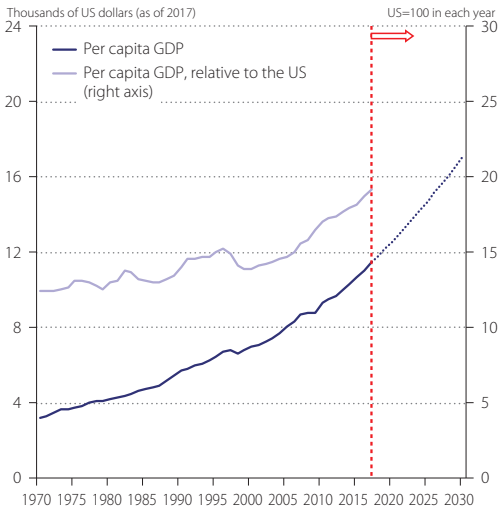

Figure 1 Per Capita GDP

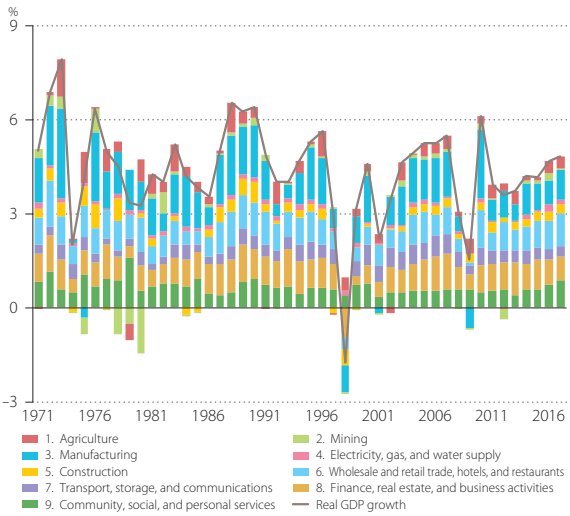

Figure 2 Industry Origins of Economic Growth

Labor

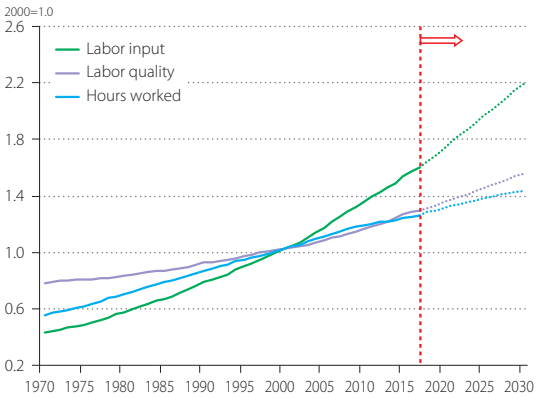

Figure 3 Labor Inputs

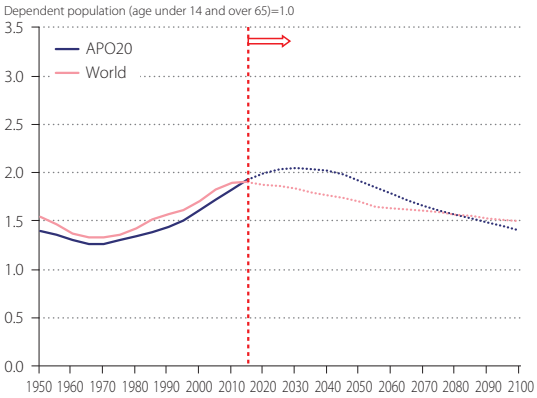

Figure 4 Demographic Dividend

Productivity

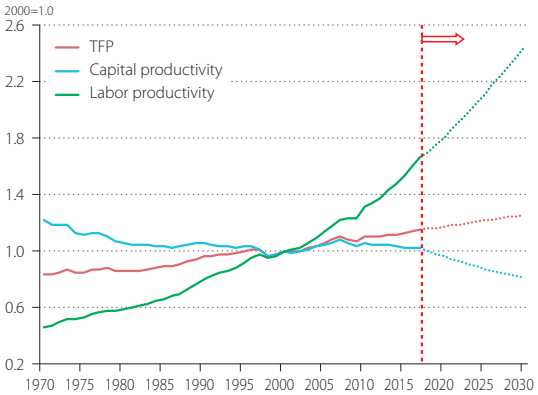

Figure 5 Productivity Indicators

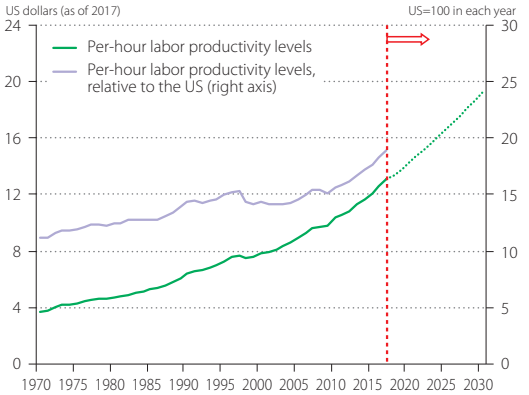

Figure 6 Labor Productivity Level

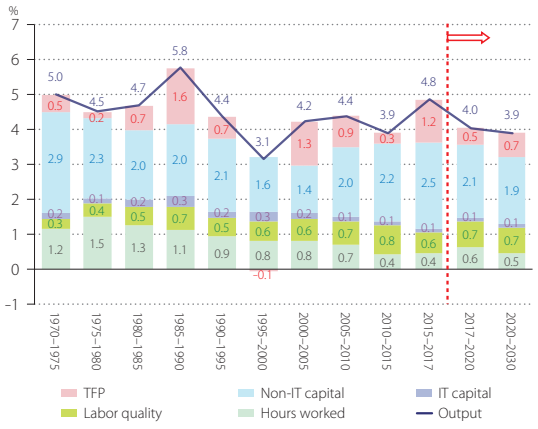

Figure 7 Decomposition of Economic Growth

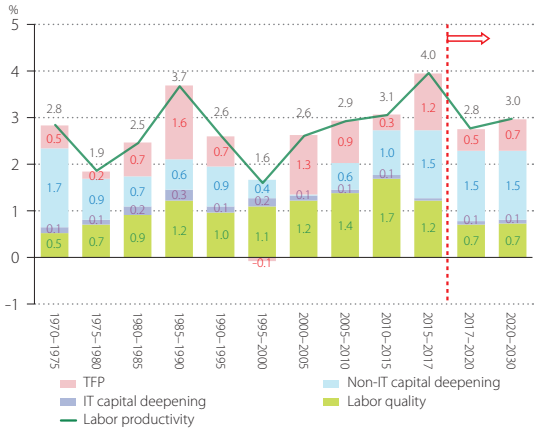

Figure 8 Decomposition of Labor Productivity Growth

Asia24

Key Indicators

GDP in 2017	53,830	Billions of US dollars (as of 2017)
Per capita GDP in 2017	13.2	Thousands of US dollars (as of 2017)
(exchange rate based)	6.4	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	13.2	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	35.0	US dollars(as of 2017)
Energy productivity levels in 2016	12.8	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	n.a.	g-CO2 per US dollar (as of 2017)

Investment share in 2017	34.3	%
ICT investment share in GFCF in 2017	5.2	%
Agriculture share in GDP in 2017	9.3	%
Manufacturing share in GDP in 2017	23.6	%
Agriculture share in employment in 2017	32.3	%
Female employment share in 2017	n.a.	%
Average schooling years of workers in 2017	n.a.	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	4.9	5.7	5.0	6.1	5.4	5.4	5.6	4.9	4.0
Labor input growth	3.1	3.2	2.6	2.2	1.3	1.5	0.7	1.8	0.9
Labor quality growth	0.5	0.7	0.9	0.9	0.7	0.9	0.1	1.2	0.7
Hours worked growth	2.6	2.5	1.7	1.3	0.6	0.6	0.5	0.6	0.2
IT capital input growth	13.0	16.2	10.4	8.9	7.4	8.1	5.9	6.8	5.5
Non-IT capital input growth	6.1	5.2	5.2	6.1	7.8	7.9	7.5	7.7	6.0
Labor productivity growth	2.3	3.1	3.4	4.9	4.8	4.8	5.0	4.3	3.8
Capital productivity growth	–6.3	–5.5	–5.4	–6.3	–7.7	–7.8	–7.3	–3.2	–2.4
TFP growth	0.3	1.4	1.2	1.9	1.1	0.9	1.8	1.1	1.2

Production

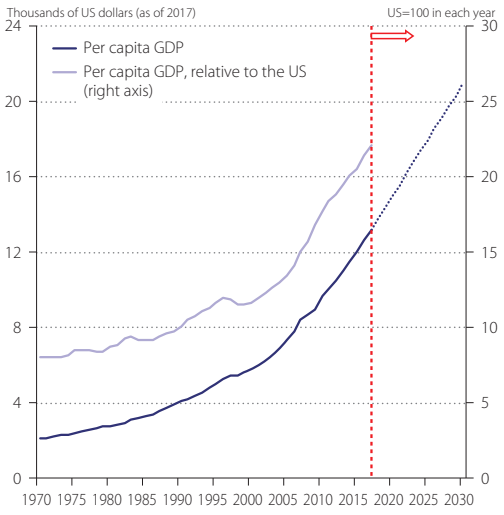

Figure 1 Per Capita GDP

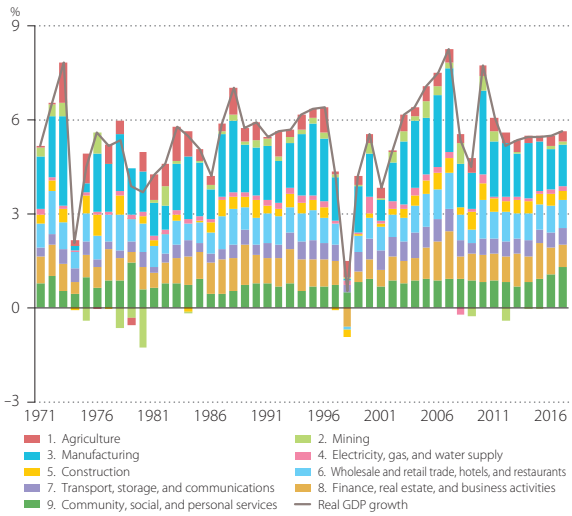

Figure 2 Industry Origins of Economic Growth

Labor

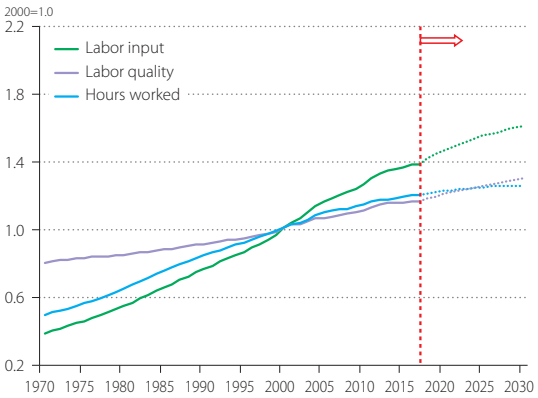

Figure 3 Labor Inputs

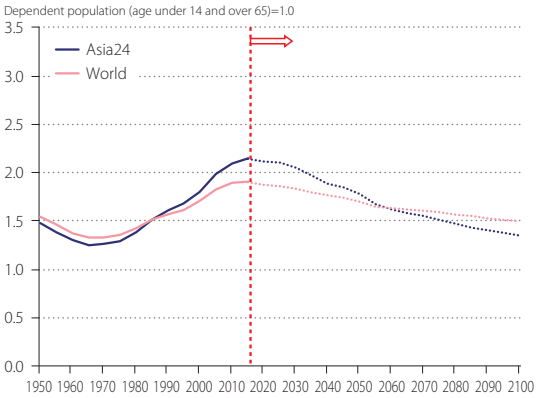

Figure 4 Demographic Dividend

Productivity

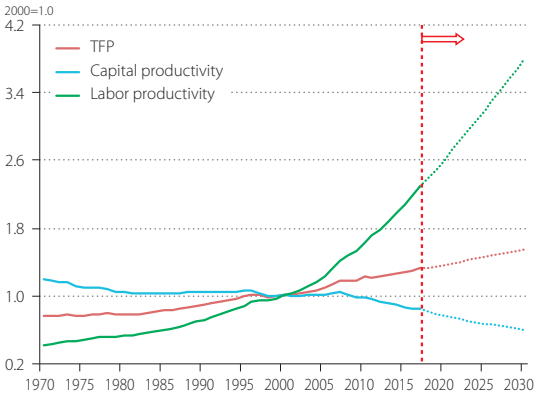

Figure 5 Productivity Indicators

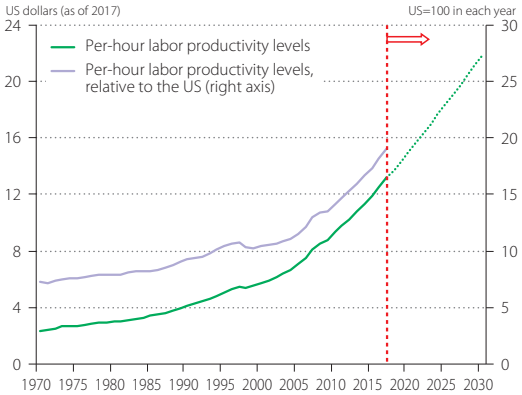

Figure 6 Labor Productivity Level

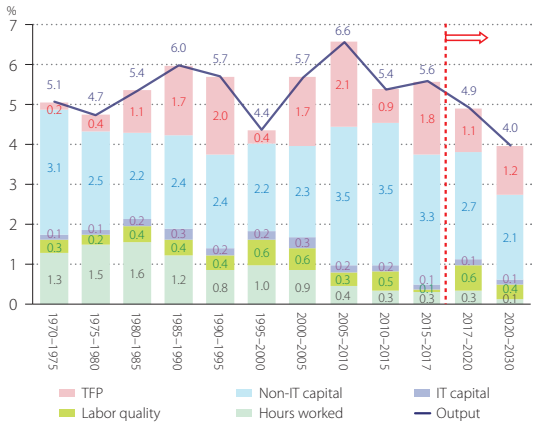

Figure 7 Decomposition of Economic Growth

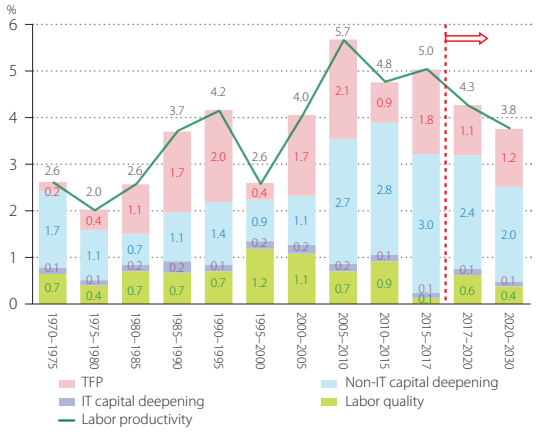

Figure 8 Decomposition of Labor Productivity Growth

East Asia

Key Indicators

GDP in 2017	32,520	Billions of US dollars (as of 2017)
Per capita GDP in 2017	20.3	Thousands of US dollars (as of 2017)
(exchange rate based)	12.2	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	16.7	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	49.0	US dollars(as of 2017)
Energy productivity levels in 2016	11.9	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	n.a.	g-CO2 per US dollar (as of 2017)

Investment share in 2017	38.4	%
ICT investment share in GFCF in 2017	5.1	%
Agriculture share in GDP in 2017	6.5	%
Manufacturing share in GDP in 2017	27.7	%
Agriculture share in employment in 2017	23.6	%
Female employment share in 2017	n.a.	%
Average schooling years of workers in 2017	n.a.	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	5.3	6.1	5.1	6.2	5.5	5.6	5.2	4.6	3.2
Labor input growth	3.0	3.1	2.3	1.5	0.5	0.8	–0.3	0.9	–0.4
Labor quality growth	0.5	0.3	0.8	0.7	0.2	0.5	–0.4	1.2	0.6
Hours worked growth	2.5	2.8	1.4	0.8	0.3	0.4	0.1	–0.3	–1.0
IT capital input growth	13.1	16.2	10.0	8.0	6.1	6.7	4.6	6.5	5.0
Non-IT capital input growth	6.5	5.4	5.3	7.1	8.5	8.8	7.9	7.8	5.8
Labor productivity growth	2.7	3.3	3.7	5.4	5.2	5.3	5.1	4.9	4.2
Capital productivity growth	–6.7	–5.9	–5.5	–7.2	–8.3	–8.6	–7.7	–3.6	–2.9
TFP growth	0.6	1.8	1.5	2.1	1.7	1.5	2.2	1.5	1.5

Production

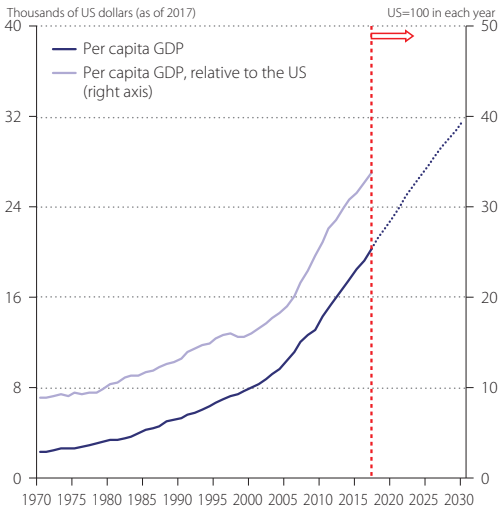

Figure 1 Per Capita GDP

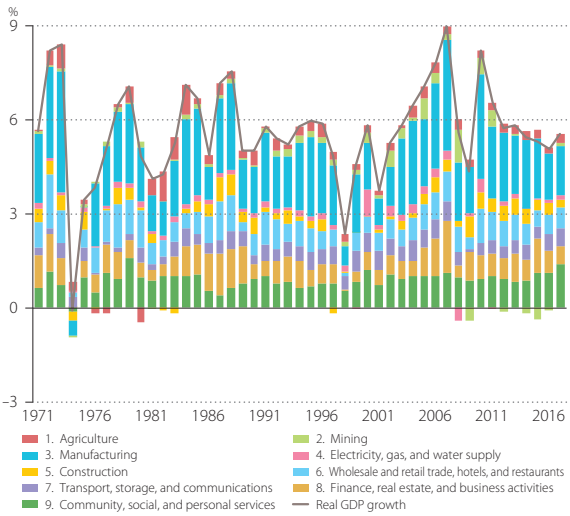

Figure 2 Industry Origins of Economic Growth

Labor

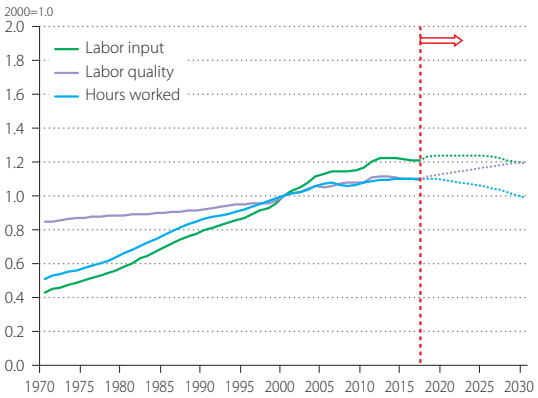

Figure 3 Labor Inputs

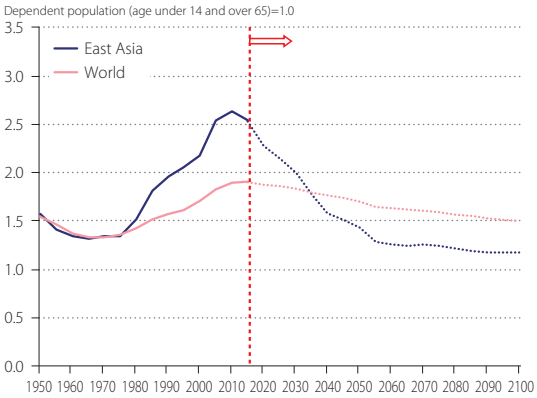

Figure 4 Demographic Dividend

Productivity

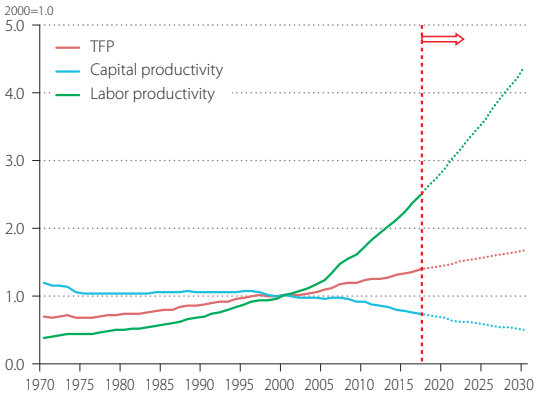

Figure 5 Productivity Indicators

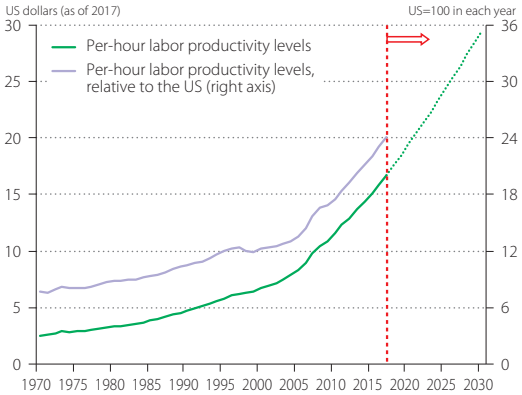

Figure 6 Labor Productivity Level

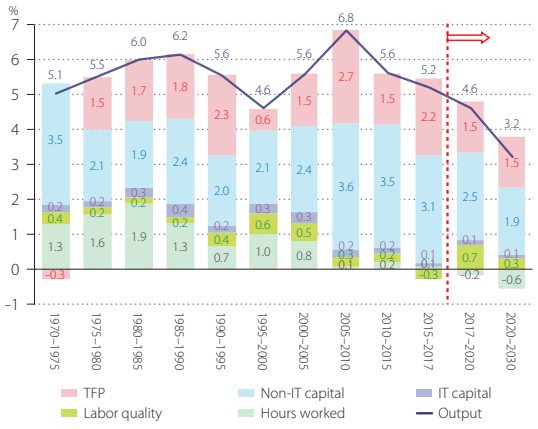

Figure 7 Decomposition of Economic Growth

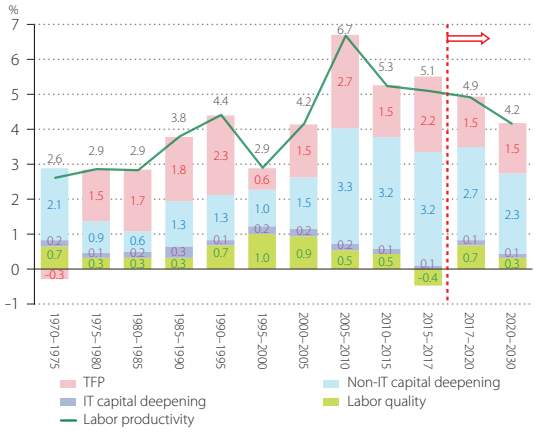

Figure 8 Decomposition of Labor Productivity Growth

South Asia

Key Indicators

GDP in 2017	11,613	Billions of US dollars (as of 2017)
Per capita GDP in 2017	6.6	Thousands of US dollars (as of 2017)
(exchange rate based)	1.9	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	8.2	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	16.6	US dollars(as of 2017)
Energy productivity levels in 2016	15.0	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	n.a.	g-CO2 per US dollar (as of 2017)

Investment share in 2017	29.1	%
ICT investment share in GFCF in 2017	3.7	%
Agriculture share in GDP in 2017	16.8	%
Manufacturing share in GDP in 2017	14.0	%
Agriculture share in employment in 2017	44.8	%
Female employment share in 2017	n.a.	%
Average schooling years of workers in 2017	n.a.	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	3.0	5.5	5.3	6.6	6.2	6.0	6.9	6.4	5.7
Labor input growth	3.1	3.1	2.9	3.0	2.2	2.4	1.8	3.3	3.0
Labor quality growth	0.7	1.1	1.0	1.3	1.4	1.5	1.1	1.7	1.7
Hours worked growth	2.3	2.0	1.8	1.6	0.9	0.9	0.7	1.6	1.2
IT capital input growth	8.6	14.6	14.7	15.4	15.4	16.7	12.3	8.7	7.5
Non-IT capital input growth	3.8	5.0	5.1	6.6	8.5	8.7	8.3	8.6	7.4
Labor productivity growth	0.7	3.5	3.4	5.0	5.4	5.0	6.2	4.7	4.5
Capital productivity growth	–3.8	–5.0	–5.2	–6.7	–8.7	–8.8	–8.3	–2.6	–2.0
TFP growth	–0.3	1.8	1.5	1.9	1.1	0.7	2.1	1.3	1.3

Production

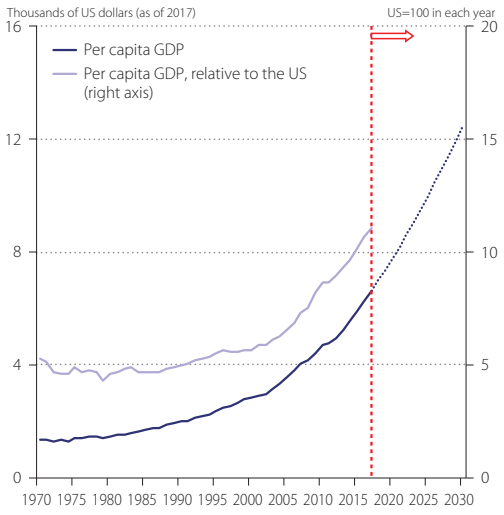

Figure 1 Per Capita GDP

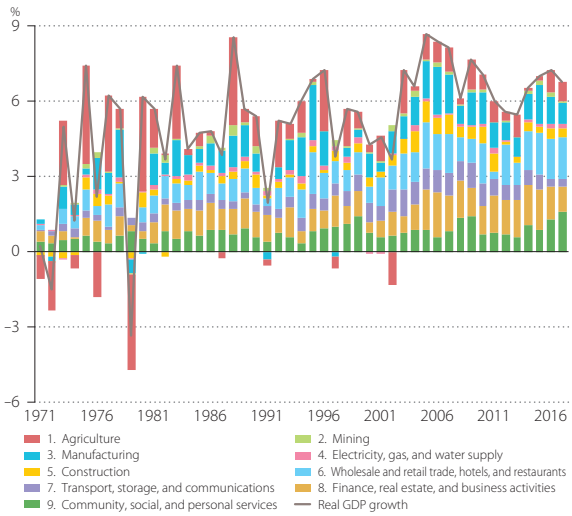

Figure 2 Industry Origins of Economic Growth

Labor

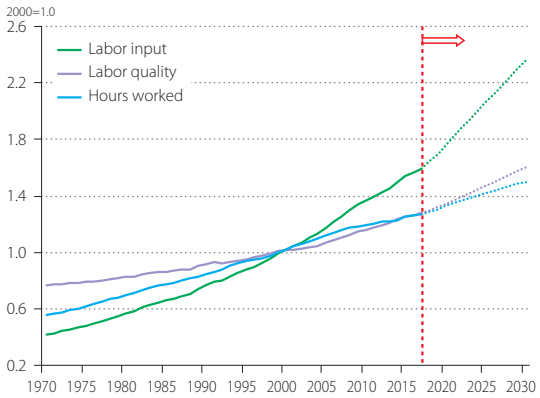

Figure 3 Labor Inputs

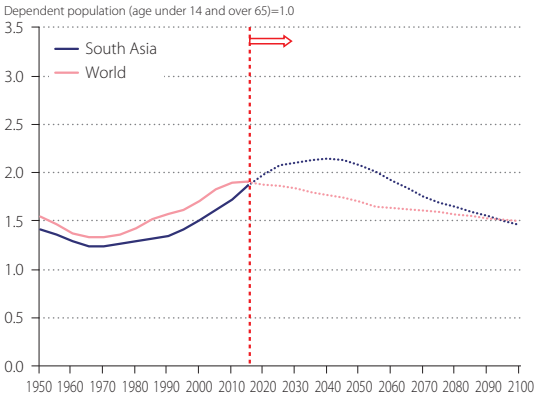

Figure 4 Demographic Dividend

Productivity

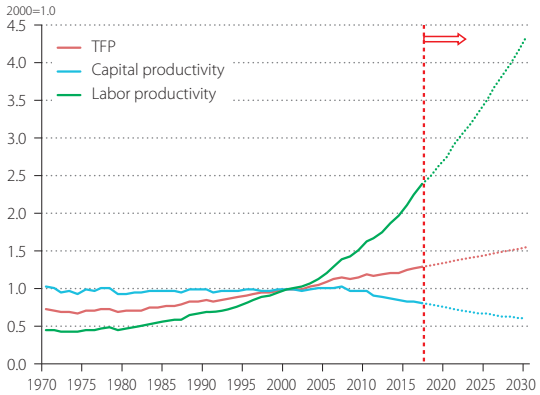

Figure 5 Productivity Indicators

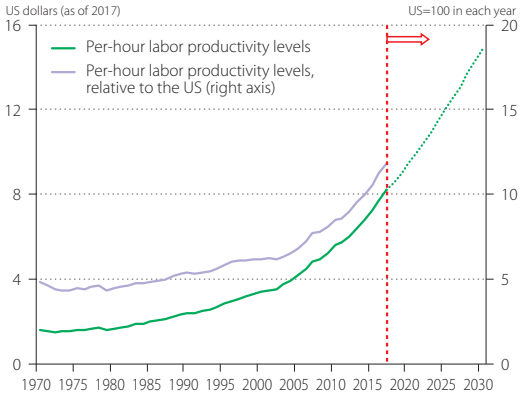

Figure 6 Labor Productivity Level

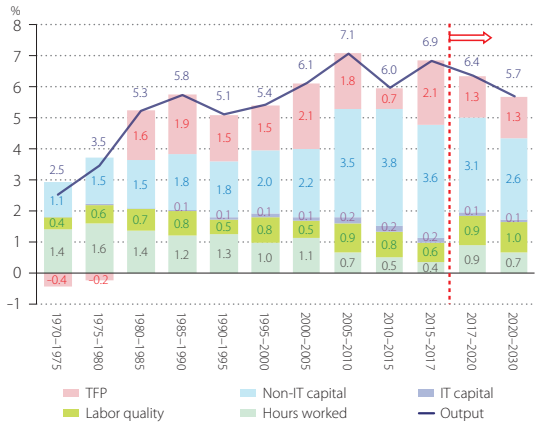

Figure 7 Decomposition of Economic Growth

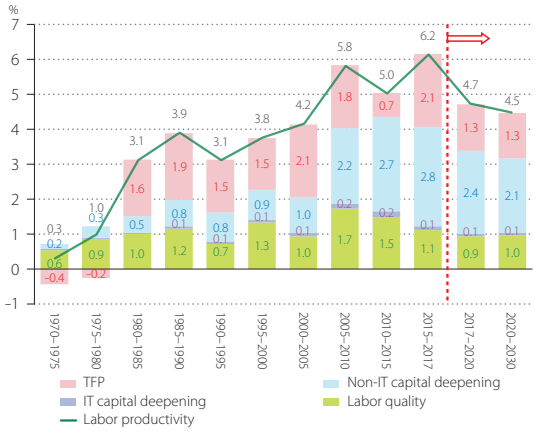

Figure 8 Decomposition of Labor Productivity Growth

ASEAN

Key Indicators

GDP in 2017	7,916	Billions of US dollars (as of 2017)
Per capita GDP in 2017	12.4	Thousands of US dollars (as of 2017)
(exchange rate based)	4.3	Thousands of US dollars (as of 2017)
Labor productivity level in 2017	11.7	US dollars per hour worked(as of 2017)
Capital stock per hour worked in 2017	31.9	US dollars(as of 2017)
Energy productivity levels in 2016	16.0	Thousands of US dollars per toe(as of 2017)
Carbon intensity of GDP in 2016	n.a.	g-CO2 per US dollar (as of 2017)

Investment share in 2017	29.1	%
ICT investment share in GFCF in 2017	7.6	%
Agriculture share in GDP in 2017	11.3	%
Manufacturing share in GDP in 2017	21.0	%
Agriculture share in employment in 2017	32.3	%
Female employment share in 2017	n.a.	%
Average schooling years of workers in 2017	n.a.	Years

(%: average annual growth rate)	1970 –1980	1980 –1990	1990 –2000	2000 –2010	2010 –2017	2010 –2015	2015 –2017	projection 2017–2020	projection 2020–2030
GDP growth	6.7	5.4	4.8	5.2	4.9	4.9	4.8	4.9	4.3
Labor input growth	4.2	4.7	4.4	4.4	3.5	3.6	3.2	3.2	2.7
Labor quality growth	0.8	1.7	2.4	2.3	2.6	2.9	1.9	2.1	1.8
Hours worked growth	3.4	2.9	2.0	2.1	0.9	0.7	1.3	1.1	0.9
IT capital input growth	14.0	17.3	13.7	13.1	10.2	11.0	8.2	6.7	5.6
Non-IT capital input growth	6.4	6.1	6.5	3.8	5.7	5.3	6.5	6.8	5.8
Labor productivity growth	3.4	2.5	2.8	3.1	4.0	4.2	3.5	3.7	3.4
Capital productivity growth	–6.4	–6.3	–6.7	–4.2	–5.8	–5.6	–6.5	–2.4	–1.8
TFP growth	1.1	–0.3	–1.0	0.9	0.0	0.2	–0.3	0.6	0.7

Production

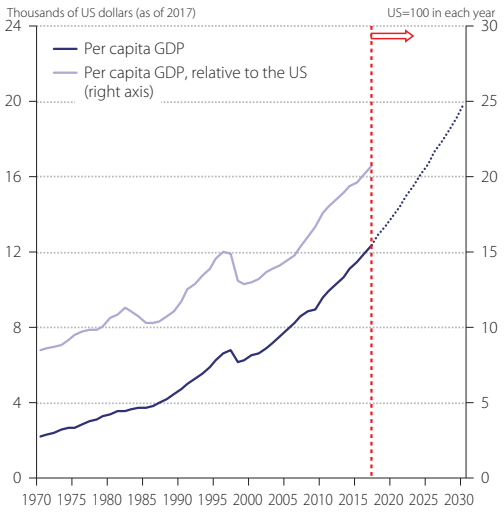

Figure 1 Per Capita GDP

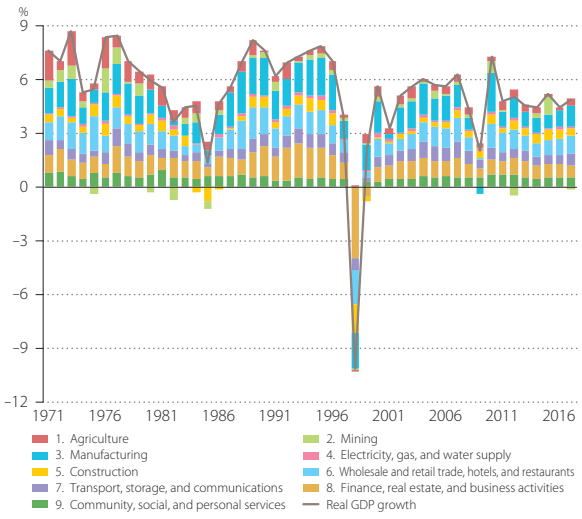

Figure 2 Industry Origins of Economic Growth

Labor

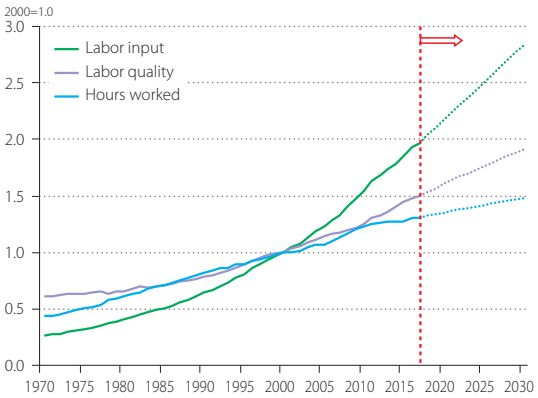

Figure 3 Labor Inputs

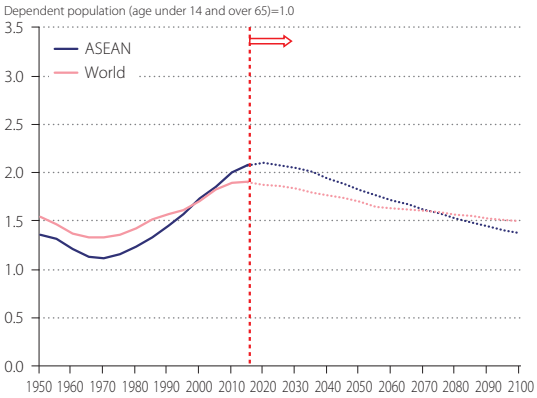

Figure 4 Demographic Dividend

Productivity

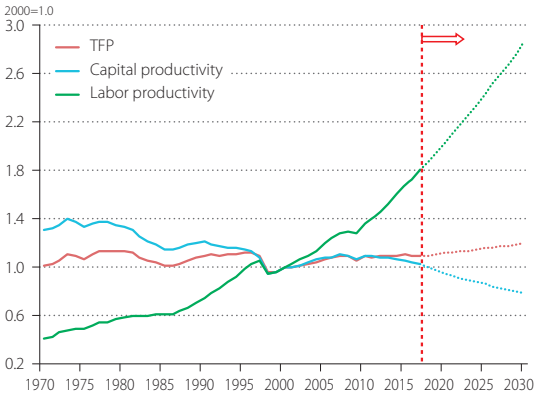

Figure 5 Productivity Indicators

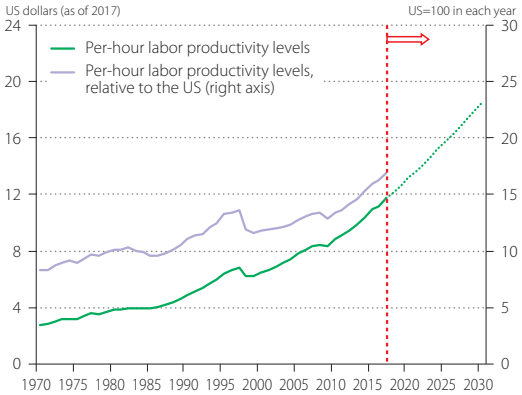

Figure 6 Labor Productivity Level

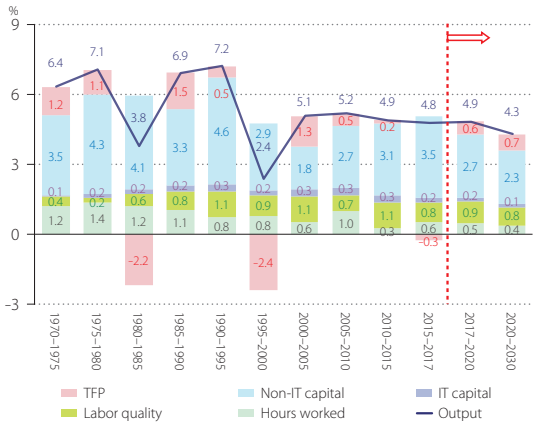

Figure 7 Decomposition of Economic Growth

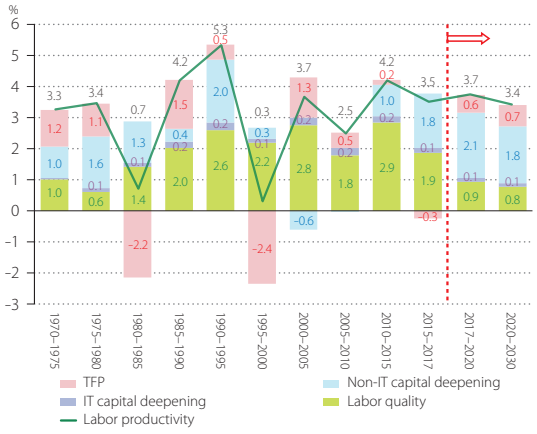

Figure 8 Decomposition of Labor Productivity Growth

Appendix

A.1 National Accounts in Asia

Understanding data comparability is essential for the construction of an international database and requires continuous effort and expert knowledge. Broadly speaking, cross-country data inconsistency can arise from variations in one or more of the three aspects of a statistic: definition, coverage, and methodology. The international definitions and guidelines work to standardize countries' measurement efforts. However, country data can deviate from the international best practice and vary in terms of omissions and coverage achieved. Countries can also vary in their estimation methodology and assumptions in benchmark and/or annual revisions. This may account for part of the differences observed in the data, as well as interfere with comparisons of countries' underlying economic performance.

Between December 2018 and March 2019, the APO Productivity Database project conducted the Metadata Survey 2019 on the national accounts and other statistical data required for international comparisons of productivity among the APO member economies. Since most of the economic performance

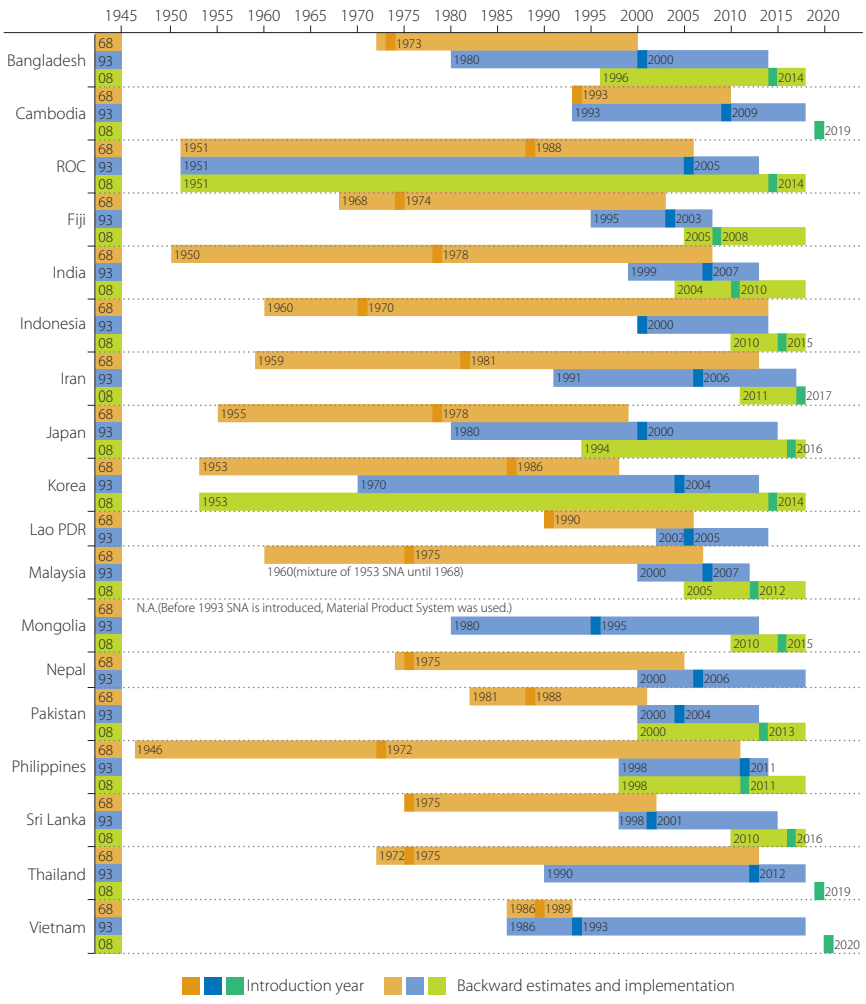

Figure 76 Implementation of the 1968, 1993, and 2008 SNA

Source: APO Metadata Survey 2019 and our investigation at KEO.

indicators in this report are GDP-related, the surveys put much emphasis on discerning countries' GDP compilation practices. In the Databook 2019, the 2008 SNA is used as the standard, noting how countries' practices deviate from it. Since there are differences between the 2008 SNA and its predecessors (1993 SNA or 1968 SNA) in some concepts and coverage, it is important to know in which year the data series definitions and classification started to switch over. This allows identification in breaks in the time series. Figure 76 presents the current situation in compilations and data availability of the backward estimates based on the 1968 SNA, the 1993 SNA, and the 2008 SNA (including the plan for introducing the 2008 SNA), based on our Metadata Survey 2019 and our investigation at KEO. For example, this chart indicates that Japan started to publish national accounts based on the 1968 SNA in 1978 (at present, backward estimates based on the 1968 SNA are available from 1955), national accounts based on the 1993 SNA in 2000 (backward estimates based on the 1993 SNA are available from 1980 to 2014), and national accounts based on the 2008 SNA in 2016 (backward estimates based on the 2008 SNA are available from 1994 to present).

As Figure 76 suggests, countries differ in their year of introduction, the extent of implementation, and the availability of backward estimates. In the Asia24, 16 economies are currently 2008 SNA compliant (partially or fully). The starting year of the official 2008 or 1993 SNA compliant time series varies a great deal across countries, reflecting the differences in the availability of backward estimates. Countries may have adopted the 2008/1993 SNA as the framework for their national accounts, but the extent of compliance in terms of coverage may also vary. The APO Productivity Database tries to reconcile the national accounts variations, to provide harmonized estimates for international comparison. See Appendix 2 for details of the adjustments.

A.2 GDP Harmonization

The Databook incorporates some significant revisions to the national accounts. Recent developments for upgrading their national accounts based on the 2008 SNA have resulted in Sri Lanka as of March 2016, Japan and Turkey as of December 2016, and Iran as of August 2017. As discussed in Appendix 1, 16 economies of the Asia24 are 2008 SNA-compliant and others are 1993 SNA-compliant, although it should be noted that the extent of compliance in terms of coverage may vary. The different statuses of SNA adaptions among economies explain the huge variations of data definitions and coverage in national accounts, calling for data harmonization to better perform comparative productivity analyses.

This edition largely follows the concepts and definitions of the 2008 SNA and tries to reconcile the national accounts variations, in particular on the difference in the treatment of research and development (R&D), military weapon systems, software investment, and financial intermediation services indirectly measured (FISIM).[54] In order to create long-time series data for the Databook, it is necessary to use the past estimates based on the 1968/1993 SNA, with exceptions in the ROC, Korea, and Singapore, who already published the backward estimates based on the 2008 SNA from the 1950s or 1960. In addition, some additional adjustments are necessary to harmonize the long-term estimates of GDP. Procedures for these adjustments are explained below.

54: The introductions of the 2008 SNA are usually conducted with the benchmark revisions. Thus, in some countries there are large revisions in data due to the uses of the newly available survey (e.g., a new survey on services) or of the new benchmark data (e.g., a new development of the supply and use table), not largely due to the revisions from the 1993 SNA. The information required to reconcile the different benchmark-year series is collected for through our questionnaire to the national experts in our project or based on our investigation at KEO.

1) FISIM

FISIM is an indirect measure of the value of financial intermediation services provided. It represents a significant part of the income of the finance sector. The 1993 SNA (United Nations, 1993) recommends that FISIM should be allocated to users (to individual industries and final demands). This contrasts with the 1968 SNA, where the imputed banking services were allocated exclusively to the business sector. The common practice was to create a notional industry that buys the entire service as an intermediate expense and generates an equivalent negative value added. As such, the imputed banking services have no impact on GDP. Therefore, the 1993/2008 SNA recommendation, if fully implemented, will impact industry GDP and the overall GDP for the total economy (by the part of FISIM allocated to final demands).

Among the 20 APO member economies, three countries – Cambodia, the Lao PDR, and Nepal – do not allocate FISIM to final demands in their official national accounts, because of them not following the 1993/2008 SNA recommendation. Thus, the GDP values in these countries are smaller than others. In addition, in the countries whose national accounts follow the 1993/2008 SNA's recommendation on FISIM, the available data sometimes does not cover the entire periods of our observations. To harmonize the GDP concept among countries and over periods, final demands of FISIM are estimated for those countries in the APO Productivity Database, using available estimates of value added in Imputed Bank Service Charge (IBSC) or financial intermediation (in instances where IBSC data is not available). The ratios of value added of IBSC or financial intermediation on FISIM allocated to final demand are assumed to be identical with the average ratios observed in the countries in which data is available. Figure 77 describes the countries, years, and methods to adjust FISIM in the official national accounts. As described, in instances where both value-added data are not available, the trend of the FISIM share on GDP is applied to extrapolate past estimates (although the impacts on GDP are minor).

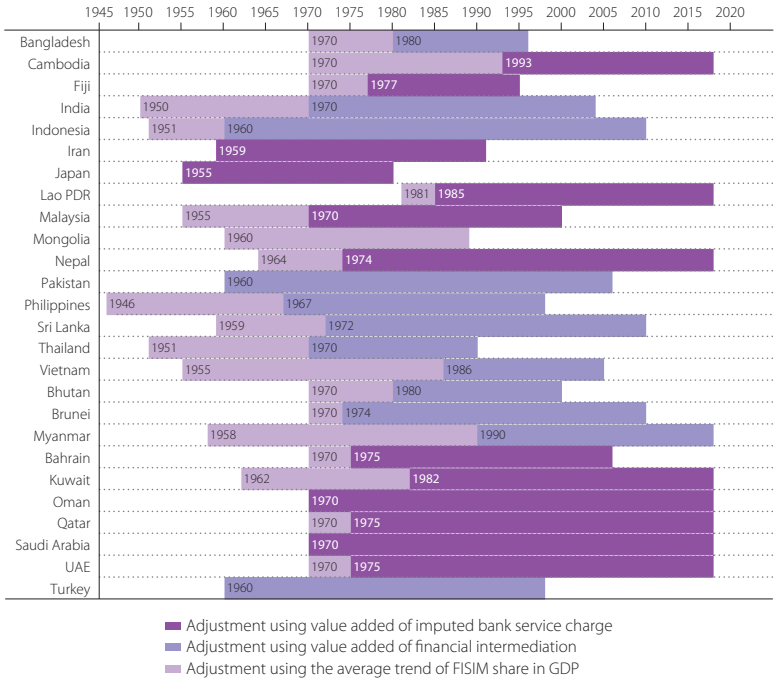

Figure 77 Adjustment of FISIM

Source: APO Productivity Database 2019.

Figure 78 plots per capita GDP levels in 2017 and the FISIM share in GDP as an average in 2000–2017 (including both of the original estimates in the official national accounts and our estimates). In countries where GDP are adjusted, the proportions by which author adjustments for FISIM increases GDP stand at 0.7–1.2% for Nepal and the Lao PDR and less than 0.4% GDP in others.

2) Software

The 2008 SNA recommends the capitalization of intellectual property products (IPP), which changes not only GDP but also capital input. One of the IPP capitalized in the Databook is computer software, which includes pre-packaged software, custom software, and own-account software. Among the Asia24 economies, 16 economies have capitalized all three types of software. Another three countries exclude own-account software in their capitalization, and in one country only custom software is capitalized. In the APO Productivity Database, tentative adjustments have been made to harmonize data to include all software.

3) Valuables

Valuables are defined as "goods of considerable value that are not used primarily for purposes of production or consumption but are held as stores of value over time" (United Nations, 1993: para. 10.7). They are held under the expectation that their prices will not deteriorate and will rise in the long run. Valuables consist of precious stones and metals such as diamonds; artwork such as paintings and sculptures; and other valuables such as jewelry made from stones and metals. In a small number of countries, such as India, Iran, Mongolia, Sri Lanka, Vietnam, and Bhutan, net acquisitions of valuables are recorded as a part

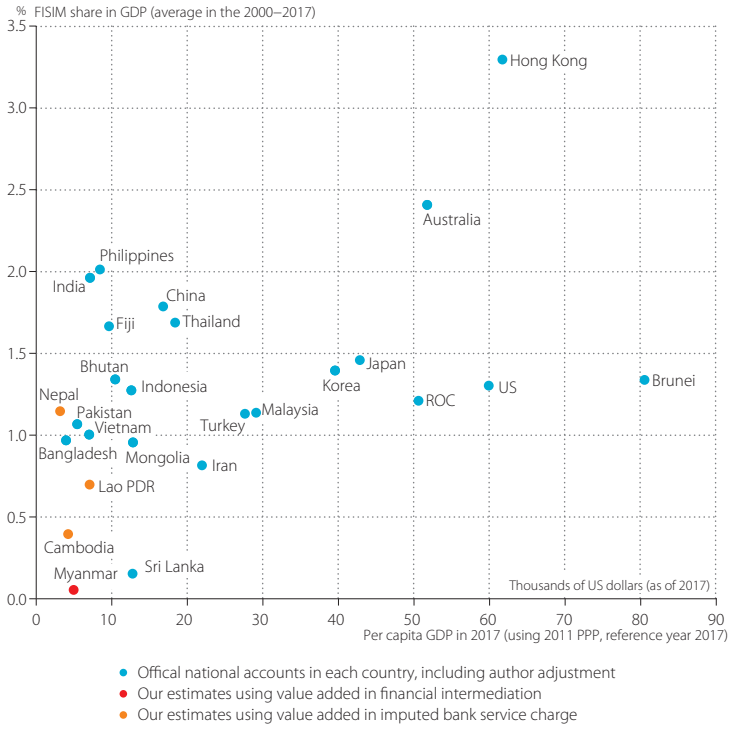

Figure 78 FISIM Share in GDP
——Average share of FISIM Production in GDP at current market prices in 2000–2017

Sources: Official national accounts in each country and author estimates.

of gross capital formation. For example, the SNA in India has included it since 1999. The current decision is to harmonize the data by excluding net acquisition of valuables from GDP in the Databook.

4) Consumption of Fixed Capital of Assets Owned by Government

As of February 2012, Thailand officially switched to the 1993 SNA, and its national accounts became compatible with the 1993 framework for the first time. In this series, government consumption includes the consumption of fixed capital (CFC) owned by the government since 1990. To construct the long time-series data in the Databook series, the past data based on the 1968 SNA has been adjusted to be consistent with the new series. In the Databook, government capital stock and its CFC for the period 1970–1989 are estimated and the past government consumption and GDP are adjusted accordingly. A similar adjustment on the CFC of the assets owned by government was conducted for Bangladesh (for the period 1970–1995), Malaysia (1970–1999), and Mongolia (1970–2004).

5) R&D

The Databook capitalizes the R&D by following the 2008 SNA recommendations. In the countries that still do not follow the 2008 SNA, the R&D expenditures are not allocated to GFCF (but to intermediate uses). To harmonize the GDP concept among countries and over periods, the R&D investment is estimated for those countries in APO Productivity Database. As a preferable approach, the data on the R&D expenditure are collected based on the official surveys in each country, to estimate the R&D investment. Figure 79 describes the countries, years, and methods to estimate R&D investment and adds it to GFCF in the official national accounts. If the data on R&D expenditures are not available, as a crude estimate, the trend of R&D investment shares on GFCF or GDP are applied to extrapolate past estimates.

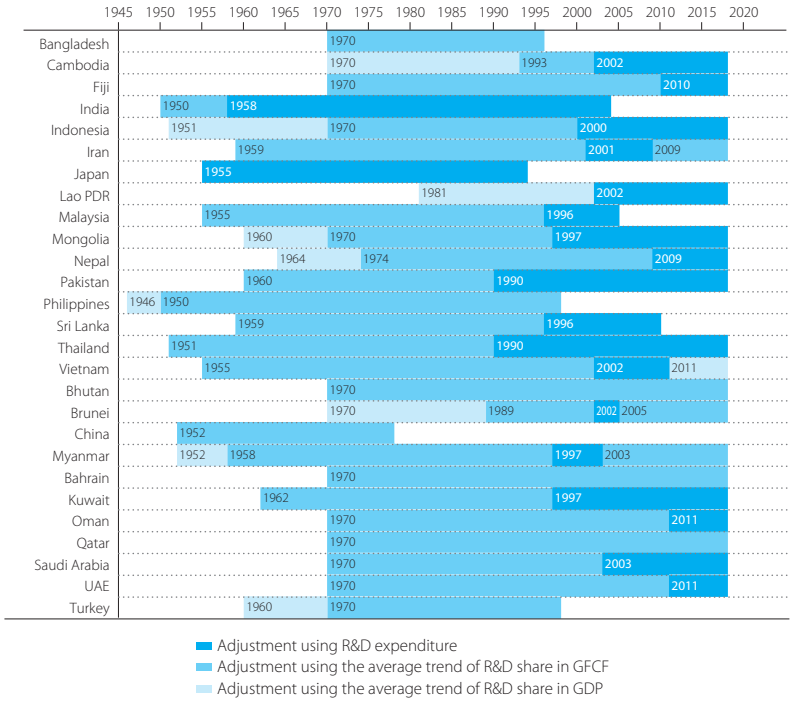

Figure 79 Adjustment of R&D

Source: APO Productivity Database 2019.

6) GDP at basic prices

GDP can be valued using different price concepts: factor cost, basic prices, and market prices. If the price concept is not standardized across countries, it will interfere with the international comparisons. All the countries covered in this Databook officially report GDP at market prices (or at purchasers' prices), but this is not true for GDP at factor cost and GDP at basic prices. International comparisons in Chapter 3 and Chapter 4 are based on GDP at market prices. However, by valuing output and input at the prices that producers actually pay and receive, GDP at basic prices is a more appropriate measure of countries' output for international comparisons of TFP and industry performance, as it is a measure from the producers' perspective. Hence, Chapter 5 on productivity performance is based on GDP at basic prices, including our estimates.

These concepts of GDP differ in the treatment of indirect tax and subsidies (and import duties). The difference between GDP at basic prices and GDP at market prices is "taxes on products" minus "subsidies on products." "Taxes on products" are the indirect taxes payable on goods and services mainly when they are produced, sold, and imported, and "subsidies on products" are subsidies payable on goods and services mainly when they are produced, sold, and imported. Since GDP at basic prices is available for some economies, such as Hong Kong, India, Korea, Mongolia, Nepal, Singapore, and Sri Lanka, a GDP at basic prices calculation, needs to be constructed for all other countries. To obtain GDP at basic prices, "taxes on products" and "duties on imports" are subtracted from GDP at market prices, which are available for all the countries studied, and "subsidies on products" is added. The main data sources for estimating "taxes on products" and "subsidies on products" are tax data in national accounts, the IMF's Government Finance Statistics, and the input-output tables in each country (Table 3).

Readers should bear these caveats in mind when interpreting the results in Chapter 6, since the definition of GDP by industry differs among countries due to data availability. GDP is valued at: factor cost for Fiji, and Pakistan; basic prices for Bangladesh, Cambodia, Hong Kong, India, Korea, the Lao PDR, Mongolia, Nepal, Singapore, and Vietnam; producers' prices for Iran, the ROC, and the Philippines; and market prices for Indonesia, Japan, Malaysia, Sri Lanka, and Thailand. In this sense, the industry data should be treated as a work in progress as it is difficult to advise on data uncertainty. These issues will be examined in the future.

Table 3 Input-Output Tables and Supply and Use Tables in Asia

	Input-Output Tables and Supply and Use Tables
Bangladesh	1981/1982, 1986/1987, 1992/1993, 1993/1994, 2000, 2005/2006, 2010/2011
ROC	Benchmark (1981, 1986, 1991, 1996, 2001, 2004, 2006, 2011) Extended (1984, 1989, 1994, 1999, 2004) Annual (2006–2017)
Fiji	1972, 1981, 2002, 2005, 2008
India	1993/1994, 1998/1999, 2003/2004, 2006/2007, 2007/2008
Indonesia	1971, 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010
Iran	1962, 1973, 1974, 1986, 1988, 1991, 1999, 2001, 2004, 2011
Japan	1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2011
Korea	Benchmark (1960, 1963, 1966, 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015) Updated (1973, 1978, 1983, 1986–1988, 1993, 1998, 2003, 2006–2015)
Malaysia	1978, 1983, 1987, 1991, 2000, 2005, 2010
Mongolia	1963, 1966, 1970, 1977, 1983, 1987, 1997, 2000, 2005, 2010
Pakistan	1975/1976, 1984/1985, 1989/1990, 1999/2000
Philippines	1961, 1965, 1969, 1974, 1979, 1985, 1988, 1994, 2000, 2006, 2012
Singapore	1973, 1978, 1983, 1988, 2000, 2005, 2007, 2010, 2012, 2013, 2014
Sri Lanka	2006
Thailand	1975, 1980, 1985, 1990, 1995, 1998, 2000, 2005, 2007, 2010
Vietnam	1989, 1996, 2000, 2007, 2012
China	1987, 1992, 1997, 2002, 2007, 2012
Brunei	2005, 2010
Turkey	1973, 1979, 1985, 1990, 1996, 1998, 2002, 2012

Note: These SUT/IOT are collected in our project and used to develop the comprehensive database. This edition of Databook newly reflects the SUT/IOT of the ROC for in 2017, Korea for 2015, Singapore for 2014, and Thailand for 2010.

A.3 Capital Stock of Produced Assets

About half of APO member economies publish estimates of capital stocks in their systems of national accounts. Even where estimates are available, users must be mindful of differences in methodologies and assumptions used to estimate capital stock and its consumption, as well as a large diversity in the treatment of quality adjustment in price statistics among countries. In the APO Productivity Database 2019, a harmonized framework is applied in estimating capital stock and capital services, covering the Asia24 economies and the US as a reference country. The geometric approach is used to measure capital stock. The standard parameters on geometric depreciation rates are assumed in Table 4, by the country groups (D1–D6) that are defined in Table 2 in Section 6.1 (p. 68).

Quality changes in the aggregate measure of capital input can originate from two kinds of sources, namely the composition change by type of asset, and the quality improvement in each type of asset. To take the composition change of assets into account, the current database classifies 11 types of assets (Table 4) and four types of land stock. For countries in which detailed investment data is not available from national accounts, the 11 types of investment data are estimated based on the benchmark and/or annual input–output tables (IOT) or supply-use table (SUT) and our own estimates on the commodity flow of domestic production and export/import of assets. Thus, readers are cautioned about data uncertainty and should expect that the decomposition of contributions of capital services into IT and non-IT capital may be considerably revised for some countries, when more reliable data sources for estimation become available. The SUT/IOT used in our measurement is listed in Table 3 in Appendix 3. In our estimates on investment by type of asset, this edition of the Databook newly reflects the SUT/IOT of the ROC for in 2017, Korea for 2015, Singapore for 2014, and Thailand for 2010.

It is well known that prices of constant-quality IT capital have been falling rapidly. For cross-country comparisons, it has been noted that there is great diversity in the treatment of quality adjustment in price statistics among countries. Cross-country comparisons will be significantly biased if some countries adjust their deflators for quality change while others do not. Price harmonization is sometimes used to control for methodological differences in the compilation of price indexes, under the assumption that individual countries' price data fails to capture quality improvements. If the relative price of IT to non-IT capital in the countries compared is set equal to the IT to non-IT prices relative in the reference country, the harmonized price is formulated as: $\Delta \ln \tilde{P}^{X}_{IT} = \Delta \ln P^{X}_{nIT} + (\Delta \ln P^{ref}_{IT} - \Delta \ln P^{ref}_{nIT})$, where the superscript X denotes the country included in the comparisons, P_{IT} is the price of IT capital, and P_{nIT} is the price of non-IT capital. The price of IT capital in country X, $\tilde{P}^{X}_{IT}$, is computed by the observed prices P^{ref}_{IT} and P^{ref}_{nIT} in the reference country and P^{X}_{nIT} in X. Schreyer (2002) and Schreyer, Bignon, and Dupont (2003) applied price harmonization to OECD capital services, with the US as a reference country, since the possible error due to using a harmonized price index would be smaller than the bias arising from comparing capital services based on national deflators.

In this Databook, the same price harmonization method is applied to adjust the quality improvement for IT

Table 4 Classification of Produced Assets and Assumptions of Depreciation Rates

asset code	δ					
	D1	D2	D3	D4	D5	D6
1. IT hardware	0.294	0.294	0.294	0.294	0.294	0.294
2. Communications equipment	0.246	0.246	0.246	0.246	0.246	0.246
3. Transportation equipment	0.219	0.219	0.162	0.138	0.138	0.138
4. Other machinery and equipment and weapon systems	0.178	0.178	0.138	0.117	0.117	0.117
5. Dwellings	0.049	0.049	0.041	0.037	0.033	0.033
6. Non-residential buildings	0.084	0.084	0.062	0.056	0.050	0.045
7. Other structures	0.026	0.026	0.019	0.018	0.017	0.016
8. Cultivated biological resources	0.215	0.215	0.202	0.161	0.145	0.131
9. Research and development (R&D)	0.190	0.190	0.180	0.162	0.162	0.162
10. Computer software	0.330	0.330	0.330	0.330	0.330	0.330
11. Other intellectual property products	0.270	0.270	0.270	0.270	0.270	0.270

Source: APO Productivity Database 2019.
Note: See Table 2 in Section 6.1 (p. 68) for the country groups (D1–D6).

hardware and communications equipment in countries where the appropriate quality-adjusted price data is not available, with Japan's prices as a reference country. A similar procedure was applied in cases where the prices for some assets were not available, to estimate missing data based on the relative price of these assets to total GFCF.

Figure 80 presents the estimated capital-output ratio (stock coefficient) that is defined by the ratio of the beginning-of-period net capital stock (all types of produced assets owned by private and public institutions) to the basic-price GDP at current prices. Bhutan has the highest capital-output ratio among the Asia24 economies, at 4.0 in 2017, reflecting the industry structure skewing to electricity (hydropower). Compared to the 1980 level in each country, all Asian countries except Cambodia, Mongolia, Iran, and Pakistan have an increasing trend of capital-output ratio.

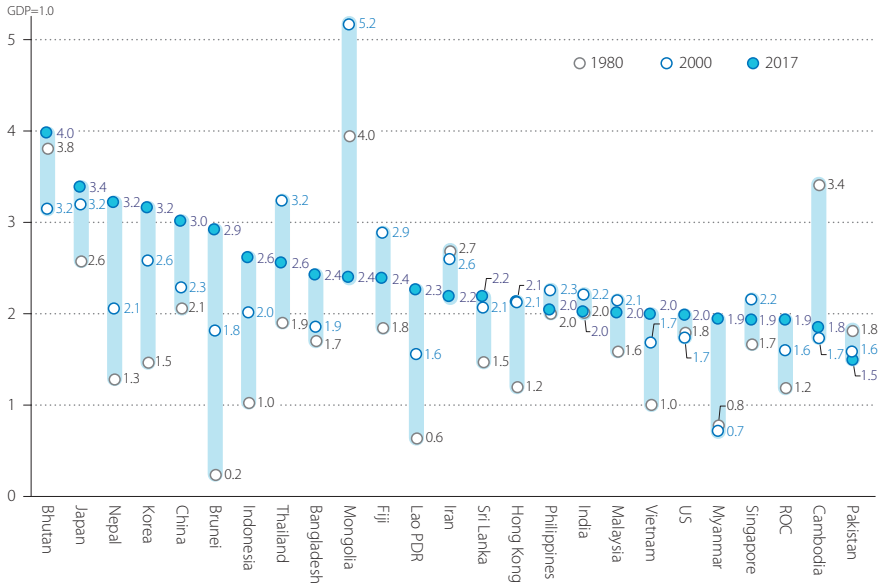

Figure 80 Capital-Output Ratio (Produced Assets)
——Ratio of the beginning-of-period net capital stock to basic-price GDP at current prices in 1980, 2000, and 2017

Source: APO Productivity Database 2019.

A.4 Land Stock

Land is an important factor of production not only in the agriculture sector, but also in manufacturing and service sectors. In densely populated countries, land occupies a large share of nominal capital stock. Regardless of its importance, land has not been considered as capital in the past Databook series. This edition of the Databook newly considers land as capital. Table 5 defines the types of land use. In the APO Productivity Database 2019, four types of land for economical use (land code: L1100, L1211, L1212, and L1213) are treated as non-produced assets (asset code: 12–15). In Asia, only a few Asian countries (i.e., Japan and Korea) publish the estimates of land stocks in their national balance sheets of the national accounts. To cover the Asia24 economies, the land stock database has been developed since 2017 at KEO.

The land stock data consists of the estimates at current and constant prices by four types of land uses. The data on land area (m^2) is available in FAOSTAT for agricultural use (asset code 12) and in national data

resources (including the data collected by the national experts in APO member economies and research team at KEO) for non-agricultural use (code: 13-15). For countries in which the data of national land area for residential use (code 15) is not available, they are estimated based on multiple approaches using available information and our estimates; e.g., number of households, average area per unit of household, population/household density in rural and urban areas, stock estimates of dwellings (see Appendix 3), and per capita GDP, and so on. If land for industrial use (code 13) is not available from national surveys like the manufacturing census, it is estimated based on our estimates of productivity of industry-use land and the manufacturing GDP. Similarly, land for commercial use (code 14) is estimated based on our estimates of productivity of commercial-use land and the service-sector GDP, if it is not available in national data resources.

Table 5 Classification of Land

asset code	type of land classification
	L0000 Total land L1000 Land for economical use
12	L1100 Land for agricultural use L1200 Land for non-agricultural use L1210 Land for building use
13	L1211 Land for industrial use
14	L1212 Land for commercial use
15	L1213 Land for residential use L1220 Land for other use L2000 Land for forest use L3000 Land for inland water use

Source: APO Productivity Database 2019.
Note: See Table 4 in Appendix 3 (p. 152) for the classification of produced assets.

For countries in which the land stocks at current prices are not available, the samples of land price data are collected to estimate the current-price land stocks. The land price data are available mainly in the urban area and are collected from market data and survey results such as *The World Land Value Survey* (Japan Association of Real Estate Appraisers: JAREA), *Report on Survey of Urban Land Prices in the Developing World* (International Housing Coalition: IHC), and *Survey on Business Conditions of Japanese Companies in Asia and Oceania* (Japan External Trade Organization: JETRO). With our assumptions on the price gaps between urban and rural areas in each country, these survey prices of urban land area are discounted to estimate the national level averages. On land prices for agricultural use, the national level average price is estimated in each country based on our estimates of the discounted present value of future rents, which are based on our estimates of mixed income in agriculture sector and the rate of return (see Appendix 5).

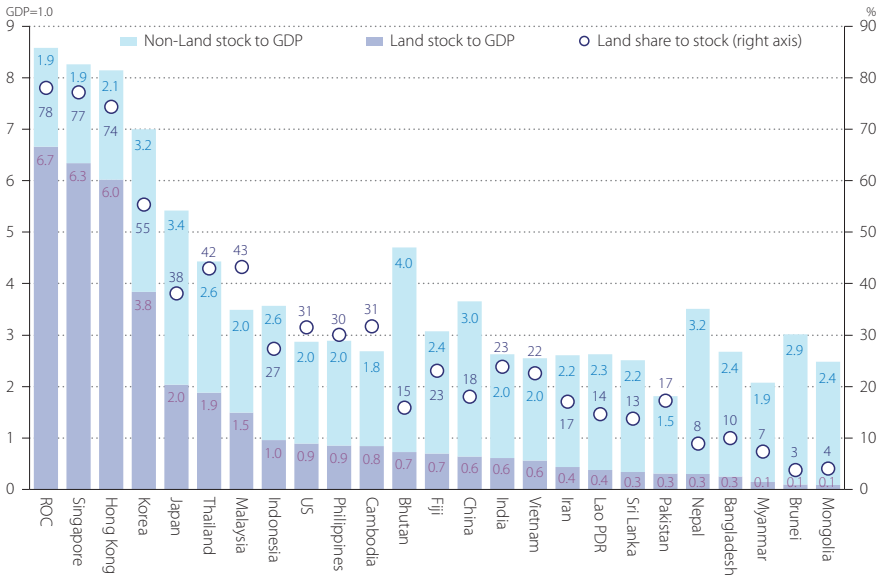

Figure 81 Capital-Output Ratio (Produced Assets and Land)
——Ratio of the beginning-of-period net capital stock to basic-price GDP at current prices in 2017

Source: APO Productivity Database 2019.

Although further efforts to improve the estimates are required, Figure 81 presents our current estimates of the ratios of total capital stock to basic-price GDP and the land shares of total capital stocks (at right axis) in 2017. When including land stocks, the country order of capital-output ratios is considerably revised from Figure 80, which is based on only produced assets. In ROC, Singapore, and Hong Kong, the estimated land shares exceed 70% of total capital stock, which are almost twice of 38% in Japan and 31% in the US. As the capital-output ratios are over 5 in Asian Tigers and Japan, the consideration of land stocks is expected to eliminate a bias to underestimate TFP growth (See Box 3, p. 64).

A.5 Capital Services

In the analysis of production and productivity, capital service provides an appropriate concept of capital as a factor of production. The fundamental assumption in measuring capital services is proportionality between the (productive) capital stock and capital services in each type of asset. Thus, the growth rates of capital services can differ from that of capital stock only at the aggregate level. For aggregating different types of capital, the user costs of capital by type of asset are required. This Appendix outlines the methodology of the user cost of capital estimation and presents the estimated results of endogenous rate of return for Asian countries in the APO Productivity Database 2019.

The user cost of capital of a new asset (with type of asset denoted as k of the period t), $u^k_{t,0}$, is defined as $q^k_{t-1,0}\{r_t + (1 + \pi^k_t)\,\delta^k_{P,t,0} - \pi^k_t\}$, where r_t, $\delta^k_{P,t,0}$, and $q^k_{t,0}$ are the expected nominal rate of return, cross-section depreciation rate, and asset price, respectively. The asset-specific inflation rate π^k_t is defined as $(q^k_{t,0} / q^k_{t-1,0} - 1)$. The OECD assumes the country-specific ex-ante real rate of return r^* that is constant for the whole period, and defines the nominal rate of return as $r_t = (1 + r^*)(1 + \rho_t) - 1$, where ρ_t represents the expected overall inflation rate, defined by a five-year centered moving average of the rate of change of the CPI (see Schreyer, Bignon, and Dupont, 2003).

One of the main difficulties in applying the ex-ante approach for measuring user cost of capital is obtaining proper estimates for real rates of return, which can differ considerably among countries and over time. On the other hand, the ex-post approach originated by Jorgenson and Griliches (1967) allows an estimation based on observed data. Assuming constant returns to scale and competitive markets, capital compensation can be derived from the summation of the capital service cost V^k_t for each asset, which is defined as the product of the user cost of capital and the productive capital stock (i.e., $V_t = \sum_k V^k_t = \sum_k u^k_{t,0} S^k_t$). Based on this identity and the n-equations of user cost of capital, the n+1 variables of $u^k_{t,0}$ and r_t are simultaneously determined, using the observed capital compensation V_t as the total sum of V^k_t that is not observable in each asset. Note that the depreciation rate $\delta^k_{P,t,0}$ is not independent of the estimated r_t.

The estimated results of the ex-post real rate of return based on $r^*_t = (1 + r_t) / (1 + \rho_t) - 1$ for 24 Asian countries and the US are presented Table 6, as the five-year averages in the entire observation period 1970–2017. In 2015–2017, the real rate of return ranged from 3.7–3.9% in Hong Kong, Japan, Korea, and Singapore to 20–25% in Myanmar and Pakistan. Using these ex-post estimates, the aggregate capital services are measured in this report. The difference caused by the ex-ante and ex-post approaches may provide a modest difference in the growth measure of capital services, regardless of the substantial differences in the rates of return and capital compensations.

Table 6 Average Ex-Post Real Rate of Return in Asia

	1970–1974	1975–1979	1980–1984	1985–1989	1990–1994	1995–1999	2000–2004	2005–2009	2010–2014	2015–2017
Bangladesh	11.8	12.4	11.2	19.6	21.4	17.3	17.2	15.7	17.8	17.1
Bhutan	3.5	5.6	0.4	7.5	4.6	5.8	7.6	7.6	5.6	4.2
Brunei	80.8	134.3	157.0	68.6	39.9	24.2	29.8	38.3	29.0	12.6
Cambodia	14.6	13.6	4.2	–25.0	–22.1	20.4	18.1	12.7	21.8	17.1
China	22.9	14.0	11.8	10.0	9.1	8.7	10.3	12.1	7.6	4.1
ROC	8.5	6.5	6.4	9.0	4.2	5.3	6.1	4.6	6.6	5.3
Fiji	13.0	14.5	10.4	9.9	18.6	11.2	10.5	11.7	11.6	14.4
Hong Kong	7.6	7.1	1.9	8.0	2.7	4.0	7.6	7.9	4.6	3.7
India	5.0	9.8	6.1	6.8	5.7	6.5	9.4	9.2	3.8	7.9
Indonesia	28.5	25.6	27.3	21.5	17.5	8.6	12.9	16.9	14.9	7.3
Iran	25.8	19.6	7.3	2.8	2.7	3.8	17.6	20.3	14.3	15.8
Japan	2.5	0.8	4.0	5.6	2.7	1.7	3.0	3.8	2.8	3.7
Korea	4.2	0.2	1.5	6.3	1.9	1.8	5.4	6.1	4.3	3.9
Lao PDR	15.1	–0.8	–7.7	–4.2	13.1	–8.3	6.0	16.9	16.8	18.0
Malaysia	26.6	25.8	17.9	14.1	14.4	13.3	16.5	20.1	19.6	14.1
Mongolia	12.8	10.7	10.0	10.4	0.5	–1.8	11.6	18.3	15.5	16.2
Myanmar	39.5	56.2	54.3	34.6	32.3	36.1	38.6	35.9	48.7	24.7
Nepal	39.5	26.1	19.1	17.3	14.1	10.1	14.0	15.2	10.3	9.0
Pakistan	20.3	19.0	16.6	20.8	17.9	21.9	27.1	20.9	23.3	20.9
Philippines	13.9	15.7	9.8	10.4	11.9	15.4	20.2	19.2	17.2	16.7
Singapore	4.6	5.9	6.4	6.2	5.1	3.4	4.4	7.3	3.5	3.7
Sri Lanka	27.2	30.7	12.9	11.1	9.6	11.0	11.6	15.4	23.3	17.9
Thailand	12.1	11.3	9.6	12.4	11.6	7.3	10.8	11.8	11.2	10.5
Vietnam	25.4	23.8	6.6	–46.3	8.3	21.7	21.6	13.6	12.4	10.5
US	9.1	7.1	6.0	7.9	5.9	9.9	9.6	8.5	9.1	10.6

Unit: Percentage
Source: APO Productivity Database 2019.

A.6 Hours Worked and Labor Compensation

Labor volume can be measured in three units: number of persons in employment; number of filled jobs; and hours actually worked. Given the variations in working patterns and employment legislation both over time and across countries, hours worked, if accurately measured, offers the most time-consistent and somewhat internationally comparable unit measuring the volume in each of different types of labor. This is the primary underlying reason for the importance of choosing hours actually worked in productivity analysis, but, due to the difficulty in accurately estimating average hours actually worked, it is not always available or comparable across countries. The variety of data sources, definitions, and methodologies available in estimating these labor market variables often leads to a fragmentation of labor market statistics of an individual country concerned, dubious data quality, and incomparability across countries. Here follows an attempt to outline some of these intricate measuring issues.

Data on labor volume comes from two main statistical surveys on establishment and household, with respective strengths and weaknesses. Establishment surveys are surveys of firms with stratified sample frames by the size of establishments. The concentration of total employment in a relatively small number of establishments means that this sampling strategy is cost-effective in delivering high precision labor market estimates with a small sampling error. Questionnaires are designed to be close to the concepts used in company administration. This has both strengths and weaknesses. Data collected is of high quality and accuracy. On the other hand, changes in legislation and regulation could be a source of instability to the definitions, and in turn of the data collected. Furthermore, data that companies do not collect for administrative purpose, such as unpaid hours and worker characteristics, are unavailable. This greatly limits the varieties of labor market data that can be collected through establishments.[55] Information on hours is on paid hours rather than hours actually worked. Certain categories of employment, most notably the

55: Employment as measured is necessarily based on jobs rather than on persons employed, as persons holding multiple jobs with different establishments cannot be identified and will be counted more than once.

self-employed, are not covered. Sometimes small firms, informal employment (occupies more than 50% in some developing Asian countries) or the public sector is also excluded. Because of these limitations, labor market data from establishment surveys often requires a raft of adjustments for omissions and definition modifications during the compilation process.

Household-based labor force surveys (LFS), in contrast, have full coverage of the economy, although they sometimes incorporate age or geographic exclusions and may have imperfect coverage of the armed forces and other institutional households. Nonetheless, they provide valuable data on certain employment groups such as the self-employed and unpaid family workers, and on the rate of multiple job holding. Employment status in LFS is independently determined and is not subject to the criteria used in company records. Most countries follow the International Labour Organization (ILO) definitions. As LFS are surveys from the socio-economic perspective, they also provide rich data on worker characteristics that are relevant to productivity analysis.[56]

The common practice of statistical offices has been to combine information from both establishment and household surveys, with a view of making use of the most reliable aspects of each of the surveys. This seems to be the most promising avenue forward in improving the quality and consistency of data on labor input. However, statistical offices could still differ a great deal in their methodologies, especially in estimating the annual average hours worked per job/person, depending on their starting points, namely LFS data or enterprise data. All these must be considered in international comparisons of productivity.

Figure 82 presents a cross-country comparison of average annual hours worked per worker for 2010–2017, relative to the level of the US, based on the Asia QALI Database in Appendix 7. It indicates that workers in Asian countries tend to work much longer hours than those in the US and Europe. In many of the countries sampled, the difference in annual hours worked per person relative to the US is more than 10% of the US level.[57] Prolonged working hours are observed in Asian countries regardless of their stage of development, spanning low-income countries such as Bangladesh and Cambodia to high-income countries

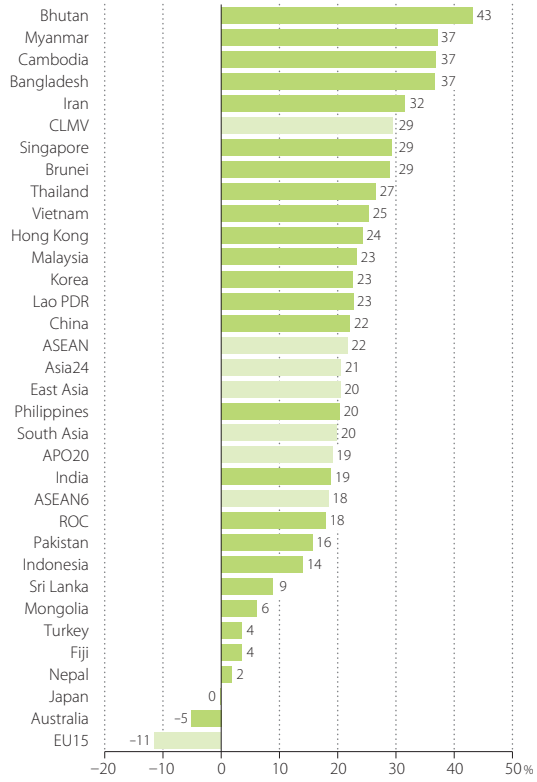

Figure 82 Hours Worked Per Worker, Relative to the US

——Average annual hours worked per worker in 2010–2017

Sources: Official national accounts and labor force survey in each country, including author adjustments, for Asian countries and OECD Stat for the EU15.

56: The major weakness of the LFS, however, is data precision. By relying on the recollection of the respondents, their response also depends on perception. Response errors could, therefore, arise from confusion of concepts and imprecise recollection of the respondents concerning work patterns and pay during the reference week. Another source of error originates from proxy response, which relies on the proxy's perception and knowledge of another household's member. A high level of proxy responses could, therefore, reduce the reliability of data collected.

57: Shorter hours worked in Nepal is due to frequent general strikes called "Banda", which are mainly lead by some political parties. According to the Nepal Human Rights Commission, Banda were called 821 times in various regions in 2009, and economic activities were closed during Banda.

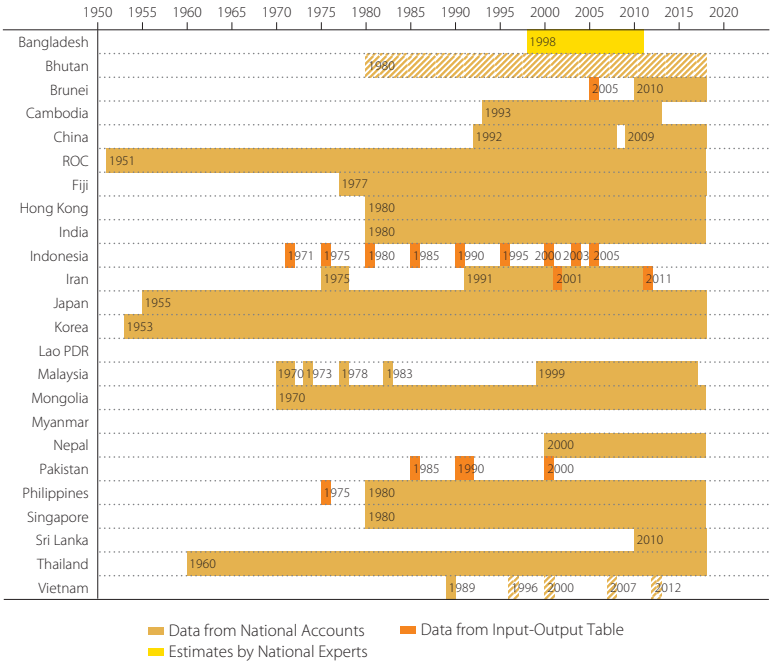

Figure 83 Availability of COE Estimates

Sources: Official national accounts and SUT/IOT in each country.
Note: Hatched areas show the periods in which only the data mingled with operating surplus or mixed income is available.

such as Singapore and Korea. An exception is Japan. Workers in Japan are likely to work much shorter hours than those in other Asian countries. However, compared with the EU15, hours worked by workers in Japan are still about 11% greater.

The labor share, which is defined as the ratio of labor compensation of total employment to GDP at basic prices, is one of the key factors to determine TFP growth. The estimates on the compensation of employees (COE), however, are not fully available in the official national accounts in Asian countries. Figure 83 summarizes the availability of the COE estimates in the official national accounts and the input-output tables in each country (Table 3 in Appendix 3). Currently the national accounts in Bangladesh, Bhutan, Indonesia, the Lao PDR, Myanmar, Pakistan, and Vietnam do not fully publish the COE estimates. In addition, in some countries like Cambodia and Iran, the estimates are not fully available for the entire period of our observation of 1970–2017. In such cases, the COE is estimated or extrapolated by the estimates based on the Asia QALI Database.

The compensation for the self-employed and contributing family workers is not separately estimated in the national accounts but is combined with returns to capital in mixed income. The APO Productivity Database 2019 uses the estimates in the Asia QALI Database (Appendix 7), in which a country-common assumption is applied, with the exceptions for countries where reliable data are available. The assumption used in Asia QALI is that the wage differential ratio (WDR) in hourly wages of non-employees to employees in each elementary group of labor inputs is set at 0.5 for Japan, the Asian Tigers, and CLMV (except Myanmar) and 0.2 for other countries in the Asia QALI Database 2019.

A.7 Quality-adjusted Labor Inputs

In productivity analysis, labor inputs are expected to be quality adjusted to reflect workforce heterogeneity, as recommended in the SNA 2008 (United Nations, 2009). To adjust total hours worked for quality would require information on worker characteristics to differentiate the workforce into different types, which are then weighed by their marginal productivity and approximated by their respective shares of total compensation. In the stage of high economic growth, labor quality growth can be a significant factor as well as the increase in hours worked, improvement in education attainment of workers, and a shift from the self-employed (e.g., in agriculture or informal service sectors) to the employees (e.g. in manufacturing or formal service sectors).

Deriving a quality adjusted labor input (QALI) measure is a data-demanding exercise. Even if LFS provides the required information, researchers often run into the consistency issues discussed in Appendix 6, as well as sample size problems as they break down the workforce into fine categories. Covering the Asia24 economies, our project has collected the data on employment and wage/incomes by type of labor categories since 2013, based mainly on LFS and Population Census, as listed in Table 7. The developed data is called as Asia QALI. This data consists of number of workers, hours worked per worker, and hourly wages, which are cross-classified by gender, education attainment, age, and employment status. The first report on development of Asia QALI for South Asian countries was published in Nomura and Akashi (2017). Although further examinations will be required to improve the estimates, the first set of Asia QALI Database covering the Asia24 economies is newly used to provide the estimates of total hours worked, labor qualities, and QALI in the APO Productivity Database 2019.

Table 7 Sources of Labor Data

	Sources of Labor Data
Bangladesh	Population and Housing Census, Labour Force Survey
Bhutan	Population and Housing Census, Labour Force Survey, Labour Market Information Bulletin,
Brunei	Population and Housing Census, Labour Force Survey
Cambodia	General Population Census, Inter-Censal Population Survey, Labor Force Survey, Socio-Economic Survey
China	China Statistical Yearbook, China Labor Statistical Yearbook, Population Census, 1% National Population Sample Survey
ROC	Population and Housing Census, Yearbook of Manpower Survey Statistics in Taiwan Area, Manpower Utilization Survey
Fiji	Census of Population and Housing, Employment and Unemployment Survey, Annual Employment Survey
Hong Kong	Population Census, Population By-Census, General Household Survey, Annual Earnings and Hours Survey
India	Census of India, Employment and Unemployment Survey, National Sample Survey
Indonesia	Population and Housing Census, Labor Force Situation in Indonesia, Laborer Situation in Indonesia
Iran	National Population and Housing Census, Labour Force Survey, Iran Salary Report
Japan	Population Census, Labor Force Survey, Census of Manufacture, Basic Survey on Wage Structure, Monthly Labour Survey, Japan's System of National Accounts
Korea	Population and Housing Census, Economically Active Population Survey, Employment Structure Survey, Wage Structure Survey
Lao PDR	Population Census, Labour Force Survey, Urban Labour Force Survey, ADB Key Indicators for Asia and the Pacific
Malaysia	Population and Housing Census, Labour Force Survey, Salaries & Wages Survey
Mongolia	Population and Housing Census, Labour Force Survey, Survey on Wages and Salaries, A Pilot Time Use Survey
Myanmar	Population and Housing Census, Labour Force Survey, Salary Survey Report, Survey on Business Conditions of Japanese Companies in Asia and Oceania
Nepal	Population and Housing Census, Labor Force Survey
Pakistan	Population Census, Labour Force Survey, Census of Manufacturing Industries
Philippines	Labor Force Survey
Singapore	Population Census, Labor Force Survey, Singapore Yearbook of Manpower Statistics, General Household Survey
Sri Lanka	Census of Population and Housing, Labour Force Survey
Thailand	Population and Housing Census, Labor Force Survey
Vietnam	Population and Housing Census, Labour Force and Employment Survey, Living Stabdards Survey, Vietnam Statistical Data in the 20th Century, Vietnam Economy 1986–1991

Source: Asia QALI Database 2019.

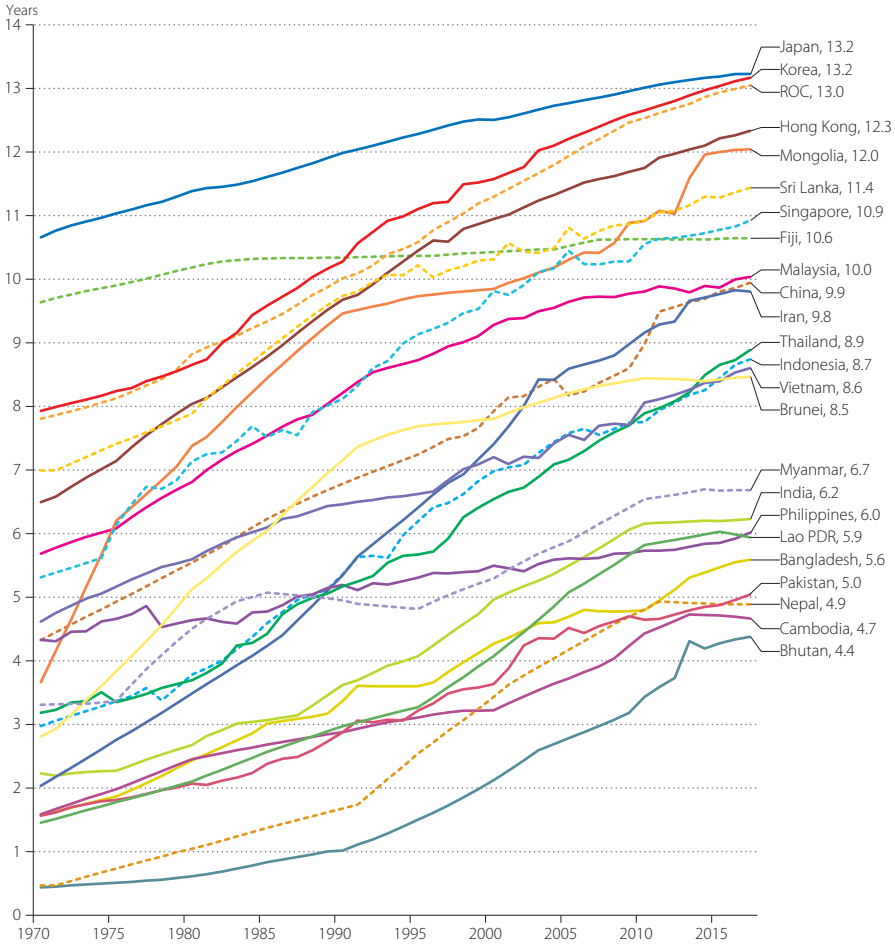

Figure 84 Average Schooling Years of Workers

Source: Asia QALI Database 2019.

Figure 84 presents the time-series comparisons of the average schooling years observed in terms of workers since 1970, as a more intuitive indicator based on the Asia QALI Database. Japan is the leading country (13.2 years), followed by Korea (13.2 years), the ROC (13.0 years), Hong Kong (12.3 years) and Mongolia (12.0 years). The reverse reflects the differences in employment rate of highly educated persons, e.g. higher rate of unemployment of educated persons in Korea. Although there is a significant range in 2017 from 4.4 years (Bhutan) to 13.2 years (Japan), the average years have increased since 1970 in almost all economies in Asia.

A.8 Purchasing Power Parities

Purchasing power parities (PPPs) are indispensable inputs into economic research and policy analysis involving cross-country comparisons of macroeconomic aggregates. They affect a double conversion of macroeconomic measures, estimated in national currencies and price levels, into comparable cross-country volume measures. These are expressed in a common currency and at a uniform price level. PPPs are price relatives that show the ratio of the prices in national currencies of single or composite goods and services

in different countries. They are compiled within the International Comparisons Program (ICP). Comparisons are made from the expenditure side of GDP. To this end, the ICP compiles PPPs by holding worldwide surveys at regular intervals (currently, every six years) to collect comparable price and expenditure data for the entire range of final goods and services that make up the final expenditures on GDP. In April 2014, the new benchmark PPP estimates were published by the ICP 2011 round. For several methodological improvements, see Eurostat-OECD (2012) and World Bank (2014).

Chapter 3 mainly provides the cross-country comparison of economic volumes. To obtain comparable volume measures, the Databook uses the constant PPP approach, which relies not on a time series of PPPs, but on one of the benchmark estimates. The Databook has used the benchmark estimates by the ICP 2011 round since the 2014 edition. The use of this approach creates national series for volumes at the prices of a common reference year (i.e., 2017), and deflates these by the PPP for a fixed year (i.e., 2011).

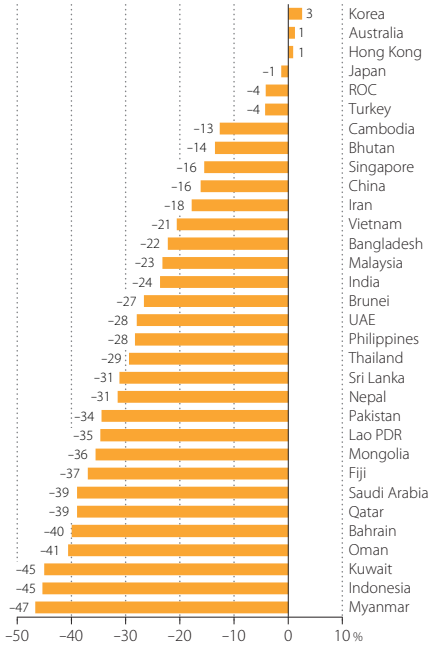

Figure 85 Revisions of PPP for GDP by the 2011 ICP Round

——Ratio of the 2011 ICP PPP to the 2005 ICP PPP (extrapolated for 2011)

Source: World Bank, *World Development Indicators 2014*.

It is inevitable that they will be compared with the results of the previous round in 2005, which has provided the benchmark estimate for the past Databook series in 2009–2013. Figure 85 shows the revisions of PPPs in Asian countries at the 2011 ICP round, in comparison with the 2005 ICP round. The 2011 benchmark PPP for most of the Asian countries is lower than suggested by their extrapolated equivalents from the 2005 benchmark, with a difference ranging from +3% for Korea to –47% for Myanmar. Except for Singapore, it is observed that revisions for the more mature economies are much smaller (ranging within ±4%) than those for the rapidly developing economies (with downward revisions greater than 10%). Therefore, the impact of the PPP revisions is to raise the relative size of Asian economies, moving them closer to the level of the more mature economies. More specifically, the PPP revisions for India and China are –24% and –16%, respectively. As a result, the relative positions of India and China have improved considerably in cross-country level comparisons after PPP revisions at the 2011 ICP round.

These revisions by the 2005 ICP round have a property to partly offset the past upward revisions by the 2005 ICP round for many Asian countries. The 2005 benchmark PPP for most of the Asian countries were upwardly revised compared to their extrapolated equivalents from the 1993 benchmark estimates that had been used in the Databook 2008. For example, the PPP estimates were upwardly revised by 55% and 65% (thus the internationally comparable measures of GDP in 2005 were reduced by 36% and 40%) for India and China, respectively.

Singapore is an exceptional country, in which the PPP has been downwardly revised (thus the relative size of the economy has been upwardly revised) by both revisions of the ICP 2005 and 2011 rounds. The PPP for Singaporean GDP was revised by –29% and by –16% in the ICP 2005 and 2011 rounds, respectively. Based on the constant PPP approach, the revision by the ICP 2011 round advanced the years when the Singapore economy has surpassed Japan and the US to 1980 (from 1993) and 1992 (from 2004), respectively, as a measure of per capita GDP. It may require further examination if this revision provides an

appropriate view. The cross-country level comparison has to face a much larger opportunity to be revised, compared to the cross-country growth comparison. The readers should bear in mind these circumstances.

A.9 Other Data

For China, multiple data sources have been used; GDP for the whole economy, industry GDP, final demands, employment, and income data are taken from *China Statistical Yearbook* and *China National Income 1952–1995*; time-series data of GFCF during 1952–2017 at current and constant prices are constructed at KEO; the main references for GFCF construction are drawn from *Statistics on Investment in Fixed Assets of China 1950–2000*, *China Statistical Yearbook*, and *1987, 1992, 1997, 2002, 2007, and 2012 Input–Output Tables of China*; and multiple data sources for manufacturing, electrics, and trade data from China's Customs Statistics are also utilized.[58]

The data source for the EU15 and the EU28 is the OECD.Stat (http://stats.oecd.org/) and the Eurostat (http://ec.europa.eu/). The data for the US, Australia, Bhutan, and Turkey is taken from the website of the US Bureau of Economic Analysis (http://www.bea.gov), the Australian Bureau of Statistics (http://www.abs.gov.au/), the National Statistics Bureau of Bhutan (http://www.nsb.gov.bt/) and UNDESA (2016), and the Turkish Statistical Institute (http://www.turkstat.gov.tr), respectively.

The exchange rates used in this edition are adjusted rates, called the Analysis of Main Aggregate (UNSD database) rates, in the UNSD National Accounts Main Aggregate Database. The AMA rates coincide with IMF rates except for some periods in countries with official fixed exchange rates and high inflation, when there could be a serious disparity between real GDP growth and growth converted to US dollars based on IMF rates. In such cases, the AMA adjusts the IMF-based rates by multiplying the growth rate of the GDP deflator relative to the US.

Tax data of member economies are supplemented by the IMF's Government Finance Statistics. From its tax revenue data, "taxes on goods and services" and "taxes on imports" are used for calculating taxes on products. From its expenditure data, "subsidies" are taken. Data taken from Government Finance Statistics play a key role in adjusting GDP at market prices to GDP at basic prices. The data for energy consumptions and CO2 emissions is based on IEA's *CO2 Emissions from Fuel Combustion, Energy Balances of OECD Countries*, and *Energy Balances of non-OECD Countries*.

58: Holz (2006) provides a useful reference on Chinese official statistics. The project appreciates Meng Ruoyan (Keio University) for her supports on Chinese data.

A.10 Supplementary Tables

Table 8 GDP using Exchange Rate

——GDP at current market prices, using annual average exchange rate

1970		(%)	1980		(%)	1990		(%)	2000		(%)	2010		(%)	2017		(%)
Japan	208	100.0	Japan	1,087	100.0	Japan	3,128	100.0	Japan	4,888	100.0	China	6,101	100.0	China	12,238	100.0
China	93	44.7	China	306	28.2	China	395	12.6	China	1,211	24.8	Japan	5,700	93.4	Japan	4,860	39.7
India	64	30.5	India	190	17.5	India	335	10.7	Korea	562	11.5	India	1,671	27.4	India	2,601	21.3
Iran	11	5.4	Saudi Arabia	165	15.2	Korea	279	8.9	India	482	9.9	Korea	1,094	17.9	Korea	1,531	12.5
Pakistan	10	4.9	Iran	97	9.0	ROC	167	5.3	ROC	331	6.8	Indonesia	756	12.4	Indonesia	1,016	8.3
Indonesia	10	4.8	Indonesia	80	7.3	Indonesia	127	4.1	Saudi Arabia	191	3.9	Saudi Arabia	533	8.7	Saudi Arabia	697	5.7
Bangladesh	10	4.7	Korea	65	6.0	Saudi Arabia	119	3.8	Hong Kong	172	3.5	Iran	498	8.2	ROC	575	4.7
Korea	9.0	4.3	UAE	44	4.1	Iran	95	3.0	Indonesia	168	3.4	ROC	446	7.3	Iran	510	4.2
Thailand	7.3	3.5	ROC	42	3.9	Thailand	89	2.8	Thailand	127	2.6	Thailand	342	5.6	Thailand	458	3.7
Philippines	6.8	3.3	Thailand	33	3.1	Hong Kong	77	2.5	Iran	111	2.3	UAE	298	4.9	UAE	397	3.2
ROC	5.8	2.8	Philippines	33	3.0	UAE	51	1.6	UAE	106	2.2	Malaysia	255	4.2	Hong Kong	342	2.8
Saudi Arabia	5.4	2.6	Kuwait	30	2.7	Philippines	47	1.5	Singapore	96	2.0	Singapore	236	3.9	Singapore	337	2.8
Malaysia	3.9	1.9	Hong Kong	29	2.7	Pakistan	46	1.5	Malaysia	95	1.9	Hong Kong	229	3.7	Malaysia	315	2.6
Hong Kong	3.8	1.8	Malaysia	25	2.3	Malaysia	45	1.4	Philippines	81	1.7	Philippines	200	3.3	Philippines	314	2.6
Kuwait	3.0	1.4	Pakistan	24	2.2	Singapore	39	1.2	Pakistan	79	1.6	Pakistan	175	2.9	Pakistan	303	2.5
Sri Lanka	2.8	1.4	Bangladesh	19	1.7	Bangladesh	31	1.0	Bangladesh	51	1.1	Qatar	128	2.1	Bangladesh	246	2.0
Myanmar	2.7	1.3	Singapore	12	1.1	Kuwait	19	0.6	Kuwait	38	0.8	Kuwait	118	1.9	Vietnam	227	1.9
Singapore	1.9	0.9	Qatar	7.9	0.7	Oman	12	0.4	Vietnam	33	0.7	Vietnam	117	1.9	Qatar	172	1.4
Vietnam	1.2	0.6	Oman	6.3	0.6	Sri Lanka	9.4	0.3	Oman	20	0.4	Bangladesh	115	1.9	Kuwait	123	1.0
Nepal	1.1	0.5	Brunei	6.2	0.6	Qatar	7.5	0.2	Sri Lanka	19	0.4	Oman	58	0.9	Sri Lanka	87	0.7
UAE	1.1	0.5	Myanmar	5.9	0.5	Vietnam	6.5	0.2	Qatar	18	0.4	Sri Lanka	56	0.9	Oman	72	0.6
Cambodia	0.8	0.4	Sri Lanka	4.9	0.5	Myanmar	5.7	0.2	Bahrain	8.4	0.2	Myanmar	37	0.6	Myanmar	45	0.4
Qatar	0.5	0.3	Bahrain	3.5	0.3	Bahrain	4.5	0.1	Myanmar	7.8	0.2	Bahrain	26	0.4	Bahrain	35	0.3
Bahrain	0.4	0.2	Nepal	2.6	0.2	Nepal	4.4	0.1	Brunei	6.7	0.1	Nepal	19	0.3	Nepal	29	0.2
Oman	0.3	0.1	Fiji	1.2	0.1	Brunei	3.9	0.1	Nepal	6.3	0.1	Brunei	14	0.2	Cambodia	22	0.2
Brunei	0.2	0.1	Vietnam	1.0	0.1	Cambodia	1.8	0.1	Cambodia	3.7	0.1	Cambodia	11	0.2	Lao PDR	17	0.1
Fiji	0.2	0.1	Cambodia	0.7	0.1	Mongolia	1.6	0.1	Lao PDR	1.8	0.0	Lao PDR	7.4	0.1	Brunei	12	0.1
Lao PDR	0.1	0.1	Mongolia	0.5	0.0	Fiji	1.4	0.0	Fiji	1.7	0.0	Mongolia	7.2	0.1	Mongolia	11	0.1
Mongolia	0.1	0.1	Lao PDR	0.3	0.0	Lao PDR	0.9	0.0	Mongolia	1.4	0.0	Fiji	3.2	0.1	Fiji	4.9	0.0
Bhutan	0.1	0.0	Bhutan	0.1	0.0	Bhutan	0.3	0.0	Bhutan	0.4	0.0	Bhutan	1.6	0.0	Bhutan	2.5	0.0
(region)			(region)			(region)			(region)			(region)			(region)		
APO20	358	171.9	APO20	1,748	160.8	APO20	4,531	144.8	APO20	7,310	149.6	APO20	11,937	195.7	APO20	13,806	112.8
Asia24	454	218.0	Asia24	2,066	190.1	Asia24	4,936	157.8	Asia24	8,536	174.6	Asia24	18,090	296.5	Asia24	26,103	213.3
Asia30	464	223.1	Asia30	2,323	213.7	Asia30	5,148	164.6	Asia30	8,918	182.5	Asia30	19,250	315.5	Asia30	27,600	225.5
East Asia	320	153.7	East Asia	1,530	140.7	East Asia	4,047	129.4	East Asia	7,165	146.6	East Asia	13,577	222.6	East Asia	19,556	159.8
South Asia	88	42.1	South Asia	241	22.2	South Asia	427	13.6	South Asia	638	13.1	South Asia	2,036	33.4	South Asia	3,269	26.7
ASEAN	35	16.7	ASEAN	197	18.1	ASEAN	366	11.7	ASEAN	619	12.7	ASEAN	1,975	32.4	ASEAN	2,763	22.6
ASEAN6	30	14.4	ASEAN6	189	17.4	ASEAN6	351	11.2	ASEAN6	573	11.7	ASEAN6	1,802	29.5	ASEAN6	2,452	20.0
CLMV	4.8	2.3	CLMV	8.0	0.7	CLMV	15	0.5	CLMV	46	0.9	CLMV	173	2.8	CLMV	312	2.5
GCC	11	5.1	GCC	257	23.6	GCC	213	6.8	GCC	382	7.8	GCC	1,160	19.0	GCC	1,497	12.2
(reference)			(reference)			(reference)			(reference)			(reference)			(reference)		
US	1,073	515.7	US	2,857	262.8	US	5,963	190.6	US	10,252	209.8	US	14,992	245.7	US	19,485	159.2
EU15	1,246	598.7	EU15	3,325	305.9	EU15	6,398	204.5	EU15	9,918	202.9	EU15	14,577	238.9	EU15	18,685	152.7
									EU28	11,024	225.5	EU28	16,800	275.4	EU28	21,136	172.7
Australia	45	21.7	Australia	173	15.9	Australia	324	10.3	Australia	409	8.4	Australia	1,299	21.3	Australia	1,416	11.6
Turkey	24	11.7	Turkey	92	8.5	Turkey	204	6.5	Turkey	273	5.6	Turkey	772	12.7	Turkey	852	7.0

Unit: Billions of US dollars.
Sources: Official national accounts in each country, including author adjustments.
Note: See Appendix 2 for the adjustments made to harmonize GDP coverage across countries.

App.

Table 9 GDP using PPP

——GDP at constant market prices, using 2011 PPP, reference year 2017

1970		(%)	1980		(%)	1990		(%)	2000		(%)	2010		(%)	2017		(%)
Japan	1,669	100.0	Japan	2,632	100.0	Japan	4,153	100.0	China	5,150	100.0	China	14,024	100.0	China	23,369	100.0
India	751	45.0	India	1,009	38.3	China	1,910	46.0	Japan	4,727	91.8	India	6,037	43.0	India	9,511	40.7
China	430	25.8	Saudi Arabia	802	30.5	India	1,732	41.7	India	2,948	57.2	Japan	5,037	35.9	Japan	5,427	23.2
Saudi Arabia	303	18.2	China	787	29.9	Indonesia	894	21.5	Indonesia	1,352	26.3	Indonesia	2,252	16.1	Indonesia	3,252	13.9
Iran	302	18.1	Indonesia	488	18.5	Saudi Arabia	754	18.2	Korea	1,073	20.8	Korea	1,655	11.8	Korea	2,035	8.7
Indonesia	218	13.1	Iran	420	16.0	Korea	549	13.2	Saudi Arabia	988	19.2	Iran	1,520	10.8	Saudi Arabia	1,795	7.7
Kuwait	154	9.2	UAE	214	8.1	Iran	544	13.1	Iran	811	15.8	Saudi Arabia	1,381	9.8	Iran	1,772	7.6
Philippines	119	7.1	Korea	213	8.1	Thailand	410	9.9	ROC	668	13.0	ROC	1,004	7.2	Thailand	1,248	5.3
Thailand	101	6.0	Philippines	212	8.1	ROC	349	8.4	Thailand	638	12.4	Thailand	999	7.1	ROC	1,193	5.1
Pakistan	93	5.6	Thailand	192	7.3	Pakistan	314	7.6	Pakistan	530	10.3	Pakistan	804	5.7	Pakistan	1,091	4.7
Korea	88	5.3	ROC	158	6.0	Philippines	259	6.2	Malaysia	393	7.6	Malaysia	653	4.7	Malaysia	933	4.0
Bangladesh	88	5.3	Pakistan	149	5.7	UAE	219	5.3	Philippines	362	7.0	Philippines	577	4.1	Philippines	877	3.8
ROC	59	3.5	Kuwait	125	4.7	Malaysia	193	4.7	UAE	359	7.0	UAE	534	3.8	UAE	717	3.1
Malaysia	48	2.9	Malaysia	106	4.0	Hong Kong	169	4.1	Hong Kong	249	4.8	Vietnam	433	3.1	Vietnam	659	2.8
Vietnam	44	2.7	Bangladesh	96	3.6	Bangladesh	143	3.5	Bangladesh	238	4.6	Bangladesh	409	2.9	Bangladesh	638	2.7
Hong Kong	37	2.2	Hong Kong	88	3.4	Singapore	115	2.8	Singapore	229	4.5	Singapore	403	2.9	Singapore	536	2.3
Myanmar	35	2.1	Vietnam	58	2.2	Vietnam	98	2.4	Vietnam	213	4.1	Hong Kong	372	2.7	Hong Kong	456	2.0
Sri Lanka	30	1.8	Singapore	55	2.1	Kuwait	95	2.3	Kuwait	167	3.2	Kuwait	254	1.8	Qatar	348	1.5
Singapore	23	1.4	Myanmar	54	2.0	Oman	68	1.6	Sri Lanka	113	2.2	Qatar	250	1.8	Kuwait	301	1.3
Qatar	19	1.1	Sri Lanka	45	1.7	Sri Lanka	68	1.6	Oman	109	2.1	Myanmar	198	1.4	Sri Lanka	273	1.2
Nepal	13	0.8	Qatar	33	1.3	Myanmar	62	1.5	Myanmar	105	2.0	Sri Lanka	188	1.3	Myanmar	261	1.1
Brunei	13	0.8	Brunei	32	1.2	Qatar	38	0.9	Qatar	73	1.4	Oman	148	1.1	Oman	193	0.8
Cambodia	12	0.7	Oman	31	1.2	Nepal	28	0.7	Nepal	45	0.9	Nepal	66	0.5	Nepal	92	0.4
UAE	11	0.7	Nepal	18	0.7	Brunei	24	0.6	Bahrain	31	0.6	Bahrain	55	0.4	Bahrain	71	0.3
Oman	11	0.7	Bahrain	17	0.6	Bahrain	19	0.5	Brunei	30	0.6	Cambodia	41	0.3	Cambodia	66	0.3
Bahrain	8.1	0.5	Mongolia	6.6	0.3	Mongolia	11	0.3	Cambodia	19	0.4	Brunei	34	0.2	Lao PDR	49	0.2
Mongolia	3.7	0.2	Cambodia	5.6	0.2	Cambodia	9.5	0.2	Lao PDR	14	0.3	Lao PDR	29	0.2	Mongolia	40	0.2
Lao PDR	3.1	0.2	Lao PDR	4.4	0.2	Lao PDR	7.9	0.2	Mongolia	12	0.2	Mongolia	23	0.2	Brunei	34	0.1
Fiji	2.4	0.1	Fiji	3.9	0.1	Fiji	4.8	0.1	Fiji	6.1	0.1	Fiji	7.0	0.0	Fiji	8.7	0.0
						Bhutan	1.4	0.0	Bhutan	2.2	0.0	Bhutan	5.1	0.0	Bhutan	7.6	0.0
(region)			(region)			(region)			(region)			(region)			(region)		
APO20	3,706	222.0	APO20	5,961	226.5	APO20	10,054	242.1	APO20	14,642	284.3	APO20	22,509	160.5	APO20	30,158	129.1
Asia24	4,186	250.7	Asia24	6,837	259.8	Asia24	12,052	290.2	Asia24	19,930	387.0	Asia24	36,770	262.2	Asia24	53,830	230.3
Asia30	4,689	280.9	Asia30	8,059	306.2	Asia30	13,247	318.9	Asia30	21,659	420.6	Asia30	39,393	280.9	Asia30	57,255	245.0
East Asia	2,288	137.0	East Asia	3,885	147.6	East Asia	7,142	172.0	East Asia	11,880	230.7	East Asia	22,115	157.7	East Asia	32,520	139.2
South Asia	976	58.4	South Asia	1,318	50.1	South Asia	2,287	55.1	South Asia	3,876	75.3	South Asia	7,509	53.5	South Asia	11,613	49.7
ASEAN	617	37.0	ASEAN	1,210	46.0	ASEAN	2,074	49.9	ASEAN	3,356	65.2	ASEAN	5,619	40.1	ASEAN	7,916	33.9
ASEAN6	523	31.3	ASEAN6	1,088	41.3	ASEAN6	1,896	45.7	ASEAN6	3,006	58.4	ASEAN6	4,919	35.1	ASEAN6	6,881	29.4
CLMV	94	5.6	CLMV	121	4.6	CLMV	177	4.3	CLMV	351	6.8	CLMV	701	5.0	CLMV	1,035	4.4
GCC	504	30.2	GCC	1,221	46.4	GCC	1,194	28.7	GCC	1,729	33.6	GCC	2,622	18.7	GCC	3,425	14.7
(reference)			(reference)			(reference)			(reference)			(reference)			(reference)		
US	5,345	320.2	US	7,296	277.2	US	10,110	243.4	US	14,175	275.3	US	16,839	120.1	US	19,485	83.4
EU15	6,614	396.2	EU15	9,052	343.9	EU15	11,563	278.4	EU15	14,514	281.8	EU15	16,440	117.2	EU15	17,991	77.0
									EU28	16,491	320.2	EU28	18,947	135.1	EU28	20,959	89.7
Australia	304	18.2	Australia	406	15.4	Australia	546	13.2	Australia	774	15.0	Australia	1,051	7.5	Australia	1,273	5.4
Turkey	272	16.3	Turkey	405	15.4	Turkey	674	16.2	Turkey	964	18.7	Turkey	1,429	10.2	Turkey	2,233	9.6

Unit: Billions of US dollars (as of 2017).
Sources: Official national accounts in each country, including author adjustments.
Note: See Appendix 2 for the adjustments made to harmonize GDP coverage across countries.

Table 10 GDP Growth

——Average annual growth rate of GDP at constant market prices

1990–1995		1995–2000		2000–2005		2005–2010		2010–2015		2015–2017		2000–2017	
China	11.6	Qatar	10.6	China	9.3	Qatar	16.6	Mongolia	9.8	Iran	7.7	Qatar	9.2
Malaysia	9.3	China	8.3	Cambodia	8.8	China	10.7	China	7.6	India	7.1	China	8.9
Kuwait	9.2	Vietnam	7.3	Vietnam	8.0	Bhutan	9.1	Lao PDR	7.6	Bangladesh	7.0	Cambodia	7.4
Singapore	8.3	Cambodia	7.2	Qatar	8.0	Lao PDR	7.8	Cambodia	7.0	Nepal	6.9	Lao PDR	7.2
Vietnam	8.1	UAE	6.3	Bhutan	7.5	India	7.8	India	6.2	Lao PDR	6.9	Bhutan	7.2
Thailand	8.1	Lao PDR	6.0	Iran	7.2	Cambodia	6.5	Bangladesh	6.1	Cambodia	6.8	Mongolia	7.0
Korea	8.1	ROC	5.8	Kuwait	7.2	Singapore	6.5	Sri Lanka	6.1	China	6.6	India	6.9
Indonesia	7.5	Bhutan	5.7	India	6.5	Mongolia	6.4	Vietnam	5.8	Philippines	6.6	Vietnam	6.6
ROC	7.2	India	5.7	Myanmar	6.4	Myanmar	6.3	Qatar	5.8	Vietnam	6.4	Bangladesh	5.8
Cambodia	6.7	Myanmar	5.6	Lao PDR	6.4	Sri Lanka	6.2	Philippines	5.7	Bhutan	5.8	Myanmar	5.4
Lao PDR	6.0	Singapore	5.5	Mongolia	6.3	Vietnam	6.2	Bhutan	5.6	Pakistan	5.5	Philippines	5.2
Pakistan	6.0	Korea	5.3	Bahrain	5.9	Bangladesh	5.9	Indonesia	5.4	Malaysia	4.9	Sri Lanka	5.2
Oman	5.7	Bangladesh	5.1	UAE	5.4	Indonesia	5.6	Malaysia	5.2	Indonesia	4.9	Indonesia	5.2
Sri Lanka	5.3	Malaysia	4.9	Thailand	5.3	Bahrain	5.4	UAE	5.1	Thailand	3.6	Malaysia	5.1
Bahrain	5.3	Sri Lanka	4.9	Malaysia	5.2	Iran	5.4	Saudi Arabia	5.0	Sri Lanka	3.5	Singapore	5.0
Hong Kong	5.2	Nepal	4.8	Pakistan	5.0	Oman	5.2	Myanmar	4.7	Bahrain	3.4	Bahrain	4.8
Bangladesh	5.0	Pakistan	4.5	Bangladesh	5.0	Malaysia	5.0	Oman	4.5	Singapore	3.3	Iran	4.6
India	5.0	Iran	4.3	Singapore	4.8	Philippines	4.8	Singapore	4.4	Mongolia	3.3	Pakistan	4.3
Myanmar	4.9	Bahrain	4.2	Korea	4.6	Nepal	4.4	Pakistan	3.9	Hong Kong	3.0	Nepal	4.1
Nepal	4.9	Philippines	3.9	Indonesia	4.6	ROC	4.2	Nepal	3.8	Korea	3.0	UAE	4.1
Iran	3.7	Oman	3.7	Philippines	4.5	Korea	4.0	Fiji	3.6	ROC	2.3	Thailand	3.9
UAE	3.6	Mongolia	3.6	Hong Kong	4.1	Hong Kong	3.8	Bahrain	3.6	Myanmar	2.1	Korea	3.8
Bhutan	3.4	Hong Kong	2.6	Saudi Arabia	4.0	Thailand	3.7	Kuwait	3.5	Oman	2.0	Hong Kong	3.6
Brunei	3.1	Saudi Arabia	2.6	Sri Lanka	4.0	Pakistan	3.3	Thailand	3.0	Qatar	2.0	Saudi Arabia	3.5
Philippines	2.8	Kuwait	2.1	ROC	4.0	Saudi Arabia	2.7	Korea	3.0	UAE	1.9	Kuwait	3.5
Saudi Arabia	2.8	Fiji	2.0	Nepal	3.1	UAE	2.5	Hong Kong	2.9	Fiji	1.9	ROC	3.4
Fiji	2.7	Brunei	1.3	Brunei	2.1	Kuwait	1.2	ROC	2.5	Japan	1.3	Oman	3.4
Qatar	2.3	Japan	1.1	Fiji	2.0	Fiji	0.7	Japan	1.0	Saudi Arabia	0.5	Fiji	2.1
Japan	1.5	Thailand	0.7	Japan	1.2	Brunei	0.7	Iran	0.0	Kuwait	–0.3	Japan	0.8
Mongolia	–1.8	Indonesia	0.7	Oman	1.0	Japan	0.1	Brunei	–0.1	Brunei	–0.6	Brunei	0.7
(region)		(region)		(region)		(region)		(region)		(region)		(region)	
APO20	4.4	APO20	3.1	APO20	4.2	APO20	4.4	APO20	3.9	APO20	4.9	APO20	4.1
Asia24	5.7	Asia24	4.4	Asia24	5.7	Asia24	6.6	Asia24	5.4	Asia24	5.6	Asia24	5.5
Asia30	5.5	Asia30	4.3	Asia30	5.6	Asia30	6.4	Asia30	5.4	Asia30	5.3	Asia30	5.4
East Asia	5.6	East Asia	4.6	East Asia	5.6	East Asia	6.8	East Asia	5.6	East Asia	5.2	East Asia	5.6
South Asia	5.1	South Asia	5.4	South Asia	6.1	South Asia	7.1	South Asia	6.0	South Asia	6.9	South Asia	6.0
ASEAN	7.2	ASEAN	2.4	ASEAN	5.1	ASEAN	5.2	ASEAN	4.9	ASEAN	4.8	ASEAN	5.0
ASEAN6	7.3	ASEAN6	1.9	ASEAN6	4.8	ASEAN6	5.0	ASEAN6	4.8	ASEAN6	4.7	ASEAN6	4.8
CLMV	6.9	CLMV	6.7	CLMV	7.5	CLMV	6.3	CLMV	5.7	CLMV	5.3	CLMV	6.5
GCC	3.8	GCC	3.6	GCC	4.6	GCC	3.7	GCC	4.9	GCC	1.0	GCC	3.9
(reference)		(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
US	2.5	US	4.2	US	2.5	US	0.9	US	2.2	US	1.9	US	2.4
EU15	1.7	EU15	2.9	EU15	1.8	EU15	0.7	EU15	1.0	EU15	2.1	EU15	1.6
		EU28	2.9	EU28	1.9	EU28	0.9	EU28	1.1	EU28	2.2	EU28	1.7
Australia	3.2	Australia	3.8	Australia	3.4	Australia	2.8	Australia	2.8	Australia	2.6	Australia	3.1
Turkey	3.2	Turkey	4.0	Turkey	4.7	Turkey	3.2	Turkey	6.9	Turkey	5.2	Turkey	4.4

Unit: Percentage.
Sources: Official national accounts in each country, including author adjustments.
Note: See Appendix 2 for the adjustments made to harmonize GDP coverage across countries.

Table 11 Population

1970		(%)	1980		(%)	1990		(%)	2000		(%)	2010		(%)	2017		(%)
China	829.9	41.3	China	987.1	40.0	China	1,143.3	38.4	China	1,267.4	36.9	China	1,340.9	34.8	China	1,390.1	33.7
India	553.6	27.5	India	696.8	28.2	India	870.1	29.2	India	1,053.1	30.6	India	1,231.0	31.9	India	1,339.2	32.4
Indonesia	116.1	5.8	Indonesia	147.5	6.0	Indonesia	179.4	6.0	Indonesia	206.3	6.0	Indonesia	237.6	6.2	Indonesia	258.7	6.3
Japan	104.7	5.2	Japan	117.1	4.7	Japan	123.6	4.1	Pakistan	137.9	4.0	Pakistan	173.5	4.5	Pakistan	200.3	4.9
Bangladesh	71.2	3.5	Bangladesh	85.4	3.5	Pakistan	112.1	3.8	Japan	126.9	3.7	Bangladesh	147.3	3.8	Bangladesh	161.8	3.9
Pakistan	60.6	3.0	Pakistan	82.6	3.3	Bangladesh	109.0	3.7	Bangladesh	124.1	3.6	Japan	128.1	3.3	Japan	126.7	3.1
Vietnam	42.7	2.1	Vietnam	53.7	2.2	Vietnam	66.0	2.2	Vietnam	77.6	2.3	Philippines	92.3	2.4	Philippines	104.2	2.5
Philippines	36.7	1.8	Philippines	48.1	1.9	Philippines	60.7	2.0	Philippines	76.5	2.2	Vietnam	86.9	2.3	Vietnam	93.7	2.3
Thailand	34.4	1.7	Thailand	44.8	1.8	Iran	55.1	1.8	Iran	64.2	1.9	Iran	74.3	1.9	Iran	80.8	2.0
Korea	32.2	1.6	Iran	38.8	1.6	Thailand	54.5	1.8	Thailand	60.6	1.8	Thailand	65.9	1.7	Thailand	67.7	1.6
Iran	28.4	1.4	Korea	38.1	1.5	Korea	42.9	1.4	Korea	47.0	1.4	Myanmar	50.2	1.3	Myanmar	53.4	1.3
Myanmar	26.4	1.3	Myanmar	33.4	1.4	Myanmar	40.6	1.4	Myanmar	46.1	1.3	Korea	49.6	1.3	Korea	51.4	1.2
ROC	14.8	0.7	ROC	17.9	0.7	ROC	20.4	0.7	Malaysia	23.5	0.7	Malaysia	28.6	0.7	Saudi Arabia	32.9	0.8
Sri Lanka	12.5	0.6	Sri Lanka	14.7	0.6	Malaysia	18.1	0.6	Nepal	22.8	0.7	Saudi Arabia	27.4	0.7	Malaysia	32.0	0.8
Nepal	11.3	0.6	Nepal	14.6	0.6	Nepal	18.1	0.6	ROC	22.3	0.6	Nepal	26.4	0.7	Nepal	28.4	0.7
Malaysia	10.9	0.5	Malaysia	13.9	0.6	Sri Lanka	17.0	0.6	Sri Lanka	19.1	0.6	ROC	23.2	0.6	ROC	23.6	0.6
Cambodia	6.77	0.3	Saudi Arabia	9.74	0.4	Saudi Arabia	16.3	0.5	Cambodia	11.9	0.3	Sri Lanka	20.7	0.5	Sri Lanka	21.4	0.5
Saudi Arabia	5.84	0.3	Cambodia	6.59	0.3	Cambodia	8.84	0.3	Hong Kong	6.67	0.2	Cambodia	14.0	0.4	Cambodia	15.6	0.4
Hong Kong	3.96	0.2	Hong Kong	5.06	0.2	Hong Kong	5.70	0.2	Lao PDR	5.22	0.2	UAE	8.26	0.2	UAE	9.39	0.2
Lao PDR	2.50	0.1	Lao PDR	3.20	0.1	Lao PDR	4.14	0.1	Singapore	4.03	0.1	Hong Kong	7.02	0.2	Hong Kong	7.39	0.2
Singapore	2.07	0.1	Singapore	2.41	0.1	Singapore	3.05	0.1	Mongolia	2.39	0.1	Lao PDR	6.26	0.2	Lao PDR	6.96	0.2
Mongolia	1.25	0.1	Mongolia	1.66	0.1	Kuwait	2.10	0.1	Fiji	0.80	0.0	Singapore	5.08	0.1	Singapore	5.61	0.1
Kuwait	0.74	0.0	Kuwait	1.36	0.1	Mongolia	2.07	0.1	Bhutan	0.60	0.0	Kuwait	2.91	0.1	Oman	4.82	0.1
Oman	0.68	0.0	Oman	1.09	0.0	UAE	1.77	0.1	Bahrain	0.64	0.0	Oman	2.77	0.1	Kuwait	3.73	0.1
Fiji	0.52	0.0	UAE	1.04	0.0	Oman	1.63	0.1	Kuwait	1.86	0.1	Mongolia	2.76	0.1	Mongolia	3.13	0.1
Bhutan	0.29	0.0	Fiji	0.63	0.0	Fiji	0.74	0.0	Oman	2.40	0.1	Qatar	1.70	0.0	Qatar	2.52	0.1
UAE	0.25	0.0	Bhutan	0.41	0.0	Bhutan	0.54	0.0	Qatar	0.61	0.0	Bahrain	1.23	0.0	Bahrain	1.50	0.0
Bahrain	0.21	0.0	Bahrain	0.34	0.0	Bahrain	0.49	0.0	Saudi Arabia	20.8	0.6	Fiji	0.86	0.0	Fiji	0.91	0.0
Brunei	0.13	0.0	Qatar	0.22	0.0	Qatar	0.42	0.0	UAE	3.00	0.1	Bhutan	0.68	0.0	Bhutan	0.73	0.0
Qatar	0.11	0.0	Brunei	0.19	0.0	Brunei	0.25	0.0	Brunei	0.32	0.0	Brunei	0.39	0.0	Brunei	0.42	0.0
(region)			(region)			(region)			(region)			(region)			(region)		
APO20	1,147.1	57.0	APO20	1,433.5	58.1	APO20	1,771.5	59.5	APO20	2,092.9	60.9	APO20	2,421.3	62.8	APO20	2,629.6	63.7
Asia24	2,003.8	99.6	Asia24	2,454.6	99.4	Asia24	2,956.3	99.2	Asia24	3,407.3	99.1	Asia24	3,813.4	98.9	Asia24	4,074.2	98.7
Asia30	2,011.7	100.0	Asia30	2,468.4	100.0	Asia30	2,979.0	100.0	Asia30	3,436.6	100.0	Asia30	3,857.7	100.0	Asia30	4,129.1	100.0
East Asia	986.8	49.1	East Asia	1,166.8	47.3	East Asia	1,338.0	44.9	East Asia	1,472.7	42.9	East Asia	1,551.5	40.2	East Asia	1,602.3	38.8
South Asia	709.4	35.3	South Asia	894.5	36.2	South Asia	1,126.8	37.8	South Asia	1,357.5	39.5	South Asia	1,599.5	41.5	South Asia	1,751.9	42.4
ASEAN	278.6	13.9	ASEAN	353.8	14.3	ASEAN	435.7	14.6	ASEAN	512.1	14.9	ASEAN	587.3	15.2	ASEAN	638.3	15.5
ASEAN6	200.3	10.0	ASEAN6	256.9	10.4	ASEAN6	316.0	10.6	ASEAN6	371.2	10.8	ASEAN6	430.0	11.1	ASEAN6	468.6	11.3
CLMV	78.4	3.9	CLMV	96.9	3.9	CLMV	119.6	4.0	CLMV	140.9	4.1	CLMV	157.3	4.1	CLMV	169.6	4.1
GCC	7.82	0.4	GCC	13.8	0.6	GCC	22.7	0.8	GCC	29.3	0.9	GCC	44.3	1.1	GCC	54.9	1.3
(reference)			(reference)			(reference)			(reference)			(reference)			(reference)		
US	205.1	10.2	US	227.2	9.2	US	249.6	8.4	US	282.2	8.2	US	309.3	8.0	US	325.1	7.9
EU15	342.1	17.0	EU15	357.3	14.5	EU15	366.3	12.3	EU15	377.6	11.0	EU15	397.4	10.3	EU15	407.9	9.9
EU28	439.9	21.9	EU28	461.8	18.7	EU28	475.2	16.0	EU28	487.3	14.2	EU28	503.2	13.0	EU28	511.5	12.4
Australia	12.6	0.6	Australia	14.7	0.6	Australia	17.1	0.6	Australia	19.0	0.6	Australia	22.0	0.6	Australia	24.6	0.6
Turkey	35.6	1.8	Turkey	44.7	1.8	Turkey	56.5	1.9	Turkey	67.8	2.0	Turkey	73.7	1.9	Turkey	80.8	2.0

Unit: Millions of persons.
Sources: Population census and other official data in each country, including author interpolations.

Table 12 Per Capita GDP using Exchange Rate

——GDP at current market prices per person, using annual average exchange rate

1970		(%)	1980		(%)	1990		(%)	2000		(%)	2010		(%)	2017		(%)
Japan	1.99	100.0	Japan	9.29	100.0	Japan	25.3	100.0	Japan	38.5	100.0	Singapore	46.6	100.0	Singapore	60.0	100.0
Hong Kong	0.96	48.4	Hong Kong	5.70	61.4	Hong Kong	13.5	53.3	Hong Kong	25.8	66.9	Japan	44.5	95.6	Hong Kong	46.2	77.0
Singapore	0.93	46.5	Singapore	5.00	53.9	Singapore	12.8	50.4	Singapore	23.8	61.8	Hong Kong	32.6	69.9	Japan	38.4	63.9
Fiji	0.43	21.5	Iran	2.51	27.0	ROC	8.17	32.3	ROC	14.9	38.6	Korea	22.1	47.4	Korea	29.8	49.6
Iran	0.40	19.9	ROC	2.37	25.5	Korea	6.52	25.7	Korea	11.9	31.0	ROC	19.3	41.4	ROC	24.4	40.7
ROC	0.39	19.7	Fiji	1.92	20.7	Malaysia	2.50	9.9	Malaysia	4.04	10.5	Malaysia	8.92	19.2	Malaysia	9.82	16.4
Malaysia	0.36	17.9	Malaysia	1.78	19.1	Fiji	1.86	7.3	Fiji	2.11	5.5	Iran	6.70	14.4	China	8.80	14.7
Korea	0.28	14.0	Korea	1.70	18.4	Iran	1.72	6.8	Thailand	2.09	5.4	Thailand	5.18	11.1	Thailand	6.76	11.3
Bhutan	0.23	11.5	Thailand	0.74	8.0	Thailand	1.63	6.4	Iran	1.73	4.5	China	4.55	9.8	Iran	6.31	10.5
Sri Lanka	0.23	11.4	Philippines	0.69	7.4	Philippines	0.77	3.0	Philippines	1.06	2.8	Fiji	3.68	7.9	Fiji	5.44	9.1
Thailand	0.21	10.7	Indonesia	0.54	5.8	Mongolia	0.77	3.0	Sri Lanka	1.01	2.6	Indonesia	3.18	6.8	Sri Lanka	4.06	6.8
Philippines	0.18	9.3	Bhutan	0.34	3.6	Indonesia	0.71	2.8	China	0.96	2.5	Sri Lanka	2.72	5.8	Indonesia	3.93	6.6
Pakistan	0.17	8.4	Sri Lanka	0.33	3.6	Bhutan	0.58	2.3	Indonesia	0.82	2.1	Mongolia	2.61	5.6	Mongolia	3.65	6.1
Bangladesh	0.14	7.0	China	0.31	3.3	Sri Lanka	0.55	2.2	Bhutan	0.74	1.9	Bhutan	2.34	5.0	Bhutan	3.49	5.8
Cambodia	0.12	6.0	Pakistan	0.29	3.1	Pakistan	0.41	1.6	Mongolia	0.60	1.6	Philippines	2.16	4.6	Philippines	3.01	5.0
India	0.11	5.8	Mongolia	0.29	3.1	India	0.39	1.5	Pakistan	0.57	1.5	India	1.36	2.9	Lao PDR	2.47	4.1
China	0.11	5.6	India	0.27	2.9	China	0.35	1.4	India	0.46	1.2	Vietnam	1.35	2.9	Vietnam	2.42	4.0
Myanmar	0.10	5.1	Bangladesh	0.22	2.4	Bangladesh	0.29	1.1	Vietnam	0.42	1.1	Lao PDR	1.19	2.6	India	1.94	3.2
Nepal	0.10	5.0	Myanmar	0.18	1.9	Nepal	0.25	1.0	Bangladesh	0.42	1.1	Pakistan	1.01	2.2	Bangladesh	1.52	2.5
Mongolia	0.09	4.7	Nepal	0.18	1.9	Lao PDR	0.22	0.9	Lao PDR	0.35	0.9	Cambodia	0.81	1.7	Pakistan	1.51	2.5
Indonesia	0.09	4.3	Cambodia	0.11	1.2	Cambodia	0.20	0.8	Cambodia	0.31	0.8	Bangladesh	0.78	1.7	Cambodia	1.44	2.4
Lao PDR	0.05	2.4	Lao PDR	0.10	1.1	Myanmar	0.14	0.6	Nepal	0.28	0.7	Myanmar	0.74	1.6	Nepal	1.04	1.7
Vietnam	0.03	1.4	Vietnam	0.02	0.2	Vietnam	0.10	0.4	Myanmar	0.17	0.4	Nepal	0.72	1.5	Myanmar	0.85	1.4
Bahrain	1.88	94.7	Bahrain	10.3	110.9	Bahrain	9.25	36.5	Bahrain	13.2	34.2	Bahrain	20.8	44.7	Bahrain	23.5	39.2
Kuwait	4.00	201.2	Kuwait	21.8	234.9	Kuwait	9.10	35.9	Kuwait	20.6	53.5	Kuwait	40.7	87.4	Kuwait	33.1	55.1
Oman	0.40	19.9	Oman	5.79	62.4	Oman	7.21	28.5	Oman	8.22	21.3	Oman	20.9	44.8	Oman	15.0	25.0
Qatar	4.97	250.0	Qatar	35.4	381.5	Qatar	17.8	70.4	Qatar	29.5	76.7	Qatar	75.3	161.6	Qatar	68.3	113.8
Saudi Arabia	0.92	46.4	Saudi Arabia	17.0	182.7	Saudi Arabia	7.26	28.7	Saudi Arabia	9.21	23.9	Saudi Arabia	19.4	41.7	Saudi Arabia	21.2	35.3
UAE	4.28	215.4	UAE	42.3	455.3	UAE	28.9	114.4	UAE	35.3	91.8	UAE	36.0	77.4	UAE	42.2	70.4
Brunei	1.72	86.7	Brunei	33.0	355.3	Brunei	15.4	61.0	Brunei	20.5	53.2	Brunei	35.5	76.1	Brunei	28.8	48.0
(region)			(region)			(region)			(region)			(region)			(region)		
APO20	0.31	15.7	APO20	1.22	13.1	APO20	2.56	10.1	APO20	3.49	9.1	APO20	4.93	10.6	APO20	5.25	8.8
Asia24	0.23	11.4	Asia24	0.84	9.1	Asia24	1.67	6.6	Asia24	2.51	6.5	Asia24	4.74	10.2	Asia24	6.41	10.7
Asia30	0.23	11.6	Asia30	0.94	10.1	Asia30	1.73	6.8	Asia30	2.59	6.7	Asia30	4.99	10.7	Asia30	6.68	11.1
East Asia	0.32	16.3	East Asia	1.31	14.1	East Asia	3.02	12.0	East Asia	4.87	12.6	East Asia	8.75	18.8	East Asia	12.2	20.3
South Asia	0.12	6.2	South Asia	0.27	2.9	South Asia	0.38	1.5	South Asia	0.47	1.2	South Asia	1.27	2.7	South Asia	1.87	3.1
ASEAN	0.12	6.3	ASEAN	0.56	6.0	ASEAN	0.84	3.3	ASEAN	1.21	3.1	ASEAN	3.36	7.2	ASEAN	4.33	7.2
ASEAN6	0.15	7.5	ASEAN6	0.74	7.9	ASEAN6	1.11	4.4	ASEAN6	1.54	4.0	ASEAN6	4.19	9.0	ASEAN6	5.23	8.7
CLMV	0.06	3.1	CLMV	0.08	0.9	CLMV	0.12	0.5	CLMV	0.33	0.9	CLMV	1.10	2.4	CLMV	1.84	3.1
GCC	1.36	68.2	GCC	18.6	200.4	GCC	9.35	37.0	GCC	13.0	33.9	GCC	26.2	56.2	GCC	27.3	45.4
(reference)			(reference)			(reference)			(reference)			(reference)			(reference)		
US	5.23	263.2	US	12.6	135.4	US	23.9	94.4	US	36.3	94.4	US	48.5	104.1	US	59.9	99.9
EU15	3.64	183.2	EU15	9.31	100.2	EU15	17.5	69.0	EU15	26.3	68.2	EU15	36.7	78.8	EU15	45.8	76.4
									EU28	22.6	58.8	EU28	33.4	71.7	EU28	41.3	68.9
Australia	3.57	179.8	Australia	11.8	126.9	Australia	19.0	74.9	Australia	21.5	55.8	Australia	59.0	126.7	Australia	57.6	96.0
Turkey	0.68	34.4	Turkey	2.06	22.2	Turkey	3.61	14.3	Turkey	4.03	10.5	Turkey	10.5	22.5	Turkey	10.5	17.6

Unit: Thousands of US dollars.
Sources: Official national accounts in each country, including author adjustments.
Note: See Appendix 2 for the adjustments made to harmonize GDP coverage across countries.

App.

Table 13 Per Capita GDP

——GDP at constant market prices per person, using 2011 PPP, reference year 2017

1970		(%)	1980		(%)	1990		(%)	2000		(%)	2010		(%)	2017		(%)
Japan	16.0	100.0	Singapore	22.7	100.0	Singapore	37.8	100.0	Singapore	56.9	100.0	Singapore	79.4	100.0	Singapore	95.5	100.0
Singapore	11.1	69.6	Japan	22.5	99.1	Japan	33.6	88.9	Hong Kong	37.4	65.7	Hong Kong	52.9	66.7	Hong Kong	61.7	64.6
Iran	10.6	66.6	Hong Kong	17.4	76.9	Hong Kong	29.7	78.5	Japan	37.2	65.4	ROC	43.3	54.6	ROC	50.6	53.0
Hong Kong	9.42	59.1	Iran	10.8	47.7	ROC	17.1	45.2	ROC	30.0	52.6	Japan	39.3	49.5	Japan	42.8	44.8
Fiji	4.66	29.2	ROC	8.87	39.1	Korea	12.8	33.8	Korea	22.8	40.1	Korea	33.4	42.1	Korea	39.6	41.4
Malaysia	4.39	27.5	Malaysia	7.64	33.7	Malaysia	10.7	28.2	Malaysia	16.7	29.4	Malaysia	22.8	28.8	Malaysia	29.1	30.5
ROC	3.98	24.9	Fiji	6.10	26.9	Iran	9.89	26.1	Iran	12.6	22.2	Iran	20.5	25.8	Iran	21.9	23.0
Philippines	3.24	20.3	Korea	5.59	24.7	Thailand	7.52	19.9	Thailand	10.5	18.5	Thailand	15.2	19.1	Thailand	18.4	19.3
Mongolia	2.93	18.4	Philippines	4.42	19.5	Fiji	6.56	17.3	Fiji	7.62	13.4	China	10.5	13.2	China	16.8	17.6
Thailand	2.93	18.4	Thailand	4.29	18.9	Mongolia	5.39	14.3	Indonesia	6.56	11.5	Indonesia	9.48	11.9	Mongolia	12.8	13.4
Korea	2.74	17.2	Mongolia	3.99	17.6	Indonesia	4.99	13.2	Sri Lanka	5.92	10.4	Sri Lanka	9.10	11.5	Sri Lanka	12.7	13.3
Sri Lanka	2.36	14.8	Indonesia	3.31	14.6	Philippines	4.26	11.3	Mongolia	5.11	9.0	Mongolia	8.34	10.5	Indonesia	12.6	13.2
Indonesia	1.88	11.8	Sri Lanka	3.03	13.4	Sri Lanka	3.98	10.5	Philippines	4.74	8.3	Fiji	8.14	10.3	Bhutan	10.5	11.0
Cambodia	1.72	10.8	Pakistan	1.81	8.0	Pakistan	2.80	7.4	China	4.06	7.1	Bhutan	7.59	9.6	Fiji	9.63	10.1
Pakistan	1.54	9.7	Myanmar	1.61	7.1	Bhutan	2.64	7.0	Pakistan	3.84	6.7	Philippines	6.25	7.9	Philippines	8.42	8.8
India	1.36	8.5	India	1.45	6.4	India	1.99	5.3	Bhutan	3.76	6.6	Vietnam	4.98	6.3	India	7.10	7.4
Myanmar	1.33	8.3	Lao PDR	1.39	6.1	Lao PDR	1.92	5.1	India	2.80	4.9	India	4.90	6.2	Lao PDR	7.08	7.4
Bhutan	1.26	7.9	Bhutan	1.33	5.9	China	1.67	4.4	Lao PDR	2.77	4.9	Lao PDR	4.71	5.9	Vietnam	7.03	7.4
Lao PDR	1.24	7.8	Nepal	1.22	5.4	Nepal	1.55	4.1	Vietnam	2.74	4.8	Pakistan	4.63	5.8	Pakistan	5.45	5.7
Bangladesh	1.24	7.8	Bangladesh	1.12	5.0	Myanmar	1.52	4.0	Myanmar	2.27	4.0	Myanmar	3.94	5.0	Myanmar	4.89	5.1
Nepal	1.17	7.4	Vietnam	1.08	4.7	Vietnam	1.49	3.9	Nepal	2.00	3.5	Cambodia	2.92	3.7	Cambodia	4.24	4.4
Vietnam	1.04	6.5	Cambodia	0.84	3.7	Bangladesh	1.31	3.5	Bangladesh	1.92	3.4	Bangladesh	2.78	3.5	Bangladesh	3.95	4.1
China	0.52	3.3	China	0.80	3.5	Cambodia	1.07	2.8	Cambodia	1.59	2.8	Nepal	2.51	3.2	Nepal	3.23	3.4
Bahrain	39.0	244.6	Bahrain	49.6	218.4	Bahrain	39.6	104.8	Bahrain	49.2	86.5	Bahrain	44.9	56.5	Bahrain	47.3	49.5
Kuwait	208.8	1,309.1	Kuwait	91.8	404.6	Kuwait	45.3	119.9	Kuwait	89.8	157.7	Kuwait	87.2	109.8	Kuwait	80.7	84.5
Oman	16.0	100.5	Oman	28.1	123.7	Oman	41.9	110.8	Oman	45.5	79.9	Oman	53.5	67.4	Oman	40.2	42.1
Qatar	173.7	1,089.1	Qatar	147.6	650.4	Qatar	91.0	240.6	Qatar	119.3	209.6	Qatar	147.3	185.4	Qatar	137.9	144.4
Saudi Arabia	52.0	325.7	Saudi Arabia	82.3	362.6	Saudi Arabia	46.2	122.2	Saudi Arabia	47.6	83.6	Saudi Arabia	50.4	63.4	Saudi Arabia	54.5	57.1
UAE	44.8	281.1	UAE	205.4	905.3	UAE	123.5	326.7	UAE	120.0	210.8	UAE	64.6	81.3	UAE	76.3	79.9
Brunei	101.0	633.1	Brunei	169.3	746.1	Brunei	95.4	252.2	Brunei	92.6	162.7	Brunei	89.1	112.2	Brunei	80.5	84.3
(region)			(region)			(region)			(region)			(region)			(region)		
APO20	3.23	20.3	APO20	4.16	18.3	APO20	5.68	15.0	APO20	7.00	12.3	APO20	9.30	11.7	APO20	11.5	12.0
Asia24	2.09	13.1	Asia24	2.79	12.3	Asia24	4.08	10.8	Asia24	5.85	10.3	Asia24	9.64	12.1	Asia24	13.2	13.8
Asia30	2.33	14.6	Asia30	3.26	14.4	Asia30	4.45	11.8	Asia30	6.30	11.1	Asia30	10.2	12.9	Asia30	13.9	14.5
East Asia	2.32	14.5	East Asia	3.33	14.7	East Asia	5.34	14.1	East Asia	8.07	14.2	East Asia	14.3	18.0	East Asia	20.3	21.3
South Asia	1.38	8.6	South Asia	1.47	6.5	South Asia	2.03	5.4	South Asia	2.86	5.0	South Asia	4.69	5.9	South Asia	6.63	6.9
ASEAN	2.22	13.9	ASEAN	3.42	15.1	ASEAN	4.76	12.6	ASEAN	6.55	11.5	ASEAN	9.57	12.1	ASEAN	12.4	13.0
ASEAN6	2.61	16.4	ASEAN6	4.24	18.7	ASEAN6	6.00	15.9	ASEAN6	8.10	14.2	ASEAN6	11.4	14.4	ASEAN6	14.7	15.4
CLMV	1.20	7.5	CLMV	1.25	5.5	CLMV	1.48	3.9	CLMV	2.49	4.4	CLMV	4.45	5.6	CLMV	6.10	6.4
GCC	64.4	403.9	GCC	88.5	390.1	GCC	52.5	138.9	GCC	59.0	103.7	GCC	59.2	74.5	GCC	62.4	65.3
(reference)			(reference)			(reference)			(reference)			(reference)			(reference)		
US	26.1	163.4	US	32.1	141.5	US	40.5	107.1	US	50.2	88.2	US	54.4	68.6	US	59.9	62.7
EU15	19.3	121.2	EU15	25.3	111.6	EU15	31.6	83.5	EU15	38.4	67.5	EU15	41.4	52.1	EU15	44.1	46.2
									EU28	33.8	59.4	EU28	37.7	47.4	EU28	41.0	42.9
Australia	24.1	150.9	Australia	27.6	121.8	Australia	32.0	84.6	Australia	40.7	71.5	Australia	47.7	60.1	Australia	51.7	54.2
Turkey	7.65	47.9	Turkey	9.06	39.9	Turkey	11.9	31.6	Turkey	14.2	25.0	Turkey	19.4	24.4	Turkey	27.6	28.9

Unit: Thousands of US dollars (as of 2017)
Sources: Official national accounts in each country, including author adjustments.
Note: See Appendix 2 for the adjustments made to harmonize GDP coverage across countries.

Table 14 Final Demand Shares in GDP

——Share of final demands with respect to GDP at current market prices

	1970				1990				2000				2010				2017			
	Household consumption	Government consumption	Investment	Net exports	Household consumption	Government consumption	Investment	Net exports	Household consumption	Government consumption	Investment	Net exports	Household consumption	Government consumption	Investment	Net exports	Household consumption	Government consumption	Investment	Net exports
Bahrain	67.8	14.8	21.3	−3.9	62.1	23.4	12.8	1.8	48.9	17.3	10.1	23.8	41.2	12.9	27.3	18.6	42.1	16.7	33.1	8.1
Bangladesh	89.0	1.3	9.8	−0.1	84.7	4.6	17.5	−6.8	75.9	5.0	23.8	−4.6	74.4	5.1	26.2	−5.8	68.7	6.0	30.5	−5.2
Bhutan	68.5	33.6	24.6	−26.7	49.6	32.6	21.1	−3.3	51.3	21.9	45.7	−18.9	53.0	20.0	55.3	−28.3	54.7	16.4	49.3	−20.4
Brunei					40.3	21.8	18.4	19.5	30.4	25.5	18.9	25.3	14.7	22.1	23.7	39.4	24.7	26.5	34.8	14.0
Cambodia	69.0	22.5	10.2	−1.8	95.8	5.7	6.7	−8.3	88.9	5.2	17.8	−11.8	81.2	6.3	17.9	−5.4	74.8	5.1	23.6	−3.4
China	55.5	11.0	33.3	0.1	49.0	13.6	34.7	2.7	46.6	16.6	34.4	2.4	35.9	12.8	47.6	3.6	40.2	14.3	43.6	1.9
ROC	55.9	17.7	26.4	0.0	52.3	18.1	25.5	4.2	55.1	15.7	27.2	2.0	53.1	14.9	25.0	7.1	52.9	14.1	20.2	12.7
Fiji	66.8	14.0	22.4	−3.1	73.4	17.1	14.2	−4.7	66.2	17.2	21.7	−5.1	72.1	14.9	19.3	−6.3	63.8	19.5	21.9	−5.3
Hong Kong	66.2	5.7	20.4	7.7	57.5	6.8	27.2	8.5	58.6	9.4	27.6	4.4	61.4	8.9	23.9	5.9	67.1	9.8	22.0	1.1
India	74.0	9.4	16.7	−0.1	62.4	11.9	27.1	−1.4	64.1	12.8	23.9	−0.9	57.5	11.7	35.3	−4.5	61.8	11.1	30.3	−3.2
Indonesia	73.0	8.2	21.1	−2.2	61.8	7.9	27.7	2.5	61.2	6.4	22.1	10.3	56.2	9.0	32.9	1.9	56.2	9.1	33.5	1.2
Iran	54.5	17.6	28.5	−0.6	56.1	11.8	40.3	−8.2	51.3	15.2	25.2	8.2	41.4	19.5	32.6	6.6	58.5	15.4	17.7	8.4
Japan	47.2	11.1	40.6	1.1	50.9	13.6	34.7	0.8	54.4	16.9	27.3	1.4	57.8	19.5	21.3	1.5	55.5	19.7	23.9	0.9
Korea	73.5	9.9	26.3	−9.7	49.7	11.3	39.6	−0.6	53.6	11.3	32.9	2.1	50.3	14.5	32.0	3.2	48.2	15.3	31.1	5.4
Kuwait	39.8	13.2	12.3	34.7	59.6	37.4	15.7	−12.7	42.2	21.1	10.9	25.9	30.0	16.7	17.8	35.4	47.7	24.4	25.6	2.3
Lao PDR	82.7	8.0	15.0	−5.8	79.3	7.2	26.6	−13.1	79.7	6.7	27.7	−14.0	81.1	11.4	20.9	−13.4	60.2	12.6	34.2	−7.0
Malaysia	57.4	18.2	20.2	4.2	52.6	13.5	31.9	2.0	43.8	10.0	27.1	19.0	48.1	12.6	23.4	15.9	55.3	12.2	25.6	6.9
Mongolia	66.3	24.1	32.7	−23.1	66.9	20.4	31.5	−18.8	72.3	14.4	24.4	−11.1	55.1	12.7	42.2	−10.0	50.1	12.8	34.8	2.4
Myanmar	90.7	8.1	10.1	−8.9	91.0	7.6	8.2	−6.7	84.7	3.6	11.3	0.4	42.4	4.6	17.1	35.8	42.5	8.4	31.3	17.8
Nepal	81.3	6.1	7.5	5.1	83.8	7.6	21.0	−12.4	80.2	8.0	22.4	−10.5	76.4	9.4	37.8	−23.7	73.1	11.4	51.4	−35.9
Oman	19.8	12.7	13.8	53.7	41.3	27.0	17.6	14.1	35.0	21.2	15.6	28.2	33.4	18.4	23.4	24.8	44.5	25.4	27.4	2.7
Pakistan	76.8	10.1	15.8	−2.7	71.8	13.0	19.9	−4.7	75.5	8.1	17.6	−1.1	79.7	10.3	15.8	−5.8	82.0	11.3	16.1	−9.3
Philippines	66.2	10.1	24.6	−0.8	70.1	10.6	26.3	−7.0	72.2	11.4	18.4	−2.0	71.6	9.7	20.5	−1.8	73.5	11.3	25.1	−9.9
Qatar	21.7	20.3	23.4	34.6	28.1	32.2	18.7	20.9	15.6	19.3	21.1	44.0	16.8	13.7	31.8	37.7	25.3	16.5	44.8	13.4
Saudi Arabia	32.6	15.8	22.4	29.2	46.6	28.8	15.7	8.9	36.5	25.6	19.4	18.5	32.4	20.0	31.2	16.4	41.0	24.1	29.4	5.4
Singapore	69.0	11.8	38.2	−19.0	44.8	9.5	35.6	10.1	42.1	10.7	34.9	12.3	35.5	10.2	28.2	26.1	36.5	10.6	28.5	24.4
Sri Lanka	79.4	6.3	16.9	−2.5	81.1	7.0	18.6	−6.7	73.1	7.6	28.2	−8.9	68.9	8.5	29.8	−7.3	70.6	8.5	28.1	−7.2
Thailand	67.0	11.9	25.3	−4.2	55.8	10.0	41.7	−7.4	55.6	13.5	22.5	8.4	53.0	15.8	25.5	5.7	46.7	16.3	23.3	13.7
UAE	38.5	6.0	21.7	33.8	56.9	9.5	17.4	16.2	58.0	9.3	20.9	11.9	49.1	9.8	27.4	13.8	36.0	11.9	25.2	27.0
Vietnam	69.4	33.5	21.8	−24.7	87.2	7.5	14.5	−9.1	67.7	6.1	28.6	−2.3	65.9	5.9	36.3	−8.1	63.3	6.4	27.5	2.8
(region)																				
APO20	59.5	11.2	29.7	−0.5	56.7	12.1	31.8	−0.6	58.5	13.1	25.7	2.7	56.7	13.8	28.6	0.9	58.8	13.1	27.1	1.0
Asia24	59.4	11.2	30.0	−0.5	55.7	12.3	32.2	−0.1	55.5	14.0	27.9	2.7	48.6	13.4	35.8	2.2	50.6	13.6	34.3	1.5
Asia30	56.7	11.6	28.8	3.0	55.1	13.5	30.7	0.7	54.3	14.5	27.1	4.0	47.7	13.6	35.3	3.4	49.9	14.0	34.0	2.0
East Asia	50.3	11.1	38.0	0.6	50.5	13.5	34.4	1.5	51.1	16.0	30.9	2.0	43.2	14.5	39.0	3.3	44.1	15.2	38.4	2.4
South Asia	75.8	8.6	16.0	−0.4	65.9	11.4	25.2	−2.5	66.9	11.5	23.2	−1.5	61.2	11.1	32.6	−4.9	64.4	10.8	29.1	−4.3
ASEAN	70.0	12.0	22.4	−4.5	62.0	9.3	30.0	−1.2	59.0	9.1	23.3	8.6	55.1	10.5	28.4	6.1	55.3	10.8	29.1	4.8
ASEAN6	68.6	10.5	23.4	−2.4	59.6	9.4	31.5	−0.6	57.2	9.6	23.4	9.9	54.3	11.1	28.3	6.3	54.9	11.3	29.1	4.7
CLMV	79.0	21.7	16.6	−17.3	88.2	7.5	12.8	−8.5	74.4	5.3	22.8	−2.5	60.8	5.8	29.1	4.2	58.6	7.1	28.5	5.7
GCC	34.8	14.9	19.2	31.2	48.9	25.8	16.2	9.1	40.8	21.1	18.5	19.6	34.3	16.8	28.7	20.3	39.2	20.7	29.7	10.4
(reference)																				
US	60.3	18.0	21.4	0.4	63.9	15.9	21.5	−1.3	66.0	14.0	23.7	−3.7	67.9	16.7	18.7	−3.4	68.4	14.0	20.6	−3.0
EU15	56.6	15.9	27.9	−0.5	56.8	19.4	24.5	−0.7	57.9	19.0	22.7	0.4	57.3	21.5	20.2	1.0	55.8	20.2	20.4	3.7
EU28									58.1	19.0	22.5	0.3	57.2	21.5	20.4	1.0	55.6	20.1	20.6	3.7
Australia	54.2	13.9	32.1	−0.3	57.7	18.2	24.3	−0.1	58.7	17.8	23.5	0.1	54.7	17.8	26.5	1.0	56.6	18.7	24.3	0.4
Turkey	72.8	7.9	19.7	−0.4	68.7	9.3	23.2	−1.2	67.3	12.0	23.8	−3.1	63.1	15.0	27.0	−5.0	59.0	14.5	31.0	−4.5

Unit: Percentage.
Sources: Official national accounts in each country, including author adjustments.
Note: Final demand shares in country groups are computed by using the PPP for GDP. Household consumption includes consumption of NPISHs. Investment includes GFCF plus changes in inventories.

Table 15 Per-Worker Labor Productivity Growth

——Average annual growth rate of GDP at constant basic prices per worker, using 2011 PPP

1990–1995		1995–2000		2000–2005		2005–2010		2010–2015		2015–2017		2000–2017	
Kuwait	13.0	China	7.1	China	8.6	China	10.3	Mongolia	7.6	India	6.7	China	8.5
China	10.6	Oman	6.4	Vietnam	5.6	India	7.0	China	7.2	China	6.5	India	5.8
Malaysia	6.6	Qatar	5.6	Cambodia	4.7	Bhutan	6.0	Sri Lanka	6.6	Bangladesh	5.8	Lao PDR	5.0
Thailand	6.5	Vietnam	5.4	India	4.7	Lao PDR	5.3	Lao PDR	5.8	Vietnam	5.6	Vietnam	4.7
Indonesia	6.4	ROC	4.8	Myanmar	4.1	Iran	5.2	India	5.3	Lao PDR	5.1	Mongolia	4.5
Vietnam	5.8	Korea	4.6	Lao PDR	4.0	Mongolia	5.1	Cambodia	4.9	Iran	4.8	Cambodia	4.3
Korea	5.7	India	4.2	Thailand	3.8	Sri Lanka	5.0	Bangladesh	4.4	Philippines	4.5	Sri Lanka	4.3
ROC	5.5	Lao PDR	3.7	Indonesia	3.7	Myanmar	4.8	Vietnam	4.3	Cambodia	4.5	Bangladesh	3.9
Bhutan	5.2	Singapore	3.5	Malaysia	3.6	Vietnam	3.8	Philippines	4.3	Thailand	4.4	Myanmar	3.9
Pakistan	4.2	Cambodia	3.3	Iran	3.3	Bangladesh	3.4	Indonesia	4.2	Nepal	4.2	Bhutan	3.6
Singapore	4.2	Bangladesh	3.3	Korea	3.3	Nepal	3.4	Myanmar	3.7	Bhutan	3.7	Thailand	3.3
Sri Lanka	4.1	Myanmar	2.8	Hong Kong	3.3	Cambodia	3.2	Bhutan	3.6	Malaysia	3.5	Indonesia	3.3
Cambodia	4.0	Nepal	2.8	Bangladesh	3.2	Korea	3.2	Thailand	3.4	UAE	2.9	Philippines	2.9
Hong Kong	3.8	Philippines	2.6	ROC	3.2	ROC	3.2	UAE	3.1	Pakistan	2.9	Iran	2.7
India	3.1	Mongolia	2.5	Singapore	3.2	Hong Kong	3.1	Fiji	2.5	Singapore	2.8	Hong Kong	2.6
Bahrain	2.9	Pakistan	2.2	Mongolia	2.7	Indonesia	2.8	Bahrain	1.9	Hong Kong	2.5	Korea	2.5
Myanmar	2.9	Sri Lanka	1.6	Sri Lanka	2.5	Philippines	2.6	Pakistan	1.9	Korea	1.8	Malaysia	2.4
Lao PDR	2.5	Saudi Arabia	1.6	Pakistan	2.2	Thailand	2.5	Malaysia	1.7	Myanmar	1.6	ROC	2.4
Nepal	2.4	Bhutan	1.5	Nepal	1.7	Malaysia	1.5	Singapore	1.5	ROC	1.6	Nepal	2.4
Bangladesh	2.3	Fiji	1.5	Japan	1.4	Singapore	0.6	Nepal	1.3	Indonesia	1.6	Singapore	1.9
Iran	1.4	Japan	1.3	Bhutan	1.2	Fiji	0.5	Hong Kong	1.3	Sri Lanka	1.2	Pakistan	1.4
Saudi Arabia	1.0	Malaysia	1.1	Philippines	1.2	Japan	0.2	ROC	1.3	Fiji	0.7	Fiji	1.0
Japan	0.7	Iran	0.9	Oman	1.1	Pakistan	−0.4	Korea	1.3	Japan	0.1	Japan	0.7
Qatar	0.3	UAE	0.7	Kuwait	0.8	Brunei	−1.0	Japan	0.7	Brunei	0.1	UAE	−0.5
Philippines	−0.1	Bahrain	0.6	Fiji	0.1	Saudi Arabia	−1.6	Saudi Arabia	−0.2	Qatar	−0.4	Brunei	−0.9
Fiji	−0.2	Hong Kong	0.4	Saudi Arabia	−0.4	Bahrain	−2.6	Kuwait	−0.4	Mongolia	−0.4	Saudi Arabia	−1.0
Brunei	−0.6	Thailand	0.3	Brunei	−0.6	Qatar	−2.9	Iran	−1.3	Bahrain	−1.9	Bahrain	−1.8
Mongolia	−1.4	Kuwait	0.2	Qatar	−0.8	UAE	−4.1	Brunei	−1.6	Kuwait	−2.3	Qatar	−2.0
UAE	−3.7	Indonesia	−1.6	UAE	−1.8	Kuwait	−6.7	Qatar	−2.8	Oman	−2.4	Kuwait	−2.1
Oman	−9.3	Brunei	−2.0	Bahrain	−4.8	Oman	−8.5	Oman	−4.9	Saudi Arabia	−3.0	Oman	−3.9
(region)		(region)		(region)		(region)		(region)		(region)		(region)	
APO20	2.6	APO20	1.6	APO20	2.5	APO20	3.0	APO20	2.8	APO20	3.7	APO20	2.9
Asia24	4.3	Asia24	3.0	Asia24	4.4	Asia24	5.6	Asia24	4.6	Asia24	4.9	Asia24	4.9
Asia30	4.1	Asia30	2.9	Asia30	4.3	Asia30	5.4	Asia30	4.5	Asia30	4.6	Asia30	4.7
East Asia	4.5	East Asia	3.6	East Asia	4.9	East Asia	6.5	East Asia	5.2	East Asia	5.0	East Asia	5.5
South Asia	3.2	South Asia	3.9	South Asia	4.2	South Asia	5.9	South Asia	4.9	South Asia	6.1	South Asia	5.1
ASEAN	5.4	ASEAN	0.4	ASEAN	3.3	ASEAN	2.8	ASEAN	3.7	ASEAN	3.0	ASEAN	3.2
ASEAN6	5.6	ASEAN6	0.1	ASEAN6	3.3	ASEAN6	2.6	ASEAN6	3.7	ASEAN6	2.5	ASEAN6	3.1
CLMV	4.6	CLMV	4.4	CLMV	5.0	CLMV	4.1	CLMV	4.2	CLMV	4.4	CLMV	4.4
GCC	0.9	GCC	1.9	GCC	−0.5	GCC	−3.0	GCC	−0.1	GCC	−1.6	GCC	−1.3
(reference)		(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
US	1.5	US	2.4	US	1.8	US	1.3	US	0.8	US	0.4	US	1.2
EU15	1.9	EU15	1.3	EU15	0.9	EU15	0.3	EU15	0.6	EU15	0.6	EU15	0.6
		EU28	1.8	EU28	1.4	EU28	0.5	EU28	0.8	EU28	0.8	EU28	0.9
Australia	2.3	Australia	2.1	Australia	1.3	Australia	0.6	Australia	1.5	Australia	0.5	Australia	1.0
Turkey	1.3	Turkey	3.4	Turkey	6.1	Turkey	0.8	Turkey	3.6	Turkey	2.3	Turkey	3.4

Unit: Percentage.
Source: APO Productivity Database 2019.

Table 16 Per-Hour Labor Productivity Level

——GDP at constant basic prices per hour, using 2011 PPP, reference year 2017

1970		(%)	1980		(%)	1990		(%)	2000		(%)	2010		(%)	2017		(%)
Iran	15.6	100.0	Singapore	22.1	100.0	Singapore	30.9	100.0	Singapore	43.0	100.0	Singapore	53.8	100.0	Singapore	63.2	100.0
Singapore	15.2	97.5	Japan	21.0	95.2	Japan	30.8	99.8	Japan	37.7	87.6	Hong Kong	44.9	83.6	Hong Kong	54.0	85.5
Japan	13.6	87.2	Iran	16.5	74.6	Hong Kong	26.7	86.3	Hong Kong	32.2	75.0	ROC	43.9	81.7	ROC	47.7	75.5
Hong Kong	9.4	60.5	Hong Kong	15.4	69.7	ROC	17.6	57.0	ROC	30.2	70.3	Japan	42.7	79.4	Japan	45.0	71.3
Fiji	8.3	53.0	ROC	9.7	44.0	Iran	16.7	54.1	Iran	19.0	44.3	Iran	30.8	57.3	Iran	32.2	51.0
Malaysia	5.7	36.8	Fiji	9.5	43.1	Malaysia	12.0	39.0	Malaysia	17.6	41.0	Korea	27.1	50.4	Korea	31.8	50.4
ROC	5.0	32.1	Malaysia	9.2	41.8	Korea	9.8	31.8	Korea	17.5	40.7	Malaysia	23.0	42.8	Malaysia	27.3	43.3
Philippines	4.7	30.2	Philippines	5.6	25.5	Fiji	9.6	31.2	Fiji	10.0	23.3	Sri Lanka	11.7	21.8	Sri Lanka	16.3	25.7
Mongolia	3.7	23.8	Mongolia	5.6	25.4	Mongolia	6.6	21.4	Sri Lanka	7.5	17.5	Fiji	10.6	19.7	Mongolia	15.0	23.7
Sri Lanka	3.5	22.5	Korea	5.1	22.9	Indonesia	6.1	19.6	Indonesia	7.5	17.3	Mongolia	10.3	19.2	Thailand	14.5	22.9
Indonesia	3.1	19.8	Indonesia	4.6	20.9	Sri Lanka	5.7	18.4	Mongolia	7.0	16.3	Thailand	10.0	18.6	Indonesia	12.9	20.3
Korea	3.0	19.3	Sri Lanka	4.5	20.2	Philippines	5.0	16.3	Thailand	6.8	15.9	Indonesia	9.9	18.4	China	12.1	19.1
Thailand	2.4	15.5	Thailand	3.0	13.4	Thailand	4.7	15.3	Pakistan	6.2	14.4	China	7.4	13.7	Fiji	11.5	18.2
Pakistan	2.2	14.3	Pakistan	2.7	12.2	Pakistan	4.5	14.4	Philippines	5.8	13.5	Philippines	7.2	13.3	Philippines	9.5	15.1
Myanmar	1.6	10.5	Myanmar	1.9	8.7	Bhutan	2.6	8.3	Bhutan	3.6	8.3	Pakistan	7.0	13.0	Pakistan	8.8	14.0
Cambodia	1.6	10.4	India	1.5	7.0	India	2.2	7.0	India	3.1	7.3	India	5.6	10.3	India	8.3	13.1
Nepal	1.5	9.6	Nepal	1.5	6.7	Nepal	2.0	6.5	China	3.0	6.9	Bhutan	5.3	9.9	Bhutan	7.8	12.3
India	1.5	9.4	Lao PDR	1.3	6.1	Lao PDR	1.9	6.0	Nepal	2.6	6.0	Lao PDR	4.0	7.4	Lao PDR	5.8	9.2
Bangladesh	1.3	8.3	Bangladesh	1.2	5.5	Myanmar	1.8	5.9	Lao PDR	2.5	5.9	Myanmar	3.8	7.0	Vietnam	5.2	8.2
Bhutan	1.1	7.3	Bhutan	1.2	5.4	Bangladesh	1.5	4.8	Myanmar	2.4	5.6	Vietnam	3.5	6.4	Myanmar	4.7	7.4
Lao PDR	1.0	6.5	Vietnam	0.9	4.1	China	1.3	4.2	Vietnam	2.1	4.8	Nepal	3.3	6.2	Nepal	3.9	6.1
Vietnam	0.8	5.4	Cambodia	0.7	3.4	Vietnam	1.2	3.9	Bangladesh	1.9	4.3	Bangladesh	2.6	4.8	Bangladesh	3.8	6.1
China	0.5	3.4	China	0.7	3.3	Cambodia	1.0	3.3	Cambodia	1.4	3.2	Cambodia	2.0	3.7	Cambodia	2.7	4.2
Brunei	146.9	942.9	Brunei	204.0	923.4	Brunei	102.4	331.3	Brunei	90.1	209.6	Brunei	83.4	155.0	Brunei	78.0	123.5
(region)			(region)			(region)			(region)			(region)			(region)		
APO20	3.7	23.8	APO20	4.7	21.2	APO20	6.4	20.6	APO20	7.9	18.3	APO20	10.4	19.3	APO20	13.1	20.7
Asia24	2.4	15.3	Asia24	3.0	13.6	Asia24	4.1	13.3	Asia24	5.8	13.4	Asia24	9.4	17.4	Asia24	13.2	20.8
East Asia	2.5	16.4	East Asia	3.4	15.2	East Asia	4.7	15.1	East Asia	6.7	15.7	East Asia	11.6	21.6	East Asia	16.7	26.5
South Asia	1.6	10.2	South Asia	1.7	7.7	South Asia	2.4	7.8	South Asia	3.4	8.0	South Asia	5.6	10.5	South Asia	8.2	13.0
ASEAN	2.7	17.6	ASEAN	3.8	17.4	ASEAN	4.9	15.9	ASEAN	6.5	15.1	ASEAN	8.9	16.5	ASEAN	11.7	18.6
ASEAN6	3.6	23.2	ASEAN6	5.0	22.6	ASEAN6	6.3	20.5	ASEAN6	8.4	19.5	ASEAN6	11.2	20.9	ASEAN6	14.7	23.3
CLMV	1.2	7.5	CLMV	1.2	5.7	CLMV	1.4	4.7	CLMV	2.2	5.2	CLMV	3.6	6.6	CLMV	5.0	7.9
(reference)			(reference)			(reference)			(reference)			(reference)			(reference)		
US	33.0	212.0	US	37.8	171.0	US	44.5	144.1	US	55.0	127.9	US	66.4	123.5	US	69.4	109.9
									EU15	46.7	108.6	EU15	51.2	95.2	EU15	55.6	88.0
			Australia	33.1	149.9	Australia	36.4	117.9	Australia	45.8	106.5	Australia	52.6	97.7	Australia	58.1	92.0
						Turkey	16.7	54.1	Turkey	20.3	47.3	Turkey	29.7	55.3	Turkey	38.1	60.4

Unit: US dollar (as of 2017).
Source: APO Productivity Database 2019.

Table 17 Per-Hour Labor Productivity Growth

——Average annual growth rate of GDP at constant basic prices per hour, using 2011 PPP

1990–1995		1995–2000		2000–2005		2005–2010		2010–2015		2015–2017		2000–2017	
China	10.3	China	6.3	China	7.7	China	10.5	Mongolia	7.6	Vietnam	7.0	China	8.2
Malaysia	6.5	Korea	5.3	Vietnam	7.3	India	6.9	China	7.3	Thailand	6.6	India	5.7
Indonesia	6.3	ROC	5.2	Thailand	5.2	Iran	6.2	Sri Lanka	6.0	India	6.6	Vietnam	5.4
Thailand	6.2	Vietnam	4.9	India	4.6	Bhutan	5.2	Bhutan	6.0	China	6.5	Lao PDR	4.8
Korea	6.2	India	4.1	Korea	4.3	Sri Lanka	5.1	Bangladesh	5.7	Bangladesh	5.8	Bhutan	4.6
Vietnam	5.9	Lao PDR	3.7	Myanmar	4.1	Mongolia	4.9	Lao PDR	5.6	Lao PDR	5.2	Sri Lanka	4.5
ROC	5.6	Bangladesh	3.1	Cambodia	4.1	Lao PDR	4.9	Vietnam	5.3	Iran	5.1	Mongolia	4.5
Bhutan	5.2	Singapore	3.1	Lao PDR	4.0	Myanmar	4.8	India	5.3	Pakistan	4.4	Thailand	4.4
Sri Lanka	4.5	Nepal	2.8	ROC	3.7	Korea	4.5	Thailand	4.8	Nepal	4.1	Bangladesh	4.3
Pakistan	4.2	Myanmar	2.8	Sri Lanka	3.7	ROC	3.8	Indonesia	4.6	Cambodia	4.1	Myanmar	3.9
Hong Kong	4.0	Mongolia	2.6	Singapore	3.7	Hong Kong	3.5	Cambodia	4.4	Philippines	4.1	Cambodia	3.9
Cambodia	4.0	Pakistan	2.4	Iran	3.4	Bangladesh	3.5	Philippines	4.1	Korea	4.0	Korea	3.5
Singapore	3.6	Cambodia	2.4	Indonesia	3.3	Nepal	3.3	Myanmar	3.6	Bhutan	3.7	Indonesia	3.2
India	3.2	Philippines	2.3	Hong Kong	3.1	Cambodia	3.1	Pakistan	2.9	Singapore	3.6	Iran	3.1
Myanmar	2.8	Japan	2.1	Malaysia	3.1	Vietnam	2.8	Hong Kong	2.3	Hong Kong	3.4	Hong Kong	3.0
Lao PDR	2.5	Bhutan	1.4	Bangladesh	3.0	Philippines	2.4	Malaysia	2.3	ROC	3.0	Philippines	2.9
Nepal	2.2	Fiji	1.2	Bhutan	2.8	Thailand	2.4	Fiji	1.8	Malaysia	2.9	ROC	2.7
Japan	1.9	Thailand	1.2	Mongolia	2.8	Indonesia	2.4	Singapore	1.8	Indonesia	1.7	Malaysia	2.6
Iran	1.6	Malaysia	1.1	Pakistan	2.5	Malaysia	2.3	Korea	1.6	Myanmar	1.6	Nepal	2.4
Bangladesh	1.3	Sri Lanka	1.1	Nepal	1.8	Fiji	1.4	Nepal	1.3	Sri Lanka	1.2	Singapore	2.3
Philippines	0.5	Iran	1.0	Philippines	1.8	Singapore	0.8	Japan	1.0	Brunei	0.5	Pakistan	2.1
Fiji	–0.4	Hong Kong	–0.2	Japan	1.8	Japan	0.8	ROC	0.4	Japan	0.1	Japan	1.0
Brunei	–0.6	Brunei	–2.0	Fiji	–0.3	Pakistan	–0.1	Iran	–1.1	Fiji	–0.4	Fiji	0.8
Mongolia	–1.5	Indonesia	–2.1	Brunei	–0.6	Brunei	–1.0	Brunei	–1.5	Mongolia	–0.4	Brunei	–0.9
(region)		(region)		(region)		(region)		(region)		(region)		(region)	
APO20	2.6	APO20	1.6	APO20	2.6	APO20	2.9	APO20	3.1	APO20	4.0	APO20	3.0
Asia24	4.2	Asia24	2.6	Asia24	4.0	Asia24	5.7	Asia24	4.8	Asia24	5.0	Asia24	4.9
East Asia	4.4	East Asia	2.9	East Asia	4.2	East Asia	6.7	East Asia	5.3	East Asia	5.1	East Asia	5.3
South Asia	3.1	South Asia	3.8	South Asia	4.2	South Asia	5.8	South Asia	5.0	South Asia	6.2	South Asia	5.1
ASEAN	5.3	ASEAN	0.3	ASEAN	3.7	ASEAN	2.5	ASEAN	4.2	ASEAN	3.5	ASEAN	3.5
ASEAN6	5.5	ASEAN6	0.1	ASEAN6	3.5	ASEAN6	2.4	ASEAN6	4.2	ASEAN6	2.9	ASEAN6	3.3
CLMV	4.6	CLMV	4.0	CLMV	6.0	CLMV	3.5	CLMV	4.7	CLMV	5.2	CLMV	4.8
(reference)		(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
US	1.7	US	2.5	US	2.3	US	1.5	US	0.7	US	0.5	US	1.4
				EU15	1.2	EU15	0.6	EU15	0.9	EU15	1.9	EU15	1.0
Australia	2.2	Australia	2.4	Australia	1.8	Australia	0.9	Australia	1.7	Australia	0.8	Australia	1.4
Turkey	1.2	Turkey	2.7	Turkey	6.1	Turkey	1.4	Turkey	4.1	Turkey	2.3	Turkey	3.7

Unit: Percentage.
Source: APO Productivity Database 2019.

Table 18 TFP Growth

——Average annual growth rate of total factor productivity

1990–1995		1995–2000		2000–2005		2005–2010		2010–2015		2015–2017		2000–2017	
China	6.9	Mongolia	3.6	Mongolia	3.6	China	4.3	Mongolia	2.4	Iran	6.4	China	3.1
Cambodia	3.9	China	2.2	China	2.8	Bhutan	2.8	Pakistan	2.4	China	3.1	Mongolia	2.3
Sri Lanka	3.4	Iran	2.2	India	2.5	Lao PDR	2.6	China	2.3	India	2.5	Lao PDR	2.3
Vietnam	2.8	Korea	1.9	Lao PDR	2.4	Sri Lanka	2.3	Fiji	2.3	Hong Kong	2.5	India	1.9
ROC	2.7	ROC	1.8	Thailand	2.3	India	2.3	Lao PDR	2.0	Pakistan	2.5	Hong Kong	1.8
Korea	2.3	India	1.8	Cambodia	2.3	Hong Kong	2.1	Philippines	1.9	Vietnam	2.5	Pakistan	1.5
Iran	2.0	Sri Lanka	1.3	Iran	2.2	ROC	2.0	Vietnam	1.6	Nepal	2.2	ROC	1.4
India	1.6	Cambodia	1.0	Hong Kong	1.9	Iran	1.5	Hong Kong	1.1	Cambodia	2.1	Philippines	1.3
Pakistan	1.4	Pakistan	0.5	Pakistan	1.5	Singapore	1.3	Cambodia	1.0	ROC	2.1	Cambodia	1.1
Bhutan	0.9	Japan	0.4	ROC	1.3	Korea	1.3	Sri Lanka	0.9	Lao PDR	1.6	Iran	1.0
Hong Kong	0.7	Vietnam	0.2	Malaysia	1.3	Philippines	1.3	Japan	0.9	Thailand	1.6	Sri Lanka	1.0
Singapore	0.5	Bangladesh	0.2	Singapore	1.2	Mongolia	1.2	India	0.8	Korea	1.5	Thailand	0.9
Myanmar	0.5	Singapore	−0.1	Philippines	1.0	Malaysia	0.8	ROC	0.8	Mongolia	1.2	Bhutan	0.9
Bangladesh	0.2	Fiji	−0.2	Vietnam	1.0	Nepal	0.6	Bhutan	0.5	Bangladesh	0.9	Singapore	0.9
Malaysia	0.2	Lao PDR	−0.3	Sri Lanka	0.8	Fiji	0.6	Bangladesh	0.5	Singapore	0.8	Korea	0.8
Japan	0.1	Philippines	−0.7	Korea	0.8	Indonesia	0.4	Malaysia	0.3	Malaysia	0.8	Malaysia	0.8
Indonesia	0.0	Nepal	−0.8	Japan	0.7	Bangladesh	0.4	Thailand	0.2	Philippines	0.3	Vietnam	0.6
Lao PDR	−0.4	Bhutan	−0.9	Indonesia	0.3	Pakistan	0.3	Korea	0.2	Japan	0.3	Fiji	0.5
Mongolia	−0.5	Myanmar	−1.2	Myanmar	0.0	Thailand	0.1	Singapore	0.1	Bhutan	0.2	Japan	0.5
Philippines	−0.7	Malaysia	−1.3	Brunei	−0.2	Japan	−0.1	Nepal	−0.1	Brunei	−0.6	Bangladesh	0.3
Thailand	−0.9	Hong Kong	−1.7	Bangladesh	−0.3	Cambodia	−0.5	Indonesia	−1.2	Fiji	−1.5	Nepal	0.1
Nepal	−1.3	Brunei	−2.1	Fiji	−0.4	Myanmar	−1.3	Iran	−2.7	Sri Lanka	−1.7	Indonesia	−0.4
Fiji	−1.6	Thailand	−2.6	Bhutan	−0.5	Vietnam	−1.6	Myanmar	−3.3	Indonesia	−2.3	Myanmar	−1.7
Brunei	−6.0	Indonesia	−4.9	Nepal	−1.1	Brunei	−3.0	Brunei	−5.5	Myanmar	−3.1	Brunei	−2.6
(region)		(region)		(region)		(region)		(region)		(region)		(region)	
APO20	0.7	APO20	−0.1	APO20	1.3	APO20	0.9	APO20	0.3	APO20	1.2	APO20	0.9
Asia24	2.0	Asia24	0.4	Asia24	1.7	Asia24	2.1	Asia24	0.9	Asia24	1.8	Asia24	1.6
East Asia	2.3	East Asia	0.6	East Asia	1.5	East Asia	2.7	East Asia	1.5	East Asia	2.2	East Asia	1.9
South Asia	1.5	South Asia	1.5	South Asia	2.1	South Asia	1.8	South Asia	0.7	South Asia	2.1	South Asia	1.6
ASEAN	0.5	ASEAN	−2.4	ASEAN	1.3	ASEAN	0.5	ASEAN	0.2	ASEAN	−0.3	ASEAN	0.5
ASEAN6	0.0	ASEAN6	−2.8	ASEAN6	1.2	ASEAN6	0.7	ASEAN6	−0.2	ASEAN6	−0.7	ASEAN6	0.4
CLMV	1.7	CLMV	−0.4	CLMV	0.7	CLMV	−1.3	CLMV	0.7	CLMV	1.1	CLMV	0.2
(reference)		(reference)		(reference)		(reference)		(reference)		(reference)		(reference)	
US	0.8	US	1.1	US	0.8	US	0.1	US	0.5	US	0.1	US	0.4

Unit: Percentage.
Source: APO Productivity Database 2019.

Table19 Output Growth and Contributions of Labor, Capital, and TFP

		Output	Labor				Capital				TFP	
			Hours Worked		Labor Quality		IT		Non–IT			
Bangladesh	1970–1975	−2.0	0.2	(−10)	0.3	(−15)	0.0	(0)	0.6	(−31)	−3.2	(157)
	1975–1980	3.7	1.2	(34)	0.8	(21)	0.1	(2)	1.4	(39)	0.2	(5)
	1980–1985	3.7	1.5	(41)	0.5	(13)	0.0	(1)	1.9	(52)	−0.3	(−7)
	1985–1990	4.4	0.7	(15)	−0.1	(−1)	0.1	(2)	2.7	(61)	1.0	(23)
	1990–1995	5.0	1.8	(37)	0.2	(5)	0.1	(2)	2.7	(54)	0.2	(4)
	1995–2000	5.1	1.0	(19)	0.2	(4)	0.2	(4)	3.5	(69)	0.2	(3)
	2000–2005	5.0	0.9	(18)	0.2	(4)	0.1	(2)	4.0	(81)	−0.3	(−6)
	2005–2010	5.9	1.1	(18)	0.1	(2)	0.2	(3)	4.2	(71)	0.4	(6)
	2010–2015	6.1	0.2	(2)	1.0	(16)	0.3	(4)	4.3	(70)	0.5	(7)
	2015–2017	7.0	0.5	(7)	1.1	(16)	0.3	(4)	4.2	(60)	0.9	(14)
	1970–2017	4.2	0.9	(22)	0.4	(9)	0.1	(3)	2.9	(68)	−0.1	(−3)
Brunei	1970–1975	7.9	0.7	(9)	0.3	(4)	0.0	(0)	2.3	(29)	4.6	(58)
	1975–1980	9.7	0.7	(7)	0.2	(2)	1.1	(12)	3.8	(39)	3.9	(40)
	1980–1985	−3.7	0.4	(−10)	0.3	(−9)	0.3	(−7)	8.9	(−239)	−13.6	(366)
	1985–1990	−1.8	1.1	(−63)	0.4	(−22)	−0.1	(4)	4.1	(−228)	−7.3	(409)
	1990–1995	3.1	0.8	(27)	0.2	(7)	1.1	(35)	6.9	(223)	−6.0	(−192)
	1995–2000	1.3	0.7	(57)	0.1	(4)	0.3	(21)	2.3	(177)	−2.1	(−159)
	2000–2005	2.1	0.6	(29)	0.2	(10)	0.4	(19)	1.1	(53)	−0.2	(−11)
	2005–2010	0.7	0.4	(57)	0.2	(30)	0.8	(115)	2.3	(350)	−3.0	(−453)
	2010–2015	−0.1	0.3	(−450)	0.0	(36)	1.6	(−2292)	3.6	(−5102)	−5.5	(7908)
	2015–2017	−0.6	−0.4	(59)	−0.2	(42)	−0.1	(18)	0.8	(−128)	−0.6	(109)
	1970–2017	2.0	0.6	(29)	0.2	(10)	0.6	(29)	3.8	(188)	−3.1	(−156)
China	1970–1975	5.7	1.0	(18)	0.2	(4)	0.0	(1)	5.1	(89)	−0.6	(−11)
	1975–1980	6.3	1.4	(22)	0.1	(1)	0.0	(1)	3.6	(57)	1.2	(19)
	1980–1985	10.1	1.9	(19)	0.1	(1)	0.1	(1)	3.3	(33)	4.7	(47)
	1985–1990	7.6	1.3	(17)	0.1	(1)	0.1	(1)	4.1	(54)	2.0	(26)
	1990–1995	11.6	0.7	(6)	0.4	(3)	0.1	(1)	3.4	(30)	6.9	(60)
	1995–2000	8.3	1.2	(15)	0.7	(8)	0.3	(3)	3.9	(47)	2.2	(27)
	2000–2005	9.3	0.9	(10)	0.6	(6)	0.8	(8)	4.2	(45)	2.8	(30)
	2005–2010	10.7	0.1	(1)	0.2	(2)	0.4	(4)	5.7	(53)	4.3	(40)
	2010–2015	7.6	0.2	(2)	0.2	(3)	0.3	(4)	4.6	(60)	2.3	(30)
	2015–2017	6.6	0.1	(1)	−0.4	(−6)	0.2	(2)	3.6	(55)	3.1	(47)
	1970–2017	8.5	0.9	(11)	0.3	(3)	0.2	(3)	4.2	(49)	2.9	(34)
Fiji	1970–1975	5.6	1.8	(31)	0.8	(15)	0.1	(2)	2.3	(41)	0.6	(11)
	1975–1980	3.7	1.4	(37)	1.4	(37)	0.0	(1)	2.6	(70)	−1.6	(−44)
	1980–1985	0.7	1.3	(187)	0.9	(134)	0.1	(7)	1.5	(219)	−3.2	(−447)
	1985–1990	3.7	0.9	(25)	1.4	(37)	0.2	(6)	0.5	(13)	0.7	(19)
	1990–1995	2.7	1.4	(52)	1.3	(47)	0.1	(4)	1.5	(56)	−1.6	(−59)
	1995–2000	2.0	0.4	(21)	0.7	(35)	0.0	(−1)	1.2	(57)	−0.2	(−11)
	2000–2005	2.0	1.1	(55)	0.6	(31)	0.1	(5)	0.6	(28)	−0.4	(−20)
	2005–2010	0.7	−0.3	(−43)	0.2	(21)	0.1	(15)	0.2	(30)	0.6	(76)
	2010–2015	3.6	0.7	(20)	0.1	(3)	0.1	(3)	0.4	(12)	2.3	(63)
	2015–2017	1.9	0.8	(44)	0.9	(49)	0.3	(16)	1.3	(70)	−1.5	(−80)
	1970–2017	2.7	1.0	(35)	0.8	(30)	0.1	(4)	1.2	(44)	−0.4	(−13)
India	1970–1975	2.8	1.7	(60)	0.3	(12)	0.0	(0)	1.0	(34)	−0.2	(−6)
	1975–1980	3.1	1.7	(55)	0.5	(17)	0.0	(1)	1.3	(41)	−0.4	(−14)
	1980–1985	5.0	1.4	(29)	0.8	(15)	0.0	(1)	1.3	(25)	1.5	(30)
	1985–1990	5.8	1.3	(23)	0.9	(15)	0.1	(1)	1.6	(27)	2.0	(34)
	1990–1995	5.0	1.2	(24)	0.4	(8)	0.1	(2)	1.6	(33)	1.6	(33)
	1995–2000	5.7	1.0	(18)	0.9	(16)	0.1	(2)	1.8	(33)	1.8	(31)
	2000–2005	6.5	1.2	(18)	0.6	(9)	0.1	(2)	2.1	(32)	2.5	(39)
	2005–2010	7.8	0.5	(6)	1.2	(16)	0.2	(3)	3.6	(46)	2.3	(29)
	2010–2015	6.2	0.6	(9)	0.8	(13)	0.2	(4)	3.8	(61)	0.8	(13)
	2015–2017	7.1	0.3	(4)	0.4	(6)	0.2	(2)	3.7	(52)	2.5	(36)
	1970–2017	5.4	1.1	(21)	0.7	(13)	0.1	(2)	2.1	(38)	1.4	(25)
Iran	1970–1975	9.5	0.6	(7)	0.6	(6)	0.1	(1)	5.9	(62)	2.3	(25)
	1975–1980	−2.9	1.1	(−40)	0.1	(−5)	0.0	(−1)	5.8	(−201)	−9.9	(346)
	1980–1985	3.8	0.6	(16)	0.1	(2)	0.1	(1)	2.3	(59)	0.8	(21)
	1985–1990	1.3	1.1	(79)	0.7	(52)	0.1	(4)	0.4	(26)	−0.8	(−61)
	1990–1995	3.7	0.5	(13)	0.5	(14)	0.1	(2)	0.6	(16)	2.0	(55)
	1995–2000	4.3	0.7	(17)	0.3	(7)	0.1	(2)	1.0	(22)	2.2	(51)
	2000–2005	7.2	0.8	(11)	0.5	(6)	0.3	(4)	3.4	(48)	2.2	(31)
	2005–2010	5.4	−0.2	(−3)	0.3	(6)	0.2	(3)	3.6	(67)	1.5	(27)
	2010–2015	0.0	0.3	(−4586)	0.3	(−5846)	0.1	(−1549)	2.0	(−35094)	−2.7	(47174)
	2015–2017	7.7	0.6	(8)	0.0	(0)	0.0	(0)	0.7	(9)	6.4	(83)
	1970–2017	3.8	0.6	(16)	0.4	(10)	0.1	(3)	2.7	(71)	0.0	(0)
Bhutan	1970–1975	1.4	2.4	(174)	0.2	(11)	0.0	(2)	1.1	(81)	−2.3	(−169)
	1975–1980	6.7	2.2	(33)	−0.1	(−1)	0.1	(1)	0.9	(13)	3.6	(53)
	1980–1985	7.2	1.3	(18)	0.7	(9)	0.1	(1)	1.5	(21)	3.7	(51)
	1985–1990	11.6	0.9	(8)	1.5	(13)	0.1	(1)	1.7	(15)	7.5	(64)
	1990–1995	3.4	−0.9	(−26)	1.4	(41)	0.2	(7)	1.8	(53)	0.9	(26)
	1995–2000	5.7	2.3	(40)	0.6	(11)	0.8	(15)	2.9	(50)	−0.9	(−16)
	2000–2005	7.5	2.5	(33)	0.8	(11)	0.0	(0)	4.7	(62)	−0.5	(−6)
	2005–2010	9.1	1.7	(19)	1.0	(11)	0.4	(4)	3.1	(34)	2.8	(31)
	2010–2015	5.6	−0.2	(−4)	0.9	(16)	0.2	(3)	4.2	(76)	0.5	(9)
	2015–2017	5.8	0.9	(16)	0.4	(6)	0.2	(3)	4.2	(72)	0.2	(3)
	1970–2017	6.4	1.3	(21)	0.7	(12)	0.2	(3)	2.5	(39)	1.6	(25)
Cambodia	1970–1975	−7.7	0.8	(−10)	0.3	(−4)	0.0	(0)	1.7	(−22)	−10.5	(136)
	1975–1980	−7.1	−0.5	(7)	0.4	(−6)	0.0	(0)	0.1	(−2)	−7.2	(101)
	1980–1985	2.8	1.1	(41)	0.2	(7)	0.0	(0)	0.2	(7)	1.2	(44)
	1985–1990	7.8	0.9	(12)	0.1	(2)	0.0	(0)	1.0	(12)	5.8	(74)
	1990–1995	6.7	1.2	(18)	0.1	(2)	0.0	(1)	1.4	(22)	3.9	(58)
	1995–2000	7.2	2.3	(32)	0.4	(5)	0.1	(2)	3.4	(47)	1.0	(14)
	2000–2005	8.8	2.4	(27)	0.4	(5)	0.1	(1)	3.6	(41)	2.3	(26)
	2005–2010	6.5	1.6	(25)	0.5	(7)	0.1	(2)	4.8	(74)	−0.5	(−8)
	2010–2015	7.0	1.3	(18)	1.2	(17)	0.1	(2)	3.4	(48)	1.0	(15)
	2015–2017	6.8	1.3	(19)	−0.1	(−1)	0.1	(2)	3.3	(49)	2.1	(31)
	1970–2017	3.7	1.2	(33)	0.4	(10)	0.1	(2)	2.2	(60)	−0.2	(−6)
ROC	1970–1975	9.3	2.0	(21)	0.0	(0)	0.3	(4)	4.6	(49)	2.3	(25)
	1975–1980	10.6	1.9	(18)	0.9	(9)	0.3	(3)	3.5	(33)	4.0	(38)
	1980–1985	6.9	1.3	(19)	0.3	(4)	0.3	(4)	2.6	(38)	2.4	(35)
	1985–1990	8.9	1.1	(12)	0.8	(9)	0.3	(3)	2.7	(31)	4.0	(45)
	1990–1995	7.2	1.0	(14)	0.6	(8)	0.2	(3)	2.7	(37)	2.7	(37)
	1995–2000	5.8	0.3	(5)	0.6	(11)	0.6	(11)	2.5	(43)	1.8	(31)
	2000–2005	4.0	0.1	(3)	0.9	(22)	0.3	(7)	1.4	(35)	1.3	(34)
	2005–2010	4.2	0.2	(5)	0.9	(21)	0.1	(1)	1.1	(26)	2.0	(47)
	2010–2015	2.5	1.1	(42)	0.6	(23)	0.0	(2)	0.1	(4)	0.8	(30)
	2015–2017	2.3	−0.4	(−16)	0.4	(19)	0.0	(1)	0.1	(3)	2.1	(93)
	1970–2017	6.4	0.9	(15)	0.6	(9)	0.3	(4)	2.3	(35)	2.4	(37)
Hong Kong	1970–1975	6.3	1.9	(30)	0.1	(2)	0.2	(3)	2.6	(41)	1.5	(24)
	1975–1980	10.9	2.0	(18)	0.7	(7)	0.2	(2)	2.9	(26)	5.2	(47)
	1980–1985	5.6	0.9	(16)	0.6	(11)	0.2	(4)	2.5	(45)	1.4	(25)
	1985–1990	7.4	0.2	(2)	1.0	(14)	0.4	(5)	2.0	(27)	3.8	(52)
	1990–1995	5.2	0.6	(11)	0.9	(17)	0.4	(8)	2.6	(51)	0.7	(13)
	1995–2000	2.6	1.5	(56)	0.5	(18)	0.6	(24)	1.7	(67)	−1.7	(−65)
	2000–2005	4.1	0.5	(13)	0.3	(6)	0.4	(9)	1.1	(26)	1.9	(46)
	2005–2010	3.8	0.2	(5)	0.3	(7)	0.3	(7)	1.1	(28)	2.1	(54)
	2010–2015	2.9	0.3	(11)	0.6	(21)	0.2	(8)	0.6	(21)	1.1	(39)
	2015–2017	3.0	−0.2	(−8)	0.5	(18)	−0.1	(−3)	0.2	(8)	2.5	(85)
	1970–2017	5.3	0.8	(16)	0.5	(10)	0.3	(6)	1.8	(34)	1.8	(34)
Indonesia	1970–1975	8.3	1.4	(17)	0.8	(9)	0.0	(0)	4.2	(51)	1.9	(23)
	1975–1980	7.8	1.4	(17)	0.6	(7)	0.1	(2)	5.2	(67)	0.5	(7)
	1980–1985	4.7	1.4	(30)	0.5	(10)	0.1	(2)	4.7	(102)	−2.1	(−44)
	1985–1990	7.5	1.0	(13)	1.3	(17)	0.2	(3)	4.2	(56)	0.8	(11)
	1990–1995	7.5	0.5	(7)	2.5	(33)	0.2	(3)	4.2	(56)	0.0	(1)
	1995–2000	0.7	1.1	(152)	1.1	(147)	0.1	(17)	3.3	(456)	−4.9	(−671)
	2000–2005	4.6	0.5	(11)	1.4	(31)	0.2	(4)	2.2	(48)	0.3	(5)
	2005–2010	5.6	1.1	(20)	0.6	(11)	0.2	(3)	3.3	(58)	0.4	(7)
	2010–2015	5.4	0.3	(5)	2.2	(40)	0.2	(3)	4.0	(74)	−1.2	(−23)
	2015–2017	4.9	1.4	(29)	1.0	(21)	0.2	(4)	4.6	(92)	−2.3	(−46)
	1970–2017	5.7	1.0	(17)	1.2	(21)	0.2	(3)	4.0	(69)	−0.6	(−10)
Japan	1970–1975	4.4	−0.4	(−10)	1.0	(24)	0.3	(6)	3.1	(70)	0.5	(10)
	1975–1980	4.7	0.7	(15)	0.8	(18)	0.2	(5)	1.5	(32)	1.5	(31)
	1980–1985	4.3	0.5	(11)	0.6	(15)	0.3	(8)	1.4	(32)	1.5	(34)
	1985–1990	4.9	0.4	(8)	0.6	(12)	0.5	(10)	1.7	(34)	1.7	(35)
	1990–1995	1.5	−0.2	(−17)	0.4	(27)	0.2	(16)	1.0	(69)	0.1	(4)
	1995–2000	1.1	−0.6	(−52)	0.4	(36)	0.3	(31)	0.5	(47)	0.4	(38)
	2000–2005	1.2	−0.3	(−28)	0.4	(38)	0.2	(19)	0.2	(13)	0.7	(58)
	2005–2010	0.1	−0.4	(−384)	0.4	(390)	0.1	(121)	0.1	(85)	−0.1	(−113)
	2010–2015	1.0	0.0	(−1)	0.1	(15)	0.1	(6)	−0.1	(−12)	0.9	(92)
	2015–2017	1.3	0.6	(51)	0.2	(15)	0.0	(1)	0.2	(12)	0.3	(20)
	1970–2017	2.5	0.0	(−1)	0.5	(21)	0.2	(10)	1.0	(40)	0.8	(30)

		Output	Labor				Capital				TFP	
			Hours Worked		Labor Quality		IT		Non–IT			
Korea	1970–1975	9.4	1.8	(19)	0.2	(3)	0.1	(1)	3.2	(34)	4.0	(43)
	1975–1980	7.5	1.5	(20)	0.5	(6)	0.3	(4)	4.0	(52)	1.3	(17)
	1980–1985	8.9	1.2	(14)	1.7	(19)	0.3	(3)	2.6	(29)	3.0	(34)
	1985–1990	9.8	1.7	(18)	1.4	(14)	0.5	(5)	3.3	(34)	2.9	(29)
	1990–1995	8.1	1.1	(13)	1.6	(19)	0.4	(4)	2.8	(35)	2.3	(28)
	1995–2000	5.3	0.0	(0)	0.8	(15)	0.5	(10)	2.1	(40)	1.9	(36)
	2000–2005	4.7	0.2	(5)	1.1	(24)	0.4	(8)	2.2	(47)	0.8	(16)
	2005–2010	4.2	−0.1	(−4)	0.9	(22)	0.1	(3)	2.0	(47)	1.3	(31)
	2010–2015	2.9	0.7	(23)	0.5	(18)	0.1	(3)	1.5	(51)	0.2	(5)
	2015–2017	2.8	−0.6	(−21)	0.5	(19)	0.1	(2)	1.3	(46)	1.5	(54)
	1970–2017	6.6	0.8	(13)	1.0	(14)	0.3	(4)	2.6	(39)	1.9	(30)
Malaysia	1970–1975	7.7	1.2	(15)	0.4	(6)	0.1	(1)	5.3	(68)	0.8	(10)
	1975–1980	8.2	1.2	(14)	0.8	(10)	0.1	(1)	5.1	(61)	1.1	(13)
	1980–1985	5.1	1.2	(24)	0.9	(17)	0.1	(2)	6.0	(118)	−3.1	(−61)
	1985–1990	6.9	1.3	(19)	0.7	(10)	0.2	(3)	2.9	(42)	1.9	(27)
	1990–1995	9.3	1.0	(11)	1.2	(13)	0.4	(4)	6.5	(71)	0.2	(2)
	1995–2000	4.9	1.3	(26)	0.6	(12)	0.5	(10)	3.9	(80)	−1.3	(−27)
	2000–2005	5.2	0.7	(14)	0.9	(17)	0.7	(14)	1.5	(30)	1.3	(26)
	2005–2010	5.0	0.9	(19)	0.5	(10)	0.5	(9)	2.3	(47)	0.8	(15)
	2010–2015	5.2	1.0	(20)	0.4	(7)	0.3	(5)	3.1	(61)	0.3	(6)
	2015–2017	4.9	0.8	(16)	0.2	(5)	0.0	(0)	3.1	(63)	0.8	(16)
	1970–2017	6.3	1.1	(17)	0.7	(11)	0.3	(5)	4.0	(64)	0.2	(4)
Myanmar	1970–1975	2.2	1.1	(49)	−0.2	(−10)	0.0	(0)	2.0	(93)	−0.7	(−32)
	1975–1980	6.3	1.3	(21)	0.4	(6)	0.1	(2)	4.9	(77)	−0.4	(−7)
	1980–1985	4.8	1.0	(21)	0.3	(6)	0.1	(2)	4.9	(103)	−1.5	(−32)
	1985–1990	−2.0	0.6	(−30)	0.8	(−39)	0.0	(−2)	1.1	(−58)	−4.6	(229)
	1990–1995	4.9	1.1	(22)	1.0	(20)	0.1	(1)	2.3	(46)	0.5	(11)
	1995–2000	5.6	1.4	(24)	0.3	(5)	0.3	(5)	4.9	(88)	−1.2	(−22)
	2000–2005	6.4	1.0	(15)	0.6	(10)	0.2	(3)	4.6	(72)	0.0	(0)
	2005–2010	6.3	0.6	(9)	0.7	(11)	0.3	(5)	6.0	(95)	−1.3	(−21)
	2010–2015	4.7	0.4	(8)	0.2	(5)	0.4	(8)	7.1	(150)	−3.3	(−70)
	2015–2017	2.1	0.2	(8)	0.0	(−2)	0.1	(7)	5.0	(240)	−3.1	(−152)
	1970–2017	4.3	0.9	(21)	0.4	(10)	0.2	(4)	4.2	(99)	−1.5	(−34)
Pakistan	1970–1975	3.6	1.0	(28)	0.7	(20)	0.0	(0)	2.1	(59)	−0.3	(−8)
	1975–1980	5.8	1.5	(26)	1.0	(18)	0.0	(0)	2.7	(47)	0.6	(10)
	1980–1985	7.9	1.3	(16)	0.1	(1)	0.0	(0)	2.7	(35)	3.7	(48)
	1985–1990	7.0	1.4	(20)	1.0	(15)	0.1	(1)	2.7	(39)	1.7	(25)
	1990–1995	6.0	1.0	(16)	0.9	(16)	0.1	(1)	2.6	(44)	1.4	(23)
	1995–2000	4.5	1.0	(23)	0.5	(11)	0.0	(0)	2.5	(55)	0.5	(10)
	2000–2005	5.0	1.1	(21)	0.6	(12)	0.1	(3)	1.7	(34)	1.5	(30)
	2005–2010	3.3	1.3	(41)	0.2	(5)	0.1	(2)	1.4	(43)	0.3	(10)
	2010–2015	3.9	0.4	(10)	0.7	(17)	0.0	(1)	0.5	(12)	2.4	(60)
	2015–2017	5.5	0.5	(10)	1.1	(20)	0.1	(2)	1.3	(23)	2.5	(46)
	1970–2017	5.2	1.1	(21)	0.6	(12)	0.1	(1)	2.1	(40)	1.4	(26)
Singapore	1970–1975	9.1	2.6	(29)	0.4	(5)	0.3	(3)	4.6	(51)	1.1	(12)
	1975–1980	8.3	2.4	(29)	0.6	(8)	0.3	(4)	3.1	(38)	1.8	(22)
	1980–1985	6.6	1.4	(21)	1.3	(19)	0.5	(8)	4.0	(61)	−0.6	(−9)
	1985–1990	8.3	2.2	(26)	0.6	(8)	0.8	(9)	2.6	(31)	2.1	(26)
	1990–1995	8.3	2.1	(26)	1.6	(20)	0.6	(7)	3.3	(40)	0.5	(7)
	1995–2000	5.5	1.1	(20)	1.0	(18)	0.5	(10)	2.9	(54)	−0.1	(−2)
	2000–2005	4.8	0.5	(11)	1.1	(22)	0.5	(11)	1.5	(31)	1.2	(25)
	2005–2010	6.5	2.5	(38)	0.4	(6)	0.4	(7)	1.9	(29)	1.3	(20)
	2010–2015	4.4	1.1	(26)	0.5	(12)	0.4	(9)	2.2	(50)	0.1	(2)
	2015–2017	3.3	−0.1	(−4)	0.5	(16)	0.4	(13)	1.7	(51)	0.8	(24)
	1970–2017	6.7	1.7	(25)	0.8	(13)	0.5	(7)	2.9	(43)	0.8	(12)
Thailand	1970–1975	5.5	1.0	(18)	1.3	(24)	0.1	(1)	2.3	(42)	0.8	(15)
	1975–1980	7.4	3.0	(41)	1.0	(14)	0.2	(3)	2.8	(38)	0.3	(4)
	1980–1985	5.3	1.1	(22)	1.9	(35)	0.2	(5)	2.8	(52)	−0.7	(−14)
	1985–1990	9.8	1.6	(16)	1.7	(17)	0.4	(4)	3.6	(36)	2.6	(26)
	1990–1995	8.1	0.8	(9)	1.8	(23)	0.7	(8)	5.8	(71)	−0.9	(−11)
	1995–2000	0.7	−0.2	(−23)	2.0	(265)	0.0	(5)	1.5	(207)	−2.6	(−353)
	2000–2005	5.3	0.1	(1)	1.9	(36)	0.3	(6)	0.7	(14)	2.3	(44)
	2005–2010	3.7	0.5	(14)	0.9	(24)	0.8	(21)	1.4	(39)	0.1	(2)
	2010–2015	3.0	−0.8	(−25)	1.5	(51)	0.6	(21)	1.4	(47)	0.2	(6)
	2015–2017	3.6	−1.2	(−32)	1.7	(47)	0.2	(5)	1.3	(36)	1.6	(44)
	1970–2017	5.4	0.7	(13)	1.6	(29)	0.4	(7)	2.4	(46)	0.3	(5)

		Output	Labor				Capital				TFP	
			Hours Worked		Labor Quality		IT		Non–IT			
Lao PDR	1970–1975	5.3	0.8	(15)	0.2	(3)	0.0	(0)	2.9	(56)	1.4	(26)
	1975–1980	1.8	−0.3	(−15)	0.2	(10)	0.0	(1)	2.4	(134)	−0.5	(−30)
	1980–1985	7.4	0.4	(6)	0.2	(3)	0.0	(0)	3.6	(48)	3.2	(43)
	1985–1990	4.2	1.5	(36)	0.2	(4)	0.1	(2)	4.1	(98)	−1.6	(−39)
	1990–1995	6.0	1.4	(24)	0.1	(2)	0.2	(3)	4.7	(78)	−0.4	(−7)
	1995–2000	6.0	1.1	(18)	0.5	(8)	0.1	(1)	4.7	(78)	−0.3	(−5)
	2000–2005	6.4	1.2	(19)	0.4	(7)	0.2	(2)	2.2	(34)	2.4	(37)
	2005–2010	7.8	1.6	(20)	0.6	(8)	0.4	(4)	2.7	(35)	2.6	(33)
	2010–2015	7.6	1.0	(13)	0.4	(6)	0.6	(8)	3.4	(45)	2.0	(27)
	2015–2017	6.9	0.8	(12)	0.0	(1)	0.2	(3)	4.2	(61)	1.6	(24)
	1970–2017	5.9	1.0	(16)	0.3	(5)	0.2	(3)	3.4	(59)	1.0	(17)
Mongolia	1970–1975	6.5	0.5	(8)	2.6	(40)	0.1	(1)	4.2	(65)	−1.0	(−15)
	1975–1980	5.4	0.9	(16)	0.7	(13)	0.1	(3)	5.1	(95)	−1.5	(−27)
	1980–1985	6.6	0.8	(12)	0.5	(7)	0.2	(2)	5.5	(83)	−0.3	(−5)
	1985–1990	3.8	1.5	(39)	0.3	(7)	0.1	(2)	3.0	(79)	−1.1	(−28)
	1990–1995	−1.8	−0.1	(6)	−1.3	(72)	0.0	(−3)	0.1	(−6)	−0.5	(30)
	1995–2000	3.6	0.2	(6)	−0.2	(−7)	0.1	(4)	−0.2	(−4)	3.6	(102)
	2000–2005	6.3	0.8	(12)	0.7	(11)	0.3	(5)	0.9	(14)	3.6	(58)
	2005–2010	6.4	0.3	(5)	0.0	(0)	0.4	(6)	4.4	(69)	1.2	(19)
	2010–2015	9.8	0.7	(7)	1.5	(15)	0.3	(3)	5.0	(51)	2.4	(24)
	2015–2017	3.3	1.2	(38)	0.6	(19)	0.0	(−1)	0.3	(9)	1.2	(36)
	1970–2017	5.1	0.7	(13)	0.5	(10)	0.2	(3)	3.0	(59)	0.7	(15)
Nepal	1970–1975	2.9	1.6	(55)	0.2	(7)	0.1	(3)	2.6	(88)	−1.5	(−53)
	1975–1980	3.1	1.8	(60)	0.2	(8)	0.1	(3)	3.1	(103)	−2.2	(−74)
	1980–1985	4.1	1.0	(23)	1.8	(45)	0.1	(1)	3.1	(75)	−1.9	(−45)
	1985–1990	4.9	0.6	(13)	1.8	(37)	0.0	(1)	2.7	(55)	−0.3	(−6)
	1990–1995	4.9	1.6	(32)	2.0	(40)	0.0	(1)	2.6	(54)	−1.3	(−27)
	1995–2000	4.8	1.2	(25)	2.1	(44)	0.1	(2)	2.2	(46)	−0.8	(−16)
	2000–2005	3.0	0.7	(25)	1.4	(46)	0.1	(2)	1.9	(63)	−1.1	(−36)
	2005–2010	4.1	0.4	(10)	0.7	(16)	0.1	(2)	2.3	(57)	0.6	(15)
	2010–2015	3.5	1.2	(36)	0.1	(2)	0.1	(4)	2.2	(62)	−0.1	(−3)
	2015–2017	6.5	1.3	(20)	0.0	(−1)	0.2	(2)	2.9	(44)	2.2	(34)
	1970–2017	4.0	1.1	(28)	1.1	(27)	0.1	(2)	2.5	(63)	−0.8	(−20)
Philippines	1970–1975	5.7	2.0	(35)	0.3	(6)	0.1	(2)	3.2	(56)	0.1	(1)
	1975–1980	5.9	1.4	(24)	0.8	(13)	0.1	(2)	4.5	(76)	−0.9	(−15)
	1980–1985	−1.4	1.4	(−104)	0.7	(−53)	0.2	(−15)	3.2	(−233)	−6.9	(505)
	1985–1990	5.3	1.0	(19)	0.9	(17)	0.1	(1)	1.1	(21)	2.2	(41)
	1990–1995	2.8	0.9	(32)	0.2	(5)	0.1	(4)	2.4	(85)	−0.7	(−26)
	1995–2000	3.9	0.5	(13)	0.8	(20)	0.5	(13)	2.7	(71)	−0.7	(−17)
	2000–2005	4.5	0.8	(18)	0.1	(3)	0.6	(12)	2.0	(44)	1.0	(23)
	2005–2010	4.8	0.8	(17)	0.5	(11)	0.1	(3)	2.1	(43)	1.3	(26)
	2010–2015	5.7	0.7	(12)	0.5	(9)	0.2	(3)	2.5	(43)	1.9	(33)
	2015–2017	6.6	1.0	(15)	1.0	(15)	0.4	(6)	3.8	(58)	0.3	(5)
	1970–2017	4.2	1.1	(25)	0.6	(13)	0.2	(5)	2.7	(63)	−0.3	(−6)
Sri Lanka	1970–1975	2.9	0.8	(28)	0.3	(12)	0.0	(1)	1.9	(65)	−0.2	(−6)
	1975–1980	5.4	0.8	(15)	0.2	(4)	0.1	(1)	2.8	(52)	1.4	(27)
	1980–1985	5.0	0.1	(3)	0.9	(18)	0.1	(1)	3.0	(60)	0.9	(18)
	1985–1990	3.3	1.5	(47)	0.3	(9)	0.0	(−1)	0.7	(21)	0.8	(24)
	1990–1995	5.3	0.4	(7)	0.8	(15)	0.1	(2)	0.6	(12)	3.4	(64)
	1995–2000	4.9	1.9	(40)	0.2	(3)	0.2	(3)	1.3	(27)	1.3	(27)
	2000–2005	4.0	0.1	(1)	0.9	(22)	0.3	(7)	1.9	(48)	0.8	(21)
	2005–2010	6.2	0.4	(6)	−0.2	(−3)	0.2	(4)	3.5	(56)	2.3	(38)
	2010–2015	6.1	0.0	(0)	0.3	(4)	0.0	(1)	4.8	(80)	0.9	(15)
	2015–2017	3.5	0.8	(22)	0.7	(19)	0.0	(1)	3.8	(107)	−1.7	(−49)
	1970–2017	4.7	0.7	(14)	0.4	(9)	0.1	(2)	2.3	(50)	1.2	(25)
Vietnam	1970–1975	1.8	1.0	(54)	0.6	(32)	0.0	(−1)	1.8	(100)	−1.5	(−86)
	1975–1980	3.5	0.6	(17)	0.4	(11)	0.1	(2)	3.3	(93)	−0.8	(−24)
	1980–1985	6.2	0.8	(13)	0.5	(8)	0.1	(1)	2.7	(44)	2.1	(34)
	1985–1990	4.4	0.9	(21)	0.3	(7)	0.0	(1)	2.4	(55)	0.7	(15)
	1990–1995	8.1	1.0	(13)	0.1	(1)	0.1	(1)	4.1	(51)	2.8	(35)
	1995–2000	7.3	1.3	(17)	0.6	(8)	0.1	(2)	5.2	(70)	0.2	(3)
	2000–2005	8.0	0.3	(4)	1.5	(19)	0.2	(2)	5.0	(63)	1.0	(13)
	2005–2010	6.2	1.5	(24)	0.9	(15)	0.3	(5)	5.1	(82)	−1.6	(−27)
	2010–2015	5.8	0.3	(5)	0.6	(10)	0.3	(5)	3.1	(53)	1.6	(27)
	2015–2017	6.4	−0.3	(−5)	1.0	(16)	0.3	(5)	2.9	(45)	2.5	(39)
	1970–2017	5.7	0.8	(14)	0.6	(11)	0.1	(2)	3.6	(63)	0.6	(10)

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		Output	Labor				Capital				TFP	
			Hours Worked		Labor Quality		IT		Non–IT			
US	1970–1975	2.6	0.6	(25)	0.1	(3)	0.1	(4)	1.4	(55)	0.4	(14)
	1975–1980	3.6	1.5	(43)	0.0	(0)	0.2	(7)	1.1	(30)	0.7	(20)
	1980–1985	3.2	0.9	(27)	0.2	(6)	0.4	(11)	0.8	(25)	1.0	(32)
	1985–1990	3.3	1.1	(33)	0.2	(6)	0.4	(11)	1.0	(30)	0.6	(20)
	1990–1995	2.5	0.5	(21)	0.3	(13)	0.3	(11)	0.6	(23)	0.8	(32)
	1995–2000	4.2	1.0	(24)	0.4	(10)	0.7	(17)	1.0	(23)	1.1	(27)
	2000–2005	2.5	0.2	(6)	0.4	(14)	0.4	(16)	0.8	(32)	0.8	(31)
	2005–2010	0.9	−0.4	(−40)	0.3	(37)	0.3	(39)	0.5	(59)	0.1	(6)
	2010–2015	2.2	0.8	(39)	0.2	(10)	0.3	(12)	0.3	(15)	0.5	(24)
	2015–2017	1.9	0.8	(41)	0.2	(11)	0.3	(14)	0.5	(26)	0.1	(8)
	1970–2017	2.8	0.7	(26)	0.2	(9)	0.3	(12)	0.8	(30)	0.7	(24)
Asia24	1970–1975	5.1	1.3	(25)	0.3	(7)	0.1	(3)	3.1	(62)	0.2	(4)
	1975–1980	4.7	1.5	(32)	0.2	(5)	0.1	(3)	2.5	(52)	0.4	(9)
	1980–1985	5.4	1.6	(29)	0.4	(7)	0.2	(4)	2.2	(41)	1.1	(20)
	1985–1990	6.0	1.2	(21)	0.4	(6)	0.3	(5)	2.4	(39)	1.7	(29)
	1990–1995	5.7	0.8	(15)	0.4	(7)	0.2	(3)	2.4	(41)	2.0	(34)
	1995–2000	4.4	1.0	(22)	0.6	(15)	0.2	(5)	2.2	(50)	0.4	(8)
	2000–2005	5.7	0.9	(15)	0.6	(10)	0.3	(5)	2.3	(40)	1.7	(30)
	2005–2010	6.6	0.4	(7)	0.3	(5)	0.2	(3)	3.5	(53)	2.1	(33)
	2010–2015	5.4	0.3	(6)	0.5	(9)	0.2	(3)	3.5	(66)	0.9	(16)
	2015–2017	5.6	0.3	(5)	0.1	(1)	0.1	(2)	3.3	(59)	1.8	(33)
	1970–2017	5.4	1.0	(18)	0.4	(7)	0.2	(4)	2.7	(49)	1.2	(22)
South Asia	1970–1975	2.5	1.4	(57)	0.4	(15)	0.0	(1)	1.1	(45)	−0.4	(−17)
	1975–1980	3.5	1.6	(47)	0.6	(17)	0.0	(1)	1.5	(43)	−0.2	(−7)
	1980–1985	5.3	1.4	(27)	0.7	(13)	0.0	(1)	1.5	(29)	1.6	(31)
	1985–1990	5.8	1.2	(21)	0.8	(13)	0.1	(1)	1.8	(31)	1.9	(33)
	1990–1995	5.1	1.3	(25)	0.5	(9)	0.1	(1)	1.8	(35)	1.5	(29)
	1995–2000	5.4	1.0	(19)	0.8	(15)	0.1	(2)	2.0	(37)	1.5	(27)
	2000–2005	6.1	1.1	(19)	0.5	(9)	0.1	(2)	2.2	(36)	2.1	(34)
	2005–2010	7.1	0.7	(10)	0.9	(13)	0.2	(3)	3.5	(49)	1.8	(25)
	2010–2015	6.0	0.5	(9)	0.8	(14)	0.2	(3)	3.8	(63)	0.7	(11)
	2015–2017	6.9	0.4	(6)	0.6	(9)	0.2	(2)	3.6	(53)	2.1	(30)
	1970–2017	5.3	1.1	(21)	0.7	(13)	0.1	(2)	2.2	(42)	1.2	(23)
ASEAN6	1970–1975	7.2	1.4	(20)	0.7	(10)	0.1	(1)	3.6	(50)	1.4	(19)
	1975–1980	7.5	1.7	(23)	0.6	(8)	0.2	(2)	4.3	(58)	0.7	(9)
	1980–1985	3.6	1.3	(37)	0.8	(23)	0.2	(5)	4.1	(113)	−2.8	(−77)
	1985–1990	7.5	1.1	(15)	1.1	(15)	0.3	(3)	3.4	(45)	1.6	(22)
	1990–1995	7.3	0.7	(10)	1.5	(21)	0.3	(5)	4.7	(64)	0.0	(0)
	1995–2000	1.9	0.7	(36)	1.1	(58)	0.2	(11)	2.7	(141)	−2.8	(−146)
	2000–2005	4.8	0.5	(11)	1.1	(24)	0.3	(7)	1.7	(34)	1.2	(24)
	2005–2010	5.0	1.0	(19)	0.6	(13)	0.4	(7)	2.4	(49)	0.7	(13)
	2010–2015	4.8	0.2	(5)	1.5	(30)	0.3	(6)	3.0	(62)	−0.2	(−3)
	2015–2017	4.7	0.8	(16)	1.0	(21)	0.2	(4)	3.5	(74)	−0.7	(−15)
	1970–2017	5.5	1.0	(18)	1.0	(18)	0.2	(5)	3.3	(61)	−0.1	(−1)

		Output	Labor				Capital				TFP	
			Hours Worked		Labor Quality		IT		Non–IT			
APO20	1970–1975	5.0	1.2	(23)	0.3	(6)	0.2	(3)	2.9	(58)	0.5	(10)
	1975–1980	4.5	1.5	(33)	0.4	(9)	0.1	(3)	2.3	(51)	0.2	(4)
	1980–1985	4.7	1.3	(27)	0.5	(11)	0.2	(5)	2.0	(42)	0.7	(15)
	1985–1990	5.8	1.1	(20)	0.7	(12)	0.3	(5)	2.0	(36)	1.6	(28)
	1990–1995	4.4	0.9	(22)	0.5	(12)	0.2	(4)	2.1	(47)	0.7	(15)
	1995–2000	3.1	0.8	(26)	0.6	(18)	0.3	(8)	1.6	(50)	−0.1	(−2)
	2000–2005	4.2	0.8	(19)	0.6	(14)	0.2	(4)	1.4	(32)	1.3	(30)
	2005–2010	4.4	0.7	(16)	0.7	(15)	0.1	(3)	2.0	(45)	0.9	(21)
	2010–2015	3.9	0.4	(11)	0.8	(21)	0.1	(3)	2.2	(57)	0.3	(8)
	2015–2017	4.8	0.4	(9)	0.6	(13)	0.1	(2)	2.5	(51)	1.2	(25)
	1970–2017	4.5	0.9	(21)	0.6	(13)	0.2	(4)	2.1	(46)	0.7	(16)
East Asia	1970–1975	5.1	1.3	(26)	0.4	(7)	0.2	(4)	3.5	(68)	−0.3	(−5)
	1975–1980	5.5	1.6	(29)	0.2	(4)	0.2	(3)	2.1	(38)	1.5	(27)
	1980–1985	6.0	1.9	(31)	0.2	(3)	0.3	(4)	1.9	(32)	1.7	(29)
	1985–1990	6.2	1.3	(22)	0.2	(3)	0.4	(6)	2.4	(40)	1.8	(30)
	1990–1995	5.6	0.7	(12)	0.4	(7)	0.2	(3)	2.0	(37)	2.3	(41)
	1995–2000	4.6	1.0	(22)	0.6	(13)	0.3	(6)	2.1	(46)	0.6	(14)
	2000–2005	5.6	0.8	(14)	0.5	(10)	0.3	(6)	2.4	(44)	1.5	(27)
	2005–2010	6.8	0.1	(1)	0.3	(4)	0.2	(3)	3.6	(53)	2.7	(39)
	2010–2015	5.6	0.2	(4)	0.2	(4)	0.2	(3)	3.5	(63)	1.5	(26)
	2015–2017	5.2	0.1	(1)	−0.3	(−5)	0.1	(2)	3.1	(60)	2.2	(42)
	1970–2017	5.6	0.9	(17)	0.3	(5)	0.2	(4)	2.6	(47)	1.5	(27)
ASEAN	1970–1975	6.4	1.2	(19)	0.4	(6)	0.1	(1)	3.5	(54)	1.2	(19)
	1975–1980	7.1	1.4	(19)	0.2	(3)	0.2	(2)	4.3	(60)	1.1	(15)
	1980–1985	3.8	1.2	(32)	0.6	(14)	0.2	(5)	4.1	(106)	−2.2	(−56)
	1985–1990	6.9	1.1	(15)	0.8	(11)	0.2	(3)	3.3	(47)	1.5	(22)
	1990–1995	7.2	0.8	(11)	1.1	(15)	0.3	(5)	4.6	(64)	0.5	(6)
	1995–2000	2.4	0.8	(35)	0.9	(37)	0.2	(8)	2.9	(119)	−2.4	(−99)
	2000–2005	5.1	0.6	(11)	1.1	(21)	0.3	(6)	1.8	(36)	1.3	(26)
	2005–2010	5.2	1.0	(19)	0.7	(13)	0.3	(7)	2.7	(52)	0.5	(10)
	2010–2015	4.9	0.3	(6)	1.1	(23)	0.3	(6)	3.1	(63)	0.2	(3)
	2015–2017	4.8	0.6	(12)	0.8	(17)	0.2	(4)	3.5	(72)	−0.3	(−5)
	1970–2017	5.4	0.9	(17)	0.8	(14)	0.2	(4)	3.4	(62)	0.2	(3)
CLMV	1970–1975	1.1	1.0	(88)	0.3	(31)	0.0	(0)	1.8	(162)	−2.0	(−182)
	1975–1980	4.0	0.7	(18)	0.3	(7)	0.1	(2)	3.1	(79)	−0.2	(−6)
	1980–1985	5.5	0.9	(16)	0.4	(6)	0.1	(2)	2.9	(52)	1.3	(24)
	1985–1990	2.1	0.9	(43)	0.5	(22)	0.1	(3)	2.1	(101)	−1.4	(−68)
	1990–1995	6.9	1.1	(16)	0.3	(5)	0.1	(1)	3.7	(54)	1.7	(25)
	1995–2000	6.7	1.4	(20)	0.4	(7)	0.2	(2)	5.1	(76)	−0.4	(−5)
	2000–2005	7.5	0.7	(9)	1.1	(14)	0.2	(3)	4.9	(65)	0.7	(9)
	2005–2010	6.3	1.2	(20)	0.8	(13)	0.3	(5)	5.2	(82)	−1.3	(−20)
	2010–2015	5.7	0.4	(8)	0.5	(9)	0.3	(5)	3.7	(65)	0.7	(13)
	2015–2017	5.3	0.1	(1)	0.6	(10)	0.3	(5)	3.3	(62)	1.1	(21)
	1970–2017	5.1	0.9	(17)	0.5	(10)	0.1	(3)	3.6	(71)	0.0	(−1)

Unit: Average annual growth rate (percentage), contribution share in parentheses.
Source: APO Productivity Database 2019.
Note: See footnote 27 for the country-exception in the country groups.

Table 20 Role of TFP and Capital Deepening in Labor Productivity Growth

		Labor Productivity	Labor Quality		Capital deepening				TFP	
					IT		Non–IT			
Bangladesh	1970–1975	−2.4	0.3	(−13)	0.0	(0)	0.4	(−18)	−3.2	(131)
	1975–1980	1.3	0.8	(61)	0.1	(4)	0.3	(20)	0.2	(15)
	1980–1985	1.0	0.5	(48)	0.0	(3)	0.8	(76)	−0.3	(−27)
	1985–1990	3.0	−0.1	(−2)	0.1	(3)	1.9	(65)	1.0	(33)
	1990–1995	1.3	0.2	(17)	0.0	(4)	0.9	(66)	0.2	(14)
	1995–2000	3.1	0.2	(7)	0.2	(6)	2.5	(82)	0.2	(6)
	2000–2005	3.0	0.2	(7)	0.1	(3)	3.0	(100)	−0.3	(−10)
	2005–2010	3.5	0.1	(3)	0.2	(5)	2.9	(82)	0.4	(10)
	2010–2015	5.7	1.0	(17)	0.3	(5)	4.0	(71)	0.5	(8)
	2015–2017	5.8	1.1	(19)	0.3	(5)	3.5	(61)	0.9	(16)
	1970–2017	2.2	0.4	(16)	0.1	(5)	1.9	(85)	−0.1	(−6)
Brunei	1970–1975	2.9	0.3	(11)	−0.2	(−5)	−1.9	(−64)	4.6	(159)
	1975–1980	3.7	0.2	(6)	0.9	(24)	−1.3	(−37)	3.9	(106)
	1980–1985	−6.4	0.3	(−5)	0.2	(−3)	6.7	(−106)	−13.6	(214)
	1985–1990	−7.4	0.4	(−5)	−0.2	(3)	−0.3	(4)	−7.3	(99)
	1990–1995	−0.6	0.2	(−39)	1.0	(−169)	4.2	(−715)	−6.0	(1023)
	1995–2000	−2.0	0.1	(−3)	0.1	(−6)	−0.1	(3)	−2.1	(106)
	2000–2005	−0.6	0.2	(−37)	0.3	(−49)	−0.8	(148)	−0.2	(39)
	2005–2010	−1.0	0.2	(−20)	0.7	(−68)	1.1	(−109)	−3.0	(297)
	2010–2015	−1.5	0.0	(2)	1.5	(−97)	2.5	(−163)	−5.5	(358)
	2015–2017	0.5	−0.2	(−49)	0.0	(1)	1.4	(275)	−0.6	(−128)
	1970–2017	−1.4	0.2	(−14)	0.5	(−32)	1.1	(−79)	−3.2	(226)
China	1970–1975	2.9	0.2	(7)	0.0	(1)	3.3	(113)	−0.6	(−21)
	1975–1980	3.5	0.1	(2)	0.0	(1)	2.2	(63)	1.2	(34)
	1980–1985	6.6	0.1	(2)	0.1	(1)	1.7	(26)	4.7	(72)
	1985–1990	5.1	0.1	(2)	0.1	(2)	2.9	(58)	2.0	(39)
	1990–1995	10.3	0.4	(4)	0.1	(1)	2.9	(28)	6.9	(67)
	1995–2000	6.3	0.7	(11)	0.2	(4)	3.1	(50)	2.2	(35)
	2000–2005	7.7	0.6	(7)	0.7	(10)	3.5	(46)	2.8	(37)
	2005–2010	10.5	0.2	(2)	0.4	(4)	5.6	(53)	4.3	(41)
	2010–2015	7.3	0.2	(3)	0.3	(4)	4.4	(61)	2.3	(32)
	2015–2017	6.5	−0.4	(−6)	0.2	(2)	3.6	(56)	3.1	(48)
	1970–2017	6.7	0.3	(4)	0.2	(3)	3.3	(50)	2.9	(43)
Fiji	1970–1975	1.9	0.8	(44)	0.1	(3)	0.4	(19)	0.6	(34)
	1975–1980	1.0	1.4	(140)	0.0	(1)	1.2	(127)	−1.6	(−168)
	1980–1985	−1.7	0.9	(−56)	0.0	(−2)	0.5	(−28)	−3.2	(186)
	1985–1990	1.9	1.4	(73)	0.2	(10)	−0.4	(−20)	0.7	(37)
	1990–1995	−0.4	1.3	(−283)	0.1	(−18)	−0.2	(44)	−1.6	(357)
	1995–2000	1.2	0.7	(57)	0.0	(−3)	0.8	(64)	−0.2	(−18)
	2000–2005	−0.3	0.6	(−179)	0.1	(−17)	−0.6	(182)	−0.4	(114)
	2005–2010	1.4	0.2	(11)	0.1	(9)	0.6	(40)	0.6	(39)
	2010–2015	1.8	0.1	(6)	0.1	(3)	−0.7	(−38)	2.3	(128)
	2015–2017	−0.4	0.9	(−258)	0.2	(−68)	0.0	(7)	−1.5	(419)
	1970–2017	0.7	0.8	(128)	0.1	(10)	0.1	(22)	−0.4	(−60)
India	1970–1975	0.4	0.3	(80)	0.0	(2)	0.3	(60)	−0.2	(−42)
	1975–1980	0.6	0.5	(79)	0.0	(3)	0.5	(83)	−0.4	(−65)
	1980–1985	3.0	0.8	(26)	0.0	(1)	0.6	(22)	1.5	(52)
	1985–1990	3.9	0.9	(22)	0.1	(1)	1.1	(27)	2.0	(50)
	1990–1995	3.2	0.4	(13)	0.1	(2)	1.1	(33)	1.6	(51)
	1995–2000	4.1	0.9	(23)	0.1	(3)	1.3	(32)	1.8	(43)
	2000–2005	4.6	0.6	(12)	0.1	(3)	1.4	(30)	2.5	(55)
	2005–2010	6.9	1.2	(18)	0.2	(3)	3.2	(46)	2.3	(33)
	2010–2015	5.3	0.8	(16)	0.2	(4)	3.4	(65)	0.8	(15)
	2015–2017	6.6	0.4	(7)	0.1	(2)	3.4	(52)	2.5	(39)
	1970–2017	3.6	0.7	(20)	0.1	(3)	1.5	(41)	1.4	(37)
Iran	1970–1975	7.3	0.6	(8)	0.1	(1)	4.3	(59)	2.3	(32)
	1975–1980	−6.1	0.1	(−2)	0.0	(0)	3.7	(−60)	−9.9	(162)
	1980–1985	2.1	0.1	(4)	0.0	(2)	1.1	(54)	0.8	(40)
	1985–1990	−1.8	0.7	(−39)	0.0	(−2)	−1.7	(95)	−0.8	(46)
	1990–1995	1.6	0.5	(32)	0.1	(4)	−1.0	(−66)	2.0	(129)
	1995–2000	1.0	0.3	(31)	0.1	(6)	−1.6	(−154)	2.2	(218)
	2000–2005	3.4	0.5	(14)	0.2	(6)	0.5	(13)	2.2	(66)
	2005–2010	6.2	0.3	(6)	0.2	(3)	4.3	(69)	1.5	(23)
	2010–2015	−1.1	0.3	(−30)	0.1	(−7)	1.2	(−103)	−2.7	(240)
	2015–2017	5.1	0.0	(0)	0.0	(0)	−1.3	(−25)	6.4	(125)
	1970–2017	1.6	0.4	(24)	0.1	(5)	1.1	(73)	0.0	(−2)
Bhutan	1970–1975	−2.5	0.2	(−6)	0.0	(−1)	−0.3	(12)	−2.3	(95)
	1975–1980	3.5	−0.1	(−3)	0.1	(2)	0.0	(−1)	3.6	(102)
	1980–1985	5.2	0.7	(12)	0.1	(1)	0.8	(16)	3.7	(70)
	1985–1990	10.0	1.5	(15)	0.1	(1)	1.0	(10)	7.5	(75)
	1990–1995	5.2	1.4	(27)	0.2	(5)	2.6	(51)	0.9	(17)
	1995–2000	1.4	0.6	(43)	0.7	(51)	1.0	(69)	−0.9	(−63)
	2000–2005	2.8	0.8	(28)	−0.1	(−5)	2.6	(93)	−0.5	(−16)
	2005–2010	5.2	1.0	(19)	0.3	(6)	1.1	(21)	2.8	(54)
	2010–2015	6.0	0.9	(15)	0.2	(3)	4.4	(74)	0.5	(8)
	2015–2017	3.7	0.4	(10)	0.1	(3)	3.0	(82)	0.2	(5)
	1970–2017	4.1	0.7	(18)	0.2	(4)	1.5	(37)	1.7	(41)
Cambodia	1970–1975	−9.4	0.3	(−3)	0.0	(0)	0.7	(−8)	−10.5	(111)
	1975–1980	−6.1	0.4	(−7)	0.0	(0)	0.6	(−10)	−7.2	(117)
	1980–1985	0.4	0.2	(54)	0.0	(3)	−1.1	(−300)	1.2	(344)
	1985–1990	5.6	0.1	(2)	0.0	(0)	−0.4	(−7)	5.8	(104)
	1990–1995	4.0	0.1	(4)	0.0	(1)	−0.1	(−2)	3.9	(98)
	1995–2000	2.4	0.4	(15)	0.1	(4)	0.9	(39)	1.0	(42)
	2000–2005	4.1	0.4	(11)	0.1	(2)	1.2	(31)	2.3	(56)
	2005–2010	3.1	0.5	(15)	0.1	(4)	3.0	(98)	−0.5	(−17)
	2010–2015	4.4	1.2	(27)	0.1	(2)	2.1	(47)	1.0	(23)
	2015–2017	4.1	−0.1	(−2)	0.1	(2)	2.0	(48)	2.1	(52)
	1970–2017	1.0	0.4	(40)	0.1	(5)	0.8	(82)	−0.3	(−27)
ROC	1970–1975	5.9	0.0	(1)	0.3	(5)	3.2	(54)	2.3	(40)
	1975–1980	7.4	0.9	(12)	0.2	(3)	2.2	(30)	4.0	(54)
	1980–1985	4.7	0.3	(6)	0.2	(5)	1.8	(39)	2.4	(51)
	1985–1990	7.1	0.8	(11)	0.3	(4)	2.1	(29)	4.0	(57)
	1990–1995	5.6	0.6	(11)	0.2	(4)	2.1	(38)	2.7	(48)
	1995–2000	5.2	0.6	(12)	0.6	(12)	2.3	(43)	1.8	(34)
	2000–2005	3.7	0.9	(23)	0.3	(7)	1.3	(34)	1.3	(36)
	2005–2010	3.8	0.9	(23)	0.0	(1)	0.9	(24)	2.0	(52)
	2010–2015	0.4	0.6	(137)	0.0	(−1)	−0.9	(−214)	0.8	(178)
	2015–2017	3.0	0.4	(14)	0.0	(1)	0.4	(14)	2.1	(70)
	1970–2017	4.8	0.6	(13)	0.2	(5)	1.6	(34)	2.4	(49)
Hong Kong	1970–1975	2.8	0.1	(5)	0.1	(5)	1.0	(36)	1.5	(55)
	1975–1980	7.0	0.7	(10)	0.2	(3)	1.0	(14)	5.2	(73)
	1980–1985	3.9	0.6	(15)	0.2	(6)	1.7	(43)	1.4	(36)
	1985–1990	7.1	1.0	(14)	0.4	(5)	1.9	(27)	3.8	(54)
	1990–1995	4.0	0.9	(22)	0.4	(10)	2.0	(51)	0.7	(17)
	1995–2000	−0.2	0.5	(−207)	0.5	(−239)	0.5	(−220)	−1.7	(766)
	2000–2005	3.1	0.3	(9)	0.3	(10)	0.6	(20)	1.9	(61)
	2005–2010	3.5	0.3	(7)	0.3	(7)	0.9	(26)	2.1	(59)
	2010–2015	2.3	0.6	(27)	0.2	(9)	0.4	(15)	1.1	(49)
	2015–2017	3.4	0.5	(16)	−0.1	(−2)	0.4	(13)	2.5	(74)
	1970–2017	3.7	0.5	(15)	0.3	(8)	1.1	(29)	1.8	(48)
Indonesia	1970–1975	4.4	0.8	(18)	0.0	(1)	1.7	(39)	1.9	(43)
	1975–1980	3.7	0.6	(15)	0.1	(3)	2.5	(68)	0.5	(14)
	1980–1985	0.6	0.5	(79)	0.1	(11)	2.1	(361)	−2.1	(−351)
	1985–1990	4.8	1.3	(26)	0.2	(4)	2.5	(52)	0.8	(18)
	1990–1995	6.3	2.5	(40)	0.2	(3)	3.5	(56)	0.0	(1)
	1995–2000	−2.1	1.0	(−47)	0.1	(−4)	1.6	(−79)	−4.9	(234)
	2000–2005	3.3	1.4	(44)	0.2	(5)	1.4	(43)	0.3	(8)
	2005–2010	2.4	0.6	(27)	0.1	(5)	1.2	(51)	0.4	(16)
	2010–2015	4.6	2.2	(47)	0.2	(4)	3.5	(76)	−1.2	(−27)
	2015–2017	1.7	1.0	(61)	0.1	(8)	2.8	(165)	−2.3	(−134)
	1970–2017	3.1	1.2	(39)	0.1	(4)	2.2	(73)	−0.5	(−17)
Japan	1970–1975	5.1	1.0	(20)	0.3	(6)	3.4	(65)	0.5	(9)
	1975–1980	3.6	0.8	(23)	0.2	(5)	1.1	(31)	1.5	(41)
	1980–1985	3.5	0.6	(18)	0.3	(9)	1.1	(31)	1.5	(42)
	1985–1990	4.2	0.6	(14)	0.5	(12)	1.4	(33)	1.7	(41)
	1990–1995	1.9	0.4	(21)	0.3	(13)	1.2	(63)	0.1	(3)
	1995–2000	2.1	0.4	(19)	0.4	(18)	0.9	(43)	0.4	(20)
	2000–2005	1.8	0.4	(25)	0.2	(14)	0.4	(22)	0.7	(39)
	2005–2010	0.8	0.4	(51)	0.1	(19)	0.3	(45)	−0.1	(−15)
	2010–2015	1.0	0.1	(15)	0.1	(6)	−0.1	(−10)	0.9	(90)
	2015–2017	0.1	0.2	(181)	0.0	(−26)	−0.3	(−301)	0.3	(246)
	1970–2017	2.6	0.5	(20)	0.3	(10)	1.0	(40)	0.8	(29)

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		Labor Productivity	Labor Quality		Capital deepening				TFP	
					IT		Non–IT			
Korea	1970–1975	5.8	0.2	(4)	0.1	(2)	1.4	(24)	4.0	(70)
	1975–1980	4.6	0.5	(11)	0.3	(6)	2.5	(55)	1.3	(28)
	1980–1985	6.7	1.7	(25)	0.3	(4)	1.7	(25)	3.0	(46)
	1985–1990	6.6	1.4	(21)	0.4	(7)	1.9	(29)	2.9	(44)
	1990–1995	6.2	1.6	(25)	0.3	(5)	2.1	(33)	2.3	(37)
	1995–2000	5.3	0.8	(15)	0.5	(10)	2.1	(40)	1.9	(36)
	2000–2005	4.3	1.1	(27)	0.3	(8)	2.1	(48)	0.8	(18)
	2005–2010	4.5	0.9	(21)	0.1	(3)	2.1	(47)	1.3	(29)
	2010–2015	1.6	0.5	(32)	0.0	(3)	0.9	(56)	0.2	(9)
	2015–2017	4.0	0.5	(14)	0.1	(2)	1.8	(46)	1.5	(39)
	1970–2017	5.0	1.0	(19)	0.3	(5)	1.9	(37)	1.9	(39)
Malaysia	1970–1975	4.5	0.4	(10)	0.0	(1)	3.3	(72)	0.8	(17)
	1975–1980	5.0	0.8	(17)	0.1	(2)	3.0	(60)	1.1	(22)
	1980–1985	1.8	0.9	(49)	0.1	(5)	3.9	(224)	−3.1	(−177)
	1985–1990	3.6	0.7	(19)	0.2	(4)	0.8	(24)	1.9	(52)
	1990–1995	6.5	1.2	(18)	0.3	(5)	4.8	(74)	0.2	(3)
	1995–2000	1.1	0.6	(54)	0.4	(36)	1.4	(132)	−1.3	(−121)
	2000–2005	3.1	0.9	(29)	0.7	(21)	0.2	(6)	1.3	(44)
	2005–2010	2.3	0.5	(21)	0.4	(16)	0.7	(29)	0.8	(34)
	2010–2015	2.3	0.4	(16)	0.2	(8)	1.4	(61)	0.3	(14)
	2015–2017	2.9	0.2	(8)	0.0	(−1)	1.9	(66)	0.8	(27)
	1970–2017	3.3	0.7	(21)	0.2	(7)	2.2	(65)	0.2	(6)
Myanmar	1970–1975	0.0	−0.2	(−1146)	0.0	(18)	0.9	(4846)	−0.7	(−3618)
	1975–1980	3.3	0.4	(12)	0.1	(4)	3.2	(97)	−0.4	(−13)
	1980–1985	2.1	0.3	(13)	0.1	(4)	3.3	(153)	−1.5	(−70)
	1985–1990	−3.3	0.8	(−24)	0.0	(−1)	0.4	(−13)	−4.6	(137)
	1990–1995	2.8	1.0	(34)	0.1	(2)	1.3	(45)	0.5	(19)
	1995–2000	2.8	0.3	(10)	0.2	(9)	3.5	(126)	−1.2	(−44)
	2000–2005	4.1	0.6	(15)	0.2	(4)	3.3	(80)	0.0	(0)
	2005–2010	4.8	0.7	(15)	0.3	(6)	5.1	(106)	−1.3	(−27)
	2010–2015	3.6	0.2	(6)	0.3	(9)	6.4	(176)	−3.3	(−92)
	2015–2017	1.6	0.0	(−3)	0.1	(8)	4.7	(290)	−3.1	(−194)
	1970–2017	2.2	0.4	(20)	0.1	(7)	3.1	(140)	−1.5	(−66)
Pakistan	1970–1975	1.2	0.7	(62)	0.0	(1)	0.7	(62)	−0.3	(−24)
	1975–1980	2.8	1.0	(37)	0.0	(0)	1.2	(43)	0.6	(20)
	1980–1985	5.5	0.1	(1)	0.0	(0)	1.7	(30)	3.7	(68)
	1985–1990	4.5	1.0	(23)	0.1	(2)	1.6	(36)	1.7	(39)
	1990–1995	4.2	0.9	(22)	0.0	(1)	1.8	(44)	1.4	(33)
	1995–2000	2.4	0.5	(20)	0.0	(0)	1.5	(61)	0.5	(19)
	2000–2005	2.5	0.6	(25)	0.1	(5)	0.2	(8)	1.5	(62)
	2005–2010	−0.1	0.2	(−264)	0.0	(−41)	−0.6	(904)	0.3	(−498)
	2010–2015	2.9	0.7	(23)	0.0	(1)	−0.2	(−6)	2.4	(82)
	2015–2017	4.4	1.1	(24)	0.1	(2)	0.7	(16)	2.5	(57)
	1970–2017	2.9	0.6	(22)	0.0	(1)	0.9	(30)	1.3	(46)
Singapore	1970–1975	4.3	0.4	(10)	0.2	(5)	2.5	(58)	1.1	(26)
	1975–1980	3.2	0.6	(20)	0.2	(7)	0.6	(17)	1.8	(56)
	1980–1985	3.3	1.3	(38)	0.4	(13)	2.2	(67)	−0.6	(−19)
	1985–1990	3.4	0.6	(19)	0.6	(18)	0.0	(1)	2.1	(63)
	1990–1995	3.6	1.6	(46)	0.4	(12)	0.9	(27)	0.5	(15)
	1995–2000	3.1	1.0	(33)	0.5	(15)	1.7	(56)	−0.1	(−3)
	2000–2005	3.7	1.1	(29)	0.5	(12)	1.0	(26)	1.2	(33)
	2005–2010	0.8	0.4	(48)	0.2	(22)	−1.0	(−129)	1.3	(159)
	2010–2015	1.8	0.5	(31)	0.3	(16)	0.8	(47)	0.1	(5)
	2015–2017	3.6	0.5	(15)	0.4	(12)	1.8	(51)	0.8	(22)
	1970–2017	3.0	0.8	(28)	0.4	(12)	1.0	(33)	0.8	(27)
Thailand	1970–1975	3.1	1.3	(43)	0.0	(2)	0.9	(28)	0.8	(27)
	1975–1980	0.9	1.0	(111)	0.1	(16)	−0.6	(−61)	0.3	(34)
	1980–1985	3.1	1.9	(60)	0.2	(7)	1.8	(57)	−0.7	(−24)
	1985–1990	6.3	1.7	(27)	0.3	(5)	1.7	(28)	2.6	(41)
	1990–1995	6.2	1.8	(29)	0.6	(10)	4.7	(76)	−0.9	(−15)
	1995–2000	1.2	2.0	(172)	0.1	(5)	1.8	(153)	−2.6	(−229)
	2000–2005	5.2	1.9	(36)	0.3	(6)	0.7	(13)	2.3	(45)
	2005–2010	2.4	0.9	(37)	0.7	(30)	0.7	(29)	0.1	(4)
	2010–2015	4.8	1.5	(32)	0.7	(15)	2.4	(49)	0.2	(4)
	2015–2017	6.6	1.7	(26)	0.3	(5)	2.9	(44)	1.6	(24)
	1970–2017	3.7	1.5	(42)	0.3	(9)	1.5	(42)	0.2	(7)

		Labor Productivity	Labor Quality		Capital deepening				TFP	
					IT		Non–IT			
Lao PDR	1970–1975	3.3	0.2	(5)	0.0	(0)	1.8	(53)	1.4	(42)
	1975–1980	2.4	0.2	(7)	0.0	(1)	2.7	(114)	−0.5	(−22)
	1980–1985	6.2	0.2	(4)	0.0	(0)	2.8	(45)	3.2	(51)
	1985–1990	0.3	0.2	(48)	0.1	(15)	1.7	(521)	−1.6	(−484)
	1990–1995	2.5	0.1	(5)	0.1	(6)	2.6	(106)	−0.4	(−17)
	1995–2000	3.7	0.5	(13)	0.1	(1)	3.5	(94)	−0.3	(−9)
	2000–2005	4.0	0.4	(11)	0.1	(3)	1.0	(26)	2.4	(60)
	2005–2010	4.9	0.6	(12)	0.3	(6)	1.4	(28)	2.6	(53)
	2010–2015	5.6	0.4	(8)	0.6	(10)	2.5	(45)	2.0	(37)
	2015–2017	5.2	0.0	(1)	0.2	(3)	3.3	(65)	1.6	(31)
	1970–2017	3.7	0.3	(8)	0.1	(4)	2.3	(61)	1.0	(26)
Mongolia	1970–1975	5.1	2.6	(51)	0.1	(2)	3.4	(66)	−1.0	(−19)
	1975–1980	3.2	0.7	(23)	0.1	(4)	3.8	(119)	−1.5	(−46)
	1980–1985	4.1	0.5	(12)	0.1	(3)	3.8	(93)	−0.3	(−8)
	1985–1990	−0.8	0.3	(−34)	0.0	(−5)	0.0	(5)	−1.1	(133)
	1990–1995	−1.5	−1.3	(85)	0.0	(−3)	0.3	(−17)	−0.5	(35)
	1995–2000	2.6	−0.2	(−9)	0.1	(4)	−0.9	(−34)	3.6	(139)
	2000–2005	2.8	0.7	(24)	0.2	(9)	−1.7	(−61)	3.6	(129)
	2005–2010	4.9	0.0	(0)	0.4	(7)	3.3	(68)	1.2	(25)
	2010–2015	7.6	1.5	(19)	0.2	(3)	3.6	(47)	2.4	(31)
	2015–2017	−0.4	0.6	(−144)	−0.1	(25)	−2.1	(492)	1.2	(−273)
	1970–2017	3.1	0.5	(18)	0.1	(5)	1.7	(55)	0.7	(23)
Nepal	1970–1975	−0.1	0.2	(−283)	0.1	(−110)	1.2	(−1590)	−1.5	(2083)
	1975–1980	−0.2	0.2	(−141)	0.1	(−41)	1.7	(−992)	−2.2	(1274)
	1980–1985	2.4	1.8	(75)	0.1	(2)	2.4	(98)	−1.9	(−76)
	1985–1990	3.8	1.8	(48)	0.0	(1)	2.2	(59)	−0.3	(−8)
	1990–1995	2.2	2.0	(88)	0.0	(1)	1.6	(70)	−1.3	(−59)
	1995–2000	2.8	2.1	(74)	0.1	(2)	1.5	(51)	−0.8	(−27)
	2000–2005	1.8	1.4	(79)	0.1	(3)	1.4	(79)	−1.1	(−62)
	2005–2010	3.3	0.7	(20)	0.1	(3)	1.9	(59)	0.6	(18)
	2010–2015	1.3	0.1	(4)	0.1	(9)	1.2	(95)	−0.1	(−9)
	2015–2017	4.1	0.0	(−1)	0.1	(3)	1.8	(44)	2.2	(54)
	1970–2017	2.0	1.1	(56)	0.1	(3)	1.7	(84)	−0.9	(−44)
Philippines	1970–1975	1.2	0.3	(29)	0.0	(2)	0.7	(63)	0.1	(6)
	1975–1980	2.4	0.8	(32)	0.1	(2)	2.4	(102)	−0.9	(−36)
	1980–1985	−5.0	0.7	(−14)	0.2	(−3)	1.0	(−21)	−6.9	(138)
	1985–1990	2.8	0.9	(33)	0.0	(1)	−0.3	(−11)	2.2	(78)
	1990–1995	0.5	0.2	(29)	0.1	(15)	1.0	(198)	−0.7	(−143)
	1995–2000	2.3	0.8	(35)	0.5	(21)	1.7	(73)	−0.7	(−29)
	2000–2005	1.8	0.1	(7)	0.5	(26)	0.2	(9)	1.0	(58)
	2005–2010	2.4	0.5	(21)	0.1	(3)	0.6	(24)	1.3	(52)
	2010–2015	4.1	0.5	(13)	0.1	(3)	1.5	(37)	1.9	(47)
	2015–2017	4.1	1.0	(24)	0.4	(9)	2.4	(59)	0.3	(8)
	1970–2017	1.4	0.6	(41)	0.2	(12)	1.0	(71)	−0.3	(−24)
Sri Lanka	1970–1975	1.1	0.3	(29)	0.0	(2)	0.9	(83)	−0.2	(−14)
	1975–1980	3.6	0.2	(6)	0.1	(2)	1.9	(52)	1.4	(40)
	1980–1985	4.7	0.9	(19)	0.1	(1)	2.8	(60)	0.9	(19)
	1985–1990	0.2	0.3	(126)	0.0	(−21)	−0.8	(−358)	0.8	(353)
	1990–1995	4.5	0.8	(18)	0.1	(2)	0.3	(6)	3.4	(75)
	1995–2000	1.1	0.2	(15)	0.1	(10)	−0.5	(−51)	1.3	(126)
	2000–2005	3.7	0.9	(24)	0.3	(7)	1.7	(46)	0.8	(23)
	2005–2010	5.1	−0.2	(−4)	0.2	(4)	2.8	(55)	2.3	(45)
	2010–2015	6.0	0.3	(4)	0.0	(1)	4.8	(80)	0.9	(15)
	2015–2017	1.2	0.7	(55)	0.0	(0)	2.3	(186)	−1.7	(−141)
	1970–2017	3.3	0.4	(12)	0.1	(3)	1.6	(47)	1.3	(38)
Vietnam	1970–1975	−0.5	0.6	(−117)	0.0	(5)	0.5	(−100)	−1.5	(312)
	1975–1980	2.0	0.4	(19)	0.1	(4)	2.4	(118)	−0.8	(−41)
	1980–1985	4.0	0.5	(12)	0.1	(2)	1.3	(33)	2.1	(53)
	1985–1990	1.7	0.3	(19)	0.0	(2)	0.7	(40)	0.7	(39)
	1990–1995	5.9	0.1	(1)	0.1	(1)	2.9	(50)	2.8	(48)
	1995–2000	4.9	0.6	(12)	0.1	(2)	4.0	(82)	0.2	(4)
	2000–2005	7.3	1.5	(20)	0.2	(2)	4.6	(63)	1.0	(14)
	2005–2010	2.8	0.9	(33)	0.3	(10)	3.3	(115)	−1.6	(−58)
	2010–2015	5.3	0.6	(11)	0.3	(5)	2.9	(54)	1.6	(30)
	2015–2017	7.0	1.0	(15)	0.3	(5)	3.2	(45)	2.5	(35)
	1970–2017	3.8	0.6	(16)	0.1	(3)	2.5	(67)	0.5	(14)

		Labor Productivity	Labor Quality		Capital deepening				TFP	
					IT		Non–IT			
US	1970–1975	1.6	0.1	(5)	0.1	(5)	1.1	(68)	0.4	(22)
	1975–1980	1.1	0.0	(1)	0.2	(19)	0.1	(13)	0.7	(66)
	1980–1985	1.8	0.2	(10)	0.3	(18)	0.3	(15)	1.0	(57)
	1985–1990	1.5	0.2	(14)	0.3	(21)	0.3	(22)	0.6	(43)
	1990–1995	1.7	0.3	(19)	0.3	(15)	0.3	(17)	0.8	(49)
	1995–2000	2.5	0.4	(16)	0.6	(25)	0.4	(15)	1.1	(44)
	2000–2005	2.3	0.4	(16)	0.4	(17)	0.7	(31)	0.8	(35)
	2005–2010	1.5	0.3	(22)	0.4	(24)	0.8	(50)	0.1	(4)
	2010–2015	0.7	0.2	(32)	0.2	(31)	−0.3	(−40)	0.5	(78)
	2015–2017	0.5	0.2	(39)	0.2	(40)	0.0	(−7)	0.1	(29)
	1970–2017	1.6	0.2	(15)	0.3	(19)	0.4	(25)	0.7	(41)
Asia24	1970–1975	2.6	0.7	(25)	0.1	(4)	1.7	(63)	0.2	(7)
	1975–1980	2.0	0.4	(21)	0.1	(5)	1.1	(54)	0.4	(21)
	1980–1985	2.6	0.7	(27)	0.2	(6)	0.7	(26)	1.1	(41)
	1985–1990	3.7	0.7	(19)	0.2	(6)	1.1	(28)	1.7	(47)
	1990–1995	4.2	0.7	(17)	0.1	(3)	1.4	(33)	2.0	(47)
	1995–2000	2.6	1.2	(46)	0.2	(7)	0.9	(34)	0.4	(14)
	2000–2005	4.0	1.1	(27)	0.2	(5)	1.1	(26)	1.7	(42)
	2005–2010	5.7	0.7	(12)	0.2	(3)	2.7	(47)	2.1	(38)
	2010–2015	4.8	0.9	(19)	0.1	(3)	2.8	(59)	0.9	(18)
	2015–2017	5.0	0.1	(3)	0.1	(2)	3.0	(59)	1.8	(36)
	1970–2017	3.6	0.8	(21)	0.2	(4)	1.5	(42)	1.2	(32)
South Asia	1970–1975	0.3	0.6	(186)	0.0	(2)	0.2	(53)	−0.4	(−142)
	1975–1980	1.0	0.9	(87)	0.0	(2)	0.3	(34)	−0.2	(−24)
	1980–1985	3.1	1.0	(33)	0.0	(1)	0.5	(15)	1.6	(52)
	1985–1990	3.9	1.2	(30)	0.1	(1)	0.8	(20)	1.9	(49)
	1990–1995	3.1	0.7	(24)	0.1	(2)	0.8	(26)	1.5	(48)
	1995–2000	3.8	1.3	(35)	0.1	(3)	0.9	(23)	1.5	(39)
	2000–2005	4.2	1.0	(23)	0.1	(3)	1.0	(24)	2.1	(51)
	2005–2010	5.8	1.7	(30)	0.2	(3)	2.2	(37)	1.8	(30)
	2010–2015	5.0	1.5	(29)	0.2	(4)	2.7	(54)	0.7	(13)
	2015–2017	6.2	1.1	(18)	0.1	(2)	2.8	(46)	2.1	(34)
	1970–2017	3.4	1.1	(32)	0.1	(2)	1.1	(31)	1.2	(34)
ASEAN6	1970–1975	3.6	1.8	(51)	0.0	(1)	0.4	(10)	1.4	(38)
	1975–1980	2.9	1.5	(54)	0.1	(4)	0.6	(19)	0.7	(23)
	1980–1985	0.2	2.1	(1035)	0.1	(60)	0.8	(364)	−2.8	(−1359)
	1985–1990	4.5	2.8	(62)	0.2	(4)	−0.1	(−1)	1.6	(35)
	1990–1995	5.5	3.8	(69)	0.2	(4)	1.5	(27)	0.0	(0)
	1995–2000	0.1	2.9	(2689)	0.1	(94)	−0.1	(−55)	−2.8	(−2628)
	2000–2005	3.5	3.0	(86)	0.2	(7)	−0.9	(−26)	1.2	(34)
	2005–2010	2.4	1.8	(73)	0.2	(10)	−0.2	(−10)	0.7	(27)
	2010–2015	4.2	3.8	(90)	0.2	(4)	0.4	(9)	−0.2	(−4)
	2015–2017	2.9	2.4	(81)	0.1	(3)	1.2	(41)	−0.7	(−25)
	1970–2017	3.0	2.6	(89)	0.2	(5)	0.2	(8)	−0.1	(−3)

		Labor Productivity	Labor Quality		Capital deepening				TFP	
					IT		Non–IT			
APO20	1970–1975	2.8	0.5	(19)	0.1	(4)	1.7	(60)	0.5	(17)
	1975–1980	1.9	0.7	(38)	0.1	(6)	0.9	(47)	0.2	(9)
	1980–1985	2.5	0.9	(37)	0.2	(7)	0.7	(27)	0.7	(29)
	1985–1990	3.7	1.2	(33)	0.3	(7)	0.6	(17)	1.6	(43)
	1990–1995	2.6	1.0	(37)	0.1	(5)	0.9	(33)	0.7	(25)
	1995–2000	1.6	1.1	(68)	0.2	(12)	0.4	(24)	−0.1	(−4)
	2000–2005	2.6	1.2	(47)	0.1	(4)	0.0	(1)	1.3	(48)
	2005–2010	2.9	1.4	(47)	0.1	(2)	0.6	(20)	0.9	(31)
	2010–2015	3.1	1.7	(55)	0.1	(2)	1.0	(32)	0.3	(11)
	2015–2017	4.0	1.2	(31)	0.0	(1)	1.5	(37)	1.2	(31)
	1970–2017	2.7	1.1	(41)	0.1	(5)	0.8	(28)	0.7	(26)
East Asia	1970–1975	2.6	0.7	(25)	0.2	(6)	2.1	(79)	−0.3	(−10)
	1975–1980	2.9	0.3	(12)	0.1	(5)	0.9	(32)	1.5	(52)
	1980–1985	2.9	0.3	(11)	0.2	(7)	0.6	(20)	1.7	(61)
	1985–1990	3.8	0.3	(9)	0.3	(8)	1.3	(35)	1.8	(48)
	1990–1995	4.4	0.7	(15)	0.1	(3)	1.3	(30)	2.3	(52)
	1995–2000	2.9	1.0	(35)	0.2	(7)	1.0	(36)	0.6	(22)
	2000–2005	4.2	0.9	(23)	0.2	(6)	1.5	(35)	1.5	(36)
	2005–2010	6.7	0.5	(8)	0.2	(3)	3.3	(50)	2.7	(40)
	2010–2015	5.3	0.5	(9)	0.1	(3)	3.2	(61)	1.5	(28)
	2015–2017	5.1	−0.4	(−9)	0.1	(2)	3.2	(64)	2.2	(43)
	1970–2017	4.0	0.6	(14)	0.2	(5)	1.7	(43)	1.5	(37)
ASEAN	1970–1975	3.3	1.0	(31)	0.0	(1)	1.0	(31)	1.2	(37)
	1975–1980	3.4	0.6	(18)	0.1	(4)	1.6	(48)	1.1	(31)
	1980–1985	0.7	1.4	(197)	0.1	(18)	1.3	(182)	−2.2	(−297)
	1985–1990	4.2	2.0	(49)	0.2	(4)	0.4	(11)	1.5	(37)
	1990–1995	5.3	2.6	(49)	0.2	(5)	2.0	(38)	0.5	(9)
	1995–2000	0.3	2.2	(751)	0.1	(37)	0.3	(119)	−2.4	(−807)
	2000–2005	3.7	2.8	(75)	0.2	(6)	−0.6	(−17)	1.3	(36)
	2005–2010	2.5	1.8	(73)	0.2	(9)	0.0	(−2)	0.5	(20)
	2010–2015	4.2	2.9	(68)	0.2	(5)	1.0	(24)	0.2	(4)
	2015–2017	3.5	1.9	(54)	0.1	(4)	1.8	(50)	−0.3	(−7)
	1970–2017	3.1	1.9	(63)	0.2	(5)	0.8	(26)	0.2	(5)
CLMV	1970–1975	−1.1	0.8	(−75)	0.0	(1)	0.2	(−15)	−2.0	(188)
	1975–1980	2.3	0.7	(29)	0.1	(3)	1.8	(77)	−0.2	(−10)
	1980–1985	3.1	1.0	(30)	0.1	(2)	0.8	(26)	1.3	(42)
	1985–1990	−0.2	1.2	(−521)	0.0	(−15)	0.0	(17)	−1.4	(619)
	1990–1995	4.6	0.7	(15)	0.1	(1)	2.2	(47)	1.7	(37)
	1995–2000	4.0	0.9	(21)	0.1	(3)	3.4	(84)	−0.4	(−9)
	2000–2005	6.0	2.4	(40)	0.1	(2)	2.7	(45)	0.7	(12)
	2005–2010	3.5	1.9	(53)	0.2	(7)	2.7	(76)	−1.3	(−37)
	2010–2015	4.7	1.1	(24)	0.3	(6)	2.6	(55)	0.7	(15)
	2015–2017	5.2	1.1	(21)	0.3	(5)	2.7	(52)	1.1	(22)
	1970–2017	3.0	1.2	(39)	0.1	(4)	1.8	(60)	−0.1	(−3)

Unit: Percentage (average annual growth rate, contribution share in parentheses).
Source: APO Productivity Database 2019.
Note: See footnote 27 for the country-exception in the country groups.

Table 21 Industry Shares of Value Added

——Shares of industry GDP at current prices by Industry

	1980				1990				2000				2010				2017			
	Agriculture	Manufacturing	Service	Others	Agriculture	Manufacturing	Service	Others	Agriculture	Manufacturing	Service	Others	Agriculture	Manufacturing	Service	Others	Agriculture	Manufacturing	Service	Others
Bahrain	0.7	10.9	45.6	42.8	0.7	11.1	58.0	30.2	0.6	11.4	55.1	32.9	0.3	14.6	54.2	30.8	0.3	18.8	57.8	23.1
Bangladesh	30.0	13.2	40.0	6.7	28.8	12.5	40.9	8.4	24.1	14.4	43.4	10.0	17.8	16.9	45.5	9.3	14.2	18.3	56.5	11.0
Bhutan	42.5	3.1	45.8	8.6	34.3	8.5	40.7	16.5	27.4	8.4	36.6	27.6	17.5	9.1	37.9	35.5	18.3	7.6	39.1	35.0
Brunei	0.2	19.4	9.3	71.1	0.9	13.8	35.8	49.5	1.0	18.3	34.3	46.4	0.7	14.6	31.9	52.7	1.1	12.5	40.2	46.3
Cambodia	43.8	10.0	40.7	5.5	49.9	8.6	37.5	4.0	37.8	16.9	39.1	6.2	36.0	15.6	40.7	7.6	24.9	17.3	42.2	15.6
China	29.9	37.2	21.9	10.9	26.8	31.0	32.0	10.1	14.9	32.5	39.4	13.2	9.8	32.1	43.6	14.5	8.2	29.3	51.2	11.3
ROC	8.3	35.8	45.3	10.7	4.2	32.6	54.7	8.5	2.0	26.4	65.7	5.9	1.6	29.9	63.6	4.9	1.8	32.0	61.6	4.6
Fiji	21.0	10.8	58.7	9.5	20.4	10.8	58.6	10.3	16.3	13.3	62.6	7.9	11.7	15.3	67.1	5.9	14.9	13.5	65.8	5.9
Hong Kong	0.8	20.5	70.5	8.2	0.2	14.9	77.3	7.6	0.1	4.8	87.3	7.8	0.1	1.8	93.0	5.2	0.1	1.1	92.4	6.5
India	35.6	17.8	38.5	8.1	29.1	17.2	43.5	10.1	23.1	15.3	50.8	10.8	18.0	14.9	54.4	12.7	16.3	13.9	59.1	10.8
Indonesia	19.2	10.8	46.0	24.1	15.1	16.7	54.9	13.4	12.2	21.2	51.9	14.7	14.2	22.4	42.4	21.1	13.5	20.7	46.1	19.7
Iran	13.1	12.3	49.5	25.2	15.1	18.5	49.0	17.4	11.1	13.9	48.2	26.8	6.2	11.0	47.9	34.9	8.3	17.8	49.6	24.3
Japan	3.5	27.6	57.4	11.4	2.3	26.3	59.7	11.7	1.6	22.1	66.9	9.4	1.2	20.9	71.3	6.7	1.2	20.8	70.5	7.5
Korea	15.9	24.3	48.7	11.2	8.4	27.3	51.9	12.4	4.4	29.0	57.5	9.1	2.5	30.7	59.3	7.6	2.2	30.4	58.3	9.2
Kuwait	0.3	5.6	27.1	67.0	1.6	11.2	49.1	38.1	0.6	6.5	44.2	48.7	0.4	5.3	41.4	52.9	0.5	6.2	50.9	42.5
Lao PDR	65.5	3.8	23.3	7.5	61.2	5.1	24.3	9.4	52.5	10.7	24.6	12.2	31.4	9.8	40.4	18.4	23.7	8.1	37.3	30.9
Malaysia	23.8	17.7	40.3	18.2	15.5	22.9	45.2	16.4	8.6	29.2	46.5	15.7	10.2	23.7	48.9	17.2	9.0	22.7	51.5	16.8
Mongolia	8.1	16.6	56.7	18.7	9.6	19.4	50.6	20.3	24.7	7.4	52.6	15.3	13.1	7.6	50.0	29.4	11.4	10.0	46.5	32.2
Myanmar	46.5	9.5	40.8	3.1	54.7	7.7	35.0	2.5	53.4	8.4	31.2	7.0	24.7	5.4	19.6	50.3	19.0	7.9	26.8	46.3
Nepal	53.0	4.9	36.9	5.2	45.5	6.8	40.9	6.8	36.6	9.0	46.1	8.3	37.1	6.2	48.0	8.7	27.6	5.4	57.6	9.4
Oman	2.5	0.6	28.2	68.7	2.9	2.9	40.5	53.6	2.2	5.6	39.4	52.7	1.4	10.4	35.9	52.4	2.2	9.9	49.9	38.0
Pakistan	34.5	10.1	48.6	6.9	28.8	12.1	51.3	7.8	29.4	10.6	52.6	7.3	24.3	13.6	55.1	6.9	24.4	12.8	56.5	6.3
Philippines	21.9	27.6	36.0	14.5	19.2	26.7	43.2	10.9	14.0	24.5	51.6	10.0	12.3	21.4	55.1	11.1	9.7	19.5	59.9	11.0
Qatar	0.5	3.3	23.5	72.7	0.8	13.0	42.8	43.5	0.4	5.4	29.5	64.7	0.1	8.9	32.4	58.6	0.2	8.3	45.2	46.3
Saudi Arabia	1.0	4.1	27.8	67.1	5.7	8.5	45.3	40.5	4.9	9.6	41.2	44.3	2.6	11.0	39.1	47.3	2.5	12.9	51.6	33.0
Singapore	1.6	27.5	62.2	8.7	0.3	25.6	67.3	6.8	0.1	27.7	65.1	7.1	0.0	21.4	72.3	6.3	0.0	19.6	75.2	5.1
Sri Lanka	20.2	21.3	47.9	10.5	17.4	19.9	53.7	9.0	11.6	20.2	60.0	8.2	9.5	20.1	60.9	9.6	8.5	17.6	61.4	12.5
Thailand	20.3	22.5	50.4	6.9	10.0	27.1	53.1	9.8	8.5	28.4	54.8	8.3	10.5	30.9	49.6	9.0	8.3	27.2	56.5	8.1
UAE	0.5	3.7	30.8	65.0	1.1	7.1	42.1	49.7	2.2	12.0	46.2	39.6	0.8	8.0	46.7	44.6	0.8	8.8	55.6	34.8
Vietnam	41.7	17.2	35.3	5.7	41.5	5.6	43.1	9.8	26.2	12.7	42.6	18.5	21.0	14.8	42.8	21.3	17.0	17.0	46.4	19.5
(region)																				
APO20	14.8	22.2	50.3	12.7	11.9	22.5	54.1	11.5	10.3	20.5	58.0	11.1	10.1	19.6	57.8	12.5	10.2	18.9	59.3	11.6
Asia24	16.8	23.8	46.7	12.7	14.5	23.8	50.4	11.3	11.8	23.7	52.9	11.7	10.1	24.6	51.8	13.5	9.3	23.6	55.4	11.6
Asia30	14.4	20.9	44.1	20.6	13.6	22.5	49.9	14.0	11.1	22.6	52.0	14.3	9.5	23.7	51.1	15.7	8.9	22.9	55.2	13.0
East Asia	9.7	29.5	49.5	11.2	9.5	27.7	51.7	11.1	7.8	27.2	54.1	10.9	6.9	29.0	52.3	11.8	6.5	27.7	55.5	10.3
South Asia	34.9	16.5	40.8	7.9	28.9	16.2	45.3	9.6	23.9	14.7	51.3	10.2	18.6	14.9	54.7	11.8	16.8	14.0	58.8	10.4
ASEAN	21.4	17.4	43.5	17.7	16.2	20.2	51.5	12.2	12.7	23.3	51.2	12.8	12.8	22.7	47.1	17.3	11.3	21.0	51.2	16.5
ASEAN6	19.0	17.9	44.1	19.1	13.6	21.3	52.5	12.6	10.3	24.5	52.6	12.7	11.4	24.2	48.6	15.8	10.3	21.9	52.8	15.0
CLMV	45.0	12.8	37.7	4.5	47.7	6.5	39.0	6.8	36.4	11.5	38.1	14.0	23.4	11.9	35.8	28.9	18.4	14.3	40.6	26.7
GCC	0.9	4.1	28.4	66.6	4.1	8.3	44.9	42.6	3.5	9.4	42.2	45.0	1.7	9.7	40.4	48.3	1.7	10.9	51.8	35.7
(reference)																				
US	2.2	21.0	66.9	9.9	1.6	17.7	72.7	8.0	1.0	15.1	76.6	7.3	1.1	12.3	79.1	7.6	0.9	11.2	81.0	7.0
Australia	5.9	18.5	57.2	18.5	3.5	13.7	66.4	16.4	3.8	12.0	70.2	13.9	2.4	7.9	69.3	20.4	2.8	6.2	71.5	19.6
Turkey	21.1	22.2	48.2	8.5	13.9	28.2	47.6	10.3	11.3	20.9	58.7	9.1	10.3	17.2	61.8	10.8	6.9	19.8	60.2	13.1

Unit: Percentage.

Sources: Official national accounts in each country, including author adjustments.

Note: Services are defined as the total of industries 6–9 and Others are defined as the total of industries 2, 4, and 5 of nine industries, which consists of 1–agriculture; 2–mining; 3–manufacturing; 4–electricity, gas, and water supply; 5–construction; 6–wholesale and retail trade, hotels, and restaurants; 7–transport, storage, and communications; 8–finance, real estate, and business activities; and 9–community, social, and personal services. See the Online Appendix for the concordance with the ISIC, Revisions 3 and 4.

Table 22 Industry Origins of Labor Productivity Growth

——Average annual growth rates (contributions) of industry labor productivity in 2010–2017

	1. Agriculture		2. Mining		3. Manufacturing		4. Electricity, gas, and water supply		5. Construction		6. Wholesale and retail trade, hotels, and restaurants		7. Transport, storage, and communications		8. Finance, real estate, and business activities		9. Community, social, and personal services		Total economy
Bahrain	2.5	(0.0)	2.5	(0.5)	2.5	(0.4)	2.5	(0.1)	2.5	(0.0)	2.5	(0.1)	2.5	(0.1)	2.5	(0.6)	2.5	(−0.8)	0.9
Bangladesh	3.9	(0.8)	9.1	(0.1)	4.3	(0.9)	2.4	(0.1)	3.4	(0.3)	5.8	(0.8)	4.5	(0.5)	2.4	(0.5)	1.3	(0.7)	4.6
Brunei	0.4	(0.0)	0.4	(−1.5)	0.4	(0.1)	0.4	(0.0)	0.4	(−0.8)	0.4	(0.0)	0.4	(0.0)	0.4	(0.1)	0.4	(0.1)	−2.1
Cambodia	5.1	(1.9)	9.3	(0.2)	9.1	(1.3)	−2.1	(0.0)	2.6	(0.8)	−1.8	(−0.6)	−2.3	(0.3)	−0.3	(0.7)	−3.2	(−0.5)	4.2
China	8.5	(1.7)	7.2	(0.1)	7.2	(2.4)	7.2	(0.1)	7.2	(0.5)	4.4	(0.5)	4.4	(0.4)	4.4	(0.9)	4.4	(0.4)	7.0
ROC	−2.7	(0.0)	−4.8	(0.0)	2.8	(1.0)	1.0	(0.0)	−2.2	(−0.1)	0.9	(0.1)	1.1	(0.0)	1.3	(0.4)	0.1	(0.0)	1.4
Fiji	1.8	(0.3)	1.8	(0.0)	1.8	(0.3)	1.8	(−0.1)	1.8	(−0.1)	1.8	(0.4)	1.8	(0.3)	1.8	(0.5)	1.8	(0.2)	1.8
Hong Kong	−3.8	(0.0)	0.0	( )	1.7	(0.1)	−2.3	(0.0)	5.1	(0.0)	2.8	(0.8)	2.6	(0.2)	−0.1	(0.6)	1.3	(0.1)	1.8
India	4.1	(1.0)	4.1	(0.1)	4.6	(0.7)	4.1	(0.1)	4.1	(0.3)	4.1	(1.0)	4.1	(0.4)	4.1	(1.5)	4.1	(0.8)	5.9
Indonesia	5.4	(1.2)	−1.5	(0.1)	2.4	(0.5)	3.5	(0.0)	0.5	(0.3)	1.6	(−0.1)	8.2	(0.6)	−6.0	(0.4)	2.6	(0.0)	3.2
Iran	2.5	(0.1)	−6.0	(−0.4)	0.5	(0.1)	2.9	(0.3)	−7.9	(−0.4)	0.5	(0.0)	2.6	(0.2)	0.5	(0.4)	−1.3	(−0.2)	0.1
Japan	0.1	(0.1)	−5.8	(0.0)	1.8	(0.4)	−5.7	(0.0)	3.3	(0.2)	1.0	(0.1)	0.4	(0.0)	1.0	(0.2)	−0.9	(−0.4)	0.5
Korea	3.7	(0.2)	3.0	(0.0)	1.3	(0.8)	3.0	(0.1)	1.0	(0.0)	1.6	(0.0)	1.3	(0.1)	0.6	(0.3)	0.4	(0.0)	1.4
Kuwait	2.9	(0.0)	1.2	(1.3)	2.3	(0.1)	8.9	(0.2)	−3.7	(−0.3)	2.7	(0.2)	1.9	(0.1)	−2.1	(−0.1)	−0.7	(−2.3)	−0.8
Malaysia	1.3	(0.2)	−7.3	(0.1)	2.5	(0.7)	2.8	(0.2)	7.2	(0.2)	1.4	(−0.1)	4.9	(0.5)	−1.1	(0.0)	4.4	(0.5)	2.2
Mongolia	10.8	(1.2)	8.7	(1.2)	0.5	(0.3)	3.3	(0.1)	−6.9	(−0.4)	5.4	(0.5)	8.8	(0.7)	3.2	(1.1)	−0.8	(−0.4)	4.2
Nepal	1.0	(−0.2)	1.0	(0.0)	1.0	(0.0)	1.0	(0.0)	1.0	(0.2)	1.0	(0.5)	1.0	(0.4)	1.0	(0.6)	1.0	(0.6)	2.1
Oman	3.5	(−0.1)	−17.4	(0.3)	−10.2	(−1.1)	−17.2	(0.0)	3.8	(−2.0)	−5.0	(−1.4)	−18.3	(−0.4)	−12.9	(0.0)	−0.2	(−0.2)	−4.9
Pakistan	1.5	(0.3)	−9.3	(0.0)	−1.2	(−0.2)	5.3	(0.1)	−0.3	(−0.2)	0.8	(0.3)	0.6	(0.2)	17.5	(0.4)	3.7	(0.7)	1.7
Philippines	3.0	(0.8)	2.6	(0.0)	5.4	(1.3)	6.8	(0.2)	0.6	(0.1)	3.4	(0.6)	2.9	(0.2)	0.8	(1.2)	0.2	(−0.1)	4.3
Qatar	2.0	(−0.1)	4.4	(1.3)	4.3	(0.5)	−0.8	(0.0)	4.6	(−3.8)	1.8	(−0.2)	1.8	(0.0)	15.4	(1.3)	1.8	(−0.5)	−1.5
Saudi Arabia	−5.2	(−0.3)	−1.4	(1.2)	−1.1	(0.0)	−3.9	(−0.1)	−2.1	(−0.8)	6.3	(0.3)	3.4	(0.1)	11.3	(0.5)	−2.7	(−2.5)	−1.6
Singapore	−7.7	(0.0)	0.0	( )	2.6	(0.7)	4.9	(0.0)	1.2	(−0.1)	2.7	(0.6)	0.8	(0.2)	2.9	(1.5)	−0.5	(−0.8)	2.0
Sri Lanka	6.0	(1.1)	14.8	(0.3)	3.1	(0.3)	2.1	(0.1)	6.7	(0.4)	4.7	(0.5)	4.7	(0.7)	13.9	(1.2)	2.6	(0.6)	5.0
Thailand	3.8	(1.1)	−6.8	(0.0)	−1.2	(0.1)	−2.2	(0.1)	4.9	(0.2)	4.0	(0.9)	3.4	(0.3)	−0.3	(0.6)	1.5	(0.2)	3.5
UAE	3.4	(0.0)	3.4	(1.2)	3.4	(0.3)	3.4	(0.2)	3.4	(0.3)	3.4	(0.3)	3.4	(0.3)	3.4	(0.7)	3.4	(−0.5)	2.7
Vietnam	4.2	(1.2)	4.6	(0.1)	4.7	(0.8)	7.2	(0.4)	2.6	(0.1)	3.9	(0.5)	3.9	(0.1)	5.4	(0.7)	3.7	(0.4)	4.3
(region)																			
APO20	3.7	(0.7)	−0.3	(0.0)	1.4	(0.4)	1.7	(0.1)	2.7	(0.1)	2.0	(0.4)	2.6	(0.3)	1.1	(0.8)	0.6	(0.3)	3.0
Asia24	5.5	(1.1)	5.1	(0.0)	4.5	(1.3)	4.5	(0.1)	4.8	(0.3)	2.8	(0.4)	3.4	(0.3)	2.0	(0.8)	2.0	(0.4)	4.8
Asia30	5.5	(1.1)	6.3	(0.1)	4.5	(1.2)	4.4	(0.1)	4.6	(0.3)	2.8	(0.4)	3.3	(0.3)	2.0	(0.8)	1.9	(0.3)	4.6
East Asia	8.1	(1.4)	7.2	(0.1)	5.8	(1.8)	5.2	(0.1)	6.0	(0.4)	2.6	(0.3)	3.0	(0.3)	3.0	(0.7)	1.6	(0.2)	5.2
South Asia	3.8	(0.9)	3.9	(0.1)	3.8	(0.6)	4.0	(0.1)	3.9	(0.3)	4.0	(0.9)	3.7	(0.4)	4.8	(1.3)	3.6	(0.7)	5.4
ASEAN	4.1	(0.9)	2.8	(0.1)	1.5	(0.5)	3.0	(0.1)	2.6	(0.2)	2.2	(0.3)	4.8	(0.4)	−1.5	(0.6)	2.1	(0.2)	3.4
ASEAN6	4.5	(1.0)	−1.8	(0.1)	1.7	(0.5)	2.5	(0.1)	2.0	(0.2)	2.4	(0.2)	5.5	(0.5)	−1.7	(0.6)	1.6	(0.1)	3.2
CLMV	3.2	(1.0)	11.8	(0.6)	5.2	(0.7)	7.0	(0.3)	5.3	(0.4)	2.4	(0.3)	2.0	(0.1)	−1.5	(0.3)	5.4	(0.5)	4.3
GCC	−2.7	(−0.2)	0.2	(1.2)	−0.2	(0.0)	−0.3	(0.0)	−1.3	(−0.8)	4.1	(0.2)	1.9	(0.1)	4.4	(0.6)	−0.9	(−1.7)	−0.6
(reference)																			
US	2.1	(0.0)	6.6	(0.1)	−0.3	(0.0)	0.8	(0.0)	−0.2	(−0.1)	1.0	(0.1)	2.2	(0.2)	0.3	(0.3)	−0.3	(−0.2)	0.5
Australia	2.0	(0.0)	−1.3	(0.3)	0.2	(0.0)	0.8	(0.0)	3.4	(0.2)	1.3	(0.0)	0.8	(0.1)	1.2	(0.8)	0.5	(−0.3)	1.2
Turkey	2.3	(0.1)	−0.6	(0.0)	6.0	(1.2)	−0.7	(0.1)	4.8	(0.5)	1.6	(0.2)	2.3	(0.6)	−4.4	(0.1)	1.3	(0.2)	3.0

Unit: Percentage (average annual growth rate, contribution share in parentheses).
Source: APO Productivity Database 2019.

Table 23 Real Income and Terms of Trade

——Average annual growth rate of real income, real GDP, trading gain, and net primary income transfer from abroad

2000–2005					2005–2010					2010–2015					2015–2017					2000–2017				
	Real income	Real GDP	Trading gain	Net primary income from abroad		Real income	Real GDP	Trading gain	Net primary income from abroad		Real income	Real GDP	Trading gain	Net primary income from abroad		Real income	Real GDP	Trading gain	Net primary income from abroad		Real income	Real GDP	Trading gain	Net primary income from abroad
China	11.0	10.0	0.9	0.1	Myanmar	12.8	5.4	7.4	0.0	Mongolia	9.6	8.8	0.9	0.0	Vietnam	8.4	6.5	1.7	0.2	China	9.8	9.4	0.3	0.1
Mongolia	10.9	5.6	5.6	−0.2	China	12.0	11.8	0.2	0.1	China	8.1	7.8	0.3	0.0	India	8.1	7.3	0.7	0.0	Cambodia	8.1	7.8	0.4	−0.2
Cambodia	10.3	10.6	0.0	−0.3	India	8.6	8.4	0.3	−0.1	Myanmar	7.8	6.8	1.2	−0.1	Nepal	7.7	6.5	1.5	−0.3	Mongolia	7.9	6.8	1.9	−0.9
Iran	9.8	8.0	2.1	−0.3	Cambodia	7.7	6.6	1.1	0.0	Cambodia	6.8	6.8	0.3	−0.3	Cambodia	6.5	6.4	0.1	0.0	Myanmar	7.6	5.6	2.0	0.0
Myanmar	8.6	5.8	2.8	0.0	Vietnam	7.3	6.6	1.1	−0.4	Vietnam	6.1	5.6	0.8	−0.3	Pakistan	6.1	5.4	1.0	−0.3	Vietnam	7.3	6.6	0.9	−0.2
Vietnam	8.1	7.7	0.6	−0.1	Bhutan	7.0	7.8	0.1	−0.9	India	6.1	6.4	−0.3	0.0	Philippines	6.1	6.8	−0.2	−0.5	India	7.3	7.3	0.0	0.0
Bhutan	7.6	7.6	0.2	−0.3	Singapore	7.0	6.6	−0.9	1.3	Bhutan	6.0	6.8	−0.5	−0.3	Bangladesh	6.0	6.9	0.2	−1.0	Bhutan	6.7	7.2	0.0	−0.5
Malaysia	7.3	5.3	1.2	0.8	Bangladesh	6.3	6.2	−0.6	0.7	Philippines	5.7	5.9	−0.3	0.1	Iran	5.8	5.3	0.5	0.1	Malaysia	5.9	5.1	0.5	0.3
India	6.9	7.1	−0.3	0.1	Sri Lanka	6.2	5.9	0.2	0.0	Sri Lanka	5.5	5.1	0.7	−0.3	Malaysia	5.6	5.5	0.1	0.0	Bangladesh	5.7	5.9	−0.2	0.1
Sri Lanka	5.5	4.8	0.6	0.1	Philippines	5.9	4.8	−0.1	1.1	Bangladesh	5.3	5.8	−0.1	−0.3	Bhutan	5.4	6.0	0.2	−0.8	Philippines	5.7	5.2	−0.2	0.7
Bangladesh	5.4	5.2	−0.1	0.2	Malaysia	5.7	4.9	0.6	0.3	Malaysia	4.9	5.0	−0.2	0.1	China	5.2	5.8	−0.6	0.1	Sri Lanka	5.4	4.9	0.6	−0.1
Philippines	5.3	4.2	−0.3	1.4	Indonesia	5.5	5.8	−0.7	0.4	Indonesia	4.9	5.3	−0.3	−0.1	Indonesia	5.0	4.7	0.2	0.1	Indonesia	4.8	5.1	−0.5	0.2
Pakistan	5.0	5.2	−0.8	0.6	Mongolia	4.8	7.1	−0.9	−1.4	Nepal	4.8	3.9	0.8	0.2	Thailand	4.3	3.6	0.3	0.4	Nepal	4.5	4.0	0.4	0.0
Thailand	4.6	5.2	0.0	−0.5	Iran	4.6	2.8	1.6	0.2	Pakistan	4.3	4.1	−0.3	0.4	Hong Kong	4.3	2.9	0.2	1.2	Singapore	4.4	5.2	−0.4	−0.4
Singapore	4.1	5.1	0.2	−1.2	Nepal	4.4	3.6	0.9	0.0	Thailand	3.4	3.0	0.6	−0.2	Mongolia	3.7	4.3	2.7	−3.3	Pakistan	4.3	4.4	−0.5	0.4
Indonesia	3.8	4.4	−1.0	0.4	Thailand	3.8	3.8	0.0	0.1	ROC	3.1	2.6	0.5	0.0	Singapore	3.4	3.8	−0.4	0.0	Thailand	4.0	4.0	0.2	−0.2
Korea	3.8	4.5	−0.7	0.0	Korea	3.6	4.1	−0.6	0.2	Fiji	3.0	3.0	0.3	−0.3	Korea	3.4	2.9	0.6	−0.1	Iran	3.7	4.6	−0.8	0.0
Fiji	3.3	3.6	0.2	−0.5	Hong Kong	3.3	3.8	−0.8	0.3	Hong Kong	2.9	2.9	0.1	−0.1	Sri Lanka	2.9	1.7	1.3	−0.1	Korea	3.4	3.6	−0.2	0.0
Hong Kong	3.1	4.1	−1.0	−0.1	Pakistan	2.9	3.4	−0.9	0.4	Korea	2.7	2.4	0.3	0.0	ROC	1.4	2.3	−0.6	−0.2	Hong Kong	3.2	3.5	−0.5	0.2
Nepal	2.9	3.4	−0.8	0.1	ROC	1.9	4.2	−2.4	0.1	Singapore	2.6	4.5	−0.6	−1.3	Japan	1.3	1.2	0.1	−0.1	ROC	2.4	3.4	−1.1	0.1
ROC	2.6	3.8	−1.4	0.2	Japan	−0.3	0.1	−0.5	0.1	Japan	1.2	1.0	0.0	0.2	Fiji	−2.0	0.4	0.1	−2.5	Fiji	1.5	1.9	0.2	−0.6
Japan	1.0	1.2	−0.3	0.1	Fiji	−0.5	−0.4	0.1	−0.2	Iran	−4.0	2.7	−6.7	0.1	Myanmar	−8.8	2.7	−11.4	−0.1	Japan	0.7	0.8	−0.2	0.1
Bahrain	7.9	6.5	1.3	0.0	Bahrain	8.5	6.4	3.5	−1.4	Bahrain	3.1	3.9	−1.6	0.8	Bahrain	2.7	2.9	−0.1	0.0	Bahrain	6.1	5.3	0.9	−0.2
Kuwait	10.7	7.3	4.6	−1.2	Kuwait	3.2	0.4	3.3	−0.5	Kuwait	−1.5	3.5	−5.5	0.5	Kuwait	1.2	−1.2	0.4	2.1	Kuwait	3.8	3.1	0.8	−0.1
Oman	8.1	3.0	4.9	0.2	Oman	6.4	2.9	4.2	−0.6	Oman	1.9	3.7	−2.5	0.6	Oman	1.8	5.6	−3.3	−0.4	Oman	5.0	3.5	1.5	0.0
Qatar	12.0	9.7	4.6	−2.3	Qatar	14.8	13.3	1.0	0.6	Qatar	4.9	6.0	−2.8	1.7	Qatar	6.2	6.8	−1.6	1.0	Qatar	10.1	9.3	0.6	0.1
Saudi Arabia	9.2	4.0	5.3	−0.1	Saudi Arabia	5.4	2.5	2.6	0.2	Saudi Arabia	1.9	5.0	−3.2	0.2	Saudi Arabia	1.2	0.1	1.0	0.0	Saudi Arabia	5.0	3.4	1.5	0.1
UAE	6.7	5.0	1.8	−0.1	UAE	4.4	2.6	2.2	−0.3	UAE	4.2	5.3	−1.2	0.1	UAE	1.9	1.9	−0.1	0.1	UAE	4.7	4.0	0.8	−0.1
Brunei	8.0	3.8	4.2	0.0	Brunei	1.6	−4.3	6.0	−0.1	Brunei	0.1	0.0	−1.0	1.1	Brunei	−0.9	−0.2	−1.2	0.6	Brunei	2.7	−0.2	2.5	0.4
(reference)					(reference)					(reference)					(reference)					(reference)				
US	2.5	2.5	0.0	0.1	US	1.0	0.9	0.0	0.1	US	2.3	2.2	0.2	0.0	US	2.0	1.8	0.2	0.0	US	2.0	1.9	0.1	0.1
EU15	1.9	1.8	0.1	0.0	EU15	0.7	0.7	−0.1	0.0	EU15	0.9	0.9	0.1	−0.1	EU15	2.4	2.2	0.1	0.2	EU15	1.3	1.3	0.0	0.0
EU28	1.9	1.7	0.1	0.1	EU28	0.8	0.9	−0.1	0.0	EU28	1.1	1.1	0.1	−0.1	EU28	2.3	2.3	0.1	0.0	EU28	1.4	1.3	0.0	0.0
Australia	4.2	3.3	1.2	−0.2	Australia	4.3	2.8	1.4	0.0	Australia	1.7	2.8	−1.4	0.3	Australia	3.8	2.5	1.6	−0.3	Australia	3.4	2.9	0.5	0.0
Turkey	4.5	4.7	0.3	−0.5	Turkey	3.3	3.8	−0.3	−0.1	Turkey	6.7	7.1	−0.3	−0.1	Turkey	5.3	5.8	−0.4	−0.1	Turkey	4.9	5.2	−0.2	−0.2

Unit: Percentage.
Sources: Official national accounts in each country, including author adjustments.
Note: See footnote 52 in Section 7.1 (p. 88) for the definition of real GDP growth, real income growth, and trading gain growth.

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