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Good Times, Uncertain Times:

A Time to Prepare

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Contents

Definitions

In this *Regional Economic Outlook: Asia and Pacific*, the following groupings are employed:

"ASEAN" refers to Brunei Darussalam, Cambodia, Indonesia, Lao P.D.R., Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam, unless otherwise specified.

"ASEAN-5" refers to Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

"Advanced Asia" refers to Australia, Hong Kong SAR, Japan, Korea, New Zealand, Singapore, and Taiwan Province of China.

"Emerging Asia" refers to China, India, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam.

"Frontier and Developing Asia" refers to Bangladesh, Cambodia, Lao P.D.R., Mongolia, Myanmar, Nepal, and Sri Lanka.

"Asia" refers to ASEAN, East Asia, Advanced Asia, South Asia, and other Asian economies.

"EU" refers to the European Union.

The following abbreviations are used:

ASEAN	Association of Southeast Asian Nations
BEAT	Base Erosion Anti-abuse Tax
CPI	consumer price index
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
FDI	foreign direct investment
FDII	foreign-driven intangible income
GDP	gross domestic product
GILTI	global intangible low-taxed income
GVC	global value chain
IS	investment saving
JGB	Japanese government bond
NAIRU	nonaccelerating inflation rate of unemployment
OECD	Organisation for Economic Co-operation and Development
PICs	Pacific island countries
PPI	producer price index
REER	real effective exchange rate
TCJA	Tax Cuts and Jobs Act
WEO	*World Economic Outlook*

The following conventions are used:

In tables, a blank cell indicates "not applicable," ellipsis points (. . .) indicate "not available," and 0 or 0.0 indicates "zero" or "negligible." Minor discrepancies between sums of constituent figures and totals are due to rounding.

In figures and tables, shaded areas show IMF projections.

An en dash (–) between years or months (for example, 2007–08 or January–June) indicates the years or months covered, including the beginning and ending years or months; a slash or virgule (/) between years or months (for example, 2007/08) indicates a fiscal or financial year, as does the abbreviation FY (for example, FY2009).

An em dash (—) indicates the figure is zero or less than half the final digit shown.

"Billion" means a thousand million; "trillion" means a thousand billion.

"Basis points" refer to hundredths of 1 percentage point (for example, 25 basis points are equivalent to ¼ of 1 percentage point).

As used in this report, the term "country" does not in all cases refer to a territorial entity that is a state as understood by international law and practice. As used here, the term also covers some territorial entities that are not states but for which statistical data are maintained on a separate and independent basis.

This *Regional Economic Outlook: Asia and Pacific* was prepared by a team coordinated by Koshy Mathai of the IMF's Asia and Pacific Department, under the overall direction of Changyong Rhee and Kenneth Kang. Contributors include Sergei Dodzin, Juan Angel Garcia Morales, Keiko Honjo (RES), Sarwat Jahan, Joong Shik Kang, Weicheng Lian (RES), Pablo Lopez Murphy, Medha Madhu Nair, Rui Mano, Dirk Muir, Simon Paroutzoglou, Tahsin Saadi Sedik, Piyaporn Sodsriwiboon, Cormac Sullivan, Katsiaryna Svirydzenka, Niklas Johan Westelius, Rizki Wimanda, Irene Zhang, Qianqian Zhang, and country teams. Alessandra Balestieri and Socorro Santayana provided production assistance. Linda Long of the IMF's Communications Department edited the volume and coordinated its publication and release with editing help from David Einhorn. Heidi Grauel provided layout services. This report is based on data available as of April 2, 2018, and includes comments from other departments and some Executive Directors.

Executive Summary

The economic outlook for Asia and the Pacific remains strong, and the region continues to be the most dynamic of the global economy. Near-term prospects have improved since the *Regional Economic Outlook Update: Asia and Pacific* in October 2017, and risks around the forecast are broadly balanced for now. Over the medium term, however, downside risks dominate, including from a tightening of global financial conditions, a shift toward protectionist policies, and an increase in geopolitical tensions. Given the many uncertainties, macroeconomic policies should be conservative and aimed at building buffers and increasing resilience. Policymakers should also push ahead with structural reforms to address medium- and long-term challenges, such as population aging and declining productivity growth, and to ensure that Asia is able to reap the full benefits of increasing digitalization in the global economy.

Growth in Asia is forecast at 5.6 percent in 2018 and 2019, while inflation is projected to be subdued. Strong and broad-based global growth and trade, reinforced by the US fiscal stimulus, are expected to support Asia's exports and investment, while accommodative financial conditions should support domestic demand. China's growth is projected to ease to 6.6 percent, partly reflecting the authorities' financial, housing, and fiscal tightening measures. Growth in Japan has been above potential for eight consecutive quarters and is expected to remain strong this year at 1.2 percent. And in India, growth is expected to rebound to 7.4 percent, following temporary disruptions related to the currency exchange initiative and the rollout of the Goods and Services Tax.

Risks around the outlook are balanced for now but tilted to the downside over the medium term. On the upside, the global recovery could again prove stronger than expected, and over time the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and successful implementation of the Belt and Road Initiative—assuming debt sustainability and project quality are maintained—could both support trade, investment, and growth. On the downside, Asia remains vulnerable to a sudden and sharp tightening of global financial conditions, while too long a period of easy conditions risks a further buildup of leverage and financial vulnerabilities. These vulnerabilities could be exacerbated by excessive risk taking and a migration of financial risks toward nonbanks. The gains from globalization have not been shared equally, and, as highlighted by recent tariff actions and announcements, a shift toward inward-looking policies is another risk, with the potential to disrupt international trade and financial markets. Geopolitical tensions remain another important source of risk. Finally, cybersecurity breaches and cyberattacks are on the rise globally, and climate change and natural disasters could continue to have a significant impact on the region.

Long-term growth prospects for the Asia and Pacific region are impacted by demographics, slowing productivity growth, and the rise of the digital economy. One important challenge is population aging, as many economies in the region face the risk of "growing old before they grow rich," and the adverse effect of aging on growth and fiscal positions could be substantial. A second challenge is slowing productivity growth. Finally, the global economy is becoming increasingly digitalized, and while some recent advances could be truly transformative, they also bring challenges, including those related to the future of work. Asia is embracing the digital revolution, albeit with significant heterogeneity across the region.

Chapter 2 analyzes the factors behind low inflation despite strong growth, and how long this is expected to last. The findings highlight that temporary global factors, including imported inflation, have been key drivers of low inflation. And indeed, in line with an upturn in oil prices over recent months, headline inflation in the region has picked up, while core inflation has remained subdued and below target in many economies. Second, while inflation expectations are generally well anchored to targets, the influence of expectations in driving inflation has declined, as the inflation process has instead become more backward looking. Third, there is some evidence that the sensitivity of inflation to economic slack has diminished—in short, the Phillips curve has flattened.

Inflation in the Asia and Pacific region may increase once global factors, including US inflation and commodity prices, become less favorable, and policymakers should stand ready to act. In addition, higher inflation may persist on account of the increasingly backward-looking inflation process. And with a flatter Phillips curve, the output cost of disinflating could be higher. Accordingly, policymakers should be vigilant in responding to early signs of inflation pressure, though the response to commodity price shocks should be to accommodate first- but not second-round effects. Improved monetary policy frameworks and central bank communications could increase the role of expectations in driving inflation and thus make inflation less sticky. More flexible exchange rates could mitigate the role of imported inflation, and macroprudential policies can help address financial stability risks.

With output gaps closing in much of the region, continued fiscal support is less needed, and most economies in Asia should turn to strengthening buffers, increasing resilience, and ensuring sustainability. Some economies should also focus on improving revenue mobilization to create space for infrastructure and social spending and help support structural reforms. The strong economic outlook makes this an opportune moment to pursue such reforms. Tailored measures are needed to boost productivity and investment, narrow gender gaps in labor force participation, deal with the demographic transition, address climate change, and support those affected by shifts in technology and trade. And finally, to reap the full benefits of the digital revolution, Asia will need a comprehensive and integrated policy response covering information and communication technology, infrastructure, trade, labor markets, and education.

1. Good Times, Uncertain Times: A Time to Prepare

The world economy continues to perform well, with strong growth and trade, rising but still muted inflation, and accommodative financial conditions, notwithstanding some increased financial market volatility in early 2018. Driven partly by the procyclical tax stimulus in the United States, near-term economic prospects for both the world and Asia have improved from the already-favorable outlook presented in the October 2017 Regional Economic Outlook Update: Asia and Pacific. *Asia is expected to grow by about 5½ percent this year, accounting for nearly two-thirds of global growth, and the region remains the world's most dynamic by a considerable margin. But despite the strong outlook, policymakers must remain vigilant. While risks around the forecast are broadly balanced for now, they are skewed to the downside over the medium term. Key risks include further market corrections, a shift toward protectionist policies, and an increase in geopolitical tensions. With output gaps closing in much of the region, fiscal policies should focus on ensuring sustainability. Given still moderate wage and price pressures, monetary policies can remain accommodative in most Asian economies for now, but central banks should stand ready to adjust their stances as inflation picks up, and macroprudential policies should be used appropriately to contain credit growth. Many Asian economies face important medium-term challenges, including population aging and declining productivity growth, and will need structural reforms, complemented in some cases by fiscal support. Finally, the global economy is becoming increasingly digitalized, and some of the emerging technologies have the potential to be truly transformative, even as they pose new challenges. Asia is already a leader in many aspects of the digital revolution, but to remain at the cutting edge and reap the full benefits from technological advances, policy responses will be needed in a range of areas, including information and communication technology, trade, labor markets, and education.*

This chapter was prepared by Sergei Dodzin (lead), Joong Shik Kang, and Simon Paroutzoglou, under the guidance of Koshy Mathai. Substantial input was provided by Keiko Honjo (RES), Sarwat Jahan, Dirk Muir, Medha Madhu Nair, Tahsin Saadi Sedik, Piyaporn Sodsriwiboon, Cormac Sullivan, Irene Zhang, and country teams. Alessandra Balestieri and Socorro Santayana provided excellent production assistance.

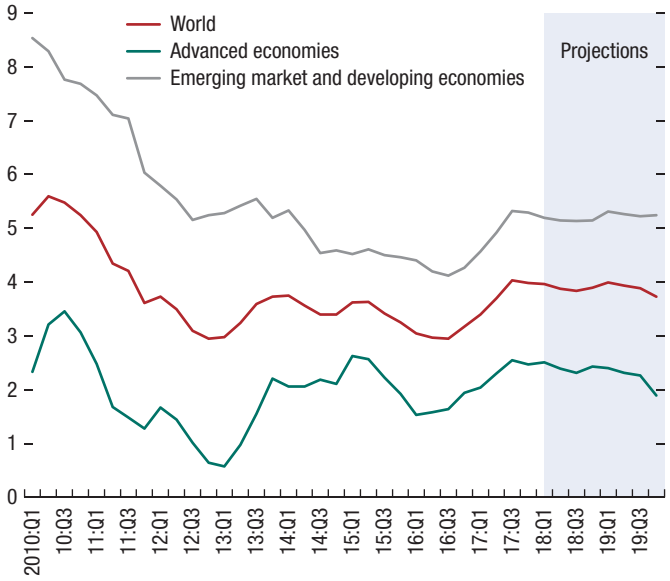
Global Context

Growth continues to be strong, with the cyclical upturn that started in mid-2016 continuing through 2017. Global output is estimated to have grown by 3.8 percent in 2017, 0.2 of a percentage point higher than projected in the October 2017 *World Economic Outlook* and the fastest since 2011 (Figure 1.1). The pickup in growth was broad-based, with growth accelerating in about three-quarters of the economies, but especially strong for the advanced economies. Global investment, which had slowed in the previous two years, recovered strongly in both advanced and emerging market economies, partly driven by the technology cycle and the launch of new products. World trade picked up in turn, with global trade volume growth rising to 5 percent in 2017 from 2.3 percent the year before (Figure 1.2).

Headline inflation has increased since September with the recent rise in oil and food prices, but core inflation and wage growth remain muted. Inflation picked up in advanced economies from 0.8 percent in 2016 to a still moderate 1.7 percent in 2017, while declining in emerging market and developing economies from 4.3 to 4.1 percent (Figure 1.3). Despite the pickup in activity and falling headline unemployment rates in many economies, wage growth has been tepid, reflecting weak productivity growth and continued labor market slack in the form of low participation rates and high levels of involuntary part-time work.

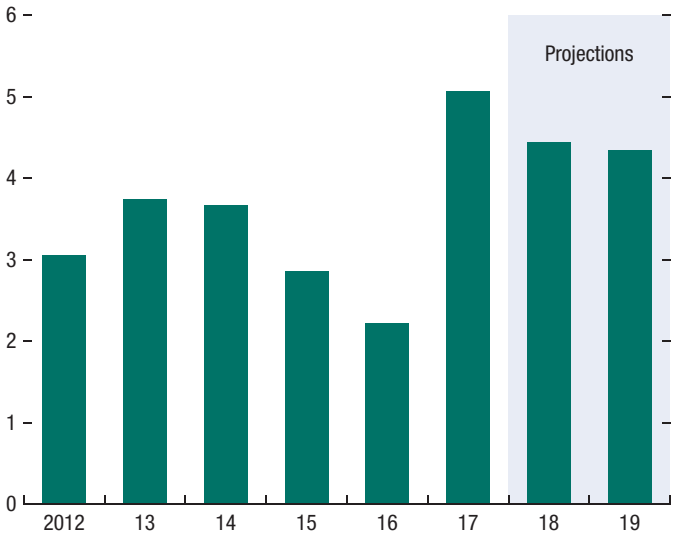
Notwithstanding some episodes of increased financial market volatility this year—sparked first by growing concerns about higher inflation in the United States and a faster pace of monetary

Figure 1.1. Real GDP Growth
(Percentage points, year over year)



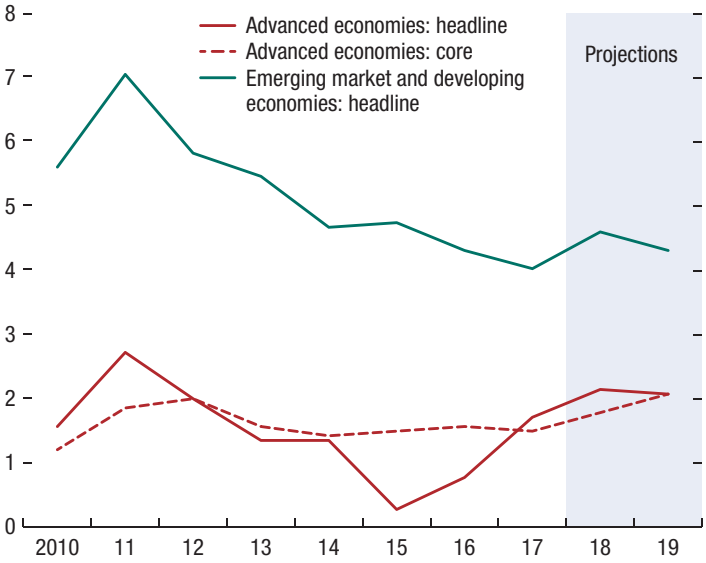
Sources: IMF, World Economic Outlook database; and IMF staff calculations.

Figure 1.2. World: Volume of Total Exports of Goods and Services
(Percentage points, year over year)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.

Figure 1.3. Price Inflation: Headline and Core
(Percentage points, year over year)

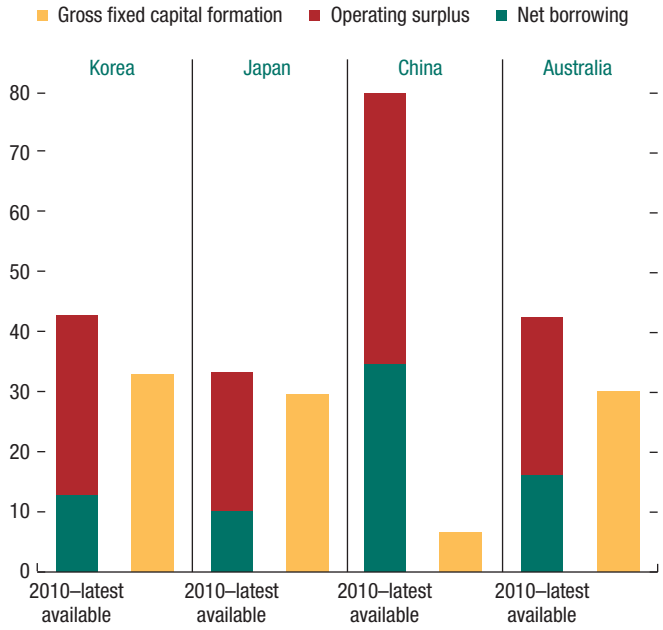


Sources: IMF, World Economic Outlook database; and IMF staff calculations.

policy normalization, and later by announcements of tariff increases and fears of escalation—overall global financial conditions remain accommodative and supportive of the recovery. As most central banks maintained their accommodative policies amid weak inflation, investors continued their search for yield given low interest rates, an improved economic outlook, and increased risk appetite. Across the world, companies' operating surplus exceeded investment requirements, and companies used internal resources and available credit for share buybacks and other financial transactions, further boosting asset prices (Figure 1.4). And despite some recent turmoil, emerging markets generally continued to experience large capital inflows and very low borrowing spreads (Figure 1.5).

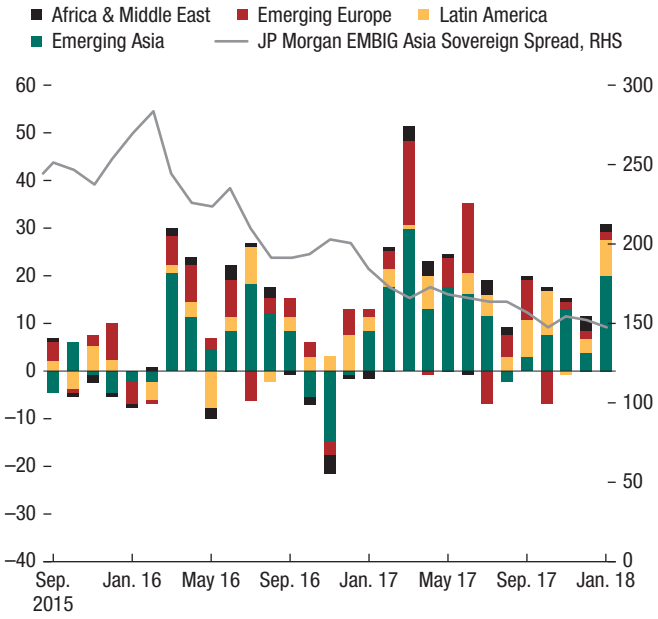
The near-term global outlook continues to be strong, as noted in the April 2018 *World Economic Outlook*, with growth projected at 3.9 percent in both 2018 and 2019 (Figure 1.1). Recent developments point to strong momentum, which could continue. The US tax reform and budget will provide substantial front-loaded stimulus to the United States and the global economy, and financial conditions remain favorable (see the discussion in the April 2018 *Global Financial Stability Report*). Over the medium term, however, global growth is expected to slow to 3.7 percent,

Figure 1.4. Selected Economies: Sources and Uses of Funds
(Percent of GDP)



Sources: Bank for International Settlements; Bloomberg Finance L.P.; CEIC Data Co.; IMF, *Balance of Payments Statistics;* IMF, *Monetary and Financial Statistics;* IMF, *World Economic Outlook;* Organisation for Economic Co-operation and Development; and IMF staff calculations.

Figure 1.5. Total Portfolio Flows
(Billions of US dollars, basis points)



Sources: Bloomberg Finance L.P.; Institute of International Finance; national sources; and IMF staff calculations.
Note: RHS = right scale.

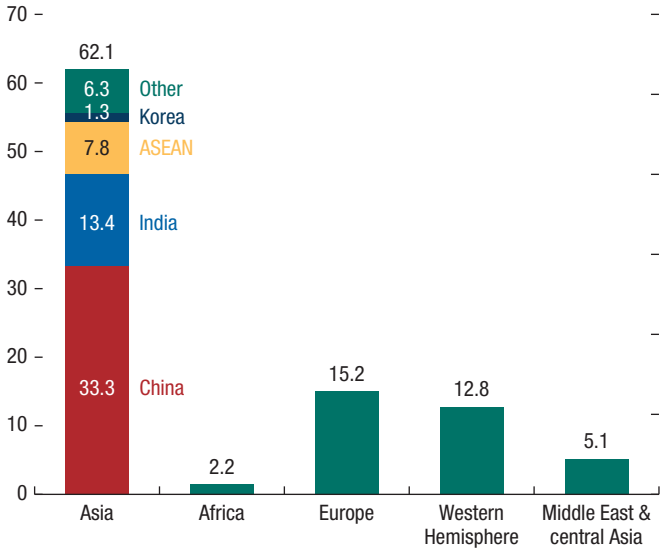
partly reflecting population aging and lackluster productivity growth in advanced economies.

The global forecast is surrounded by considerable uncertainty, particularly given the important changes to tax, trade, and monetary policies in the United States and possible further policy responses from other economies. Risks around the outlook appear to be broadly balanced in the near term but tilted to the downside in the medium term. While the current cyclical rebound could continue to surprise on the upside, a sudden tightening of global financial conditions, possibly triggered by inflation surprises and revised market expectations of monetary policy tightening, could weigh on global demand. At the same time, continued easy financial conditions also pose risks over the medium term, as they could lead to a further buildup of financial vulnerabilities over time. The US fiscal stimulus heightens medium-term risks by contributing to an increase in US debt as well as a (temporary) buildup of global imbalances. A shift toward inward-looking policies remains an important risk, as highlighted by recent tariff actions and announcements. An increase in geopolitical tensions, climate change, and cybersecurity breaches pose additional risks to the outlook.

Regional Developments

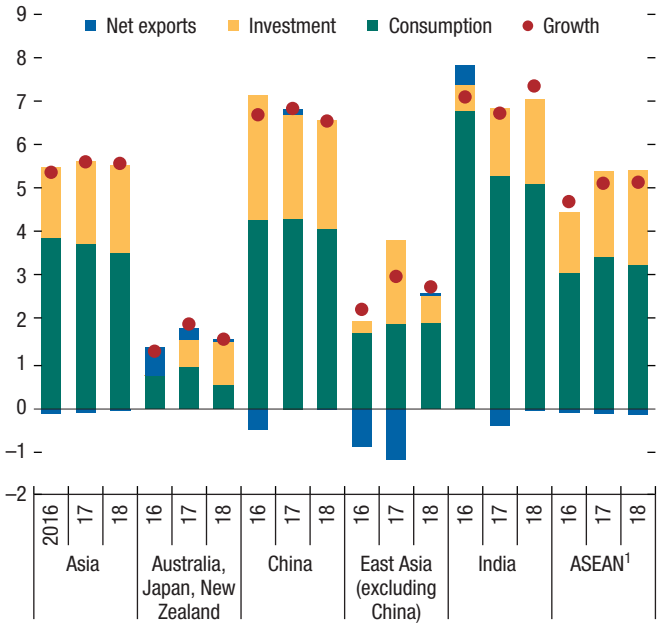
Growth in Asian economies has picked up in line with global developments. Asia grew by 5.7 percent in 2017, up 0.3 of a percentage point from the year before, with the pickup broad-based across the region (Table 1.1). Asia continues to be both the fastest-growing region in the world and the main engine of the world's economy, contributing more than 60 percent of global growth (three-quarters of which comes from China and India) (Figure 1.6). Consumption and investment continue to be major contributors. The contribution of net exports remained small, but the strong growth of gross exports and imports suggests that the recovery in external demand (both inside and outside the region) was an

Figure 1.6. Contribution to Global Growth by Region
(Percent, 2017 estimates)



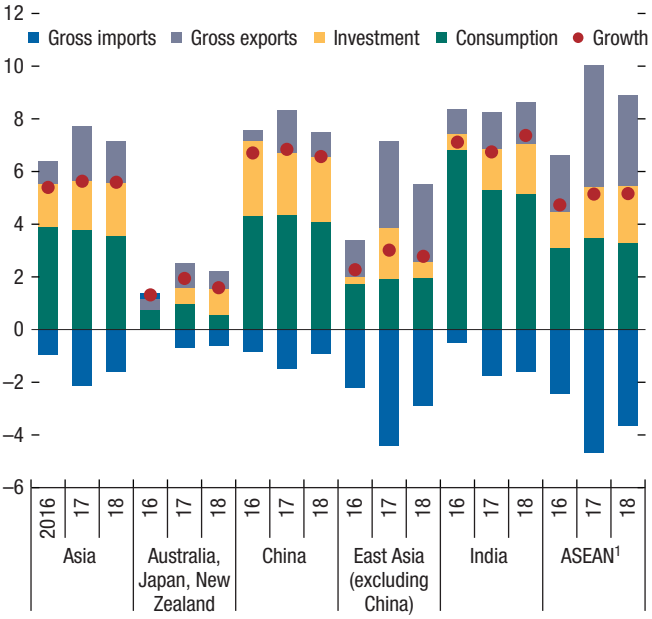
Sources: IMF, *World Economic Outlook*; and IMF staff estimates.
Note: Regional categories based on IMF classification. ASEAN = Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam.

Figure 1.7. Selected Asia: Contributions to Projected Growth
(Percentage points, year over year)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.
[1]ASEAN = Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam.

Figure 1.8. Selected Asia: Contributions to Projected Growth
(Percentage points, year over year)



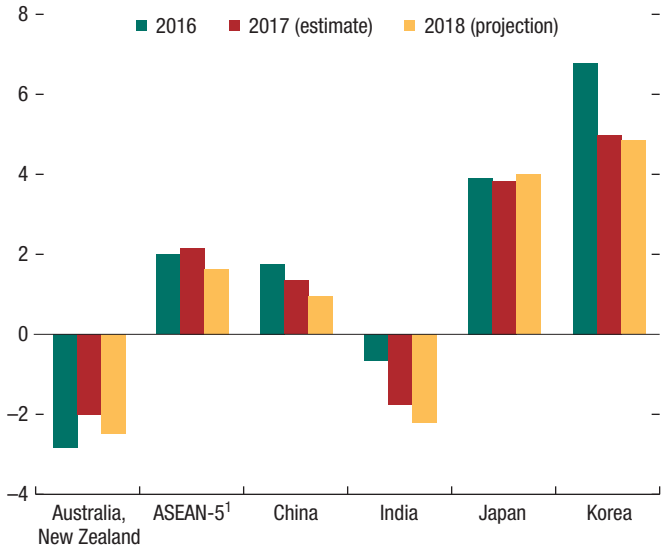
Sources: IMF, World Economic Outlook database; and IMF staff calculations.
[1]ASEAN = Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam.

important driver of GDP growth in Asia (Figures 1.7 and 1.8).

While rising domestic demand and the pickup in oil prices helped reduce current account balances in large surplus economies, including China and Korea, many Asian emerging market and developing economies continued to run moderate current account deficits on the back of ongoing capital investments. Overall, the current account surplus for the region narrowed to 2.1 percent of GDP, down by ½ percent from 2016 (Figure 1.9 and Table 1.3).

As in other regions, inflation has largely remained subdued despite a pickup in growth. While headline inflation rose slightly in 2017 because of oil prices, core inflation remained low and wage pressures were muted (Table 1.2). The puzzling phenomenon of low inflation is taken up in Chapter 2, which suggests that the decline in commodity prices since 2013 was a major driver, that expectations have become more backward-looking, and that the Phillips curve may have flattened in recent years, possibly on account of factors such as increasing automation and integration with global value chains that have

Figure 1.9. Asia: Current Account Balances
(Percent of GDP)

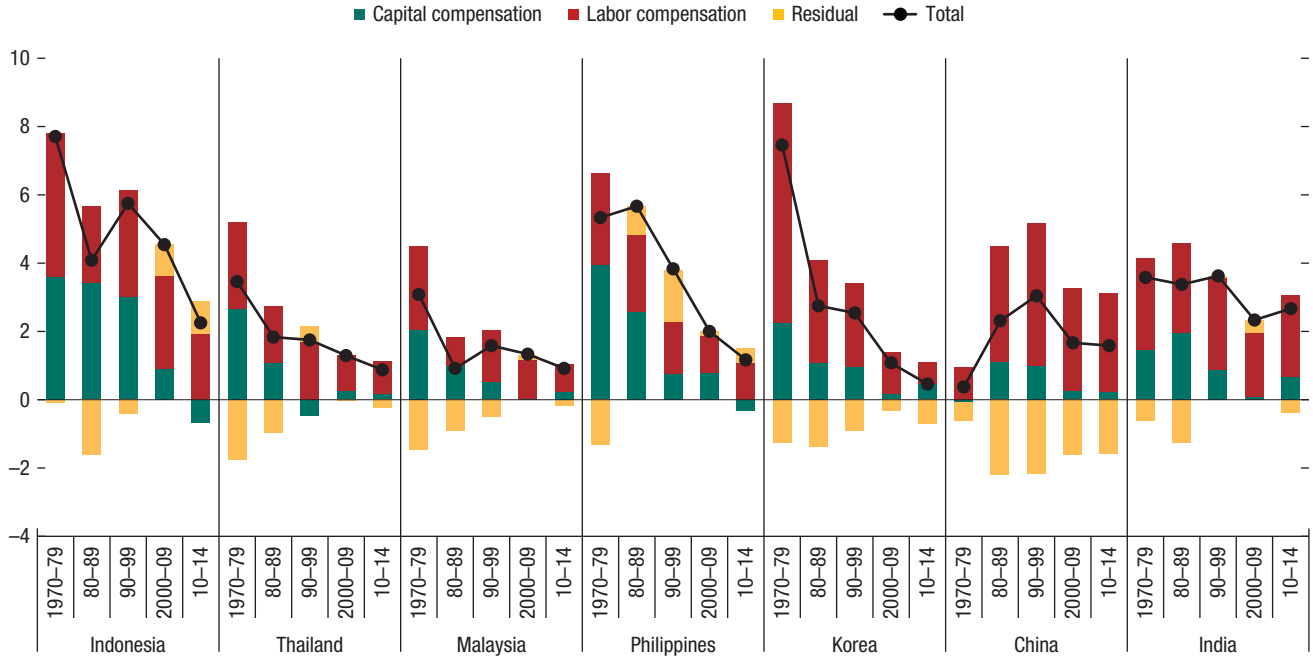


Sources: IMF, World Economic Outlook database; and IMF staff calculations.
[1]ASEAN-5 = Malaysia, Philippines, Singapore, Thailand, Vietnam.

reduced labor's bargaining power. Technological progress and the decline in capital costs could also be contributing factors (Figure 1.10).

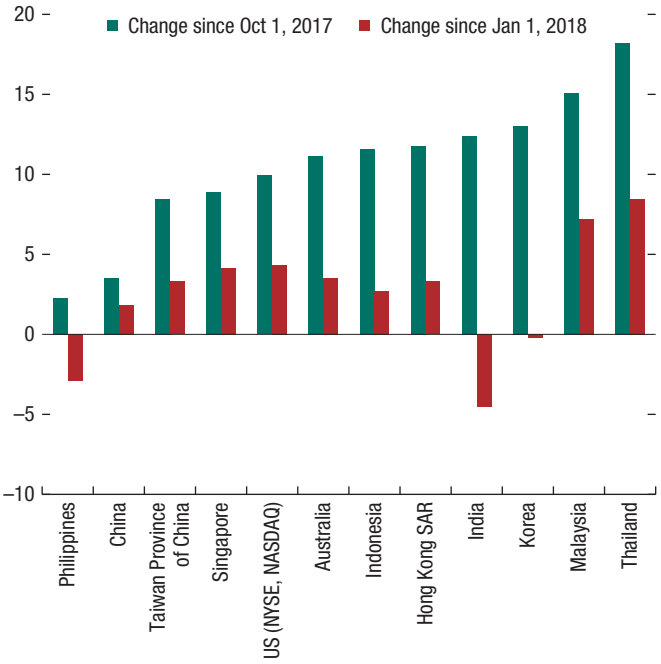
Notwithstanding the equity market declines in early 2018, overall financial conditions in the region remained favorable, as the impact of the US Federal Reserve's gradual policy normalization was largely offset by a further strengthening in risk appetite. Stock markets rose sharply through the end of January 2018 and, despite weakening thereafter, are still up over the past year. Sovereign bond yields generally declined, supported by continued capital flows into the region (Figures 1.11 and 1.12). After some outflows in late 2016, net portfolio inflows resumed in the first half of 2017 and continued through the second half of the year, albeit at a slower pace (Figures 1.13 and 1.14). With the US dollar weakening, most Asian currencies continued to appreciate during 2017 and into 2018.

Figure 1.10. Selected Economies: GDP Deflators–Contribution by Components
(Percent change)



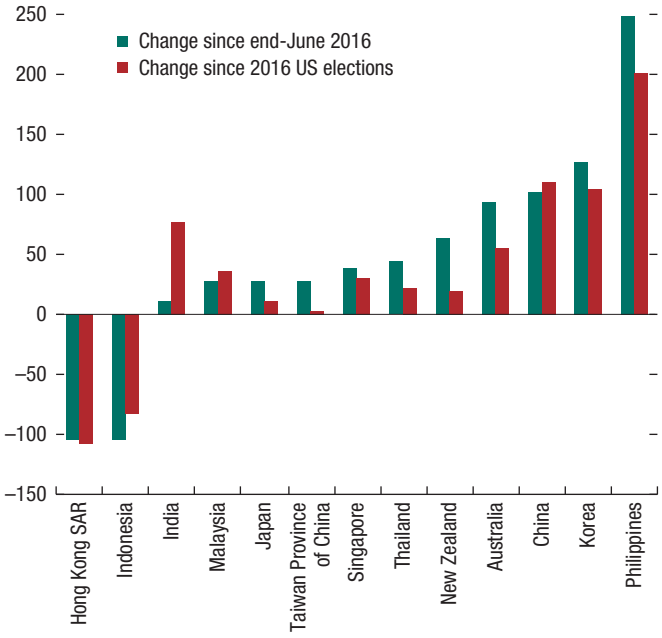
Sources: Penn World Table 9.0; and IMF staff calculations.
Note: The figure presents the percentage change decomposition of the GDP deflator into changes in capital cost contribution p_k, labor cost contribution w, and change in the residual A_t (proxy for aggregate productivity change and other effects): $\frac{dc}{c} = -\frac{dA_t}{A_t} + \alpha_t \frac{dp_k}{p_k} + (2-\alpha)\frac{dw}{w}$.

Figure 1.11. Asia: Equity Market Capitalization
(Percent)



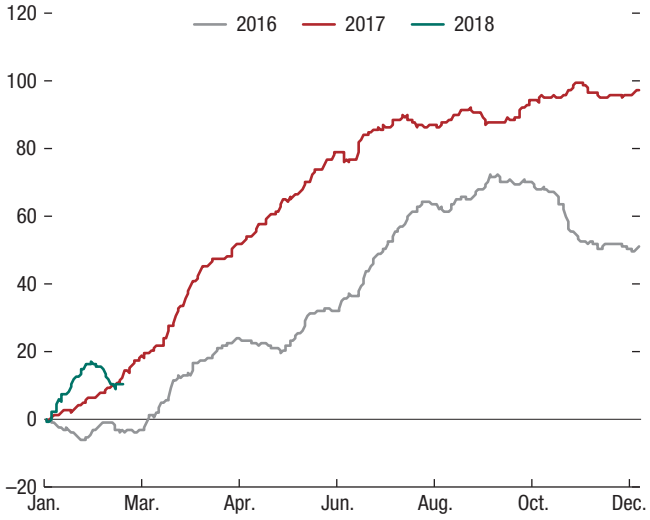
Sources: Bloomberg Finance L.P.; Haver Analytics; and IMF staff calculations.

Figure 1.12. Asia: Ten-year Sovereign Bond Yields
(Basis points)



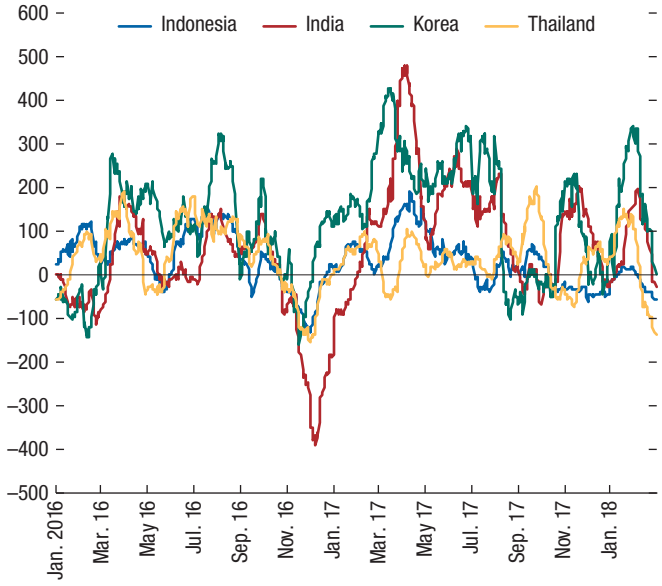
Sources: Bloomberg Finance L.P.; Haver Analytics; and IMF staff calculations.

Figure 1.13. Asia: Cumulative Portfolio Flows
(Billions of US dollars)



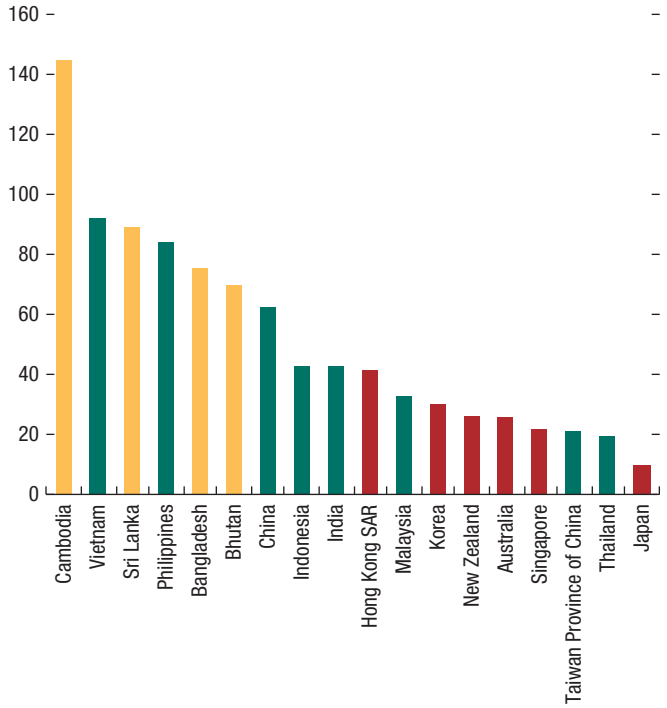
Sources: Bloomberg Finance L.P.; Haver Analytics; and IMF staff estimates.
Note: Equities coverage: India, Indonesia, Korea, Philippines, Sri Lanka,Taiwan Province of China, Thailand, Vietnam; bonds coverage: India, Indonesia, Korea, Thailand.

Figure 1.14. Selected Economies: Portfolio Flows
(Millions of US dollars a day; 28-day moving average)



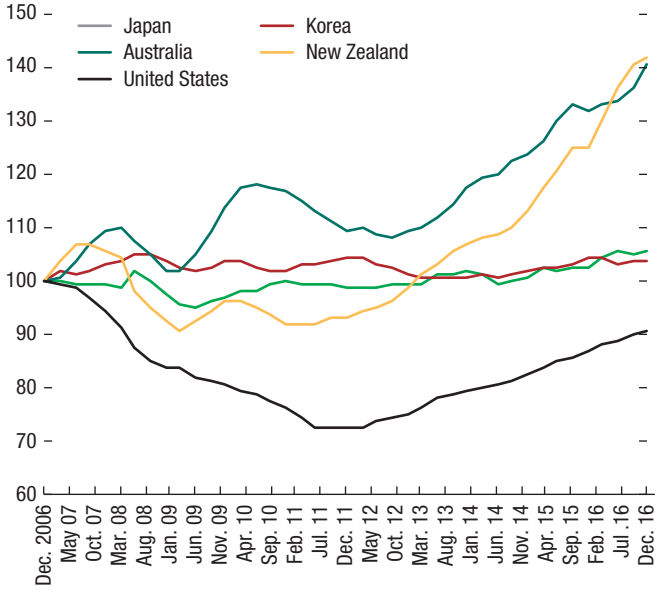
Sources: Bloomberg Finance L.P.; Haver Analytics; and IMF staff calculations.

Figure 1.15. Selected Asia: Real Private Sector Credit Growth
(Cumulative growth, 2013–17)



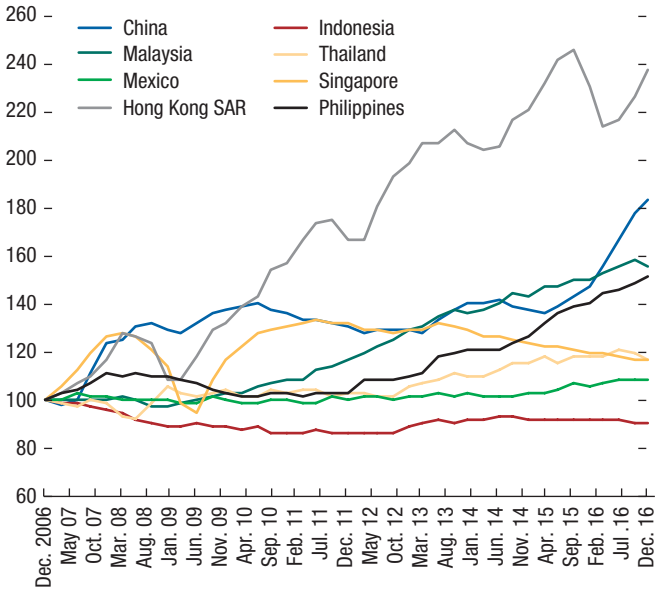
Sources: CEIC Data Co.; Haver Analytics; and IMF staff calculations.
Note: Private sector credit is based on the depository corporations survey.

Figure 1.16. Advanced Economies: Housing Index
(Index, 2006:Q4 = 100)



Sources: IMF Research Department; and IMF staff calculations.

Figure 1.17. Emerging Market Economies: Housing Index
(Index, 2006:Q4 = 100)



Sources: IMF Research Department; and IMF staff calculations.

Credit growth in the region remained strong, resulting in a further buildup of corporate leverage and household debt from already high levels (Figure 1.15 and Box 1.1). Strong credit growth also contributed to a further rally in house prices in some economies in the region (Figures 1.16 and 1.17). Several economies, including Australia, Hong Kong SAR, Korea, and Singapore, used macroprudential measures to limit risks in housing markets, and house prices have begun to show some signs of stabilization in recent months.

Developments in individual Asian economies were as follows:

- In *China*, GDP growth accelerated to 6.9 percent in 2017, reversing the trend moderation over the last few years, bolstered by stronger-than-expected external demand and a supportive macro policy mix. Consumption slowed despite a still tight labor market and accounted for less than 60 percent of total GDP growth. Investment also slowed on cooling private real estate investment, which was offset somewhat by still robust public infrastructure as well as the first acceleration in manufacturing

investment in five years. On the supply side, the service sector remained the key driver, reflecting growth in the new economy, especially information technology. Despite a strong pickup in the producer price index (PPI), headline consumer price index (CPI) inflation remained contained, while core inflation rose steadily to above 2¼ percent. (Box 2.1 in Chapter 2 discusses PPI and CPI inflation in China.)

- In *Japan*, GDP growth picked up strongly in 2017 to 1.7 percent, from 0.9 percent in 2016, driven by rising global demand, strengthened business investment, and short-term fiscal support. Exports have increased strongly, more than offsetting a rebound in imports. Headline inflation picked up in the second half of 2017 owing to higher global energy and commodity prices, and recent evidence suggests an uptick in inflation expectations. Nevertheless, underlying inflation (excluding fresh food and energy) remains subdued. The real effective exchange rate depreciated by 5 percent in 2017, while the current account surplus rose slightly to 4 percent of GDP.
- In *India*, the economy is recovering from temporary disruptions from the November 2016 currency exchange initiative and the July 2017 rollout of the new Goods and Services Tax. Growth rebounded strongly to 7.2 percent in the third quarter of FY2017/18, up from 6.1 percent in the first half of the fiscal year. CPI inflation in FY2017/18 is estimated at 3.6 percent, close to the midpoint of the target band (4 percent ±2 percent), reflecting low food price inflation in the first half of the year.
- Growth in *Korea*, after slowing in the second part of 2016, picked up in 2017, supported especially by buoyant investment, while recent geopolitical tensions have had a limited impact. The output gap, nonetheless, remains negative. Inflation pressure has been subdued, with core inflation remaining below 2 percent. The current account surplus narrowed but remained elevated at 5.1 percent of GDP in 2017, down from 7 percent in 2016.
- *Australia*'s recovery from the end of the mining boom advanced further in 2017 despite setbacks from temporary factors, but domestic demand momentum is not yet broad-based. Aggregate demand was led by strong investment, while consumption remained subdued, held back by weak real income growth. Employment grew strongly in 2017 but wage growth has remained weak. Inflation increased to 2 percent in 2017 but is still slightly below the target range of 2–3 percent. The housing market is cooling in the eastern capitals, and price increases have moderated in real terms. *New Zealand* continued to enjoy a period of solid expansion that extends back to 2011. Record strength in net migration, accommodative monetary policy, improving services exports, and continued strong terms of trade have been the major growth drivers.
- Growth in *Hong Kong SAR* in 2017 is estimated at about 3.8 percent, driven mostly by private consumption, and recent high-frequency indicators point to a continuing expansion. External conditions strengthened in 2017, with the current account surplus estimated at 3 percent of GDP. The labor market has been tight, but wage and price pressures have been contained. Despite increasing policy rates amid US tightening, financial conditions remain accommodative. Asset prices saw robust gains—house prices, for instance, rose by over 25 percent between March 2016 and December 2017, after falling somewhat in late 2015 and early 2016—while liquidity stayed ample.

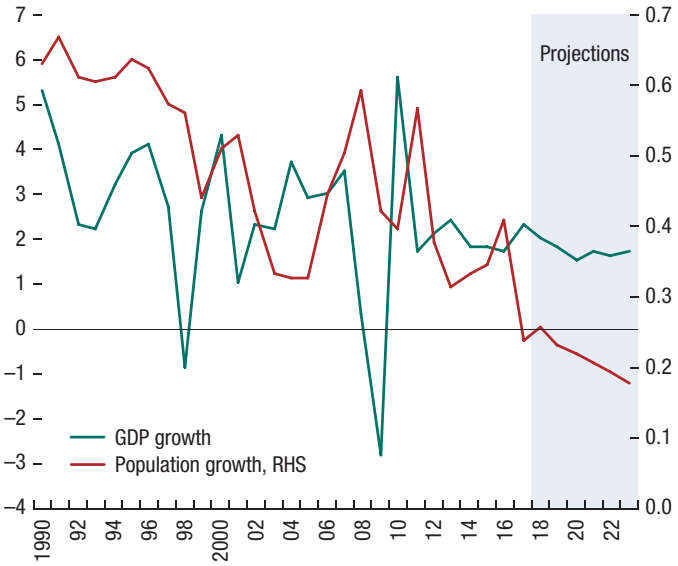
Association of Southeast Asian Nations (ASEAN)

- In *Indonesia*, growth picked up slightly to 5.1 percent in 2017, led by fixed investment. Headline inflation remained below 4 percent, while core inflation remained stable at

about 3 percent. The balance of payments stayed in surplus, with gross international reserves reaching eight months of imports in December 2017. Supportive capital inflows and last year's ratings upgrade to investment grade have buoyed financial markets. In 2018, the rupiah has remained stable, bond yields have fallen, and equities have risen, notwithstanding the earlier market correction.

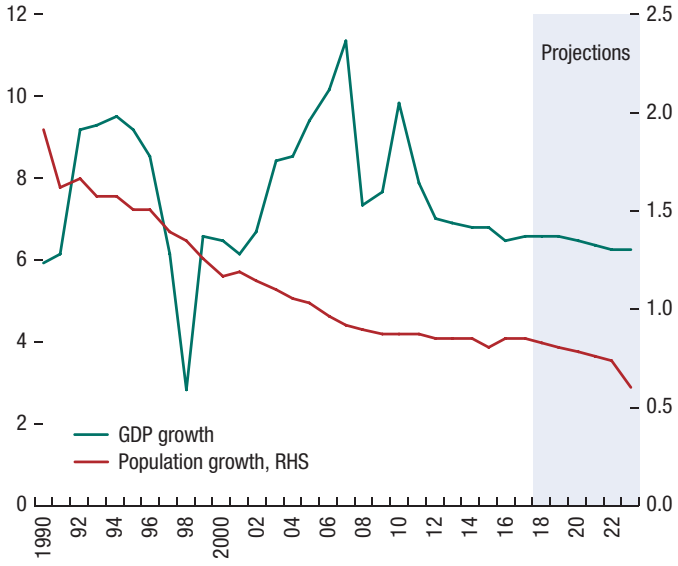
- *Thailand's* growth improved in 2017, supported by strong goods exports and buoyant tourism, as well as resilient private consumption, while both private and public investment have disappointed. Despite higher growth, inflation remains very low and is projected to remain below the target range in the near term. The large current account surplus (10.8 percent of GDP in 2017) remains excessive, reflecting an undervalued exchange rate, weak private investment due to structural bottlenecks, high precautionary savings as a consequence of poorly developed social safety nets, and rapid population aging. A boost in tourist arrivals from China also contributed. Reserve accumulation continues at a fast pace—as of December 2017, international reserves stood at $239 billion, up nearly $42 billion from the end of 2016 and well above IMF adequacy metrics.
- *Singapore's* growth is estimated at 3.6 percent in 2017, driven by a cyclical recovery in trade, including stronger external demand for electronics products. The economic recovery is broadening from externally oriented manufacturing sectors to domestic service sectors as the economy continues its transition to a labor-lean and innovation-based growth model. Headline inflation remains moderate, averaging 0.6 percent in 2017, although higher than in 2016 on account of rising global oil prices. Core inflation, which excludes private accommodation and private transport, rose to 1.5 percent in 2017.
- *Malaysia's* economy grew by 5.9 percent in 2017, driven by private consumption, with private investment and public consumption also contributing, and supported by increased global demand for electronics. After peaking at 4.9 percent in March 2017, headline inflation fell, averaging 3.8 percent for the year, partly reflecting improved commodity terms of trade. Core inflation also fell, driven by lower services and durable goods inflation.
- Growth in the *Philippines* reached 6.7 percent in 2017, led by strong consumption and exports. Inflation picked up to 3.2 percent, still within the target band of 2–4 percent, and edged up further in January 2018 owing to the temporary effects of tax reform implementation and higher energy prices. The current account recorded a small deficit of 0.4 percent of GDP in 2017, partly reflecting higher imports of capital goods for infrastructure investment. The banking sector remains healthy, although credit to the consumer and real estate sectors grew rapidly.
- Economic performance was strong in much of the rest of ASEAN as well. In *Vietnam,* growth reached 6.8 percent in 2017, supported by strong exports and accommodative monetary policy, while inflation remains contained on account of low import prices and the dollar peg. *Cambodia*'s growth in 2017 is estimated at 6.9 percent, backed by higher public spending and robust construction and tourism activity, while inflation picked up to nearly 3 percent. And in *Lao P.D.R.*, growth was strong at 6.8 percent, but the economy faces significant macro-financial imbalances. In *Myanmar*, however, growth dropped to 5.9 percent in 2016/2017 given a temporary suspension of construction permits in Yangon as well as a weakening of agriculture, while inflation dropped to 6.8 percent. And in *Brunei Darussalam*, growth recovered to 0.5 percent in 2017, turning positive for the first time since 2012, mainly driven by the non-oil-and-gas sector.

Figure 1.18. GDP and Population Growth: Advanced Asia
(Weighted average, year over year; percentage points)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: Advanced Asia = Australia, Japan, New Zealand, and the countries of newly industrialized Asia—Hong Kong SAR, Korea, Singapore, Taiwan Province of China. RHS = right scale.

Figure 1.19. GDP and Population Growth: Emerging Asia
(Weighted average, year over year; percentage points)



Sources: IMF, World Economic Outlook database; and IMF staff calculations.
Note: Emerging Asia = China, India, Indonesia, Malaysia, Thailand, Philippines, Vietnam, Mongolia. RHS = right scale.

Other economies

- Performance in other frontier economies was generally strong, with some exceptions. Growth rose above 7 percent in *Bangladesh*, with consumption the main driver. In *Nepal*, growth accelerated to 7.5 percent in 2017 as activity recovered from the 2015 earthquakes and subsequent trade disruptions, while inflation fell to a multiyear low of 4.5 percent as a consequence of low food prices. In *Mongolia*, which is currently implementing an IMF-supported program, higher commodity prices and coal export volumes pushed GDP growth to 5.1 percent, despite substantial fiscal consolidation. But growth in *Sri Lanka*, also under an IMF-supported program, is estimated to have fallen to 3.1 percent on account of droughts and floods that affected agricultural production, as well as slowing construction. A number of frontier and developing economies have seen rapid credit growth (Box 1.1)
- Growth in *Pacific island economies* remained about 2.6 percent in 2017, broadly unchanged from the year before. In *Fiji*, growth jumped to 3.8 percent given the recovery from Cyclone Winston, while in *Papua New Guinea* and *Timor-Leste*, growth remained relatively subdued, partly reflecting weak commodity export prices. Cyclone Gita caused widespread destruction in a number of economies, including *Tonga* and *Samoa*.

Regional Outlook

Asia's strong economic performance is expected to continue in the near term. Growth for the region overall is forecast at 5.6 percent in both 2018 and 2019—up by about 0.1 of a percentage point from projections in October 2017—while emerging Asia is projected to grow by about 6½ percent in both years (Table 1.1). Growth also remains robust in per capita terms (Figures 1.18 and 1.19). With strong growth and consequent import demand, along with higher oil prices, current account

balances are expected to decline further for the region to about 1¾ percent of GDP in 2018–19 (Figure 1.9). Inflation is projected to be subdued, at about 1½ percent on average in advanced economies and about 3¼ percent on average in emerging markets (Table 1.2).

The favorable near-term outlook is driven by strong global growth, which should support Asia's exports and investment, as well as still accommodative policies and financial conditions, which should underpin domestic demand. As noted above, the US tax reform and budget will boost investment and growth in the United States in the short term—though without substantial long-term effects on the level of GDP—with spillovers to Asia, as highlighted in Box 1.2.

The outlook for individual Asian economies is as follows:

- Growth in *China* is projected to moderate to 6.6 percent in 2018 as financial, housing, and fiscal tightening measures take effect, and as net exports contribute less.
- In *Japan*, rising global demand and increased private investment are expected to carry forward into 2018. While average headline inflation is projected at 1.1 percent in 2018, core inflation is expected to be much lower, at 0.5 percent. Wage increases are expected to remain modest despite tight labor market conditions.
- *India*'s growth, projected at 6.7 percent in FY2017/18, should recover to 7.4 percent in FY2018/19, making India once again one of the region's fastest-growing economies. The recovery is expected to be underpinned by a rebound from transitory shocks as well as robust private consumption. Medium-term headline CPI inflation is forecast to remain within but closer to the upper bound of the Reserve Bank of India's inflation-targeting band (4 percent ±2 percent). Medium-term growth prospects remain positive, benefiting from key structural reforms, including the landmark national Good and Services Tax reform. The current account deficit in FY2017/18 is expected to widen somewhat but should remain modest, financed by robust foreign direct investment inflows.
- In *Korea*, the cyclical recovery is expected to continue, with growth of about 3 percent in 2018 and 2019 and consumer price inflation stable at about 2 percent. Private consumption will benefit from the large minimum wage increase and policies supporting employment and social spending. Investment growth should remain positive, although the contribution of construction and facilities investment is expected to decline on account of tighter macroprudential policies. Net exports will also contribute to growth, and the current account surplus is expected to remain elevated at about 5 percent, reflecting the high saving rate.
- *Australia*'s recovery is expected to accelerate, driven by infrastructure investment and private consumption. Inflation is forecast to return to the midpoint of the target range within the next three years. The baseline outlook assumes a soft landing in the housing market, with price growth slowing gradually, reflecting increased supply, demand shifts toward renting, and eventually higher interest rates. *New Zealand*'s growth is expected to be above trend in the near term and to moderate toward trend in the medium term in the face of lower net migration, less earthquake reconstruction spending, and weaker residential investment.
- *Hong Kong SAR*'s strong growth is expected to remain strong at about 3.6 percent in 2018, while the current account surplus is forecast to remain stable at about 3.1 percent of GDP. CPI inflation is projected to increase to 2.2 percent for 2018 and to rise gradually thereafter.

ASEAN

- *Indonesia*'s growth is projected to increase to 5.3 percent in 2018 and 5.5 percent in 2019, led by a pickup in investment and

consumption driven by infrastructure activity and stronger commodity prices. Inflation is projected to remain near the center of the target band (3.5 ±1 percent). The current account deficit is projected to remain contained at 1.9 percent of GDP in 2018, helped by firmer commodity prices and robust exports. Over the medium term, real GDP growth is projected at 5½ percent.

- *Thailand*'s growth is forecast at 3.7 percent in 2017 and 3.5 percent in 2018, while inflation is projected to remain below the 2.5 percent midpoint of the target range in 2018. The current account surplus is projected to decline but still remain very large.
- In *Singapore*, growth is projected at 2.9 percent in 2018, easing to 2.7 percent in 2019 and about 2.6 percent over the medium term. The current account surplus will remain elevated in the near term. Headline inflation is expected to rise to 1.2 percent in 2018, partly on account of higher oil prices, and to stabilize at about 1 percent thereafter, while core inflation should move closer to 2 percent over the medium term.
- *Malaysia*'s GDP growth is projected at 5.3 percent in 2018, slightly above potential. Despite a small positive output gap, there are no signs of inflation pressure. Growth is expected to converge to its potential of about 5 percent in the medium term, with inflation about 2.5 percent.
- In the *Philippines*, growth is projected at 6¾ percent in 2018–19 and about 7 percent over the medium term, led by robust infrastructure investment and private consumption. Inflation should remain within the target band of 2–4 percent, but the authorities will need to watch carefully for building inflation pressure, as well as rapid credit growth. The current account deficit is projected to widen to 0.5 percent of GDP in 2018.
- The outlook is favorable for much of the rest of the ASEAN economies as well. *Vietnam*'s growth is expected to continue at 6½ percent in the near and medium term, with inflation remaining in the range of 4 percent. In *Myanmar*, growth is expected to pick up toward the estimated potential of 7 to 7.5 percent over the medium term, reflecting continued strong foreign direct investment inflows and an improvement in public investment spending and efficiency. *Cambodia*'s medium-term growth is projected to slow to about 6 percent on account of a moderation in the credit and real estate cycles, coupled with ongoing challenges in improving economic diversification and competitiveness. Growth in *Lao P.D.R.* is expected to continue at about 7 percent in the near and medium term, while in *Brunei Darussalam,* growth is expected to pick up to 1 percent in 2018 reflecting higher oil output.

Other economies

- The outlook for other frontier economies is mostly positive. In *Bangladesh*, growth should slow slightly to 7 percent in FY2018, while inflation should drop toward target as the effects of food price shocks wane. In *Nepal*, growth is expected to slow to 5 percent in 2018 following the post-earthquake rebound, and inflation is expected to rise to 6 percent as food prices normalize and activity begins to run up against capacity constraints. *Sri Lanka*'s economy should recover from the recent weather-related shocks, with growth rising to 4.4 percent and inflation dropping to 5 percent—the midpoint of the target range—by the end of 2018. In *Mongolia*, growth is expected to remain strong in 2018 and pick up sharply over the medium term as a major new mine comes onstream.
- Growth in *Pacific island economies* is expected to pick up slightly in 2018–19 to about 3 percent, helped by growing tourist arrivals, higher commodity prices, and stronger fishing revenues. Inflation is expected to remain low in most economies. The outlook, however, is subject to significant downside risks related to natural disasters.

Risks to the Outlook

The balance of risks has improved since the October 2017 *Regional Economic Outlook Update: Asia and Pacific*. Key factors include the stronger near-term global growth outlook and the smooth transition to US monetary policy normalization. But while risks around the outlook are broadly balanced in the near term, they remain tilted to the downside over the medium term. Key uncertainties include a possible sudden tightening of global financial conditions, a retreat from global integration, a continued buildup of private sector leverage and financial vulnerabilities, and rising geopolitical tensions.

Upside Risks

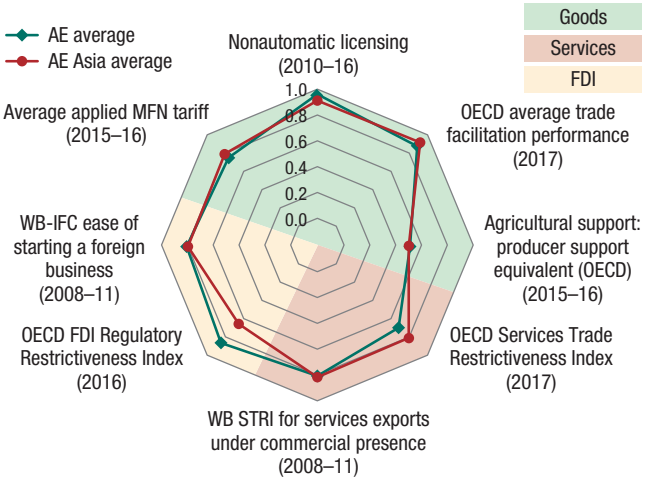
In the near term, growth momentum could be more durable than expected amid strong consumer and business confidence and still loose financial conditions. The implementation of fiscal stimulus in the United States as well as a stronger recovery in the euro area could lift global growth, with positive spillovers to the Asia and Pacific region. Over the medium term, the new Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) could boost trade, investment, and growth, and successful implementation of China's Belt and Road Initiative could facilitate greater regional integration, as long as the investment scale-up does not compromise debt sustainability or project quality. Asia is also embracing the digital revolution, though to different degrees across economies. The digital revolution encompasses a broad array of new technological developments, some of which could transform economies and boost productivity and potential growth in the region over the medium term (Box 1.3).

Sharp Tightening of Global Financial Conditions

Net financial flows to emerging market and developing economies have picked up over the past year as global risk appetite has recovered, leading to rich asset valuations in the region, and indeed across the world. Global equity markets, however, saw increased volatility this year, along with some capital flows toward safe havens, hinting that further asset price corrections and portfolio adjustment remain possible. An abrupt change in global risk appetite—due, for instance, to an inflation surprise in the United States or an escalation of trade tensions (see below)—could lead to a sudden, sharp increase in interest rates and a tightening of global financial conditions. And while Asia's rapid growth—which should make it attractive to capital inflows—and its increased external buffers since the 2013 taper tantrum should help, the region remains vulnerable to a global risk-off event. Such a tightening would strengthen the US dollar and euro vis-à-vis other currencies and, as international investors withdraw, bring about corrections in rich market valuations, imposing strains and sizable output costs on regional economies with high leverage, balance sheet mismatches, or US dollar pegs (see the April 2018 *Global Financial Stability Report*).

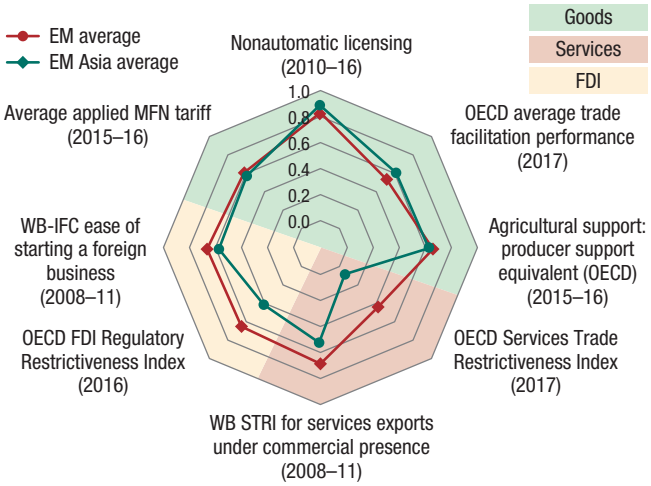
There is also a potential for strains in dollar funding markets for economies where financial institutions have relied on short-term external funding. Stricter liquidity supervision may increase foreign banks' holdings of dollar liquidity in the United States, restricting international supply, as discussed in the April 2018 *Global Financial Stability Report*. These structural changes are likely to raise the cost of funding in global markets. For example, in Japan, some internationally active regional banks are exposed to foreign exchange funding liquidity risk given that they rely on short-term foreign exchange swaps relatively more than large banks do. The potential negative funding gap for those banks would, however, account for only a very small portion of total foreign-currency-denominated liabilities of the entire Japanese banking sector (see the IMF's 2017 Japan Financial Sector Assessment Program).

Figure 1.20. Advanced Economies: Overall Trade and Foreign Direct Investment Regime



Source: Cerdeiro and Nam (2018).
Note: AE = advanced economy; FDI = foreign direct investment; MFN = most favored nation; OECD = Organisation for Economic Co-operation and Development; WB-IFC, World Bank, International Finance Corporation; WB STRI = World Bank, Services Trade Restrictiveness Index.

Figure 1.21. Emerging Market Economies: Overall Trade and FDI Regime



Source: Cerdeiro and Nam (2018).
Note: EM = emerging market; FDI = foreign direct investment; MFN = most favored nation; OECD = Organisation for Economic Co-operation and Development; WB-IFC = World Bank, International Finance Corporation; WB STRI = World Bank, Services Trade Restrictiveness Index.

Retreat from Global Integration

Gains from globalization have not been shared equally. Particularly in some advanced economies, weak economic growth, stagnant wages, and high unemployment, accompanied by rising income inequality, have increasingly popularized inward-looking policies that could prompt a retreat from global integration and hinder the political consensus for needed market-friendly reforms. Notwithstanding the CPTPP, a shift toward inward-looking policies remains a risk, as highlighted by several steps taken by the United States this year, including the imposition of global safeguard tariffs on imported washing machines and solar cells and modules in January, the new tariffs on steel and aluminum in early March, and, most recently, the announcement of a Section 301 action on China's intellectual property practices that could entail new tariffs on some $50 billion in Chinese exports to the United States and that has already induced a tariff announcement in response by China. Greater protectionism could disrupt global supply chains, lead to reduced migration (and remittances), reduce global productivity, and hurt longer-term growth. These policies could make tradable consumer goods less affordable and slow the pace of global economic convergence, which could harm low-income households disproportionately. In addition, uncertainty about trade policies and possible retaliation can weigh on financial markets and business confidence.

Given its trade dependence, Asia is subject to risks from inward-looking policies. The near-term economic impact of inward-looking policies could vary substantially depending on the exact nature of the measures. It appears that recently announced measures would likely have only a modest impact on overall trade and growth in the region and across the globe. But the actions have already sparked some retaliatory measures, and a serious concern is that tensions would escalate, dampening foreign direct investment and trade, disrupting major sources of growth, and disturbing financial markets.

Under any scenario for global tariff actions, Asian economies have scope to improve the openness of their trade and foreign direct investment policies. As suggested in Figures 1.20 and 1.21, this is particularly true for emerging market economies,

which lag behind comparators outside the region in terms of regulations governing services trade and foreign direct investment.

High Private Sector Leverage and Heightened Financial Vulnerabilities

Property prices have risen substantially in a few economies in the region. Tighter financial conditions could slow or reverse property price increases, weighing on consumption via a negative wealth effect with possible second-round effects on banks' balance sheets. Some economies face external financing vulnerabilities, including from the high share of government bonds held by foreigners (including more procyclical retail investors). And as discussed further below, China faces downside financial risks related to banks' still elevated off-balance-sheet exposures, thin capital and liquidity buffers at small and medium-size banks in particular, and the ongoing reliance by both banks and shadow banking entities on implicit guarantees.

While a sudden tightening of financial conditions poses near-term risks, too long a period of easy conditions could be equally problematic, insofar as it may lead to a buildup of financial stability vulnerabilities over the medium term. A protracted period of very low interest rates and low expected volatility in asset prices could foster the accumulation of vulnerabilities, as yield-seeking investors increase exposure to lower-rated corporate and sovereign borrowers and less creditworthy households. Indeed, corporate and household leverage have both risen. If global economic sentiment remains strong and inflation muted, financial conditions could remain loose into the medium term, reinforcing yield-seeking behavior and amplifying the buildup of financial vulnerabilities. These vulnerabilities could be further exacerbated by a migration of risks toward nonbanks within domestic financial systems.

Geopolitical Uncertainties

Expectations of a peaceful resolution of geopolitical tensions surrounding North Korea have increased recently, against the backdrop of the Pyeongchang Olympics, the planned inter-Korean summit, and the agreement to hold a US-North Korea summit. But risks could escalate again, particularly if the upcoming talks are viewed as unsuccessful, and in such a scenario, financial markets—which have been resilient so far—and investment could be adversely affected. While an actual conflict with US involvement remains a tail risk, tensions surrounding North Korea could reach a point where they significantly affect perceptions of regional security, causing market turbulence in South Korea, Japan, and possibly China, and denting business and consumer confidence. Territorial disputes in the South China Sea also remain a possibility.

Other Risks

The outlook is also subject to other important downside risks. In China, failure to achieve the envisaged pivot from high-speed to high-quality growth could lead to continued unsustainable policies and increase financial imbalances and the probability of a sharp adjustment. In several economies, there is a risk that higher food prices could spill over to headline inflation and require monetary policy tightening. Cybersecurity breaches and cyberattacks are on the rise globally and could be highly disruptive to the global economy, particularly if they target critical infrastructure (such as the power grid or the financial market architecture) or highly interconnected entities.

Climate change and natural disasters could continue to have a significant economic impact on the region, and especially on small and low-income economies with smaller buffers. During 1980–2016, 204 natural disasters were

recorded in the 12 economies in the Pacific, implying a nearly 50 percent chance of a country being hit in any given year, and disasters caused damage averaging 14 percent of GDP (Lee, Zhang, and Nguyen, forthcoming). Finally, small states and Pacific island economies, which pay high costs for transferring remittances, face the important risk of a withdrawal of correspondent banking relationships by global banks.[1]

Longer-Term Growth Prospects

Over the medium and long term, Asia faces some significant challenges. An important one, as discussed in the April 2017 *Regional Economic Outlook: Asia and Pacific*, is population aging. Many economies in Asia face the risk of "growing old before they grow rich," meaning that at the point at which the working-age share of the population starts to decline—and rapid growth thus becomes harder to achieve—they will be at income levels substantially below that of the United States: 70 percent of the United States level for Korea, 20 percent in China, and less than 40 percent for most others. Furthermore, the adverse effect of aging on growth is substantial, estimated in the range of ½ to 1 percent for China, Japan, Korea, and Thailand, and aging of course will imply substantial additional fiscal burdens for these economies, compounding the medium-term challenges.

Another headwind for Asia is slowing productivity growth. The April 2017 *Regional Economic Outlook: Asia and Pacific* found that there has been no sign of productivity catch-up or convergence recently relative to the United States, except for low-income emerging market and developing economies. The decline in productivity growth is observed across different sectors, including manufacturing and especially services. Lack of quality infrastructure also represents a critical structural weakness in most economies in the region. The digital revolution (see below) may lead to an acceleration of productivity growth, but the history of previous technological disruptions suggests that such benefits may be observed only with a delay.

Ensuring that the benefits of rapid growth are enjoyed by all will be an important challenge going forward. Many Asian economies have historically enjoyed very equitable growth, given early land reform, high-quality public education, and rapid improvements in living standards. But inequality is rising across much of Asia, and policies to foster inclusive growth will be critical going forward.

Yet another critical issue that Asia, and indeed the world, will need to confront is the rise of the digital economy. As discussed in Box 1.3, recent technological advances could represent a "fourth industrial revolution" and have the potential to be truly transformative. Asia is a leader in many areas, but some of these advances will create winners and losers and indeed may change the very growth models that economies have used for decades. The widespread use of industrial robots, for instance, may over time boost productivity growth substantially, but it also risks raising structural unemployment if alternative opportunities for displaced labor cannot be created.

Effectively harnessing the benefits of the digital revolution will require a comprehensive and integrated policy response, including revamping education and investing in physical and regulatory infrastructure to help spur competition and innovation. Policy measures will need to address digitalization-linked risks without stifling innovation. Given the profound economic implications of these technologies, an analytical chapter is planned for the October 2018 *Regional Economic Outlook: Asia and Pacific* that will focus on the digital economy in Asia. That analysis will take stock of key digitalization and automation developments in Asia, their implications, and how Asia compares to other regions, including in terms of policies to reap digital dividends.

[1]The IMF is providing technical assistance to help economies strengthen their anti-money-laundering/combating the financing of terrorism frameworks, and is also bringing banks and money transfer organizations together to develop concrete, industry-led solutions.

Policy Recommendations

Confronting a combination of continued strong growth, subdued inflation, and abundant liquidity that has contributed to asset price increases rather than inflation, Asian policymakers will need a carefully calibrated policy mix that promotes sustainable, inclusive growth while enhancing resilience.

With output gaps closing across much of the region, the need for continued fiscal support has diminished, and in general, economies in Asia would be well served by gearing their fiscal policies toward strengthening buffers, safeguarding sustainability, and increasing resilience. This is particularly true given the heavy fiscal burden that population aging will bring to some economies. There is, however, some heterogeneity across the region. China, India, Indonesia, and a number of other economies should aim for growth-friendly consolidation. In Japan, a premature reduction in the level of fiscal support should be avoided, and a credible framework for medium- and long-term consolidation is a key priority. By contrast, a more supportive near-term fiscal stance is appropriate in Australia and Singapore, and in Korea, a substantial expansion would be appropriate as part of a broader effort to rebalance the economy. Finally, some economies in the region should undertake tax reform over the medium term to create space for infrastructure and social spending, and to support structural reforms.

Given still relatively subdued inflation, a continued accommodative monetary policy stance is appropriate for much of Asia, with some notable exceptions. In China, where growth targets should be deemphasized and credit growth slowed, the overall stance of policies, including monetary policy, should become less accommodative. In India, given increased inflation pressure, monetary policy should maintain a tightening bias. More generally across the region, given easy liquidity conditions, the mix of monetary, macroprudential, exchange rate, and other policies needs to be considered carefully, with due regard for the risk that overly accommodative monetary conditions may, in some circumstances, contribute to froth in financial markets.

As will be shown in Chapter 2, low inflation in Asia has been driven largely by temporary forces, including imported inflation. As commodity prices rise and other favorable global factors reverse themselves, Asian economies could well see rising inflation. Given the backward-looking nature of the process, also shown in Chapter 2, higher inflation could persist. And with some evidence pointing to a flattening of the Phillips curve, the output costs of disinflating could be higher than expected. Thus, policymakers will need to be vigilant and stay ahead of the curve in responding to signs of inflation pressure (though the response to commodity price shocks should be to accommodate first-round effects but not second-round ones). Strengthening monetary policy frameworks and central bank communications can also help make inflation less sticky (and instead more driven by expectations), and also ensure that expectations—which have been declining in many Asian economies during recent years—remain well anchored around inflation targets. Finally, exchange rate flexibility can help to insulate economies from imported inflation (whether high or low).

Macroprudential and other financial policies will continue to play an important role across the region, as suggested in a recent IMF analysis (Corbacho and Peiris 2018). Many economies need to develop and broaden their macroprudential toolkits, and those currently facing currency mismatches and rapid credit growth—including frontier and developing economies—could usefully tighten macroprudential requirements. Policymakers should, however, be aware of the limits of macroprudential policies in the context of excessive liquidity. They should also be careful in their use of capital flow management measures (IMF 2012, 2016, 2017) and should generally allow flexible exchange rates to function as a buffer against external shocks.

Finally, the current recovery momentum provides an opportunity to pursue fiscal, financial, and

structural reforms to lift long-term growth, enhance labor force participation rates, make growth more inclusive, and build resilience to economic shocks ("fix the roof while the sun is shining"). This calls for tailored measures—as detailed in previous *World Economic Outlook* and *Regional Economic Outlook* reports—to boost productivity and investment, narrow gender labor force participation gaps, deal with the demographic transition, address climate change, and support those affected by shifts in technology and trade. For developing economies, these steps will also be essential for making progress toward the United Nations Sustainable Development Goals as well as promoting economic diversification. In addition, to adapt most effectively to the digital revolution, policymakers need to upgrade both physical and regulatory infrastructure, reduce lower trade restrictions (particularly in services), enhance human capital, and address labor market and social challenges.

Box 1.1. Rapid Credit Growth in Frontier and Developing Asian Economies

Many Asian frontier and developing economies (FDEs) are currently experiencing rapid credit growth.[1] Cambodia, Lao P.D.R., Myanmar, Nepal, Sri Lanka, and Vietnam have seen double-digit growth in credit to the private sector for several years, and Mongolia went through a credit boom a few years ago. This could be a "good" credit expansion, reflecting improved macroeconomic prospects and financial deepening of shallow credit markets. But it could also be a "bad" expansion, signaling mounting macro-financial risks emanating from macroeconomic imbalances and unsustainable dynamics in the banking sector. Macro-financial risks facing FDEs are particularly pressing given typically weak supervisory capacity, poor risk management and underwriting standards, fewer macroprudential tools, and financial activity by nonbanks that may not be appropriately licensed and supervised.

Rapid credit growth in Asia is not a new phenomenon. Following the strong credit growth in several advanced and emerging market Asian economies in the run-up to the 1997 Asian crisis, rapid credit expansions—and in some cases, credit booms—have occurred with greater frequency in FDEs that are in a transitional stage of economic development (Figure 1.1.1). During 2011–16, 9 out of 11 credit boom episodes in Asia—as identified using the methodology in Bakker and others (2012)—were in FDEs, and five out of nine Asian FDEs experienced credit booms. Among the FDEs that had a credit boom during this period, annual real credit growth averaged nearly 23 percent, the median credit-to-GDP ratio rose from about 35 to 56 percent, and credit gaps averaged about 5 percent of GDP (and ranged up to 17 percent of GDP).

A prolonged increase in credit growth has in many cases failed to translate into a sustained increase in domestically financed private investment. For example, in Sri Lanka, the 2012 credit boom helped boost domestically financed private investment (total private investment excluding foreign direct investment), but the credit expansion in 2016 did not have the same impact. In Nepal, nominal credit grew by 32 percent—nearly six times faster than nominal GDP growth—yet domestically financed private investment rose by just 2 percent in 2016 (though the 2015 earthquakes and subsequent trade disruption might also have played a role).

The causes of rapid credit growth are not universal across FDEs. In Nepal, the credit boom was driven by strong remittance inflows, which are a key funding source for the bank-based financial sector, coupled with insufficient sterilization. On the other hand, in Cambodia, credit booms are being financed by foreign borrowing by banks and large microfinance institutions. And in Vietnam, credit growth has been led by substantial unsterilized intervention to maintain the dollar peg in the face of large capital inflows, higher banking sector credit growth targets set by the central bank, and the easing of macroprudential policy via lower risk weights on lending to the real estate and securities sectors.

Given the disparate causes of rapid credit expansions, policy options vary, but with some common elements. Most FDEs can benefit from strengthening bank and nonbank supervision and regulation, including further developing macroprudential indicators and tools, and ensuring effective crisis management and resolution frameworks. In several of the current credit boom cases, such as Cambodia, Nepal, Sri Lanka, and Vietnam, credit appears to be concentrated in real estate and related sectors. Tailored macroprudential policies can help prevent a buildup of risks, though limited capacity for, and experience with, these tools needs to be taken into account. Reducing loan-to-value ratios on real estate loans and hire purchases, introducing real estate exposure limits, and raising risk weights on these loans could all be considered, as could tools designed to prevent a migration of lending from banks to nonbanks. Fiscal policies such as taxes on land or housing—particularly for properties not used as primary residences—can also be used.

This box was prepared by Sarwat Jahan, Medha Madhu Nair, Piyaporn Sodsriwiboon, Cormac Sullivan, and Irene Zhang.

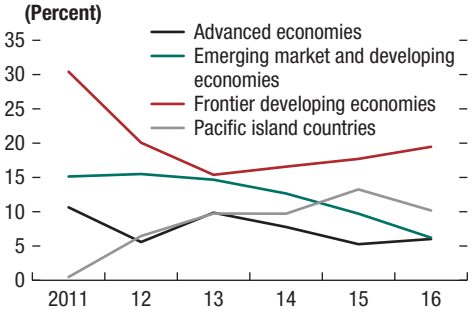
[1]Asian frontier and developing economies comprise Bangladesh, Bhutan, Cambodia, Lao P.D.R., Mongolia, Myanmar, Nepal, Sri Lanka, and Vietnam.

Box 1.1 *(continued)*

Figure 1.1.1. Rapid Credit Growth in Asian Frontier and Developing Economies

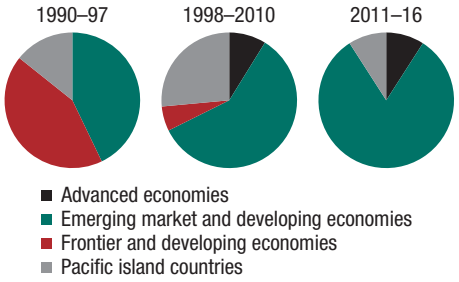
Credit in Asian FDEs has been growing at a fast pace ...

1. Asia: Real Credit Growth Median (Percent)



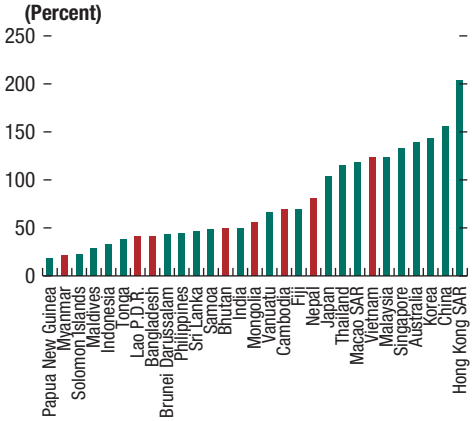
... and credit booms in Asia are now more prevalent in FDEs than in other economies.

2. Credit Booms in Asia (Share of total)



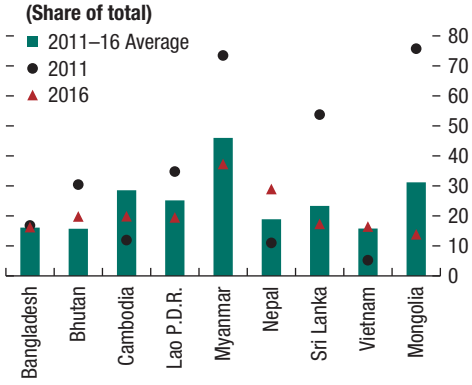
While shallow credit markets in most FDEs may warrant financial deepening ...

3. Credit-to-GDP Ratios in Asia and the Pacific, 2016 (Percent)



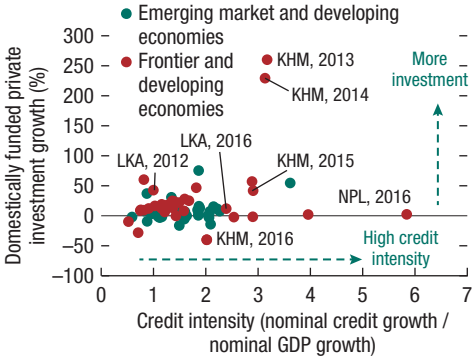
... double-digit credit growth for several years raises concerns over underlying vulnerabilities ...

4. Credit Booms in Asia (Share of total)



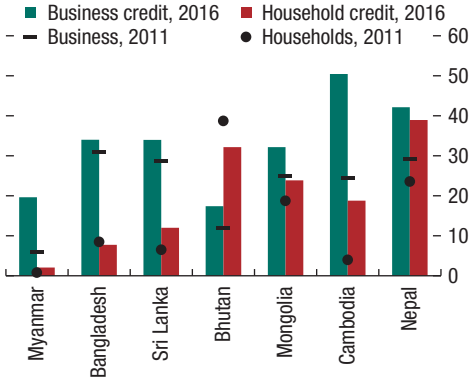
... especially as more intensive use of credit has not always translated to higher domestic private investment.

5. Credit Intensity and Domestically Funded Private Investment Growth



Nonetheless, household and corporate indebtedness has not changed dramatically for most economies.

6. Credit-to-GDP Ratio by Counterparty (Percent)



Source: IFS, *International Financial Statistics*; IMF, *World Economic Outlook*; and IMF staff estimates.
Note: FDEs = frontier and developing economies; KHM = Cambodia; LKA = Sri Lanka; NPL = Nepal.

Box 1.2. Spillovers to Asia from the US Tax Reform

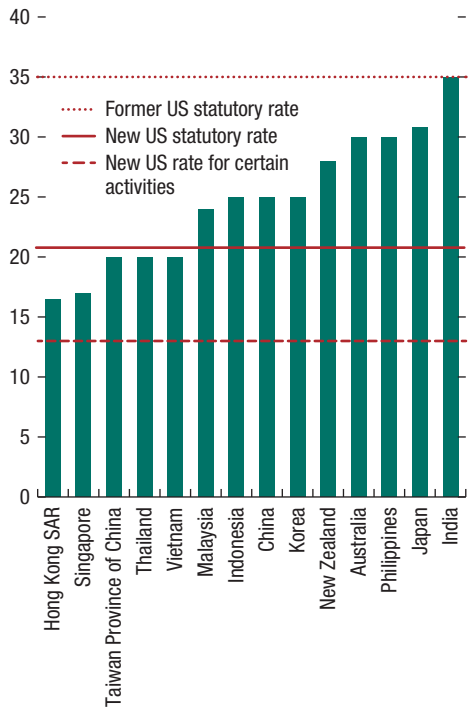
The Tax Cuts and Jobs Act (TCJA) of December 2017 has many components with the potential to affect both the United States and the global economy through a number of channels. The reduction in the corporate tax rate and the move to allow the temporary expensing of investment are likely to provide a short-term boost to growth and investment in the United States, and this in turn could lead to a faster pace of monetary tightening, dollar appreciation, capital outflows from emerging markets (including in Asia), and a widening US current account deficit. Estimates presented below suggest that the direct growth spillovers to Asia will be relatively small. But the legislation also includes many other provisions that can affect firms' decisions on where and how much to invest, and that may also induce other governments to change their own tax laws. The overall impact of the legislation may thus be more substantial—and more nuanced—than initially thought.

Understanding the Tax Cuts and Jobs Act[1]

Some of the key changes to corporate taxation under the TCJA are as follows:

- **Rate cut:** The statutory rate in the United States is cut from 35 percent, the highest among member economies of the Organisation for Economic Co-operation and Development (OECD), to 21 percent, slightly lower than the OECD average. And as noted below, the applicable rate for some activities is lower still, at 13.125 percent. The US rates are now lower than in a number of Asian economies (Figure 1.2.1).
- **Capital expensing:** For the next five years, corporate investments can be fully deducted in the first year instead of being depreciated over time. During the subsequent five years, the share of investment that can be expensed will be gradually reduced. Even with the move to expensing, interest remains deductible (albeit subject to tighter limits), implying a continued subsidy for debt-financed investment (at least when the limits are not binding).
- **Territorial taxation and repatriation:** Previously, the United States was the only remaining large advanced economy that taxed its firms on worldwide income, with a credit offered for foreign income tax paid; however, tax was deferred until profits were repatriated, which had induced firms to leave as unrepatriated a stock of profits estimated at some $2.6 trillion. Under the new legislation, the United States joins most other advanced economies in taxing income on a territorial basis: income earned in the United

Figure 1.2.1. Selected Economies: Corporate Income Tax Rates
(Percent)



Source: IMF Fiscal Affairs Department, Tax Policy Rates Database.

This box was prepared by Keiko Honjo and Dirk Muir.

[1]See the April 2018 *Fiscal Monitor* for a fuller description of the tax reform and its spillovers.

Box 1.2 *(continued)*

States will be taxed at the US rate, whereas—subject to an important qualification below—income earned overseas will be taxed only by those jurisdictions. In addition, hitherto unrepatriated profits are now deemed to be repatriated and are subject to tax at preferential rates (with those tax payments spread over an eight-year period).[2]

- **Base-erosion provision:** A new base erosion anti-abuse tax (BEAT) is introduced to limit the scope for firms (above a certain size) to shift profits out of the United States. Under the BEAT, a firm's tax liability can fall no lower than 10 percent of its income, excluding certain payments to foreign-affiliated corporations. In addition, a new global intangible low-taxed income (GILTI) tax is applied—a foreign affiliate's returns above 10 percent on tangible assets will be taxed at a rate of 10.5 percent, with a credit of 80 percent of foreign taxes paid. This implies that if a multinational's average foreign tax rate is 13.125 percent or higher—that is, 10.5 percent divided by 80 percent—no GILTI will be owed.
- **Foreign-derived intangible income (FDII):** The legislation offers a reduced tax rate of 13.125 percent on export income from intangible assets (defined as export income exceeding a 10 percent return on domestic tangible assets, equivalent to the GILTI), so as to reduce incentives to hold intellectual property overseas. Some questions have been raised about the consistency of this measure with World Trade Organization obligations.

What do all these changes imply for firms' investment decisions and for the prospects for tax competition? All else equal, the rate cut would be expected to spur investment overall and to attract investment back to the United States, though the BEAT may limit this effect. Expensing, particularly given that it is time-bound, should provide a substantial near-term boost to investment, although many firms already enjoyed very favorable tax treatment of investment. The move to territorial taxation should, to some extent at least, make foreign tax rates more relevant to US firms and may thus induce tax competition among these jurisdictions—rates above 21 percent will risk losing US investment back to the United States—but at the same time, the anti-base-erosion nature of the GILTI implies that rates lower than 13.125 percent may provide limited benefit to firms and thus in turn not much benefit to foreign jurisdictions dependent on US investment. Some have suggested that deemed repatriation may attract US firms' overseas cash back home, but as much of this is already invested in US assets, it is not clear how substantial the macro impact will be; the provision should, however, raise revenue. Finally, the FDII may lead some companies to keep more intellectual property back in the United States. Much of the impact will also depend on firms' assumptions about the medium-term development of the tax system.

The discussion above concentrates exclusively on the corporate provisions of the TCJA. The legislation, however, also features a number of important changes to the taxation of individuals, including personal income tax rate reductions, as well as increased exemptions under the estate tax. As discussed in the April 2018 *Fiscal Monitor,* the benefits of these changes appear to accrue mostly to richer segments of the population with relatively low propensity to consume, and the impact on overall growth is thus likely to be small.

Modeling Growth Spillovers from the United States

The economic projections in the April 2018 *World Economic Outlook* (WEO) incorporate an IMF staff estimate of the boost to US growth and investment from the corporate tax rate cut and the expensing of investment. Many of the other effects discussed above are difficult to estimate quantitatively. It is likely that the new effective US corporate tax rates will drop below those in some Asian economies, such as Australia, China, Japan, the Philippines, and Sri Lanka. In addition, the move to territorial taxation could lead to relocation of certain types of corporate activity from Asia and toward lower-tax jurisdictions. These indirect effects are difficult to quantify as they depend on the international response to the US action.

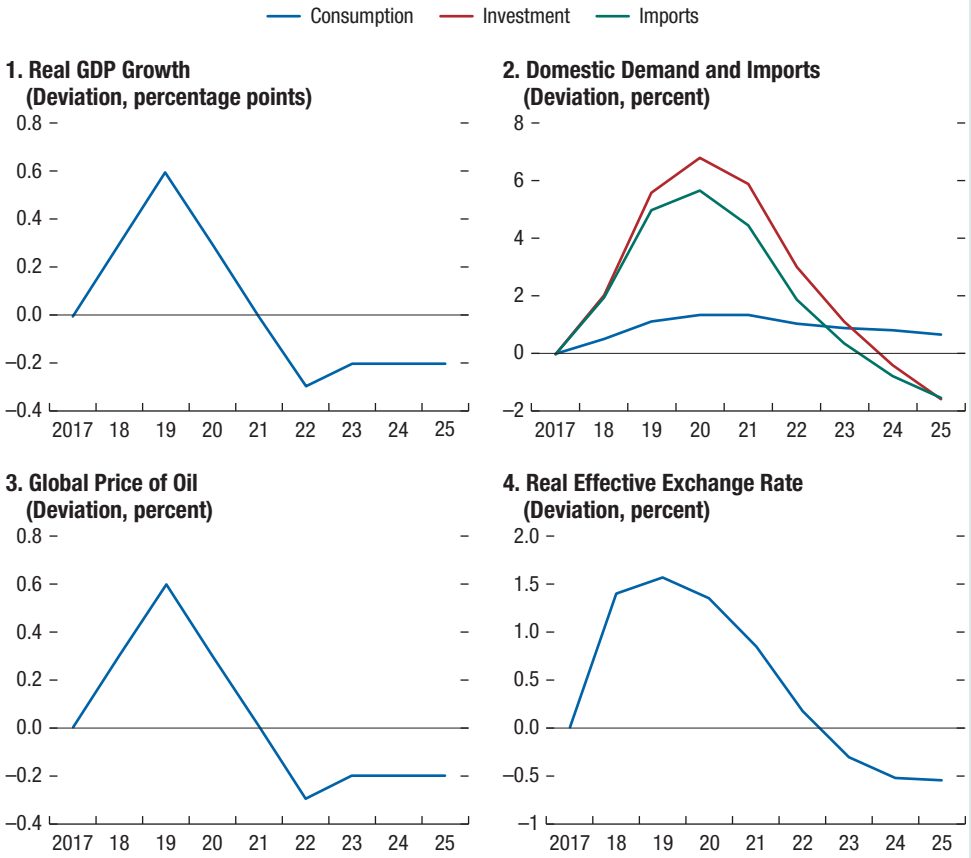
[2]See, for example, the global KPMG tax rates database at https://home.kpmg.com/xx/en/home/services/tax/tax-tools-and- resources/tax-rates-online/corporate-tax-rates-table.html.

Box 1.2 *(continued)*

The direct spillovers to Asia from higher US growth in the baseline WEO projections, however, can be illustrated using the APDMOD module of the IMF's Flexible System of Global Models.[3] This analysis focuses exclusively on the TCJA and does not model the additional stimulus coming from the two-year budget agreement (though this is already factored into the baseline WEO projections). As shown later in this box, the direct impact on Asia from tax reform is relatively small.

In the model, the United States cuts its corporate taxes starting in 2018, which leads to an expansion in real GDP from 2018 to 2021, with growth being, on average, 0.3 of a percentage point higher a year (Figure 1.2.2). The US output gap, however, is already mostly closed, so the additional fiscal stimulus is inflationary and leads to additional interest rate hikes by the US Federal Reserve. Therefore, real GDP growth is lower by about 0.1 of a percentage point for the remainder of the IMF's forecast horizon. Real GDP growth then returns to its original path, as TCJA provisions expire.

Figure 1.2.2. Impacts in the United States of US Corporate Tax Cuts



Source: IMF calculations.

[3]The IMF's APDMOD is an annual, multiregional, general equilibrium model of the global economy that models real GDP and its components, prices, the supply side, and global commodity markets (see Andrle and others 2015 for a complete description). Economies are linked through two global markets: one for saving and investment, priced by the global real interest rate and real exchange rates, and a driver in trade flows; and the other for commodities, especially fuels and metals. Monetary policy and fiscal policy are driven by inflation targets and debt targets in general. The commodity sectors act as global shock absorbers—for example, in a global economic expansion, some of the effects will be offset by higher global commodity prices coming from increased global demand pressures.

Box 1.2 *(continued)*

Growth is driven first by investment from the tax cut, increasing potential output, which also stimulates labor demand. This leads to higher incomes and consumption, but is also the primary source of inflation pressure and the short-term appreciation of the real effective exchange rate (REER). Higher domestic demand means that real imports peak 6 percent higher than in the baseline by 2020. This is the main conduit for spillovers to the Asia and Pacific region. But higher US demand also will drive commodity prices, with different effects for commodity exporters and importers.

In the long term, the real GDP effect is much less. This is because, first, provisions expire over time, and this affects firms' and households' behavior several years beforehand given their forward-looking expectations of income, wealth, and prices. Second, the generalized cut to corporate taxes reduces firms' costs for producing goods and services, leading to a long-term depreciation in the REER, undoing the short-term trade spillovers and most of the gains in global GDP and commodity prices.

The results of the simulation point to limited positive effects on Asian economies. Most of the Asia spillover effects are less than 0.2 of a percent of GDP at their peak in 2020 (Table 1.2.1). There are three main channels to consider:

- The main channel is increased exports to the United States based on increased US aggregate demand. This is often paired with a short-term REER depreciation, reflecting the transmission of the short-term US appreciation. This is the key channel for China, Japan, Korea, and some of the ASEAN economies. In other words, current account surpluses grow in much of Asia, worsening global imbalances.
- A secondary channel is the intra-Asia rebalancing from cross-exchange-rate effects. Some economies have stronger REER depreciation than others (mainly Japan and a few Association of South East Asian Nations economies) and as a result enjoy relatively larger gains. Some economies, however, such as Singapore and some other ASEAN members, instead experience an appreciation, since their trade links are less with the United States than with other Asian economies, particularly China, Japan, and/or Korea.

Table 1.2.1. Cumulative Increases in Macroeconomic Indicators
(Deviation from scenario without US tax reform)

	2018 Impact	2020 Peak	2018 Impact	2021 Peak	2018 Impact	2020 Peak
			Current Account			
	Real GDP[1]		Balance to GDP[2]		Import Volumes[1]	
United States[3]	0.30	1.20	−0.26	−0.88	1.93	5.65
					Export Volumes[1]	
Asia-Pacific	0.04	0.09	0.04	0.23	0.28	1.00
Australia	0.03	0.04	−0.01	−0.53	0.14	0.34
China	0.03	0.07	0.05	0.35	0.31	1.18
India	0.03	0.06	0.02	−0.08	0.28	0.94
Japan	0.01	0.16	0.05	0.33	0.35	1.26
Korea	0.05	0.09	0.03	0.14	0.20	0.77
ASEAN-5[4]	0.06	0.13	0.05	0.10	0.19	0.59
Rest of Asia and Pacific	0.09	0.22	0.06	0.31	0.24	0.77

Source: IMF calculations.
[1]Percent deviation.
[2]Percentage point deviation.
[3]For the United States, the current-account-balance-to-GDP peak is in 2020.
[4]ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

Box 1.2 *(continued)*

- A third channel is the movement in commodity prices. This is a relatively minor drag on commodity importers with strong US trade links, such as China, India, Japan, Korea, and some ASEAN economies. It is more beneficial to commodity exporters such as Australia, Mongolia, and New Zealand, which have relatively small direct trade links with the United States but have second-round spillovers from higher Asian demand as they manufacture US-bound goods. For example, Australia's real GDP increases because of China's increased demand for Australia's commodities required to meet China's increased exports to the United States. But Australia's export volume gains are still less than China's overall gains from its sizable direct trade links with the United States.

The model also shows a slight widening of global imbalances. The increase in US aggregate demand implies a widening of the US current account deficit by –0.9 of a percentage point of GDP by 2021 compared with the baseline. At the same time, the current account surplus for Asia widens by over 0.2 of a percentage point of GDP compared with the baseline, led by China, Japan, and Korea. Those economies without direct links to the United States depend on spillovers from their other trading partners and resulting movements in their exchange rates—much of emerging Asia sees strengthening current account balances, while other economies, such as Australia, see a weakening.

Box 1.3. Is Asia Ready for the Digital Revolution?

A new wave of digital innovation is reshaping the global economy, and Asia has been at the forefront in several areas, while lagging in others. The digital revolution encompasses a broad array of new technological developments. Some of these are "general purpose," and, while their future impact is uncertain, they have the potential to transform entire economies. These innovations, collectively dubbed "the fourth industrial revolution," provide opportunities and challenges. Comprehensive policies and fresh thinking are needed to reap digital dividends.

While digitalization and automation are not new, their pace of evolution has accelerated over the past few years. The latest wave of digital innovations was triggered by advances in artificial intelligence, robotics, computing power, cryptography, the explosion of big data, 3-D printing, the ubiquitous reach of the Internet, and the precipitous decline in data storage costs. The unprecedented pace of these advances may continue thanks to future breakthroughs in computing power (for example, quantum computing) and in data generation (for example, the "Internet of everything"), thus resulting in exponential increases in cognitive capability and further advances in robotics and artificial intelligence. Automation is undergoing a "Cambrian explosion" (Pratt 2015; McAfee and Brynjolfsson 2017), as these technological developments are leading to a massive increase in the diversification and applicability of automation ranging from robots to drones, self-driving cars, blockchain, and smart contracts.

As digitalization penetrates an increasing number of activities and sectors, the boundaries between the digital and physical worlds will be blurred, and the entire world economy may be considered to be digital. The new digital technologies are general-purpose in nature, with the potential to reshape the global economy and fundamentally alter the way we live and work, in the same way that the steam engine and electricity did. General-purpose technologies have the potential to change the types of goods and services produced, where they are produced, and how they are exchanged; how production is organized and what physical and regulatory infrastructure is required to support it; and the nature of work itself.

These new technologies are automating increasingly complex activities that could previously be performed only by people. As in the past, technological progress has the potential to bring enormous benefits to societies by increasing economic growth and creating new jobs. But major transitions lie ahead that could match the scale of historical shifts out of agriculture and manufacturing (Manyika and others 2017), creating new challenges for policymakers.

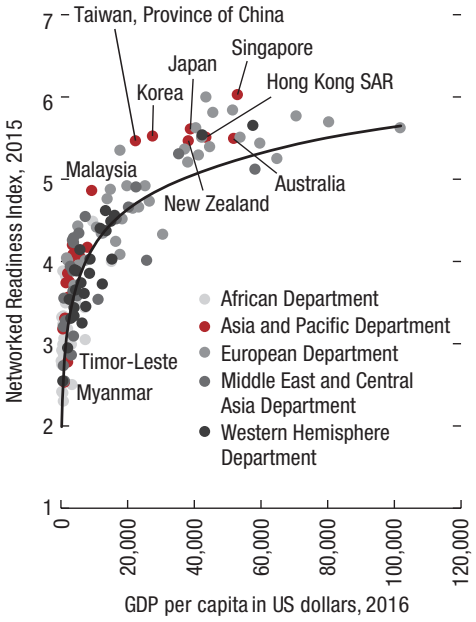
Traditionally, Asian manufacturing has been based on the supply of relatively low-cost and low-skilled labor. But artificial intelligence, robotics, and 3-D printing are expected to decrease competitiveness based on wage arbitrage alone, transforming the nature of manufacturing and leading to the reshoring of production back to developed economies (ADB and WEF 2017). Anecdotal evidence shows that "reshoring" is already happening, and economies with large pools of low-skilled labor may need to devise radically new growth models. Neither the opportunities nor the challenges have become fully apparent as the new technologies have not yet been widely diffused.

Asia is embracing the digital revolution, though there is significant heterogeneity across economies in terms of initial conditions. Moreover, while many Asian economies are advanced in the use of new technologies, few are at the frontier in terms of developing these technologies. Digitalization increases with the level of GDP per capita, and Asian economies are at the frontier relative to their peers with similar levels of economic development (Figure 1.3.1). Even for Asian economies with lower GDP per capita, digitalization is accelerating, meaning that these economies are catching up (Figure 1.3.2). Asia is the world's strongest growth market for the use of industrial robots, with about two-thirds of the world's robots being used there

This box was prepared by Tahsin Saadi Sedik.

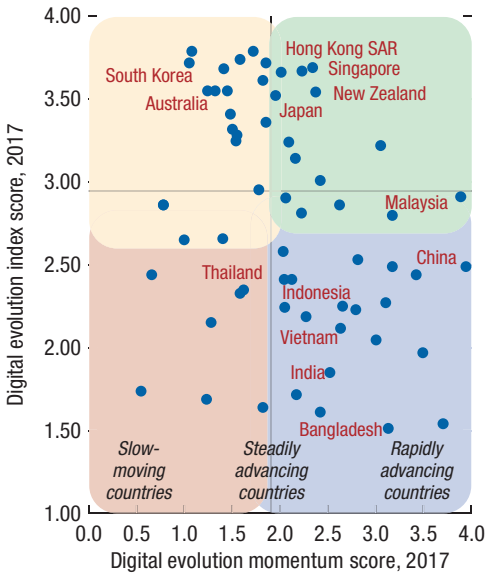
Box 1.3 *(continued)*

Figure 1.3.1. GDP per Capita and Networked Readiness
(US dollars; score, 1–7)



Sources: IMF, *World Economic Outlook*; and World Economic Forum, *Networked Readiness Index*.

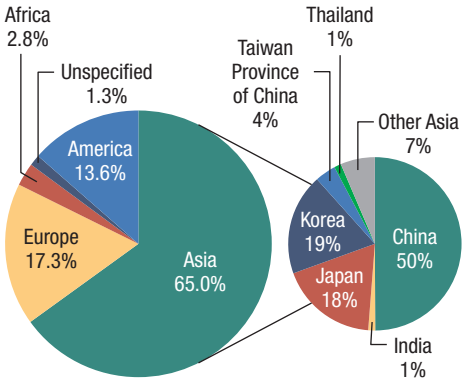
Figure 1.3.2. Digital Evolution: Level and Momentum
(Index,1–4; change, 0–4)



Source: Tufts University, *Digital Planet 2017*.

(Figure 1.3.3). China is the largest robot market in the world, with a 30 percent share of the total supply in 2016. Korea is the second largest market (14 percent), and Japan is the third (13 percent), ahead of the United States (11 percent). In terms of robot density (the number of industrial robots per 10,000 workers), Korea is the global leader, followed by Japan and Germany. E-commerce is also developing rapidly in some Asian economies. For instance, China accounted for less than 1 percent of worldwide transactions about a decade ago, but that share is now more than 40 percent (Wang and others 2017). Some Asian economies have also been at the frontier in terms of cryptocurrencies—indeed, some small states have been approached by private companies to issue these as legal tender, raising a variety of concerns—and regulatory approaches vary substantially across the region. While mobile payments are expanding sharply in such economies as Bangladesh, India, and the Philippines, on average Asia is lagging sub-Saharan Africa.

Figure 1.3.3. Estimated Number of Industrial Robots Delivered, 2017
(Percent of total)



Sources: International Federation of Robotics; and IMF staff calculations.

Box 1.3 *(continued)*

Comprehensive policies and fresh thinking are needed to reap digital dividends. Policy responses will need to address digitalization-linked risks without stifling innovation. Policies to harness digital dividends include revamping education; investing in physical and regulatory infrastructure that spurs competition and innovation; reforming trade (especially in services) and investment policies; and addressing labor market and social challenges. Policy priorities differ across the region as economies' initial conditions are different. Regional and international cooperation will be key to developing effective policy responses, and the IMF can play an important role in this regard.

Table 1.1. Asia: Real GDP
(Year-over-year percent change)

	Estimate and Latest Projections					Difference from October 2017 *World Economic Outlook*		
	2015	2016	2017	2018	2019	2017	2018	2019
Asia	**5.6**	**5.4**	**5.7**	**5.6**	**5.6**	**0.1**	**0.1**	**0.1**
Advanced economies (AEs)	**1.8**	**1.7**	**2.3**	**2.0**	**1.9**	**0.3**	**0.3**	**0.1**
Australia	2.5	2.6	2.3	3.0	3.1	0.1	0.0	0.1
New Zealand	4.2	4.2	3.0	2.9	2.9	−0.4	−0.1	0.3
Japan	1.4	0.9	1.7	1.2	0.9	0.2	0.6	0.1
Hong Kong SAR	2.4	2.1	3.8	3.6	3.2	0.3	1.0	0.3
Korea	2.8	2.8	3.1	3.0	2.9	0.1	0.1	0.0
Taiwan Province of China	0.8	1.4	2.8	1.9	2.0	0.8	0.0	0.0
Singapore	2.2	2.4	3.6	2.9	2.7	1.1	0.3	0.1
Emerging market and developing economies (EMDEs)[1]	**6.8**	**6.5**	**6.5**	**6.5**	**6.6**	**0.1**	**0.0**	**0.1**
Bangladesh	6.8	7.2	7.1	7.0	7.0	0.0	0.0	0.0
Brunei Darussalam	−0.4	−2.5	0.5	1.0	8.0	1.8	0.4	−0.7
Cambodia	7.2	7.0	6.9	6.9	6.8	0.0	0.1	0.0
China	6.9	6.7	6.9	6.6	6.4	0.1	0.1	0.1
India[2]	8.2	7.1	6.7	7.4	7.8	0.0	0.0	0.0
Indonesia	4.9	5.0	5.1	5.3	5.5	−0.1	0.0	0.0
Lao P.D.R.	7.3	7.0	6.8	6.8	7.0	−0.1	−0.1	−0.1
Malaysia	5.0	4.2	5.9	5.3	5.0	0.5	0.5	0.2
Myanmar	7.0	5.9	6.7	6.9	7.0	−0.5	−0.7	−0.4
Mongolia	2.4	1.2	5.1	5.0	6.3	3.1	2.5	−0.4
Nepal	3.3	0.4	7.5	5.0	4.0	0.0	0.0	0.2
Philippines	6.1	6.9	6.7	6.7	6.8	0.1	0.0	0.0
Sri Lanka	5.0	4.5	3.1	4.0	4.5	−1.6	−0.8	−0.4
Thailand	3.0	3.3	3.9	3.9	3.8	0.2	0.4	0.4
Vietnam	6.7	6.2	6.8	6.6	6.5	0.5	0.3	0.3
Pacific island countries and other small states	**5.8**	**3.2**	**3.0**	**3.7**	**3.9**	**−0.7**	**−0.7**	**−0.8**
Bhutan	6.1	6.3	6.0	7.1	7.6	0.1	−4.1	−6.2
Fiji	3.8	0.4	3.8	3.5	3.4	0.0	0.0	0.0
Kiribati	10.3	1.1	3.1	2.3	2.4	0.4	0.0	0.2
Maldives	2.2	4.5	4.8	5.0	5.0	0.3	0.4	0.2
Marshall Islands	1.9	2.0	1.9	1.8	1.7	0.0	0.0	0.0
Micronesia	3.9	2.9	2.0	1.4	0.9	0.0	0.0	0.0
Nauru	2.8	10.4	4.0	−3.0	0.0	0.0	1.0	−0.2
Palau	11.4	0.5	−1.0	1.0	4.0	−2.0	−4.5	−0.5
Papua New Guinea	8.0	2.4	2.5	2.9	2.6	−0.6	0.0	0.0
Samoa	1.6	7.1	2.4	2.5	2.8	0.3	1.5	1.0
Solomon Islands	2.5	3.5	3.2	3.0	2.9	0.3	0.0	0.1
Timor-Leste	4.0	5.3	−0.5	2.8	5.7	−4.5	−3.2	−0.3
Tonga	3.5	3.1	3.1	3.2	2.9	0.0	0.0	0.0
Tuvalu	9.1	3.0	3.2	3.5	3.1	0.0	1.0	0.9
Vanuatu	0.2	3.5	4.2	3.8	3.5	−0.3	−0.2	0.0
ASEAN[3]	**4.8**	**4.8**	**5.3**	**5.3**	**5.3**	**0.2**	**0.1**	**0.1**
ASEAN-5[4]	**4.5**	**4.6**	**5.1**	**5.0**	**5.1**	**0.1**	**0.2**	**0.1**
EMDEs excluding China and India	**5.1**	**5.1**	**5.5**	**5.5**	**5.6**	**0.0**	**0.1**	**0.1**

Sources: IMF, World Economic Outlook database; and IMF staff estimates and projections.
[1]EMDEs excluding Pacific island countries and other small states.
[2]India's data are reported on a fiscal year basis. Its fiscal year starts April 1 and ends March 31.
[3]ASEAN comprises Brunei Darussalam, Cambodia, Indonesia, Lao P.D.R., Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.
[4]ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

Table 1.2. Asia: Consumer Prices

(Year-over-year percent change)

	Estimates and Latest Projections					Difference from October 2017 *World Economic Outlook*		
	2015	2016	2017	2018	2019	2017	2018	2019
Asia	**2.3**	**2.3**	**2.1**	**2.9**	**2.9**	**−0.2**	**0.1**	**0.0**
Advanced economies (AEs)	**0.8**	**0.5**	**1.0**	**1.4**	**1.5**	**0.0**	**0.2**	**−0.1**
Australia	1.5	1.3	2.0	2.2	2.4	0.0	0.1	-0.1
New Zealand	0.3	0.6	1.9	1.7	2.1	−0.4	−0.3	0.0
Japan	0.8	−0.1	0.5	1.1	1.1	0.1	0.6	0.0
Hong Kong SAR	3.0	2.4	1.5	2.2	2.1	−0.5	0.0	−0.3
Korea	0.7	1.0	1.9	1.7	1.9	0.0	−0.2	0.0
Taiwan Province of China	−0.3	1.4	0.6	1.3	1.3	−0.4	−0.1	−0.2
Singapore	−0.5	−0.5	0.6	1.2	1.0	−0.3	−0.1	−0.6
Emerging market and developing economies (EMDEs)[1]	**2.7**	**2.8**	**2.4**	**3.3**	**3.3**	**−0.2**	**0.1**	**0.0**
Bangladesh	6.2	5.7	5.7	6.0	6.0	0.0	0.2	0.5
Brunei Darussalam	−0.4	−0.7	−0.1	0.1	0.3	0.0	0.1	0.2
Cambodia	1.2	3.0	2.9	3.3	3.2	−0.8	−0.2	0.0
China	1.4	2.0	1.6	2.5	2.6	−0.2	0.1	0.1
India[2]	4.9	4.5	3.6	5.0	5.0	−0.2	0.1	0.1
Indonesia	6.4	3.5	3.8	3.5	3.4	−0.2	−0.4	−0.4
Lao P.D.R.	1.3	1.6	0.8	2.3	3.1	−1.5	−0.4	0.0
Malaysia	2.1	2.1	3.8	3.2	2.4	0.0	0.3	−0.6
Myanmar	10.0	6.8	5.1	5.5	5.8	−1.4	−0.7	−0.7
Mongolia	5.9	0.6	4.6	6.4	6.8	0.3	0.3	1.0
Nepal	7.2	9.9	4.5	6.0	5.8	0.0	0.0	0.0
Philippines	1.4	1.8	3.2	4.2	3.8	0.1	1.2	0.8
Sri Lanka	2.2	4.0	6.5	4.8	4.8	0.5	−0.2	−0.2
Thailand	−0.9	0.2	0.7	1.4	0.7	0.1	0.4	−0.9
Vietnam	0.6	2.7	3.5	3.8	4.0	−0.8	−0.2	0.0
Pacific island countries and other small states	**3.9**	**4.0**	**3.8**	**2.8**	**2.7**	**−0.4**	**−1.4**	**−1.4**
Bhutan	6.3	3.9	3.4	4.1	4.6	−0.1	−0.1	−0.2
Fiji	1.4	3.9	3.4	3.3	3.0	−0.4	−0.2	0.0
Kiribati	0.6	1.9	2.2	2.5	2.5	0.0	0.0	0.0
Maldives	1.0	0.5	2.8	1.5	1.7	0.2	−0.6	−0.5
Marshall Islands	−2.2	−1.5	0.7	1.1	1.5	0.0	0.0	0.0
Micronesia	−0.2	0.5	0.5	2.0	2.0	−0.5	0.0	0.0
Nauru	9.8	8.2	5.1	2.0	2.0	0.0	0.0	0.0
Palau	0.9	−1.0	0.9	2.0	2.0	−0.6	0.0	0.0
Papua New Guinea	6.0	6.7	5.2	2.9	2.5	−0.5	−2.6	−2.5
Samoa	1.9	0.1	1.3	2.9	2.5	−0.5	1.0	0.0
Solomon Islands	−0.6	0.5	−0.4	1.3	1.4	0.1	−0.4	−1.5
Timor-Leste	0.6	−1.3	0.6	1.8	2.7	−0.4	−0.9	−0.9
Tonga	−1.1	2.6	8.0	3.0	2.5	0.5	0.3	0.0
Tuvalu	3.2	3.5	2.4	2.7	2.5	−0.5	−0.1	−0.3
Vanuatu	2.5	0.8	3.1	4.8	3.4	0.5	2.0	0.5
ASEAN[3]	**3.3**	**2.4**	**3.0**	**3.2**	**2.9**	**−0.2**	**0.0**	**−0.3**
ASEAN-5[4]	**3.3**	**2.2**	**2.9**	**3.0**	**2.7**	**−0.1**	**0.1**	**−0.4**
EMDEs excluding China and India	**3.8**	**3.0**	**3.5**	**3.6**	**3.4**	**−0.2**	**0.0**	**−0.2**

Sources: IMF, World Economic Outlook database; and IMF staff estimates and projections.

[1]EMDEs excluding Pacific island countries and small states.

[2]India's data are reported on a fiscal year basis. Its fiscal year starts April 1 and ends March 31.

[3]ASEAN comprises Brunei Darussalam, Cambodia, Indonesia, Lao P.D.R., Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.

[4]ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

Table 1.3. Asia: Current Account Balance
(Percent of GDP)

	Estimates and Latest Projections					Difference from October 2017 *World Economic Outlook*		
	2015	2016	2017	2018	2019	2017	2018	2019
Asia	**2.7**	**2.5**	**2.1**	**1.9**	**1.8**	**0.0**	**0.0**	**0.2**
Advanced economies (AEs)	**3.8**	**4.3**	**4.2**	**4.2**	**4.1**	**0.1**	**0.1**	**0.2**
Australia	−4.7	−3.1	−2.3	−1.9	−2.3	−0.8	0.5	0.2
Japan	−3.1	−2.3	−2.7	−2.6	−3.0	0.8	1.1	0.8
New Zealand	3.1	3.8	4.0	3.8	3.7	0.4	0.0	0.1
Hong Kong SAR	3.3	4.0	3.0	3.1	3.2	0.0	0.0	0.0
Korea	7.7	7.0	5.1	5.5	5.8	−0.5	0.1	0.5
Taiwan Province of China	14.3	13.6	13.8	13.6	13.5	0.0	−0.3	−0.6
Singapore	18.6	19.0	18.8	18.9	18.7	−0.7	−0.6	−0.1
Emerging market and developing economies (EMDEs)[1]	**2.0**	**1.4**	**0.9**	**0.6**	**0.6**	**0.0**	**0.0**	**0.2**
Bangladesh	1.7	0.6	−1.2	−2.0	−2.3	−0.5	−0.8	−0.5
Brunei Darussalam	16.0	9.6	6.1	5.0	13.1	1.3	7.1	4.1
Cambodia	−9.3	−8.8	−8.8	−10.7	−9.5	−0.3	−2.1	−1.1
China	2.7	1.7	1.4	1.2	1.2	0.1	0.1	0.3
India[2]	−1.1	−0.7	−2.0	−2.3	−2.1	−0.6	−0.8	−0.5
Indonesia	−2.0	−1.8	−1.7	−1.9	−1.9	0.0	−0.1	−0.1
Lao P.D.R.	−18.0	−12.0	−13.0	−14.9	−13.7	−3.3	−3.9	−4.1
Malaysia	3.0	2.4	3.0	2.4	2.2	0.6	0.2	0.3
Myanmar	−5.1	−3.9	−5.3	−5.4	−5.6	1.3	1.2	1.0
Mongolia	−4.0	−6.3	−8.8	−6.4	−8.3	−3.9	2.3	4.1
Nepal	5.0	6.3	−0.4	−3.6	−3.1	0.0	−2.8	−2.1
Philippines	2.5	−0.3	−0.4	−0.5	−0.6	−0.3	−0.2	0.0
Sri Lanka	−2.4	−2.4	−2.9	−2.7	−2.5	−0.4	−0.4	−0.4
Thailand	8.0	11.7	10.8	9.3	8.6	0.8	1.2	2.5
Vietnam	−0.1	3.0	4.1	3.0	2.4	2.8	1.6	1.5
Pacific island countries and other small states	**5.2**	**2.9**	**4.0**	**6.1**	**5.6**	**−0.5**	**2.2**	**1.8**
Bhutan	−28.3	−29.1	−20.5	−19.6	−15.9	8.9	−3.0	−0.9
Fiji	−3.6	−5.0	−4.5	−5.2	−4.5	0.5	−0.5	−0.3
Kiribati	46.7	19.4	9.0	17.0	7.1	13.6	22.9	14.0
Maldives	−7.4	−24.5	−22.1	−18.0	−15.2	−4.9	−1.0	1.2
Marshall Islands	16.5	8.5	5.5	4.5	3.8	−0.5	0.1	0.0
Micronesia	4.2	3.3	3.6	3.2	3.1	0.2	0.2	0.2
Nauru	−9.5	1.7	0.7	−0.7	0.1	12.8	13.8	13.1
Palau	−7.7	−10.4	−13.6	−13.4	−13.8	−1.4	1.0	−0.8
Papua New Guinea	13.3	16.7	16.8	20.2	19.2	−1.8	2.9	2.0
Samoa	−2.8	−4.2	−1.3	−1.8	−3.4	4.5	3.2	0.9
Solomon Islands	−3.0	−3.9	−4.4	−5.0	−6.4	0.6	0.0	−0.7
Timor-Leste	6.4	−21.6	−13.0	−22.6	−24.7	−7.4	−6.7	−5.6
Tonga	−14.7	−12.7	−10.9	−12.1	−11.9	2.6	1.5	−1.2
Tuvalu	−23.8	−32.0	−19.2	−20.5	−29.7	18.5	18.5	2.3
Vanuatu	−10.6	−4.1	−9.0	−9.2	−8.6	5.4	4.4	2.3
ASEAN[3]	**3.3**	**3.8**	**3.7**	**3.2**	**3.0**	**0.5**	**0.5**	**0.8**
ASEAN-5[4]	**4.1**	**4.3**	**4.2**	**3.7**	**3.5**	**0.2**	**0.4**	**0.8**
EMDEs excluding China and India	**1.1**	**1.5**	**1.3**	**0.7**	**0.5**	**0.4**	**0.3**	**0.5**

Sources: IMF, World Economic Outlook database; and IMF staff estimates and projections.
[1]EMDEs excluding Pacific island countries and other small states.
[2]India's data are reported on a fiscal year basis. Its fiscal year starts April 1 and ends March 31.
[3]ASEAN comprises Brunei Darussalam, Cambodia, Indonesia, Lao P.D.R., Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam.
[4]ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore, and Thailand.

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2. Low Inflation in Asia: How Long Will It Last?

Introduction and Main Findings

Global growth in 2017 was the highest since 2011 and is expected to strengthen further in 2018–19, supported by broad-based momentum across countries and fiscal expansion in the United States. Headline inflation has been picking up with the upturn in oil prices since September, but core inflation remains surprisingly subdued, especially in advanced economies. Asia has been in a sweet spot of strong growth and benign inflation. While GDP growth forecasts for 2017–18 have been repeatedly revised up over the past two years, inflation forecasts have been kept constant or revised down (Figure 2.1). Core inflation remains below inflation targets in many Asian economies (Figure 2.2).

Motivated by these developments, this chapter aims to shed light on the following questions: Why has inflation been low in Asia recently, and how long will it last? What has been the role of import prices and global factors? How well anchored are inflation expectations? To what extent has inflation become less sensitive to economic slack? How do these drivers of inflation in Asia differ from those in other regions? Finally, what are the key implications for policymakers?

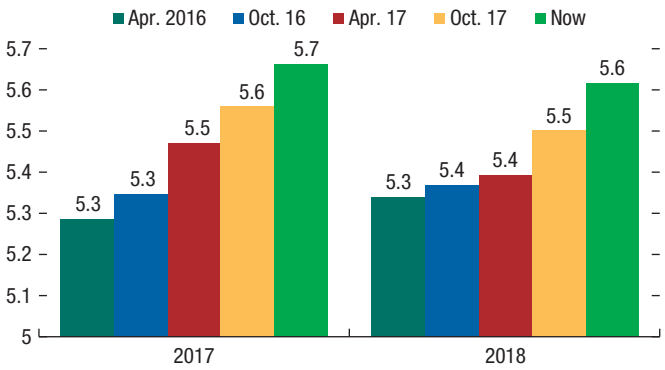
To address these questions, the chapter analyzes inflation dynamics relying on a variety of approaches, including estimation of augmented Phillips curves, principal component analysis to distinguish global factors from country-specific factors, and an analysis of trend inflation to shed light on how long low inflation is likely to persist.

The main findings are as follows:

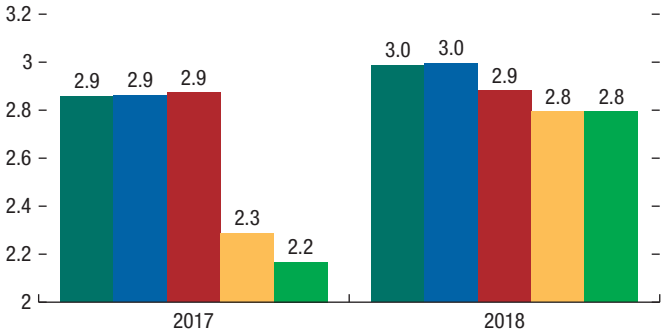
This chapter was prepared by Pablo Lopez Murphy (lead), Juan Angel Garcia Morales, Weicheng Lian, Katsiaryna Svirydzenka, Rizki Wimanda, and Qianqian Zhang, under the guidance of Koshy Mathai. Alessandra Balestieri and Socorro Santayana provided excellent production assistance.

Figure 2.1. Growth and Inflation

1. Asia: Real GDP Growth
(Percent)



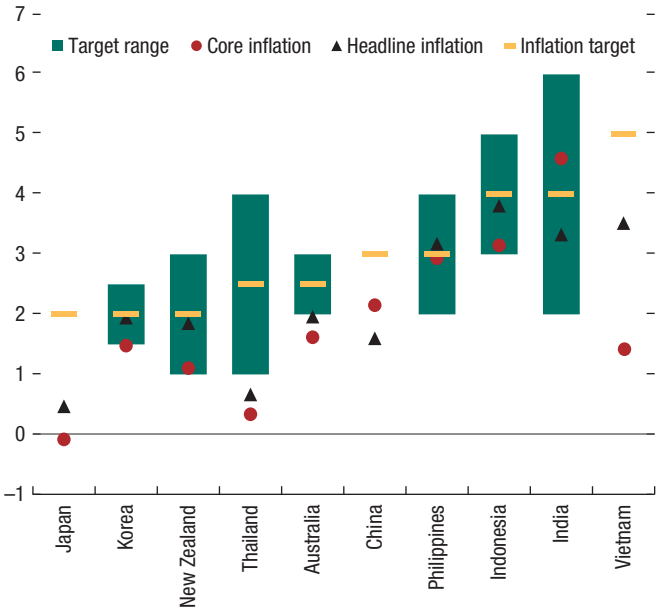
2. Asia: Inflation
(Percent)



Source: IMF, *World Economic Outlook*.

- ***Recent low inflation has been driven mainly by temporary forces, including imported inflation.*** The Phillips curve estimation indicates that weaker import prices, including low commodity prices, contributed to half of the undershooting of inflation targets in advanced Asia and most of the undershooting in emerging Asia in recent years. In addition, China seems to have played an important role in driving both global and regional inflation. More generally, an analysis looking at temporary and trend components suggests that temporary shocks have accounted for the bulk of the recent reduction in inflation.

Figure 2.2. 2017 Inflation Target versus Headline and Core Inflation
(Percent)



Sources: Haver Analytics; and IMF staff calculations.
Note: Australia and New Zealand are based on quarterly data as of the third quarter of 2017.

- ***The inflation process has become more backward-looking.*** While inflation expectations are generally relatively well anchored, especially in advanced Asia and in economies with inflation-targeting frameworks, the importance of expectations in driving inflation has declined in recent years, with past inflation playing a larger role.
- ***The sensitivity of inflation to the unemployment gap has declined.*** There seems to be a flattening of the Phillips curve compared with the 1990s in advanced Asia and a similar but more continuous flattening in emerging Asia. Outside Asia, the slope of the Phillips curve seems to have been more stable.

Looking forward, these findings suggest that inflation may well rise in Asia as commodity prices and other temporary factors reverse themselves (the April 2018 *World Economic Outlook* projects a near-term increase in commodity prices). Higher inflation in the rest of the world and weaker currencies in the region could pose upside risks to inflation. If such risks materialize, higher inflation may well persist, given the stickiness of the inflation process. And given the relative flatness of the Phillips curve, the output costs of disinflating may be high.

The main policy implications of the findings are as follows:

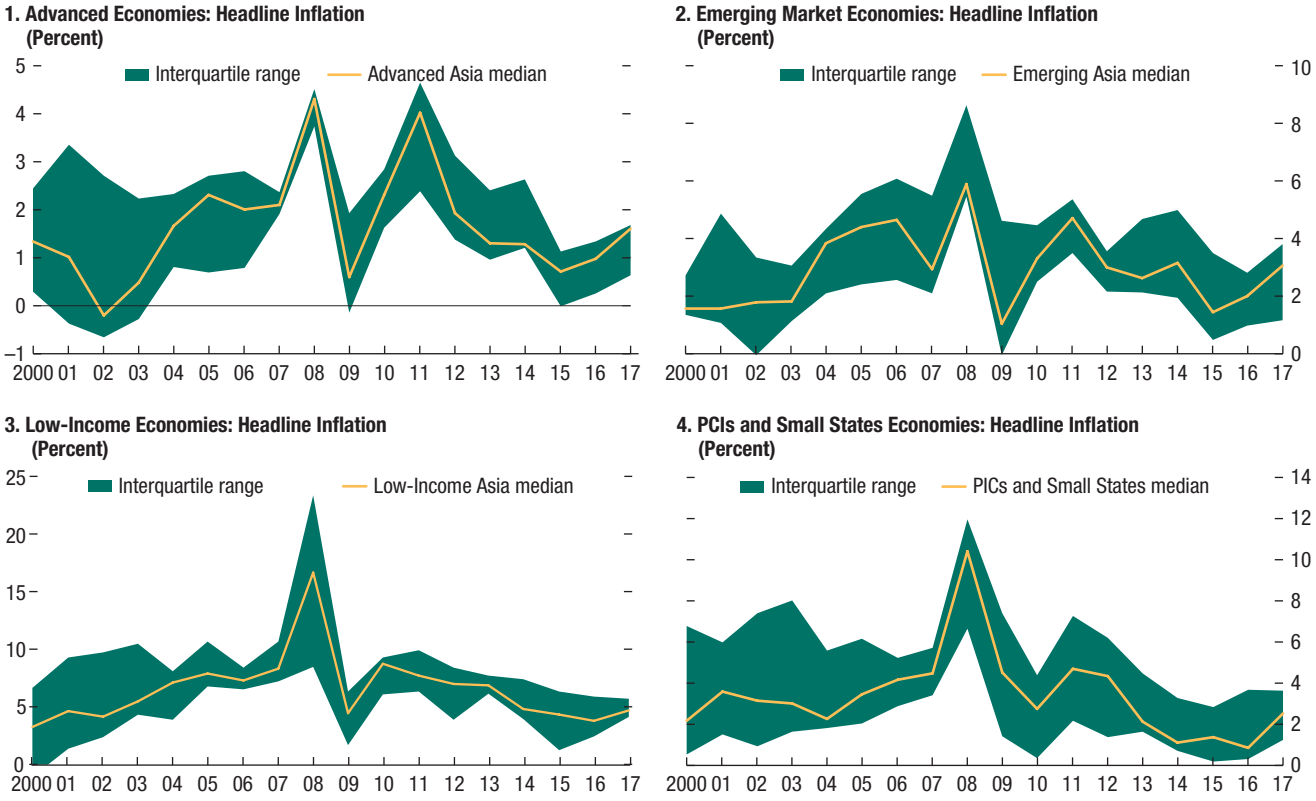
- Central banks should be vigilant in responding to early signs of inflation pressure, including from global factors. A sudden increase in inflation may then persist, and disinflating may be costly if the sensitivity of inflation to the unemployment gap has declined.
- It will be important to strengthen monetary policy frameworks and improve central bank communications in order to both increase the role of expectations in driving inflation and to maintain expectations anchored to targets.
- To mitigate the role of imported inflation, exchange rates should be allowed to adjust more flexibly.
- In principle, the monetary policy response to commodity price shocks should be to accommodate first-round effects but not second-round effects.

The chapter first reviews recent inflation trends in Asia, followed by an examination of the structural drivers of inflation. It then analyzes the anchoring of inflation expectations and distinguishes global from country-specific factors in driving inflation. The chapter then presents an analysis of trend inflation and concludes with policy implications.

Recent Inflation Trends in Asia

Headline inflation declined sharply during 2012–15 across many advanced, emerging market, and developing economies in Asia (Figure 2.3). Disinflation was broad-based across sectors and inflation measures. The breakdown

Figure 2.3. Asia: Headline Inflation

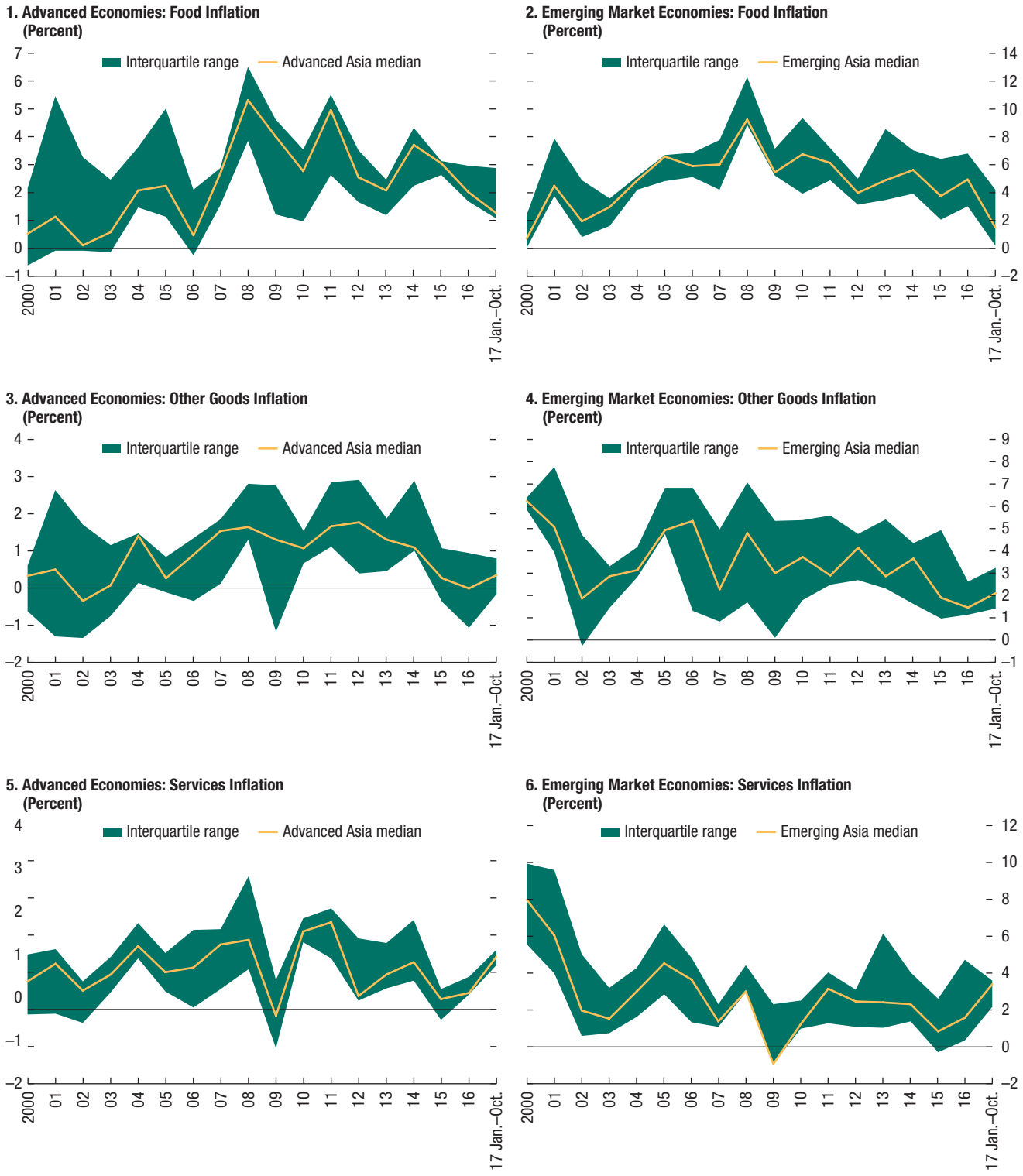


Sources: IMF, *World Economic Outlook*; and IMF staff calculations.
Note: PICs = Pacific island countries.

of inflation across expenditure categories shows that the decline in inflation in advanced and emerging market economies was widespread (Figure 2.4). On average, the decline in inflation was comparable across food, other goods, and services. While food inflation declined the most across advanced economies, it remained generally positive despite the decline in international food prices over the same period, suggesting a rather low pass-through from international to domestic food prices. Other goods inflation entered negative territory in several advanced Asian economies, reflecting the large decline in manufacturing producer prices (Figure 2.5). In turn, this may reflect a larger effect of lower commodity prices in manufacturing as well as an increase in excess manufacturing capacity. Core inflation—the change in the prices of goods and services excluding food and energy—also declined widely, as did wage inflation (Figure 2.5).

Headline inflation started to pick up in 2016, with the share of low-inflation economies dropping from its 2015 peak (Figure 2.6). Inflation is currently picking up in Australia, Japan, Korea, and some ASEAN economies (Figure 2.7). The recent pickup in headline inflation is primarily explained by other goods and services inflation, with the manufacturing producer price index (PPI) recovering strongly. The pickup is in line with other advanced economies and emerging markets (Figure 2.8), reflecting the recent increase in commodity prices (Figure 2.9). In China, however, the pickup in PPI inflation did not spill over to consumer price index (CPI) inflation (Box 2.1). While food prices are still declining, core inflation is edging up, and wage inflation is recovering. That said, the level of inflation is still low in many economies, with headline and core inflation below inflation targets in most economies (Figure 2.2).

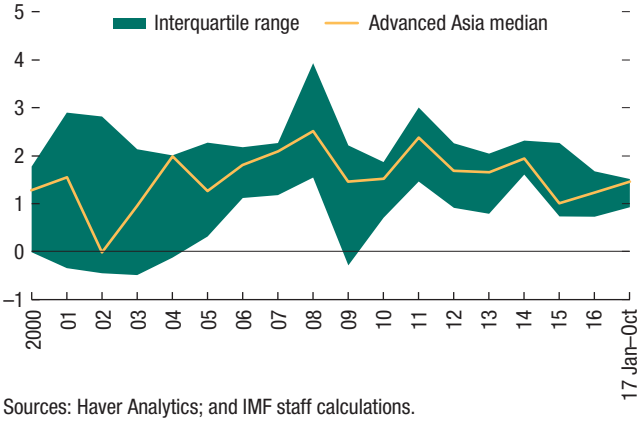
Figure 2.4. Asia: Inflation by Sector



Sources: Haver Analytics; and IMF staff calculations.
Note: Some countries' data are only through August 31, 2017.

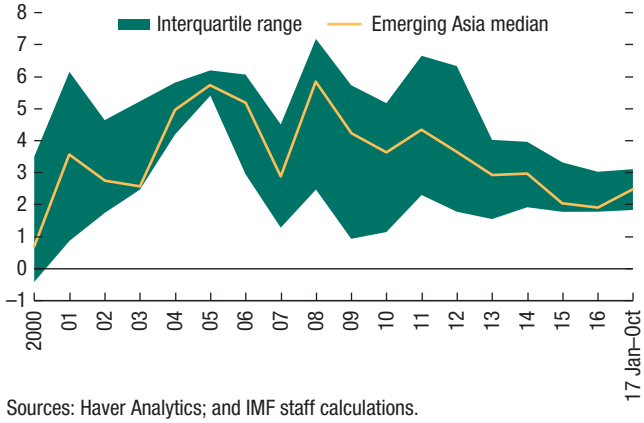
Figure 2.5. Asia: Other Inflation Measures

1. Advanced Economies: Core Inflation
(Percent)



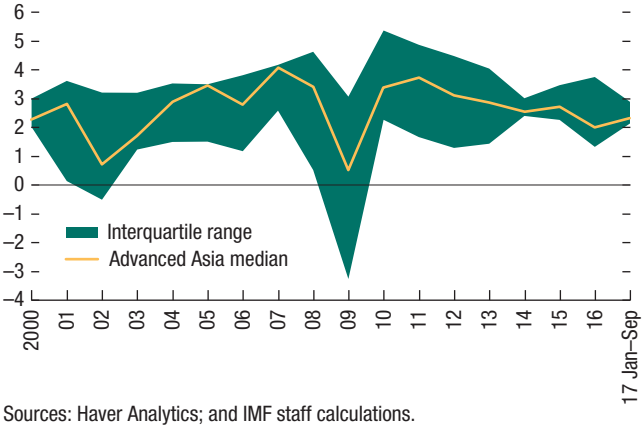
Sources: Haver Analytics; and IMF staff calculations.

2. Emerging Market Economies: Core Inflation
(Percent)



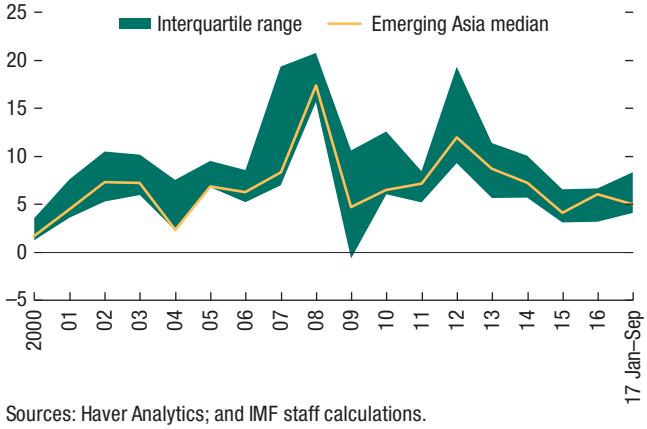
Sources: Haver Analytics; and IMF staff calculations.

3. Advanced Economies: Wage Inflation
(Percent change in nominal wages, year over year)



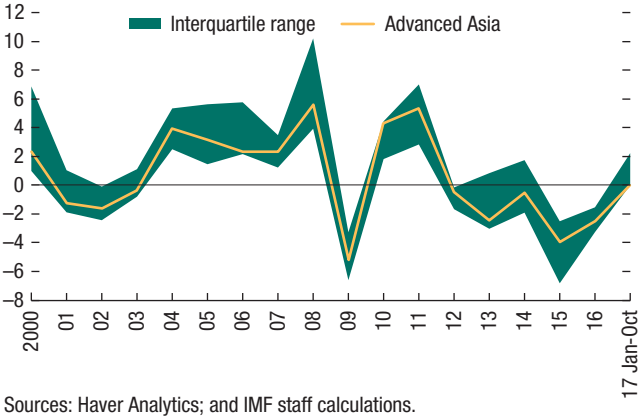
Sources: Haver Analytics; and IMF staff calculations.
Note: Some countries' data are only through August 31, 2017.

4. Emerging Market Economies: Wage Inflation
(Percent change in nominal wages, year over year)



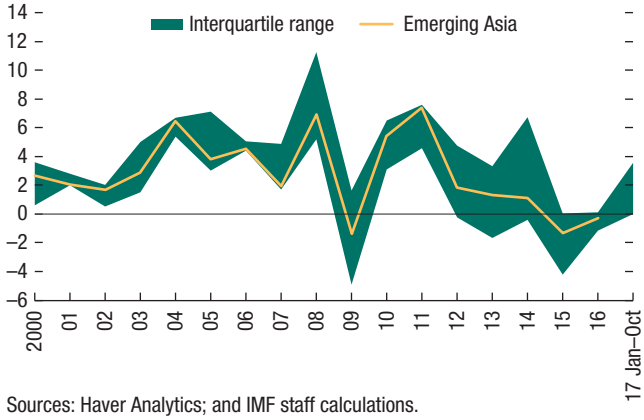
Sources: Haver Analytics; and IMF staff calculations.
Note: Some countries' data are only through August 31, 2017.

5. Advanced Economies: Manufacturing PPI
(Percent change)



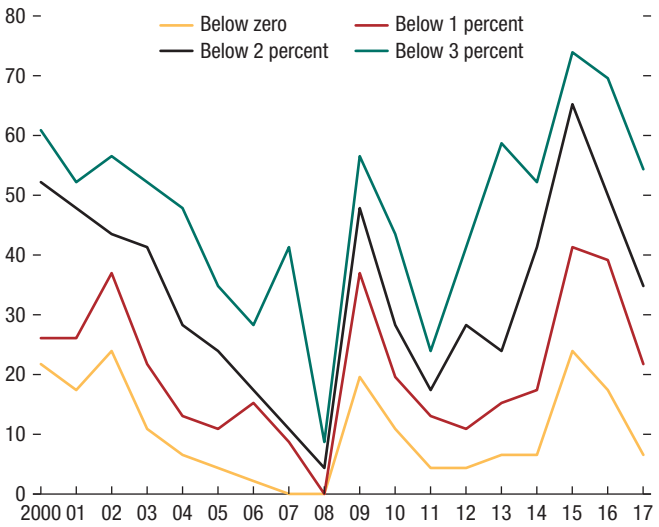
Sources: Haver Analytics; and IMF staff calculations.
Note: Some countries' data are only through August 31, 2017.

6. Emerging Market Economies: Manufacturing PPI
(Percent change)



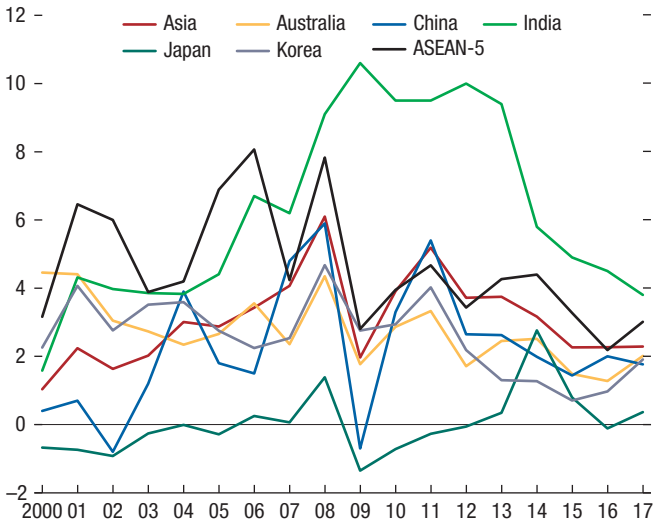
Sources: Haver Analytics; and IMF staff calculations.
Note: Some countries' data are only through August 31, 2017.

Figure 2.6. Share of Asian Countries with Low Inflation
(Percent)



Sources: IMF, *World Economic Outlook*; and IMF staff calculations.

Figure 2.7. Headline Inflation - Selected Asian Countries
(Percent)



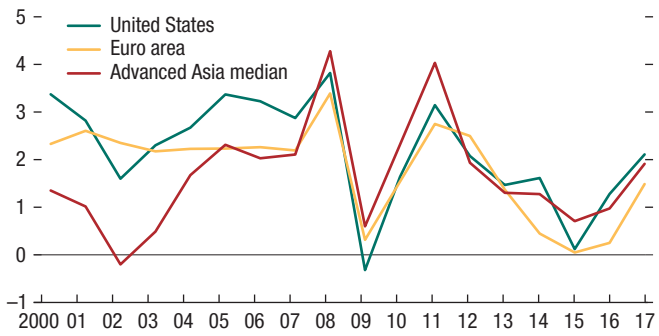
Sources: IMF, *World Economic Outlook*; and IMF staff calculations.
Note: ASEAN-5 = Indonesia, Malaysia, Phillipines, Singapore, and Thailand.

Structural Drivers of Inflation

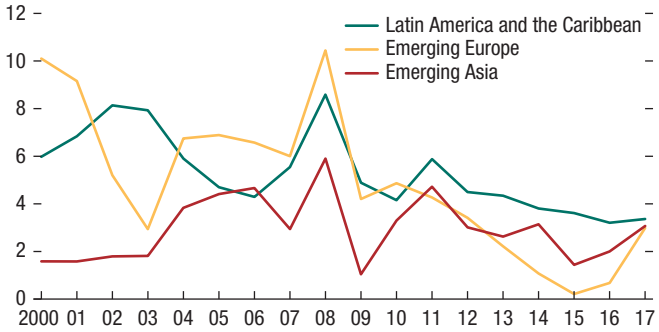
To study inflation dynamics, this chapter follows the analytical framework in Chapter 3 of the April 2013 *World Economic Outlook*, Chapter 3 of the October 2016 *World Economic Outlook*, and Blanchard, Cerutti, and Summers (2015). It

Figure 2.8. Headline Inflation and Rest of the World

Advanced Economies: Headline Inflation
(Percent)

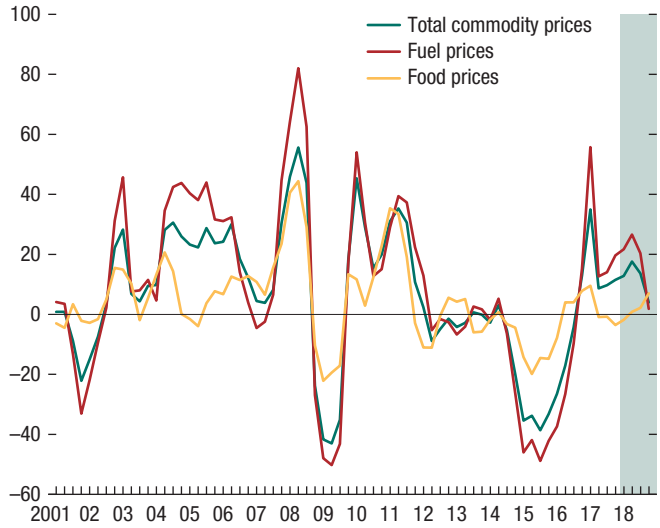


Emerging Markets: Headline Inflation
(Percent; median of the region)



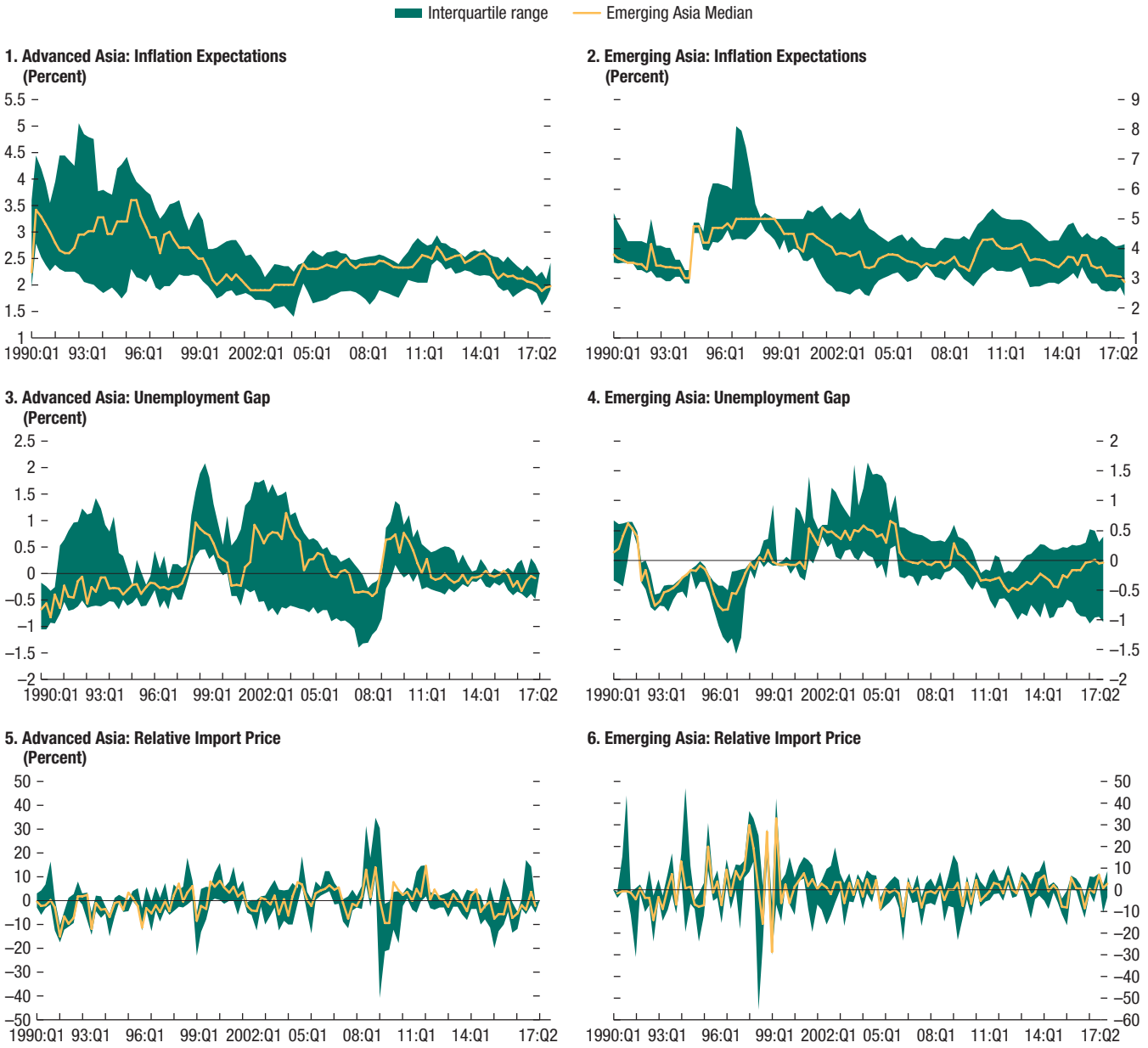
Sources: IMF, *World Economic Outlook*; and staff calculations.

Figure 2.9. Commodity Prices
(Percent change, year over year)



Source: IMF, *World Economic Outlook*.

Figure 2.10. Inflation Drivers



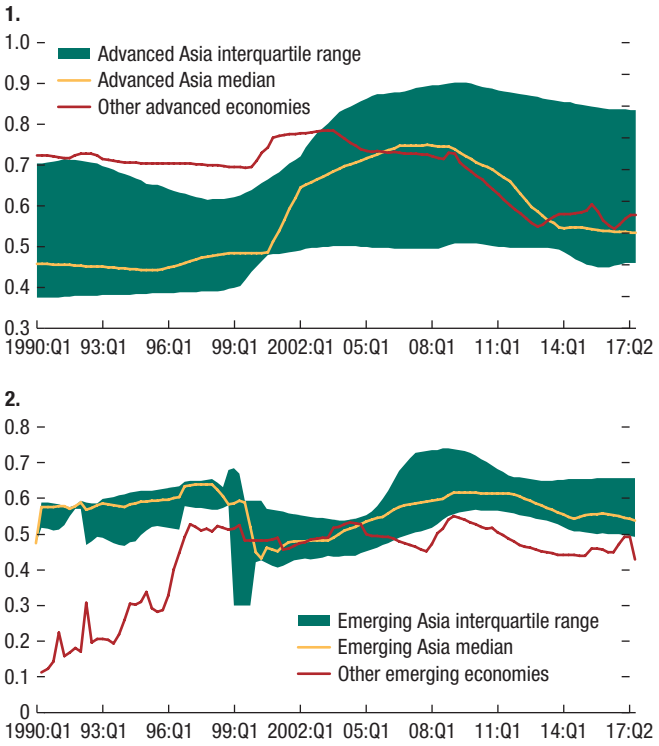
Source: IMF staff estimates.

builds on the hybrid new Keynesian Phillips curve of Fuhrer (1995) and Galí and Gertler (1999) and relates domestic inflation to inflation expectations, cyclical unemployment, and imported inflation.

Figure 2.10 shows the evolution of the underlying variables. Inflation expectations came down substantially in the 1990s for both advanced and emerging Asia and have been on a declining trend since 2011. There was some slack in labor markets in the aftermath of the global financial crisis, but unemployment gaps seem to be closing in recent periods, with some slack still remaining in China, India, Korea, Malaysia, and Singapore.

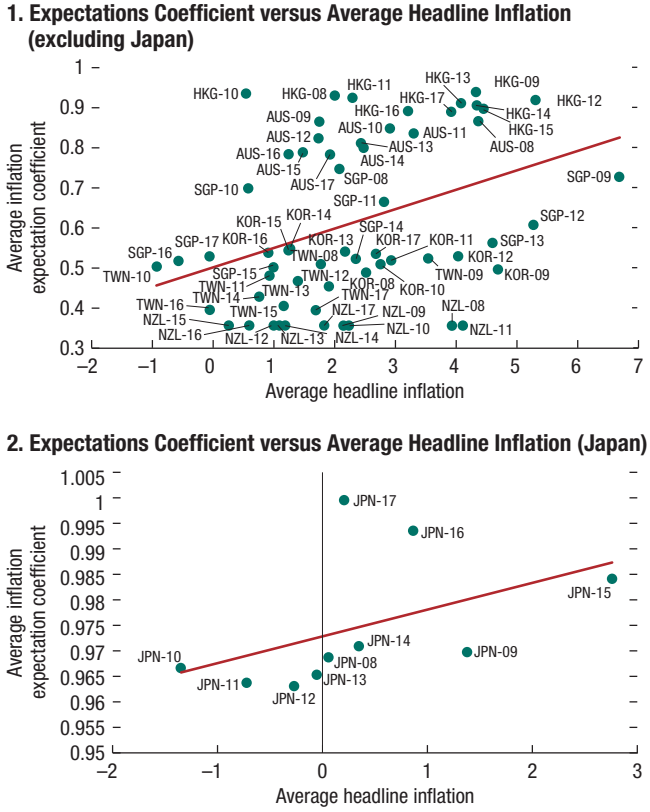
The main findings from the estimates of Phillips curve parameters are discussed below (see Annex 2.1 for details).

Figure 2.11. Estimated Coefficient on Inflation Expectations
(Percent)



Source: IMF staff estimates.

Figure 2.12. Expectations Coefficient versus Average Headline Inflation

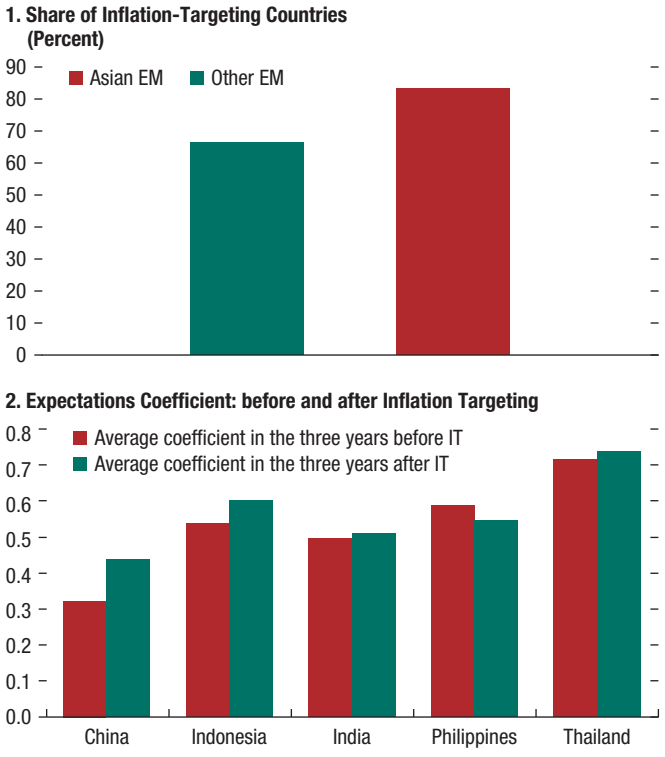


Source: IMF staff estimates.

First, the inflation process in Asia has become more sticky, or backward-looking, since the global financial crisis. The estimated coefficient on inflation expectations has declined in both advanced economies and emerging markets back to levels of the early 2000s, suggesting that inflation is being driven more by past inflation than by expectations about future inflation (Figure 2.11).

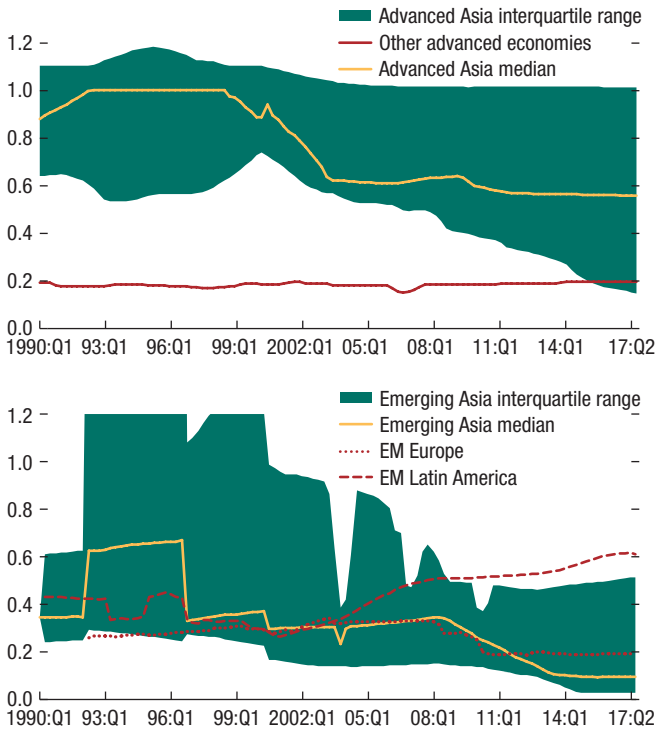
- In advanced Asia, the role of long-term inflation expectations was less important than in other advanced economies but has gradually caught up. Since the global financial crisis, the coefficient has declined in line with other advanced economies, a finding similar to that of Chapter 3 of the October 2016 *World Economic Outlook*. The decline could reflect the difficulty of central banks in reaching inflation targets when faced with negative inflation shocks. As a result, the inflation process has become more backward-looking, as opposed to following expectations. Indeed, after 2007, the expectations coefficient was lower in economies with lower inflation (Figure 2.12). A lower coefficient on expectations implies that the effects of cyclical unemployment, import prices, and shocks on inflation have become relatively more persistent in the recent period.
- The role of inflation expectations in driving inflation in emerging Asia has generally been more important than it has been in other emerging markets and, as a result, inflation shocks have been less persistent. This could be related to the fact that Asia has a higher share of inflation-targeting countries, and the fact that the inflation expectations coefficient tends to increase after the adoption of inflation targeting (Figure 2.13). There has

Figure 2.13. Share of Inflation-Targeting Countries and Expectations Coefficient



Source: IMF staff estimates.
Note: EM = emerging market; IT = inflation targeting.

Figure 2.14. Estimated Coefficient on Cyclical Unemployment



Source: IMF staff estimates.
Note: EM = emerging market.

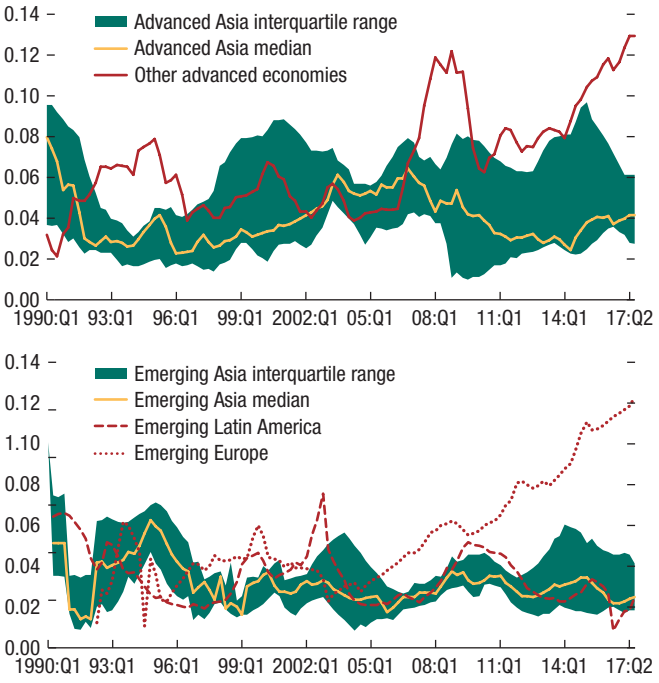
been some decline in the coefficient since the global financial crisis, but less than in other countries and with a longer lag compared with advanced economies. This finding suggests that inflation may be more driven by inflation expectations in emerging Asia than in other emerging markets.

Second, the slope of the Phillips curve, which measures the sensitivity of inflation to domestic labor market slack, is estimated to have declined in Asia (Figure 2.14).

- In Asian advanced economies, inflation in the 1990s was more sensitive to labor market slack than in other advanced economies, with median coefficients of about 1 and 0.2, respectively. The slope declined compared with the 1990s from 1 to about 0.6, but has remained broadly stable since 2004. This contrasts with other advanced economies, where it has remained stable since the 1990s.
- In Asian emerging markets, the slope has been declining steadily, mirroring the developments in emerging Europe, while Latin American emerging markets did not see such a flattening of the Phillips curve. The flattening has been significant and prevalent across most Asian emerging markets.
- This result is robust to alternative measures of the nonaccelerating inflation rate of unemployment (NAIRU) to measures of slack based on capacity utilization rather than unemployment, and to some (but not all) estimates of slack based on the output gap.

Third, the coefficient on imported inflation remained broadly constant in both advanced economies and emerging markets (Figure 2.15). In Asian advanced economies, it has been lower than

Figure 2.15. Estimated Coefficient on Relative Import Prices



Source: IMF staff estimates.

in other advanced economies. In Asian emerging markets, it has been broadly in line with Latin American emerging markets but lower than in European emerging markets.

Putting together the sensitivity of inflation to these factors and their changes over time, the analysis shows that imported inflation has been the most important driver of inflation deviations from targets in recent years (Figure 2.16):[1]

- In advanced economies, while cyclical unemployment was the main driver of deviations before the global financial crisis, import prices accounted for about half of the undershooting since 2013.
- In emerging markets, the undershooting of inflation targets since 2014 is mainly accounted for by import prices. Unlike in advanced economies, cyclical unemployment has also been behind the inflation undershooting in emerging markets.
- Starting in 2016 and 2017, inflation expectations also started to contribute to the undershooting of inflation compared with targets, accounting for 35 percent of the undershooting in advanced Asia and 40 percent of the undershooting in emerging Asia in the first two quarters of 2017.
- The depreciation of Asian currencies in 2015 following China-induced volatility contributed in a positive way to inflation in both advanced and emerging Asia.

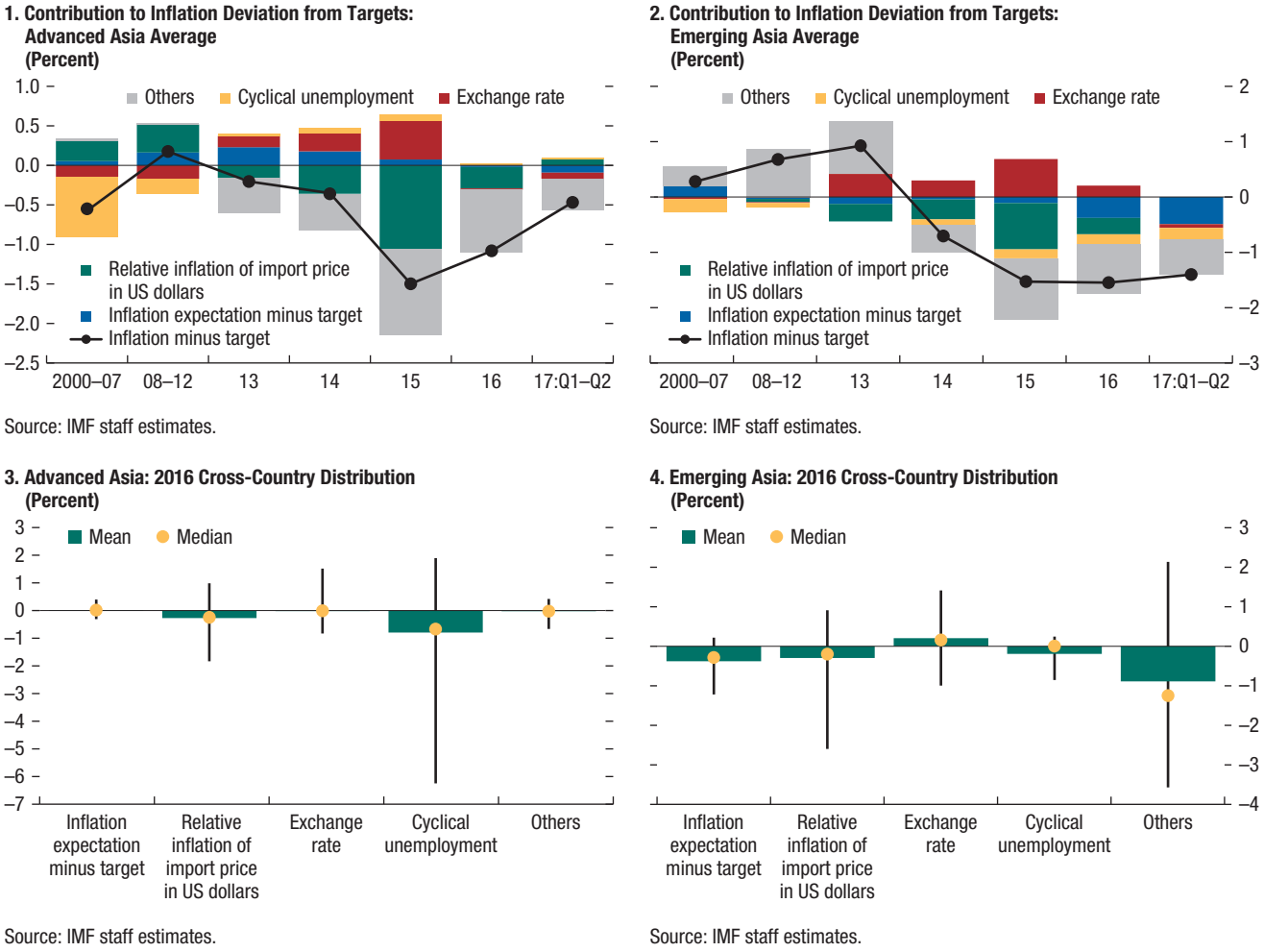
There is, however, a large share of unexplained factors driving inflation undershooting in Asia, especially in advanced economies. These could reflect the mismeasurement of labor market slack by headline unemployment rates, the fact that expectations of actual price setters may have dropped more than those of professional forecasters (Coibion and Gorodnichenko 2015), or technical constraints on monetary policy in the form of the zero lower bound. There also seems to be large cross-country heterogeneity in the drivers (Figure 2.16).

Overall, the analysis shows that low inflation in Asia has been driven mainly by sluggish import prices and inflation expectations being below targets. In addition, while the Phillips curve fits the inflation data in Asia, it seems to have flattened, meaning that the sensitivity of inflation to economic slack has declined.

The undershooting of inflation targets due to import prices seems to be linked to manufacturing slack in China. Figure 2.17 shows the averages, medians, and the interquartile range of the coefficients from country-level regressions of the import price contribution in Figure 2.16 on manufacturing slack in China, Japan, and the United States. Changes in import prices depend

[1]Inflation targets are proxied by the average of 10-year-ahead inflation expectations during 2000–07. The decomposition of inflation dynamics is conducted in a way similar to that in Chapter 3 of the October 2016 *World Economic Outlook* and Yellen (2015). The contribution of each explanatory variable is obtained by setting its value to zero and comparing the model's prediction with that when all explanatory variables are set at their historical values. The contribution of import prices to inflation is further decomposed into the contribution of import prices in US dollars and variations in the domestic exchange rate vis-à-vis the US dollar.

Figure 2.16. Contributions to Inflation Deviation from Targets



Source: IMF staff estimates.

Source: IMF staff estimates.

Source: IMF staff estimates.

Source: IMF staff estimates.

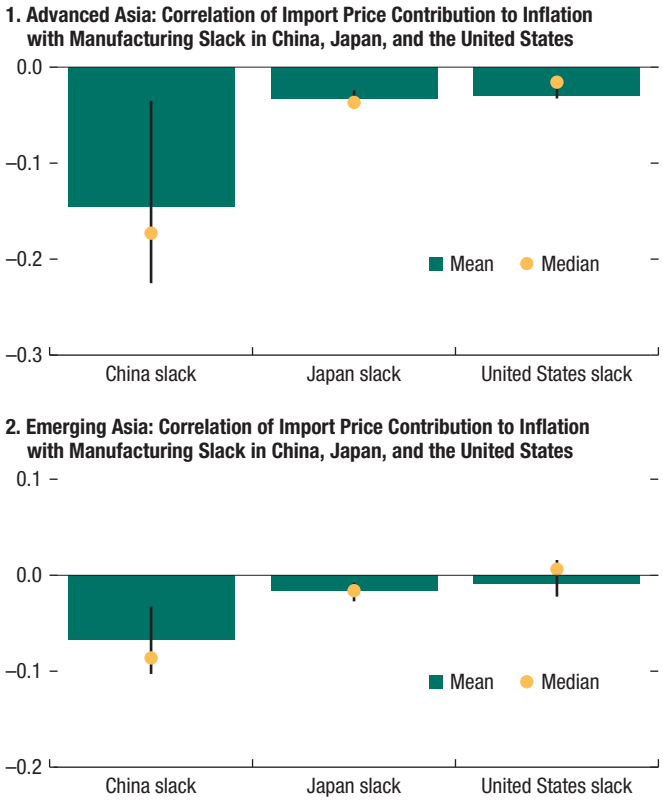
on the degree of excess supply or demand in globally integrated markets for tradable goods and services. This in turn is related to the rising slack in tradables sectors in large economies and systemic trading partners. Using estimates of manufacturing slack,[2] it seems that the import price contribution to inflation in Asia is particularly strongly related to slack in China (Figure 2.17).

To the extent that growth in China in 2018 and 2019 is expected to be stronger than envisaged in the October 2017 *Regional Economic Outlook Update: Asia and Pacific*, this could put upward pressure on inflation in the region.

The next section explores why the Phillips curve may have flattened—that is, why inflation may be becoming less sensitive to the unemployment gap. The analysis then examines whether inflation expectations in Asia are becoming unanchored—while the role of expectations in driving inflation has weakened over time, their contribution to inflation undershooting has increased recently. If expectations are becoming unanchored, as some analysts have suggested, this would imply a risk of continued undershooting of targets.

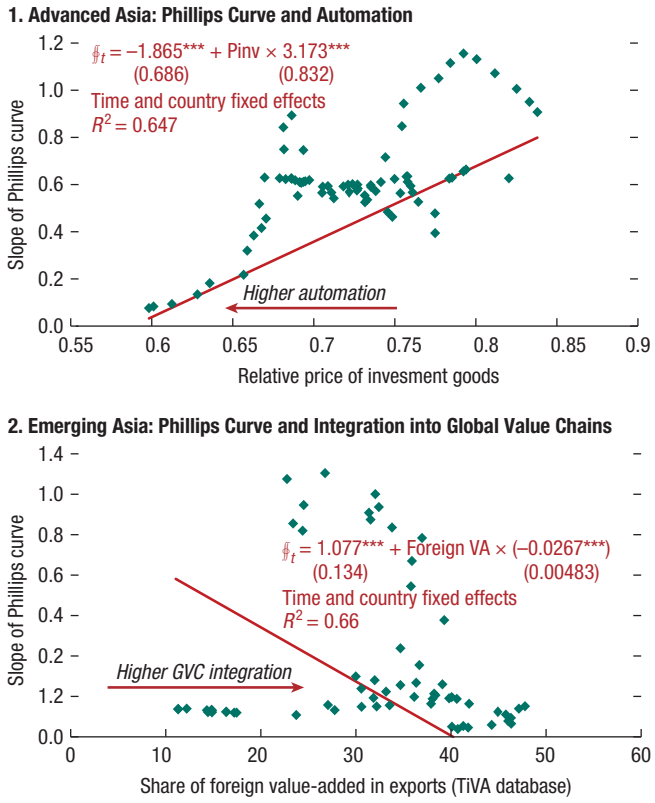
[2]Estimates of slack for the industrial sector of each economy are obtained through an extended multivariate filter that includes information on GDP, consumer price inflation, PPI inflation, and industrial production.

Figure 2.17. Correlations of Manufacturing Slack in China, Japan, and the United Sates with Import Price Contribution to Inflation in Other Countries



Source: IMF staff estimates.

Figure 2.18. Phillips curve, Automation, and Global Value Chains



Source: IMF staff estimates.
Note: Excludes China and India. The Phillips curve slope estimates for these two countries are less reliable given difficulties in measuring the unemployment gap in countries with large informal sector (India) and state-owned enterprises (China). GVC = global value chain.

Why Is Inflation Becoming Less Sensitive to the Unemployment Gap?

Inflation can become less responsive to labor market slack when the ability of workers to bid up their wages is weakened. Workers' bargaining power is affected by institutional factors, such as union density and collective bargaining agreements, labor laws, and employment regulations.[3] There could also be structural factors at play, such as aging,[4] technological progress, global integration, and the rise of the service economy.

In Asia, there appears to be a link between the flattening of the Phillips curve and automation (in advanced economies) and between inflation and integration in global value chains (GVCs) (in emerging market economies) (Figure 2.18). To the extent that automation substitutes, or threatens to substitute, for some low- or middle-skilled workers with routine job tasks (Autor and Dorn 2013; Goos, Manning, and Salomons 2014), it could weaken the power of such workers to bid up their wages. It could also weaken their unionization. Workers' bargaining power can also be influenced by exposure to international competition. This may arise through trade and through firms' participation in global supply chains. The threat

[3]For example, the global decline in trade union membership and the rise of nonregular or nonunionized employment since the 1990s resulted in a collective decline in bargaining power, which may have further undercut leverage for wage increases.

[4]With an aging workforce, job security takes on more importance than wage increases, especially where wages are seniority based.

of production facilities' relocating to economies where labor costs are lower would weaken the ability of workers to bargain for higher wages and weaken the effectiveness of labor unions.

A scatter plot of indicators of automation and GVCs shows some correlation with the slope of the Phillips curve in Asia. Automation is measured by the price of investment goods relative to the consumer price deflator (see Chapter 2 of the October 2017 *World Economic Outlook*). A decline in the cost of capital relative to labor can lower the cost of automating routine tasks. GVC integration is measured through backward linkages—the share of foreign value added in a country's exports—as shown in the Organisation for Economic Co-operation and Development's Trade in Value-Added database. Figure 2.18 shows the scatter plots of annual averages of slope coefficients by country (based on quarterly estimates) and the fitted lines from panel regressions on automation and GVC integration with country and time fixed effects. There is a statistically significant link between the flattening of the Phillips curve and automation in advanced Asia and between the flattening of the Phillips curve and GVC integration in emerging Asia (Figure 2.18).

These findings are in line with those in Chapter 3 of the April 2017 *World Economic Outlook* that show that technological progress, reflected in the steep decline in the relative price of investment goods, along with varying exposure to routine-based occupations, explained about half of the overall decline in the labor shares of income in advanced economies. In emerging markets, the labor-share evolution was driven by the forces of global integration, particularly the expansion of GVCs, which contributed to raising the overall capital intensity in production.

In general, the Phillips curve appears to have flattened more when Asia experienced a rapid increase in GVC integration and automation. Now that these factors have stabilized, one would expect the slope of the Phillips curve to normalize.

The next section turns to the role of inflation expectations and the risks that they may be becoming unanchored.

How Well Anchored Are Inflation Expectations?

Medium-term inflation expectations in Asia have been on a declining trend since 2011 (Figure 2.10) and have started to contribute to the undershooting of inflation relative to targets more recently (Figure 2.16). This section investigates the risks that inflation expectations may be becoming unanchored by (1) computing the fraction of time that expectations are within inflation targets; and (2) examining the response of expectations to inflation shocks. Box 2.2 examines policy efforts in Japan to break the "deflation mindset."

Time within the Target

As a first step, Table 2.1 shows the number of quarters in which inflation expectations, measured

Table 2.1 Percent of Time Expectations are within Inflation Targeting Range, Inflation Targeting start till 2017

			Expectation Horizon (years)					
Country	Start of Inflation Targeting	Most Recent Target Band	0	1	2	3	4	5
Australia	1993	2–3	54	70	76	82	86	88
China	2005	2–4	40	79	92	92	100	96
Indonesia	2001	2.5–4.5	47	54	40	35	54	50
India	2016	2–6	100	100	100	100	100	100
Japan	2013	1–3	25	65	80	80	80	90
Korea	1998	1.5–2.5	48	86	90	90	80	78
New Zealand	1990*	1–3	73	91	100	100	100	100
Philippines	2002**	2–4	85	88	73	58	45	35
Thailand	2000	1–4	50	72	83	83	86	89

Source: IMF staff calculations.
*Evaluation begins at 1995 due to availability of inflation expectations data.
**Evaluation begins at 2008 due to availability of inflation expectations data.

Table 2.2. Percent of Time Expectations are within Inflation Targeting Range, 2013–17

Country	Start of Inflation Targeting	Most Recent Target Band	Expectation Horizon (years)					
			0	1	2	3	4	5
Australia	1993	2–3	70	100	100	100	100	100
China	2005	2–4	45	75	100	100	100	100
Indonesia	2001	2.5–4.5	50	65	35	10	25	20
India	2016	2–6	100	100	100	100	100	100
Japan	2013	1–3	25	65	80	80	80	90
Korea	1998	1.5–2.5	20	75	80	60	60	80
New Zealand	1990*	1–3	70	100	100	100	100	100
Philippines	2002**	2–4	70	95	75	65	60	60
Thailand	2000	1–4	50	90	100	100	100	100

Source: IMF staff calculations.
*Evaluation begins at 1995 due to availability of inflation expectations data.
**Evaluation begins at 2008 due to availability of inflation expectations data.

Table 2.3. Average Absolute Deviation from Target (from Beginning of Inflation Targeting until 2017)

Country	Start of Inflation Targeting	Most Recent Point Target	Expectation Horizon (years)					
			0	1	2	3	4	5
Australia	1993	1.5	0.7	0.5	0.4	0.3	0.2	0.2
China	2005	3	1.3	0.6	0.6	0.5	0.3	0.4
Indonesia	2001	3.5	1.7	1.1	1.2	1.1	0.9	1.0
India	2016	4	0.9	1.0	1.2	1.0	0.9	0.9
Japan	2000	2	1.4	0.7	0.6	0.9	0.6	0.6
Korea	1998	2	0.7	0.4	0.3	0.3	0.4	0.4
New Zealand	1990*	2	0.8	0.4	0.3	0.3	0.3	0.3
Philippines	2002**	3	0.5	0.4	0.7	0.9	1.0	1.1
Thailand	2000	2.5	1.4	0.9	1.0	1.0	1.0	0.9

Source: IMF staff calculations.
*Evaluation begins at 1995 due to availability of inflation expectations data.
**Evaluation begins at 2008 due to availability of inflation expectations data.

by Consensus Forecasts for different time horizons, are within the target range, divided by the number of quarters since the inflation target was adopted.[5]

The degree of anchoring of inflation expectations to the target varies with the time horizon. Inflation expectations for the current year in most Asian economies are not well anchored. This is because short-term inflation expectations are usually close to actual inflation, which may differ from the target. In contrast, one-year-ahead to five-year-ahead inflation expectations are better anchored to inflation targets, except in Indonesia and the Philippines, where they tend to overshoot. More generally, the anchoring of inflation expectations around targets improved during the past five years (Table 2.2), except in Indonesia and Korea.

Table 2.3 assesses how far inflation expectations are from the inflation targets in terms of average absolute deviation. Indonesia tends to overshoot the targets the most, and Thailand has started to undershoot more recently. While India tends to have relatively high inflation expectations, they fall within its ±2 percent target range. All economies improved their performance in the past five years, except Indonesia (Table 2.4).

Response to Shocks

The second step is to examine how inflation expectations respond to shocks. Chapter 3 of the October 2016 *World Economic Outlook* and Levin, Natalucci, and Piger (2004) relate changes in inflation expectations to inflation surprises in the following way:

$$\Delta\pi^{e}_{t+h} = \beta^{h}\pi^{news}_{t} + \varepsilon_{t+h} \qquad (2.1)$$

in which π^{e}_{t+h} is the first difference in inflation expectations $_{h}$ periods ahead; and π^{news}_{t} is a measure of inflation shocks, defined as the

[5]When the central bank has only a point target, the target range is defined as the point target ±1 percent.

Table 2.4. Average Absolute Deviation from Target, 2013–17

Country	Start of Inflation Targeting	Most Recent Point Target	Expectation Horizon (years)					
			0	1	2	3	4	5
Australia	1993	1.5	0.4	0.2	0.2	0.1	0.1	0.1
China	2005	3	1.0	0.7	0.5	0.5	0.4	0.4
Indonesia	2001	3.5	1.3	1.0	1.0	1.3	1.3	1.4
India	2016	4	0.9	1.0	1.2	1.0	0.9	0.9
Japan	2000	2	1.4	0.7	0.6	0.9	0.6	0.6
Korea	1998	2	1.1	0.3	0.2	0.5	0.4	0.3
New Zealand	1990*	2	0.7	0.2	0.2	0.2	0.2	0.1
Philippines	2002**	3	0.6	0.4	0.6	0.7	0.7	0.8
Thailand	2000	2.5	1.4	0.7	0.5	0.6	0.6	0.4

Source: IMF staff calculations.
*Evaluation begins at 1995 due to availability of inflation expectations data.
**Evaluation begins at 2008 due to availability of inflation expectations data.

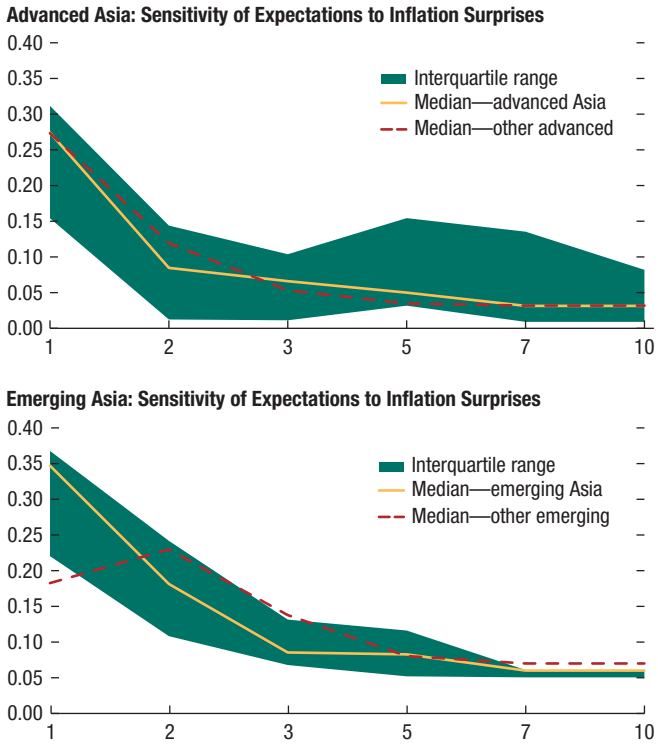
difference between actual inflation and short-term inflation expectations (for example, expectations for the current year's inflation from the previous year).

The coefficient β^h reflects the degree of anchoring in h-years-ahead inflation expectations, or what is often referred to as "shock anchoring" (Ball and Mazumder 2011). When monetary policy is credible, the value of β^h should be close to zero at sufficiently long horizons. In other words, inflation shocks should not lead to changes in medium-term expectations when agents believe the central bank is able to counteract short-term shocks and bring inflation back to target over the medium term.

Equation (2.1) is estimated using ordinary least squares with quarterly data from the first quarter of 1995 to the third quarter of 2017 from the Consensus Forecasts for seven advanced economies (Australia, Hong Kong SAR, Japan, Korea, New Zealand, Singapore, Taiwan Province of China) and six emerging markets (China, India, Indonesia, Malaysia, Philippines, Thailand).

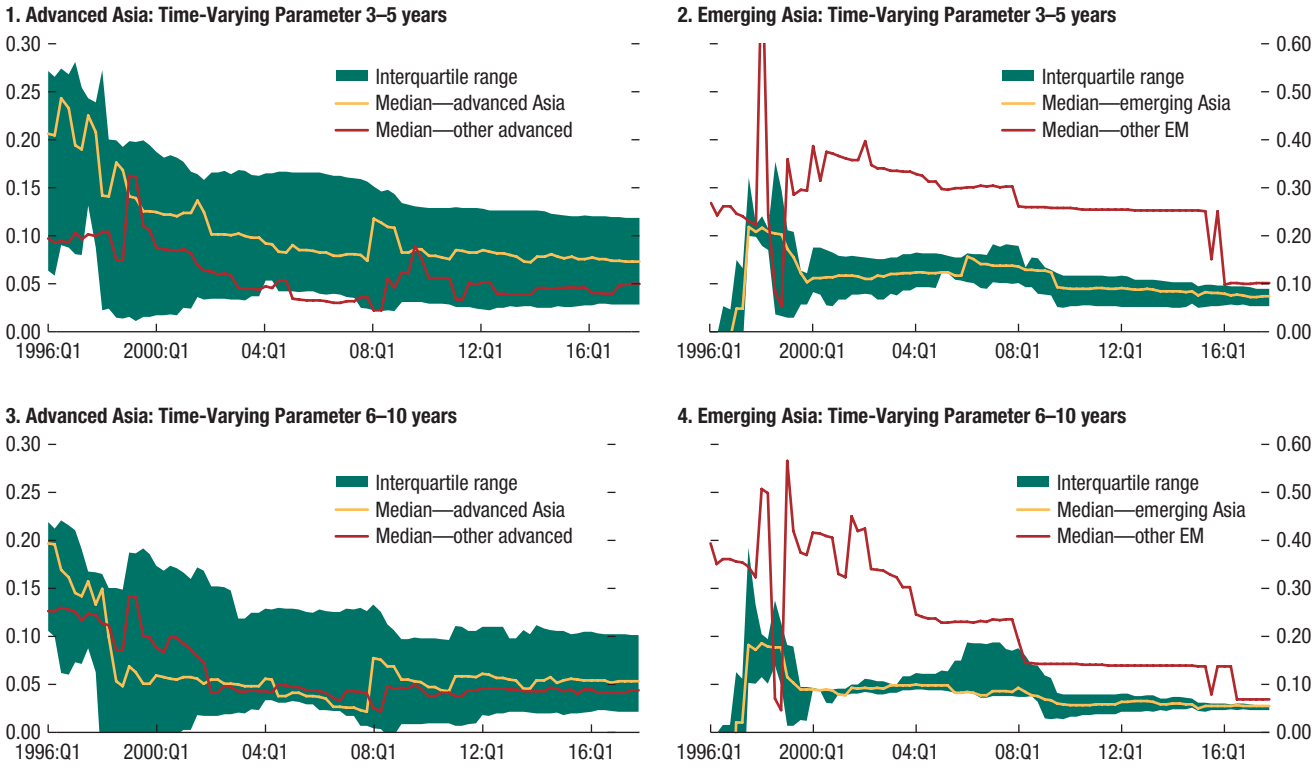
Inflation expectations seem to be better anchored in advanced than in emerging Asia. Figure 2.19 exhibits the sensitivity of inflation expectations to inflation surprises at horizons of 1, 2, 3, 5, 7, and 10 years ahead. In general, the longer the horizon, the less-sensitive inflation expectations are to inflation surprises. Emerging markets in Asia seem to be, on average, more sensitive to inflation shocks than advanced economies in Asia, especially over shorter horizons. For example, a 1 percentage point increase in inflation results in a 0.32 percentage point increase in inflation expectations one year ahead in emerging markets, and a somewhat smaller 0.26 percentage point increase in advanced economies.

Figure 2.19. Sensitivity of Expectations to Inflation Surprises



Source: IMF staff estimates.

Figure 2.20. Sensitivity of Expectations to Inflation Surprises with Time-Varying Parameters



Source: IMF staff estimates.
Note: EM = emerging market.

Inflation expectations have become better anchored over time for both advanced and emerging Asia. Figure 2.20 compares the evolution of the sensitivity of inflation expectations to inflation surprises in both advanced economies and emerging markets for the medium term (3–5 years ahead) and long term (6–10 years ahead), estimating equation (2.1) but allowing the parameters to change over time.[6]

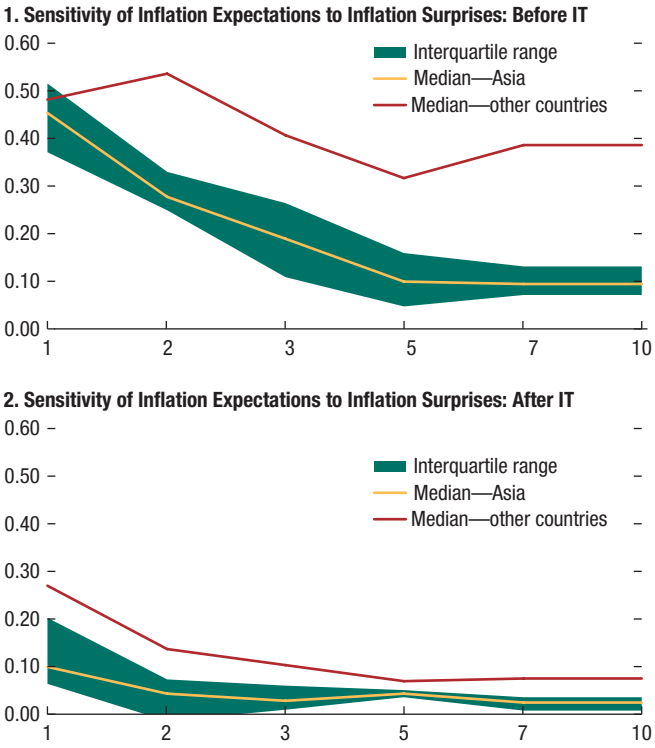
Adopting inflation targeting also seems to help anchor inflation expectations (Figure 2.21). Equation (2.1) is estimated before and after the adoption of the inflation-targeting framework in six economies in the region: New Zealand (March 1990), Australia (July 1993), Korea (January 1998), the Philippines (January 2002), Thailand (May 2002), and Indonesia (July 2005). The sensitivity of inflation expectations to inflation shocks after adopting inflation targeting is smaller than before adopting inflation targeting, as is the distribution of inflation outcomes. This suggests that adopting an inflation-targeting framework helps to better anchor inflation expectations. This is in line with Brito, Carrière-Swallow, and Gruss (2018), who provide evidence that the adoption of inflation targeting indeed anchors inflation expectations when adoption is accompanied by increased central bank transparency.

Overall, while there is some evidence that inflation expectations have been coming down recently, there is no strong evidence that inflation expectations are becoming unanchored—that is, expectations are generally relatively well anchored to targets.

The estimation of Phillips curves suggested that low inflation in Asia is mostly explained by import prices. This finding is explored further in the next section, which performs principal component

[6]The estimation is done with a Kalman filter.

Figure 2.21. Sensitivity of Expectations to Inflation Surprises and Inflation Targeting



Source: IMF staff estimates.
Note: IT = inflation targeting.

analyses to uncover the importance of global factors in driving inflation.

Global Factors

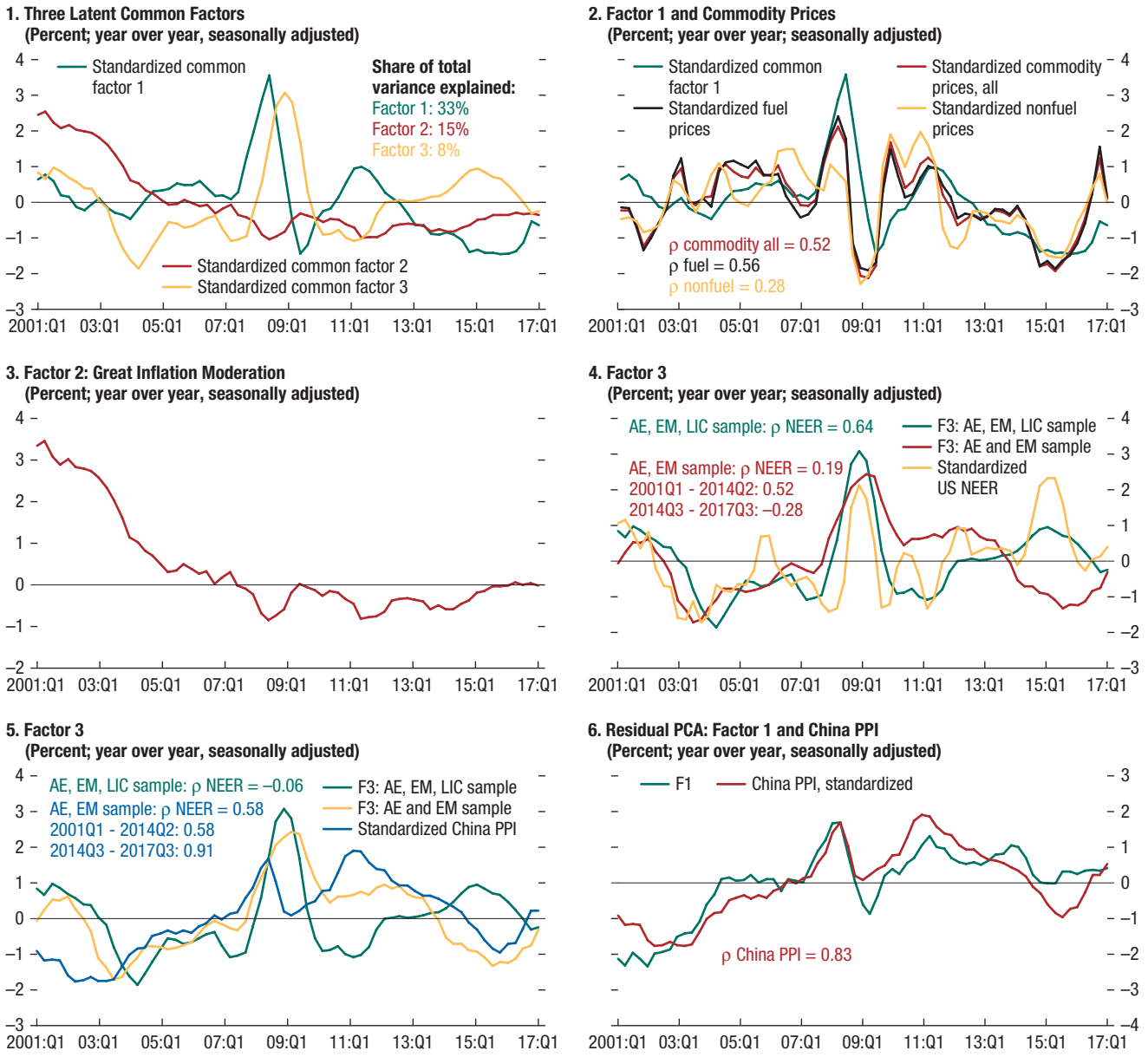
To gauge the role of global factors in driving inflation dynamics, a latent factor model is applied to cross-country data on inflation over the past 15 years (see Annex 2.2 for details). Three global factors explain 56 percent of the variance in headline inflation in the full cross-country panel sample (Figure 2.22). The first common factor explains 33 percent of the total variance, with the second and third common factors explaining 15 percent and 8 percent, respectively. In many economies, more than 50 percent of the variation in inflation is explained by common factors (Figure 2.23). Advanced Asia seems to be broadly in line with advanced economies in other regions in terms of factor loadings (Figure 2.24), as are low-income economies and small states. Emerging Asia seems more responsive to Factor 1 than Latin America.

While the common factors are statistical constructs, they can be associated with economic variables that theory suggests might influence global inflation. Factor 1 fits well with the behavior of global commodity prices, especially fuel prices (Figure 2.22). The fit is especially strong after 2006, when there were large swings in the prices of food and fuel. Factor 2 seems to reflect the "great moderation" in inflation brought about by globalization, the rise of e-commerce, transition from central planning in eastern Europe, the aftermath of the emerging market crises in the 1990s, and the wider adoption of inflation-targeting frameworks (Figure 2.22). Factor 3 seems to be associated with the movements in the nominal effective exchange rate of the US dollar.

This is consistent with the fact that the US dollar is the numeraire for international trade, and its movements tend to be passed through to local prices (Figure 2.22). The fit is particularly strong when the sample includes low-income economies, while the correlation for the advanced economy and emerging market sample seems to have broken down in 2014. This could reflect the fact that many low-income economies have dollar pegs, so dollar movements have a more pronounced impact on their inflation.

As suggested separately above, China seems to be playing a role in driving inflation at the global level. The correlation of PPI inflation in China with Factor 1 is 0.34, suggesting that China could affect global inflation indirectly via its impact on commodity prices. The correlation of Factor 3 in the advanced economy and emerging market sample with Chinese PPI is 0.59, and it increased to 0.91 in the post-2014 period, as the correlation with the US dollar broke down. This indicates that PPI in China could be playing a larger role in driving inflation in advanced and emerging market economies than the US dollar, especially recently (Figure 2.22).

Figure 2.22. Common Factors Driving Inflation

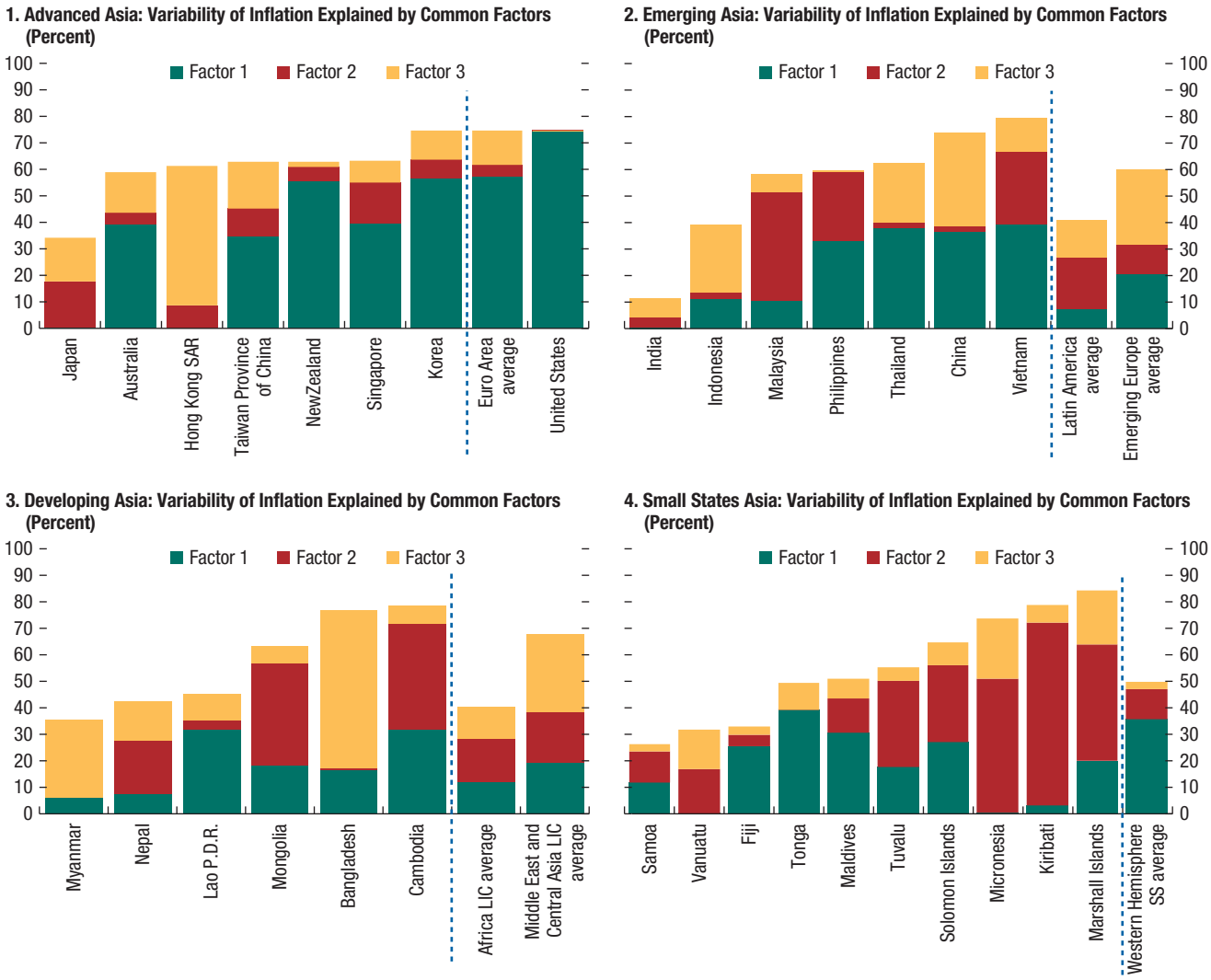


Source: IMF staff estimates.
Note: AE = advanced economy; EM = emerging market economy; LIC = low-income country; NEER = nominal effective exchange rate; PCA = principal components analysis, PPI = producer price index.

China also plays a significant role in driving inflation at the regional level. After extracting the global factors, a second principal component analysis on residuals for Asian economies is estimated. The first common regional factor explains 50 percent of the residual variation in inflation and has a correlation with Chinese PPI of 0.83 (Figure 2.22).

To summarize, global factors seem to be playing a large role in Asia, implying that low inflation in the region may not last once global commodity prices recover. But to understand the outlook for inflation better, the next section presents an analysis of trend inflation, which aims to uncover the importance of temporary and permanent shocks in explaining inflation dynamics.

Figure 2.23. Variability of Inflation Explained by Common Factors



Source: IMF staff estimates.
Note: LIC = low-income country; SS = small state.

Trend Inflation[7]

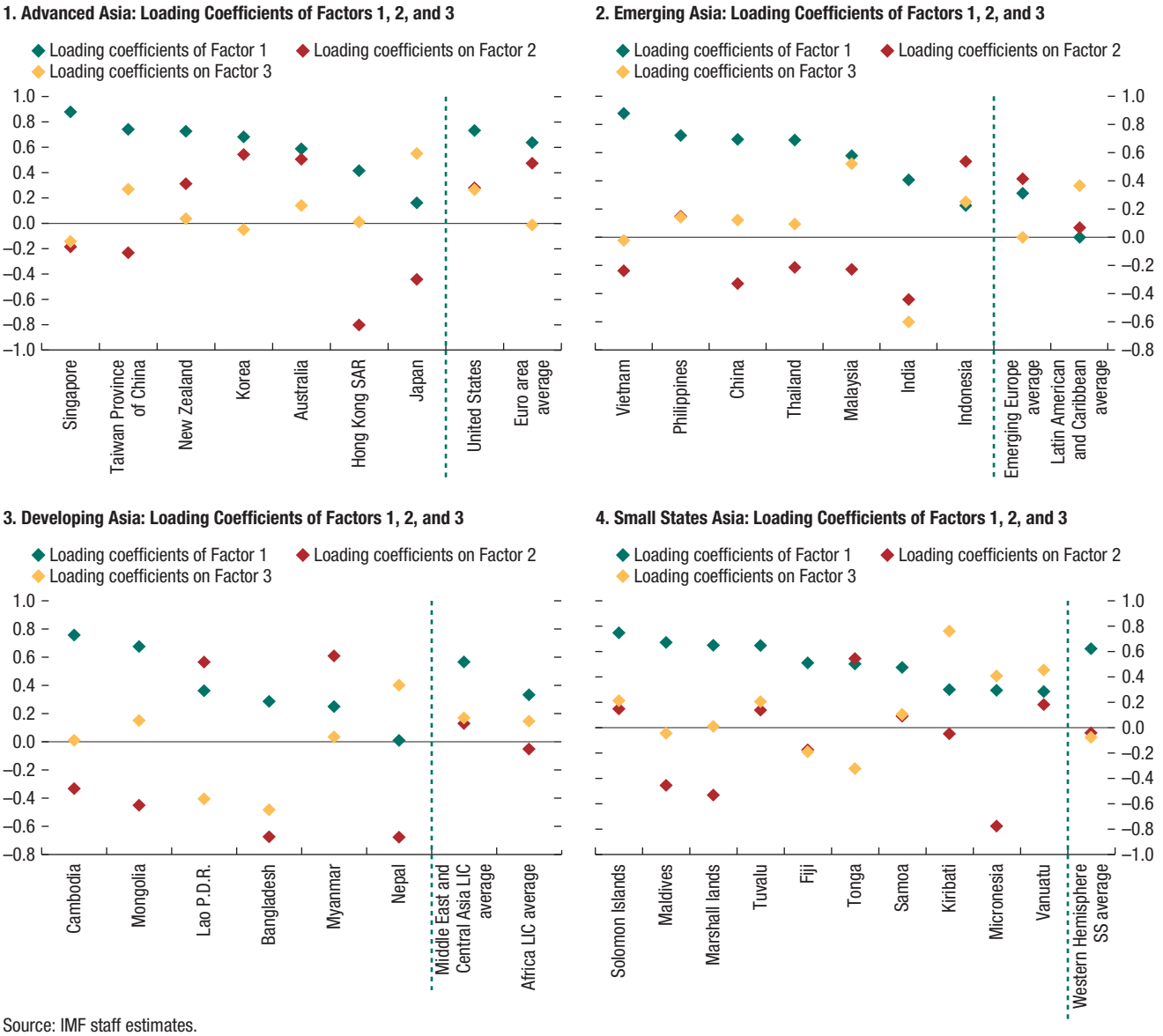
Univariate time series models have been relatively more successful than more structural models in forecasting inflation (Stock and Watson 2007). In these models, inflation is represented as the sum of a permanent component (that is, the trend) and a temporary component.

Trend inflation has been declining. In both advanced and emerging Asia, trend inflation came down substantially over the 1990s, and there was another decrease, although milder, after 2011.

The decomposition shows a concentration of transitory disinflationary shocks in the region over the past few years (Figure 2.25). The recent bout of low inflation in Asia seems to have been driven by temporary forces, with the transitory component of inflation predominantly negative for most economies since 2014. Going forward, positive transitory shocks could lift inflation more quickly than expected. In addition, nonlinearities

[7]See Annex 2.3 for details.

Figure 2.24. Importance of Common Factors across Countries



Source: IMF staff estimates.
Note: LIC = low-income country; SS = small state.

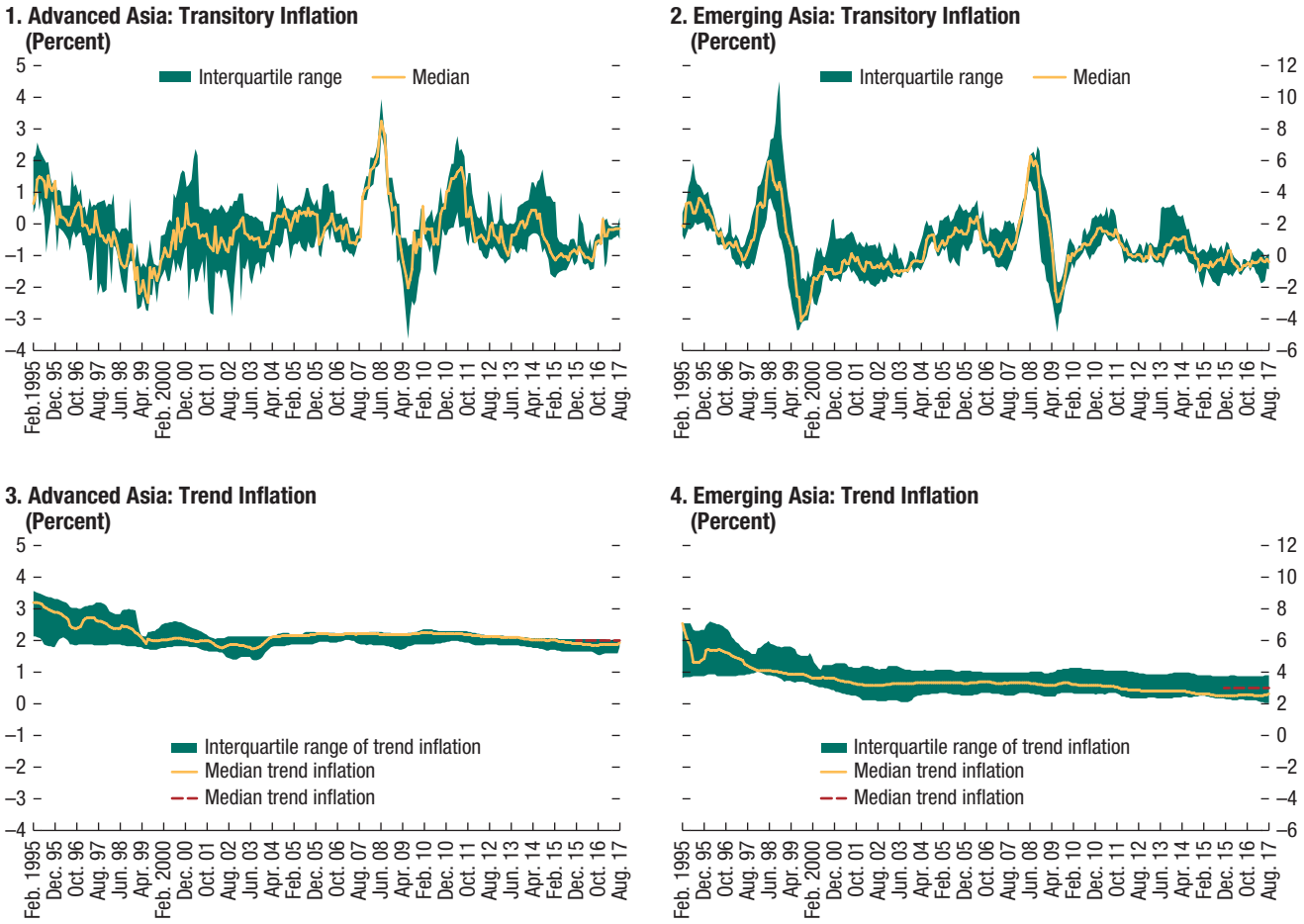
of the Phillips curve could lead to a jump in inflation at higher inflation levels.[8]

Conclusions and Policy Implications

Inflation in Asia largely followed the global pattern of a sharp decline during 2012–15 followed by an uptick more recently. The analysis in this chapter suggests that this reflects Asian economies' exposure to commodity price cycles and global competition, with inflation fluctuations mainly being driven by prices of imported goods. As

[8]For example, Guimaraes and Papi (2016) find that inflation becomes more sensitive to the output gap at higher inflation levels.

Figure 2.25. Trend and Transitory Inflation



Source: IMF staff estimates.

inflation in the United States and commodity prices rise, Asia is likely to see rising inflation.

The inflation process has also become more backward-looking since the global financial crisis. This implies a risk that inflation shocks can lead inflation to deviate persistently from targets, undermining their credibility, and suggests benefits from pursuing a clear, well-communicated policy reaction function. The analysis in the chapter also suggests room for Asian emerging markets to further strengthen their monetary policy frameworks. There is evidence that inflation expectations are better anchored in Asian economies that adopted inflation-targeting frameworks. Finally, the chapter provides some evidence that Phillips curves in Asia have flattened, implying a higher real cost for reducing inflation.

These findings mean that central banks should be vigilant about imported inflation when setting their policy reaction function to avoid sustained deviations from inflation targets. With more backward-looking inflation and a flatter Phillips curve, the costs of disinflating could be larger than in the past, as a central bank would need to induce a larger change in domestic demand to bring inflation back to target (Figure 2.26).

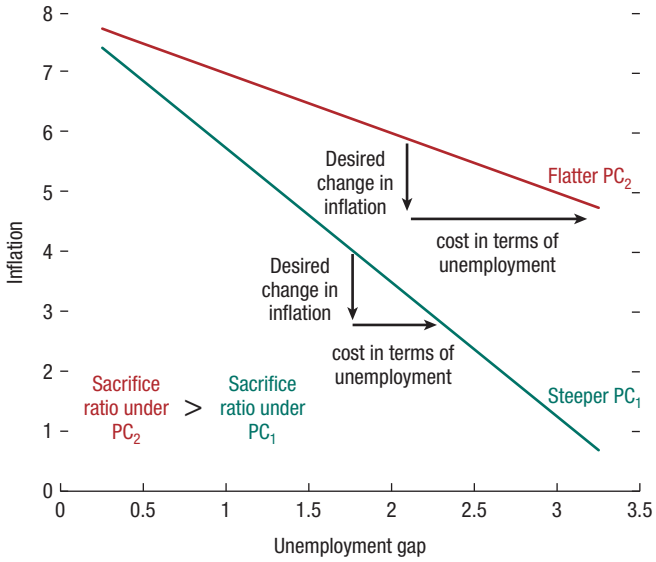
Higher exchange rate flexibility will better insulate domestic inflation from imported inflation. Inflation is likely to increase in the United States, as output will rise above potential following a sizable fiscal expansion. In that context, an

appreciation of Asian currencies vis-à-vis the US dollar will help Asian economies preserve monetary policy autonomy and keep higher inflation pressure coming from the United States under control.

In the case of a commodity price shock,[9] the appropriate response is to accommodate the first-round effects on the CPI but not the second-round effects on other CPI components. This will lower output volatility, as shown in Chapter 3 of the September 2011 *World Economic Outlook*. Since commodity price shocks are typically temporary, this suggests that central banks should consider underlying as well as headline inflation in their monetary policymaking.

Having said that, in economies where central bank credibility is limited and the share of commodity prices in the CPI is high, a commodity price shock is likely to have larger second-round effects and require a more aggressive policy response when excess demand pressures are high and inflation is running above target.

Figure 2.26. Slope of Phillips Curve and Disinflation



Source: IMF staff estimates.
Note: PC = Phillips curve.

[9]A commodity price shock could be seen as a special case of imported inflation; however, from an analytical point of view, they are different because commodity price shocks entail changes in terms of trade.

Box 2.1. The Disconnect between the Consumer and Producer Price Indices in China: Where Are Price Pressures Coming From?

In 2017, Chinese producer prices soared while consumer prices remained subdued. Rather than a puzzle, this disconnect stems from (1) an expansion in domestic infrastructure and real estate investment, and (2) the rebound in advanced economies' demand, both of which are behind the acceleration in Chinese growth since late 2016. Supply restrictions in selected industries in China did not play a lead role in the broad-based reflation of producer prices. Going forward, while the global environment will remain supportive of Chinese producer prices, a less favorable outlook for domestic investment and less stringent supply restrictions will lead to a gradual unwinding of producer price pressures.

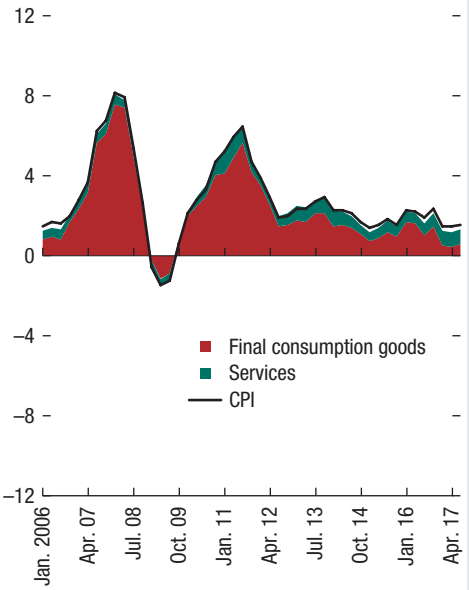
Producer price index (PPI) and consumer price index (CPI) inflation diverged markedly in 2017 (Figure 2.1.1). The disconnect between producer and consumer prices is not new, and has been particularly noticeable since 2012, when the PPI fell into deflation territory for 54 consecutive months, while the CPI hovered around 2 percent. The declining PPI could reflect a variety of factors, including excess capacity in some sectors, global developments (PPIs have followed a similar pattern in several Asian economies), and, more recently, falling commodity prices. The two price indices have grown further apart as PPI inflation rebounded since November 2016 and remained above 5 percent.

The contemporaneous disconnect between the CPI and PPI is not surprising given the modest overlap in representative baskets (Figures 2.1.2 and 2.1.3).[1] Final consumption goods behave similarly across the CPI

Figure 2.1.1. Consumer Price Index and Producer Price Index Inflation
(Percent)

Sources: Haver Analytics.
Note: CPI = consumer price index; PPI = producer price index.

Figure 2.1.2. Consumer Price Index Decomposition
(Percent)

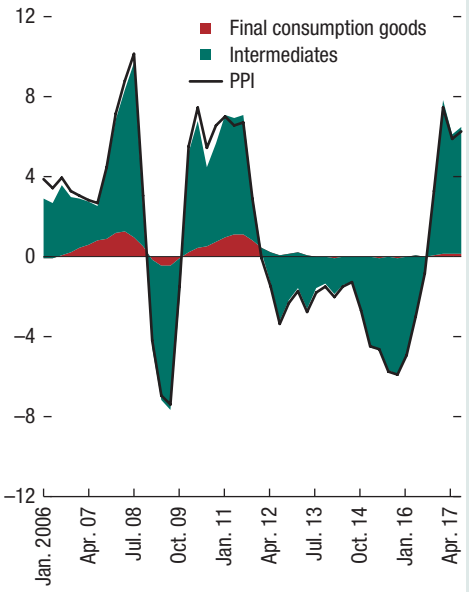


Sources: Haver Analytics; and IMF staff estimates.
Note: CPI = consumer price index.

This box was prepared by Rui Mano.
[1]China does not publish the composition of its CPI and PPI baskets. The figures rely on regression-estimated weights.

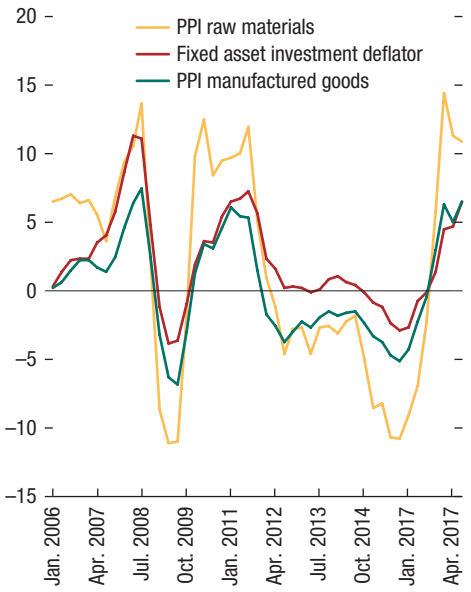
Box 2.1 *(continued)*

Figure 2.1.3. Producer Price Index Decomposition
(Percent)



Sources: Haver Analytics; and IMF staff estimates.
Note: PPI = producer price index.

Figure 2.1.4. Producer Price Index and Investment Deflator
(Percent)



Source: Haver Analytics.
Note: CPI = consumer price index; PPI = producer price index.

and PPI, but they make up three-quarters of the CPI basket and only one-quarter of the PPI basket.[2] Thus, while final consumption goods drive CPI, in the case of PPI it is the price of intermediates that plays the leading role.

So where are price pressures on intermediate goods coming from? An overall consumption demand shock cannot be the driver behind PPI developments, given muted consumer prices. Moreover, if the price of final consumption is not rising in response to higher prices of intermediate goods, then it means either that (1) the margins of producers of final goods are being squeezed, something that does not seem to be happening at present in China, or (2) upstream price pressures are showing up elsewhere.

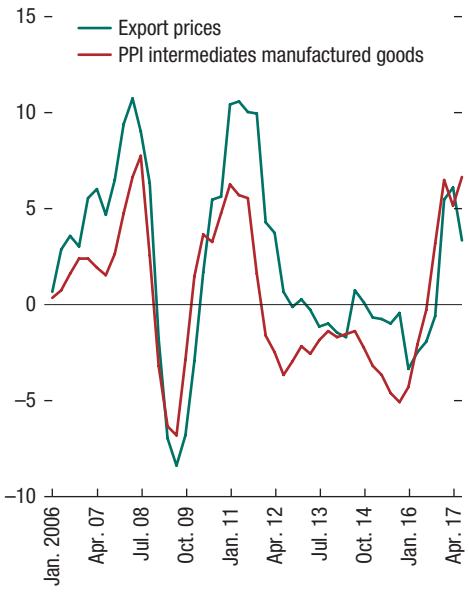
China's investment demand may partly explain the rise in producer prices of intermediate goods (Figure 2.1.4). Since early 2016 and through 2017, the government has propped up the real estate market and infrastructure investment to support growth. Prices for fixed asset investment, a high-frequency measure of Chinese investment, co-move with PPI inflation of raw materials and intermediate manufacturing goods. This points to an investment demand shock as one of the drivers behind PPI inflation.

In addition, a spike in foreign demand since late 2016 also seems to have played a role. Global trade rebounded strongly in 2017, led by final demand in advanced economies. China's real exports of goods surged in response, as did their prices (Figure 2.1.5). Intermediate manufacturing goods are an important Chinese export, and thus their prices co-move strongly with overall goods export prices. Therefore, the demand shock in advanced economies seems to be another key factor behind PPI inflation.

[2]The Chinese PPI is composed of goods for final consumption and intermediates. Within intermediates there are three categories: mining and quarrying goods, raw materials, and intermediate manufacturing goods.

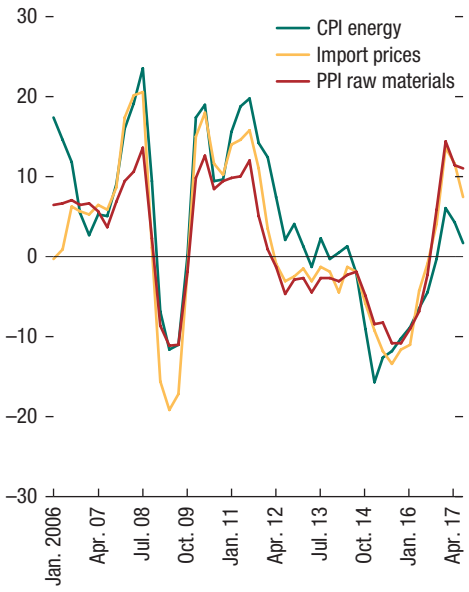
Box 2.1 *(continued)*

Figure 2.1.5. Producer Price Index and Export Prices
(Percent)



Source: Haver Analytics.
Note: PPI = producer price index.

Figure 2.1.6. Producer Price Index, Consumer Price Index, and Import Price Inflation
(Percent)



Source: Haver Analytics.
Note: CPI = consumer price index; PPI = producer price index.

In turn, higher domestic investment and foreign demand led to surging imports of raw materials, which further supported PPI inflation (Figure 2.1.6). China depends on imports of raw materials to satisfy its investment demand and as the input into its manufacturing exports. It is thus not surprising that the price pressures in investment and intermediate manufacturing goods for export translate into higher prices for raw materials and overall import prices.[3] The energy component of the CPI is also tightly linked with prices of raw materials, but its weight is small, and thus this link is not discernible in the headline CPI numbers.

Supply-side adjustments in selected Chinese upstream industries magnified the PPI inflation rebound but did not play a lead role. China started a campaign in 2016 to shut down overcapacity in the steel and coal industries. This may have played a marginal role in supporting PPI inflation but cannot explain the broad-based reflation that is more consistent with the investment and foreign-demand shocks. Moreover, actual production of steel throughout the period increased. And while coal production declined in 2016, it was on the rise in 2017 until the government initiated an intensified crackdown on polluting industries ahead of the 2017–18 winter. This latest campaign may have also contributed to sustaining price pressures, although it is hard to assess its ultimate effects because the authorities suspended production of intermediate goods while also suspending construction projects that demand the same input.

[3]Some of the increase in commodity prices cannot be attributed solely to international and Chinese demand; markets such as that for crude oil are also heavily influenced by supply constraints.

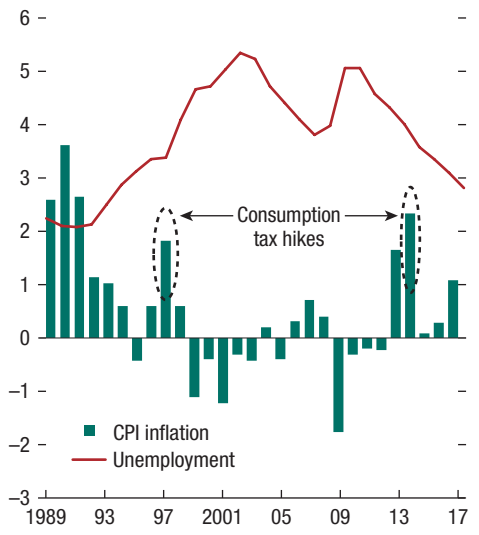
Box 2.2. Japan's Elusive Quest for Inflation

The Japanese economy has experienced low inflation for more than two and a half decades. Annual consumer price index (CPI) inflation averaged 0.2 percent between 1993 and 2017 (Figure 2.2.1), and the GDP deflator contracted by an average of 0.3 percent a year during the same period. While efforts to reflate the economy intensified under Abenomics, breaking the deflation mindset and reanchoring inflation expectations at the 2 percent inflation target have proved difficult. This box sheds light on the following questions: Why did Japan fall into a deflation trap? What were the policy responses before and after the introduction of Abenomics? What are the policy constraints and prospects for successfully reflating the economy?

Falling into the Deflation Trap

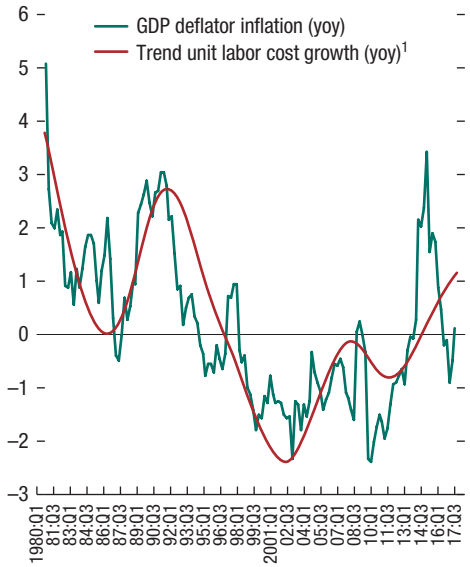
A multitude of factors contributed to Japan's transition into deflation in the 1990s. From the demand side, the economy was hit by several shocks. The collapse of the asset price bubble in the early 1990s led to deleveraging by households, banks, and businesses, causing the real economy to slow, unemployment to rise, and inflation to fall (Figure 2.2.1). The 1997–98 Asian crisis further weakened demand, and high levels of nonperforming loans resulted in a banking crisis that finally pushed the economy into deflation in 1998–99. Supply-side factors likely added to the effect of demand shocks, exacerbating deflation pressure. In particular, the government began to deregulate the labor market in the mid-1990s and early 2000s, leading to a sharp rise in the share of nonregular workers. The consequent decline in labor's bargaining power contributed to downward pressure on prices by lowering unit labor costs (Figure 2.2.2). Moreover, the aging and shrinking of Japan's labor force—which intensified in the 1990s—had an adverse impact on potential growth and fiscal sustainability, negatively affecting permanent income and potentially boosting precautionary savings (Anderson, Botman, and Hunt 2014; Liu and Westelius 2017).

Figure 2.2.1. Japan: CPI Inflation and Unemployment Rate, 1989–2017
(Percent)



Source: Haver Analytics.
CPI = consumer price index.

Figure 2.2.2. Japan: Inflation and Unit Labor Cost Growth, 1980–2017
(Percent)



Sources: Haver Analytics; and IMF staff calculations.
Note: yoy = year over year.
[1]Detrended by Hodrick-Prescott filter.

This box was prepared by Niklas Johan Westelius.

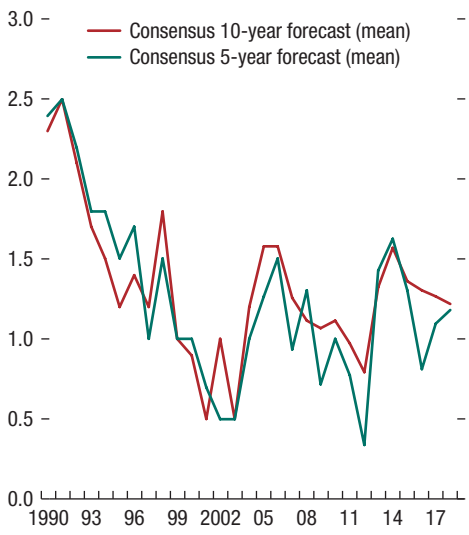
Box 2.2 *(continued)*

Policy Response and the Emergence of the Deflation Mindset

The policy response to the economic slowdown in the 1990s may also have played a role in Japan's deflation experience. As several observers have pointed out, the monetary policy response was "too little, too late" and fiscal policy proved ineffective in stimulating growth (Bernanke and Gertler 1999; Ito and Mishkin 2006; Kuttner and Posen 2002). In fact, the Bank of Japan only gradually lowered the policy rate, and it was not until 1999 that it adopted its "zero interest rate policy," and later on, in 2001, switched to quantitative easing. In hindsight, the exit from quantitative easing and the increase in the policy rate from zero that started in early 2006 was probably premature. Fiscal policy did remain broadly accommodative throughout the period of deflation, but periodic attempts at consolidation led to stop-and-go policy implementation that reduced the effectiveness of fiscal policy. In short, the lack of sustained follow-through by fiscal and monetary policy—and the associated uncertainty—likely significantly reduced policy effectiveness. Once the inflation outlook finally did improve in 2006–07, reflation prospects were again shattered when the global financial crisis hit in 2008 and CPI inflation fell back into negative territory.

Importantly, the prolonged period of low inflation resulted in a gradual decline in inflation expectations and the emergence of the so-called deflation mindset (Figure 2.2.3). After two and a half decades of depressed inflation and deflation, a generation of Japanese has grown up in an environment of infrequent price increases. With the nominal interest rate at the zero lower bound, this has significantly constrained the Bank of Japan's ability to lower the real interest rate and generate demand-driven inflation. Moreover, low inflation expectations have contributed to less ambitious wage demands by unions, and firms have become reluctant to adjust prices in response to economic conditions (Watanabe and Watanabe 2018).

Figure 2.2.3. Japan: Long-term Inflation Expectations, 1990–2018
(Percent)



Source: Consensus Economics.

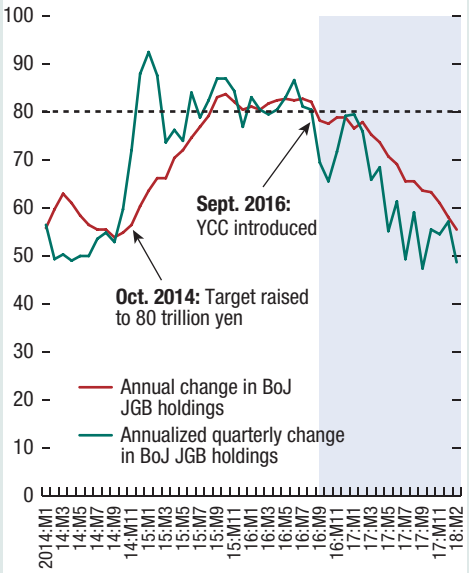
Abenomics: From Shock Therapy to Sustained Accommodation

In early 2013, the Japanese authorities shifted gears to decisively lift the economy out of deflation, boost growth, and address public debt sustainability. To break the deflation mindset and push down the entire yield curve, the Bank of Japan announced an explicit inflation target of 2 percent and significantly ramped up its Japanese government bond (JGB) purchases. These actions were also complemented by flexible fiscal policy and a commitment to implementing needed structural reforms. The initial impact appeared favorable as CPI inflation reached 1.6 percent in 2013, and inflation expectations started to gradually rise.

With a sharp drop in energy prices, however, the slowdown in global growth, and the implementation of the 2014 consumption tax hike, Japanese inflation began to drop again. The Bank of Japan provided additional stimulus by boosting JGB purchases in October 2014 and implementing a negative interest rate on excess marginal reserves in early 2016. By mid-2016, however, it was clear that these efforts had not yielded the desired result. Moreover, concerns were emerging that the Bank of Japan would run out of JGBs to purchase and that the flattening of the yield curve could significantly impair financial intermediation by further depressing profitability (Figure 2.2.4).

Box 2.2 *(continued)*

Figure 2.2.4. Japan: Annual Change in Bank of Japan Japanese Government Bond Holdings, 2014–17
(Trillions of Yen)



Source: Haver Analytics.
Note: BoJ = Bank of Japan; JBG = Japanese government bond; YCC = yield curve control.

To address these concerns, the Bank of Japan introduced its yield curve control framework in September 2016. This framework is composed of two main commitments: (1) to keep expanding the monetary base until inflation overshoots its target in a stable manner; and (2) appropriately shaping the entire yield curve to achieve price stability while considering financial conditions. So far, the framework appears to have worked relatively well (IMF 2017c). By deemphasizing quantities in favor of a yield target, the Bank of Japan has been able to reduce JGB purchases and thus alleviate some concerns over policy sustainability (Figure 2.2.4). Moreover, increased long-term yields have helped alleviate pressures on institutional investors (for example, pension funds and insurers).

Looking Forward: The High-Pressure Economy and Prospects for Reflation

In the context of an improving global environment, the Japanese economy has now experienced eight consecutive quarters of above-potential growth, the unemployment rate is at its lowest level since 1993, and CPI headline inflation reached 1.1 percent in March 2018. Nevertheless, core inflation remains stubbornly, and crucially low, long-run inflation expectations have yet to display convincing signs of moving toward the 2 percent target. Moreover, wage growth remains very low, particularly for regular workers, and anecdotal evidence suggests that firms are reluctant to pass higher labor costs on to prices—instead resorting to labor rationing and investment in labor-saving technologies.

Thus far in 2018 the Bank of Japan has been taking a patient approach, with the view that labor shortages will build enough pressure in the economy to force firms to increase prices at a higher rate. Nonetheless, with inflation expectations remaining slow to adjust, this process may take time, and at some point, the monetary policy cost-benefit trade-off may change. In addition, since other major central banks are beginning to normalize policy, market speculation is growing as to whether and when the Bank of Japan will follow suit. It is therefore imperative to take advantage of the current favorable macroeconomic environment to implement a comprehensive policy package that exploits complementarities between labor market reforms and coordinated income and demand policies, so that the Japanese deflation mind-set can be durably unwound.

Annex 2.1. New Keynesian Phillips Curve

The new Keynesian Phillips curve relates domestic inflation to inflation expectations, cyclical unemployment, and imported inflation as follows:

$$\pi_t = \alpha_t \pi^e_{t+10} + (1 - \alpha_t)\hat{\pi}_{t-1} + \beta_t u^c_t + \gamma_t \pi^m_t + \varepsilon_t, \quad \text{(A2.1.1)}$$

in which π_t is headline consumer price inflation; π^e_{t+10} is inflation expectations 10 years ahead;[1] $\hat{\pi}_{t-1}$ is the moving average of inflation in the previous four quarters; u^c_t is cyclical unemployment, estimated as the deviation of the unemployment rate from the rate consistent with stable inflation, or the nonaccelerating inflation rate of unemployment; π^m_t is inflation in the relative price of imports (the import-price deflator relative to the GDP deflator); and ε_t is the impact of other factors, including measurement error and supply shocks in addition to those controlled for by relative import price inflation.

The coefficient α_t captures the degree to which inflation is driven by long-term inflation expectations as opposed to lagged inflation; β_t denotes the slope of the Phillips curve (that is, the sensitivity of inflation to cyclical unemployment); and γ_t captures the impact of imported inflation.

Equation (A2.1.1) is estimated at the country level for 44 advanced and emerging market economies, including 13 Asian economies, using quarterly data for the first quarter of 1990 to the second quarter of 2017. The estimation method is maximum likelihood based on a constrained nonlinear Kalman filter that allows for time variation in the regression coefficients. Allowing time variation is important to capture structural changes.

[1]When such measures are not available, five-year *World Economic Outlook* forecasts of headline inflation are used.

Annex 2.2. Common Factors

To gauge the role of global factors in driving inflation dynamics, and following the approach in Chapter 1 of the May 2015 *Regional Economic Outlook: Asia and Pacific*, a latent-factor model is applied to the inflation rates of 136 advanced, emerging market, and low-income economies from the first quarter of 2001 to the third quarter of 2017 in order to identify the global common drivers of inflation and their importance for individual economies:

$$\begin{bmatrix} \pi_{1,t} \\ \pi_{2,t} \\ \vdots \\ \pi_{N,t} \end{bmatrix} - \begin{bmatrix} \bar{\pi}_{1,t} \\ \bar{\pi}_{2,t} \\ \vdots \\ \bar{\pi}_{N,t} \end{bmatrix} = \begin{bmatrix} \beta_{1,1} & \beta_{1,2} & \cdots & \beta_{1,K} \\ \beta_{2,1} & \beta_{2,2} & \cdots & \beta_{2,K} \\ \vdots & \vdots & \ddots & \vdots \\ \beta_{N,1} & \beta_{N,2} & \cdots & \beta_{N,K} \end{bmatrix} \begin{bmatrix} f_{1,t} \\ f_{2,t} \\ \vdots \\ f_{K,t} \end{bmatrix} + \begin{bmatrix} e_{1,t} \\ e_{2,t} \\ \vdots \\ e_{N,t} \end{bmatrix} \quad \text{(A2.2.1)}$$

$$\pi_t - \bar{\pi}_t = \beta f_t + e_t \quad \text{(A2.2.2)}$$

Each economy's demeaned total inflation ($\pi_t - \bar{\pi}_t$) can be decomposed into a common component (βf_t) and an idiosyncratic component (e_t); f is a ($K \times 1$) vector of latent (unobserved) factors; and β is an ($N \times K$) matrix, representing the loading coefficients or weight of each common factor in each country's inflation. Inflation is measured as the year-over-year percent change in the headline consumer price index, and the model is estimated with principal component analysis.

The importance of each common factor is country-specific, depending on the estimated value of the loading coefficients, which are assumed to be constant over the entire period and loaded contemporaneously. A higher loading factor means that the country's inflation is affected more strongly by that factor. Cross-country differences in inflation reflect not only country-specific factors but also different sensitivity to global factors (that is, different loading factors).

Annex 2.3. Trend Inflation

Chan, Clark, and Koop (2016) decompose inflation, π_t, into trend, π_t^*, and a deviation from trend, c_t, components in an unobserved-components framework (Stock and Watson 2007):

$$\pi_t = \pi_t^* + c_t \qquad \text{(A2.3.1)}$$

The two components of inflation are identified by assuming that

$$\lim_{j\to\infty} E_t\left[\pi_{t+j}\right] = E_t\left[\pi_{t+j}^*\right] = \pi_t^* \qquad \text{(A2.3.2)}$$

and

$$\lim_{j\to\infty} E_t\left[c_{t+j}\right] = 0 \qquad \text{(A2.3.3)}$$

By construction, the permanent component or "trend" in inflation, π_t^*, reflects the most likely inflation rate to be observed once transitory influences on inflation die off.

Trend inflation is estimated within an unobserved component and stochastic volatility model with data on headline inflation for six advanced economies (Australia, Hong Kong SAR, Japan, Korea, New Zealand, Taiwan Province of China) and six emerging markets (China, India, Indonesia, Malaysia, Philippines, Thailand). A crucial element in the analysis is the use of survey measures of long-term inflation expectations (6–10 years ahead) from the Consensus Forecasts as additional information to improve the estimation (Chan, Clark, and Koop 2016; Garcia and Poon, forthcoming).

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