CHAPTER 1

GLOBAL PROSPECTS AND POLICIES

Global economic activity is picking up with a long-awaited cyclical recovery in investment, manufacturing, and trade. World growth is expected to rise from 3.1 percent in 2016 to 3.5 percent in 2017 and 3.6 percent in 2018, slightly above the October 2016 World Economic Outlook *(WEO) forecast. Stronger activity and expectations of more robust global demand, coupled with agreed restrictions on oil supply, have helped commodity prices recover from their troughs in early 2016. Higher commodity prices have provided some relief to commodity exporters and helped lift global headline inflation and reduce deflationary pressures. Financial markets are buoyant and expect continued policy support in China and fiscal expansion and deregulation in the United States. If confidence and market sentiment remain strong, short-term growth could indeed surprise on the upside.*

But these positive developments should not distract from binding structural impediments to a stronger recovery and a balance of risks that remains tilted to the downside, especially over the medium term. Structural problems—such as low productivity growth and high income inequality—are likely to persist. Inward-looking policies threaten global economic integration and the cooperative global economic order, which have served the world economy, especially emerging market and developing economies, well. A faster-than-expected pace of interest rate hikes in the United States could tighten financial conditions elsewhere, with potential further U.S. dollar appreciation straining emerging market economies with exchange rate pegs to the dollar or with material balance sheet mismatches. More generally, a reversal in market sentiment and confidence could tighten financial conditions and exacerbate existing vulnerabilities in a number of emerging market economies, including China—which faces the daunting challenge of reducing its reliance on credit growth. A dilution of financial regulation may lead to stronger near-term growth but may imperil global financial stability and raise the risk of costly financial crises down the road. In addition, the threat of deepening geopolitical tensions persists, especially in the Middle East and North Africa.

Against this backdrop, economic policies have an important role to play in staving off downside risks and securing the recovery, as stressed in previous WEOs. On the domestic front, policies should support demand and balance sheet repair where necessary and feasible; boost productivity through structural reforms, well-targeted infrastructure spending, and other supply-friendly fiscal policy measures; and support those displaced by structural transformations, such as technological change and globalization. Credible strategies are needed in many countries to place public debt on a sustainable path. Adjusting to lower commodity revenues and addressing financial vulnerabilities remain key challenges for many emerging market and developing economies. The world also needs a renewed multilateral effort to tackle a number of common challenges in an integrated global economy.

Recent Developments and Prospects

World Economy Gaining Momentum

Economic activity gained some momentum in the second half of 2016, especially in advanced economies. Growth picked up in the United States as firms grew more confident about future demand, and inventories started contributing positively to growth (after five quarters of drag). Growth also remained solid in the United Kingdom, where spending proved resilient in the aftermath of the June 2016 referendum in favor of leaving the European Union (Brexit). Activity surprised on the upside in Japan thanks to strong net exports, as well as in euro area countries, such as Germany and Spain, as a result of strong domestic demand.

Economic performance across emerging market and developing economies has remained mixed. Whereas China's growth remained strong, reflecting continued policy support, activity has slowed in India because of the impact of the currency exchange initiative, as well as in Brazil, which has been mired in a deep recession. Activity remained weak in fuel and nonfuel commodity exporters more generally, while geopolitical factors held back growth in parts of the Middle East and Turkey.

Table 1.1. Overview of the *World Economic Outlook* Projections

(Percent change, unless noted otherwise)

		Projections		Difference from January 2017 *WEO Update*[1]		Difference from October 2016 WEO[1]	
	2016	2017	2018	2017	2018	2017	2018
World Output	**3.1**	**3.5**	**3.6**	**0.1**	**0.0**	**0.1**	**0.0**
Advanced Economies	**1.7**	**2.0**	**2.0**	**0.1**	**0.0**	**0.2**	**0.2**
United States	1.6	2.3	2.5	0.0	0.0	0.1	0.4
Euro Area	1.7	1.7	1.6	0.1	0.0	0.2	0.0
Germany	1.8	1.6	1.5	0.1	0.0	0.2	0.1
France	1.2	1.4	1.6	0.1	0.0	0.1	0.0
Italy	0.9	0.8	0.8	0.1	0.0	–0.1	–0.3
Spain	3.2	2.6	2.1	0.3	0.0	0.4	0.2
Japan[2]	1.0	1.2	0.6	0.4	0.1	0.6	0.1
United Kingdom	1.8	2.0	1.5	0.5	0.1	0.9	–0.2
Canada	1.4	1.9	2.0	0.0	0.0	0.0	0.1
Other Advanced Economies[3]	2.2	2.3	2.4	0.1	0.0	0.0	0.0
Emerging Market and Developing Economies	**4.1**	**4.5**	**4.8**	**0.0**	**0.0**	**–0.1**	**0.0**
Commonwealth of Independent States	0.3	1.7	2.1	0.2	0.3	0.3	0.4
Russia	–0.2	1.4	1.4	0.3	0.2	0.3	0.2
Excluding Russia	1.8	2.5	3.5	0.0	0.2	0.2	0.6
Emerging and Developing Asia	6.4	6.4	6.4	0.0	0.1	0.1	0.1
China	6.7	6.6	6.2	0.1	0.2	0.4	0.2
India[4]	6.8	7.2	7.7	0.0	0.0	–0.4	0.0
ASEAN-5[5]	4.9	5.0	5.2	0.1	0.0	–0.1	0.0
Emerging and Developing Europe	3.0	3.0	3.3	–0.1	0.1	–0.1	0.1
Latin America and the Caribbean	–1.0	1.1	2.0	–0.1	–0.1	–0.5	–0.2
Brazil	–3.6	0.2	1.7	0.0	0.2	–0.3	0.2
Mexico	2.3	1.7	2.0	0.0	0.0	–0.6	–0.6
Middle East, North Africa, Afghanistan, and Pakistan	3.9	2.6	3.4	–0.5	–0.1	–0.8	–0.2
Saudi Arabia	1.4	0.4	1.3	0.0	–1.0	–1.6	–1.3
Sub-Saharan Africa	1.4	2.6	3.5	–0.2	–0.2	–0.3	–0.1
Nigeria	–1.5	0.8	1.9	0.0	–0.4	0.2	0.3
South Africa	0.3	0.8	1.6	0.0	0.0	0.0	0.0
Memorandum							
European Union	2.0	2.0	1.8	0.2	0.0	0.3	0.0
Low-Income Developing Countries	3.6	4.7	5.3	0.0	–0.1	–0.2	0.1
Middle East and North Africa	3.8	2.3	3.2	–0.6	–0.1	–0.9	–0.2
World Growth Based on Market Exchange Rates	2.4	2.9	3.0	0.1	0.0	0.1	0.1
World Trade Volume (goods and services)	**2.2**	**3.8**	**3.9**	**0.0**	**–0.2**	**0.0**	**–0.3**
Imports							
Advanced Economies	2.4	4.0	4.0	0.2	–0.2	0.1	–0.2
Emerging Market and Developing Economies	1.9	4.5	4.3	0.3	–0.4	0.4	–0.2
Exports							
Advanced Economies	2.1	3.5	3.2	0.1	–0.2	0.0	–0.8
Emerging Market and Developing Economies	2.5	3.6	4.3	–0.1	–0.3	0.0	0.1
Commodity Prices (U.S. dollars)							
Oil[6]	–15.7	28.9	–0.3	9.0	–3.9	11.0	–5.1
Nonfuel (average based on world commodity export weights)	–1.9	8.5	–1.3	6.4	–0.4	7.6	–0.6
Consumer Prices							
Advanced Economies	0.8	2.0	1.9	0.3	0.0	0.3	0.0
Emerging Market and Developing Economies[7]	4.4	4.7	4.4	0.2	0.0	0.3	0.2
London Interbank Offered Rate (percent)							
On U.S. Dollar Deposits (six month)	1.1	1.7	2.8	0.0	0.0	0.4	0.7
On Euro Deposits (three month)	–0.3	–0.3	–0.2	0.0	0.0	0.1	0.2
On Japanese Yen Deposits (six month)	0.0	0.0	0.0	0.0	0.0	0.1	0.1

Note: Real effective exchange rates are assumed to remain constant at the levels prevailing during February 1–March 1, 2017. Economies are listed on the basis of economic size. The aggregated quarterly data are seasonally adjusted.

[1]Difference based on rounded figures for the current, January 2017 *World Economic Outlook Update*, and October 2016 *World Economic Outlook* forecasts.

[2]Japan's historical national accounts figures reflect a comprehensive revision by the national authorities, released in December 2016. The main revisions are the switch from the System of National Accounts 1993 to the System of National Accounts 2008 and the updating of the benchmark year from 2005 to 2011.

[3]Excludes the G7 (Canada, France, Germany, Italy, Japan, United Kingdom, United States) and euro area countries.

[4]For India, data and forecasts are presented on a fiscal year basis and GDP from 2011 onward is based on GDP at market prices with FY2011/12 as a base year.

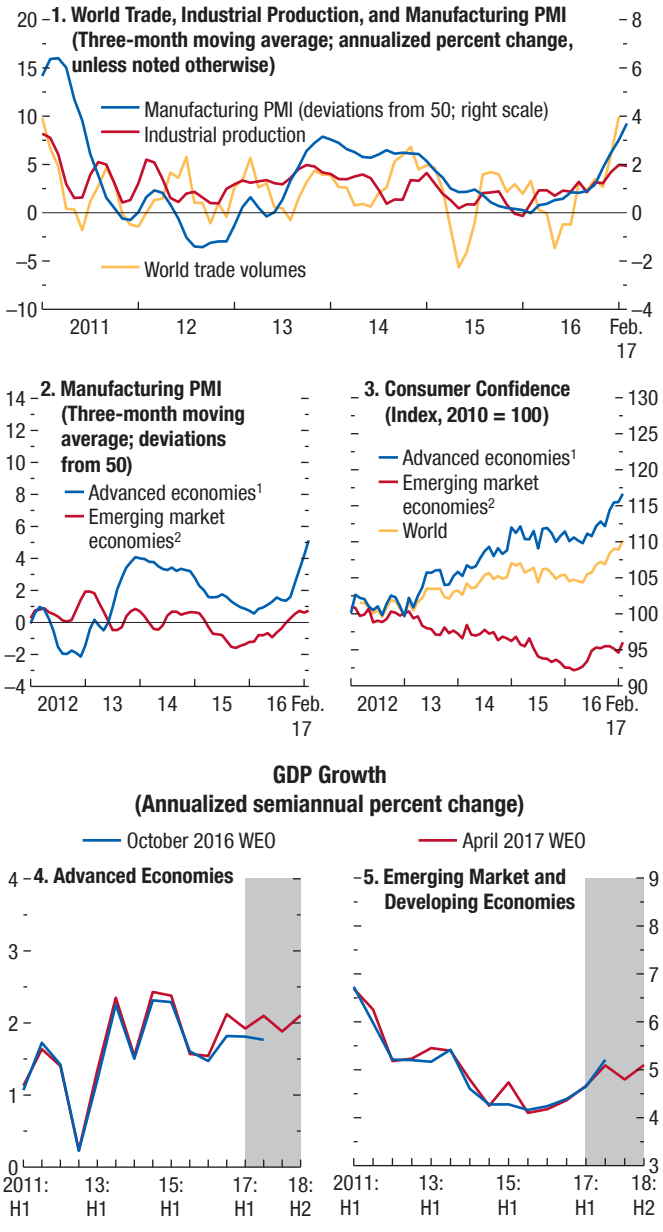
Table 1.1 *(continued)*

	Year-over-Year				Q4-over-Q4[8]			
			Projections				Projections	
	2015	2016	2017	2018	2015	2016	2017	2018
World Output	**3.4**	**3.1**	**3.5**	**3.6**	**3.2**	**3.2**	**3.5**	**3.6**
Advanced Economies	**2.1**	**1.7**	**2.0**	**2.0**	**1.8**	**2.0**	**2.0**	**2.0**
United States	2.6	1.6	2.3	2.5	1.9	2.0	2.3	2.5
Euro Area	2.0	1.7	1.7	1.6	2.0	1.7	1.7	1.5
Germany	1.5	1.8	1.6	1.5	1.3	1.8	1.7	1.5
France	1.3	1.2	1.4	1.6	1.2	1.2	1.9	1.4
Italy	0.8	0.9	0.8	0.8	1.0	1.0	0.8	0.8
Spain	3.2	3.2	2.6	2.1	3.5	3.0	2.3	2.1
Japan[2]	1.2	1.0	1.2	0.6	1.2	1.6	1.0	0.6
United Kingdom	2.2	1.8	2.0	1.5	1.7	1.9	1.7	1.5
Canada	0.9	1.4	1.9	2.0	0.4	1.9	1.7	2.0
Other Advanced Economies[3]	2.0	2.2	2.3	2.4	2.0	2.4	2.4	2.6
Emerging Market and Developing Economies	**4.2**	**4.1**	**4.5**	**4.8**	**4.4**	**4.4**	**4.8**	**5.0**
Commonwealth of Independent States	–2.2	0.3	1.7	2.1	–2.8	0.7	1.6	1.6
Russia	–2.8	–0.2	1.4	1.4	–3.0	0.4	1.6	1.3
Excluding Russia	–0.5	1.8	2.5	3.5	. . .	. . .	. . .	. . .
Emerging and Developing Asia	6.7	6.4	6.4	6.4	6.8	6.5	6.5	6.3
China	6.9	6.7	6.6	6.2	6.8	6.8	6.4	6.1
India[4]	7.9	6.8	7.2	7.7	8.5	6.9	7.8	7.6
ASEAN-5[5]	4.8	4.9	5.0	5.2	4.9	4.8	5.1	5.3
Emerging and Developing Europe	4.7	3.0	3.0	3.3	4.9	3.4	2.1	3.4
Latin America and the Caribbean	0.1	–1.0	1.1	2.0	–1.1	–1.1	1.6	2.1
Brazil	–3.8	–3.6	0.2	1.7	–5.8	–2.5	2.0	1.7
Mexico	2.6	2.3	1.7	2.0	2.4	2.4	0.9	3.0
Middle East, North Africa, Afghanistan, and Pakistan	2.7	3.9	2.6	3.4	. . .	. . .	. . .	. . .
Saudi Arabia	4.1	1.4	0.4	1.3	4.3	1.2	0.4	2.0
Sub-Saharan Africa	3.4	1.4	2.6	3.5	. . .	. . .	. . .	. . .
Nigeria	2.7	–1.5	0.8	1.9	. . .	. . .	. . .	. . .
South Africa	1.3	0.3	0.8	1.6	0.3	0.4	1.0	1.9
Memorandum								
European Union	2.4	2.0	2.0	1.8	2.3	2.0	1.9	1.8
Low-Income Developing Countries	4.6	3.6	4.7	5.3	. . .	. . .	. . .	. . .
Middle East and North Africa	2.6	3.8	2.3	3.2	. . .	. . .	. . .	. . .
World Growth Based on Market Exchange Rates	2.7	2.4	2.9	3.0	2.4	2.6	2.9	2.9
World Trade Volume (goods and services)	**2.7**	**2.2**	**3.8**	**3.9**	**. . .**	**. . .**	**. . .**	**. . .**
Imports								
Advanced Economies	4.4	2.4	4.0	4.0	. . .	. . .	. . .	. . .
Emerging Market and Developing Economies	–0.8	1.9	4.5	4.3	. . .	. . .	. . .	. . .
Exports								
Advanced Economies	3.7	2.1	3.5	3.2	. . .	. . .	. . .	. . .
Emerging Market and Developing Economies	1.4	2.5	3.6	4.3	. . .	. . .	. . .	. . .
Commodity Prices (U.S. dollars)								
Oil[6]	–47.2	–15.7	28.9	–0.3	–43.4	16.2	13.5	–2.0
Nonfuel (average based on world commodity export weights)	–17.4	–1.9	8.5	–1.3	–19.1	9.8	3.9	–1.0
Consumer Prices								
Advanced Economies	0.3	0.8	2.0	1.9	0.4	1.2	1.9	2.0
Emerging Market and Developing Economies[7]	4.7	4.4	4.7	4.4	4.7	4.0	4.1	3.9
London Interbank Offered Rate (percent)								
On U.S. Dollar Deposits (six month)	0.5	1.1	1.7	2.8	. . .	. . .	. . .	. . .
On Euro Deposits (three month)	0.0	–0.3	–0.3	–0.2	. . .	. . .	. . .	. . .
On Japanese Yen Deposits (six month)	0.1	0.0	0.0	0.0	. . .	. . .	. . .	. . .

[5]Indonesia, Malaysia, Philippines, Thailand, Vietnam.
[6]Simple average of prices of U.K. Brent, Dubai Fateh, and West Texas Intermediate crude oil. The average price of oil in U.S. dollars a barrel was $42.84 in 2016; the assumed price based on futures markets is $55.23 in 2017 and $55.06 in 2018.
[7]Excludes Argentina and Venezuela. See country-specific notes for Argentina and Venezuela in the "Country Notes" section of the Statistical Appendix.
[8]For World Output, the quarterly estimates and projections account for approximately 90 percent of annual world output at purchasing-power-parity weights. For Emerging Market and Developing Economies, the quarterly estimates and projections account for approximately 80 percent of annual emerging market and developing economies' output at purchasing-power-parity weights.

Figure 1.1. Global Activity Indicators

Global economic activity gained momentum in the fourth quarter of 2016. Manufacturing PMIs and consumer confidence increased noticeably in advanced economies in the last few months of 2016 and early 2017. They also recovered to a more modest extent in emerging market economies.



Sources: CPB Netherlands Bureau for Economic Policy Analysis; Haver Analytics; Markit Economics; and IMF staff estimates.
Note: CC = consumer confidence; PMI = purchasing managers' index.
[1]Australia, Canada (PMI only), Czech Republic, Denmark, euro area, Hong Kong SAR (CC only), Israel, Japan, Korea, New Zealand (PMI only), Norway (CC only), Singapore (PMI only), Sweden (CC only), Switzerland, Taiwan Province of China, United Kingdom, United States.
[2]Argentina (CC only), Brazil, China, Colombia (CC only), Hungary, India (PMI only), Indonesia, Latvia (CC only), Malaysia (PMI only), Mexico (PMI only), Philippines (CC only), Poland, Russia, South Africa, Thailand (CC only), Turkey, Ukraine (CC only).

Indicators of Economic Activity

In the second half of 2016, the stronger global momentum in demand—investment in particular—resulted in marked improvements in manufacturing and trade, which were very weak in late 2015 and early 2016 (Figure 1.1, panel 1).

Production of both consumer durables and capital goods rebounded in the second half of 2016 (Figure 1.2). A number of factors contributed to these developments: a gradual global recovery in investment, supported by infrastructure and real estate investment in China, reduced drag from adjustment to lower commodity prices, and the end of an inventory cycle in United States. Forward-looking indicators, such as purchasing managers' indices, suggest continued strength in manufacturing activity into early 2017.

Consistent with indications of firming global manufacturing activity, global trade is showing some signs of recovery after a long period of weakness (Figure 1.3, panel 1). As discussed in Chapter 2 of the October 2016 WEO, trade growth—in particular, growth in imports—is strongly correlated with investment dynamics. This pattern is illustrated for a cross-section of advanced economies (Figure 1.3, panel 2) and emerging market economies (Figure 1.3, panel 3) for 2016. Panel 3, in particular, highlights the sharp contractions in trade and investment in several commodity exporters during 2016, a pattern similar to the one for the previous year. The gradual stabilization of macroeconomic conditions in these economies, also supported by some rebound in commodity prices, should lead to a gradual recovery in imports and investment in 2017 and beyond, as discussed in more detail in the section titled "The Forecast."

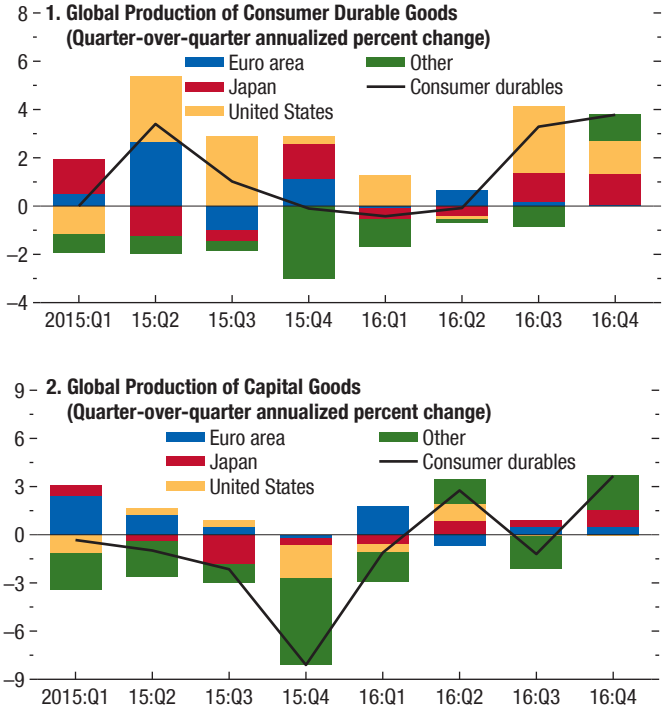
Commodity Prices and Markets

Alongside the pickup in economic activity, commodity prices have also strengthened (see the Commodity Special Feature for more details). The IMF's Primary Commodities Price Index increased by 15 percent between August 2016 and February 2017—that is, between the reference periods for the October 2016 and the current WEO reports (Figure 1.4). Some of the strongest price increases were for fuels:

- Oil prices increased by some 20 percent between August 2016 and February 2017, in part due to the agreement by the Organization of the Petroleum Exporting Countries (OPEC) and other producers to cut oil production. Stronger activity and expec-

Figure 1.2. Recent Trends in Global Production

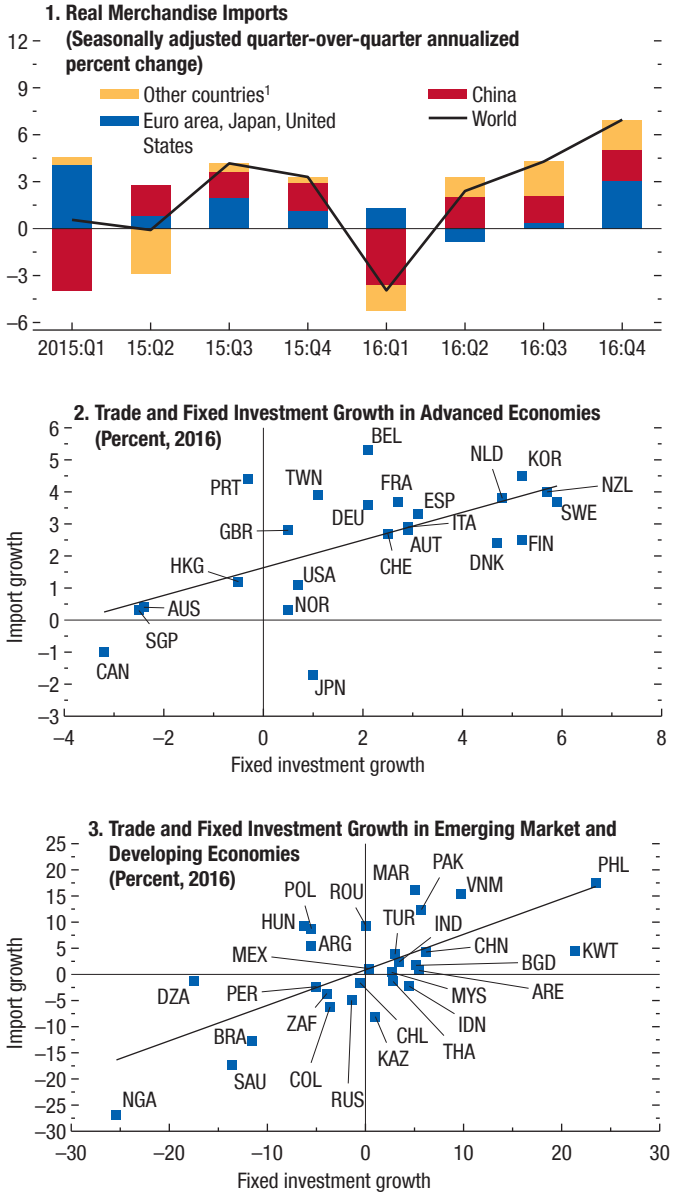
The production of both consumer durables and capital goods recovered in late 2016, after several quarters of lackluster growth or contraction.



Source: IMF staff estimates.
Note: Euro area data are through November 2016. Other = Brazil, India, Korea, Norway, Sweden, Switzerland, Taiwan Province of China, Turkey, United Kingdom.

Figure 1.3. Global Trade and Fixed Investment Growth

Real import growth picked up in the second half of 2016, consistent with the firming in investment.



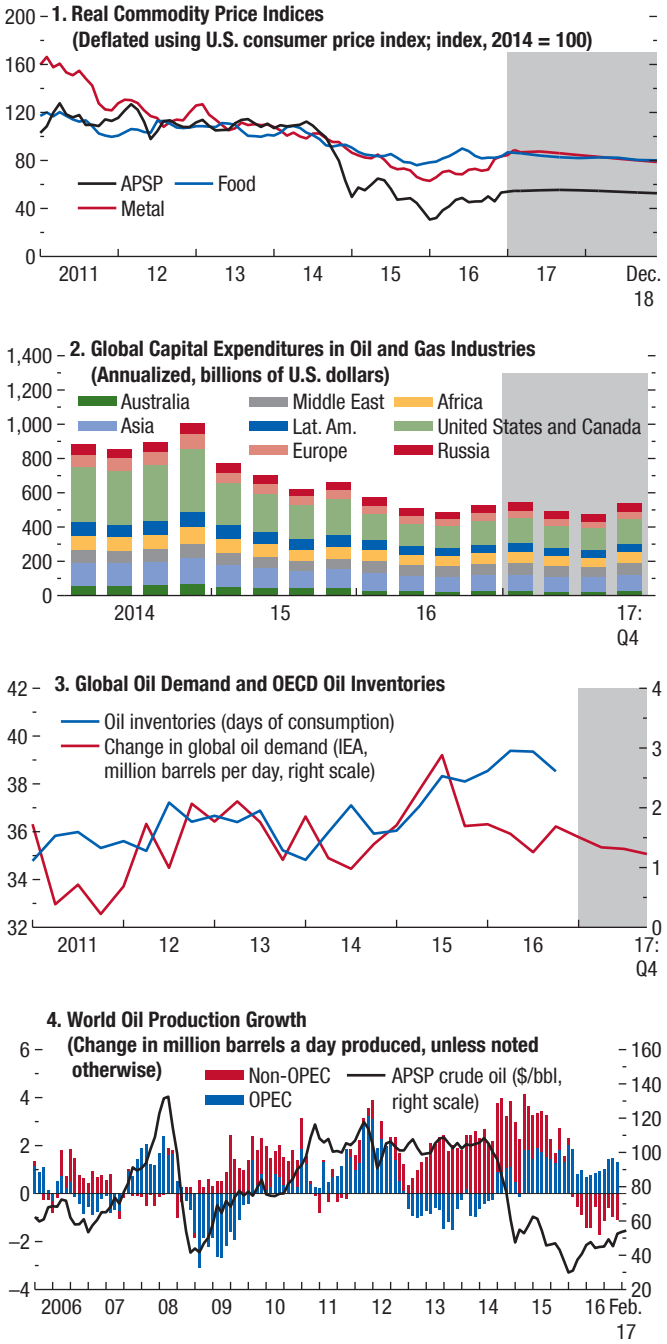
Source: IMF staff estimates.
Note: Data labels in the figure use International Organization for Standardization (ISO) country codes.
[1]Other countries = Brazil, Bulgaria, Canada, Czech Republic, Denmark, Hong Kong SAR, Korea, Malaysia, Mexico, Peru, Singapore, South Africa, Sweden, Switzerland, Taiwan Province of China, Thailand, Turkey, United Kingdom.

tations of more robust future global demand also contributed to strengthening oil prices since their troughs in early 2016. Following some weakening in recent weeks, oil prices stood at about $50 a barrel as of end-March, still some 12 percent stronger than in August 2016.

- Natural gas prices have increased—as of February 2017 the average price for Europe, Japan, and the United States was up by about 19 percent relative to August 2016. In Europe, natural gas prices have risen following higher oil prices. While prices in Asia and the United States initially rose because of expectations of strong winter demand, a fairly mild winter led to subdued demand for gas-fired power generation and helped contain gas prices.
- Coal prices have rallied, with the average of Australian and South African prices in February 2017 more than 20 percent higher than in August 2016. That rally has followed government-led reductions

Figure 1.4. Commodity and Oil Markets

Commodity prices have strengthened as global economic activity has gained momentum.



Sources: IMF, Primary Commodity Price System; International Energy Agency (IEA); Organisation for Economic Co-operation and Development; and IMF staff estimates.
Note: In panel 2, 2017 projections are based on investment plans. APSP = average petroleum spot price; bbl = barrel; Lat. Am. = Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay); OPEC = Organization of the Petroleum Exporting Countries.

in coal production in China and production and shipment outages in Australia.

Among nonfuel commodities, metal prices have increased by 23.6 percent and agricultural commodity prices by 4.3 percent.

- Metal prices have been supported by higher real estate investment and capacity reduction efforts in China and the anticipated fiscal policy easing in the United States.
- Among agricultural commodities, food prices rose by 4.9 percent as excess supply eased, especially for grains and vegetable oils. Prices have increased for most items, except for a few, including rice and cocoa beans.

Inflation Developments

The increase in commodity prices has contributed to a recovery in global inflation since August (Figure 1.5). The increase in global producer price inflation has been particularly marked, reflecting both the greater weight of commodities in producer price indices when compared with consumer price indices and their importance as intermediate inputs in production. Notably, China's producer prices have emerged from deflation after four years, reflecting higher raw material prices as well as efforts to reduce excess industrial capacity and recovering real estate investment.

Global consumer price inflation has also ticked up as the retail prices of gasoline and other energy-related products have increased. The uptick has been especially strong for advanced economies, where 12-month consumer price inflation in February stood slightly above 2 percent (more than double the average annual inflation rate of 0.8 percent in 2016). By contrast, core inflation has increased much less—if at all—and remains well below central bank targets in almost all advanced economies. In emerging market economies, the revival in headline consumer inflation is more recent, as the impact of higher fuel prices has only of late started to outweigh the downward pressure from the fading of earlier exchange rate depreciations.

Near- and longer-term inflation expectations also remain subdued. Survey-based consumer price inflation expectations for 2017 have only very recently stopped falling for advanced economies, and expected inflation for the next 10 years has only recently registered an increase after declining steadily in 2015 and 2016 (Figure 1.5, panels 5 and 6).

Financial Market Developments

Market sentiment has strengthened since August, reflecting generally positive data on the outlook as well as expectations of a fiscal stimulus, higher infrastructure investment, and deregulation in the United States.

With stronger future demand suggesting more inflation pressure and a less gradual normalization of U.S. monetary policy, long-term nominal and real interest rates have risen substantially since August, especially since the U.S. elections in November (Figure 1.6). As of end-March, nominal yields on 10-year U.S. Treasury bonds had increased by some 85 basis points compared with August and 55 basis points compared with just before the U.S. election. Long-term rates increased sharply in the United Kingdom as well, reflecting spillovers from higher U.S. rates and expectations of a less accommodative monetary policy stance going forward, given rising inflation pressure. The increase in core euro area long-term yields after August was more moderate—about 40 basis points in Germany—but Italian yields rose more sharply (about 120 basis points), reflecting elevated political and banking sector uncertainties. The U.S. Federal Reserve raised short-term interest rates in December 2016 and March 2017, as expected, with markets pricing in two additional rate increases by the end of 2017 or early 2018. In most other advanced economies, the monetary policy stance has remained broadly unchanged.

Equity markets in advanced economies have registered sizable gains in recent months, amid strengthening consumer confidence and positive macroeconomic data. As discussed in more detail in the April 2017 *Global Financial Stability Report* (GFSR), gains have been notable for sectors that are particularly exposed to potential fiscal stimulus measures as well as for financial stocks. Higher valuations of financial stocks reflect both welcome developments, such as the favorable impact of steepening yield curves and higher growth on expected profitability, as well as factors that could heighten downside risks, such as the possibility of some rollback in financial regulation in the United States.

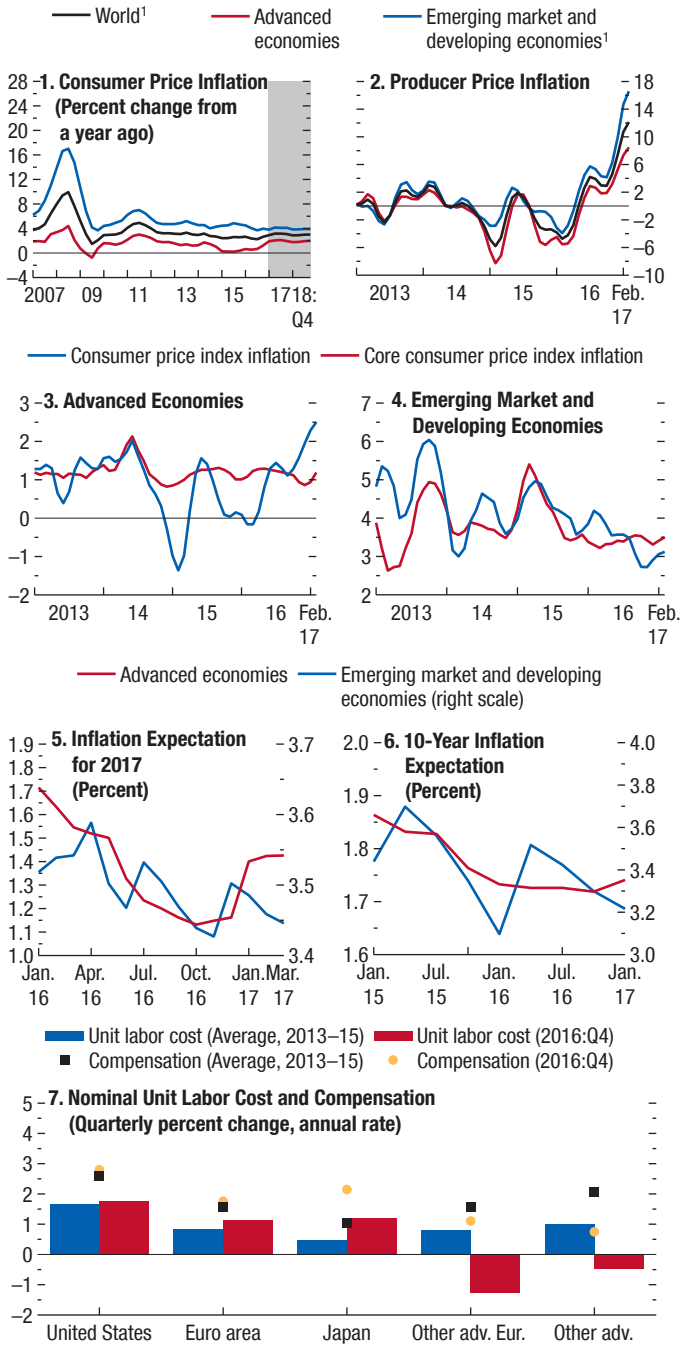
With widening interest differentials, the U.S. dollar has strengthened in real effective terms by about 3.5 percent between August 2016 and late March 2017 (Figure 1.7, panel 1), whereas the euro and especially the Japanese yen have weakened.

In emerging market economies, financial conditions have been diverse. Long-term interest rates on local-currency bonds rose in the aftermath of the U.S. elections,

Figure 1.5. Global Inflation

(Three-month moving average; annualized percent change, unless noted otherwise)

Higher commodity prices have pushed up global headline inflation. Core inflation remains subdued, especially in advanced economies.

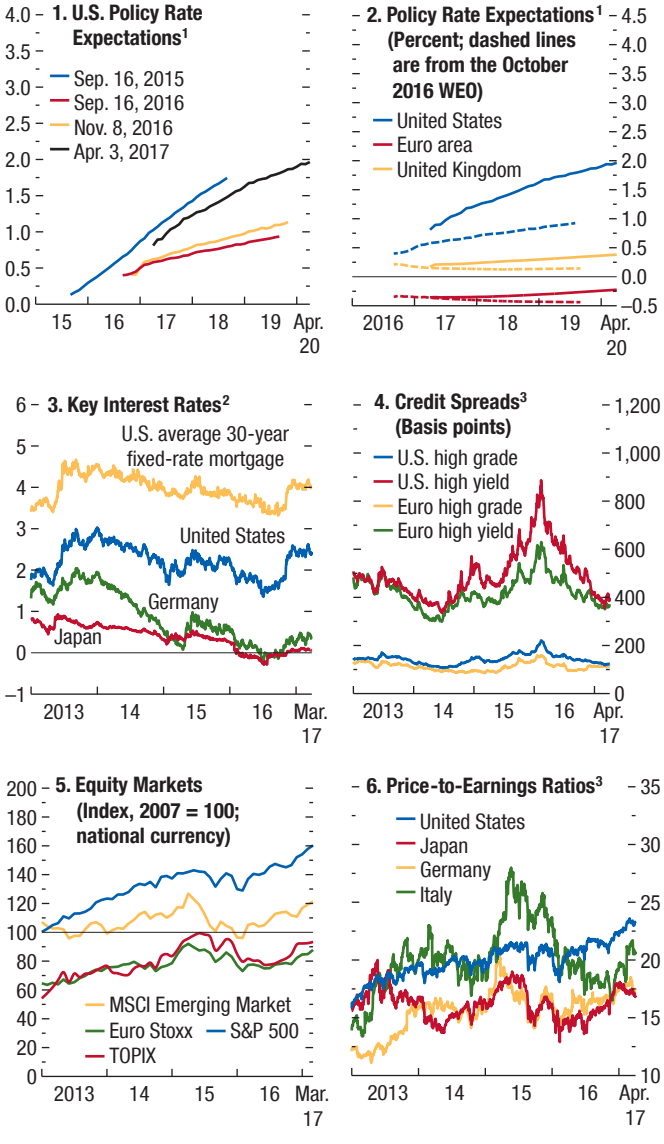


Sources: Consensus Economics; Haver Analytics; IMF, Primary Commodity Price System; and IMF staff estimates.
Note: Other adv. Eur. = other advanced Europe (Iceland, Norway, Sweden, Switzerland, United Kingdom); Other adv. = other advanced economies (Australia, Canada, New Zealand). All quarterly data are seasonally adjusted.
[1]Excludes Argentina and Venezuela.

Figure 1.6. Advanced Economies: Monetary and Financial Market Conditions

(Percent, unless noted otherwise)

With markets expecting a less gradual normalization of U.S. monetary policy, long-term nominal real rates have risen in the United States, pushing up longer-term rates elsewhere as well. Equity markets in advanced economies have registered strong gains in recent months.

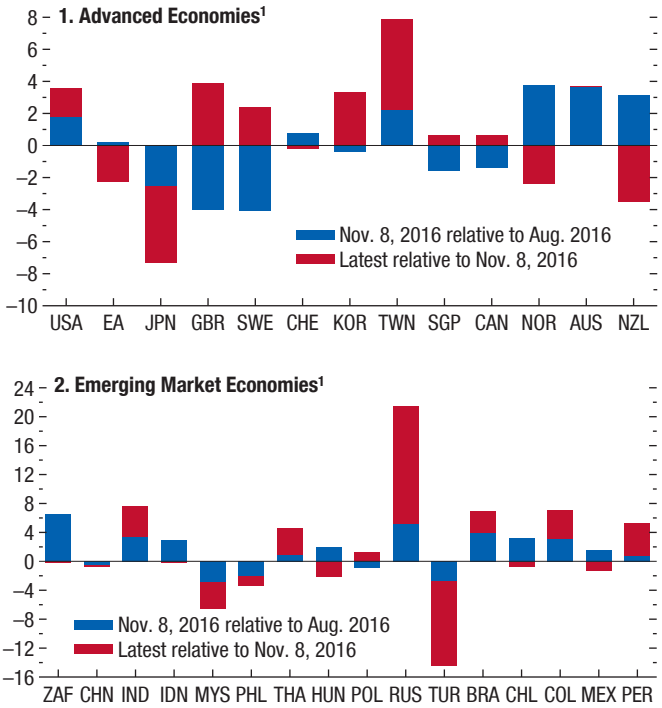


Sources: Bank of Spain; Bloomberg, L.P.; Haver Analytics; Thomson Reuters Datastream; and IMF staff calculations.
Note: MSCI = Morgan Stanley Capital International; S&P = Standard & Poor's; TOPIX = Tokyo Stock Price Index.
[1]Expectations are based on the federal funds rate futures for the United States, the sterling overnight interbank average rate for the United Kingdom, and the euro interbank offered forward rate for the euro area; updated April 3, 2017.
[2]Interest rates are 10-year government bond yields, unless noted otherwise. Data are through March 31, 2017.
[3]Data are through April 3, 2017.

Figure 1.7. Real Effective Exchange Rate Changes, August 2016–March 2017

(Percent)

The U.S. dollar, Korean won, Taiwanese dollar, and Australian dollar have strengthened in real effective terms since August, while the euro, and especially the Japanese yen, have weakened. The Turkish lira and the Malaysian ringgit have depreciated in real effective terms, while the Indian rupee and the currencies of commodity exporting emerging market economies—in particular the Russian ruble—have gained. The Mexican peso has also strengthened in recent weeks and now stands little changed relative to August.



Source: IMF staff calculations.
Note: EA = euro area. Data labels in the figure use International Organization for Standardization (ISO) country codes.
[1]Latest data available are for March 31, 2017.

especially in emerging Europe, but have since declined (Figure 1.8). Policy rate changes since August also reflect this diversity—with rate hikes in Mexico and Turkey and cuts in Brazil, India, and Russia—as do changes in EMBI (Emerging Market Bond Index) spreads.

Equity markets in emerging market and developing economies have strengthened since August, staging a strong recovery so far this year after weakening in the immediate aftermath of the U.S. election (Figure 1.9). However, they generally remain below their post-financial-crisis peaks, reached in 2011.

A few emerging market currencies have depreciated substantially in recent months—most notably the

Turkish lira and, to a lesser extent, the Malaysian ringgit—while the currencies of some commodity exporters, especially Russia, have appreciated (Figure 1.7, panel 2). The Mexican peso, which had depreciated sharply in the aftermath of the U.S. election, has strengthened in recent weeks and now stands little changed relative to August. Preliminary data point to sharp nonresident portfolio outflows from emerging markets in the wake of the U.S. election, following a few months of solid inflows, but a turnaround in more recent weeks (Figure 1.10, panel 1).

Key Forces Shaping the Outlook

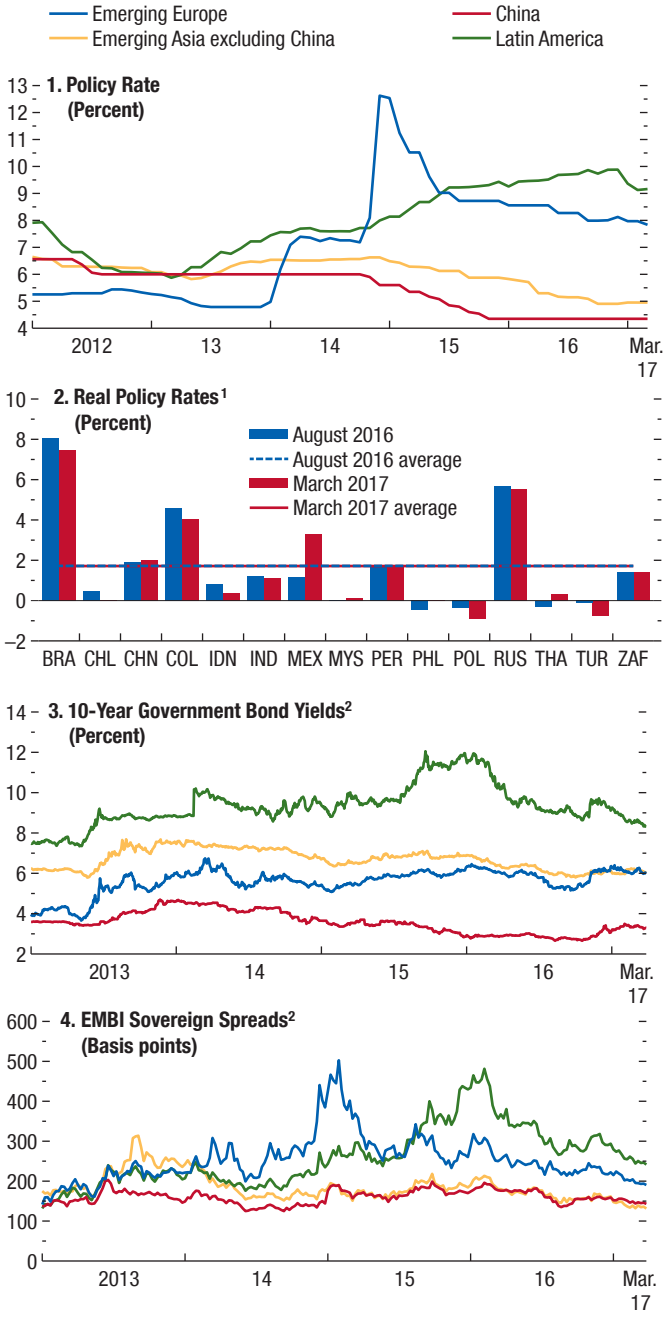
The main forces shaping the outlook differ, to some extent, between advanced economies and emerging market and developing economies. Among the advanced economies group, the U.S. economy is projected to gather steam as a result of expansionary fiscal policy. Elsewhere, especially in Europe, the cyclical recovery from the crises of 2008–09 and 2011–12 will help keep growth modestly above potential over the next few years. Looking to the medium term, however, demographic headwinds and weak trend productivity are likely to restrain growth, as discussed in the October 2016 WEO. Among emerging market and developing economies, especially those that rely heavily on energy or metal exports, the adjustment to lower commodity prices remains a key influence on the outlook, in both the short and medium term. The slowdown of productivity growth in the past few years is also a medium-term challenge for many emerging market and developing economies.

Continued Cyclical Recovery in Advanced Economies

As discussed in Chapter 1 of the October 2016 WEO, the recovery from the crises of 2008–09 and 2011–12 is ongoing in many advanced economies. Output is still below potential, and unemployment is above 2008 levels in many countries, especially in euro area economies with high borrowing spreads during the 2011–12 sovereign debt crisis. The cyclical rebound that normally follows deep recessions, supported by accommodative monetary policy, has been slow in many countries in a context of gradual repair of impaired balance sheets (through temporarily high private and public sector savings) and the associated weakening of the monetary policy transmission mechanism. The tightening in fiscal policy in many economies between 2011 and 2015 also put a brake on the postcrisis recovery.

Figure 1.8. Emerging Market Economies: Interest Rates

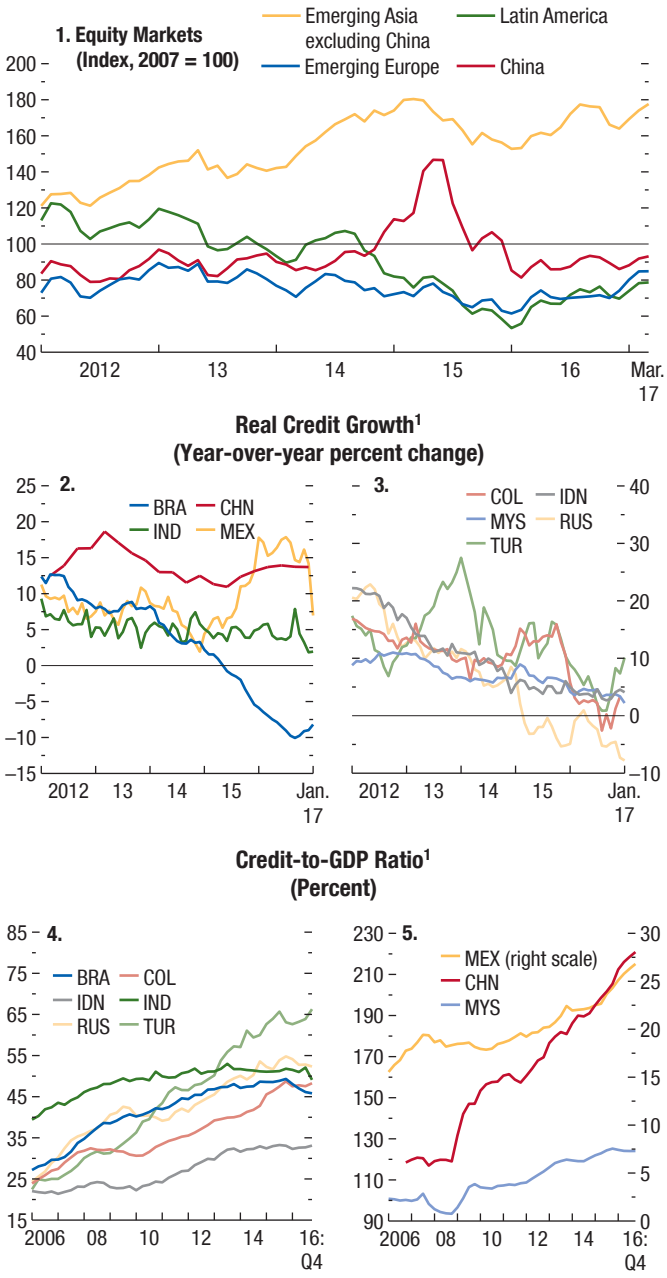
The evolution of financial market conditions has been diverse across emerging market economies. Long-term government bond yields in local currency rose together with bond yields in advanced economies after the U.S. election in November, but have since retreated in most countries.



Sources: Bloomberg L.P.; Haver Analytics; IMF, Balance of Payments and International Investment Position Statistics database; and IMF staff calculations.
Note: Emerging Asia excluding China comprises India, Indonesia, Malaysia, the Philippines, and Thailand; emerging Europe comprises Poland, Romania, Russia, and Turkey; Latin America comprises Brazil, Chile, Colombia, Mexico, and Peru. EMBI = J.P. Morgan Emerging Markets Bond Index. Data labels in the figure use International Organization for Standardization (ISO) country codes.
[1]Deflated by two-year-ahead *World Economic Outlook* inflation projections.
[2]Data are through March 31, 2017.

Figure 1.9. Emerging Market Economies: Equity Markets and Credit

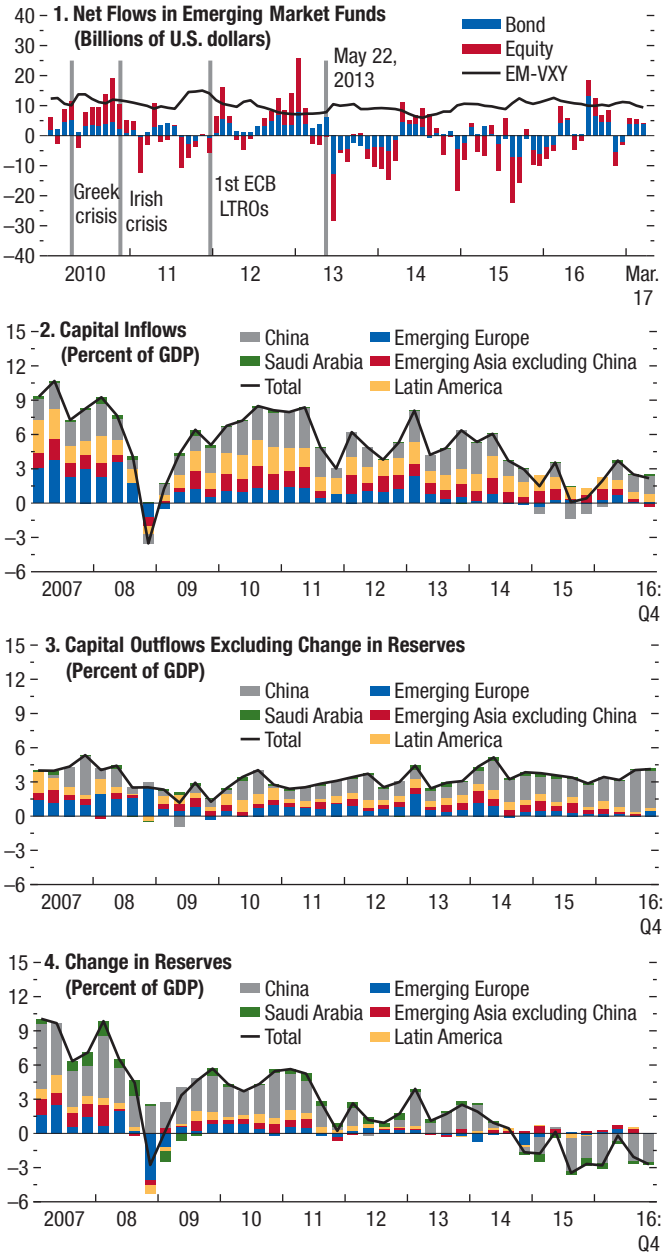
Equity prices are up, relative to August, in most emerging market economies. Credit dynamics are heterogeneous across emerging market economies.



Sources: Bloomberg L.P.; Haver Analytics; IMF, International Financial Statistics (IFS) database; and IMF staff calculations.
Note: Data labels in the figure use International Organization for Standardization (ISO) country codes.
[1]Credit is other depository corporations' claims on the private sector (from IFS), except in the case of Brazil, for which private sector credit is from the Monetary Policy and Financial System Credit Operations published by Banco Central do Brasil, and China, for which credit is total social financing after adjusting for local government debt swap.

Figure 1.10. Emerging Market Economies: Capital Flows

Net flows into emerging market funds turned negative in the immediate aftermath of the November 8 election in the United States, but were positive in the first three months of 2017. Capital inflows into emerging market economies declined somewhat in the third quarter of 2016 while capital outflows picked up modestly; both were little changed in the fourth quarter. Reserves continue to decline for the group, driven largely by continued reserve decumulation in China.



Sources: Bloomberg L.P.; EPFR Global; Haver Analytics; IMF, International Financial Statistics (IFS) database; and IMF staff calculations.
Note: Capital inflows are net purchases of domestic assets by nonresidents. Capital outflows are net purchases of foreign assets by domestic residents. Emerging Asia excluding China comprises India, Indonesia, Malaysia, the Philippines, and Thailand; emerging Europe comprises Poland, Romania, Russia, and Turkey; Latin America comprises Brazil, Chile, Colombia, Mexico, and Peru. ECB = European Central Bank; EM-VXY = J.P. Morgan Emerging Market Volatility Index; LTROs = longer-term refinancing operations.

Barring unforeseen developments, continued recovery and gradual closing of output gaps are projected to keep growth modestly above potential in many advanced economies over the next few years. The pattern of growth surprises for 2016 suggests that the cyclical recovery may be firming up. Indeed, growth in 2016 is estimated to have exceeded expectations to a greater extent in countries with deeper output gaps, especially in Europe (Figure 1.11). Policy actions to accelerate the cleanup of balance sheets and demand support would help entrench the recovery in countries operating with significant excess capacity, as discussed in the section titled "Policy Priorities."

Adjustment to Terms-of-Trade Changes in Emerging Market and Developing Economies

As discussed in a number of previous WEO reports, the slowdown in China—along with commodity price fluctuations—has been the key driver of economic performance in emerging market and developing economies, especially in commodity exporters.[1] Panel 1 of Figure 1.12 shows China's growth rate and the purchasing-power-parity GDP-weighted aggregate growth rates for commodity exporters and the remaining emerging market and developing economies. The growth profiles of commodity and noncommodity exporters are quite similar until 2011, when a growth downturn begins for commodity exporters against the backdrop of falling non-oil commodity prices. For emerging market and developing economies as a group, the decline in growth between 2011 and 2016 was 2.2 percentage points, with about two-thirds of this decline attributable to weaker growth in commodity exporters (Figure 1.12, panel 2)—the rest being accounted for by slower growth in China and in other emerging market and developing economies.[2] Commodity exporters account for most of the projected pickup in emerging market and developing economy growth in 2017–19, even though their projected growth recovery is relatively modest compared with the striking decline in their growth rates over the past five years.

A broadly similar picture holds for low-income developing countries (Figure 1.12, panel 3). The lion's share of the 1.6 percentage point decline in growth between 2011 and 2016 is attributable to the drastic slowdown in Nigeria, an oil exporter that in 2016 accounted for more than 20 percent of purchasing-power-parity GDP of low-income countries and about half of the GDP of commodity exporters in this country group. Panel 3 of Figure 1.12 also underscores the broad stability of growth in low-income countries that are not primarily commodity exporters—a group of countries in which Bangladesh and Vietnam have large weights—as well as the milder slowdown in low-income commodity exporters excluding Nigeria when compared with all commodity exporters.

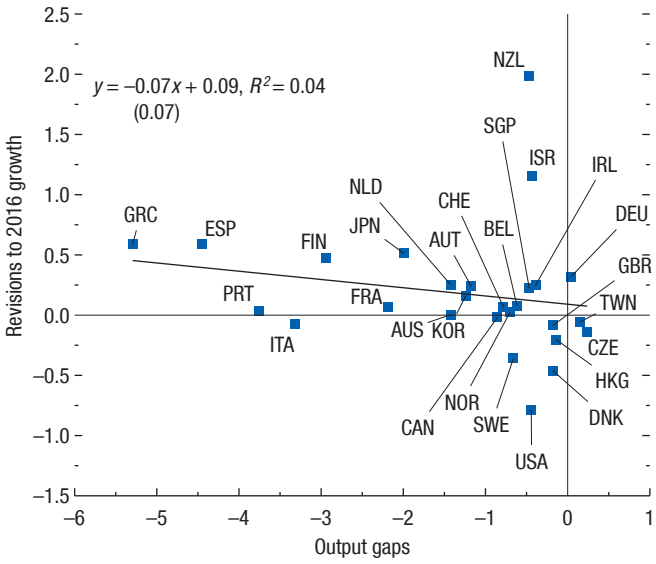
Panel 1 of Figure 1.13 illustrates the windfall gains and losses in emerging market and developing economies arising from commodity price fluctuations (see also the April 2016 WEO and the October 2016 WEO for related discussions). Commodity exporters suffered sizable income losses during 2015 and 2016.

[1]See, for instance, Chapter 4 of the April 2014 WEO, Chapter 2 of the October 2015 WEO, and Chapter 1 of the April 2016 WEO.

[2]The negative impact of the large decline in Chinese growth on aggregate growth in emerging market and developing economies is attenuated by China's rising weight in the group, which reflects a growth rate substantially above most of the rest of the group.

Figure 1.11. Revisions to 2016 Growth and Output Gaps in 2015
(Percent)

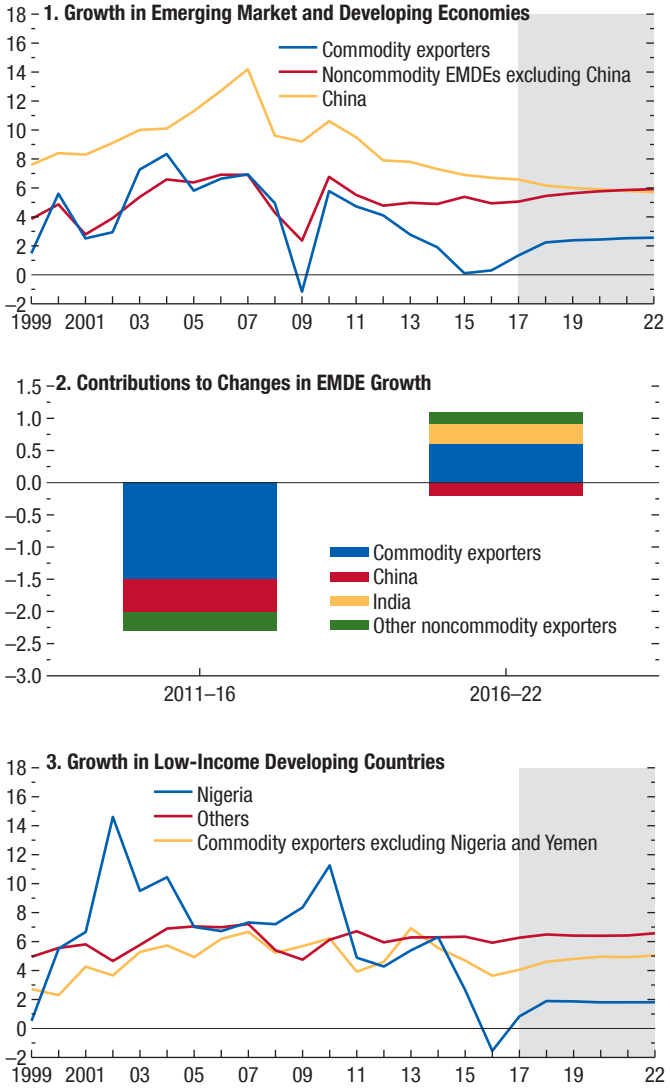
Growth surprises for 2016 tended to be larger in countries with greater excess capacity, suggesting that the cyclical recovery may be gaining momentum.



Source: IMF staff estimates.
Note: 2016 growth revisions are differences between current growth estimates for 2016 and projections in the April 2016 *World Economic Outlook*. Japan's latest figures reflect comprehensive methodological revisions adopted in December 2016. The number in parentheses in the regression equation is the standard error of the estimated coefficient on the output gap. Data labels in the figure use International Organization for Standardization (ISO) country codes.

Figure 1.12. GDP Growth, 1999–2021
(Percent)

Among emerging market and developing economies, growth rates have diverged markedly since 2011 between the commodity-exporter and -importer groups. Growth in exporters is projected to pick up over 2017–19, but to remain below the average growth rate for 2000–10. Growth in importers is projected to remain buoyant.



Source: IMF staff estimates.
Note: Commodity exporters includes fuel and nonfuel primary products exporters, as indicated in Table D of the Statistical Appendix, plus Brazil and Peru. EMDE = emerging market and developing economy.

Although commodity price forecasts suggest some recovery in prices during 2017 and beyond, the forecast gains are expected to be much more modest than the losses already incurred. This suggests that, for many of these countries, the period ahead will be one of protracted adjustment—particularly in those economies in which revenues from commodities account for an important fraction of government revenues (see the discussion in the April 2017 *Fiscal Monitor*). The need for a protracted period of fiscal consolidation is one important reason the recovery in commodity exporters is forecast to be subdued.

Productivity Headwinds

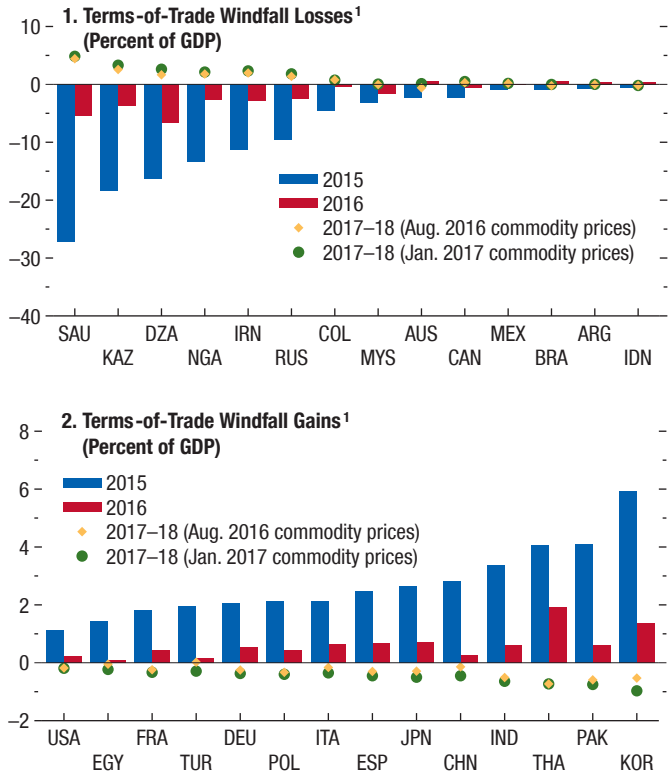
Medium-term growth rates in both advanced and emerging market economies will be shaped largely by the pace of total factor productivity (TFP) growth. GDP projections in the April 2017 WEO incorporate a gradual recovery in TFP growth rates from recent weak levels. Nonetheless, TFP growth is projected to stay below the pace registered before the global financial crisis, especially in emerging market economies (Figure 1.14, panel 1).

The persistent decline in TFP growth in recent years and its projected slow recovery, in part, reflect the legacies of the financial crisis. New evidence suggests that in advanced economies, notably in Europe, high levels of corporate debt and nonperforming bank loans have constrained investment in capital goods and intangible assets, slowing the pace of capital-embodied technological change (Figure 1.14, panels 2 and 3) (Adler and others 2017). In a number of advanced economies, the boom-bust cycle also appears to have increased the misallocation of capital within and across sectors, dragging down productivity growth.

Subdued TFP growth prospects also reflect unfavorable trends that started before the crisis. The broadly synchronized slowdown in productivity growth ahead of the global financial crisis can be traced to forces that weakened technological innovation or diffusion, including the waning effects of the earlier boom in the adoption of information and communications technologies (Fernald 2014), population aging (Feyrer 2007), decelerating global trade integration (Ahn and Duval, forthcoming), slowing human capital accumulation, and taxation policies (Chapter 2 of the April 2017 *Fiscal Monitor*). In emerging market economies, the fading effects of earlier structural reforms and structural transformation—whereby resources are real-

Figure 1.13. Emerging Markets: Terms-of-Trade Windfall Gains and Losses

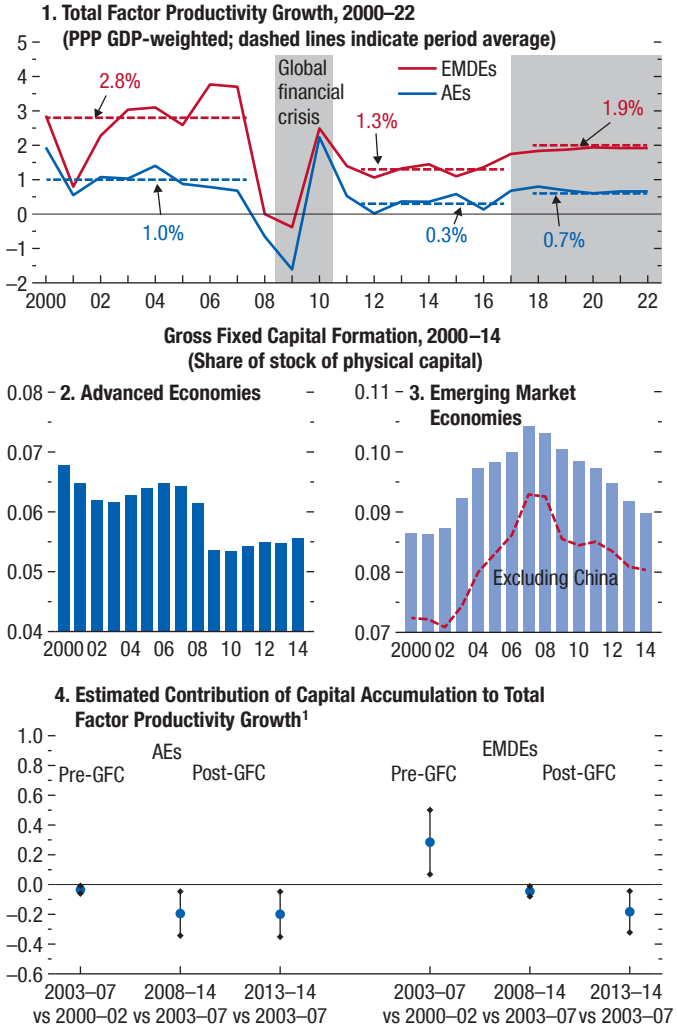
Commodity exporters are set to experience some windfall gains from higher commodity prices in 2017 and beyond, but these gains will be modest compared with the losses experienced in 2015–16.



Source: IMF staff estimates.
Note: Data labels in the figure use International Organization for Standardization (ISO) country codes.
[1]Gains (losses) for 2017–18 are simple averages of annual incremental gains (losses) for 2017 and 2018. The windfall is an estimate of the change in disposable income arising from commodity price changes. The windfall gain in year t for a country exporting x U.S. dollars of commodity A and importing m U.S. dollars of commodity B in year $t-1$ is defined as $(\Delta p_t^A x_{t-1} - \Delta p_t^B m_{t-1}) / Y_{t-1}$, in which Δp_t^A and Δp_t^B are the percentage changes in the prices of A and B between year $t-1$ and year t, and Y is GDP in year $t-1$ in U.S. dollars. See also Gruss (2014).

Figure 1.14. Total Factor Productivity
(Percent)

Total factor productivity slowed sharply following the 2008–09 crisis, both in advanced and emerging market economies. While some recovery is expected, productivity growth is not projected to return to its precrisis pace. A key factor behind the slowdown has been weak investment—and the associated slow pace of adoption of capital-embodied technologies. The drop in investment was abrupt and sustained in advanced economies, but more gradual in emerging market economies.



Sources: Penn World Table 9.0; and IMF staff estimates.
Note: Weighted averages are reported for each income group. AEs = advanced economies; EMDEs = emerging market and developing economies. GFC = global financial crisis; PPP = purchasing power parity. Advanced economies comprise Australia, Austria, Belgium, Canada, Denmark, France, Germany, Israel, Italy, Japan, Korea, the Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, Taiwan Province of China, the United Kingdom, and the United States. Emerging market and developing economies comprise Brazil, Chile, China, Colombia, Egypt, India, Indonesia, Iran, Malaysia, Mexico, Pakistan, the Philippines, Poland, Russia, South Africa, Thailand, Turkey, and the United Arab Emirates. In panel 1, TFP growth data for 2015 and 2016 are estimates, and those for 2017–22 are forecasts based on projections in the *World Economic Outlook* for GDP, gross fixed capital formation, and employment.
[1]Panel 4 shows the estimated contribution of capital accumulation to the change in total factor productivity growth between stated periods. 90 percent confidence bands are reported. See details in Adler and others (2017).

located from low-productivity to high-productivity sectors and firms—seem to have accounted for part of the TFP slowdown.

The Forecast

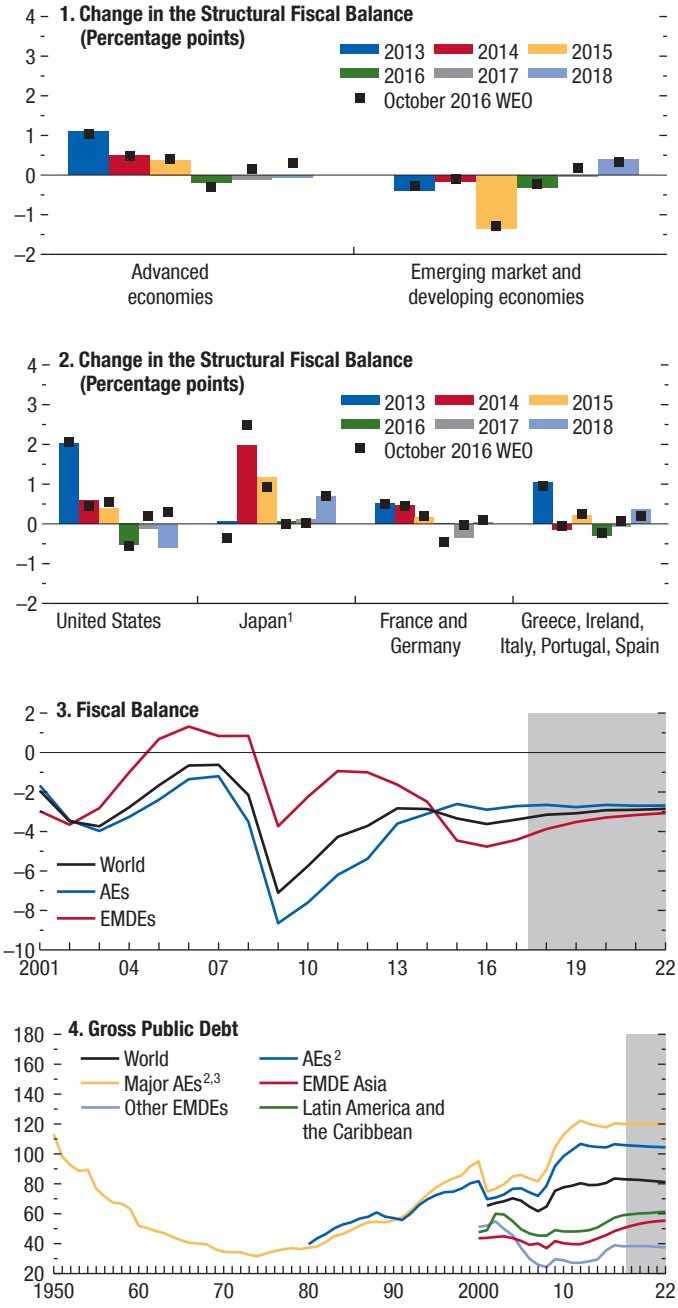
Policy Assumptions

After providing mild support to economic activity in 2016, fiscal policy at the global level is projected to be broadly neutral in 2017 and 2018. The overall neutral stance masks substantial variation across

Figure 1.15. Fiscal Indicators

(Percent of GDP, unless noted otherwise)

Fiscal policy is projected to be broadly neutral at the global level in 2017 and 2018, but this overall neutral stance masks considerable diversity across countries.



Source: IMF staff estimates.
Note: AEs = advanced economies; EMDEs = emerging market and developing economies.
[1]Japan's latest figures reflect comprehensive methodological revisions adopted in December 2016.
[2]Data through 2000 exclude the United States.
[3]Canada, France, Germany, Italy, Japan, United Kingdom, United States.

countries and important changes relative to the October 2016 WEO assumptions. Among advanced economies, the fiscal stance (measured by the fiscal impulse) in 2017 is forecast to be expansionary in Canada, France, and Germany; contractionary in Australia, Korea, and the United Kingdom; and broadly neutral in Japan and the United States (Figure 1.15).[3] For the advanced economies as a whole, and the United States in particular, the projected neutral fiscal stance in 2017 represents a slight easing relative to the October 2016 WEO assumptions. In 2018, the forecast assumes a sizable fiscal stimulus in the United States, reflecting the anticipated changes in U.S. federal government tax policy. The U.S. fiscal deficit is assumed to widen by 2 percentage points of GDP by 2019, which entails a fiscal impulse of 1 percent of GDP, with about equally sized decreases in the personal and corporate income tax burdens, concentrated in 2018 and 2019, and no change in infrastructure spending for the time being.[4] In emerging market and developing economies as a group, fiscal adjustment is expected to detract slightly from economic activity in 2017 and 2018, albeit with marked differences across countries and regions.

On the monetary policy front, the forecast assumes a less gradual normalization of policy interest rates in advanced economies than projected in the October 2016 WEO, particularly in the United Kingdom and the United States. With the anticipated widening of the U.S. fiscal deficit, monetary policy is projected to be moderately less accommodative than previously expected because of stronger demand and inflation pressure. The U.S. policy interest rate is projected to rise by 75 basis points in 2017 and 125 basis points in 2018, reaching a long-term equilibrium rate of just below 3 percent in 2019. In other advanced economies, the forecast assumes that monetary policy will remain very accommodative. Short-term rates are projected to remain negative in the euro area through 2018 and close to zero in Japan over the forecast horizon. The assumed monetary policy stances across emerging market economies vary, reflecting these economies' diverse cyclical positions.

[3]The fiscal impulse is defined as the change in the structural fiscal balance as a share of potential output.

[4]The projection for fiscal policy in the United States is the one IMF staff sees as the most likely among a wide range of possible scenarios.

Other Assumptions

Global financial conditions are assumed to remain accommodative, though somewhat tighter than forecast in the October 2016 WEO. As discussed in the April 2017 GFSR, an easing of lending conditions in major economies is expected to offset the anticipated rise in interest rates, while the normalization of monetary policy in the United States and the United Kingdom—even if faster than previously thought—is expected to proceed smoothly, without triggering large and protracted increases in financial market volatility. With the exception of several vulnerable economies, most emerging markets are expected to face generally accommodative financial conditions, with higher policy rates partially offset by a recovery in risk appetite, as reflected in the recent decline in sovereign bond spreads and the uptick in most equity markets. The forecast also incorporates a firming of commodity prices. Oil prices are expected to rise to an average of $55 a barrel in 2017–18, compared with an average of $43 a barrel in 2016. Nonfuel commodity prices, in particular for metals, are expected to strengthen in 2017 relative to their 2016 averages as a result of substantial infrastructure spending in China, expectations of fiscal easing in the United States, and a general pickup in global demand. Finally, negotiations on the future economic relations between the United Kingdom and the European Union are assumed to proceed without raising excessive uncertainty, and the arrangements are expected to eventually settle in a manner that avoids a very large increase in economic barriers.

Global Outlook for 2017–18

World growth, estimated as in the October 2016 WEO, at 3.1 percent in 2016, is projected to increase to 3.5 percent in 2017 and 3.6 percent in 2018—an upward revision of 0.1 percentage point for 2017 relative to October. Together with the modest change in the forecast for the overall global growth rate, projections of the strength of economic activity across country groups have also shifted. In line with the stronger-than-expected pickup in growth in advanced economies and weaker-than-expected activity in some emerging market economies in the latter half of 2016, the forecast for 2017–18 envisions a rebound in activity in advanced economies that is faster than previously expected, while growth in 2017 is forecast to be marginally weaker in emerging market and developing economies relative to the October 2016 WEO. These revisions notwithstanding, the broad story remains unchanged: over the near and medium term, most of the projected pickup in global growth will stem from stronger activity in emerging market and developing economies.

Economic activity in advanced economies as a group is now forecast to grow by 2.0 percent in 2017 and 2018, 0.2 percentage point higher than expected in October 2016. The stronger outlook in advanced economies reflects a projected cyclical recovery in global manufacturing, signs of which were already visible at the end of 2016, and an uptick in confidence, especially after the U.S. elections, which are expected to fuel the cyclical momentum. As also noted in the January 2017 *WEO Update*, this forecast is particularly uncertain in light of potential changes in the policy stance of the new U.S. administration and their global spillovers.

Growth in the group of emerging market and developing economies is forecast to rise to 4.5 percent and 4.8 percent, respectively, in 2017 and 2018, from an estimated outturn of 4.1 percent in 2016. This projected upturn reflects, to an important extent, a stabilization or recovery in a number of commodity exporters, some of which underwent painful adjustments following the drop in commodity prices, and strengthening growth in India, partially offset by a gradual slowdown of the Chinese economy. Nevertheless, as emphasized in previous WEOs, the outlook for emerging market and developing economies remains uneven and generally below these economies' average performance in 2000–15. A variety of factors weigh on their outlooks, including China's transition to a more sustainable pattern of growth that is less reliant on investment and commodity imports; a protracted adjustment to structurally lower commodity revenues in some commodity exporters; high debt levels everywhere; sluggish medium-term growth prospects in advanced economies; and domestic strife, political discord, and geopolitical tensions in a number of countries (see Box 1.1).

Growth Outlook for the Medium Term

Global growth is forecast to increase marginally beyond 2018, reaching 3.8 percent by 2022. This pickup in global activity comes entirely from developments in emerging market and developing economies, where growth is projected to increase to 5 percent by the end of the forecast period. These economies'

impact on global activity is further boosted by their rising world weight. This forecast assumes continued strengthening of growth in commodity exporters, albeit to rates much more modest than in 2000–15 (Figure 1.12); an acceleration of activity in India resulting from the implementation of important structural reforms; and a successful rebalancing of China's economy to lower, but still high, trend growth rates. Advanced economies' more modest medium-term growth rates reflect the structural headwinds they face once output gaps have closed: diminished growth of the labor force as populations age, and persistently low productivity growth, barring significant structural reform efforts (Adler and others 2017).

Growth Outlook for Individual Countries and Regions

Advanced Economies

- The *U.S.* economy is projected to expand at a faster pace in 2017 and 2018, with growth forecast at 2.3 and 2.5 percent, respectively, a cumulative increase in GDP of ½ percentage point relative to the October 2016 forecast. The stronger near-term outlook reflects the momentum from the second half of 2016, driven by a cyclical recovery in inventory accumulation, solid consumption growth, and the assumption of a looser fiscal policy stance. The anticipated shift in the policy mix so far has buoyed financial markets and strengthened business confidence, which could further fuel the current momentum. Over a longer horizon, however, the outlook for the U.S. economy is more subdued. Potential growth is estimated at only 1.8 percent, weighed down by an aging population and weaker TFP growth.
- The *euro area* recovery is expected to proceed at a broadly similar pace in 2017–18 as in 2016. The modest recovery is projected to be supported by a mildly expansionary fiscal stance, accommodative financial conditions, a weaker euro, and beneficial spillovers from a likely U.S. fiscal stimulus; political uncertainty as elections approach in several countries, coupled with uncertainty about the European Union's future relationship with the United Kingdom, is expected to weigh on activity. Output in the euro area is expected to grow by 1.7 percent in 2017 and 1.6 percent in 2018. Growth is forecast to soften in *Germany* (1.6 percent in 2017 and 1.5 percent in 2018), *Italy* (0.8 percent in 2017 and 2018), and *Spain* (2.6 percent in 2017 and 2.1 percent in 2018), but to increase modestly in *France* (1.4 percent in 2017 and 1.6 percent in 2018). The medium-term outlook for the euro area as a whole remains dim, as projected potential growth is held back by weak productivity, adverse demographics, and, in some countries, unresolved legacy problems of public and private debt overhang, with a high level of nonperforming loans.
- Growth in the *United Kingdom* is projected to be 2.0 percent in 2017, before declining to 1.5 percent in 2018. The 0.9 percentage point upward revision to the 2017 forecast and the 0.2 percentage point downward revision to the 2018 forecast reflect the stronger-than-expected performance of the U.K. economy since the June Brexit vote, which points to a more gradual materialization than previously anticipated of the negative effects of the United Kingdom's decision to leave the European Union. These effects include reduced consumer purchasing power following the pound's depreciation and its gradual pass-through to prices and the impact of uncertainty on private investment. Though highly uncertain, medium-term growth prospects have also diminished in the aftermath of the Brexit vote because of the expected increase in barriers to trade and migration, as well as a potential downsizing of the financial services sector amid possible barriers to cross-border financial activity.
- In *Japan*, a comprehensive revision of the national accounts led to an upward revision of historical growth rates and placed the 2016 growth estimate at 1.0 percent, significantly higher than projected in the October 2016 WEO. The growth momentum, fueled by stronger-than-expected net exports in 2016, is expected to continue into 2017, with growth forecast at 1.2 percent. The pace of expansion is expected to weaken thereafter, with the assumed withdrawal of fiscal support and a recovery of imports offsetting the impact of stronger anticipated foreign demand and Tokyo Olympics–related private investment. Over the medium term, a shrinking labor force will weigh on Japan's growth prospects, although its per capita income growth rates are projected to remain near the levels seen over the past several years.
- In most other advanced economies, the pace of activity is expected to accelerate.
  - In *Switzerland*, growth is projected to rise modestly to 1.4 percent in 2017 and 1.6 percent in 2018, supported by sustained external and

domestic demand and the waning effects of the past appreciation of the Swiss franc.
  - The pace of expansion of *Sweden*'s economy is expected to moderate to a still-robust 2.7 percent in 2017 and 2.4 percent in 2018. The slowdown from the very strong growth in 2015–16 is partly a result of normalization of public consumption and moderation of high investment growth, which outweigh some strengthening in private consumption.
  - Growth in commodity-exporting advanced economies is projected to recover. In 2017 it is forecast to rise to 1.2 percent in *Norway*, 1.9 percent in *Canada*, and 3.1 percent in *Australia*. The acceleration in activity will be supported by accommodative monetary policies, supportive fiscal policies or infrastructure investment, improving sentiment following the upturn in commodity prices, and less drag from declining investment in the commodity sector (Australia, Norway). Canada's economy also stands to benefit from the stronger U.S. outlook and the appreciation of the U.S. dollar.
  - Among other advanced economies in Asia, a pickup in growth for 2017 is projected in *Hong Kong Special Administrative Region* (to 2.4 percent), *Taiwan Province of China* (to 1.7 percent), and *Singapore* (to 2.2 percent), partly because of the expected recovery in China's import demand. By contrast, a marginal decline in growth is forecast in *Korea* (to 2.7 percent in 2017, 0.3 percentage point less than forecast in the October 2016 WEO), reflecting weaker private consumption growth due to the expiration of temporary supportive measures, ongoing political uncertainty, and high household debt.

Emerging Market and Developing Economies

- Growth in *China* is projected at 6.6 percent in 2017, slowing to 6.2 percent in 2018. The upward revision to near-term growth—the 2017 forecast is 0.4 percentage point higher than in the October 2016 WEO and the 2018 forecast is 0.2 percentage point higher—reflects the stronger-than-expected momentum in 2016 and the anticipation of continued policy support in the form of strong credit growth and reliance on public investment to achieve growth targets. The medium-term outlook, however, continues to be clouded by increasing resource misallocation and growing vulnerabilities associated with the reliance on near-term policy easing and credit-financed investment.
- Elsewhere in emerging and developing Asia, growth is projected to remain robust, even if somewhat lower than anticipated in the October 2016 WEO. In *India*, the growth forecast for 2017 has been trimmed by 0.4 percentage point to 7.2 percent, primarily because of the temporary negative consumption shock induced by cash shortages and payment disruptions from the recent currency exchange initiative. Medium-term growth prospects are favorable, with growth forecast to rise to about 8 percent over the medium term due to the implementation of key reforms, loosening of supply-side bottlenecks, and appropriate fiscal and monetary policies. Economic activity is forecast to accelerate slightly in 2017 in four ASEAN-5 economies (*Indonesia*, *Malaysia*, *Philippines*, *Vietnam*). The fifth, *Thailand*, is projected to recover from a temporary dip in tourism and consumption in late 2016. Growth in 2017 is projected to be 5.1 percent in *Indonesia*, 4.5 percent in *Malaysia*, 6.8 percent in the *Philippines*, and 6.5 percent in *Vietnam*. In these economies, the near-term pickup in growth is underpinned to a significant extent by stronger domestic demand and, in the *Philippines*, by higher public spending in particular.
- A weaker-than-previously-expected recovery is projected to take hold in *Latin America and the Caribbean*, with growth forecast at 1.1 percent in 2017 and 2.0 percent in 2018 (0.5 and 0.2 percentage point lower than in the October 2016 WEO). Within the region, the growth outlook differs substantially across countries. While activity in most commodity exporters is expected to be supported by the recovery in commodity prices, domestic fundamentals continue to play a key role in the outlook of some large countries. At the same time, the outlook for Mexico, one of the largest economies in the region, has weakened.
  - Growth in *Mexico* is projected to moderate to 1.7 percent in 2017 and 2.0 percent in 2018. The 1.2 percentage point cumulative growth downgrade over the two years reflects subdued prospects for investment and consumption in the face of tighter financial conditions and increased uncertainty about future U.S.–Mexico trade relations. These factors more than offset the positive impact of a stronger U.S. outlook and the depreciation of the currency. Continued imple-

mentation of structural reforms in the areas of energy, labor markets, competition, telecommunications, and the financial sector is projected to boost growth by about ½ percentage point over the medium term.

- Among commodity exporters, *Brazil* is expected to emerge from one of its deepest recessions, with growth forecast at 0.2 percent in 2017 and 1.7 percent in 2018 (0.3 percentage point lower and 0.2 percentage point higher, respectively, relative to the October 2016 WEO forecast). The gradual recovery will be supported by reduced political uncertainty, easing monetary policy, and further progress on the reform agenda. After a contraction last year, activity in *Argentina* is also set to expand by 2.2 percent in 2017, thanks to stronger consumption and public investment, and 2.3 percent in 2018, reflecting the gradual rebound of private investment and exports. *Venezuela* remains mired in a deep economic crisis, with output forecast to contract by 7.4 percent in 2017 and 4.1 percent in 2018, as monetization of fiscal deficits, extensive economic distortions, and severe restrictions on intermediate goods imports fuel rapidly rising inflation. Higher commodity prices will help strengthen growth in 2017 in *Chile* (1.7 percent) and *Colombia* (2.3 percent).

- The near-term outlook for the *Commonwealth of Independent States* has improved, with growth projected to rise to 1.7 percent in 2017 (0.3 percentage point higher than forecast in the October 2016 WEO). *Russia* is poised to exit recession, with growth reaching 1.4 percent in 2017 (following a cumulative contraction of about 3 percent in the previous two years). The pickup in activity reflects firming oil prices and a recovery in domestic demand attributable to easing financial conditions and improved confidence. At the same time, Russia's potential growth will remain subdued at about 1.5 percent barring reforms, slowing a convergence toward advanced economy per capita income levels. Higher oil prices and the improved outlook for Russia will support activity elsewhere in the region, given tight linkages through trade, investment, and remittances. Among oil exporters, growth in *Kazakhstan* is now projected to reach 2.5 percent in 2017, 1.9 percentage points higher than forecast in October, as a result of higher oil production and stronger external demand. In *Ukraine*, activity is supported by improved confidence and rising real incomes, including from a higher minimum wage, but growth is projected to soften slightly to 2 percent in 2017 due to the adverse impact on industrial production of the recent trade blockade in the eastern part of Ukraine.
- Economic prospects in *emerging and developing Europe* are relatively favorable, with the exception of Turkey. For the group as whole, growth is projected to remain at 3.0 percent in 2017 and strengthen to 3.3 percent in 2018. In *Turkey*, after a sharp slowdown in growth in the third quarter of 2016, a modest acceleration in activity is projected, with growth reaching 2.5 percent in 2017 based on stronger net exports and a moderate fiscal stimulus. The outlook is clouded by heightened political uncertainty, security concerns, and the rising burden of foreign-exchange-denominated debt caused by the lira depreciation. Growth in the rest of the region is expected to pick up after a temporary slowdown, as rising wages in some countries support strong domestic consumption growth.
- In *sub-Saharan Africa*, a modest recovery is foreseen in 2017. Growth is projected to rise to 2.6 percent in 2017 and 3.5 percent in 2018, largely driven by specific factors in the largest economies, which faced challenging macroeconomic conditions in 2016. After contracting by 1.5 percent in 2016 because of disruptions in the oil sector coupled with foreign exchange, power, and fuel shortages, output in *Nigeria* is projected to grow by 0.8 percent in 2017 as a result of a recovery in oil production, continued growth in agriculture, and higher public investment. In *South Africa*, a modest recovery is expected, with growth forecast at 0.8 percent in 2017 as commodity prices rebound, drought conditions ease, and electricity capacity expands. *Angola's* growth is also expected to turn positive in 2017 (to 1.3 percent), driven by an expansion in the non-oil sector because of higher public spending and better terms of trade. The outlook for the region, however, remains subdued: output growth is expected only moderately to exceed population growth over the forecast horizon, having fallen short in 2016. Many commodity exporters still need to adjust fully to structurally lower commodity revenues because commodity prices—the recent rebound notwithstanding—remain low (restraining stronger growth in Nigeria, Angola, and oil exporters within the Economic Community of Central African States). Many of the

largest non-resource-intensive countries will find it increasingly hard to sustain growth through higher public capital spending, as they have done in the past, in the face of rising public debt and a slowing credit cycle.

- The near-term outlook for the *Middle East, North Africa, Afghanistan, and Pakistan* region has weakened, with growth forecast to be 2.6 percent in 2017, 0.8 percentage point lower than projected in the October 2016 WEO. The subdued pace of expansion reflects lower headline growth in the region's oil exporters, driven by the November 2016 OPEC agreement to cut oil production, which masks the expected pickup in non-oil growth as the pace of fiscal adjustment to structurally lower oil revenues slows. Continued strife and conflict in many countries in the region also detract from economic activity. Growth in *Saudi Arabia*, the region's largest economy, is expected to slow to 0.4 percent in 2017 because of lower oil production and ongoing fiscal consolidation, before picking up to 1.3 percent in 2018. Growth rates in most other countries in the Cooperation Council of the Arab States of the Gulf are similarly projected to dip in 2017. By contrast, activity in most of the region's oil importers is expected to continue to accelerate, with growth rising from 3.7 percent in 2016 to 4.0 percent in 2017 and 4.4 percent in 2018. In *Pakistan*, a broad-based recovery is expected to continue at a healthy pace, with growth forecast at 5 percent in 2017 and 5.2 percent in 2018, supported by ramped-up infrastructure investment. In *Egypt*, comprehensive reforms are expected to deliver sizable growth dividends, lifting growth from 3.5 percent in 2017 to 4.5 percent in 2018.

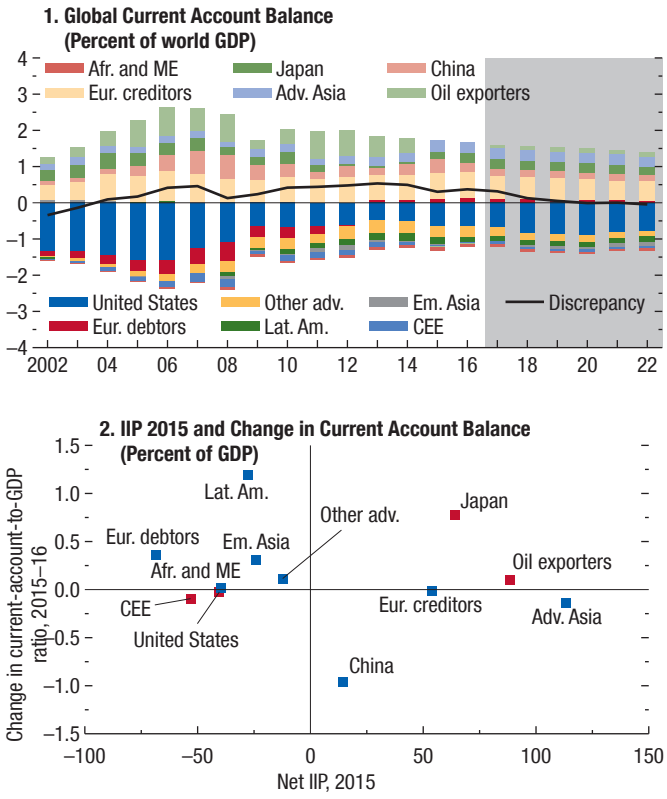
Inflation Outlook for 2017–18

With the uptick in commodity prices, a broad-based increase in headline inflation rates is projected in both advanced and emerging market and developing economies. In nearly all advanced economies, inflation rates are expected to be higher in 2017 than in 2016. For the advanced group as a whole, inflation is forecast to be 2.0 percent in 2017, up from 0.8 percent in 2016, and to stabilize at about that level over the next few years. Inflation in emerging market and developing economies (excluding Argentina and Venezuela) is projected to rise to 4.7 percent in 2017 from 4.4 percent last year, mostly reflecting higher commodity prices.

- In the United States, consumer price inflation is picking up relatively strongly with the recovery in energy prices, from 1.3 percent in 2016 to a projected 2.7 percent in 2017. Core inflation, however, remains relatively subdued and is forecast to rise more gradually, reaching its medium-term objective of 2 percent personal consumption expenditure inflation targeted by the Federal Reserve by 2018, as economic slack diminishes and wage growth strengthens.
- Inflation is also picking up in the euro area, to about 1.7 percent in 2017 from 0.2 last year, partly reflecting base effects from energy and food prices. But core inflation remains subdued and the output gap is still negative; as such, headline inflation will only gradually approach the European Central Bank's objective of below but close to 2 percent over the next few years, reaching 1.9 percent in 2022. Higher energy prices, the recent weakening in the yen, and slowly building wage-price pressures are expected to lift inflation in Japan as well. However, with inflation expectations rising only slowly, the increase in inflation is projected to be quite subdued, with inflation rates staying well below the Bank of Japan's target throughout the forecast horizon.
- In all remaining advanced economies, except Norway, consumer price inflation rates are expected to rise in 2017. In the United Kingdom, the pound's depreciation and the increase in energy prices are projected to push inflation up to 2.5 percent in 2017, before it gradually subsides to the Bank of England's target of 2 percent in the next few years. Average headline inflation is expected to return to positive territory in Singapore and Switzerland in 2017.
- The projected path of inflation rates among emerging market and developing economies shows considerable diversity. Inflation in China is expected to pick up to 2.4 percent in 2017 and to 3 percent over the medium term as slack in the industrial sector and downward pressure on goods prices diminish. A pickup in inflation is also forecast in Mexico and Turkey in 2017, reflecting mostly the liberalization of gasoline prices in Mexico as well as the significant depreciation of both countries' currencies. By contrast, inflation rates in Brazil and Russia are expected to continue to decline, reflecting a combination of negative output gaps and the

Figure 1.16. Global Current Account Balances

Global current account imbalances narrowed marginally in 2016. In general, current account balances tended to increase in debtor countries but decline in creditors—changes that would help stabilize the international investment positions. Imbalances are projected to remain stable in 2017 but widen again from 2018 onward.



Source: IMF staff estimates.
Note: Adv. Asia = advanced Asia (Hong Kong SAR, Korea, Singapore, Taiwan Province of China); Afr. and ME = Africa and the Middle East (Democratic Republic of the Congo, Egypt, Ethiopia, Ghana, Jordan, Kenya, Lebanon, Morocco, South Africa, Sudan, Tanzania, Tunisia); CEE = central and eastern Europe (Belarus, Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovak Republic, Turkey, Ukraine); Em. Asia = emerging Asia (India, Indonesia, Pakistan, Philippines, Thailand, Vietnam); Eur. creditors = European creditors (Austria, Belgium, Denmark, Finland, Germany, Luxembourg, Netherlands, Norway, Sweden, Switzerland); Eur. debtors = European debtors (Cyprus, Greece, Ireland, Italy, Portugal, Spain, Slovenia); IIP = international investment position; Lat. Am. = Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay); Other adv. = other advanced economies (Australia, Canada, France, Iceland, New Zealand, United Kingdom); Oil exporters = Algeria, Azerbaijan, Iran, Kazakhstan, Kuwait, Nigeria, Oman, Qatar, Russia, Saudi Arabia, United Arab Emirates, Venezuela.

dissipation of the effects of past currency depreciations, supply shocks, and/or administrative price increases. Inflation in 2017 is expected to remain at double-digit levels in a few large economies in sub-Saharan Africa (for example, Nigeria, Angola, Ghana), reflecting, among other factors, the pass-through of large depreciations.

External Sector Outlook

Global trade is estimated to have grown by 2.2 percent in 2016 in volume terms, the slowest pace since 2009, and below the 2.4 growth rate of world GDP at market exchange rates. The further slowdown is attributable to developments in advanced economies, whose exports and imports slowed substantially relative to 2015. Weaker trade growth was related to an investment slowdown and inventory adjustment, especially during the first part of the year. At the same time, there are signs of recovery, as discussed earlier, which should lead to a pickup in trade growth in 2017–18, as demand and especially capital spending recover.

After declining to about ¼ percent in 2015, trade growth in emerging market and developing economies showed some signs of recovery, rising to an estimated 2.2 percent in 2016. This recovery was underpinned by stronger trade growth in China and India as well as in Russia and the Commonwealth of Independent States, where the contraction in imports moderated from the dramatic pace in 2015. Trade growth is projected to increase further in 2017–18, as a gradual recovery in investment by commodity exporters boosts import growth. As a result, global trade is projected to grow at a rate of close to 4 percent in 2017–18 (close to 1 percentage point above world growth at market exchange rates).

Preliminary data suggest that global current account imbalances in 2016 narrowed marginally (Figure 1.16, panel 1). Among creditor countries, the current account balance in fuel exporters worsened slightly, reflecting the further decline in oil prices, and the surplus in China contracted. These developments more than offset the increase in the current account surplus in Japan, which was driven primarily by a sharp decline in the volume and price of energy imports.

Among debtor countries, current account balances strengthened in nonfuel-exporting Latin American countries, reflecting the impact of weak domestic demand on imports, as well as in emerging Asia and in euro area debtor countries, also helped by further terms-of-trade gains.

While there is, of course, no normative presumption that current account deficits and surpluses should be compressed, the IMF's 2016 *External Sector Report* highlights how, in 2015, current account imbalances in some of the world's largest economies were too large in relation to country-specific norms consistent with underlying fundamentals and desirable policies. The forthcoming 2017 *External Sector Report* will update

those assessments. Current account balances in 2016 generally tended to increase in debtor countries and decrease in creditor countries, thereby moving in a stabilizing direction (Figure 1.16, panel 2). The global current account forecasts indicate broad stability of imbalances in 2017 but a widening of deficits starting in 2018, as a projected fiscal expansion would lead to stronger domestic demand in the United States and a higher current account deficit (Figure 1.16, panel 1).

Despite the narrowing of flow imbalances, creditor and debtor positions are estimated to have widened in 2016 and are projected to widen further over the medium term in relation to world GDP (Figure 1.17, panel 1).[5] On the debtor side, the increase is explained entirely by rising net external liabilities in the United States, where the current account deficit is projected to widen over the next few years. In contrast, net external liabilities are projected to shrink further in euro area debtor countries. Among creditor countries, the increase in net external claims reflects primarily the projected continuation of large current account surpluses in European creditor countries (such as Germany and the Netherlands) and in advanced Asian economies.

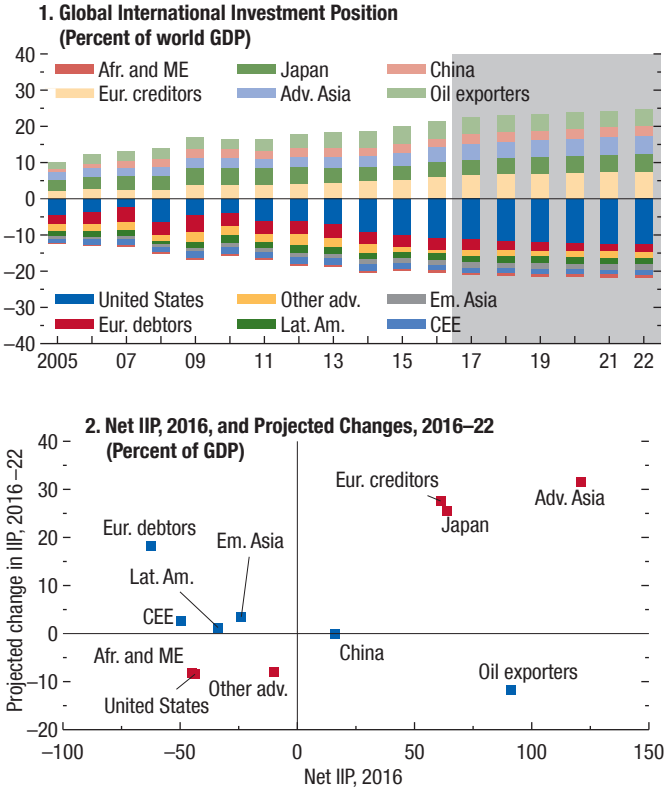
The assessment of net international investment positions is becoming increasingly complex as these positions—alongside national accounts figures—can be affected by financial decisions related to the corporate structure of large multinational companies, with no clear repercussions for external sustainability (or any tangible effects on employment and living standards). A case in point is Ireland, where the relocation of entire balance sheets by multinational companies, and in particular intellectual property products, led to a very large upward revision in the stock of intangible capital in the country in 2015 (about €300 billion, larger than Irish GDP). There was a corresponding increase in Irish net external liabilities, which thus exceeded 200 percent of GDP, as well as a sharp upward revision to growth. Box 1.2 discusses the repercussions of these financial operations for domestic and external accounts in Ireland and the measurement challenges they pose.

Panel 2 of Figure 1.17 shows how creditor and debtor positions are projected to evolve over 2016–22 as a share of domestic GDP. It highlights further growth in creditor positions among both European creditor countries and advanced economies in Asia in the range of 25–30 percentage points of GDP;

[5]Predicting the evolution of the net international investment position is particularly difficult given the importanct role of valuation changes arising from movements in exchange rates and other asset prices. These changes have contributed to a sharp widening in the U.S. net liability position in recent years, as the appreciation of the U.S. dollar has reduced the dollar value of U.S. external assets, and to corresponding improvements in countries experiencing sharp exchange rate depreciations and holding dollar assets. Valuation changes have also been notable in the United Kingdom, where the depreciation of the pound has turned the country into a net creditor as of 2016, by boosting the domestic-currency value of foreign-currency assets.

Figure 1.17. Net International Investment Position

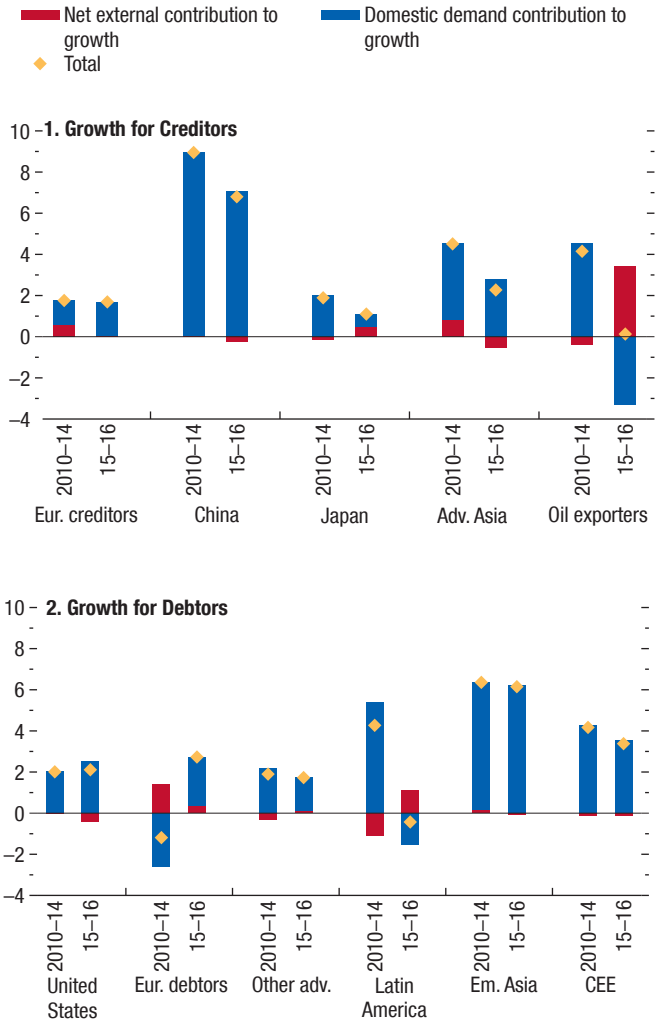
Creditor and debtor positions are estimated to have widened in 2016 and are projected to widen further over the medium term.



Source: IMF staff estimates.
Note: Adv. Asia = advanced Asia (Hong Kong SAR, Korea, Singapore, Taiwan Province of China); Afr. and ME = Africa and the Middle East (Democratic Republic of the Congo, Egypt, Ethiopia, Ghana, Jordan, Kenya, Lebanon, Morocco, South Africa, Sudan, Tanzania, Tunisia); CEE = central and eastern Europe (Belarus, Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovak Republic, Turkey, Ukraine); Em. Asia = Emerging Asia (India, Indonesia, Pakistan, Philippines, Thailand, Vietnam); Eur. creditors = European creditors (Austria, Belgium, Denmark, Finland, Germany, Luxembourg, Netherlands, Norway, Sweden, Switzerland); Eur. debtors = European debtors (Cyprus, Greece, Ireland, Italy, Portugal, Spain, Slovenia); IIP = international investment position; Lat. Am. = Latin America (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay); Other adv. = Other advanced economies (Australia, Canada, France, Iceland, New Zealand, United Kingdom); Oil exporters = Algeria, Azerbaijan, Iran, Kazakhstan, Kuwait, Nigeria, Oman, Qatar, Russia, Saudi Arabia, United Arab Emirates, Venezuela.

Figure 1.18. Growth for Creditors and Debtors
(Percent)

Among creditor countries and regions, net external demand in 2015–16 supported output growth in oil exporters and Japan, whereas it detracted from growth in China and advanced Asia. Among debtors, net external demand has added to growth in Latin America and in European debtor countries, while it has deducted from growth in the United States.



Source: IMF staff calculations.
Note: Adv. Asia = advanced Asia (Hong Kong SAR, Korea, Singapore, Taiwan Province of China); CEE = central and eastern Europe (Belarus, Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Slovak Republic, Turkey, Ukraine); Em. Asia = emerging Asia (India, Indonesia, Pakistan, Philippines, Thailand, Vietnam); Eur. creditors = European creditors (Austria, Belgium, Denmark, Finland, Germany, Luxembourg, Netherlands, Norway, Sweden, Switzerland); Eur. debtors = European debtors (Cyprus, Greece, Ireland, Italy, Portugal, Spain, Slovenia); Latin America = Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay; other Adv. = other advanced economies (Australia, Canada, France, Iceland, New Zealand, United Kingdom); Oil exporters = Algeria, Azerbaijan, Iran, Kazakhstan, Kuwait, Nigeria, Oman, Qatar, Russia, Saudi Arabia, United Arab Emirates, Venezuela.

among debtor countries the largest reduction in net liabilities is projected for euro area debtor countries (over 18 percentage points of GDP). The projected deterioration in the U.S. net external position is about 8 percentage points of GDP.

Figure 1.18 looks at global rebalancing from a different but related angle—namely, the contribution to a country's or a region's growth rate from domestic demand and from net external demand. In the aftermath of the global financial crisis, the growth rate of creditor countries, in the aggregate, has exceeded that of debtor countries, reflecting to a significant extent rapid growth in China. Among creditor countries and regions, the figure shows that during 2015–16, the contribution of net external demand to growth in China, smaller advanced Asian economies, and European creditor countries has declined. It has, however, increased in Japan and especially in oil exporters, where domestic demand has been contracting, dragging down the demand for imports.[6] Among debtor countries, those in Latin America display a pattern similar to the one for oil exporters for the same reasons. Among other debtor regions, net external demand has been supporting growth in euro area debtor countries, albeit to a lesser extent than in 2010–14 in light of recovery in their domestic demand.

The shifting constellation of global macroeconomic policies and associated exchange rate movements could lead flow imbalances to widen again, generating a further expansion of stock imbalances. In the future, stronger reliance on domestic demand growth in a number of creditor countries, especially those with the policy space to support it, would help sustain world growth while facilitating global rebalancing. In the United States, which already has close to full employment, fiscal policy measures designed to gradually enhance productive capacity along with demand, anchored in a medium-term fiscal consolidation plan to bring down the rising ratio of public debt to GDP, would result in a more sustained growth impact and help contain external imbalances.

Risks

Risks Remain Tilted to the Downside

WEO growth forecasts represent the IMF staff's modal scenario—the growth path the staff sees as

[6]Given the very large terms-of-trade losses discussed in the first section, current account balances have actually worsened in oil exporters, despite the sharp import contraction (Figure 1.16, panel 2).

the most likely within the distribution of possible outcomes. Outturns may differ from the baseline forecast if key macroeconomic policies are different than assumed or if economic and noneconomic shocks materialize. The former factor is particularly salient at this time, given the high uncertainty surrounding policies going forward.

Risks to the baseline forecast remain tilted to the downside, more so over the medium term. But near-term upside potential has risen in recent months. In particular, gains in business and consumer sentiment in advanced economies since last fall, as reflected in survey outcomes and equity prices, could underpin stronger momentum in consumption and investment in the short term. If followed through by supply-friendly reforms and policies, the momentum could become entrenched and sustain the pickup in activity for longer. Another source of short-term upside risk is the possibility of policy easing greater than assumed in the baseline in the United States and China. For instance, pending specifics, the baseline forecast for the United States does not incorporate additional public infrastructure investment. But the size and composition of fiscal policy easing may also be modest and less growth friendly than assumed in the baseline, as discussed below.

There are five primary areas of uncertainty affecting the forecast, most pointing to downside risks relative to the baseline.

Disruption of Global Trade, Capital Flows, and Migration

As noted in Chapter 3, a number of middle-skill jobs in advanced economies have been lost as a result of technological change since the early 1990s. And the slow recovery from the crises of 2008–09 and 2011–12 in countries where the distribution of income has continued to favor the highest earners has left little room for those with lower incomes to advance—or in some cases, even preserve—their living standards. The result—notably in the United States and parts of Europe—has been growing disillusionment with globalization. There is a palpable risk that legitimate equity concerns could trigger protectionist policy actions under the pressure of mounting skepticism toward trade, immigration, and multilateral engagement. In the United States, the authorities have declared their intention to reopen existing trade agreements. If well executed, and mutually agreeable, such efforts could benefit all signatories; by contrast, an increase in tariffs or other trade barriers would harm both the U.S. economy and its trading partners, especially if there are retaliatory responses. In Europe, the coming elections offer a platform for such protectionist policy tendencies to enter the mainstream.

Most economists agree that raising barriers to trade would reduce aggregate output and lower well-being. As shown in Scenario Box 1 of the October 2016 WEO, a country that hikes tariffs can expect to see its price level rise and output fall, especially if its trading partners retaliate. The analysis also shows that a broad-based increase in import costs caused by heightened global trade protectionism would put a dent in global output. The damage could be even higher in light of the increasing fragmentation of production processes across countries (Koopman, Wang, and Wei 2014; Yi 2003, 2010). Higher import costs could do particular harm to the purchasing power of lower-income groups in advanced economies, whose consumption baskets tend to skew toward heavily traded goods (Fajgelbaum and Khandelwal 2016). Further to such immediate adverse effects on demand, a persistent, protection-induced reduction of trade could also harm supply-side potential. As competitive pressures to innovate weaken, and the cross-border diffusion of new technologies slows, productivity growth would suffer over time. Similarly, curbing immigration flows would hinder opportunities for skill specialization in advanced economies, limiting a positive force for productivity and income growth over the long term (Chapter 4 of the October 2016 WEO).

The negative repercussions of protectionism could be even larger if the disruption of international economic linkages leads to a more generalized decline in cross-border cooperation. As coordinated solutions to multilateral challenges become more elusive, heightened perceptions of policy ineffectiveness could magnify the output costs of negative shocks, including those discussed further below.

So far, signs of a potential inward-looking tilt in policies have not had a noticeable impact on economic sentiment indicators in advanced economies. For instance, despite the increased possibility of greater impediments to trade and migration down the road, private sector confidence and spending in the United Kingdom have remained resilient in the aftermath of the Brexit vote. This resilience could reflect still-high expectations of a favorable outcome; the backdrop of an improving global economy may also have helped mask some of the concerns. Nonetheless, growing

salience of a future increase in trade costs will likely gradually dampen expectations of future real earnings and weigh on investment and hiring. Such headwinds could be magnified if the negotiations on new trade agreements are drawn out and contribute to an increase in uncertainty. A case in point is Mexico, where financial market conditions have tightened noticeably because of fears of protectionist policy changes in the United States.

The U.S. Policy Agenda

Several aspects of the U.S. policy agenda contribute to uncertainty around the U.S. and global growth projections, in particular the size and composition of any fiscal policy easing, and the impact of a possible reform of the corporate tax system (toward destination-based cash flow taxation).

The U.S. Fiscal Policy Stance

The projections for the April 2017 WEO were prepared before crucial details of U.S. fiscal policy changes—including the overall amount and composition of easing—were known. Uncertainty about the U.S. policy actions and their effects on U.S. aggregate demand, potential output, the government budget deficit, and the value of the U.S. dollar suggests a wide range of upside and downside risks to the current baseline forecast for the United States, in both the near and the medium term. Global spillovers are thus also uncertain and will vary across countries, depending on their economic linkages with the United States and their sensitivity to changes in global financial conditions, as discussed in Chapter 3 of the April 2017 GFSR.

A sustained noninflationary increase in output in the United States, underpinned by a significant expansion of the U.S. capital stock and a lasting rise in labor force participation, should be associated with a moderate pace of interest rate increases under the Federal Reserve's price stability mandate. By contrast, if a large fiscal stimulus does not lead to a significant increase in supply potential, or if the inflation response to the rise in demand is larger than expected, a steeper path for interest rates would be necessary to contain inflation. The weaker fiscal position could lead markets to deliver faster normalization of the term premium—causing tighter overall financial conditions both in the United States and globally—which could put stress on many emerging market and some low-income economies. The dollar would appreciate more sharply, and the U.S. current account deficit would widen more. The associated widening in global imbalances in such a scenario could intensify the demand for trade protection and retaliatory responses.

Fiscal sustainability would require any increase in the U.S. federal deficit to be reversed at some point. That is, a fiscal policy shift that results in sustained widening of the fiscal deficit would essentially shift demand from the future to the present, supporting short-term activity but imposing a drag on U.S. growth over the medium term. To illustrate these considerations, Scenario Box 1 discusses the potential consequences of an increase in U.S. federal government spending and tax cuts using stylized scenarios. It contrasts a scenario in which the changes yield a strong increase in U.S. potential output with one in which the positive supply effects are more limited (but still positive) and both U.S. and global financial conditions tighten more rapidly. The IMF staff's baseline growth projections for the United States would fall between these two cases. In both hypothetical scenarios, fiscal adjustment is undertaken five years into the simulation horizon to stabilize public debt, which requires a larger contraction in the primary deficit in the second scenario than in the first, given the more limited increase in potential output.

- In the United States, output rises above the baseline path in both cases, an output gap opens up, monetary policy tightens, the U.S. dollar appreciates, and the U.S. current account deficit widens given the increase in U.S. permanent income. These effects are generally stronger in the first case, in which the impact on potential output is more favorable. The increased demand for foreign saving by the United States raises the global interest rate in both cases, but more in the second case owing to the assumed faster normalization in U.S. and global term premia. The permanent increase in the level of U.S. public debt also adds to the upward pressure on the global interest rate. The dollar depreciates over the longer term, given the assumed permanent decline in U.S. public sector saving.
- The impact on most other economies is initially positive under the first scenario because the larger increase in U.S. imports outweighs the negative effect on demand of higher global interest rates. In the second scenario, the boost from U.S. imports to foreign output is more limited, given a smaller rise in U.S. demand, and is more than offset by the adverse impact from the sharper tightening in

financial conditions. Once U.S. fiscal policy tightens in the medium term, the positive demand spillovers weaken and output falls below baseline in all economies in both scenarios because of permanently tighter financial conditions.

A number of factors are not captured in the simulations. On the upside, productivity gains in the United States could spill over to some extent on other economies, boosting permanent incomes and demand there as well. A more generalized rise in productivity would temper the widening of the U.S. current account deficit, the increase in global interest rates, and the attendant negative ramifications for other economies. On the downside, the initial appreciation of the dollar could generate financial and real stress among emerging market economies with de jure or de facto currency pegs to the U.S. dollar and/or balance-sheet vulnerabilities (associated with currency mismatches)—aspects not captured in the model simulations but elaborated further below. Finally, as noted in Scenario Box 1, a similar growth-friendly fiscal policy implemented in a deficit-neutral way would lead to an even higher long-term level of GDP.

All in all, the simulations point to the downside risks associated with deficit-financed U.S. fiscal policy easing, especially in the medium term. The scenarios highlight how the ultimate impact of the policy changes on the U.S. economy itself depend on whether the measures successfully lift U.S. potential output. They also underscore the possible negative international repercussions of the policy easing through tighter global financial conditions.

U.S. Corporate Tax Reform

Beyond a shift to a more expansionary fiscal policy, potentially far-reaching tax policy changes are being considered in the United States, including a structural overhaul of the corporate income tax. The U.S. corporate tax system has well-documented shortcomings and distortions. It is too complex, has a narrow base and a marginal rate that is too high, is rife with legislated exemptions, favors debt financing, and incentivizes a range of cross-border avoidance and tax planning mechanisms to lower U.S. tax liabilities.[7] One specific proposal now under discussion is to replace the U.S. corporate income tax with a destination-based cash flow tax (discussed in detail in Box 1.1 of the *Fiscal Monitor*). If the proposal is implemented, the full and immediate expensing of investment under the destination-based tax would be expected to meaningfully boost U.S. business investment and output.

A replacement of the U.S. corporate income tax with a destination-based cash flow tax could generate large international spillovers through several channels. As discussed in Box 1.1 of the *Fiscal Monitor,* the change would generate strong incentives for profit and production shifting into the United States. Other countries might then take measures to protect their own tax bases or ultimately also move toward destination-based taxation.

A cash flow tax with full expensing of capital would be expected to raise the U.S. household saving rate and put downward pressure on global interest rates. The effects of the change on U.S. competitiveness, however, would likely be limited. The border adjustment inherent in destination-based taxation—which exempts exports from revenues and does not allow firms to deduct the cost of imports from their tax base—would in the simplest textbook case strengthen the dollar relative to all other currencies and/or raise domestic prices and wages, so as to leave the trade balance unchanged. A sharp appreciation of the U.S. dollar, however, would generate deflation pressure in economies whose currencies are tied to the U.S. dollar and could impose financial stress on countries whose private or public balance sheets contain significant currency mismatches. In addition, the border adjustment may prove inconsistent with existing World Trade Organization rules, which may lead to trade disputes with trading partners, posing risks to the open trading system.

Financial Deregulation

As discussed in Chapter 1 of the April 2017 GFSR, the postcrisis reform agenda has strengthened oversight of the financial system, raised capital and liquidity buffers of individual institutions, and improved cooperation among regulators. A wholesale dilution or backtracking on important steps taken since the global financial crisis in enhancing the resilience of the financial system would raise the probability of costly financial crises in the future. Deregulation in one country may also lead to deregulation in others in the highly interconnected international financial system. A failure to complete the global reform agenda and allowing regulatory fragmentation across borders would

[7]See Box 6 of the 2016 IMF Article IV Staff Report on the United States.

also hurt countries outside the central standard-setting bodies, in particular emerging market economies, which rely heavily on a strong global standard to level the playing field and support financial stability at a time when threats to their domestic financial stability have risen.

Tightening of Economic and Financial Conditions in Emerging Market Economies

Emerging market and developing economies have accounted for the bulk of the downward revisions to global growth in recent years and have been a source of uncertainty around the WEO forecasts. Most of the downward revisions to growth have been in China and India, especially during 2011–13; in commodity exporters following the 2015–16 plunge in oil prices; and, to a lesser extent, in Middle Eastern economies suffering from conflict (see Box 1.1).

Many emerging market economies have gone through bouts of financial volatility over the past few years. Some large commodity exporters and other stressed economies have also weathered substantial exchange rate movements, while China has experienced a swing from net capital inflows to sizable net outflows. Though it proved short lived for most, the tightening of financial conditions across emerging market economies in the immediate aftermath of the U.S. election is a reminder that many countries in this group remain vulnerable to sudden shifts in global market sentiment.

Risks from Continued Rapid Credit Expansion in China

Chinese authorities are expected to maintain emphasis on protecting macroeconomic stability in the run-up to the leadership transition later this year. Progress with demand-side rebalancing and reducing excess industrial capacity has continued, but so has the reliance on stimulus measures to maintain high rates of growth and the Chinese economy's dangerous dependence on rapidly expanding credit, intermediated through an increasingly opaque and complex financial system. Recent months have seen a return of capital outflows, reflecting market expectations of renminbi depreciation against the dollar and narrowing yield differentials as global interest rates increased. Though Chinese equity markets have remained tranquil, in stark contrast to the turmoil of August 2015 and January 2016, bond markets have seen bouts of turbulence. Efforts by the People's Bank of China to tighten short-term liquidity pushed up repurchase arrangement rates in late 2016, causing losses for leveraged bond investors and pushing up bond yields sharply. Segments of the repurchase arrangement market began to seize up, leading the authorities to take actions to provide broad-based liquidity support in December 2016. This episode of market turmoil serves as a reminder of the elevated risks associated with existing vulnerabilities in China's financial system, as discussed in Chapter 1 of the April 2017 GFSR.

The baseline forecast assumes limited progress in tackling the corporate debt overhang and reining in credit, and a policy preference for maintaining relatively high GDP growth in the near term. The resulting persistent resource misallocation, however, raises the risk of a disruptive adjustment in China in the medium term.

External triggers, such as a shift toward protectionism in advanced economies or domestic shocks, could lead to a broader tightening of financial conditions in China, possibly exacerbated by capital outflow pressures, with an adverse impact on demand and output. As demonstrated by market jitters in the second half of 2015 and early 2016, spillovers onto other economies from turbulence in China can be large, operating mainly through commodity prices and global financial risk aversion (Chapter 4 of the October 2016 WEO).

Vulnerabilities in Other Emerging Market and Developing Economies

Compared with past episodes of capital inflow slowdowns, emerging market economies have seen fewer financial sector problems in recent years, despite entering the episode with highly leveraged corporate sectors and, in some cases, experiencing sharp losses in earnings driven by adverse shifts in their terms of trade (Chapter 2 of the April 2016 WEO). The improvement in emerging market economies' ability to cope with external volatility is testimony to better macroeconomic policy management and in particular the beneficial role of exchange rate flexibility in smoothing shocks. Credit booms are waning in many economies (with the key exception of China), and corporate leverage, in most cases, has peaked and continues to decline from a high level. But underlying fragilities remain, and in some cases, corporate sector buffers could be wearing thin after a period of macroeconomic strains and financial volatility. More generally, reduced profitability, still-elevated corporate debt, limited policy space, and, in

some cases, weak bank balance sheets suggest that some emerging market economies remain potentially exposed to tighter global financial conditions, capital flow reversals, and the adverse balance sheet implications of sharp currency depreciations (Chapter 1 of the April 2017 GFSR). Such strains could materialize, for example, if the projected fiscal policy easing in the United States proves to be more inflationary than expected, requiring a faster pace of monetary policy tightening and triggering a faster normalization of U.S. term premia (a possibility discussed above), or if there is a marked shift toward protectionist policy actions in advanced economies. As elaborated in Chapter 2, a weakening growth impulse from a less supportive external environment could lead to persistent and durable shifts in growth outcomes for emerging market and developing economies, raising financial vulnerabilities as well.

In the baseline forecast, recoveries in a relatively small number of stressed economies—most of which are commodity exporters—account for an important portion of the global growth pickup in 2017–18. The pace of these recoveries could fall short of the baseline projections if domestic reforms to tackle structural problems are delayed, harming confidence. Likewise, in many commodity-exporting low-income economies where fiscal buffers are exhausted, further delays in policy adjustments could lead to disorderly conditions and weaker growth than currently projected. A reversal of foreign direct investment and other capital flows from China could also put significant strain on a number of low-income economies that rely increasingly on such financing for key infrastructure projects.

Even in emerging market economies where growth has remained resilient in recent years, in some cases because of favorable terms-of-trade shifts, investor sentiment could falter and growth could disappoint if policymakers do not implement needed structural reforms, tackle debt overhangs, and undertake necessary fiscal adjustments.

Weak Demand and Balance Sheet Problems in Parts of Europe

One common theme running through several recent WEO reports has been weak demand in a number of advanced economies and its possibly pernicious and long-lasting effects on inflation and supply potential. These effects could, in principle, work through three channels:

- A downshift in inflation expectations, higher expected real interest rates, debt service difficulties, and negative feedback to demand
- Weak investment and slower adoption of capital-embodied technological change, lower productivity growth, and weaker expected profitability, reinforcing the sluggishness in investment
- A prolonged period of high unemployment leading some job seekers to drop out of the workforce or become unemployable as a result of skill erosion

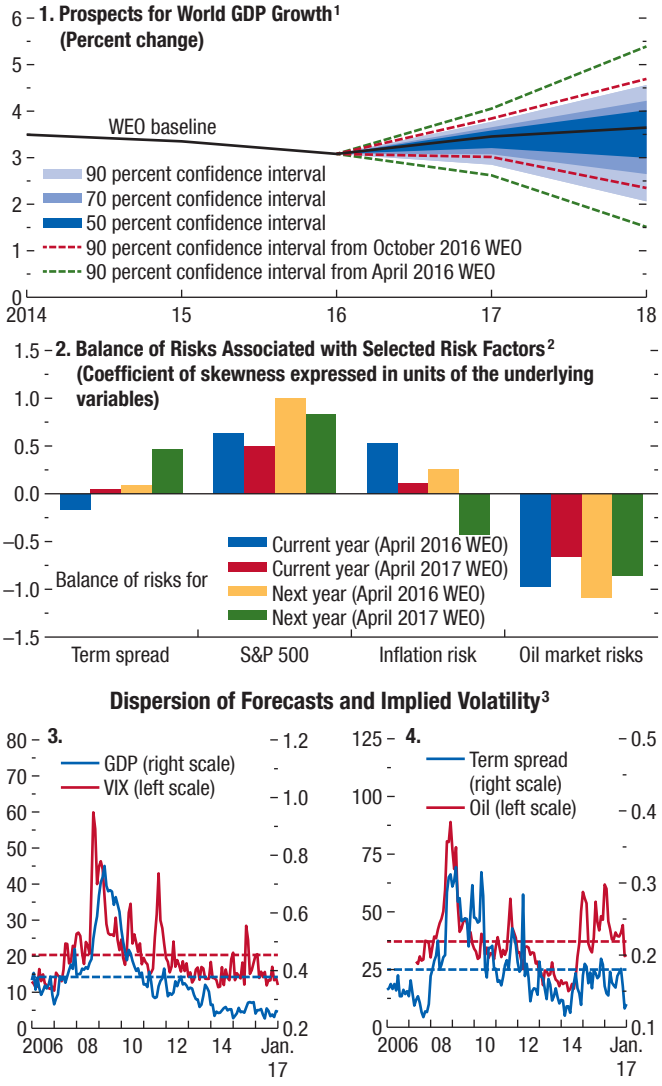
With a slightly firmer outlook for demand in advanced economies, fears of such debilitating cycles have receded somewhat. Steepening yield curves have also alleviated some of the concerns about the profitability of banks and other financial intermediaries and their ability to support the recovery. Nevertheless, in parts of Europe, the cyclical recovery in output, employment, and inflation remains incomplete under a large burden of nonperforming loans, and banking system profitability is challenged by structural features, such as high costs and overbanking (Chapter 1 of the April 2017 GFSR). In the absence of a more concerted effort to clean up balance sheets, consolidate and raise the cost effectiveness of banking systems, maintain demand, and enact productivity-enhancing reforms, these economies will continue to confront weak inflation dynamics and investment and remain susceptible to the danger of self-reinforcing adverse feedback loops. As growth and core inflation prospects in core euro area economies strengthen, there is also a risk that euro area monetary policy tightens, weighing on the recovery in countries with high unemployment and large output gaps. A sluggish recovery in incomes can, in turn, fuel pressures for an inward turn in policies and the adoption of protectionist measures, further harming demand both at home and abroad.

Noneconomic Factors

Geopolitical tensions as well as domestic strife and idiosyncratic political problems have been on the rise in recent years, burdening the outlook for various regions. Most notable are the civil wars and domestic conflicts in parts of the Middle East and Africa, the tragic plight of refugees and migrants in neighboring countries and in Europe, and acts of terror worldwide. For many of the severely affected countries, the baseline scenario assumes a gradual easing of tensions. However, these episodes may turn out to be more protracted, holding back recovery in these countries.

Figure 1.19. Risks to the Global Outlook

A fan chart analysis suggests that risks to the global growth outlook remain skewed to the downside.



Sources: Bloomberg L.P.; Chicago Board Options Exchange (CBOE); Consensus Economics; Haver Analytics; and IMF staff estimates.

[1]The fan chart shows the uncertainty around the April 2017 *World Economic Outlook* (WEO) central forecast with 50, 70, and 90 percent confidence intervals. As shown, the 70 percent confidence interval includes the 50 percent interval, and the 90 percent confidence interval includes the 50 and 70 percent intervals. See Appendix 1.2 of the April 2009 WEO for details. The 90 percent intervals for the current-year and one-year-ahead forecasts from the October 2016 WEO and April 2016 WEO are shown.

[2]The bars depict the coefficient of skewness expressed in units of the underlying variables. The values for inflation risks and oil price risks enter with the opposite sign since they represent downside risks to growth.

[3]GDP measures the purchasing-power-parity-weighted average dispersion of GDP growth forecasts for the Group of Seven economies (Canada, France, Germany, Italy, Japan, United Kingdom, United States), Brazil, China, India, and Mexico. VIX is the CBOE Standard & Poor's (S&P) 500 Implied Volatility Index. Term spread measures the average dispersion of term spreads implicit in interest rate forecasts for Germany, Japan, the United Kingdom, and the United States. Oil is the CBOE crude oil volatility index. Forecasts are from Consensus Economics surveys. Dashed lines represent the average values from 2000 to the present.

Weak governance and large-scale corruption can also undermine confidence and popular support, taking a heavy toll on domestic activity.

Other noneconomic factors weighing on growth include the persistent effects of a drought in eastern and southern Africa and the spread of the Zika virus. If these factors intensify, the hardship in directly affected countries, especially smaller developing economies, would deepen (IMF 2016). Increased geopolitical tensions and terrorism could also take a toll on global market sentiment and broader economic confidence.

Fan Chart

A fan chart analysis—based on equity and commodity market data as well as the dispersion of inflation and term spread projections of private sector forecasters—corroborates the assessment that risks remain skewed to the downside for 2017 and 2018. The analysis suggests a narrower dispersion of outcomes around the current- and next-year baseline than a year ago, consistent with the more optimistic tone in financial markets and reduced uncertainty in the aftermath of the Brexit vote in June 2016 and the U.S. elections in November. Nonetheless, the analysis continues to suggest that the balance of risks to the outlook are tilted to the downside. As illustrated in Figure 1.19, although the width of the 90 percent confidence interval has diminished for both the current- and next-year growth forecasts, the decline is slightly greater for the upper part of the interval, pointing to a somewhat more pronounced downward skew of risks than in October 2016.

The probability of a recession over a four-quarter horizon (first quarter of 2017–fourth quarter of 2017) has declined in most regions, relative to the probability computed in October 2016 for the third quarter of 2016–second quarter of 2017 (Figure 1.20). Stronger cyclical momentum and the anticipated U.S. fiscal stimulus have lifted the growth outlook in advanced economies, while the increase in external demand and the rise in commodity prices have boosted growth prospects in emerging Asia and selected commodity exporters. Deflation risks—as measured by the estimated probability of a decline in the price level relative to one year ago—remain elevated for the euro area and Japan because the pass-through of higher commodity prices to headline inflation is projected to fade next year and core inflation remains weak, especially in Japan.

Policy Priorities

Global economic activity is picking up speed, but the potential for disappointments remains high, and momentum is unlikely to be sustained in the absence of efforts by policymakers to implement the right set of policies and avoid missteps. For many economies, continued demand support and well-targeted structural reforms to lift supply potential and broaden economic opportunities across the skills spectrum remain key goals. The precise combination of priorities differs across individual economies, depending on their cyclical conditions, structural challenges, and needs for enhancing resilience.

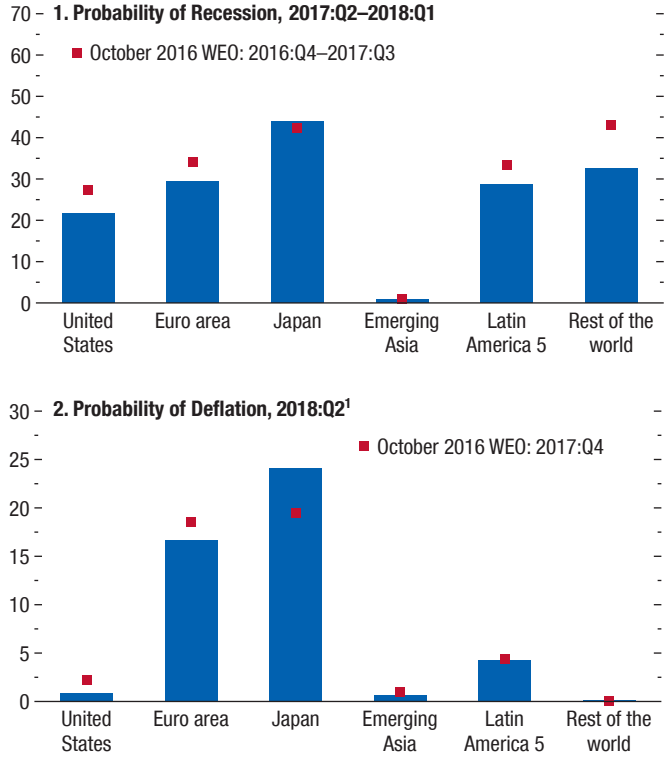
An overarching challenge for policymakers will be to safeguard global economic integration and the cooperative global economic order, which have been critical sources of productivity growth and resilience over the past several decades. A body of research has documented that economic integration together with technological progress has increased the efficient use of global resources, boosted incomes, and expanded access to goods and services.[8] Hundreds of millions were lifted out of poverty through this process, helping to reduce global income inequality.

However, amid weak growth and rising inequality, popular support for international trade and immigration has eroded in some advanced economies. As documented in Chapter 3, wages have not kept up with productivity in many economies over much of the past three decades, leading to a decline in labor's share of national income. Moreover, the declines have been much harsher for those in lower- and middle-skill groups, potentially contributing to worsening income distributions and income polarization within countries. As this process coincided with deepening global economic integration, the economic model of free movement of goods and factors of production, which has guided policymaking over the past several decades, is being increasingly questioned as a politically viable mechanism for delivering broad-based growth. How much of the deterioration in income distributions and the decline in the labor share of income can be traced to cross-border economic integration? The analysis in Chapter 3 suggests that the bulk of the decline in the labor share in advanced economies is attributable to technological change, with trade integration playing only a relatively small role. The analysis does find declining labor shares in emerging market economies to be closely linked to trade integration. However, this reflects the fact that, with the rise in global production sharing, trade has been increasingly accompanied by investment flows and capital deepening—a development that is otherwise beneficial to capital-scarce emerging market economies. Nonetheless, amid growing recognition that the gains from growth often are not broadly shared, support for inward-looking protectionist measures and restrictions on the cross-border movement of people is gaining ground.

[8]For a recent summary, see Baldwin (2016). See also Fajgelbaum and Khandelwal (2016), Costinot and Rodríguez-Clare (2013), and Wacziarg and Welch (2008).

Figure 1.20. Recession and Deflation Risks
(Percent)

The probability of recession has declined in most regions, except in Japan where it is broadly unchanged. Deflation risks remain elevated in Japan and the euro area.



Source: IMF staff estimates.
Note: Emerging Asia comprises China, Hong Kong SAR, India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan Province of China, and Thailand; Latin America 5 comprises Brazil, Chile, Colombia, Mexico, and Peru; Rest of the world comprises Argentina, Australia, Bulgaria, Canada, Czech Republic, Denmark, Israel, New Zealand, Norway, Russia, South Africa, Sweden, Switzerland, Turkey, the United Kingdom, and Venezuela. October 2016 WEO data refer to simulations run in September 2016.
[1]Deflation is defined as a fall in the price level on a year-over-year basis in the quarter indicated in the figure.

Rolling back economic integration would not address these legitimate distributional concerns, which are to a significant extent the consequence of technological change, especially in advanced economies. Heightened restrictions on trade and capital flows would impose broad economic costs, harming consumers and producers alike, with the potential to leave all countries worse off if protectionism begets retaliation. Instead, the challenge will be to preserve the gains from cross-border economic integration while ramping up domestic policy efforts to ensure that those gains are shared more broadly. Well-targeted initiatives can help workers adversely affected by structural transformations find jobs in expanding sectors. Short-term measures include active labor market policies combined with social safety nets to smooth the loss of income. In the longer term, adequate education, skill building and retraining, and policies to facilitate reallocation, such as housing and credit access, will be needed to attain inclusive and sustainable growth in a context of continued rapid technological progress and economic integration. Such efforts require public resources, so progressive taxes and well-targeted transfer policies will also have an increasingly important role to play (see Chapter 1 of the April 2017 *Fiscal Monitor)*.

Policies—Advanced Economies

The recent uptick in momentum notwithstanding, advanced economies as a group continue to face modest current and prospective economic growth, characterized by sluggish productivity dynamics, low investment, and, in some cases, persistently low core inflation. These features reflect, to a large extent, the interplay between subdued demand, diminished growth expectations, and aging populations. A cross-cutting theme for economies therefore is the need to lift potential output. At the same time, the cyclical conditions of individual economies continue to diverge. In Germany, the United States, and a number of other advanced economies in Europe and Asia, output is either close to or above potential. By contrast, output remains significantly below potential in France, Italy, Portugal, Spain, and especially in Greece. These heterogeneous cyclical positions call for differentiated macroeconomic policy stances.

- In those advanced economies where output gaps are still negative and wage pressures and inflation expectations for the next few years are muted, the risk of persistently low inflation (or deflation, in some cases) remains. Monetary policy therefore must continue to chart an accommodative course, relying on unconventional strategies, as needed, to help raise inflation expectations and lower the real costs of borrowing for households and firms. But accommodative monetary policy alone cannot lift demand sufficiently and can potentially generate undesirable side effects (as discussed in the October 2016 GFSR). Fiscal support—calibrated to the amount of space available and oriented toward policies that protect the vulnerable and lift medium-term growth prospects—also remains essential for generating momentum and reducing the risk that a prolonged shortfall in demand erodes supply capacity or unmoors medium-term inflation expectations. In cases in which postponing fiscal adjustment is either not possible or too risky, its speed and composition should be configured to minimize the drag on output. And support for demand must be accompanied by efforts to address corporate debt overhangs and decisively repair bank balance sheets (addressing a legacy of nonperforming loans and strengthening operational efficiency, as discussed in the October 2016 GFSR and the October 2016 *Fiscal Monitor)*.
- In those advanced economies where output is close to or above potential, well-anchored inflation expectations should allow for monetary policy to be normalized gradually. Desirable changes to the fiscal policy stance depend on country circumstances, including public debt dynamics. Fiscal policy should aim at strengthening safety nets (including to help with the integration of refugees in some cases) and increasing longer-term potential output.
- Structural reforms are needed across advanced economies to enhance productivity, investment, and labor supply. Specific priorities vary across countries and include measures to boost labor force participation through reforms to labor taxes and social benefits, well-targeted infrastructure investments, corporate income tax reform and tax incentives to boost research and development, facilitation of improvements in human capital by investing in education and health care, and elimination of product and labor market distortions to boost private sector dynamism.[9]

[9]As discussed in Chapter 3 of the April 2016 WEO, removing barriers to entry into product and service markets can also raise near-term activity, but labor market reforms may require supportive macroeconomic policies to lessen possible dampening effects on near-term growth and inflation when the economy is weak.

As discussed earlier, resisting a retreat from global economic integration also needs to be a part of the agenda for strengthening growth.

Country-Specific Priorities

- In the *United States*, the economy regained momentum in the second half of 2016, with strong job creation, solid growth in disposable income, and robust consumer spending. The economy is close to full employment, but core personal consumption expenditure inflation is only slowly inching up toward the Federal Reserve's 2 percent target, suggesting that monetary policy can continue to tighten at a gradual, data-dependent pace. A credible deficit- and debt-reduction strategy is needed to open up space for policies to improve social outcomes and lift productive capacity while putting the debt ratio firmly on a downward path. The fiscal stance should remain neutral this year, and fiscal consolidation could start in 2018. Structural and fiscal policies should seek to upgrade the public infrastructure, boost labor force participation, and enhance human capital. Skill-based immigration reform, job training, paid family leave, and child care assistance are key priorities in this regard. Complementing the fiscal consolidation plan, a comprehensive reform of the business tax code geared toward simplification and fewer exemptions would encourage job creation and investment, ultimately enhancing fiscal sustainability. Any changes to financial regulation should strive to avoid a buildup of financial stability risks. While potential changes to the existing framework could lower existing regulatory burdens for small and community banks, there is a need to strengthen the regulation and supervision of nonbank financial institutions, particularly as financial activity continues to shift to these less-regulated entities.
- In the *euro area*, with inflation expectations still below target and several economies still operating significantly below capacity, the European Central Bank should maintain its current accommodative stance. Additional easing may be needed if core inflation fails to pick up. Critically, monetary policy will be more effective if supported by measures to clean up balance sheets, strengthen the financial sector, use fiscal space where available, and accelerate structural reforms. Specifically,
  - A critical priority for boosting growth and limiting downside risks in the euro area is to accelerate banks' balance sheet repair and the resolution of nonperforming loans, including through a combination of greater supervisory encouragement, insolvency reform, and the development of distressed debt markets. Completion of the banking union, including by introducing a common deposit insurance program with a common effective fiscal backstop, also remains critical. These actions would strengthen the transmission of monetary policy accommodation to the real economy and facilitate the consolidation and restructuring of the banking sector.
  - Greater centralized investment in public infrastructure will help countries with continued demand shortfalls that lack fiscal space or need to consolidate because of high and rising debt burdens. Where consolidation is required, it should be undertaken in a gradual and growth-friendly manner. In countries with fiscal space, such as Germany, fiscal policy should be geared toward bolstering productive capacity as well as demand. In turn, this would help reduce their current account surpluses, support intra-euro-area rebalancing, and generate positive demand spillovers for others.
  - Synergies between structural reforms and demand management policies should be exploited to the extent possible. Where demand is still weak but fiscal space is lacking, budget-neutral fiscal support can enhance the effects of public administration or labor market reforms. Product and labor market reforms are needed to encourage business dynamism, raise labor force participation rates, and address labor market duality. Reforms to complete the single market would help boost productive capacity.
  - Refugee integration into the workforce should be facilitated through swift processing of asylum applications, language training and assistance in job search, better recognition of migrants' skills through credential systems, and support for migrant entrepreneurship.
- In *Japan*, growth was stronger than expected in 2016. Inflation appears to be bottoming out, helped by higher fresh food prices and fading downward pressure from the earlier yen appreciation. Net exports were the main driver of growth

in 2016, with fiscal policy also supportive of the positive economic momentum. Despite a tightening labor market, wage demands are not stronger than in the past few years and thus are unlikely to kindle much-needed positive wage-price dynamics. The Bank of Japan's monetary easing through asset purchases and negative deposit rates, and the introduction of quantitative and qualitative easing with yield curve control, have been critical to preventing another bout of deflation, but the low and declining neutral real rate and low nominal rates constrain monetary policy effectiveness. Continued efforts to raise inflation expectations to further lower real rates thus remain necessary, including through a further upgrade to the Bank of Japan's communication framework. To attain a durable increase in inflation and growth, a comprehensive policy approach that enhances monetary accommodation with a supportive fiscal stance and reforms to labor market policies is needed. Elements of such a package would include reforms to diminish labor market duality and increase labor force participation by women and older workers while admitting more foreign workers, lowering entry barriers in retail trade and services, improving the provision of capital for new ventures, and supporting stronger corporate governance to discourage companies from accumulating excess cash reserves. A credible fiscal consolidation over the medium term—based on a gradual preannounced increase in the consumption tax, social security reform, and a broadening of the tax base—remains critical.

- In the *United Kingdom*, a principal challenge will be to successfully navigate the exit from the European Union and negotiate the new arrangements for economic relations with the European Union and other trading partners. The adverse impact on medium-term output would be lower if the new arrangements limit new economic barriers. The current accommodative monetary policy stance is appropriate because growth is expected to slow and domestic cost pressures to remain contained. On the fiscal front, the envisioned path of steady but gradual fiscal consolidation and the moderate relaxation of the targets strike an appropriate balance between providing an anchor for medium-term objectives and allowing room for short-term maneuvering amid elevated uncertainty about the economic outlook.

Policies—Emerging Market and Developing Economies

Emerging market and developing economies have operated in a complicated external environment in recent years, characterized by generally sluggish demand from advanced economies, a sharp correction in commodity prices followed by a recovery since the first quarter of 2016 (albeit to levels well below previous peaks), and spells of relatively benign financial conditions interspersed with recurrent spikes in market volatility.

As discussed in Chapter 2, some aspects of the external environment are likely to be less supportive going forward than in the past, while others remain uncertain. Weaker potential output growth across advanced economies, together with a possible increase in trade barriers in some, could translate into generally subdued demand growth for emerging market and developing economies. An additional element that may weigh on commodity exporters in particular is China's necessary transition to slower, more sustainable, consumption- and services-based growth. External financial conditions facing emerging market and developing economies are likely to remain uncertain. A gradual, generalized tightening is expected as U.S. monetary policy normalizes, but this tightening will likely be accompanied by a continued search for yield in emerging market investment opportunities as long as returns remain modest in a low-growth environment in advanced economies. A third, important element of the external environment—the terms of trade—may improve for a subset of emerging market and developing economies with the bottoming out of commodity prices, but the outlook for export prices remains subdued compared with the past. By contrast, for importers, the windfall gains from lower commodity prices will diminish.

Although this combination of factors may provide a weaker growth impulse for emerging market and developing economies than had been the case for long intervals since 2000, the analysis in Chapter 2 points to the role of domestic policies that can help these countries secure growth prospects in an increasingly complicated external environment. Country-specific priorities will necessarily differ, based on levels of development and individual circumstances. But, in general, a policy orientation that protects trade integration, permits exchange rate flexibility, and ensures that vulnerabilities stemming from high external imbalances and public debt are contained is likely to help emerging market

and developing economies extract the most out of a weaker external growth impulse and help sustain convergence to higher levels of income.

With ever-present risks of global financial volatility, sharp currency movements, and capital flow reversals, it will be important for economies with large and rising nonfinancial debt, unhedged foreign liabilities, or heavy reliance on short-term borrowing to adopt stronger risk management practices and contain balance sheet mismatches. Decisive actions toward improving domestic governance, institutions, and the business environment can help reduce country risk perceptions and thereby act as a powerful countervailing force against the expected tightening in global financial conditions.

Country-Specific Priorities

- The near-term outlook for *China* has strengthened in recent months, with policy support expected to maintain steady growth in the run-up to the leadership transition in late 2017. The complex process of rebalancing is advancing on multiple fronts, rotating activity away from industry to services and reorienting demand from exports and investment to consumption. Progress lags along one critical dimension, however: the continued heavy reliance on credit to support activity compounds the considerable risks that have accrued in recent years from the rapid buildup of corporate and local government debt, funded through an increasingly opaque financial system. With vulnerabilities continuing to accumulate, the macro policy mix needs to focus on containing the problems at their source by accepting slower and more sustainable growth outcomes; reducing the pace of credit growth closer to that of nominal GDP; raising policy rates; and cutting off-budget public sector investment while increasing on-budget allocations for social assistance, health expenditure, unemployment benefits, and restructuring funds. Together with these measures, structural reform priorities to improve efficiency include deregulating sectors dominated by state-owned enterprises to facilitate entry; decisively restructuring those that are unprofitable and replenishing bank buffers, as needed, once the losses are appropriately accounted for; and accelerating household residency reforms to facilitate more efficient matching of labor market vacancies with job seekers. An intensified focus is also needed on containing financial risks in domestic capital markets by reining in shadow products and strengthening the supervisory framework.
- *India*'s economy has grown at a strong pace in recent years owing to the implementation of critical structural reforms, favorable terms of trade, and lower external vulnerabilities. Beyond the immediate challenge of replacing currency in circulation following the November 2016 currency exchange initiative, policy actions should focus on reducing labor and product market rigidities to ease firm entry and exit, expand the manufacturing base, and gainfully employ the abundant pool of labor. Policy actions should also consolidate the disinflation under way since the collapse in commodity prices through agricultural sector reforms and infrastructure enhancements to ease supply bottlenecks; boost financial stability through full recognition of nonperforming loans and raising public sector banks' capital buffers; and secure the public finances through continued reduction of poorly targeted subsidies and structural tax reforms, including implementation of the recently approved nationwide goods and services tax.
- In *Brazil*, the pace of contraction has diminished, but investment and output had yet to bottom out at the end of 2016, while fiscal crises in some states continue to deepen. Inflation has continued to surprise on the downside, allowing for prospects of faster monetary easing. Growth is projected to recover gradually and remain moderate. Against this backdrop, Brazil's macroeconomic prospects hinge on the implementation of ambitious structural economic and fiscal reforms. To underpin medium-term fiscal consolidation, the focus should be on reforms that address unsustainable expenditure mandates, including in the social security system, but there is also merit in undertaking actions to achieve a more front-loaded reduction in the fiscal deficit. Reforms to boost potential growth are needed not only to restore and improve living standards after the deep recession, but also to facilitate the fiscal consolidation. Imperatives for lifting investment and productivity include addressing long-standing infrastructure bottlenecks, simplifying the tax code, and reducing barriers to trade.
- In *South Africa*, following the decline in commodity prices and amid perceptions of weakening governance and rising policy uncertainty, economic growth gradually softened and came to a near standstill in 2016. The projected near-term recovery remains insufficient to keep pace with population

growth. In the baseline scenario of a moderate resumption of growth this year, monetary policy can remain on hold unless inflation expectations rise or external financing becomes challenging. Envisioned fiscal measures appropriately strike a balance between maintaining debt sustainability and safeguarding the fragile economic recovery. If growth prospects were to falter, additional measures—such as slower public sector wage increases and a moderate increase in consumption taxes—would be needed to stabilize the debt ratio. With monetary and fiscal policies constrained by the need to keep inflation and the rising public debt in check, reforms in product and labor markets that allow greater entry by new firms and reduce impediments to job creation are urgently needed to strengthen confidence, investment, and growth. Such reforms would lower the cost of crucial inputs for businesses and of services for workers—such as in electric power generation, telecommunications, and transportation.

- In *Russia,* the economy is projected to continue its nascent recovery in 2017. Inflation is expected to fall further toward the central bank's inflation target over the course of 2017, providing the conditions for the central bank to gradually resume monetary policy easing, with due attention to external risks and the need to build the credibility of the newly introduced inflation-targeting regime. The reestablishment of a three-year fiscal framework will help facilitate the consolidation required by lower oil revenues. However, to sustain the significant adjustment, better-targeted and more permanent reforms to the pension system, subsidies, and tax exemptions are needed. The adoption of a revised fiscal rule would help reduce policy uncertainty and cement the fiscal adjustment. Improvements to financial supervision and regulation as well as a stronger resolution framework are needed to make the financial system more resilient and improve credit allocation. Raising medium-term growth prospects will necessitate a diversification of the economy, accelerated institutional reforms, and an improved business climate.

Policies—Low-Income Developing Countries

Among low-income economies, the economic prospects of commodity-exporting countries continue to diverge from those with more diversified export bases. The sharp realignment of global commodity prices since mid-2014 has been a major setback for commodity-exporting low-income developing countries, where policies have been slow to adjust to the large income loss. Three years after commodity prices fell from their peak, fiscal deficits remain wide, external positions are weaker, debt is rising, and depreciated currencies—although they help cushion the adverse terms-of-trade shock—have, in some cases, led to higher inflation and pushed up external debt. Although most commodity exporters are set to record positive growth in 2017, their medium-term growth prospects are subdued. By contrast, low-income countries with more diversified export bases have recorded relatively strong growth and are expected to continue to grow at a healthy rate, with the benefit of lower oil bills outweighing the drop in remittances and weaker demand from commodity exporters. Robust growth, however, has not always translated into improved fiscal and external current account positions, reflecting limited progress in adopting countercyclical policies, but also public investment to support activity. Many low-income developing economies have been also hit by idiosyncratic shocks, such as conflicts and security disruptions (Afghanistan, Chad, South Sudan, Yemen, parts of Nigeria), and natural disasters (Haiti, Ethiopia, Malawi). Some still endure the persistent growth-dampening effect of the Ebola outbreak (Guinea, Liberia, Sierra Leone).

With such divergent prospects, the appropriate courses of action in the near term differ across low-income developing countries.

- Commodity exporters need to continue and, in some cases, accelerate the process of adjusting to structurally lower commodity prices based on comprehensive and internally consistent sets of policies. Fiscal policy needs to be better calibrated to contain debt accumulation while protecting outlays that are key to growth prospects, such as priority capital expenditures and social spending. In many countries, improving domestic revenue mobilization and continued rationalization of spending needs, along with concessional financing, are necessary to underpin successful adjustment processes. Monetary tightening may also be needed in a number of countries, either to defend pegged exchange rates or to contain inflation resulting from the side effects of exchange rate flexibility and depreciation. Enhanced financial sector regulation and supervision will be required to manage foreign currency exposures in balance sheets.
- Policy priorities for diversified low-income developing countries vary, given the diversity of coun-

try circumstances. However, an overarching goal for these economies should be to strike a better balance between spending for developmental and social needs and improving public debt sustainability, rebuilding fiscal positions and foreign reserves holdings while growth is strong to enhance resilience against potential future shocks. Stronger debt management will also help those exposed to global financial markets better cope with volatility in capital inflows.

Near-term challenges notwithstanding, low-income developing countries should not lose sight of their longer-term objectives reflected in the United Nations Sustainable Development Goals. In that context, many of the policies that would set these economies on a sustainable macroeconomic trajectory in the near term will also help achieve sustained growth and resilience in the long term, a precondition for convergence and attaining the development goals. In particular, efforts to create fiscal space by enhancing domestic resource mobilization and improving the efficiency of government spending and debt management, steps to reorient fiscal spending to protect the vulnerable and address infrastructure gaps, and measures to improve financial sector resilience and deepen financial inclusion, will help achieve macroeconomic stabilization, overall economic resilience, and durable and inclusive growth.

Multilateral Policies

To put the pickup in global growth on a firmer footing and sustain improvements in global living standards over the medium term, supporting national policy efforts with continued *multilateral cooperation* in a number of areas will be vital. Such cooperation is particularly needed for preserving an open, rules-based multilateral trading system, maintaining global financial stability, cracking down on tax evasion and limiting tax avoidance, and addressing longer-term challenges facing the global economy.

Maintaining a Rules-Based, Open Multilateral Trade System, with Broadly Shared Gains

As documented in Chapter 2 of the October 2016 WEO, the slower pace of new trade reforms and an uptick in protectionist measures have contributed to the remarkable slowdown in global trade in recent years (although their estimated contribution to the trade slowdown is smaller than that of the weakness in aggregate demand, in particular investment). Rolling back temporary barriers to trade introduced since the global financial crisis and further reducing trade costs would support the nascent recovery in trade, revving up an important engine of global productivity growth. To that end, it is critical to preserve the multilateral rules-based trading system and press ahead with an ambitious trade agenda at the global level. Addressing tariff barriers in sectors where they remain high, such as agriculture, and implementing commitments under the Trade Facilitation Agreement, which went into effect in February 2017, can significantly reduce trade costs in traditional areas. Advancing trade reforms in services and in "frontier" areas, such as digital trade, and improving cooperation in investment policies have the potential to make large contributions to cross-border flows and global growth. However, as discussed, further trade liberalization should go hand in hand with domestic policies to support individuals and communities that may be at risk of being left behind.

Cooperation on International Taxation Issues

As increased capital mobility across borders has fueled international tax competition, governments have found it more challenging to finance their budgets without imposing higher taxes on labor income or implementing regressive consumption taxes. Policymakers can achieve equitable tax systems (that prevent an increasing share of after-tax income from accruing to owners of capital) in the future only if their national efforts to tackle tax evasion and avoidance are backed up with multilateral cooperation on these fronts. If firms continue to face pronounced incentives to shift profits across borders for tax planning and avoidance, popular support for trade and investment flows may wane further. Box 1.1 of the April 2017 *Fiscal Monitor* discusses the implications of proposals for corporate tax reform in the United States that aim to reduce the incentives for profit shifting by U.S. firms.

Maintaining Global Financial Stability

Efforts to strengthen the resilience of the global financial system must continue, including by recapitalizing institutions and cleaning up balance sheets where necessary, ensuring effective national and international banking resolution frameworks, and addressing emerging risks from nonbank intermediaries. A stronger global safety net can protect economies with robust fundamentals that may nevertheless be vulnerable to cross-border contagion and spillovers in the context of

elevated downside risks to the global outlook. Closer cross-border regulatory cooperation is also required to limit the withdrawal of correspondent banking relationships that provide low-income countries access to the international payments system.

Longer-Term Challenges

Finally, multilateral cooperation is also indispensable for addressing important longer-term global challenges, such as meeting the 2015 Sustainable Development Goals, providing financial support to vulnerable economies and fragile states, mitigating and adapting to climate change, and preventing the spread of global epidemics. Risks stemming from noneconomic factors with cross-border repercussions, such as the ongoing refugee crisis, further underscore the case for instituting globally funded vehicles to help the exposed economies cope with the strains.

Scenario Box 1. Permanent U.S. Fiscal Expansions

This box uses the IMF's G20 Model (G20MOD) to illustrate the impact of two alternative U.S. fiscal expansions relative to a baseline scenario with no change in U.S. fiscal policy. Both expansions use identical instruments: reduced labor income taxes, reduced corporate income taxes, and increased infrastructure spending. However, differences in the efficacy of the infrastructure spending and labor tax cuts, and the way the public debt is eventually stabilized, lead to different macroeconomic outcomes, as discussed below.

Assumptions

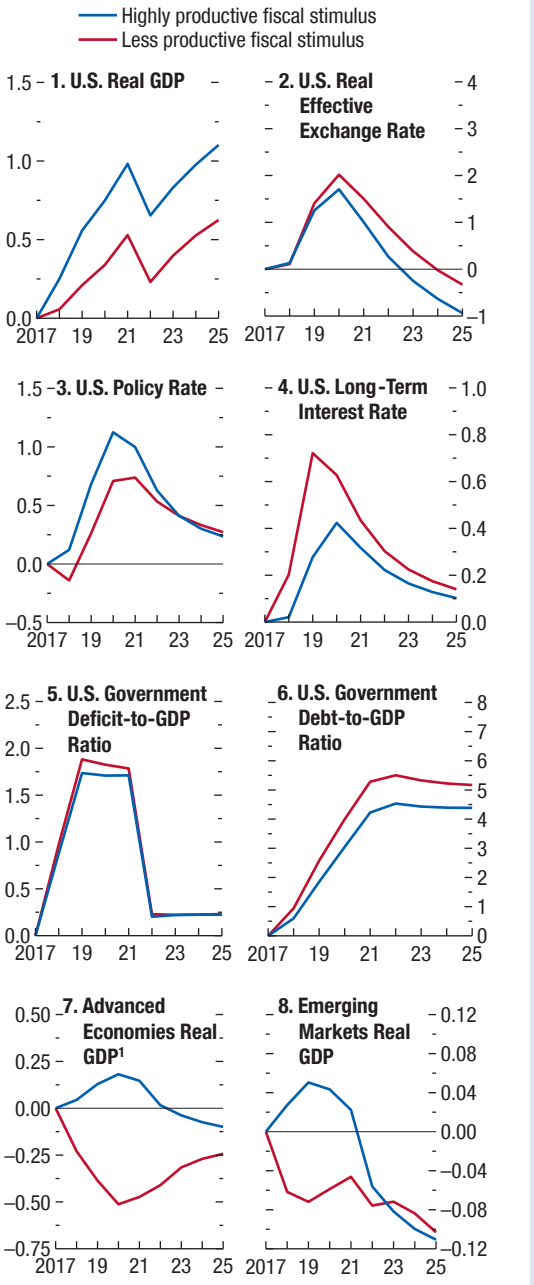
In both cases, the fiscal expansion is debt financed for the first four years (2018–21), and monetary policy in the United States responds endogenously to the change in demand. It is assumed that monetary policy in both Japan and the euro area would accommodate any positive increase in demand, but would have no conventional policy space to respond to negative developments. Households and firms are assumed to learn gradually about the changes in fiscal policy and their permanent nature. In both cases, after four years (2022) the fiscal authority needs to adjust policy to stabilize the debt-to-GDP ratio.

In the first case, the fiscal expansion is highly productive (blue lines in Scenario Figure 1)—the increase in public infrastructure spending is assumed to have a strong positive impact on output, and the cuts in labor income taxes are assumed to be broad based. In the second case, the fiscal expansion is less productive (red lines in Scenario Figure 1)—the infrastructure spending is assumed to be unproductive, and the tax cuts are assumed to go mostly to wealthier households with a very low marginal propensity to spend the additional income on consumption. In the second case, it is also assumed that financial markets deliver a faster normalization in the U.S. term premium than in the case of no change in fiscal policy (25 basis points in 2018 and an additional 25 basis points in 2019). This faster normalization in the U.S. term premium is transmitted into the term premium worldwide, consistent with the empirical correlations in the IMF's *2014 Spillover Report*.

Once policy needs to adjust to stabilize debt, in the highly productive case, the fiscal authority partially cuts back the initial increase in infrastructure spending to simply maintain the new higher level of the public capital stock (Scenario Table 1). Half of the remaining required adjustment comes from reducing tax expen-

Scenario Figure 1. Fiscal Stimulus in the United States

(Percent deviation from case with no change in U.S. fiscal policy)



Source: IMF staff estimates.
[1]Excluding the United States.

Scenario Box 1. *(continued)*

Scenario Table 1. The Impact of Fiscal Measures on the Deficit
(Percent of no-change-in-fiscal-measures case GDP)

Highly Productive Fiscal Measures						
Capital Income Taxes	0	0.375	0.750	0.750	0.750	0.750
General Labor Income Taxes	0	0.375	0.750	0.750	0.750	–0.330
Productive Infrastructure Spending	0	0.250	0.500	0.500	0.500	0.150
Tax, Expenditures	0	0	0	0	0	–0.320
Total Change in the Deficit	0	1.000	2.000	2.000	2.000	0.200
Less Productive Fiscal Measures						
Capital Income Taxes	0	0.375	0.750	0.750	0.750	0.750
Labor Income Taxes for the Wealthy	0	0.375	0.750	0.750	0.750	0
General Labor Income Taxes	0	0	0	0	0	–0.530
Unproductive Infrastructure Spending	0	0.250	0.500	0.500	0.500	0
Total Change in the Deficit	0	1.000	2.000	2.000	2.000	0.220

Source: IMF staff assumptions for the scenario analysis.

ditures, and the other half comes from higher labor income taxes. In the less productive case, the increase in unproductive infrastructure spending is completely unwound and the tax cuts to the wealthy are completely reversed. The remaining adjustment required to stabilize debt comes in the form of higher general labor income taxes. In both cases, these adjustments stabilize the public-debt-to-GDP ratio roughly 5 percentage points above its prestimulus level.

Results

When the fiscal measures are highly productive, U.S. GDP rises notably, peaking at 1 percent above the no-policy-change case in 2021. When fiscal measures are less productive, U.S. GDP rises by roughly half that amount by 2021. With a smaller increase in U.S. output in the less productive case, the deficit and debt as a share of GDP both rise by more. In both cases, U.S. monetary policy tightens in response to higher demand and inflation, and higher real U.S. interest rates lead to an appreciation of the U.S. dollar. In the less productive case, the U.S. policy rate tightens by less, but the faster normalization of the term premium and thus higher long-term interest rates leads to more upward pressure on the currency in the near term. With regard to spillovers to the rest of the world, in the highly productive case, other advanced economies benefit the most in the short term, with GDP roughly 0.2 percent higher. This outcome reflects inclusion in this group of Canada and Mexico, which have strong trade links with the United States, and the assumption that monetary policy in the euro area and Japan does not tighten in the face of the increase in external demand. In the highly productive case, the spillovers to emerging market economies are also positive in the short term, but modest. Under the less productive fiscal expansion, the short-term spillovers become negative both for other advanced economies and for emerging market economies for two reasons. First, with lower U.S. demand in the less productive case, the direct trade spillovers are smaller. Second, the faster normalization of term premiums worldwide tightens financial conditions, which is particularly onerous for advanced economies that have limited or no conventional monetary policy space with which to respond.

Once U.S. fiscal policy needs to be tightened to stabilize public debt, the withdrawal of stimulus temporarily lowers U.S. GDP relative to its level in 2021 in both cases. However, because capital income taxes are assumed to be permanently lower in both cases, thereby raising the returns to private capital, real GDP subsequently recovers as firms continue investing to raise the private capital stock to its higher desired level. In the highly productive fiscal expansion, this effect is reinforced by the permanently higher level of the public capital stock, which raises private productivity, further increasing the return to private capital. With U.S. output permanently higher in the long term and with no change in the relative price of U.S. tradable

Scenario Box 1. *(continued)*

and nontradable goods, the U.S. dollar would need to depreciate to maintain external stability.

In the long term, the spillovers to all economies outside the United States are small, but negative, because the permanently higher level of U.S. public debt raises global real interest rates. The increase in global interest rates in turn permanently raises the cost of capital, which more than offsets the increase in the return to private capital coming from higher U.S. demand.

It is important to note that the positive effects on U.S. GDP over the medium and long term arise from the beneficial supply-side effects of some tax and expenditure changes (notably the reduction in corporate income tax rates and the increase in public investment in infrastructure) rather than simply from the initial fiscal expansion. Simulations show that a similarly growth-friendly fiscal policy implemented in a deficit-neutral way (financed by a reduction in tax expenditures and lower government consumption) would lead to a higher long-term level of GDP. In the short term, GDP would be lower compared with the deficit-financed expansion, with policy rates and long-term interest rates correspondingly lower. The dollar would appreciate by less, but there would be no subsequent need for additional tightening of fiscal policy, and with lower medium-term debt long-term interest rates would be a bit lower. Both factors support medium-term GDP, the first on a temporary basis and the second on a permanent basis.

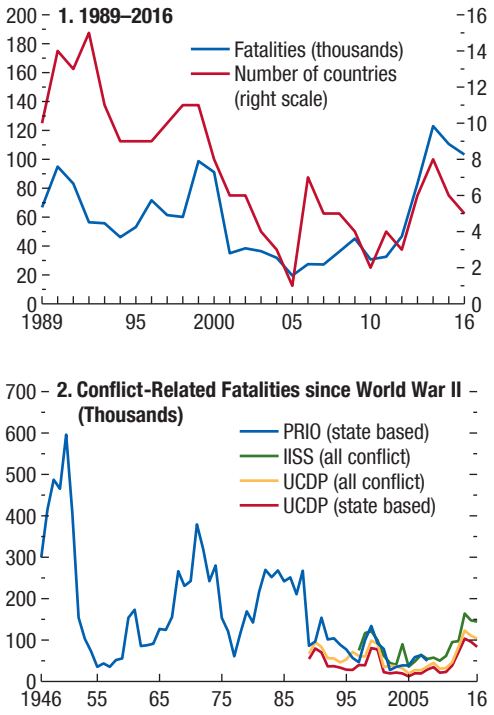
Box 1.1. Conflict, Growth, and Migration

Conflict has been on the rise since the early 2000s. The incidence of conflict, defined as the number of countries that have had at least 100 conflict-related deaths per 1 million people, has risen in recent years from low levels in the early 2000s (Figure 1.1.1, panel 1).[1] Although the total annual number of conflict-related deaths is still relatively low from a historical perspective, its increase in recent years has been quite sharp, reflecting the very deadly conflicts in Afghanistan, Iraq, and Syria (Figure 1.1.1, panel 2). Over time, the nature of conflict has changed: there was more interstate conflict between World War II and the 1990s, and there has been more internal civil war since the 1990s (Blattman and Miguel 2010). The location of conflict has also shifted, from sub-Saharan Africa in the 1990s to the broader Middle East region, especially since 2010.[2]

Conflict leads not only to immeasurable humanitarian suffering, but also to significant economic losses that can persist for years. Empirical research points to conflict as one of the factors that can hold back economic development (Rodrik 1999; Besley and Persson 2008). It can also ignite large refugee flows and may affect the economies of countries near and far for an extended period.

The tragic rise in conflict has also weighed on global GDP growth in recent years, given the increasing number of economies experiencing strife, the severe effect of some of these episodes on economic activity, and the considerable size of some of the affected economies. The countries currently involved in conflict accounted for 1.0–2.5 percent of GDP in 2010, depending on the precise threshold used to define the incidence of conflict (Figure 1.1.2, panel 1).[3] In some countries, the difference between

Figure 1.1.1. Conflict-Related Fatalities and Number of Countries Affected by Conflict



Sources: International Institute for Strategic Studies (IISS) Armed Conflict database; Peace Research Institute Oslo (PRIO) Battle Deaths data set v. 3.1; UN (2016); Uppsala Conflict Data Program (UCDP) Georeferenced Event data set v. 5.0 and Battle-Related Deaths data set v. 5.0; and IMF staff calculations.
Note: In panel 1, a country is considered in conflict if in any year 100 people or more are killed per 1 million population. In panel 2, state-based conflicts are those in which at least one of the conflict parties is a state. All conflicts can also include one-sided violence (for example, violence against civilians perpetrated by rebel groups) and nonstate conflict (for example, organized rebel or communal group fight). Fatalities that are not attributed to a specific country are excluded. The UCDP all-conflict estimate of fatalities excludes the Rwanda outlier in 1994 (501,958 dead).

The authors of this box are Natalija Novta and Evgenia Pugacheva.

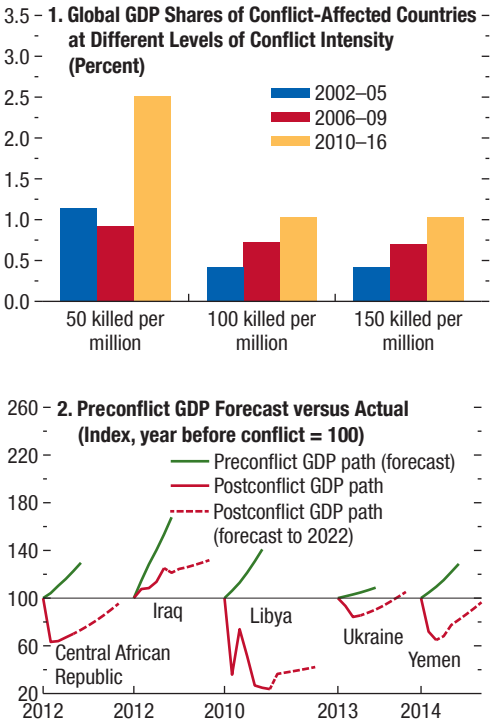
[1]The choice of different thresholds does not change the thrust of the findings. In Figure 1.1.1, a country is considered in conflict in a given year if there are more than 100 conflict-related deaths per 1 million people in the country. In many previous conflict studies, conflict incidence is defined as an absolute number of conflict-related deaths; however, this approach makes it mechanically harder for smaller countries to pass the threshold, even if they are experiencing significant conflict (see Mueller 2016).

[2]Middle East, including Afghanistan, Israel, North Africa, Palestine, and Pakistan.

[3]Three definitions of conflict are used, based on severity—if there are at least 50, 100, or 150 conflict-related deaths per million people in the country and for three different periods: 2002–05, 2006–09, and 2010–15. If calculated separately each year, the share of global GDP in conflict-affected countries mechanically declines during the period of conflict because the GDP of conflict-affected countries typically drops during conflict (Mueller 2013; Cerra and Saxena 2008). To limit this mechanical effect, in panel 1 of Figure 1.1.2, the percentage of global GDP that a country represents is recorded in the first year of the period.

Box 1.1 *(continued)*

Figure 1.1.2. Global GDP Shares of Conflict-Affected Countries and Impact of Conflict on Growth



Sources: UN (2016); Uppsala Conflict Data Program Georeferenced Event data set v. 5.0 and Battle-Related Deaths data set v. 5.0; and IMF staff calculations.
Note: In panel 1, GDP shares are based on the first year within the bin (using 2011 data for South Sudan and rescaling all 2010 numbers). In panel 2, conflict onset is the first year of conflict in which the number of deaths exceeds 100 per 1 million population (after at least four consecutive years without passing that threshold).

preconflict GDP forecasts and actual GDP during conflict is dramatic (Figure 1.1.2, panel 2).

Economic Recovery from Conflict Is Slow

The onset of conflict can hurt GDP per capita growth in many ways, such as by directly reducing the workforce or hampering labor productivity. The negative effects of conflict can be large over the medium and long term if people's health is permanently damaged, they leave the country as refugees or economic migrants, or they are prevented from attending school, which lowers human capital both individually and in the aggregate (see Blattman and Miguel 2010; Justino 2007 and 2009). Furthermore, conflict typically leads to lower investment (as investors lose confidence), changes in household saving and consumption (Voors and others 2012), and capital flight (Collier, Hoeffler, and Pattillo 2004).

During 1989–2016, outbreaks of conflict are estimated to have reduced output per capita by a cumulative 18 percent over the subsequent 10 years, on average (Figure 1.1.3, panel 1).[4] Restricting the analysis to state-based conflicts and using data for a longer period point to losses of about 5 percent after 10 years (Figure 1.1.3, panel 2).[5] The econometric finding of a persistent loss of output holds true if the conflict variable is defined as the share of lost lives in the population or with a dummy variable indicating conflict incidence in a given year. In the first case (conflict fatalities), the cumulative loss in output after 10 years is about 5 percent, and in the second case (annual conflict incidence), the cumulative loss is about 7 percent (not shown in figures). These losses build up as conflict evolves.[6]

[4]The local projection method of Jorda (2005) and Teulings and Zubanov (2014) is used to estimate the impact of conflict on GDP over the subsequent 10-year horizon. The following type of equation is estimated:

$$y_{it+h} - y_{it-1} = \beta_1^h c_{it} + \beta_2^h c_{it-1} + \sum_{j=1}^{h-1} \beta_3^{hj} c_{it+h-j} + \theta_1^h \Delta y_{it-1} + \mu_i^h + \theta_{rt}^h + \varepsilon_{it}^h, \quad h = 0,\ldots,10,$$

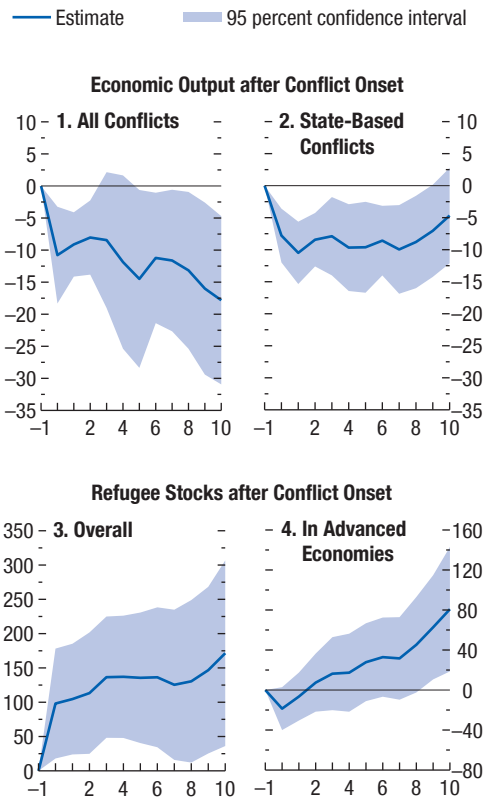
in which y_{it} is log GDP per capita (or log number of refugees, for migration), c_{it} are conflict variables (the onset of conflict, percentage of population killed, or conflict incidence), μ_i^h are country fixed effects, θ_{rt}^h are time fixed effects, and h is the horizon. The reported findings are generally robust to the addition of various controls.

[5]The longest series for conflict-related deaths, which is compiled by the Peace Research Institute Oslo, starts in 1946, but covers only state-based conflicts. The Uppsala Conflict Data Program provides data on fatalities from all types of conflict (including non-state-based actors, one-sided violence against civilians, and so on) starting in 1989.

[6]The econometric estimates would be biased if low growth caused the conflict rather than resulting from it. However, the results do not change much if the *World Economic Outlook* (WEO) GDP per capita forecast for the current year, made the year before the conflict, is controlled for in the regressions (based on the level of GDP per capita projections from different vintages of the WEO). Overall, the results are very similar to those from regressions that do not control for GDP forecasts.

Box 1.1 *(continued)*

Figure 1.1.3. Impact of Conflict Onset
(Percent; years on x-axis)



Sources: UN (2016); UNHCR (2016); Uppsala Conflict Data Program Georeferenced Event data set v. 5.0 and Battle-Related Deaths data set v. 5.0; and IMF staff calculations.
Note: $t = 0$ is the year of the shock. Conflict onset is the first year of conflict in which the number of deaths exceeds 100 per 1 million population (after at least four consecutive years without passing that threshold).

Emigration from Conflict-Ridden Areas Remains High for a Long Time

Refugee populations tend to grow for many years after conflict begins, potentially placing a significant burden on other economies (Figure 1.1.3, panel 3). After a conflict erupts, neighboring economies are typically the first to receive a large influx of refugees, but if these countries do not offer much economic opportunity, refugees may eventually prefer to move to advanced economies. Panel 4 of Figure 1.1.3 shows that refugee populations in advanced economies remain on the rise 10 years after the beginning of a conflict.

Box 1.2. Tackling Measurement Challenges of Irish Economic Activity

On July 12, 2016, the Central Statistics Office of Ireland disseminated unprecedented revisions to some of the country's main macroeconomic statistics. GDP growth in real terms for 2015 was revised from a preliminary figure of 7.8 percent to a record 26.3 percent, growth in the gross national income (GNI) was revised from 5.7 percent to 18.7 percent, and revisions to exports and imports resulted in an increase in net exports of more than €35 billion (about 17 percent of the preliminary 2015 GDP) estimate reported in March 2016 in 2015 (Figure 1.2.1).

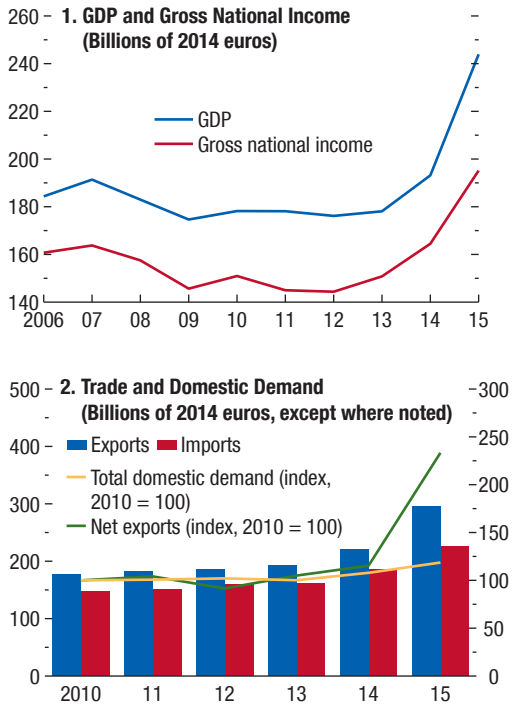
The revisions conform to international standards—the System of National Accounts (2008 SNA) and the European System of Accounts (ESA 2010)—and the new data were disseminated according to an established revision cycle.

The unusually large revisions are explained to a great extent by relocations of entire balance sheets and their related activity to Ireland. More specifically, the revisions were driven mainly by: (1) a significant increase in external contract manufacturing activity attributable to Ireland, and (2) the relocation and use of intellectual property products. From a statistical perspective, the increase in contract manufacturing activity through redomiciliation means that all value added derived from this type of production is now recorded in Ireland. This will have an impact on production, exports, imports, and taxation. Even when actual physical manufacturing of goods is carried out abroad, the payment to the manufacturer is treated as importation of services, and the final output of this activity, once sold (exported), contributes to exports in an amount that includes the cost of intermediate inputs (including manufacturing services), license fees, other production costs, and profit margins.

The relocation of intellectual property products has several direct effects on national accounts, the balance of payments, and the international investment position. Net exports are affected because: (1) the fees that firms located in Ireland charge foreign companies to manufacture patented products result in an increase in services exports, and (2) firms located in Ireland producing patented products no longer pay the fee associated with relocated intellectual property products, which reduces services imports. GDP and GNI are also affected because the increase in fixed assets implies an increase in the estimates of depreciation.

The author of this box is Michael Stanger.

Figure 1.2.1. Irish National Accounts



Sources: Central Statistics Office Ireland; and IMF staff calculations.

The intellectual property product relocations were mostly recorded as "other changes" in the international investment position—implying a sharp downward revision to the net international investment position. This is because the intellectual property product transfer resulted in much larger intercompany debt in foreign direct investment liabilities (Table 1.2.1).[1] If these relocations had been recorded in the balance of payments, the effects on GDP would have been the same, but the Irish accounts would have shown an additional very large one-off increase in imports of services and a correspondingly large one-off current account deficit, along with a one-off increase in gross fixed capital formation in 2015.

The relocation of balance sheets (dominated by intellectual property) is not new, but the scale observed

[1]The transfer of intellectual property capital to Ireland was "financed" by loans to the relevant Irish affiliates from other entities in the group and hence resulted in a sharp increase in foreign direct investment liabilities in the form of debt.

Box 1.2 *(continued)*

Table 1.2.1 Ireland: Balance of Payments and International Investment Position
(Billions of euros)

	Direct Investment	International Investment Position (end of 2014)	Balance of Payments (2015)	Other Changes	International Investment Position (end of 2015)
Release 2015:Q4	Assets	522.8	91.6	114.3	728.8
	Liabilities	311.5	90.7	–2.2	400.0
Release 2016:Q1	Assets	510.2	149.9	155.1	815.2
	Liabilities	342.7	169.8	283.1	795.6
Revisions	Assets	12.6	58.3	40.8	86.4
	Liabilities	31.2	79.2	285.3	395.6

Sources: Central Statistics Office of Ireland (for data on balance of payments and international investment position); "Other Changes" derived residually.

in 2015 is exceptional—it added about €300 billion to Ireland's capital stock and a similar amount to its net external liabilities. Activity attributable to goods for processing (that is, contract manufacturing) also increased significantly. Together, these two factors had a substantial impact on Ireland's macroeconomic statistics, particularly given the small size of the economy.

Need for Additional Measures to Understand Complex New Arrangements

The acquisition of foreign-owned intellectual property assets adds to capital formation, and any subsequent revenue from licensing adds to Ireland's GDP if licenses are charged; this has not happened significantly to date. Moreover, the growth of capital formation significantly increases standard measures of labor productivity and alters their relationship with domestically generated GDP and employment.

The inclusion of contract manufacturing activity in statistical accounts increases output (exports), imports, GDP, and GNI, but leaves domestic employment mostly unchanged. GDP is a measure of production and thus includes value added that accrues to foreign investors. GNI, in contrast, is a measure of income, and Ireland's GNI is significantly lower than its GDP because GNI does not include the income paid abroad or the retained earnings of foreign direct investors in Ireland. However, GNI does include retained earnings on foreign investment that is not direct (many corporate relocations to Ireland entail foreign investment that is not direct—that is, individual owners fall short of the 10 percent threshold that classifies an investment as direct). In those cases, corporate entities are considered Irish, and their retained earnings are treated as Irish income, even though retained earnings ultimately accrue to foreign shareholders through their impact on stock prices. Furthermore, in the case of companies and products with substantial intellectual property content, retained earnings are typically sizable because they need to offset the relatively rapid depreciation of intellectual property capital.

As a consequence of these relocations, the use of standard headline measures—such as domestic production, national income, domestic demand, and net exports—are less applicable to economic activity in Ireland. For instance, the conventional measures of fixed capital formation and domestic demand contain significant components related to the nondomestic economy. Additional measures to reflect the level of activity within the domestic economy are therefore required.

Strategy to Address Measurement Issues

The Central Statistics Office of Ireland convened the Economic Statistics Review Group to provide direction on how best to meet user needs for a better understanding of Irish economic activity in the context of a highly globalized economy.[2] The group finalized its report in December 2016, and in February 2017 the Central Statistics Office published its response to the report's recommendations, including a timetable for implementation.

Based on the report's recommendations, GDP and GNI will remain the key international standard indicators, and new analytical presentations and supplementary statistics will be made available. Annual aggregates will be developed first, followed by quarterly series where feasible and appropriate. Most recommenda-

[2]The Economic Statistics Review Group includes policymakers, analysts, regulators, business and trade union representatives, academics, and members of the international statistics community represented by Eurostat and the IMF.

Box 1.2 *(continued)*

tions are to be implemented between mid-2017 and the end of 2018, in particular the following:

- A reliable indicator of the size of the economy that is relatively immune to relocations. The recommended indicator is an adjusted GNI that is an extension of the standard GNI and takes into account the retained earnings of redomiciled firms and depreciation on foreign-owned domestic capital assets. Corresponding adjusted presentations of the balance of payments and international investment position data are also proposed.
- A standard set of structural macroeconomic indicators that better describe economic activity by multinational-company-dominated and domestic sectors. This includes a breakdown of the nonfinancial sector in the annual Institutional Sector Accounts into two broadly defined, foreign and domestic, subsectors, as this sector accounts for most of the multinational enterprises operating in Ireland. The same detail is needed for the entire system of national accounts, the balance of payments, and the international investment position.
- Additional detail on cross-border economic activities to allow for the monitoring of the domestic macroeconomic situation, which would provide increased detail on gross fixed capital formation, domestic demand, exports, and imports. Along the same lines, an additional breakdown of the industrial production index is proposed.
- A number of initiatives to enhance the communication strategy to make it easier for users to understand major statistical releases.

Annex Table 1.1.1. European Economies: Real GDP, Consumer Prices, Current Account Balance, and Unemployment

(Annual percent change, unless noted otherwise)

	Real GDP			Consumer Prices[1]			Current Account Balance[2]			Unemployment[3]		
		Projections			Projections			Projections			Projections	
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Europe	**2.0**	**2.0**	**2.0**	**0.9**	**2.5**	**2.4**	**2.4**	**2.3**	**2.4**	. . .	. . .	. . .
Advanced Europe	**1.8**	**1.8**	**1.7**	**0.4**	**1.8**	**1.6**	**2.9**	**2.9**	**2.9**	**8.7**	**8.3**	**8.0**
Euro Area[4,5]	1.7	1.7	1.6	0.2	1.7	1.5	3.4	3.0	3.0	10.0	9.4	9.1
Germany	1.8	1.6	1.5	0.4	2.0	1.7	8.5	8.2	8.0	4.2	4.2	4.2
France	1.2	1.4	1.6	0.3	1.4	1.2	–1.1	–0.9	–0.5	10.0	9.6	9.3
Italy	0.9	0.8	0.8	–0.1	1.3	1.3	2.7	2.0	1.8	11.7	11.4	11.0
Spain	3.2	2.6	2.1	–0.2	2.4	1.4	2.0	1.5	1.6	19.6	17.7	16.6
Netherlands	2.1	2.1	1.8	0.1	0.9	1.4	9.6	9.2	9.1	5.9	5.4	5.3
Belgium	1.2	1.6	1.5	1.8	2.0	1.7	1.0	0.9	1.0	8.0	7.8	7.6
Austria	1.5	1.4	1.3	1.0	2.1	1.8	2.4	2.4	2.2	6.1	5.9	5.9
Greece	0.0	2.2	2.7	0.0	1.3	1.4	–0.6	–0.3	–0.0	23.8	21.9	21.0
Portugal	1.4	1.7	1.5	0.6	1.2	1.4	0.8	–0.3	–0.4	11.1	10.6	10.1
Ireland	5.2	3.5	3.2	–0.2	0.9	1.5	4.7	4.7	4.7	7.9	6.5	6.3
Finland	1.4	1.3	1.4	0.4	1.4	1.6	–1.1	–1.3	–1.2	8.8	8.5	8.3
Slovak Republic	3.3	3.3	3.7	–0.5	1.2	1.5	0.4	0.3	0.2	9.7	7.9	7.4
Lithuania	2.3	2.8	3.1	0.7	2.8	2.0	–0.9	–1.6	–1.5	7.9	7.4	7.2
Slovenia	2.5	2.5	2.0	–0.1	1.5	2.0	6.8	5.5	5.1	7.9	7.0	6.6
Luxembourg	4.0	3.7	3.5	0.1	1.4	1.3	4.8	5.1	5.1	6.4	5.9	5.7
Latvia	2.0	3.0	3.3	0.1	2.8	2.5	1.5	–1.1	–1.4	9.6	9.4	9.2
Estonia	1.6	2.5	2.8	0.8	3.2	2.5	2.7	1.4	0.9	6.9	8.3	8.9
Cyprus	2.8	2.5	2.3	–1.2	1.5	1.4	–2.4	–2.5	–2.5	12.9	11.3	10.2
Malta	5.0	4.1	3.5	0.9	1.5	1.6	5.8	5.5	5.3	4.8	4.7	4.7
United Kingdom[5]	1.8	2.0	1.5	0.6	2.5	2.6	–4.4	–3.3	–2.9	4.9	4.9	5.1
Switzerland	1.3	1.4	1.6	–0.4	0.4	0.7	12.0	10.8	10.5	3.3	3.0	2.9
Sweden	3.3	2.7	2.4	1.1	1.4	1.6	4.7	4.6	4.2	7.0	6.7	6.7
Norway	1.0	1.2	1.9	3.6	2.6	2.5	4.6	5.7	5.7	4.8	4.5	4.2
Czech Republic	2.4	2.8	2.2	0.7	2.3	1.8	1.1	1.2	0.7	4.0	3.8	4.2
Denmark	1.1	1.5	1.7	0.3	0.6	1.1	8.1	7.5	7.2	6.2	5.8	5.8
Iceland	7.2	5.7	3.6	1.7	2.2	2.6	8.0	6.9	6.7	3.0	3.0	3.3
San Marino	1.0	1.2	1.3	0.6	0.7	0.8	. . .	. . .	. . .	8.6	8.0	7.4
Emerging and Developing Europe[6]	**3.0**	**3.0**	**3.3**	**3.2**	**5.7**	**5.5**	**–1.9**	**–2.8**	**–2.8**	. . .	. . .	. . .
Turkey	2.9	2.5	3.3	7.8	10.1	9.1	–3.8	–4.7	–4.6	10.8	11.5	11.0
Poland	2.8	3.4	3.2	–0.6	2.3	2.3	–0.3	–1.7	–1.8	6.1	5.5	5.3
Romania	4.8	4.2	3.4	–1.6	1.3	3.1	–2.4	–2.8	–2.5	6.0	5.4	5.2
Hungary	2.0	2.9	3.0	0.4	2.5	3.3	4.3	3.7	3.0	4.9	4.4	4.3
Bulgaria[5]	3.4	2.9	2.7	–1.3	1.0	1.8	4.2	2.3	2.0	7.7	7.1	6.9
Serbia	2.8	3.0	3.5	1.1	2.6	3.0	–4.0	–4.0	–4.0	15.9	16.0	15.6
Croatia	2.9	2.9	2.6	–1.1	1.1	1.1	3.9	2.8	1.8	15.0	13.9	13.5

Note: Data for some countries are based on fiscal years. Please refer to Table F in the Statistical Appendix for a list of economies with exceptional reporting periods.
[1]Movements in consumer prices are shown as annual averages. Year-end to year-end changes can be found in Tables A6 and A7 in the Statistical Appendix.
[2]Percent of GDP.
[3]Percent. National definitions of unemployment may differ.
[4]Current account position corrected for reporting discrepancies in intra-area transactions.
[5]Based on Eurostat's harmonized index of consumer prices except for Slovenia.
[6]Includes Albania, Bosnia and Herzegovina, Kosovo, FYR Macedonia, and Montenegro.

Annex Table 1.1.2. Asian and Pacific Economies: Real GDP, Consumer Prices, Current Account Balance, and Unemployment

(Annual percent change, unless noted otherwise)

	Real GDP			Consumer Prices[1]			Current Account Balance[2]			Unemployment[3]		
		Projections			Projections			Projections			Projections	
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Asia	**5.3**	**5.5**	**5.4**	**2.3**	**2.9**	**2.9**	**2.5**	**2.1**	**2.0**	**. . .**	**. . .**	**. . .**
Advanced Asia	**1.6**	**1.9**	**1.6**	**0.5**	**1.4**	**1.3**	**4.6**	**4.6**	**4.5**	**3.6**	**3.5**	**3.5**
Japan	1.0	1.2	0.6	–0.1	1.0	0.6	3.9	4.2	4.3	3.1	3.1	3.1
Korea	2.8	2.7	2.8	1.0	1.8	1.9	7.0	6.2	6.1	3.7	3.8	3.6
Australia	2.5	3.1	3.0	1.3	2.0	2.4	–2.6	–2.8	–2.9	5.7	5.2	5.1
Taiwan Province of China	1.4	1.7	1.9	1.4	1.4	1.3	14.2	14.8	15.0	3.9	4.0	4.0
Singapore	2.0	2.2	2.6	–0.5	1.1	1.8	19.0	20.1	19.2	2.1	2.1	2.1
Hong Kong SAR	1.9	2.4	2.5	2.6	2.6	2.7	5.1	3.0	3.1	3.3	3.2	3.2
New Zealand	4.0	3.1	2.9	0.6	1.5	2.0	–2.7	–2.5	–3.1	5.1	5.0	4.8
Macao SAR	–4.0	2.8	1.7	2.4	2.0	2.2	27.1	29.5	30.5	1.9	2.0	2.0
Emerging and Developing Asia	**6.4**	**6.4**	**6.4**	**2.9**	**3.3**	**3.3**	**1.3**	**0.8**	**0.7**	**. . .**	**. . .**	**. . .**
China	6.7	6.6	6.2	2.0	2.4	2.3	1.8	1.3	1.2	4.0	4.0	4.0
India[4]	6.8	7.2	7.7	4.9	4.8	5.1	–0.9	–1.5	–1.5	. . .	. . .	. . .
ASEAN-5	**4.9**	**5.0**	**5.2**	**2.4**	**3.6**	**3.7**	**2.2**	**1.6**	**1.1**	**. . .**	**. . .**	**. . .**
Indonesia	5.0	5.1	5.3	3.5	4.5	4.5	–1.8	–1.9	–2.0	5.6	5.4	5.2
Thailand	3.2	3.0	3.3	0.2	1.4	1.5	11.4	9.7	7.8	0.8	0.7	0.7
Malaysia	4.2	4.5	4.7	2.1	2.7	2.9	2.0	1.8	1.8	3.5	3.4	3.2
Philippines	6.8	6.8	6.9	1.8	3.6	3.3	0.2	–0.1	–0.3	5.5	6.0	5.5
Vietnam	6.2	6.5	6.3	2.7	4.9	5.0	4.7	4.1	3.4	2.4	2.4	2.4
Other Emerging and Developing Asia[5]	**5.5**	**6.1**	**6.3**	**5.6**	**5.9**	**5.6**	**–1.0**	**–2.0**	**–2.6**	**. . .**	**. . .**	**. . .**
Memorandum												
Emerging Asia[6]	6.4	6.4	6.4	2.8	3.2	3.2	1.4	0.9	0.8	. . .	. . .	. . .

Note: Data for some countries are based on fiscal years. Please refer to Table F in the Statistical Appendix for a list of economies with exceptional reporting periods.
[1]Movements in consumer prices are shown as annual averages. Year-end to year-end changes can be found in Tables A6 and A7 in the Statistical Appendix.
[2]Percent of GDP.
[3]Percent. National definitions of unemployment may differ.
[4]See country-specific notes for India in the "Country Notes" section of the Statistical Appendix.
[5]Other Emerging and Developing Asia comprises Bangladesh, Bhutan, Brunei Darussalam, Cambodia, Fiji, Kiribati, Lao P.D.R., Maldives, Marshall Islands, Micronesia, Mongolia, Myanmar, Nauru, Nepal, Palau, Papua New Guinea, Samoa, Solomon Islands, Sri Lanka, Timor-Leste, Tonga, Tuvalu, and Vanuatu.
[6]Emerging Asia comprises the ASEAN-5 (Indonesia, Malaysia, Philippines, Thailand, Vietnam) economies, China, and India.

Annex Table 1.1.3. Western Hemisphere Economies: Real GDP, Consumer Prices, Current Account Balance, and Unemployment

(Annual percent change, unless noted otherwise)

	Real GDP			Consumer Prices[1]			Current Account Balance[2]			Unemployment[3]		
		Projections			Projections			Projections			Projections	
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
North America	**1.7**	**2.2**	**2.4**	**1.4**	**2.8**	**2.4**	**–2.6**	**–2.7**	**–3.2**	**. . .**	**. . .**	**. . .**
United States	1.6	2.3	2.5	1.3	2.7	2.4	–2.6	–2.7	–3.3	4.9	4.7	4.6
Canada	1.4	1.9	2.0	1.4	2.0	2.1	–3.3	–2.9	–2.7	7.0	6.9	6.8
Mexico	2.3	1.7	2.0	2.8	4.8	3.2	–2.7	–2.5	–2.7	4.3	4.4	4.4
Puerto Rico[4]	–1.8	–3.0	–2.5	0.2	1.5	0.5	. . .	. . .	. . .	11.8	12.6	12.1
South America[5]	**–2.7**	**0.6**	**1.8**	**. . .**	**. . .**	**. . .**	**–1.9**	**–1.9**	**–2.1**	**. . .**	**. . .**	**. . .**
Brazil	–3.6	0.2	1.7	8.7	4.4	4.3	–1.3	–1.3	–1.7	11.3	12.1	11.6
Argentina	–2.3	2.2	2.3	. . .	25.6	18.7	–2.6	–2.9	–3.4	8.5	7.4	7.3
Colombia	2.0	2.3	3.0	7.5	4.5	3.2	–4.4	–3.6	–3.3	9.2	9.5	9.3
Venezuela	–18.0	–7.4	–4.1	254.9	720.5	2,068.5	–2.4	–3.3	–2.1	21.2	25.3	28.2
Chile	1.6	1.7	2.3	3.8	2.8	3.0	–1.4	–1.4	–1.7	6.5	7.0	6.8
Peru	3.9	3.5	3.7	3.6	3.1	2.6	–2.8	–1.9	–2.0	6.7	6.7	6.7
Ecuador	–2.2	–1.6	–0.3	1.7	0.3	0.6	1.1	0.9	–0.1	5.2	5.7	5.8
Bolivia	4.1	4.0	3.7	3.6	4.0	5.0	–5.4	–3.9	–2.6	4.0	4.0	4.0
Uruguay	1.4	1.6	2.6	9.6	7.7	7.5	–1.0	–1.5	–1.6	7.9	7.8	7.8
Paraguay	4.1	3.3	3.7	4.1	4.0	4.0	0.6	–1.4	–0.5	5.1	5.4	5.5
Central America[6]	**3.8**	**3.9**	**4.1**	**2.1**	**2.8**	**3.5**	**–3.0**	**–3.1**	**–3.2**	**. . .**	**. . .**	**. . .**
Caribbean[7]	**3.4**	**3.6**	**4.2**	**2.8**	**4.3**	**4.3**	**–3.4**	**–3.7**	**–3.8**	**. . .**	**. . .**	**. . .**
Memorandum												
Latin America and the Caribbean[8]	–1.0	1.1	2.0	5.6	4.2	3.7	–2.1	–2.1	–2.3	. . .	. . .	. . .
East Caribbean Currency Union[9]	1.9	2.4	2.3	–0.2	1.7	1.6	–11.7	–13.8	–13.8	. . .	. . .	. . .

Note: Data for some countries are based on fiscal years. Please refer to Table F in the Statistical Appendix for a list of economies with exceptional reporting periods.
[1]Movements in consumer prices are shown as annual averages. Year-end to year-end changes can be found in Tables A6 and A7 in the Statistical Appendix.
[2]Percent of GDP.
[3]Percent. National definitions of unemployment may differ.
[4]Puerto Rico is a territory of the United States but its statistical data are maintained on a separate and independent basis.
[5]Includes Guyana and Suriname. Data for Argentina's and Venezuela's consumer prices are excluded. See country-specific notes for Argentina and Venezuela in the "Country Notes" section of the Statistical Appendix.
[6]Central America comprises Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama.
[7]The Caribbean comprises Antigua and Barbuda, The Bahamas, Barbados, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago.
[8]Latin America and the Caribbean comprises Mexico and economies from the Caribbean, Central America, and South America. Data for Argentina's and Venezuela's consumer prices are excluded. See country-specific notes for Argentina and Venezuela in the "Country Notes" section of the Statistical Appendix.
[9]Eastern Caribbean Currency Union comprises Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines as well as Anguilla and Montserrat, which are not IMF members.

Annex Table 1.1.4. Commonwealth of Independent States Economies: Real GDP, Consumer Prices, Current Account Balance, and Unemployment

(Annual percent change, unless noted otherwise)

	Real GDP			Consumer Prices[1]			Current Account Balance[2]			Unemployment[3]		
		Projections			Projections			Projections			Projections	
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Commonwealth of Independent States[4]	**0.3**	**1.7**	**2.1**	**8.3**	**5.7**	**5.3**	**–0.2**	**1.6**	**1.8**	**. . .**	**. . .**	**. . .**
Net Energy Exporters	**0.2**	**1.7**	**2.0**	**7.9**	**5.2**	**4.9**	**0.4**	**2.2**	**2.5**	**. . .**	**. . .**	**. . .**
Russia	–0.2	1.4	1.4	7.0	4.5	4.2	1.7	3.3	3.5	5.5	5.5	5.5
Kazakhstan	1.1	2.5	3.4	14.6	8.0	7.2	–6.1	–4.0	–2.8	5.0	5.0	5.0
Uzbekistan	7.8	6.0	6.0	8.0	8.6	8.8	1.4	2.1	1.6	. . .	. . .	. . .
Azerbaijan	–3.8	–1.0	2.0	12.4	10.0	8.0	–3.8	1.3	3.8	6.0	6.0	6.0
Turkmenistan	6.2	6.5	6.3	3.5	6.0	6.2	–21.0	–12.8	–11.5	. . .	. . .	. . .
Net Energy Importers	**1.1**	**1.6**	**2.7**	**11.0**	**9.5**	**8.2**	**–4.7**	**–4.9**	**–4.6**	**. . .**	**. . .**	**. . .**
Ukraine	2.3	2.0	3.2	13.9	11.5	9.5	–3.6	–3.6	–2.9	8.8	9.0	8.7
Belarus	–3.0	–0.8	0.6	11.8	9.3	8.7	–4.3	–4.7	–5.0	1.0	1.0	1.0
Georgia	2.7	3.5	4.0	2.1	5.7	2.4	–12.4	–12.9	–12.5	. . .	. . .	. . .
Armenia	0.2	2.9	2.9	–1.4	2.0	3.5	–2.9	–3.2	–2.9	18.8	18.9	18.9
Tajikistan	6.9	4.5	5.0	5.9	5.8	6.0	–5.1	–5.5	–5.1	. . .	. . .	. . .
Kyrgyz Republic	3.8	3.4	3.8	0.4	3.6	5.2	–9.4	–12.0	–12.1	7.5	7.4	7.3
Moldova	4.0	4.5	3.7	6.4	5.5	5.9	–3.4	–3.8	–4.0	4.2	4.3	4.2
Memorandum												
Caucasus and Central Asia[5]	2.4	3.1	4.1	10.4	7.9	7.2	–6.2	–3.8	–3.0	. . .	. . .	. . .
Low-Income CIS Countries[6]	6.1	5.1	5.2	5.8	7.0	7.1	–2.1	–1.9	–2.2	. . .	. . .	. . .
Net Energy Exporters Excluding Russia	2.2	3.1	4.1	11.5	8.3	7.6	–5.9	–3.2	–2.3	. . .	. . .	. . .

Note: Data for some countries are based on fiscal years. Please refer to Table F in the Statistical Appendix for a list of economies with exceptional reporting periods.
[1]Movements in consumer prices are shown as annual averages. Year-end to year-end changes can be found in Table A7 in the Statistical Appendix.
[2]Percent of GDP.
[3]Percent. National definitions of unemployment may differ.
[4]Georgia, Turkmenistan, and Ukraine, which are not members of the Commonwealth of Independent States (CIS), are included in this group for reasons of geography and similarity in economic structure.
[5]Caucasus and Central Asia comprises Armenia, Azerbaijan, Georgia, Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan.
[6]Low-Income CIS countries comprise Armenia, Georgia, the Kyrgyz Republic, Moldova, Tajikistan, and Uzbekistan.

Annex Table 1.1.5. Middle East, North African Economies, Afghanistan, and Pakistan: Real GDP, Consumer Prices, Current Account Balance, and Unemployment

(Annual percent change, unless noted otherwise)

	Real GDP			Consumer Prices[1]			Current Account Balance[2]			Unemployment[3]		
		Projections			Projections			Projections			Projections	
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Middle East, North Africa, Afghanistan, and Pakistan	**3.9**	**2.6**	**3.4**	**5.1**	**7.6**	**7.4**	**–3.4**	**–1.1**	**–0.8**	**. . .**	**. . .**	**. . .**
Oil Exporters[4]	**4.0**	**1.9**	**2.9**	**4.6**	**5.8**	**6.3**	**–2.7**	**0.4**	**0.6**	**. . .**	**. . .**	**. . .**
Saudi Arabia	1.4	0.4	1.3	3.5	3.8	5.1	–3.9	1.5	2.0	5.7	. . .	. . .
Iran	6.5	3.3	4.3	8.9	11.2	11.0	6.3	5.3	5.1	12.5	12.5	12.5
United Arab Emirates	2.7	1.5	4.4	1.8	2.8	3.7	2.4	3.5	3.9	. . .	. . .	. . .
Algeria	4.2	1.4	0.6	6.4	4.8	4.3	–16.4	–12.3	–10.2	10.5	11.7	13.2
Iraq	10.1	–3.1	2.6	0.4	2.0	2.0	–7.3	–4.4	–4.9	. . .	. . .	. . .
Qatar	2.7	3.4	2.8	2.7	2.6	5.7	–2.2	0.7	0.6	. . .	. . .	. . .
Kuwait	2.5	–0.2	3.5	3.2	4.2	3.6	2.7	8.2	7.1	2.1	2.1	2.1
Oil Importers[5]	**3.7**	**4.0**	**4.4**	**6.2**	**11.4**	**9.5**	**–4.8**	**–4.9**	**–4.3**	**. . .**	**. . .**	**. . .**
Egypt	4.3	3.5	4.5	10.2	22.0	16.9	–5.6	–5.3	–3.9	12.7	12.6	11.8
Pakistan	4.7	5.0	5.2	2.9	4.3	5.0	–1.1	–2.9	–3.0	6.0	6.0	6.1
Morocco	1.5	4.4	3.9	1.6	1.2	1.5	–3.9	–2.6	–2.0	9.4	9.3	9.5
Sudan	3.0	3.7	3.6	17.8	23.2	16.0	–5.8	–4.7	–4.3	20.6	19.6	18.6
Tunisia	1.0	2.5	3.1	3.7	3.9	3.8	–9.0	–8.6	–8.1	14.0	13.0	12.0
Lebanon	1.0	2.0	2.5	–0.8	2.6	2.0	–16.0	–15.5	–14.9	. . .	. . .	. . .
Jordan	2.1	2.3	2.5	–0.8	2.3	2.5	–9.4	–8.6	–7.4	. . .	. . .	. . .
Memorandum												
Middle East and North Africa	3.8	2.3	3.2	5.4	8.1	7.7	–3.7	–1.0	–0.6	. . .	. . .	. . .
Israel[6]	4.0	2.9	3.0	–0.5	0.7	1.4	3.6	3.4	3.4	4.8	4.8	4.8
Maghreb[7]	2.6	6.2	2.0	5.7	5.6	5.4	–14.1	–9.0	–8.3	. . .	. . .	. . .
Mashreq[8]	3.9	3.3	4.2	8.7	19.3	14.9	–7.2	–7.4	–6.1	. . .	. . .	. . .

Note: Data for some countries are based on fiscal years. Please refer to Table F in the Statistical Appendix for a list of economies with exceptional reporting periods.
[1]Movements in consumer prices are shown as annual averages. Year-end to year-end changes can be found in Tables A6 and A7 in the Statistical Appendix.
[2]Percent of GDP.
[3]Percent. National definitions of unemployment may differ.
[4]Includes Bahrain, Libya, Oman, and Yemen.
[5]Includes Afghanistan, Djibouti, and Mauritania. Excludes Syria because of the uncertain political situation.
[6]Israel, which is not a member of the economic region, is included for reasons of geography but is not included in the regional aggregates.
[7]The Maghreb comprises Algeria, Libya, Mauritania, Morocco, and Tunisia.
[8]The Mashreq comprises Egypt, Jordan, and Lebanon. Syria is excluded because of the uncertain political situation.

Annex Table 1.1.6. Sub-Saharan African Economies: Real GDP, Consumer Prices, Current Account Balance, and Unemployment

(Annual percent change, unless noted otherwise)

	Real GDP			Consumer Prices[1]			Current Account Balance[2]			Unemployment[3]		
		Projections			Projections			Projections			Projections	
	2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Sub-Saharan Africa	**1.4**	**2.6**	**3.5**	**11.4**	**10.7**	**9.5**	**–4.0**	**–3.8**	**–3.7**	**. . .**	**. . .**	**. . .**
Oil Exporters[4]	**–1.7**	**0.7**	**1.9**	**18.8**	**18.3**	**16.2**	**–1.4**	**–0.7**	**–0.2**	**. . .**	**. . .**	**. . .**
Nigeria	–1.5	0.8	1.9	15.7	17.4	17.5	0.6	1.0	1.0	12.7	. . .	. . .
Angola	0.0	1.3	1.5	32.4	27.0	17.8	–4.3	–3.8	–3.2	. . .	. . .	. . .
Gabon	2.3	1.0	2.7	2.1	2.5	2.5	–9.0	–8.3	–6.3	. . .	. . .	. . .
Chad	–6.4	0.3	2.4	–1.1	0.2	1.8	–8.8	–4.7	–6.2	. . .	. . .	. . .
Republic of Congo	–2.7	0.6	8.8	3.6	1.3	2.1	–28.5	–4.7	12.1	. . .	. . .	. . .
Middle-Income Countries[5]	**1.9**	**2.5**	**3.5**	**6.8**	**5.9**	**5.2**	**–3.4**	**–3.8**	**–3.8**	**. . .**	**. . .**	**. . .**
South Africa	0.3	0.8	1.6	6.3	6.2	5.5	–3.3	–3.4	–3.6	26.7	27.4	27.7
Ghana	4.0	5.8	9.2	17.5	12.0	9.0	–6.4	–6.0	–4.9	. . .	. . .	. . .
Côte d'Ivoire	7.5	6.9	7.2	1.0	1.5	2.0	–2.2	–4.0	–3.5	. . .	. . .	. . .
Cameroon	4.4	3.7	4.3	0.9	1.0	1.4	–3.6	–3.1	–3.0	. . .	. . .	. . .
Zambia	3.0	3.5	4.0	17.9	9.0	8.0	–5.5	–3.2	–2.5	. . .	. . .	. . .
Senegal	6.6	6.8	7.0	0.9	1.9	2.0	–7.1	–7.8	–7.7	. . .	. . .	. . .
Low-Income Countries[6]	**5.4**	**5.5**	**5.8**	**7.0**	**6.7**	**6.1**	**–8.3**	**–8.3**	**–8.9**	**. . .**	**. . .**	**. . .**
Ethiopia	8.0	7.5	7.5	7.3	6.3	7.5	–9.9	–10.0	–9.1	. . .	. . .	. . .
Kenya	6.0	5.3	5.8	6.3	6.5	5.2	–5.5	–5.8	–5.7	. . .	. . .	. . .
Tanzania	6.6	6.8	6.9	5.2	5.1	5.0	–6.3	–7.2	–7.0	. . .	. . .	. . .
Uganda	4.7	5.0	5.8	5.5	6.3	6.0	–5.9	–7.0	–8.1	. . .	. . .	. . .
Madagascar	4.1	4.5	4.8	6.7	6.9	6.4	–2.3	–3.7	–4.2	. . .	. . .	. . .
Democratic Republic of the Congo	2.4	2.8	3.5	22.4	15.0	10.0	–4.4	–3.8	–2.9	. . .	. . .	. . .
Memorandum												
Sub-Saharan Africa Excluding South Sudan	1.5	2.7	3.5	10.5	10.3	9.4	–4.0	–3.8	–3.7	. . .	. . .	. . .

Note: Data for some countries are based on fiscal years. Please refer to Table F in the Statistical Appendix for a list of economies with exceptional reporting periods.
[1]Movements in consumer prices are shown as annual averages. Year-end to year-end changes can be found in Table A7 in the Statistical Appendix.
[2]Percent of GDP.
[3]Percent. National definitions of unemployment may differ.
[4]Includes Equatorial Guinea and South Sudan.
[5]Includes Botswana, Cabo Verde, Lesotho, Mauritius, Namibia, Seychelles, and Swaziland.
[6]Includes Benin, Burkina Faso, Burundi, the Central African Republic, Comoros, Eritrea, The Gambia, Guinea, Guinea-Bissau, Liberia, Malawi, Mali, Mozambique, Niger, Rwanda, São Tomé and Príncipe, Sierra Leone, Togo, and Zimbabwe.

Special Feature: Commodity Market Developments and Forecasts, with a Focus on the Role of Technology and Unconventional Sources in the Global Oil Market

Commodity prices have rallied since the release of the October 2016 World Economic Outlook *(WEO). Oil prices have increased following the announcement of the production agreement by the Organization of the Petroleum Exporting Countries (OPEC). China's continued strength in the construction sector and the anticipated possibility of a fiscal stimulus in the United States have increased metal demand prospects and prices. And easing of excess supply conditions has helped the recovery in food prices. This special feature on commodity market developments includes an in-depth analysis of the role of technology and unconventional sources in the global oil market.*

The IMF's Primary Commodities Price Index has increased by 15.5 percent since August 2016, the reference period for the October 2016 WEO (Figure 1.SF.1, panel 1). While energy and metals have rallied, by 21.1 percent and 23.6 percent, respectively, food prices increased more modestly, by 4.9 percent. Oil prices have continued to increase, by 21.2 percent, following the agreement by OPEC members to cut oil production. Natural gas prices have increased in Europe on account of supply tightening and higher oil prices. Coal prices have rallied, by 21.0 percent, following government-led reductions in coal production in China and outages in Australia that affected production and shipment.

On November 30, 2016, members of OPEC agreed to reduce crude oil output to 32.5 million barrels a day (mbd), effective January 2017 and for a duration of six months, extendable for another six months. That agreement would suggest a cut of 1.2 mbd from production levels in October 2016. Iraq, Kuwait, Saudi Arabia, and the United Arab Emirates are bearing the brunt of the cuts, alongside other member countries. Libya and Nigeria are exempt.[1] Participants at an OPEC and non-OPEC meeting in Vienna on Decem-

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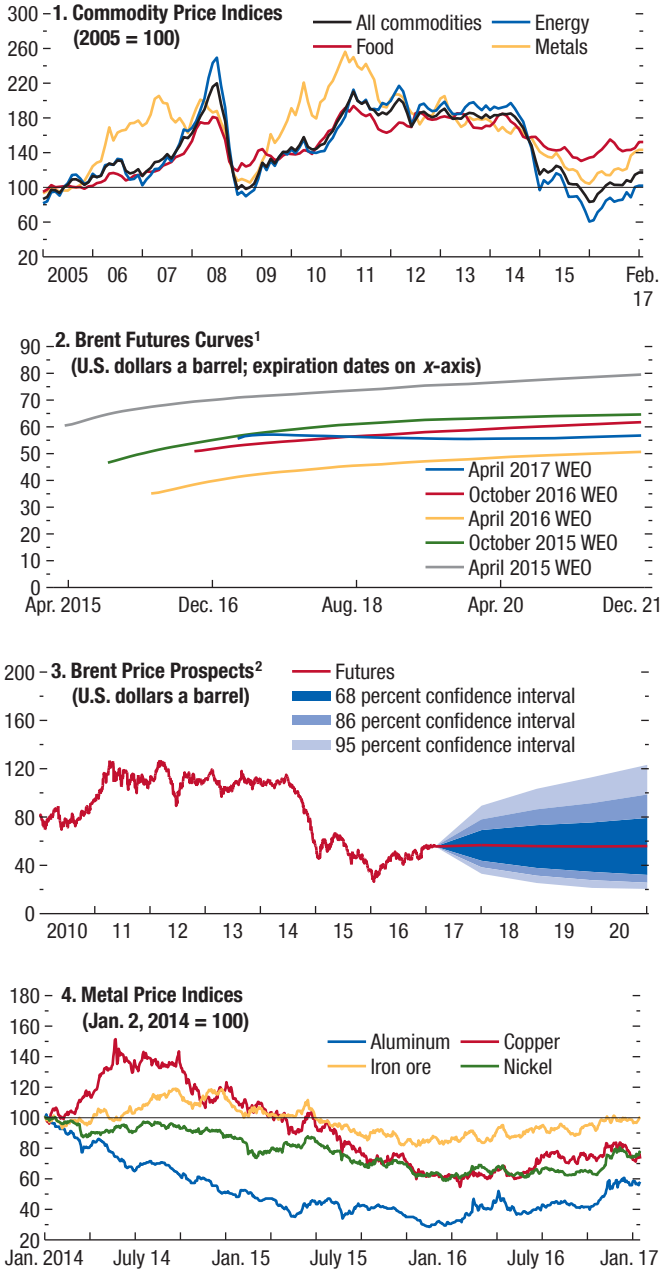
[1]Indonesia, which accounted for 0.75 mbd of production, has been suspended from OPEC.

Figure 1.SF.1. Commodity Market Developments



Sources: Bloomberg L.P.; IMF, Primary Commodity Price System; Thomson Reuters Datastream; and IMF staff estimates.
Note: WEO = *World Economic Outlook*.
[1]WEO future prices are baseline assumptions for each WEO and derived from future prices. April 2017 WEO prices are based on February 28, 2017 closing.
[2]Derived from prices of futures options on February 28, 2017.

ber 10, 2016, agreed to additional cuts amounting to about 0.6 mbd. Russia, a country that is not a member of OPEC, has committed to reducing production by 0.3 mbd, and 10 other non-OPEC countries agreed to contribute the remainder. Following these production agreements, Saudi Arabia indicated it could cut production beyond its initial commitment in a bid to enhance the credibility of the agreement.

In response to these agreements, spot oil prices increased to more than $50 a barrel. Oil prices beyond that level will stimulate investment, which is expected to increase in 2017 after two consecutive years of significant decline. The effectiveness of the production agreements could thus be partially offset by an increase in U.S. shale oil production, which, unlike conventional oil, can commence within a year of initial investment. Production data from the International Energy Agency (IEA) for January 2017 indicate that only a few OPEC members fully complied with the agreement, although Saudi Arabia has cut more than initially agreed on. In addition, Libya, which is exempt from the production agreement, increased production.

Oil demand grew at 1.6 mbd in 2016, which is lower than during 2015. The IEA expects demand growth to slow further to 1.4 mbd in 2017—still above trend growth, estimated at 1.2 mbd. Amid a significant cutback in production, fairly robust demand could move the oil market from surplus to deficit in the first half of 2017, in turn reducing oil inventory levels. However, rapid investment recovery in the U.S. shale sector could tip the market back into surplus as early as the second half of 2017.

The natural gas price index—an average for Europe, Japan, and the United States—has increased by 18.7 percent since August 2016. Although prices in Asia and the United States initially rose on expectations of strong winter demand, a fairly mild winter led to subdued demand for gas-fired power generation and contained prices. In Europe, prices rose 38.4 percent, reflecting higher oil prices and a cold winter. Natural gas prices are expected to stay low because ample supply from the United States and Russia will meet strong natural gas demand growth—which is expected to exceed oil demand growth.

The coal price index—an average of Australian and South African prices—has increased by 21.0 percent since August 2016. The rally in coal prices reflects a continued effort by Chinese authorities to reduce coal mining capacity substantially as part of a broader reform agenda to restructure its economy. To help soften rising prices, China has recently sought to relax restrictions on the number of days coal miners may work in a year. Growing environmental and health concerns are expected to lead to a reduction in the share of coal in primary energy, accentuating excess capacity in that sector, especially in China.

Oil futures contracts point to stable prices of about $55 a barrel (Figure 1.SF.1, panel 2). Baseline assumptions for the IMF's average petroleum spot prices, which are based on futures prices, suggest average annual prices of $55.2 a barrel in 2017—an increase of 28.9 percent from the 2016 average—and $55.1 a barrel in 2018 (Figure 1.SF.1, panel 3). The response of futures prices over a three-year horizon has been more muted, suggesting that the production agreements are expected to have a limited effect in the medium term. Uncertainty remains around the baseline assumptions for oil prices, although risks are balanced. Upside risks include unscheduled outages and geopolitical events, especially in the Middle East. Although these occurrences could cause oil market disruptions, high inventory levels and a rapid response by shale production should prevent a sharp rise in prices in the near future.

Metal prices have increased by 23.6 percent since August 2016 (Figure 1.SF.1, panel 4). Iron ore was one of the best performing metals in 2016, almost doubling in price to $80 a metric ton. On the demand side, metal consumption in China, which accounts for half of global demand, rebounded in 2016 in response to the authorities' policies in support of credit growth. In turn, these policies have stimulated construction, which uses metals intensively. The Chinese authorities have also addressed issues of excess capacity in the steel sector by cutting production of outdated factories, including to reduce pollution. Steel mills in mainland China have increased their use of imported higher-grade iron ore, which has helped increase iron ore prices. Amid speculation over the increase in demand for cobalt, a key battery input, spot prices have almost doubled since August 2016.

Announcement following the U.S. election of a $1 trillion infrastructure plan (over 10 years) provided a further boost to metal prices. However, in the global context, the impact of this potential infrastructure spending on world metal demand is likely to be modest. Indeed, in 2015 the United States accounted for only 8 percent of global refined copper demand according to the World Bureau of Metal Statistics and 3 percent of iron ore demand according to the World Steel Association.

On the supply side, the declining investment in, and closure of, high-cost and high-polluting mining operations have driven price increases in iron ore, nickel, tin, zinc, and copper. However, overall excess capacity will probably put downward pressure on prices in many base metals. In January 2017, Indonesia—one of the world's largest nickel producers—relaxed its export ban on ores. This action partly offsets the drop in supply caused by the Philippines' closure of its mines over environmental concerns.

Most metal prices are expected to stay near their current levels, except iron ore prices, which are expected to decline sharply. The IMF metal price index is projected to decline from the current level, but its 2017 average is expected to increase by 23.2 percent from the average in 2016, reflecting the surge during late 2016. The index is expected to decrease by 4.0 percent in 2018 from 2017. There are downside risks to the outlook for metal prices, including from the waning policy support and real estate investment in China, from a faster rebalancing from investment to consumption in the medium term, or from a disorderly adjustment in China's corporate debt market.

The agriculture index, which consists of food, beverages, and agricultural raw materials prices, has increased by 4.3 percent since August 2016. Although prices of palm oil, tea, and rubber have increased significantly, prices of rice and cocoa beans have decreased. Wheat prices reached an 11-year low in December 2016, but have since somewhat recovered. Overall, wheat prices have increased by 15.2 percent since August 2016. Maize prices have increased, although they remain near historical lows. The global stock-to-use ratios of wheat and maize remain significantly above the 10-year average, indicating that markets are well supplied.

Soybean prices have remained broadly unchanged on account of continued strength in animal protein demand countering favorable supply conditions. Palm oil prices climbed more than 36.7 percent throughout 2016 and increased 19 percent year over year. This rise is associated with plantations in Indonesia and Malaysia facing the aftereffects of the El Niño weather system and the reduction in palm oil inventories. The annual price of cocoa has fallen for the first time in five years, as harvests in West Africa have been favorable.

Projections for prices of most agricultural commodities have been revised upward on account of less favorable weather conditions, including in the United States. Annual food prices are now expected to increase by 3.0 percent in 2017, drop by 0.5 percent in 2018, and remain broadly unchanged thereafter. Rising costs of energy and weather variability, including concerns about La Niña, constitute upside risks to the price forecast. Downside risks may arise from China dismantling its price floor systems.

The Role of Technology and Unconventional Sources in the Global Oil Market

Technological factors have played an important role in explaining the collapse in oil prices that started in June 2014. Although technological innovation is often regarded as exogenous, it is endogenous to the level of oil prices. Indeed, high oil prices, prompting breakthroughs in technology in extractive industries, led to the emergence of new sources known as "unconventional oil." Shale, in particular, will have important consequences for the oil market outlook in that it will help lead to more limited and shorter production and price cycles. This special feature documents the endogenous response of technology to oil prices and institutional factors.

Although the OPEC production agreement has captured the public's attention, technological forces affecting oil markets over the medium term have received less attention. Technology has indeed transformed the oil market in powerful ways. Technological innovation and subsequent adoption of new recovery techniques—including drilling and processing—have given rise to new sources known as unconventional oil. One recent example of a new source is shale oil, which has become a major contributor to global oil supply. Provided they pan out and diffuse, improvements in recovery techniques mechanically increase the size of technically recoverable oil reserves. This increase, in turn, changes the outlook for oil supply, with potentially large immediate implications for oil prices—acting through the expectation channel associated with the future path of oil production. Although the feedback effect from lower oil prices reduces investment and hence production, the industry is forced to become more efficient, unleashing automatic stabilization forces.

Innovation in recovery techniques typically follows periods of prolonged high prices or changes in regulations rendering new techniques economical. New oil sources often come onstream in times of need—because of, say, depletion of existing conventional sources—in places that have economic and institu-

tional systems more favorable to innovation and adoption of new recovery techniques. The way drilling is performed has significantly evolved since the inception of the oil market, and in addition to improvements in drilling techniques that gave rise to shale and tight oil production, successive improvements in techniques for offshore drilling have led to a significant increase in new sources of oil. In the 1970s production in the North Sea and the surge of production in the Gulf of Mexico were made possible by deepwater drilling and higher oil prices after the two oil shocks during the 1970s. Such a development—a relatively high-cost producer that emerges with new oil sources—often gives rise to tensions with low-cost OPEC producers, who in the 1980s and more recently responded strategically by moderating their production levels.

The following discussion address four questions about the role of technology and unconventional oil sources in the global oil market:[2]

- What are unconventional oil sources?
- Where are the production and reserve centers?
- How have investment and production evolved?
- What lies ahead?

What Are Unconventional Oil Sources?

Today's version of unconventional oil consists of oil sands, extra heavy oil, shale and tight oil, and ultradeepwater oil.[3] Unconventional oil is typically more difficult and more expensive to extract and process than conventional oil. The categorization as unconventional is, of course, time specific. Before being included in what is now known as conventional sources, heavy oil and deepwater oil were considered unconventional sources. New sources of oil are part of a continuum of oil sources that is evolving thanks to improvements in recovery techniques. For this reason, and to give a historical perspective on how these "new" sources have evolved and contributed to the transformation of the oil market, this feature adopts an all-encompassing definition of unconventional sources.[4]

Oil sands are either loose sands or partially consolidated sandstone containing a naturally occurring mixture of sand, clay, and water, saturated with a dense and extremely viscous form of petroleum technically referred to as bitumen (or colloquially as tar because of its superficially similar appearance). Heavy and extra heavy oil are characterized by high viscosity, high density, and high concentrations of nitrogen, oxygen, sulfur, and heavy metals. These characteristics result in higher costs of extraction, transportation, and refining than are incurred with conventional oil. In spite of their cost and technical difficulties, major oil corporations regard these resources as providing reliable long-term flows of liquid hydrocarbons and substantial payoffs for any incremental improvements in recovery. However, environmental concerns have often surfaced, considering the potential damage these extraction and refining activities may cause. Such concerns surrounding these new oil sources have often been met with specific safety regulations and standards to help limit the risks.

Shale oil (also known as tight oil) is petroleum that consists of light crude oil contained in petroleum-bearing formations of low permeability, often shale or tight sandstone. Exploitation of shale oil began with the development of shale gas extraction using a combination of hydraulic fracturing (or fracking, a well-stimulation technique in which rock is fractured by a hydraulically pressurized liquid) and directional drilling (the practice of drilling nonvertical wells). These techniques were later widely adopted by the oil industry, primarily in the United States. Shale oil sources are developed by relatively smaller corporations and have a cost structure different from those of other oil sources. Shale oil requires lower sunk costs than conventional oil, and the lag between initial investment and production is much shorter.

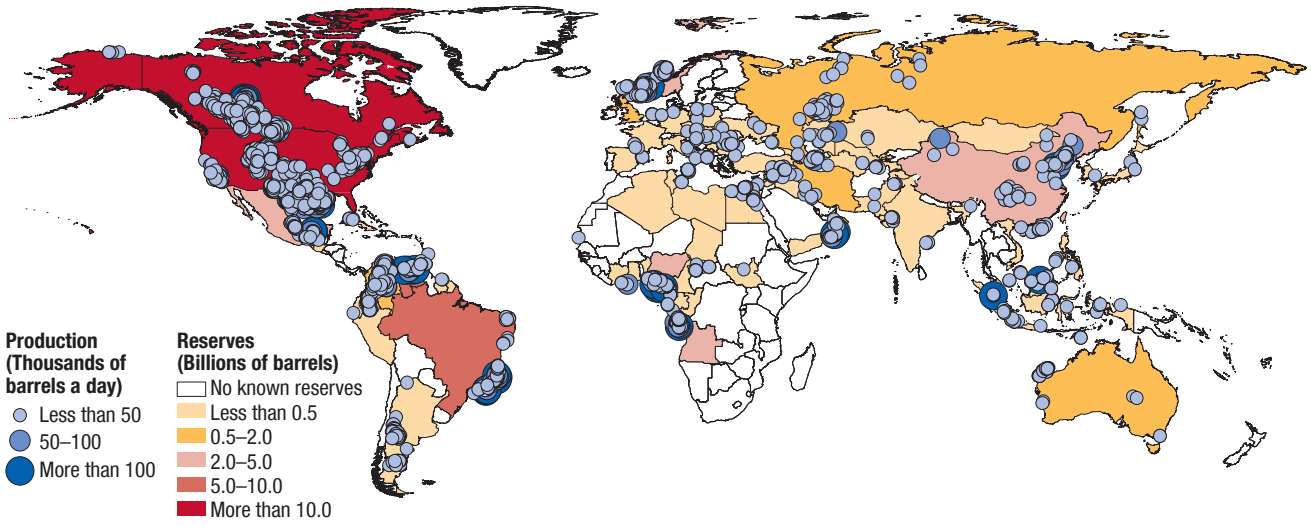
Deepwater and ultradeepwater oil result from offshore production activities that take place at depths of more than 125 meters and 1,500 meters, respectively. As mentioned, successive improvements in drilling techniques have allowed for drilling much farther from coastlines and much deeper. The type of offshore rig used for ultradeepwater oil drilling activities is very different from the type used for deepwater drilling. Ultradeepwater rigs are partially submerged in water and can involve dynamic positioning systems or can be drill ships—self-propelled offshore drilling rigs that can work beyond a depth of 3,000 meters. Although it is a high-fixed-cost activity, ultradeepwater drilling can deliver a steady stream of oil for a very long period, which makes these assets attractive to major international oil corporations.

[2]The focus of this feature is on oil, here referring to liquids including crude oil, condensate, and natural gas liquids.

[3]See Kleinberg (forthcoming) for a discussion of unconventional sources.

[4]Unless indicated otherwise, unconventional oil sources refer to the broader definition rather than the narrower (contemporaneous) definition of unconventional oil sources.

Figure 1.SF.2. Unconventional Oil, Proven Reserves, and Production, 2016



Sources: Rystad Energy research and analysis; and IMF staff calculations.
Note: Production and reserves include oil sands, heavy, extra heavy, tight and shale, deepwater, and ultradeepwater oil. A proven reserve is one with a greater-than-90 percent probability that the resource is recoverable and economically profitable. Deepwater is defined at 125–1,500 meters. Ultradeepwater is defined at 1,500 meters and above. When deepwater (or ultradeepwater) production was also categorized as heavy (or extra heavy) oil, the production was counted once, as deepwater (or ultradeepwater). Oil refers to crude oil, condensate, and natural gas liquids.

Where Are the Production and Reserve Centers?

Production and reserve centers for unconventional sources are concentrated in a few countries. North America has the highest concentration of economically recoverable proven reserves and production in unconventional sources (Figure 1.SF.2; Table 1.SF.1). These consist of shale oil in the United States and oil sands in Canada. Central and South America also host significant reserves and production centers, comprising heavy and extra heavy oil and deepwater and ultradeepwater oil resources in Brazil, Colombia, Ecuador, and Venezuela. The remainder of world reserves and production of unconventional sources are scattered and consist mostly of heavy oil in Europe and deepwater and ultradeepwater oil in the North Sea and West Africa. It is noteworthy that the Middle East has the highest concentration of conventional oil reserves and production, but has a relative low level of proven reserves and production in unconventional oil.

In addition to the actual, hard-to-observe geology, the high concentration of unconventional proven reserves and production reflects the geography of innovation and subsequent adoption of new recovery techniques in the form of investment in exploration and extraction. Conceptually, resource economists have long argued that the resource base is endogenous to how much effort is applied to exploring resources.[5] Knowledge about the actual geology is gained through exploration efforts and constantly evolves with technological improvements. Thus, proven reserves and production are governed as much by economic and institutional factors (above-ground factors) as by actual geology (below-ground factors).

Economic factors affecting the geography of exploration and production include proximity to markets and complementarities with available infrastructure. These factors often lead to agglomeration in production and in proven reserves.[6] Institutional

[5]The canonical model is the exploration model developed by Pindyck (1978) in which a social planner maximizes the present value of the social net benefits from consumption of oil, and the reserve base can be replenished through exploration and discovery of new fields. Resource exploration and discovery has been investigated either as a deterministic or a stochastic process (for example, Pindyck 1978; Arrow and Chang 1982; Devarajan and Fisher 1982).

[6]Moreno-Cruz and Taylor (2016) propose a spatial model of energy exploitation that determines how the location and productivity of energy resources affect the distribution of economic activity

Table 1.SF.1. Unconventional Oil Production, 2016
(Million barrels a day)

Country	Heavy Oil	Oil Sands and Extra Heavy Oil	Deepwater	Ultradeepwater	Shale and Tight Oil	Total
United States	0.07	0.40	0.77	0.79	7.25	9.28
Canada	0.08	2.60	-	-	0.60	3.28
Brazil	0.03	0.09	1.09	1.18	-	2.39
Angola	0.00	-	1.34	0.16	-	1.50
Norway	0.02	-	1.36	-	-	1.39
China	0.73	0.36	0.08	0.01	0.03	1.21
Venezuela	0.18	1.00	-	-	-	1.18
Nigeria	0.08	0.00	0.83	-	-	0.91
Mexico	0.31	0.48	0.01	-	0.00	0.80
Azerbaijan	0.01	0.00	0.72	-	-	0.74
Colombia	0.13	0.50	-	-	0.00	0.63
Oman	0.12	0.30	-	-	0.01	0.43
United Kingdom	0.05	-	0.29	-	-	0.34
Russia	0.19	0.10	-	-	-	0.30
Ecuador	0.20	0.01	-	-	-	0.21
Malaysia	0.01	0.01	0.16	-	-	0.19
Australia	-	0.01	0.16	-	0.00	0.17
Equatorial Guinea	-	-	0.17	-	-	0.17
Congo, Republic of	-	0.01	0.16	-	-	0.17
Indonesia	0.01	0.14	0.00	-	-	0.15
Kazakhstan	0.06	0.09	-	-	-	0.15
Argentina	0.08	0.01	-	-	0.04	0.13

Sources: Rystad Energy research and analysis; and IMF staff calculations.
Note: Deepwater is defined at 125–1,500 meters. Ultradeepwater is defined at 1,500 meters and above. When deepwater (or ultradeepwater) production was also categorized as heavy (or extra heavy) oil, the production was counted once, as deepwater (or ultradeepwater). Oil refers to crude oil, condensate, and natural gas liquids. Dash denotes zero production in record.

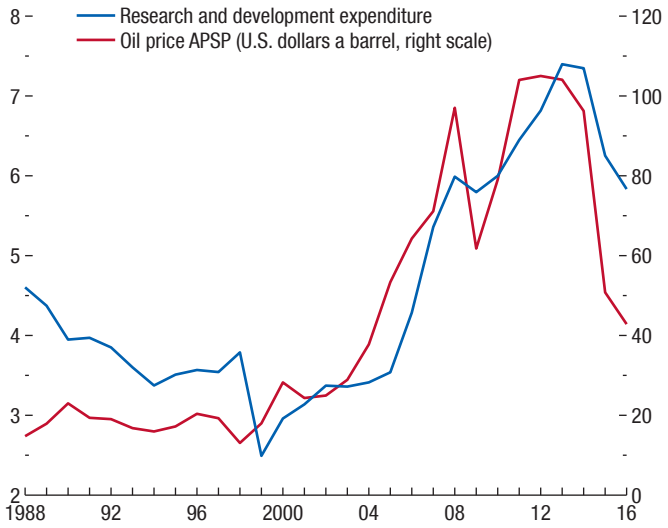
factors affecting exploration and production include openness to foreign investment and the strength of property rights, including in subsoil assets. Arezki, van der Ploeg, and Toscani (2016) provide empirical evidence of a causal—and economically significant—relationship running from changes in market orientation to discoveries of major hydrocarbon and mineral deposits, over and above increases in resource prices and depletion.

The observed differences between known reserves and production across countries reflect differences in production efficiency. These differences can be explained by institutional factors emanating from the ownership structure of the industry. For instance, Wolf (2009) provides evidence that the structure of ownership in the oil sector—that is, whether it is state owned—plays a key role in determining relative efficiency. He finds that, everything else equal, non-state-owned oil corporations significantly outperform state-owned ones. Difficulties with production systems can lead to a low propensity to produce from existing reserves. To exploit unconventional sources, oil companies need to be able to innovate or to implement new techniques.

Regulatory changes also play a central role in determining whether innovation and subsequent adoption of recovery techniques occur. Consider shale oil in the United States. Most large reserves of oil—and gas—in shale rock in the United States have been known for a long time—since as early as the 1920s according to some. Until the mid-2000s, oil extraction from shale rock formations was thought to be too costly, if not technologically impossible. In addition to high prices driven by the rapid increase in demand from emerging economic giants, such as China and India, the advent of shale oil can also be seen as the consequence of a regulatory shock in the United States. This is clear from the published forecasts of the U.S. Energy Information Administration. The expansion of shale oil extraction was aided by a landmark study conducted by the U.S. Environmental Protection Agency in 2004, which found that hydraulic fracturing posed no threat to underground drinking water supplies. Shortly

across geographic space. They find that a novel scaling law links the productivity of energy resources to population size, while rivers and roads effectively magnify productivity. Arezki and Bogmans (2017) provide evidence for the role of proximity to major markets and state capacity in the production of fossil fuels.

Figure 1.SF.3. Evolution of Research and Development Expenditure in Select Integrated Oil and Service Companies
(Billions of U.S. dollars, unless noted otherwise)



Sources: IMF, Primary Commodity Price System; Bloomberg L.P.; and IMF staff calculations.
Note: APSP = average petroleum spot price—average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted. The companies included are Baker Hughes, BP P.L.C., Chevron Corporation, ExxonMobil Corporation, The Halliburton Company, Royal Dutch Shell plc, Total S.A., and Schlumberger Limited.

afterward, the George W. Bush administration's Energy Policy Act of 2005 exempted chemicals used in hydraulic fracturing from the Safe Drinking Water Act regulations (see Gilje, Loutskina, and Strahan 2016).

Shale oil deposits have been identified in several other countries (for example, Argentina, Australia, Canada, China, Mexico, Russia). However, except for Argentina and Canada, where shale oil production is gearing up, regulatory obstacles and technological challenges, as well as recent low oil prices, have delayed or discouraged extraction.[7] Specifically, regulatory obstacles are related to environmental concerns, including water supply quality and the need for costly tailoring of fracking to the more complex nature of rock in some places.[8] Some countries have gone so far as to ban all exploration and production of shale oil. All in all, the global diffusion of shale oil production remains uncertain, contributing to broader uncertainty about the global oil supply outlook.

How Have Investment and Production Evolved?

The adage "necessity is the mother of invention" illustrates the cyclical nature of technological change (Hanlon 2015). The direction of technical change has been shown to be biased toward specific needs, depending on prevailing forces (see Acemoglu 2002). In the particular case of the oil sector, the need to address the rapid depletion of conventional oil reserves in certain locations, resulting in periods of high oil prices, has fostered improvements in recovery techniques. These episodes of high prices have been accompanied by significant increases in research and development expenditure, mostly on the part of major corporations—and at times smaller corporations—operating in the oil and gas sectors (Figure 1.SF.3). The current low-price environment provides scant incentive for research in oil-recovery techniques. Lindholt (2015) finds that technological improvements through research and development activity have offset the effect of ongoing depletion on the cost of finding and developing additional reserves of oil around the world. However, he finds that when considering a longer period, depletion generally outweighs technological progress. That result could stem from the fact that technical improvements are cyclical while depletion is not.[9]

The so-called peak-oil hypothesis posited that oil supply would top out in the mid-2000s, precisely the moment at which the shale revolution started. In many respects, that revolution can be viewed as an endogenous supply response to high prices in the 2000s, hence challenging the overly pessimistic view that geological factors limit supply (Arezki and others 2017).[10]

[7]Although the prospects for shale oil diffusing beyond the United States have been limited so far, shale gas production is under way in a number of countries, such as Argentina, China, and Russia.

[8]See *Nature Climate Change* (2013) for a discussion of the pros and cons of fracking.

[9]For the Gulf of Mexico, Managi and others (2004, 2005, 2006), using microlevel data from 1947–98, find empirical support for the hypothesis that technological change has offset depletion for offshore oil and gas production. For the United States, Cuddington and Moss (2001) present evidence that technological improvements respond to instances of scarcity by analyzing the determinants of the average finding cost for additional petroleum reserves over the period 1967–90.

[10]High oil prices also stimulate technological change in the energy-using sector. Aghion and others (2016) provide evidence that firms in the auto industry tend to innovate more in "clean" (and less in "dirty") technologies when they face higher fuel prices. The lower-for-longer oil price environment could, however, delay the energy transition by slowing technological change—and subsequent adoption—directed toward moving away from fossil fuel use (Arezki and Obstfeld 2015).

Historically, global investment and operational expenditures in unconventional oil have closely followed oil price developments (Figure 1.SF.4).[11] During episodes of dramatic price movements, as in the late 1970s, investment in the oil sector responded promptly. In late 2008 during the global financial crisis, oil investment plummeted but then rebounded in 2009 following the sharp but temporary drop in oil prices. The 2000s episode marks the most unprecedented increase in global capital expenditure and reflects a prolonged era of high oil prices. The rapid increase in oil demand, especially from large emerging market economies, such as China and India, has driven oil prices up and encouraged further investment in tight oil formations, ultradeepwater oil, and extra heavy oil, which were previously uneconomical at lower oil prices. While comovement between oil prices and capital expenditure in unconventional sources is akin to what it is in conventional sources, expenditure in unconventional sources embodies technological changes that contribute to changing the response of global oil production. Shale oil requires a lower level of sunk costs than conventional oil, and the lag between initial investment and production is much shorter. Shale oil is thus contributing to shorter and more limited oil price cycles (Arezki and Matsumoto 2016).

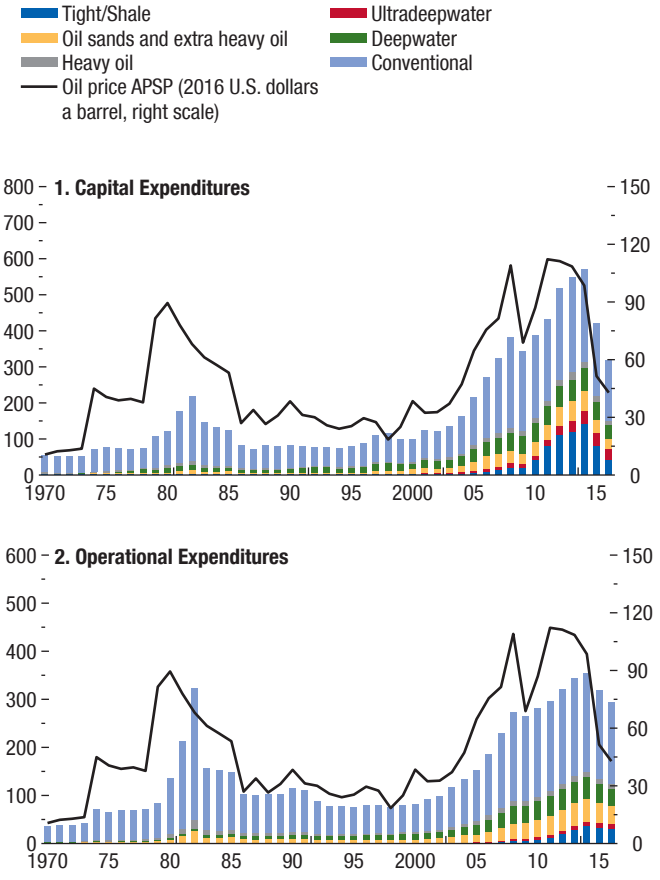
The unprecedented increase in capital expenditure in unconventional sources in the 2000s has contributed to these sources' centrality in the global oil market. In particular, shale oil production growth has emerged as a major contributor to global supply growth (Figure 1.SF.5).[12] The rapid increase in unconventional sources also contributed to the change in OPEC's strategic behavior, leading to the dramatic collapse in oil prices (Arezki and Blanchard 2014). Although that abrupt decline in prices led to a reduction in investment and expenditure, large operational efficiency gains acted as automatic stabilizers.

The downward shift in the cost structure induced by lower oil prices is partly temporary. A commonly held belief is that the cost structure—which is often proxied by the break-even price (the price at which it is economical to produce a barrel of oil)—is constant and driven by immutable factors, such as the nature of the oil extracted and the associated geology (Figure 1.SF.6).

[11]Investment and oil price series are deflated using a price index of private fixed investment in mining and oilfield machinery in the United States obtained from the Bureau of Economic Analysis website.

[12]In 2016, shale oil added 7.9 mbd in a market of 96 mbd—that is, 4.4 mbd in crude oil, 2.7 mbd in natural gas liquids, and 0.8 mbd in condensate.

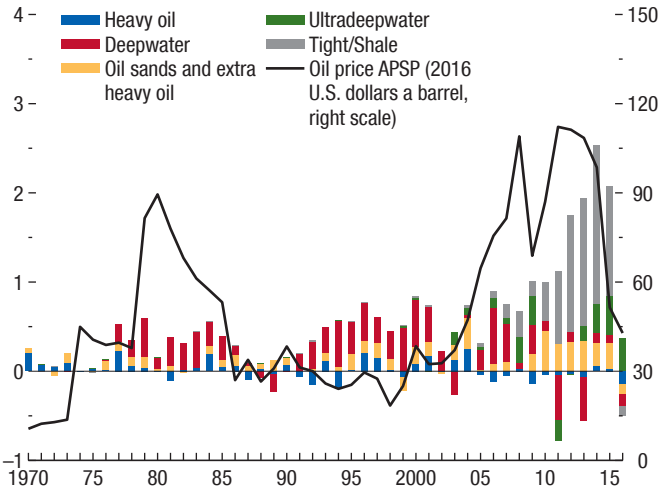
Figure 1.SF.4. Historical Evolution of Global Capital and Operational Expenditures
(Billions of 2016 U.S. dollars, unless noted otherwise)



Sources: IMF, Primary Commodity Price System; IMF International Financial Statistics database; Rystad Energy research and analysis; and IMF staff calculations.
Note: APSP = average petroleum spot price–average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted. Capital expenditure includes exploration costs associated with seismic and drilling wildcats or appraisal wells to discover and delineate oil and gas fields, and all development costs related to facilities and drilling of wells. Operational expenditure includes operational expenses directly related to oil and gas activities. The costs are estimated at asset level and calibrated against company reported values. Deepwater is defined at 125–1,500 meters. Ultradeepwater is defined at 1,500 meters and above. When deepwater (or ultradeepwater) production was also categorized as heavy (or extra heavy) oil, the production was counted once, as deepwater (or ultradeepwater). Oil refers to crude oil, condensate, and natural gas liquids.

In practice, the cost structure depends on a host of factors, including technological improvements and the extent of "learning by doing," which will reduce costs permanently. In instances such as the recent dramatic drop in prices, break-even prices have moved downward in sync with oil prices. That shift is explained by the operational efficiency gains stemming from the

Figure 1.SF.5. Growth in Unconventional World Oil Production and Real Oil Prices
(Million barrels a day, unless otherwise noted)



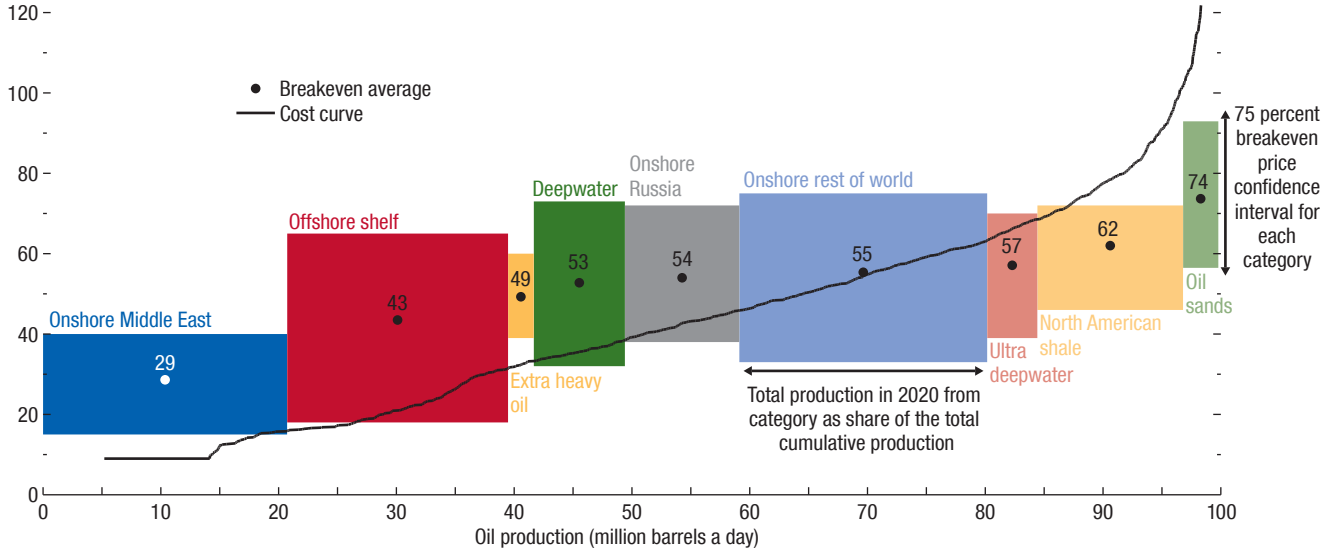
Sources: IMF, Primary Commodity Price System; Bureau of Economic Analysis; Rystad Energy research and analysis; and IMF staff calculations.
Note: APSP = average petroleum spot price—average of U.K. Brent, Dubai, and West Texas Intermediate, equally weighted. Total world production in 2016 was estimated at 96.5 mbd (million barrels a day). Deepwater is defined at 125–1,500 meters. Ultradeepwater is defined at 1,500 meters and above. When deepwater (or ultradeepwater) production was also categorized as heavy (or extra heavy) oil, the production was counted once, as deepwater (or ultradeepwater). Oil refers to crude oil, condensate, and natural gas liquids.

service industry's significant reduction in margins to support the upstream sector. In shale oil specifically, the extraordinary resilience to the drop in oil prices can be explained by important efficiency gains compounded by the fact that shale came on the scene at the onset of an investment cycle in which learning by doing was important (Figure 1.SF.7).[13] The shale cost structure is likely to shift back up somewhat because some of the efficiency gains cannot be sustained under an expansion of oil production, while the cost of capital is expected to increase as U.S. interest rates rise.

The shift in cost structure has not been uniform across unconventional sources. Oil sand production, which is subject to high decommissioning costs, has displayed continued high growth rates. However, the lower investment in exploring new fields is expected to affect production of oil sands down the line. Deepwater and ultradeepwater oil production has been subject to active upgrading, which has made it somewhat resil-

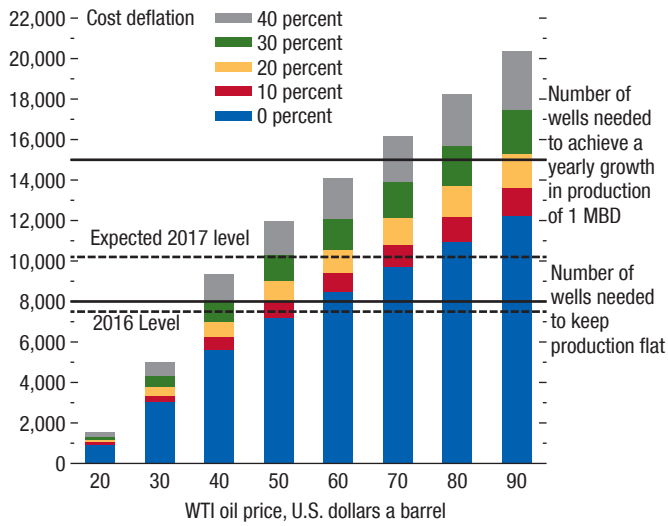
[13]Figure 1.SF.7 indicates that under a scenario of no cost deflation, the oil price level required to keep shale production constant is higher than $80 a barrel. With cost deflation of about 40 percent, akin to what has been observed in the recent past, the required price level is only $40 a barrel. After having weakened production, the recent rally in oil prices has been followed by signs of recovery in investment and production.

Figure 1.SF.6. Global Oil Supply Cost Curve and Breakeven Prices
(U.S. dollars a barrel)



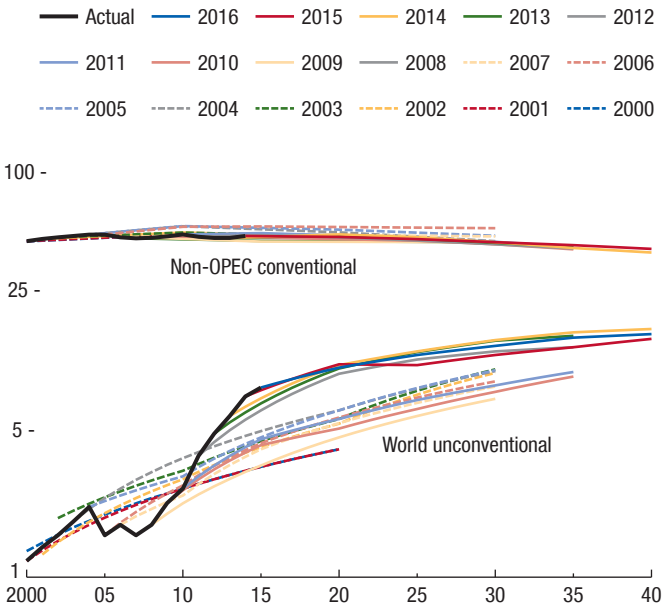
Source: Rystad Energy research and analysis.
Note: The breakeven price is the Brent oil price at which net present value equals zero, considering all future cash flows using a real discount rate of 7.5 percent. Oil refers to crude oil, condensate, and natural gas liquids.

Figure 1.SF.7. North American Shale Oil Wells at Different West Texas Intermediate Oil Prices and Cost Deflation Scenarios
(Annual number of wells)



Source: Rystad Energy research and analysis.
Note: Refers to spudded wells, defined as wells that are drilled but not extracted. At $60/barrel, approximately 8,000 shale wells have to be drilled, with 10 percent cost deflation, to keep production flat. MBD = million barrels a day; WTI = West Texas Intermediate.

Figure 1.SF.8. Unconventional Oil Production Outlook Vintages
(Million barrels a day, logarithmic scale)



Source: International Energy Agency.
Note: OPEC = Organization of the Petroleum Exporting Countries. Replicated from Wachtmeister, Henke, and Höök (2017). Dates correspond to vintages from forecast.

ient. But again, lower investment in new fields will also tend to affect deepwater and ultradeepwater oil further in the future, albeit with different patterns across regions owing to below- and above-ground factors.

What Lies Ahead?

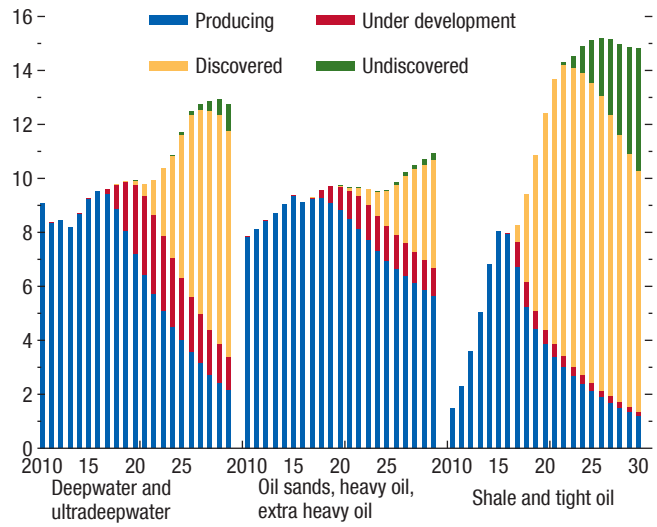
The development of unconventional sources is inherently uncertain. Uncertainty is apparent when comparing the ability to forecast unconventional relative to conventional production (Figure 1.SF.8).[14,15] Technological improvements and their subsequent adoption—including the extent of learning and spatial diffusion—are hard to predict. As mentioned earlier, uncertainty surrounding the development of unconventional sources is governed by the very uncertain nature of the processes of innovation and adoption, owing to an interaction between below- and above-ground factors. All in all, the rising importance of unconventional sources in global supply is not only changing the dynamic response of production to prices, but also results in more uncertainty over the medium term.

Despite uncertainty about technological improvements and the recent OPEC agreement, rebalancing oil supply in line with demand accompanied by stable prices, will hinge on the prospects for unconventional sources (Figure 1.SF.9). The negotiated reduction in oil production by 1.8 mbd for six months will, in principle, help rebalance the market by the end of 2017, eliminating an excess supply currently estimated to be a little less than 1 mbd. Annual oil demand growth, commonly projected at about 1.2 mbd, will be met by unconventional sources over the next few years, mainly through resources under development for deepwater and ultradeepwater oil, oil sands, and heavy and extra heavy oil. In the absence of shale, depletion forces and the legacy of low invest-

[14]The IEA does not provide specific forecasts for oil production by OPEC.

[15]Wachtmeister, Henke, and Höök (2017) present a detailed assessment of the production forecast prepared by the IEA using a narrower definition of unconventional oil sources. Leduc, Moran, and Vigfusson (2013) present evidence of the rather gradual learning in futures markets.

Figure 1.SF.9. Unconventional Oil Outlook
(Million barrels a day)



Sources: Rystad Energy research and analysis; and IMF staff calculations.
Note: Deepwater is defined at 125–1,500 meters. Ultradeepwater is defined at 1,500 meters and above. When deepwater (or ultradeepwater) production was also categorized as heavy (or extra heavy) oil, the production was counted once, as deepwater (or ultradeepwater). Oil refers to crude oil, condensate, and natural gas liquids.

ment would start to kick in and push prices up significantly after a few years. Instead, in the new normal for the oil market, shale oil production will be further stimulated by a moderate price increase (Arezki and Matsumoto 2016). As a result, supply from shale will help somewhat tame the otherwise sharp upward swing in oil prices. Over the medium term, as prices increase further, technical improvements in unconventional oil recovery will be reactivated, which will eventually set off another price cycle.

References

Acemoglu, Daron. 2002. "Directed Technical Change." *Review of Economic Studies* 69 (4): 781–809.

Adler, Gustavo, Romain Duval, Davide Furceri, Sinem Kiliç Çelik, Ksenia Koloskova, and Marcos Poplawski-Ribeiro. 2017. "Gone with the Headwinds: Global Productivity." IMF Staff Discussion Note 17/04, International Monetary Fund, Washington, DC.

Aghion, Philippe, Antoine Dechezlepretre, David Hemous, Ralf Martin, and John Van Reenen. 2016. "Carbon Taxes, Path Dependency, and Directed Technical Change: Evidence from the Auto Industry." *Journal of Political Economy* 124 (1): 1–51.

Ahn, JaeBin, and Romain Duval. Forthcoming. "Trading with China: New Sector-Level Evidence from Advanced Economies." IMF Working Paper, International Monetary Fund, Washington, DC.

Arezki, Rabah, and Olivier Blanchard. 2014. "Seven Questions about the Recent Oil Price Slump." iMFdirect blog, December 22.

Arezki, Rabah, and Akito Matsumoto. 2016. "A New Normal for the Oil Market." iMFdirect blog, October 27.

Arezki, Rabah and Christian Bogmans. 2017. "Proximity to Markets, State Capacity and the Production of Fossil Fuels." Unpublished.

Arezki, Rabah, Zoltan Jakab, Douglas Laxton, Akito Matsumoto, Armen Nurbekyan, Hou Wang, and Jiaxiong Yao. 2017. "Oil Prices and the Global Economy." IMF Working Paper 17/15, International Monetary Fund, Washington, DC.

Arezki, Rabah and Maurice Obstfeld. 2015. "The Price of Oil and the Price of Carbon." iMFdirect blog, December 2, and VoxEU.org, December 3.

Arezki, Rabah, Frederick van der Ploeg, and Frederik Toscani. 2016. "Shifting Frontiers in Global Resource Extraction: The Role of Institutions." CEPR Discussion Paper 11553, Centre for Economic Policy Research, London.

Arrow, Kenneth J., and Sheldon Chang. 1982. "Optimal Pricing, Use and Exploration of Uncertain Natural Resource Stocks." *Journal of Environmental Economics and Management* 9 (1): 1–10.

Baldwin, Richard. 2016. *The Great Convergence: Information Technology and the New Globalization*. Cambridge, MA: Belknap Press.

Besley, Timothy, and Torsten Persson. 2008. "Wars and State Capacity." *Journal of the European Economic Association* 6 (2–3): 522–30.

Blattman, Christopher, and Edward Miguel. 2010. "Civil War." *Journal of Economic Literature* 48 (1): 3–57.

Cerra, Valerie, and Sweta Chaman Saxena. 2008. "Growth Dynamics: The Myth of Economic Recovery." *American Economic Review* 98 (1): 439–57.

Collier, Paul, Anke Hoeffler, and Catherine Pattillo. 2004. "Africa's Exodus: Capital Flight and the Brain Drain as Portfolio Decisions." *Journal of African Economies* 13 (Supplement 2): 15–54.

Costinot, Arnaud, and Andrés Rodríguez-Clare. 2013. "Trade Theory with Numbers: Quantifying the Consequences of Globalization." NBER Working Paper 18896, National Bureau of Economic Research, Cambridge, MA.

Cuddington, John T., and Diana L. Moss. 2001. "Technological Change, Depletion, and the U.S. Petroleum Industry." *American Economic Review* 91 (4): 1135–48.

Devarajan, Shantaynan, and Anthony C. Fisher. 1982. "Exploration and Scarcity." *Journal of Political Economy* 90 (6): 1279–90.

Fajgelbaum, Pablo, and Amit Khandelwal. 2016. "Measuring the Unequal Gains from Trade." *Quarterly Journal of Economics* 131 (3): 1113–80.

Fernald, John. 2014. "Productivity and Potential Output before, during, and after the Great Recession." NBER Working Paper 20248, National Bureau of Economic Research, Cambridge, MA.

Feyrer, James. 2007. "Demographics and Productivity." *Review of Economics and Statistics* 89 (1): 100–09.

Gilje, Erik P., Elena Loutskina, and Philip E. Strahan. 2016. "Exporting Liquidity: Branch Banking and Financial Integration." *Journal of Finance* 71 (3): 1159–84.

Gruss, Bertrand. 2014. "After the Boom—Commodity Prices and Economic Growth in Latin America and the Caribbean." IMF Working Paper 14/154, International Monetary Fund, Washington, DC.

Hanlon, W. Walker. 2015. "Necessity Is the Mother of Invention: Input Supplies and Directed Technical Change." *Econometrica* 83 (1): 67–100.

International Monetary Fund (IMF). 2016. "Small States' Resilience to Natural Disasters and Climate Change—Role for the IMF." IMF Policy Paper, Washington, DC.

Jorda, Oscar. 2005. "Estimation and Inference of Impulse Responses by Local Projections." *American Economic Review*, 95(1): 161–182.

Justino, Patricia. 2007. "On the Links between Violent Conflict and Household Poverty: How Much Do We Really Know?" MICROCON Research Working Paper 1, Brighton, United Kingdom.

———. 2009. "Poverty and Violent Conflict: A Micro-Level Perspective on the Causes and Duration of Warfare." *Journal of Peace Research* 46 (3): 315–33.

Kleinberg, Robert L. Forthcoming. "Unconventional Fossil Fuels." In M.J. Aziz and A.C. Johnson, *Introduction to Energy Technology: Depletable and Renewable,* Wiley-VCH.

Koopman, Robert, Zhi Wang, and Shang-Jin Wei. 2014. "Tracing Value-Added and Double Counting in Gross Exports." *American Economic Review* 104 (2): 459–94.

Leduc, Sylvain, Kevin Moran, and Robert Vigfusson. 2013. "Learning about Future Oil Prices." Unpublished.

Lindholt, Lars. 2015. "The Tug-of-War between Resource Depletion and Technological Change in the Global Oil Industry 1981–2009." *Energy* 93: 1607–16.

Managi, Shunsuke, James J. Opaluch, Di Jin, and Thomas A. Grigalunas. 2004. "Technological Change and Depletion in

Offshore Oil and Gas." *Journal of Environmental Economics and Management* 47 (2): 388–409.

———. 2005. "Technological Change and Petroleum Exploration in the Gulf of Mexico." *Energy Policy* 33 (5): 619–32.

———. 2006. "Stochastic Frontier Analysis of Total Factor Productivity in the Offshore Oil and Gas Industry." *Ecological Economics* 60 (1): 204–15.

Moreno-Cruz, Juan, and M. Scott Taylor. 2016. "An Energy-Centric Theory of Agglomeration." NBER Working Paper 22964, National Bureau of Economic Research, Cambridge, MA.

Mueller, Hannes. 2013. "The Economic Costs of Conflict." International Growth Centre Working Paper, London.

———. 2016. "Growth and Violence: Argument for a per Capita Measure of Civil War." *Economica* 83 (331): 473–97.

Nature Climate Change. 2013. "Fracking Fracas." April 25.

Pindyck, Robert S. 1978. "The Optimal Exploration and Production of Nonrenewable Resources." *Journal of Political Economy* 86 (5): 841–61.

Rodrik, Dani. 1999. "Where Did All the Growth Go? External Shocks, Social Conflict, and Growth Collapses." *Journal of Economic Growth* 4 (4): 385–412.

Teulings, Coen N., and Nikolay Zubanov. 2014. "Is Economic Recovery a Myth? Robust Estimation of Impulse Responses." *Journal of Applied Econometrics* 29 (3): 497–514.

United Nations (UN). 2016. "World Population Prospects, the 2015 Revision." Department of Economic and Social Affairs, Population Division, New York, NY.

United Nations High Commissioner for Refugees (UNHCR). 2016. "Population Statistics Reference Database." New York, NY.

Voors, Maarten J., Eleonora E. M. Nillesen, Philip Verwimp, Erwin H. Bulte, Robert Lensink, and Daan P. Van Soest. 2012. "Violent Conflict and Behavior: A Field Experiment in Burundi." *American Economic Review* 102 (2): 941–64.

Wachtmeister, Henrik, Petter Henke, and Mikael Höök. 2017. "Oil Projections in IEA World Energy Outlooks: Revisions, Accuracy and Uncertainty." Uppsala University Working Paper, Uppsala, Sweden.

Wacziarg, Romain, and Karen Horn Welch. 2008. "Trade Liberalization and Growth: New Evidence." *World Bank Economic Review* 22 (2): 187–231.

Wolf, Christian. 2009. "Does Ownership Matter? The Performance and Efficiency of State Oil vs. Private Oil (1987–2006)." *Energy Policy* 37 (7): 2642–52.

Yi, Kei-Mu. 2003. "Can Vertical Specialization Explain the Growth of World Trade?" *Journal of Political Economy* 111 (1): 52–102.

————————. 2010. "Can Multistage Production Explain the Home Bias in Trade?" *American Economic Review* 100 (1): 364–93.