

SPECIAL FOCUS

The U.S. Economy and the World

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Developments in the U.S. economy, the world's largest, have effects far beyond its shores. A surge in U.S. growth—whether due to expansionary fiscal policies or other reasons—could provide a significant boost to the global economy. Tightening U.S. financial conditions—whether due to faster-than-expected normalization of U.S. monetary policy or other reasons—could reverberate across global financial markets, with adverse effects on some emerging market and developing economies (EMDEs) that rely heavily on external financing. In addition, lingering uncertainty about the course of U.S. economic policy could have a significantly negative effect on global growth prospects. While the United States plays a critical role in the world economy, activity in the rest of the world is also important for the United States. The new U.S. administration's specific economic policies are still being shaped. By assessing the U.S. economy's role in the world, the objective of this Special Focus is to inform the analysis of potential global implications of such policies.

Introduction

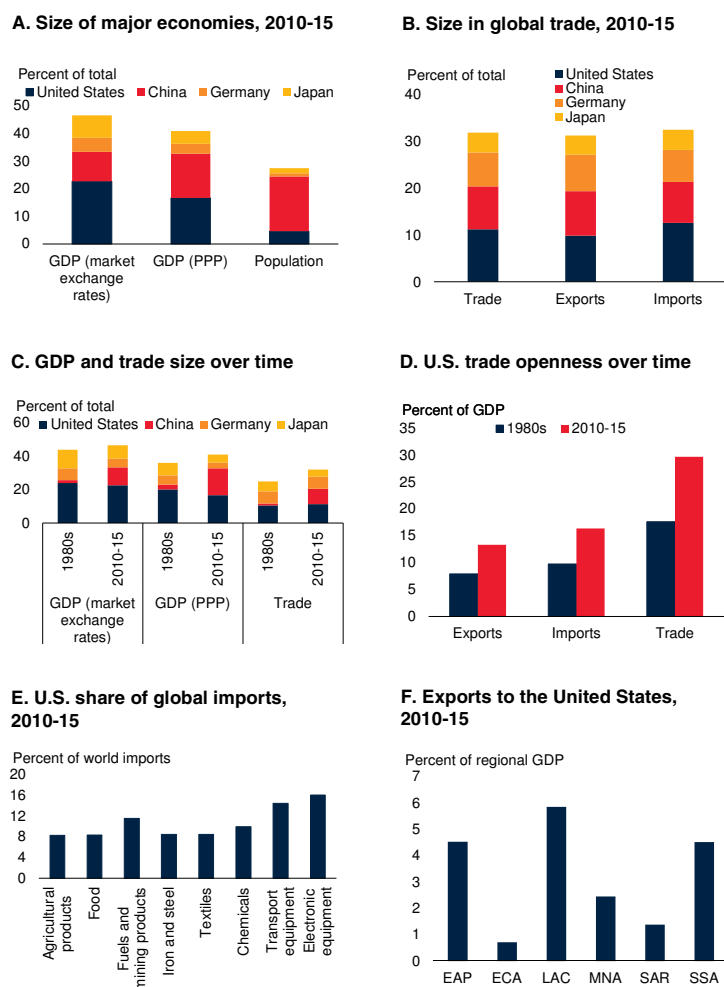
Developments in the U.S. economy, because of its size and international linkages, are bound to have substantial implications for the global economy. The United States is the world's single largest economy (at market exchange rates), accounting for almost 22 percent of global output and over a third of stock market capitalization (Figures SF.1 and SF.2). It is prominent in virtually every global market, with about one-tenth of global trade flows, one-fifth of global FDI stock, close to one-fifth of remittances, and one-fifth of global energy demand. Since the U.S. dollar is the most widely used currency in global trade and financial transactions, changes in U.S. monetary policy and investor sentiment play a major role in driving global financing conditions.

At the same time, the global economy is important for the United States. Affiliates of U.S. multinationals operating abroad and affiliates of foreign companies located in the United States account for a sizable share of output, employment, cross-border trade and financial flows. One-sixth of consumer goods purchases by U.S. consumers are for imported goods, with an even higher share in cars and consumer electronics.

This Special Focus examines the role of the United States in the global economy and the two-way

FIGURE SF.1 United States in the global economy

The U.S. economy is the world's largest, accounting for almost one quarter of global GDP and one-tenth of global trade.



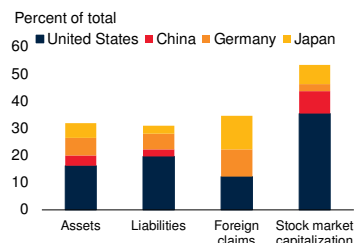
Note: This Special Focus was prepared by M. Ayhan Kose, Csilla Lakatos, Franziska Ohnsorge, and Marc Stocker, and with contributions from Carlos Arteta, John Baffes, Jongrim Ha, Raju Huidrom, Ergys Islamaj, Ezgi O. Ozturk, Hideaki Matsuoka, Naotaka Sugawara, and Temel Taskin. Xinghao Gong, Trang Nguyen, and Peter Williams provided research assistance.

Sources: World Bank, International Monetary Fund, UN Population Statistics.
 A.C. "PPP" stands for purchasing power parity exchange rates.
 B.D. Trade is the sum of exports and imports of goods.
 E. Goods imports.
 F. "EAP" stands for East Asia and Pacific; "ECA" stands for Europe and Central Asia; "LAC" stands for Latin America and the Caribbean; "MNA" stands for Middle East and North Africa; "SAR" stands for South Asia; and "SSA" stands for Sub-Saharan Africa.

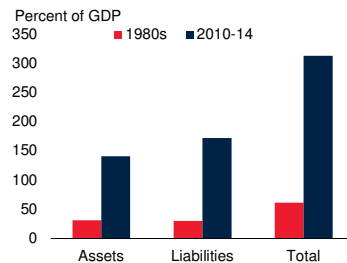
FIGURE SF.2 United States in global financial markets

The United States is the single largest international creditor and debtor, and U.S. financial markets are highly integrated with global markets. The U.S. dollar is the most widely used currency in global trade and financial transactions.

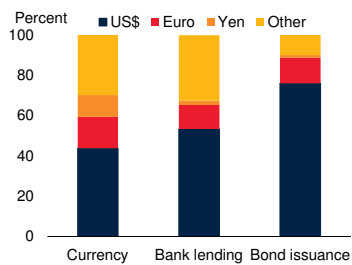
A. Financial market size, 2010-15



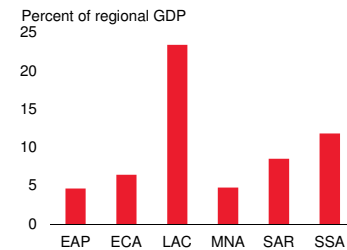
B. U.S. financial openness, 2010-14



C. Share of U.S. dollar-denominated transactions in financial markets, 2016



D. Capital investment by the United States, 2010-15



Sources: World Bank, Lane and Milesi-Ferretti (2007), Bank for International Settlements, International Monetary Fund, World Federation of Exchange.

A. Foreign claims are consolidated foreign claims of BIS-reporting banks headquartered in respective countries or locations (data unavailable for China). Assets and liabilities are international investment positions. Average share for 2010-15, except for assets and liabilities (2010-14).

B. Total is the sum of assets and liabilities. Average shares in GDP over the periods of 1980-89 and 2010-14.

C. For currency, totals sum to 100 percent because each foreign exchange transaction involves two different currencies. "Euro" includes all legacy currencies of the Euro as well as the European Currency Unit. Data for the center and right bars are for June 2016.

D. Capital investment refers to stocks of foreign direct investment (FDI), portfolio investment, and cross-border bank lending from the United States to EMDE regions. Country coverage varies by capital investment component. As FDI data are not available for 2015, data up to 2014 are used for FDI.

interactions between the U.S. economy and other economies by addressing the following questions:

- How important are linkages between the U.S. economy and the world?
- How synchronous are business cycles in the United States and other economies?
- How large are global spillovers from shocks originating in the United States?
- How important is the global economy for the United States?

Much attention has focused on the domestic and global implications of the economic policies that

may be pursued by the new U.S. administration.¹ The incoming administration has signaled its intention to pursue more expansionary fiscal policies, which could lead to stronger growth in the short-term. It has also promised a change in direction in trade policies. In designing these policies, the challenge will be to generate domestic benefits while containing potentially adverse feedbacks from their global repercussions. While detailed plans are still being worked out, an understanding of the role of the U.S. economy in the global economy can inform the analysis of potential global implications of likely policies. In light of the answers to the four questions above, some preliminary implications are sketched out in the concluding section of this Special Focus.

Linkages between the United States and the World

With an estimated nominal GDP of more than \$18 trillion in 2016, the United States is the world's single largest economy and has the world's third largest population. It accounts for more than 22 percent of global GDP (at 2015 market exchange rates), 11 percent of global trade, 12 percent of bank foreign claims, and 35 percent of global stock market capitalization (Figures SF.1 and SF.2).² The U.S. share of global output and trade has remained broadly stable since the 1980s, whereas the share of other major advanced economies has declined gradually. The United States is the single largest international creditor and debtor: it holds the largest stock of foreign assets and liabilities and, by a wide margin, the largest net foreign asset position (updated and extended version of dataset constructed by Lane and Milesi-Ferretti 2007).

U.S. trade and financial integration with other advanced economies and EMDEs—especially in Latin America and the Caribbean (Figure SF.3)—

¹Early assessments have emphasized the need for additional details and challenges for policy, see Blanchard (2016); Bown (2016); Constancio (2016); Chandy and Seidel (2016); Spence (2016).

²At purchasing power exchange rates, the United States is the world's second largest economy with about 16 percent of global GDP in 2015. China is the world's largest, accounting for 17 percent of global GDP.

runs deep. Countries whose trade and financial ties are predominantly with the United States are directly exposed to U.S. developments. In addition, those that are in general highly open to global trade and finance are indirectly exposed because of widespread spillovers from the United States.

Trade links. Trade accounted for 30 percent of U.S. GDP in 2015, considerably less than the average for other advanced economies (70 percent) but almost twice as much as in the 1980s (18 percent). The United States is the world’s single largest importer and exporter of goods and services, and the largest exporter and importer of business services (Figure SF.4). It accounts for 14 percent of global goods imports and 9 percent of global services imports.

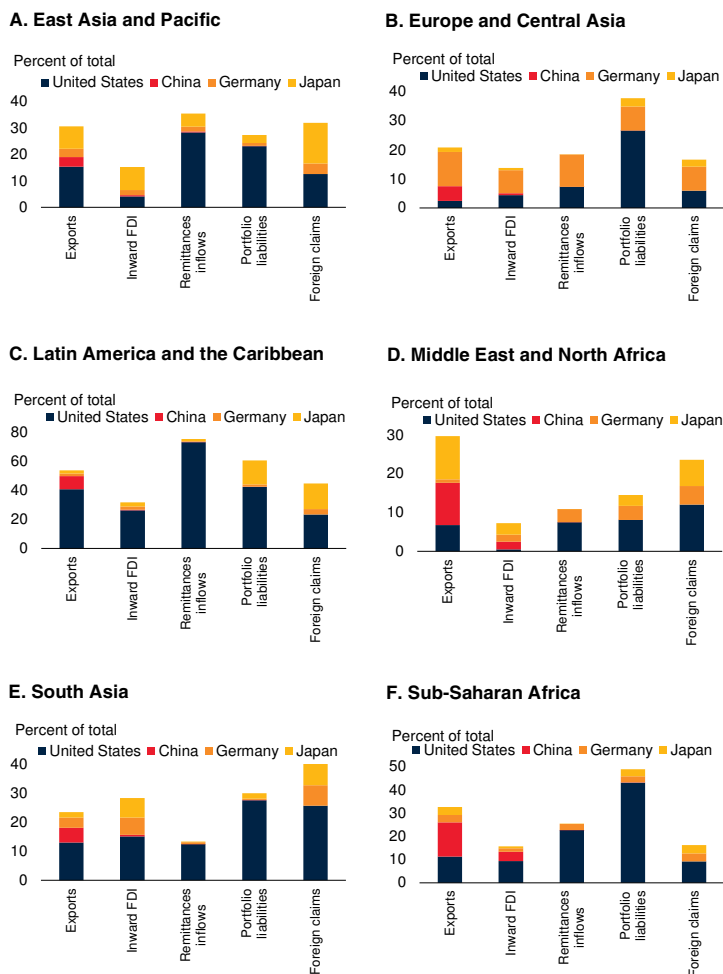
Manufactured goods account for more than three-quarters of U.S. goods imports, with oil imports making up most of the remainder despite a steady decline since 2000. The most prominent imported manufacturing categories are motor vehicles, data processing machines, and drugs. More than two-thirds of U.S. manufacturing imports originate from China (24 percent of imports), the European Union (20 percent of imports), Mexico and Canada (combined 24 percent of imports).

The United States is the single largest export destination for one-fifth of the world’s countries. It is the largest export market for more than half of the EMDEs in Latin America and the Caribbean, and South Asia, and the primary export market for several countries in other EMDE regions, especially in East Asia Pacific. Mexico, Colombia, Ecuador and many smaller Central American EMDEs rely particularly heavily on exports to the United States.

The growth of trade linkages between the United States and other countries has taken place in an era of trade liberalization. Since 1948, the General Agreement on Trade and Tariffs (GATT) and, since 1995, the World Trade Organization (WTO) have provided a multilateral framework for this process. The majority of U.S. trade is conducted under the Most Favored Nation (MFN) regime, with average tariffs at 3.5 percent

FIGURE SF.3 Linkages between the United States and EMDE regions

The United States is a particularly large trading partner and source of finance for Latin America and the Caribbean, and East Asia and the Pacific. Portfolio and remittance inflows from the United States are important for most EMDE regions.



Sources: World Integrated Trade Statistics, Bank for International Settlements, International Monetary Fund, World Bank.
 Notes: Averages for 2010-15, except for FDI (2010-14 average). In percent of total exports of each EMDE region, total inward FDI stocks in each EMDE region, total portfolio liabilities (derived from creditor data) in each EMDE region, total foreign claims of BIS-reporting banks on each EMDE region, and total remittance flows to each region.

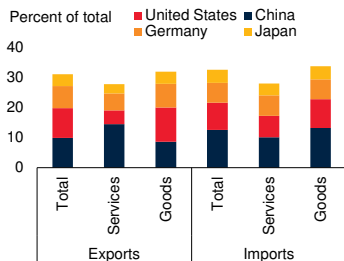
(5.2 percent for agricultural products). In addition to multilateral agreements, the United States has negotiated 14 bilateral or regional trade agreements with 20 partner countries, which cover 32 percent of its imports of goods and services (Jackson 2016).³ The largest of these agreements is

³For discussions of the implications of the NAFTA and CAFTA-DR, see De Hoyos and Iacovone (2013); Kose, Meredith and Towe (2005); Kose, Rebucci and Schipke (2005); Lederman, Maloney, and Serven (2004); and Romalis (2007).

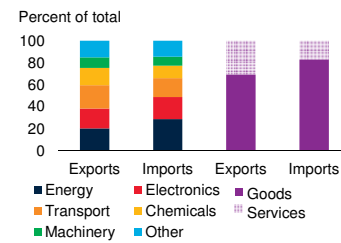
FIGURE SF.4 U.S. trade flows: Composition and partners

The U.S. is the single largest country destination of global exports of goods and services. It is a key market for the LAC region as well as for some EMDEs in East Asia. Electronic and transport equipment account for the bulk of U.S. manufacturing imports and are mostly imported from other NAFTA members, European Union countries, and China.

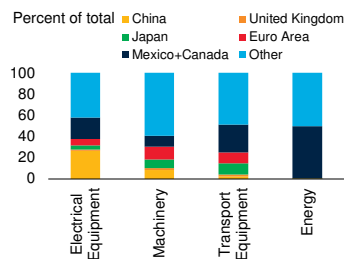
A. U.S. share of global goods and services trade



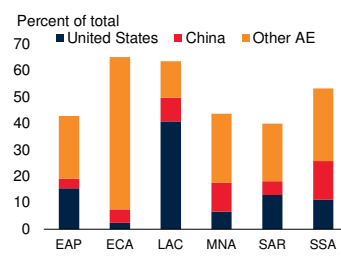
B. Composition of U.S. exports and imports



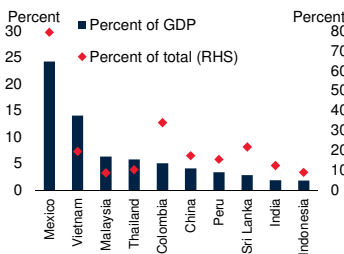
C. Main sources of U.S. imports



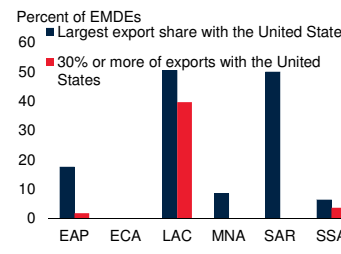
D. Exports destinations of EMDE regions



E. Selected EMDEs: Exports to the United States



F. Share of EMDEs for which United States is a major export destination



Sources: World Trade Organization, World Integrated Trade Statistics, Bureau of Economic Analysis, IMF, World Bank.

Note: Averages for 2010-15 unless otherwise specified.

A. U.S. imports of goods and services in percent of global goods and services imports.

B. U.S. imports of goods or services in percent of total U.S. imports of goods and services (purple bars); U.S. imports in each sector in percent of total U.S. goods imports (other bars). "Energy" includes energy-related products, metals and minerals; "Electronics" stands for electronic products; "Chemicals" stands for chemicals and related products; "Transport" stands for transportation equipment; "Other" includes agricultural and forestry products, textiles, apparel, and footwear. Averages for 2010-2014.

C. Sectoral exports from European Union, China, Japan, and other economies to the United States in percent of total U.S. imports in each sector.

D. Exports to the United States, other advanced economies, and China in percent of total exports of each EMDE region. "AE" stands for advanced economies.

E. Exports to the United States in percent of total exports or in percent of GDP of each EMDE economy.

F. Share of EMDE economies in each region for which exports to the United States account for the single largest share of total exports or for which exports to the United States account for at least 30 percent of total exports.

the North American Free Trade Agreement (NAFTA), in force since 1994. The United States also grants unilateral preferences to a number of EMDEs through its Generalized System of Preferences (GSP) and African Growth Opportunity Act (AGOA) which cover about 3.3 percent of U.S. imports (Frazer and Biesebroek 2008; Mattoo, Roy, and Subramaniam 2003; Cooper 2014).

Financial links. The U.S. financial markets are highly integrated with global markets. Following a rapid expansion over three decades, by 2010-14, its international assets and liabilities were on average three times GDP, broadly in line with that of other advanced economies (Figure SF.2). The United States remains the world's largest source and recipient of foreign direct investment (FDI) flows, accounting for about one-fourth of world FDI inflows and outflows in 2015. The European Union (EU), Japan, Canada and Switzerland together hold about 90 percent of FDI assets in the United States, while the EU and Canada are the largest recipients of U.S. FDI. The countries of the Latin America and Caribbean region are the most exposed to FDI inflows originating in the United States, in particular, Brazil, Chile, and Mexico (Figure SF.5). Reflecting the size and depth of its financial markets, the United States accounts for the largest share of portfolio assets in one-third of EMDEs.

The U.S. dollar is the most widely used currency in international trade and financial markets and is the world's preeminent reserve currency. Around 80 percent of EMDE bond issuance and more than 50 percent of cross-border bank flows to EMDEs are denominated in U.S. dollars. Europe and Central Asia is the only EMDE region where the U.S. dollar is surpassed—by the euro—as the currency of denomination for cross-border bank flows. Ecuador, El Salvador, and Panama use the U.S. dollar as their official currency; more than 30 other EMDEs maintain exchange rate pegs against the U.S. dollar. A large share of official foreign exchange reserves (63 percent) are dollar-denominated. The U.S. dollar is widely used in international trade transactions for current account transactions, accounting for about one-third of invoicing for goods and services in Europe

and two-thirds in Asia (Goldberg and Tille 2008, 2016; Devereux and Shi 2013).

Commodity market links. The United States is a large producer and consumer of commodities (Figure SF.6). For example, it has re-emerged as the largest producer of oil and natural gas in recent years, accounting for 13 percent of global oil production (similar to its share in the early 1990s). U.S. production is almost evenly split between natural gas and petroleum, in contrast to the predominantly petroleum-based production of other major hydrocarbon producers such as Russia and Saudi Arabia (EIA 2016). U.S. shale oil production, which tripled during 2009-14, requires little capital investment and can be brought onstream rapidly; hence, it has become a highly flexible source of global oil supply, responding quickly to price changes (Baffes et al. 2015).

The United States is also the world's largest biofuel producer, accounting for 42 percent of global production, and one-third of U.S. maize production. Rapid growth in maize-based production was encouraged by the Renewable Fuel Standard (RFS), mandated by the Energy Policy Act of 2005 and the Energy Independence and Security Act of 2007, which requires transportation fuel sold in the United States to contain a minimum volume of renewable fuels.

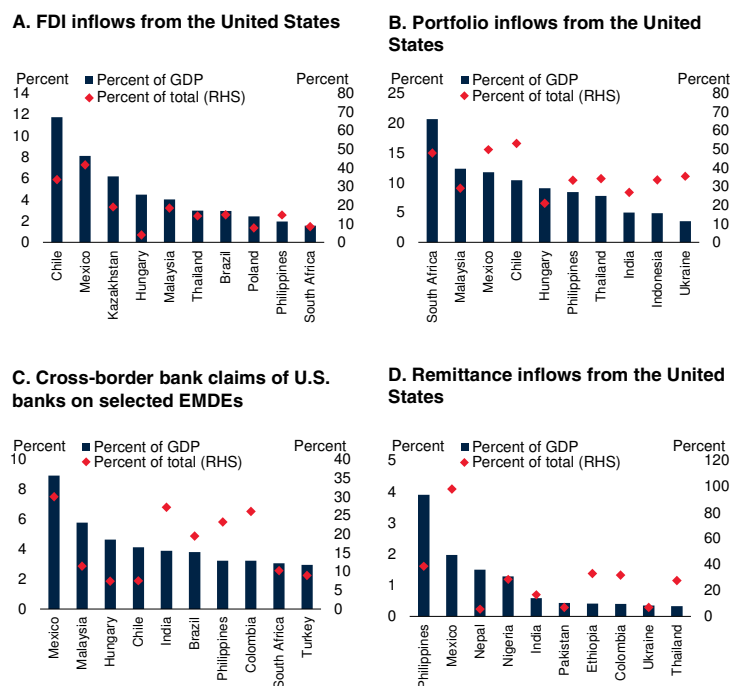
Historically, the United States has been a major consumer of agricultural, energy, and metal commodities. With the rise of large EMDEs, such as China and India, this role has diminished over time (World Bank 2015a). However, the United States is still the largest consumer of natural gas and oil, accounting for more than one-fifth of global consumption. It is the second largest consumer of a wide range of commodities, including aluminum, copper, lead, and coffee.

Synchronization of U.S. and global cycles

Synchronization of business cycles. Business cycles in the United States, other advanced economies and EMDEs have been highly

FIGURE SF.5 U.S. financial flows: Composition and partners

Because of its large financial system and economy, the United States is an important source of FDI, portfolio flows, remittances and bank lending to EMDEs across the world.



Sources: Bank for International Settlements, International Monetary Fund, World Bank.
 A. Share of FDI inflows from United States in total FDI inflows into (and in percent of GDP of) each EMDE region, average of 2010-2014.
 B. Share of portfolio investment from United States in total portfolio inflows into (and in percent of GDP of) each EMDE region, average of 2010-2015.
 C. Share of consolidated U.S.-headquartered BIS-reporting banks' claims on each EMDE region in total consolidated BIS-reporting banks' claims on (and in percent of GDP of) each EMDE region, average of 2010-2015.
 D. Share of remittances inflows from United States in total remittances inflows into (and in percent of GDP of) each EMDE region, average of 2010-2015.

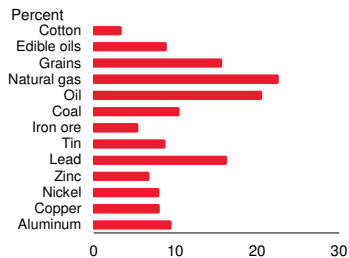
synchronous (Figure SF.7). This is partly a reflection of the strength of global trade and financial linkages of the U.S. economy with the rest of the world. In addition, it is because of global shocks that had a common effect on many countries at the same time. Business cycles in the United States are somewhat more correlated with those in other advanced economies than those in EMDEs (with the important exception of Mexico) because of deeper economic integration.

Concordance of cyclical turning points. International business cycle synchronization tends to be particularly strong when the U.S. economy is in recession but, over the phases of the U.S. business cycle, GDP growth in the rest of the world correlates substantially. For example,

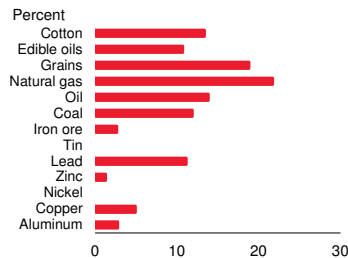
FIGURE SF.6 The U.S. economy and commodity markets

The United States accounts for more than one-fifth of global consumption of oil and natural gas. It is the largest producer of oil and natural gas.

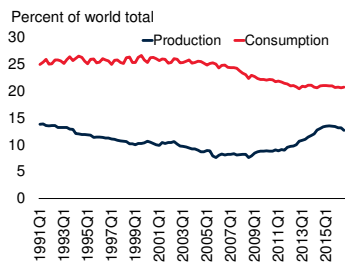
A. U.S. share of global consumption, 2015



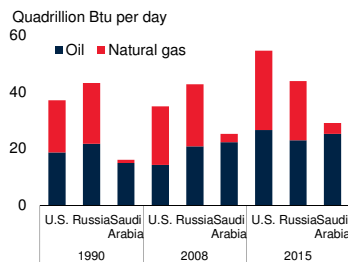
B. U.S. share of global production, 2015



C. U.S. share of global crude oil consumption and production



D. Oil and gas production, 2015



Sources: Haver Analytics, World Bank, BP Statistical Review of World Energy Efficiency, U.S. Energy Information Administration.

A.B. Data for metals represent refined consumption and production. Iron ore consumption is estimated with crude steel production. Grains include wheat, maize and rice; edible oils include coconut oil, cottonseed oil, palm oil, palm kernel oil, peanut oil, rapeseed oil and soybean oil. Oil includes inland demand plus international aviation and marine bunkers and refinery fuel and loss. Coal includes commercial solid fuels only, i.e., bituminous coal, anthracite, lignite and brown coal, and other commercial solid fuels. Natural gas excludes natural gas converted to liquid fuels but includes derivatives of coal as well as natural gas consumed in gas-to-liquids transformation. D. Oil and natural gas production in British thermal units (Btu), assuming that 1 barrel of crude oil is equivalent to 5,729,000 Btu and 1 cubic foot of natural gas is equivalent to 1,032 Btu.

growth was on average higher in other advanced economies and EMDEs during periods of U.S. expansions than it was when the U.S. economy was in recession. More importantly, although the four recessions the global economy experienced since 1960 (1975, 1982, 1991, and 2009) were driven by a host of problems in many corners of the world, they all overlapped with severe recessions in the United States.⁴

The global recession of 1975 coincided with the beginning of a prolonged period of stagflation,

⁴Global recessions are contractions in inflation-adjusted output per capita accompanied by broad, synchronized declines in various other measures, such as world industrial production, employment, trade and capital flows, and energy consumption (Kose and Terrones 2015).

with low output growth and high inflation in the United States. During the 1982 recession, the United States and several other advanced economies experienced a sharp decline in activity along with a steep increase in unemployment in the wake of anti-inflationary monetary policies. The economy again went into recession in July 1990 following a period of depressed activity in the housing market and a credit crunch. The deep global recession of 2009 was driven by the global financial crisis, which had its origins in the U.S. mortgage market but turned into a truly global crisis after the collapse of Lehman Brothers in September 2008. These four U.S. recessions coincided with global recessions; there were, however, four other U.S. recessions post-1960 that did not.

An event study of the last two U.S. recessions, in 2001 and 2009, illustrates the concordance of the turning points of the U.S. business cycle with those of other advanced economies and EMDEs (Figure SF.7).⁵ The 2009 recession was particularly severe for the United States whereas the U.S. economy experienced a mild recession in 2001 following the burst of the “dot com” bubble of the late 1990s. In the four quarters leading up to the last two U.S. business cycle troughs, other advanced economies also experienced a decline in the cyclical component of their GDP of, respectively, 0.5 and 4 percent, while their subsequent recoveries have been sluggish. Among EMDEs, slower activity was also observed around U.S. cyclical troughs.

Concordance statistics illustrate the degree of synchronization between the phases of the U.S. business and financial cycles and those of other economies. Business cycles are more highly synchronized than financial cycles: other countries tend to be in the same business cycle phase with the U.S. cycle roughly 80 percent of the time. While the degree of synchronization of financial cycles with the U.S. financial cycle is lower than that of business cycles, they are quite often in the same phase—about sixty percent of the time for

⁵Two U.S. business cycle peaks (March 2001 and December 2007) and two U.S. business cycle troughs (November 2001 and June 2009) are identified since 2000 by the NBER’s Business Cycle Dating Committee.

credit, housing, and equity price cycles (Figure SF.7). While it is difficult to establish empirically whether the U.S. economy leads business and financial cycle turning points in other major economies, recent research indicates that the United States appears to influence the timing and duration of recessions in a number of other major economies (Francis, Owyang, and Soques 2015).

Spillovers from the United States to the global economy

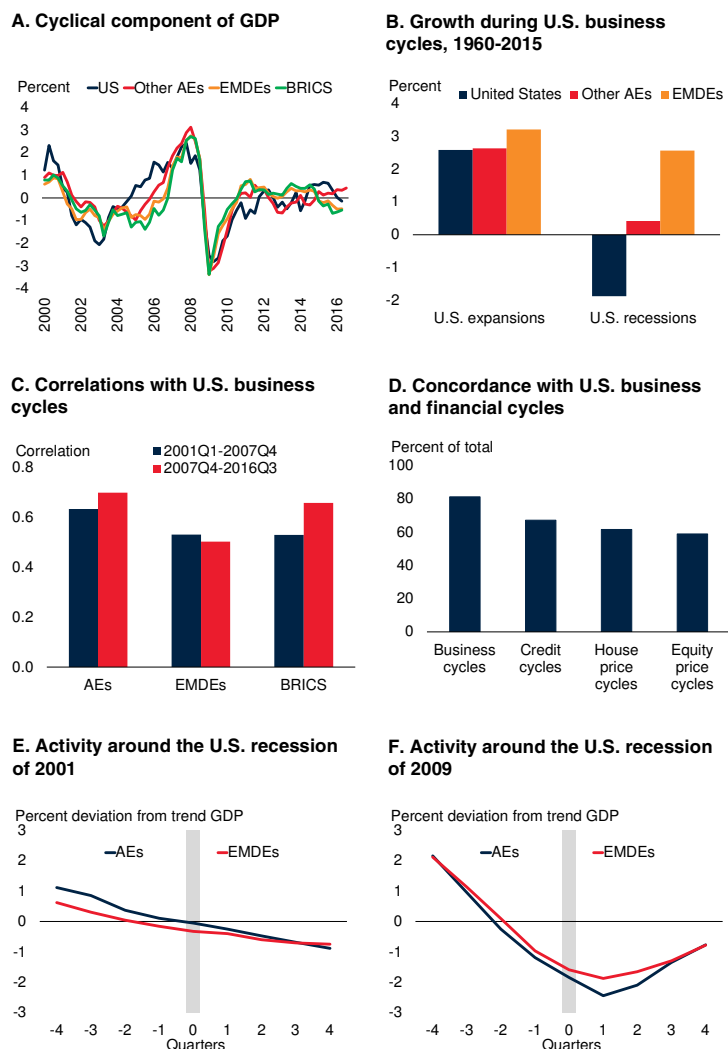
Developments in the U.S. economy have significant impacts on the global economy. Shocks to the U.S. economy transmit to the rest of the world through the wide range of channels discussed above. An acceleration in U.S. activity can lift growth in its trading partners directly, through an increase in import demand, and indirectly, by strengthening productivity spillovers embedded in trade.⁶ Given its sizable role in global commodity markets, an acceleration in U.S. activity tends to lift global commodity demand and raise prices. This supports activity and eases balance of payments pressures in commodity exporters. Financial market developments in the United States may have even wider global implications. Fiscal stimulus in the United States could therefore be expected to boost domestic activity and generate cross-border spillovers through real and financial channels.

Independently of growth, policy, or financial market developments in the United States, shocks to confidence of U.S. businesses and consumers can themselves reverberate across borders and be sources of business cycle fluctuations (Levchenko and Pandalai-Nayar 2015). Elevated uncertainty about changes in U.S. policies can reduce incentives to commit to capital investment at home and abroad, and this in turn could adversely affect long-term global growth prospects (Kose and Terrones 2015).

⁶For a detailed analysis of the intensity of business cycle linkages between the United States and other countries, see Dai (2014); Déés and Vansteenkiste (2007); Canova (2005); Stock and Watson (2005); Kose (2003); Kose, Prasad, and Terrones (2004); Jansen and Stokman (2004); Eckmeier (2006); IMF (2007); and Roache (2008).

FIGURE SF.7 Synchronization of business and financial cycles

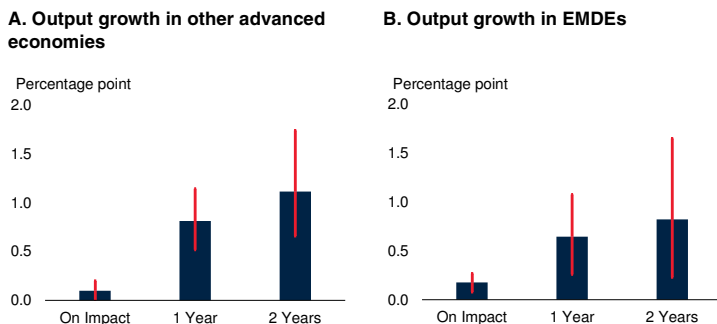
Business cycles have been highly synchronized between the United States, other advanced economies, and EMDEs. Business cycles in the United States and the world are somewhat more synchronized than financial cycles.



Sources: Haver Analytics, World Bank, Kose and Terrones (2015), International Monetary Fund.
 A. Cyclical component is defined as deviation from Hodrick-Prescott-filtered trend.
 B. Annual average per capita growth rates in purchasing power parity during years of expansions and recessions in the United States. Years of expansions and recessions are defined as those with annual positive and negative GDP per capita purchasing power parity growth in the United States, respectively. Other AEs exclude the United States.
 C. Contemporaneous correlations between cyclical component of U.S. real GDP and cyclical component of real GDP of advanced economies and EMDEs.
 D. Average share of years in which business cycles in the United States and all economies were in the same phase. A higher share suggests more synchronization between two countries.
 E, F. The graph shows cyclical component of GDP measured as the deviation from trend GDP computed using a Hodrick-Prescott filter on seasonally adjusted quarterly GDP around a trough in U.S. business cycle ($t = 0$) indicated by the solid bar. Troughs are 2001Q4 and 2009 Q2, defined by the National Bureau of Economic Research. The line refers to median of 35 advanced economies and 51 EMDEs.

FIGURE SF.8 Spillovers from U.S. growth shocks

A 1 percentage point increase in U.S. growth could lift global growth by about 0.7 percentage points over the following year.



Sources: World Bank; Haver Analytics; OECD.
Notes: See Annex SF.1A for details on the methodology.

Growth spillovers. U.S. growth shocks generally have sizable effects on activity in the rest of the world. A 1 percentage point increase in U.S. growth could lift growth in advanced economies by 0.8 percentage point and in EMDEs by 0.6 percentage points after one year, while global growth could rise by 0.7 percentage point (Figure SF.8).⁷ The impact on investment in these economies would be approximately twice as large. NAFTA members (Canada and Mexico) would particularly benefit from trade spillovers (Yifan and Abeysinghe 2016). Terms of trade effects through commodity markets would be another transmission channel (World Bank 2016c).

Financial market spillovers. The role of the United States in global financial markets goes well beyond direct capital flows to and from the United States.⁸ U.S. bond and equity markets are the largest and most liquid in the world. Swings in U.S. sovereign bond yields are often closely mirrored in the Euro Area and other large financial markets. Similarly, cross-border spillovers from U.S. equity markets are large and depend more on openness to the global economy than on the size of actual bilateral portfolio flows

⁷This estimate for advanced economies is in line with other estimates for Canada (Swiston and Bayoumi 2008). For Mexico and Caribbean economies with strong economic ties to the United States, considerably larger spillovers in excess of 1 percentage point have been estimated (Sun and Samuel 2009; Swiston and Bayoumi 2008).

⁸See Berkmen et al. (2012); de Grauwe and Yi (2015); Frankel and Saravelos (2012); Helbling et al. (2011); Metiu, Björn, and Grill (2015).

(Ehrmann, Fratzscher, and Rigobon 2011; Rose and Spiegel 2011). This makes U.S. monetary policy and investor confidence an important driver of global financial conditions (Ehrmann and Fratzscher 2009; Arteta et al. 2015; Rey 2015).

Because of its predominant use in global trade and financial transactions, broad-based U.S. dollar exchange rate movements have global implications. Episodes of U.S. dollar appreciation tend to coincide with bank deleveraging, tighter global financial conditions, greater incidence of financial crises and subdued EMDE growth.⁹ Although the share of private and public debt denominated in foreign currency has declined since the 1990s, the exposure of some EMDEs to foreign currency movements is still high, especially in commodity exporters, as well as importers that have received large capital inflows after the global financial crisis (Arteta et al. 2016). If the U.S. dollar goes through a period of significant appreciation, previous experience indicates that EMDEs with substantial short-term dollar-denominated debt could become vulnerable to rollover and interest rate risks and to a drying up of foreign exchange liquidity.¹⁰

Monetary policy spillovers. Changes in U.S. monetary policy have sizable cross-border effects through their impact on domestic activity and global financial markets, including currency and asset markets. Since the global financial crisis, highly accommodative monetary policies in advanced countries have coincided with an acceleration in capital inflows to EMDEs. In turn, higher U.S. interest rates could reduce such flows, especially those intermediated by banks, and push up global interest rates.¹¹

Although actual or expected changes in U.S. monetary policy have significant impacts on U.S. and global long-term yields, the implications for EMDEs would likely depend on underlying

⁹See Bruno and Shin (2015a and b); IMF (2015a and b); Druck, Magud, and Mariscal (2015); Abbate et al. (2016).

¹⁰See Chow et al. (2015); Chui, Fender, and Sushko (2014); McCauley, McGuire, and Sushko (2015).

¹¹See Ammer et al. (2016); Glick and Leduc (2015); Georgiadis (2015); Borio and Zhu (2012); Bowman, Londono, and Sapriza (2015); Bruno and Shin (2015); Neely (2015).

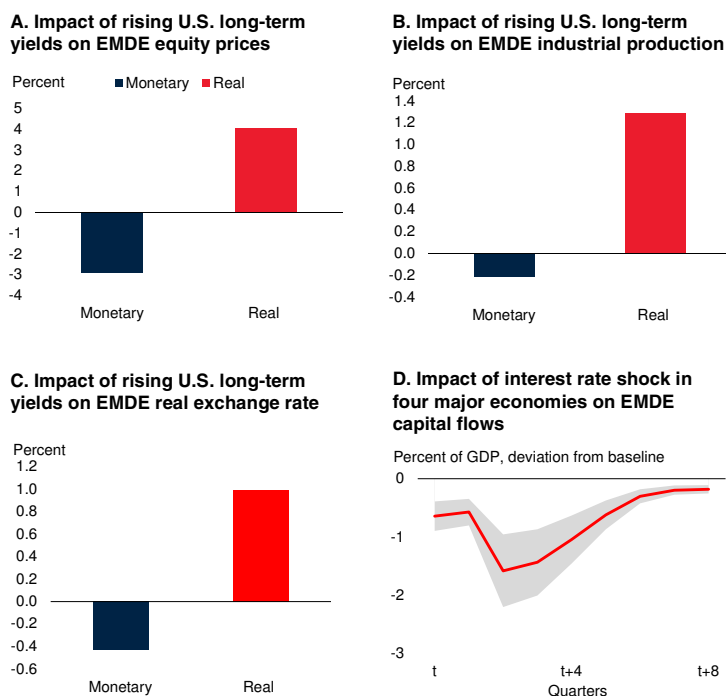
drivers. For example, if a rise in long-term U.S. yields is supported by prospects of a strengthening U.S. economy (a favorable “real shock”), the net effect for EMDEs could be positive (Figure SF.9). In particular, it could bolster equity valuations and activity, and lead to less pronounced currency pressures. Alternatively, if financial markets are surprised by prospects of a less accommodative stance of U.S. monetary policy, one that is not supported by strengthening growth, this could have adverse consequences for EMDEs through asset price and capital flow channels (an adverse “monetary shock”). Financial stress associated with such a change could combine with domestic fragilities and increase the risks of sudden stops to capital inflows to more vulnerable EMDEs.

The ultimate impact on capital flows of unexpected U.S. monetary policy tightening (beyond one warranted by strengthening U.S. activity) would also depend on policy actions of other major central banks. Effects would be amplified if it coincided with rate increases by other major central banks or would be dampened if it coincided with rate cuts elsewhere. A 100 basis point increase in long-term U.S. bond yields could reduce capital flows to EMDEs by 20–45 percent, with the upper bound of this range reflecting simultaneous interest rate increases by other major central banks and the lower bound reflecting unchanged monetary policy elsewhere.

Fiscal policy spillovers. U.S. fiscal policy stimulus could generate international spillovers by raising U.S. demand for imports from abroad or by causing exchange rate pressures. Simulations using the Federal Reserve Board’s model (FRB/US) suggest that a fiscal stimulus of 1 percent of GDP could be expected to raise GDP by between 0.7 and 1.5 percent after two years. However, the effectiveness of fiscal stimulus in lifting U.S. growth depends critically on the circumstances of its implementation. Fiscal multipliers—the additional output generated by an additional U.S. dollar of government deficit—depend on the presence of economic slack, the reaction of monetary policy, and the nature of the fiscal measures (Laforte and Roberts 2014; Brayton, Laubach, and Reifschneider 2014; Whalen and Reichling 2015).

FIGURE SF.9 Spillovers from U.S. interest rate shocks to EMDEs

An increase in U.S. long-term yields supported by a stronger U.S. economy (real shock) could lift EMDE equity prices and industrial production. In contrast, an increase in yields driven by a sudden reassessment of monetary policy expectations (monetary shock) could have a sizable adverse effect on EMDE equity markets, exchange rates, industrial production, and capital flows.



Sources: Haver Analytics, Bloomberg, World Bank estimates. Notes: See Annex SF.1B for details on the methodology.

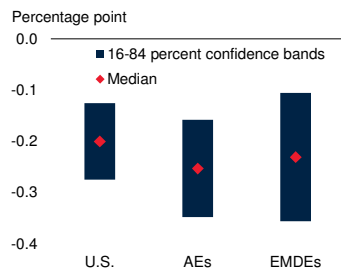
In addition to this demand effect, fiscal stimulus in the United States could generate currency pressures, with financial stability implications for EMDEs. In particular, fiscal stimulus could cause dollar appreciation, at least in the short run. This could eventually lift exports of U.S. trading partners because of improved competitiveness. However, in the short-term, it might trigger financial stability concerns in economies with elevated U.S.-dollar denominated liabilities. Empirical evidence of the impact of U.S. fiscal policy on the strength of the U.S. dollar is mixed, however.¹² In addition, if U.S. fiscal stimulus leads to a higher level of U.S. public debt in the long-term, this could cause an increase in global interest

¹²See Enders, Müller, and Scholl (2011); Ravn, Schmitt-Grohé, and Uribe (2012); and Corsetti, Meier, and Müller (2012); Forni and Gambetti (2016); and Auerbach and Gorodnichenko (2016).

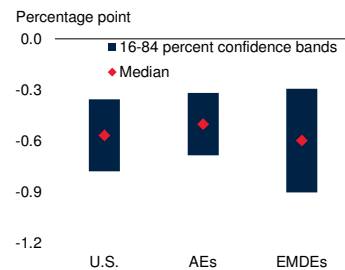
FIGURE SF.10 Spillovers from U.S. uncertainty shocks to EMDEs

A sustained increase in financial market volatility or policy uncertainty in the United States would significantly slow U.S. growth, as well as output and investment growth in other AEs and EMDEs.

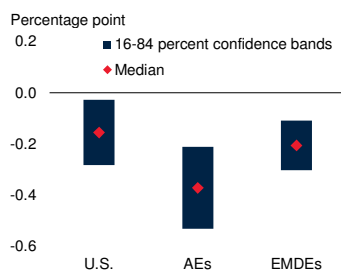
A. Impact of 10-percent rise in VIX on output growth



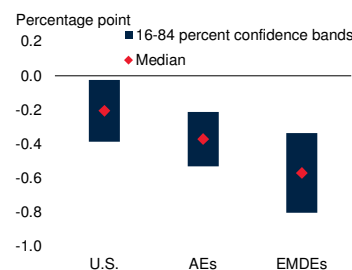
B. Impact of 10-percent rise in VIX on investment growth



C. Impact of 10-percent rise in U.S. EPU on output growth



D. Impact of 10-percent rise in U.S. EPU on investment growth



Sources: Haver Analytics, OECD, World Bank estimates.
Note: See Annex SF.1C for details on the methodology.

rates and be a source of adverse cross-border spillovers through tightening financial conditions (Cardarelli and Kose 2004).

Uncertainty spillovers. Increased uncertainty driven by financial market volatility or ambiguity about the direction and scope of policies could discourage investors—in the United States and elsewhere—that base their decisions about long-term investments on stable financing conditions and predictable policies. Sustained increases in financial market uncertainty, e.g., as captured in the implied volatility of the U.S. stock market (VIX), could set back output and investment growth in the United States, other advanced economies and EMDEs (Carrière-Swallow and Céspedes 2013; Bloom 2009). A 10 percent increase in the VIX could reduce average EMDE output growth by about 0.2 percentage point and EMDE investment growth by about 0.6 percentage point after one year (Figure SF.10).

The impact on other advanced economies would be broadly comparable.

Financial market volatility does not necessarily coincide with policy uncertainty, yet both appear to be detrimental to investment. Policy uncertainty is measured by the Economic Policy Uncertainty Index (EPU), a news-based measure of policy uncertainty (Baker, Bloom and Davies 2013). A sustained 10 percent increase in the index of U.S. EPU could, after one year, reduce U.S. output growth by about 0.15 percentage point, EMDE output growth by 0.2 percentage point, and EMDE investment growth by 0.6 percentage point (Figure SF.10).

Spillovers to the United States from the global economy

Important as the U.S. economy is to the global economy, the U.S. economy also benefits from the strength of its linkages with the rest of the world (Figure SF.11). Moreover, global economic and financial developments play an important role in driving activity and financial markets in the United States.

Global trade. In 2015, trade accounted for more than one-quarter of U.S. GDP (28 percent) and manufacturing output for slightly more than one-fifth (22 percent) of GDP. Most U.S. goods exports are manufacturing goods (87 percent of U.S. goods exports), followed by agricultural products (4 percent) and oil, gas and minerals (2 percent). The most prominent goods export categories are petroleum oils (other than crude), motor vehicles and their parts, and electronic parts. Most U.S. goods and services exports are shipped to Canada, the EU, Mexico, and China, which altogether account for more than 60 percent of total U.S. exports. Export-intensive industries in the United States have tended to be more productive and offered higher wages than non-export-intensive industries: during 1989-2009, on average, their total factor productivity growth was 51 percent higher; labor productivity was 10 percent higher; and wages were 17 percent higher (Council of Economic Advisors 2015).

Global value chain participation. Many U.S. companies are deeply integrated into global supply chains. As a result, U.S. exports themselves are often an input into other countries' production for exports ("forward participation"). One-quarter of U.S. exports represents U.S. value added embodied in other countries' exports. Such forward participation is particularly high in chemicals, business services, and electronics, and with China, Canada, and Mexico. "Backward participation" is more limited: the average import content of U.S. exports was 13 percent in 2014, well below the average for other advanced economies (27 percent). However, in some U.S. industries, imports account for more than 20 percent of inputs. These include apparel and leather products, motor vehicles, and computers and electronics (U.S. Trade Commission 2011). Imports are often essential components that do not have readily available domestic substitutes.

Multinational corporations. Much global value chain activity is conducted through U.S. multinational corporations and their affiliates abroad. Although U.S. multinationals account for less than 1 percent of the total number of U.S. firms, since 1990, they accounted for one-third of U.S. real GDP growth and almost half of U.S. labor productivity growth (McKinsey Global Institute 2010). As part of global supply chains, U.S. multinationals rely heavily on exports and imports; in fact, the largest U.S. exporters are multinationals (Moran and Oldenski 2016). Multinationals' presence in financial markets is large; for example, they account for about 85 percent of the stock market capitalization of the S&P500.

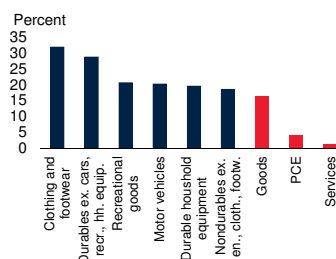
About 43 percent of total U.S. trade occurs within multinational firms (intra-firm trade), especially in the case of U.S. trade with advanced economies. Since the global financial crisis, intra-firm trade has continued to grow robustly (especially with EMDEs) whereas arm's-length trade has slowed sharply.

Access to foreign markets has also benefited domestic U.S. activity. For example, a 10 percent increase in foreign direct investment by U.S. multinationals abroad was accompanied by 2.6

FIGURE SF.11 Importance of the global economy for the U.S. economy

Imported goods account for about one-sixth of consumption expenditures. Multinational corporations make significant contributions to U.S. output, exports, and employment. Global developments account for a sizable fraction of variation in business cycles in the United States. Growth shocks originating in other economies, especially in other advanced economies, have a significant impact on activity in the United States.

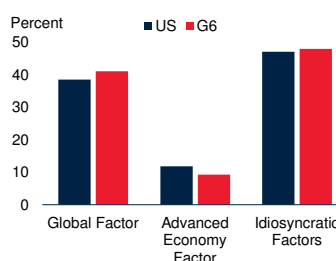
A. Share of imports in U.S. consumption expenditures, 2009



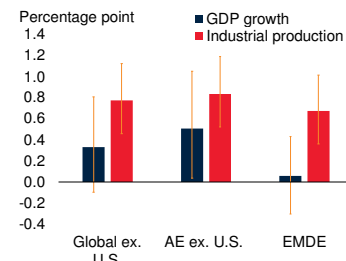
B. Role of foreign multinational corporations in the United States



C. Variance share of U.S. and G6 growth



D. Spillover to United States from 1 percentage point increase in global, other AE and EMDE growth



Sources: McCully (2011), Bureau of Economic Analysis, World Bank estimates.
 A. Share of imports in U.S. personal consumption expenditures. "Durables ex. cars, rec., hh. equip." stands for durables excluding motor vehicles and parts, recreational goods and vehicles, and furnishings and durable household equipment. "Recreational goods" stands for recreational goods and vehicles. "Durable household equipment" stands for furnishings and durable household equipment. "Motor vehicles" stands for motor vehicles and parts. "Nondurables ex. en., cloth., footw." stands for nondurables excluding gasoline and other energy goods, clothing and footwear. "PCE" stands for personal consumption expenditure and consists of goods and services.
 B. Share of multinational corporations in U.S. sales, exports and imports of goods and employment. "Sales" indicates sales of multinational corporations in gross output of U.S. private sector industries. Data covers 2010-2013.
 C. D. See Annex SF.1D for details on the methodology.

percent greater domestic investment in the United States (Desai, Foley, and Hines 2009). In turn, foreign multinationals operating in the United States provided 10 percent of U.S. employment and 19 percent of U.S. exports, on average, during 2010-13 (Figure SF.11).

Global finance. Financial linkages between the U.S. and the rest of the world, including emerging market economies, have grown rapidly over the past decade, potentially leading to two-way spillovers. Financial market stress or sharp growth slowdowns in the rest of the world can put

pressure on the U.S. financial system (IMF 2012; 2013; 2014). For example, financial stress that raises risk premia and widens output gaps by 1 percent in some major economies, could widen the U.S. output gap by 0.1-0.35 percent (IMF 2013).

A significant appreciation of the U.S. dollar, which could be driven by increasingly divergent monetary policies with other reserve currencies, weakening growth prospects in the rest of the world, or relatively sizable fiscal stimulus in the United States, could have a negative impact on U.S. growth as well. For example, a 10 percent appreciation of the trade-weighted U.S. dollar, could reduce U.S. GDP from baseline by over 1½ percent after three years, assuming no change in monetary policy (Fischer 2015). The adverse effect would materialize only gradually, with over half of the impact occurring after more than a year. Monetary policy accommodation could substantially ease the impact of a strengthening dollar to about one-half to two-thirds of its direct trade effect.¹³

Consumer and labor markets. About one-third of U.S. consumer spending is on goods, of which about one-sixth is on imported goods. The share of imports in consumption expenditures is larger for durable goods (29 percent)—especially durable household equipment, motor vehicles, and recreational goods—and clothing and footwear (32 percent). The United States hosts the world’s largest number of immigrants (Chandy and Seidel 2016). Immigrants accounted for 17 percent of the U.S. civilian labor force, on average, in 2015, and more than one-quarter in some parts of the United States. Immigrants originate from all over the world, but mainly from Mexico, China, and India.¹⁴

Spillovers from the world to the United States. Because of strengthening multidimensional linkages between the United States and the rest of the world, U.S. business cycles are highly

synchronized with the global business cycle. Global developments account for a sizable fraction of variation in business cycles in the United States. In addition, growth shocks originating in other economies, especially in other advanced economies, have a significant impact on activity in the United States through demand spillovers (Bems, Johnson, and Yi 2010; Figure SF.11).¹⁵

Conclusion

Economic policy initiatives in the United States can have sizable ripple effects around the world—a testament to the U.S. size and global integration. Continuing uncertainty about the direction of U.S. policies in itself could influence global growth prospects. The incoming administration promises major changes in key areas, including fiscal policy and international trade. Many questions arise about the domestic and global implications of these changes. Given limited knowledge to date about the scope and form of the new policies, it is too early to rigorously examine them, or to make detailed estimates of their implications, especially as regards the new direction on international trade. This Special Focus aims to provide information that will assist assessments of policies as and when they are defined in operational terms and their global implications. Relevant questions on the role of the United States in the global economy are as follows:

What are the major channels of transmission of developments in the U.S. economy to other countries? The United States is the world’s single largest economy: it accounts for roughly one-quarter of global output and about one-tenth of total trade flows. It is also the single largest international creditor and debtor. Given its massive size and the strength of its ties with the global economy, shocks to the U.S. economy are transmitted globally through a variety of channels, including trade, finance, and commodity market linkages.

¹³See Erceg, Guerrieri, and Gust 2006; Laforte and Roberts (2014); Brayton, Laubach, and Reifschneider (2014).

¹⁴Immigration generally appears to raise aggregate wages and lower prices as well as stimulate investment and innovation (Peri 2010; Greenstone and Looney 2012; Hunt and Gaultier-Loiselle 2010; Chellaraj, Maskoo and Mattoo 2008).

¹⁵Some recent studies examine the impact of shocks originating in other countries on activity in the United States (Bayoumi and Swiston 2009; Osborn and Vehbi 2013; IMF 2014; Cashin, Mohaddes and Raissi 2016). For the cyclical spillovers between U.S. and global business cycles, see Kose, Otrok and Whiteman (2008); Dees and Saint-Guilhem (2009); Huidrom, Kose, and Ohnsorge (2016); World Bank (2016).

How strong are business cycle linkages between the United States and other economies? U.S. business cycles are highly synchronized with global business cycles. Growth is often higher in rest of the world during periods of U.S. expansions than it is during U.S. recessions. The four global recessions since 1960 all coincided with severe recessions in the United States.

How large are global spillovers from shocks originating in the United States? Shocks to U.S. growth, changes in U.S. fiscal and monetary policies, or uncertainty in U.S. financial markets or policies all could have global spillovers. For example, a surge in U.S. growth can be expected to accelerate activity in the rest of the world. In contrast, lingering uncertainty about the direction of U.S. policy could dampen activity and investment abroad.

How important is the global economy for the United States? Because of its size and reach, the United States is at the center of global trade and financial networks. U.S. multinational corporations and their affiliates abroad are deeply integrated into global supply chains. Financial linkages between the U.S. and the rest of the world, including emerging market economies, have grown rapidly over the past decade, widening the potential for spillovers in either direction. These two-way channels imply that, important as the U.S. economy is for the global economy, the U.S. economy is in turn affected by developments in the rest of the world.

This Special Focus aims to provide the background required to inform an assessment of U.S. policy initiatives and their global implications. U.S. growth is expected to regain only modest momentum to 2.2 percent in 2017, from a subdued 1.6 percent in 2016, predicated on a broadly neutral fiscal stance expected for 2017. Given the uncertainty about the eventual shape of U.S. policies, these forecasts do not yet include the likely impact of U.S. policy changes.

Many details of the new administration's policy plans have yet to be announced. For example, the new administration has signaled its intention to pursue more expansionary fiscal policies, including

personal and corporate tax cuts and tax incentives to stimulate infrastructure upgrades, possibly coupled with other federal spending changes. Sizable fiscal stimulus measures could result in faster-than-anticipated U.S. growth in the near term. However, the positive growth impact of these actions could be offset by shifts in the pattern of federal government outlays that result in sizable net spending cuts, or by fiscal sustainability concerns. Changes in some other U.S. policies, such as changes in trade policy, could also offset the positive effects of fiscal stimulus, or could even set back growth. Until comprehensive and specific proposals are available, the overall impact of U.S. policy changes on U.S. and global activity cannot be assessed. However, the isolated impact of some individual components can be analyzed.

Reduction in corporate and personal income taxes. The fiscal proposals put forward by the new U.S. administration include a cut in the statutory corporate income tax rate from 35 to 15 percent. Such a corporate income tax cut could—by itself and without considering other policies by the new administration—boost U.S. GDP growth by around 0.6 percentage point after four quarters following implementation, and by cumulatively 0.9 to 1.3 percentage points after eight quarters, depending in particular on the reaction of monetary policy authorities (Annex SF.2).

The new administration also proposed cutting personal income taxes, especially for the highest-income earners; reducing the number of individual income tax brackets; and changing the structure of tax deductions. If fully implemented, these measures could reduce the average tax rate on personal income by about 2.5 percentage points, and by over 7 percentage points for top income earners (Nunns et al. 2016). Such a cut could—by itself—increase U.S. GDP growth by around 0.3 percentage point after four quarters following implementation and by cumulatively 0.4 to 0.6 percentage point after eight quarters, again depending in particular on the reaction of monetary policy authorities (Annex SF.2).

Taken together, these corporate and personal income tax reforms could—without consideration

of additional policy changes by the new administration—raise U.S. GDP growth forecasts to 2.2-2.5 percent in 2017 and 2.5-2.9 percent in 2018 (Annex SF.2). These estimates depend on the timing of the tax cuts, the reaction of monetary policy authorities, the amount of slack remaining in the U.S. economy, and how businesses and households adjust their expectations to these policy changes. In addition, these estimates do not specifically take into account fiscal sustainability considerations.

Stronger U.S. growth would help global activity by raising U.S. demand for trading partners' exports. Empirical estimates indicate that a 1 percentage-point shock to U.S. growth could boost growth after one year by 0.8 percentage point in other advanced economies, and by 0.6 percentage point in EMDEs. In the illustrative scenario of reforms to U.S. corporate and personal income taxes discussed above, global growth could rise by up to 0.1 percentage point in 2017 if tax cuts are fully implemented in the second quarter of the year. In addition, global growth could rise by at least 0.3 percentage point in 2018, depending on the timing of tax cuts and the reaction of U.S. monetary policy authorities. Investment could respond even more strongly. While some of the proposed U.S. corporate tax reforms could potentially affect corresponding fiscal revenues in other countries where U.S. corporations operate, the net global impact of stronger activity and investment in the United States is likely to be positive (Clausing, Kleinbard, and Matheson 2016; Nicar 2015). These potential positive spillovers from U.S. personal and corporate income tax reforms could be amplified or dampened by other policy changes.

For individual countries, the benefits of U.S. fiscal stimulus would also depend on the impact on exchange rates. If a fiscal stimulus were accompanied by U.S. dollar appreciation, debt burdens for EMDEs with elevated U.S. dollar-denominated liabilities would rise and become a potential source of financial strains.

Increase in infrastructure investment. The new U.S. administration has signaled a number of measures to stimulate infrastructure investment,

but specifics remain to be clearly formulated for both the overall size and the choice of measures (and, hence, their impact on activity). There have been suggestions of increasing both public investment in transportation and infrastructure and of boosting private investment through tax credits. Empirical studies suggest that increases in government infrastructure investment tend to have large immediate effects on activity, with fiscal multipliers often estimated to be markedly above 1 (Auerbach and Gorodnichenko 2013; Bivens 2014; Whalen and Reichling 2015). Empirical evidence regarding the effect of tax credit and policy-driven support to private investment in infrastructure in the United States is limited. Studies of comparable initiatives in Europe point to positive but limited net effects (Claeys and Leandro 2016). Until additional details are unveiled, it is difficult to quantify the potential impact of these measures on the outlook.

Changes in federal spending. The new U.S. administration has suggested sizable cuts in non-defense spending, likely accompanied by increases in defense spending. While specific proposals have not yet been made, it is possible that, on net, overall federal spending will be substantially reduced. Accordingly, the impact of corporate and personal income tax cuts and infrastructure spending on aggregate demand could be offset in the short term if overall federal spending is also cut. This offsetting effect would depend on the size of the net reduction in government outlays and on the estimated fiscal multiplier of various spending categories (Whalen and Reichling 2015).

Other policy proposals mentioned by the new administration include changes to trade agreements and import tariffs. If they lead to higher import costs, policy initiatives to renegotiate trade agreements could be detrimental to U.S. and global activity. For about one-quarter of the world's countries, the United States is the largest trading partner. Moreover, given the significant integration of many U.S. companies into global supply chains, there could be even larger adverse collateral effects from imposing new trade barriers if other countries were to retaliate (Noland, Robinson, and Moran 2016). More detailed information is needed to quantify the

potential costs of any new trade policies. However, even without any policy action by the United States, heightened uncertainty about potential policy initiatives could set back already-weak global investment (Chapter 3). A 10 percent increase in the U.S. Economic Policy Uncertainty index or the VIX could reduce EMDE investment growth by 0.6 percentage point after a year.

Global spillovers. In sum, given that policy initiatives in the United States would have significant global implications, a robust U.S. economy is critical for the health of the world economy. On the one hand, a well-targeted fiscal stimulus could lead to stronger growth in the United States, which could be accompanied by sizable positive spillovers to the rest of the world over the short term. On the other hand, rising trade barriers and policy uncertainty could, through feedbacks, negatively affect U.S. growth as well as the global economy.

Annex SF. 1 Cyclical spillovers

A. Spillovers from U.S. growth

Figure SF.8 shows the cumulative impulse response of weighted average AE and EMDE GDP growth to a 1 percentage point increase in growth in real GDP in the United States. Growth spillovers to AE and EMDE are based on a Bayesian vector autoregression of global GDP growth excluding the United States and AE or EMDE, U.S. GDP growth, the U.S. 10-year sovereign bond yield plus JP Morgan's EMBI index and AE or EMDE GDP growth. The oil price is exogenous. Bars represent medians, and error bars 16-84 percent confidence bands. The Sample for AE includes Euro Area (19 countries), Canada, Japan, and the United Kingdom and 19 EMDE for 1998Q1-2016Q2.

B. Spillovers from U.S. interest rate increases

Figure SF.9A-C shows impulse responses after 12 months from a panel vector autoregression model that includes EMDE industrial production, long-term bond yields, stock prices, nominal effective

exchange rates and bilateral exchange rates against the U.S. dollar, and inflation. Monetary and real shocks are exogenous regressors. Monetary and real shocks are defined as in Box 1 of Arteta et al. (2015). All data are monthly or monthly averages of daily data, spanning January 2013-September 2015. A total of for 23 EMDEs were included. For comparability, the size of U.S. real and monetary shocks is normalized such that each shock raises EMDE bond yields by 100 basis points on impact.

Figure SF.9D shows the impulse response of capital flows to EMDEs to a 100 basis point increase in the U.S. term spread. The results are based on a six-variable VAR model estimated over the period 2001Q1 to 2014Q4 for 64 EMDEs (Arteta et al. 2015). The VAR model includes capital flows to EMDEs (including foreign direct investment, portfolio investment, and other investment as a share of GDP), quarterly real GDP growth in EMDEs and G4 countries (United States, Euro Area, Japan, and the United Kingdom), real G4 short-term interest rates (three-month money market rates minus annual inflation measured as changes in GDP deflator), G4 term spread (10-year government bond yields minus three month money market rates), and the VIX index of implied volatility of S&P 500 options.

The grey area shows the range of estimated effects on capital inflows depending on rate hikes of other major central banks. The lower bound corresponds to unchanged policy rates by the European Central Bank (ECB), Bank of England, and Bank of Japan, implying a 40 basis points shock to global bond yields. The upper bound corresponds to a 100 basis point increase in policy rates by the ECB, the Bank of England and the Bank of Japan (i.e., a 100 basis points shock to global bond yields). In the median case, global bond yields increase initially by 70 basis points, similar to the 2013 "taper tantrum".

C. Spillovers from U.S. policy and financial market uncertainty

Figure SF.10 shows cumulative impulse responses after one year on output growth (A.C.) or investment growth (B.D.) in the United States, 23

other AEs, and 18 EMDEs to a 10-percent increase in the VIX (A.B.) or in the U.S. EPU (C.D.). Vector autoregressions are estimated for 1998Q1-2016Q2 with two lags.

The model for the U.S. includes, in this order, uncertainty index (VIX or U.S. EPU), U.S. stock price index (S&P 500), U.S. 10-year bond yields, U.S. real GDP, and investment growth.

The model for AEs includes uncertainty indexes (VIX or U.S. EPU), MSCI Index for advanced economies (MXGS), U.S. 10-year bond yields, aggregate real output, and investment growth in 23 other AEs.

The model for EMDEs includes uncertainty indexes (VIX or U.S. EPU), the MSCI emerging market equity price index, J.P. Morgan Emerging Market Bond Index (EMBIG), aggregate real output and investment growth in 18 EMDEs. G7 real GDP growth, U.S. 10-year bond yields, and the MSCI world equity price index are added as exogenous regressors.

D. Spillovers from the global economy to the United States

Figure SF.11C shows the contribution of global, group-specific, and other factors to the variance of GDP growth. A dynamic factor model is estimated over the period 1985-2015, using a sample of 106 countries grouped into three regions: advanced markets (AE), emerging and frontier markets (EM-FM), and other developing countries. Variance decompositions are computed for each country and, within each country, for output. Each bar represents the variance share of U.S. and G6 output growth attributable to the global factor, the AE-specific factor, the country-specific factor and the idiosyncratic term.

Figure SF.11.D shows cumulative impulse responses after one year of GDP or industrial production (IP) growth in the United States following a 1 percentage point increase in GDP or industrial production growth in 22 other AEs and 19 EMDEs (13 EMDEs for industrial production). “Global” indicates the weighted average impact of AEs and EMDEs. Vertical lines

indicate 16th-84th percentile confidence bands. Vector autoregression models are estimated for 1998Q1-2016Q2 with four lags. The model includes, in this order, global GDP or industrial production growth excluding the United States and AE or EMDE, U.S. GDP or industrial production growth, the U.S. 10-year sovereign bond yield plus JP Morgan’s EMBI index and AE or EMDE GDP or industrial production growth. The oil price is exogenous.

Annex SF.2 Fiscal policy simulations

The impact of corporate and personal income tax changes on U.S. growth was simulated using the Federal Reserve Board’s model for the U.S. economy (FRB/U.S.). Simulations assume full implementation of both corporate and personal income tax cuts at once (i.e., no phasing in). The lower estimate of the growth impact after eight quarters assumes that monetary policy adjusts following a traditional Taylor Rule. The upper estimate assumes no monetary policy reaction.

Corporate income tax cut. A cut in the statutory corporate income tax from 35 percent to 15 percent is modelled. The net loss of corporate tax revenues, caused by a 15 percentage-point reduction in the average effective marginal tax rate implied by a 20 percentage-point statutory corporate income tax cut (Nunns et al. 2016), could amount to 1.2 percent of GDP in the first year. Implicitly, the fiscal multiplier—the additional output generated for each additional dollar of tax losses—would be 0.4 in the first year, which is within the range of available estimates (Chahrour, Schmitt-Grohé, and Uribe 2012).

Personal income tax changes. A reduction in the average tax rate on personal income by about 2.5 percentage points is modelled (Nunns et al. 2016). The net loss of personal income tax revenues caused by a 2.5 percentage point reduction in the average effective marginal tax rate is estimated to be around 1.0 percent of GDP in the first year, with a corresponding fiscal multiplier of 0.3. This is at the lower end of the range of estimated fiscal multipliers generally associated with personal

income tax cuts (0.3-1.5), but within the range of estimated fiscal multipliers associated with personal income tax cuts targeted to higher-income households (0.1-0.6; Whalen and Reichling 2015).

Taken together, these corporate and personal income tax reforms could—without consideration of additional policy changes by the new administration—raise U.S. GDP growth forecasts to 2.2-2.5 percent in 2017 and 2.5-2.9 percent in 2018. These tax reforms could support stronger near-term growth by boosting households' real disposable income and companies' after-tax earnings and profit margins. According to the FRB/U.S. model simulations, the largest short-term growth effect would be associated with the simulated corporate income tax cuts, with investment being boosted by a rise in corporate profits and a reduction in the cost of capital. The effect on consumption would be more limited, as household savings are projected to increase following the personal income tax cut.

The impact would depend on the timing of the implementation of the tax reforms and the monetary policy response. In particular, the upper bound of the range of simulated U.S. growth forecasts assumes that both corporate and personal income tax cuts are fully implemented in the second quarter of 2017, and monetary policy does not react to the change in fiscal policy. In a more realistic scenario where monetary policy authorities adjust their policy stance, the growth impact is somewhat reduced, particularly in 2018.

The lower bound of the range assumes both delayed implementation of the tax cuts to the first quarter of 2018 and a tightening of monetary policy in reaction to changes in fiscal policy. In the case where monetary policy is allowed to react to a more rapid closing of the output gap, interest rates are estimated to increase by an additional 60 basis points after four quarters, and by up to 100 basis points after eight quarters. The dollar would also appreciate, while inflation would remain broadly unchanged. The revenue loss for the government would increase the budget deficit by around 2.4 percent of GDP after eight quarters.

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