



2015 SPILLOVER REPORT

July 23, 2015

IMF staff regularly produces papers proposing new IMF policies, exploring options for reform, or reviewing existing IMF policies and operations. The following document(s) have been released and are included in this package:

- The **2015 Spillover Report** prepared by IMF staff and completed on June 8, 2015.

Informal Session to Engage:

The report prepared by IMF staff has benefited from comments and suggestions by Executive Directors following the informal session on June 22, 2015. Such informal sessions are used to brief Executive Directors on policy issues and to receive feedback from them in preparation for a formal consideration at a future date. No decisions are taken at these informal sessions. The views expressed in this paper are those of the IMF staff and do not necessarily represent the views of the IMF's Executive Board.

The documents listed below have been or will be separately released.

- Departmental Paper: Spillovers from Dollar Appreciation
- Departmental Paper: Spillover Implications of Differences in Monetary Conditions in the United States and the Euro Area

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**International Monetary Fund
Washington, D.C.**



2015 SPILLOVER REPORT

June 8, 2015

EXECUTIVE SUMMARY

Many countries around the globe, particularly the systemic advanced economies, face the challenge of closing output gaps and raising potential output growth. Addressing these challenges requires a package of macroeconomic, financial and structural policies that will boost both aggregate demand and aggregate supply, while closing the shortfall between demand and supply. Each element of this package is important and one cannot substitute for the other: easy monetary policy will not raise potential output just as structural reforms will not close the output gap. This report studies the impact on emerging markets and nonsystemic advanced economies from monetary policy actions in systemic advanced economies, with a look also at knock-on effects from the decline in world oil prices.

Closing of output gaps in systemic advanced economies through accommodative monetary policies can have positive spillovers on growth elsewhere. News about better growth prospects in the United States or euro area raises economic activity and capital inflows in emerging market and nonsystemic advanced economies. These positive spillovers are amplified when there is good news about growth in both the United States and euro area and dampened when there is good news about growth in one but not in the other.

Sustained U.S. dollar appreciation associated with expected divergence in monetary policies among systemic advanced economies poses significant risks for other countries. Many emerging markets and low-income countries have lowered their vulnerability to a crisis through improvements in their net international investment position. Nevertheless, large gross positions and the currency composition of the foreign exchange debt position could pose vulnerabilities for some countries. To an important extent, this trend reflects the rise in corporate debt in emerging markets: this is also a source of risk, particularly because highly leveraged corporate sectors have higher foreign exchange exposure.

The decline in world oil prices has added to the complexity of the economic situation for many countries. While beneficial on the whole, the decline has created fiscal and external strains on net oil exporters and on many countries with which they have strong trade or financial linkages. Concomitant declines in other commodity prices have worsened the economic outlook for many commodity exporters. Oil price declines are exerting a strong deflationary pull on headline inflation, but central bank credibility and communication should help to keep expectations about core inflation anchored.

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Glossary

CCA	Caucasus and Central Asia countries
CIS	Commonwealth of Independent States
EM	emerging market economies
EMDE	emerging markets and developing economies
EMNS	emerging market economies and non-systemic advanced economies
FX	foreign exchange
IIP	international investment position
LCU	local currency
NEER	nominal effective exchange rate
OVX	Chicago Board of Options Exchange oil price volatility index
SAE	systemic advanced economies (Euro Area, Japan, United Kingdom and United States)
USD	U.S. dollar
VIX	Volatility Index

INTRODUCTION

1. **Monetary policy actions in advanced economies and the decline in world oil prices last year have created a “spillover-rich” environment.** Since the July 2014 Spillover Report, the European Central Bank and the Bank of Japan significantly eased monetary policies and are expected to maintain accommodative policies for a substantial period of time. The United Kingdom and United States, in contrast, are closer to the point at which policy interest rates could be increased. The resulting divergence in the stance of monetary policies among these systemic advanced economies (SAEs), together with changes in expectations about growth, has been reflected in exchange rate movements, notably a sustained appreciation of the U.S dollar (USD) during 2014.

Another major development has been the decline in world oil prices by nearly 50 percent in the second half of 2014. While most countries gained from the decline, it has also created strains for oil exporters—and because of declines in other commodity prices—for other commodity-exporting countries. In addition, the fall in oil prices has contributed to declines in headline inflation in many countries, adding to the risks posed by very low inflation rates.

2. **This report analyzes the spillover consequences of these developments.** The focus of the report is on the spillover effects on emerging markets and nonsystemic advanced economies (EMNS) from SAE monetary policy choices. The report also discusses briefly the knock-on effects from the decline in oil prices. The report is structured as follows.

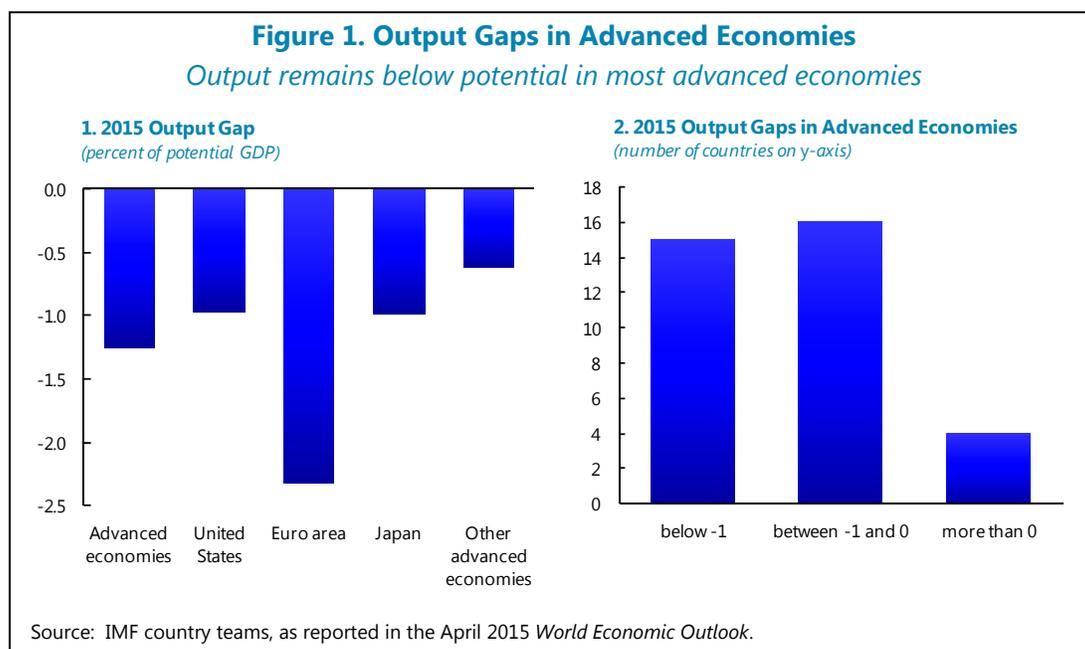
- Section 2 begins with a brief assessment of the likely impact of SAE monetary policies in fulfilling the near-term domestic goals of these countries, namely, closing output gaps and raising inflation back towards target. The bulk of the analysis is devoted to the impacts of these policies on other countries, drawing on a background note (Osorio-Buitron and Vesperoni, 2015).
- Section 3 studies the impact of U.S. dollar appreciation on emerging market economies, again drawing on a background note (Chow, Jaumotte, Park and Zhang, 2015).
- Section 4 describes the various spillover effects from the 2014 oil price decline and their likely impacts, including on inflation.
- Section 5 concludes with the policy implications of the findings.

While this report is focused is on a small number of themes, there are other sources of spillover effects at this juncture, some of which have been discussed in previous work by staff. In particular, the spillover effects from a slowdown in growth in emerging markets, particularly China, were analyzed extensively in the 2014 Spillover Report.

SPILOVERS FROM MONETARY POLICIES IN SYSTEMIC ADVANCED ECONOMIES

3. **Many advanced economies face the challenge of closing output gaps against a difficult fiscal backdrop.** Output in advanced economies is expected to remain below potential in 2015: nearly 2½ percent below potential in the euro area and under 1 percent in the United States (Figure 1, panel 1). Of the 35 advanced economies for which IMF staff estimates are available, 31 are expected to have output below potential (Figure 1, panel 2). Unemployment is high, particularly in the euro area, and investment remains well below pre-crisis rates. Inflation rates have also remained low, raising concerns about deflationary risks.

Low inflation and sluggish growth have also adversely affected debt dynamics in advanced economies. Despite significant fiscal adjustment since 2010 and record-low nominal bond yields, the average ratio of debt to GDP remains above 100 percent.

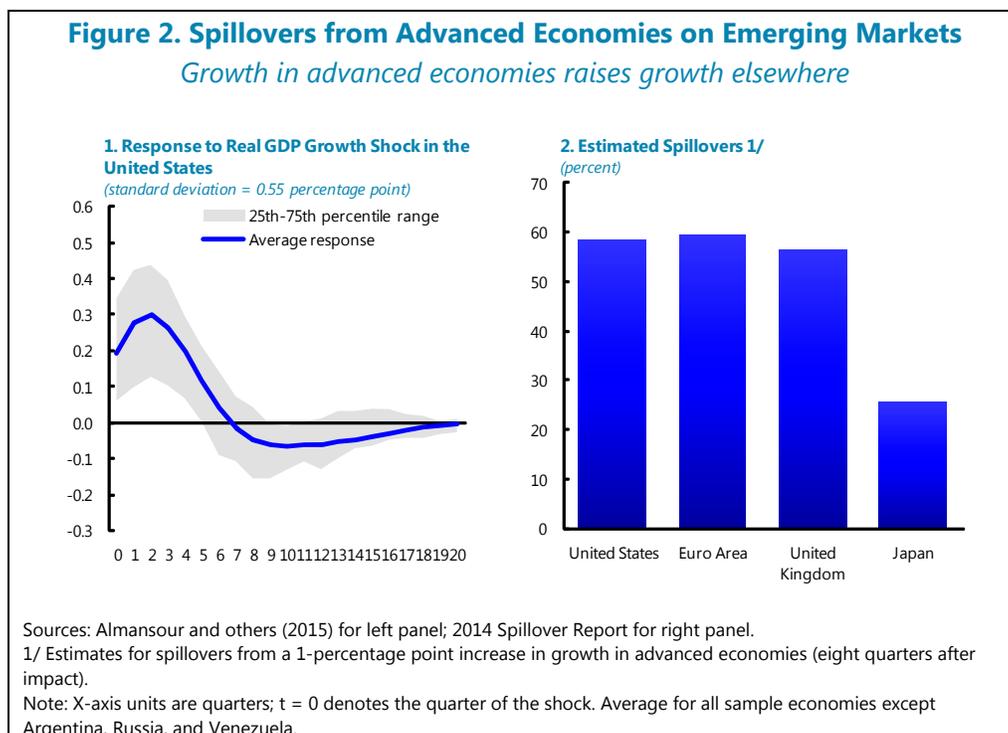


4. **Monetary policy responses in the systemic advanced economies are expected to help them achieve their domestic goals.** Staff estimates that the euro area output gap is expected to decline from nearly 3 percent in 2014 to about 1 percent in 2017. In Japan, the output gap, which was over 1½ percent in 2014, is expected essentially to close by 2016. The closing of output gaps, in turn, will help labor markets and investment. Cyclical movements in employment and output are tightly linked in most advanced economies and have remained so during the crisis. Likewise, the overriding factor holding investment back has been the overall weakness of economic activity.

Closing output gaps should also help to raise inflation rates, though the magnitude of this effect is subject to some uncertainty.¹

5. **The closing of output gaps in systemic advanced economies is expected to raise economic activity elsewhere.** Accommodative monetary policies in SAEs affect economy activity in other countries through two main channels, which work in different directions. First, higher growth in advanced economies boosts exports from emerging markets. Second, global financial conditions tighten and there may be capital outflows from some countries. In the past, for emerging markets as a whole, the impact of the first channel has ended up outweighing the second.

The impact of U.S. growth on emerging market economies (EM) has been studied extensively. A recent study by Almansour and others (2015)—which is representative of others in the literature—finds that emerging markets growth is boosted by a rise in U.S. growth despite the associated higher interest rates: a 1 percentage point increase in U.S. growth raises EM growth by 0.3 percentage points on impact. The cumulative effect remains positive even after two years (Figure 2, panel 1). An analysis in the 2014 Spillover Report found the positive spillover effects to be somewhat larger: the impact on EM growth was about 60 percent of the increase in U.S. growth, with similar figures for the Euro Area and the United Kingdom (Figure 2, panel 2).²



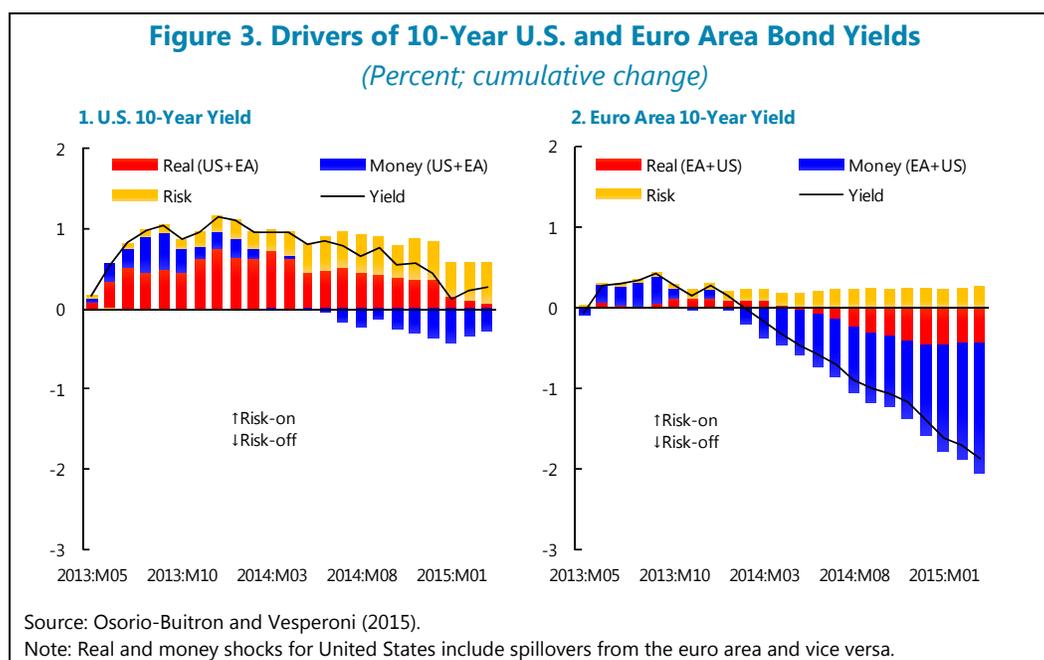
¹ The link between short-run employment and output movements is discussed in Loungani (2014), between output and investment in Chapter 4 of the April 2015 World Economic Outlook, and between output and inflation in Blanchard, Cerutti and Summers (2015).

² The authors use vector autoregression (VAR) models to estimate the impact of U.S. growth on 16 EMs over the period 1988 to 2013.

6. Structural analysis of the drivers of U.S. and euro area long-term bond yields shows that good news about economic growth in these economies raises economic activity elsewhere.

Bond yields in systemic advanced economies could rise for many reasons. The purpose of the structural analysis is to uncover the underlying shocks behind the rise and to show that the impact on other countries depends on why bond yields rise in the first place. Specifically, three types of shocks are identified based on the joint behavior of bond yields and stock prices:

- ‘Real’ shocks: Positive real shocks are assumed to increase both bond yields and stock prices: they capture an improvement in economic prospects in advanced economies.
- ‘Money’ shocks: Positive money shocks are assumed to push up bond yields and depress stock prices: they capture an unanticipated tightening of monetary conditions.
- ‘Risk’ shocks: Movements in bond yields and stock prices associated with movements in the Volatility Index (VIX) are assumed to capture changes in risk appetite.



Monthly data on 10-year bond yields and stock prices from 1994 to the present is used to identify the three shocks.³ The relative contribution of the shocks is illustrated in Figure 3 for the period since mid-2013. The increase in U.S. bond yields over 2014 was in large part driven by positive real shocks—that is, good news about growth prospects (panel 1)—whereas the decline in euro area

³ The impact of risk shocks is measured through regressions of bond yields and stock prices on VIX. The residuals from this exercise are then decomposed into real and money shocks using the sign restrictions described above, namely that real shocks push bond yields and stock prices in the same direction and money shocks push them in opposite directions. The impact of real and money shocks on EMNS variables is measured using a panel vector autoregression.

yields reflected both real and money shocks—that is, weaker growth prospects and perceptions of easier monetary policy (panel 2).

As discussed in detail in the background note, there have been significant spillovers between the United States and euro area. The tightening of U.S. financial conditions in mid-2013 had real and monetary spillovers on the euro area. Over the past year, the accommodative monetary conditions in the euro area are compressing yields not only in the euro area but also in the United States. More recently, the increase in yields of German bunds—and an associated increase in volatility—is affecting markets in other advanced economies, including the United States.

The next step of the analysis is to see the impact of real and money shocks on emerging economies and nonsystemic advanced (EMNS) economies. The findings are shown in Figure 4. The bars show the impact of a 1 percentage point increase in bond yields in either the U.S. or the euro area on bond yields, net capital inflows and industrial production in other economies. The impact shown is the average across the various EMNS economies.

A notable feature of the results is that real and money shocks (in either the U.S. or the euro area) have vastly different spillover effects on other economies. This can be seen by comparing the panels on the left with those on the right. While both types of shocks lead to an increase in bond yields in other economies, real shocks lead to higher capital inflows and an increase in industrial production, whereas money shocks do the opposite.⁴

This illustrates the point that spillovers depend on why advanced economy bond yields are increasing: the spillovers are positive if yields go up because of good news about growth prospects in advanced economies.

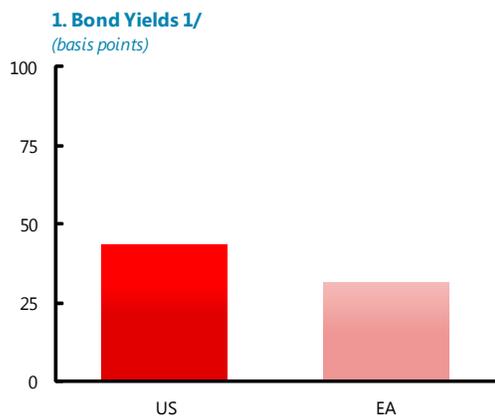
The results also show that both U.S. and euro area real shocks have positive spillovers on other economies. Hence, spillovers to EMNS economies could be amplified when there is good news about growth prospects in both the United States and the euro area (“synchronous” episodes of positive real shocks) and dampened when there is good news about one but not the other.

There are some differences in spillovers across regions, reflecting different economic links with the United States and Europe; for instance, the effect of a real shock in the euro area is considerably larger in Emerging Europe than in other regions owing to stronger trade links. Real shocks in both the United States and Europe generate larger capital inflows to Asia than to other regions, partly

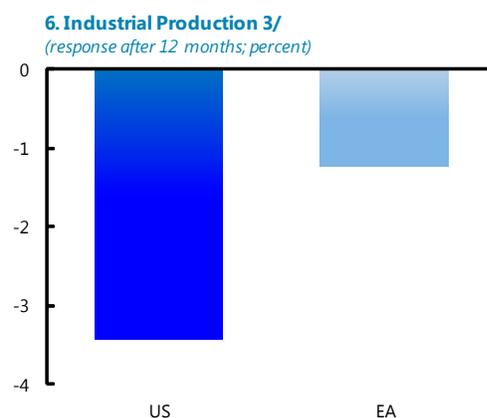
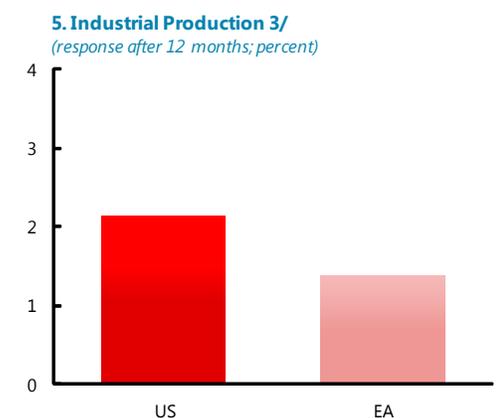
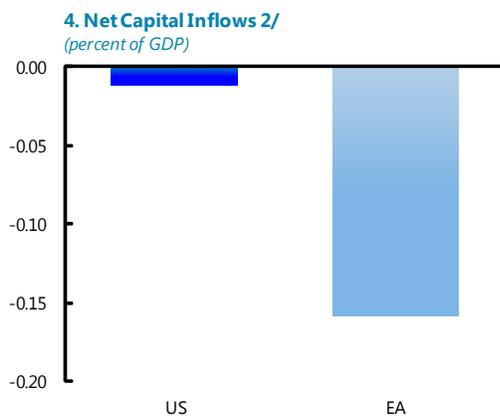
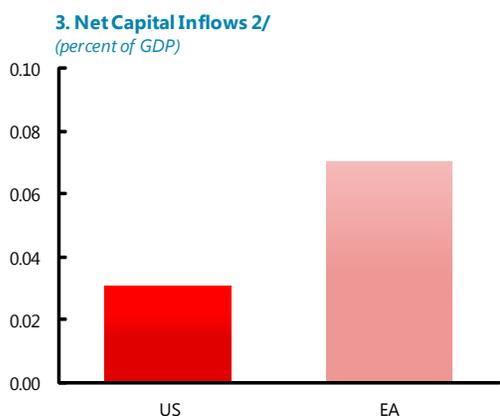
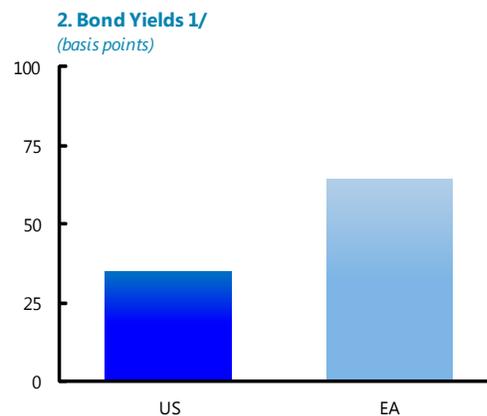
⁴ It may appear surprising that higher growth in the United States or euro area leads to higher flows to emerging markets. There are two channels at play here. First, there is the ‘traditional channel’ through which a growth shock in the U.S. (or euro area) induces capital to flow to the country where the shock originates and causes an appreciation of the dollar (or the euro). Second, there is a ‘risk appetite channel’, through which a real shock boosts investor risk-appetite—agents invest in EMNS as they envisage better economic prospects at the global level. This would cause capital to flow to EMNS and their currencies to appreciate. Our results suggest that the second effect dominates—likely related to size of capital flows out of emerging and systemic countries.

Figure 4. Impacts of Developments in United States and Euro Area on Other Economies
Spillovers depend on the underlying reasons for the increase in advanced economy bond yields

Spillovers to EMNS from Real Shocks in SAEs
(average response after 3 months, unless stated otherwise)



Spillovers to EMNS from Money Shocks in SAEs
(average response after 3 months, unless stated otherwise)



Source: Osorio-Buitron and Vesperoni (2015).

Note: EA = euro area; EMNS = emerging markets and nonsystemic advanced economies; SAEs = systemic advanced economies; US = United States.

1/ Local-currency 10-year sovereign bond yield.

2/ Net debt and equity inflows (in percent of GDP).

3/ Annual change in industrial production.

because the sample of Asian economies includes two world financial hubs—Hong Kong SAR and Singapore—that experience much larger capital inflows than other EMNS.

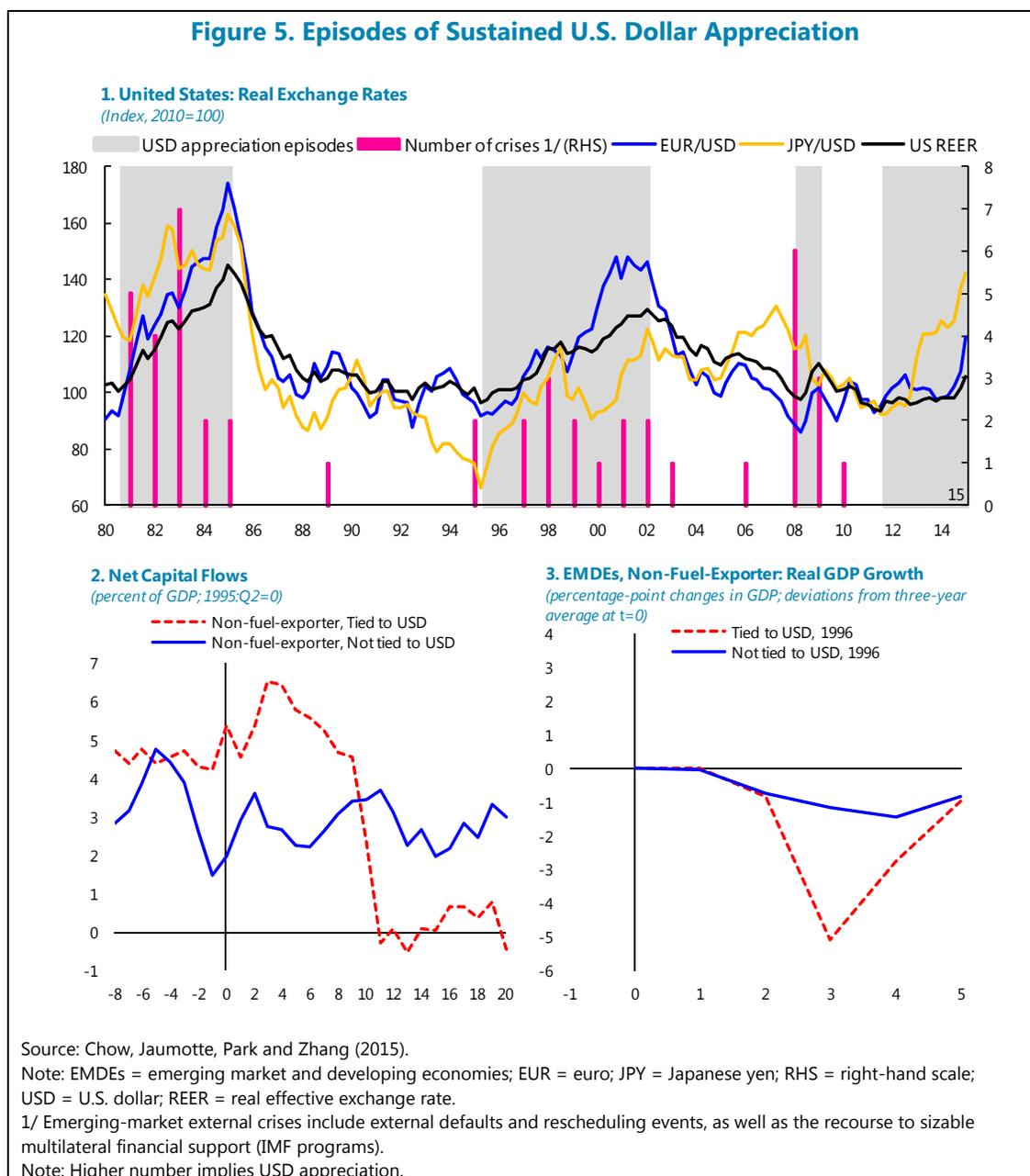
To summarize, the results presented thus far suggest that improvement in growth prospects in advanced economies generates positive spillovers for economic activity in emerging markets. These findings are consistent with previous staff work on spillovers (e.g. the 2014 Spillover Report). However, a distinctive feature of present developments is the large movements in exchange rates, notably a sustained dollar appreciation. It could be that this appreciation has adverse effects on balance sheets and economic activity in other economies—this is the topic of the next section.

SPILLOVERS FROM U.S. DOLLAR APPRECIATION

7. **Past episodes of sustained dollar appreciation have been associated with crises in emerging markets.** Since 1980, episodes of strong and sustained U.S. dollar (USD) appreciation, 1980–85, 1995–2001, and 2008–2009, have been associated with an increase in the number of external crises in emerging market (EM) economies, though other factors such as financial overheating and balance sheet mismatches may have contributed as well in some episodes (Figure 5, panel 1). The 1995–2001 episode shares some features with current circumstances: the dollar appreciation during those years took place against a background of stronger growth prospects and tighter U.S. monetary policy relative to that in Europe and Japan. In the group of countries whose currencies were ‘tied’ to the dollar at the start of the episode, there was a sudden stop in net capital inflows; in contrast, countries where currencies were flexible experienced steadily increased net capital inflows and reserve asset accumulation (Figure 5, panel 2). The external crises took a toll on output in the tied group, while the not-tied group had on average more stable growth rates (Figure 5, panel 3).

8. **Since the mid-1990s, the net international investment position of emerging markets and low-income countries has improved considerably and has become less vulnerable to currency changes.** These evolutions reflect three factors: (i) since the mid-1990s, EM current accounts have improved substantially, leading to a better international investment position (IIP) and more foreign exchange (FX) reserve accumulation; (ii) EMDEs have been able to rely increasingly on domestic-currency, equity-type liabilities, reducing their dependency on FX debt; and (iii) EMs have increasingly been able to issue in domestic-currency debt instruments. The net IIP of EMs increased on average from about –40 percent of GDP in 1995 to –25 percent of GDP in 2013, with net debt improving by about 20 percentage points of GDP and FX reserves by about 10 percentage points of GDP (Figure 6, panel 1). The improvement in net IIP and net debt is even more striking for LICs, partly reflecting debt forgiveness for highly-indebted countries (Figure 6, panel 2).

As a result, many EMs, including most systemic countries, are now long FX in debt instruments, a sharp improvement from the mid-1990s (Figure 6, panel 4). One key indicator to assess vulnerability to external crisis is the net FX debt asset position, defined as the sum of FX debt assets and FX reserves, minus FX debt liabilities. About half of EMs are now long FX, and another quarter have a

Figure 5. Episodes of Sustained U.S. Dollar Appreciation

short FX debt position lower than 20 percent of GDP. Systemic EMs (with the exception of Turkey) have also considerably improved their net FX debt asset position. Most of them have become long FX, and fuel exporters and some EMs in Emerging Asia have accumulated large long FX positions. Nevertheless, since the mid-2000s, the short FX position of the bottom quartile of the distribution has been widening again, indicating gradual rebuilding of vulnerabilities (Figure 6, panel 3).⁵

⁵ Of course, this improvement in net international investment position comes at a cost: while it reduces vulnerability, countries are also forgoing some profitable investment opportunities.

9. Large gross positions in some countries and the currency composition of the FX debt position could pose vulnerabilities.

- *While net positions have improved, large gross positions could still signal vulnerabilities.* Agents holding foreign assets may not be the same as those holding foreign liabilities. This is especially important as foreign liabilities have increasingly migrated from sovereign to non-financial corporate balance sheets. Therefore balance sheet effects on the assets and liability side may not offset each other. Moreover, large gross positions make countries more vulnerable to rollover and interest rate risk in case of sudden stops of capital inflows or drying up of FX market liquidity. Foreign liabilities are especially large in Chile, Hungary, Malaysia, Poland and Thailand, while FX debt liabilities are significant in Hungary, Malaysia and Turkey.⁶
- *The currency composition of the FX debt position also matters to determine vulnerability to a US dollar appreciation.* For most countries, debt liabilities are mostly in dollars, except in Emerging Europe where debt in euros is prevalent. Debt assets are both in dollars and euros. The currency composition of FX reserves broadly aligns with that of net FX debt assets: countries whose liabilities are exposed to the dollar have a higher share of dollar reserves, while Emerging Europe tends to have both higher euro debt liabilities and euro FX reserves. Most systemic EMs have small net debt positions in both the dollar and the euro. Turkey, however, has a considerable short debt position in dollars, which makes it potentially vulnerable to a dollar appreciation. China and Thailand have considerable long positions in debt instruments in the dollar and euro, and Russia in the euro, which could also expose them to balance sheet effects (either positive if their currencies appreciate against the euro or negative in the contrary case).

10. While balance sheet effects at the country level—based on information on currency exposures and exchange rate movements thus far—remain moderate, some caution is warranted.⁷

The balance sheet effect of FX shocks is calculated as the change in the ratio of net FX debt assets-to-GDP induced by currency changes. In the event of a shock that leads to a currency depreciation, a long FX position confers valuation gains and helps cushion the impact. The results show that despite significant nominal depreciations against the US dollar, and in some cases (Emerging Europe, Commonwealth of Independent States) against the euro, estimates of debt balance sheet effects are so far moderate for the majority of countries, at least compared to valuation effects experienced by crisis countries during the mid-1990s appreciation episode.⁸

- Negative balance sheet effects are however larger in Hungary, and in some smaller countries especially from the Commonwealth of Independent States (CIS), reflecting large short US dollar debt positions combined with sizable depreciations against the dollar.

⁶ In Poland, a high share of relatively stable intercompany debt is a mitigating factor.

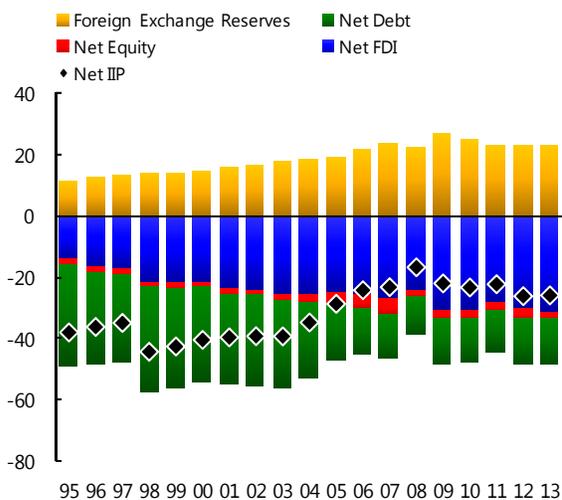
⁷ It should be noted that there are significant limitations to the currency composition data and that it does not take into account hedging through derivatives.

⁸ The calculations are done for debt assets and liabilities denominated in the five currencies (dollar, euro, yen, pound, and Swiss franc) which cover most liabilities and assets. Balance sheet effects are calculated for the period from end-2013 until April 2015.

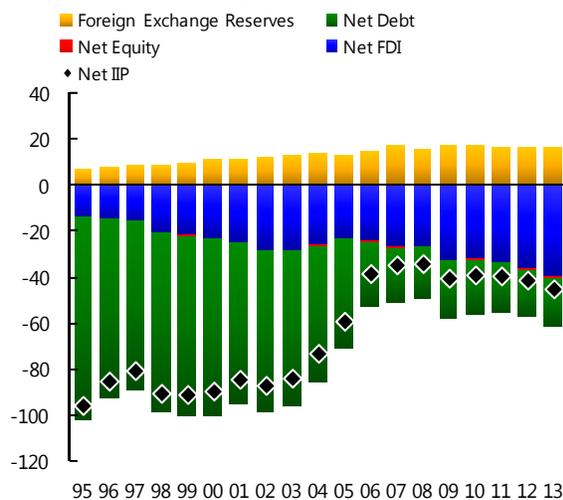
Figure 6. Net International Investment Position in Emerging Markets and Low-Income Countries

Since the mid-1990s the net international investment position has improved

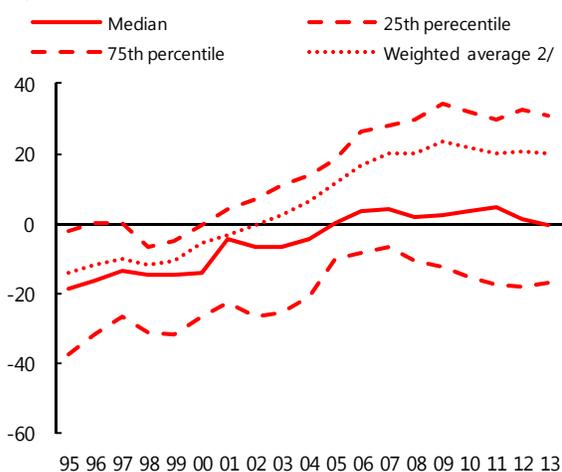
1. Emerging Market Countries: Net IIP Decomposition (percent of GDP; unweighted average)



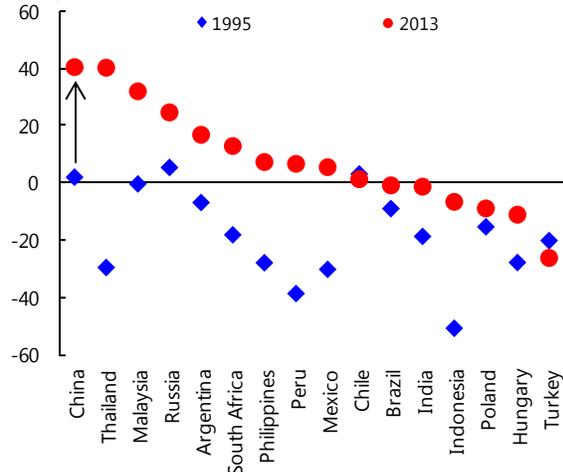
2. Low-Income Countries: Net IIP Decomposition (percent of GDP; unweighted average)



3. Emerging Market Countries: Net FX Foreign Debt Assets Including ForExReserves 1/ (percent of GDP)



4. Emerging Market Countries: Net FX Foreign Debt Assets Including ForExReserves (percent of GDP)



Source: Chow, Jaumotte, Park and Zhang (2015).

Note: FDI = foreign direct investment; IIP = international investment position.

1/ Defined as foreign-exchange debt assets + foreign-exchange reserves – foreign-exchange debt liabilities.

2/ Weights are based on GDP in U.S. dollars.

Note: Foreign-exchange debt liabilities are adjusted for the share of domestic currency in gross external debt, whenever available.

- China and Thailand also experienced negative balance sheet effects, due to an appreciation against the euro, in which they have significant long positions.
- Russia had large positive balance sheet effects, reflecting its depreciation against the euro, in which it has a large long debt position.

While balance sheet risks have improved, there are many reasons to remain cautious:

- A significant part of the improvement in net FX debt assets for EMs comes from the accumulation of FX reserves. The holders of FX debt liabilities may not be the holders of FX reserves or other FX debt assets. Moreover, while large reserves do provide reassurance to foreign investors, they may not prove enough if financial conditions become disorderly.
- Domestic-currency external debt, though not vulnerable to exchange rate changes, is not without risk. Sudden capital outflows or a sharp rise in interest rates would have substantial impact on EMs' domestic bond markets and financing costs.
- Issuances by offshore subsidiaries, difficult to track, could be significant for a few larger EMs.
- While FX exposures have been reduced in most cases at the country level, the exposure of the corporate sector has picked up considerably in EMs, of which a lot is in FX. This is examined next.

11. The corporate debt stock in emerging markets has risen significantly over the past decade and the highly leveraged corporate sectors also tend to have higher FX exposure. An analysis of annual firm-level balance sheet information for several EMs shows that both total and foreign currency corporate debt rose rapidly in Asia and Latin America since the global financial crisis.⁹ Nonfinancial corporate sectors have the highest debt-to-GDP ratios in Bulgaria, China, Chile, Malaysia, Thailand and Turkey. In some countries, the ratio of corporate debt-to-GDP is close to levels seen during the Asian financial crisis.

Highly leveraged corporate sectors tend to have higher FX exposure, with a few notable exceptions. While China's debt is mostly denominated in local currency (LCU), Chile, Malaysia, Thailand, Bulgaria, Turkey and Hungary have sizable FX debt in share of GDP. In most countries, FX debt is largely denominated in USD especially in Asia and Latin America but also in Turkey, while in Emerging Europe (e.g. Bulgaria, Hungary and Poland), the euro and other currencies account for a larger share of total FX debt (Figure 7, panels 1 and 2).

12. An assessment of the risks of increased FX exposure has to account for a number of factors: the extent of hedging, sectoral differences and maturity structure.

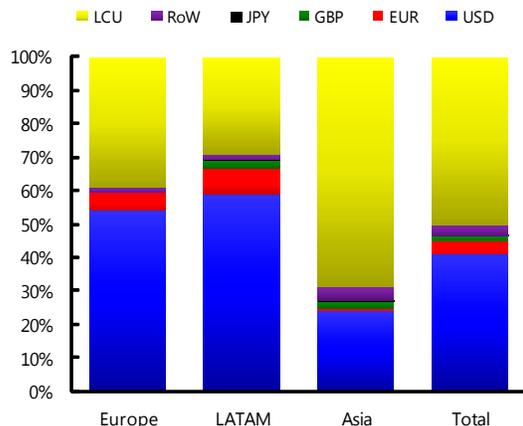
Hedging: A country is more vulnerable to a dollar appreciation shock if it has a large stock of dollar debt while its income stream is mostly in domestic currencies or euro (Figure 7, panels 3 and 4).

⁹ The analysis is based on information for about 40,000 firms for the countries shown in Figure 7. The coverage of firms' total assets is around two-thirds of the total GDP of these countries.

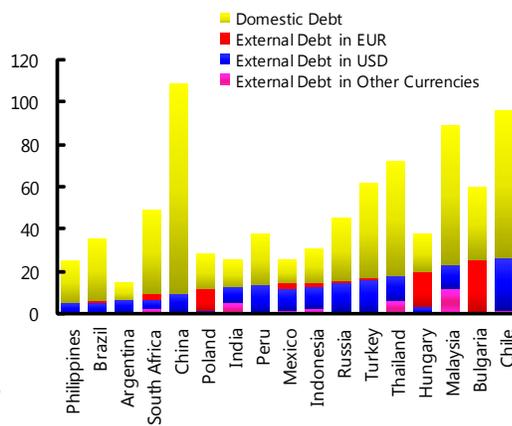
Figure 7. Emerging Markets Corporate Debt Exposures

The exposure to foreign-currency debt varies greatly across countries

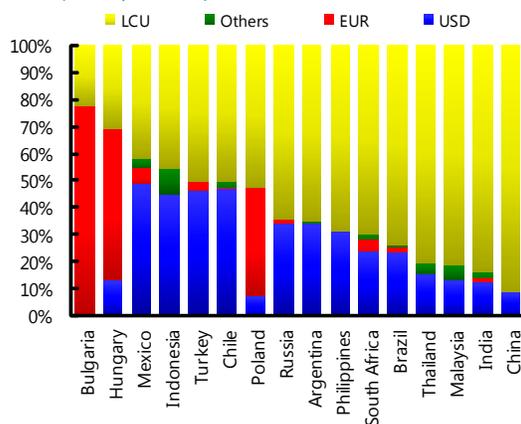
1. Currency Breakdown of Corporate Debt Outstanding in 2014, 16 Emerging Markets
(percent)



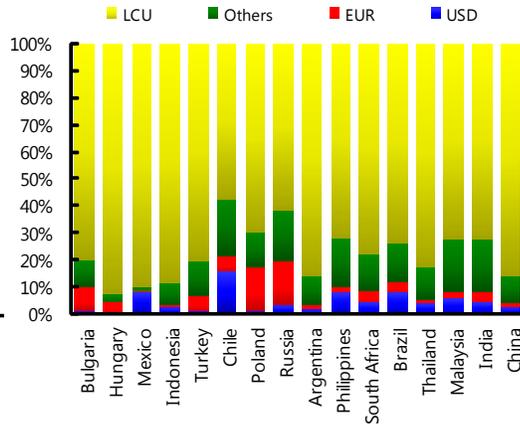
2. Corporate Debt to GDP
(percent of GDP)



3. Foreign Exchange Breakdown of Total Corporate Debt
(share of total debt)



4. Foreign Exchange Breakdown of Total Corporate Income
(share of total income)



Source: Chow, Jaumotte, Park and Zhang (2015).

Note: EUR = euro; GBP = British pound; JPY = Japanese yen; LATAM = Latin America; LCU = local currency; RoW = rest of world; USD = U.S. dollar. In panel 4, it is assumed that exports to the United States and China are invoiced in USD.

Though corporates in these countries may be actively hedging through derivatives, especially in the tradable sectors, data limitations make the extent of hedging hard to quantify.

Sectoral differences: Capital intensive sectors such as utility, commodity exporters, and real estate/construction sectors are more leveraged than other sectors. Non-tradable sectors have on average lower FX debt stock than tradable sectors, but they tend to generate less income in FX and financial hedging is rather uncommon in these sectors. Accounting for natural hedges, some non-tradable sectors, including utility and real estate sectors are more vulnerable to FX movements.

Maturity structure: Over time, the debt structure has shifted from bank loans to more corporate

bonds issuances, which generally have a relatively long-term maturity structure. The share of bonds maturing in the next two years, relative to total bonds outstanding, is highest in China, Thailand and Russia and lowest in Peru, the Philippines, and Chile. While most bonds maturing in Asia are in local currencies, Hungary, Argentina and Indonesia have the highest share of FX bonds maturing by 2016.

Taken together, the analysis suggests that corporate sector risks remain moderate though, as with the country-level analysis of balance sheets, there are possibilities of greater vulnerabilities emerging as a result of further currency movements.¹⁰

IMPACTS OF THE 2014 OIL PRICE DECLINE

13. **The oil price decline represents a “shot in the arm” for the global economy but a number of factors appear to have moderated the near-term boost.** Arezki and Blanchard (2014) note the sizable scale of the impact for the many oil-importing economies around the world: for an economy with a 4 percent oil consumption share, a 50 percent decline in oil prices should translate into an increase in real income of 2 percent of GDP. Moreover, although the gains and losses across producers and consumers from an oil price decline sum to zero, the net effect on global activity should be positive through two channels. First, the increase in spending by oil importers is likely to exceed the decline in spending by exporters; second, lower production costs will stimulate supply in other sectors for which oil is an input.

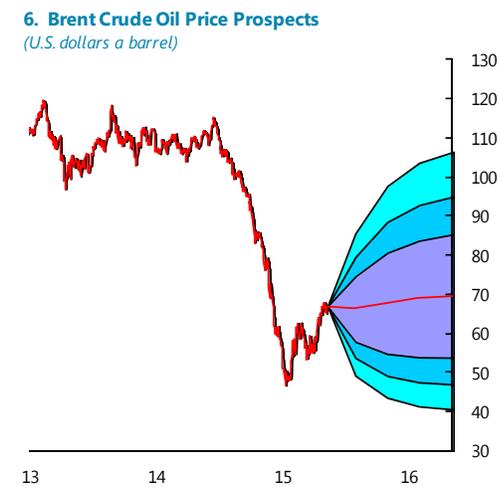
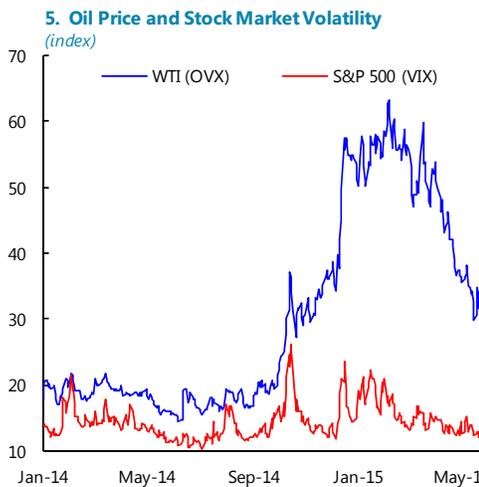
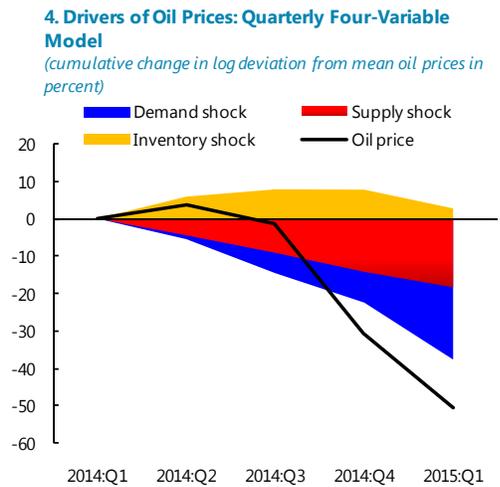
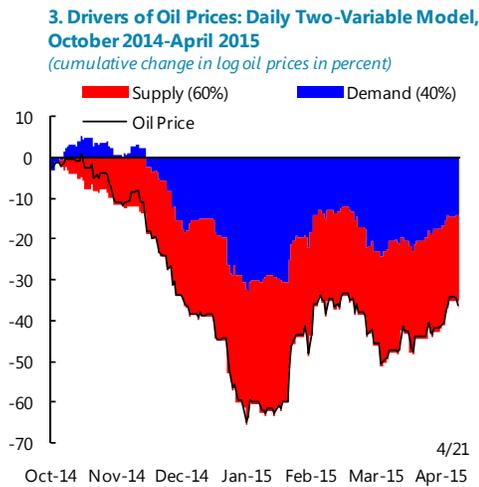
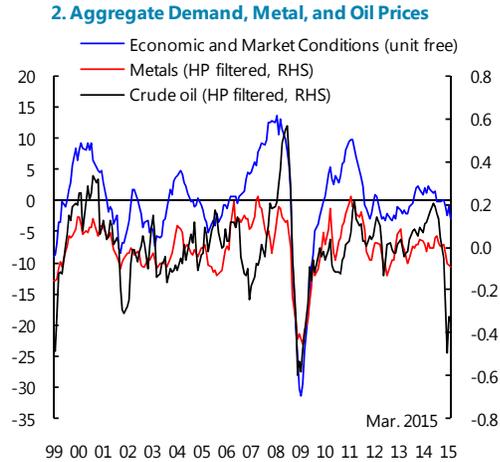
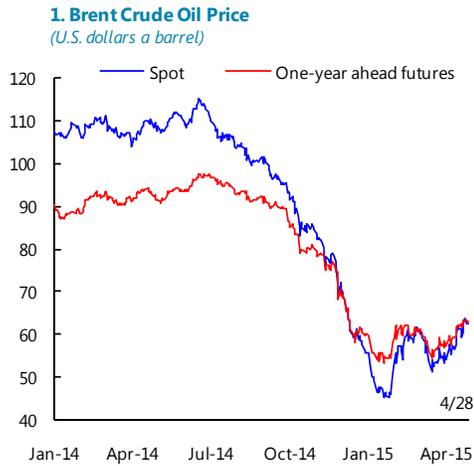
The size of the overall boost depends on a number of factors:

- *Persistence and volatility:* After reaching lows of about \$45 a barrel in January, oil prices have been volatile and recovered to about \$60 in mid-April, creating some uncertainty about the degree of persistence of the 2014 oil price decline (Figure 8, panel 1). With the partial recovery in prices, the benefits to oil importers are smaller.
- *Underlying drivers:* Though the relative importance of demand and supply factors is difficult to pin down precisely, supply factors continue to play an important role in driving oil prices this year. The decline in oil prices has remained larger than that for other commodities and has been larger than would be predicted based on a global indicator on demand conditions (panel 2). Results from a small structural model, which disentangles oil demand and supply shocks by examining the comovement of oil prices and stock prices, show that on average higher oil supply accounted for 60 percent of the price decline during the mid-October to mid-April 2015 period (panel 3). A larger model, which distinguishes the roles of supply, demand and inventory demand in driving oil prices (Beidas-Strom and Pescatori, 2014), assigns a somewhat smaller but nonetheless important role to supply factors during 2014 (panel 4).

¹⁰ Chow and others (2015) describes the results of a stress test in which a combination of shocks to exchange rates, interest rates and earnings could significantly increase debt at risk, in some case overwhelming banks' buffers.

Figure 8. Oil Prices: Developments and Drivers

There is considerable uncertainty about the persistence and drivers of the oil price decline



Sources: Bloomberg; IMF Primary Commodity Price System; and IMF staff calculations.
Note: HP = Hodrick-Prescott; OVX = Chicago Board of Options Exchange oil price volatility index; RHS = right-hand scale; S&P = Standard & Poor's; VIX = Chicago Board Options Exchange Market Volatility Index; WTI = West Texas Intermediate.

- *Uncertainty:* The decline in oil prices has been accompanied by an increase in uncertainty: the oil component of the VIX has gone up compared to the overall VIX (panel 5) and the distribution of futures prices shows a wide range of possibilities (panel 6). High oil price uncertainty can lead firms to postpone irreversible investment decisions and wait for more information if the cash flow from the investment is dependent upon the oil price; likewise households can postpone durable consumption such as purchase of automobiles. While empirical studies find that oil price volatility has a negative impact on investment and real GDP, the empirical evidence suggests this offset will be small relative to the boost provided by the substantial decline in the oil price.
- *Extent of pass-through:* By end-2014, retail fuel prices had declined on average globally by only half as much as world oil prices, roughly matching the pass-through observed during the oil price decline in 2008 (Figure 9, panel 1). A simulation of the IMF's G20 Model shows that if an adjustment is made for differences across countries in the pass-through of lower oil prices to private sector consumers and producers, global output would rise by more than ½ percentage point, about half the impact that would prevail under full pass-through. The impacts on the United States and the euro area would not be very different but the impact on large emerging markets such as China and India would be much more muted (Figure 9, panel 2).

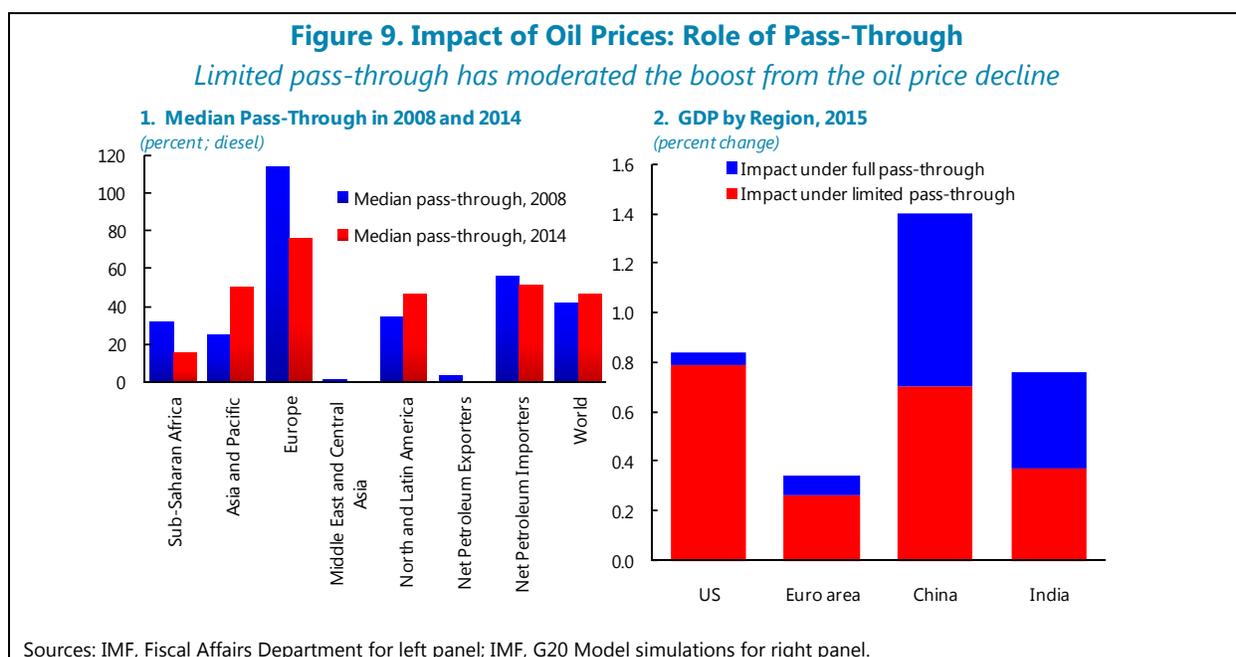
14. The decline in oil prices has had adverse spillover impacts on countries and sectors dependent on oil and other commodities but the stress thus far is limited.

Stress in major oil exporters: Major oil exporters have suffered a terms-of-trade loss (measured just in terms of decline in export prices). Countries with fixed exchange rate regimes have had a larger loss because they have larger oil sectors (Figure 10, panel 1). The fiscal loss for oil exporters associated with lower oil prices is estimated to average 4 percent of GDP this year with country estimates as high as 25 percent of GDP (Figure 10, panel 2).

The extent to which oil exporters appear able to cope with the short-term effects varies:

- Governments with significant financial assets (net of public debt)—including most of the Cooperation Council for the Arab States of the Gulf (GCC) countries and Norway—are better placed than those with fewer accumulated financial assets—such as Libya, Nigeria, and Venezuela—which are already facing major budget challenges.
- Oil exporters that have allowed their currencies to weaken (including Azerbaijan, Colombia, Nigeria, and Russia) will be able to partially offset lower oil revenues in foreign currency terms in contrast to those with fixed or tightly managed exchange rates (such as Ecuador, Kazakhstan, and Venezuela), whose fiscal positions have deteriorated more sharply.
- For many oil exporters, fiscal revenues when oil prices were high were used to pay for large increases in current and capital expenditures without building appropriate buffers. As a result, the fiscal break-even price for oil (the price necessary to balance the budget) increased significantly in most exporting countries in the Middle East between 2008 and 2014 (Figure 10,

panel 4). For low-income oil exporting countries or frontier markets, the fiscal stress is particularly severe because of pressing infrastructure and social spending needs.



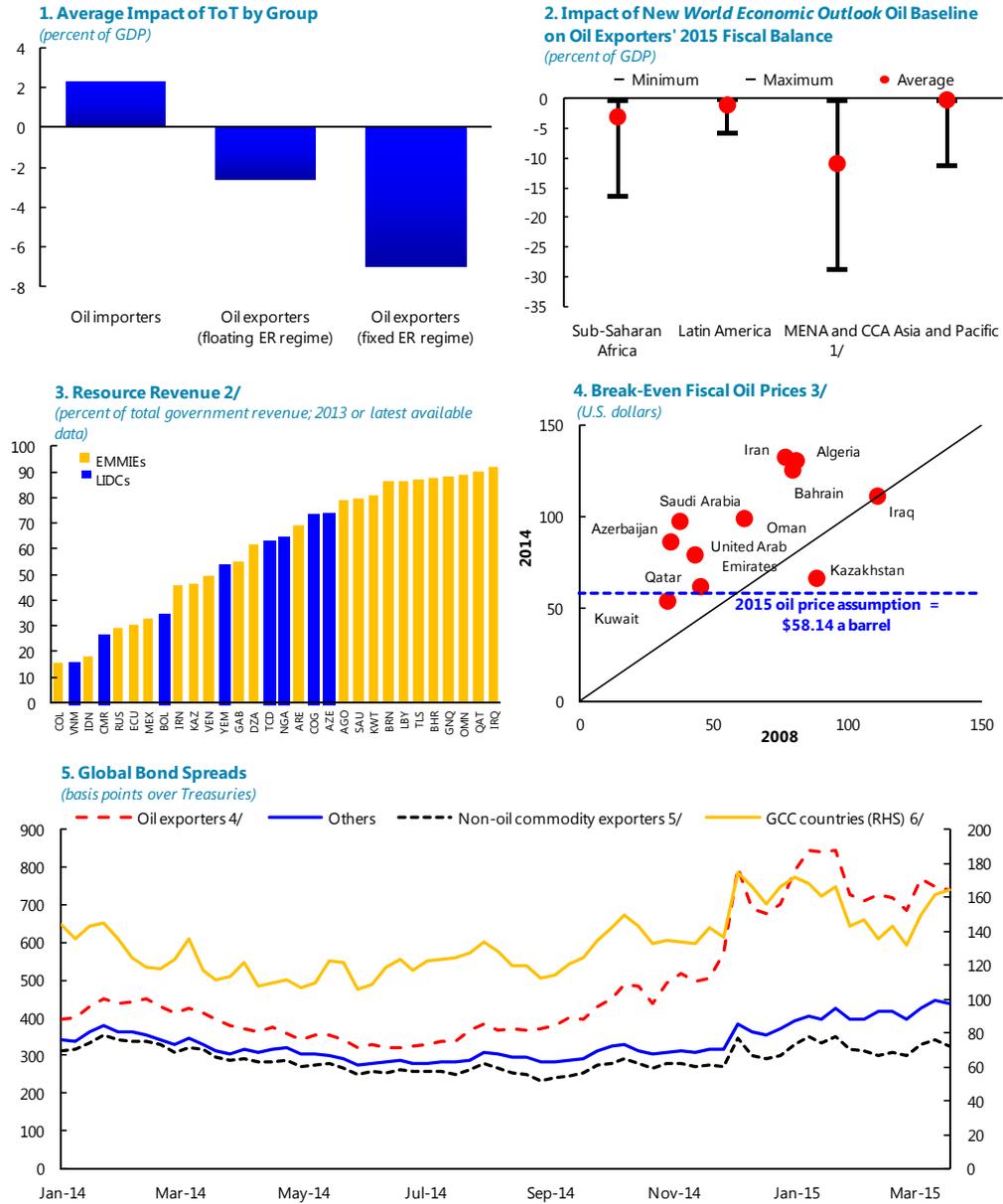
Stress in oil exporting countries in turn has spillover effects on neighboring countries or others with whom they have trade or financial linkages—see Box 1 on spillovers from developments in Russia. Countries dependent on oil revenues have already been significantly re-priced by investors since the summer of 2014, as reflected in bond spreads (Figure 10, panel 5).

Movements in other commodity prices: Prices of other energy sources and commodities more generally have declined along with the decline in oil prices (Figure 11, panel 1 and April 2014 *Western Hemisphere* REO).¹¹ Natural gas prices have adjusted downward, with a differentiated impact across regional markets. Despite the wide differentials in natural gas price levels across regions due to region-specific factors, the evidence suggests a close trailing relationship with oil prices, implying the prospect of further softening in the months ahead. Coal prices have often followed oil prices given substitution opportunities and a common cycle. Coal prices have been declining since early 2011 partly because of the slowdown in emerging markets and displacement by cheap natural gas in the United States. Any further slowing of growth in emerging markets, combined with a further decline in oil prices, could push coal prices down some more. The projected decline in export earnings (expressed as a share of GDP) due to declines in natural gas and coal prices over the past year is shown for major exporters in Figure 11, panel 2.

¹¹ One of the factors for such co-movement is the impact of withdrawals from commodity index-linked investment across commodities, given that liquidations triggered a significant decline in assets under management.

Figure 10. Impact of Oil Exporters

The oil price decline has placed considerable fiscal strains on net oil exporters



Sources: Bloomberg L.P.; Commodities Futures Trade Commission; Dealogic; Haver Analytics; Intercontinental Exchange; IMF, Fiscal Affairs Department Tax Policy Database; U.S. Department of Treasury; and IMF staff calculations.

Note: CCA = Caucasus and Central Asia; ER = exchange rate; MENA = Middle East and North Africa; RHS = right-hand scale; ToT = terms of trade. Panel 3 employs three-letter International Organization for Standardization (ISO) country abbreviations.

1/ Impact on fiscal revenues.

2/ EMMIEs = emerging market and middle-income economies; LIDCs = low-income developing countries.

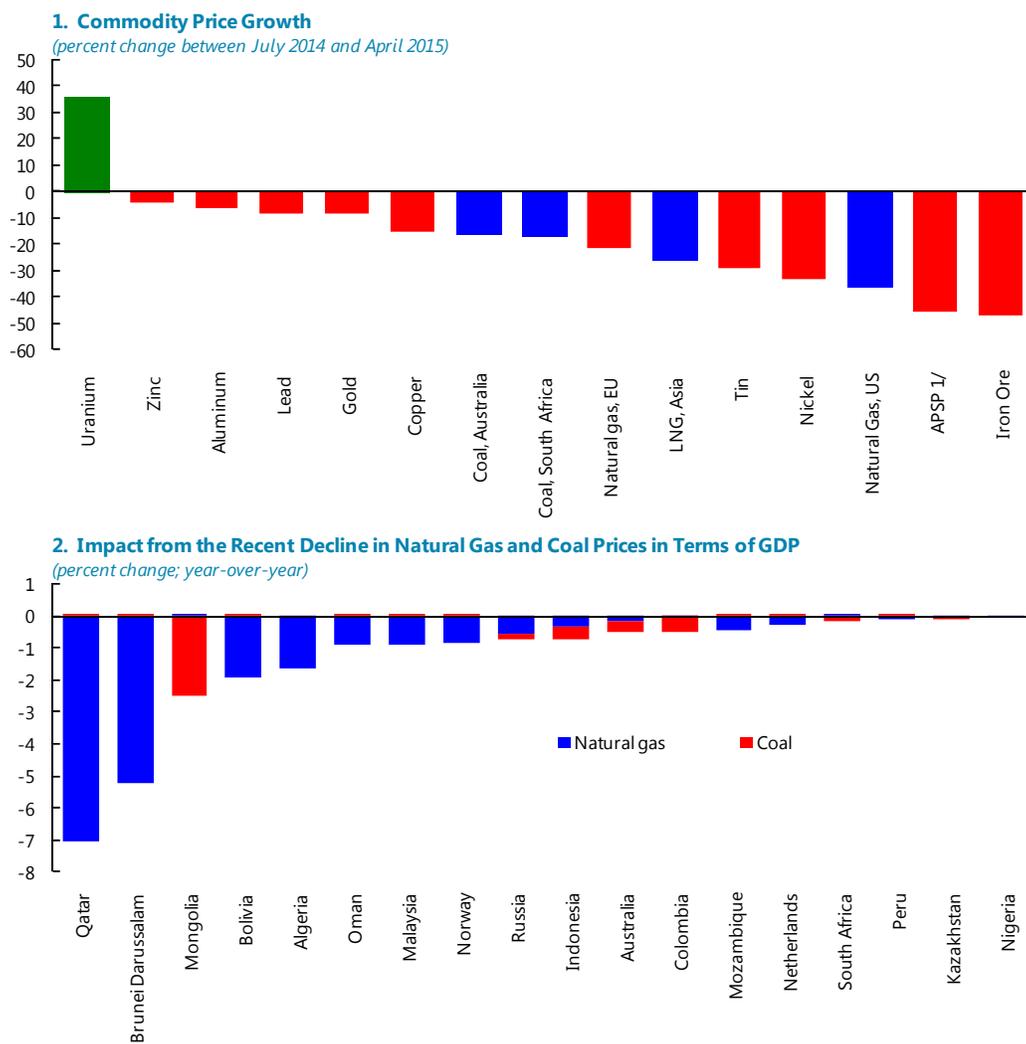
3/ Price of oil that is sufficient to ensure that total revenues are equal to or greater than government spending.

4/ Oil exporters are comprised of Colombia, Gabon, Kazakhstan, Nigeria, and Russia.

5/ Non-oil commodity exporters are Chile, Côte d'Ivoire, South Africa, Uruguay, and Zambia.

6/ Cooperation Council for the Arab States of the Gulf (GCC) countries are comprised of Bahrain, Qatar, and the United Arab Emirates.

Figure 11. Declines in Other Commodity Prices and Likely Impact
Commodity prices have declined along with the decline in oil prices



Sources: IMF, Primary Commodity Price System, UN Comtrade, and IMF staff calculations.

Note: APSP = average petroleum spot price; LNG = liquid natural gas.

1/ Simple average of spot prices for West Texas Intermediate, Brent, and Dubai Fateh.

Sectoral impacts within oil importing countries: While lower oil prices are expected to have a net positive impact for these economies, the effects on their oil industries will be negative. However, for most countries this drag will be small given the small share of oil in the overall economy. For instance, in the United States, the oil and gas extraction sector amounts to only 1½–2 percent of GDP. The employment share of the sector in total employment is also small—0.6 percent (Box 1.1 of the April 2015 *Western Hemisphere Regional Economic Outlook*). There are issues of timing, however, as the decline in oil sector investment and employment is immediate and sharp, whereas the pickup in non-oil sectors may take time.

Box 1. Spillovers from Lower Oil Prices, Sanctions, and Other Factors, Through Growth in Russia, on Neighboring Countries

Russia's weak economic growth will affect neighboring countries, particularly the CIS, through trade, remittances and FDI channels. Belarus and Turkmenistan have the largest share of exports to Russia (over 10 percent of GDP). The remittances channel is particularly prominent for CIS oil importers, which are among the most remittance dependent economies in the world. The FDI channel is also important for a number of countries (Armenia, Belarus, Moldova, and Tajikistan). The financial sector channel is more limited, given the relatively small presence of Russian banks, although exchange rate depreciations may have already begun to pose risks to financial stability, especially in highly dollarized economies.

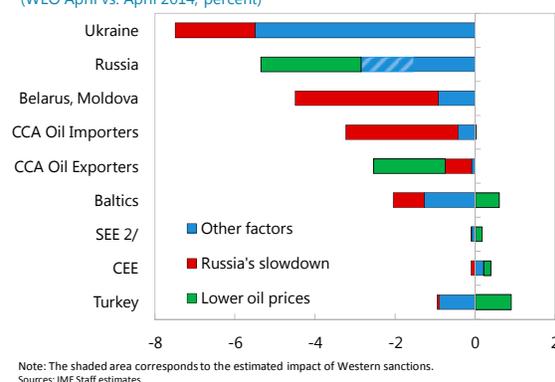
The negative spillovers have contributed to sizable downward revisions to growth forecasts across the CIS (chart). In particular, for Ukraine, Belarus, Moldova, and CCA oil importers adverse spillovers from Russia's recession in 2015 account for more than 2.5 percentage points of the downward growth revision relative to April 2014. For CCA oil exporters, negative spillovers from Russia contributed to about 1.4 percentage point of the downward revision in the growth forecast. The slower medium-term growth in Russia is expected to have negative implications for the medium-term outlook of both CIS and Baltic countries.

Currencies of most CIS countries depreciated (or were devalued) sharply relative to the US dollar following ruble's depreciation (in some cases accompanied by large interventions), reflecting confidence effects and expected decline in foreign currency inflows from Russia. Countries with significant trade and remittance links to Russia experienced larger currency depreciations relative to the dollar reflecting expected deterioration in current account balances. At the same time, the sharp ruble depreciation and US dollar appreciation (to which some CIS currencies are pegged) have put upward pressure on nominal effective exchange rates.

Despite slowing growth, inflation is rising due to the large pass-through from exchange rate depreciations. This was a notable factor contributing to upward revisions to inflation forecasts in Belarus, Moldova, Ukraine, and CCA oil importers.

Revisions to Real GDP Growth, 2015

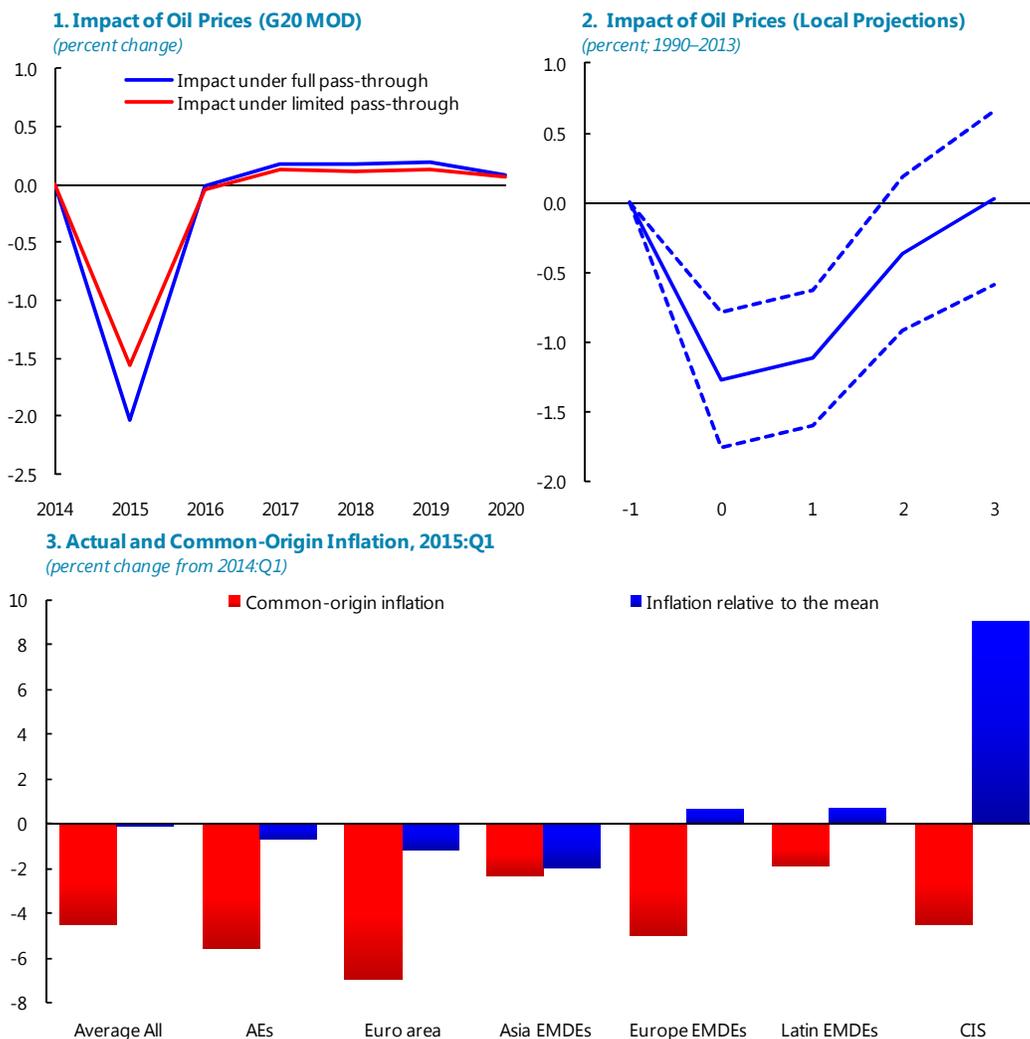
(WEO April vs. April 2014, percent)



15. **For many countries, the decline in oil prices exerts downward pressure on already low headline inflation, with the impact of sustained dollar appreciation providing some offset.** Simulations based on the IMF's large-scale model for G-20 countries show that the nearly 50 percent decline in oil prices can translate into a decline in headline inflation of about 1.5 percentage points under either limited or full pass-through (Figure 12, panel 1). For a larger set of advanced, emerging and low-income economies, the average response of headline inflation to the drop is also about -1.5 percentage points on impact and the effect remains significant up to two years after the decline (Figure 12, panel 2). At the same time, for many countries, the increase in the U.S. nominal effective exchange rate exerts an upward pressure on headline inflation.

For particular countries, the net effect depends on their respective sensitivities to the two influences. An analysis conducted in the April 2015 *Regional Economic Outlook* suggests that for the Asia-Pacific

Figure 12. Impact of Oil Prices and U.S. Dollar Appreciation on Headline Inflation

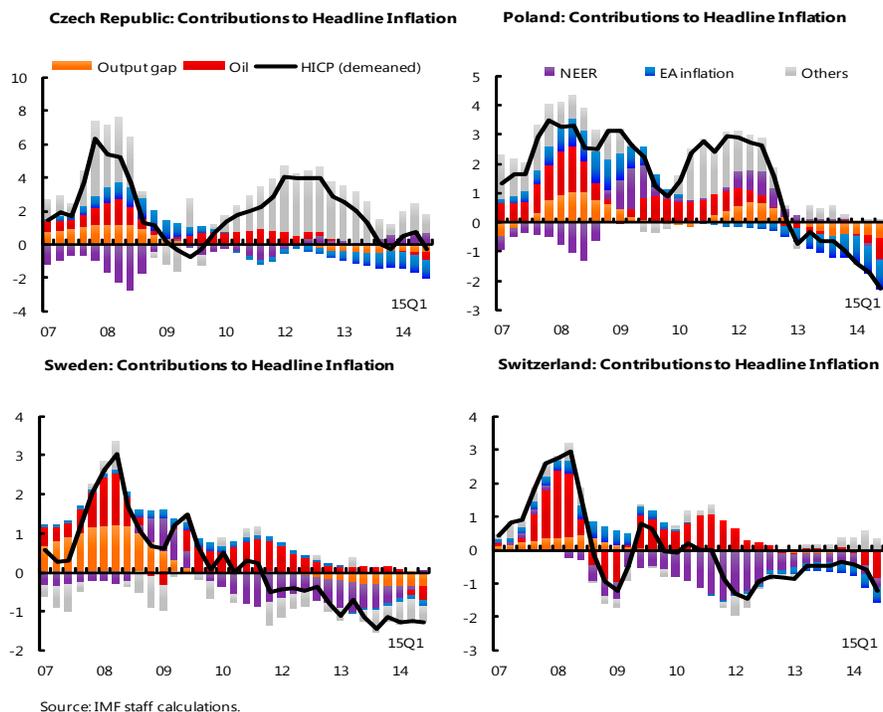


Sources: IMF G20 Model (G20 MOD) simulations for panel 1; Choi and others (2015) for other panels.
Note: AEs = advanced economies; CIS = Commonwealth of Independent States; EMDEs = emerging market and developing economies.

region, inflation at present is close to what would be expected based on the influence of such common factors. A similar analysis for other regions shows that oil prices are exerting a deflationary pull in other regions as well (shown as ‘common-origin’ inflation in panel 3) but the inflation experience so far is quite varied across regions (shown as ‘inflation relative to the mean’). Box 2 illustrates the respective roles of commodity prices, exchange rate fluctuations, and the output gap in driving inflation in selected European countries.

Box 2. Common and Domestic Factors in Inflation: A Case Study of Selected European Countries

Disinflationary pressures from the euro area would be expected to spill over into countries with exchange rates pegged to the euro. Surprisingly, even European countries with inflation targeting regimes have also experienced persistently below-target inflation. This Box focuses on the Czech Republic, Poland, Sweden, and Switzerland. A small semi-structural model is estimated for each country to distinguish the relative contributions of country-specific (or 'domestic') factors such as the output gap and factors that are common to all countries (e.g., commodity price shocks). Consistent with the findings in this report, decompositions of headline inflation show that declining commodity prices, especially the dramatic drop in oil prices since mid-2014, have been a common factor contributing to low headline inflation (the contribution is indicated by the red bars in the figure).



Nominal effective exchange rate fluctuations (as shown by the light purple bars) have contributed to lower inflation in Sweden and Switzerland, which experienced large and persistent exchange rate appreciations after the crisis. However, in the Czech Republic the central bank's decision to put a floor on the koruna/euro rate in late-2013 that was higher than the prevailing market rate at the time provided a positive impetus to inflation in 2014. Spillovers from euro area inflation, illustrated by the blue bars, have been as important as the contribution from oil, particularly for the Czech Republic, Poland, and Switzerland. Domestic factors have also played a role in low inflation, especially the output gap (shown by orange bars). However, growth has been picking up and output gaps, though negative, are rapidly closing, except in Switzerland where the recent exchange rate appreciation is likely to weigh on growth in 2015.

POLICY IMPLICATIONS

16. **Accommodative monetary policies in systemic advanced economies can generate positive spillovers for other countries.** As discussed in paragraphs 3–6 of this report, accommodative monetary policies in SAEs are the appropriate response to the situation they face of output below potential and inflation below target. The analysis in this report suggests that these actions will also have a positive impact on economic activity in other countries if they are perceived as good news about growth prospects in advanced economies.

Though not discussed in this report, the advice given in the 2014 Spillover Report and elsewhere (for example, Sahay and others, 2014) on additional steps that SAEs can take to ensure positive spillovers remains valid.

- First, SAE central banks have an obligation to communicate their policy intentions clearly and to maintain a dialogue with other central banks.
- Second, financial sector measures (for example, cleaning up of non-performing loans) can ensure that the monetary transmission mechanism is working, so that monetary accommodation leads to output gaps being closed instead of feeding a search for yield.
- Third, the policy mix used to achieve domestic goals can be adjusted to some extent. Growth-friendly fiscal policies in advanced economies can also help close output gaps—with different exchange rate impacts than monetary policy—and also raise potential output.¹² In this context, one area where more could be done is government spending on infrastructure. Increased public infrastructure investment raises output in both the short and long term, particularly during periods of economic slack and when investment efficiency is high. In many countries, where borrowing costs are low and demand is weak, debt-financed projects could have large output effects, without increasing the debt-to-GDP ratio. Dabla-Norris and others (2015) note that infrastructure investment can have a quick and positive effect on both employment and output, which is useful in an environment of weak demand and high unemployment.

17. **Risks of emerging market crises appear lower than in previous episodes of U.S. dollar appreciation, although vulnerabilities remain.** The discussion in paragraphs 7–12 suggests that emerging markets appear to be more resilient to the impacts of a sustained dollar appreciation than in the past, when many had limited exchange rate flexibility and their liabilities were mostly denominated in foreign currency debt instruments. Since the mid-1990s, the net international investment position for emerging markets has improved and become less vulnerable to FX changes.

¹² One distinctive feature of this global recovery is that monetary and fiscal policies in advanced economies were pushing in different directions at the start of the recovery; in previous global recoveries, government spending in advanced economies remained strong all through the early years of the recovery (Kose, Loungani and Terrones, 2013). This reflected worries about the high debt-to-GDP ratios and forecasts in 2011 of a strong recovery. With these forecasts turning out to be too optimistic, the pace of fiscal consolidation has slowed and the need to make fiscal policies as growth-friendly as possible has become widely recognized.

Fewer currencies are tied to the U.S. dollar, especially among systemic EMs, which should allow for a more gradual depreciation of exchange rates. Countries tied to the U.S. dollar should be watchful of pressures on reserves and developments in the current account. Some, with limited balance sheet exposure, may benefit from more exchange rate flexibility, in particular fuel exporters who are also experiencing a deterioration in terms of trade from the oil price shock. There remain macro-level balance sheet vulnerabilities to a USD appreciation, especially in some countries of Emerging Europe and the CIS. In the corporate sector in some emerging markets, leverage has increased and debt servicing capacity has deteriorated. Should a combination of severe macroeconomic shocks affect the nonfinancial sector, debt at risk would rise further, putting pressure on banking systems' buffers, especially in countries in which corporate and banking sectors are already weak.

18. In addition to being affected by sustained dollar appreciation, emerging markets have to cope with increased capital flow volatility. The analysis in this report has focused on the impacts of a sustained dollar appreciation. However, as noted by Carstens (2013) and Rajan (2014), emerging markets have also had to cope with increased volatility of capital flows. During inflows the countries can rebalance the macro policy mix where needed, accumulating reserves when below adequate levels, and implement prudential measures—including in some cases, capital controls (or so-called capital flow management tools)—to prevent the build-up of systemic financial risks. During bouts of volatility, the exchange rate can be used as a shock absorber and, where reserves are adequate, foreign exchange intervention can be used to counter temporary disorderly market conditions. Though emerging markets are becoming more adept at the use of these tools, they would also benefit from a strengthening of the global safety net through further expansion of swap lines and increased take-up of IMF instruments such as the Flexible Credit Line, Precautionary and Liquidity Lines, and precautionary Stand-By Arrangements.

Emerging markets are increasingly using macroprudential tools to contain risks to financial stability from accommodative conditions in advanced economies. These tools should be deployed to limit foreign currency balance sheet exposures and rapid increases in credit and private sector leverage.

19. The decline in oil prices is adding to policy challenges in oil exporters and—through spillovers—in other countries. Husain and others (2015) discuss how the policy responses in countries adversely affected by oil price declines have to be tailored depending on the terms-of-trade impact, fiscal and external vulnerabilities, and the domestic cyclical position; similar considerations apply to other commodity exporters. For countries affected by developments in oil exporters through trade or financial linkages, the responses are again varied.¹³

20. In most countries, inflation rates are being affected by conflicting forces, making policy choices difficult. For most advanced economies, the responsiveness of inflation to output

¹³ Box 1 illustrated the spillovers from the slowdown in Russia. In most cases, policy responses in CIS and the Baltics have allowed the exchange rate to depreciate to mitigate these spillovers. Monetary policy was tightened (Armenia, Belarus, Moldova, Kyrgyz Republic), and fiscal policy was loosened where policy space permitted (Kazakhstan, Moldova) or where IMF programs allowed (Armenia, Kyrgyz Republic). In a number of countries, macroprudential measures were put in place to contain the increase in dollarization and foreign currency lending.

gaps is lower today than in the 1980s; hence closing output gaps may have only a small impact on inflation, though it also implies that the risks of overshooting the inflation target through policies aimed at filling the output gap are smaller. In addition to domestic factors, inflation rates are being affected by factors that are common across countries. For many countries, commodity price declines and the appreciation of the U.S. nominal effective exchange rate are pushing in opposite directions. For most countries, the impact of commodity prices dominates, so that common factors are on the whole exerting a deflationary pull on headline inflation. Central banks have become better at not overreacting to commodity price movements and at communicating to the public that the impact on headline inflation is expected to be transitory. Thus, while the decline in oil prices poses some deflationary risks, it should not lead to inflation expectations becoming unanchored. In general, policy responses to low inflation have varied across countries, depending on their circumstances and available policy space.¹⁴

¹⁴ For the countries discussed in Box 2, the responses have been varied. Poland cut its policy rate but still has room to employ traditional easing. Sweden cut its policy rate below zero and launched a quantitative easing (QE) program this year. The Czech Republic and Switzerland have both employed exchange rate interventions after rates hit the zero lower bound, in the form of floors on the exchange rate against the euro. Concerns about the availability of sufficient domestic assets for a quantitative easing program and, in Switzerland's case, exchange rate appreciation related to capital inflows appear to have factored into their policy decisions. However, in January, the Swiss exited their exchange rate floor, which caused a rapid appreciation of the currency despite a reduction in the marginal interest rate on central bank deposits, and have since shifted towards more discretionary FX interventions.

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