

## Understanding the Plunge in Oil Prices: Sources and Implications<sup>1</sup>

Oil prices fell sharply in the second half of 2014, bringing to an end a four-year period of stability around \$105 per barrel.<sup>2</sup> The decline, which is much larger than that of the non-oil commodity price indices compared to early-2011 peaks, may signal an end to a price “supercycle”.<sup>3</sup> Oil prices are expected to remain low in 2015 and rise only marginally in 2016 (Chapter 1). The sources and implications of the sharp decline in oil prices have led to intensive debate.

This essay presents a brief assessment of the magnitude, drivers, and implications of the recent oil price drop. Specifically, it addresses four major questions:

- How does the recent decline in oil prices compare with previous episodes?
- What are the causes of the sharp drop?
- What are the macroeconomic and financial implications of a sustained decline in oil prices?
- What are the main policy implications?

### How Does the Recent Decline in Oil Prices Compare with Previous Episodes?

Compared to previous episodes of price declines during the past thirty years, the fall in oil prices in the second half of 2014 qualifies as a significant event (Figure 4.1). Between 1984–2013, five other episodes of oil price declines of 30 percent or more in a six-month period occurred, coinciding with major changes in the global economy and oil markets: an increase in the supply of oil and change in OPEC policy (1985–86); U.S. recessions (1990–91 and 2001); the Asian crisis (1997–98); and the global financial crisis (2007–09).

There are particularly interesting parallels between the recent episode and the collapse in oil prices in 1985–86. After the sharp increase in oil prices in the 1970s, technological developments made possible to reduce the intensity of oil consumption and to extract oil from various

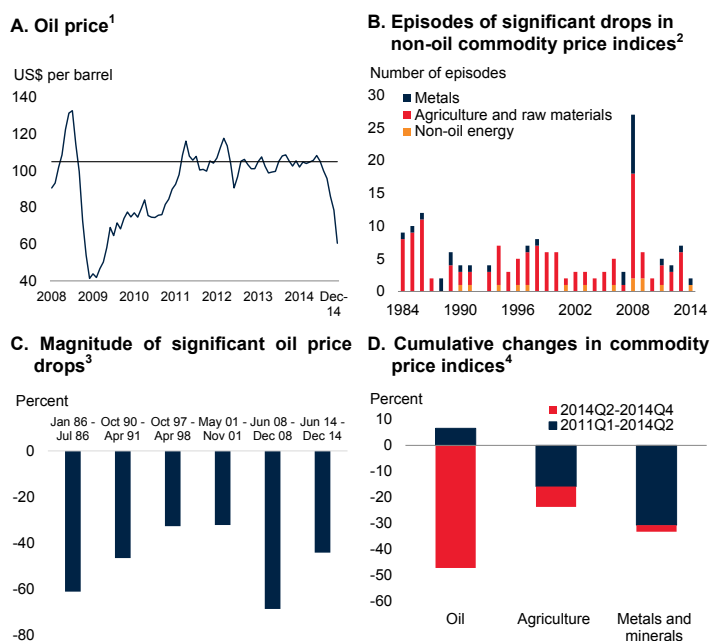
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<sup>2</sup>During the period 2011:1–2014:6, monthly average oil prices fluctuated between \$93 and \$118 per barrel. Since 2000, monthly average oil prices touched an all-time high of \$133 (July 2008) prior to going down to \$61 per barrel (December 2014).

<sup>3</sup>For additional information about the commodity price supercycle, see World Bank (2009); Canuto (2014); Erten and Ocampo (2013); and Cuddington and Jerrett (2008).

**FIGURE 4.1 Changes in commodity prices**

Oil prices dropped sharply between June and December 2014, bringing to an end a four-year period of relative price stability. The decline, which was much larger than that of other commodity prices from their early-2011 peaks, may signal an end to a price supercycle.



Source: World Bank.

1. Monthly average of WTI, Dubai, and Brent oil prices. Horizontal line denotes \$105 per barrel, the average for January 2011–June 2014. Latest data for December 2014.

2. Non-consecutive episodes of six-months for which commodity prices dropped by more than 30 percent (31 agricultural and raw materials, 4 non-oil energy commodities, 7 industrial and 2 precious metals and minerals).

3. Non-consecutive episodes of six-months for which the unweighted average of WTI, Dubai, and Brent oil prices dropped by more than 30 percent.

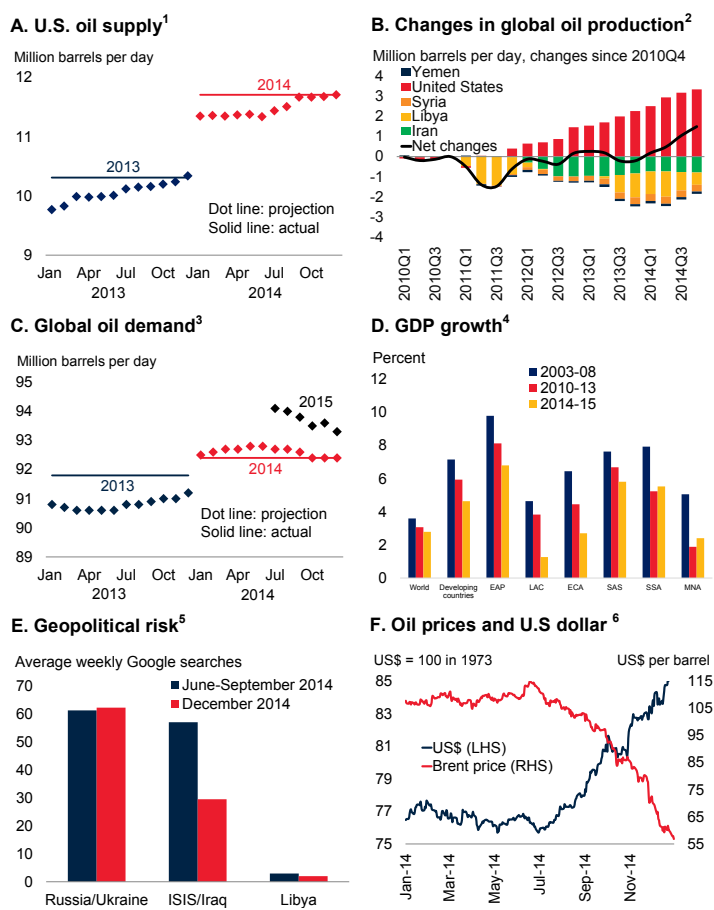
4. Includes unweighted average of WTI, Brent, and Dubai oil prices, 21 agricultural goods, and 7 metal and mineral commodities.

offshore fields, including the North Sea and Alaska. After Saudi Arabia changed policy in December 1985 to increase its market share, the price of oil declined by 61 percent, from \$24.68 to \$9.62 per barrel between January–July 1986. Following this episode, low oil prices prevailed for more than fifteen years.

In other commodity markets, episodes of large price declines have mostly been observed in agriculture, typically associated with specific weather conditions. After reaching deep lows during the global financial crisis, most commodity prices peaked in the first quarter of 2011. Since then, prices of metals and agricultural and raw materials have declined steadily as a result of weak global demand and robust supplies. In contrast, oil prices fluctuated within

**FIGURE 4.2 Short-term drivers of oil price decline**

Despite concerns about geopolitical risk, oil supply has repeatedly surprised on the upside, especially in the United States, while oil demand has surprised on the downside, partly reflecting weaker-than-expected global growth. Oil prices declines have coincided with a strengthening U.S. dollar.



Sources: World Bank, IEA, Bloomberg, FRED, and Google Trends.  
 1. Oil supply includes supply of crude oil, biofuels and liquids.  
 2. Crude oil supply only.  
 3. Oil demand includes demand for crude oil, biofuels, and liquids.  
 4. Weighted average of real GDP growth rates for developing countries in each region.  
 5. Average weekly Google searches for the words Russia, Ukraine, ISIS, Iraq, and Libya.  
 6. "US\$" is the nominal effective exchange rate of the U.S. dollar against a trade-weighted basket of major currencies. Latest data for December 26, 2014.

a narrow band around \$105/barrel (bbl) until June 2014. Softness in the global economy was offset by concerns about geopolitical risks, supply disruptions, and production controls exercised by OPEC (led by Saudi Arabia, its largest oil producer). The last factor in part reflected the willingness of Saudi Arabia and other low-cost producers to withhold output in support of OPEC price objectives. The steep decline in the second half of 2014 intensified after a change in policy at the OPEC meeting in late November. By the end of 2014, the cumulative fall in oil prices from the 2011 peak was much larger than that in non-oil commodity price indices.

**What are the Causes of the Sharp Drop?**

As for any storable commodity, underlying demand and supply conditions for oil determine the long-run trend in prices, while in the short-run movements in market sentiment and expectations (in some cases driven by geopolitical developments and OPEC decisions) exert an influence too. Prices may respond rapidly to surprises in the news even before actual changes occur. In 2014, relevant events included geopolitical conflicts in some oil-producing regions, OPEC announcements, and the appreciation of the U.S. dollar (Figure 4.2). Long-term developments in supply and demand have also played important roles in driving the recent decline in oil prices (Figure 4.3).

- *Trends in supply and demand.* Recent developments in global oil markets have occurred against a long-term trend of greater-than-anticipated supply and less-than-anticipated demand. Since 2011, U.S. shale oil production has persistently surprised on the upside, by some 0.9 million barrels per day (mb/d, about 1 percent of global supply) in 2014.<sup>4</sup> Expectations of global oil demand have been revised downwards on several occasions during the same period as economic growth disappointed. Between July and December 2014 alone, the projected oil demand for 2015 has been revised downwards by 0.8 mb/d (IEA, 2014a and 2014b). Global growth in 2015 is expected to remain much weaker than it was during the 2003-08 period when oil prices rose substantially. Further, the oil-intensity of global GDP has almost halved since the 1970s as a result of increasing energy efficiency and declining oil-intensity of energy consumption.

- *Changes in OPEC objectives.* Saudi Arabia has traditionally acted as the cartel's swing producer, often using its spare capacity to either increase or reduce OPEC's oil supply and stabilize prices within a desired band. This changed dramatically in late November 2014 after OPEC failed to agree on production cuts. The OPEC decision to maintain its production level of 30 mb/d signaled a significant change in the cartel's policy objectives from targeting an oil price band to maintaining market share.<sup>5</sup>

<sup>4</sup>The high oil prices of recent years made technologies of extracting oil from tight rock formations and tar sands profitable. These technologies employ hydraulic fracturing and horizontal drilling. Two key characteristics of the projects which use these new technologies are their very short lifecycle (2.5-3 years from development to full extraction) and relatively low capital costs. Shale (or tight) oil is among so-called unconventional oils. Other types of unconventional oil include oil sands (produced in Canada), deep sea oil and biofuels.

- Receding geopolitical concerns about supply disruptions.* In the second half of 2014, it became apparent that supply disruptions from conflict in the Middle East had unwound, or did not materialize as expected. In Libya, despite the internal conflict, production recovered by 0.5 million barrels per day (about ½ percent of global production) in the third quarter of 2014. In Iraq, as the advance of ISIS stalled, it became apparent that oil output could be maintained. In addition, the sanctions and counter-sanctions imposed after June 2014 as a result of the conflict in Ukraine have had little effect on oil and natural gas markets thus far.
- U.S. dollar appreciation.* In the second half of 2014, the U.S. dollar appreciated by 10 percent against major currencies in trade-weighted nominal terms. A U.S. dollar appreciation tends to have a negative impact on the price of oil as demand can decline in countries that experience an erosion in the purchasing power of their currencies. Empirical estimates of the size of the U.S. dollar effect cover a wide range: the high estimates suggest that a 10 percent appreciation is associated with a decline of about 10 percent in the oil price, whereas the low estimates suggest 3 percent or less.<sup>6</sup>

Although the exact contribution of each of these factors cannot be quantified with precision, it is clear that the dominant factor in the price fall has been changes in supply conditions, stemming from the expansion of oil output in the United States, receding concerns on supply disruptions, and OPEC’s switch to a policy of maintaining market share.

### What are the Macroeconomic and Financial Implications?

Oil prices feed into growth and inflation mainly through three channels (see Box 4.1 for a brief review of the literature on the analytical and empirical linkages between oil prices, output, and inflation).

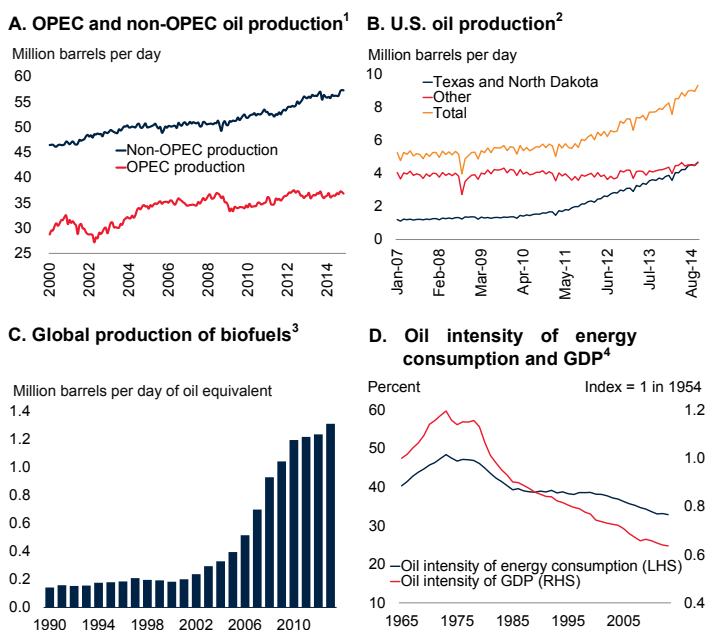
- Input costs.* Lower oil prices reduce energy costs generally, as prices of competing energy materials are forced down too, and oil-fired electrical power is

<sup>5</sup>OPEC’s “desired” range was set to \$100-110/bbl during the early 2010s. OPEC produces about 36 mb/d, of which 30 mb/d comes from crude oil (subject to quotas) and 6 from liquids (not subject to quotas). Non-OPEC countries produce about 55 mb/d. Even before the November 27 decision, Saudi Arabia has signaled its intention to maintain its market share by aggressively cutting prices for East Asian buyers.

<sup>6</sup>Zhang et al. (2008) and Akram (2009) present estimates. Frankel (2014) argues that U.S. dollar appreciation, triggered by diverging monetary policies in the United States, Euro Area, and Japan, played an important role in the general decline of commodity prices.

### FIGURE 4.3 Long-term drivers of oil price decline

OPEC’s share of global oil supply has fallen, partly as a result of rising unconventional oil production in the United States and biofuel production. Meanwhile, the oil intensity of global activity has steadily declined.



Source: IEA, BP Statistical Review, U.S. Energy Information Agency, and World Bank.

- Production includes crude, biofuel-based, and liquid-based oil. Latest observation for November, 2014.
- Crude oil production only. Texas and North Dakota are the U.S. states with the largest shale oil production. Latest observation for October, 2014.
- Most biofuels are accounted by maize-based ethanol in the United States, sugar cane-based ethanol in Brazil, and edible oil-based bio diesel in Europe.
- Oil intensity of real GDP is measured as oil consumption relative to real GDP, indexed at 1 in 1954. Oil intensity of energy consumption is measured as oil consumption in percent of total energy consumption. Latest observation for 2013.

cheaper to produce. In addition, since oil is feedstock for various sectors, including petrochemicals, paper, and aluminum, the decline in price directly impacts a wide range of processed or semi-processed inputs. The transportation, petrochemicals, and agricultural sectors, and some manufacturing industries, would be major beneficiaries from lower prices.

- Real income shifts.* Oil price declines generate changes in real income benefiting oil-importers and losses hurting oil-exporters. The shift in income from oil exporting economies with higher average saving rates to net importers with a higher propensity to spend should generally result in stronger global demand over the medium-term. However, the effects could vary significantly across countries and over time: some exporting economies may be forced by financial constraints to adjust both government spending and

## BOX 4.1 What do we know about the impact of oil prices on output and inflation? A Brief Survey<sup>1</sup>

*Movements in oil prices have often been associated with changes in output and inflation. Although the effects of oil price movements on output and inflation have declined over time, they tend to be larger when prices go up (rather than down) and when they are driven by changes in oil supply (rather than demand).*

Large jumps in oil prices have historically been followed by rising inflation and recessions in many countries.<sup>2</sup> This basic observation led to a voluminous literature analyzing the complex linkages between movements in oil prices and activity and inflation. This box presents a brief review of this literature to address the following questions:

- Which key channels transmit changes in oil prices to activity and inflation?
- How large is the impact of oil price movements on activity?
- How large is the pass-through of changes in oil prices to inflation?

### Which key channels transmit oil price changes to activity and inflation?

Falling oil prices often affect activity and inflation by shifting aggregate demand and supply and triggering policy responses. On the supply side, lower oil prices lead to a decline in the cost of production (Finn, 2000). The lower cost of production across a whole range of energy-intensive goods may be passed on to consumers and hence, indirectly, reduce inflation (Blanchard and Gali 2008). The lower cost of production can also translate in higher investment. On the demand side, by reducing energy bills, a decline in oil prices raises consumers' real income and leads to an increase in consumption (Edelstein and Kilian, 2008; Kilian, 2014; Hamilton, 2009).<sup>3</sup>

If falling oil prices ease inflation—especially, core inflation or inflation expectations (Alvarez et al., 2011)—central banks may respond with monetary loosening which, in turn, can boost

activity (Bernanke, Watson and Gertler, 1997).<sup>4</sup> However, if core inflation or inflation expectations do not ease with falling oil prices, central banks may refrain from a monetary policy response such that the impact on real activity could be small (Hunt, Isard and Laxton, 2001). Lower oil prices can also lead to adjustments in fiscal policies that can in turn affect activity.

### How large is the impact of oil price movements on activity?

The literature mostly focuses on estimating the impact of oil price *increases* on real activity in major economies.<sup>5</sup> These estimates vary widely, depending on the oil intensity of the economy, oil exporter status, data samples, and methodology. For example, for OECD countries, a 10 percent increase in oil prices has been associated with a decline in real activity of 0.3-0.6 percent in the United States and 0.1-0.3 percent for the Euro Area (Jimenez-Rodriguez and Sanchez, 2005).<sup>6</sup> Similar results have also been found for developing countries.<sup>7</sup>

Recent literature has established that the effects of oil prices on activity and inflation depend on the underlying source and direction of the changes in prices. Also, the impact has declined over the years.<sup>8</sup>

*Source of the oil price movements.* The impact of oil prices on activity depends critically on their source. Oil supply shocks would be expected to generate an independent impact on activity. In contrast, oil demand shocks would themselves be the outcome of changing real activity with limited second-round effects (Kilian, 2009). Indeed, oil price changes driven by oil supply shocks are often associated with significant changes in global output and income shifts between oil-exporters and importers. Changes in prices driven by demand shocks, on the other hand,

<sup>1</sup>The main authors of this box are Derek Chen, Raju Huidrom and Tianli Zhao.

<sup>2</sup>Hamilton (2005) documents that nine out of ten recessions in the U.S. were preceded by sharp oil price increases. De Gregorio, Landierretche, and Neilson (2007) show the strong correlation between oil price shocks and subsequent high inflation in many countries.

<sup>3</sup>For example, a \$10 per barrel oil price decline may reduce U.S. consumers' gasoline bills by as much as \$30 billion (0.2 percent of GDP; Gault, 2011). However, the uncertainty associated with oil price swings can have a negative impact on investment (Elder and Serletis, 2010).

<sup>4</sup>The impact of endogenous monetary responses to oil price movements on aggregate activity is contested in the literature. For instance, Kilian and Lewis (2011) argue that, once the endogeneity of oil price movements is taken into account, there is no empirical support for a significant role of the monetary policy in amplifying the effects of oil price shocks on the U.S. economy.

<sup>5</sup>For the global economy, as mentioned in the text, Arezki and Blanchard (2014) report estimates of model simulations that the current oil price slump could increase global output by 0.3 – 0.7 percentage points. Similar estimates based on such large scale- macroeconomic models are also available from other sources (World Bank, 2013; IMF, 2014; OECD, 2014).

<sup>6</sup>Jimenez-Rodriguez and Sanchez (2005) derive these estimates from a variety of different methodologies. Their results are broadly in line with Aboysinghe (2001), Reifschneider, Tetlow and Williams (1999), and Mork (1994), Cashin, Mohaddes and Raissi (2014), and Peersman and Van Robays (2012).

<sup>7</sup>See Tang, Wu, and Zhang (2010) and Allegret, Couharde and Guillaumin (2012). In addition to changes in the level of oil prices, their volatility has been associated with a decline in investment in some developing countries, for example in Thailand (Shuddhasawtta, Salim, Bloch, 2010).

<sup>8</sup>Hamilton (2005), Kilian (2008, 2014) provide comprehensive surveys of the literature on these issues.



**BOX 4.1 (continued)**

tend to lead to weaker and, in some studies, insignificant effects (Cashin, Mohaddin, and Raissi, 2014; Kilian, 2009; Peersman and Van Robays, 2012).

*Asymmetric effects.* The failure of the 1986 oil price collapse to produce an economic boom has sparked a literature on the asymmetric impact of oil price movements on activity. Such an asymmetric effect may result from costly factor reallocation, uncertainty, and an asymmetric monetary policy response. In particular, the U.S. Federal Reserve has typically chosen to respond vigorously to inflation increases triggered by higher oil prices but has responded less to unexpected declines in inflation following oil price declines (Kilian, 2014; Bernanke, Gertler, and Watson, 1997).<sup>9</sup> Hence, while oil price increases—especially large ones—have been associated with significantly lower output in the United States, oil price declines have been followed by much smaller, and statistically insignificant, benefits to activity (Hamilton, 2003; Jimenez-Rodriguez and Sanchez, 2005).<sup>10</sup>

*Declining impact.* Several studies have documented that the impact of oil prices on output has fallen over time. For example, Hamilton (2005) estimates that a 10 percent oil price spike would reduce U.S. output by almost 3 percent below the baseline over four quarters in 1949-80 but less than 1 percent in a sample that extends to 2005. The literature has offered a variety of reasons for the declining impact of oil prices on the economy (Blanchard and Gali, 2008): structural changes such as falling energy-intensity of activity, and more flexible labor markets which lowered rigidities associated with price-markups.<sup>11</sup> In addition, stronger monetary policy frameworks have reduced the impact of oil price shocks by better anchoring inflation expectations, thus dampening firm pricing power

imports abruptly in the short-term, while benefits for importing countries could be diffuse and offset by higher precautionary savings if confidence in recovery remains low.

- *Monetary and fiscal policies.* In oil-importing countries where declining oil prices may reduce medium-term inflation expectations below target, central banks could respond with additional monetary policy loosening, which, in turn, can support growth. The combination of lower inflation and higher output implies a favorable short-run policy outcome. In oil-exporting countries, however, lower oil prices might trigger contractionary fiscal policy measures, unless

(Taylor, 2000) and helping create a regime where inflation is less sensitive to price shocks.

**How large is the pass-through of changes in oil prices to inflation?**

Historically, oil price swings and inflation have been positively correlated, even though this relationship has varied widely across countries (as documented in Figure 4.5 in the main text). Large increases in oil prices during the past forty years were often followed by episodes of high inflation in many countries (De Gregorio, Landerretche, and Neilson, 2007). As in the case of output, the impact of oil price swings on inflation has, however, declined over the years. For instance, Hooker (2002) showed that oil prices contributed substantially to U.S. inflation before 1981, but since that time the pass-through has been much smaller. Similar results have been found for other advanced economies (Cologni and Manera 2006; Alvarez et.al, 2011) and for some emerging market economies (De Gregorio, Landerretche, and Neilson, 2007; Cunado and Gracia, 2005). The decline in pass-through is attributable to the reasons above that explain the decline in the impact on activity, in particular improvements in monetary policy frameworks that resulted in better anchoring of long-run inflation expectations.

<sup>9</sup>Kilian and Vigfusson (2011) presents a survey of the literature on the nonlinearities and asymmetries in oil price-output relationship.

<sup>10</sup>Similar estimates are also found in the earlier literature (Mork et. al., 1994; Smyth, 1993; Mory, 1993).

<sup>11</sup>Barsky and Kilian (2004) and Blanchard and Gali (2008) argue that the impact of oil prices on the U.S. stagnation in the 1970s is overestimated in the earlier literature.

buffers are available to protect expenditures from the decline in tax revenues from the oil sector.

These channels operate with different strengths and lags across countries. However, it seems clear that oil price declines generally have smaller output effects on oil-importing economies than oil price increases.<sup>7</sup> This asymmetry could be caused by the frictions and adjustment costs associated with oil price changes.

<sup>7</sup>See Jimenez-Rodriguo and Sanchez (2005) for details on these findings. Hoffman (2012) provides a summary of the results in the literature.

The impacts of oil price changes on output may also vary between developing and developed countries. Output in developing countries may be relatively more energy intensive and, hence, may benefit more from a decline in energy input costs. Household inflation expectations in developing economies may also be more responsive to changes in fuel prices than in developed countries, partly as a result of a greater weight of fuel and food in consumption baskets. This is reflected in stronger effects of commodity price shocks on inflation in developing countries than in advanced economies (Gelos and Ustyugova, 2012; IMF, 2011).

### *Global growth*

The upward surprises in oil supply, the unwinding of some geopolitical risks, and the changes in OPEC's policy objectives all indicate that supply-related factors have played a major role in the recent price drop.<sup>8</sup> Historical estimates suggest that a 30 percent oil price decline (as expected, on an annual average basis, between 2014 and 2015) driven by a supply shock would be associated with an increase in world GDP of about 0.5 percent in the medium-term (World Bank, 2013; IMF, 2014; OECD, 2014).

Because of the confluence of various types of demand, supply, and policy-related factors, growth outcomes following the five episodes of significant declines in oil prices listed above differed widely. However, most episodes were preceded by a period of weakening global growth and many were followed by relatively slow recoveries in the year after the oil price decline, particularly after 1990-91, 1997-98, and 2008-09. During the post-2001 recession, global growth picked up more rapidly in 2002 against the background of an aggressive easing of monetary policy by the major central banks. After the 1985-86 episode, global growth remained steady while the U.S. Federal Reserve embarked on a series of interest rate cuts in 1986.

Like previous declines, the current fall in oil prices takes place against the backdrop of both cyclical and structural developments that might affect the growth impact in 2015-16:

- *Weak growth.* Disappointing global growth prospects and weak oil demand are likely to be responsible in

some part for the price drop (Hamilton, 2014a and 2014b).<sup>9</sup> Demand shocks driven changes in oil prices tend to have a smaller impact on growth.

- *Limited support from monetary policy.* The monetary policy loosening that was typically associated with demand shocks driven oil price declines in the past is unlikely to materialize. Specifically, with policy interest rates of major central banks already at or near the zero lower bound, the room for additional monetary policy easing is limited should declining oil prices lead to a persistent undershooting of inflation expectations.
- *Small response of demand.* Post-crisis uncertainties associated with financial vulnerabilities, rapid household debt growth, elevated unemployment, and slowing long-term growth potential may encourage households and corporations to save real income gains from falling oil prices, rather than to consume and invest.
- *Changing nature of the relationship between oil and activity.* Recent research suggests that the impact of oil prices on overall activity has significantly declined since the mid-1980s as a result of the falling oil-intensity of GDP, increasing labor market flexibility, and better-anchored inflation expectations. The weakened income effect would reduce the responsiveness of demand to price changes.<sup>10</sup>
- *Reduced investment in new exploration or development.* Lower oil prices would especially put at risk oil investment projects in low-income countries (e.g., Mozambique, Uganda) or in unconventional sources such as shale oil, tar sands, deep sea oil fields (especially in Brazil, Mexico, Canada and the United States), and oil in the Arctic zone.

### *Income shifts, current accounts, and fiscal balances*

Developments in global oil markets are accompanied by significant real income shifts from oil-exporting to oil-importing countries. The ultimate impact of lower oil prices on individual countries depends on a wide range of factors, including the amount of oil in their exports or imports, their cyclical positions, and the (monetary and fiscal) policy room they have to react (Figures 4.5).

<sup>8</sup>In simulations using the IMF's large-scale macroeconomic model, Arezki and Blanchard (2014) posit that three-fifths of the oil price drop in the second half of 2014 was caused by expanding supply, and argue that this should raise global activity between 0.3 and 0.7 percent in 2015.

<sup>9</sup>Hamilton (2014a) attributes about two-fifths of the decline in oil prices in the second half of 2014 to weak global demand.

<sup>10</sup>For the changing nature of the relationship between oil prices, and activity and inflation, see Blanchard and Galí (2008), Blanchard and Riggi (2013), and Baumeister and Peersman (2013).

*Oil-exporting countries.* Empirical estimates suggest that output in some oil-exporting countries, including Russia and some in the Middle East and North Africa, could contract by 0.8–2.5 percentage points in the year following a 10 percent decline in the annual average oil price.<sup>11</sup>

The slowdown would compound fiscal revenue losses in oil-exporting countries. Fiscal break-even prices, which range from \$54 per barrel for Kuwait to \$184 for Libya, exceed current oil prices for most oil exporters (Figure 4.6). In some countries, the fiscal pressures can partly be mitigated by large sovereign wealth fund or reserve assets. In contrast, several fragile oil exporters, such as Libya and the Republic of Yemen, do not have significant buffers, and a sustained oil price decline may require substantial fiscal and external adjustment, including through depreciation or import compression. Recent developments in oil markets will also require adjustments in macroeconomic and financial policies in other oil-exporting countries, including Russia, Venezuela, and Nigeria.

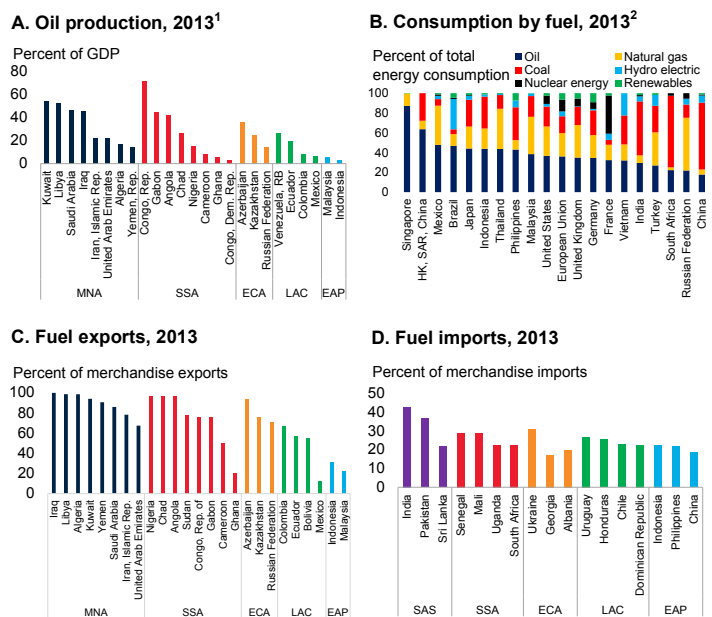
*Oil-importing countries.* A 10 percent decrease in oil prices would raise growth in oil-importing economies by some 0.1–0.5 percentage points, depending on the share of oil imports in GDP (World Bank, 2013; Rasmussen and Roitman, 2011). Their fiscal and current accounts could see substantial improvements (Kilian, Rebucci, and Spatafora, 2009).

In China, for example, the impact of lower oil prices on growth is expected to boost activity by 0.1-0.2 percent because oil accounts for only 18 percent of energy consumption, whereas 68 percent is accounted for by coal (Figure 4.4). The sectors most dependent on oil consumption—half of which is satisfied by domestic production—are transportation, petrochemicals, and agriculture. Since regulated fuel costs are adjusted with global prices (albeit with a lag), CPI inflation could fall over several quarters. The overall effect would be small, however, given that the weight of energy and transportation in the consumption basket is less than one-fifth. The fiscal impact is also expected to be limited since fuel subsidies are only 0.1 percent of GDP. Despite significant domestic oil production and the heavy use of coal, China remains the second-largest oil importer. Therefore, the sustained low oil prices of 2015 are expected to widen the current account surplus by some 0.4-0.7 percentage points of GDP.

Several other large oil-importing emerging market economies also stand to benefit from lower oil prices. In

**FIGURE 4.4 Oil production and consumption for selected countries**

*The importance of oil production in GDP varies significantly across countries. While some countries rely heavily on oil for their energy consumption, some others have diverse sources of energy. Shares of oil in exports and imports also differ substantially across countries.*



Sources: World Development Indicators, BP Statistical Review, CEIC, U.S. Energy Information Agency.

- Oil production is estimated as oil rents which are defined as the difference between the value of crude oil production at world prices and total costs of production. Estimates based on sources and methods described in "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium" (World Bank, 2011).
- Oil consumption is measured in million tons; other fuels in million tons of oil equivalent.

Brazil, India, Indonesia, South Africa and Turkey, the fall in oil prices will help lower inflation and reduce current account deficits—a major source of vulnerability for many of these countries.

Some oil importers would also be affected by a slowdown in oil-exporting countries. Sustained low oil prices will weaken activity in exporting countries, with adverse spillovers to trading partners and recipient countries of remittances or official support. A sharp recession in Russia would dampen growth in Central Asia, while weakening external accounts in Venezuela or the Gulf Cooperation Council (GCC) countries may put at risk external financing support they provide to neighboring countries (see Chapter 2 for region- and country-specific details).

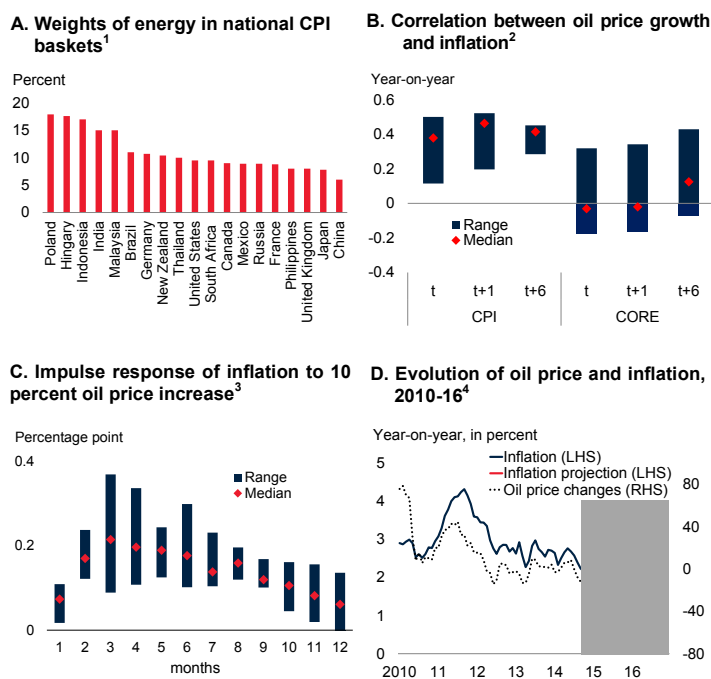
*Inflation*

Lower oil prices will temporarily reduce global inflation. The impact across countries will vary significantly, reflecting in particular the importance of oil in consumer

<sup>11</sup>For details, see World Bank (2013), Berument, Ceylan, and Dogan (2010), and Feldkirchner and Korhonen (2012).

### FIGURE 4.5 Oil prices and inflation

The projected 30 percent decline in average oil prices in average annual oil prices between 2014 and 2015 is likely to lower global inflation temporarily by up to 0.9 percentage point, but the impact will dissipate by 2016.



Sources: OECD, Morgan Stanley, IMF, Capital Economics, and World Bank.  
 1. Sourced from OECD (for high-income countries, Hungary, Mexico and South Africa); Morgan Stanley (for China); IMF (for India, Indonesia, Malaysia, Thailand and the Philippines); and Capital Economics (Brazil and Russia). Excludes transport.  
 2. Correlation computed for headline and core-CPI inflation on a monthly frequency over the period 2001-14 across 16 members of the G20. "t+1" and "t+6" refer to correlation of annual oil price changes with the first and sixth lead of inflation indicators (one month and six months ahead), respectively.  
 3. Impulse response of year-on-year CPI inflation to a 10 percent shock in year-on-year oil price changes, estimated from individual monthly Vector Auto-Regression (VAR) models for 16 countries (same sample as above) including year-on-year growth in consumer prices, producer prices, oil prices (in local currency), the nominal effective exchange rate and the deviation of industrial production from its Hodrick- Prescott-filtered trend. VAR models were estimated with 8 lags (based on a selection of information criteria) and impulse responses derived from a Choleski decomposition, with CPI inflation last in the ordering and therefore affected contemporaneously by shocks to all other variables. The range of impulse responses across countries is defined by the first and third quartiles of the distribution of individual country responses.  
 4. Inflation indicates a consumption weighted average of inflation rates of 16 members of the G20. Inflation projection is based on country specific VAR models.

baskets, exchange rate developments, stance of monetary policy, the extent of fuel subsidies and other price regulations (Figures 4.4 and 4.5). Historically, the correlation between oil price swings and headline inflation has varied widely across countries.

In order to gauge the likely impact of changes in oil prices on inflation, two simple econometric models are estimated using data for G20 countries.<sup>12</sup> First, the change in the price of oil is added to a standard Phillips curve model, in which inflation is a function of inflation

expectations and economic slack. Second, a simple Vector Auto Regression (VAR) model is estimated to study the dynamic interactions between headline consumer prices, producer prices, output gap, exchange rate and the price of oil.<sup>13</sup>

Results indicate that the pass-through to headline inflation in most cases is modest, with a 10 percent increase in the oil price raising inflation by up to 0.3 percentage point at its peak impact. This is in line with other estimates in the literature.<sup>14</sup> The impact is essentially one-off, peaking after three to five months, before fading gradually. These results suggest that a 30 percent decline in oil prices, if sustained, would reduce global inflation by about 0.4-0.9 percentage point through 2015. However, in the course of 2016, inflation would return to levels prior to the plunge in oil prices. Country-specific circumstances will in some cases influence the impact of oil prices on domestic inflation. For economies that import large volumes of oil, currency appreciation (depreciation) would reinforce (mitigate) the inflationary impact of the oil price decline. In countries where the government subsidizes household energy consumption, the pass-through of global oil prices to local energy prices will be dampened (Jongwanich and Park, 2009).

#### Financial markets

The sharp decline in oil prices has been accompanied by substantial volatility in foreign exchange and equity markets of a number of emerging economies since October (Figure 4.7). Low oil prices have already led investors to reassess growth prospects of oil-exporting countries. This has contributed to capital outflows, reserve losses, sharp depreciations, or rising sovereign CDS spreads in many oil-exporting countries, including

<sup>12</sup>The approach here closely follows the one in De Gregorio, Landerretche and Nielson (2007). The sample consists of sixteen members of the G20 (Brazil, Canada, China, Germany, Euro Area, Spain, France, United Kingdom, India, Indonesia, Italy, Japan, Mexico, Turkey, United States, and South Africa). All regressions are country-specific and estimated at a monthly frequency over the period 2001-14. Oil prices are measured in local currency to account for potentially offsetting exchange rate movements. Economic slack is proxied by the deviation of industrial production from its Hodrick-Prescott-filtered trend.

<sup>13</sup>The sample is the same as for the Phillips curve model estimations. Variables included are the year-on-year growth rate of the consumer price index, the producer price index, the nominal effective exchange rate, the oil price (denominated in local currency), and the deviation of industrial production from its Hodrick-Prescott-filtered trend.

<sup>14</sup>De Gregorio, Landerretche, and Nielson (2007) find, in a sample of 23 countries for 1980-2005, that a 10 percent increase in oil prices (in local currency) would raise inflation by somewhat less than 0.2 percentage point, on average.



in Russia, Venezuela, Colombia, Nigeria, and Angola. Growth slowdowns in oil-exporting countries could also strain corporate balance sheets (of especially large oil companies) and raise nonperforming loans. Financial problems in large oil-exporting emerging markets could have adverse contagion effects on other emerging and frontier economies.

In addition, oil-exporters have channeled surplus savings from oil revenues into a broad array of foreign assets, including government bonds, corporate bonds, equities, and real estate. The flow of so-called “petrodollars” has boosted financial market liquidity, and helped keep borrowing costs down over the past decade. If oil prices remain low, repatriation of foreign assets could generate capital outflows, and potential financial strains, for countries that have become reliant on “petro-dollar” inflows.

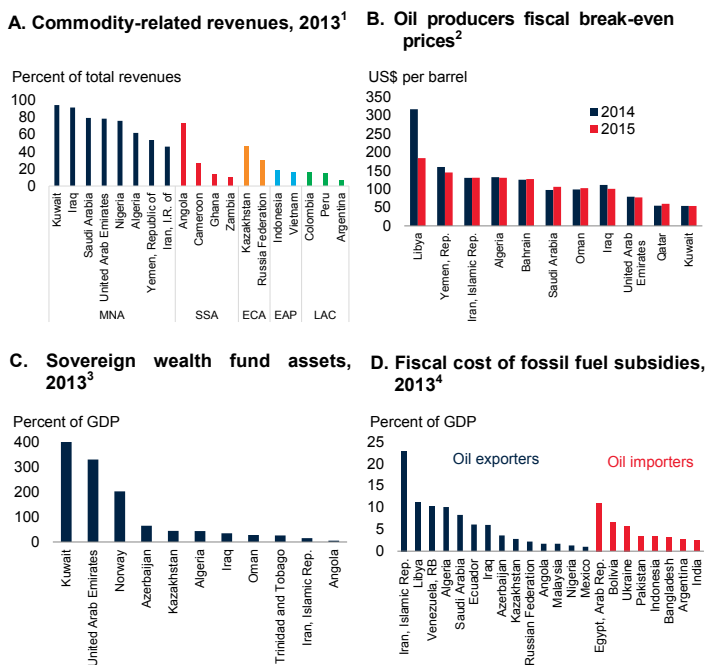
### What are the main policy implications?

**Fiscal policy.** A number of developing countries provide large fuel subsidies, in some cases exceeding 5 percent of GDP (Figure 4.6, IEA, 2014c). However, subsidies tend to benefit middle-income households disproportionately and to tilt consumption and production towards energy-intensive activities (World Bank, 2014). Falling oil prices reduce the need for fuel subsidies, and provide an opportunity for subsidy reform with limited impact on the prices paid by consumers. The Arab Republic of Egypt, India, Indonesia, the Islamic Republic of Iran, and Malaysia implemented such reforms in 2013 and 2014, removing some of the distortions and inefficiencies associated with subsidies. Fiscal resources released by lower fuel subsidies could either be saved to rebuild fiscal space lost after the global financial crisis or reallocated towards better-targeted programs to assist poor households, and critical infrastructure and human capital investments.

**Monetary policy.** Oil prices are expected to remain low over the 2015-16 period, implying that their impact on inflation is expected to be mostly temporary, dissipating by the end of 2016. In most cases, central banks would not need to respond to the temporary fall in inflation—unless there is a risk that inflation expectations become de-anchored. In some parts of Europe, where inflation is already uncomfortably low, several months of outright deflation could de-anchor inflation expectations. In this situation, central banks could help keep inflation expectations anchored by loosening monetary policy or providing forward guidance. In oil-exporting countries with flexible exchange rates, central banks will have to balance the need to support growth against the need to maintain stable inflation and investor confidence in the currency.

**FIGURE 4.6 Fiscal balances and oil prices for selected countries**

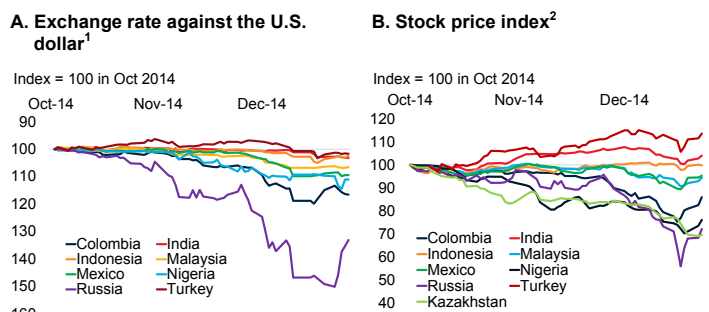
Revenues from commodity related sources account for a substantial fraction of fiscal revenues in a number of countries. For many oil producers, fiscal break-even price is higher than the current price of oil. In some oil exporters, large sovereign wealth fund assets can be deployed to mitigate the fiscal impact of oil prices. Declining oil prices will ease fiscal pressures from high energy subsidies.



Source: IMF World Economic Outlook, The Economist Magazine, Bloomberg, JP Morgan Chase, IMF, IEA Fossil Fuel Database.  
 1. Includes revenues from all commodities, including oil.  
 2. Fiscal break-even prices are oil prices associated with a balanced budget.  
 3. Countries with sovereign wealth fund assets below 5 percent of GDP not shown.  
 4. Countries where the fiscal cost of fossil fuel subsidies is below 1 percent of GDP are not shown.

**FIGURE 4.7 Exchange rates and equity prices for selected countries**

Currencies have depreciated against the U.S. dollar and stock markets have declined in oil-exporting countries in the last quarter of 2014.



Sources: Haver Analytics.  
 1. U.S. dollars per local currency unit. An decrease denotes depreciation against the U.S. dollar. Latest observation for December 26, 2014.  
 2. Stock market index in national currency. Latest observation for December 23, 2014.

*Structural policies.* If sustained over the medium-term, low oil prices may encourage a move towards production which is more intensive in fossil fuels or energy more generally. This runs counter to broader environmental goals in many countries. To offset the medium-term incentives for increased oil consumption, while at the same time building fiscal space, policymakers could modify tax policies on the use of energy, especially in countries where fuel taxes are low.

For oil-exporters, the sharp decline in oil prices is also a reminder of the vulnerabilities inherent in a highly concentrated reliance on oil exports and an opportunity to reinvigorate their efforts to diversify. These efforts should focus on proactive measures to move incentives away from activities in the non-tradable sector and employment in the public sector, including encouraging high-value added activities, exports in non-resource intensive sectors, and development of skills that are important for private sector employment (Gill et. al, 2014; Cherif and Hasanof, 2014a and 2014b).

## Conclusion

Following four years of stability at around \$105/bbl, oil prices fell sharply in the second half of 2014. Compared to the early 2011 commodity price peaks, the decline in oil prices was much larger than that in non-oil commodity price indices. The decline in oil prices was quite significant compared with the previous episodes of oil price drops during the past three decades.

There have been a number of long- and short-term drivers behind the recent plunge in oil prices: several years of large upward surprises in oil supply; some downward surprises in demand; unwinding of some geopolitical risks that had threatened production; change in OPEC policy objectives; and appreciation of U.S. dollar. Supply related factors have clearly played a dominant role, with the new OPEC strategy aimed at market share triggering a further sharp decline since November.

The decline in oil prices has significant macroeconomic, financial and policy implications. If sustained, it will support activity and reduce inflationary, external, and fiscal pressures in oil-importing countries. On the other hand, it would affect oil-exporting countries adversely by weakening fiscal and external positions and reducing economic activity. Low oil prices affect investor sentiment about oil-exporting emerging market economies, and can lead to substantial volatility in financial markets, as already occurred in some countries in the last quarter of 2014. However, declining oil prices also present a significant window of opportunity to reform energy taxes and fuel subsidies, which are substantial in several developing countries, and reinvigorate reforms to diversify oil-reliant economies.

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