



## The Implications of Lower Oil Prices for the US Economy Amid the Shale Boom

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### INTRODUCTION

Declines in oil prices are generally seen as an economic windfall for the United States and other net petroleum importers. Indeed, the recent unexpected drop of nearly 40% in crude prices since June has translated to a drop in regular pump prices of nearly \$1, to an average of \$2.78 per gallon across the United States on December 1.

The price slump has been driven by several factors, including economic weakness in large consuming countries, particularly China, which had been the engine of global oil demand growth over the last decade; an astonishing increase in US crude production due to the shale oil revolution that has added nearly 4 million barrels per day since 2008; and the return of some disrupted supplies to the market from countries like Libya. Baghdad's recent deal with Kurdish regional authorities to increase Iraqi exports could add further barrels to the market.<sup>1</sup>

Last week, prices plunged after the Organization of the Petroleum Exporting Countries (OPEC) announced it would hold production steady at 30 million b/d rather than cut output, despite the price drop and the concomitant pressure on oil-reliant economies. Many countries within OPEC, such as Venezuela and Libya, wanted a cut to boost prices, but these countries were unwilling or unable to shoulder significant reductions and instead looked for others, especially the group's top producer Saudi Arabia, to pull back. The Kingdom, the only country in the world with significant spare capacity, has played the role of swing producer in the past to help balance the market. Saudi Arabia, however, refused to cut production unless other OPEC and non-OPEC producers did so as well, in an apparent bid to protect market share and potentially force curtailments from US oil producers.<sup>2</sup>

The lack of an agreement to reduce output will no doubt be painful for some producers. Iran and Venezuela have high revenue needs to fund social commitments. Russia is extremely vulnerable to falling oil prices, particularly on top of the impact of economic sanctions, as seen in the collapse of the ruble this week. Others, like Libya and Iran, are already producing far below their historic levels.

For the United States, new questions are emerging about the economic impact of lower oil prices. The US is now the world's largest petroleum producer<sup>3</sup> and consumer, so lower prices creates both economic winners and losers. This policy brief explores the overall economic impacts of a sharp drop in oil prices for the United States.

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<sup>1</sup> Isabel Coles and Dominic Evans, "Iraqi government reaches deal with Kurds on oil, budget," Reuters, December 2, 2014. <http://www.reuters.com/article/2014/12/02/us-mideast-crisis-iraq-kurds-idUSKCN0JG0RE20141202>.

<sup>2</sup> Alex Lawler, Amena Bakr, and Dmitry Zhdannikov, "Inside OPEC room, Naimi declares price war on U.S. shale oil,"

<sup>2</sup> Alex Lawler, Amena Bakr, and Dmitry Zhdannikov, "Inside OPEC room, Naimi declares price war on U.S. shale oil," Reuters, November 28, 2014. <http://www.reuters.com/article/2014/11/28/us-opec-meeting-shale-idUSKCN0JC1GK20141128>.

Grant Smith, Golnar Motevalli and Wael Mahdi, "Saudi-Venezuela OPEC Split Plays Out Behind Closed Doors," Bloomberg News, December 2, 2014. <http://www.bloomberg.com/news/2014-12-02/saudi-venezuela-opec-split-plays-out-behind-closed-doors.html>

<sup>3</sup> Based on production of crude oil, condensates, natural gas liquids, refinery processing gain, and other liquids, including biofuels.



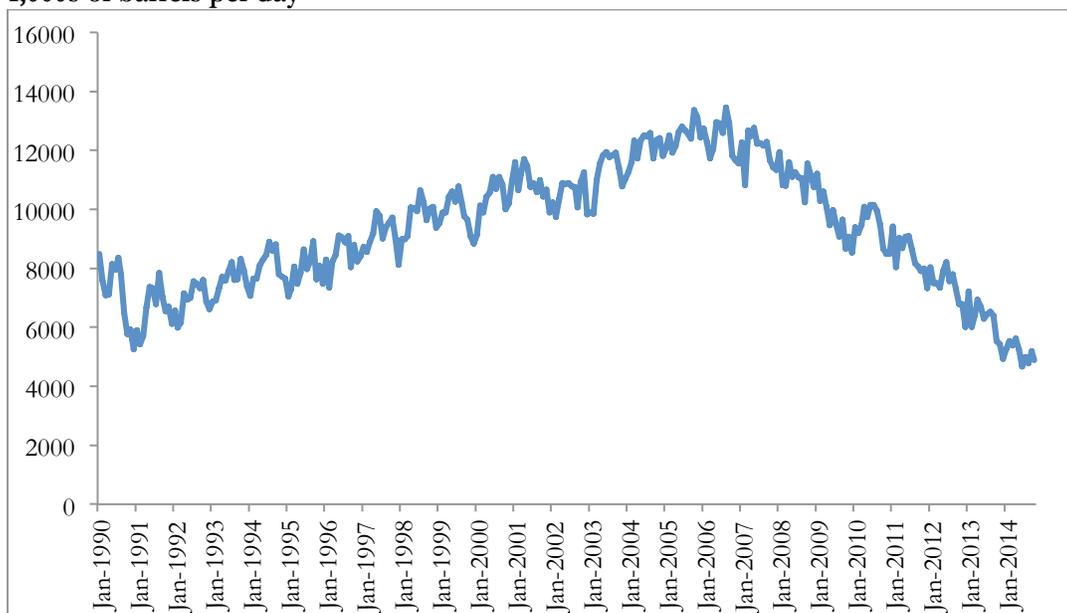
## THE ECONOMIC BENEFITS OF LOWER OIL PRICES DIFFER AS THE ROLE OF OIL IN THE US ECONOMY CHANGES

From a macroeconomic perspective, declining oil prices have five main effects on the US economy. These effects play out over different and in some cases long time frames.

1. **Lower oil prices means less money is sent abroad so more is available for domestic consumption.** Because the United States is still a net importer of oil, part of each dollar spent on petroleum goes abroad and does not contribute to domestic production, domestic employment, or GDP. Suppose the price of oil falls by \$10 and that net imports are 5 million b/d (their value for November). Because gasoline consumption does not change much in the short run in response to the price change, US payments for foreign oil therefore drop by approximately \$50 million per day, or \$18.25 billion per year. This money, which would have been sent abroad, becomes available for domestic consumption and therefore supports domestic production and GDP. If all this windfall is spent on domestic consumption, then annual GDP would increase by approximately \$18 billion, or by 0.1 percent. In practice, some of this windfall would be saved, but what is spent would then increase the income of US shopkeepers and workers who would turn around and spend more themselves. On net and depending on the magnitude of this multiplier effect, the effect of a \$10 fall in the price of oil, operating through this “net imports” channel, would be to increase the rate of growth of GDP by approximately 0.1 percentage point, so a sustained drop of \$30 from the average of roughly \$100 for the first half of the year would increase GDP growth by roughly 0.3 percentage point.

The magnitude of this channel is smaller today than it was ten or even five years ago because of the sharp reduction in net petroleum imports (Figure 1), which fell from a high of approximately 12 million barrels per day in 2006 to 5 million barrels per day over the past four months.

**Figure 1: Net US petroleum imports  
1,000s of barrels per day**

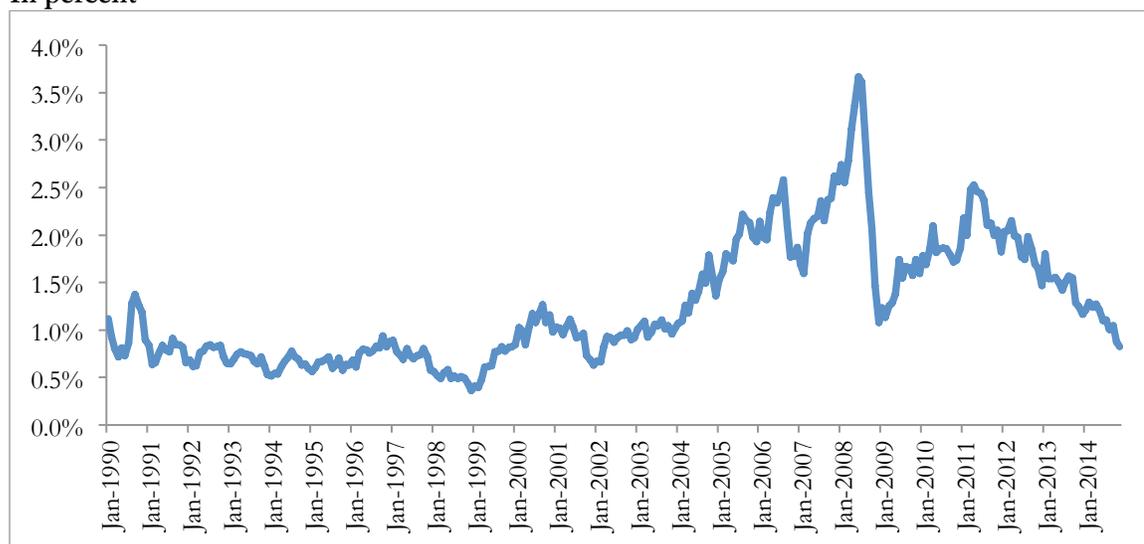


Source: EIA.



This reduction in the volume of physical imports has led to a sharp decline over the past several years in the net import share of oil in GDP, from over 2 percent of GDP in the mid-2000s to just over one percent in May – September 2014. Currently, as is shown by the projections for October and November 2014 in Figure 2, this import share is on track to fall below 1% for the first time since 2002. This falling GDP share of net oil imports reduces the benefits of an oil price reduction on the economy through the trade channel – but by the same token it reduces the vulnerability of the economy to future spikes in international oil prices. It is worth noting that lower oil prices could drive up petroleum demand, which could threaten to stall out the decline in physical net imports, or even turn it around, at least temporarily.

**Figure 2: Oil import share of US GDP**  
In percent



Source: EIA and authors' calculations.

2. **Although savings to consumers means less income to oil companies, typical consumers tend to spend a larger fraction of income than do the owners of oil companies.** Putting aside the net imports channel, lower oil prices leave money in the pocket of gasoline consumers, and deny potential returns to oil companies and their owners. Although virtually every American is a consumer of gasoline and oil companies are widely held through pension plans and other investment vehicles, it is reasonable to assume that gasoline consumers spend a greater fraction of their marginal dollar of income than do the more affluent owners of oil companies. In this channel, a lower oil price tends to result in a net increase in consumption, although the magnitude of this effect is likely to be less than the direct effect of reducing net imports. Combining this channel and the net imports channel, Goldman Sachs estimated that the recent fall in oil prices is roughly equivalent to a \$75 billion tax cut.<sup>4</sup>
3. **Lower oil prices reduce costs to firms, enabling them to produce more at a given price.** Oil price hikes affect not just the pump price but the price of goods produced using oil, such as air transportation and package delivery services. Output increases as more of these goods are produced and consumed.

<sup>4</sup> Goldman Sachs Economic Research, “Lower Oil Prices: Still a Boost, but not All Gravy,” Issue 14/48, Nov. 26, 2014.



4. **Lower oil prices will likely reduce the growth of oil production.** The Council of Economic Advisers estimates that oil and natural gas production added 0.22 percentage point annually to the growth of GDP in 2012 and 2013.<sup>5</sup> Lower prices will dampen this growth, but as is discussed in more detail below the magnitude of this effect could be modest because of the rapidly improving technology and declining costs of domestic production.
5. **Some of the negative economic effects of oil price volatility occur regardless of whether average prices are trending up or down.** Clearly, falling prices will benefit consumers more than producers, and vice versa when price rise. But price volatility reflects uncertainty about future supply and demand. The impossibility of perfectly anticipating the future is a negative drag for both consumers and producers as they must make strategic decisions on capex, staffing, inventory management, sales incentives, and so on. For example, when oil prices break higher after a period of low prices, automobile dealers and producers will suffer losses as gas-guzzlers are left on the lot and consumers switch to energy-efficient alternatives. Similarly, as consumers shift toward less energy-intensive pursuits, for example, away from air travel, when prices go up, some airline workers are laid off while hiring picks up in more energy-efficient industries. And unexpected oil price hikes can postpone investment as firms rethink making capital expenditures that lock in energy inefficient technologies. These channels also work in the opposite direction: hybrids, not gas guzzlers, are left on the lot when petroleum prices suddenly decline after a period of elevated prices. For all these effects, price volatility itself can dampen economic activity whether prices go either up or down.

The first three of these channels are positives for the economy, but the latter two are negatives. There is a large body of research on the effect of oil prices on the economy. On net, the research suggests that the first two channels are likely to dominate in the short run: lower oil prices stimulate the economy because consumers can spend money domestically on restaurants and holiday shopping rather than sending it abroad.

#### **LOW PRICES WILL SLOW US OIL GROWTH, BUT MANY FACTORS MITIGATE**

While there is a great deal of uncertainty over the impact of lower prices on US tight oil production, it is likely that capital investment will be curtailed at today's much lower prices. Importantly, however, reduced spending should not be expected to lead to a one-to-one reduction in production growth as several variables will act to support output:

- Falling oil prices will squeeze the service companies too, so the whole tight oil cost structure is likely to come down.
- Companies have already started to drill thousands of wells but not completed them, often to hold acreage under lease terms, so they can go back and complete those unfinished wells.
- The bulk of production (around 70 percent) comes from a minority of wells (about 30 percent), so to the extent companies can focus their investment spending on the most productive sweet spots, they can limit the slowdown in the growth of production.
- Technology and drilling efficiency continues to improve. Indicators such as initial production per well, cost per well, and drilling times are all getting better and better.
- Many companies may be hedged and thus are able to withstand short term dips in the oil price.

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<sup>5</sup> Council of Economic Advisers. *The All-of-the-Above Energy Strategy as a Path to Sustainable Economic Growth*, 2014, at [http://www.whitehouse.gov/sites/default/files/docs/aota\\_energy\\_strategy\\_as\\_a\\_path\\_to\\_sustainable\\_economic\\_growth.pdf](http://www.whitehouse.gov/sites/default/files/docs/aota_energy_strategy_as_a_path_to_sustainable_economic_growth.pdf)



All told, it is reasonable to expect that upstream spending will decline and that this will have a knock on effect on production growth, perhaps a few hundred thousands barrels per day below what would otherwise have been the case without a sustained decline in prices. If prices were to fall still further and remain at these low levels for an extended duration, the growth rate of US tight oil production would slow even further. Indeed, these production declines may only be temporary, particularly given the relative responsiveness of tight oil production to price changes, with a return to a higher priced environment again spurring investment.

### HOW LOW, HOW LONG?

How much oil production declines will depend upon how low prices go and how long they remain at low levels. While oil prices may not stay in the \$60s for long, it is reasonable to think they will be in the \$70s or \$80s for the next year or even several years, as the market may need to pull off as much as 1.5 million b/d of supply to balance, according to estimates by several market analysts. However, there are several reasons to expect prices may rebound in the coming year:

- OPEC may yet find a way to cut production, as further economic pain and panic from a bigger oil price drop leads major producers to come together to restrict output, potentially with an emergency meeting in the spring of 2015. Non-OPEC producers like Mexico or Russia may even find it in their interests to join the effort.
- There will be some impact on US production, although it is too early to know how much, which will help tighten markets.
- Faster economic growth and oil demand, partly spurred by lower prices, would support oil prices.
- There remains a great deal of geopolitical risk in the oil market—from Libya to Iran to Iraq to Russia—and further instability might push prices back up. Indeed, lower oil prices that strain the ability of countries to continue funding social programs may even exacerbate some instability.

### CONCLUSION

The \$30 per barrel oil price drop since the first half of 2014, resulting in a near \$1 per gallon gasoline price decline, could add 0.2 to 0.4 percentage points to the growth rate of GDP. Lower energy prices both make more money available for domestic consumption instead of sending it abroad and reduce the overall cost of goods. This overall beneficial macroeconomic effect is smaller than it was a decade ago because net imports have fallen and because the drop in oil prices may retard the growth of nonconventional oil production, with the ultimate impact determined by how low prices fall and how long they stay at these new low levels.

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