

Box 3.3. Short-Term Effects of Oil Shocks on Economic Activity

The short-term impact of large, unexpected oil price changes—typically referred to as oil shocks—on economic activity is hard to quantify and can be quite different from the impact over the long term. Both the nature of the oil price shock and the mix of short-term transmission channels at work can contribute to such differences. This box considers these issues and describes how the short-term impact of oil shocks may differ from the model simulations presented in this chapter.

The nature of the oil price shock is the most important determinant of its eventual impact on economic activity. If an unexpected increase in oil prices is driven by an unexpected boom in world economic growth (a demand shock), oil prices and GDP growth are likely to move together initially: the higher prices moderate the initial boom but do not cause a downturn. However, supply shocks due to factors such as a temporary disruption in oil production caused by geopolitical events or a permanent decline in the availability of oil are likely to raise oil prices regardless of global economic conditions and, depending on the magnitude of the supply disruption, may cause a loss of output.¹

The expected duration of a supply shock is also likely to shape its macroeconomic effects. Producers and consumers base their decisions, in part, on expectations of future prices. As a result, a shock that is expected to be temporary (for example, supply disruptions due to short-lived geopolitical disturbances) should affect these plans less than a shock that is very persistent.

The analysis in this chapter considers an unexpected permanent supply reduction and suggests a relatively benign macroeconomic impact over

the medium to long term. This should not be surprising; over this horizon, the share of oil in the cost of production should shape most of the GDP impact of an oil price shock. In particular, although oil is either a direct or an indirect factor of production for many final and intermediate goods (from perfume to jet fuel), oil's overall cost share as a proportion of GDP is quite small, ranging from 2 to 5 percent depending on the country. In principle, for an oil importer, the elasticity of GDP with respect to an oil price change induced by a supply shock should be about equal to that of the cost share—that is, quite small. Moreover, for the entire world—which includes oil exporters where higher oil prices stimulate demand for goods and services—the impact can be even smaller.

In the short term, however, other factors and amplification channels may significantly affect the response of output to an unexpected oil price hike. These channels are, however, hard to consider in a large-scale model, and they may not play a significant role in all instances in practice.

A first channel is related to the possibility that oil price spikes (particularly those associated with geopolitical events) make both firms and households more risk-averse.² Higher uncertainty regarding future economic prospects can cause firms and households to postpone decisions that are difficult to reverse, such as hiring, investing, and buying durable goods. Financial markets may exacerbate these effects if imperfect information or herd behavior in markets contributes to a sharp decline in liquidity and a sharp adjustment in asset prices.

A second channel is the reallocation of the factors of production. Industries and firms that produce oil-intensive goods or use them as inputs

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¹Precautionary demand can exacerbate the oil price effects of small oil supply disruptions or supply concerns (Kilian, 2009).

²Studies have noted how small increases in the probability of very unlikely but catastrophic events (such as oil shortages, political turmoil, and the shutdown of some industries) can have dramatic effects on human behavior.

Box 3.3 (continued)

are particularly vulnerable to oil price increases. Some of these industries and firms may no longer be profitable if oil prices stay high for long. This can either depress their profit margins or decrease demand for their products when the oil price increases are passed on to consumers.³ At a macro-economic level, the exit of such firms involves reallocation of capital and labor to other industries, a process that can take some time and involve large sunk costs.⁴ More generally, the adverse effects of large-scale bankruptcies in hard-hit industries can spread to the rest of the economy through either corporate or bank balance sheets.

Policy mistakes can also exacerbate the effects of an oil supply shock. For instance, monetary policy can contribute to destabilizing output by mistakenly fighting a temporary oil-induced surge in headline inflation.⁵ Price controls can lead to rationing and shortages, which may have played a role in amplifying the effects of the 1973 oil shock.⁶

Quantifying the short-term impact on growth of oil shocks has been a daunting challenge in the empirical literature (Table 3.3.1). It can be difficult to determine the nature of the shock—whether induced by demand or supply—and the interplay of the

³For example, the U.S. auto industry was hit hard by the 2007–08 gasoline price increase.

⁴Reallocating labor usually involves a loss of human capital, given that some skills are job-specific. One firm's capital goods may be less productive in another firm or just too costly to move.

⁵The role played by monetary policy in amplifying the initial oil shock is still debated (see Hamilton, 1996; Bernanke, Gertler, and Watson, 1997; and Hamilton and Herrera, 2004).

⁶In particular for gasoline (see Ramey and Vine, 2010).

Table 3.3.1. Annualized Percent Impact of a 10 Percent Oil Price Increase on Real U.S. GDP Growth after One Year

| | GDP Peak Response (percent) | Sample Period |
|-----------------------------|-----------------------------|---------------|
| <i>Older Sample Period</i> | | |
| Rotemberg-Woodford (1996) | -2.00 | 1948–80 |
| Hamilton (1996) | -0.75 | 1948–73 |
| Blanchard-Gali (2007) | -0.40 | 1970–83 |
| <i>Recent Sample Period</i> | | |
| Hamilton (1996) | -0.20 | 1974–94 |
| Kilian (2009) ¹ | < -1.00 | 1975–2007 |
| Blanchard-Gali (2007) | -0.15 | 1984–2007 |
| Cavallo-Wu (2006) | -0.40 | 1984–2007 |

Sources: Blanchard and Galí (2007); Cavallo and Wu (2006); Hamilton (1996); Rotemberg and Woodford (1996); and IMF staff calculations.

Note: The oil price series used may differ across studies. In all studies, oil price changes are meant to be induced by oil supply shocks and not driven by global demand.

¹IMF staff calculations are based on Kilian (2009) results.

amplification channels described above. But another challenge arises from recent structural changes in economies. For example, there is general agreement that recent oil price hikes have affected output less than those during the 1970s. Some possible explanations include that recent increases were driven mainly by demand, that monetary policy forestalled damaging second-round effects on wages, that real wage rigidities have diminished, and that the oil intensity of advanced economies has fallen a lot.⁷ Disentangling demand from supply shocks is the key challenge facing empirical work that tries to quantify the relationship between oil prices and activity.

⁷See Blanchard and Galí (2007) and Nakov and Pescatori (2010).