

A note on oil prices and the world economy in the IMF's *World Economic Outlook*

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The IMF's most recent *World Economic Outlook* (IMF 2007) contains a box entitled "Understanding the Link Between Oil Prices and the World Economy". In our view the analysis is misleading, and likely to confuse rather than clarify the question of the relationship between demand, supply, oil prices, and the world economy.

The Box compares the impact on the world economy of a supply-driven oil price shock with the impact of a demand-driven oil price shock using the IMF's Global Economic Model (GEM). The supply-driven oil price shock is modelled as a restriction in supply that leads to a rise in the oil price of 100 percent at its peak (see the blue lines in their Figure 1, copied here from IMF 2007, p. 17). This very standard exercise results in a drop in world GDP of 1.4 percent at its trough, a little over one year after the shock, while world inflation rises by 1.5 percent at its peak, after two quarters.

The authors cite three mechanisms through which the oil price rise affects the macroeconomy, all of which are plausible: the redistribution to oil exporters, the 'direct impact on production costs' (p. 17), and a rise in interest rates induced by a rise in inflation. In the model, "Monetary policy is specified in terms of a credible commitment to an interest rate rule that targets inflation,"² so the pass-through of oil prices to core inflation induces a rise in interest rates. However, given the importance of monetary policy in the relationship between oil prices and the macroeconomy – as highlighted by the literature on oil price shocks³ – a consideration of the impacts of different monetary policy reaction functions would have been illuminating.⁴

The second simulation in the box describes the impact of an oil price shock caused by what they describe as a "demand shock". This "demand shock" is modelled as "a significant increase in productivity growth in oil-importing countries that permanently raises global growth by ½ of a percentage point [which] generates a significant short-run surge in oil prices that is sustained over the medium term... [reflecting] the low short-term elasticity of supply" (pp. 18-19). So what impact does this "demand shock"-driven oil price shock have on world GDP? They report that "the short-run path for world GDP is opposite to that resulting from a supply-induced increase in the price of oil because higher prices are being caused by stronger growth" (p. 19).

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² Reported in Elekdag et al. (2007: 6), in which the authors describe the model used for the IMF estimations. Specifically, "In order to hit a target of 2 percent (2.5 percent in the United States) for core consumer price inflation four to six quarters in the future, the change in the interest rate must be twice as large as the deviation of core inflation from its target level" (p. 9) where core inflation excludes gasoline prices.

³ E.g. Bernanke et al. (1997).

⁴ It should also be observed that if the demand-reducing effects of an oil price shock come through whilst the direct pass-through to core inflation is attenuated, then monetary policy will in fact be offsetting, preventing the decline in demand by reducing interest rates. The demand-reducing effects of an oil price shock on an oil importer can easily be seen if one notes the equivalence between an external oil price shock and a rise in domestic taxes on oil, the revenue from which is not spent.

This analysis is problematic. We place scare-quotes around “demand shock” because the shock that they model is a demand shock only from the point of view of the oil market: from the point of view of every other market, a rise in productivity growth is a supply shock. But worse than this, the construction of the shock tells us nothing about the impact of oil prices. Why? Because the rise in productivity growth has apparently been calibrated precisely to raise global growth by $\frac{1}{2}$ a percentage point per year within the model. Their Figure 1 in the Box (repeated below) duly shows that under the “demand shock”, world GDP rises above baseline at a rate of $\frac{1}{2}$ a percentage point a year. To then observe that the “demand shock”-induced oil price shock did not prevent world GDP growth from rising by $\frac{1}{2}$ a percentage point a year is simply to observe that the calibrators successfully performed the proposed calibration.

The calibrations presented in the main text therefore tell us nothing about the differential impacts of different kinds of oil price shocks. The Box reports a more meaningful exercise, however, in footnote 4 (p. 19) where it is stated that “If the same increase in productivity is considered in a version of the model that does not include oil, world GDP expands by slightly more in the short and medium term than in the model with oil.” This is an appropriate comparison as it tells us whether the rise in oil prices affects GDP growth for a given rate of productivity growth. The fact that world GDP expands by only “slightly more” without oil leads the footnote to conclude that “This suggests that while high oil prices have resulted in a drag on world growth, these effects are relatively minor.”

While this comparison is meaningful, it is not comparable to the exercise with an oil supply-induced oil price shock, because the two different shocks involve very different sizes of increase in the price of oil. While the oil supply shock is calibrated to induce a peak rise of 100 percent in the price of oil, the “demand shock” induces a rise in the price of oil which spikes at only 35 percent in the first year (the time paths of oil prices are indicated in Figure 1). Since the induced oil price shocks are of such different magnitudes, the exercises reported in the Box tell us nothing about the difference made by the *source* of the oil price shock.

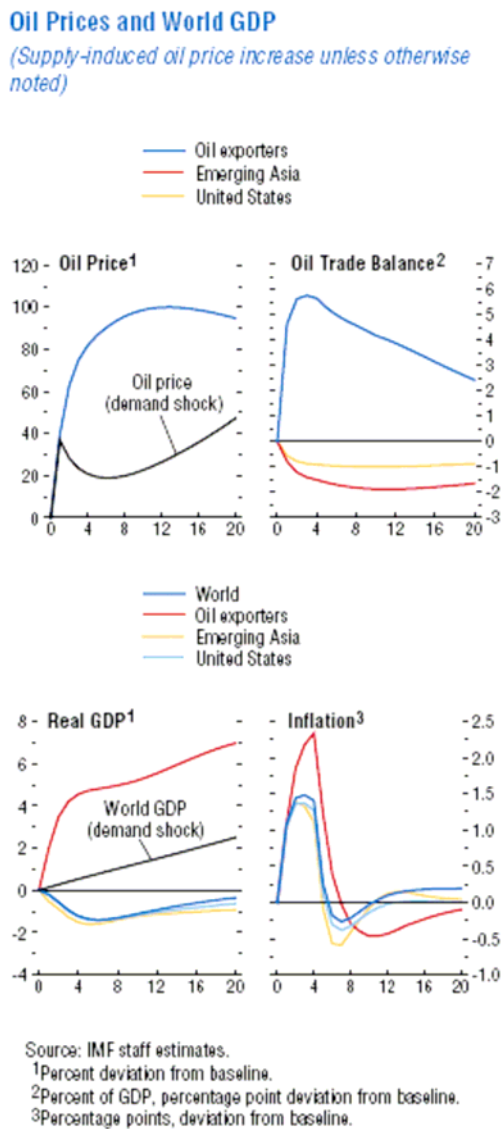
The box therefore lacks an analysis of different policy responses to a supply shock, and inappropriately specifies its “demand shock”. Yet beyond these specifics, our contention is that the attempt to differentiate between sources of oil price shocks is the wrong way to think about policy. Policy makers face a world full of economic phenomena, and policy has to be made in the light of all available information. Today, global demand is booming. In such an environment the rise in the oil price may have helped to rein in excess demand by reducing expenditures on non-oil output. In conjunction with low-priced exports from China that further reduced inflationary pressures, high oil prices may have thereby facilitated low global interest rates. During the stagflation of the 1970s, on the other hand, an expansionary monetary policy intended to offset the rise in the oil price would have led to unacceptable levels of inflation. Rates of growth and inflation are crucial in determining policy. But whether high growth or a restriction in supply are what caused a given rise in the price of oil has not been shown to be of any independent interest.

References:

Bernanke, Ben S., Mark Gertler, and Mark Watson (1997): “Systematic Monetary Policy and the Effects of Oil Price Shocks,” *Brookings Papers on Economic Activity* 1, 91–142.

Elekdag, Selim, René Lalonde, Douglas Laxton, Dirk Muir, and Paolo Pesenti (2007): “Oil Price Movements and the Global Economy: A Model-Based Assessment”, Bank of Canada, Working Paper 2007-34.

IMF (2007): *World Economic Outlook*, April 2007, Washington, D.C.: IMF.



Source: IMF *World Economic Outlook*, April 2007, p. 17.