

## CLIMATE NOTES: THE DYNAMICS OF OIL PRICE SHOCKS AND SPECULATION

MARC GRONWALD\* AND JANA LIPPELT\*\*

In the wake of the July 2008 oil price episode – during which oil prices reached a record level of over 140 US dollars per barrel – a heated debate emerged in both public and academic spheres as to whether this oil price increase was caused by ‘speculation’. This article summarizes this debate.<sup>1</sup>

For many observers in the broader public the role of speculation seems to be obvious: the oil price increase observed after 2002 coincided with the so-called financialization of the oil futures markets – a considerable increase in liquidity in oil futures markets and the increasing importance of non-commercial traders. The claim that this financialization caused the oil price increase is referred to as ‘Masters hypothesis’, named after the fund manager Michael W. Masters (see Masters and White 2008).

Academic observers, however, tend to take a different view. The majority of empirical studies investigating this issue do not find evidence of index funds positions having an impact on oil price changes; see e.g. Irwin and Sanders (2012). Irwin and Sanders test the Masters hypothesis directly using data on traders’ positions provided by the Commodity Futures Trading Commission (CFTC). They apply various empirical techniques, including Granger causality tests; but do not find empirical support for the Masters hypothesis.

A number of other papers address this issue from a macro perspective. Hamilton (2009), for instance, ar-

gues that “a low price elasticity of demand and the failure of physical production to increase, rather than speculation *per se*, should be construed as the primary cause of the oil shock of 2007-08”. Kilian and Murphy (2013) specifically analyse the oil inventory channel. Their empirical analysis uses global crude oil production data, a measure of global real activity, the real price of crude oil, and change in oil inventories above the ground. They identify four different types of shocks: an oil flow supply shock, an oil flow demand shock, a residual oil demand shock, and, most importantly, a speculative demand shock. This last shock is defined as a shock to the demand for “above-ground oil inventories arising from forward-looking behaviour not otherwise captured by the model”. The core finding that emerges from their paper is that the 2003–2008 oil price surge “was caused by unexpected increases in world oil consumption driven by the global business cycle.” However, the authors also show that during oil price episodes in 1979 and 1986, as well as in 1990, “speculative demand shocks played an important role”. Indeed, the authors calculate that about “one third of the price increase from July to August of 1990 was caused by speculative demand shocks”.

Juvenal and Petrella (2014) extend Kilian and Murphy’s (2013) analysis by using a large-scale econometric model that captures the bulk of aggregate information of a very large dataset consisting of macro-financial data as well as commodity prices. Their main finding is that global demand shocks account for the largest share of oil price fluctuations, but speculative shocks are the second most important driver. In addition, their historical decomposition of oil prices for the period 2004-2010 shows that speculative shocks accounted for around 15 percent to the oil price increase between 2004 and mid-2006. Between 2007 and 2008 the contribution of speculative shocks was found to be considerably smaller. Morana (2013) applies a similar empirical approach consisting of two blocks of variables: one ‘global’ block capturing macro-financial as well as oil market demand-and-supply side variables; and a ‘local’ block capturing macro-financial variables for a number of individual countries. Overall, the paper finds that financial shocks exercise a remarkably strong influence: 44 percent out of the

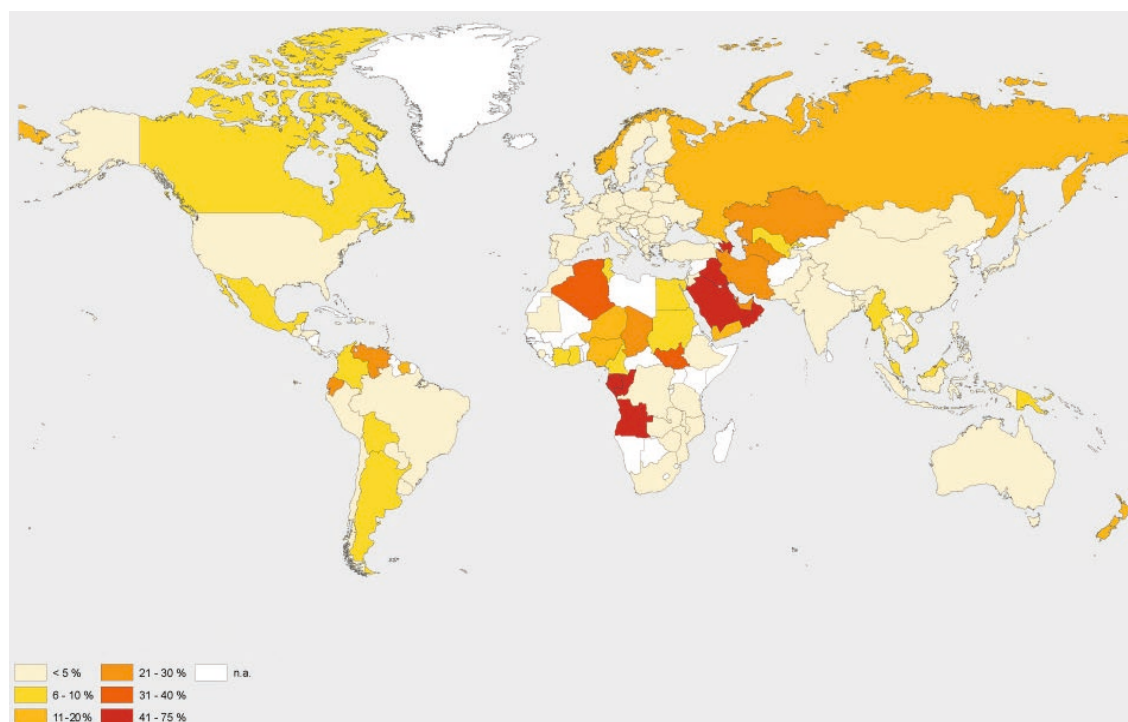
\* University of Aberdeen.

\*\* Ifo Institute.

<sup>1</sup> It is worth noting that the academic papers discussed in this article provide explicit definitions of the term speculation. It falls outside the scope of this short article to discuss these definitions in greater detail. The interested reader is referred to the original papers.

Figure 1

## Value of annual oil production measured by gross domestic product (%)



Sources: World Bank (2014); EIA (2014) – International Energy Statistics; Federal Reserve Bank of St. Louis (2014)

65 percent price increase between 2004 and 2010 are attributable to financial shocks. The 2007-2008 oil price swing, however, is found to have macroeconomic drivers.

The survey of this literature by Fattouh *et al.* (2013) concludes that “the co-movements between spot and futures prices reflect common economic fundamentals rather than the financialization of oil futures markets”. The authors conclude with the statement that “one of the problems in this literature and, more importantly, in the public debate about speculation is that it is rarely clear how speculation is defined and why it is considered harmful to the economy”. It is generally hard to disagree with this statement, but there nevertheless seems to be one issue which – somewhat surprisingly – is not very present in this discussion.

Figure 1 presents the economic importance of oil production across countries. It displays the value of crude oil production 2012 in relation to each country’s gross domestic product of the same year; and clearly shows that crude oil production is not particularly important for most countries. For a small number of oil exporting countries, however, a different picture emerges: the ‘usual suspects’ in the Middle East, plus some African countries as well as Venezuela, exhibit considerably

larger economic dependency on crude oil production. The brief summary of the literature provided above suggests that speculative activity generally can influence crude oil prices. The quantifications of the influence of speculative activity show that this can be relatively strong. Oil exporting countries therefore stand to be considerably affected by ‘speculative’ oil price fluctuations.

The political relevance of the economic value of oil production and oil resources was highlighted recently in the context of the Scottish independence referendum. The Scottish crude oil resources featured prominently in this debate, and the extent to which the Scottish economy benefits from these resources was emphasized virtually on a daily basis. At the same time, however, it has also been argued that this resource dependency is also accompanied by a considerable degree of uncertainty. The development of the price of crude oil would certainly have been an essential driver of the development of an independent Scotland.

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