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Macroeconomic impacts of oil prices and underlying financial shocks

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ABSTRACT

We extend Kilian's (2009) framework to identify an exogenous shock arising from changes in financial market conditions and examine the consequent macroeconomic impacts of oil price changes. We find that a financial shock is a key determinant of oil prices and its macroeconomic impact is as important as the impact of other underlying shocks. The results indicate that policymakers must explicitly consider changes in financial market conditions when analyzing the impacts of oil shocks. Further, a stabilisation policy must be forward-looking and tailored to underlying causes because different shocks have different impacts at different time horizons.

1. Introduction

Large fluctuations in oil prices and their high volatility have long been sources of instability in the global economy. In particular, the sharp rise in oil prices during the commodity boom that started in the early 2000s posed serious challenges to macroeconomic management in both developed and developing countries. Against this background, a large body of literature has empirically examined the underlying causes of oil price fluctuations and their macroeconomic impacts. Early research mainly focuses on the relationships between oil prices and economic activity (see, for example, Hamilton, 1983; Hooker, 1996), finding a strong negative relation between rising oil prices and GDP growth

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in many countries. Previous studies also suggest a positive association between rising oil prices and inflationary pressures on the economy (see, for example, Cunado and Perez de Gracia, 2005).

Further, while a growing body of literature examines the effect of oil prices on the stock market, there is no robust consensus about the effect of oil price shocks on stock market returns. Ciner (2001) finds that a statistically significant relationship exists between oil price futures and real stock returns, but that the correlation is non-linear. Similarly, Aloui et al. (2008) find that changes in oil prices significantly increase the volatility of stock market returns in six developed countries. By contrast, Jammazi and Aloui (2010) show that oil price shocks do not affect stock market returns during recession phases.[1]

Recent studies have shown that the effects of oil price shocks on stock markets depend on whether the country is an oil importer or an oil exporter. For example, Park and Ratti (2008) show that oil price shocks account for a statistically significant proportion of the volatility in real stock returns. Moreover, they find that the increased volatility of oil prices significantly depresses real stock returns in many European oil-importing countries. Arouri and Rault (2012), on the other hand, report that oil price increases positively influence stock prices in Gulf Cooperation Council countries, except in Saudi Arabia.

Despite the accumulation of empirical evidence, however, two major deficiencies are evident in the traditional approach to modelling oil price shocks frequently used in the literature. First, although reverse causality may run from real economic activities to oil prices, oil price shocks are assumed to be exogenous. Second, the recent literature presents evidence that the relation between oil prices and stock prices depends on the origin and nature of oil price shocks (see, for example, Ciner, 2013; Degiannakis et al., 2013). These results indicate that the macroeconomic impacts of oil price shocks could depend on the underlying causes, which has not been fully taken into account in previous analyses.

Kilian (2009) proposes a two-step approach to analyzing the macroeconomic impacts of oil price shocks in order to overcome these shortcomings. In the first step, a vector autoregression (VAR) that includes oil production, global economic activity, and oil prices as endogenous variables is estimated in order to identify three types of structural shocks that underlie oil price changes: an oil supply shock, an aggregate demand shock, and an oil market-specific demand shock that reflects an unexpected change in precautionary oil demand. In the second step, ordinary least squares (OLS) regressions are estimated to evaluate the impact of the identified structural shocks on the macroeconomic indicators. Kilian (2009) adopts this framework to demonstrate that US macroeconomic indicators respond differently to oil price shocks depending on the types of underlying shocks.

Kilian's (2009) two-step approach has been employed by recent studies of how oil price shocks influence real economic activity and stock markets. For instance, it has been shown that the consideration of the origins of oil price shocks is crucial, since different shocks in the oil market have diverse effects on real activity and stock markets (see, among others, Kilian and Park, 2009; Apergis and Miller, 2009; Yoshizaki and Hamori, 2013). However, to the best of our knowledge, no authors have yet attempted to extend Kilian's (2009) framework in order to identify an exogenous shock that arises from unexpected changes in financial market conditions and examine the consequent macroeconomic impacts of oil price changes. This extension must be meaningful because there is emerging evidence of the so-called financialization of commodity markets, a phenomenon characterised by a high degree of price correlation among a broad set of commodities as well as between commodities and financial assets, presumably due to the greater participation of financial investors in commodity markets (Henderson et al., 2012; Nissanke, 2012; Singelton, 2012; Tang and Xiong, 2012; Buyuksahin and Robe, 2012; Morana, 2013; Basak and Pavlova, 2013). A consequence of the financialization process is that commodity prices such as oil prices are determined not only by their supply and demand but also by the financial market conditions that affect financial investment.

The financial collapse of 2008 has sparked renewed interest in the accurate measurement of financial shocks to the real economy. In this context, many researchers have developed methods for constructing financial condition indexes, which contain information on financial variables selected

[1] Similar findings are reported in Huang et al. (1996) and Cong et al. (2008).