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THE EFFECTS OF OIL PRICE VARIATIONS ON THE US ECONOMY

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Overview

Since the first oil price shock, a great body of research has been devoted to the analysis of the consequences of a rise in the barrel price on economic activity. However, the relationship between oil prices and real GDP has proved to be unstable and hard to quantify. As a consequence, analysts still disagree about the magnitude of the impact. Considering the United States for example, the elasticities estimated between the two variables cover a large range stretching from a value close to -1% to more (in absolute value) than -10% .

Methods

Inspired from Marshall's theory and from his treatment of Time, this paper highlights the distinction between long- and short-run components in economic time series. Indeed, when one tries to analyze the interactions between two variables, four distinct questions arise: 1) is there a relationship between the long-run components of the two series, 2) what are the interactions between their short-run components, 3) does the short-run component of one of the series affect the long-run component of the other and 4) does the long-run component of one of the series affect the short-run component of the other.

Considering the specific question of the influence of oil price variations on US economic activity, we mainly focus on the consequences of short-run fluctuations in oil prices on the business cycle. We propose for this purpose a new approach to measure short-run interactions between economic indicators and estimate an econometric sectoral and non-linear model.

In the context of the recent surge in the equilibrium level of the barrel price, we further try to adapt the model in order to deal with the last of the four basic questions listed above and to evaluate what might be the short-run consequences on the US economic activity of a long-run oil price rise.

Results

The econometric model that we propose enables to estimate stable and significant short-run relationships between oil prices and sectoral economic indicators. Nonetheless, given the long-term variability of both the sectoral energy intensities and the shares of each sector in the economy, the simulated impact on aggregate GDP change over time, which explains the tendential weakening of the relationship noted in many studies. According to the values of the structural parameters in the model, the elasticities that we get cover the whole range of the published elasticities. In the long-term situation of 1998 (which is the most recent date where the sectoral data needed are available), our elasticity is -3.6% . The evaluation of the short-run economic effects of long-run oil price changes still deserves further study. Nonetheless, our preliminary results indicate that the rise of the barrel price since 2004 could have a delayed impact on the US business cycle in 2007 and cause a deviation of about -0.8 percentage point from the base case.

Conclusions

This paper makes primarily a contribution to the field of econometric modelization by proposing a new approach to measure the interactions between economic time series.

Considering in particular the question of the short-run effects on economic activity of short-run oil price variations, we estimate stable relationships between the former and a group of sectoral indicators, which enables us to evaluate an elasticity between oil prices and US real GDP that changes with the structural situation of the economy (shares of different sectors and sectoral energy intensities) and that covers approximately the range of published elasticities.

Further, we make a first step towards adapting our model to deal with the question of short-run effects on economic activity of long-run oil price variations. Our preliminary results indicate that the delayed impact in 2007 of the recent surge in oil prices might be stronger than anticipated by the consensus.

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