Monetary and Fiscal Policy Interactions in a Three-Country Model with Oil[*]

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Abstract

Sudden and protracted oil-price increases are generally accompanied by economic contractions and high inflation (as documented e.g. by Hamilton (1983, 1996)). The oil crises of the 1970s and the subsequent world stagflation provide one major example of the linkages between energy prices and the macroeconomy. Not surprisingly, the surge in oil prices observed since 2003 has raised concerns among analysts and policy makers. The macroeconomic effects are expected to be different from the past, though. One reason is the steady reduction in oil dependence in most advanced economies over the last decades. Another reason is the nature of the recent oil price increase, which is mainly attributed to higher world demand as opposed to the large supply component of the oil-price shock experienced in the 70s.

In this paper, we build a model that is able to replicate the current scenario of higher oil prices and use it to address some normative and positive issues concerning the interaction between fiscal and monetary policy.

The framework is a three-country dynamic stochastic general equilibrium (DSGE) model, which is characterized by two net oil-importing countries (US and the euro area) and one oil-exporting country (OPEC). A crucial feature of the model is the assumption that oil-prices are partially endogenous to the world economy. This allows for demand-driven oil-price escalations as well as for international spillovers of national fiscal and monetary policies.

We calibrate the model in order to reproduce a set of key stylized facts, as in Backus and Crucini (2000). The facts are captured by first moments, standard deviations, correlation of domestic variables and cross-country correlations. The parameter values that provide the best

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fit of the model with the data are close to those estimated in recent DSGE models of the US and the euro area (e.g. Smets and Wouters (2003), de Walque and Wouters (2004) and Christiano et al. (2001)).

We use the calibrated model to analyze the mix of monetary and fiscal policies adopted by oil importing countries. First, fixing energy taxes to the levels prevailing in the US and the euro area, we derive the optimal (within a class of simple policy rules) monetary reaction to an oil price shock. In particular, we analyze whether monetary policy should respond to the consumer price level or to a narrower measure of inflation. Second, we address the implications of the observed differences in energy taxes (substantially higher in the euro area relative to the US) for the optimal response of monetary policy. Third, we compute the welfare-maximizing level of energy taxes and ask what is the optimal monetary policy reaction to an oil price shock under this scenario.

Our policy evaluation is based on a second order approximation of the welfare function of the representative consumer in the oil-importing countries. The global interdependence implies that, for example, an anti-inflationary policy implemented by one oil-importing country in response to an oil-price shock has repercussions on inflation and output dynamics of the other oil-importing country. The optimal weight attached to oil-price changes by one monetary authority will, therefore, depend on the response to oil prices of the other central bank. Likewise, as the size of oil taxes can affect the response of domestic and foreign inflation and output, fiscal and monetary decisions affect each other, domestically as well as internationally. We study the cooperative as well as the non-cooperative solution of the policy game for a specific and limited set of policy instruments and under the assumption of full commitment of the policy makers to linear operational feedback rules.

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