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Jiménez-Rodríguez, R., and M. Sánchez. 2004. Oil price shocks and real GDP growth: Empirical evidence for some OECD countries. ECB Working Paper no. 362. European Central Bank, Frankfurt am Main.
Kilian, L. 2008. The economic effects of energy price shocks. *Journal of Economic Literature* 46 (4): 871–909.
———. 2009. Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market. *American Economic Review* 99 (3): 1053–69.
Kilian, L., and C. Park. 2009. The impact of oil price shocks on the U.S. stock market. *International Economic Review* 50 (4): 1267–87.
Lee, K., and S. Ni. 2002. On the dynamic effects of oil price shocks: A study using industry level data. *Journal of Monetary Economics* 49 (4): 823–52.
McKibbin, W., and P. Wilcoxen. 1998. The theoretical and empirical structure of the G-Cubed model. *Economic Modelling* 16 (1): 123–48.
Pesenti, P. 2008. The global economy model: Theoretical framework. *IMF Staff Papers* 55 (2): 243–84.
Research and Statistics Department, Bank of Japan. 2007. Recent developments of Japan's external trade and corporate behavior. BOJ Reports & Research Papers (Ad Hoc Themes). Bank of Japan.
Rotemberg, J. J., and M. Woodford. 1996. Imperfect competition and the effects of energy price increases on economic activity. *Journal of Money, Credit, and Banking* 28 (4): 549–77.

Comment

Francis T. Lui

Fukunaga, Hirakata, and Sudo's chapter provides a useful analysis of how shocks in oil prices affect production and prices at industry and aggregate economy levels. Changes in oil prices have been regarded in the real business cycles (RBC) literature as a major source of productivity shocks that can cause business cycles. The findings of this chapter therefore may have interesting implications for RBC models. They also remind us that the particular transmission mechanism of the effects of oil price changes matters a lot and that different economies may respond to these shocks in different ways.

The methodology of the chapter consists of using an identified VAR model with three sets of variables. They are

X_{1t} = global oil market variables
= (world crude oil output, world industrial output, spot crude oil price)
X_{2t} = domestic aggregate variable
= (aggregate industrial production)
X_{3t} = domestic industry-level variables
= industry production, producer price)

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The block recursive matrix in the estimated model ensures that the X_{1t} variables depend on their lags, the X_{2t} variables depend on their own lags and those of X_{1t}, and the X_{3t} variables depend on its own lags and those of X_{1t} and X_{2t}. By adopting this approach, the chapter can analyze how the shocks in the X_{1t} variables are transmitted to the X_{2t} and X_{3t} variables.

While this approach is reasonable, one can nevertheless raise a number of issues. First, as stated before, the actual data used for the X_{1t} variables are world crude oil output, industrial output of major economies, and spot crude prices. However, the chapter interprets the shocks to these variables as oil supply shocks, global demand shocks, and oil-specific demand shocks, respectively. This interpretation is questionable. Here we only have a quantity variable, a demand shifter, and a price variable. They are not sufficient for identifying the supply and demand functions separately. Thus, interpreting changes in these variables as supply and demand shocks in the oil market could be misleading.

Second, the block-recursive nature of the VAR model implies that the "global" variables in X_{1t} do not depend on the "domestic" variable X_{2t} or X_{3t}. But the United States and Japan are the two largest economies in the world. World industrial output must therefore be affected by the industrial outputs in the United States or Japan in some significant ways. In the newly added appendix, the authors state that they have partially relaxed the block recursive restrictions by incorporating the feedbacks from the United States and Japan to the global oil market. They claim that the main results remain robust. This is a good attempt, but some readers may want to know some measures of the quantitative differences.

Third, the chapter interprets a shock as a demand shock when it causes price and quantity to move in the same direction and as a supply shock when it causes price and quantity to move in opposite directions. Changes in price and quantity could be the results of simultaneous movements in supply and demand. All we can say in this context is that supply shock dominates demand shock, or vice versa.

Fourth, the chapter claims that there is no clear evidence indicating sizable resource reallocation across industries both in the United States and Japan. However, it also reports that the magnitudes of the responses of production to each kind of shocks differ considerably across industries. Why cannot this phenomenon be interpreted as resource reallocation across industries?

The chapter has several interesting results. First, oil-specific "demand" shocks are shown to have different implications for the United States and Japan. This seems to be true irrespective of whether the oil price shocks are demand or supply shocks. Second, unanticipated oil price increases have a negative impact on the U.S. economy both at the aggregate and industry levels. Third, the impact of an increase in oil price on Japan's aggregate economy could be positive or insignificant. However, the impact on oil-intensive industries there is positive.

The second result is easily anticipated. The third one is surprising, but is in fact reasonable. Japan is good at producing energy-efficient products. An increase in oil price may benefit Japan because this may induce even more people to purchase energy-efficient Japanese products such as cars or intermediate products used for producing them. This result may inspire government policy-making, especially at times of economic crisis.

Another point we should note is that outputs in United States and Japan during the sample period seem to be driven by world demand and domestic aggregate demand. This may mean that productivity changes or other supply-side factors are unimportant. It would be premature for us to arrive at this conclusion, because the model itself cannot distinguish supply shocks from demand shocks.

Comment

Warwick J. McKibbin

This chapter explores the causes and impacts of oil price changes in the United States and Japan. It also focuses on the transmission of global oil shocks within these economies at the macroeconomic and industry levels. The introduction of the chapter talks about the scarcity of studies on the impact and causes of oil price shocks but this discussion is really about the studies that have used the vector autoregression (VAR) methodology. There is a large literature using large-scale macroeconometric models, computable general equilibrium models (e.g., the G-Cubed model of McKibbin and Wilcoxen [1999]), and energy models in academic journals such as *Energy Journal and Climate Change,* which explore the causes and impacts of oil price shocks. It is true that these approaches use a different methodology, but more widespread citation would be worthwhile.

The basis of the empirical part of the chapter is two independent VAR models. One model is for the United States and a separate model is for Japan. Each model has a global oil market, a domestic macroeconomic variable, and domestic industry-level variables. The disaggregation into industry-level detail is a contribution of the chapter.

Identification is critical in VAR models. Most of my comments focus on how identification is imposed in the chapter. The authors impose restrictions so that the global energy markets are not affected by feedback from the macroeconomic or industry variables. Similarly, the macroeconomic variables are affected by the global oil market but not by industry variables. Finally, the industry variables are affected by themselves and the global oil market

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