Online Appendix for "The Effects of the Real Oil Price on Regional Wage Dispersion"

Matthias Kehrig* and Nicolas L. Ziebarth†

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This online appendix contains details on how the oil supply shocks are estimated.

1 Estimating shocks driving the real oil price

We follow Kilian (2009) in estimating oil supply, aggregate demand and real oil price-specific shocks in the following VAR:

$$\mathbf{z}_t = \mathbf{c} + \sum_{i=1}^{24} \mathbf{A}_i \mathbf{z}_{t-i} + \mathbf{u}_t$$

where vector $\mathbf{z}$ consists of the monthly time series of the growth rate of global oil production, $\Delta oilprod_t$, the deviations in Kilian's linearly detrended log index of global economic activity, rea_t, and the real price of oil, rpo_t: $\mathbf{z} = [\Delta oilprod_t \; rea_t \; rpo_t]'$.

We assume that the residual disturbances, $\mathbf{u_t}$, can be represented as follows:

$$\mathbf{u_t} = \mathbf{A_0^{-1}} \varepsilon_\mathbf{t}$$

where $\mathbf{A_0}$ is lower triangular consistent with the timing assumptions of Kilian (2009) and $\varepsilon_\mathbf{t}$ is a vector of structural shocks which are serially uncorrelated and independent of each other. These timing assumptions postulate that innovations to global oil production $\varepsilon_t^{oilprod}$ contemporaneously impact all of global oil production, global aggregate demand and the real oil price. Innovations to real economic activity ε_t^{rea}

*Corresponding Author, University of Texas at Austin, Department of Economics, 2225 Speedway Stop C3100, Austin, TX 78712-1690, matthias.kehrig@austin.utexas.edu. The latest version of this paper can be downloaded at http://ssrn.com/abstract=1787768

†University of Iowa, 21 E. Market St., Iowa City, IA 52242, nicolas-ziebarth@uiowa.edu.

contemporaneously impact global aggregate demand and the real oil price but oil production only with a month's lag. Finally, innovations to the real oil price ε_t^{rpo} have an immediate impact only on the real oil price but affect oil production and aggregate demand only with a month's lag.

The data for global oil production January 1973-November 2015 come form the Energy Information Administration, Table 11.1b World Crude Oil Production.[1]Data on global economic activity were downloaded from Lutz Kilian's website who has updated and extended this time series until 2015 compared to the version published alongside Kilian (2009).[2]

To measure the real price of oil, we obtain data on refiner acquisition cost for imported crude downloaded from the EIA[3]. Like Kilian (2009) who follows Barsky and Kilian (2002), we use the producer price index for fuels and related products, item crude petroleum, from BLS. We then deflate these nominal data by the U.S. consumer price index for all urban consumers, all items less energy, also downloaded from FRED[4], to obtain a measure of the real price of oil.

References

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[1]http://www.eia.gov/beta/MER/index.cfm?tbl=T11.01B#/?f=M&start=200001.
[2]http://www-personal.umich.edu/ lkilian/reaupdate.txt.
[3]http://www.eia.gov/dnav/pet/pet_pri_rac2_dcu_nus_m.htm.
[4]https://research.stlouisfed.org/fred2/series/CPILEGSL.