**Home Work 4**

1. Increases in oil prices have been blamed for several recessions in developed countries. To quantify the effect of oil prices on real economic activity, researchers have run regressions like those discussed in this chapter. Specifically, let *Ot* equal the greater of zero or the percentage point difference between oil prices at date *t* and their maximum value during the past 3 years. In this exercise, you will estimate the effect of oil prices on macroeconomic activity using monthly data on the Index of Industrial Production (IP) and the monthly measure of *Ot*. The data can be found in the file **us\_macro\_monthly**.

**a.** Compute the monthly growth rate in IP, expressed in percentage points, *ip*\_*growtht* = 100 \* ln(*IPt*>*IPt* - 1). What are the mean and standard deviation of *ip\_growth* over the 1960:M1–2012:M12 sample period? What are the units for *ip\_growth* (percent, percent per annum, percent per month, or something else)?

**b.** Plot the value of *Ot*. Why are so many values of *Ot* equal to zero? Why aren’t some values of *Ot* negative?

**c.** Estimate a distributed lag model by regressing *ip\_growth* onto the current value and 18 lagged values of *Ot*, including an intercept. What value of the HAC standard truncation parameter *m* did you choose? Why?

**d.** Taken as a group, are the coefficients on *Ot* statistically significantly different from zero?

**e.** Construct graphs like those in Figure 15.2, showing the estimated dynamic multipliers, cumulative multipliers, and 95% confidence intervals. Comment on the real-world size of the multipliers.

**f.** Suppose that high demand in the United States (evidenced by large values of *ip\_growth*) leads to increases in oil prices. Is *Ot* exogenous? Are the estimated multipliers shown in the graphs in (e) reliable? Explain.