

Stata Exercise on Bartik Instruments
Graduate Urban Economics, SUFE

This exercise closely follows Goldsmith-Pinkham, Sorkin, and Swift “Bartik Instruments: What, When, Why, and How” (AER 2020). The goal is to simulate the simplest case of two industries and a single period of growth (or one observation of growth between two periods). We will use the following setup:

Wage growth in location l , y_l , is a function of employment growth, x_l , and an unobservable amenity shock, a_l

$$y_l = \beta x_l + \delta a_l + \epsilon_l \quad (1)$$

Employment growth in l can be decomposed into local growth in each of the two industries ($k \in \{1, 2\}$):

$$x_l = g_{l1}z_{l1} + g_{l2}z_{l2} \quad (2)$$

In turn, local growth is a function of national growth, g_1 and g_2 , and an idiosyncratic local component:

$$g_{lk} = g_k + \tilde{g}_{lk} \quad (3)$$

The local amenity shock is just the weighted sum of the idiosyncratic growth terms:

$$a_l = \tilde{g}_{l1}z_{l1} + \tilde{g}_{l2}z_{l2} \quad (4)$$

Finally, make the \tilde{g}_{lk} and ϵ_l terms random normal variables with distribution:

$$\tilde{g}_{lk} \sim N(\mu_g, \sigma_g) \quad (5)$$

$$\epsilon_l \sim N(0, \sigma_e) \quad (6)$$

Simulate this set-up and make the following 7 parameters global variables so you can easily change them. I have listed the values I will use in my code so that we can compare.

1. Count of locations L ; My values: $L = 100$
2. National growth rates g_1, g_2 ; My values: $g_1 = 0.1, g_2 = 0.05$
3. Coefficients: β, δ ; My values: $\beta = 1.5, \delta = 1$
4. Distribution parameters: $\mu_g, \sigma_g, \sigma_e$; My values: $\mu_g = 0.025, \sigma_g = 0.01, \sigma_e = 0.005$

Show that the Bartik instrument is equivalent to IV regression using industry shares