Unemployment and Production Networks

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Motivation

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Literature has explored implications of labor market mobility

- Jovanovic and Moffet (1990) find that workers ability to change jobs is worth about 6 to 9 percent of GDP
- Lee and Wolpin (2006) find that workers face large costs of switching sectors. Eliminating these costs would double output in both services and manufacturing
- Sahin et al (2014) find that misallocation (a lack of mobility) can explain at most one-third of the rise in unemployment during the Great Recession

But none of these papers take production linkages, and the possible amplification channels these create, into account

Basic model

Toy Model - Labor Demand

Key features: Model with both labor market and production linkages

Simple example: Two sector vertical economy, firms in sectors 1 and 2 have production function

$$y_1 = A_1 N_1^{\alpha_1}, \; y_2 = A_2 N_2^{\alpha_2} y_1^{\beta_2}$$

Assuming exogenous rigid wages as in Hall (2005), taken as given by firms, profit maximization implies labor demands are

$$L_1^d(\theta_1) = \left(\frac{\alpha_1 A_1}{w_1 (1 + \tau_1(\theta_1))^{\alpha_1}} \right)^{\frac{1}{1-\alpha_1}}$$

$$L_2^d(\theta_1, \theta_2) = \left(\frac{\alpha_1 A_1^{\frac{1}{\alpha_1}}}{w_1 (1 + \tau_1(\theta_1))} \right)^{\frac{\alpha_1}{1-\alpha_1} \frac{\beta_2}{1-\alpha_2}} \left(\frac{\alpha_2 A_2}{w_2 (1 + \tau_2(\theta_2))^{\alpha_2}} \right)^{\frac{1}{1-\alpha_2}}$$

Note: This setup nests the case where there are no production linkages ($\beta_2 = 0$).

Toy Model - Labor Supply

We assume, for now, that unemployed workers in industry i commit an exogenous fraction λ_i of their search time to searching in industry i and spend the remaining $1 - \lambda_i$ searching in industry j, and define

$$\theta_i = \frac{V_i}{\lambda_i U_i + (1 - \lambda_j) U_j}$$

Assume exogenous separation rate s_i, recruiting costs κ_i, and Cobb-Douglas matching function m_i in market i. Implies recruiter producer ratio in market i

$$\tau_i(\theta_i) = \frac{\kappa_i s_i}{q_i(\theta_i) - \kappa_i s_i}.$$

Toy Model - Labor Supply

Given the search behavior of unemployed workers, labor supply in industry i (for a given employment level in industry j, L_j) is

$$L_i^s(\theta_i, \theta_j) = \frac{f_i(\theta_i)}{s_i + \lambda_i f_i(\theta_i)} \left[\lambda_i H_i + (1 - \lambda_j)\left[H_j - L_j\right]\right]$$

Note: This setup nests both immobile labor ($\lambda_i = \lambda_j = 1$) and perfect labor mobility ($\lambda_i = \lambda_j = \frac{1}{2}$).

Unemployment response to shocks: Different labor market linkages

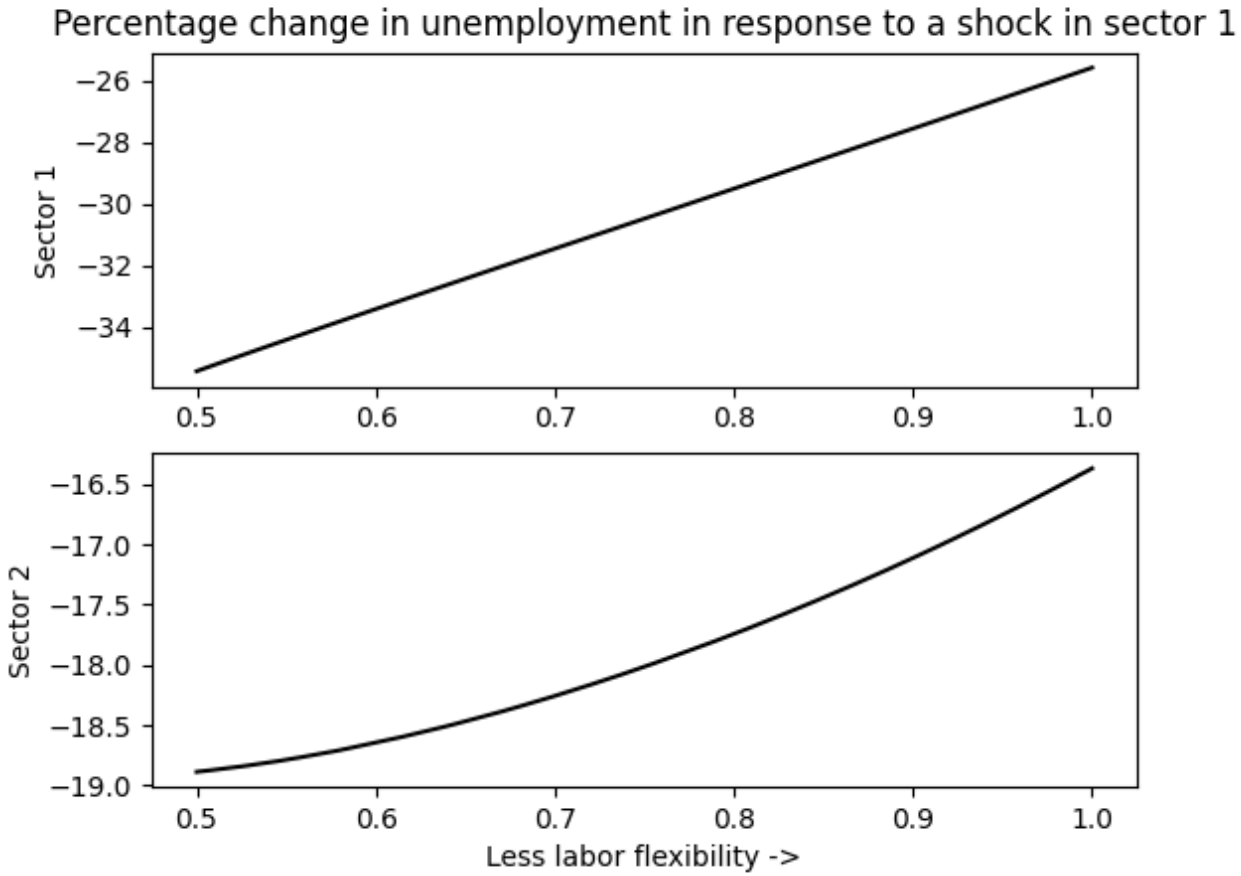
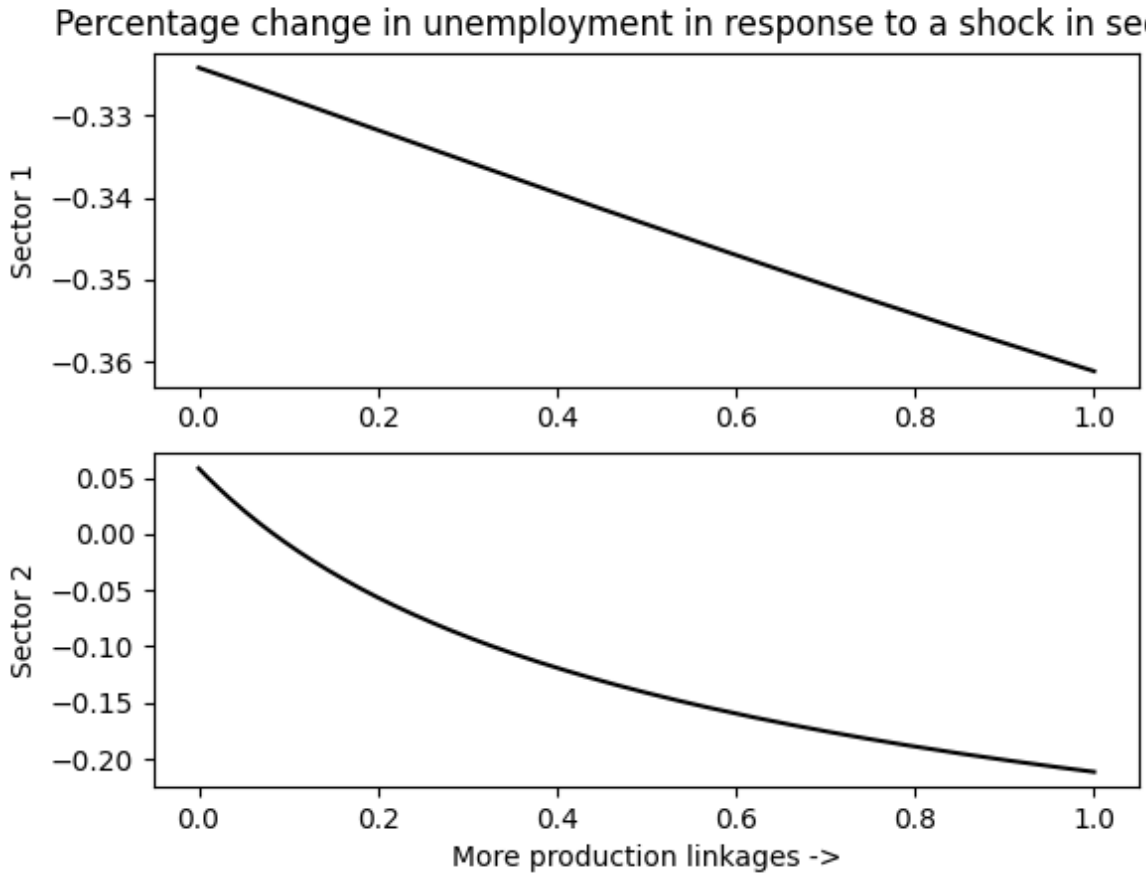


Figure: How does the response to a 1% productivity shock in sector 1 change when labor markets become more integrated?

Unemployment response to shocks: Different production linkages



Data

Data

Burning Glass Technologies data:

- Job Postings
  - Time Coverage: 2007 to 2020
  - Includes information on salary, location, industry, skill requirements, and certification requirements
- Resume data
  - Updated in 2020
  - Covers past job histories, education, location, skills and certifications

Methodology

Methodology

Still thinking about what how to leverage the data, what exactly we want to be estimating.
Perhaps we could do something similar to Sahin et al (2014), production linkages would definitely change the effects of mismatch, and could amplify the contribution to unemployment from not having perfect mobility.
Could we use job transitions in BGT data to estimate the λ's?