

Econ 809: Assignment 1

January 2006

1 Part 1

On Robert Shimer's webpage, <http://home.uchicago.edu/~shimer/data/mmm/>, you will find data on the job-finding rate p_t , and the vacancy-unemployment ratio θ_t . Use this data to perform a 'Solow residual' exercise. In particular, assume that the aggregate matching technology is Cobb-Douglas:

$$m_t = e^{x_t} v_t^\alpha u_t^{1-\alpha},$$

so that $p_t = e^{x_t} \theta_t^\alpha$. with $\alpha = 0.70$ (in the neighborhood of Shimer's preferred estimate; but you can experiment with different values). Using the available data, you should be able to construct a series for $\{x_t\}_{t=1}^T$; i.e.,

$$x_t = \ln(p_t) - \alpha \ln(\theta_t).$$

1. Plot p_t and θ_t on a graph.
2. Plot the series $\{x_t\}$ (with the mean of x_t normalized to zero) for two different values of $\alpha \in \{0.3, 0.7\}$. Is there much 'unexplained' variation in the job-finding rate? If yes, why might this be the case?
3. Report the standard deviations for x_t , $\ln(p_t)$, and $\ln(\theta_t)$.
4. Explain why the fluctuations in x_t may be measuring fluctuations in search intensity (by either unemployed workers, or workers engaged in on-the-job search). In particular, suppose that the 'true' matching function is given by:

$$m_t = e^{x_t} v_t^\alpha (u_t s_t)^{1-\alpha},$$

where s_t denotes search intensity.

2 Part 2

Consider the following 'static' model. A representative agent has preferences for consumption and leisure given by:

$$u(c, l) = c + \psi \frac{l^{\eta-1} - 1}{\eta - 1}.$$

There is an aggregate production function given by $y = e^z k^\theta n^{1-\theta}$. The technology shock evolves according to a first-order Markov process; $z' = \rho z + \sigma$. The capital stock is fixed over time (there is no capital investment).

- [1] For a reasonable set of parameters, numerically solve for the optimal policy function $n(z)$.
- [2] Simulate the model and compute statistics of interest.