Chapter 6: Unemployment[1]

1 A Job Search/Loss Model of the Labor Market

1.1 Definitions

Natural rate of unemployment: the average rate of unemployment around which the economy fluctuates. Also called the steady-state unemployment rate.
L = number of workers in the labor force
E = number of employed workers
U = number of unemployed workers
$s \equiv \lambda$ = rate of job separation ($0 \leq \lambda \leq 1$)
$f \equiv \phi$ = rate of job finding ($0 \leq \phi \leq 1$)
$\phi = 1 \Rightarrow$ job finding is instantaneous and the natural rate of unemployment is near zero.
Why $\phi < 1$ in reality: costly and time-consuming job search, wage rigidity.
Frictional unemployment: caused by the job search process.
Why does frictional unemployment exist?

1. Workers have different abilities and preferences; jobs have different required skills
2. Geographic mobility of workers limited and not instantaneous
3. Imperfect information flows about vacancies and job candidates
4. Sectoral shifts: changes in the composition of demand across industries or regions
5. Unemployment insurance (drives down the rate of job finding)

Structural unemployment: caused by real wage rigidity (sticky wages) and job rationing.
Why does structural unemployment exist?

1. Minimum wage laws
2. Unions exercise monopoly power to secure higher wages for their members
3. Efficiency wage theory: higher wages increase worker productivity by attracting higher-quality job applicants, increasing worker effort, reducing turnover, and improving worker health

1.2 Assumptions

1. Exogenous labor force: $L = \bar{L}$
2. Exogenous rate of job separation: $\lambda = \bar{\lambda}$
3. Exogenous rate of job search: $\phi = \bar{\phi}$
4. Initial conditions: $E = E_0$ and $U = U_0$ (at $t = 0$)

[1] Econ 302, Week 8, 10/23/2009; UW-Madison. TAs Lihan Liu and Scott Swisher.

1.3 Steady-state (Equilibrium)

Steady-state in the labor market: in long-run equilibrium, the unemployment rate is constant.
Steady-state condition: the following equation defines a steady-state in the labor market model.

$$\lambda E = \phi U \;\Rightarrow\; \frac{U}{L} = \frac{\lambda}{\lambda + \phi} \tag{1}$$

If this steady-state condition holds, the flows in to and out of groups U and E are equal.

1.4 Policy

How to lower the steady-state unemployment rate with economic policy?

1. Increase ϕ: job training programs, public job directories, cut unemployment benefits
2. Decrease λ: eliminate minimum wage laws, break unions, allow mild inflation to lower the real wage (will mitigate the effects of sticky wages)

2 Exercise: Unemployment

Consider the island economy of LaLaLand, which has a labor force of 4000. There are currently 400 discouraged workers on the island; these workers are not considered part of the labor force. The entire labor force is engaged in fishing, but in order to fish you must be hired on the crew of a boat. In a given week, 5% of all employed individuals lose their job and 25% of all unemployed individuals are hired by a boat.

a) What is the natural rate of unemployment on the island?

b) Let $E_0 = 1000$ (at $t = 0$). What is E_1? (Hint: Find the change in employment by considering the number of employed that lose their job in addition to the number of unemployed that find a job.)

c) Using your result from the last part, write out $E_t = f(E_{t-1}, U_{t-1}, \phi, \lambda)$ and $U_t = g(E_{t-1}, U_{t-1}, \phi, \lambda)$ explicitly. Interpret.

d) Compute L, E, U, and $\frac{U}{L}$ for $t = 0, 1, 2, \ldots, 25$ (use a table in Excel).

e) What happens to the unemployment rate over time? How does this relate to the natural rate of unemployment?

f) At $t = 26$, the discouraged workers decide to look for employment and are thus considered unemployed. How will this affect the unemployment rate, both initially and over time?

g) Compute L, E, U, and $\frac{U}{L}$ out to $t = 40$ given the change in the labor force at $t = 26$.

h) At $t = 41$, a new fleet of fishing boats arrives at the island and hires additional workers. As a result, $\phi_{t \geq 41} = 0.4$ and $\lambda_{t \geq 41} = 0.04$. Compute L, E, U, and $\frac{U}{L}$ out to $t = 60$ given this change.

i) What is the new natural rate of unemployment after the events at $t = 26$ and $t = 41$?