

Econ 102 Discussion – Week 6

February 27 – 28, 2014

Unemployment

1. Suppose you collect the following data from the US Bureau of Labor Statistics:

	Total Population	% Female	% Male
Population Age 16+	15,000	45%	55%
Labor Force	10,000	40%	60%
Unemployed	1,000	55%	45%
Employed	9,000	38.33%	61.67%

(a) What is the total unemployment rate?

$$\text{Unemployed} = \text{labor force} - \text{employed} = 10,000 - 9,000 = 1,000$$

$$u = \text{unemployed/labor force} = 1,000/10,000 = 10\%$$

(b) What is the total labor force participation rate?

$$\text{LFPR} = \text{labor force/population} = 10,000/15,000 = 66.67\%$$

(c) What is the unemployment rate for women? What is the labor force participation rate for women?

$$\text{Population women} = 15,000 * 45\% = 6,750$$

$$\text{Labor force women} = 10,000 * 40\% = 4,000$$

$$\text{Unemployed women} = 1,000 * 55\% = 550$$

$$u = \text{unemployed women/labor force women} = 550/4,000 = 13.75\%$$

$$\text{LFPR} = \text{labor force women/population women} = 4,000/6,750 = 59.3\%$$

(d) What is the unemployment rate for men? What is the labor force participation rate for men?

$$\text{Population men} = 15,000 - 6,750 = 8,250$$

$$\text{Labor force men} = 10,000 - 4,000 = 6,000$$

$$\text{Unemployed men} = 1,000 - 550 = 450$$

$$u = \text{unemployed men/labor force men} = 450/6,000 = 7.5\%$$

$$\text{LFPR} = \text{labor force men} / \text{population men} = 6,000 / 8,250 = 72.7\%$$

(e) Complete the table above.

$$\text{Employed women} = 4,000 - 550 = 3,450$$

$$\text{Employed \% female} = 3,450 / 9,000 = 38.33\%$$

2. Suppose there are 15,000 people living in Madison in 2008. 4,000 are either too old or too young to work. Of the remaining people, 4,000 are employed with full-time jobs; 3,000 are employed part-time, but they wish to work full time; and 2,000 are underemployed, but they are working full-time jobs; 1,000 are currently not working, but they are looking for work; and the remainder are discouraged workers.

(a) What is the size of the labor force in Madison in 2008?

The size of the labor force is the sum of the employed workers plus the unemployed workers. There are 9000 employed workers (4000 with full-time work, 3000 with part-time work, and 2000 who are working but are underemployed) and there are 1000 unemployed workers. Hence the size of the labor force is 10,000 or (9000+1000).

(b) What is the employment rate in Madison in 2008?

$$\text{Employment Rate} = (\text{Employed} / \text{Labor Force}) * 100 = (9000 / 10000) * 100 = 90\%$$

(c) What is the unemployment rate in Madison in 2008?

$$\text{Unemployment Rate} = 100 - \text{Employment Rate} = 10\%$$

$$\text{or } (\text{Unemployed} / \text{Labor force}) * 100 = (1000 / 10000) * 100 = 10\%$$

(d) What percentage of the population of Madison are discouraged workers in 2008?

$$\text{We have 1000 discouraged workers, so } 1000 / 15000 = 6.6666\%$$

(e) Now suppose that Madison's real GDP is \$400,000 in 2008. Reports say that 100 people find jobs for every \$10,000 increase in the level of output. If the mayor of Madison wants to target an unemployment rate of 7% next year, what would the change in output need to be? Assume that the size of the labor force is unaffected by the change in GDP.

The current unemployment rate is 10%. To reduce the unemployment rate to 7%, we need that 300 unemployed workers find jobs. This requires the output to increase by $3 * \$10,000 = \$30,000$.

(f) Given the growth in GDP found in part (e), what is the GDP growth rate between 2008 and 2009?

Now, Madison's GDP is 430,000 (400,000+30,000). The growth rate is $(430,000 - 400,000)/400,000$ equals 0.075 or 7.5%

3. Suppose that the labor market for an economy is characterized by the following equations:

$$W = 50 - Q^D$$

$$W = 10 + 3Q^S$$

(a) In market equilibrium, how many people are employed? What is the wage?

In equilibrium, $Q^D = Q^S = Q$. Therefore, $W = 50 - Q = 10 + 3Q$. Solving this yields $Q=10$.

Plug this into either the demand or supply equation to find equilibrium wage:

$$W = 50 - (10) = 40.$$

(b) Now suppose that the government implements a minimum wage such that structural unemployment is 4 workers. What minimum wage did the government implement? What is the unemployment rate?

Structural unemployment of 4 workers means that 4 more workers are supplied than are demanded. In equation form:

$$Q^S = Q^D + 4$$

With the supply and demand equations, we have 3 equations and 3 unknowns. Set the supply and demand equations equal as in (a): $50 - Q^D = 10 + 3Q^S$. Now substitute in the structural unemployment equation to solve for Q^D :

$$50 - Q^D = 10 + 3(Q^D + 4)$$

Solving yields $Q^D = 7$. We can also solve for $Q^S = 11$ and $W = 43$. Therefore, the minimum wage must be \$43.

11 workers want to be employed but 4 are unemployed, so the unemployment rate is $4/11 = 36.36\%$.