Economics 227: Intermediate Macroeconomics
Problem Set #4 Answers

1. Of U-1 through U-6, which do you think is the best measure of involuntary joblessness? Why?

   Your opinions may vary. I believe that trends in U-1 through U-6 collectively give a nice picture of the state of joblessness in a country. U-1 and U-2 measure the flow of workers into unemployment, and tell us whether involuntary joblessness is worsening or improving. The total unemployment rate U-3 is a convenient statistic, but trends in U-3 should only be evaluated with reference to the broaded measures U-4 through U-6. A drop in the total unemployment rate could perversely signal worsening involuntary joblessness if it is driven by people leaving the labor market altogether, rather than finding work.

2. Suppose the production function is given by $Y = K^{\alpha}L^{1-\alpha}$.

   (a) If the real wage is w and this economy has $K = 100$ units of capital, find the demand for labor $L^d(w)$.

   $$L^d(w) = 100\left[\frac{1-\alpha}{w}\right]^{\frac{1}{\alpha}}$$

   (b) Suppose $\alpha = \frac{1}{2}$. Find the equilibrium wage if the supply of labor is $L = 100$
   If $\alpha = \frac{1}{2}$, $L^d(w) = \frac{100}{(2w)^2} = \frac{25}{w^2}$. Set $L^d(w) = 100$ and solve for $w = \frac{1}{2}$.

   (c) If the government imposes a minimum wage of $\underline{w} = \frac{3}{4}$, how much unemployment does this generate?
   $L^d\left(\frac{3}{4}\right) = 44.44$. Since the supply of labor is still 100, at $\underline{w} = \frac{3}{4}$ there is an excess supply of 55.66 workers, and the minimum wage prevents the labor market from clearing. So 55.66 workers are unemployed.

   (d) Does the unemployment generated by the minimum wage rise or fall if $\alpha = \frac{3}{4}$?
   Let $L_2^d(w)$ give the demand for labor with $\alpha = \frac{3}{4}$. Then

   $$L_2^d(w) = \frac{15.749}{w^{4/3}} \Rightarrow L_2^d(0.75) = 23.11$$

   So with $\alpha = \frac{3}{4}$ unemployment generated by the minimum wage is higher: 76.89 workers are unemployed now, versus 55.66 with $\alpha = \frac{1}{2}$.

   (e) Recall the elasticity of demand for labor is given by $\varepsilon_d = \frac{\%\Delta L^d}{\%\Delta w} = \frac{\partial L^d(w)}{\partial w}\frac{w}{L}$. Find the elasticity of demand for labor given arbitrary values of w and α.
   Writing $L^d(w) = 100\left[1-\alpha\right]^{\frac{1}{\alpha}} w^{-\frac{1}{\alpha}}$, we have

   $$\frac{\partial L^d(w)}{\partial w} = \frac{-100}{\alpha}(1-\alpha)^{\frac{1}{\alpha}} w^{-\frac{1}{\alpha}-1}$$

   So

   $$\varepsilon_d = \frac{\frac{-100}{\alpha}(1-\alpha)^{\frac{1}{\alpha}} w^{-\frac{1}{\alpha}-1} w}{100\left[1-\alpha\right]^{\frac{1}{\alpha}} w^{-\frac{1}{\alpha}}} = -\frac{1}{\alpha}$$

(f) Explain your answer to part (d) intuitively.

The demand curve for labor becomes less elastic when α rises to $\frac{3}{4}$: ε_d falls in absolute value from 2 to $\frac{4}{3}$. Now you'd probably expect that if the demand curve becomes less elastic, the minimum wage should generate less unemployment. A given percentage change in the wage will lead to a relatively small drop in the demand for labor if the demand curve for labor is relatively inelastic. To resolve the puzzle, note that with $\alpha = \frac{3}{4}$, the equilibrium wage is much smaller: the equilibrium wage is $\frac{1}{4}$ versus $\frac{1}{2}$. Even though the demand for labor is less elastic, the minimum wage produces more unemployment when α is $\frac{3}{4}$ versus $\alpha = \frac{1}{2}$ because it imposes larger percentage increase in the wage.

3. In March of 2005, Ben Bernanke said the following. (Ben Bernanke later became the Chairman of the U.S. Federal Reserve, which is the U.S. Central Bank.)

"I don't believe that the recent deterioration in the U.S. trade balance reflects economic policies and other developments within the U.S. itself. A satisfying explanation for the recent upward climb of the U.S. trade deficit requires a global perspective. To be more specific, over the past decade a combination of forces has created a significant increase in global saving – a global saving glut – which helps to explain the increase in the U.S. trade deficit."

(a) What are some "economic policies and other developments within the U.S. itself" that could cause the increase in the trade deficit?

An increase in government spending would reduce national savings and certainly increase the trade deficit.

(b) What effect would a global savings glut have on a small open economy?

A global savings glut would increase the world supply of loanable funds and therefore reduce the world interest rate r^*. In a small open economy, the demand for investment goods would rise: $I = I(r^*)$.

(c) Bernanke gave his speech at the height of the U.S. housing boom. Could a global savings glut help explain why there was a housing boom?

A global savings glut could certainly explain the housing boom: the savings glut would make the demand for housing rise because it would reduce the cost of financing the purchase of a houses.