

Economics 460: Labor Economics  
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Problem Set #3 – Answers

1. As long as  $w$  adjusts to clear the market, then there is no unemployment. So, the wage must *not* adjust automatically to clear the market if there is to be unemployment. This could happen for any number of reasons: (i) firms pay efficiency wages above  $w^*$ , (ii) there is a binding minimum wage, (iii) the wage is slow to adjust to the equilibrium so that the market is in dis-equilibrium for extended periods of time, etc.
2. An increase in labor productivity increases the  $MP_L$  for all values of  $L$ . As a result, the labor demand curves shifts out and the new equilibrium entails a higher wage and higher level of employment. Given the assumption that the wage always adjusts instantaneously to clear the market, there is no unemployment before or after the change, although the size of the labor force has increased as a result of the increase in productivity.
3. An increase in immigration will shift out the labor supply curve assuming all the new immigrants wish to work at some wage rate. Nothing happens to the labor demand curve. (NOTE: alternatively, one could assume that the increase in immigration will increase demand for goods produced in the US and will increase the price of final output, thereby shifting out the labor demand curve; i am ignoring this possibility, however.) As a result, the new equilibrium wage is lower and employment is higher, although the increase in employment is smaller than the amount of immigrants who enter the country since the lower wage encourages some "natives" to exit the labor force since they value their leisure at a higher amount. As in (2), there is no unemployment either before or after the change.

4. The claim is not true. The two taxes are equivalent and will yield identical effects. Thus, well informed voters should realize this and be indifferent between the two politicians regardless of whether they are firm owners or workers. Graphically, both subsidies result in a decrease in the wage from  $w^*$  to  $w^{*'}.$
  
5. The subsidy shifts out the labor demand curve. Thus, the new equilibrium involves a higher wage, greater employment, and a larger labor force (absent unemployment, the labor force is just given by the number of employed). The new equilibrium wage is greater than the original wage, but less than the original wage plus the subsidy ( $w^{*' < w^* + s$ ). This is because the higher wage induces some individuals who were previously out of the labor force to now work. The additional works pushes the equilibrium wage down a bit below  $w^* + s$ .
  
6. The claim is false. Since the firm with the more complicated computer system invests more training in each worker, they have a greater incentive to reduce employee turnover (thereby reducing the training costs of new workers). To reduce turnover, the model of efficiency wages predicts that the firm with the complicated computer system should pay higher wages. In terms of the model, the firm with higher training costs has a higher value of  $\tau$ . Thus, the optimal wage paid by the firm is higher.
  
7. Given that the wage rate paid to the clean job is \$16, the utility for someone who works in the clean job is 4 ( $u = \sqrt{16} - 2(0) = 4$ ). Therefore to encourage others to work in the dirty sector, they must be given the same utility. The only thing left to do is figure out their wage rate ( $4 = \sqrt{w_1} - 2(1) \Rightarrow w_1 = 36$ ) and the compensating differential ( $w_1 - w_0 = 36 - 16 = 20$ ).
  
8. The utility levels are as follows:  $u_A = 3 + 25 = 28$ ,  $u_B = 12 + 16 = 28$ ,  $u_C = 23 + 9 = 32$ , and  $u_D = 25 + 4 = 29$ . Therefore the individual will choose job C. If the government regulates all jobs to be A, then to give the individual the same utility the wage necessary is 7 ( $32 = w + 25$ ).