

4616- Labor Economics- Midterm Exam #2 Solutions

A: 90-100 11%

B: 74-89 42%

C: 56-73 39%

D: <56 8%

If you would like me to re-consider some aspect of your grade, submit a written request no later than Tues, April 18

1) Assume that all workers have the same utility function, which is given by

$$U = \sqrt{w} - 2x$$

where w is the wage for a given job and x is the fraction of the firm's "air" that is composed of toxic pollutants. Now suppose that there are only two types of jobs in the economy, clean jobs ($x=0$) and dirty jobs ($x=1$). If the clean job pays \$16 per hour, what will be the market compensating differential for taking the dirty job?

We know that the compensating wage differential must equalize the utility of a clean job with the utility of a dirty job. Therefore:

$$\begin{aligned}\sqrt{16} - 2(0) &= \sqrt{16+x} - 2(1) \\ \Rightarrow 4 &= \sqrt{16+x} - 2 \Rightarrow \sqrt{16+x} = 6 \Rightarrow 16+x = 36 \Rightarrow x = 20\end{aligned}$$

2) Suppose Linda is trying to decide whether or not to go to law school after college. If she does not go to law school, she will earn \$40,000 a year for the next 40 years. It will take her three years to earn a law degree and the tuition will cost \$40,000 each year. After finishing law school, she will earn \$80,000 a year for 37 years. Suppose Linda's discount rate is 10%. Should Linda go to law? Show why or why not.

$$\text{Hint: } \sum_{t=j}^k \frac{A}{(1+r)^t} = \frac{A}{r} \left[\frac{1}{(1+r)^{j-1}} - \frac{1}{(1+r)^k} \right]$$

$$\begin{aligned}\text{PV(noLaw)} &= 40,000 + 40,000/(1.1) + 40,000/(1.1)^2 + \dots + 40,000/(1.1)^{39} \\ &= (40,000/0.1)[(1.1) - 1/(1.1)^{39}] = \$430,278\end{aligned}$$

$$\text{PV(MBA)} = -40,000 - 40,000/(1.1) - 40,000/(1.1)^2 + 80,000/(1.1)^3 + \dots + 80,000/(1.1)^{39}$$

$$\begin{aligned}\text{PV(MBA)} &= (40,000/0.1)[(1.1) - 1/(1.1)^2] + (80,000/0.1)[1/(1.1)^2 - 1/(1.1)^{39}] = \\ &= -109,421 + 641,713 = \$532,292\end{aligned}$$

So Linda should go to law school.

3) In the aftermath of Hurricane Katrina, about 150,000 evacuees were received by Houston, Texas, a city of just under 2 million people. FEMA has struggled to determine what is the appropriate assistance to offer to the evacuees. Consider two alternative policies. In the first, FEMA provides funding to Houston to build subsidized housing and provide housing vouchers (vouchers that can be redeemed for housing in the Houston rental market). In the second, FEMA provides cash payments directly to the evacuees that they can use to live in Houston or to move to another location of their choice. Compare the two policies in terms of their effects on:

- a) Migration decisions of Katrina evacuees and Pre-Katrina Houston residents
- b) Wages in Houston.
- c) Wages of Katrina evacuees.

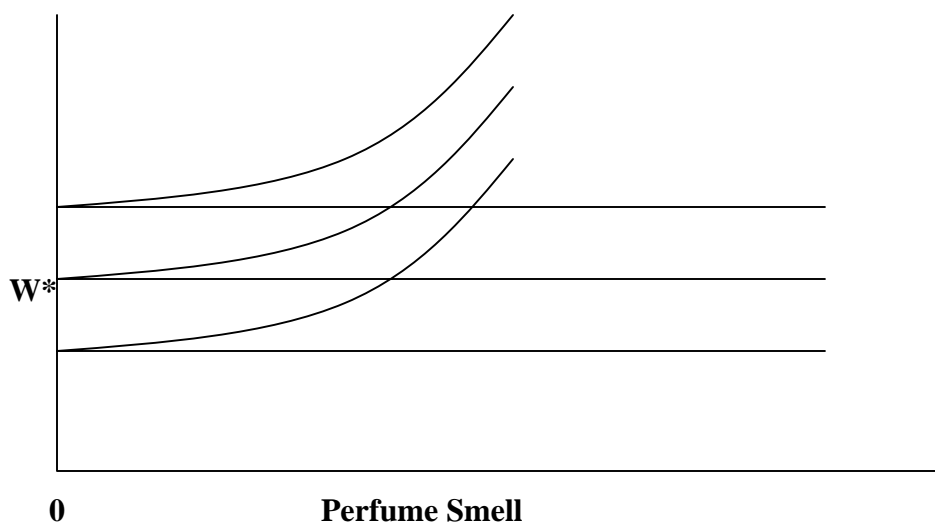
The policy to provide housing in Houston will keep more evacuees in Houston. The increased supply of labor in Houston will drive down Houston wages. This supply shift will be offset somewhat by Pre-Katrina residents migrating away from Houston in response to the low wages—the extent of the offset will depend on the migration response of the Pre-Katrina residents (which, in turn, depends on their migration costs).

The policy to provide funds for relocation reduces the migration costs for Katrina evacuees in Houston. Many Evacuees will use these funds to locate elsewhere, so the downward pressure on Houston wages should be less severe and generate less exit of Pre-Katrina residents.

The effect of the first policy will be to trap evacuees in a city with wages depressed by the sudden population increase. The effect of the second policy will be to reduce migration costs so that evacuees can relocate to their optimal location—their wages should be higher under the second policy.

4) Suppose that workers in perfume factories dislike the smell of perfume. Further suppose that there is no cost for firms to reduce or eliminate the smell of perfume in their factories. Finally, assume that perfume factory workers can obtain jobs in other industries for alternative wage, w^* .

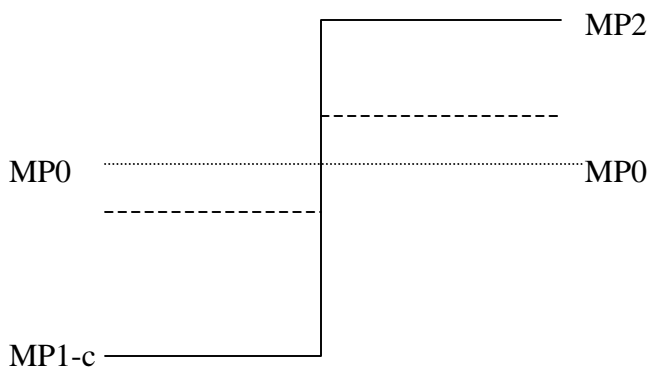
a) Draw the relevant isoprofit curves for firms that manufacture perfume.



b) Add indifference curves to the graph and indicate on the graph the wage paid to perfume factory workers and the level of perfume smell in perfume factories. (You can either add to the graph in part A or make a new graph below). *Explain your results.*

The isoprofit curves are horizontal because it is costless to reduce/eliminate the perfume smell. Because the workers do not like perfume smell and because it is costless to eliminate, the firms will fully eliminate the smell and will pay w^* , the alternative wage available to the workers. They will not have perfume smell and pay more than w^* to compensate the workers for their disutility when it is costless to eliminate.

5) We expect to see
 Circle one: Higher or Lower
 turnover in jobs that provide substantial firm-specific training compared to jobs that provide substantial general-skills training.



Consider the case of a worker receiving general training and (as discussed in class) the predicted wage path indicated by the solid line. Further consider the case of a worker receiving specific training and (as discussed in class) the predicted wage path indicated by the fully horizontal dotted line. In theory, we should not see turnover in either case. In both cases, the worker is making the same as their outside alternative (MP2 in the case of the general-trained worker and MP0 in the case of the specific trained worker), so there is no reason for them to go.

In real life, however, there are circumstances that might cause turnover. The bus routes might change so that it is difficult for the worker to get to that particular location. The demand for the firm's product might decrease due to some unexpected demand shock, causing them to reduce employment. For these examples, there is no difference between the general-trained and specific trained workers in their cost of leaving the firm. They are both being paid exactly their outside alternative, so neither loses anything by leaving. The fact that the specific skills are not portable compared to the general skills does not matter in this case, because in both cases they are being paid exactly their alternative wage.

The firm providing general training likewise experiences no costs from turnover, because the worker pays the cost of training. The firm providing specific training, however, does experience costs from turnover, because they pay the cost of training, and earn that investment back when they pay the worker less than their productivity in the 2nd period. The firms providing specific training will therefore be more likely to respond to these unexpected events in ways to reduce turnover of those already trained. They might provide reimbursement for transportation costs, and might delay layoffs.

If, instead, the wage path for the worker with specific training follows the dashed line (worker shares part of cost to reduce layoffs in 2nd period; firm pays above market in 2nd period to protect their investment), then the specific-trained worker is also not indifferent to leaving because they are being paid above their alternative wage. Unlike the general-trained worker, their wage will decrease if they move.

6) Consider a case in which a tech sector boom increases wages in Denver relative to the rest of Colorado and most of the surrounding states. We learned in class that migration into Denver should occur until wages equalize. Our simple model, however, did not take into account the price of housing. What should happen to the price of housing in Denver? How does this change our predictions regarding migration? What important feature of the housing market will determine the extent to which our predictions are changed?

In-migration will increase the cost of housing in the Denver area. Therefore in-migration will be less than that predicted without considering housing costs and wages will not converge (without taking into account differences in purchasing power). The extent to which in-migration is less than predicted will depend on the elasticity of supply of housing. If supply is very elastic, then there will be a large supply response and housing prices will barely rise. In this case, the level of migration will not be much less than predicted by a model without housing prices.