

# Homework 3

ECON 380  
UNC Chapel Hill

Name: \_\_\_\_\_

ONYEN: \_\_\_\_\_

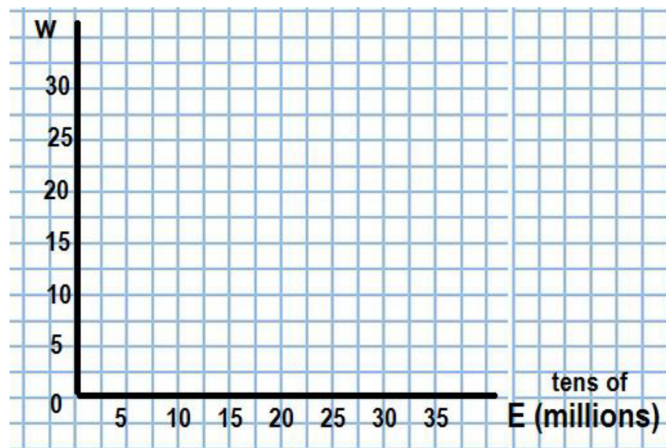
This homework is due on **February 22** by **12:05PM**. You must turn in your work on a printed copy of this document in order for it to be graded. Your assignment must be stapled and in the correct order. Non-stapled assignments will automatically receive a 10 point deduction. There are a total of 50 available points.

## Labor Market Equilibrium

1. Suppose demand for low-skilled workers in the United States is given by  $E_D = 300 - 10w$  and supply of low skilled workers is given by  $E_S = 30w - 300$ , where  $E$  represents the number of workers (in millions) and  $w$  is the daily wage rate.

(a) Solve for the equilibrium wage rate and employment level of low-skilled workers. [2 pts]

(b) Plot the labor demand and labor supply functions on the graph below, labeling each as  $E_D$  and  $E_S$ , respectively. [2 pts]



- (c) On your plot above, label (i) worker surplus and (ii) firm (producer) surplus. Compute their values here. [4 pts]
- (d) What is total surplus in the US market for low-skilled labor? [2 pts]
- (e) If the government imposes a \$20 minimum wage in this market, what will be the change in worker, firm, and total surplus as a result? Note: Assume that the workers with the lowest reservation wages are those that end up employed. This ensures we are calculating the maximum potential surplus as a result of this law. [3 pts]

### Immigration Impacts

1. Suppose that after an influx of immigrants, labor supply in the market for low-skilled workers is now given by  $E_S = 30w - 180$ . Labor demand is still  $E_D = 300 - 10w$ . The government decided against imposing a minimum wage and the market wage is freely determined by labor supply and demand.
  - (a) Are the immigrants perfect substitutes or complements for native low-skill labor? [2 pts]
  - (b) Plot the new labor supply curve on your plot above, labeling it  $E_S^1$ . [2 pts]
  - (c) What is the equilibrium wage rate and employment level in the market for low-skilled labor after the influx of immigrants? [2 pts]
  - (d) How many native workers are employed now? [2 pts]
  - (e) What is the change in total surplus as a result of this immigration wave? [2 pts]

## Non-Competitive Labor Markets

1. Wrigley is a company town, and the only purchaser of labor in the region is the Wrigley Gum Company (WGC), who produce chewing gum to sell in the market for wholesale gum. WGC employs only labor, and labor is their only expenditure. Because they are a monopsony, they may either choose to pay low wages and hire just a few workers, or pay higher wages to induce more workers to produce gum. Note that the market for wholesale gum is competitive, so WGC must accept the market price of \$35 for each box of gum they produce. Table 1 shows the number of labor hours WGC can hire at different wages and how much output is produced by those labor hours.

Table 1: WGC Costs and Production

Wage	Labor Hours	Total Cost	Marginal Cost	Output	Total Revenue	Marginal Revenue
\$10	5		—	100		—
\$12	6			101		
\$14	7			102		
\$16	8			103		
\$18	9			104		
\$20	10			105		
\$22	11			106		
\$24	12			107		
\$26	13			108		

- (a) Fill in the blank columns in Table 1. **[4 pts]**
- (b) Assuming WGC is a profit maximizing firm, how many hours of labor should they hire? **[2 pts]**
- (c) What is the profit earned by WGC if they employ the profit-maximizing number of labor hours? **[2 pts]**
- (d) Compare the wage rate to the value of the marginal product of labor. Which is greater (or are they equivalent)? **[2 pts]**
- (e) Now, suppose that the town of Wrigley imposes a minimum wage of \$22. In Table 2 below, fill in WGC's total cost, marginal cost, and profit. Assume prices and revenues are the same as before. **[3 pts]**

Table 2: WGC Costs and Production

Wage	Labor Hours	Total Cost	Marginal Cost	Profit
\$22	5		—	
\$22	6			
\$22	7			
\$22	8			
\$22	9			
\$22	10			
\$22	11			
\$24	12			
\$26	13			

- (f) What happens to the quantity of labor employed after the minimum wage is imposed? [2 pts]  
How does this compare to the effect of a binding minimum wage in a competitive market?
- (g) What happens to worker surplus as a result of the minimum wage? Explain why. You [2 pts]  
don't have to calculate the change in worker surplus here, just explain why it changes in  
the direction it does.
- (h) What happens to total surplus as a result of the minimum wage (relative to the total surplus [2 pts]  
without the minimum wage)? Explain why. You don't have to calculate the change in total  
surplus here, just explain why it changes in the direction it does.

## LMDCs

Directions: Type your answers to the following questions and attach them to the back of this packet.

1. Read the introduction of Jayachandran (2006). In 3-5 sentences, briefly summarize the paper's [4 pts]  
results in regards to how the wage responded differently to productivity shocks depending on  
the availability of "smoothing mechanisms."
2. Read the introduction to Jensen (2012). In 3-5 sentences, briefly summarize the paper's results [4 pts]  
in regards to how increased labor market opportunities affected young women's labor market  
participation as well as other outcomes beyond the labor market.