Econ 371 Marietta College
Problem Set 2 Fall 2009

**Labor Demand**

1. Explain how marginal revenue product is derived. Why is the MRP curve the firm's short-run labor demand curve? Explain how and why the labor demand curves of a perfectly competitive seller (a price taker) and an imperfectly competitive seller differ.

2. Referring to the output and substitution effects, explain why an increase in the wage rate for autoworkers will generate more of a negative employment response in the long run than in the short run. Assume there is no productivity increase and no change in the price of nonlabor resources.

3. Suppose that the elasticity of demand for unskilled workers is E = - 1.33. If the wage rate paid to unskilled workers rises by 15%, what will happen to the employment level of unskilled workers? What would you predict will happen to the total wage bill earned by unskilled workers after the wage increase?

4. The table below describes the key elements in deriving a labor demand curve for a bakery. Complete the table and answer the following questions.

| Number of Workers | Number of Loaves Baked per hour | MP of Labor | Price per loaf | P x MP | Nominal Wage Rate (W) | Real Wage Rate (W/P) |
|---|---|---|---|---|---|---|
| 0 | 0 | -- | $1 | -- | $8 | $8 |
| 1 | 20 | 20 | $1 | $20 | $8 | $8 |
| 2 | 36 | | $1 | | | |
| 3 | 48 | | $1 | | | |
| 4 | 56 | | $1 | | | |
| 5 | 60 | | $1 | | | |
| 6 | 62 | | $1 | | | |

a) At what employment level does the firm encounter diminishing marginal returns?
b) Draw a graph of the (PxMP) column. Plot the number of workers on the horizontal axis and dollars on the vertical axis. What does this curve represent?
c) How many workers will the bakery hire if the nominal wage rate is $8?
d) Suppose the price of bread increased to $2 per loaf. How many workers will the bakery hire if the nominal wage rate is $8? How many workers will the bakery hire if the nominal wage rate is $16?

5. What, if any, is the difference between the MRP and the VMP?

6. What effect will each of the following have on the market labor demand for a specific type of labor?
a) An increase in product demand of this type of labor.
b) A decline in the productivity of this type of labor.
c) An increase in the price of a gross complement for labor.
d) A decline in the price of a gross substitute for labor.
e) The demise of several firms that hire this labor.
f) A decline in the market wage for this labor.

7. Use the table below to answer the following questions. Assume that the labor market is perfectly competitive.

| Labor | Output | Price (D1) | Price (D2) |
|---|---|---|---|
| 0 | 0 | $10.00 | $10.00 |
| 1 | 15 | $10.00 | $9.50 |
| 2 | 29 | $10.00 | $9.00 |
| 3 | 42 | $10.00 | $8.50 |
| 4 | 54 | $10.00 | $7.50 |
| 5 | 65 | $10.00 | $6.50 |
| 6 | 75 | $10.00 | $5.50 |

a) Suppose product demand is given by D1. If the wage rate is $100, the firm will maximize profits by hiring ____ workers.
b) Suppose product demand is given by D1. If the wage rate rises from $100 to $130, the firm will reduce the quantity of labor employed by ____ units.
c) Suppose product demand is given by D2. If the wage rate is $100, the firm will maximize profits by hiring ____ workers.
d) Suppose product demand is given by D1. If the wage rate rises from $100 to $130, the firm will reduce the quantity of labor employed by ____ units.

**Market Equilibrium**

8. What would happen to the wages and employment levels of engineers if government expenditures on research and development programs were to fall? Show graphically.

9. In the early 1970's two things happened roughly simultaneously: crude oil prices rose substantially and more information became available about the long-term health effects of working in underground coal mines. What effect would these events have on the equilibrium wage and employment of coal miners? Show graphically.

10. Suppose a particular labor market were in equilibrium. What could happen to cause the equilibrium wage to fall? If all nominal wages rose each year, how would this market adjust?

11. Using economic analysis, what is meant by being "over-paid" or "under-paid"? What type of signals may indicate whether and occupation was under- or over-paid?

12. Consider the market for goat herders. What would we expect to happen to wages and employment if the following events occurred: the demand for goat milk and wool declines, while the wages in occupations closely related to goat herding increase.
a) Show graphically.
b) Suppose you discovered that the wages of goat herders rose from $5 to $6 and employment fell from 30,000 to 28,000. Is this consistent with your conclusions? Why or why not?

13. What impact do you think the emergence of the internet has had on the competitiveness of the labor market? Think about how the presence of the internet has affected the realism of the assumptions necessary for the labor market to operate in a perfectly competitive environment.

14. Suppose the supply of physicists is given by $w = 10 + 5L$, while the demand curve is given by $w = 50 - 3L$. Calculate the equilibrium wage and employment levels. Suppose now that the demand for physicists increases and the new demand curve is given by $w = 70 - 3L$. Assume that this market is subject to cobwebs. Calculate the wage and employment levels in each "round" as the wage and employment levels slowly adjust to the demand shock. What is the new equilibrium level of wages and employment?

15. The data below pertain to Durtee Coal Co., a monopsonist in a small West Virginia town:

| Wage | Labor | TC | MWC | Total Output | Output Price | MP | MRP |
|---|---|---|---|---|---|---|---|
| 4 | 30 | | | 400 | 2 | | |
| 5 | 35 | | | 460 | 2 | | |
| 6 | 40 | | | 510 | 2 | | |
| 7 | 45 | | | 550 | 2 | | |
| 8 | 50 | | | 580 | 2 | | |
| 9 | 55 | | | 600 | 2 | | |
| 10 | 60 | | | 610 | 2 | | |

a) Complete the table by computing TC (= W*L) and MWC ($=\Delta TC/\Delta L$).
b) Determine the level of employment which will maximize this firm's profit.
c) What wage will the firm pay to attract this quantity of labor?
d) Describe the hiring decision of a perfectly discriminating monopsonist. In what sense do monopsonists "exploit" workers?

**Alternative Pay Schemes**

16. Cite four methods by which firms may structure their pay systems to improve worker productivity. For each of these methods, cite its potential drawbacks.

17. Define the term "economic efficiency" as it relates to labor markets. Under what conditions will it be achieved? How must this definition be altered to account for differences in pay schemes across different industries and firms?

18. Salaried employees.
a) Using a labor-leisure diagram from Chapter 2, illustrate the work/leisure choice facing a *salaried* employee.
b) Using indifference curves, illustrate on the graph the utility-maximizing choice of hours worked (assuming no monitoring).
c) How do you reconcile your answer to part (b) with the observation that, on average, salaried employees work longer hours than hourly employees?

19. Explain the "principal-agent problem" as it arises in the labor market. Describe two methods by which the firm may structure pay so as to reduce or eliminate this problem, citing the strengths and weaknesses of each.

20. You are the employer in a large firm. You offer workers an hourly wage determined according to:
Wage = $5 + 0.10Y where Y = years with the firm.

All workers enter the firm at age 25; every hour each worker produces output valued at $7. Can your firm survive without inducing workers to retire at some age? If yes, explain why; if no, at what age would you want them to retire and why? Would this payment scheme induce efficient behavior from the worker over the course of his employment? Why or why not?

21. What is an efficiency wage? What is the implication of the efficiency wage theory for unemployment?

22. Speculate on what actions workers might take to resolve a free-rider problem arising from a profit-sharing plan.

23. People often sell goods (or raffle tickets) as part of fund-raising projects. These projects typically offer valuable prizes to those who sell over a fixed number of units. Often a grand prize, like a trip to Hawaii, is offered to the person who sells the most units. Why are these prizes offered? Relate this example to the high pay received by chief executive officers of large corporations.