

**Answers to Midterm
October 23, 2008**

Directions: You have 75 minutes to complete the exam. Please write your answers on a separate sheet of paper. Be sure to clearly number your answers so I can figure out exactly what question you are answering. **Also, be sure to write your name on each separate sheet of paper.**

Section I—Multiple Choice (15 points—each question worth 5 points).

1. If a firm offers firm-specific training to its workers, when the training is over,
 - a. workers will most likely be paid a wage that is equal to their marginal product.
 - b. workers will most likely be paid a wage that is greater than their marginal product, to compensate for the training.
 - c. workers will most likely be paid a wage that is less than their marginal product.
 - d. workers will most likely be paid a wage that is less than their wage before training.

Answer: c

2. If a single small firm's demand for secretaries increases, then
 - a. its wage rate will increase and its employment level will remain the same.
 - b. its wage rate will increase and its employment level will increase.
 - c. its wage rate will remain the same and its employment level will increase.
 - d. both its wage rate and its employment level will remain the same.

Answer: c

3. If labor is a small percentage of the total costs of an industry, this will tend to make the own wage elasticity of labor demand
 - a. high.
 - b. low.
 - c. positive.
 - d. zero.

Answer: b

Section II—Short Answers.

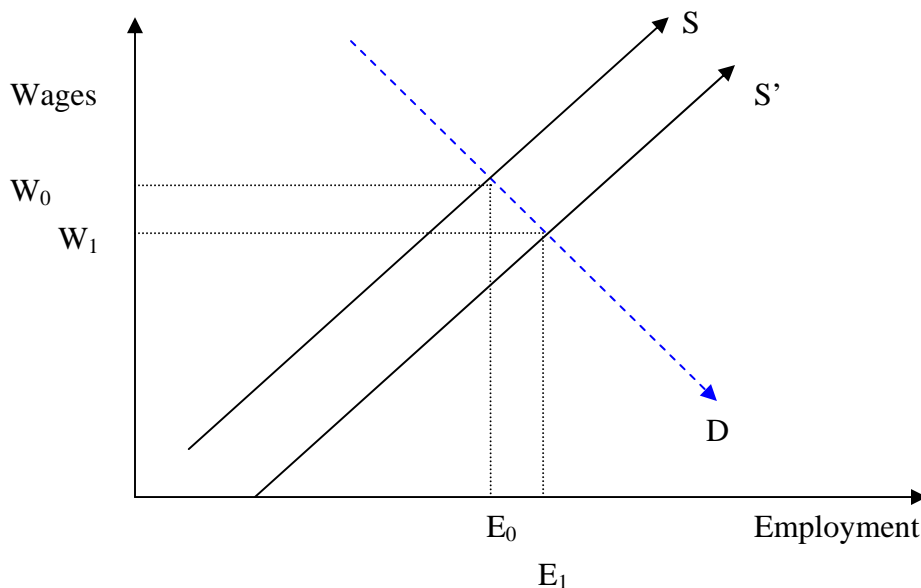
4. (10 points) Anti-sweatshop activists want to raise wages and improve working conditions in factories, primarily in third-world countries. Assume that the

economy is global and that the activists are successful in raising wages for factory workers in third-world countries. How will these changes abroad affect labor market outcomes (wages and employment) for workers in the apparel and retailing industries in the United States? Explain

Answer: If increased labor costs abroad are not accompanied by increases in the productivity of workers in third-world countries, then firms will have an incentive to substitute for these foreign workers with capital or workers elsewhere, including workers in the United States. However, the increase in wages of foreign workers will increase the costs of manufacturing apparel which would lead to an increase in the price of apparel and be expected to reduce sales and the scale of output, which will put downward pressure on employment in the American apparel and retailing industries. In other words, the substitution and scale effects work in opposite direction. The ultimate effect on American workers in these industries cannot be predicted by theory alone.

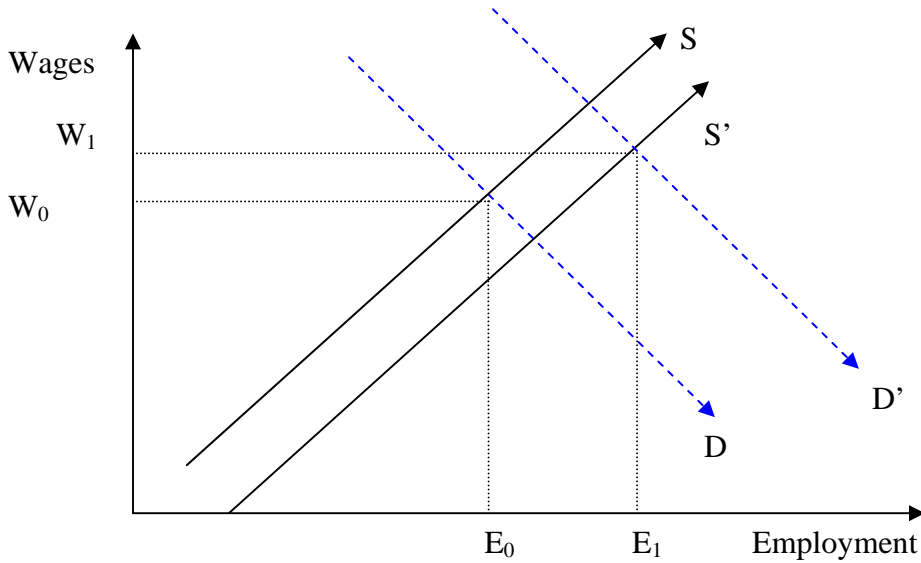
5. Kentucky wants to double the number of college graduates in the state. Consider two scenarios that could occur if the number of college graduates doubled.
 - a. (5 points) Suppose wages of college graduates decline. Explain how this could occur using a graph of labor supply and labor demand.

Answer: Suppose labor demand did not change. Labor supply of college graduates shifts out (from S to S'). Then the graph below illustrates how wages decline after the supply of college graduates shifts out.



- b. (5 points) Suppose wages of college graduates increase. Explain how this could occur using a graph of labor supply and labor demand.

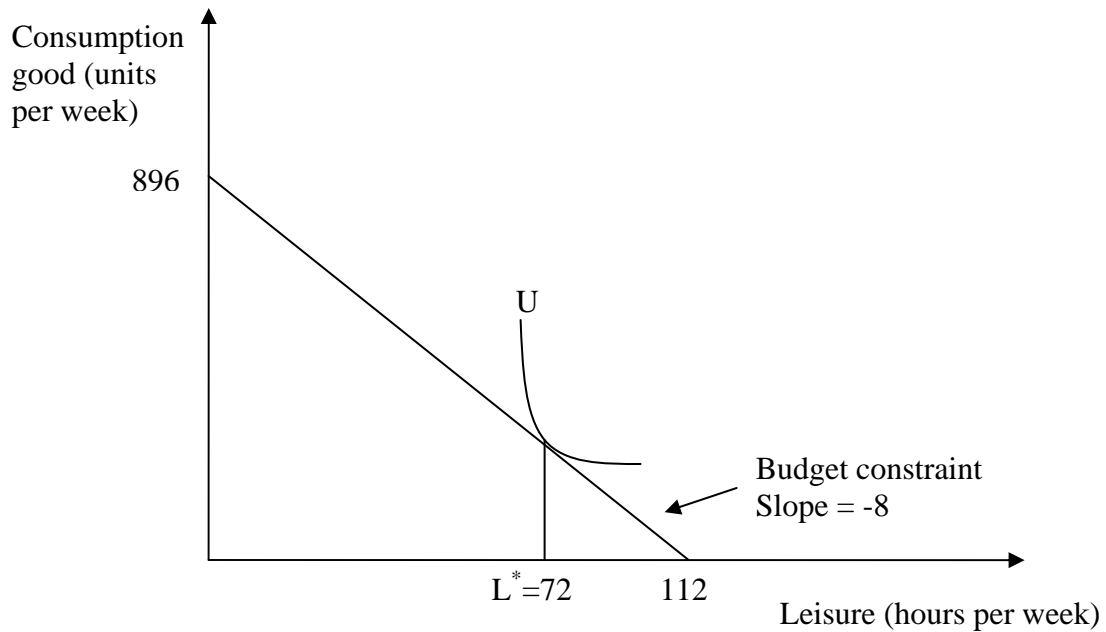
Answer: Suppose that demand for college graduates also shifted out (D to D'). In the graph below, wages rose from W_0 to W_1 . In other words, the number of college graduates increased, but the end result is a higher equilibrium wage.



Section III—Long Answers

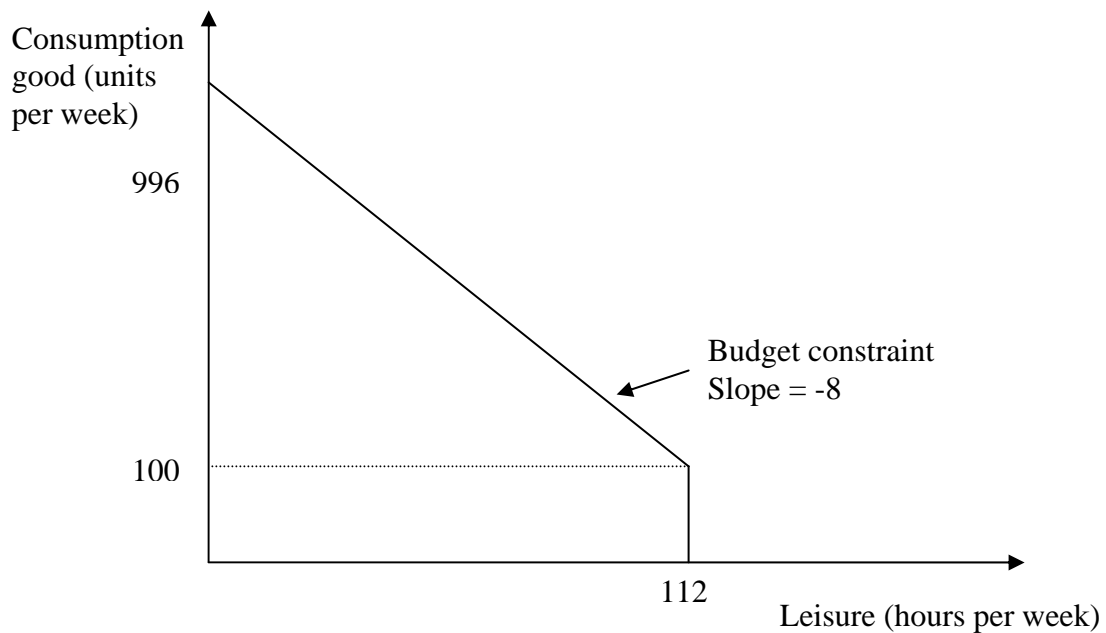
6. Aldo is a college student working part-time at a gas station. He makes \$8 an hour.
 - a. (5 points) Assume Aldo has no non-labor income and that he could work 112 hours a week if he consumed 0 hours of leisure. Graph his weekly budget constraint and show graphically the utility maximizing outcome if Aldo chooses to work 40 hours a week. What is Aldo's marginal rate of substitution at the optimal number of hours?

Answer: Aldo's marginal rate of substitution at the optimal number of hours is the wage, \$8 an hour.



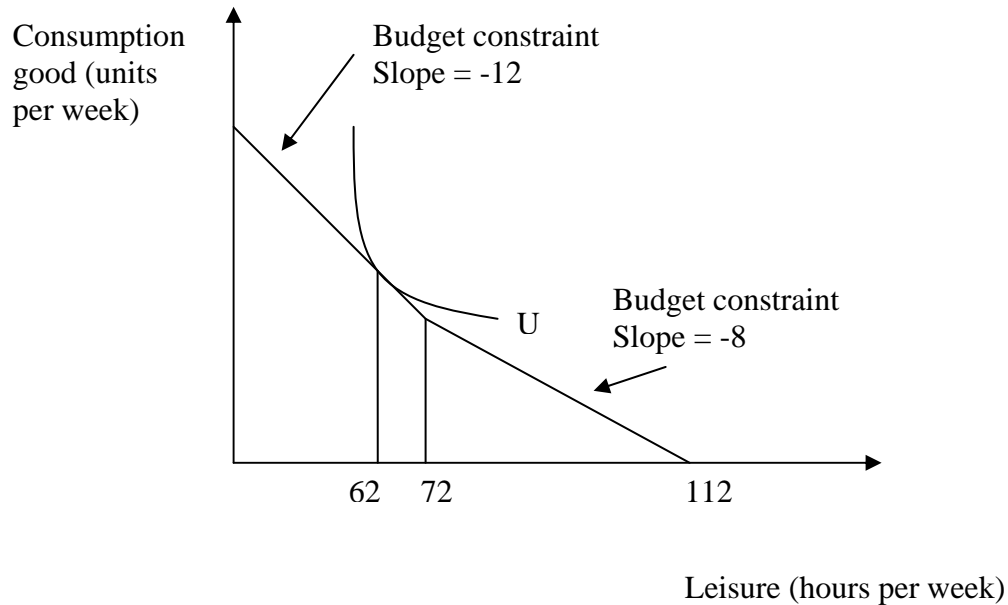
- b. (5 points) Suppose Aldo's parents decide to send him \$100 a week. Graph Aldo's new budget constraint. If leisure is a normal good, what is the predicted effect (on hours worked) of this non-labor income?

Answer: *If leisure is a normal good, then the increased income should result in an increase in consumption of leisure – and therefore a reduction in the number of hours worked.*



- c. (5 points) Suppose Aldo receives overtime pay of \$12 an hour for each hour worked beyond 40. His parents find out about the overtime and stop sending him \$100 a week. Now Aldo decides that his optimal work week is 50 hours a week. Illustrate graphically the new equilibrium.

Answer:

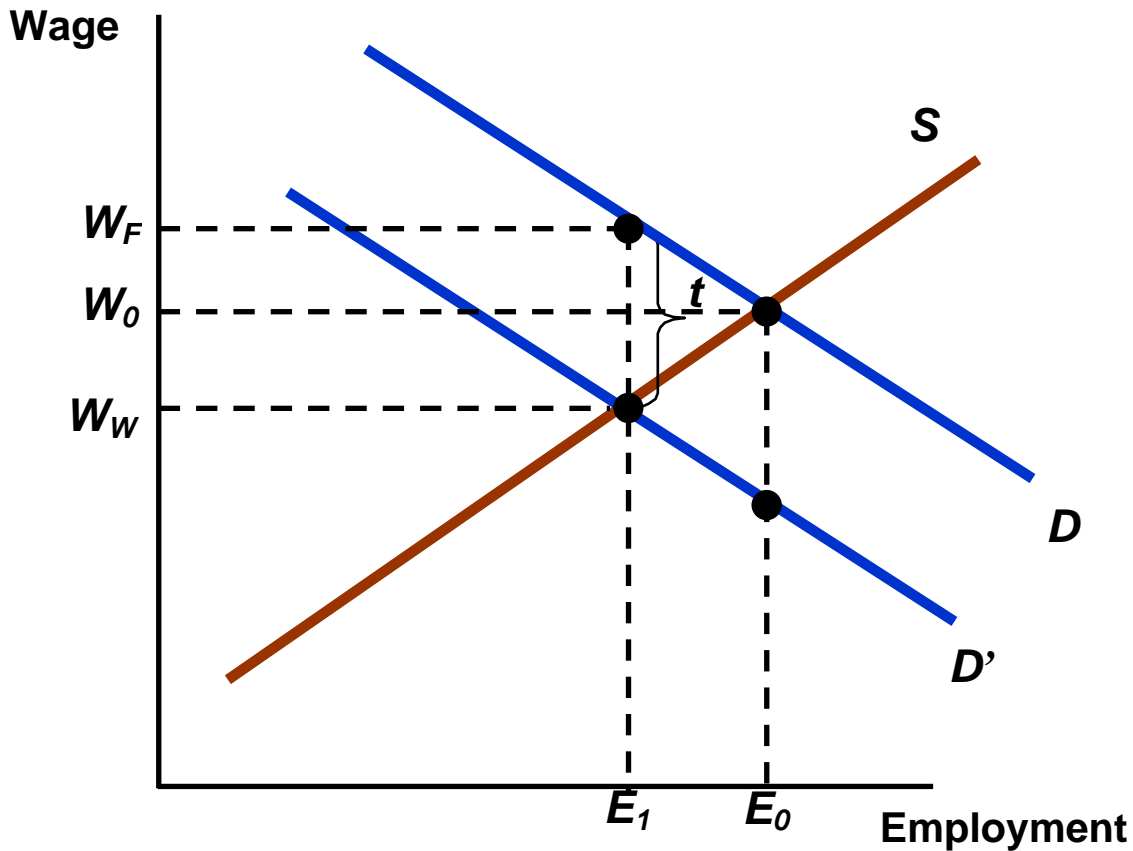


- d. (5 points) Is Aldo's utility in part (c) lower or higher than the utility he was receiving in part (a)? Why?

Answer: Aldo could have chosen the same utility he was receiving in part (a), but he chose (c) instead. Therefore, the utility received in part (c) must be higher than the utility he was receiving in part (a).

7. The Earned Income Tax Credit (EITC) is a more effective, but more costly, measure to fight poverty than the minimum wage. Suppose the government tries to raise money for the EITC by taxing high-skill workers through the use of a payroll tax on high-skill workers.
- a. (10 points) Show graphically the effect of the tax in the short run for a perfectly competitive high-skill labor market with moderate elasticity of supply and demand. Will high-skill workers or their employers pay the tax? What are the short-run wage and employment effects (consider both the wage paid by the firm and the wage received by the worker and assume that the EITC provides no benefits to high-skilled workers)?

Answer: As the graph below illustrates, in the short run the labor demand curve shifts “down” by the amount of the tax. Because we assumed a moderate slope (elasticity) for both supply and demand, both the worker and the firm pay the tax. Note the graph shows the employment decreases from E_0 to E_1 . The wage paid by the firm increases (from W_0 to W_F), but the wage received by the worker decreases (from W_0 to W_W).



- b. (5 points) Suppose that low-skill workers are gross substitutes for high-skill workers. What is the long-run employment effect of the tax on low-skill workers (ignoring the benefits of the EITC)?

Answer: Because low-skill workers are gross substitutes for high-skill workers, the cross elasticity is positive. The firm views the wage tax as an increase in the wage. Therefore, the employment change for low-skill workers is also positive.

8. (15 points) Suppose there is an exogenous increase in the supply of capital to the auto industry. How will this affect the demand for labor in the industry? Give three examples of industry characteristics that would influence the size of the change in labor demand (influence the elasticity of labor demand) and explain how the characteristics would affect the size of the change.

Answer: According to the Hicks-Marshall four laws of demand three factors that will affect the change in the demand for labor due to an exogenous change in the supply of a factor, and thus a fall in the price for that factor, are: the price elasticity of output; the ease of substitution between K and L; and the supply elasticity of L.

The fall in the price of capital will lead to a fall in the price of the output and this in turn will lead to a rise in the demand for the product. If the output is relatively price elastic then this fall in price will lead to a large increase in the demand for the product and thus will help to offset the fall in the demand for labor due to the fall in the price of capital. In fact, if the demand for the product is extremely price elastic the fall in r may even lead to a rise in the demand for L.

If it is relatively easy to substitute between capital and labor then the firm will be able to substitute away from labor and towards capital. Take an extreme example, if K and L are perfect substitutes and before the firm was indifferent between using K or L, now the firm will use only K and substitute completely away from L.

The fall in the price of K will lead the firm to substitute away from L towards K. If the supply of L is relatively inelastic then as all firms in the markets use less L there will be a large drop in the price of L. This will serve to lessen the firm's desire to substitute away from L towards K, so the more inelastic is the supply of L the less the firm will want to substitute away from L.

9. (15 points) The State of Iowa has a program for subsidized training of disadvantaged workers by its community colleges. Employers who are adding at least 12 jobs can arrange for a community college to provide a customized program (tailored to the individual firm), in which the college places ads for new hires and screens the applicants. Firms then choose whom they want trained from the list supplied by the college, and the college provides the training (using equipment supplied by the firm). Finally, the firm selects employees from among those who successfully complete the training. Trainees are not paid during the training period. Compare the likely effects on wages, employment, and hours worked under the program with those that would occur in the absence of a program.

Answer: This program reduces the hiring and training investments required by firms, thus increasing both employment and wages. Firms have fewer fixed costs to recoup. The program could reduce the hours each employee works per week, however, because the reduction in training costs creates incentives to substitute workers for hours per worker.