

Name (please print) \_\_\_\_\_

**ECO361: LABOR ECONOMICS**  
**FIRST MIDTERM EXAMINATION**  
**OCTOBER 1, 2009**

Prof. Bill Even

**DIRECTIONS.**

The exam contains a mix of short answer and essay questions. Your answers to the 22 short answer portion of the exam (3 points each) should be listed on the answer sheet attached to the end of the exam. No credit will be given for answers placed elsewhere. Your answers to the essays (54 points total) should be provided in the blue book provided.

You have until 2:00 to complete the exam. **If you wish to purchase additional time, you may do so at a price of 5 percentage points per minute.** When you complete the exam, place your exam and answer sheet inside of the bluebook.

**Table A. Major indicators of labor market activity, seasonally adjusted**  
(Numbers in thousands)

Category	Quarterly averages		Monthly data			July-Aug. change
	I 2009	II 2009	June 2009	July 2009	Aug. 2009	
<b>HOUSEHOLD DATA</b>	<b>Labor force status</b>					
Civilian labor force .....	153,993	154,912	154,926	154,504	154,577	73
Employment .....	141,578	140,591	140,196	140,041	139,649	-392
Unemployment .....	12,415	14,321	14,729	14,462	14,928	466
Not in labor force .....	80,920	80,547	80,729	81,366	81,509	143

Answer the next 3 questions using the information in the table above.

1. What is the unemployment rate in August 2009? (Give your answer as a percentage with 2 decimal points of accuracy – e.g. 10.22%).
2. What is the labor force participation rate in August 2009? (Give your answer as a percentage with 2 decimal points of accuracy – e.g. 10.22%).
3. What is the employment-population ratio in August 2009? (Give your answer as a percentage with 2 decimal points of accuracy – e.g. 10.22%).
4. A recent Wall Street Journal suggests that a substantial number of elderly workers that were laid off during the most recent recession have filed for Social Security disability. If these workers become eligible for disability benefits and quit searching for work, this would cause the unemployment rate to \_\_\_\_\_ and the employment population ratio to \_\_\_\_\_.
  - a. Rise; fall
  - b. Fall; rise
  - c. Not change; not change.
  - d. Fall; not change
  - e. None of the above.

**Table 1. Median usual weekly earnings of full-time wage and salary workers by selected characteristics, quarterly averages, not seasonally adjusted**

Characteristic	Number of workers (in thousands)		Median weekly earnings			
	II 2008	II 2009	In current dollars		In constant (1982) dollars	
			II 2008	II 2009	II 2008	II 2009
<b>SEX AND AGE</b>						
Total, 16 years and over .....	107,119	100,130	\$719	\$734	\$320	\$330
Men, 16 years and over .....	59,759	55,419	800	815	356	367
16 to 24 years .....	6,169	5,128	469	450	209	203
25 years and over .....	53,589	50,290	862	872	384	393
Women, 16 years and over .....	47,360	44,711	634	652	282	294
16 to 24 years .....	4,692	3,911	415	413	185	186
25 years and over .....	42,668	40,801	668	679	297	306

To answer the next 3 questions, refer to the table above. Note that the CPI is used to adjust for price changes and that earnings in “current dollars” are nominal earnings.

5. Based on the information provided, the CPI in 2009 is \_\_\_\_\_ (give your answer to one decimal – e.g. 103.2).
6. Based on the information provided, what was the inflation rate (i.e. percentage change in CPI) between 2008 and 2009? (give your answer to one decimal – e.g. 1.2%).
7. A nominal wage of \$10 per hour in 1982 would have the same purchasing power as a nominal wage of \_\_\_\_\_ in 2009. (Give your answer to the nearest cent – e.g. \$3.21.)

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To answer the next 2 questions, suppose that an apple orchard operates in perfectly competitive product and labor markets. It can sell a bushel of apples for \$30 and the marginal revenue product of an hour of labor is \$20.

8. If this firm hires another worker, its profits
    - a. Will increase \$10
    - b. Will decrease \$10
    - c. Will increase only if the wage rate is less than \$20
    - d. None of the above
  9. Based on the information provided, hiring another hour of labor would cause apple production to increase by \_\_\_\_\_ (give your answer to 2 decimal places – e.g. 1.37).
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To answer the next two questions, assume that a firm is faced by the following labor supply curve:

Wage	\$10	\$11	\$12	\$13	\$14
# of workers	50	60	70	80	90

10. When employment rises from 50 to 60, the marginal expense per worker is \_\_\_\_\_.
11. Suppose the marginal product of each worker is fixed at 10 units. This firm's profits would rise if it increased employment from 50 to 60 if and only if the price per unit of output was above \$\_\_\_\_\_.
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To answer the next two questions, suppose that a roofing company operates in perfectly competitive product and labor markets and is paying \$40 per hour for capital and \$20 per hour for labor. Suppose the marginal product of capital is 400 square feet of roofing per hour and the marginal product of labor is 250 square feet per hour.

12. Based on the information provided, if the firm is going to keep production constant:
- It can reduce cost by using more labor and less capital.
  - It can reduce cost by using more capital and less labor
  - It cannot reduce cost because it is currently using the optimal mix of labor and capital.
  - It is impossible to tell whether it is possible to reduce cost by changing the mix of labor and capital without information on the price of roofing.
13. If the price of roofing is \$.15 per square foot, this firm's profits would
- Increase if it hired another unit of labor and held capital constant.
  - Increase if it rented another unit of capital and held labor constant.
  - Decrease if it rented another unit of capital and held labor constant.
  - Both a and b.
  - Both a and c.

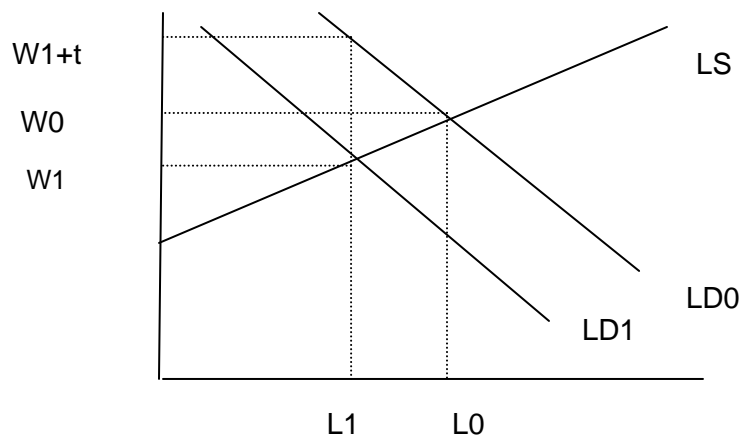
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14. Labor economists argue that unions will be more successful at organizing workers when
- Labor demand is more inelastic since wage increases would lead to smaller employment losses.
  - Labor demand is more elastic since wage increases would lead to smaller employment losses.
  - Labor supply is more inelastic since wage increases would lead to smaller employment losses.
  - Labor supply is more elastic since wage increases would lead to smaller employment losses.

15. According to the Hicks-Marshall Laws of derived demand, labor demand is more inelastic when:
- Labor is a small share of total cost since the scale effect of a wage increase would be smaller.
  - Labor is a large share of total cost since the substitution effect of a wage increase would be smaller.
  - Product demand is more elastic since the scale effect of a wage increase would be smaller.
  - Both a and c.
  - Both b and c
16. If Industry A can substitute capital for labor easily and Industry B cannot, then (other things equal)
- Industry A's own-wage elasticity of demand will be higher than Industry B's.
  - Industry B's own-wage elasticity of demand will be higher than Industry A's.
  - the industries' own-wage elasticities of demand will be equal.
  - we cannot predict which firm's own-wage elasticity of demand will be higher
17. If the quantity of labor demanded for nurses rises from 11 million to 12 million when the equilibrium wage falls from \$30 to \$29, the own-wage elasticity of demand for nurses is \_\_\_\_\_. (Use the midpoint formula developed in class and give your answer to 2 decimal places – e.g. 1.23.)
18. If the elasticity of demand for labor is .3, a 10% increase in the wage rate will cause employment to fall by \_\_\_\_\_ % and cause total income received by workers to (rise, fall) by \_\_\_\_\_. [Be sure to indicate whether income would rise or fall in your answer!]
19. A monopsonist:
- Faces an upward sloping labor supply curve
  - Must increase wages to increase employment
  - Will hire fewer workers than a competitive firm and pay lower wages
  - All of the above
20. A quasi-fixed labor cost is a cost that
- increases with hours per worker but not the number of workers.
  - increases with the number of workers but not the number of hours per worker.
  - is independent of the number of workers and the number of hours per worker.
  - increases with both hours per worker and number of workers.

21. Currently, the federal unemployment insurance payroll tax is 6.2% of the first \$7,000 of wages paid to each employee during a calendar year. Based on this, the unemployment insurance tax
- a) Is a quasi-fixed labor cost
  - b) Is a variable labor cost
  - c) Is a variable labor cost for workers earning less than \$7,000 per year and a quasi-fixed cost for workers earning more than \$7,000 per year.
  - d) Is a quasi-fixed labor cost for workers earning less than \$7,000 per year and a variable cost for workers earning more than \$7,000 per year.
22. Suppose that the interest rate is 5% and a worker is offered \$100,000 today, \$110,000 one year from today, and \$120,000 two years from today. What is the present value of the three years of pay combined? Round your answer to the nearest dollar.

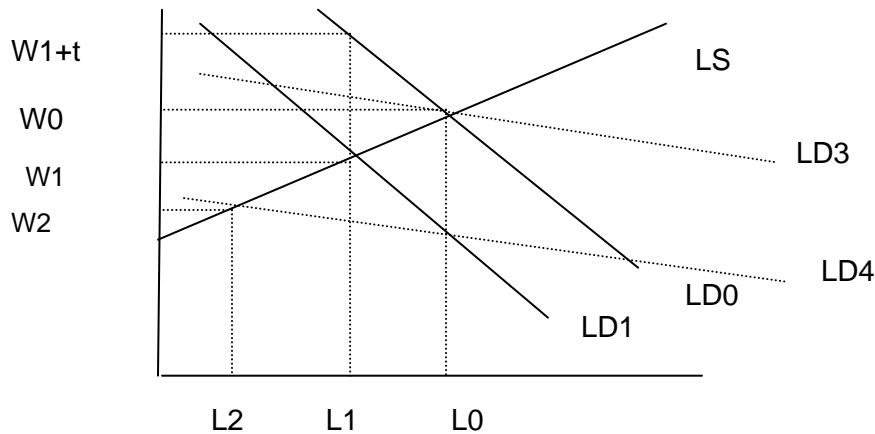
Answer both questions on this page (15 points each)

1. There are three health reform bills current being considered by either the house or senate. Each of them would impose a fee on employers who do not provide coverage for their workers. Across the three bills, the fee ranges from a little as \$750 per year per employee to an 8% payroll tax.
  - a. Use a labor demand and labor supply model to illustrate the effect of this new tax in labor markets where workers do not currently have health insurance coverage. Label your axes, and illustrate the effect of the new tax on the equilibrium wage and level of employment.



*A payroll tax on the employer will shift the labor demand curve downward vertically by the amount of the tax (from LD0 to LD1). This causes the wage received by the employee to drop from  $W_0$  to  $W_1$  and employment to drop from  $L_0$  to  $L_1$ . The employer's total cost per hour rises from  $W_0$  to  $(W_1+t)$  where  $t$  is the size of the tax per hour in the above diagram.*

- b. Use a labor supply and labor demand diagram to illustrate how the wage and employment effects of the tax would differ depending on the elasticity of labor demand. Be sure to provide a verbal discussion of how your diagram illustrates the effects on the wages paid by employer and received by the employee, as well as the employment effect.



*The above diagram illustrates the effect of a payroll tax when labor demand is relatively elastic (LD0 and LD1) as opposed to when it is inelastic (LD3 and LD4). Notice that the size of the tax is identical for the two cases because the LD curves shift vertically by the same amount. With the more elastic demand curves, wages received by employees drop more (to  $W_2$  instead of  $W_1$ ) and employment drops more (to  $L_2$  instead of  $L_1$ ). Hence, with more elastic labor demand, both wages and employment decrease more in response to a payroll tax.*

- c. Given your discussion in (b), would the effect of the tax be greater in a labor or capital intensive industry? **Explain.**

*According to the Hicks-Marshall laws of derived demand, labor demand is more elastic when labor is a larger share of total cost (i.e. in "labor intensive" industries). Consequently, the decrease in wages and employment will be greater in labor intensive industries.*

- d. Given your discussion in (b), would the effect of the tax be greater in an industry that has significant import competition or one that does not? **Explain.**

*According to the Hicks-Marshall laws of derived demand, labor demand is more elastic when product demand is more elastic. Since import competition will make product demand more elastic because there are more substitutes available for the product, the wage and employment effects will be greater in an industry with import competition.*

2. The executive team for a manufacturing company is considering whether to send some its workers to a month long training session. The cost of the training session is \$10,000 per worker (this includes paying them wages during the trainings session). It has been estimated that the training session would increase the productivity of the typical worker by \$3,000 per year.

- a. Assuming the training costs and effects on productivity are agreed upon, would you advise the executive team to invest in this training program? Discuss any other factors that would be important to the advice you would provide.

*First, in order to recapture the \$10,000 investment, the firm must be able to pay the worker less than their MP after the training is complete. For example, if the firm can pay the worker \$3,000 less than their MP after the training is complete, the worker would have to remain for at least 3.33 years (assuming zero interest rate) to break even on the training expense.*

*If the training is general, the worker's MP is increased by \$3000 at all employers and it will be difficult to recapture the investment by paying a wage below MP since the worker can leave and earn their full MP at another employer after the training is complete. The only way that the firm could successfully recoup their investment in general training is by preventing the worker from leaving for a higher wage (perhaps with a noncompete clause). If the training is specific, the firm can pay a wage above the worker's MP elsewhere but less than MP with the firm and still retain the worker. Consequently, the firm will be more able to make a profit on the training investment if it is specific training.*

- b. If the executive team chooses to invest in the training, would you advise them to defer more or less pay than previously? Why?

*If the firm defers pay, it will pay the worker less than the MP early with the promise of paying more than MP late in the career. If a worker quits, he forfeits the deferred pay. Consequently, deferred pay reduces worker turnover and increases the chance that the firm can recoup its investment in training.*

- c. If the executive team is going to send a new group of hires to the training program every year, how would you advise them to adjust their recruiting strategy in terms of the types of workers they seek? Explain.

*The firm should try to avoid "quitters" when recruiting. Since workers are reluctant to truthfully reveal their intentions about quitting, the firm might resort to statistical discrimination where they use a person's characteristics to predict quit behavior. For example, married workers or workers with children may be less mobile than single workers. Also, there is some evidence that "high discounters" are more likely to quit, so a firm may want to review credit reports for their applicants.*

Answer 3 of the 4 questions on this page (8 points each)

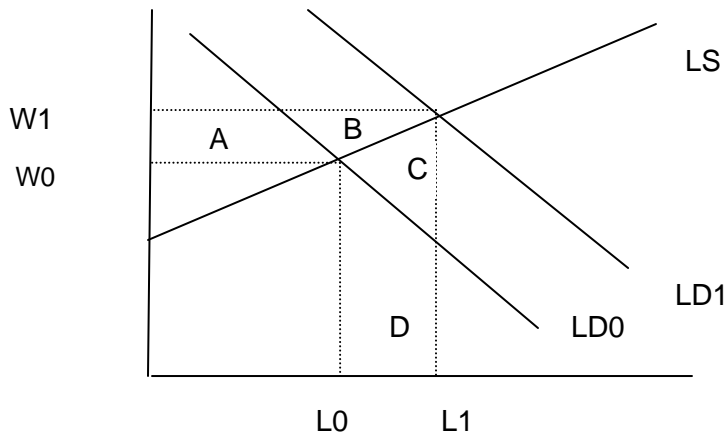
3. Suppose that the U.S. is considering increased enforcement of immigration laws which would, for example, reduce the supply of immigrant farm workers in the U.S. Discuss the scale and substitution effects of fewer immigrants on U.S. workers and discuss whether these effects would benefit or harm U.S. workers.

*If the supply of immigrant farm workers is reduced, their wages increase. The substitution effect of higher wages for immigrant workers will create increased demand for U.S. workers as employers substitute U.S. workers for immigrants. This will benefit U.S. workers by increasing their wages and employment. The scale effect of the higher wages for immigrant labor is to drive up the costs of farm production and reduce the quantity of all goods produced with immigrant labor. This, in turn, reduces the demand for U.S. workers and reduces their wages and employment. On net, U.S. workers are better off if the substitution effect dominates and worse off if the scale effect dominates.*

4. Quoting a 1998 article by David Cutler and Brigitte Madrian: “Using data from the Current Population Survey (CPS) and the Survey of Income and Program Participation (SIPP), we show that rising health insurance costs during the 1980s increased the hours worked by those with health insurance by up to 3%.” Using concepts discussed in this course, provide an economic explanation for their finding.

*Health insurance is a quasi-fixed cost for labor. That is, it is a cost that varies with the number of workers but not the number of hours per worker. When quasi-fixed labor costs rise, firms have an incentive to reduce the number of workers and increase the number of hours per worker.*

- 5a. Draw a labor supply and demand diagram and use it to show how an increase in labor demand affects the “rents” received by employees. Be sure to carefully label the area reflecting the increase in rents.



*The increase in labor demand from LD0 to LD1 causes rents to increase by the areas A+B.*

- b. Use the diagram you drew in (a) to evaluate the following statement: If labor demand increases and increases the earnings of workers by \$1 million, workers are \$1 million “better off”.

*While rents increase by A+B, total compensation increases by A+B+C+D. (The reason for this is that compensation before LD increases is the rectangle  $W_0 \cdot L_0$  and  $W_1 \cdot L_1$  after LD increases.) Consequently, the increase in earnings exceeds the increase in rents. The reason is that, although the workers have \$1 million more of earnings, they have to work more to earn that extra income. The rent is the extra earnings minus the value the workers place on the lost leisure.*

6. Suppose there are two airlines: BigJets and SmallJets. BigJets flies large jets that carry an average of 300 passengers. SmallJets flies smaller jets that carry an average of 50 passengers. Both large and small jets require a pilot and copilot. Now suppose there is a payroll tax imposed on all employers to finance health care reform.
- Will the pilots of BigJets or SmallJets be affected more by this payroll tax? Explain.

*Bigjets is more capital intensive than Smalljets and will therefore have more inelastic labor demand since labor is a smaller fraction of total costs. From our earlier analysis (see answer to question 1), we know that if labor demand is more inelastic, a payroll tax will cause a smaller decrease in wages and employment. Consequently, the pilots at Bigjets will be impacted less by the payroll tax than those at Smalljets.*

- Is it possible that the pilots of one of these companies could actually experience an increase in wages as a result of the payroll tax? Explain.

*This is similar to the example involving surface and underground coal miners and the payroll tax used to finance the black lung benefits. The point is that this payroll tax will drive up the price of flights more at SmallJets than at Bigjets. As a result, some of the customers of SmallJets may switch to Bigjets and the demand for the latter company's flights may increase. This could actually benefit the pilots at BigJets as they experience an increase in the demand for their services.*

Name (please print) \_\_\_\_\_

Place all answers to first 22 questions in space below.

1	9.66%
2	65.47%
3	59.15%
4	D
5	222.4
6	-1.0%
7	\$22.24
8	C
9	\$.67
10	\$16
11	\$1.60
12	A
13	D
14	A
15	A
16	A
17	2.57
18	3%; rise 7%
19	D
20	B
21	C
22	\$313,605