

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

Last 4 digits of your Student ID Number: \_\_\_\_\_ Section \_\_\_\_\_

**ECON 100A FALL 2006**  
**University of California, Berkeley**  
**Homework 7**  
**Due date: 2006.12.07 [on the last Lecture]**

Question #	Answer	Points
1.1		
1.2		
1.3		
1.4		
1.5		
1.6		
1.7		
1.8		
1.9		
1.10		
Multiple Choice Total		
2		
Total Score		

**Instructions** For Problem 1: Put your answers in the table above (column 2).  
 For Problem 2: Write your answers *NEATLY* and *CONCISELY*. Please staple your homework answers together.

**Problem 1:** (10 multiple choice questions) Showing your work is not necessary for multiple choice problems. Place all multiple choice answers in the table above. **No credit is given if more than one letter was provided as an answer in the table.**

Problem 1.

Question 1.1 The bonus of a plant manager in a vertically integrated firm is based on the following formula:

$$\text{Bonus} = 10,000 - .5(Q_f - Q)$$

where  $Q_f$  is feasible production and  $Q$  is actual production. The value for  $Q_f$  is provided by the plant manager at the beginning of the year. With this scheme, the plant manager has an incentive:

- to underestimate  $Q_f$ .
- to overestimate  $Q_f$ .
- to reveal the true  $Q_f$  and make  $Q$  as small as possible.
- to reveal the true  $Q_f$  and make  $Q$  as large as possible.

Question 1.2 When a moral hazard problem exists for automobile driving, the marginal cost of driving

- is lowered, and the amount of driving done is raised above the efficient level.
- is lowered, and the amount of driving done is lowered below the efficient level.
- is raised, and the amount of driving done is raised above the efficient level.
- is raised, and the amount of driving done is lowered below the efficient level.
- is raised above the efficient level, but market forces keep the total amount of driving is kept at the efficient level.

Questions 1.3 – 1.7 Consider the following Scenario:

The probability of a fire in a factory without a fire prevention program is 0.01. The probability of a fire in a factory with a fire protection program is 0.001. If a fire occurred, the value of the loss would be \$300,000. A fire prevention program would cost \$80 to run. [[Assume that potential insurers cannot observe whether the fire prevention program was run, and no insurer can run the fire prevention program by himself. Potential insurers are risk-neutral.]]

Refer to Scenario. If there is no insurance and a fire protection program in place, the expected loss from fire for this company is

- \$0.
- \$300.
- \$3,000.
- \$6,000.
- \$300,000.

Refer to Scenario. If there is no insurance and no fire protection program in place, the expected loss from fire for this company is

- \$0.
- \$300.
- \$3,000.
- \$6,000.
- \$300,000.

Your answers to these questions will help you with Questions 1.5 - 1.7:

Question 1.4 Refer to Scenario. If the fire protection program were in place, the company could insure the warehouse for a premium equal to

- a. the loss from the fire, \$300,000.
- b. the expected loss from the fire, \$300.
- c. the expected loss from the fire, \$3,000.
- d. the cost of the fire protection program, \$80.
- e. \$0.

Question 1.5. Refer to Scenario. If the fire protection program were not in place, the insurer would not be willing to ensure the warehouse for any amount less than

- a. \$80.
- b. \$300.
- c. \$3,000.
- d. \$6,000.
- e. \$300,000.

Question 1.6. Refer to Scenario. Moral hazard arises in this situation because once the firm

- a. pays the premium that is based on the 0.001 probability, it has no incentive to spend the additional \$80 for the fire protection program, so the true probability of loss is no longer 0.001.
- b. pays the premium that is based on the 0.01 probability, it has no incentive to spend the additional \$80 for the fire protection program, so the true probability of loss is no longer 0.01.
- c. puts the fire protection program in place, it has less incentive to spend \$300 for a premium, leaving the firm underinsured.
- d. puts the fire protection program in place, it has less incentive to spend \$6,000 for a premium, leaving the firm underinsured.
- e. puts the fire protection program in place, it will consider that a substitute for insurance and not be able to deal with the loss from a fire should it occur.

Question 1.7 Refer to Scenario. Moral hazard would be eliminated in this situation if

- a. the insurer would always charge \$300.
- b. the insurer would always charge \$6000.
- c. the insurer could costlessly monitor whether a fire prevention program has been implemented, and adjust the premium upward if it is not.
- d. the insurer could costlessly monitor whether a fire prevention program has been implemented, and adjust the premium downward if it is not.
- e. the fire did not occur.

Question 1.8 The principal-agent problem of ownership vs. control of the corporation tends to get worse when

- a. stock in a corporation is held exclusively by a small number of people who control the company's day-to-day operations.
- b. stock in the company is tightly held, but there are some "outsider" stockholders.
- c. stock in the company is very diffusely held, with no individual or group having control over a large block of stock.
- d. managers have profit-sharing schemes as part of their incentive package.
- e. managers focus on maximizing the firm's profits, rather than the firm's market share.

Question 1.9 What is the problem with paying plant managers in multi-plant firms according to the level of output they produce? [[Assume that investors cannot observe plant costs of production (which could range from high to low) and production capacity (which could range from high to low too).]]

- a. Managers in low-cost or high-capacity plants could be penalized, in percentage terms, for their overproduction.
- b. The production problem in multi-plant firms is usually how to lower production to increase market power, not how to increase production.
- c. Managers in high-cost or low-capacity plants could be penalized for production constraints over which they have no control.
- d. Managers would have an incentive to understate the productive capacity of their plants.
- e. Managers would have an incentive to overstate the productive capacity of their plants.

Question 1.10 What is the problem with paying plant managers in multi-plant firms according to how much each plant produces relative to its capacity? [[Assume that investors cannot observe plant costs of production (which range from high to low) and production capacity (which range from high to low too), and only the manager could give investors information about his plant's capacity.]]

- a. Managers in low-cost or high-capacity plants could be penalized, in percentage terms, for their overproduction.
- b. The production problem in multi-plant firms is usually how to lower production to increase market power, not how to increase production.
- c. Managers in high-cost or low-capacity plants could be penalized for production constraints over which they have no control.
- d. Managers would have an incentive to understate the productive capacity of their plants.
- e. Managers would have an incentive to overstate the productive capacity of their plants.

**Problem 2:** Financial regulations as public good provision. Fed task is to assure system stability (by Bailing out financial intermediaries in crisis cases). But also, Fed has to prevent Banks from excessive risk taking (i.e., there is moral hazard problem here).

Fed and Banks: Consider the following payoff matrix. Federal Reserve's payoff is listed before the comma and Banks' payoffs after the comma.

		<b>Banks Invest into ventures with</b>	
		High Risk	Low Risk
<b>Fed</b>	Bailout	(1, 5)	(2, 2)
	No Bailout	(2, -2)	(1, -1)

a) Check if each players has a dominant strategy.

b) Does Nash equilibrium in pure strategies exist?

c) Find the mixed strategy equilibrium if one exists.

(Denote the probability of Bailout  $f$ , and the probability for Banks to choose High Risk  $p$ .)

d) Next, assume that due to exogenous change (for example, dynamic hedging was discovered), taking High Risks becomes even more profitable for the banks. The payoff matrix becomes:

		<b>Banks Invest into ventures with</b>	
		High Risk	Low Risk
<b>Fed</b>	Bailout	(1, 18)	(2, 2)
	No Bailout	(2, -3)	(1,-1)

Find mixed strategy equilibrium.

e) Assume that Banks approach Fed and convince its officials that taking High Risks is efficient, because expected profits are so high. Banks propose to compensate Fed for the bailout, and the payoff matrix changes to:

		<b>Banks Invest into ventures with</b>	
		High Risk	Low Risk
<b>Fed</b>	Bailout	(3, 15)	(2, 2)
	No Bailout	(2, -3)	(1,-1)

Find an equilibrium.