

Homework #3
ISYE 6230 – Economic Decision Analysis II - Spring 2004
Due April 8, 2003 12:05pm

Show all your work.

Question 1: (8 points)

From your work experience or personal life, describe a situation, which could be modeled as a principal-agent problem. Give a detailed “story” of the situation. (What happened, when, where, how did people behave, etc.) Identify the principal(s), the agent(s), possible actions and outcomes, the contract (incentive scheme), and the payoffs. Clearly explain why this situation falls into the principal-agent framework. Also, discuss potential conflicts in the motives of the principal(s) and the agent(s).

Examples of such situations:

- A person buying a house (principal) working with a real-estate agent.
- Shareholders (principals) and auditors (e.g., Arthur Andersen). Remember the case of Enron? Arthur Andersen was both the auditor and the financial consultant to Enron. In this case, rather than acting in the interest of the shareholders (principals) Andersen (the agent) was facing a conflict of interest, because Enron was its client.
- A cashier (agent) at the supermarket (principal).
- A homeowner (principal) and a cleaning service (agent).
- Doctor (agent) and patient (principal).

Question 2: (7 points) Find an article from popular press (e.g., Business Week, Fortune, The New York Times, Economist, Business 2.0, etc.) published within the past 10 months, which relates to the topics covered in this course. Write a short paragraph explaining how the situation discussed in the article is related to the course topics. Attach the article to your homework, and highlight the relevant sections.

Question 3: (6 points) Suppose your neighbor, Charlene Chatter, asks you to join her in her business venture, an internet cafe. She needs \$100,000 to open the shop, but she only has \$10,000 to invest. She heard that you just sold your time-share in Miami Beach, so she knows you could invest \$90,000. If you make the investment, you will own 90% of the cafe and Charlene will own the other 10%. If Charlene provides fresh coffee and cross sells high margin bake goods, the shop could make \$50,000 each year after paying Charlene a base salary of \$40,000. Your share would be \$47,500, a 50% return on your investment while Charlene’s share would be \$2,500 in addition to her \$40,000 salary. But maybe not! Charlene may decide to forgo the \$2,500 in profits and buy cherry bookcases and oriental rugs, surf the internet, and gossip with customers instead of cross selling baked goods leaving no profits for you. What might you do as a prudent investor to prevent this scenario from occurring? You need not right down equations, rather, discuss in (not too many) words alternative schemes that can help solve the agency problem.

Question 4: (14 points) An agent can work hard ($e=e_H$) or lazy ($e=e_L$), where $e_H > e_L > 0$. There are two profit levels, x_1 and x_2 ; $x_1 < x_2$. Hard work makes the high profit level more

likely. Specifically, $\text{Prob}(x = x_2)$ is f_H if the agent works hard and $f_L < f_H$, if the agent is lazy. The principal can only observe realized profits x . The principal is risk neutral and the agent is risk averse with preferences $u(w)$. The utility function u is strictly concave and increasing.

- a. (7 points) Assume that the principal requires a non-negative profit. Show how to solve for the Pareto Optimal and incentive scheme. $s(x_i) = s_i$, $i=1,2$, where s_i represents the payment to the agent if the outcome is x_i .
- b. (7 points) Suppose that the agent can choose a third action e_M with the features that $\text{Prob}(x_2|e_M) = \frac{1}{2} f_H + \frac{1}{2} f_L$ and $e_M > \frac{1}{2} e_H + \frac{1}{2} e_L$. Can it ever be in the principal interest to implement e_M ?