

Economics 4650 - John L. Turner

Homework 4.

Suppose the following principal-agent problem. The Enran corporation is recruiting division managers of its energy-trading business. It offers compensation of the following form:

$$W_0 + \beta\Pi_D$$

where W_0 is a fixed wage and Π_D is the division's profits. Profits come from two sources: trading commission and capital gains. Trading commissions depend on the number of trades executed by the division manager, while capital gains depend upon whether the trades are profitable. Specifically:

$$\Pi_D = 200T + \psi$$

where T is the number of trades and ψ is the profit or loss from capital gains. On average, the capital gains profit is zero. Potential division managers are risk-neutral and their preferences display no wealth effects, but they do face (effort) costs of executing transactions of:

$$C(T) = T^2,$$

so that the marginal cost of effort is given by

$$C'(T) = 2T$$

- If a person chooses to work as a division manager, how many transactions will she execute?
- If Enran receives Π_D in benefits from the effort of the division manager and pays the salary $W_0 + \beta\Pi_D$ to the division manager, what is its profit as a function of only W_0 and the commission rate β ?
- It turns out that $\beta = .5$ is the level of incentives that maximizes Enran's profit (you may wish to use this to check your answer to part (b)). Is this the efficient level of incentives? If not, why not and how should β be adjusted to increase efficiency? Be specific and provide details supporting your answer.
- Suppose that $\psi = -5,500$ with probability .5 and $+5,500$ with probability .5. If each potential division manager has an outside offer that pays \$2,500 for sure, will Enran be able to hire division managers with $W_0 = \$1,000$? Prove your answer.