

Economics 152
 Sample Problems for Chap. 4, 5
 Philip Babcock

1. As in Example 1 in Chapter 4 of Lazear, suppose you must pay a worker 40K a year and that there are 5 types of workers (A, B, C, D, E), as described in the Table below. Testing costs \$1000/worker and tells you only **whether a worker is or is not type E**. Is it worth it to screen workers and hire only type E? What is your expected profit per worker if you do?

Type	A	B	C	D	E
Prop. of Population	0.1	0.2	0.3	0.3	0.1
Ave Revenues	-100k	0	50k	100k	200k

2. You have three workers at your firm and two divisions, manufacturing and service (M & S). By rotating workers through both divisions, you have determined that the addition to net revenues per period generated by each worker is as follows:

Worker	Net revenues M	Net revenues S
1	200	190
2	50	30
3	20	40

a) Assuming that you can vary the size of both divisions in any way you want costlessly, who should work in M and in S? Explain your reasoning.

b) If testing costs 10\$/worker and workers retire after 3 periods, was this screening investment worthwhile in part a)? Show why or why not.

c) Suppose instead that because of large capital investments that your firm has made, you are currently required to put 1 worker into manufacturing and two into sales. What is the optimal job assignment now? Explain your reasoning and why the assignments change from part a).

d) If testing costs 10\$/worker and workers retire after 3 periods, was this screening investment worthwhile in part c)? Show why or why not.

3.
 A firm wishes to establish a wage

$$w = a + bE,$$

where E is worker effort and a and b are to be chosen by the firm. The worker maximizes utility given by

$$U = w - 2E^2 \quad (\text{which is to say the worker's cost of effort is } 2E^2.)$$

Each unit of effort generates 6 units of output which can be sold for \$2 per unit. Assume the workers' utility must be at least 0 for him to be willing to accept the job.

- a. Calculate the workers choice of effort E^* and the profit-maximizing values of a and b .
- b. Calculate the firm's profit, given this optimal wage schedule.
- c. On the same graph, plot the line that represents the firm's wage offers as a function of effort, $a^* + b^*E$, and plot the worker's cost of effort $C(E)$ as a function of effort.
- d. Calculate the numeric value of workers utility at different effort levels of effort: E^* , $E^* - 1$, and $E^* + 1$.