Ec317 Labour Economics Problem Set 12

1. A salesperson in a bookstore sells books for £50 each. The cost of the books to the store is £30. The number of books the salesperson sells in a week is equal to q = 2e + v, where e represents the effort she puts in, and v is luck (on average v = 0). She is paid a base salary plus a commission on every book sold, so that her weekly earnings y = a + bq. Utility depends on earnings and on the effort level (which can be any positive real number), and is given by

$$U = y - \frac{e^2}{2},$$

which reflects the fact that the salesperson does not like putting in effort.

- (a) Assume a = 50 and b = 10. If the salesperson maximizes utility, which level of effort will she choose, how many books does she sell, and what is her expected weekly earnings (i.e. assuming v = 0).
- (b) With the parameters as in (a), calculate the expected profits of the bookstore, assuming the only costs are the cost of the books and the wage paid to the salesperson.
- (c) The employer experiments with letting the salesperson keep the entire markup on the book, i.e. £20. If the employer wants the salesperson to have the same utility as in (a), what will the value of a be?
- (d) What would the effort of the salesperson be under the parameters in (c), how many books does she sell, what are her expected earnings, and what are profits for the bookstore?
- (e) Explain why the quantity sold under the new scheme is greater than the quantity sold under the old one. What are some potential problems for the bookstore of using this new scheme?
- 2. A U.S. amusement park open only in the summer hires teenagers to operate its rides and concession stands, paying them \$4.00 per hour and putting aside \$1.50 per hour into a fund that they will receive as a lump sum payment if they work through labor day (typically, its biggest day of the year).
 - (a) What problem is the amusement park apparently trying to solve with its compensation plan, and in what two ways does this plan help to solve the problem?
 - (b) Suppose the government rules that the compensation plan violates minimum wage laws because workers who quit before Labor Day receive only \$4.00 per hour (the minimum wage is currently \$5.15). How can the park now address the problem mentioned in your answer to (a)?

- 3. Suppose a worker can choose between high effort (e = 1) and low effort (e = 0). If the worker chooses low effort, he is fired with probability 0.2. If the worker is fired, he can get a wage of £4 at some other firm, where he does not have to put in high effort. Effort is costly to the worker, $C(e = 1) = \pounds 2$ and C(e = 0) = 0. The worker maximizes expected earnings minus the cost of effort.
 - (a) What is the lowest wage the firm would have to pay the worker in order to induce the worker to choose e = 1?
 - (b) It may not be profitable for the firm to pay this efficiency wage. What must be the minimum difference in the output of a high effor worker and the output of a low effort worker for the firm to prefer to pay the efficiency wage calculated in (a)?
 - (c) Is the worker better off being paid the efficiency wage than if he was paid £4 and could put in low effort? Why is that the case?
 - (d) What would happen to the level of the efficiency wage if the probability that the worker is fired given he chooses low effort rises above 0.2? In particular, what would be the efficiency wage if that probability was 1? What is the interpretation of that wage?