

STRATEGIC GAME THEORY FOR MANAGERS

Problem Set 3

Note: Make any economic assumptions you think necessary, but make them explicitly. You may talk to fellow students about this, but do not copy others' work.

1. A reviewer of Peter Robinson's memoir of becoming an MBA (*Snapshots from Hell: The Making of an MBA*, NY: Warner, 1995) writes:

Mr Robinson pretty much concludes that business schools are a sifting device—M.B.A. degrees are union cards for yuppies. But perhaps the most important fact about the Stanford business school is that all meaningful sifting occurs before the first class begins. No messy weeding is done within the walls. "They don't want you to flunk. They want you to become a rich alum who'll give a lot of money to the school." But one wonders: If corporations are abdicating to the Stanford admissions office the responsibility for selecting young managers, why don't they simply replace their personnel departments with Stanford admissions officers, and eliminate the spurious education? Does the very fact of throwing away a lot of money and two years of one's life demonstrate a commitment to business that employers find appealing?

What answer to this question can you give based on our analysis of strategies in situations of asymmetric information?

2. Kit wants to obtain a restaurant franchise from Jill, the franchisor. Jill has another franchise opportunity that would definitely earn her \$20,000; but Kit gets nothing if Jill doesn't allow him to obtain the franchise. After Jill has signed Kit up (if she does), Kit can choose to set up a restaurant with up-market decor or a restaurant with a simple decor, but once it's open Kit can't change the style.

The neighbourhood chosen for the restaurant has a 25% chance of getting poorer, in which case Jill would get no return from an up-market restaurant, and only \$16,000 from a simple restaurant. If the neighbourhood stays well-off (a chance of

75%), Jill would get return of \$40,000 from an up-market restaurant, and only \$8,000 from a simple one.

Kit, however, sees things differently, and apparently marches to the beat of different drummer: he gets utility from a mismatched restaurant. When the neighbourhood is well-off, he gets 9 units of utility from a simple restaurant, and only 6 units from an up-market one. When the neighbourhood is poorer, he get 18 units of utility from an up-market restaurant, and only 3 from a simple restaurant.

- a. Plot the game tree and the expected payoffs if no-one can tell whether the neighbourhood will stay well-off or become poorer until after the restaurant is built. What will Kit choose? What will Jill choose? Explain.
 - b. Do the same if Kit knows with certainty what the neighbourhood will become before he starts the restaurant, while Jill remains ignorant. What will Kit choose? What will Jill choose? Explain.
3. A tyre manufacturer produces at a cost of \$10 per tyre. It sells units to a retailer who in turn sells the tyres to consumers. Imagine that the retailer faces the inverse demand function $p = 200 - \frac{q}{100}$. That is, if the retailer brings q tyres to the market, then these tyres will be sold at a price of $p = 200 - \frac{q}{100}$. The retailer has no cost of production, other than whatever it must pay to the manufacturer for the tyres.
- a. Suppose the manufacturer and the retailer interact as follows. First, the manufacturer sets a price x that the retailer must pay for each tyre. Then, the retailer decides how many tyres q to buy from the manufacturer and sell to consumers. The manufacturer's payoff (profit) is $q(x - 10)$, whereas the retailer's profit is $(200 - \frac{q}{100})q - xq$. Calculate the subgame perfect equilibrium of this game, using a game tree. Explain.
 - b. Next suppose the manufacturer sells its tyres directly to consumers, bypassing the retailer. Thus, the manufacturer can sell q tyres at price $p = 200 - \frac{q}{100}$. Calculate the manufacturer's profit-maximising choice of q in this case (as a monopolist). Explain.
 - c. Compare the joint profit of the manufacturer and the retailer in part a. with the manufacturer's profit in part b. Explain why there is a difference.

4. Magnacorp's board has funds for internal investment, and every so often asks each of its eight divisions to make a pitch in front of the Board on the best new proposal the division would undertake, if it were given sufficient resources. In general, the Board chooses the project (from the eight) with the highest forecast NPV (= estimated Net Present (Benefits - Costs)) to fund. Over the years, however, the Board has been disappointed. Far too frequently the promised net returns of the highest-NPV projects have not eventuated, even though each of the eight divisions has had roughly equal turns.

Assuming that Magacorp's divisions have not knowingly exaggerated the estimated NPVs, what could explain the Board's experience?