ECON 425
Fall 2006
Homework #2

The following is a simplified version of the franchise problem found in Mathewson & Winter (1985):

A Franchisor (P) contracts with a franchisee (A) in a local market where sales are a function of A's investment in quality (q). However the sales function is stochastic; there are good days and bad days. The sales function for each state can be described as follows:

$$good : X^2(q_2) = 14q_2 - q_2^2 \quad bad : X^1(q_1) = 10q_1 - q_1^2$$

On any given day only A knows which state (good or bad). P knows the production function and can measure output, thereby inferring the state. The franchise contract states that A pays P a fixed Fee (F_i) and specifies the level of q_i. The cost of q_i is $c(q_i) = 2q_i$ and is completely paid for by the franchisee.

1. Assuming no shirking, solve for the first best levels of X, q, and F in each state that maximizes P's profit. Assume that $f = 0.4$ and that the following condition must hold regarding the agent's profit function.

   $$0.4X^i - 2q_i - F_i \geq 0 \quad i = 1, 2$$

   (Assume that the fixed franchise fee, F_i is set residually by P to extract any excess profits)

2. Assuming that the agent can shirk only by misdeclaring the state, calculate the quality supplied and profits earned if the agent chose to shirk. What premium would be needed and in what state would it be paid in order to ensure honesty?

3. Graph your results.

4. Suppose the Franchisor decides to engage in monitoring. Specifically, the level of monitoring is such that there is a 50% probability of detection. Calculate the expected profits from cheating for the Franchisee. What would be the franchise Fee in this situation? How much would the cost of monitoring 50% need to be in order to make your answer in b be preferable to monitoring?

Here are some tips: You do not need to use the lagrangian approach to solve this problem. You can, but the math may get messy.

First approach the problem from the view of a vertically integrated firm: what output would the firm choose? Then consider what would happen if the agent could freely choose q.