Birkbeck 2.13. FIR. 2008-9. Worksheet 1.

Disappearing markets: Adverse Selection in the market for fund management; Minimum Standards Rules; low quality equilibrium.

1. Suppose a situation along the lines of the Akerlof 1970 model:
   - 40% of second-hand cars turn out to be 'lemons' which – with perfect information – would have fetched a price of £2000.
   - The rest of the cars are 'peaches' which would – on the basis of the same assumption – have fetched £5000.
   - Buyers are aware of these overall percentages, but have no way of distinguishing between the two types of cars *ex ante.*
   - They nevertheless decide to try their luck.

What might you expect to be the highest price they would be prepared to pay?

2. Applying the same model to the market for fund management, suppose that
   - The ability of fund managers to beat the performance of the market is at best 3% p.a.
   - At worst the funds they manage just perform in line with the market.
   - We consequently define the 'quality' of managers as x, where $0 \leq x \leq 3$.
   - The capacity of the various individual managers is uniformly distributed between these two extremes.
   - The costs of a manager (c) are perfectly correlated with the quality of his/her management.
   - Quality is exogenous – the quality of an individual manager does not change.
   - In a seller's market, managers receive a 50% mark-up on costs.
   - Managers can correctly assess their own individual ability, but their clients can only observe the *average* performance of the fund management industry as a whole.

(i) Provide an expression for a manager's management performance (a), in terms of his/her quality and costs.

(ii) Under the conditions indicated above, what is the average quality of managers at the moment when the market opens?

(iii) What would be the reservation price of clients (p^d) at this moment?

(iv) What would be the reservation price of the best-performing manager (p^s) at this moment?

(v) What is, in general, the viability condition for trade?

(vi) Use the expression for the viability condition to express, in quantitative terms, the situation confronting the best-performing manager in this case at this moment?

(vii) What action is the best-performing manager likely to take?

(viii) Provide a definition of the 'marginal manager', and an expression for this manager's viability condition in terms of his/her reservation price (p^s_{max}) and costs (c_{max}).

(ix) Provide an expression for the reservation price of clients in terms of the marginal manager's costs, i.e. once the best manager has dropped out of the market (a) in general terms (b) in the present case.

(x) What is now the viability condition confronting the marginal manager?

(xi) What process will now ensue?

(xii) Plot this situation. Horizontal axis: Costs of marginal manager. Vertical axis: Price.

3. **Minimum Standards Rules**: We now apply the same (Akerlof 1970) model to a case where the fund management industry establishes a self-regulatory body which succeeds in excluding all managers who fail to beat the market by at least 1.5%.

> *Note*: You need not memorise the algebra in this and the following question, but you are recommended to work through it, and you should at lease be able to appreciate the logic of the associated diagrams.

(i) What would now be the costs of the worst manager?

(ii) At the moment when the market opens under these conditions, what would be the reservation price of (a) clients (b) the best-performing manager?

(iii) Is trade viable in this case? Discuss, with a diagram.

(iv) Does adverse selection occur in this situation?

(v) What would be the equilibrium price?

(vi) Discuss the nature of the outcome, with reference to (a) average profit (b) total profit.

(vii) How do you suppose clients might react to this situation, and what alternative situation might arise?

4. [*Optional*.] **Low quality equilibrium**: Suppose the above fund managers decide to relax their standards; they now exclude only those managers whose costs are less than 1/3 % p.a. of the funds managed.

> (i) At the moment when the market opens under these conditions, what would be the reservation price of (a) clients (b) the best-performing manager?
>
> (ii) What is the performance of the worst manager in the market?
>
> (iii) Will adverse selection occur in this situation?
>
> (iv) Is trade viable? Discuss algebraically.
>
> (v) Plot this situation in a diagram, and discuss the nature of the outcome.

Answers.

1. 0.4 (2000) + 0.6 (5000) = 800 + 3000 = £3800.

2

(i) $a \equiv x/c$.

(ii) We have x = 3 for best and x = 0 for worst manager, and their performance is uniformly distributed. This gives us:

$$\underline{x} \;=\; \tfrac{1}{2}(0 + 3) \;=\; 3/2$$

(iii) Clients cannot observe x of individual managers, so will set reservation price (p^d) at historical market average, i.e. $\underline{x}$.

(iv) Reservation price of best-performing manager will reflect performance of x = 3.
In seller's market (optimal situation for the manager), will expect mark-up of 50% on costs.
i.e. Costs would be 2.
x is exogenous and c is directly correlated with c → c also exogenous / unchanging.
So to prevent loss, will set reservation price at:

$$p^s \;=\; c \;=\; 2$$

(v) $p^d > p > p^s$, where p is market price.

(vi) We have, from
2 (iii) $p^d = \underline{x}$
2 (ii) $\underline{x} = 1.5 \rightarrow p^d = 1.5$
2 (iv) $p^s = 2$

Viability condition is thus: $p^d = 1.5 \;>\; p \;>\; p^s = 2$

Or, more briefly: $1.5 > 2$!

(vii) We thus have $p^d = 1.5$, yet the reservation price of the best manager is 2, so this manager will drop out of the market.

(viii) The best manager remaining in the market.
Viability condition (general): $p \geq c$
Thus in this case we have $p^s_{max} \geq c_{max}$

(ix) (a) We have

$$p^d = \underline{x} = ac$$

Since costs are perfectly correlated with quality, we can accordingly substitute in $c = \underline{c}$

$$\rightarrow \quad p^d = \underline{x} = a\underline{c}$$

Since quality (and therefore costs) are uniformly distributed, we have:

$$\underline{c} = \tfrac{1}{2}(0 + c_{max})$$

$$\rightarrow \quad p^d = a.\tfrac{1}{2}(0 + c_{max}) = a.\tfrac{1}{2}c_{max}$$

(b) Substituting a = 3/2, we have:

$$p^d = 3/2 \,.\, \tfrac{1}{2}(0 + c_{max})$$

→ $p^d = \frac{3}{4}.\, c_{max}$

(x) The same situation that faced the best manager when the market opened will now face the marginal manager, since we have the viability condition:

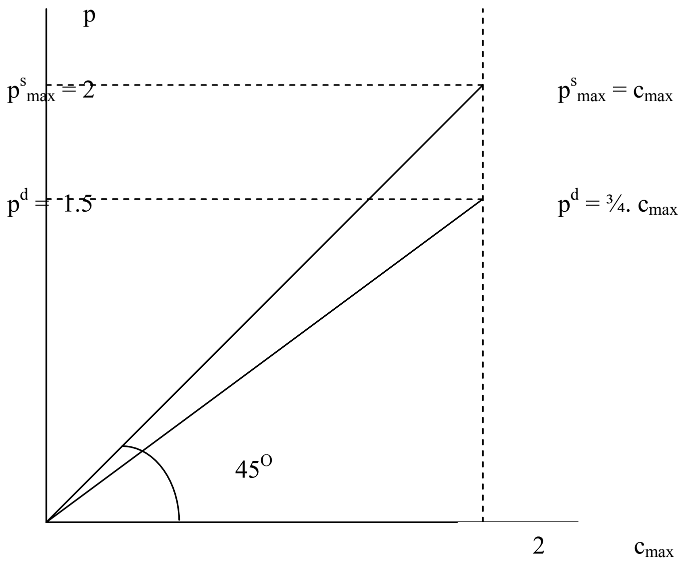
$$p^d = \tfrac{3}{4}\, c_{max} > p > p^s_{max} = c_{max}$$

i.e. $\tfrac{3}{4}\, c_{max} > c_{max}$

or equivalently $\tfrac{3}{4} > 1$!

(xi) The same process will be repeated successively in a downward spiral of quality until, at the limit, the market for fund management is extinguished.

(xii)



3 (i) $a = x/c \rightarrow c = x/a \rightarrow c_{min} = x_{min}/a = (3/2).(2/3) = 6/6 = 1$

(ii) (a) $p^d = \underline{x} = \frac{1}{2}(x_{min} + x_{max}) = \frac{1}{2}(3/2 + 3) = 9/4 = 2\frac{1}{4}$

(b) $p^s_{max} = c_{max} = x_{max}/a = 3.(2/3) = 2$

(iii) Here we have $p^d > p^s_{max}$ ($2\frac{1}{4} > 2$), so yes, there are gains from trade.

(iv) No, no adverse selection now occurs: all qualified managers remain in the market.

(v) It is a seller's market: price is determined by the 'short end of the market', i.e. p^d, so $p = 2\frac{1}{4}$

(vi) (a) Average profit: $\underline{\pi} = \underline{x} - \underline{c}$

Without MSR, we have:

$\underline{\pi}_0 = \frac{1}{2}(0 + 3) - \frac{1}{2}(0 + 2) = 3/2 - 1 = \frac{1}{2}$

With MSR, we have:

$\underline{\pi}_{MSR} = \frac{1}{2}(x_{min} + x_{max}) - \frac{1}{2}(c_{min} + c_{max}) = \frac{1}{2}(3/2 + 3) - \frac{1}{2}(1 + 2) = \frac{1}{2}.(9/2) - \frac{1}{2}(3) = 9/4 - 3/2 = 9/4 - 6/4 = \frac{3}{4}$

Thus *average* profit has *risen* by 50% for those managers who remain in the market.

(b) Total profit: $\Pi = n.\underline{\pi}$, where n is the total number of managers.
Without MSR, we have:
$\Pi_0 = n\underline{\pi} = ½n$.
With MSR at this level, only half the managers remain in the market; the rule $c_{min} = 1$ excludes exactly half of them, since they are uniformly distributed between c ~ [0, 2]. We thus have:
$\Pi_{MSR} = ½n.\underline{\pi}_{MSR} = ½.n.¾ = 3/8n$.
Thus *total* profit for the industry has *declined* by 25%. Since profit is our criterion for efficiency, this is a sub-optimal outcome.

(vii) Clients might turn to unqualified providers for a lower-quality service, resulting in a two-tier market along the lines of the London taxi market. This could restore some gains from trade (and consumer choice) to clients, an effect that could be further enhanced if a multi-tier market develops.

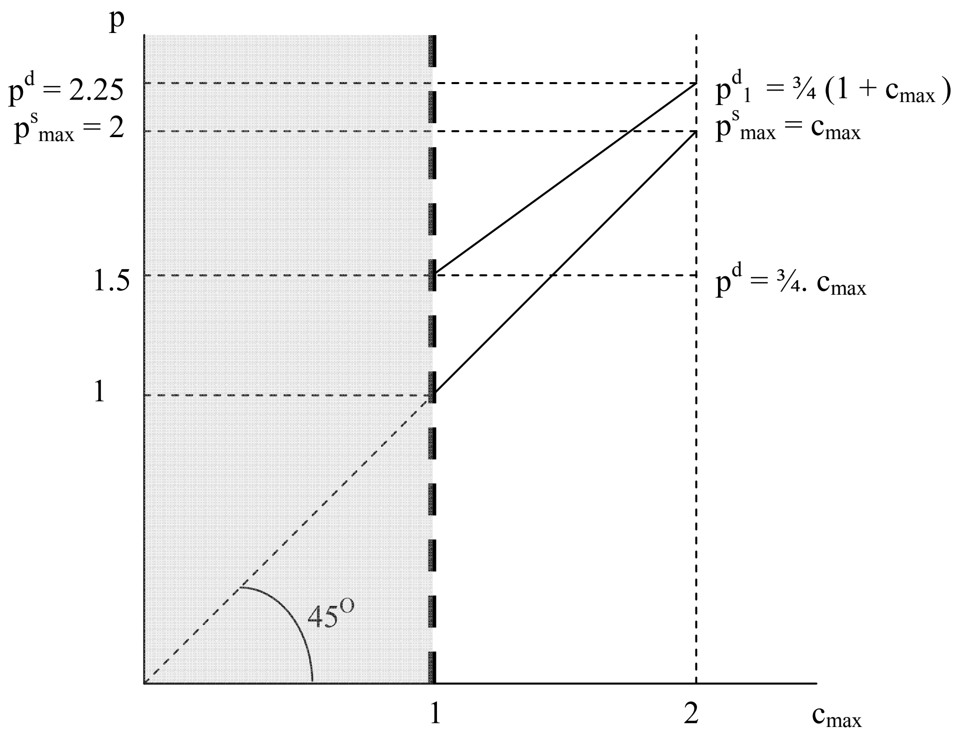


Figure for Question 3.

4 (i) (a) $p^d = \underline{x} = a\underline{c} = 3/2.½(1/3 + 2) = ¾.7/3 = 21/12 = 7/4 = 1.75$

(b) $p^s_{max} = c_{max} = 2$ (as before)

(ii) $x_{min} = ac_{min} = 3/2.1/3 = 0.5$

(iii) Yes, since $p^d = 1.75 < p^s_{max} = 2$

The best manager drops out, and so successively do all remaining managers with costs $2 > c > 1.75$.

(iv) Yes. The downward spiral in quality comes to a halt before the market is extinguished, since a non-zero equilibrium solution can be found for c_{max}:

Setting $p^d = p^s_{max}$, we have:

$p^d = ¾(1/3 + c_{max}) = p^s_{max} = c_{max} \rightarrow ¼ + 3/4\, c_{max} = c_{max} \rightarrow 1/4\, c_{max} = ¼ \rightarrow c_{max} = 1$

(v) It is an 'low quality' equilibrium.

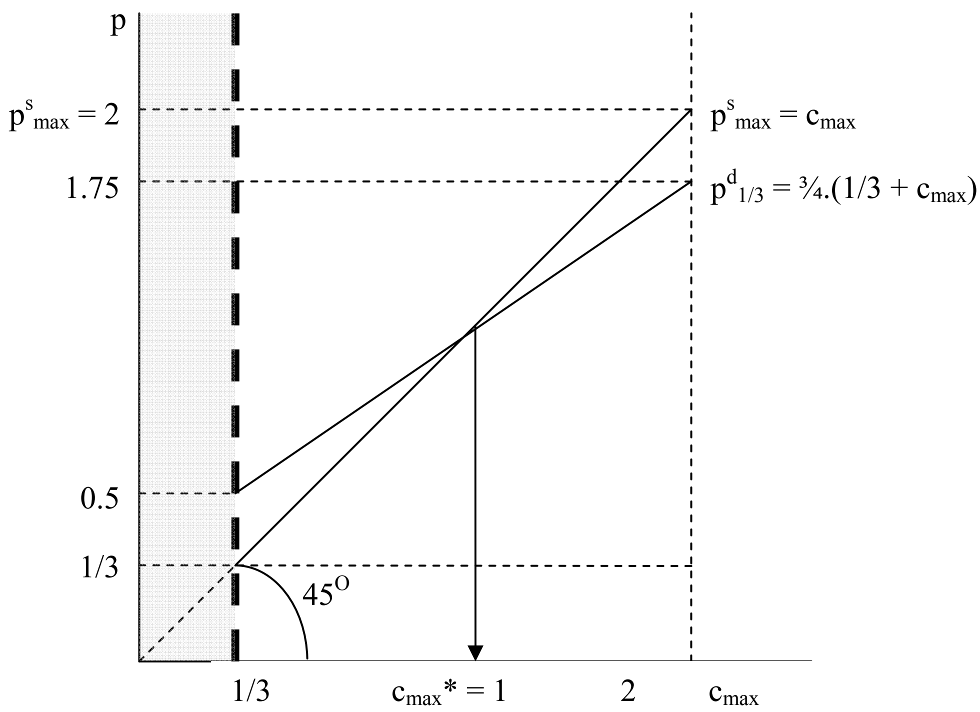


Figure for Question 4.