Economic Development Midterm, 2002

Your examination contains three questions. Answer all questions. Total time is 2 hours and 10 minutes. You should not need more than 30 minutes per question. Keep your answers brief and to the point.

Total Points: \(15 + 15 + 15 + 5\) (extra credit) = 50.

[1] (15 points) Consider the following two-player game:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(\theta, \theta)</td>
<td>(\theta, 0)</td>
</tr>
<tr>
<td>(b)</td>
<td>(0, \theta)</td>
<td>4, 4</td>
</tr>
</tbody>
</table>

where \(\theta\) is a random variable uniformly distributed on \([-1, 5]\). Make exactly the assumptions about the observability of \(\theta\) as in Morris-Shin. Prove that for all small values of the signal range \(\epsilon\), there is a unique equilibrium.

Warning. This is a problem straight out of the course, no twists. To get full credit, therefore, I will need to see all the steps done right. I am not as fussy about getting the exact algebra right (though of course I prefer it right rather than wrong!).

[2] (15 points) Suppose that a dynasty has nonpaternalistic utility: \(\sum_{s=t}^{\infty} \delta^s u(c_s)\) for every generation \(t\). Imagine there are no occupational choices at all. Every generation’s wage is zero; they only live off financial bequests. Money bequeathed earns a rate of return of \(r\). Assume the following: \(r = (1 - \delta)/\delta\).

(a) (5) Using the unimprovability argument, prove and interpret this result: if a generation starts with total wealth \(W\), it will leave the next generation exactly with wealth \(W\), no matter what the value of \(W\) is.

Now consider the occupational choice model studied in class. Suppose that you can train your child to be skilled at a cost of \(S\), or leave her unskilled (at no cost). In addition, suppose you can leave financial bequests to your child at exactly the rate described above. Finally, suppose that there is a unit measure of dynasties, and that the production function is given by \(Y = \lambda^\alpha (1 - \lambda)^{1-\alpha}\), where \(\lambda\) is the fraction of skilled labor and \(\alpha \in (0, 1)\).

(b) (6) Using part (a) carefully, describe (as completely as you can) the characteristics of a steady state with perfect equality in net consumption. Pay attention to what the wages have to be, as well as to the minimum level of what the per-capita wealth has to be.

(c) (4) Explain why the distinctness condition of the inequality proposition (studied in class) fails under the situation of part (b).

[3] (15 points) A monopolist makes offers to two agents. If neither agent accepts the offer, the agents receive an outside payoff of \(a\) each and the monopolist gets 0. If one agent accepts an offer but the other doesn’t, the outside payoff for the “free” agent drops to \(b < a\).
Offers consist of payoffs to agents. If the monopolist offers \( r \) to an agent, the monopolist makes a profit of \( \pi(r) \), where \( \pi \) is a decreasing function. So \( \pi(b) > \pi(a) \), but in any case assume that \( \pi(a) + \pi(b) > 0 \).

The game goes as follows: the monopolist makes offers to one or both agents, or to none, the agents say yes or no independently, and then payoffs are received.

(a) (7) If there is only one round of offers, describe the possible equilibria of this game. Now re-do this exercise assuming that the two agents manage to avoid all coordination failure among themselves. What are the equilibria now?

Continue to maintain the no-coordination failure assumption (among the agents) in what follows.

(b) (8) Suppose that the principal can make two rounds of offers. Assume that all payoffs are received at the end of the two rounds. Now describe what happens. Hint: Pay special attention to the two subcases \( \pi(a) < 0 \) and \( \pi(a) > 0 \).