

Economics 326: Homework 1

17 January, 2004

1. In the 17th Century a Captain in the Royal Navy had the option to take their surgeon with them when they moved ship. Consider the following model:

(a) An old Captain gets a new ship without a surgeon. He can either stick with his current surgeon who cures sailors with probability p . Alternatively he can pick a fresh surgeon who's quality is unknown, with p distributed uniformly on $[0, 1]$. When should he stick with the old surgeon?

(b) A new Captain takes over from the old Captain's ship. Suppose the old Captain has not taken his surgeon with him. Should the new Captain stick with this surgeon or pick a fresh one?

(c) Intuitively explain what's going on.

(d) Suppose the old Captain did not have the option to take his surgeon with him. Should the new Captain replace the old surgeon with a fresh one?

2. Consider Akerlof's car model with competitive buyers (as in the second half of lecture 1). Suppose the buyer's value is θ is distributed uniformly on $[100, 1100]$ and the seller's reservation value is $r(\theta) = \theta - 100$. What types will trade? What is the value of trade? If there were perfect information what is the value of trade?

3. Consider Akerlof's model with private values (rather than common values). There is a seller who's reservation price r is uniform over $[0, 1000]$. There is a continuum of identical buyers who's valuations v are identical and uniform over $[100, 1100]$. Quality is purely subjective: r and v are independent of each other.

(a) First suppose r and v are observed by everyone. Who will trade?

(b) Suppose only the seller knows r ; neither party knows the buyers' value v . What price are the buyers willing to pay? What types of seller will trade?

(c) How does trade in (a) and (b) compare?

4. Consider the credit rationing model. Suppose the project's returns R and uniformly distributed between $[100 - \theta, 100 + \theta]$, where θ is privately known to the investor. Suppose there is collateral 20 and the bank requires interest payment $B(1 + r) = 120$.

(a) If an investor undertakes a project when will they declare bankruptcy? How often will they declare bankruptcy?

(b) What is the expected profits of an investor? Show an investor should borrow if and only if $\theta \geq 80$.