

## Economic 211B, David K. Levine Problems on Repeated Games

Last modified: January 19, 1999 ([click here for answers](#))

### 1. Investment

An investor may either be wealthy or bankrupt. If he is bankrupt he receives zero and has no choices. If he is wealthy he may choose to invest in stocks or bonds. If he invests in bonds, he remains wealthy, but receives a utility of only one. If he invests in stocks, he has a  $p$  chance of going bankrupt each period but receives a utility of two. For what values of  $p, \delta$  should the investor buy stocks?

### 2. Long Run Consumers

A short-run firm has the option of giving a single indivisible item to a long-run consumer. The consumer has the option of paying for the item or not. If the consumer pays, there is a 50% chance that the check gets lost in the mail. (Note: if the check is lost, the payment is not received by the firm, *and* the consumer is not charged for the item.) The consumer values the item at \$5.00, and the firm values the item at \$1.00. The payment is \$4.00, and both parties are risk neutral. In all that follows, equilibrium means perfect public equilibrium of the infinitely repeated game with public randomization.

- Find the extensive and normal forms of the stage-game.
- For the long-run player, find the minmax, the static Nash, maxmax, mixed precommitment and pure precommitment payoffs.
- Find the worst equilibrium for the long-run player, and describe in general terms the set of equilibrium payoffs for the long-run player.

First assume that the firm can observe whether or not the check is lost in the mail.

- Find the best equilibrium for the consumer as a function of the discount factor.

Now assume that the firm cannot observe whether the check is lost in the mail or not, but only whether the payment is made.

- Find the best equilibrium for the consumer as a function of the discount factor.

### 3. Folk Theorem

Consider the following coordination game:

2,2	1,0
0,1	0,0

- What is the unique static Nash equilibrium?
- Sketch the socially feasible, individually rational set.
- Find a discount factor and subgame perfect strategies such that each player receives 1.5.

(d) Can you find an information system for which this is an equilibrium in a matching protocol?

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