

ECON4260

Problems to be discussed at the 5th seminar

Problem 1

- a) Consider an ultimatum game in which the proposer gets, initially, 100 NOK. Assume that both the proposer (*A*) and the responder (*B*) have inequity aversion as specified in the model of Fehr and Schmidt (1999), with $\alpha_i = 3$ and $\beta_i = 0.3$, $i = A, B$. Explain the optimal strategy of the two players if these preferences are common knowledge.
- b) Assume that the responder (*B*) has the preferences specified in Question 1a), but that the proposer (*A*) is only concerned about his own material payoff. What are now the players' optimal strategies, if these preferences are common knowledge?
- c) Assume that the proposer (*A*) has the preferences specified in Question 1a), but that the responder (*B*) is only concerned about his own material payoff. What is now the optimal strategy for the two players, assuming that their preferences are common knowledge?

Problem 2

Consider the following game:

	Cooperate	Defect
Cooperate	3,3	-5, 5
Defect	5,-5	0,0

The rows correspond to possible choices of Player A, while columns correspond to possible choices of Player B. The first number in each cell denotes player A's material payoff, the second number in each cell denotes B's material payoff.

Think of A and B as partners in a firm. If both invest 10 in a project, the project will achieve an income of 13 (per person), so both will get net earnings of 3. If only one of them invests, the project earns only 5 (per person), leading to a payoff of -5 for the person who invested and 5 for the other. If none of them invests, both get nothing.

- a) What are the players' dominant strategies if each cares only about his own material payoff?
- b) Assume that both players have inequity aversion as specified in Question 1a). Is (Cooperate, Cooperate) then a Nash Equilibrium?

- c) Assume that player A has inequity aversion as specified in Question 1a), but that player B cares only about his own material payoff. Is (Cooperate, Cooperate) then a Nash Equilibrium?

Problem 3

Assume now that both players in the game described in Problem 2 above have reciprocal preferences. Let player i 's utility U_i be defined as follows:

$$U_i = x_i + k_{ij} \tilde{k}_{ji}$$

where x_i = i 's material payoff, k_{ij} = i 's kindness towards j , and \tilde{k}_{ji} = i 's belief about j 's kindness towards i ($i=1,2; j=1,2; i \neq j$).

3 a) Does it seem reasonable that a person with reciprocal preferences as specified above might prefer to play Cooperate in this game, if he expects that the other will play Cooperate? Explain the main intuition (you should not necessarily have to define "kindness" formally to be able to do this).

3 b) Explain what a fairness equilibrium is.

Let us now define "kindness" formally. Assume that i 's kindness towards j is defined in the following way:

$$k_{ij} = x_j(s_i, b_{ij}) - 1/2[x_j^{\max}(b_{ij}) + x_j^{\min}(b_{ij})]$$

where s_i = i 's strategy (Cooperate, or Defect),

b_{ij} = i 's belief about j 's strategy (Cooperate, or Defect),

$x_j^{\max}(b_{ij})$ is the largest material payoff i could secure to j , given i 's belief about j 's strategy b_{ij} , and $x_j^{\min}(b_{ij})$ is the smallest material payoff i could secure to j , given b_{ij} .

Hence, kindness is given by the payoff i allocates to j compared to the average of those payoffs i could potentially have allocated to j (given his beliefs).

Moreover, let c_{iji} = i 's belief about j 's belief about i 's strategy. We can then define \tilde{k}_{ji} in the same way as k_{ij} , but taking into account that to evaluate j 's kindness towards himself (i), i must use his *beliefs* about j 's strategy, b_{ij} , and his *beliefs* about j 's beliefs about i 's own strategy (c_{iji}):

$$x_i(b_{ij}, c_{iji}) - 1/2[x_i^{\max}(c_{iji}) + x_i^{\min}(c_{iji})]$$

3 c) What is/are the fairness equilibrium/equilibria in the game described above, given the reciprocal preferences and definitions of kindness specified here? Explain.