

Exam
Advanced Microeconomics: Part II (Uwe Jirjahn)

Summer 2023

Choose **two** questions out of the three questions Q1, Q2 and Q 3.

Q.1 Player 1 and player 2 choose their strategies s_1 and s_2 simultaneously where $s_1 \in \{X, Y\}$ and $s_2 \in \{L, R\}$. The payoff matrix is

	Player 2		
		L	R
Player 1			
X		$1, \theta$	$-\theta, 0$
Y		$\theta, 0$	$1, \theta$

where $\theta \in \{-2, 2\}$ is privately known by player 1, and $Prob(\theta = -2) = 0.8$. Find the Bayesian Nash equilibrium.

Q.2 Player 1 and player 2 bargain over sharing 300 dollars. The bargaining procedure follows the Rubinstein bargaining model. Player 1's share is

$$x_1^* = 300 \frac{1 - e^{-\Delta/5}}{1 - e^{-\Delta/5} e^{-2\Delta/5}}$$

where Δ is the time interval between subsequent periods. Calculate player 1's and player 2's share if Δ approaches zero.

Q.3 Two firms produce homogeneous products. The inverse demand function is given by: $p(x_1, x_2) = 80 - x_1 - x_2$, where x_1 is the quantity chosen by firm 1 and x_2 the quantity chosen simultaneously by firm 2. The cost function of firm 2 is $C_2(x_2) = 20x_2$. The cost function of firm 1 is $C_1(x_1) = c_1x_1$. Nature chooses $c_1 = c_L = 15$ with probability 0.5 and $c_1 = c_H = 25$ with probability 0.5. While firm 1 observes nature's choice, firm 2 cannot observe that choice. Identify the static Bayesian Nash equilibrium.

Note: If you answer all questions, we will only consider Q.1 and Q.2.