



Bargaining, Arbitration, Mediation

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Final Exam - (2898)

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Solve only 2 out of the 3 following problems below. Each problem is worth up to 30 points. (At maximum you can get 60 points!)

If you solve more than 2 problems, **the first two which appear on your answer sheets will be graded** (so make sure to delete clearly and unambiguously what you don't want to be graded). The bold figures (in parentheses) indicate the maximum points per question.

You are only allowed to use non-programmable pocket calculator (no dictionary!). Notes on this exercise sheet will be disregarded during the grading. Give answers exclusively in your working sheets; leave a margin of 3cm.

Undecipherable scribbling will not be graded. Use the terminology and the mathematical tools presented in the lecture and the tutorial; make clear how you derive your results.

- 1) A plaintiff (P) considers bringing a lawsuit against his opponent, the defendant (D). If P wins in court, D has to pay 100. This will occur with probability q . Pursuing a trial, however, is costly. The individual cost of P is $C_p = 20$, and of D is $C_D = 40$. Before P files the suit, the parties may settle the case. Assume first that each party has to bear its own costs, regardless of who wins in court.
- Draw the game tree. (4)
 - What is the threshold value of the probability to prevail such that P is motivated to bring suit (given the parties do not agree upon a settlement)? (4)
 - What is the bargaining rent during the settlement stage? (2)
 - What is the threat point of each party in the settlement? (2)
 - Write down the Nash product and derive the symmetric Nash bargaining solution. (4)
- Assume now the British (or European) rule: the loser of a trial pays both side's costs.
- Derive the condition under which P would go to court if no settlement has been reached. (4)
 - Calculate the Nash Bargaining solution for the British Rule. (4)
 - Does one cost allocation rule systematically favor the plaintiff? (2)
 - Assuming $q=0.5$, P considers investing into the quality of evidence that supports his law suit, i.e., increases q to 1. Derive his marginal willingness to pay for such improvement under each rule. (4)

- 2) A penniless entrepreneur (X) wants to setup a project today that has revenue of $R = 1500\text{€}$ tomorrow. The project requires an initial investment of 1000€. In order to setup the project, X asks a wealthy investor (Y) for financial support in exchange for sharing the project return. Assume both are risk-neutral and both have no other opportunity to invest.
- Denote X's share as x , whereas Y receives $1-x$. What are the payoffs of each player? (2)
 - What is the bargaining rent? (2)
 - Draw the Pareto Frontier. (4)
 - Write down the Nash Product. (2)
 - Derive the share x predicted by the symmetric Nash-bargaining solution (SNBS). (4)
- Instead of a constant revenue, consider now the case in which the project return depends on the effort (e) of the entrepreneur $R = 100 \cdot e$. The entrepreneur faces effort costs: $c = e^2$
- Calculate the efficient investment if the entrepreneur were able to finance the project on his own. (4)
 - With the optimal effort spent, what is the share predicted by the SNBS? (4)
 - Anticipating the SNBS, would X have the incentive to spend optimal effort? Why? (4)
 - Alternatively, the entrepreneur can borrow the initial funding from a bank and repay interest rate r . Would X have the incentive to spend optimal effort? Why? (4)
- 3) During the summer season, a hotel owner (H) expects to collect a daily revenue of \$100000. The only cost factor under scrutiny is wages. The 200 workers in the hotel are represented by a union Manager (U), who wants to increase the daily wage rate and threatens to go on strike. Each day the workers are on strike the hotel's revenues drop down to zero. The summer season lasts n days. H and the workers have no other income source. In order to reach an agreement, U and H can make alternating daily offers. U makes the first offer.
- Briefly describe the difference between the bargaining models of Rubinstein and Ståhl. Which model is more adequate to describe the situation above? (4)
 - Draw the game-tree for $n=3$, and derive the subgame perfect equilibrium wage per worker and the residual profits of the hotel. (6)
 - Draw the game-tree for $n=4$, and derive the subgame perfect equilibrium wage per worker and the residual profits of the hotel. (6)
 - Assume now that the workers face a guaranteed unemployment payment of 250€ per worker if the hotel goes bankrupt. How does this change the subgame perfect wage for $n=4$? (4)
 - Assume now that strike is illegal unless preceded by an arbitration procedure. The arbiter receives an offer from both sides and implements the average of the offers. Derive the Nash equilibrium offers of the two parties for $n=4$. (4)
 - What is the wage implemented by the arbiter? (2)
 - Assume the arbiter wants to implement a wage that fulfills the axiomatic approach of the Nash bargaining solution. Name these axioms. (4)