

PURE EXCHANGE, GENERAL EQUILIBRIUM**Problem 1**

Paul's utility function is given by the formula $U_P(x_{P1}, x_{P2}) = x_{P1}^{1/3} x_{P2}^{2/3}$, and John's utility function is $U_J(x_{J1}, x_{J2}) = x_{J1}^{1/2} x_{J2}^{1/2}$. Paul has the initial endowment of $\omega_{P1} = 1$ and $\omega_{P2} = 0$, while the initial endowment of John is $\omega_{J1} = 0$ and $\omega_{J2} = 1$. Their only income comes from selling (some of) the initial endowments. Assume that prices p_1 and p_2 of goods x_1 and x_2 , respectively, are determined by an impartial arbiter-auctioneer.

- At what price ratio will the equilibrium of the exchange between Paul and John emerge?
- What will be the gross demand of each of them for every good in the equilibrium?
- How does the exchange affect the utility of each of them?

Problem 2

Martina and Christian are investors who trade stocks of two companies specializing in the sale of agricultural products – Bysto & Co. (B) and Polan & Co. (P). There are no other investors besides Martina and Christian. Revenues from stocks are risky because they depend on whether there is much or little rain during the summer. Both situations (much and little rain) are equally likely. The dividend per single share of Bysto & Co. amounts to 1 PLN if the summer is rainy and 0 otherwise. For Polan & Co., the contrary holds, i.e., the dividend per single share of that company is 0 if the summer is rainy and 1 otherwise. Martina owns 100 shares of Bysto & Co. and does not have any shares of Polan & Co., while Christian has 100 shares of Polan & Co. and does not have any shares of Bysto & Co. Both Martina (M) and Christian (C) maximize their expected utility given by the following formula: $U_i(B_i, P_i) = 1/2 \ln B_i + 1/2 \ln P_i$, where $i = \{M, C\}$.

- In the Edgeworth box, indicate the initial endowments and explain whether it is an efficient allocation or not.
- What is the equilibrium price ratio of the shares?
- How much shares will each of the two investors own in the equilibrium?
- Discuss Martina's and Christian's risk related to the split shares in the initial situation and the equilibrium. Which of these two allocations is less risky?

Multiple-choice questions**Problem 1**

In a pure exchange economy, consumers A and B exchange goods x and y . The utility function of consumer A is $U_A(x_A, y_A) = x_A y_A$, and the utility function of consumer B is $U_B(x_B, y_B) = 3x_B + 2y_B$. Consumer A's initial endowment is 2 units of good x and 3 units of good y , while consumer B's initial endowment is 4 units of good x and 3 units of good y . Neither of them can influence the prices of x and y . In pure competition, the equilibrium price ratio p_x/p_y is:

- 3/2.
- 3/5.
- 2/3.
- is not unambiguously defined – different price ratios are possible in the equilibrium.
- None of the above

Problem 2

Anne and Tom consume only chips (C) and peanuts (P). Regardless of the amounts of the goods consumed, the marginal rate of substitution chips for peanuts (MRS_{CP}) is -2 for Tom and -3 for Anne. Assume that Tom's initial endowment is 3 packages of chips and 3 packages of peanuts, while Anne's initial endowment is 6 packages of chips and 10 packages of peanuts. Which of the following statements is true?

- The described allocation is Pareto efficient.
- The described allocation is not Pareto efficient because Tom and Anne have different amounts of each of the goods.
- The described allocation is not Pareto efficient because Anne could trade 2 packages of peanuts for 1 package of chips and, as a result of this, improve her situation without worsening Tom's situation.
- The described allocation is not Pareto efficient because Tom could trade 1 package of peanuts for 2 packages of chips and, as a result of this, improve his situation without worsening Anne's situation.
- None of the above