

Home Assignment

UEC-51806 Advanced Microeconomics, Part 1, Fall 2022

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Consider a competitive farmer who uses the entire area of land he owns (\bar{L}) to cultivate soybeans (S) and rapeseed (R). Denote the corresponding areas of land as L_S and L_R (measured in hectares), with $L_S + L_R = \bar{L}$. Denote the market price of soybeans as P_S and the price of rapeseed as P_R (in euros per metric ton). The yields are y_S and y_R , respectively (in metric tons per hectare). The production cost functions are given by $C_S(\cdot)$ and $C_R(\cdot)$ and depend on the **production** of each crop (given that the yields are exogenous), not on the cultivated area. You may assume that $C_i'(\cdot) > 0$ and $C_i''(\cdot) > 0$ for $i = \{S, R\}$.

Tasks:

1. Write down the profit maximization problem (PMP) of the farmer. What is (are) the choice variable(s)?
2. Derive the first-order conditions corresponding the PMP.
3. Consider an exogenous increase in the price of soybeans. What happens to the area of land dedicated to rapeseed? That is, determine the sign of $\partial L_R / \partial P_S$. Is this effect ambiguous or unambiguous? Provide your intuition.
4. What happens to the share of the revenue from soybeans in the total revenue of the farmer when the price of soybeans increases? Is this effect ambiguous or unambiguous? Provide your intuition.