

Schreiben Sie den Nachnamen, den Vornamen und den Studiengang in DRUCKSCHRIFT!

Nachname:\_\_\_\_\_

Vorname:\_\_\_\_\_

Matrikel-Nr.:\_\_\_\_\_

Studiengang:\_\_\_\_\_

Unterschrift:\_\_\_\_\_

☐ Regulärer Versuch   ☐ Erste Wiederholung   ☐ Zweite Wiederholung   ☐ Verbesserungsversuch

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Universität Rostock  
Wirtschafts- und Sozialwissenschaftliche Fakultät  
Lehrstuhl für Angewandte Wirtschaftsforschung  
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Modulprüfung  
Introduction to Environmental and Resource Economics  
Wintersemester 2024-25, 10. Februar 2025

- Beantworten Sie zwei der drei gestellten Aufgaben! Unterschreiben Sie die Klausur auf der letzten Seite. Alle Aufgaben sind gleich gewichtet.
- *Please answer two out of three questions! Sign the exam on the last page. All questions are equally weighted.*
- Erlaubte Hilfsmittel: keine / *Additional materials allowed: none.*
- Insgesamt sind in der Klausur **90 Punkte** zu erreichen / *Overall 90 points are achievable.*
- Um die Klausur zu bestehen, müssen Sie **mindestens 45 Punkte** erreichen.
- *To pass the exam, you will need to achieve **at least 45 points**.*
- Bearbeitungszeit: 90 Minuten
- *Time limit: 90 minutes*
- *Viel Erfolg / Good luck!*

**Two (and only two) out of three questions! If you attempt more than two questions, cross out the one you do NOT want counted. Otherwise, we will count the first two.**

**Question 1. Externalities and bargaining.** (45 points) Suppose A and B are neighbors. A loves playing the saxophone. B hates music but cannot avoid hearing it, as the walls of her apartment are too thin to block out the sound of A playing. Assume that nobody else is affected by the music.

- a) Assume that the legal situation is such that A has the right to play as much music as she wants to. How much music will she play if there is no intervention, neither by B nor anybody else? Argue based on a graph showing marginal benefits of playing for A and marginal external costs of listening for B. (12 points)
- b) Continue assuming that A has the same right to playing as in part a). However, now suppose that A and B can bargain. What will be the outcome with respect to the amount of music played by A? Why? Argue graphically and explain briefly. (12 points)
- c) Suppose now that the legal situation has changed. B has the right to complete silence. A and B can still bargain. What will now be the outcome with respect to the amount of music played by A? Why? Argue graphically and explain briefly. (12 points)
- d) Discuss the distributional differences between the two situations in parts b) and c). Argue graphically and explain briefly. (9 points)

**Question 2. Instruments.** (45 points) Suppose a government considers introducing a pollution tax or a cap-and-trade scheme. It wants to assess the likely performance of these two instruments.

- a) A government economist claims that – as long as abatement costs are known with certainty – it does not matter whether a pollution tax or an equivalent cap-and-trade scheme is implemented. She argues that both instruments will achieve the same results with respect to the equilibrium price and quantity of pollution. Do you agree? Argue graphically and discuss briefly. (18 points)
- b) Suppose the government suspects that its current assessment of the marginal abatement cost (MAC) overestimates the true level of the MAC curve. If this suspicion turns out to be true, will the pollution tax and cap-and-trade still achieve the same results with respect to the equilibrium price and quantity of pollution? Show graphically and explain briefly. (18 points)
- c) Compare the relative magnitude of efficiency losses from overestimating MAC, for the tax and for cap-and-trade. In your answer, assume that the marginal-damage-of-emissions curve is known with certainty and that it is "steeper" than the MAC curve. (9 points)

**Question 3. International environmental problems.** (45 points) Suppose two countries, X and Y, are negotiating an agreement to counter an international environmental problem. The countries play a static game of perfect information, i.e. both countries move simultaneously and all payoffs are known to all players. Each country is self-interested. Suppose the payoffs are as follows:

- Each country that abates incurs an abatement cost of 5. Being a public good, abatement by each country gives an abatement benefit of 4 to each country.
- If one country abates while the other pollutes, the polluter incurs no cost but does collect the benefit of 4 from the other player abating. The abater incurs the abatement cost of 5 and abatement benefit of 4.
- If neither country abates, both countries receive a payoff of -5 each.

a) Fill in the payoff matrix. (10 points)

X's strategy \ Y's strategy	Pollute	Abate
Pollute		
Abate		

b) What is the Nash equilibrium / what are the Nash equilibria of this game? Why? (10 points)

c) Does any player in this game have a dominant strategy? Explain briefly. (10 points)

d) Is this game a prisoner's dilemma? Explain briefly. (10 points)

e) What change to the payoff matrix in part a) would make this game a prisoner's dilemma? Explain briefly. (5 points)