

Exam

Adv. PSE I: New Systems Competition

Wirtschaftswissenschaftliche Fakultät der Friedrich-Schiller-Universität Jena
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| First name: | | Last name: | |
| Student ID number: | | Course of study: | |

Please note:

- (a) The exam consists of 10 pages including this one. Please check whether your copy of the exam is complete.
- (b) The exam consists of 3 questions. The maximum number of points receivable is 60. You have 60 minutes to complete the exam.
- (c) Please answer the questions by writing into the boxes provided after each question. **Do not use your own paper!** Fill your name and student ID number into the form at the top of each page.
- (d) If not defined otherwise, variables have the same meaning as in class. Please make sure that your answers are clearly legible and without any ambiguity. Your answers have to be tractable. If you use diagrams, make sure to label and explain them.
- (e) You may use a calculator, but it must not have a text storage function.
- (f) It is your own responsibility to hand in your copy of the exam to the supervisory staff at the end of the exam.

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|-------------------|----|----|----|-----|-------|
| Question | 1 | 2 | 3 | Sum | Grade |
| Points receivable | 25 | 15 | 20 | 60 | |
| Points received | | | | | |

Question 1: Tax Competition (25 Points)

Questions 1(a) to 1(c) refer to a model of tax competition which was discussed in class:

A representative firm maximises its profit (1). This results in two first-order conditions (2) and (3). If the government of one country i changes its tax rate τ^i , firms in country i will react according to (4a) and firms in other countries j will react according to (4b). Using (5) as an additional assumption, one can derive (6). Substituting this into (4a, 4b) yields (7a, 7b).

Each country is endowed with capital \bar{k} . However, the amount of capital that is employed in each country k^i may differ from \bar{k} , because capital is mobile across borders.

$$\max_{k,l} \pi = f(k,l) - (r + \tau)k - wl \quad (1)$$

$$f_k = r + \tau \quad (2)$$

$$f_l = w \quad (3)$$

$$\frac{dk^i}{d\tau^i} = \frac{\frac{\partial r}{\partial \tau^i} + 1}{f_{kk}^i} \quad \frac{dk^j}{d\tau^i} = \frac{\frac{\partial r}{\partial \tau^i}}{f_{kk}^j} \quad (4a, 4b)$$

$$n\bar{k} = \sum_{i=1}^n k^i \quad (5)$$

$$\frac{\partial r}{\partial \tau^i} = -\frac{1}{n} \quad (6)$$

$$\frac{\partial k^i}{\partial \tau^i} = \frac{n-1}{n} \frac{1}{f_{kk}^i} \quad \frac{\partial k^j}{\partial \tau^i} = -\frac{1}{n} \frac{1}{f_{kk}^j} \quad (7a, 7b)$$

The government of a country i aims to maximize the utility of its citizens $u(c^i, g^i)$ by setting its tax rate τ^i . Citizens derive utility from the consumption of a private good $c^i = f(k^i) - f_k k^i + r\bar{k}$ and a public good $g^i = \tau^i k^i$.

Assuming that all countries are symmetrical, one can derive the rule (8) by which the government will decide on its tax rate:

$$u_g = u_c \frac{1}{1 + \frac{\partial k^i}{\partial \tau^i} \frac{\tau^i}{k^i}} \quad (8)$$

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Question 1(a) (7 Points)

(a1) Briefly describe how (4a, 4b) can be calculated. (You do not have to do the calculation.)

(a2) Briefly describe the economic intuition of equations (2), (5), and (6).

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Question 1(b) (5 Points)

Derive (8) formally!

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Question 1(c) (7 Points)

According to (8) governments make allocatively inefficient decisions from a global point of view.

(c1) Explain why governments do not make efficient decisions.

(c2) Assume that the governments of all countries can enter into a binding contract about a mechanism that would incentivize each individual government to make an efficient decision. Give the name of such a mechanism. Briefly describe how it would work.

Question 1(d) (6 Points)

Now consider a different model of tax competition which was also discussed in class: In the model by Hans-Werner Sinn the public good does not enter into the utility of the citizens. Instead it is an infrastructure good that reduces firms' cost of using capital. The government raises a capital tax and a labor tax to cover the costs of providing the infrastructure good.

Here, the governments' decisions lead to an efficient result. However there is another problem ...

(d1) Briefly describe the problem.

(d2) Should governments attempt to solve the problem by agreeing on a common tax rate? Explain!

(d3) Which kind of international agreement could solve the problem in the context of the model? No further explanation is required.

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Question 2: Welfare States (15 Points)

Question 2(a) (7 Points)

Which motive or argument for the existence of welfare states was discussed in class? Why does the possibility of migration pose a challenge to welfare states based on this motive?

Question 2(b) (8 Points)

The paper by Thum and Übelmesser (2003) which was discussed in class presents a game-theoretic model of the provision of public education where a young and an old generation make the following decisions:

(The order of decisions in the list was chosen randomly. See question (b2).)

- (OT) The old generation sets the wage tax rate that members of the young generation will have to pay if they stay in the country after completing their education.
- (OE) The old generation decides to which extent the education provided to the young generation will be applicable in other countries.
- (YL) Members of the young generation decide whether or not to leave the country and work abroad after completing their education.

After all decisions have been made, tax revenues are redistributed from the young generation to the old generation.

(b1) A fourth decision is missing. Which one? Who makes it?

(b2) In which order are the decisions made in the model? (Please make sure to order from first to last, not the other way round.)

(b3) Despite the fact that the old generation is quite powerful in this model, it decides to provide a fairly high amount of internationally applicable education and sets a fairly low tax rate. Explain why!

Question 3: Multiple Choice Questions (20 Points)

No, one, several, or all of the following statements are correct.

Mark true statements. Do not mark false statements.

You will be awarded one point for every statement that is marked correctly. You will be awarded no points for statements that are marked incorrectly.

(a) Regulatory Competition

The following five items relate to the series of models of emissions and spillovers that were discussed in class.

- In a closed economy without spillovers governments can achieve allocative efficiency by levying a Pigovian tax on emissions.
- If the damage of all emissions spreads evenly across the world, governments will set a tax rate that leads to an efficient result.
- The regulatory decision of the government of country i is affected by the extent of the damage that other countries' emissions cause in country i .

Now assume that there are no spillovers, but polluting firms are jointly owned by natives and foreigners. Governments only care about the welfare of their own citizens. Governments are likely to regulate in a way that leads to allocative efficiency if they agree to only use ...

- Tradeable Emission Permits
- Environmental Standards

(b) Competition of Product Standards

Imagine the market for a lemon good which can be produced in different qualities reaching from very high to very low. It is costly to producers to increase the quality of their products. Producers cannot credibly communicate the quality of their products to buyers. Buyers cannot assess the quality of a product before they buy.

- The market is affected by ex-post moral hazard.
- Even if goods of very high quality are offered at first, they will gradually disappear from the market. The process will stop once the best remaining goods are of average quality.

In a closed economy a social planner would set quantity and quality according to the following rule(s):

- Consumers' willingness to pay for a unit of the lemon good equals the marginal cost of production.
- For any given quantity the marginal utility of an increase in quality equals the marginal cost of an increase in quality.

Under systems competition ...

- Policy changes of a single government do not affect the profits of local producers.

(c) Competition in Banking Regulation

- A bankruptcy externality exists if bank owners are only partially liable for bank losses.
- Banks never invest more into safe assets than the minimum amount prescribed by the government.
- If the government increases the minimum requirement for safe assets, banks will always shift towards less risky investments.

Equation (9) is taken from the model of banking regulation discussed in class. α is the share of natives among bank lenders. β is the share of natives among bank owners.

$$\frac{\partial W}{\partial \varepsilon} = (\alpha - \beta) (1 - p(q)) s + \alpha \frac{dq}{d\varepsilon} p'(q) (rF - s\varepsilon) \quad (9)$$

According to (9) ...

- If $\alpha = \beta$, governments will prescribe a minimum requirement for safe assets that leads to a socially optimal amount of risk taking.
- If $\alpha < \beta$, the redistribution effect and the risk reduction effect operate in opposite directions.

(d) Competition of Competition Rules

Assume a market for a regular good with two competing firms.

- The transition from a Cournot to a Stackelberg Oligopoly leads to a redistribution of rents from consumers to producers.
- Welfare is higher in a Stackelberg Oligopoly than in a Cournot Oligopoly.

Assume that competition rules are subject to systems competition. There are at least two firms per country.

- Upholding ordo-liberal antitrust regulation can only be an equilibrium strategy for all governments if no government has the opportunity to form a national cartel which can commit to an output quantity before its international competitors.

At the end of the deregulation race described by Hans-Werner Sinn ...

- Overall welfare is larger than in a situation where all governments uphold ordo-liberal antitrust law.
- The outcome is a Pareto improvement over a situation where all governments uphold ordo-liberal antitrust law.