Exam

Adv. PE I: Public Policy in Open Economies

Wirtschaftswissenschaftliche Fakultät der Friedrich-Schiller-Universität Jena
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First name:		Last name:	
Student ID:		Study programme:	

Please note:

(a) The exam consists of 9 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 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. You may use a dictionary, but it must not contain any notes.

(f) It is your own responsibility to hand in your copy of the exam to the supervisory staff at the end of the exam.

Question	1	2	3	Sum	Grade
Max. no. of points	20	20	20	60	
No. of points received					

Question 1: Education as a Commitment Device *(20 Points)*

The paper by Thum and Uebelmesser (2003), which was discussed in class, presents a game-theoretic model of the provision of public education. Production Y_i in country i is a function of domestically productive labor provided by domestic and immigrated workers in efficiency units, L_i (see (1)). According to (2), m_i represents the domestic wage per efficiency unit of L_i.

If I_i denotes the domestically valuable human capital of the N_i domestic workers, and I_j^i symbolizes the human capital of the N_j^i immigrated workers from country j which is productive in country i; then the total amount of efficiency units available in country i is represented by (3). Consider further that (4) shows that I_i is defined by the amount of education Z_i, times γ_i, the fraction of education that increases only the domestic productivity in i.

$$Y_i = F_i(L_i) \tag{1}$$

$$\frac{\partial F_i}{\partial L_i} = m_i \tag{2}$$

$$L_i = I_i N_i + I_j^i N_j^i \tag{3}$$

$$I_i = \gamma_i Z_i \tag{4}$$

Question 1(a) *(2 Points)*

The model considers an Old-Generation (OG) and a Young-Generation (YG). Briefly mention one assumption about each one.

Question 1(b) *(10 Points)*

The decision structure of the model consists of four stages. Each of the following equations can be associated with one of the stages. (The order of equations in the list was chosen randomly).

$$m_i \gamma_i Z_i (1 - t_i) = m_j (1 - \gamma_i) Z_i \tag{5}$$

$$m_i m_j \left(\frac{1}{2} - \gamma_i\right) = -m_j^2 (1 - \gamma_i) \tag{6}$$

$$t_i^* = 1 - \frac{m_j (1 - \gamma_i)}{m_i \gamma_i} \tag{7}$$

$$Z_i^* = \frac{1}{2} m_j (1 - \gamma_i) \tag{8}$$

Describe the four stages of the model in the order the decisions are made (not in the order the model is solved!). For each stage, be sure to mention a) the decision that is made, b) who makes the decision, and c) the number of the equation (5, 6, 7 or 8) that is associated with the stage.

Question 1(c) *(2 Points)*

Equation (6) can be rewritten in the following way:

$$m_i Z_i^* + m_i \gamma_i \frac{\partial Z_i^*}{\partial \gamma_i} = -m_j^2 (1 - \gamma_i) \tag{9}$$

The left-hand side of (9) shows two opposing effects on the income of the Old-Generation (OG). Describe both effects and associate them with the terms in the equation.

Question 1(d) *(2 Points)*

The right-hand side of (9) shows an effect on the income of the Young-Generation (YG). Mention two implications of a marginal increase of γ_i.

Question 1(e) *(4 Points)*

Despite the fact that the Old-Generation (OG) 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 2: Banking Regulation *(20 Points)*

Consider the model of banking regulation which was discussed in class. Assume initially that we are in a closed economy. Due to large transaction costs, banks act as financial intermediaries between bank lenders and firms that require funds. Bank lenders buy bank bonds which pay an interest rate of $r-1$. The demand for bank bonds F is completely inelastic to the interest rate.

Banks can invest in safe assets and in risky projects. Safe assets yield a return of $s-1$. The amount invested in safe assets is denoted by C. The government can pass regulation to force banks to invest at least $C=\epsilon$ in safe assets.

For investments in risky projects, banks can decide about the amount of risk they want to take on: higher risk is associated with a larger return $q-1$, but also with a larger probability of failure $1-p(q)$.

Consider the maximization problem of the bank. A very simple maximization problem is given by (10). The resulting first-order condition is (11). A more realistic maximization problem is given by (12). Assuming $sC < rF$, (12) can be transformed into (13). The corresponding optimality conditions are (14), (15), and (16).

$$\max_{q} E\pi = (p(q)\,q - r)\,F \tag{10}$$

$$p'(q)\,q + p(q) = 0 \tag{11}$$

$$\max_{q,C} E\pi = p(q)\,[sC + (q-r)\,F] + (1-p(q))\,max\,(sC - rF,0) - sC \quad s.t. \quad C > \epsilon \tag{12}$$

$$\max_{q,C} E\pi = (p(q)\,q - r)\,F + (rF - sC)\,(1-p(q)) \quad s.t. \quad C > \epsilon \tag{13}$$

$$(p'(q)\,q + p(q))\,F - p'(q)\,(rF - sC) = 0 \tag{14}$$

$$s\,(1-p(q)) = \lambda \tag{15}$$

$$\lambda\,(C-\epsilon) = 0 \tag{16}$$

Question 2(a) *(2 Points)*

Which form of liability is described by (10)? Which form of liability is described by (12)?

Question 2(b) *(2 Points)*

Explain the economic intuition behind equation (11).

Question 2(c) *(6 Points)*

Explain the economic intuition behind equation (12). Be sure to explain the structure of the equation.

Question 2(d) *(2 Points)*

Based on equations (15) and (16). What is the amount of equity that the bank chooses and what is the intuition behind it?

Question 2(e) *(6 Points)*

Consider now an open economy. The government sets the minimum equity requirement ϵ in order to maximize the welfare of domestic residents taking the regulation in other countries as given. The government's maximization problem (17) contains the expected utility EU of bank lenders and the expected profits $E\pi$ of bank owners. Both groups consist of nationals and foreigners. α denotes the share of domestic residents among the people lending to domestic banks, and β is the share of domestic banks owned by domestic residents. The maximization problem of the government yields the first-order condition (18).

$$\max_{\epsilon} W = \alpha EU + \beta E\pi \tag{17}$$

$$\frac{\partial W}{\partial \epsilon} = (\alpha - \beta)\left(1 - p\left(q\right)\right)s + \alpha \frac{dq}{d\epsilon} p'\left(q\right)\left(rF - s\epsilon\right) \tag{18}$$

Identify and explain the two effects that can be distinguished in the first-order condition (18).

Question 2(f) *(2 Points)*

Choose two combinations of α and β: one combination where the resulting regulation is too lax and one combination where the resulting regulation is not too lax.

Question 3: Multiple-Choice Questions *(20 Points)*

You will be *awarded one point* for ticking a correct statement and for not ticking an incorrect statement. You will *neither receive nor lose points* for marking statements incorrectly.

Question 3(a) Capital Tax Competition and Public Good Provision *(5 Points)*

In class we analyzed the incentives to compete for capital, when capital is only mobile across countries, and not across regions of the same country.

Correct?	
☐	In a closed economy ($n = 1$), any increase in the tax rate can be shifted onto capital owners via a proportional reduction in the interest rate.
☐	In a small open economy ($n \to \infty$), the international interest rate cannot be influenced via the local tax policy.
☐	When increasing the tax rate, the outflow of capital is decreasing (in absolute terms) in the number of countries n, i.e. the larger n, the more weakly capital demand in country i reacts to a marginal increase in τ^i.
☐	The marginal cost of public funds (MCPF) measures how much public consumption has to be sacrificed in order to raise one additional unit of tax revenues.
☐	The higher the Tax Base Elasticity, the more severe the underprovision tendency of the public good.

Question 3(b) Competition of Competition Rules *(5 Points)*

Correct?	
☐	If there is initially a group of identical closed markets; creating a common market, given the number of firms, increases aggregate output and welfare, because the market share of each single firm falls and competition becomes more intense.
☐	If, in a symmetric confederation of countries, firms follow Cournot-Nash strategies; policy competition brings about an equilibrium where all countries dismantle their antitrust laws due to the creation of a common market.
☐	Assume that governments are engaged in policy competition. It can only be an equilibrium to uphold national ordo-liberal antitrust laws if all firms can credibly commit to an output quantity.
☐	Ceteris paribus, a Stackelberg oligopoly is characterized by higher welfare than a Cournot oligopoly.
☐	At the end of the Deregulation Race, overall welfare is larger than in a situation where all governments stick to ordo-liberal antitrust laws.

Question 3(c) Environmental Regulation *(5 Points)*

Correct?	
☐	In a closed economy without waste spillovers, the national government can achieve allocative efficiency by levying a Pigovian tax on emissions.
☐	In the case of international waste spillovers, the national government will choose a too restrictive tax rate.
☐	When the environment is regulated by means of permanently valid permits and when some of the permits have found their way into the pockets of foreigners, the national government will implement a too restrictive environmental policy.
☐	When the environment is regulated by means of permanently valid permits, the negative externality stemming from a rent-dissipation effect affects foreign direct investors only if there are international waste spillovers.
☐	If the national government regulates the environment via quantity standards, policy competition will always lead to a too lax environmental policy.

Question 3(d) Refugee Protection as an International Public Good *(5 Points)*

Consider the model by Facchini et al. (2006) discussed in class, where citizens of two symmetric countries derive a "warm glow" from admitting refugees into either country.

Correct?	
☐	The costs from admitting refugees are borne entirely by the country that decides to admit asylum seekers.
☐	Immigration levels are strategic substitutes. This means that the higher the number of asylum seekers admitted by the other country, the lower is the number of refugees country i decides to accept.
☐	The median voter strategically delegates to a representative that has a higher preference for immigration.
☐	Due to strategic delegation and positive spillovers not being internalized, the number of refugees accepted in the non-cooperative equilibrium is suboptimally low.
☐	With policy coordination, the number of refugees admitted is efficient because cross-country spillovers are internalized and strategic delegation can be eliminated.