Exam for the M.Sc. in Economics
University of Copenhagen

Political Economics, Fall 2009

January 12, 2010
3 hours.

Answers should be given in English.
No aids allowed except Danish-English / English-Danish dictionaries.

1. **Short questions.** Write briefly and concisely, no more than 2 pages per question.

   (a) Define single-peaked preferences and explain why this concept is of interest in political economics modelling.

   (b) In a median-voter equilibrium of an economy with broad redistributive program higher income inequality leads to more redistribution. True or false? Explain your answer.

   (c) Suppose two parties i and j are engaged in a war-of-attrition style negotiation over a budget (this is also sometimes referred to as a game of chicken, or a staring contest). If j concedes, i wins and vice versa. If i wins it receives utility U_i^W, if it loses it receives utility U_i^L. Party i does not know the optimal concession time of its opponent, only its associated cumulative distirbution function H and the density function h. We can write the expected utility of party i as a function of T_i as

   $$EU_i(T_i) = \int_0^{T_i} U_i^W(t)\, h(t)\, dt + (1 - H(T_i))\, U_i^L(T_i).$$

   Explain why expected utility has this form.
   The marginal cost of continuing bargaining is given by δ_i. If we solve for the optimal stopping time T_i^*, we can show that the (necessary and sufficient) first order condition is

   $$\left[u^W - u^L\right] \frac{h(T_i^*)}{1 - H(T_i^*)} = \delta_i.$$

   where the gain from winning $u^W - u^L$ is independent of T_i. Explain the intuition: What is the trade-off faced by party i?

2. Consider a society with a politician and N citizens. The politician allocates a fixed budget of size 1. The procedure is as follows: the politician makes a proposal of how much money to give to each individual citizen and to the politician himself, $(f_1, f_2, ..., f_N, f_P)$, such that $f_i \geq 0$ and the budget is balanced

   $$f_P + \sum_{i=1}^{N} f_i = 1.$$

   The citizens observe the proposal and vote on it, simultaneously and non-cooperatively. If the proposal is rejected, each of the citizen gets a default option of $\overline{f}_i = \frac{1}{N}$, $i = 1, ..., N$, and politician does not get anything. Voting is sincere, that is, each citizen votes for the proposal if and only if it pays as much as the default option.

   (a) Assume that in order to get the proposal accepted, the politician needs a support of at least $N/2$ (i.e., a majority) of citizens. Describe all possible Nash equilibria outcomes in terms of allocation of the budget (an informal description is sufficient). What is the budget share of the politician in these equilibria (f_P^{Maj})?

(b) Assume now that citizens are living in 3 districts of equal size $n = N/3$. In order to get the proposal accepted, the politician needs the support of at least 2 (i.e., majority) of the districts. By support of a district here we mean that at least half ($= n/2$) of the district population votes for the proposal. How do the Nash equilibrium allocations of the budget look like? (an informal description is sufficient). What is the budget share of politician $f_P^{\mathrm{Pr}\,or}$?

(c) In the view of your results above and the models that we discussed in class comment on the impact of different electoral rules on politician's rents.

3. Consider an economy populated by two groups of individuals. The share of population in group $J = 1, 2$ is given by α_J, $\alpha_A + \alpha_B = 1$, and group 1 is a minority

$$\alpha_1 < \alpha_2.$$

Individuals in group $J = 1, 2$ have preferences over economic outcomes, given by

$$w_J = c + 2\beta_J\sqrt{e}.$$

Here c stands for private consumption and $2\beta_J\sqrt{e}$ represents individual's utility from clean environment, where e denotes the measures of environmental protection undertaken by the government, and β_J is the relative taste for environmental protection. We assume that β_J is the same within each group, but different across groups - individuals in group 1 care more about the environment than individuals in group 2

$$\beta_1 > 1 > \beta_2.$$

We assume that the parameters are normalized in such a way, that

$$\alpha_1\beta_1 + \alpha_2\beta_2 = 1.$$

All individuals have the same income $y = 1$, and are taxed by uniform income tax t levied on everyone, so their consumption is equal to their after tax income

$$c = 1 - t.$$

The government uses the tax proceeds to finance the measures of environmental protection, so that the government budget constraint is given by

$$t = e.$$

(a) Derive the level of taxation t^{SO}/environmental protection e^{SO} in utilitarian social optimum.

(b) Compute each individual's preferred tax level. How does it depend on the taste for environmental protection β_J? Provide intuition to your answer.

(c) Suppose that two purely office-seeking (i.e., maximizing its probability of winning) political parties, A and B, compete in elections in this economy. Assume that each party can commit to its electoral promises in case it wins elections. Citizens vote for the party that provides them with most utility. The party that gets most votes wins, and when there is a tie, each of the parties wins with probability 1/2.

   i. What is the level of taxation t^*/environmental protection e^* in this equilibrium?

   ii. Compare them to the socially optimal levels you found in (a) and comment on the source of difference.

(d) Now assume that voters also have ideological preferences towards parties. Voter i in group J votes for party A if

$$w_J(e_A) > w_J(e_B) + \sigma_J^i + \delta$$

where σ_J^i is an individual ideological taste parameter, and δ is a population-wide ideological shock. Assume that for each group $J = 1, 2$ parameter σ_J^i has a uniform group-specific distribution with density ϕ_J and mean 0, and δ is uniformly distributed with density ψ and mean 0. When parties propose their policies (taxes/environmental protection), they know the distributions of σ_J^i and δ but not the exact values.

i. Identify the swing voter in group J and show that the share of votes party A gets in group J is given by

$$\phi_J \left(w_J(e_A) - w_J(e_B) - \delta \right) + \frac{1}{2}.$$

What is the total share of votes for party A in the entire population? (HINT: remember that group sizes are given by α_J)

ii. Show that the probability of winning elections for party A is given by

$$p_A \left(e_A, e_B \right) = \frac{1}{2} + \psi \left(\sum_{J=1,2} \alpha_J \phi_J \left(w_J(e_A) - w_J(e_B) \right) \right).$$

iii. Show that taxation t^{**}/environmental protection e^{**} in this equilibrium is given by

$$t^{**} = e^{**} = \left(\frac{\alpha_1 \phi_1 \beta_1 + \alpha_2 \phi_2 \beta_2}{\alpha_1 \phi_1 + \alpha_2 \phi_2} \right)^2.$$

iv. Under what condition there is an equilibrium in which there is too much environmental protection from the socially optimal point of view? Provide an intuitive explanation for your result.