Political Economics
Problem Set 1 Complimentary

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Note

The solution to this problem set should be uploaded to Studentportalen no later than **November 20** at 24:00. Write your individual answers on computer and put your name at the top of the document. This problem set is about Social choice, voting and bargaining. Please carefully motivate your answers. For any questions concerning the exercises, send me an e-mail at davide.cipullo@nek.uu.se. My office is **E434** at the Department of Economics. Good luck!

1. **Social choice.** Answer to the next questions in one short paragraph each. Throughout the exercise, assume majority voting when you need to consider an explicit voting system.

   (a) Explain which axiom(s) of Arrow's Impossibility theorem is (are) not fulfilled.

   (b) Now assume that preferences are single-peaked on a multidimensional policy space. Explain, if any, which assumptions of the Median Voter theorem are not fulfilled. If they are all fulfilled, motivate why.

   (c) Now assume that preferences are single-peaked on a single dimension policy space. Explain, if any, which assumptions of the Median Voter theorem are not fulfilled. If they are all fulfilled, motivate why.

   (d) Describe which of the Arrow's axiom we are restricting in (c). What does this imply to the Independence of irrelevant alternatives?

   (e) Give an intuition about why the median voter theorem only works under the assumption of single-peaked preferences.

2. **Voting.** Consider an economy of three individuals $i = \{1, 2, 3\}$ that make decisions on how much to invest in military defense. All individuals have the same quasi-linear utility function: $U_i(c_i, G) = c_i + G^{1/2}$ where c is a consumption (private) good, and G is the public good (military defense). The public good is financed through a proportional income tax t. Hence, the government budget constraint is $G = \sum_{i=1}^{3} tw_i$ while individual budget constraint is $c_i = (1-t)w_i \ \forall i \in \{1, 2, 3\}$. Wages are exogenously given: $w_1 = 1$; $w_2 = 2$; $w_3 = 9$.

   (a) What is the expenditure on military defense that the society will choose? What is the tax rate? Solve the model.

   (b) Compare $\frac{dU_3}{dG}$ and $\frac{dU_1}{dG}$ and interpret the result.

   (c) Compare your results in (a) with the ones that you would obtain instead assuming that the level of defense and taxation rate are chosen by a central planner that maximizes an utilitarian SWF. In particular, discuss whether the median voter outcome leads to under-provision or to over-provision of public goods compared to the social planner's solution.
   Is your answer driven by the wage distribution and/or the preferences at hand, or can you generalize it to any situation in which the median voter theorem applies?

Suppose now that all individuals have equal wage $w = 2$, but preferences are instead represented by the utility function $U_i(c_i, G) = c_i^{i/3} G^{(3-i)/3}$ $\forall i \in \{1, 2, 3\}$. The government budget constraint and the individual budget constraints are the same as before.

(d) Motivate why individuals have different optimal tax rate although they all have the same wage. *Hint: For the scope of this exercise, you do not need to solve the model again.*

(e) Draw indifference curves on the (c_i, G) space for each of the three individuals. How does the one for individual 3 looks?

3. **Bargaining in Legislature.** Consider the European Council, in which each country member of the EU is represented by one member. Thus, the Council is composed by 28 members. In the European Council, one of the members is the speaker and acts as agenda setter. Assume for the scope of the exercise that at each point in time all members have the same probability of becoming the new speaker. The speaker has the right of making a proposal about how to distribute European grants to each country. If the speaker's proposed distribution is voted down, then a new speaker is chosen at random among the members and and will propose a new allocation. The members of the Council will continue the bargaining game a finite number of times, until an agreement is made. Each member of the council has utility function $U_i = r_i$, where r_i represents the transfer that country represented by counselor i receives. The public budget constraint is $R = \sum_{i=1}^{28} r_i$, hence R is the total size of the European budget. Assume also that (i) if after the last stage no agreement has been made, all counselors get an exogenous payoff of zero; (2) that counselors discount future with a discount factor $\beta < 1$; (3) that every time one counselor is indifferent between supporting a proposal and voting against it, she will support the proposal.

(a) How will the distribution of spending will look like in the last round of voting if you need the absolute majority of members to support the speaker's proposal in order to make it pass? Motivate!

(b) How would your answer to (a) change in the case of a rule that requires that $\frac{2}{3}$ of the members vote in support for a proposal to be approved? What if, instead, we assume that unanimity is required?

(c) Consider now the first round. Determine the distribution of spending in the case one needs the absolute majority of members to support the speaker's proposal.

(d) How would your answer to (c) change in the case of a rule that requires that $\frac{2}{3}$ of the members vote in support for a proposal to be approved? What if, instead, we assume that unanimity is required?

(e) Discuss all your results in relation to agenda setting power. Limit your answer to half page.