



Semestre 1 du Master 1 in Economics  
MARKETS AND ORGANIZATIONS  
Mercredi 27 janvier 2010  
De 14h à 17h  
AMPHI MB IV  
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Answer all three questions

Question 1)

Imagine that you are alone in an elevator, travelling from the ground floor to the fifth floor. It stops at the fourth floor, and four other people get in. You ask if they are going up, and they reply that they are going down. You discover that this elevator is "democratic"; at each stop the next destination is decided by majority vote of the people in it.

- a) Would this method of deciding the destination of the elevator be more efficient than the traditional method (the "aristocratic" principle) whereby the wishes of those who get in first have priority over those who arrive later? What kinds of inefficiencies might arise if it were generally known that this was how elevators worked?
- b) What, if anything, does this tell you about the strengths and weaknesses of systems of majority vote for governing modern societies?
- c) Is there any evidence that democracy is less suitable for poor countries than for rich ones?

Question 2)

Two countries are negotiating to set limits on pollution that each emits and that harms them both. They each agree to set lower pollution levels than in the past, and each country is deciding whether to stick to the lower levels that it has promised. Pollution levels are set simultaneously once per year and cannot be changed until the following year. If both set low pollution levels they will each suffer costs of €100 billion, while if they both set high levels they will each suffer annual costs of €200m. If one of them, however, sets low pollution while the other sets high pollution, the country with the low pollution will suffer net costs of zero. The costs for the country with the higher pollution in this case would be €250m if it is country 1 and \$300m if it is country 2. The two countries have discount rates of  $\gamma_1$  and  $\gamma_2$ , which are not necessarily the same.

- a) Calculate the lowest values of  $\gamma_1$  and  $\gamma_2$  which would enable the outcome in which both countries set a low pollution level to be sustained as a sub-game perfect equilibrium of an infinitely repeated game by the threat that if either country sets a high pollution level, the other will choose high pollution for ever, starting in the following year.

- b) Would your answers be different if, each year, country 1 first chose its pollution level and then country 2 could observe this before deciding which level of its own to set?
- c) Suppose that each country has a subjective probability equal to  $p$  that the other will choose low pollution in the current year, and  $(1-p)$  that it will choose high pollution. Calculate, as a function of  $p$ , the values of  $\gamma_1$  and  $\gamma_2$  at which the two countries will be just indifferent between high pollution and low pollution, assuming that, if both countries choose low pollution this year, they will do so for ever in the future.
- d) Suppose the two countries cannot observe each others' discount factors. Might each of them have an incentive to pretend that it has a lower discount factor than it really has?

### Question 3)

Suppose two different mafia organizations are competing to offer protection (at a price). Mafia 1 can expropriate each citizen's wealth with probability 0.4, while offering protection from Mafia 2 with probability 0.6. Mafia 2 also can expropriate wealth with probability 0.4 but can only offer protection from Mafia 1 with probability 0.4. You can assume that citizens are risk-neutral.

- a) At what price would Mafias 1 and 2 offer protection if they had a monopoly – i.e. if they did not have to compete against each other? You can assume that the price is expressed as a proportion of each citizen's wealth.
- b) At what price do they in fact offer protection given that they have to compete against each other? You may assume that each Mafia takes the other's price as given.
- c) Do your findings suggest that the citizens are better off under monopoly or under competition between the mafias?
- d) What difference would it make if Mafia 2 could offer protection against Mafia 1 with a probability 0.8?
- e) Can models of this kind help us to understand why piracy has become a problem in recent years in certain parts of the world such as the Horn of Africa?