Applied Game Theory

The theory of costly signaling: applications in economics

M1 ISF

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In this class, we are going to study in particular games of imperfect information (given by a game tree) and apply them to the study of costly signaling.

Evaluation of the lecture *(le "cours magistral") is based on your essay, which has to be handed in until May 30th 2020.*

Evaluation of the problem-set sessions *(le "TD") is based on your preparation of readings and exercises as well as your participation in class.*

Session 1

Thursday, February 4
9-11h50, Salle 506, Centre Assas

- *Introduction into the theory of costly signaling: history of the idea; the debate in economics, sociology, and biology. What are the problems to which it gives answers? Its applications?*
- *The basic model: a costly-signaling game with 2 states of nature, 2 signals, and 2 actions in response to the signal.*
- *Class I: differential costs for producing the signal (as in Spence's 1973 model). Case 1: costs of the signal for both types of player 1 strictly lower than the gain from the "good" response ("hire," "buy," etc.) of player 1.*
    - *The game in extensive form (given by a game tree)*

Session 2

Thursday, February 11
9-11h50, Salle 506, Centre Assas

- *Equilibrium analysis of the game*
    - *The game in normal form (given by a matrix)*
    - *Finding the Nash equilibria in the normal form, for the case p<1/2.*
    - *Finding the sequential Bayesian Nash equilibria in the extensive form, for the case p<1/2.*

Session 3

Thursday, February 18
9-11h50, Salle 506, Centre Assas

- *Equilibrium analysis continued*
    - *Finding the Nash equilibria in the normal form, for the case p>1/2.*
    - *Finding the sequential Bayesian Nash equilibria in the extensive form, for the case p>1/2.*
    - *Discussion of applications.*

Session 4

Thursday, February 25
9-11h50, Salle 506, Centre Assas

- *Equilibrium analysis continued*
    - *Looking at different parameter specifications. Identifying conditions under which a perfectly separating equilibrium exists.*
- *Class II: uniform costs for producing the signal (as in a model of advertising) but different payoffs when player 2 takes the "good" action.*

Session 5

Thursday, March 4
9-11h50, Salle 506, Centre Assas

- *Addressing the problem of multiple equilibria in signaling games: equilibrium refinement and selection*
    - *Restrictions on beliefs (probability assessments) "off the equilibrium path"*
    - *Dynamics in games*

Session 6

Thursday, March 11
9-11h50, Salle 506, Centre Assas

Writing a research paper

Problem-set sessions (TD—"Travaux dirigés")

Problem-set 1
Friday, February 12
10h55-12h25, Salle 402, Centre Assas

Problem-set 2
Friday, February 19
10h55-12h25, Salle 402, Centre Assas

1) *Reading: Spence (1973), pp 355-368.*
   Excerpt these pages (you should be able to present the basics of the model in class), and prepare the following questions for discussion:
   a. *What are the main differences between Spence's model and the model that we have considered in class? (Answer this question for each of the cases regarding the cost parameters of our model "Class I" that we have distinguished.)*
   b. *In how far are the two models similar?*
   c. *Does Spence use the terminology of game theory?*

2) *Exercise: to be handed in (individually or in groups of two) at the beginning of the problem-set session.*

   Consider the following variation of the game in extensive form that we have seen in class (Class I, case 0 c_1 <c_2< 1): assume that player 2 also incurs a cost k of the signal (0< k <1), but only when she accepts a player who has produced the signal.

   a. *Write down the resulting payoff matrix.*
   b. *With these new payoffs, at which probability is player 2 indifferent between accepting and not, (1) in the information set after observation of the signal S, (2) in the information set after the absence of the signal?*
   c. *Determine at least one Bayesian Nash equilibrium for the case p<1/2. (You can show the analysis of this equilibrium in the game matrix or in the extensive form of the game.)*

Exercise: "Invent" your own game modeling some application in economics by making use of the game tree that we have seen in class.

Problem-set 3
Friday, February 26
10h55-12h25, Salle 07, Centre Assas

Comparing results. Discussion of possible topics for term paper.

Problem-set 4
Friday, March 5
10h55-12h25, Salle 402, Centre Assas

Reading:
Milgrom and Roberts (1986)
or Bliege Bird and Smith (2005)
or a chapter of your choice from Veblen (1899).

Problem-set 5
Friday, March 12
10h55-12h25, Salle 402, Centre Assas

References

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