

Applied Game Theory

The theory of costly signaling: applications in economics

M1 ISF

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Spring term 2021

Until further notice, classes are online. A ZOOM connection link will be sent out.

Evaluation of the lecture (le cours magistral) is based on your essay, which has to be handed in until April 30th 2021; evaluation of the problem-set sessions (le "TD") is based on your preparation of readings and exercises as well as your participation in class.

In this class, we study in particular games of imperfect information and apply them to the study of costly signaling.

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.*
 - o *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*
 - o *The game in normal form (given by a matrix)*
 - o *Finding the Nash equilibria in the normal form, for the case $p < 1/2$.*
 - o *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*
 - o *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”)

10h55-12h25, Salle 402, Centre Assas

Problem-set 1

Friday, February 12

Problem-set 2

Friday, February 19

Problem-set 3

Friday, February 26

Problem-set 4

Friday, March 5

Problem-set 5

Friday, March 12

References

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- [2] Banks, J. S., and J. Sobel. 1987. "Equilibrium selection in signaling games." *Econometrica* 55 (3): 647–661.
- [3] Bliege Bird, R., Smith E. A. 2005. "Signaling theory, strategic interaction and symbolic capital." *Current Anthropology* 46 (2): 221–248.
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- [5] Hofbauer, J., Pawlowitsch, C. 2019. "The evolutionary dynamics of costly signaling." Working paper.
- [6] Kreps, D. M., Sobel, J. 1994. "Signalling." In *Handbook of Game Theory*, Vol. 2, edited by R. J. Aumann and S. Hart, 849–867. Amsterdam/New York: Elsevier.
- [7] Kreps, D. M., Wilson, R. 1982. "Sequential equilibria." *Econometrica* 50 (4): 863–894.
- [8] Milgrom P., Roberts, J. 1986. "Price and advertising signals of product quality." *The Journal of Political Economy* 94(4): 796–821.
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- [13] Van Rooy, R. 2003. "Being polite is a handicap: towards a game theoretical analysis of polite linguistic behavior." *Proceedings of TARK 9*.
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