

Cours magistral

Applied Game Theory

The theory of costly signaling: applications in economics

Christina Katt-Pawlowitsch

Paris University Panthéon-Assas

Spring term 2024

Content: In this course, we investigate games of incomplete information and apply them to the study of costly signaling and strategic information transmission.

Evaluation of this course (3 ECTS) is based on your paper (see instructions: “Your final paper” – <https://signaling.u-paris2.fr/Pawlowitsch/2024-Applied-Game-Theory-your-essay.pdf>).

Session 1

Thursday, January 25

9-11h50, Salle 402, Centre Assas

Session 2

Thursday, February 1

9-11h50, Salle 402, Centre Assas

Session 3

Thursday, February 8

9-11h50, Salle 402, Centre Assas

Session 4

Thursday, February 15

9-11h50, Salle 402, Centre Assas

Session 5

Thursday, February 22

9-11h50, Salle 402, Centre Assas

Session 6

Thursday, February 29

9-11h50, Salle 402, Centre Assas

Problem-set sessions (travaux dirigés)

Friday, 9h20-10h50, Centre Assas, Salle 405, 5 meetings from 2nd week of the term

Evaluation of the problem-set sessions (1 ECTS) is based on your preparation and presentation of problems as well as on your participation in class. *Problems have to be worked out in written form and handed in at the beginning of the session for which they are due.*

Problem 1 (due February 2)

Determine the normal form as given by the payoff matrix for the costly-signaling game given by a tree that we have seen in class.

Problem 2 (due February 9)

Determine all the Nash equilibria (in pure as well as in mixed strategies) of the game in normal form given by Problem 1 under the assumption that

- the cost of the signal for both types is strictly between 0 and 1 with the cost of the signal for the high type lower than that of the low type, for each of the two following cases:
 - o $p < 1/2$
 - o $p > 1/2$

Problem 3 (due February 16)

Determine all the Nash equilibria (in pure as well as in mixed strategies) of the game in normal form given by Problem 1 under the assumption that

- the cost of the signal for the high type is strictly between 0 and 1 and the cost of the signal for the low type is higher than 1. Again, for each of the two cases:
 - o $p < 1/2$
 - o $p > 1/2$

Problem 4 (due February 23)

Keeping the general structure of the game that we have seen in class, come up with your own assumptions about payoffs at the end nodes of the tree, expressed in a parametric form (that is, use parameters for costs and benefits and impose assumptions on them; do not use specific numerical payoffs).

- Determine the payoff matrix of this game.
- Analyze its Nash equilibria, by making a case distinction for the prior probabilities of types if needed.

References

- [1] Akerlof, G. A. 1970. "The market for 'lemons': quality uncertainty and the market mechanism." *The Quarterly Journal of Economics* 84 (3): 488–500.
- [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.
- [4] Cho, I-K. and D. M. Kreps. 1987. "Signaling games and stable equilibria." *The Quarterly Journal of Economics* 102 (2): 179–221.
- [5] Hofbauer, J., Pawlowitsch, C. 2023. "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.
- [9] Miller, M. H., Rock, K. 1985. "Dividend policy under asymmetric information." *The Journal of Finance* XL (4), 1031–1051.
- [10] Sobel, J. 2009. "Signaling Games." In *Encyclopedia of Complexity and System Science*, edited by R. Meyers, 8125–8139. New York: Springer.
- [11] Spence, M. 1973. "Job market signaling." *The Quarterly Journal of Economics* 87 (3): 355–374.
- [12] Spence, M. 2002. "Signaling in retrospect and the informational structure of markets." *The American Economic Review* 92 (3): 434–459.
- [13] Veblen, T. 1899. *The Theory of the Leisure Class: An Economic Study of Institutions*. New York: The Macmillan Company.