Topics in Game Theory D:
Acquiring Costly Information in Contracts and Institutions
Fall 2021 – Period II

Instructor and Class Information

Name: Jan Knoepfle
Email: jan.knoepfle@aalto.fi
Lectures: Tuesdays 13:15-14:45 (first meeting on 02.11.2021)
Student presentations: Blocked on 1-2 days at end of period (exact dates tba)
Room: Lecture hall T003 on the ground floor in Ekonominaukio 1

Objectives

After taking this course, students should...

- Know main contributions and understand essential techniques at the topic's research frontier.
- Be able to read, understand, and assess scientific articles (more) efficiently.
- Get started developing research ideas and, if interested, start writing a paper on the topic.

Course Content

Problems of asymmetric information lie at the heart of most of modern economics. In situations with *adverse selection*, agents have private information about their preferences or characteristics: think of a seller who is privately informed about her valuation for a car, an employee who knows her productivity, or a defendant in court who knows whether he is guilty or not. In situations with *moral hazard*, agents have private information about their actions: think of a manufacturing company who privately observes how much money and effort it invests in preventing pollution, or a pharmaceutical company who was granted funding to research a specific disease but can secretly divert the funds for investments with lower social benefit.

In most of the classical literature studying optimal *mechanisms* and *contracts* to create the right incentives in these situations, we assume it is exogenously given what the principal knows and learns about the agent's preferences or actions. However, verifying claims or collecting further information typically requires time and money, so one must decide when it is optimal to invest in information acquisition, as well as how react to it. It is thus not hard to think of situations in which the decision what to learn is endogenous: A potential employer may perform an assessment centre to evaluate the ability of some candidates. Environmental agencies can inspect companies to determine whether they comply with current regulation. Investors can visit creditors to observe their progress and inspect financial records to detect fund-diversion. When deciding whether an approved drug should be subsidised, the regulating agency will verify claims from the producing company as well as other stakeholders.

We shall see that the possibility of (costly) information acquisition has profound implications for both modelling techniques as well as the optimal design of incentive schemes in practice. Most importantly, the possibility of verifying the agent's private information allows us to create incentives in situations where monetary transfers are infeasible or considered morally unacceptable as is the case in many public-sector institutions.
Further applications of these models include

- Income tax codes and audit policies
- Debt-contracts when banks can verify a creditor's claim of insolvency
- Optimal hiring procedures when the employee's ability becomes observable after she is hired
- The design of judicial procedures.

Course Structure

In each lecture, I will present one or two papers which students read beforehand. The lecture will convey the most important technical tools and then we discuss the main practical insights and intuition in group. Each student will present a paper from the list enclosed. These presentations will be held during a block seminar at the end of period II.
The lectures will cover a selection of the following papers:

- Green and Laffont (1986), Bull and Watson (2004, 2007), Deneckere and Severinov (2008) Myerson (1982)
- Border and Sobel (1987)
- Mookherjee and Png (1992)
- Ben-Porath, Dekel, and Lipman (2014), Townsend (1979), Ben-Porath et al. (2019)
- Halac, Kremer, and Winter (2021)
- Malenko (2019)

For student presentations, students choose a paper from the reference list below. You can also suggest other papers related to the course content, and schedule an office hour to find a paper together.

Student Contribution

Students are expected to actively participate in class. Each participant will also

- Read each week's paper prior to the corresponding lecture
- Hand in 1-2 brief research proposals (1 page max) outlining a potential idea for own research
- Present one paper from the list below at the end of the period
- *Voluntary:*
  Hand in a term paper. This is an opportunity to get continual feedback during and after the elaboration of a first draft if you want to write one of your dissertation chapters on a topic related to the course. (This could also be your second-year paper)

Other Remarks

- Please do not hesitate to email me in case of questions and for office hours
- Lectures will be in person. In case you cannot assist physically due to Covid, please let me know at least a day in advance and I will set up a live stream option
- One day after the first lecture, i.e. on On 03.11.2021, Ian Ball will present a related paper (see reference list) in the micro seminar from 3-4pm (note the change of time)

References

Andreas Asseyer. Optimal monitoring in dynamic procurement contracts. *International Journal of Industrial Organization*, 59:222–252, 2018.

Ian Ball and Deniz Kattwinkel. Probabilistic Verification in Mechanism Design. In *Proceedings of the 2019 ACM Conference on Economics and Computation*, pages 389–390, 2019.

Elchanan Ben-Porath, Eddie Dekel, and Barton L. Lipman. Optimal Allocation with Costly Verification. *American Economic Review*, 104(12):3779–3813, 2014.

Elchanan Ben-Porath, Eddie Dekel, and Barton L Lipman. Mechanisms with Evidence: Commitment and Robustness. *Econometrica*, 87(2):529–566, 2019.

Elchanan Ben-Porath, Eddie Dekel, and Barton L Lipman. Mechanism Design for Acquisition of/Stochastic Evidence. *Working Paper*, 2021.

Mostafa Beshkar and Eric W Bond. Cap and Escape in Trade Agreements. *American Economic Journal: Microeconomics*, 9(4):171–202, 2017.

Philippe Bontems and Jean-Marc Bourgeon. Optimal environmental taxation and enforcement policy. *European Economic Review*, 49(2):409–435, 2005.

Kim C Border and Joel Sobel. Samurai accountant: A theory of auditing and plunder. *The Review of Economic Studies*, 54 (4):525–540, 1987.

Jesse Bull and Joel Watson. Evidence Disclosure and Verifiability. *Journal of Economic Theory*, 118(1):1–31, 2004.

Jesse Bull and Joel Watson. Hard evidence and mechanism design. *Games and Economic Behavior*, 58(1):75–93, 2007.

Gabriel Carroll and Georgy Egorov. Strategic communication with minimal verification. *Econometrica*, 87(6):1867–1892, 2019.

Raymond Deneckere and Sergei Severinov. Mechanism Design with Partial State Verifiability. *Games and Economic Behavior*, 64(2):487–513, 2008.

Douglas W Diamond. Financial intermediation and delegated monitoring. *The review of economic studies*, 51(3):393–414, 1984.

Markos Epitropou and Rakesh Vohra. Optimal On-Line Allocation Rules with Verification. In *International Symposium on Algorithmic Game Theory*, pages 3–17. Springer, 2019.

Albin Erlanson and Andreas Kleiner. Costly Verification in Collective Decisions. *Theoretical Economics*, 15(3):923–954, 2020.

Douglas Gale and Martin Hellwig. Incentive-Compatible Debt Contracts: The One-Period Problem. *Review of Economic Studies*, 52(4):647–663, 1985.

Jacob Glazer and Ariel Rubinstein. On Optimal Rules of Persuasion. *Econometrica*, 72(6):1715–1736, 2004.

Jerry R Green and Jean-Jacques Laffont. Partially Verifiable Information and Mechanism Design. *The Review of Economic Studies*, 53(3):447–456, 1986.

Marina Halac and Pierre Yared. Commitment versus Flexibility with Costly Verification. *Journal of Political Economy*, 128 (12):4523–4573, 2020.

Marina Halac, Ilan Kremer, and Eyal Winter. Monitoring teams. 2021.

Sergiu Hart, Ilan Kremer, and Motty Perry. Evidence Games: Truth and Commitment. *The American Economic Review*, 107(3):690–713, 2017.

Navin Kartik and Olivier Tercieux. Implementation with Evidence. *Theoretical Economics*, 7(2):323–355, 2012.

Frédéric Koessler and Eduardo Perez-Richet. Evidence Reading Mechanisms. *Social Choice and Welfare*, 53(3):375–397, 2019.

Yunan Li. Mechanism Design with Costly Verification and Limited Punishments. *Journal of Economic Theory*, 186:105000, 2020.

Andrey Malenko. Optimal dynamic capital budgeting. *The Review of Economic Studies*, 86(4):1747–1778, 2019.

Arun S Malik. Avoidance, screening and optimum enforcement. *The RAND Journal of Economics*, pages 341–353, 1990.

David A Miller and Kareen Rozen. Wasteful sanctions, underperformance, and endogenous supervision. *American Economic Journal: Microeconomics*, 6(4):326–61, 2014.

Dilip Mookherjee and Ivan Png. Optimal Auditing, Insurance, and Redistribution. *The Quarterly Journal of Economics*, 104(2):399–415, 1989.

Dilip Mookherjee and Ivan PL Png. Monitoring vis-a-vis investigation in enforcement of law. *The American Economic Review*, pages 556–565, 1992.

Roger B Myerson. Optimal coordination mechanisms in generalized principal–agent problems. *Journal of mathematical economics*, 10(1):67–81, 1982.

Tymofiy Mylovanov and Andriy Zapechelnyuk. Optimal Allocation with Ex Post Verification and Limited Penalties. *American Economic Review*, 107(9):2666–94, September 2017.

Eduardo Perez-Richet and Vasiliki Skreta. Test Design under Falsification. *Work. Pap., Sci. Po, Paris Access provided by University of Chicago Libraries on*, 9:04–19, 2018.

Erica L Plambeck and Terry A Taylor. Supplier evasion of a buyer's audit: Implications for motivating supplier social and environmental responsibility. *Manufacturing & Service Operations Management*, 18(2):184–197, 2016.

Erica L Plambeck and Terry A Taylor. Testing by competitors in enforcement of product standards. *Management Science*, 65(4):1735–1751, 2019.

Martin Pollrich. Mediated audits. *The RAND Journal of Economics*, 48(1):44–68, 2017.

David Rahman. But who will monitor the monitor? *American Economic Review*, 102(6):2767–97, 2012.

B Ravikumar and Yuzhe Zhang. Optimal auditing and insurance in a dynamic model of tax compliance. *Theoretical Economics*, 7(2):241–282, 2012.

Steven Shavell. The optimal use of nonmonetary sanctions as a deterrent. *The American Economic Review*, pages 584–592, 1987.

Ron Siegel and Bruno Strulovici. Judicial Mechanism Design. *Unpublished manuscript. Pennsylvania State University, Department of Economics, University Park*, 2020.

Francisco Silva. If we Confess our Sins. *International Economic Review*, 60(3):1389–1412, 2019.

Bernard Sinclair-Desgagné and H Landis Gabel. Environmental auditing in management systems and public policy. *Journal of Environmental Economics and Management*, 33(3):331–346, 1997.

Robert M. Townsend. Optimal Contracts and Competitive Markets with Costly State Verification. *Journal of Economic Theory*, 21(2):265–293, October 1979.

Felipe Varas, Iván Marinovic, and Andrzej Skrzypacz. Random inspections and periodic reviews: Optimal dynamic monitoring. *The Review of Economic Studies*, 87(6):2893–2937, 2020.