

Course title: Foundational aspects of decision and game theory

Instructor: Eddie Dekel

Term: Spring semester 2014-15

School of Economics, Tel Aviv University

Course requirements: Students are expected to come to lectures and participate. The assignment is to present one or more advanced papers on a topic related to the course. This presentation will take the form of summarizing and analyzing the papers, and, ideally, developing an extension or application. The papers to be presented will be determined jointly with the instructor, and the set will be finalized by April 1. The presentation will take place during subsequent classes: it will be given orally and also in a written format. The goal is that through the class you learn about some current and classical topics, learn how to read papers, and learn how to present a paper.

Communication during the course: We will need to coordinate paper presentations, class meetings and other issues during the course. It is imperative that I have a mailing list for the class and that you check all your email accounts.

Overview: The course will discuss several advanced topics in economic theory, with a focus on foundational questions in decision theory and game theory. The course will cover a small subset of the topics listed below, based on a selection to be determined jointly by discussion in a preliminary class that will take place on April 18 at noon. Each topic will be approximately one class.

We will study classical as well as contemporary papers from each topic.

The topics will (most likely) be a small selection from the following list, which is enough for several courses.

Robustness:

- Hierarchies-base

- Max-min based

Communication:

- Cheap talk

- Persuasion

- Hard evidence

- Delegation

Information structures:

- Ranking (the value of information)

- Endogenous choice of information in various environments (games, mechanisms, contracts)

Models of self control in decision theory

Epistemic foundations of solution concepts

An initial list of the papers for the course is below.

Almost all of the papers listed will *not* be covered and are provided as supplementary reading, and the list may be adjusted as we see how much material is covered and where class interests lead.

1. Robustness:

1.1 Hierarchies Based:

*Brandenburger, A and E Dekel (1993) "Hierarchies of belief and common knowledge," *JET*

Related constructs:

Larry G. Epstein, Stanley E. Zin (1989), "[Substitution, Risk Aversion, and the Temporal Behavior of Consumption and Asset Returns: A Theoretical Framework](#)" *Econometrica* 57, Issue: 4 (Only one result from the appendix.)

David Ahn, "Hierarchies of Ambiguous Beliefs," *Journal of Economic Theory* 136(1): 286-301, September 2007

Epstein and Wang, "Beliefs about Beliefs" without Probabilities," *Econometrica*, 1996.

Gul and Pesendorfer, JET (forthcoming), "[Interdependent Preference Models as a Theory of Intentions.](#)"

Ketz (2012) "Bounded Reasoning and higher order uncertainty," mimeo.

T. Mariotti, M. Meier and M. Piccione (2005) "Hierarchies of Beliefs for Compact Possibility Model", *Journal of Mathematical Economics*

Epstein and Peters, "A Revelation Principle for Competing Mechanisms," *Journal of Economic Theory* 88, 119--160 (1999)

Battigalli and Siniscalchi, "Hierarchies of Conditional Beliefs and Interactive Epistemology in Dynamic Games," *Journal of Economic Theory* (1999), **88**, 188-230

Kajji-Morris "The Robustness of Equilibria to Incomplete Information," *Econometrica* 65 (1997), 1283-1309

*J. Weinstein and M. Yildiz (2007): [A Structure Theorem for Rationalizability with Application to Robust Predictions of Refinements](#), *Econometrica*, 75, Issue 2.

(Relies on a result from: Lipman, "[Finite Order Implications of Common Priors](#)," *Econometrica*, July 2003 and one from Interim Correlated Equilibrium cited above.

Extensions and related results:

Ui, "[Robust Equilibria of Potential Games](#)" *Econometrica* 69 (5) (2001) 1373-80.

Oyama, Daisuke & Tercieux, Olivier, 2010. "[Robust equilibria under non-common priors](#)," *Journal of Economic Theory*, Elsevier, vol. 145(2), pages 752-784.

Ely and Peski (2011) "Critical Types," *Review of Economic Studies*

Yi-Chun Chen, Satoru Takahashi, Siyang Xiong, JET, Vol, 151, May 2014, 448-475 The robust selection of rationalizability

Weinstein and Yildiz: Robust Predictions in Infinite-Horizon Games—an Unrefinable Folk Theorem, *Review of Economic Studies*, Volume 80, Issue 1 Pp. 365-394.

Yi-Chun Chen, "A structure theorem for rationalizability in the normal form of dynamic games" *GEB* Vol. 75, No. 2, July 2012, 587-597

Penta, A. (2012), Higher Order Uncertainty and Information: Static and Dynamic Games. *Econometrica*, 80: 631–660

*Chassang and Takahashi, Robustness to incomplete information in repeated games, *Theoretical Economics*, Volume 6, Issue 1, pages 49–93, January 2011

1.2 Max-min and other notions

Oury, M. and Tercieux, O. (2012), Continuous Implementation. *Econometrica*, 80: 1605–1637.

*Robust Mechanism Design (with Dirk Bergemann), *Econometrica* 73 (2005), 1521-1534

*Kim-Sau Chung and Jeffrey Ely (2007), Foundations of Dominant Strategy Mechanisms, *Review of Economic Studies* 74, pp. 447-476 and a critique Tilman Borgers: (No) Foundations of Dominant-Strategy Mechanisms: A Comment on Chung and Ely (2007).

Chassang; Calibrated Incentive Contracts; *Econometrica*; September 2013

*Carroll; Robustness and Linear Contracts; *AER*; 2014

*Bergemann, Brooks and Morris, The Limits of Price Discrimination (with Dirk Bergemann and Benjamin Brooks), forthcoming in *American Economic Review*.

Bergemann, Brooks, Morris; Extremal Information Structures in the First Price Auction; mimeo; November 2013.pdf

Madarász, Kristof, and Andrea Prat. Sellers with misspecified models. working paper, London School of Economics, 2014.

2. Endogenous information choice

2.1 Global games:

Morris and Shin: Unique Equilibrium in a Model of Self-Fulfilling Attacks, *American Economic Review* 88 (1998), 587-597

Global games with endogenous information:

Ming Yang, Coordination with flexible information acquisition, *JET* (forthcoming)

2.2 Information acquisition and mechanism design

Ben Porath, Dekel and Lipman: "Optimal Allocation with Costly Verification," *American Economic Review*, December 2014

Bergemann and Valimaki "Information Acquisition and Efficient Mechanism Design"

Bichandani and Obara "Mechanism Design with Information Acquisition: Efficiency and Full Surplus Extraction."

Cremer and Khalil "Gathering Information Before Signing a Contract"

Ye and Zhang "Monopolistic Nonlinear Pricing with Costly Information Acquisition"

Ye and Zhang "Efficient and Optimal Mechanisms with Private Information Acquisition Costs"

Zambrano "Motivating Information Acquisition in Strategic Settings"

2.3 Information acquisition in games

Hellwig and Veldkamp, "Knowing What Others Know: Coordination Motives in Information Acquisition"

Llosa and Venkateswaran "Efficiency with endogenous information choice"

Myatt and Wallace "Endogenous information acquisition in coordination games"

Tirole, mimeo *Cognitive Games and Cognitive Traps*, October 2014.

2.3 Miscellaneous

*Horner, Johannes, and Andrzej Skrzypacz. "Selling information." (2011), forthcoming, *JPE*

Che, Yeon-Koo, and Johannes Hörner. Optimal design for social learning. *Mimeo*, 2013.

Kremer, Ilan, Yishay Mansour, and Motty Perry. "Implementing the "Wisdom of the Crowd"." *Journal of Political Economy* 122.5 (2014): 988-1012.

3. Cheap talk

Battaglini, Marco (2002), "Multiple referrals and multidimensional cheap talk", *Econometrica* 70:4.

*Chakraborty, Archishman and Rick Harbaugh (2010), "Persuasion by cheap talk", *The American*

Economic Review .

*Che, Yeon-Koo, Wouter Dessein, and Navin Kartik (2013), "Pandering to persuade", *The American Economic Review* 103:1.

*Ying Chen, Navin Kartik & Joel Sobel, 2008. "Selecting Cheap-Talk Equilibria," *Econometrica*, *Econometric Society*, vol. 76(1), pages 117-136, 01.

*Crawford, Vincent P. and Joel Sobel (1982), "Strategic information transmission", *Econometrica: Journal of the Econometric Society* .

Kartik, Navin, Marco Ottaviani, and Francesco Squintani (2007), "Credulity, lies, and costly talk", *Journal of Economic theory* 134:1.

*Levy, Gilat and Ronny Razin (2007), "On the limits of communication in multidimensional cheap talk: a comment", *Econometrica* 75:3.

Wouter Dessein. Authority and communication in organizations. *Review of Economic Studies*, 2002, 69(4), 811-838.

Joseph Farrell. Meaning and credibility in cheap-talk games. *Games and Economic Behavior*, 1993, 5(4), 514-531.

4. Evidence, Providing information and Persuasion

Acharya, Viral V., Peter Demarzo, and Ilan Kremer (2011), "Endogenous Information Flows and the Clustering of Announcements", *The American Economic Review* 101:7.

Dye, Ronald A. (1985), "Disclosure of nonproprietary information", *Journal of accounting research* 23:1.

Michael Fishman and Katherine Hagerty. The optimal amount of discretion to allow in disclosure.

Grossman, Sanford J. (1981), "The informational role of warranties and private disclosure about product quality", *Journal of law and economics* Jung, Woon-Oh and Young K. Kwon (1988), "Disclosure when the market is unsure of information endowment of managers", *Journal of Accounting Research*

Emir Kamenika and Matthew Gentzkow. Bayesian persuasion. *AER*, October 2011, 101(6), 2590-2615.

Paul Milgrom. Good news and bad news: Representation Theorems and applications. *Bell Journal of Economics*, 1981, XII, 380-91. 4 33.

Paul Milgrom. What the seller won't tell you: persuasion and disclosure in markets. *Journal of Economic Perspectives*, 2009, 22(2), 115-131. 34.

Paul Milgrom and John Roberts. Relying on information of interested parties. *The Rand Journal of Economics*, 1986, 17(1), 18-32.

Rayo, Luis, and Ilya Segal. "Optimal information disclosure." *Journal of political Economy* 118.5 (2010): 949-987.

Hyun Shin. Disclosure and asset returns. *Econometrica*, January 2003, 71(1), 105-133

Verrecchia, Robert E. (1983), "Discretionary disclosure", *Journal of accounting and economics* 5.

5. Delegation

Aghion, Philippe and Jean Tirole (1997), "Formal and real authority in organizations", *Journal of political economy*.

Alonso, Ricardo and Niko Matouschek (2008), "Optimal delegation", *The Review of Economic Studies* 75:1.

- Amador, Manuel and Kyle Bagwell (2013), "The theory of optimal delegation with an application to tariff caps", *Econometrica* 81:4.
- Armstrong, Mark and John Vickers (2010), "A model of delegated project choice", *Econometrica* 78:1. 24
- Frankel, Alexander (2014), "Aligned delegation", *The American Economic Review* 104:1.
- Holmstrom, Bengt Robert (1977), *On incentives and control in organizations*, Stanford University.
- Koessler, Frdric and David Martimort (2012), "Optimal delegation with multidimensional decisions", *Journal of Economic Theory* 147:5.
- Kolotilin, Anton, Hao Li, and Wei Li (2013), "Optimal limited authority for principal", *Journal of Economic Theory* 148:6.
- Kovac, Eugen and Tymofiy Mylovanov (2009), "Stochastic mechanisms in settings without monetary transfers: The regular case", *Journal of Economic Theory* 144:4.
- Martimort, David and Aggey Semenov (2006), "Continuity in mechanism design without transfers", *Economics Letters* 93:2.
- Melumad, Nahum D. and Toshiyuki Shibano (1991), "Communication in settings with no transfers", *The RAND Journal of Economics*.
- Mylovanov, Tymofiy (2008), "Veto-based delegation", *Journal of Economic Theory* 138:1.
- Vickers, John (1985), "Delegation and the Theory of the Firm", *The Economic Journal*.

6. More communication models

- Blume, Andreas, Oliver J. Board, and Kohei Kawamura (2007), "Noisy talk", *Theoretical Economics* 2:4.
- Dessein, Wouter (2002), "Authority and communication in organizations", *The Review of Economic Studies* 69:4. 22
- Dewatripont, Mathias and Jean Tirole (2005), "Modes of communication", *Journal of Political Economy* 113:6.
- Goltsman, Maria et al. (2009), "Mediation, arbitration and negotiation", *Journal of Economic Theory* 144:4.
- Ivanov, Maxim (2010a), "Communication via a strategic mediator", *Journal of Economic Theory* 145:2.
- (2010b), "Informational control and organizational design", *Journal of Economic Theory* 145:2.
- Krishna, Vijay and John Morgan (2004), "The art of conversation: eliciting information from experts through multi-stage communication", *Journal of Economic Theory* 117:2.

7. Ranking information (value of information)

- Athey, Susan and Jonathan Levin (2001), "The value of information in monotone decision problems".
- Blackwell, David (1953), "Equivalent comparisons of experiments", *The annals of mathematical statistics* 24:2.
- Brandt, Nikolai et al. (2014), "Information and the dispersion of posterior expectations", *Journal of Economic Theory* 154.
- Cabrales, Antonio, Oliver Gossner, and Roberto Serrano (2014), *The inverse demand for information and the appeal of information transactions*, tech. rep., Working paper.
- Cabrales, Antonio, Olivier Gossner, and Roberto Serrano (2013), "Entropy and the Value of Information for Investors", *American Economic Review* 103:1.

Cremer, Jacques (1982), "A simple proof of Blackwell's comparison of experiments theorem", *Journal of Economic Theory* 27:2. 44

Eckwert, Bernhard and Itzhak Zilcha (2008), "Efficiency of screening and labor income inequality", *Journal of Public Economic Theory* 10:1. Ganuza, Juan-Jos and Jose S. Penalva (2010), "Signal orderings based on dispersion and the supply of private information in auctions", *Econometrica* 78:3.

Gossner, Olivier (2000), "Comparison of Information Structures", *Games and Economic Behavior* 30:1.

Gossner, Olivier and Jean-Francois Mertens (2001), "The value of information in zero-sum games", preprint.

Johnson, Justin P. and David P. Myatt (2006), "On the Simple Economics of Advertising, Marketing, and Product Design", *American Economic Review* 96:3.

Lehmann, E. L. (1988), "Comparing Location Experiments", *The Annals of Statistics* 16:2. Lehrer, Ehud,

Dinah Rosenberg, and Eran Shmaya (2013), "Garbling of signals and outcome equivalence", *Games and Economic Behavior* 81.

Moscarini, Giuseppe and Lones Smith (2002), "The law of large demand for information", *Econometrica* 70:6.

Persico, Nicola (2000), "Information acquisition in auctions", *Econometrica* 68:1.

Peski, Marcin (2008), "Comparison of information structures in zero-sum games", *Games and Economic Behavior* 62:2.

Radner, Roy and Joseph Stiglitz (1984), "A Nonconcavity in the Value of Information", *Bayesian models in economic theory* 5.

Shmaya, Eran (2006), "The Value of Information Structures in Zero-sum Games with Lack of Information on One Side", *International Journal of Game Theory* 34:2.

8. Epistemic justifications of solution concepts

Dekel and Siniscalchi, "Epistemic game theory," link available here:

<https://sites.google.com/site/eddiedekelsite/papers/working-papers>

9. Preferences for Temptation and flexibility

The seminal paper: *D. Kreps, "[A Representation Theorem for `Preferences for Flexibility`](#)", 1979, *Econometrica*

Two subsequent developments:

*E. Dekel, B. Lipman and A. Rustichini: "[Representing Preferences with a Unique Subjective State Space](#)," *Econometrica*, 2001, see also "[Representing Preferences with a Unique Subjective State Space: Corrigendum](#)," with Todd Sarver, *Econometrica*, 2007, "[Supplemental Appendix](#)

*Gul and Pesendorfer (2001) [Temptation and self-control](#), *Econometrica*

*On the connection between GP's costly temptation and Strotz' overwhelming temptation models: "[Costly Self Control and Random Self Indulgence](#)," Bart Liman and Eddie Dekel, *Econometrica*, 2011

Other papers on this topic:

Dekel, E., B. L. Lipman, and A. Rustichini. Temptation-driven preferences. *Review of Economic Studies*, 2009.

Dillenberger D. and P. Sadowski, (2008). Ashamed to be Selfish.

Epstein, L. (2006) An axiomatic model of non-Bayesian updating. *Review of Economic Studies*, 73:413-436, 2006.

- Epstein L. and I. Kopylov (2007). Cold feet. *Theoretical Economics*, 2:231259, 2007
- Ergin, H., and T. Sarver, "A Unique Costly Contemplation Representation," *Econometrica*, 78, July 2010, 1285-1339.
- Gul F. and W. Pesendorfer. (2004). Self-Control and the Theory of Consumption. *Econometrica*, 2004.
- Gul F. and W. Pesendorfer (2005). The Revealed Preference Theory of Changing Tastes. *Review of Economic Studies*, 72, 429-448
- Gul, F., and W. Pesendorfer, "Harmful Addiction," *Review of Economic Studies*, 74, January 2007, 147-172.
- Kopylov, I. (2009a) Perfectionism and choice. *Econometrica*
- Noor, J. (2009c). Temptation and Revealed Preference. Forthcoming in: *Econometrica*.
- Noor, J., and N. Takeoka, "Uphill Self-Control," *Theoretical Economics*, 5, May 2010
- Saito, K., "Role Conflict and Choice," mimeo. Northwestern University, 2011.
- Sarver, T., "Anticipating Regret: Why Fewer Options May Be Better," *Econometrica*, 76, March 2008, 263-305.
- Stovall, J., "Multiple Temptations," *Econometrica*, 78, January 2010