

# Economics 211a - Uncertainty, Information, and Games Fall 2002

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## Requirements

There will be a few problem sets and a final exam.

## Textbooks

Most of the topics covered in this class could be read directly in the published paper version. However, the following books may become handy in your career as an empirically conscious theorist. They are on reserve, and are available for you at the book-store.

Fudenberg, D. and Tirole, J. [1991], *Game Theory*, MIT Press.

Myerson, R. [1991], *Game Theory: Analysis of Conflict*, Cambridge University Press.

Osborne, M. J. and Rubinstein, A. [1994], *A Course in Game Theory*, MIT Press.

Thaler, R. [1992], *The Winner's Curse*, Princeton University Press.

## Outline

In this class we will be covering some topics concerning beliefs – what they are, how they are formed, their theoretical significance, and the experimental tests of the prevalent models we will be exploring. We will also touch on some applications to political economy and financial investments.

0. Introduction: what are beliefs, distinction between beliefs concerning states of the world, other players' behavior, and the players themselves.
1. Beliefs about states: subjective probabilities and desire for flexibility.
2. Beliefs about players: iterated dominance and some experimental observations.
3. Applications to strategic voting and some experimental observations.
4. Forming beliefs in static settings: games with communication and their application to strategic voting models.
5. Forming beliefs in dynamic settings :
  - a. Axiomatic foundations for discounted utility representation and some empirical observations.
  - b. Alternative models: habit formation, hyperbolic discounting, set-dependent utilities, belief-dependent utilities.
  - c. Foundations for alternative models: axiomatic and evolutionary.
  - d. Welfare considerations in dynamic settings – which beliefs should the policy maker take into account?
  - e. Social effects on dynamic belief formation: cascades, herding, and conformity.
6. Are beliefs really relevant? Reinforcement learning and case-based decision theory.

## Reading List

### 1. Beliefs About States

#### Subjective Probabilities

\* Anscombe, F. J. and Aumann, R. J. [1963], "A Definition of Subjective Probability," *Annals of Mathematical Statistics*, Vol. 34, No. 1, pp. 199-205 (JSTOR).

\* Mas-Collel, A., Whinston, M. and Green, J. [1995], *Microeconomic Theory*, Oxford University Press, Chapter 6.

Savage, L. J. [1954], *The Foundations of Statistics*, Wiley, New York, Chapters 2 and 3.

#### Subjective States and Desire for Flexibility

\* Kreps, D. M. [1979], "A Representation Theorem for "Preference for Flexibility"," *Econometrica*, Vol. 47, No. 3, pp. 565-578 (JSTOR).

Mas-Collel, A., Whinston, M. and Green, J. [1995], *Microeconomic Theory*, Oxford University Press, Chapter 6.

### 2. Beliefs about players: iterated dominance and some experimental observations

\* Costa-Gomes, M., Crawford, V. P., and Broseta, B. [2001], "Cognition and Behavior in Normal-Form Games: An Experimental Study," *Econometrica*, Vol. 69, pp. 1193-1235 (Crawford's homepage).

\* Fudenberg, D. and Tirole, J. [1991], *Game Theory*, MIT Press, Chapter 2.

Osborne, M. J. and Rubinstein, A. [1994], *A Course in Game Theory*, MIT Press, Chapters 4 and 5.

### 3. Applications to strategic voting and some experimental observations

\* Feddersen, T. and Pesendorfer, W. [1996], "The Swing Voter's Curse," *American Economic Review*, Vol. 86, No. 3, pp. 408-424 (JSTOR).

\* Guarnaschelli, S., McKelvey, R. C., and Palfrey, T. R. [2000], "An Experimental Study of Jury Decision Rules," *American Political Science Review*, Vol. 94, No. 2, pp. 407-423 (UCLA library online).

Yariv, L. [2002], "When Majority Rule Yields Majority Ruin," mimeo.

#### **4. Forming beliefs in static games**

##### Games with Communication

\* Crawford, V. and Sobel, J. [1982], "Strategic Information Transmission," *Econometrica*, Vol. 50, pp. 1431-1451 (JSTOR).

\* Myerson, R. [1991], *Game Theory: Analysis of Conflict*, Cambridge University Press, Chapter 6.

##### Applications to Voting

\* Gerardi, D. and Yariv, L. [2002], "Putting Your Ballot Where Your Mouth Is: An Analysis of Collective Choice with Communication," mimeo (available upon request).

#### **5. Forming beliefs in dynamic games**

##### **a. Axiomatic foundations for discounted utility representation and some empirical observations**

\* Epstein, L.G. [1983], "Stationary Cardinal Utility and Optimal Growth under Uncertainty," *Journal of Economic Theory*, 31, pp.133-152.

Koopmans, T. C. [1960], "Stationary Ordinal Utility and Impatience," *Econometrica*, Vol. 28, No. 2., pp. 287-309 (JSTOR).

Lowenstein, G. and Thaler, R. H. [1989], "Anomalies: Intertemporal Choice," *Journal of Economic Perspectives*, Vol. 3, No. 4, pp. 181-193 (JSTOR).

Prelec, D. and Loewenstein, G. [1998], "The Red and The Black: Mental Accounting of Savings and Debt," *Marketing Science*, Vol. 17, No. 4, pages 4-28.

\* Thaler, R. H., Kahneman, D., Knetsch, J. [1992], "Intertemporal Choice," *The Winner's Curse*, Princeton University Press.

##### **b. Alternative models**

##### Habit Formation

\* Becker, G. S. Grossman, M. and Murphy, K. M. [1991], "Rational Addiction and the Effect of Price on Consumption (in Economics of Drugs)," *The American Economic Review*, Vol. 81, No. 2, Papers and Proceedings of the Hundred and Third Annual Meeting of the American Economic Association, pp. 237-241 (JSTOR).

Becker, G. S. [1998], *Accounting for Tastes*, Harvard University Press.

Bernheim, D. and Rangel, A. [2002], "Addiction, Conditioning, and the Visceral Brain," mimeo (Rangel's home-page).

Campbell, J. Y. and Cochrane, J. H. [1999], "By Force of Habit: A Consumption-Based Explanation of Aggregate Stock Market Behavior," *Journal of Political Economy*, Vol. 107, pp. 205-251.

\* Laibson, D. [2001], "A Cue-Theory of Consumption," *Quarterly Journal of Economics* (Laibson's home-page).

### Hyperbolic Discounting

Laibson, D. [1995], "hyperbolic Discount Functions, Undersaving, and Saving Policy," Harvard University mimeo.

Laibson, D. [1997], "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics*, Vol. 112, No. 2, pp. 443-478.

O'Donoghue, T. and Rabin, M. [1999], "Incentives for Procrastinators," *Quarterly Journal of Economics*, Vol. 114, No. 3, pp. 769-816.

\* O'Donoghue, T. and Rabin, M. [1999], "Doing It Now or Later," *American Economic Review*, Vol. 89, No. 1, pp. 103-124.

O'Donoghue, T. and Rabin, M. [2001], "Choice and Procrastination," *Quarterly Journal of Economics*, Vol. 116, No. 1, pp. 121-160.

\* Rubinstein, A. [2001], "Is it 'Economics and Psychology'? The Case of Hyperbolic Discounting," mimeo (Rubinstein's home-page).

### Belief-dependent utilities: Cognitive Dissonance and Confirmatory Bias

\* Rabin, M. and Schrag, J. L. [1999], "First Impressions Matter: A Model of Confirmatory Bias," *Quarterly Journal of Economics*, pp. 37-82.

Yariv, L. [2002], "I'll See It When I Believe It: A Simple Model of Cognitive Consistency," *Cowles Foundation Discussion Paper Number 1352* (Cowles Foundation website).

### **c. Foundations for alternative models**

\* Gul, F. and Pesendorfer, W. [2001], "Temptation and Self-control," *Econometrica*, Vol. 69, No. 6, pp. 1403-1435 (UCLA library online).

Samuelson, L. and Swinkels, J. [2001], "Information and the Evolution of the Utility Function," mimeo (SITE web-site).

#### **d. Welfare considerations in dynamic settings**

\* Caplin, A. and Leahy, J. [2000], "The Social Discount Rate," NBER Working Paper 7983 (NBER web-site).

Harris, C. and Laibson, D. [2001], "Dynamic Choices of Hyperbolic Consumers," *Econometrica*, Vol. 69, No. 4, pp. 935-957 (Laibson's home-page).

Laibson, D. [1997], "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics*, Vol. 112, No. 2, pages 443-478.

#### **e. Social effects on dynamic belief formation: cascades, herding, and conformity.**

Banerjee, A. V. [1992], "A Simple Model of Herd Behavior," *Quarterly Journal of Economics*, Vol. 107, No. 3, pp. 797-817.

\* Bernheim, B. D. [1994], "A Theory of Conformity," *The Journal of Political Economy*, Vol. 102, No. 5, pp. 841-877.

\* Bikhchandani, S., Hirshleifer, D., and Welch, I. [1992], "A Theory of Fads, Fashion, Custom, and Cultural Change as Informational Cascades," *The Journal of Political Economy*, Vol. 100, No. 5, pp. 992-1026.

### **6. Are beliefs really relevant?**

#### Reinforcement Learning

Camerer, C. and Ho, T. [1999], "Experience Weighted Attraction (EWA) Learning in Normal-Form Games," *Econometrica*, Vol. 67, pp. 827-874.

\* Erev, I. and Roth, A. E. [1997], "Modeling How People Play Games: Reinforcement Learning in Experimental Games with Unique, Mixed Strategy Equilibria," mimeo (Roth's home-page).

Roth, A. E. and Erev, I. [1995], "Learning in Extensive-Form Games: Experimental Data and Simple Dynamic Models in the Intermediate Term," *Games and Economic Behavior*, Special Issue: Nobel Symposium, 8, pp. 164-212.

#### Case-Based Decision Theory

\* Gilboa, I. and Schmeidler, D. [1995], "Case-Based Decision Theory," *Quarterly Journal of Economics*, Vol. 110, pp. 605-639 (JSTOR).

Gilboa, I. and Schmeidler, D. [2001], *A Theory of Case-Based Decisions*, Cambridge University Press.