

**Ross School of Business, University of Michigan**  
**BA 865: Asymmetric Information**  
**Winter 2009**  
**Course Outline**

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Good times to find me in my office: MWF mornings. I will often be in on Sunday afternoon as well.

**Course meeting times:** For Winter A, Mondays and Wednesdays, 10:20 to 11:50 am, in Room E1550.

Please note that this class follows the Business School graduate calendar, and meets in the period from Jan 5 to Feb 16, and then from Mar 10 to Apr 20. The first class is on Wednesday, Jan 7.

### **Overview**

This is a Ph.D. course in information economics as applied to various fields. We will do a quick review of basic concepts in game and contract theory, and then switch to applications. Amongst the latter, a chunk of time is allocated to auctions, since interest in auctions spans several disciplines. Other applications being covered in class will include market microstructure and herd behavior. The exact list of applications to be covered depends partly on enrolment and student interest. Suggestions are welcome.

The goal of the course is to provide students with an understanding of the basic concepts of game and contract theory, and to expose them to some of the ways in which these concepts are used in their own fields. The tools of information economics and game theory have come to be applied to several disciplines over the last couple of decades. There are several fields across economics and business that routinely apply these tools.

The current reading list reflects my own interest and awareness of the use of game and contract theory in various disciplines. I encourage you to help me fill in any holes.

### **Grading**

There are three components to the grade. A final exam, a term paper (including presentation), and problem sets.

1. Problem sets: weekly. Many of the problem sets consist of a single long problem taken from an applied paper. Students are encouraged to get an early start on the problem set. After all, it takes a few days to figure out a paper. While I don't ask you to read a paper for the problem set, it may take some time to figure out exactly what the model is.
2. Term paper: Short report that intelligently summarizes a theory paper from your field, and provides an idea for future work in that area. In addition to the report, students are

required to make a class presentation (on the same paper). Details in due course.

3. Final exam: comprehensive exam at the end of the course.
4. Weightage: Final exam 45%, paper 25%, problem sets 30%.

### Topics and Required Readings

The following material will be directly covered in class. I will provide links to the papers (where available) on CTools.

1. *Game theory concepts*. 2 weeks.  
Correlated equilibrium.  
Bayesian games and Bayesian Nash equilibrium.  
Perfect Bayesian equilibrium.  
Signalling games, Cho-Kreps Intuitive Criterion.

#### *Readings*

- (a) Mas-Colell, Whinston, Green, *Microeconomic Theory*: Ch. 9.  
Fudenberg and Tirole, *Game Theory*: Ch. 5.1, 6.1–6.5, 8.1–8.2.  
Osborne and Rubinstein, *A Course in Game Theory*: Ch. 3.3, 11.1, 12.1, 12.3–12.4.
  - (b) Aumann, R.J. (1974), “Subjectivity and Correlation in Randomized Strategies,” *Journal of Mathematical Economics* 1: 67–96.
  - (c) Cho, I.K. and D. Kreps (1987), “Signalling Games and Stable Equilibria”, *Quarterly Journal of Economics* 102: 179–221.
2. *Contract theory concepts and applications*. 2–3 weeks.  
Principal-agent model.  
Revelation Principle.  
Adverse selection and moral hazard.  
Application: costly state verification.  
Application: technology licensing.

#### *Readings*

- (a) Bolton and Dewatripont, *Contract Theory*, Ch. 2–4.  
Mas-Colell, Whinston, Green: Ch. 13–14.
- (b) Myerson, R. (1982), “Optimal Coordination Mechanisms in Generalized Principal-Agent Problems,” *Journal of Mathematical Economics* 10:67–81.
- (c) Lovejoy, W. (2006), “Optimal Mechanisms with Finite Agent Types,” *Management Science* 52(5): 788–803.

- (d) Townsend, R. (1979), “Optimal Contracts and Competitive Markets with Costly State Verification,” *Journal of Economic Theory* 21(2): 265–293.
- (e) Gale, D. and M. Hellwig (1985), “Incentive-Compatible Debt Contracts: The One-Period Problem,” *Review of Economic Studies* 52:647–663.
- (f) Holmström, B. (1979), “Moral Hazard and Observability,” *Bell Journal of Economics* 10(1): 74–91.
- (g) Spence, M. (1973), “Job Market Signaling,” *Quarterly Journal of Economics* 87(3): 355–374.

3. *Application: Auctions.* 4 weeks.

Single object.

Private values: Revenue equivalence, first and second-price auctions.

Optimal auction.

Interdependent values: affiliation; first and second-price and English auctions.

Winner’s curse. Revenue ranking; linkage principle.

Independent and correlated signals; full surplus extraction.

*Readings*

- (a) Krishna, *Auction Theory*: Ch. 1–8.
- (b) Myerson, R. (1981), “Optimal Auction Design,” *Mathematics of Operations Research* 6: 58–73.
- (c) Milgrom, P. and R. Weber (1982), “A Theory of Auctions and Competitive Bidding,” *Econometrica* 50: 1089–1122.
- (d) Bulow, J. and P. Klemperer (2003), “Prices and the Winner’s Curse,” *Rand Journal of Economics* 33: 1–21.
- (e) Cremer, J. and R. McLean (1988), “Full Extraction of the Surplus in Bayesian and Dominant Strategy Auctions,” *Econometrica* 56: 1247–1257.

4. *Other applications:* 1–2 weeks. Flexible, depends partly on enrolment and student interest.

- (a) Market Microstructure.

*Readings*

- i. Glosten, L. and P. Milgrom (1985), “Bid, Ask, and Transaction Prices in a Specialist Market with Heterogenously Informed Traders,” *Journal of Financial Economics* 14(1): 71–100.
- ii. Kyle, P. (1985), “Continuous Auctions and Insider Trading,” *Econometrica* 53: 1315–1336.

- (b) Herd Behavior.

*Readings*

- i. Bikchandani, S., D. Hirshleifer and I. Welch (1992), “A Theory of Fads, Fashion, Custom and Cultural change as Information Cascades,” *Journal of Political Economy* 100, 992–1026.
  - ii. Scharfstein, D. and J. Stein (1990), “Herd Behavior and Investment,” *American Economic Review* 80(3): 465–479.
5. *Student presentations*: 2 weeks. Papers/topics depend on student interest and choice. Here are some of the papers presented last year.
- (a) Bolton, P. and D. Scharfstein (1990), “A Theory of Predation Based on Agency Problems in Financial Contracting,” *American Economic Review* 80(1): 93–106.
  - (b) Chetty, R. and E. Saez (2007), “An Agency Theory of Dividend Taxation,” NBER Working Paper.
  - (c) Eliaz, K. and R. Spiegler (2006), “Contracting with Diversely Naive Agents,” *Review of Economic Studies* 73: 689–714.
  - (d) Ellingsen, T. and M. Johannesson (2007), “Pride and Prejudice: The Human Side of Incentive Theory,” forthcoming, *American Economic Review*.
  - (e) Krishna, V. and J. Morgan (1997), “An Analysis of the War of Attrition and the All-Pay Auction,” *Journal of Economic Theory* 72(2): 343–362.
  - (f) Prendergast, C. (2003), “The Limits of Bureaucratic Efficiency,” *Journal of Political Economy* 111(5): 929–958.

## Supplementary Readings

These are papers from various areas, broken up by field for convenience. Most of these papers are not likely to be discussed in class, but the list may be useful as a pointer towards applications of asymmetric information in your field.

### 1. Economic theory and applications:

- (a) Akerlof, G., “The Market for Lemons: Quality Uncertainty and the Market Mechanism,” *Quarterly Journal of Economics* 84: 488–500.
- (b) Khalil, F. (1997), “Auditing Without Commitment,” *Rand Journal of Economics* 28: 629–640.
- (c) Krasa, S. and A. Villamil (2000), “Optimal Contracts when Enforcement is a Decision Variable,” *Econometrica* 68: 119–134.  
See also, Sharma, T.: Comment on Krasa–Villamil, *Econometrica* 71: 387–390.  
Krasa–Villamil, Reply to Sharma, *Econometrica* 71: 391–393.
- (d) Mookherjee, D. and I. Png (1989), “Optimal Auditing, Insurance and Redistribution,” *Quarterly Journal of Economics* 104: 399–415.
- (e) Oyer, P. (2004), “Why do Firms Use Incentives that have no Incentive Effects?” *Journal of Finance* 59(4): 1619–1649.
- (f) Spear, S. and S. Srivastava (1986), “On Repeated Moral Hazard with Discounting,” *Review of Economic Studies* 54:599–617.

### 2. Auctions:

#### • Surveys:

- (a) Klemperer, P. (1999), “Auction Theory: A Guide to the Literature”, *Journal of Economic Surveys*. Available from his web site at [www.klemperer.org](http://www.klemperer.org). This site also has some other useful papers on Auctions, including “Why Every Economist Should Know About Auctions.”
- (b) Wolfstetter, E. (1996), “Auctions: An Introduction” *Journal of Economic Surveys* 10(4): 367–420. Available on the web; do a Google search for “Wolfstetter auction survey.”

#### • Other papers:

- (a) Bulow, J. and J. Roberts (1989), “The Simple Economics of Optimal Auctions,” *Journal of Political Economy* 97: 1060–1090.
- (b) Bulow, J. and P. Klemperer (1996), “Auctions vs Negotiations,” *American Economic Review* 86: 180–194.
- (c) Myerson, R. and M. Satterthwaite (1983), “Efficient Mechanisms for Bilateral Trading,” *Journal of Economic Theory* 28: 265–281.
- (d) Finance applications:

- i. Bhattacharyya, S. and R. Singh (1999), “The Resolution of Bankruptcy by Auction: Allocating the Residual Right of Design,” *Journal of Financial Economics* 54: 269–294.
  - ii. Board, S. (2007), “Bidding into the Red: A Model of Post-Auction Bankruptcy,” *Journal of Finance*, 62(6): 2695–2723.
  - iii. DeMarzo, P., I. Kremer, and A. Skrzypacz (2005), “Bidding with Securities: Auctions and Security Design,” *American Economic Review* 95(4): 936–959.
  - iv. Parlour, C. and U. Rajan (2005), “Rationing in IPOs,” *Review of Finance*: 9: 33–63.
3. Accounting applications:
- (a) Arya, A., J. Glover and S. Sunder (1998), “Earnings Management and the Revelation Principle,” *Review of Accounting Studies* 3: 7–34.
  - (b) Baldenius, T., S. Dutta, and S. Reichelstein (2005), “Cost Allocation for Capital Budgeting,” working paper.
  - (c) Fischer, P. and P. Stocken (2004), “Effects of Investor Speculation on Earnings Management,” *Journal of Accounting Research* 42(5): 843–870.
  - (d) Shin, H.S. (2004), “Endogenous Disclosures and the Post-Earnings Announcement Drift,” Working Paper.
4. Finance applications:
- (a) Aghion P. and P. Bolton (1992), “An Incomplete Contracts Approach to Financial Contracting,” *Review of Economic Studies* 59: 473–494.
  - (b) Bolton, P. and D. Scharfstein (1990), “A theory of predation based on agency problems in financial contracting,” *American Economic Review* 80: 93–106.
  - (c) Cestone, G. and L. White (2003), “Anticompetitive Financial Contracting: The Design of Financial Claims,” *Journal of Finance* 58(5): 2109–2142.
  - (d) Diamond, D. (1984), “Financial Intermediation and Delegated Monitoring,” *Review of Economic Studies* 51(3): 393–414.
  - (e) Diamond, D. and P. Dybvig (1983), “Bank runs, deposit insurance, and liquidity,” *Journal of Political Economy* 91(3): 401–419.
  - (f) Leland, H. and D. Pyle (1977), “Informational Asymmetries, Financial Structure, and Financial Intermediation,” *Journal of Finance* 32(2): 371–387.
5. Information Systems applications:
- (a) Bakos, Y. and E. Brynjolfsson (1999), “Bundling Information Goods: Pricing, Profits and Efficiency,” *Management Science* 45: 1613–1630.
  - (b) Etzion, H., E. Pinker, and A. Seidmann (2006), “Analyzing the Simultaneous Use of Auctions and Posted Price Selling,” *Manufacturing and Service Operations Management* 8(1): 68–91.

- (c) Hitt, L. and P-Y. Chen (2003), “Bundling with Customer Self-Selection: A Simple Approach to Bundling Low Marginal Cost Goods,” Working Paper.
  - (d) Shumsky, R. and E. Pinker (2003), “Gatekeepers and Referrals in Services,” *Management Science* 49(7): 839–856.
6. Marketing applications:
- (a) Balachander, S. and K. Srinivasan (1994), “Selection of Product Line Qualities and Prices to Signal Competitive Advantage,” *Management Science* 40(7): 824–841.
  - (b) Budish, E. and L. Takeyama (2001), “Buy Prices in Online Auctions: Irrationality on the Internet?” *Economics Letters* 72:325–333.
  - (c) Chen, Y., C. Narasimhan and J. Zhang (2001), “Consumer Heterogeneity and Price-Matching Guarantees,” *Marketing Science* 20: 300–314.
  - (d) Sinha, A. and E. Greenleaf (2000), “The Impact of Discrete Bidding and Bidder Aggressiveness on Sellers’ Strategies in Open English Auctions: Reserves and Covert Shilling,” *Marketing Science* 19(3): 244–265.
7. Operations Management applications:
- (a) Beil, D. and L. Wein, “A Pooling Analysis of Two Simultaneous Online Auctions,” forthcoming, *Manufacturing and Service Operations Management*.
  - (b) Cachon, G. (2003), “Supply Chain Coordination with Contracts,” in *Handbooks in Operations Research and Management Science: Supply Chain Management* eds. S. Graves and T. de Kok.
  - (c) Cachon, G. and S. Netessine (2004), “Game Theory in Supply Chain Analysis,” in *Handbook of Quantitative Supply Chain Analysis: Modeling in the eBusiness Era*, eds D. Simchi-Levi, S. David Wu and Z.-J. Shen.
  - (d) Gallien, J. and L. Weil (2005), “A Smart Market for Industrial Procurement with Capacity Constraints,” *Management Science* 51(1): 76–91.
  - (e) Netessine, S. and T. Taylor (2005), “Product Line Design and Production Technology,” working paper.