

Industrial Organization III: Contract Theory (EC855.01) Fall 2000

Economics Department, Boston College

Prof. Ingela Alger

Carney Hall, room 244

tel: (617) 552-1589

e-mail: ingela.alger@bc.edu

Office hours: Wednesdays 1.30-4.30

Description

The main objective of this course is to provide you with the theoretical tools that are commonly used to analyze situations with asymmetric information. Various applications to IO will be covered throughout the course.

Grading

Course requirements and grading will ultimately depend on the number of students who take the class (paper presentations will be required if there are few students). However, there will in any case be two exams, which will account for the main part of the grade (60-80%), and problem sets (20-30%).

Course Material and Outline

• Main References

The required text is:

SALANIÉ, B. (1997). *The Economics of Contracts*, Cambridge: MIT Press. **(S)**

It covers most of the theoretical concepts to be developed in the course. It can be found in the BC bookstore. Two other useful references for a presentation of the main theoretical results include:

MAS-COLELL, A., M.D. WHINSTON and J.R. GREEN (1995). *Microeconomic Theory*, Oxford: Oxford University Press. **(MWG)**

FUDENBERG, D., and J. TIROLE (1991). *Game Theory*, Cambridge: MIT Press. **(FT)**

Books applying contract theory to specific topics include:

LAFFONT, J.-J., and J. TIROLE (1993). *A Theory of Incentives in Procurement and Regulation*, Cambridge: MIT Press. **(LT)**

TIROLE, J. (1988). *The Theory of Industrial Organization*, Cambridge: MIT Press. **(T)**

HART, O. (1995). *Firms, Contracts, and Financial Structure*, Oxford: Oxford University Press. **(H)**

The following books provide examples that motivate the use of contract theory, and develop many interesting questions on an intuitive level:

MILGROM, P., and J. ROBERTS (1992). *Economics, Organization & Management*, Englewood Cliffs, NJ: Prentice Hall. (MR)

WILLIAMSON, O. (1985). *The Economic Institutions of Capitalism*, New York: The Free Press. (W)

• Course Outline

* = required reading (syllabus as of Sept. 5: only adverse selection part has required readings)

▷ = hard-to-find papers that are available in my office

I. Introduction

*(S) Chapter 4.1

*(MWG) Chapter 13.A and 13.B

*AKERLOF, G.A. (1970). "The Market for 'Lemons:' Quality Uncertainty and the Market Mechanism," *Quarterly Journal of Economics*, 84:488-500.

*(Introduction) HART, O. and B. HOLMSTRÖM (1987). "The Theory of Contracts," in T. Bewley, ed., *Advances in Economic Theory, 5th World Congress of the Econometric Society*, Cambridge: Cambridge University Press.

*(Introduction and Section 1.1) LAFFONT, J.-J. and E. MASKIN (1982). "The Theory of Incentives: An Overview," in W. Hildenbrand, ed., *Advances in Economic Theory, 4th World Congress of the Econometric Society*, Cambridge: Cambridge University Press.

II. Some Game Theory

Chapter 7 of (MWG) is a good (re-)introduction to game theory.

The concepts we will use in the course are: Nash Equilibrium, Subgame Perfect Equilibrium, Bayesian Equilibrium, Perfect Bayesian Equilibrium. These are explained in *(S) Game Theory Appendix. For further comments, see Section 1.2 in LAFFONT, J.-J. AND E. MASKIN (1982).

Other sources you may use include: (T) Chapter 11, (MWG) Chapters 7, 8D, 8E, 9.A-9.C, and (FT) Chapters 1, 3, 6, 8.1-8.2.

III. Hidden Information (adverse selection)

A. Introduction

*(S) Chapter 1

*(FT) Introduction to Chapter 7

(Sections 1.3 and 2.1) LAFFONT, J.-J. AND E. MASKIN (1982)

B. The Basic Model (one principal, one agent, full commitment)

*(S) Chapter 2

(MWG) Chapter 14.C

(FT) Chapter 7.1-7.3

GUESNERIE, R. and J.-J. LAFFONT (1984). "A Complete Solution to a Class of Principal-Agent Problems with an Application to the Control of a Self-Managed Firm," *Journal of Public Economics*, 25:329-369.

C. Applications

1. Second-Degree Price Discrimination

*(S) Chapter 2.2

*(T) Chapter 3

MASKIN, E. and J. RILEY (1984). "Monopoly with Incomplete Information," *RAND Journal of Economics*, 15:171-196.

MUSSA, M. and S. ROSEN (1978). "Monopoly and Product Quality," *Journal of Economic Theory*, 18:301-317.

ALGER, I. (1999). "Consumer Strategies Limiting the Monopolist's Power: Multiple and Joint Purchases," *RAND Journal of Economics*, 30:736-757.

STOLE, L.A. (1995). "Nonlinear Pricing and Oligopoly" *Journal of Economics & Management Strategy*, 4:529-62.

2. Regulation

*(S) Chapter 3.1.1

*(LT) Introduction + Chapter 1.1-1.6

BARON, D.P. and R.B. MYERSON (1982). "Regulating a Monopolist with Unknown Costs," *Econometrica*, 50:911-930.

LAFFONT, J.-J. and J. TIROLE (1986). "Using Cost Observation to Regulate Firms," *Journal of Political Economy*, 94:614-641.

*AURIOL, E. and J.-J. LAFFONT (1992). "Regulation by Duopoly," *Journal of Economics & Management Strategy*, 1:507-533.

*Survey: LAFFONT, J.-J. (1994). "The New Economics of Regulation Ten Years After," *Econometrica*, 62:507-537.

3. Insurance

*(S) Chapter 3.1.3

4. Auditing

TOWNSEND, R. (1979). "Optimal Contracts and Competitive Markets with Costly State Verification," *Journal of Economic Theory*, 21:265-293.

MOOKHERJEE, D. and I. PNG (1989). "Optimal Auditing, Insurance, and Redistribution," *Quarterly Journal of Economics*, 104:399-415.

5. Corporate Finance

*BOLTON, P. and D.S. SCHARFSTEIN (1990). "A Theory of Predation Based on Agency Problems in Financial Contracting," *American Economic Review*, 80:93-106.

*GALE, D. and M. HELLWIG (1985). "Incentive-Compatible Debt Contracts: The One-Period Problem," *Review of Economic Studies*, 52:647-663.

D. Extensions

1. Multiple Agents: Mechanism Design and Bilateral Trading

*(FT) Chapters 7.4 and 7.5

*(MWG) Chapter 23

GROVES, T. (1973). "Incentives in Teams," *Econometrica*, 41:617-631.

CLARKE, E. (1971). "Multipart Pricing of Public Goods," *Public Choice*, 8:19-33.

D'ASPROMONT, C. and L.-A. GÉRARD-VARET (1979). "Incentives and Incomplete Information," *Journal of Public Economics*, 11:25-45.

MOOKHERJEE, D. and S. REICHELSTEIN (1992). "Dominant Strategy Implementation of Bayesian Incentive Compatible Allocation Rules," *Journal of Economic Theory*, 56:378-99.

MYERSON, R.B. and M. SATTERTHWAITE (1983). "Efficient Mechanisms for Bilateral Trading," *Journal of Economic Theory*, 28:265-281.

Application: Auctions

*(S) Chapter 3.2.2

*(LT) Chapters 7.1-7.3

MCAFEE, R.P. and J. McMILLAN (1987). "Auctions and Bidding" *Journal of Economic Literature*, 25:699-738.

*BULOW, J. and J. ROBERTS (1989). "The Simple Economics of Optimal Auctions" *Journal of Political Economy*, 97:1060-1090.

▷ DASGUPTA, P. and E. MASKIN (1998). "Efficient Auctions," Mimeo Cambridge and Harvard.

▷ Survey: KLEMPERER, P. (1999). "Auction Theory: A Guide to the Literature," CEPR DP No.2163.

2. Multiple Agents: Correlated Types

*(FT) Chapter 7.6.1

*CRÉMER, J. and R.P. McLEAN (1985). "Optimal Selling Strategies under Uncertainty for a Discriminating Monopolist when Demands are Interdependent," *Econometrica*, 53:345-361.

DEMSKI, J.S. and D. SAPPINGTON (1984). "Optimal Incentive Contracts with Multiple Agents," *Journal of Economic Theory*, 33:152-171.

MA, C.-T.A., J. MOORE and S. TURNBULL (1988). "Stopping Agents from 'Cheating'," *Journal of Economic Theory*, 46:355-72.

3. Multiple Agents: Collusion

*TIROLE J. (1986). "Hierarchies and Bureaucracies: On the Role of Collusion in Organizations," *Journal of Law, Economics, and Organizations*, 2:181-214.

*(Introduction) Survey: TIROLE, J. (1992). "Collusion and the Theory of Organizations," in J.-J. Laffont, ed., *Advances in Economic Theory: Proceedings of the Sixth World Congress of the Econometric Society*. Cambridge; Cambridge University Press.151-206

Survey: LAFFONT, J.-J. and J.-C. ROCHET (1997). "Collusion in Organizations," *Scandinavian Journal of Economics*, 99:485-495.

KOFMAN, F. and J. LAWARRÉE (1993). "Collusion in Hierarchical Agency," *Econometrica*, 61:629-56.

LAFFONT, J.-J. and D. MARTIMORT (1997). "Collusion under Asymmetric Information," *Econometrica*, 65:875-911.

*LAFFONT, J.-J. and D. MARTIMORT (1998). "Collusion and Delegation," *RAND Journal of Economics*, 29:280-305.

LAFFONT, J.-J. and D. MARTIMORT (2000). "Mechanism Design with Collusion and Correlation," *Econometrica*, 68:309-42.

FAURE-GRIMAUD, A., J.-J. LAFFONT and D. MARTIMORT (1999). "The Endogenous Transaction Costs of Delegated Auditing," *European Economic Review*, 43:1039-1048.

*LAFFONT, J.-J. (1999). "Political Economy, Information and Incentives," *European Economic Review*, 43:649-669.

4. Dynamics: The Ratchet Effect and Renegotiation

*(S) Chapter 6 (except 6.5)

*(LT) Chapters 9 and 10

FREIXAS, X., R. GUESNERIE and J. TIROLE (1985). "Planning under Incomplete Information and the Ratchet Effect," *Review of Economic Studies*, 52:173-191.

DEWATRIPONT, M. (1988). "Commitment Through Renegotiation-Proof Contracts with Third Parties," *Review of Economic Studies*, 55:377-389.

DEWATRIPONT, M. (1989). "Renegotiation and Information Revelation over Time: The Case of Optimal Labor Contracts," *Quarterly Journal of Economics*, 104:589-619.

5. Alternative Participation Constraints

*(S) Chapter 3.2.3

SALANIÉ, B. (1990). "Sélection adverse et aversion pour le risque," *Annales D'Economie et de Statistique*, 18:131-149.

- ▷ JULLIEN, B. (1999). "Participation Constraints in Adverse Selection Models," IDEI WP.
- ▷ ROCHET, J.-C. and L. STOLE (2000). "Nonlinear Pricing with Random Participation Constraints," Mimeo IDEI Toulouse and University of Chicago.

6. Countervailing Incentives

*(S) Chapter 3.2.7

- *LEWIS, T. and D. SAPPINGTON (1989). "Countervailing Incentives in Agency Theory," *Journal of Economic Theory*, 49:294-313.

7. Endogenous Asymmetric Information; Input v. Output Monitoring

- *CRÉMER, J. and F. KHALIL (1992). "Gathering Information Before Signing a Contract," *American Economic Review*, 82:567-578.

KHALIL, F. and J. LAWARRÉE (1995). "Input versus Output Monitoring: Who Is the Residual Claimant?," *Journal of Economic Theory*, 66:139-157.

8. Multi-Dimensional Private Information

*(S) Chapter 3.2.4

Survey: ARMSTRONG, M. and J.-C. ROCHET (1999). "Multi-Dimensional Screening: A User's Guide," *European Economic Review*, 43:959-979.

- J.-C. ROCHET and P. CHONÉ (1998). "Ironing, Sweeping and Multi-Dimensional Screening," *Econometrica*, 66:783-826.

9. Type-Dependent Message Spaces and Honesty

- *GREEN, J.R. and J.-J. LAFFONT (1986). "Partially Verifiable Information and Mechanism Design," *Review of Economic Studies*, 53:447-456.

KOFMAN, F. and J. LAWARRÉE (1996). "On the Optimality of Allowing Collusion," *Journal of Public Economics*, 61:383-407.

ALGER, I. and R. RENAULT (2000). "Honest Agents and Equilibrium Lies," mimeo, Boston College and Université de Caen.

ALGER, I. and A.C.-T. MA (1998). "Moral Hazard, Insurance, and Some Collusion," FMG/LSE DP No. 318.

9. Informed Principal

*(S) Chapter 3.2.6

*(FT) Chapter 7.6.3

MYERSON, R.B. (1983). "Mechanism Design by an Informed Principal," *Econometrica*, 51:1767-1797.

MASKIN, E. and J. TIROLE (1990). "The Principal-Agent Relationship with an Informed Principal: The Case of Private Values," *Econometrica*, 58:379-409.

MASKIN, E. and J. TIROLE (1992). “The Principal-Agent Relationship with an Informed Principal, II: The Case of Common Values,” *Econometrica*, 60:1-42.

10. Multiple Principals

*(FT) Chapter 7.6.5

*MARTIMORT, D. (1996). “Exclusive Dealing, Common Agency, and Multiprincipals Incentive Theory” *RAND Journal of Economics*, 27:1-31.

▷ MARTIMORT, D. (1992). “Multi-principaux avec anti-sélection,” *Annales D’Economie et de Statistique*, 20:1-37.

▷ STOLE, L. (1997). “Mechanism Design under Common Agency: Theory and Applications,” mimeo, University of Chicago.

MARTIMORT, D. (1996). “The Multiprincipal Nature of Government,” *European Economic Review*, 40:673-85.

11. Competition in Contracts

*(S) Chapter 3.2.1

*(MWG) Chapter 13.D

*ROTHSCHILD, M. and J. STIGLITZ (1976). “Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information,” *Quarterly Journal of Economics*, 90:629-649.

WILSON, C. (1977). “A Model of Insurance with Incomplete Information,” *Journal of Economic Theory*, 16:167-207.

RILEY, J. (1979). “Informational Equilibrium,” *Econometrica*, 47:331-359.

*Survey: HELLMIG, M. (1987). “Some Recent Developments in the Theory of Competition in Markets with Adverse Selection,” *European Economic Review*, 31:319-325.

E. Related Topic: Signaling

*(S) Chapter 4

*(MWG) Chapter 13.C

*SPENCE, M. (1973). “Job Market Signaling,” *Quarterly Journal of Economics*, 87:355-374.

CRAWFORD, V. and J. SOBEL (1982). “Strategic Information Transmission,” *Econometrica*, 50:1431-1451.

IV. Hidden Actions (moral hazard)

A. Introduction

*(S) Chapter 5.1

(Section 1) HART, O. AND B. HOLMSTRÖM (1987)

B. The Basic Model (one principal, one agent, commitment)

*(S) Chapters 5.2 through 5.3.4

(MWG) Chapter 14.B

HOLMSTRÖM, B. (1979). "Moral Hazard and Observability," *Bell Journal of Economics*, 10:74-91.

SHAVELL, S. (1979). "Risk Sharing and Incentives in the Principal and Agent Relationship," *Bell Journal of Economics*, 10:55-73.

GROSSMAN, S.J. and O.D. HART (1983). "An Analysis of the Principal-Agent Problem," *Econometrica*, 51:7-45.

ROGERSON, W. (1985). "The First-Order Approach to Principal-Agent Problems," *Econometrica*, 53:1357-1368.

C. Applications

1. Work Incentive Schemes

*(S) Chapter 5.4.2

SHAPIRO, C. and J. STIGLITZ (1984). "Equilibrium Unemployment as a Worker Discipline Device," *American Economic Review*, 74:433-444.

BAKER, G., M. JENSEN and K. MURPHY (1988). "Compensation and Incentives: Practice vs. Theory," *Journal of Finance*, 43:593-616.

JENSEN, M. and K. MURPHY (1990). "Performance Pay and Top-Management Incentives," *Journal of Political Economy*, 98:225-264.

ROSEN, S. (1992). "Contracts and the Market for Executives," in L. Werin and H. Wijkander, eds., *Contract Economics*, Oxford: Basil Blackwell.

▷ ALLEN, F. and D. GALE (1998). "Corporate Governance and Competition," Mimeo Wharton and NYU.

2. Career Concerns

HOLMSTRÖM, B. (1999). "Managerial Incentive Problems: A Dynamic Perspective," *Review of Economic Studies*, 66.

DEWATRIPONT, M., I. JEWITT and J. TIROLE (1999). "The Economics of Career Concerns. I: Comparison of Information Structures," *Review of Economic Studies*, 66:183-198.

DEWATRIPONT, M., I. JEWITT and J. TIROLE (1999). "The Economics of Career Concerns. II: Applications to Missions in Organizations," *Review of Economic Studies*, 66:199-217.

GIBBONS, R. and K.J. MURPHY (1992). "Optimal Incentive Contracts in the Presence of Career Concerns: Theory and Evidence," *Journal of Political Economy*, 100:468-505.

3. Insurance

*(S) Chapter 5.4.1

- ARROW, K.J. (1963). "Uncertainty and the Welfare Economics of Medical Care," *American Economic Review*, 53:941-973.
- ARROW, K.J. (1971). "Insurance, Risk and Resource Allocation," in K.J. Arrow, ed., *Essays in the Theory of Risk Bearing*, Chicago: Markham.
- ZECKHAUSER, R. (1970). "Medical Insurance: A Case Study of the Trade-Off Between Risk Spreading and Appropriate Incentives," *Journal of Economic Theory*, 2:10-26.
- MA, C.-T.A. and T. MCGUIRE (1997). "Optimal Health Insurance and Provider Payment," *American Economic Review*, 87:685-704.
- MA, C.-T.A. (1994). "Health Care Payment Systems: Cost and Quality Incentives," *Journal of Economics & Management Strategy*, 3:93-112.
- MCGUIRE, T. (2000). "Physician Agency," in A.J. Culyer and J.P. Newhouse, eds., *Handbook of Health Economics*, Amsterdam: Elsevier Science.

4. Sharecropping

- STIGLITZ, J. (1974). "Incentives and Risk Sharing in Sharecropping," *Review of Economic Studies*, 41:219-256.

D. Extensions

1. Multiple Agents

*(S) Chapter 5.3.5

- HOLMSTRÖM, B. (1982). "Moral Hazard in Teams," *Bell Journal of Economics*, 13:324-340.
- GREEN, J.R. and N.L. STOKEY (1983). "A Comparison of Tournaments and Contracts," *Journal of Political Economy*, 91:349-364.
- MOOKHERJEE, D. (1984). "Optimal Incentive Schemes in Multi-Agent Situations," *Review of Economic Studies*, 51:433-446.
- HOLMSTRÖM, B. and P. MILGROM (1990). "Regulating Trade Among Agents," *Journal of Institutional and Theoretical Economics*, 146:85-105.
- ITOH, H. (1991). "Incentives to Help in Multi-Agent Situations," *Econometrica*, 59:611-636.

2. Multiple Principals

- BERNHEIM, B.D. and M.D. WHINSTON (1986). "Common Agency," *Econometrica*, 54:923-942.

3. Multitasking

*(S) Chapter 5.3.7

- HOLMSTRÖM, B. and P. MILGROM (1991). "Multitask Principal-Agent Analyses: Incentive Contracts, Asset Ownership and Job Design," *Journal of Law, Economics and Organization*, 7:24-51.

4. Dynamics

*(S) Chapter 6.5

HOLMSTRÖM, B. and P. MILGROM (1987). "Aggregation and Linearity in the Provision of Intertemporal Incentives," *Econometrica*, 55:303-328.

FUDENBERG, D. and J. TIROLE (1990). "Moral Hazard and Renegotiation in Agency Contracts," *Econometrica*, 58:1279-1320.

MA, C.-T.A. (1991). "Adverse Selection in Dynamic Moral Hazard," *Quarterly Journal of Economics*, 106:255-75.

CHIAPPORI, P.-A., I. MACHO, P. REY and B. SALANIÉ (1994). "Repeated Moral Hazard: The Role of Memory, Commitment and the Access to Credit Markets," *European Economic Review*, 38:1527-1553.

5. Limited Liability

SAPPINGTON, D. (1983). "Limited Liability Contracts between Principal and Agent," *Journal of Economic Theory*, 29:1-21.

6. Models with Moral Hazard and Adverse Selection

MYERSON, R. (1982). "Optimal Coordination Mechanisms in Generalized Principal-Agent Problems," *Journals of Mathematical Economics*, 10:67-81.

GUESNERIE, R., P. PICARD and P. REY (1989). "Adverse Selection and Moral Hazard with Risk Neutral Agents," *European Economic Review*, 33:807-23.

VII. The Theory of the Firm

A. Introduction

(H) Chapter 1

ALCHIAN, A. and H. DEMSETZ (1972). "Production, Information Costs and Economic Organization," *American Economic Review*, 62:777-795.

COASE, A. (1937). "The Nature of the Firm," *Economica*, 4:386-405.

Survey: HOLMSTRÖM, B. and J. TIROLE (1989). "The Theory of the Firm," in R. Schmalensee and R.D. Willig, eds., *Handbook of Industrial Organization*, New York: Elsevier Science Publishers.

B. The Incomplete Contracts Approach

*(S) Chapter 7

(H) Chapters 2 and 3

(Section 3) HART, O. AND B. HOLMSTRÖM (1987)

GROSSMAN, S.J. and O.D. HART (1986). "The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration," *Journal of Political Economy*, 94:691-719.

HART, O. and J. MOORE (1988). “Incomplete Contracts and Renegotiation,” *Econometrica*, 56:755-785.

HERMALIN, B.E. and M.L. KATZ (1991). “Moral Hazard and Verifiability: The Effects of Renegotiation in Agency,” *Econometrica*, 59:1735-1753.

AGHION, P., M. DEWATRIPONT and P. REY (1994). “Renegotiation Design with Unverifiable Information,” *Econometrica*, 62:257-282.

Application: Corporate Finance

(H) Chapters 5-8

AGHION, P. and P. BOLTON (1992). “An ‘Incomplete Contracts’ Approach to Financial Contracting,” *Review of Economic Studies*, 59:473-494.

HART, O. and J. MOORE (1994). “A Theory of Debt Based on the Inalienability of Human Capital,” *Quarterly Journal of Economics*, 109:841-879.

HART, O. and J. MOORE (1998). “Default and Renegotiation: A Dynamic Model of Debt,” *Quarterly Journal of Economics*, 113:1-41.

C. Foundations and Critique of the Incomplete Contracts Approach

(H) Chapter 4

HART, O. and J. MOORE (1999). “Foundations of Incomplete Contracts,” *Review of Economic Studies*, 66:115-138.

MASKIN, E. and J. TIROLE (1999). “Unforeseen Contingencies and Incomplete Contracts,” *Review of Economic Studies*, 66:83-114.

ANDERLINI, L. and L. FELLI (1994). “Incomplete Written Contracts: Undescribable States of Nature,” *Quarterly Journal of Economics*, 109:1085-1124.

Survey: TIROLE, J. (1994). “Incomplete Contracts: Where Do We Stand?,” *Econometrica*, 67:741-781.

D. Other Theories of the Firm

JENSEN, M. and W. MECKLING (1976). “Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure,” *Journal of Financial Economics*, 305-360.

HOLMSTRÖM, B. and P. MILGROM (1994). “The Firm as an Incentive System,” *American Economic Review*, 84:972-991.

HOLMSTRÖM, B. (1999). “The Firm as a Subeconomy,” *Journal of Law, Economics and Organization*, 15:74-102.

E. The Internal Organization of the Firm (and of Government)

AGHION, P. and J. TIROLE (1997). “Formal and Real Authority in Organizations,” *Journal of Political Economy*, 105:1-29.

CRÉMER, J. (1995). “Arm’s Length Relationships,” *Quarterly Journal of Economics*, 110:275-295.

- LAFFONT, J.-J. and D. MARTIMORT (1997). "The Firm as a Multicontract Organization," *Journal of Economics & Management Strategy*, 6:201-234.
- MACLEOD, W.B. and J.M. MALCOMSON (1988). "Reputation and Hierarchy in Dynamic Models of Employment," *Journal of Political Economy*, 96:832-854.
- STRAUSZ, R. (1997). "Delegation of Monitoring in a Principal-Agent Relationship," *Review of Economic Studies*, 64:337-357.
- ▷ TIROLE, J. (1994). "The Internal Organization of Government," *Oxford Economic Papers*, 46:1-29.