

Game Theory with Applications to Finance and Marketing, II

Course Syllabus, Spring 2010

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This course is a sequel to the course *Game Theory with Applications to Finance and Marketing, I*, and it will review the major ingredients of contract theory. The intended audiences are graduate students who have taken Game Theory with Applications to Finance and Marketing, I or some graduate-level game theory course, and who are interested in applying game theory to contract and institution design in the fields of finance and/or marketing. Our textbook is

Jean-Jacques Laffont and David Martimort, 2002, *The Theory of Incentives*, New Jersey: Princeton University Press.

The course will follow closely the agenda laid out in the book. We shall manage to finish chapters 2-9.

1. Chapters 2 and 3 cover static adverse selection problem. Chapter 2 lays out the basic problem with the informed agent having two types. It proves the revelation principle and applies it to various problems in section 2.15. It emphasizes the different roles of ex-ante and ex-post participation constraints, and briefly considers random schemes. Chapter 3 considers an informed agent with more than 2 types, with multi-dimensional private information, or with type-dependent or random participation constraint. The materials there are then applied to the costly state verification (CSV) financial contracting problem.
2. Chapters 4 and 5 consider moral hazard problem. Chapter 4 considers an agent who is either risk averse or is risk neutral but protected by

limited liability. In this chapter, the agent has two effort choices, and is delegated with a single task. The theory has various applications in section 4.8, and it is related to the theory of the firm. Chapter 5 allows the agent to have more than 2 effort choices, and it allows the agent to be delegated with multiple tasks. The Holmstrom-Milgrom multi-task model is reviewed.

3. Chapter 6 considers contracting problems where contracting parties have observable but non-verifiable information. The theory of Nash and subgame-Nash implementation is briefly reviewed. Section 6.5 considers risk-averse contracting parties.
4. Chapter 7 considers a contracting environment where adverse selection, moral hazard, and/or non-verifiability problems co-exist.
5. Chapter 8 considers repeated adverse selection and repeated moral hazard problems, and gives a discussion of implicit contracts in section 8.3.
6. Chapter 9 considers incomplete contracts and the hold-up problem.

There will be homework assignments due regularly, which together with an in-class midterm and final examinations determine a student's grade. The following is a tentative schedule.

| Week no. | Contents |
|----------|---------------------|
| 1 | Chapter 2 |
| 2 | Chapter 2 continued |
| 3 | Chapter 3 |
| 4 | Chapter 3 continued |
| 5 | Chapter 3 continued |
| 6 | Chapter 4 |
| 7 | Chapter 4 continued |
| 8 | Chapter 5 |
| 9 | Chapter 5 continued |
| 10 | Midterm Examination |
| 11 | Chapter 6 |
| 12 | Chapter 6 continued |
| 13 | Chapter 7 |
| 14 | Chapter 7 continued |
| 15 | Chapter 8 |
| 16 | Chapter 8 continued |
| 17 | Chapter 9 |
| 18 | Final Examination |