

The University of Hong Kong
Faculty of Business and Economics

School of Economics and Finance

ECON6007 Industrial Organization
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Course Overview

This course aims to provide a unified theoretical understanding of different strategic interactions among firms in an oligopolistic market. It follows Part II of Tirole's *The Theory of Industrial Organization*. Tirole's Part II offers a systematic and comprehensive coverage of core models in industrial organization,¹ which are organized on the basis of short-run, medium-run, and long-run strategic interactions. For example, price is considered as a short-run strategic variable, product differentiation a medium-run variable, and entry, exit, reputation and R&D long-run variables. The common theoretical framework of these models is non-cooperative game theory. We start with an introduction to game theory in this course.

Non-Cooperative Game Theory

You are assumed to have some exposure of game theory. At the minimum, you should know what are normal form games (i.e. simultaneous games), extensive form games (i.e. sequential games), and common knowledge. We will cover the following four classes of games (and the corresponding equilibrium concepts):

- Static games of complete information (Nash equilibrium)
- Dynamic games of complete information (subgame perfect equilibrium)
- Static games of incomplete information (Bayesian equilibrium)

¹We will skip Tirole's Part I, which is exclusive on monopoly. It will be too intensive to cover both parts of Tirole in one semester.

- Dynamic games of incomplete information (perfect Bayesian equilibrium)

The materials will be introduced at a somewhat formal level, i.e. notation and some mathematics will be used. In a (technical) sense, the rest of the course can be considered as applications of these games. It is hoped that the introduction of game theory will be finished in two weeks, so that by the end of the second week, you can form a good expectation of the technical level of the course.

Short-Run Price Competition

Both the Bertrand and the Cournot models will be discussed, with the Cournot model interpreted as a solution to the Bertrand paradox. Two alternative solutions to the Bertrand paradox are covered next.

Dynamic Price Competition and Tacit Collusion

The second solution to the Bertrand paradox is obtained by relaxing the one-shot assumption in the Bertrand model. It should be intuitive that allowing repeated interactions among oligopolistic firms will promote cooperation (collusion). This approach is consistent with a number of behavioral motives for cooperation.

Product Differentiation

Introducing heterogeneous products gives another solution to the Bertrand paradox. The spatial model will be introduced to provide a formal analysis of competition when products are differentiated. The “principle of differentiation”, among other results, will be developed.

Entry, Accommodation, and Exit

A number of entry barriers will be examined including economies of scales, absolute cost advantages, and product-differentiation advantages. Two models (Spence-Dixit and Milgrom-Roberts) will be introduced to understand the entry deterrence strategy of limit pricing. The strategy to induce exit will also be covered, together with accommodation strategies.

Reputation, Limit Pricing, and Predation

The accommodation strategies are extended in the setting of asymmetric information. There are conditions that asymmetric information can be used to facilitate collusion. The focus is, however, on more aggressive strategies associated with entry deterrence and exit inducement.

R&D and New Technologies

Schumpeter's view of innovation as a public good is adopted. A system of patents is used to provide firms incentive to undertake R&D. Firm's private benefits and costs under a patent system will be analyzed and complemented by a normative analysis.

Course Schedule

Part I: Bertrand Paradox and Solutions		
1.	Non-Cooperative Game Theory	Chapter 11
2.	Short-Run Price Competition	Chapter 5
3.	Dynamic Price Competition and Tacit Collusion	Chapter 6
4.	Product Differentiation	Chapter 7
Part II: Long-Run Competition		
5.	Entry, Accommodation, and Exit	Chapter 8
6.	Reputation, Limit Pricing, and Predation	Chapter 9
7.	R&D and New Technologies	Chapter 10

Textbook: Tirole, *The Theory of Industrial Organization*, 1988

Course Objectives

- To review and strengthen the understanding of game theory
- To provide a unified theoretical treatment of different strategic interactions among firms
- To establish and differentiate equilibrium strategies for firms in short-, medium-, and long-run competition

Intended Learning Outcomes

Upon completion of the course, students should be able to:

- Understand how to use models to analyze different strategic interactions among firms
- Comprehend the key principles of avoiding short-run price competition
- Distinguish the nature of strategic competition in the long run from those in the medium and short run

Alignments of Program and Course ILOs

Program ILOs	Course ILOs
1. To master current theory and knowledge in the field of economics	ILO1, ILO2, ILO3
2. To develop the ability to apply economics to real world problems	ILO1, ILO2, ILO3

Assessment

The assessment of the course consists of three components: homework (20%), mid-term examination (30%), and final examination (50%).

Homework (20%)

There are four to five sets of homework. They are of equal weight and to be submitted every other week (approximately).

Mid-Term Examination (30%)

The mid-term examination is scheduled on *October 24, 2008 (Friday)* from 6:50–8:20pm at KKL102. It covers the first part of the course.

Final Examination (50%)

The final examination is a comprehensive examination focusing on the second part of the course.

Assessment and Course ILOs

Assessment	Course ILOs
Homework	ILO1, ILO2, ILO3
Mid-Term	ILO1, ILO2, ILO3
Final Exam	ILO1, ILO2, ILO3