Economics of Innovation

Level: Master first year M1 / second semester
Cursus: Economics, Data and Decision Science, and Data Science and Management of Innovation
Teaching hours: 24h in class (lectures)
Teacher: Philippe Solal

Overview

This course presents the main microeconomic issues related to the production and adoption of innovation: innovation race, incentives for cooperation in the R&D sector, optimal patent lifetime, externality effects of network technologies, mechanisms of competition between network technologies.

Skills developed

The major part of this course concerns the field of industrial organization applied to the production and adoption of innovation.

Content

Part I Research and Development

Chapter 1 Innovation race

1.1 Issues and model
1.2 Nash Equilibria
1.3 Socially optimal states

Chapter 2 Cooperation and competition in R&D

2.1 A Cournot duopoly with an R&D stage
2.2 Solution: subgame perfect equilibrium
2.3 Computation of the subgame perfect equilibrium
2.4 Cooperation versus competition at the R&D stage
2.5 Duopoly with cross ownership

Chapter 3 Patents

3.1 Definition and issues
3.2 A two-stage model
3.3 Determining the optimal patent lifetime

Part II Technology adoption and network effects

Chapter 1 Impact of a network technology on the market

1.1 Definition of network externalities
1.2 Adoption of a network technology provided by a monopoly
1.3 Strategic delegation under price competition and network effect
1.4 Tacit collusion and market concentration under network effect

Chapter 2 Competition between network technologies

2.1 Standardization v coexistence of the technologies
2.2 Social optimum

2.3 Evolution and optimization
2.4 The replicator dynamics

Bibliographic references

C. d'Aspremont, A. Jacquemin, Cooperative and Noncooperative R&D in duopoly with spillovers, American Economic Review, 78 (1988) 1133-1137.

K. Binmore, Adjusting to circumstances, Chap. 9, Fun and Games, (1996), University of Michigan.

R. Gibbons, Game Theory for Applied Economists. (1992), Princeton University Press.

J. Farrell, C. Shapiro, Standardization and variety. Economics Letters, 20 (1966), 71-74.

S. Hoernig, Strategic delegation under price competition and network effects. Economics Letters, 117 (2012): 487-489.

M. Katz, C. Shapiro, Network externalities, competition, and compatibility. American Economic Review, 75 (1986): 424-440.

Mukherjee A. Merger and product innovation under cross ownership and cooperative R&D. Economics Letters, 233 (2023): 111418.

P. Rupayan, M. Scrimitore, Tacit collusion and market concentration under networks effects. Economics Letters, 145 (2016): 266-269.

O. Shy, Industrial Organization : Theory and Applications, (1996), MIT Press.

O. Shy, The Economics of Network Industries, (2001), Cambridge University Press.

Prerequisites

Microeconomics course and introductory course to non-cooperative game theory at Licence 3 level.

Grading

Written exam (2 hours)