Helsingin yliopisto - Helsingfors universitet - University of Helsinki ID 2005-3362

Tiedekunta-Fakultet-Faculty		Laitos-Institution-Department
Faculty of Social Sciences		Department of Economics
Tekijä-Författare-Author		
Ahvenniemi, Rasmus		

Työn nimi-Arbetets titel-Title		
R&D Investments of a Duopoly under a Permissive Patent System		
Oppiaine-Läroämne-Subject		
Economics		
Työn laji-Arbetets art-Level	Aika-Datum-Month and year	Sivumäärä-Sidantal-Number of pages
Master's thesis	2005-05-02	52

Tiivistelmä-Referat-Abstract

This thesis considers an investment game, in which two firms invest in R&D in order to obtain an innovation. It is assumed that a permissive patent system is in use, which allows the fragmentation of immaterial property rights among several innovators in cases of simultaneous discovery. The objective is to shed light into the firms' investment behavior using a game-theoretical model.

It is assumed that initially there is an inter-firm difference in product quality, observable by the utility-maximizing consumers. The game consists of two stages: In the first stage, each firm decides on the sum that it is going to invest in R&D. Investment may result in a product quality-improving discovery. In the second stage, the firms engage in either Bertrand or Cournot competition, which are examined as separate cases.

By examining the Nash equilibrium of the firms' investments it is determined, under which parameter configurations each firm invests a positive sum in R&D. There are three parameters in the model: (i) the initial inter-firm difference in product quality, (ii) the quality-improvement resulting from an innovation and (iii) a parameter reflecting the relationship between the sum invested and the probability of making a discovery, thereby reflecting the cost of innovation. Because the mathematical expressions arrived at are complex, numerical computations done on a computer are applied in order to obtain useful results. Based on the numerical results, conclusions are drawn regarding the three parameters' influence on the firms' investment decisions.

The following results are arrived at: (i) Both firms are more likely to invest in cases of inexpensive and/or highly significant discoveries; (ii) The firm producing the higher-quality product is more likely to invest; (iii) In the case of the firm producing the lower-quality product, a large initial inter-firm difference in product quality reduces the firm's willingness to invest under Cournot competition, but increases it under Bertrand competition; (iv) Both firms are more likely to invest under Cournot competition than under Bertrand competition; (v) Under Bertrand competition, the firm selling the lower-quality product is less likely to invest if obtaining an innovation might make the products similar in quality.

Avainsanat-Nyckelord-Keywords

patent

investment

research and development

immaterial property rights

Säilytyspaikka-Förvaringsställe-Where deposited

Muita tietoja-Övriga uppgifter-Additional information