

**Working Paper Series No.111, Faculty of Economics, Niigata University**

## Heterogeneity and Number of Firms in a Patent Race Game

Noriaki Matsushima  
Institute of Social and Economic Research, Osaka University

and

Takeshi Yamazaki\*  
Faculty of Economics, Niigata University

February 10, 2010

### **Abstract**

We consider a patent race game in a Cournot model with heterogeneous firms. There are one efficient firm and identical inefficient firms. They engage in R&D for taking a patent. This setting induces the heterogeneity of the patent values, whereas the classical models of patent race games assume that the value of patent is a positive constant. In this paper, we analyze how an increase in heterogeneity among firms or the number of inefficient firms changes the winning rate of the efficient firm. One of the main results is that if the number of inefficient firms is larger than some critical value, which can be less than one, entry of an inefficient firm always increases the winning rate of the efficient firm.

JEL Classification Numbers: L13.

Key Words: Entry, Patent Race, Rent Seeking

\* Corresponding Author: Takeshi Yamazaki, Faculty of Economics, Niigata University, 8050 Ikarashi 2-no-cho, Nishi-ku, Niigata-shi 950-2181, Japan. E-mail: tyamazak@econ.niigata-u.ac.jp