

Optimal R&D Policies under Process and Product R&D

Yumiko Taba (Waseda University)

Abstract

This study explores governments' optimal research and development (R&D) policies when firms invest in both process R&D and product R&D simultaneously. We develop a model based on the third-country trade model in an international duopoly, in which a high-quality firm and a low-quality firm exist and construct a three-stage game. In the first stage, the governments of both firms determine optimal R&D policies for their domestic firms' R&D investments. In the second stage, the firms choose product quality through product R&D and its cost through process R&D. In the third stage, the firms compete under Cournot or Bertrand competition in the third country. In particular, in the second stage, we consider the following two cases. The first case is that the firms determine their products' qualities and costs by determining only total amount of R&D investments. The second case is that the firms endogenously choose the total amount of R&D investments and the ratio of R&D investment in process R&D and product R&D. We found that the governments have incentives to subsidize their domestic firm's R&D investments in these two cases irrespective of the magnitude of the R&D fraction. In addition, the government's subsidy strategically affects the rival firm's total amount of R&D investment but has no impact on the rival firm's choice of R&D fraction. We concludes that these results are maintained under both Cournot and Bertrand competition.