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Intellectual property rights, licensing, and innovation in an endogenous product-cycle model

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Abstract

We develop a dynamic general-equilibrium model of the product cycle to study the effects of stronger intellectual property rights (IPRs) in the South on the incentives of firms in the North to innovate and to license advanced technologies. Innovation and licensing are random processes requiring resources. Stronger IPRs increase the licensor's share of rents and reduce the costs of licensing contracts. Thus, the returns to both licensing and innovation would rise while additional resources would be available for R&D. In consequence, innovation and technology transfer would rise. However, the effect of stronger IPRs on relative wages between regions is ambiguous. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

Controversy persists over the role of intellectual property rights (IPRs) in encouraging firms in developed countries to innovate and in helping developing countries gain access to knowledge on the global frontier. An important means of technology acquisition is licensing, which has not been studied formally in this

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context. In this paper we develop a dynamic general-equilibrium product-cycle model to analyze the effects of Southern IPRs on incentives of Northern firms to innovate and to license state-of-the-art technologies to the South.

Helpman (1993) first modeled the dynamic effects of IPRs in a general-equilibrium framework with an innovative North and an imitative South. He finds that stronger IPRs would diminish both the Northern rate of innovation and Southern welfare when imitation is the only channel of technology transfer. Thus, in the absence of licensing, strengthened IPRs would raise imitation costs, restrict technology diffusion, and reduce long-run incentives to innovate. This pessimistic conclusion was reinforced by Glass and Saggi (1995), who allow both imitation and foreign direct investment (FDI) as channels of technology transfer. They show that a strengthening of Southern IPRs would reduce rates of innovation and imitation and also would decrease the flow of technology transfer. In a more positive vein, Lai (1998) finds that the effects depend crucially on the channel of technology transfer. Stronger IPRs in the South would expand technology transfer and innovation under FDI but would have opposite effects if production were transferred through imitation[1].

In this literature imitation and FDI are the primary sources through which the South may gain access to the North's advanced technology. Licensing has been largely ignored. In this paper we focus on licensing as the means by which the South gets advanced technology. Licensing is conceptually and practically important for a number of reasons. First, in some situations, imitation may be sufficiently difficult that it is not profitable (Bagchi et al. 1984). Second, recent empirical evidence suggests that the volume of arm's-length technology transfers is rising (Mansfield, 1995). Furthermore, government policies in some technology-importing countries prefer licensing to equity investment as the mode of technology transfer (Contractor and Sagafi-Nejad, 1981).

In our model the Northern innovative firm first chooses the intensity of effort it devotes to innovation. Once the innovation is successful, it chooses whether to license. The advantage of licensing technology to the South is higher instantaneous profits due to lower wages there. However, licensing incurs costs, including those involved in contract negotiation and in performing various activities to ensure the transfer of the necessary technology know-how. Furthermore, the licensor has to give up some rents to the licensee in order to deter imitation. Therefore, the Northern firm needs to strike a balance between saving labor costs, sacrificing rents, and incurring licensing-transfer costs.

[1] In a framework of strategic interaction between firms, Taylor (1994) shows that failure by a country to provide patent protection for foreign inventions forces innovative firms to employ ''less than best-practice technologies'' and reduces worldwide research and development (R&G) and growth.

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