

# Endogenous strength of intellectual property rights: Implications for economic development and growth

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## Abstract

The key institution that determines sustained growth in R&D-based growth models is the strength of intellectual property rights, which are usually assumed to be exogenous. In this paper we endogenize the strength of the intellectual property rights and show how private incentives to protect these rights affect economic development and growth. Our model explains endogenous differences in intellectual property rights across countries as private incentives to invest in property rights generate multiple equilibria. We show that the resulting institutional threshold offers an explanation for why the effect of a transfer of institutions from one country to another depends on the quality of the institutions that were imported.

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“The patent system added the fuel of interest to the fire of genius.” Abraham Lincoln—the only U.S. President to be issued a patent (Dobyns 1994).

## 1. Introduction

The protection of property rights and the appropriation of rents are central aspects of R&D-based growth models whose engine of growth is the return to innovation.

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As a consequence, a voluminous literature has examined the costs and benefits of intellectual property right (IPR) protection and their effects on innovation and growth. The existing analyses all share an emphasis on the government's choice of the degree of IPR protection.<sup>1</sup> Yet, both public and private choices about enforcement are important in determining the *de facto* strength of IPR protection. In contrast to the previous literature, this paper examines the role of private investments in the (endogenous) degree of IPR protection and their impact on economic growth.

We focus on the private incentives to invest in IPR protection, taking formal institutions, such as the existence of a patent office, as given.<sup>2</sup> Our interest in private investment is motivated by the evidence that private patent infringement suits are often necessary steps to establishing patent value. Khan (2003), in her description of the early British patent system, argues that “potential patentees were well advised to obtain the help of a patent agent to aid in negotiating the numerous steps [...] required for pursuit of the application in London”, and that even after the patent had been awarded “patent rights could not be regarded as settled unless the patent had been contested in court with a favorable outcome”.

Little is known about exact costs of patent enforcement, yet there is general agreement that firm level enforcement costs are substantial; see Lanjouw et al. (1998) and Lanjouw and Schankerman (2001). These costs include litigation expenses, monitoring for possible infringement, and the costs of establishing new case law to ensure legal protection for new innovations (see the discussion of patent rights in the “New Economy” in Jaffe and Lerner, 2004). All this indicates that the private cost of strengthening IPR protection is an important determinant of the returns to innovation.

In this paper we integrate endogenous strength of intellectual property rights into an R&D-based growth model to understand agents' private incentives to engage in institutional improvements, and thus endogenise the degree of rent appropriation. We use the Romer (1990) model in which firms engage in R&D in order to invent new varieties of intermediate goods, and suppose that research firms can invest resources in order to establish their patent rights. When the patent is enforced, the innovation is produced by the inventor under monopolistic conditions; if the patent is not enforced, the commodity can be imitated and produced by a competitive fringe. In this case the innovator receives no profits.<sup>3</sup>

The possibility of spending resources on IPR protection creates an interdependence between research investments and expenditures in IPR protection: A lower degree of protection reduces the returns from research and hence the incentives to do R&D; similarly, a low level of R&D will reduce the return to investment in IPR protection. As a result, multiple equilibria emerge. There is a high-growth equilibrium characterized by

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<sup>1</sup>See Helpman (1993), Horowitz and Lai (1996), Kwan and Lai (2003), and Grossman and Lai (2004).

<sup>2</sup>Although we do not model them in this paper, private incentives to establish property rights can have positive spillovers on (a) the future costs of protection through reputation, (b) the cost of IPR protection of other firms who may free ride, and (c) the cost of protection for all future firms. These and other reasons cited in Grossman and Lai (2004) have long been employed to justify the public provision of intellectual property protection.

<sup>3</sup>When we discuss policy implications below, it is important to keep in mind that by using Romer (1990) as the basis for our model we are restricting the analysis to a specific set of countries. As a referee pointed out, the model derives policy implication only for economies that innovate. These implications need not apply to countries that do not rely on their own R&D and IPR, and whose growth is (mainly) driven by imitation of foreign technology and capital deepening.

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