



Appropriate intellectual property protection and economic growth in countries at different levels of development

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ABSTRACT

This paper examines how the role of patents and utility models in innovation and economic growth varies by level of economic development. Using a panel dataset of over 70 countries, we find that patent protection is an important determinant of innovation and that patentable innovations contribute to economic growth in developed countries, but not in developing. Instead, in developing economies, a minor form of intellectual property rights (IPRs) – namely utility models – is conducive to innovation and growth, controlling for other factors. Using Korean firm level data as a case study, we find that utility model innovations contribute to firm performance when firms are technologically lagging and that those minor innovations can be a learning device and thus a stepping stone for developing more patentable inventions later on. Upon reaching higher levels of technological capabilities, firms become more reliant upon patents and less on utility models. Thus the lesson here is that patent protection enhances innovation and economic growth in countries where the capacity to conduct innovative research exists. Where this capacity is weaker, a system that provides incentives to conduct minor, incremental inventions is more conducive to growth. The significance of this paper is to emphasize the importance not just of the strength of IPRs but of the appropriate type of IPRs for economic development.

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1. Introduction

This paper addresses the role of intellectual property rights (IPRs) in the economic growth of countries at different levels of economic development. It addresses two issues. The first is whether stronger IPRs, particularly patent rights, are appropriate for the economic growth of countries regardless of their stage of economic development. The second, and related, issue is whether the same *types* of intellectual properties are appropriate for countries at different levels of economic development.

The possibility that IPRs could have differential effects on countries at different stages of economic development has been acknowledged in a World Bank publication (Fink and Maskus, 2005) and partly addressed in global intellectual property reforms (see Commission on IPR, 2002). For example, transitional periods were provided for developing and least developed countries. In addition, extensions to comply with the *Trade-Related Intellectual Property Rights Agreement* (TRIPS) have also been granted to poor countries (until 2013). Local circumstances and needs have also been

addressed, for example in policies related to essential medicines and public health.

Our contribution is to study not only the *strength* of IPRs but also the different *types* of IPRs that would be appropriate for countries at different stages of economic development. Our starting point is that innovation in many developing countries is of the adaptive, imitative type. Under the intellectual property systems of certain countries, inventors of adaptive, imitative innovations can have their inventions protected, for example through a utility model (or petty patent). Through adaptation, imitation, and incremental innovation, firms in developing economies can acquire knowledge and enjoy some learning-by-doing (Suthersanen, 2006). The innovations they produce may not have the inventive step to merit a regular patent, but they may qualify for this second-tier industrial property right; namely, a utility model. The absence of this type of industrial property right may reduce incentives to engage in incremental innovation, which may be more suitable for local needs, a stepping stone for further technological progress, and the type of innovation which best utilizes local capabilities.

To date, there have been no formal, comprehensive empirical analyses of patents and utility models from a development perspective. In academic and policy debates, whether in the context of developed or developing countries, the focus has been on the

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appropriate strength of IPRs.¹ While the original TRIPS agreement does not deal with utility models, the *World Intellectual Property Organization* (WIPO) has recently considered the usefulness of utility model systems for lower income countries.² Our study should therefore generate further interest in examining alternative means of protecting IPRs at the international level.

Indeed our empirical analysis studies the different roles of patents and utility models in the innovation and economic growth of countries at different levels of economic development, and discusses why these different types of industrial property rights may be more appropriate for different groups of countries. We first conduct our analysis using a large panel data set of countries to assess the impact of utility model laws. We then isolate one developing country in our sample, namely South Korea, in order to conduct a specific case study. Korea's case is illuminating. Due to its limited technological capability before the mid-1980s, it depended heavily on reverse engineering, importation of technology, and imitation in order to fulfill its technological needs (Kim, 1997). Moreover, local inventors tended to modify or adapt existing or imported technologies, and obtained utility model protection for their incremental innovations. By the late 1990s, Korea became one of the world's leading patenting nations. For example, U.S. patents granted to Koreans rose from 14 in 1982 to 3562 in 1999, and the share of Koreans in U.S. patents granted rose from 0.01% to 2.32% (USPTO, 2009). By 1999, Korea ranked seventh in terms of U.S. patents granted. The question is whether all of these events are connected: did utility model protection provide incentives to innovate and help pave the way for increased technological development?

As an overview, our main finding is that the importance of patent rights and utility model protection to innovation and growth varies by level of technological development. We find that patent protection contributes to innovation and economic growth in developed countries but not in developing. This is consistent with the view that patent protection matters to industrial activities only after countries have achieved a threshold level of indigenous innovative capacity along with an extensive science and technology infrastructure (Kim, 1997; Lall and Albaladejo, 2001). In contrast, utility model protection weakly affects innovation and growth in developed countries but allows developing economies to build up their indigenous innovative capacities. In our analysis of Korean firms, we find that when firms are technologically lagging, utility models (or minor inventions) contribute to firm growth and to their capacity to produce (future) patentable inventions. Once firms become more technologically advanced, their performance is driven less by utility model innovations and more by patentable inventions. These results thus indicate that different types of intellectual property rights are more appropriate for countries at different stages of economic development.

This paper is organized as follows: Section 2 reviews previous studies on the effects of IPRs on innovation and economic growth. Section 3 provides a brief comparison between patent rights and utility models, and briefly discusses the experience of utility model protection in Korea. Section 4 discusses our theoretical framework and empirical methodology, and Section 5 our data. Section 6 contains the main empirical results, and Section 7 concludes.

2. Previous literature

Previous empirical studies focus on how the *strength* of intellectual property protection, particularly patent protection, relates

to innovation and growth, not on the nature of the instrument used to protect innovation. Few of these studies examine the relationship between growth and IPRs by different income groups. Consequently, few if any address the type of protection that is appropriate for countries or firms at different levels of technological capability.

Moreover, previous empirical work on the relationship between IPRs and economic growth has almost exclusively used a measure of patent protection. Formal analyses of utility models are quite scant. To organize ideas, we can classify previous empirical studies in two ways: those that examine the impact of patent rights directly on output growth, and those that do so indirectly by examining a factor that contributes to output growth, such as R&D or innovation. For example, Gould and Gruben (1996) and Falvey et al. (2006) find instances where patent protection has a significant influence on economic growth. Other empirical studies, however, do not find a direct effect of patent protection on growth but an indirect one. For example, Park and Ginarte (1997) find that patent protection affects factor accumulation which in turn affects economic growth (see also Thompson and Rushing, 1999). Hence, more recent studies examine the relationship between patent protection and a determinant of growth, like innovation or R&D (see Varsakelis, 2001; Kanwar and Evenson, 2003). These studies find that R&D/GDP ratios are positively related to the strength of patent rights, conditional on other factors. Other studies use patents granted in the U.S. as a measure of innovation. For example, Schneider (2005) finds that stronger patent rights have a positive effect on innovation in developed countries only, while Chen and Puttitanun (2005) find a positive effect for large developing economies. The main limitation of these previous studies from our perspective is that they do not examine alternative means of protecting industrial property rights.

It is useful to inquire, though, whether in developing countries patents are an effective instrument for appropriating the returns to innovation. In a well-known survey of U.S. firms, Cohen et al. (2000) find that firms patent for various purposes other than merely as a mechanism for appropriating returns. For example, possession of patent rights plays an important role in litigation (to deter threats of infringement suits or countersuits) and in cross-licensing negotiations, where firms can better gain access to rivals' technologies if they are able to reciprocate with their own patent rights. However, the survey finds that smaller firms or inventors are less able to utilize patents for those purposes and hence are dissuaded from availing themselves of patent protection. Litigation costs are especially onerous for small firms since they have lower levels of output over which to spread the overhead costs of legal protection (e.g. legal staff). Furthermore, smaller firms or inventors have fewer and perhaps less valuable technologies to offer in cross-licensing negotiations. The implication for developing economies is that to the extent that a large share of inventors there is small, patents would not be very effective instruments for appropriating returns or accessing technologies.³ This may explain why developing economies do not engage as intensively in producing patentable innovations and why something like utility models may serve as a useful alternative outlet for emerging innovation.

Some development economists have discussed alternatives to patent rights, such as utility models. Evenson and Westphal (1995, p. 2288) make the following observation:

“Strong IPRs can be a powerful instrument for encouraging many forms of investment at all levels of technological development if they are sufficiently focused on promoting those forms

¹ See Commission on IPR (2002) and Correa (2000) for a review of policy discussions.

² See http://www.wipo.int/sme/en/ip_business/utility_models/utility_models.htm and http://www.wipo.int/sme/en/ip_business/acquire_protection.htm.

³ Mazzoleni and Nelson (1998) also discuss how strong, broad patents in less developed countries, by creating entry barriers, could impede the development of indigenous manufacturing capabilities.

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