



Intellectual property rights and skills accumulation: A product-cycle model of FDI and outsourcing[☆]



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ABSTRACT

This study investigates the effects of stronger intellectual property rights (IPR) protection in the South on innovation, skills accumulation, wage inequality, and patterns of production based on a North–South general-equilibrium model with foreign direct investment (FDI) and international outsourcing. We find that stronger Southern IPR protection raises the extent of outsourcing and reduces the extent of FDI. This increases the proportion of unskilled Southerners and mitigates Southern wage inequality. In the North, stronger Southern IPR protection raises the proportion of skilled Northerners and wage inequality. The effects of international specialization, R&D cost, and Northern population are also examined.

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1. Introduction

It is quite obvious that foreign direct investment (FDI) and international outsourcing are now very common on a global scale. When considering the production of part of their goods abroad as a means of saving costs, firms can produce those goods abroad either as multinationals or by licensing foreign firms to manufacture them on their behalf.¹ Aside from considering costs, firms also need to take the risk of imitation into account when producing goods abroad. During the 1980s, developed countries like the U.S. and some in Europe expressed strong dissatisfaction over the inadequate protection of intellectual property rights (IPR) in many developing countries. The efforts made by these developed countries for the improvement of IPR protection in developing countries resulted in the approval of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs) in the Uruguay Round.

These phenomena have led to this research being interested in the effects of stronger IPR protection in developing countries when international production is available for firms. In order to study the impacts of IPR protection in developed and developing countries, our analysis is based on a North–South product-cycle general-equilibrium model, within which final-good producers

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¹ Grossman and Helpman (2003) investigate the trade-off between FDI and outsourcing based on the assumption that final-good producers can manufacture the goods by themselves or through specific investment governed by imperfect contracts. Antras and Helpman (2004) go on to develop a model within which firms can choose between engaging in FDI or domestic/international outsourcing based on a model with heterogeneous firms.

are based in the North, but firms can choose either to carry out the entire production of the goods in the North or to allow the goods to be produced in the South (a foreign country) through FDI or international outsourcing. The North–South product-cycle model was originally introduced by [Vernon \(1966\)](#) and subsequently extended by [Segerstrom et al. \(1990\)](#) and [Grossman and Helpman \(1991a, 1991b\)](#), with literature related to this model essentially following two major lines of research. The first research line focuses on examining the impact of FDI on imitation activity in developing countries ([Helpman, 1993](#); [Lai, 2001](#); [Glass and Saggi, 2002](#)); the second research line investigates the effects of increased international outsourcing of production on innovation, wages, and patterns of production ([Glass and Saggi, 2001](#)).² Thus, in prior studies where the product-cycle model is adopted, there has clearly been a tendency to study FDI and international outsourcing activities as separate issues, thereby ignoring the fact that firms can choose to undertake their production in foreign countries based on both FDI and outsourcing.

In this study we allow firms to choose between FDI and outsourcing when carrying out production in the South. There are two major differences between FDI and outsourcing strategies. First, conducting FDI activity incurs higher governance costs ([Williamson, 1985](#); [Grossman and Helpman, 2003](#)).³ A Northern firm needs to recruit Southern skilled workers to manage or monitor its production process in the South. Second, [Lai et al. \(2009\)](#) argue that the major disadvantage of outsourcing is the possibility of the leakage of production secrets due to the incompleteness of contracts. Without properly managing or monitoring the production process in the South and given that outsourcing is plagued with contractual difficulties in the absence of perfect contracting, outsourcing is subject to the risk of imitation.⁴ However, the risk of imitation can be reduced if IPR protection in the South is strengthened.⁵

The other feature that distinguishes this paper from the extant literature is that we allow for heterogeneity among the agents by endogenizing the choices of being skilled or unskilled workers. With the recognition that global production affects a country's wage inequality between skilled and unskilled workers, some studies on trade issues have considered heterogeneous workers in a trade model. By assuming that there exist skilled and unskilled workers in the economy, [Sayek and Sener \(2006\)](#) and [Benz \(2012\)](#) examine the effects of outsourcing and IPR protection on wage inequality,⁶ but in their studies, outsourcing activities and IPR protection do not affect skill choice since the fraction of the skilled (unskilled) population is assumed to be constant. Therefore, their analysis of the effects of outsourcing activities and IPR protection on wage inequality focuses on the demand-side effect, as firms adjust to changes in outsourcing costs or Southern IPR protection by changing their labor demand, and ignores the fact that these changes will also affect the incentives of skill choice and labor supplies of skilled and unskilled workers. In this paper we allow agents to choose to become skilled or unskilled workers. Strengthening IPR protection in the South will then affect skill accumulation, which will in turn affect wage inequality within the country and the international wage dispersion of skilled workers.

We first assume that all Northerners are skilled workers and work in the R&D sector or production sector, whereas Southerners can choose to either remain unskilled or become skilled. Unskilled Southerners work in the production sector while skilled Southerners work in the FDI sector. We find that stronger Southern IPR protection increases the extents of outsourcing and Southern production while reducing the extents of FDI and Northern production. Our result outlining the reduced extent of FDI caused by stronger Southern IPR protection is different from [Lai \(1998\)](#) and [Glass and Wu \(2007\)](#) who show that stronger IPR protection does increase the extent of FDI. In addition, the result of the lower extent of Northern production is also different from [Glass and Saggi \(2002\)](#) and [Parelo \(2008\)](#), who demonstrate that stronger Southern IPR protection raises the extent of Northern production.⁷ This is because by assuming that firms only engage in Northern production and an FDI (outsourcing) strategy, previous studies are not able to capture the phenomenon that firms will switch between FDI and outsourcing strategies when Southern IPR protection is strengthened.

We also examine the effects of international specialization, the cost of R&D, and Northern population. We find that increasing incentives for outsourcing (such as the lower labor intensity for outsourcing) increases the extent of outsourcing and the demand for unskilled Southerners, thereby reducing the proportion of Southerners becoming skilled and the extent of FDI. Similar effects are caused by a reduction in the cost of R&D. On the other hand, increasing incentives for FDI (such as the lower labor intensity for FDI) causes reverse effects on the proportion of Southerners being skilled and the extents of FDI and outsourcing.

In order to address the issue about the effects on the Northern wage inequality, we then consider an economy with heterogeneous Northerners. Our results show that those changes inducing greater demand for Southern unskilled workers (such as stronger Southern IPR protection) raise wage inequality in the North and reduce wage inequality in the South, along with an increase in the international wage dispersion of skilled workers. On the other hand, changes inducing a reduction in the cost of

² [Feenstra and Hanson \(1996a\)](#) provide one of the earlier theoretical studies of the effects of outsourcing, by assuming that the final goods are produced from a continuum of intermediate goods using different proportions of skilled and unskilled workers.

³ [Tomura \(2007\)](#) finds that firms involved in FDI activity are more productive than foreign outsourcees based on firm-level data of 118,300 firms across all manufacturing industries in Japan. Although FDI requires higher fixed entry costs, it brings in higher gross profits for firms.

⁴ The [Shared Services and Business Process Outsourcing Association \(2003\)](#) (SBPOA) reports that 33% of respondents agree that a lack of control and loss of internal knowledge are the main concerns when making an outsourcing decision.

⁵ Previous literature examining the effects of stronger Southern IPR protection also tends to separate FDI and outsourcing activities. The impact of strengthening IPR protection on the FDI decision is studied by [Lai \(1998\)](#), [Glass and Saggi \(2002\)](#), [Glass and Wu \(2007\)](#), and [Parelo \(2008\)](#), while its effect on the outsourcing decision is examined by [Yang and Maskus \(2001\)](#) and [Glass \(2004\)](#).

⁶ [Lai \(1995\)](#) also assumes the heterogeneity of workers in an examination of the effects of the labor supply on the global distribution of income.

⁷ We also find that stronger Southern IPR protection increases the R&D difficulty, and this result is different from [Parelo \(2008\)](#) who finds that strengthening IPR protection reduces the R&D difficulty due to lower R&D employment.

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