Journal of Development Economics 92 (2010) 13–27

Contents lists available at ScienceDirect

Journal of Development Economics

journal homepage: www.elsevier.com/locate/econbase

Intellectual property rights, multinational firms and economic growth

Elias Dinopoulos [a,*], Paul Segerstrom [b,1]

[a] University of Florida, Department of Economics, Gainesville, FL 32611-7140, USA
[b] Stockholm School of Economics, Department of Economics, Box 6501, 11383 Stockholm, Sweden

ARTICLE INFO

Article history:
Received 7 August 2007
Received in revised form 30 October 2008
Accepted 28 January 2009

Jel Classification:
F12
F23
F43
O31
O34

Keywords:
Intellectual property rights protection
International technology transfer
North–South trade
Multinational firms
Economic growth

ABSTRACT

This paper develops a model of North–South trade with multinational firms and economic growth in order to analyze formally the effects of stronger intellectual property rights (IPR) protection in developing countries. In the model, Northern firms invent new higher-quality products, multinational firms transfer manufacturing operations to the South and the Southern firms imitate products produced by multinational firms. It is shown that stronger IPR protection in the South (i.e., the adoption and implementation of the TRIPs agreement) leads to a permanent increase in the rate of technology transfer to the South within multinational firms, a permanent increase in R&D employment by Southern affiliates of Northern multinationals, a permanent decrease in the North–South wage gap, and a temporary increase in the Northern innovation rate.

1. Introduction

The purpose of the present paper is to develop a model of North–South trade with multinational firms and economic growth in order to analyze formally the effects of stronger intellectual property rights (IPR) protection in developing countries. The Trade-Related Intellectual Property (TRIPs) agreement, which was signed as part of the Uruguay round of multilateral trade negotiations in 1994, calls for the establishment of minimum standards of IPR protection by all World Trade Organization (WTO) members by 2006. The burden of policy adjustment, however, has fallen on the shoulders of developing countries because developed countries already have higher levels of IPR protection (Maskus, 2000). As a result, an intense debate has arisen about the effects of stronger IPR protection in developing countries.[2]

Advocates of stronger IPR protection argue that this reform promotes innovation in the global economy and benefits developing countries by fostering more rapid economic growth. They also claim that a strengthening of IPR accelerates the transfer of technology from developed countries (the North) to developing countries (the South), a further channel through which developing countries benefit. Opponents of stronger IPR protection counter that this reform leads to neither faster economic growth nor faster international technology transfer, but mainly results in the transfer of rents to multinational corporate patent holders headquartered in the world's most advanced countries especially the US.[3]

Recently, new evidence has become available that is directly relevant to this public policy debate. Taking advantage of considerably richer data than had been used by prior researchers, Branstetter et al. (2006) examined how technology transfer within US-based multinational firms has changed in response to a series of IPR reforms undertaken by sixteen countries over the 1982–1999 period.[4] They find that royalty payments for the use of intangible assets made by

* Corresponding author. Tel.: +1 352 3928150; fax: +1 352 3927860.
E-mail addresses: elias.dinopoulos@cba.ufl.edu (E. Dinopoulos), paul.segerstrom@hhs.se (P. Segerstrom).
[1] Tel.: +46 8 7369203; fax: +46 8 313207.

[2] In the working version of the paper, Dinopoulos and Kottaridi (2008) report that during the time period 1960–2000, IPR protection increased on average by 50% in a sample of developed countries and by 70% in a sample of developing countries, using a popular index of patent rights protection constructed by Ginarte and Park (1997). Furthermore, the average level of patent protection offered by developed countries was 33% higher than the corresponding level of patent protection offered by developing countries.

[3] For example, according to McCalman (2001), the implied income transfers caused by TRIPs-driven stronger IPR protection benefit the US, Germany, France, Italy, Sweden and Switzerland, and harm all other countries.

[4] Most, but not all, of the countries with major patent reforms that Branstetter et al. (2006) study are developing countries. Specifically, their sample consists of Argentina, Brazil, Chile, China, Columbia, Indonesia, Japan, Mexico, Philippines, Portugal, South Korea, Spain, Taiwan, Thailand, Turkey, and Venezuela.

0304-3878/$ – see front matter © 2009 Elsevier B.V. All rights reserved.
doi:10.1016/j.jdeveco.2009.01.007

affiliates to parent firms, which reflect the value of technology transfer, increase in the wake of stronger patent regimes. R&D spending by affiliates–usually viewed as a complement to technology imports from parent firms–also increases after IPR reform. The increases in affiliate royalties and R&D are concentrated among affiliates of firms that make extensive use of the US patent system prior to reforms and are therefore likely to value reforms the most. For these patent-intensive firms, there is a 34% increase in affiliate royalty payments and a 23% increase in affiliate R&D spending. Branstetter et al. (2006) conclude that improvements in IPR protection result in significant increases in technology transfer from US-based multinationals to their affiliates in reforming countries.[5]

This evidence represents a challenge to the existing theoretical literature on trade between the North and the South. In North–South trade models with multinational firms, stronger IPR protection in the South leads to an unambiguously lower rate of technology transfer in Glass and Saggi (2002), Sener (2006), and Glass and Wu (2007), the exact opposite of what Branstetter et al. (2006) find empirically.[6] The observed increase in the rate of technology transfer that results from stronger IPR protection is consistent with the implications of North–South trade models developed by Helpman (1993), Lai (1998), and Branstetter et al. (2007). However these papers all assume that international technology transfer within multinational firms is costless and thus cannot account for the observed increase in R&D spending by foreign affiliates of US multinationals. In these papers there is no R&D spending by affiliates, while several empirical studies have documented that R&D conducted by affiliates in developing countries is focused on the absorption of parent-firm technology and on its modification for local markets (Kuemmerle, 1999).

In this paper, we present a dynamic general equilibrium North–South trade model that is consistent with the above-mentioned empirical evidence. In the model, Northern firms engage in innovative R&D to develop new higher-quality products and once successful, they engage in adaptive R&D to learn how to transfer their manufacturing production from the high-wage North to the low-wage South. The profit flows earned by firms jump up when they are successful in transferring their production to the South and each production transfer is associated with a royalty payment from the foreign affiliate to its parent for the use of the parent firm's technology. When firms are successful in transferring their production to the South, they also become exposed to a positive rate of imitation by Southern firms. Stronger IPR protection in the South is modeled as a reduction in the rate at which Southern firms imitate the products that North-based multinational firms produce in the South.

The model has unique steady-state equilibrium with a constant rate of innovation and a constant rate of technology transfer in each industry. The steady-state rate of innovation does not depend on the scale of the economy and thus this model is not subject to the Jones (1995a) critique of early endogenous growth models.[7] Scale effects are ruled out by assuming that innovating becomes more difficult as products improve in quality and become more complex, as in Segerstrom (1998) and Li (2003).[8] Consequently, economic growth is semi-endogenous (policy choices do not affect the long-run economic growth rate) and because of this property, the model is particularly tractable.

We find that stronger IPR protection in the South (i.e., the adoption and implementation of the TRIPs agreement) leads to a permanent increase in the rate of technology transfer to the South within multinational firms and a permanent increase in adaptive R&D spending in the South by multinational firms. These two effects are connected because the increase in adaptive R&D spending is what drives the increase in the rate of technology transfer within multinational firms. Thus the model is consistent with the two main empirical findings in Branstetter et al. (2006, 2007), that patent reform is associated with increased royalty payments from foreign affiliates to their parent firms in the North and increased R&D spending by these foreign affiliates. Furthermore, we find that stronger IPR protection in the South leads to a temporary increase in the Northern innovation rate and a permanent decrease in the North–South wage gap. Thus this paper provides support for the argument that patent reform in developing countries promotes innovation in the global economy and also sheds light on why several developing countries have been growing faster than typical developed countries. Along the transition path leading to a new steady-state equilibrium with stronger IPR protection, the North–South wage gap can only permanently decrease if real wages grow faster in the South than in the North.

In addition to analyzing the equilibrium effects of stronger IPR protection, we also study the long-run welfare effects. In North–South trade models where patent reform permanently increases the economic growth rate (i.e., Lai, 1998; Branstetter et al., 2007; Glass and Wu, 2007), consumers must eventually be better off than they would have been without patent reform. Likewise, in North–South trade models where patent reform permanently decreases the economic growth rate (i.e., Glass and Saggi, 2002; Sener, 2006), consumers must eventually be worse off. In our model, by contrast, the long-run welfare effects are not unambiguous because patent reform does not permanently change the economic growth rate (growth is semi-endogenous). However, most of the long-run effects go in the direction of benefiting Southern consumers. When IPR protection is strengthened in the South, Southern consumers benefit from the faster rate of innovation, the faster rate of technology transfer, and the decrease in the North–South wage gap. The only consideration that goes against Southern consumers is that stronger IPR protection leads to less manufacturing production being transferred within the South from multinational firms with higher prices to Southern firms with lower prices. Thus this paper yields a generally optimistic picture concerning the long-run welfare effects of stronger IPR protection in developing countries.

In recent decades, structural changes in the global economy have significantly increased the effective size of the South. China's entry into the world trading system has augmented the Southern labor force by 760 million workers, the collapse of communism has added 260 million workers, and recently India has added another 440 million workers (Venables, 2006). As a final exercise, we explore the effects of increasing the initial size of the South and compare these effects with the corresponding effects of patent reform. We find that increasing the

[5] In a companion paper, Branstetter et al. (2007) introduce endogenous imitation of foreign affiliates in Lai's (1998) model of North-South trade with multinationals and increasing varieties and provide further evidence that US-based multinationals expand their activities in developing countries that have established stronger IPR protection.

[6] In addition, Parello (2008) finds that stronger IPR protection in the South has ambiguous effects on the rate of technology transfer within multinational firms.

[7] Jones (1995a) points out that since the 1950s the number of scientists and engineers in advanced countries has increased more than fivefold without generating any significant and persistent upward trend in the growth rate of total factor productivity (TFP). This evidence contradicts one of the main properties of early endogenous growth models, according to which an economy with a larger population (larger scale) should exhibit higher long-run TFP growth. With the exception of Sener (2006) and Parello (forthcoming), all of the above-mentioned North-South trade models have the counterfactual scale effect property.

[8] The Jones critique has stimulated the development of two classes of scale-free endogenous growth models. On the one hand, Jones (1995b), Kortum (1997), Segerstrom (1998) and Li (2003) have developed "semi-endogenous" growth models where the long-run TFP growth rate is proportional to the rate of population growth and is invariant to changes in policy-related parameters. On the other hand, Young (1998), Aghion and Howitt (1998, chapter 12), Dinopoulos and Thompson (1998), Peretto (1998), Howitt (1999) and Segerstrom (2000) have developed "fully-endogenous" growth models where long-run TFP growth is affected by policy-related parameters. See Dinopoulos and Thompson (1999), Jones (1999) and Dinopoulos and Sener (2007) for overviews of this literature.