



# Strengthening intellectual property rights: Experience from the 1986 Taiwanese patent reforms

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## ARTICLE INFO

### Article history:

Received 28 June 2008

Received in revised form 4 October 2010

Accepted 10 November 2010

Available online 23 November 2010

### JEL classification:

O34

### Keywords:

Intellectual property rights

Patents

Invention

## ABSTRACT

Do stronger intellectual property rights spur inventive activity and foreign direct investment (FDI) in developing countries? What are the characteristics of industries where strengthening patent rights has the most favorable impact? In an attempt to answer these questions, this paper uses the 1986 Taiwanese patent reforms to examine the effects of strengthening patent rights in a developing economy. I find that the reforms encouraged R&D effort across industries. In addition, industries that were highly R&D intensive witnessed a marked increase in their patenting in the United States. The reforms also induced additional FDI.

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## 1. Introduction

There has long been a tension between developed and developing countries on intellectual property rights protection.<sup>1</sup> Developed countries have encouraged or pressured developing countries to adopt stronger systems of intellectual property rights. Despite the obvious intent to help their own inventors to extract greater returns from their discoveries, artistic creations, brand-name capital, and the like, developed countries often contend that a strengthening of intellectual property rights protection would also benefit developing societies, stimulating more domestic production of inventions as well as attracting more foreign direct investment (FDI). However, developing countries have been less than enthusiastic in embracing such an argument because an increase in intellectual property rights protection may raise the cost of goods and services produced with technologies developed abroad, decreasing not only the rate of technological diffusion but also economic welfare.<sup>2</sup> Consequently, there exists a stark divergence between developed and developing countries in their systems of intellectual property rights. As

intellectual property plays an increasingly important role in the production of goods and services and as the volumes of international trade and investment continue to grow rapidly, the tension between developed and developing economies about these policies has escalated in recent years.

Given the resurgence in international debates on intellectual property rights, scholars such as Kortum and Lerner (1999) and Sakakibara and Branstetter (2001) have sought to investigate changes in the patent system as well as their effects. However, they focus on experiences in the United States and Japan respectively.<sup>3</sup> As the contemporary policy debate centers on the advisability of strengthening intellectual property rights in developing countries, the changes in the patent systems of developed countries, or their economic circumstances more generally, may not be representative of conditions in less developed societies. A similar policy shift may, therefore, have a very different impact in a developing economy from that in a rich, advanced country.

<sup>3</sup> Notable exceptions are, for example, Lanjouw (1998), Lanjouw and Cockburn (2001), and Qian (2003). These studies explore changes in intellectual property rights system in developing-country contexts. However, most of these studies are exclusively focused on the introduction of pharmaceutical patents, and their findings of no significant evidence of causality running from the introduction of new patent laws to domestic invention may not extend to other industries. Furthermore, successful R&D in pharmaceuticals typically requires workforces with highly specialized human capital and substantial investments in resources. Few developing countries would have the capacity and inclination to carry out significant inventive activity in this field. It is, therefore, not clear that studies based on pharmaceutical patent data yield much general insight into the issue of whether stronger patent protection would spur invention in developing countries.

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<sup>1</sup> See, for example, Maskus (2000) for current debates on intellectual property rights and Machlup and Penrose (1950) for different views toward patent protection in the late 19th century.

<sup>2</sup> In addition to their potential negative effects on developing countries, stronger patent protections can be detrimental to developed countries as well. See Jaffe and Lerner (2004, pp. 78–95).

I examine the effects of strengthening intellectual property rights in a developing economy. To what extent do stronger intellectual property rights spur inventive activity? What are the characteristics of industries in which strengthening intellectual property rights may have the most favorable impact on inventive activity? Will the strengthening of intellectual property rights induce more FDI?

I explore the 1986 Taiwanese patent reforms. Taiwan, under considerable pressure from the United States, made important changes to her patent system in 1986 that became effective in January 1987. The reforms were mainly centered on improving enforcement of patent rights, such as allowing patent holders to obtain much higher compensation through civil suits for infringement. The government also introduced a wide range of administrative measures to curb infringement. Moreover, the new law stipulated the creation of a special court, which would have exclusive jurisdiction over patent litigations. This policy shift, not only sudden but also mainly pushed by foreign governments, provides an unusual natural experiment that allows one to study the impact of strengthening patent protection in a developing country.

To gauge the impact of the reforms on inventive activity, I use patent statistics. Particularly I rely on patents awarded by the United States Patent and Trademark Office (USPTO) to residents of Taiwan. I also employ R&D spending. The use of the two types of measures helps separate the impact of stronger patent protection on the propensity to patent an invention from that on investment in inventive activity (a well known issue among those who rely on patent counts). An exploration into the number of USPTO patents awarded to Taiwanese inventors allows one to further alleviate the complication due to changes in the propensity to patent. Inventors may be more inclined to employ the new Taiwanese patent system for their creations, as the new law strengthened patent protection in Taiwan. A change in patenting of Taiwanese inventions in Taiwan may result from either a change in the propensity to patent in Taiwan, or a change in inventive activity, or both. Because Taiwanese inventors have aggressively sought patent protection in the United States and because there was no significant change in the United States patent system around the time when the reforms came into effect, patenting of Taiwanese inventions in the United States provides a better measure to gauge changes in inventive activity of Taiwanese inventors than patenting of Taiwanese inventions in Taiwan. In order to control for other economic activities that may influence R&D spending and patenting, I also collect data on exports and production of various Taiwanese manufacturing industries.

I find that the 1986 Taiwanese patent reforms stimulated R&D spending. Industries that were highly R&D intensive experienced an increase in their patenting in the United States. The favorable impact was most pronounced in the electronic and electrical industry. The reforms also appeared to have encouraged investment from abroad.

The positive effects of strengthening patent protection found in this paper differ from the results from prior work (Hall and Ziedonis, 2001; and Sakakibara and Branstetter, 2001) that shows little impact of an increase in patent protection on inventive activity in advanced economies.<sup>4</sup> My results suggest that the effects of policy change in a developing country may be much stronger than for similar policy shifts in developed societies.

## 2. The 1986 Taiwanese patent reforms: a natural experiment

An increase in patent protection may change the incentive to invent. The technologically creative can also demand stricter protection so as to

better secure returns from their inventions. To get around the problem of endogeneity and establish causality, one can use an exogenous variation in patent rights to examine the impact of such a shift on inventive activity.<sup>5</sup> Such an event took place in Taiwan in 1986.<sup>6</sup>

The 1986 reforms were mostly due to tremendous pressure from the United States, Taiwan's most important military ally and then largest trading partner. By the 1980s, many U.S. firms had become extremely concerned that they were being undercut by competitors who not only benefited from locating production in developing countries with low labor costs, but who were also infringing on their intellectual property rights. Such resentment among Americans was further elevated as the U.S. economy in the early 1980s experienced its highest ever unemployment since the Great Depression. Many American companies, together with the U.S. government, thus initiated a campaign to secure reforms of intellectual property rights systems (focused particularly on patents) throughout the world. The view of Clayton Yeutter, the U.S. Trade Representative from 1985 to 1989, is a vivid example of this movement:

The pirating of U.S.-financed research and development discourages innovation, denies markets to American exports, and threatens technological progress. Protection of intellectual property rights preserves America's technological edge, which is a key to our continued international competitiveness.<sup>7</sup>

This atmosphere was reflected in U.S. trade policies. In 1984, the U.S. began to treat inadequate protection of intellectual property rights as an unfair trade practice. Taiwan's lack of intellectual property protection became a growing concern to the American public. For example, as a 1985 Wall Street Journal article stated:

When Pfizer Inc. of New York introduced an arthritis drug in Taiwan four years ago, local manufacturers flooded the market with capsules that looked exactly like Pfizer's turquoise-and-maroon Feldeanes. The company says that within a year it had 20 competitors and within two years it held less than a 30% market share. Last year Pfizer's share slipped to 18%.<sup>8</sup>

A 1985 New York Times article also expressed the same concern:

Taiwan is to counterfeiting what Miami is to drug trafficking....[F]ake goods cost American Businesses \$6 billion in 1982 and ... 60 percent of the bogus products were made in Taiwan....Counterfeiting is a problem common to most developing countries. But Taiwan is distinguished by the wide range of products it manufactures and by the large amount of the output that it exports.<sup>9</sup>

Given that Taiwan enjoyed a substantial bilateral trade surplus with the U.S. in the 1980s and was its fifth largest trading partner, it is not surprising that in November 1986 Taiwan was one of the first three

<sup>5</sup> See, for example, Meyer (1995).

<sup>6</sup> In the 1990s, many developing countries also strengthened their intellectual property rights systems. These reforms can be largely due to the pressure from the developed world or in order to comply with the Trade Related Intellectual Property Agreement (TRIP) in the World Trade Organization (then the General Agreement on Tariffs and Trade, henceforth GATT). However, this wave of strengthening intellectual property rights in these developing countries was much anticipated because the United States had embarked on a campaign to harmonize intellectual property rights systems around the world since the late 1980s and also because it took several years for GATT to conclude the TRIP. The technologically creative in these developing countries was very likely to foresee such a policy shift and respond prior to these changes.

<sup>7</sup> The quotation is from Alison Butler (1990), "The Trade-Related Aspects of Intellectual Property Rights: What Is at Stake?"

<sup>8</sup> *The Wall Street Journal*, November 13, 1985, p. 37.

<sup>9</sup> *The New York Times*, May 7, 1985, p. D12.

<sup>4</sup> Intellectual property rights reforms in the developed world are in general initiated by the technologically creative companies. For example, companies like General Electric, IBM, Microsoft, and Red Hat have joined forces to call for reforms to the U.S. patent system in recent years. As a result, the policy shifts in, or variation across intellectual property rights systems examined by these investigators seem less than exogenous.

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