



# Capital outflow and R&D investment in the parent firm

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## ABSTRACT

Outward foreign direct investment (OFDI) from emerging countries to relatively low-wage countries has raised important questions about its impact on domestic technological development because of the small gap in terms of a technological lead. This paper develops hypotheses linking the impact of OFDI on R&D-investment growth in the parent firm to the underlying motivation for investment and firm size. These hypotheses are tested using available data from Taiwanese information and electronics firms for 1993–2008. The findings are that the R&D growth is not only relevant to conventional factors, such as the knowledge stock, demand factors and institutions, but is also importantly explained by the firm's long-term investment in the home country and abroad, and the industry's OFDI and IFDI. This paper also shows that home R&D growth is negatively relevant to the wage gap between the home and the host country, and changes in OFDI policies can significantly affect the R&D growth. The implications are that multinationals have important reasons for investing abroad. An open economy can maintain a technological lead only by improvements in its domestic R&D environment and by encouraging R&D entrepreneurship and social responsibility to promote long-term and R&D investments locally.

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## 1. Introduction

There have been significant changes in foreign direct investment (FDI) patterns over the past decade in emerging countries. For example, in 1998, net inflows of FDI (IFDI) for the Asian Four Little Dragons accounted for 5.14% of GDP and outflows of FDI (OFDI) for 4.07% (Table 1). By 2008, these ratios had doubled to 11.01% and 9.65%. The ratios in the BRICs also significantly increased, in particular by six times in the case of OFDI. These changes have raised important questions regarding their impact on various aspects of domestic economies (see, e.g., Lipsey and Weiss, 1981; Kim and Kang, 1997; Chuang and Lin, 1999; Liu and Huang, 2005; Kumar and Aggarwal, 2005; Krammer, 2009; Vadlamannati and Tamazian, 2009; Marin and Sasidharan, 2010). There are, however, far fewer formal studies on the issues for emerging countries investing in countries with relatively low wages and an abundance of skilled labor (LWASL) than for developed countries, particularly in the case of OFDI and home technological development.

A special concern for emerging countries in regard to OFDI is that multinational enterprises (MNEs) investing in LWASL countries generally have a small technological lead over firms in the host country. This is particularly true for productive investment by the four Asian Little Dragons in relatively low-wage and also emerging countries, such as the BRICs. The situation is, however, on average

somewhat different for MNEs from the more advanced economies investing in low-wage countries. Because of knowledge transfer and capital outflows, OFDI can possibly help the host country and speed up the catch-up process in technological development, especially, if the MNEs do not continue investing in R&D in the home country (Chen, 2003). If accurate, such arguments would be an important concern to emerging countries experiencing the faster growth in OFDI in LWASL countries.

Significant changes in OFDI patterns from the Four Asian Little Dragons to labor-intensive and relatively low-wage countries are often policy relevant. If we take Taiwan as an example, the rise of OFDI from Taiwan to mainland China has been remarkable since 1993, two years after the Taiwan government deregulated investment in China. Fig. 1 shows that annual OFDI to China surpassed the amount to the rest of the world in 1993 and the rising trend has been persistent since 2002, following the change in policy from Cautious Self-restraint (CSR, 1996–2000) to Active Open and Effective Management (AOEM, 2001–2008) for investment in mainland China in 2001. CRS regulated OFDI to China and classified industries into three types: forbidden, special and permitted cases. In general, investments of over US\$50 million, those in high-tech industries and infrastructure construction were prohibited. AOEM narrowed down the classification to two types: forbidden and general cases. Information and electronics (IE) industries were most relevant to this policy change. In particular, notebook production was reallocated from forbidden to the general case, but the advanced production of semiconductors was still banned from such investment (ICMOEA, 2008a,b). As shown in Fig. 1, OFDI in

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**Table 1**  
Foreign direct investment, % of GDP.

| Emerging states                   | 1998        |              | 2008        |              | 2008/1998   |              |
|-----------------------------------|-------------|--------------|-------------|--------------|-------------|--------------|
|                                   | Net inflows | Net outflows | Net inflows | Net outflows | Net inflows | Net outflows |
| Average four Asian Little Dragons | 5.14        | 4.07         | 11.01       | 9.65         | 2.14        | 2.37         |
| Taiwan                            | 1.36        | 1.91         | 2.06        | 4.52         | 1.52        | 2.36         |
| Hong Kong                         | 8.85        | 10.18        | 29.30       | 27.80        | 3.31        | 2.73         |
| South Korea                       | 1.57        | 1.37         | 0.20        | 1.40         | 0.13        | 1.02         |
| Singapore                         | 8.81        | 2.84         | 12.50       | 4.90         | 1.42        | 1.73         |
| Average four BRICs                | 2.50        | 0.27         | 3.55        | 1.80         | 1.42        | 6.65         |
| China                             | 4.29        | 0.26         | 3.40        | 1.20         | 0.79        | 4.65         |
| India                             | 0.64        | 0.01         | 3.60        | 1.60         | 5.65        | 133.33       |
| Brazil                            | 4.05        | 0.35         | 2.90        | 1.30         | 0.72        | 3.77         |
| Russian                           | 1.02        | 0.47         | 4.30        | 3.10         | 4.22        | 6.62         |
| High income countries             | 2.23        | 2.83         | 2.80        | 4.40         | 1.25        | 1.55         |
| World                             | 2.42        | 2.26         | 3.04        | 3.45         | 1.26        | 1.53         |

Source: Manipulated by the author; raw data from the World Bank (2011), Financial Sector Databank, accessed on 2011/03/07.

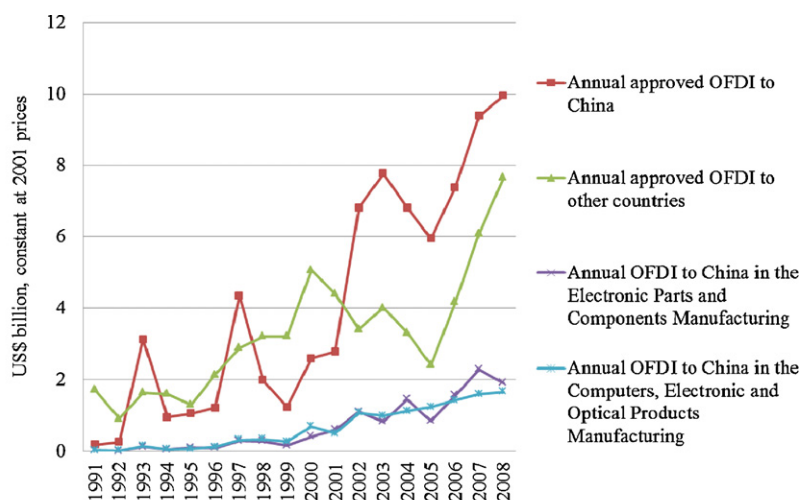
Notes: Net inflows and out flows of FDI are net inflows and outflows of equity capital, reinvestment of earnings and other short- and long-term capital. High income economies are those with a GNI per capita of \$11,906 or more.

China in the IE sector surged even more under the AOEM policy, from 27 cases in 1991 to a total of 5636 cases in 2008 (ICMOEA, 2008c). The accumulated amount, US\$25.3 billion, was about one-third of the total investment by Taiwanese in mainland China in 1991–2008, and more than twice the investment of US\$11.3 billion by Taiwanese IE companies in the rest of the world in 1952–2008.

A firm's R&D investment can be reallocated with OFDI. Table 2 shows that more and more R&D activities have been reallocated from Taiwan to China over time, and the moving abroad occurs especially rapidly in small companies. In the Taiwanese IE sector, the percentage of firms with more than 10% of R&D expenditures conducted through subsidiaries in China increased from 19.2% to 26% over the five-year period from 2001 to 2006. Importantly, of the 6.8% increase, 4% was due to firms allocating more than 90% of R&D expenditures in China's subsidiaries. For all industries, the percentage of small firms (with less than 100 employees) that allocated more than 10% of R&D expenditure in China was larger than that of the medium-sized enterprises (with 100–199 employees) and large firms (with  $\geq 200$  employees) in 2006, these percentages being 32.8%, 28.3% and 23.5%, respectively. However, in terms of

the changes that took place over the five-year period, the medium-sized enterprises were most significant (13.1%). The amount of R&D moving from Taiwan to mainland China was astonishing. However, the impact on home technological development has so far remained unclear.

In this paper, I focus on the impact of OFDI on the parent company's R&D investment. To understand the link between OFDI and the parent firm's R&D investment, it is necessary to address the underlying motivation for the investment. I consider the capital flows between the parent firm and the foreign subsidiary and link the capital flow with five motivations, including advanced technology-seeking, labor and land-seeking, R&D outsourcing, material (natural resources)-seeking, and market-seeking OFDI. The impact of direct investment abroad is compared with that of long-term investment in the home country and IFDI. Given the importance of the IE industry to the Taiwanese economy, accounting for more than 1/3 of manufacturing output (National Statistics, 2008), and the significant amount of the industry's OFDI in mainland China, the investment from Taiwan IE companies to mainland China is a good example for us to understand the possible impact



Source: Computed and graphed by the author based on OFDI data from the MOEAIC (2008) 2008 Annual Report on Foreign Direct Investment and deflators from the National Statistics data bank (2009).

**Fig. 1.** Taiwanese OFDI in China and the rest of the world.

Source: Computed and graphed by the author based on OFDI data from the ICMOEA (2008) Annual Report on Foreign Direct Investment and deflators from the National Statistics data bank (2009).

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