



How to go global with differentiated products



Ho-Chyuan Chen^a, Mei-Fang Chung^{b,*}

^a Department of Economics, National Chung Cheng University, Taiwan

^b Department of International Trade, Kun Shan University, Taiwan

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ABSTRACT

This paper employs a three-stage game to analyze the entry preference for foreign firms and host country with product differentiation. We derive a theoretical support of entry decision for multinational enterprises. It finds that lower product differentiation induces higher (lower) technology transfer given a sufficiently low (high) technology transfer cost. Moreover, the foreign firm prefers acquisition given sufficiently low transfer costs just like entering developed countries. However, probability for the equilibrium mode of acquisition to induce higher technology (than direct entry) decreases in product differentiation. We also find that both the government and the foreign firm prefer identical entry mode only when technology transfer cost is at a certain low level. Probability of this identical situation generally decreases in product differentiation. Contrarily, the governments in relatively highly developing countries generally welcome acquisition mode while the foreign firms prefer direct entry.

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1. Introduction

The issue of technology transfer and entry mode of foreign firms has gained increasing attention, because the enormous growth in foreign direct investment (FDI) has significantly increased the number of multinational enterprises (MNEs). For MNEs, one important decision to make for international diversification is to enter the foreign market through merger and acquisition (M&A) in the foreign market, or through the direct entry (Anushai, Wenjie, & Kathryn, 2013; Devereux & Griffith, 1998; Eicher & Kang, 2005; Kaynak, Demirbag, & Tatoglu, 2007). According to UNCTAD statistics (2010), emerging markets collectively accounted for only \$7 billion in 2000, but \$111 billion in 2008, in outward international M&A, showing an average annual increase of just under 200% over 8 years.¹ In this period, the form of M&A accounted for about 74%, 21%, and 8% of FDI flows in EU, Asia and China, respectively, and accounted for about 65%, 82%, and 27% of FDI flows in the world, the developed economies, and the developing economies, respectively. In this paper, we use an integral model to analyze the factors of an MNE to go global, including product differentiation, entry mode, technology transfer, and the development of host countries.

Direct entry and acquisition entry are seen as two alternative entry modes of MNEs (e.g., Elango, 2005; Williams, 2005). They may prefer acquisition when entry costs are very high (Al-Kaabi, Demirbag, & Tatoglu, 2010; Fatica, 2010), or in less developed markets to enable market development (Teixeira & Grande, 2012). On the other hand, they may reveal preference for direct entry in the case of direct historical and cultural ties between home and host countries (Demirbag, McGuinness, & Altay, 2010). Country size also matters. Eicher and Kang (2005) showed that large countries are more likely to attract acquisitions, the intermediate-sized countries may be served predominantly through trade, and small countries are most likely to experience either or no entry.

Matter of fact, the choice of entry mode can also affect the effect and the efficiency of technology transfer and therefore becomes an important strategic decision for MNEs (Eicher & Kang, 2005; Kasuga, 2003) and a regulated target for the host governments. In fact, the ability and effectiveness of adopting new technology for host countries are essential for MNEs (Lai & Tsai, 2009). As Bjorvatn (2001) found, the knowledge gaps between MNEs and the developing countries usually result in larger costs of technology transfer for mergers and acquisitions, which makes direct entry more preferable to MNEs. As for the host governments, they generally have incentive to attract FDI because of the technology transfer (Glass & Saggi, 2002), but will impose restrictions on the entry of MNEs. Lee, Yang, Chen, and Chen (2011) found that Taiwan biotech firms consider merge and acquisitions as the first-priority mode for entering mainland China due to foreign-ownership restrictions, which may lower the quality of technology transferred (Lee & Shy, 1992). Undoubtedly, the MNEs are seeking optimal entry to prevent the dissipation of their technological advantages

* Corresponding author. Tel.: +886 63319159.

E-mail addresses: chung@mail.ksu.edu.tw, bill-wang@hec-group.com.tw (M.-F. Chung).

¹ China, Hong Kong and other South-East Asian countries were the main beneficiaries of the heightened FDI flows in the form of mergers and acquisitions (M&As) and direct entry.

(e.g., Ethier & Markusen, 1996; Markusen, 2001), while the host government is regulating an entry mode of MNEs to enhance its social welfare. Besides the study of entry-mode decision of MNEs, we also study the host country's entry preference of MNEs in this paper.

Certainly, a market oriented firm tries hard to differentiated product line, rather than a single product, for customer satisfaction to maximize its profits (Marija & Milan, 2012). Accordingly, the product differentiation strategy provides a competitive advantage for MNEs. Lin (2004) observed that the entry modes of MNEs into a target market in the Server and the PC industry are generally different because their degrees of product differentiation are significantly different. Contrarily, Mukherjee and Balasubramanian (2001) found the best technology transferred if products are sufficiently differentiated.² According to Greenaway and Torstensson (2000), a large share of world trade happens as horizontal differentiated products, especially among the OECD countries. In fact, the globalization brings into a given market greater horizontal product differentiation for EU and OECD countries and the differentiated products introduced to developing countries by MNEs have been increasing recently (Storper, Chen, & De Paolis, 2002). As Porter (1990) claimed, product differentiation and lower costs are the two competitive advantages and the main reasons for the rise of Japan as a major exporter in the 1970s (Allen, Helms, Takeda, White, & White, 2006). However, the issue of product differentiation which significantly affects MNEs' behaviors has not yet been studied in the literature.³

The contribution of this paper is several folds. Firstly, we set up an integral model, which incorporates the issues of product differentiation, MNEs' entry mode, technology transfer, and the host government policy. It fits into the reality and derives several valuable conclusions on the optimal behaviors of MNEs and the host governments and on the effects of product differentiation for firms to go global. Secondly, the issue of product differentiation to affect MNEs' decisions on entry and technology transfer is studied for the first time in the literature. Lastly, using the efficiency of technology transfer as a proxy for the development level of host countries, MNEs and the host countries may be found different preferences over the entry modes with different development levels.

With the framework, we actually find that MNEs will prefer the acquisition method of entry when they sell less differentiated products in relatively developed countries. Direct entry by using a subsidiary will be preferred when they enter less developed countries. If the product has been commoditized (homogeneous products) the firms will adopt the acquisition strategy. Moreover, the MNE and the host country prefer different entry modes. However, when the cost of technology transfer is in a moderate intermediate range, both the MNE and the host country will prefer an identical acquisition mode of entry.⁴

A three-stage game model is employed in this paper. The foreign firm chooses an entry mode (acquisition or direct entry) in the first stage, determines the level of technology transfer (which lowers its marginal production costs at the production stage) in the second stage, and finally produces heterogeneous products

and Cournot-competes with the domestic firms in the host country. The rest of the paper is organized as follows. Section 2 discusses the theoretical setup and describes the two entry modes (acquisition and direct entry) for the foreign firm to enter the host country. Section 3 provides a three-stage game model to analyze the extent of technology transfer and the optimal entry mode. Section 4 focuses on the impact of the foreign firm's entry decision on the host country's welfare. Section 5 illustrates the practical implication for the MNEs and the host countries. Section 6 provides our conclusions.

2. The model

Extending the basic model structure of Mattoo, Olarreaga, and Saggi (2004), our model includes the product differentiation issue. There are 2 domestic firms and one foreign firm. The domestic firms have identical marginal production costs and homogeneous products.

The foreign firm enters the domestic market via acquisition or direct entry, introduces a differentiated product, and has lower marginal production cost through technology introduction.⁵ To investigate the relation of product differentiation, technology transfer, and mode of entry, we employ a three-stage game.

In the first stage of the model, the foreign firm has two options for entering the domestic market: acquiring a domestic firm or setting up a wholly owned subsidiary that directly competes with domestic firms.⁶ If it chooses to acquire a domestic firm, it makes a take-it-or-leave-it offer (v) to buy out the target firm. If the target firm accepts the offer, they form a new firm owned by the foreign firm. If the target firm refuses the offer, the foreign firm can enter the market by establishing its own subsidiary or by acquiring some other domestic firm.⁷ We assume the buy-out fee offer will leave the target firm with a payoff equal to that when some other domestic firm is acquired. Therefore, the structure of the domestic market influences costs of acquisition entry but not those of direct entry.

After selecting the mode of entry, the foreign firm in the second stage chooses the amount of technology transfer (x) to its subsidiary, which costs the foreign firm $C(x)$ with $C(x) = \tau x^2/2$. Assume that the technology transfer will lower the foreign firm's marginal production cost at the third stage by x . Therefore, a higher parameter τ implies lower transfer efficiency and higher marginal transfer costs. In the last stage, firms compete in a Cournot-Nash fashion.

Denote N as the total number of firms in the domestic market after the foreign firm enters. Thus $N = 3$ when the foreign firm chooses direct entry; otherwise $N = 2$. Also note that, hereafter, subscript h , i , and f denote all the $(N - 1)$ domestic firms, the individual domestic firm, and the foreign firm, respectively. With p and q denoting price and quantity, let a linear form of $p(q)$ be the inverse demand function. Then, the inverse market demand function for each firm can be expressed as follows:

$$p_i = a - q_h - \theta q_f, \quad p_f = a - \theta q_h - q_f \quad (1)$$

where $q_h = \sum_{i=1}^{N-1} q_i$, $a > 0$ and $0 \leq \theta \leq 1$.

Parameter θ measures the degree of horizontal product differentiation. When $\theta = 1$, the goods are perfect substitutes and the

² Brambilla (2006) empirically linked technological differences to product differentiation expansions of MNEs in China. In the context, the product variety expansions (or new varieties) are not innovation but rather a horizontal expansion or renovation of the product portfolio of firms. That is, new varieties are those horizontal differentiated products of firms.

³ The decision behaviors of MNEs includes those decisions on technology transfer and mode of entry.

⁴ The existing literature relevant to our paper mainly focused on the decision of entry mode, either licensing or direct entry. Among others, Uday (2013) showed that strategic licensing might lead to welfare loss for the host country, and Chang, Hwang, and Cheng (2013) found that a higher R&D efficiency of the licensor firm may lead to a lower social welfare level.

⁵ Without loss of generality, the assumption that all domestic firms produce homogeneous products can simplify our analysis.

⁶ Mattoo et al. (2004) shows that, in equilibrium, the foreign firm does not choose partial acquisition. Throughout the paper in order to proceed to a concise mathematical analysis, we consider only the case of full acquisition of the domestic firm.

⁷ There is a fixed cost of setting up plant for direct-entry MNEs. We do not contain the fixed cost in our model because it does not affect the decisions of optimal choice.

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