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Cross-border mergers and acquisitions with heterogeneous firms: Technology vs. market motives

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ABSTRACT

The most common form of foreign direct investment (FDI) is cross-border mergers and acquisitions (M&A). A common explanation for M&A activity identified in the industrial organization literature is that firms seek technological expertise. However, this has not been examined in the FDI literature. In this paper, I develop and estimate a model of cross-border M&A and focus on the technology seeking explanation. In particular, I develop a general equilibrium model of exporting, greenfield FDI, technology-seeking cross-border M&A, and market-seeking cross-border M&A with heterogeneous firms. The model predicts that firms from a larger country are more likely to acquire in a smaller country when M&A activity is driven by a technology-seeking motive, but the opposite is true when it is driven by a market-seeking motive. Using detailed data on worldwide M&A activity from 1985 to 2007, I find empirical evidence that cross-border M&A activity exhibits behavior consistent with this prediction.

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1. Introduction

Foreign direct investment (FDI) has played a major role in the increasing economic globalization of the past three decades. Cross-border M&A is the major source of FDI, particularly for developed countries accounting for as much as two-thirds of FDI ([World Investment Report, 2007](#)). Thus, understanding cross-border M&A plays a crucial role in understanding FDI and globalization.

Various motives can exist for firms to engage in cross-border M&A. Firms may engage in cross-border M&A to avoid trade costs such as tariff or shipping costs. Many previous studies in the FDI literature assume cross-border M&A as a substitute for greenfield FDI for this reason. More recent work considers cross-border M&A differently from greenfield FDI by introducing other motives. For example, firms may engage in cross-border M&A to obtain market-specific expertise² of the host country in order to better serve the host country's consumers. [Nocke and Yeaple \(2007\)](#) build a theoretical model based on this motivation.³ Firms may also engage in cross-border M&A for corporate control. This motive is the driving force behind the M&A model in [Head and Ries \(2008\)](#).

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² This can be knowledge on local marketing strategies or distribution channel that is country-specific. This motivation is present in my model as well.

³ Their basic theoretical framework is similar to [Helpman, Melitz, and Yeaple \(2004\)](#) with heterogeneous firms, which is also the case for my model. This is a standard setup for foreign market entry models with heterogeneous firms.

In this paper, I contribute to the growing cross-border M&A literature by building a model where M&A activity is potentially motivated by technology. A technology-seeking motive is important in M&A activity, as evidence for this motive can be found from various empirical articles (mostly on domestic M&A) in other literatures. For example, studies on pharmaceutical firms in the industrial organization literature show that firms engage in M&A when seeking patents for drugs (see, for example Gans, Hsu, and Stern (2002) and Danzon, Epstein, and Nicholson (2004)). Other studies also show that there exists a high correlation between R&D expenditure in a firm or in an industry and M&A activities, and firms will use M&A to substitute “bought” technology for internally-produced technology (see, for example Blonigen and Taylor (2000), Blonigen (1997), and Kogut and Chang (1991)).

I extend a model introduced by Nocke and Yeaple (2007) to include a technology-seeking motive for cross-border M&A and develop a general equilibrium model of exporting, greenfield FDI, technology-seeking cross-border M&A, and market-seeking cross-border M&A with heterogeneous firms. The model is developed from the firm entry model where there exists a competitive market for M&A, and firms engage in cross-border M&A for two reasons: (1) To gain a synergy effect⁴ by obtaining a target firm’s technology, which increases the acquirer’s productivity, or, (2) to obtain a target firm’s market-specific expertise, such as knowledge on local marketing strategies or distribution channel, which makes the acquirer’s good more desirable to consumers in the host country.⁵ I term the first motive “technology-seeking” and the second motive “market-seeking” throughout the rest of the paper.

I first show that there are distinct productivity cutoffs in the model that separate exporting, greenfield FDI, technology-seeking cross-border M&A, and market-seeking cross-border M&A in equilibrium, and I then show how different firm types sort into these foreign market access modes.

Second, I show that the model generates a sharp theoretical distinction between the two motives: Relative country size differences between the home and the host countries will have a different effect on technology-seeking cross-border M&A and market-seeking cross-border M&A. In particular, proportionately more firms engage in technology-seeking cross-border M&A when their home country’s market size is relatively larger than the host country, whereas the opposite is true for market-seeking cross-border M&A. This provides me with an estimation strategy to identify a technology-seeking cross-border M&A activity in the data. I provide evidence of this result by showing that as the relative size difference between the home and the host country (i.e. home country size minus host country size) increases, cross-border M&A into host country’s non-high R&D industries decreases but this effect is less in high-R&D sectors⁶, suggesting that the bigger the home country is relative to the host country, more firms from the home country engage in technology-seeking cross-border M&A into the smaller host country.

The rest of the paper proceeds as follows. Section 2 describes the theoretical model. Section 3 analyzes the equilibrium of the model and determines the equilibrium pattern of the four foreign market entry modes (i.e. exporting, greenfield FDI, technology-seeking cross-border M&A, and market-seeking cross-border M&A). Section 4 looks at how asymmetric country size affects the equilibrium using comparative statics to uncover the technology-seeking cross-border M&A activity. Section 5 conducts an empirical analysis suggested by the comparative statics result and provides evidence of a technology-seeking cross-border M&A activity consistent with the model’s prediction using worldwide cross-border M&A data. The last section presents conclusions.

2. The model

The model consists of two identical countries 1 and 2. The aggregate income level in both countries is denoted by Y . Labor is the only factor of production. The price of labor in each country is equal and normalized to one because a homogeneous and perfectly competitive product is produced in every country and traded freely.^{7,8} The homogeneous product is produced with one unit of labor per unit of output. The model is developed from a firm entry model where there exists a competitive market for M&A. I seek the subgame perfect equilibrium of the game. The timing of the each stage is as follows:

Stage 1: Potential entrants decide whether to enter the market or not in each country.

Stage 2: Firms decide on how to serve the foreign market to maximize their profits by choosing from the following entry modes; 1) exporting, 2) greenfield FDI, 3) participate in the cross-border mergers and acquisitions market as buyers or sellers (either technology-seeking or market-seeking).

Stage 3: Firms compete in the market as price setters and receive profits. Firms can discriminate between markets and set different prices for the two countries.

⁴ Synergy is realized because the target firm from another country has a technology that is different from the acquirer. Empirical evidence of this effect can be found in the following articles (see, for example Morosini, Shane, and Singh (1998), Vermeulen and Barkema (2001), and Gertsen, Söderberg, and Torp (1998)) and (Branstetter (2000), Takechi (2006), and Guadalupe, Kuzmina, and Thomas (2010)).

⁵ This is similar to the cross-border M&A motive used by Nocke and Yeaple (2007).

⁶ Cross-border M&As that take place in these sectors are likely to be technology-seeking since firms in these sectors are technology-intensive, whereas cross-border M&As in other sectors are more likely market-seeking.

⁷ In fact, I already assume countries are identical thus wages are equal and homogeneous good may seem unnecessary. However, homogeneous good insures the wages are equal later when I do comparative statics where country sizes aren’t identical.

⁸ This model best represents FDI between developed countries since there are no wage differences between the two countries which firms can exploit. Majority of FDI are among the developed countries (World Investment Report, 2007).

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