Journal of World Business 50 (2015) 548–557

Contents lists available at ScienceDirect

Journal of World Business

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

Operational hedging in foreign direct investments under volatile and divergent exchange rates across countries

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ARTICLE INFO

Article history:
Available online 23 September 2014

Keywords:
Multinational corporations
Foreign direct investments
Exchange rates
Operational hedging
Global intra-firm trade
MNC performance

ABSTRACT

This study examines the environmental conditions under which multinational corporations (MNCs) engage in operational hedging behaviors to actualize their operational flexibility within their international network. We analyzed a Korean MNCs' database and found that MNCs engage in operational hedging through global intra-firm trade to counteract volatile and divergent exchange rates across countries. Additionally, we found that the MNCs' utilization of intra-firm trade and flexible responses to volatile and divergent cross-country exchange rates enhances their performance. Our findings support the real options lens perspective of the value of multinational operational flexibility under external uncertainty in an international business setting.

1. Introduction

The effective management of uncertainty is one of the most critical issues facing multinational corporations (MNCs), since dealing with unpredictable macroeconomic changes in the countries of their investment requires significantly different types of resources and strategies than normal ones (Allen & Pantzalis, 1996; Chung, Lee, Beamish, & Isobe, 2010; Cuypers & Martin, 2010; Kogut & Kulatilaka, 1994; Tang & Tikoo, 1999). For this reason, previous research highlights that under a high level of uncertainty, the value of flexibility in coping with external environmental uncertainty becomes an important factor (Cuypers & Martin, 2010; Dixit & Pindyck, 1994). In other words, the ability of MNCs to exploit the flexibility of their established investments and quickly adapt their current strategy to uncontrollable changes in macroeconomic conditions, without incurring significant costs, is vital for their performance (Chung et al., 2010; Fisch & Zschoche, 2011; Huchzermeier & Cohen, 1996; Kogut & Kulatilaka, 1994; Lee & Song, 2012; Pantzalis, Simkins, & Laux, 2001).

MNCs with such flexibility obtained by a shift in production are able to gain a competitive advantage over competitors that are unable to match them in this ability (Allen& Pantzalis, 1996; Chung et al., 2010; Kogut & Kulatilaka, 1994; Lee & Makhija, 2009a,b). A key approach through which MNCs can gain operational flexibility, as emphasized in the literature, is operational hedging, which refers to buffering the firm against uncontrollable macroeconomic changes through the exploitation of cost differentials on a global scale by transferring the internal transactions of purchases or sales from one country to another within their international network (Chung et al., 2010; Cohen & Lee, 1989; Huchzermeier & Cohen, 1996; Kogut & Kulatilaka, 1994; Pantzalis et al., 2001).

While existing research has stressed heavily on the value of multinational operational flexibility, few studies have examined how MNCs actually use their international investment portfolio for operational hedging. However, without evidence of MNCs' operational hedging, it is difficult to determine if such behavior is actually undertaken, and whether doing so has any effect on their performance under uncertainty. Additionally, few studies consider cross-country macroeconomic factors, like *divergence*[3] and *volatility*, in the host countries as the primary environmental trigger for MNCs' operational hedging behaviors. The purpose of this paper is to address this concern.

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[3] Exceptions are Belderbos and Zou (2009), and Chung et al. (2010) who examined the correlations in exchange rates between a subsidiary's host country and other affiliates' host countries in their studies on subsidiary exits.

http://dx.doi.org/10.1016/j.jwb.2014.08.012
1090-9516/

Thus, the objectives of our study are two-fold: (a) to examine environmental conditions where MNCs are actually engaged in operational hedging behaviors to realize their potential operational flexibility, and specifically, to examine how changes in macroeconomic factors due to volatile and/or divergent exchange rates in the host countries affect the MNCs' engagement in operational hedging through their international network; (b) to examine the impact of operational hedging on the MNCs' performance.

In our study, we focused on MNCs' intra-firm trade, or internal purchases and sales within its international network of subsidiaries, to determine whether MNCs engage in operational hedging (Feinberg & Gupta, 2009; Kobrin, 1991). Intra-firm trade within the MNC's subsidiary network reflects the extent to which its subsidiaries in different countries are operationally connected to each other (Kiyota, Matsuura, & Urata, 2008; Makhija, Kim, & Williamson, 1997; Rangan, 1994, 1998). When the MNC's subsidiary network is characterized by low intra-firm trade, subsidiaries are not likely be highly operationally while connected to each other, thus reducing their potential to buffer the firm against unexpected environmental fluctuations in any particular location (Kogut & Kulatilaka, 1994; Lee & Makhija, 2009a; Little, 1986).

On the other hand, a network exhibiting high intra-firm trade demonstrates strong linkages among subsidiaries that can potentially be leveraged during uncertainty, by allowing for the timely transfer of internal purchases or sales from a location rendered less desirable by unexpected environmental changes to a more advantageous one (Buckley & Casson, 1976; Kiyota et al., 2008; Kotabe & Murray, 1990; Kotabe & Omura, 1989). To test our hypotheses, we used a sample of the foreign direct investments (FDIs) of publicly traded Korean manufacturing MNCs listed on the Korean Stock Exchange from 1990 to 2007.

The contributions of this paper are three-fold: first, by analyzing the changes in the MNCs' intra-firm trade, this study provides a more precise measure of operational flexibility than those used in previous literature. Second, we demonstrate that MNCs differ in their operational flexibility in accordance with the extent of the divergence and volatility of exchange rate changes in their host countries, that is, subsidiary locations that have the least commonality in exchange rate changes render the most opportunities for operational flexibility.

2. Theory and hypotheses

2.1. Applying a real options lens to uncertainty and flexibility in international business

According to real options logic, firms can structure their strategic investments in a way that allows them to keep their options open under uncertainty (Bowman & Hurry, 1993; Chi, 2000; Dixit & Pindyck, 1994; Kumar, 2005; Lee & Makhija, 2009a). For example, if the firm is faced with new environmental circumstances having a reduced potential for revenues or profits, it can withdraw from its present investment, or relocate its operations to a more profitable environment, at low cost (Chi, 2000; Kumar, 2005; O'Brien & Folta, 2009). On the other hand, if the new environmental conditions possess a greater economic potential compared to the existing ones, the firm can use its existing investment to expand or reorient its operations according to these new conditions (Chi, 2000; Chung et al., 2010; Fisch, 2008; Fisch & Zschoche, 2011, 2012; Kogut, 1991; Lee & Song, 2012). Hence, the real options view recognizes potential opportunities embedded in uncertainty and encourages managerial flexibility in adjusting investment decisions in response to uncertainty.

MNCs, in particular, are exposed to several sources of uncertainty in the international context that make it essential for them to retain flexibility (Chung & Beamish, 2006; Cuypers & Martin, 2010; Goldberg & Kolstad, 1995; Kogut & Kulatilaka, 1994; Kogut, 1991; Lee & Makhija, 2009a). The unexpected changes that characterize the macroeconomic conditions of investment countries require rapid yet potentially costly adjustments in strategy. For example, in currency and demand shifts in a host country can reduce the value of a foreign investment located there. For this reason, multinational operational flexibility, an MNC's ability to switch current strategies in a timely manner without incurring significant costs, is important for its performance and survival (Chung et al., 2010; Huchzermeier & Cohen, 1996; Kogut & Kulatilaka, 1994; Lee & Makhija, 2009a; Lee & Song, 2012). Thus, MNCs must have *a prior* investment that are structured in a manner that provides several courses of action under differing environmental conditions for the countries within its international investment network (Allen & Pantzalis, 1996; Chung et al., 2010; Lee & Makhija, 2009b; Tang & Tikoo, 1999).

The real options view argues that, based on their global operations, MNCs actualize multinational flexibility by engaging in operational hedging behaviors. Specifically, MNCs are able to cope with and exploit uncertainty by responding to favorable and unfavorable changes in asymmetric ways (Lee & Song, 2012; Pantzalis et al., 2001). Therefore, operational hedging differs from financial hedging, which mainly focuses on reducing the risks associated with financial assets by using financial derivatives including forwards contracts (Goldberg & Kolstad, 1995; Hodder, 1984; Huchzermeier & Cohen, 1996; Lee & Chung, 2007). It also differs from the international geographic diversification effect, which indicates that international investments scattered across multiple countries help firms to diversify or reduce risks associated with macroeconomic conditions (Chung et al., 2010; Goldberg & Kolstad, 1995; Lee & Chung, 2007).

2.2. Operational hedging via global intra-firm trade under exchange rate uncertainty

Globally dispersed investments provide MNCs with options that allow them to cope with the uncertainties found in an international context (Allen & Pantzalis, 1996; Chung et al., 2010; Pantzalis et al., 2001; Tang & Tikoo, 1999; Tong & Reuer, 2007). Such pre-existing investments make it possible to internally transfer from costly sites to less costly ones to take advantage of the cost differentials among countries. Thus, MNCs are able to take advantage of uncertainty by increasing their exposure to changes that are favorable for their operations and minimizing exposure to those that are unfavorable, and thus having asymmetric payoffs (Hodder, 1984; Huchzermeier & Cohen, 1996; Lee & Chung, 2007; Pantzalis et al., 2001; Weiss & Maher, 2009). For example, Patlite, a Japanese indicator-light manufacturer, transferred much of its manufacturing to its Indonesian subsidiary when labor and input costs fell during the Asian economic crisis of 1997 (Lim, 1999). Similarly, Matsushida and Hitachi, two Japanese electronics firms, were able to quickly expand their export-oriented manufacturing operations in Malaysia by taking advantage of the local currency devaluation (Agarwal & Urata, 2002).

When the subsidiaries within an MNC subsidiary network are already highly connected, it enables the MNC to efficiently utilize them to gain operational flexibility. Such connections are reflected in intra-firm trade within the MNC. Established intra-firm trade ties among subsidiaries can be used by the parent company to make rapid operational adjustments across national borders in response to abrupt environmental changes (Kogut & Kulatilaka, 1994; Lee & Makhija, 2009a; Little, 1986). Thus, an MNC with greater intra-firm trade can be expected to adjust more quickly to external uncertainty than unaffiliated and non-cooperating firms. An MNC can both gain and sustain its competitive advantage