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Complex vertical FDI and firm heterogeneity: Evidence from East Asia

Kazunobu Hayakawa ^{a,*}, Toshiyuki Matsuura ^b

^a Bangkok Research Center, Japan External Trade Organization, 16th Floor, Nantawan Building, 161 Rajadamri Road, Pathumwan, Bangkok 10330, Thailand

^b Institute of Economic and Industrial Studies, Keio University, 2-15-45 Mita, Minato-ku, Tokyo 108-8345, Japan

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ABSTRACT

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This study statistically tests the validity of the mechanics of complex vertical foreign direct investment (C-VFDI) in Japanese machinery FDI to East Asia by estimating a multiple-spatial lag model. From a theoretical perspective regarding C-VFDI, the production activity of affiliates in a given country is positively related to the production activity in neighboring countries that have large differences in factor prices with the given country. Furthermore, high-productivity firms are likely to choose a C-VFDI strategy. Our empirical results show no robust geographical relationship among affiliates' activities. However, the significantly positive relationship in wage differentials among those activities is found only for high-productivity firms. *J. Japanese Int. Economies* 25 (3) (2011) 273–289. Bangkok Research Center, Japan External Trade Organization, 16th Floor, Nantawan Building, 161 Rajadamri Road, Pathumwan, Bangkok 10330, Thailand; Institute of Economic and Industrial Studies, Keio University, 2-15-45 Mita, Minato-ku, Tokyo 108-8345, Japan.

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1. Introduction

During the recent wave of globalization, vertical division of labor among stages of production has evolved worldwide. One well-known example is automobile production in the US–Mexico nexus,

* Corresponding author. Fax: +66 2 254 1447.

E-mail address: kazunobu_hayakawa@ide-jetro.org (K. Hayakawa).

where cross-border production-sharing has featured back-and-forth intra-firm transactions between auto makers' US headquarters and their assembly plants in maquiladoras in Mexico. Another example is the Western Europe–Central and Eastern Europe (WE–CEE) nexus, where exports of finished machinery products from CEE to WE have increased rapidly.¹ Such a division of labor is important for developing economies' economic growth. It encourages the transfer of advanced knowledge and technology from developed to developing economies, enhancing productivity of firms among the latter.

Several theoretical papers have sought to clarify the mechanics underlying the vertical division of labor among production processes (e.g., Jones and Kierzkowski, 1990). In academic discussions, this division of labor has been described as “fragmentation,” “outsourcing,” and “vertical specialization.” Fragmentation is the splitting of a production processes into two or more steps culminating in one end product. When production is located beyond national borders, the fragmentation is called “international fragmentation” or “cross-border fragmentation.” International fragmentation is also discussed within the context of vertical foreign direct investment (VFDI). Studies show that once fragmentation becomes feasible because of reduced trade costs, multinational enterprises (MNEs) in one country (often a developed economy) locate affiliates in another country (often a developing economy) offering a comparative advantage in assembly processes. The MNEs then engage in a production-process vertical division of labor by exporting intermediate products to their affiliates. This two-country version of VFDI has become known as “pure VFDI.”

However, imagine that an MNE in its home country locates an affiliate in a host country and initiates vertical division of labor between the two. If production processes in the host country can be further fragmented, and if near the host country is a third country that offers comparative advantages in undertaking part of the processes undertaken in the host country, the MNE will relocate that part of its production to the third country. The result is that the MNE has two affiliates and engages in a three-country vertical division of labor. This MNE strategy resembles that occurring in recent international production systems.

According to the United Nations Conference on Trade and Development (UNCTAD, 2002):

[D]uring the past 15 years, falling barriers to international transactions have not only invigorated global markets through arm's-length transactions but also given rise to elaborate corporate systems of organizing the production process. As a result, international production systems have emerged within which TNCs [MNEs] locate different parts of the production processes, including various services functions, across the globe to take advantage of fine differences in costs, resources, logistics and markets.

As Yeaple (2003) and Grossman et al. (2006) have pointed out, this MNE strategy is known as “complex integration” (UNCTAD, 1993, 1998). Production systems involving this strategy involve a production-process vertical division of labor involving more than two countries and are unquestionably a form of VFDI. Unfortunately, traditional VFDI theory cannot depict these complex production systems because pure VFDI theory assumes a model in which each MNE selects, from among all potential destination countries, the *one* country that offers the lowest production costs for activities it wishes to relocate.

“Complex VFDI” theory (C-VFDI) provides the model for exploring more complex production systems for MNEs with affiliates in multiple countries. Recently, third-country effects have attracted attention among FDI theories, which are being reconfigured in a three-country framework instead of the traditional two-country setting (Baltagi et al., 2007; Ekholm et al., 2007; Grossman et al., 2006; Yeaple, 2003). In this paper, we statistically test the validity of the mechanics of C-VFDI using data from Japanese machinery manufacturers engaged in FDI in East Asia. Since the 1990s, machinery industries, particularly in electronics machinery, have developed international production and distribution networks in East Asia. East Asia consists of countries with different levels of economic development (different factor prices), and thus is a suitable region for developing production-process vertical division of labor among multiple countries. Japanese MNEs have led in developing such networks, diversifying locations of their affiliates and extending production across East Asia. Moreover, their East Asian

¹ See Ando and Kimura (2007) and Hanson et al. (2005).

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