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How does outward foreign direct investment enhance firm productivity? A heterogeneous empirical analysis from Chinese manufacturing

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ABSTRACT

Using an original linked firm-level panel data from Chinese manufacturing firms over the period 2002–2007, this paper examines how outward foreign direct investment (OFDI) led productivity increase of parent firms (known as the own-firm effect) changes over firm heterogeneity. Conducting propensity score matching (PSM) techniques and differences-in-differences (DID) analysis, we find strong and robust evidence that the first OFDI promotes parent firm's productivity and this effect varies substantially with the firms' characteristics. In particular, firm's absorptive capacity is essential for the own-firm effect, and the absorptive capacity related with the product innovation is more important than that of the process innovation for the own-firm effect. Also, OFDI strategies for obtaining advanced technology and investing in developed countries significantly strengthen the own-firm effect, whereas, government supports have no significant impacts on the own-firm effect.

1. Introduction

Since the "Going Out" strategy was established as the Chinese nation-level policy in the early 2000s, the number of Chinese overseas subsidiaries has been increasing steadily, especially in last decade. One of the critical reasons for launching this strategy is that the authorities believe Chinese establishments could obtain advanced technologies and management skills via outward foreign direct investment (OFDI) and thereby improve their productivity.

This productivity-enhancing effect is known as the own-firm effect (Vahter & Masso, 2007), and supported by a series of empirical studies using firm-level data, such as Vahter and Masso (2007) for Estonia, Navaretti and Castellani (2004) and Imbriani, Pittiglio, and Reganati (2011) for Italy, and Yang, Chen, and Huang (2013) and Huang, Hou, and Yang (2013) for Taiwan. Similar results are also found in Chinese OFDI firms recently, for example, Chen and Tang (2014) on all Chinese manufacturing firms with OFDI, Cozza, Rabellotti, and Sanfilippo (2015) on Chinese OFDI in 27 advanced European countries, and Edamura, Haneda, Inui, Tan, and Todo (2014) on Chinese firms' cross-border merger and acquisition (CM&A).

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However, firms investing abroad may have different motivations, capabilities, and through different ways (Blonigen, 2005; Chawla & Rohra, 2015), which would result in different impacts on their productivity. Therefore, an important question to ask is how the own-firm effect varies over heterogeneous firms. This is crucial because firms are keen to enhance their productivities and policy makers need information to implement industrial policies. Unfortunately, the heterogeneous own-firm effect is largely ignored by the existing FDI literature.

This paper attempts to fill in this gap using an original linked firm-level panel data from Chinese manufacturing firms over the period 2002–2007. Conducting propensity score matching (PSM) techniques and differences-in-differences (DID) analysis, we find strong and robust evidence that the first OFDI promotes parent firm's productivity, and more importantly, this effect varies substantially with the firms' characteristics. In particular, firm's absorptive capacity is essential for the own-firm effect, and the absorptive capacity related with the product innovation is more important than that of the process innovation for the own-firm effect. Also, OFDI strategies for obtaining advanced technology and investing in developed countries significantly strengthen the own-firm effect. By contrast, government supports have no significant impacts on the own-firm effect.

Our contributions are three-fold: First, this is the first paper studying the heterogeneous characters of OFDI firms and their consequences on the own-firm effect. We examine a series of unique features on Chinese OFDI behaviors to consider the scale and the importance of different impacts. Second, based on the existing studies on the mechanism of own-firm effect, we further identify two types of heterogeneous factors involving technology and non-technology. In particular, the absorptive capacity for technology and knowledge is firstly identified based on the product innovation and the process innovation. Third, the data used in this paper is unique and original linked. Compared with current research using the similar data set, our method improves the identified rate on Chinese firms with OFDI behaviors. Therefore, the sample linkage bias is controlled as much as possible.

The rest of the paper is structured as follows: Section 2 discusses the theoretical framework and related literature of this study. Section 3 describes our original data set. Section 4 presents our empirical strategy on PSM-DID and the constructing procession on the new sample. Section 5 contains evidence on the own-firm effect and its influential factors, and Section 6 concludes.

2. Theoretical framework and related literature

To clarify how the own-firm effect varies over heterogeneous firms, the mechanism[1] of own-firm effect should be explained at first. In general, there are three necessary steps through which the own-firm effect can take place:

First, the parent companies establish subsidiaries in host countries via OFDI, and the overseas subsidiaries acquire a series of important resources abroad through various channels. These channels can be summarized as technology and non-technology related ones. For technology related channels, the subsidiaries can directly obtain the proprietary technology and know-how through CM&A (Deng, 2004, 2009; Edamura et al., 2014), establishing R&D centers in host countries with abundant technical sources and human capital (Child & Rodrigues, 2005), and accessing to more accurate international market information on demand to develop new products (Wang, Hong, Kafouros, & Boateng, 2012); Also, the subsidiaries can indirectly get knowledge and technology via spillovers from host countries' firms (De La Potterie & Lichtenberg, 2001) through demonstration (Lin, Liu, & Zhang, 2009), labor mobility (Balsvik, 2011; Huang & Zhang, 2017), industrial linkages (Javorcik, 2004), and so on. For non-technology related channels, the resource-seeking OFDI (Chawla & Rohra, 2015) focuses on obtaining production resources such as raw materials (Amighini, Rabellotti, & Sanfilippo, 2013) and low-cost labor (Driffield & Chiang, 2009; Driffield, Love, & Taylor, 2009); The marketing-seeking OFDI (Chawla & Rohra, 2015; Child & Rodrigues, 2005) concentrates on market resources to expand overseas market share; And some overseas affiliates also devote to seek for international low-cost funds (Forssbæck & Oxelheim, 2011). Accordingly, the general-equilibrium theory models explaining for these OFDI motivations are established such as the vertical FDI model (Helpman, 1984; Helpman & Krugman, 1985) focusing on seeking to access cheaper factors of production abroad, the horizontal FDI model (Markusen, 1984; Markusen & Venables, 2000) emphasizing to serve overseas markets locally to substitute for export, and the hybrid model with neither purely horizontal nor purely vertical OFDI addressed by Yeaple (2003), Egger, Larch, and Pfaffermayr (2004), Grossman, Helpman, and Szeidl (2006), Baltagi, Egger, and Pfaffermayr (2007), and Ekholm, Forslid, and Markusen (2007).

Second, the acquired resources (i.e. technical and non-technical resources) are transferred back to parent companies through the multinational internal network (see Ambos, Ambos, & Schlegelmilch, 2006; Fosfuri & Motta, 1999; Yang, Mudambi, & Meyer, 2008) between the subsidiaries and the parent companies.

Finally, the parent companies absorb and adopt these critical resources in their production. The acquired knowledge and technologies can be directly employed in manufacturing process so as to improve parent firms' productivity; Also, resources such as materials, market, and finance could yield the cost savings or the economies of scales from input and output perspective, and thereby raise the productivity of parent firms (see Imbriani et al., 2011; Navaretti & Castellani, 2004).

Through the mechanism of own-firm effect, the heterogeneity over firms would influence the productivity of parent firms differently. More specifically, in the stage on resources acquiring, overseas subsidiaries established with diverse OFDI strategy motivations (Chawla & Rohra, 2015; Child & Rodrigues, 2005) such as technology-sourcing and marketing-seeking would tend to obtain different resources, and the heterogeneity of OFDI motivations may yield different own-firm effect; In the stage on resources transferring, absorbing, and adopting, the absorptive capability of parent firm is crucial (Girma, 2005; Glass & Saggi, 1998; Huang, Liu, & Xu, 2012; Todo, 2006). This is because the absorptive capability may directly affect the efficiency of technical

[1] We would like to thank two anonymous referees for the important suggestion on discussing the mechanism of own-firm effect.