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Agglomeration effects of inter-firm backward and forward linkages: Evidence from Japanese manufacturing investment in China



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ABSTRACT

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This paper examines the agglomeration effects of multinational firms on the location decisions of first-time Japanese manufacturing investors in China for the period 1995–2007. This is accomplished by exploiting newly constructed measures of inter-firm backward and forward linkages formed in a home country. The conditional and mixed logit estimates reveal that agglomeration by first-tier suppliers and customers draws subsequent investment into a location. However, such agglomeration effects are not pervasive and do not extend to the second and third tiers. Instead, we find that agglomeration by third-tier suppliers generates a countervailing force, making a location relatively unattractive. *J. Japanese Int. Economies* **34** (2014) 24–41. School of Economics, La Trobe University, Melbourne, VIC 3086, Australia; Keio Economic Observatory, Keio University, Tokyo, Japan; Graduate School of Economics, Tohoku University, Sendai, Japan.

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1. Introduction

The evidence that industries and firms agglomerate in particular locations is ubiquitous (e.g., Ellison et al., 2010). There is also now ample evidence that multinational enterprises (MNEs) agglomerate in particular locations in a host country (see Head et al., 1995). For example, Debaere et al. (2010) reported that 60% of South Korean MNEs in the United States have located their manufacturing plants in the state of California, and 75% of them have established new affiliates in four provinces along the Northeastern coast of China. Similar evidence is also found at a disaggregated geographical level in other host countries, such as France (Crozet et al., 2004), Portugal (Guimarães et al., 2000), and Italy (Roberto, 2004). While location decisions of MNEs are somewhat different from those indigenous firms, it is commonly found that locations with many MNE plants belonging to the same industry or to vertically related industries are more likely to attract subsequent entries of MNE plants of the same national origin (Smith and Florida, 1994; Head et al., 1995, 1999; Head and Ries, 1996; Belderbos and Carree, 2002; Chang et al., 2013).¹ This reflects the fact that the presence of MNE affiliates raises the probability of subsequent investment at the same location.

This paper investigates a new dimension of agglomeration effects of MNEs by considering *inter-firm* backward and forward linkages. Specifically, we examine the location decisions of Japanese manufacturing MNE start-ups across 22 Chinese provinces between 1995 and 2007.² We extend the idea that the presence of input–output (I–O) linkages of MNEs formed in a home country influences their co-location-cum-foreign direct investment (FDI) decisions in a host country. Moreover, the presence of inter-firm linked downstream or upstream affiliates draws further subsequent investment in particular regions due to cheaper access to existing suppliers and buyers.³ This idea is not entirely new. Previous studies have tried to capture forward and backward industry linkages using I–O tables of a host country (Amiti and Javorcik, 2008) or a home country (Debaere et al., 2010), industrial groupings such as Japanese *keiretsu* (Head et al., 1995, 1999; Belderbos and Carree, 2002; Blonigen et al., 2005), or financial dependence (Mayer et al., 2010). However, these studies only explored the agglomeration effects of an immediate industrial relationship (what we term here as ‘first-tier’ linkages). We go much further. By capitalising on a unique feature of Tokyo Shoko Research (TSR) database, we identify the co-location of the first, second, and third tiers of multinational suppliers and customers, based on actual transaction-based records of *inter-firm* linkages. In this paper, we ask the following questions: how pervasive are the agglomeration effects by MNEs beyond the first-tier linkages? Do these effects vary at different tiers of inter-firm agglomeration? How do these results compare with those obtained from standard agglomeration measures?

It is important to consider the multiple layers of inter-firm linkages in the literature pertaining to MNE location decisions for the following reasons. First, such consideration can provide a much richer interpretation of the agglomeration effects of MNEs. As discussed by Mayer et al. (2010), the standard agglomeration variable for the stock of MNE affiliates operating in the same industry in a location can be quite broad since it represents various localisation economies. Our analysis considers both inter-firm backward linkages—the focus of previous studies—as well as the ‘thickness’ of the forward linkages. We find that the latter effect exerts comparatively stronger agglomeration effects. To our

¹ Also, refer to Aruzo-Carod et al. (2010) for an extensive survey of empirical studies on location decisions of firms including MNEs.

² In our dataset, the total number of Japanese MNE affiliates in China accounts for around 40% of total Japanese FDI worldwide.

³ The importance of input–output (I–O) linkages in location choices of firms is highlighted by the New Economic Geography (NEG) models. Venables (1996) originally provided the theory of the interplay between vertically related industries and the forces of dispersion in the core-periphery economic structure. Subsequent work by Amiti (2005) considered vertically related industries under the conditions of various transportation costs and country asymmetry due to relative factor endowments. When industries are linked through an I–O structure, the downstream industry forms the market for upstream firms. To lower transportation costs, upstream firms are drawn to locations where there are relatively many downstream firms (backward linkages). Forward linkages suggest that a larger number of upstream firms located in one region can benefit downstream firms, which can obtain the intermediate inputs more cheaply by saving on transportation costs due to a large variety of differentiated inputs and more intense competition in upstream markets. These two vertical linkage effects motivate vertically related industries to cluster geographically.

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