Localization or Dispersion? Evidence from Interfirm Transactions in Japan

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Economic activities are concentrated in relatively narrow areas. Most of the economic activities in Japan are clustered in a few metropolitan employment areas (MEA) including Tokyo, which is the most concentrated region with more than a quarter of the country ’s total population.

Why do economic activities cluster in a limited number of locations? How large can a cluster become? Marshall (1890) addressed the first question and pointed to the externalities of industrial clusters, in which firms benefit from knowledge spillovers, labor pooling, and cost reduction and thus improve their productivities. These were labeled as “ Marshallian externalities, ”and many economists developed theoretical models on how these externalities create industrial clusters. For the second question, it has been evidenced that the distribution of city size is subject to the power law like other economic activities including firm size (Axtell, 2001).

A very important but often neglected question is how we measure industrial clusters. In many instances, numbers of firms located within certain areas are employed in order to gauge the extent of clusters. In contrast, studies including Duranton and Overman (2005) introduce a distance-based test for industrial clusters. They first identify geographical locations of all the manufacturing establishments in the UK, create all the possible pairs of two establishments, and then draw the distribution of inter-firm geographical distances between any pair of two establishments. If a distribution of an industry skews to the left more than others, the industry is more concentrated than others and we call this industry as “ localized. ” If a distribution skews to the right more than others, we call this industry as “ dispersed. ”

However, a serious shortcoming of their approach is the lack of information on actual interfirm relations. Duranton and Overman identify all the potential interfirm relationships between any two establishments in the country without providing any information which of these potential connections are actually active. Knowledge spillovers and cost reduction, which are important attributes of Marshallian externalities, do not occur among firms if their connections are fictitious.

In order to overcome these difficulties, we utilize a unique dataset of about 800,000 Japanese firms with information on actual interfirm transaction and ownership relationships. [1] First, we measure all the distances between any pair of two firms located in the country and examine the degree of localization and dispersion in comparison with the industry average. This is to evaluate the localization based on the potential interfirm connections. Second, we use the data on actual interfirm transactions in order to examine the degree of localization in comparison with the industry average. This is to evaluate the localization based on the actual interfirm connections. Furthermore, we examine which one of the two distributions,

[1]Saito et al.(2007) is one of very few previous studies using this dataset, in which they found that interfirm transaction relationships follow the power law.

the one based on potential transaction relationships and the one based on actual transaction relationships, is more localized than the other.

We first evaluate the localization of potential interfirm transactions by calculating distance distributions. Our methodology is as follows: For each firm i in two-digit industry r, we identify an industry s to which the firm i 's transaction partner firm j belongs. Then we assume that all of the firms $k \in \{1, \ldots, N_s\}$ in industry s are firm i's potential partners, and calculate distances d_{ik} for all $k \in \{1, \ldots, N_s\}$. Summing up all the distance distributions for each firm $i \in \{1, \ldots, N_r\}$, we obtain a distance distribution of potential transactions of industry r (potential distribution).

Next, we examine the two-digit industry-level localization of actual interfirm transactions. At first, we choose an industry $r \in \{1, \ldots, R\}$. For all firms $i \in \{1, \ldots, N_r\}$ in the industry r , we calculate the distance, d_{ij}, between firm i and its main transaction partner firm $j \in \{1, \ldots, N\}$, where N_r represents the number of firms in industry r, and N represents the total number of firms in the entire industry. Then, we obtain N_r distances on actual interfirm transactions in industry r. [2]

Distributions of the potential and actual transaction relationship distances in selected industries are presented in Figures 1 (textile industry) and 2 (electric device industry). A bold

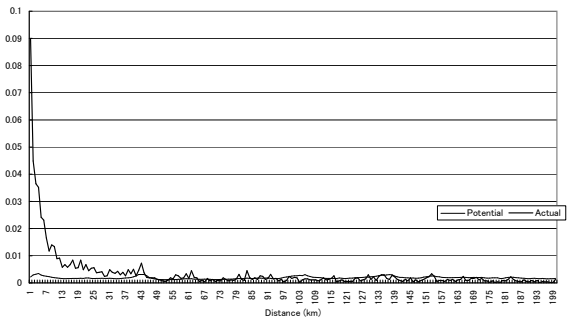

Figure 1: Textile industry

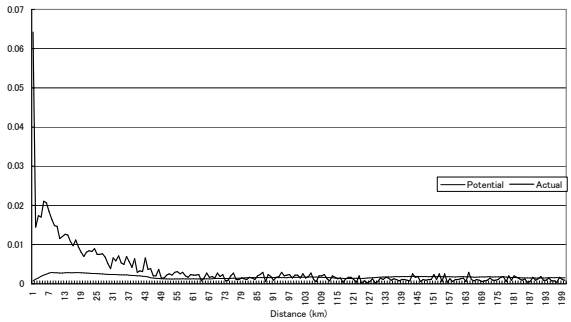

Figure 2: Electric device industry

line in each figure represents the actual distribution of interfirm transaction distances. Most of the actual interfirm transactions are observed in the range between 0 and 50 kilometers. In stark contrast with the actual transaction distances, distributions of potential transaction distances are extremely dispersed rather than localized. A thin line in each figure represents the potential distributions of interfirm transactions, which is much flatter than the bold line. Hence, we evidence that actual interfirm transactions are much more localized than potential transactions.

Keywords

Localization; Interfirm transactions; Marshallian externality; Economic geography

References

[1] Axtell, R. (2001), Zipf Distribution of US Firm Sizes, *Science* 293, 1818-1820.

[2] Duranton, G., H. Overman (2005), Testing for Localization Using Micro-Geographic Data, *The Review of Economic Studies* 72, 1077-1106.

[3] Marshall, A. (1890) *Principles of Economics*, Macmillan, London.

[4] Saito, U.Y., T. Watanabe, and M. Iwamura (2007), Do Larger Firms Have More Interfirm Relationships?, *Phisica A* 383, 158-163.

[2] A possible extension is to calculate indirect interfirm distance between firms that are indirectly connected via their common transaction partner.