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The Impact of Market Size on Firm Selection*

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Abstract

This study analyzes how local market size affects the probabilities of firm exit by focusing on single-establishment firms in the service sector. The novelty of this study is that it identifies geographic ranges of local markets using the matched data of geocoded firm location and micro-geographic data with detailed firm exit information of all Japanese firms. The results reveal that the probability of firm exit increases as local market size increases within a narrow range (3 km radius) in the service sector. We also find that small firms tend to leave the market. Our results suggest that firm selection is stronger in larger markets, where larger firms are more likely to survive.

JEL classification: L11, R10, R11, R12, R30

Keywords: Market size, Firm selection, Service sector, Micro-geographic data

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1. Introduction

Firm selection has gained attention in recent literature on economic geography and urban economics. Traditionally, this literature has investigated agglomeration economies. Firms in agglomerations benefit from a productivity premium due to Marshallian externality (e.g., Ciccone and Hall, 1996; Rosenthal and Strange, 2001; Ciccone, 2002; Henderson, 2003) and have a positive correlation with firm size (Holmes and Stevens, 2004). Recent theoretical and empirical literature investigates the selection mechanism through pro-competitive effects in the firm heterogeneity model with endogenous price-cost markup (e.g., Syverson, 2004; Melitz and Ottaviano, 2008; Combes et al., 2012). In these models, tougher market competition in larger markets leads to a stronger selection mechanism, that is, high-productivity firms tend to survive in large markets and low-productivity firms exit.

This study identifies which geographic range of the local market area significantly affects firm exit, focusing on single-establishment firms in the service sector. Unlike manufactured goods, services are non-tradable and non-storable. Services, such as restaurants, cafés, small retailers/shops, medical services, and education are locally supplied and demanded within a small district. Service firms tend to be largely influenced by the neighborhood and simultaneously face competition from neighboring firms. Retailers' locational patterns have been studied in the location theory literature (e.g., Hotelling, 1929; d'Aspremont et al., 1979). Marketing geography literature also investigates the locations of shopping malls, hotels, and retailers (e.g., Brown, 1989; Dawson, 2012; Davies, 2012). To control for the strategic decision of firm location across regions, this study excludes firms with multiple establishments.

Our study fills gaps in the empirical literature on firm selection in terms of small and micro firms. Statistical surveys should be exhaustive to investigate firm selection. Because small and micro firms tend to have low-productivity, excluding them from statistical surveys does not allow correct identification of firm selection (see also Accetturo et al., 2018). Nevertheless, the data used in the literature often do not cover all firms, particularly small and micro firms. For example, Combes et al. (2012, p. 2561) used "all firms with six employees or more," and Accetturo et al. (2018) dropped firms with less than five employees owing to low data quality for smaller firms. There is a lack of research on firm selection for small and micro firms.

Our study exploits firm-level microdata taken from exhaustive Japanese surveys. Importantly, the exit information is not self-reported. Our data contain highly credible information on firm exit directly surveyed by census enumerators. One of the purposes of economic censuses conducted by the Japanese government, such as the Establishment and Enterprise Census (Ministry of Internal Affairs and Communication, (MIC)), Economic Censuses for Business Frame (MIC), and Economic Censuses for Business Activity (MIC and Ministry of Economy, Trade, and Industry, (METI)), is to construct population lists of firms and establishments for other sample surveys. For this reason, the national or local governments employed census enumerators to visit establishments and firms (especially small and micro firms) in each survey area to distribute and collect questionnaires and confirm whether they were continuing to operate or had exited. This information was then compared with the list of establishments and firms from the previous survey.

The contribution of our study is that it identifies the impacts of local market size on firm exit using detailed information of Japanese firms. In the empirical literature on urban economics, Combes et al. (2012) investigated spatial productivity differences by distinguishing between the selection and agglomeration.[1] Their identification approach is based on the detection of the stronger left-truncation of productivity distribution in larger markets. In turn, our detailed information on firm exit enables us to directly estimate how market size affects firms' exit decision.

A novel approach of our study is to identify a geographic range of the local market area using the matched data of the geocoded location of all firms and micro-geographic data (grid square statistics at the approximately 1 km by 1 km level). Firm selection in the theoretical and empirical literature on urban economics mainly focuses on the manufacturing sector. However, it is not easy to define the geographical range of markets because manufacturing goods are tradable. Firms export their products to distant markets and market competition arises from all such other markets. Thus, the relationship between pro-competitive effects (measured by aggregate markups) and market size in consumption location is not clear (Behrens et al., 2014b). Combes et al. (2012) define market range based on employment area and urban area. To overcome this issue, Accetturo et al. (2018) additionally uses market potentials, which are calculated as the distance weighted sum of the city's population.

Our study further contributes to the existing literature by comparing the differences in firm exit between service and manufacturing sectors. In the existing literature, pro-competitive effects

[1] Arimoto et al. (2014) use Japanese historical data of silk factories and identify some selection mechanism. Kondo (2016) examines the current Japanese manufacturing sector. Accentturo et al. (2018) test selection using Italian manufacturing firm data. Kondo (2016) and Accentturo et al. (2018) consider market potential as well as local market size.

are the center of the explanation for the stronger selection in larger markets. However, other factors also explain such selection in larger markets. For example, Nocke (2006) provides an extended model in which fixed operating costs are proportional to the market size. As an extension of Bagwell (2007), Arkolakis (2010), and Akerman et al. (2013), service firms are assumed to invest advertisement costs as fixed operating costs because firms must persuade consumers to visit their locations due to non-tradability of services. Although it is difficult to distinguish each factor from aggregate effects, this study attempts to investigate each factor by comparing service and manufacturing sectors. Service firms locally face market competition due to non-tradability and non-storability of services, whereas manufacturing firms do not necessarily face local competition around their production locations because the manufactured goods are tradable. However, locating in large markets commonly increases the fixed operating costs for both sectors. Thus, it is argued that exit decisions of service firms tend to be more sensitive to local market factors through both local market competition and fixed operating costs than those of manufacturing firms.

We find that the size of local markets within a narrow range (i.e., within a 3 km radius) significantly increases the probability of exit. The quantitative impacts on firm exit are highly different across regions. The impacts of local market size on firm exit in the Greater Tokyo area are twice as large as those in rural areas. Industrial differences are also observed. We find that service firms show higher probability of exit than manufacturing firms in the same location, which suggests that both local market competition and fixed operating costs in large markets affect firm selection. Furthermore, we find that larger service firms are likely to survive in larger markets and small service firms leave the market, suggesting that firm selection plays a key role in explaining the spatial sorting of firms.[2]

The rest of this paper is organized as follows. Section 2 outlines the empirical strategy. Section 3 describes firm-level microdata and micro-geographic data. Section 4 presents estimation results. Finally, concluding remarks are provided in section 5.

2. Empirical Strategy

This study investigates whether local market size increases the probability of exit by directly examining firm exit behavior, rather than detecting the truncation of productivity distribution

[2] Stronger selection in larger markets results in the spatial sorting of firms without relocation. In the literature on new economic geography, models of spatial sorting of firms deal with firms' endogenous location choice (e.g., Baldwin and Okubo, 2006; Okubo et al., 2010; Forslid and Okubo, 2014; Behrens et al., 2014a).

based on the theoretical prediction (e.g., Combes et al., 2012). A novelty of this study is that it adopts a distance-based approach to measure the local market area that significantly affects firm exit. Introducing local market size variables into the regression, we estimate the following linear probability model of firm exit:[3]

$$D_{i,t}^{\mathrm{Exit}} = \alpha_1 \log\left(M_{i,t-1}^{[0\mathrm{km},3\mathrm{km})}\right) + \alpha_2 \log\left(M_{i,t-1}^{[3\mathrm{km},6\mathrm{km})}\right) + \alpha_3 \log\left(M_{i,t-1}^{[6\mathrm{km},9\mathrm{km})}\right) + \boldsymbol{X}_{i,t-1}\boldsymbol{\beta} + u_{i,t}, \quad (1)$$

where $D_{i,t}^{\mathrm{Exit}}$ is the dummy variable of firm exit that takes the value 1 if firm i exits between the previous survey year $t-1$ and the current survey year t and 0 if firm i remains in market in year t, $M_{i,t-1}^{[0\mathrm{km},3\mathrm{km})}$ is the local market size variable measured by neighboring employment, except workers employed in firm i within a 3 km radius from the location of firm i (similarly, 3 km intervals up to a radius of 9 km are introduced), $\boldsymbol{X}_{i,t-1}$ is a vector of control variables for firm characteristics (employment size, share of female workers, share of part-time workers, dummy of sole proprietorship business, two-digit industry dummy, and prefecture dummy), and $u_{i,t}$ is an error term.

Parameters α_1, α_2, and α_3 capture the average effects of local market size on the probability of exit. Although one may consider shorter or longer intervals, we choose 3 km intervals to construct a geographic range of local markets. One reason for this is the accuracy of geocoding. If we use smaller intervals, regression results are sensitive to the results of geocoded firm location. When we use the centroid of polygons at the block (*Banchi*) level, the exact location of some firms may contain an error of up to 1 km. If we use longer distances, we cannot examine the competition within the narrow range of the market. For this reason, we choose a 3 km radius as an interval, which implies approximately 30 minutes walking distance.

An interpretation of the coefficients of local market size variables is related to the cutoff point for operation in the firm selection model (e.g., Melitz, 2003). In particular, our regression specification empirically reveals the heterogeneous threshold for operation cutoff point in terms of local market size. Suppose that firms with the same level of productivity are located in large and small markets. If large markets show higher thresholds of operation cutoff, the probability of exit increases in large markets.

Importantly, the cutoff point for operation depends not only on the pro-competitive effects in

[3] We use the linear probability model as a baseline estimation because the qualitative results are the same as those from the probit model. Estimation results obtained from the probit model are available in the Online Appendix.

endogenous markup models (e.g., Melitz and Ottaviano, 2008), but also on different fixed operating costs across markets (e.g., Nocke, 2006). Although it is difficult to disentangle each factor from total effects, we highlight each factor by comparing service and manufacturing sectors. Manufacturing firms do not necessarily face local competition around their production locations because the manufactured goods are tradable. However, locating in large markets increases the fixed operating costs, such as land rent. Therefore, the magnitude of the effect of local market size on exit is expected to be larger for service firms as they are affected by both tougher competition and higher fixed operating cost factors in larger cities.

This regression (1) is further extended to capture heterogeneity in terms of organization type, region, and industry. The heterogeneity in organization type compares sole proprietorship and corporations. In addition, the regression is run by region (1. Hokkaido and Tohoku, 2. North-Kanto, 3. South-Kanto, 4. Hokuriku and Koshin, 5. Tokai, 6. Kansai, 7. Chugoku, 8. Shikoku, 9. Kyushu and Okinawa) and prefecture (47 prefectures in Japan). Similarly, the entire sample is divided according to two-digit level of the Japanese Standard Industrial Classification (JSIC), which includes approximately 90 sectors.

3. Data

3.1. Firm Exit and Firm Characteristics

This study uses microdata (questionnaire information) of firms, which are taken from the 2004 and 2006 Establishment and Enterprise Censuses (MIC), the 2009 and 2014 Economic Censuses for Business Frame (MIC), and the 2012 and 2016 Economic Censuses for Business Activity (MIC and METI) in Japan. These censuses are conducted every two or three years and are exhaustive. Thus, they cover all firms located in Japan except for those in the following industries: sole proprietorship in agriculture, forestry, and fisheries; homemaking services; and foreign governments and international agencies.

This study exploits the detailed information on the exit of all single-establishment firms including small and micro firms. Previous studies regarding firm selection do not necessarily cover such firms in a wide range of industries. For example, Combes et al. (2012, p. 2561) use "all firms with six employees or more in all manufacturing sectors and in business services, with the exception of finance and insurance." However, the current study focuses on the exit of all single-establishment firms in both manufacturing and service industries. Note again that firms with multiple establishments are excluded from the analysis to control for the strategic decision of firm location across regions. [4]

One of the purposes of the aforementioned census is to construct population lists of firms and establishments for other sample surveys conducted by the government. The census uses two survey methods: survey by an enumerator and survey by direct mailing. Census enumerators visit establishments and firms and confirm exit in each area by comparing the information to the previous survey list of establishments and firms.[5] Direct mailing is designed for large firms with multiple establishments and single-establishment firms, such as holding company, property investment company, a company with capital of 100 million yen or more.

An advantage of the data on firm exit is that it includes detailed information on small and micro enterprises obtained by census enumerators, not self-reported. The exit of sole proprietorship firms is not frequently captured since they do not necessary register at the Legal Affairs Bureau of Japan. This is a crucial aspect because theories in the literature predict that low productivity, small firms tend to exit, which is difficult to survey in reality. Our study solves this issue by using Japanese data based on direct survey by census enumerators. The exit of single-establishment firms is defined when census enumerators confirm a firm has shut down or disappeared from its location reported in the previous survey. For example, a new firm may operate in a space where a different firm existed before. In this case, this (previous) firm is recorded as having left the market.

This study focuses on single-establishment firms in the service sector to capture pure effects of local market size on firm exit. A comparison with the manufacturing sector is also important to highlight the characteristics of the non-tradable service sector. Manufacturing firms do not necessarily face competition in production location because the goods that they produce are tradable. However, locating in densely populated areas increases the payment of land rent, which is also a factor that promotes firm exit.

The control variables of firm characteristics include employment size, share of female workers,

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[4] Single-establishment firms occupy a large portion of all firms in Japan. According to the 2014 Economic Census for Business Frame (MIC), the number of all establishments is 5,427,665, and the number of all firms is 4,098,284 (i.e., multiple establishments are aggregated). A breakdown of these numbers by organizational type is also available. The share of single-establishment corporations reaches 83.3% (= 1,457,677/1,750,071). The share of single-establishment sole proprietorship firms reaches 98.8% (= 2,065,519/2,089,716).

[5] One disadvantage is that, except for data from the Economic Censuses for Business Activity, the data contain no information on business activity such as sales and costs.

share of part-time workers, dummy of sole proprietorship, two-digit level of industrial classification dummy, and prefecture dummy. JSIC has changed from 2004 to 2016 twice, and it is not easy to integrate these at the two-digit industry level throughout the entire period. Thus, this study uses JSIC defined in each survey year. The list of JSIC (Rev. 11; October, 2013) and prefectures in Japan are provided in Appendix A. Information for other survey years is provided in the Online Appendix.

3.2. Local Market Size Variable

A novel approach for the local market size variable is to match geocoded firm location with micro-geographic data. Conventionally, regional variables are measured in administrative units in the literature. However, the geographical range of administrative unit differs within the country, which makes it difficult to identify the geographical range of markets. The literature on international trade considers markets at the national level due to tariffs (e.g., Head and Mayer, 2004). However, services are non-tradable, and the geographical range of market area is considered much smaller than standard divisions of administrative units, such as municipality and county. Thus, this study proposes a more flexible geographical unit of local markets by utilizing a geocoding technique and micro-geographic data (grid square statistics).

Following the urban economics literature (e.g., Combes et al., 2012), local market size is measured by local employment herein. First, we identify the geographic location of all single-establishment firms by geocoding.[6] Location information (i.e., longitude and latitude) is obtained by the Address Geocoding of ArcGIS, which can be conducted offline (requirement for confidential microdata). For the cases of firms with unrecognized addresses, we use location information obtained from the shape files at the survey unit area level of the 2006 Establishment and Enterprise Census and the 2009 and 2014 Economic Censuses for Business Frame. We then exclude firms for which no locational information is available.

The next step is to match the location information with the mesh code of the Grid Square Statistics (Ministry of Internal Affairs and Communications) at the approximately 1 km by 1 km level.[7] Figure 1 shows how local market size variables are constructed with 3 km intervals up

[6] Location information (longitude and latitude) of each firm is obtained by the Address Geocoding of ArcGIS and from the shape files at the survey unit area level of the Establishment and Enterprise Census and the Economic Census for Business Frame.

[7] Grid Square Statistics based on the 2016 Economic Census for Business Activity (Statistics Bureau, Ministry of Internal Affairs and Communications) were not officially available (currently available). This study originally

to a radius of 9 km (i.e., 0–3 km, 3–6 km, and 6–9 km), focusing on the case of Tokyo Station in Chiyoda-ku, Tokyo.[8] The marker is depicted on the centroid of the grid where the Tokyo Station is located. Local market size is measured as the total employment within each interval radius. Note that the firm's own employment is not included within 3 km area. By introducing three variables for local market size within 0–3 km, 3–6 km, and 6–9 km into the regression, we identify which range of market area strongly affects the probability of exit.

[Figure 1]

3.3. Descriptive Statistics

Figure 2 compares distributions of geographical locations based on the local market size within 3 km between firms that exited and incumbent firms. Visually, firms tend to exit in larger markets (i.e., the solid red line is right-shifted). This tendency is commonly observed from 2006 to 2016.

Tables 1 and 2 present the descriptive statistics of variables in the service and manufacturing sector, respectively. This study covers more than two or three million single-establishment firms in the service sector and approximately 400,000 single-establishment firms in the manufacturing sector including small and micro enterprises. Such firms include a large number of sole proprietorship firms, and their exit decision may be different from that of corporations. To observe differences between them, the upper and lower parts of Tables 1 and 2 show the descriptive statistics of variables for single-establishment firms including and without sole proprietorship firms, respectively.

[Figure 2 and Tables 1–2]

4. Estimation Results

4.1. Stronger Selection in Larger Markets

Tables 3 and 4 present estimation results of the linear probability model on firm exit in regression (1) for the service and manufacturing sectors, respectively. The estimation results with and without firm characteristics are provided to observe how endogenous location choice is

aggregates geocoded data of all firms using the mesh code of the 1 km by 1 km level.

[8] The neighboring employment within d km is calculated by the "spgen" command developed by Kondo (2017).

correlated with firm characteristics. [9] Figure 3 visually summarizes estimation results for impacts of local market size on firm exit in Columns (2), (4), (6), (8), and (10) of Tables 3 and 4. We mainly discuss estimation results based on Figure 3.

We find that market size within a 3 km radius has significant impacts on firm exit in both service and manufacturing sectors. However, the impacts of market size within 3–6 km and 6–9 km are not significant at the 5 % level. It is suggested that a narrow range of localization affects the probability of exit.

An interesting finding is that manufacturing firms also show a higher probability of exit although they do not face market competition in local markets around the production location, which suggests that different factors from market competition affect firm exit behavior. In the service sector, tougher competition in larger markets is an important factor. On the other hand, this is unlikely in the manufacturing sector because manufactured goods are tradable across markets, regardless of their production location. Nocke (2006) suggested a possible theoretical explanation that firm exit is related with fixed operating costs. If fixed operating costs for production are higher in larger markets, they decrease net profit, resulting in a higher probability of exit. As this mechanism also affects service firms, it is assumed that the estimated coefficients in the service sector tend to be larger than those in the manufacturing sector.

Firm characteristics also have sizable impacts on the probability of exit, as shown in Tables 3 and 4. Firm size and the share of female workers are significantly negative regarding the probability of exit, and the share of part-time workers is significantly positive for the probability of exit. These findings suggest that larger firms with more male workers and more full-time workers tend to survive in larger markets, which is consistent with Melitz and Ottaviano's (2008) theoretical prediction that tougher competition in larger markets increases the selection mechanism and productive firms can survive in larger markets. In addition, our findings support those of Cabral and Mata (2003), who find that small firms face high risk of exit due to financial constraints.

[Tables 3–4 and Figure 3]

[9] The comparison of estimation results with and without firm characteristics suggests firm sorting in terms of market size. The estimate of coefficient parameters increases when firm characteristics are controlled for, meaning that firms with lower probability of exit are located in larger markets.

4.2. Organizational Heterogeneity in Firm Selection

Table 5 presents estimation results of regression (1) using the sample without sole proprietorship firms in service and manufacturing sectors. That is, these regressions focus on a sample of corporations. As earlier, we find that market size within a 3 km radius has significant impacts on firm exit in both service and manufacturing sectors and the impacts of market size within 3–6 km and 6–9 km are not significant at the 5% level. In addition, service firms face a higher probability of exit than manufacturing firms.

A notable finding is that the coefficient estimates of local market size tend to be larger than those of the full sample estimation results in Tables 3 and 4. For example, as shown in Column (8) of Table 3, the estimated coefficient within a 3 km radius from the full sample is 0.0117, but in Column (4) of Table 5, that from the sample of corporations is 0.0152 in the service sector. This tendency is also observed in the manufacturing sector. These findings suggest that corporations' exit decision is more related with local market size factors than that of sole proprietorship firms. The latter are less sensitive to local market size factors if they decide to exit from the market.

[Table 5]

4.3. Regional Heterogeneity in Firm Selection

Figure 4 shows heterogeneous impacts of local market size on firm exit across regions in the service sector. The regional division and prefecture lists are provided in Appendix A. Due to limitations of space, only estimation results in 2014 are shown here, and estimation results in other periods are provided in the Online Appendix.

A distinct feature is observed for the South-Kanto region (Greater Tokyo area) and Kansai (Greater Osaka area). The Greater Tokyo and Osaka areas show notably larger impacts of local market size on firm exit than other regions. As before, local market size within a 3 km radius has large impacts on firm exit. In turn, the Hokuriku, Koshin, and Shikoku regions (rural regions) show that a wider market area up to 6 km has significant impacts on firm exit, which suggests that the geographical range of local markets differs between urban and rural regions.

Figure 5 reports estimation results by prefecture in 2014, in which prefecture numbers are shown (see Appendix A). As seen at the regional level, urban prefectures, such as Tokyo (13), Aichi (23), and Osaka (27), show larger impacts of local market size on firm exit. These findings complement theoretical frameworks of firm selection in the literature. For example, Nocke (2006) argues that fixed operating costs are proportional to market size. Melitz and Ottaviano (2008) demonstrate that competition is tougher in larger markets. Our findings reveal the cutoff point for operation increases in local market size within a narrow range.

[Figure 4–5]

4.4. Industrial Heterogeneity in Firm Selection

Figures 6 and 7 show the heterogeneous impacts of local market size on firm exit across the two-digit level of industrial classifications in the service and manufacturing industries in 2014 (see Appendix A for industrial classification). Estimation results in other periods are provided in the Online Appendix. The confidence interval is not drawn for visibility purpose because some sectors show large standard errors. Instead, two types of the markers (solid or hollow circle) show whether the estimates are statistically significant at the 5% level or not.

The distinct feature is that local market size within a 3 km radius affects a firm's exit in almost all sectors (both service and manufacturing sectors), and the magnitudes of point estimates differ across sectors. On the other hand, coefficient estimates within 3–6 km and 6–9 km are not statistically significant except for several retail and wholesale industries (e.g., 54. Wholesale Trade (Machinery and Equipment); 58. Retail Trade (Food and Beverage); 60. Miscellaneous Retail Trade). The comparison between service and manufacturing sectors reveals that service firms are faced with higher competition within quite geographically localized markets, not only higher fixed operating costs in large markets.

Our estimation results indicate that Communication (37), Services Incidental to Internet (40), Non-deposit Money Corporations, including Lending and Credit Card Business (64), Financial Products Transaction Sealers and Futures Commodity Transaction Dealers (65), and Public Health and Hygiene (84) show larger magnitudes of local market size within a 3 km radius among two-digit service industries.

[Figure 6–7]

5. Concluding Remarks

This study analyzed how local market size affects firm exit by focusing on single-establishment firms in the service sector. Firms in the service sector face geographically localized markets because services are generally non-tradable and non-storable. A key research question is the extent to which the geographic range of local markets affects firm exit; however, this has not been revealed in the literature despite advanced theoretical studies. Bridging the gap between theory and empirics, the current study offers new evidence on local market size and firm exit using the matched data of comprehensive Japanese firm data with geocoded addresses and micro-geographic data.

A major finding of this study is that the probability of firm exit is largely affected by local market size within a 3 km radius from the location of the firm. These quantitative impacts are highly varied across regional markets. The impacts of local market size on firm exit in Tokyo are twice as large as those in rural areas, which suggests that firms located in larger urban markets face not only tougher market competition but also higher fixed operating costs. Our study also finds evidence that firm selection leads to spatial sorting of large firms. Larger firms are likely to survive in larger markets and small firms tend to leave the market.

Our estimation results emphasize the importance of direct tests examining firm exit using exhaustive surveys to determine stronger selection in larger markets. Previous studies find no evidence of stronger selection in larger cities in terms of the productivity distribution (e.g., Combes et al., 2012; Kondo, 2016; Accentturo et al., 2018). An important implication is that an identification of firm selection is more sensitive to data than the methods used in previous studies. Another different approach to firm selection and market size is to test how markups differ across markets because these partly reflect pro-competitive effects in markets. For example, estimating establishment-level markups, Kondo (2018) finds tougher competition in large markets. Future research on firm selection should pay particular attention to the identification approach and data.

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Appendix A Prefecture an Industry Codes

Table A.1 presents prefecture codes and regional classifications in Japan. Tables A.2 and A.3 present the Japan Standard Industrial Classification (JSIC) for manufacturing and service sectors, respectively. The JSIC (Rev. 11; October, 2013) is used in 2014.

[Tables A.1–A.3]

Table 1 Descriptive Statistics for Firm Exit in the Service Sector

	2006 (2004)			2009 (2006)			2012 (2009)			2014 (2012)			2016 (2014)		
Variables	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD
Single-Establishment Firms															
Dummy of Exit	2,455,759	0.14	0.34	2,411,018	0.16	0.37	3,255,173	0.16	0.37	2,944,586	0.15	0.35	2,910,220	0.13	0.33
Log(Neighboring Employment within 3 km)	2,455,759	10.40	1.77	2,411,018	10.39	1.79	3,255,173	10.50	1.80	2,944,586	10.37	1.80	2,910,220	10.49	1.79
Log(Neighboring Employment within 3–6 km)	2,455,759	10.90	1.98	2,411,018	10.90	1.98	3,255,173	11.04	1.97	2,944,586	10.93	1.97	2,910,220	11.04	1.96
Log(Neighboring Employment within 6–9 km)	2,455,759	11.01	1.99	2,411,018	11.01	1.99	3,255,173	11.16	1.99	2,944,586	11.05	1.99	2,910,220	11.16	1.98
Log(Employment)	2,455,759	0.96	0.88	2,411,018	0.96	0.88	3,255,173	1.03	0.92	2,944,586	1.05	0.93	2,910,220	1.03	0.93
Share of Female Workers	2,455,759	0.52	0.36	2,411,018	0.52	0.36	3,255,173	0.51	0.35	2,944,586	0.51	0.35	2,910,220	0.51	0.36
Share of Part-Time Workers	2,455,759	0.13	0.24	2,411,018	0.12	0.24	3,255,173	0.13	0.24	2,944,586	0.14	0.25	2,910,220	0.15	0.26
Dummy of Sole Proprietorship Business	2,455,759	0.69	0.46	2,411,018	0.68	0.47	3,255,173	0.63	0.48	2,944,586	0.62	0.49	2,910,220	0.61	0.49
Single-Establishment Firms without Sole Proprietorship Firms															
Dummy of Exit	572,708	0.14	0.34	582,382	0.16	0.37	987,627	0.16	0.37	854,512	0.14	0.35	894,018	0.12	0.33
Log(Neighboring Employment within 3 km)	572,708	10.88	1.77	582,382	10.88	1.79	987,627	10.94	1.74	854,512	10.80	1.75	894,018	10.88	1.75
Log(Neighboring Employment within 3–6 km)	572,708	11.39	1.97	582,382	11.41	1.97	987,627	11.53	1.89	854,512	11.40	1.90	894,018	11.49	1.90
Log(Neighboring Employment within 6–9 km)	572,708	11.46	1.99	582,382	11.48	1.99	987,627	11.62	1.92	854,512	11.49	1.94	894,018	11.58	1.94
Log(Employment)	572,708	1.61	0.90	582,382	1.60	0.92	987,627	1.50	0.97	854,512	1.52	1.00	894,018	1.49	0.98
Share of Female Workers	572,708	0.41	0.28	582,382	0.40	0.28	987,627	0.41	0.29	854,512	0.42	0.30	894,018	0.41	0.30
Share of Part-Time Workers	572,708	0.16	0.24	582,382	0.16	0.24	987,627	0.16	0.25	854,512	0.17	0.26	894,018	0.18	0.27
Log(Capital)	572,708	6.41	0.86	582,382	6.42	0.90	987,627	6.27	0.98	854,512	6.29	1.00	894,018	6.23	1.07

Note: The upper part of the table presents the descriptive statistics of variables for single-establishment firms. The lower part presents the descriptive statistics for single-establishment firms without sole proprietorship firms. Firm exit is observed between the year of the current survey and year of the previous survey (year in parentheses). The explanatory variables used in regression are from the year of the previous survey.

Table 2 Descriptive Statistics for Firm Exit in the Manufacturing Sector

	2006 (2004)			2009 (2006)			2012 (2009)			2014 (2012)			2016 (2014)		
Variables	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD
	Single-Establishment Firms														
Dummy of Exit	436,086	0.13	0.33	405,752	0.17	0.37	404,179	0.15	0.36	388,140	0.13	0.34	370,539	0.11	0.32
Log(Neighboring Employment within 3 km)	436,086	10.16	1.80	405,752	10.13	1.81	404,179	10.21	1.81	388,140	10.03	1.80	370,539	10.09	1.81
Log(Neighboring Employment within 3–6 km)	436,086	10.98	1.93	405,752	10.96	1.93	404,179	11.05	1.92	388,140	10.87	1.92	370,539	10.93	1.92
Log(Neighboring Employment within 6–9 km)	436,086	11.22	1.94	405,752	11.20	1.94	404,179	11.28	1.94	388,140	11.12	1.94	370,539	11.18	1.94
Log(Employment)	436,086	1.46	1.02	405,752	1.48	1.04	404,179	1.45	1.03	388,140	1.53	1.06	370,539	1.48	1.06
Share of Female Workers	436,086	0.37	0.27	405,752	0.37	0.27	404,179	0.36	0.27	388,140	0.36	0.27	370,539	0.35	0.27
Share of Part-Time Workers	436,086	0.14	0.23	405,752	0.14	0.22	404,179	0.13	0.22	388,140	0.15	0.23	370,539	0.15	0.23
Dummy of Sole Proprietorship Business	436,086	0.49	0.50	405,752	0.47	0.50	404,179	0.42	0.49	388,140	0.40	0.49	370,539	0.39	0.49
	Single-Establishment Firms without Sole Proprietorship Firms														
Dummy of Exit	221,088	0.10	0.30	213,062	0.13	0.34	231,247	0.13	0.33	227,872	0.10	0.30	220,441	0.09	0.29
Log(Neighboring Employment within 3 km)	221,088	10.39	1.71	213,062	10.36	1.72	231,247	10.44	1.72	227,872	10.22	1.72	220,441	10.30	1.72
Log(Neighboring Employment within 3–6 km)	221,088	11.22	1.84	213,062	11.20	1.84	231,247	11.29	1.83	227,872	11.09	1.83	220,441	11.17	1.83
Log(Neighboring Employment within 6–9 km)	221,088	11.44	1.87	213,062	11.43	1.88	231,247	11.52	1.86	227,872	11.33	1.86	220,441	11.41	1.86
Log(Employment)	221,088	2.03	0.99	213,062	2.04	1.00	231,247	1.91	1.01	227,872	1.98	1.04	220,441	1.93	1.04
Share of Female Workers	221,088	0.37	0.25	213,062	0.37	0.24	231,247	0.35	0.25	227,872	0.36	0.25	220,441	0.35	0.25
Share of Part-Time Workers	221,088	0.18	0.23	213,062	0.18	0.23	231,247	0.16	0.23	227,872	0.18	0.24	220,441	0.19	0.24
Log(Capital)	221,088	6.53	0.86	213,062	6.54	0.89	231,247	6.48	0.92	227,872	6.53	1.00	220,441	6.50	0.99

Note: The upper part of the table shows the descriptive statistics of variables for single-establishment firms. The lower part of the table shows the descriptive statistics for single-establishment firms without sole proprietorship firms. Firm exit is observed between the year the current survey and year of previous survey (year in the parentheses). The explanatory variables used in regression are as of year of the previous survey.

Table 3 Estimation Results of Linear Probability Model for Firm Exit in Service Sector

Variables	Dependent Variable: Dummy of Exit (1: Exit, 0: Incumbent)									
	2006 (2004)		2009 (2006)		2012 (2009)		2014 (2012)		2016 (2014)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log(Neighboring Employment within 3 km)	0.0118***	0.0134***	0.0109***	0.0130***	0.0110***	0.0127***	0.0102***	0.0117***	0.0068***	0.0080***
	(0.0027)	(0.0027)	(0.0029)	(0.0029)	(0.0027)	(0.0026)	(0.0022)	(0.0020)	(0.0015)	(0.0014)
Log(Neighboring Employment within 3–6 km)	−0.0007	−0.0012	0.0010	0.0005	−0.0016	−0.0019	0.0000	−0.0002	0.0002	0.0001
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0012)	(0.0012)	(0.0009)	(0.0010)	(0.0009)	(0.0009)
Log(Neighboring Employment within 6–9 km)	0.0007	0.0008	−0.0011	−0.0009	−0.0007	−0.0007	0.0005	0.0004	0.0002	0.0001
	(0.0009)	(0.0009)	(0.0010)	(0.0010)	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0004)	(0.0004)
Log(Employment)		−0.0370***		−0.0498***		−0.0493***		−0.0390***		−0.0399***
		(0.0033)		(0.0043)		(0.0021)		(0.0018)		(0.0015)
Share of Female Workers		−0.0150***		−0.0193***		−0.0120***		−0.0109***		−0.0082**
		(0.0039)		(0.0044)		(0.0046)		(0.0041)		(0.0041)
Share of Part-Time Workers		0.0507***		0.0557***		0.0470***		0.0316***		0.0339***
		(0.0084)		(0.0111)		(0.0100)		(0.0060)		(0.0081)
Dummy of Sole Proprietorship Business		−0.0036		−0.0090		−0.0227***		−0.0107		−0.0214***
		(0.0083)		(0.0087)		(0.0083)		(0.0074)		(0.0061)
Prefecture and Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	2,455,759	2,455,759	2,411,018	2,411,018	3,255,173	3,255,173	2,944,586	2,944,586	2,910,220	2,910,220
Adjusted R-Squared	0.0299	0.0356	0.0293	0.0382	0.0197	0.0288	0.0169	0.0236	0.0123	0.0196

Note: Heteroskedasticity-consistent standard errors clustered at the two-digit industrial classification level are in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Table 4 Estimation Results of Linear Probability Model for Firm Exit in Manufacturing Sector

Variables	Dependent Variable: Dummy of Exit (1: Exit, 0: Incumbent)									
	2006 (2004)		2009 (2006)		2012 (2009)		2014 (2012)		2016 (2014)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log(Neighboring Employment within 3 km)	0.0049***	0.0046***	0.0052***	0.0052***	0.0073***	0.0064***	0.0058***	0.0057***	0.0056***	0.0047***
	(0.0014)	(0.0013)	(0.0016)	(0.0016)	(0.0017)	(0.0016)	(0.0010)	(0.0008)	(0.0012)	(0.0012)
Log(Neighboring Employment within 3–6 km)	−0.0014	−0.0007	0.0001	0.0013	−0.0031**	−0.0021	0.0005	0.0014	−0.0005	0.0003
	(0.0018)	(0.0021)	(0.0023)	(0.0028)	(0.0013)	(0.0015)	(0.0014)	(0.0015)	(0.0011)	(0.0014)
Log(Neighboring Employment within 6–9 km)	0.0010	0.0013	−0.0016	−0.0009	0.0006	0.0012	−0.0013	−0.0002	−0.0007	0.0000
	(0.0011)	(0.0012)	(0.0016)	(0.0017)	(0.0009)	(0.0009)	(0.0010)	(0.0011)	(0.0008)	(0.0007)
Log(Employment)		−0.0406***		−0.0590***		−0.0551***		−0.0358***		−0.0456***
		(0.0037)		(0.0029)		(0.0029)		(0.0018)		(0.0019)
Share of Female Workers		−0.0242***		−0.0131		−0.0175		−0.0057		−0.0061
		(0.0079)		(0.0100)		(0.0120)		(0.0073)		(0.0059)
Share of Part-Time Workers		0.0345***		0.0345***		0.0081		0.0114*		0.0061
		(0.0066)		(0.0084)		(0.0098)		(0.0069)		(0.0061)
Dummy of Sole Proprietorship Business		0.0078		0.0145**		−0.0048		0.0290***		−0.0100**
		(0.0050)		(0.0063)		(0.0041)		(0.0040)		(0.0039)
Prefecture and Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	436,086	436,086	405,752	405,752	404,179	404,179	388,140	388,140	370,539	370,539
Adjusted R-Squared	0.0081	0.0234	0.0067	0.0334	0.0069	0.0295	0.0052	0.0228	0.0048	0.0243

Note: Heteroskedasticity-consistent standard errors clustered at the two-digit industrial classification level are in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Table 5 Estimation Results of Linear Probability Model for Firm Exit without Sole Proprietorship Firms

Variables	Dependent Variable: Dummy of Exit (1: Exit, 0: Incumbent)									
	Service Sector					Manufacturing Sector				
	2006 (2004) (1)	2009 (2006) (2)	2012 (2009) (3)	2014 (2012) (4)	2016 (2014) (5)	2006 (2004) (6)	2009 (2006) (7)	2012 (2009) (8)	2014 (2012) (9)	2016 (2014) (10)
Log(Neighboring Employment within 3 km)	0.0155***	0.0148***	0.0177***	0.0152***	0.0104***	0.0071***	0.0079***	0.0102***	0.0067***	0.0048***
	(0.0016)	(0.0020)	(0.0022)	(0.0014)	(0.0012)	(0.0014)	(0.0017)	(0.0016)	(0.0008)	(0.0013)
Log(Neighboring Employment within 3–6 km)	0.0008	0.0005	−0.0006	−0.0009	0.0012	−0.0008	−0.0019	−0.0042**	0.0001	0.0002
	(0.0010)	(0.0010)	(0.0016)	(0.0008)	(0.0010)	(0.0026)	(0.0032)	(0.0018)	(0.0015)	(0.0020)
Log(Neighboring Employment within 6–9 km)	−0.0002	0.0014	0.0006	0.0014	0.0000	−0.0014	−0.0003	0.0002	−0.0022*	−0.0008
	(0.0010)	(0.0009)	(0.0009)	(0.0009)	(0.0008)	(0.0012)	(0.0023)	(0.0008)	(0.0012)	(0.0009)
Log(Employment)	−0.0496***	−0.0608***	−0.0535***	−0.0407***	−0.0389***	−0.0443***	−0.0573***	−0.0537***	−0.0387***	−0.0407***
	(0.0024)	(0.0030)	(0.0022)	(0.0019)	(0.0015)	(0.0024)	(0.0024)	(0.0020)	(0.0014)	(0.0012)
Share of Female Workers	−0.0332***	−0.0466***	−0.0409***	−0.0249***	−0.0209***	−0.0207***	−0.0065	−0.0239**	−0.0085	−0.0076
	(0.0067)	(0.0072)	(0.0048)	(0.0041)	(0.0031)	(0.0079)	(0.0111)	(0.0098)	(0.0063)	(0.0058)
Share of Part-Time Workers	0.0619***	0.0718***	0.0529***	0.0402***	0.0377***	0.0402***	0.0401***	0.0200***	0.0248***	0.0115
	(0.0076)	(0.0097)	(0.0073)	(0.0057)	(0.0074)	(0.0070)	(0.0082)	(0.0065)	(0.0069)	(0.0071)
Log(Capital)	0.0129***	0.0109***	0.0035***	0.0037***	−0.0008	0.0155***	0.0152***	0.0095***	0.0122***	0.0064***
	(0.0015)	(0.0017)	(0.0012)	(0.0012)	(0.0008)	(0.0013)	(0.0018)	(0.0020)	(0.0019)	(0.0008)
Prefecture and Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	572,708	582,382	987,627	854,512	894,018	221,088	213,062	231,247	227,872	220,441
Adjusted R-Squared	0.0353	0.0370	0.0378	0.0277	0.0245	0.0230	0.0288	0.0310	0.0194	0.0236

Note: Heteroskedasticity-consistent standard errors clustered at the two-digit industrial classification level are in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Table A.1 Prefecture and Region in Japan

Code	Prefecture	Region
1	Hokkaido	Hokkaido & Tohoku
2	Aomori	Hokkaido & Tohoku
3	Iwate	Hokkaido & Tohoku
4	Miyagi	Hokkaido & Tohoku
5	Akita	Hokkaido & Tohoku
6	Yamagata	Hokkaido & Tohoku
7	Fukushima	Hokkaido & Tohoku
8	Ibaraki	North-Kanto
9	Tochigi	North-Kanto
10	Gunma	North-Kanto
11	Saitama	South-Kanto
12	Chiba	South-Kanto
13	Tokyo	South-Kanto
14	Kanagawa	South-Kanto
15	Niigata	Hokuriku & Koshin
16	Toyama	Hokuriku & Koshin
17	Ishikawa	Hokuriku & Koshin
18	Fukui	Hokuriku & Koshin
19	Yamanashi	Hokuriku & Koshin
20	Nagano	Tokai
21	Gifu	Tokai
22	Shizuoka	Tokai
23	Aichi	Tokai
24	Mie	Tokai
25	Shiga	Kansai
26	Kyoto	Kansai
27	Osaka	Kansai
28	Hyogo	Kansai
29	Nara	Kansai
30	Wakayama	Kansai
31	Tottori	Chugoku
32	Shimane	Chugoku
33	Okayama	Chugoku
34	Hiroshima	Chugoku
35	Yamaguchi	Chugoku
36	Tokushima	Shikoku
37	Kagawa	Shikoku
38	Ehime	Shikoku
39	Kochi	Shikoku
40	Fukuoka	Kyushu & Okinawa
41	Saga	Kyushu & Okinawa
42	Nagasaki	Kyushu & Okinawa
43	Kumamoto	Kyushu & Okinawa
44	Oita	Kyushu & Okinawa
45	Miyazaki	Kyushu & Okinawa
46	Kagoshima	Kyushu & Okinawa
47	Okinawa	Kyushu & Okinawa

Note: Prefecture code and regional classification are used in Figure 4 and 5.

Table A.2 Japan Standard Industrial Classification for Manufacturing Sector in 2014

Code	Explanation
9	Manufacture of Food
10	Manufacture of Beverages,tobacco and Feed
11	Manufacture of Textile Products
12	Manufacture of Lumber and Wood Products, Except Fourniture
13	Manufacture of Furniture and Fixtures
14	Manufacture of Pulp, Paper and Paper Products
15	Printing and Allied Industries
16	Manufacture of Chemical and Allied Products
17	Manufacture of Petroleum and Coal Products
18	Manufacture of Plastic Products, Except Otherwise Classified
19	Manufacture of Rubber Products
20	Manufacture of Leather Tanning, Leather Products and Fur Skins
21	Manufacture of Ceramic, Stone and Clay Products
22	Manufacture of Iron and Steel
23	Manufacture of Non-ferrous Metals and Products
24	Manufacture of Fabricated Metal Products
25	Manufacture of General-purpose Machinery
26	Manufacture of Production Machinery
27	Manufacture of Business Oriented Machinery
28	Electronic Parts, Devices and Electronic Circuits
29	Manufacture of Electrical Machinery, Equipment and Supplies
30	Manufacture of Information and Communication Electronics Equipment
31	Manufacture of Transportation Equipment
32	Miscellaneous Manufacturing Industries

Note: The Japan Standard Industrial Classification is based on Rev. 13, October 2013. Industrial code is used in Figure 7.

Table A.3 Japan Standard Industrial Classification for Service Sector in 2014

Code	Explanation
33	Production, Transmission and Distribution of Electricity
34	Production and Distribution of Gas
35	Heat Supply
36	Collection, Purification and Distribution of Water, and Sewage Collection, Processing and Disposal
37	Communications
38	Broadcasting
41	Video Picture Information, Sound Information, Character Information Production and Distribution
39	Information Services
40	Services Incidental to Internet
42	Railway Transport
43	Road Passenger Transport
44	Road Freight Transport
45	Water Transport
46	Air Transport
47	Warehousing
48	Services Incidental to Transport
49	Postal Services, Including Mail Delivery
50	Wholesale Trade, General Merchandise
51	Wholesale Trade (Textile and Apparel)
52	Wholesale Trade (Food and Beverages)
53	Wholesale Trade (Building Materials, Minerals and Metals, etc)
54	Wholesale Trade (Machinery and Equipment)
55	Miscellaneous Wholesale Trade
56	Retail Trade, General Merchandise
57	Retail Trade (Woven Fabrics, Apparel, Apparel Accessories and Notions)
58	Retail Trade (Food and Beverage)
59	Retail Trade (Machinery and Equipment)
60	Miscellaneous Retail Trade
61	Nonstore Retailers
62	Banking
63	Financial Institutions For Cooperative Organizations
64	Non-deposit Money Corporations, Including Lending and Credit Card Business
65	Financial Products Transaction Dealers and Futures Commodity Transaction Dealers
66	Financial Auxiliaries
67	Insurance Institutions, Including Insurance Agents, Brokers and Services
68	Real Estate Agencies
69	Real Estate Lessors and Managers
70	Goods Rental and Leasing
71	Scientific and Development Research Institutes
72	Professional Services, n.e.c.
73	Advertising
74	Technical Services, n.e.c.
75	Accommodations
76	Eating and Drinking Places
77	Food Take Out and Delivery Services
78	Laundry, Beauty and Bath Services
79	Miscellaneous Living-related and Personal Services
80	Services For Amusement and Recreation
81	School Education
82	Miscellaneous Education, Learning Support
83	Medical and Other Health Services
84	Public Health and Hygiene
85	Social Insurance, Social Welfare and Care Services
86	Postal Services
87	Cooperative Associations, n.e.c.
88	Waste Disposal Business
89	Automobile Maintenance Services
90	Machine, etc. Repair Services, Except Otherwise Classified
91	Employment and Worker Dispatching Services
92	Miscellaneous Business Services
93	Political, Business and Cultural Organizations
94	Religion
95	Miscellaneous Services

Note: The Japan Standard Industrial Classification is based on Rev. 13, October 2013. Industrial code is used in Figure 6.

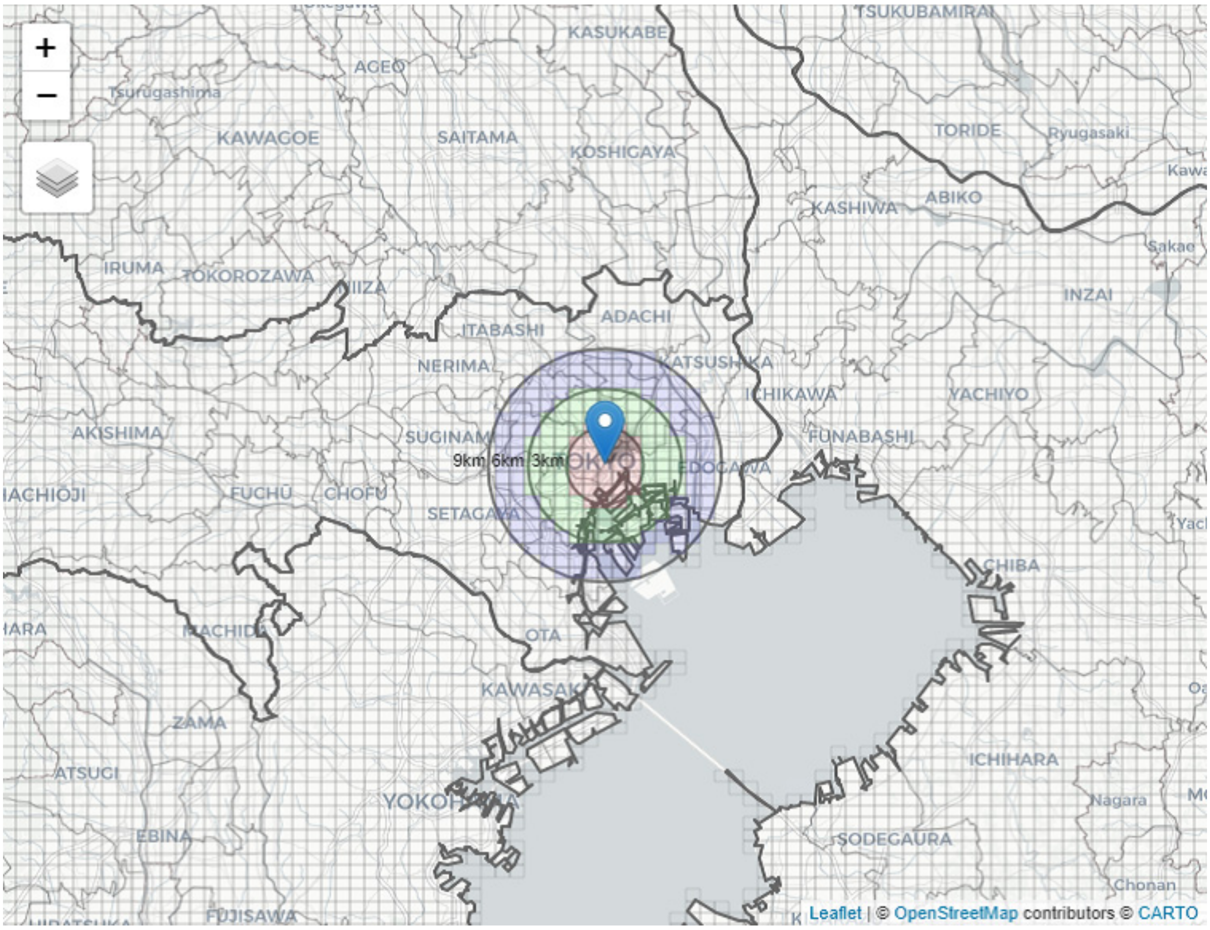
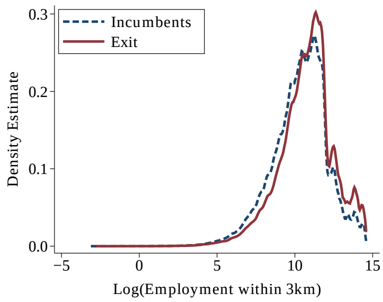
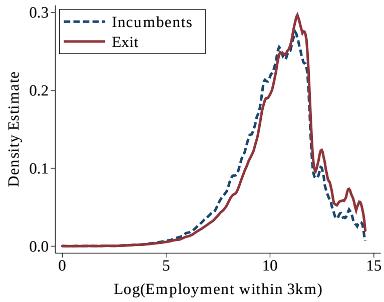


Figure 1: Construction of Local Market Size Variables based on Grid Square Statistics

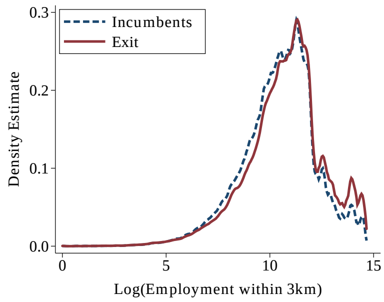
Note: Local market size is constructed using the grid square statistics (Statistics Bureau, Ministry of Internal Affairs and Communications). This example depicts the circles of 3 km intervals until 9 km (i.e., 3 km, 6 km, and 9 km) from the centroid of the grid square where Tokyo Station is located. This study calculates neighboring employment of each firm based on the grid square statistics at the approximately 1 km by 1 km level.



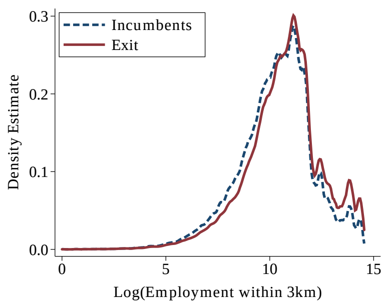
(a) 2006



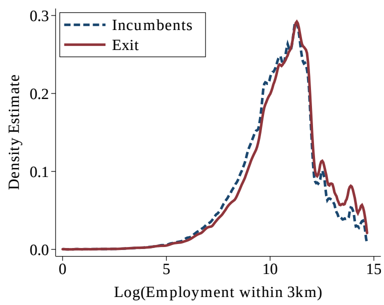
(b) 2009



(c) 2012



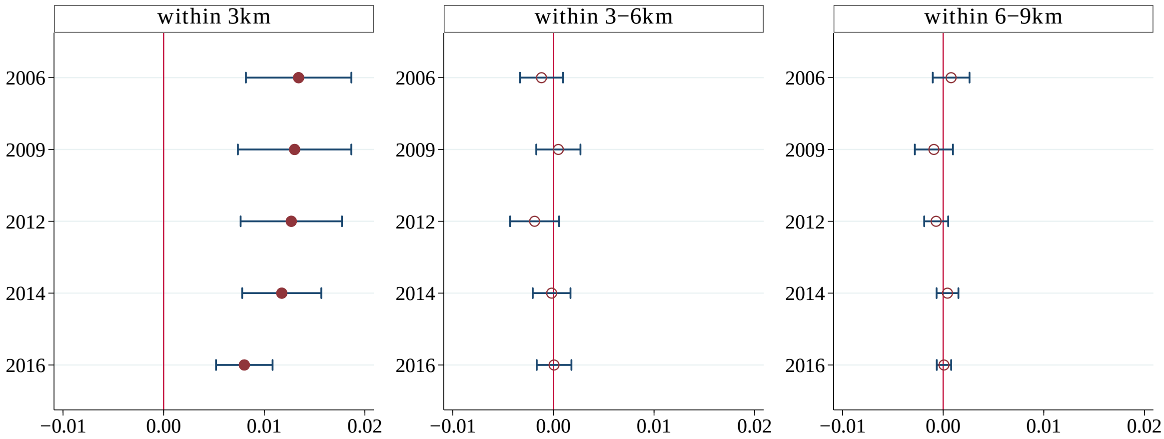
(d) 2014



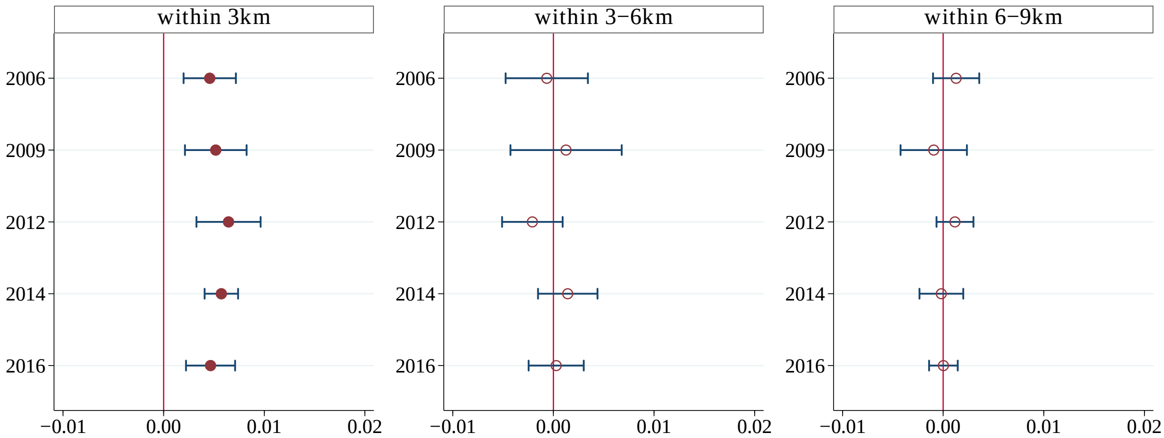
(e) 2016

Figure 2: Firm Exit and Local Market Size

Note: Local market size is expressed as the logarithm of neighboring employment within a 3 km radius of the location of firms and establishments. The sample is divided into incumbent firms and firms that exited.



(a) Service Sector



(b) Manufacturing Sector

Figure 3: Coefficient Estimates of Local Market Size on Firm Exit in 2014

Note: The coefficient estimates of local market size in Columns (2), (4), (6), (8), and (10) of Tables 3 and 4 are plotted, respectively. "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (●) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The blue lines represent the 95% confidence intervals.

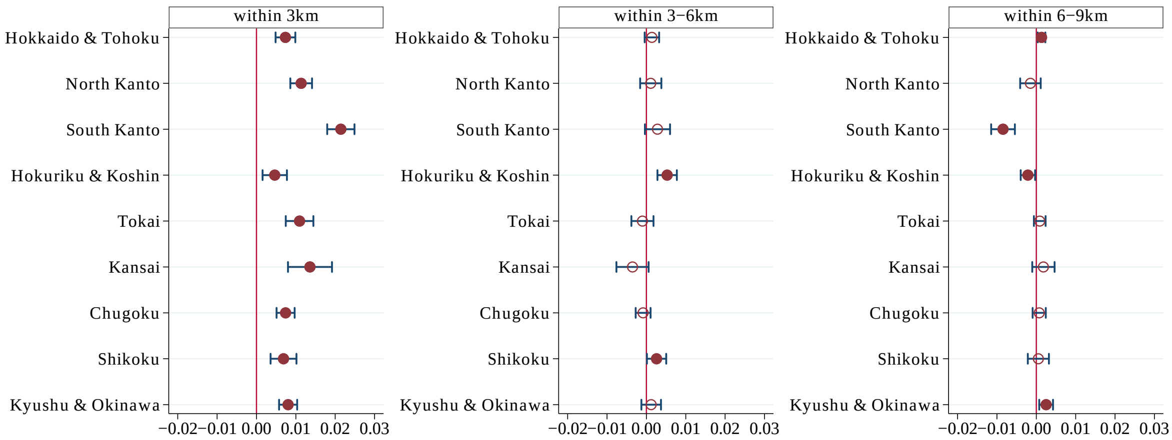


Figure 4: Impacts of Local Market Size on Firm Exit by Region in 2014

Note: The coefficient estimates of local market size by region are plotted (Tables are not presented.). “within 3 km” indicates the neighboring employment within a 3 km radius from the firm’s location. “within 3–6 km” indicates the neighboring employment between a 3 km and a 6 km radius from the firm’s location. “within 6–9 km” indicates the neighboring employment between a 6 km and a 9 km radius from the firm’s location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The blue lines represent the 95% confidence intervals.

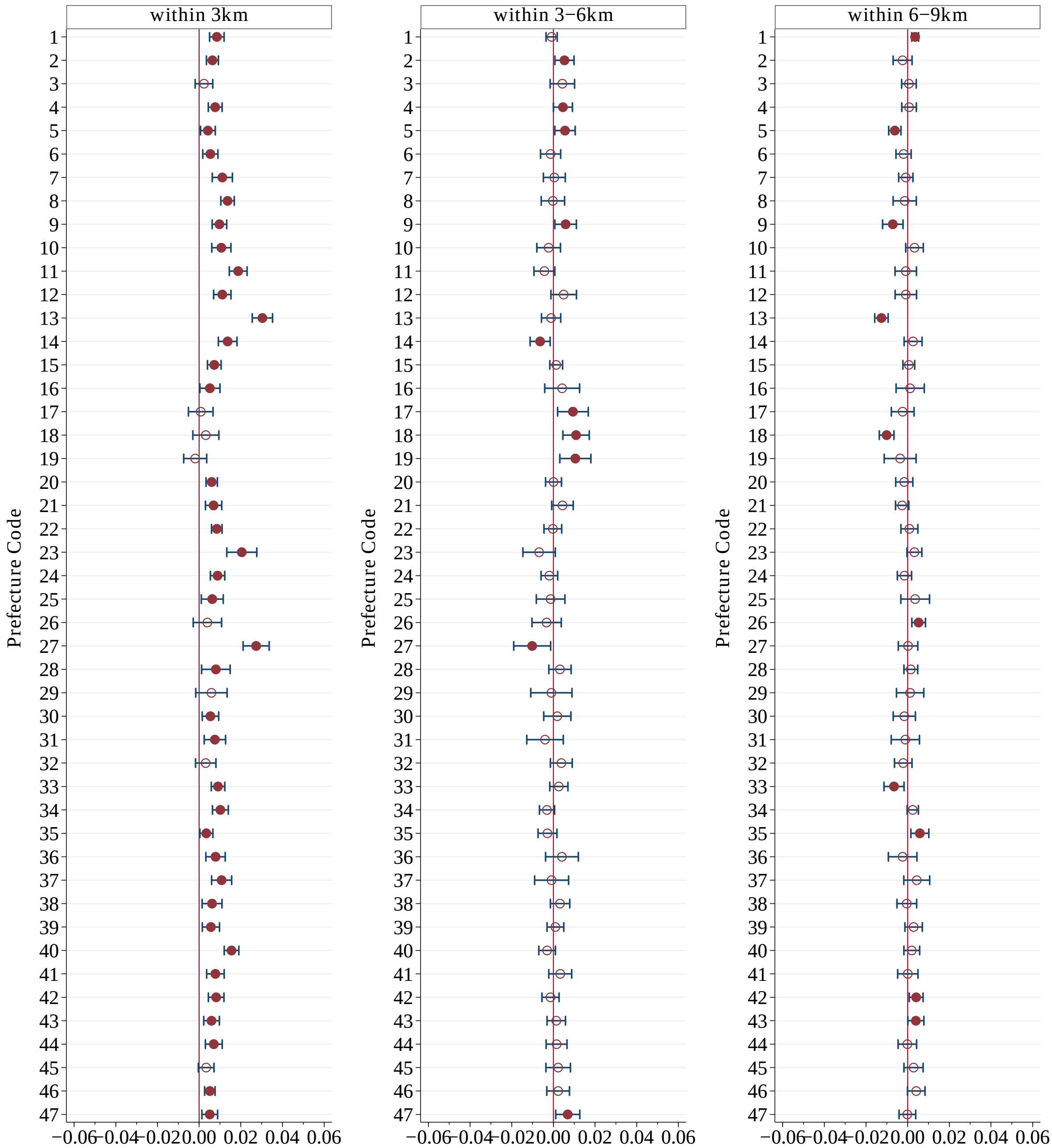


Figure 5: Impacts of Local Market Size on Firm Exit by Prefecture in 2014

Note: The coefficient estimates of local market size by prefecture are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The blue lines represent the 95% confidence intervals.

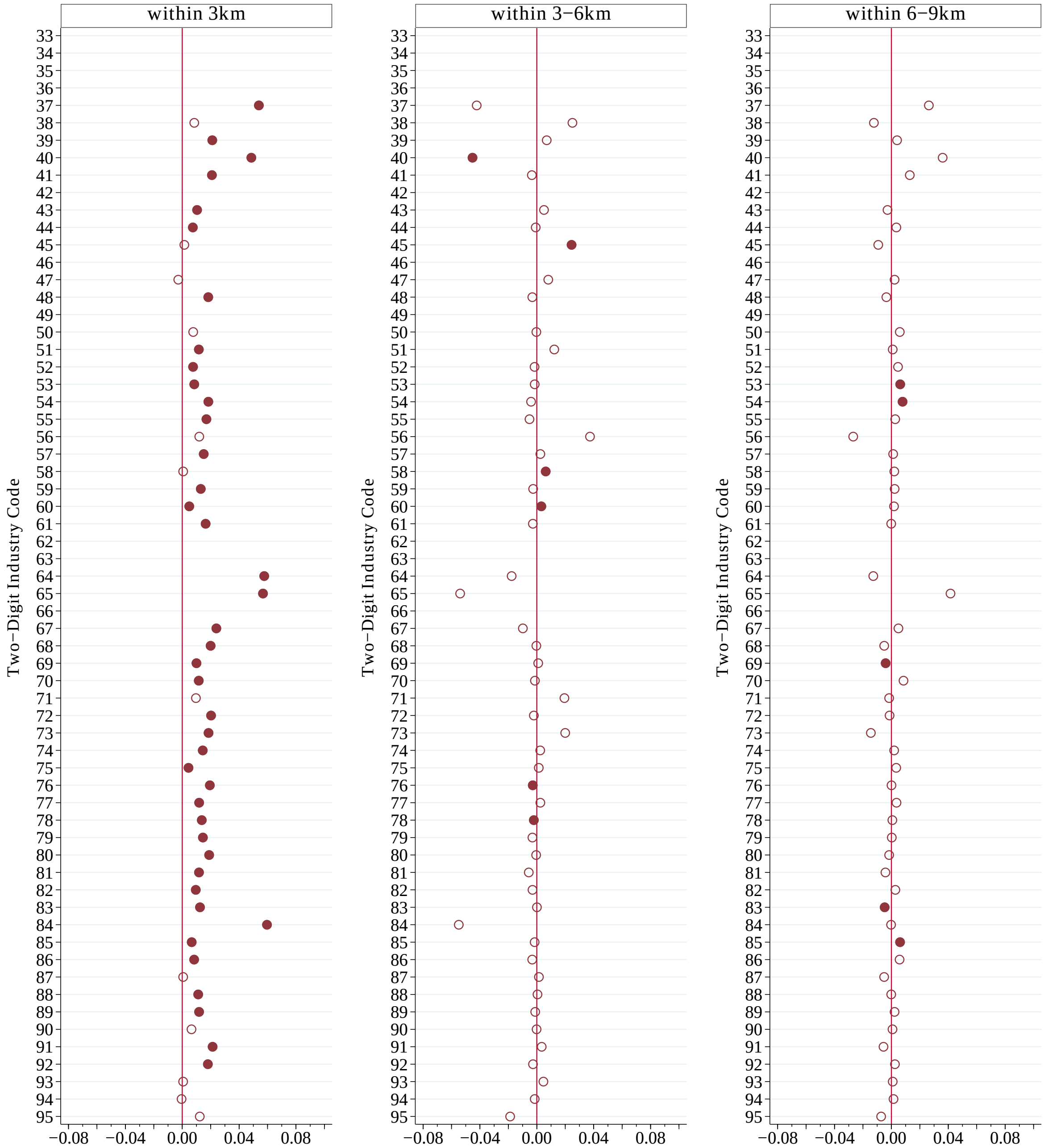


Figure 6: Impacts of Local Market Size on Firm Exit across Service Industries in 2014

Note: The coefficient estimates of local market size by two-digit service industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

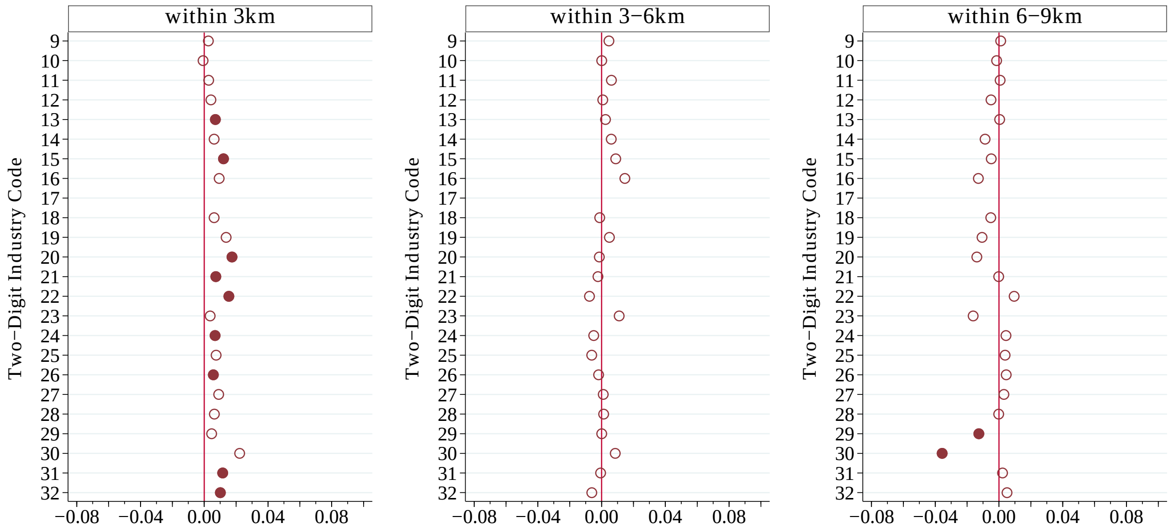


Figure 7: Impacts of Local Market Size on Firm Exit across Manufacturing Industries in 2014

Note: The coefficient estimates of local market size by two-digit manufacturing industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

Online Appendix for

The Impact of Market Size of Firm Selection

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RIETI Keio University

This online appendix provides additional estimation results.

Contents

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Online Appendix A. Industry Classification

A.1 Industry Code for 2004 and 2006

Tables OA.A. 1–OA.A. 2 present the sector list of Japan Standard Industrial Classification (Rev. 11, March 2003). These sector numbers are used in 2006(2004) period.

[Tables OA.A. 1–OA.A. 2]

A.2 Industry Code for 2009, 2012, 2014, and 2016

Tables OA.A. 4–OA.A. 3 present the sector list of Japan Standard Industrial Classification (Rev. 12, November 2007; Rev. 13, October 2013). These sector numbers are used in 2009(2006), 2012(2009), 2014(2012), and 2016(2014) periods.

[Tables OA.A. 3–OA.A. 4]

Table OA.A. 1 Manufacturing Industry in Japan Standard Industrial Classification (Rev. 11, March 2003)

Code	2006
9	Manufacture of Food
10	Manufacture of Beverages, Tobacco and Feed
11	Manufacture of Textile Mill Products, Except Apparel and Other Finished Products Made From Fabrics and Similar Materials
12	Manufacture of Apparel and Other Finished Products Made From Fabrics and Similar Materials
13	Manufacture of Lumber and Wood Products, Except Furniture
14	Manufacture of Furniture and Fixtures
15	Manufacture of Pulp, Paper and Paper Products
16	Printing and Allied Industries
17	Manufacture of Chemical and Allied Products
18	Manufacture of Petroleum and Coal Products
19	Manufacture of Plastic Products, Except Otherwise Classified
20	Manufacture of Rubber Products
21	Manufacture of Leather Tanning, Leather Products and Fur Skins
22	Manufacture of Ceramic, Stone and Clay Products
23	Manufacture of Iron and Steel
24	Manufacture of Non-ferrous Metals and Products
25	Manufacture of Fabricated Metal Products
26	Manufacture of General Machinery
27	Manufacture of Electrical Machinery, Equipment and Supplies
28	Manufacture of Information and Communication Electronics Equipment
29	Electronic Parts and Devices
30	Manufacture of Transportation Equipment
31	Manufacture of Precision Instruments and Machinery
32	Miscellaneous Manufacturing Industries

Note: Japan Standard Industrial Classification (Rev. 11, March 2003) is used in the 2006(2004) period.

Table OA.A. 2 Service Industry in Japan Standard Industrial Classification (Rev. 11, March 2003)

Code	2006
33	Production, Transmission and Distribution of Electricity
34	Manufacture of Gas
35	Heat Supply
36	Collection, Purification and Distribution of Water, and Sewage Collection, Processing and Disposal
37	Communications
38	Broadcasting
39	Information Services
40	Internet Based Services
41	Video Picture, Sound Information, Character Information Production and Distribution
42	Railway Transport
43	Road Passenger Transport
44	Road Freight Transport
45	Water Transport
46	Air Transport
47	Warehousing
48	Services Incidental To Transport
49	Wholesale Trade, General Merchandise
50	Wholesale Trade (Textile and Apparel)
51	Wholesale Trade (Food and Beverages)
52	Wholesale Trade (Building Materials, Minerals and Metals, etc.)
53	Wholesale Trade (Machinery and Equipment)
54	Miscellaneous Wholesale Trade
55	Retail Trade, General Merchandise
56	Retail Trade (Dry Goods, Apparel and Apparel Accessories)
57	Retail Trade (Food and Beverages)
58	Retail Trade (Motor Vehicles and Bicycles)
59	Retail Trade (Furniture, Household Utensil and Household Appliance)
60	Miscellaneous Retail Trade
61	Banking
62	Financial Institutions For Cooperative Organizations
63	Institutions Dealing With Postal Savings, Government-related Financial Institutions
64	Non-deposit Money Corporations Engaged In The Provision of Finance, Credit and Investment
65	Securities and Futures Commodity Dealing Activities
66	Financial Auxiliaries
67	Insurance Institutions, Including Insurance Agents, Brokers and Services
68	Real Estate Agencies
69	Real Estate Lessors and Managers
70	General Eating and Drinking Places
71	Spree Eating and Drinking Places
72	Accommodations
73	Medical and Other Health Services
74	Public Health and Hygiene
75	Social Insurance and Social Welfare
76	School Education
77	Miscellaneous Education, Learning Support
78	Postal Services, Except Otherwise Classified
79	Cooperative Associations, n.e.c.
80	Professional Services, n.e.c.
81	Scientific and Development Research Institutes
82	Laundry, Beauty and Bath Services
83	Miscellaneous Living-related and Personal Services
84	Services For Amusement and Hobbies
85	Waste Disposal Business
86	Automobile Maintenance Services
87	Machine, etc. Repair Services, Except Otherwise Classified
88	Goods Rental and Leasing
89	Advertising
90	Miscellaneous Business Services
91	Political, Business and Cultural Organizations
92	Religion
93	Miscellaneous Services

Note: Japan Standard Industrial Classification (Rev. 11, March 2003) is used in the 2006(2004) period.

Table OA.A. 3 Japan Standard Industrial Classification for Manufacturing Sector (Rev. 12, November 2007; Rev. 13, October 2013)

Code	2006
9	Manufacture of Food
10	Manufacture of Beverages,tobacco and Feed
11	Manufacture of Textile Products
12	Manufacture of Lumber and Wood Products, Except Fourniture
13	Manufacture of Furniture and Fixtures
14	Manufacture of Pulp, Paper and Paper Products
15	Printing and Allied Industries
16	Manufacture of Chemical and Allied Products
17	Manufacture of Petroleum and Coal Products
18	Manufacture of Plastic Products, Except Otherwise Classified
19	Manufacture of Rubber Products
20	Manufacture of Leather Tanning, Leather Products and Fur Skins
21	Manufacture of Ceramic, Stone and Clay Products
22	Manufacture of Iron and Steel
23	Manufacture of Non-ferrous Metals and Products
24	Manufacture of Fabricated Metal Products
25	Manufacture of General-purpose Machinery
26	Manufacture of Production Machinery
27	Manufacture of Business Oriented Machinery
28	Electronic Parts, Devices and Electronic Circuits
29	Manufacture of Electrical Machinery, Equipment and Supplies
30	Manufacture of Information and Communication Electronics Equipment
31	Manufacture of Transportation Equipment
32	Miscellaneous Manufacturing Industries

Note: Japan Standard Industrial Classification (Rev. 12, November 2007; Rev. 13, October 2013) is used in 2009(2006), 2012(2009), 2014(2012), and 2016(2014) periods.

Online Appendix B. Probit Estimation

Table OA.B. 1 provides the estimation results of probit estimation of regression (1) in the main text.

[Table OA.B. 1]

Table OA.A. 4 Service Industry in Japan Standard Industrial Classification (Rev. 12, November 2007; Rev. 13, October 2013)

Code	2006
33	Production, Transmission and Distribution of Electricity
34	Production and Distribution of Gas
35	Heat Supply
36	Collection, Purification and Distribution of Water, and Sewage Collection, Processing and Disposal
37	Communications
38	Broadcasting
41	Video Picture Information, Sound Information, Character Information Production and Distribution
39	Information Services
40	Services Incidental to Internet
42	Railway Transport
43	Road Passenger Transport
44	Road Freight Transport
45	Water Transport
46	Air Transport
47	Warehousing
48	Services Incidental to Transport
49	Postal Services, Including Mail Delivery
50	Wholesale Trade, General Merchandise
51	Wholesale Trade (Textile and Apparel)
52	Wholesale Trade (Food and Beverages)
53	Wholesale Trade (Building Materials, Minerals and Metals, etc)
54	Wholesale Trade (Machinery and Equipment)
55	Miscellaneous Wholesale Trade
56	Retail Trade, General Merchandise
57	Retail Trade (Woven Fabrics, Apparel, Apparel Accessories and Notions)
58	Retail Trade (Food and Beverage)
59	Retail Trade (Machinery and Equipment)
60	Miscellaneous Retail Trade
61	Nonstore Retailers
62	Banking
63	Financial Institutions For Cooperative Organizations
64	Non-deposit Money Corporations, Including Lending and Credit Card Business
65	Financial Products Transaction Dealers and Futures Commodity Transaction Dealers
66	Financial Auxiliaries
67	Insurance Institutions, Including Insurance Agents, Brokers and Services
68	Real Estate Agencies
69	Real Estate Lessors and Managers
70	Goods Rental and Leasing
71	Scientific and Development Research Institutes
72	Professional Services, n.e.c.
73	Advertising
74	Technical Services, n.e.c.
75	Accommodations
76	Eating and Drinking Places
77	Food Take Out and Delivery Services
78	Laundry, Beauty and Bath Services
79	Miscellaneous Living-related and Personal Services
80	Services For Amusement and Recreation
81	School Education
82	Miscellaneous Education, Learning Support
83	Medical and Other Health Services
84	Public Health and Hygiene
85	Social Insurance, Social Welfare and Care Services
86	Postal Services
87	Cooperative Associations, n.e.c.
88	Waste Disposal Business
89	Automobile Maintenance Services
90	Machine, etc. Repair Services, Except Otherwise Classified
91	Employment and Worker Dispatching Services
92	Miscellaneous Business Services
93	Political, Business and Cultural Organizations
94	Religion
95	Miscellaneous Services

Note: Japan Standard Industrial Classification (Rev. 12, November 2007; Rev. 13, October 2013) is used in 2009(2006), 2012(2009), 2014(2012), and 2016(2014) periods.

Table OA.B. 1 Estimation Results of Probit Model for Firm Exit in Service Sector

	Dependent Variable: Dummy of Exit (1: Exit, 0: Incumbent)				
Variables	2006	2009	2012	2014	2016
	(1)	(2)	(3)	(4)	(5)
Log(Neighboring Employment within 3 km)	0.0668***	0.0564***	0.0535***	0.0543***	0.0397***
	(0.0110)	(0.0120)	(0.0102)	(0.0088)	(0.0069)
Log(Neighboring Employment within 3–6 km)	−0.0078	0.0012	−0.0083	−0.0015	0.0000
	(0.0057)	(0.0051)	(0.0055)	(0.0046)	(0.0045)
Log(Neighboring Employment within 6–9 km)	0.0049	−0.0036	−0.0022	0.0022	0.0003
	(0.0046)	(0.0039)	(0.0025)	(0.0027)	(0.0018)
Log(Employment)	−0.1807***	−0.2182***	−0.2115***	−0.1780***	−0.2006***
	(0.0166)	(0.0189)	(0.0110)	(0.0078)	(0.0091)
Share of Female Workers	−0.0718***	−0.0828***	−0.0515***	−0.0495***	−0.0405**
	(0.0171)	(0.0175)	(0.0194)	(0.0184)	(0.0198)
Share of Part-Time Workers	0.2492***	0.2538***	0.2133***	0.1561***	0.1851***
	(0.0345)	(0.0410)	(0.0374)	(0.0243)	(0.0369)
Dummy of Sole Proprietorship Business	−0.0086	−0.0301	−0.0860**	−0.0392	−0.0940***
	(0.0418)	(0.0385)	(0.0365)	(0.0338)	(0.0298)
Prefecture and Industry Dummy	Yes	Yes	Yes	Yes	Yes
Number of Observations	2,455,759	2,411,018	3,255,173	2,944,586	2,910,220
Pseudo R-Squared	0.0450	0.0434	0.0332	0.0298	0.0265

Note: Heteroskedasticity-consistent standard errors clustered at the two-digit industrial classification level are in parentheses. * denotes statistical significance at the 10% level, ** at the 5% level, and *** at the 1% level.

Online Appendix C. Firm Exit by Region

Figures OA.C. 1–OA.C. 5 show full estimation results by region in the 2006–2016 periods.

[Figures OA.C. 1–OA.C. 5]

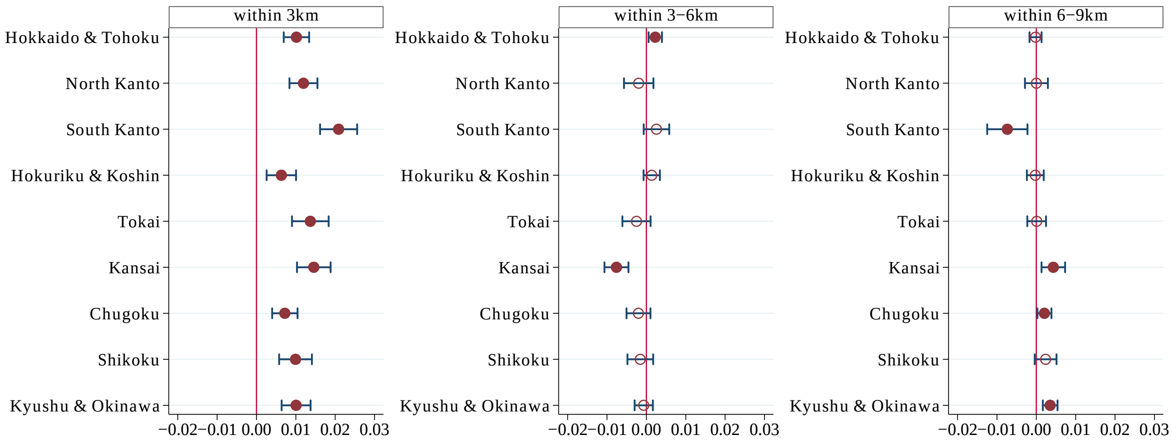

Figure OA.C. 1: Impact of Local Agglomeration on Probability of Exit by Region in 2006

Note: The coefficient estimates of local market size by region are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (●) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The blue lines represent the 95% confidence intervals.

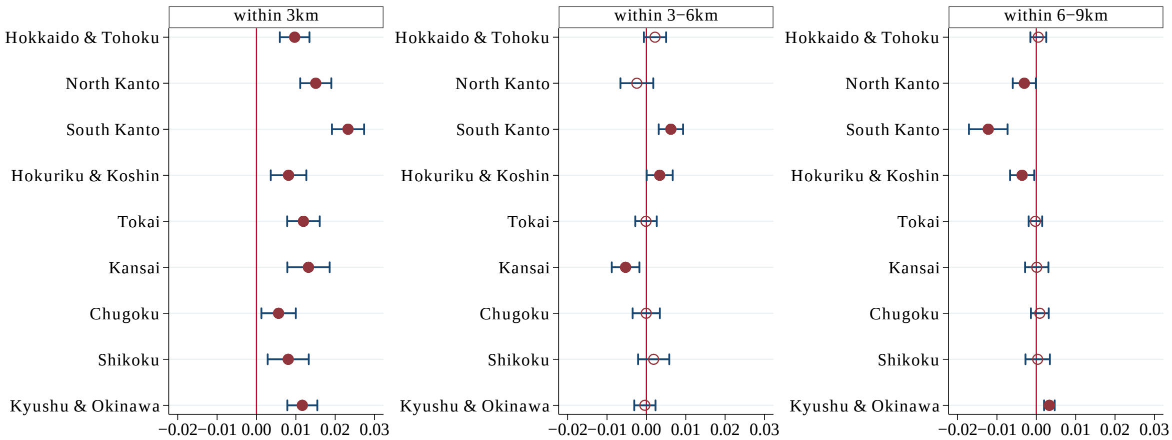

Figure OA.C. 2: Impact of Local Agglomeration on Probability of Exit by Region in 2009

Note: The coefficient estimates of local market size by region are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The blue lines represent the 95% confidence intervals.

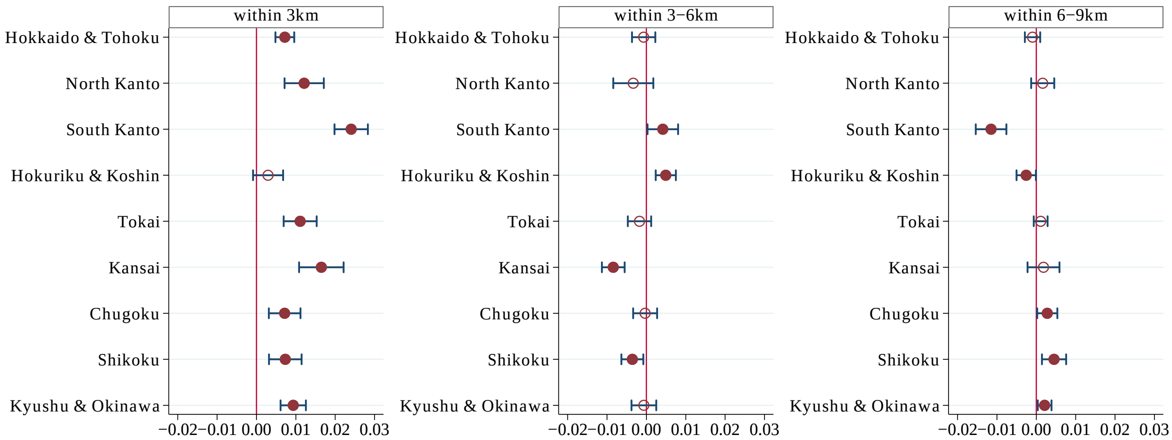

Figure OA.C. 3: Impact of Local Agglomeration on Probability of Exit by Region in 2012

Note: The coefficient estimates of local market size by region are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The blue lines represent the 95% confidence intervals.

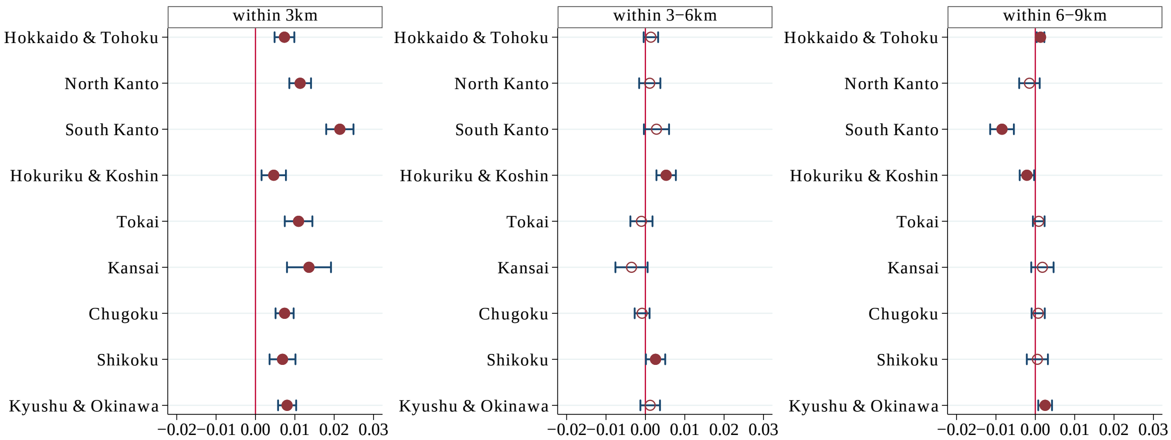

Figure OA.C. 4: Impact of Local Agglomeration on Probability of Exit by Region in 2014

Note: The coefficient estimates of local market size by region are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The blue lines represent the 95% confidence intervals.

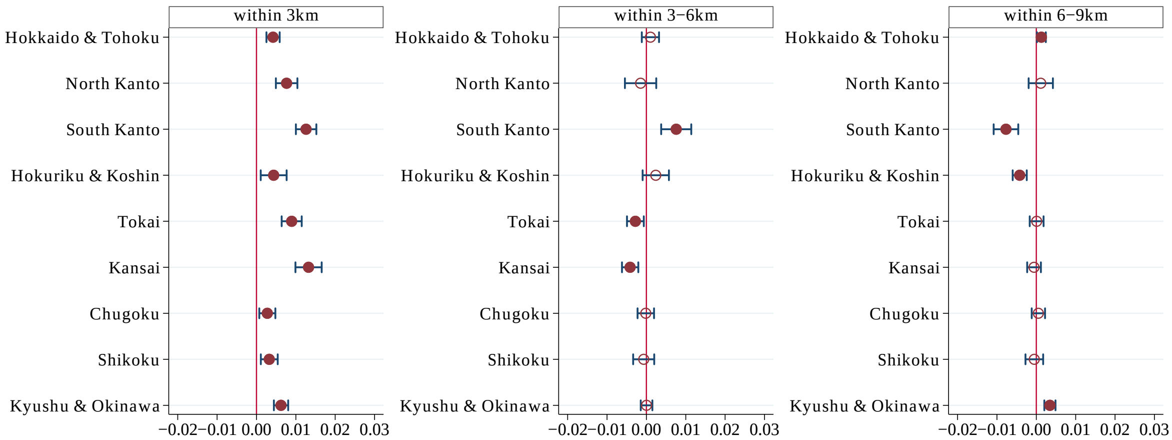

Figure OA.C. 5: Impact of Local Agglomeration on Probability of Exit by Region in 2016

Note: The coefficient estimates of local market size by region are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The blue lines represent the 95% confidence intervals.

Online Appendix D. Firm Exit by Prefecture

Figures OA.D. 1–OA.D. 5 show full estimation results by prefecture in the 2006–2016 periods.

[Figures OA.D. 1–OA.D. 5]

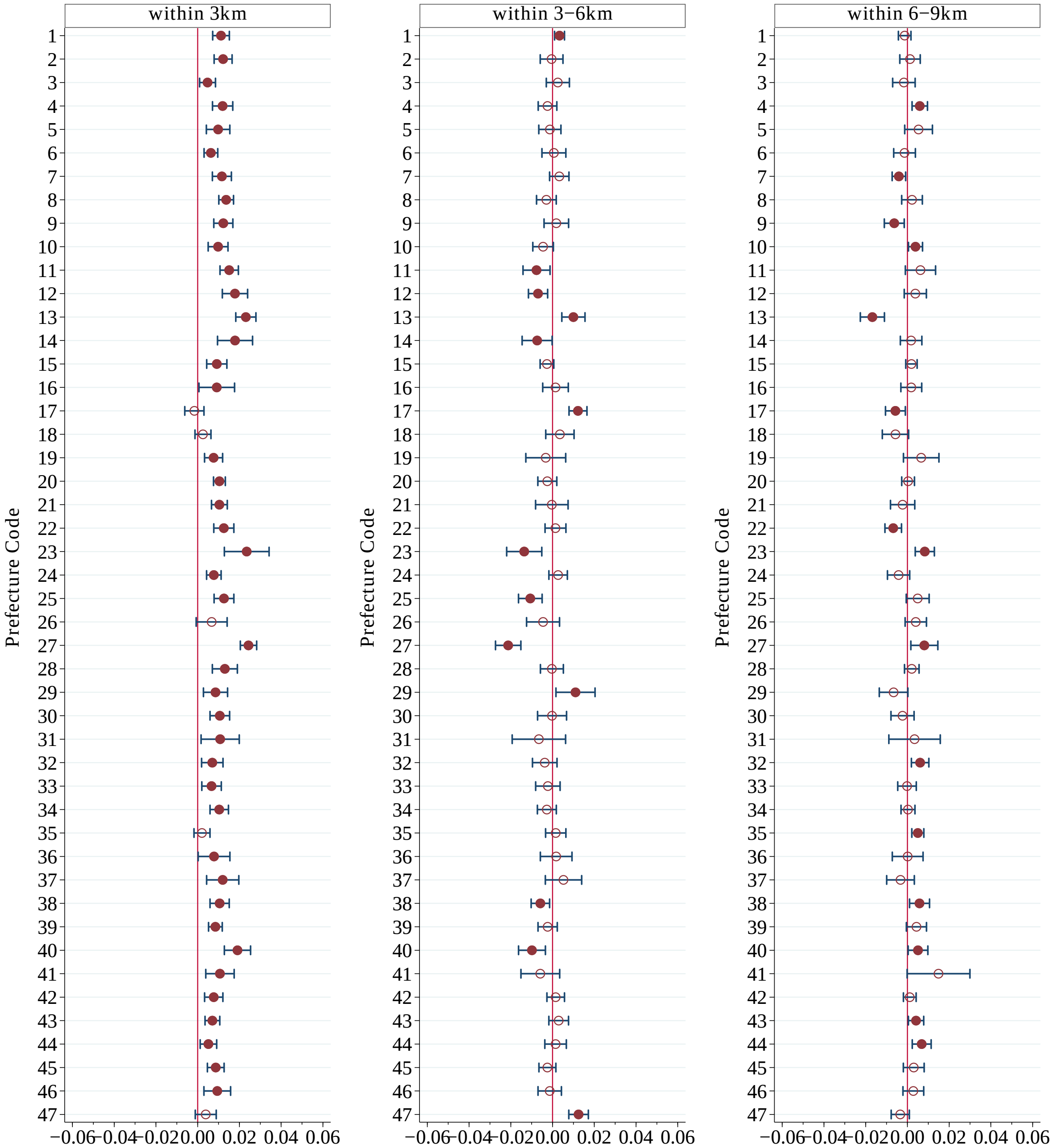

Figure OA.D. 1: Impacts of Local Agglomeration on Firm Exit by Prefecture in 2006

Note: The coefficient estimates of local market size by prefecture are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The blue lines represent the 95% confidence intervals.

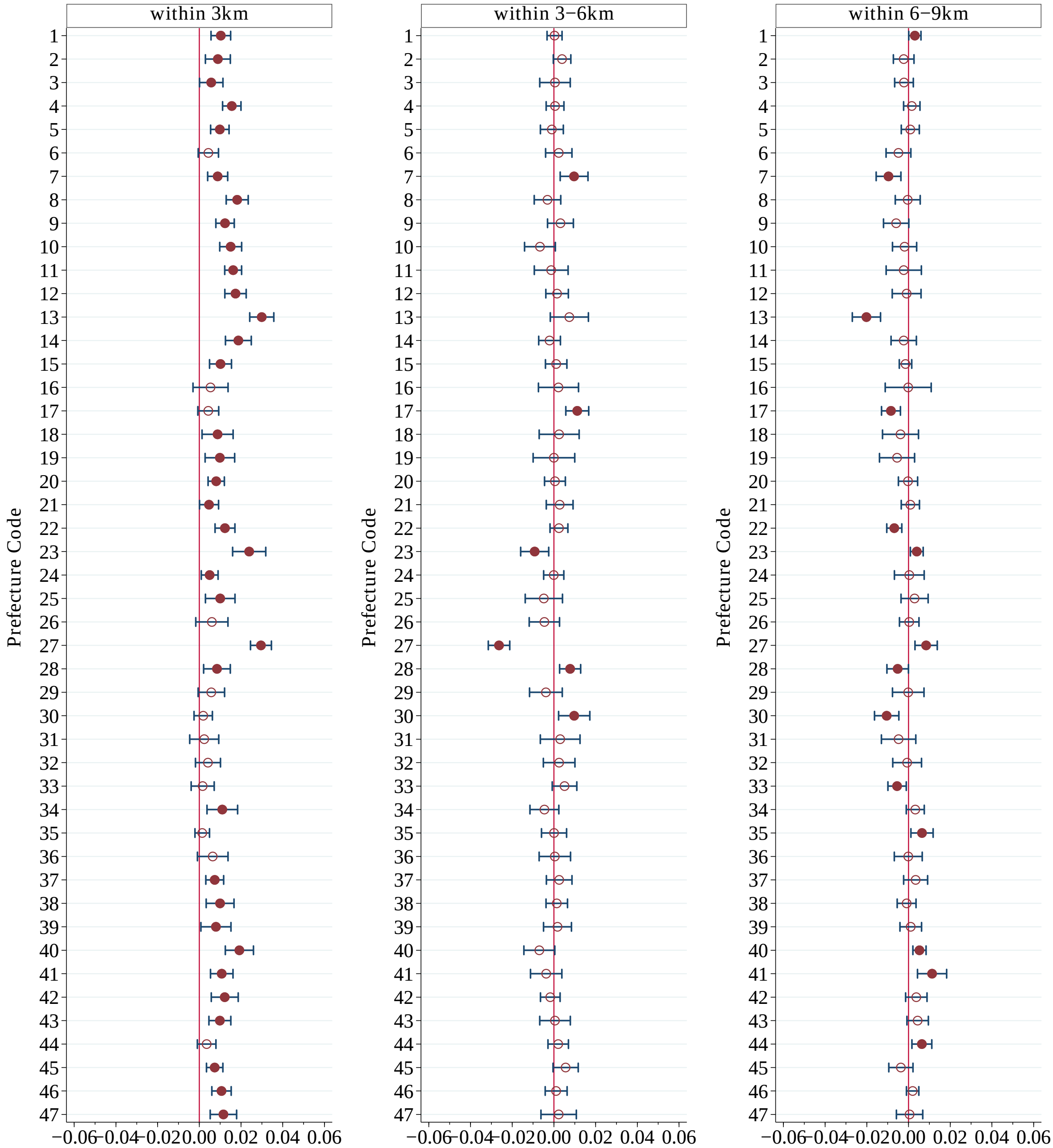

Figure OA.D. 2: Impacts of Local Agglomeration on Firm Exit by Prefecture in 2009

Note: The coefficient estimates of local market size by prefecture are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (∘) does not. The blue lines represent the 95% confidence intervals.

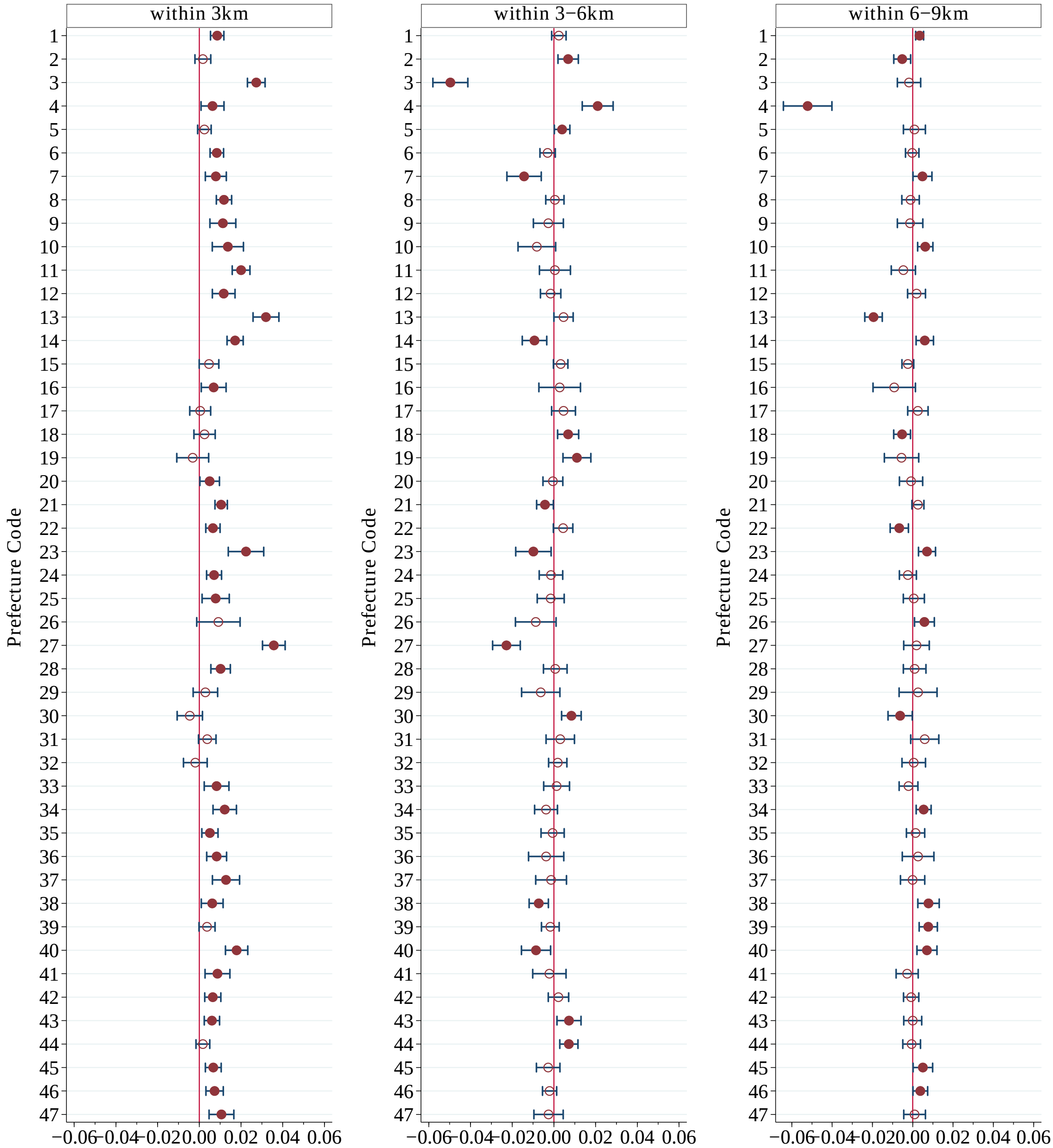

Figure OA.D. 3: Impacts of Local Agglomeration on Firm Exit by Prefecture in 2012

Note: The coefficient estimates of local market size by prefecture are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The blue lines represent the 95% confidence intervals.

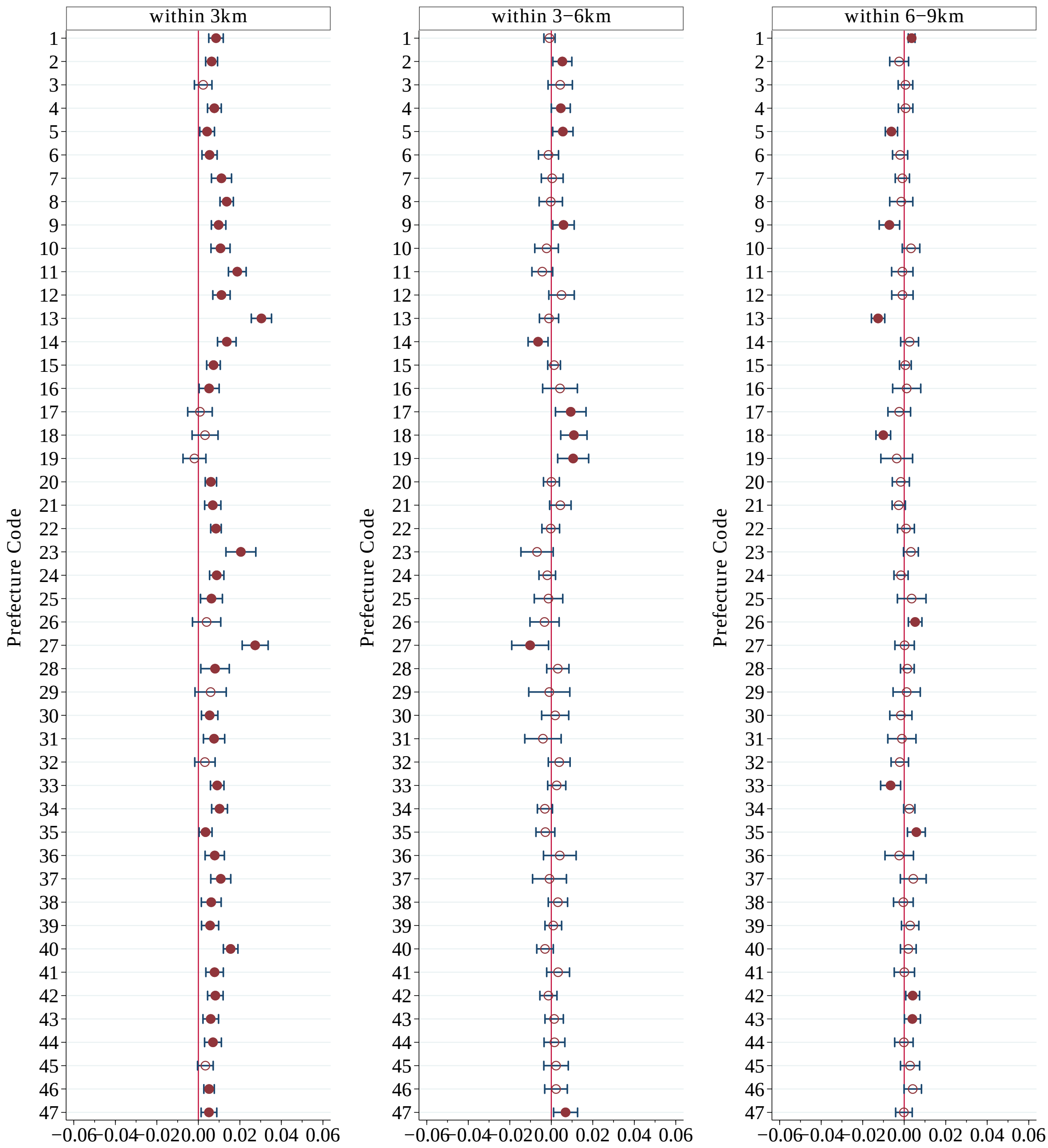

Figure OA.D. 4: Impacts of Local Agglomeration on Firm Exit by Prefecture in 2014

Note: The coefficient estimates of local market size by prefecture are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The blue lines represent the 95% confidence intervals.

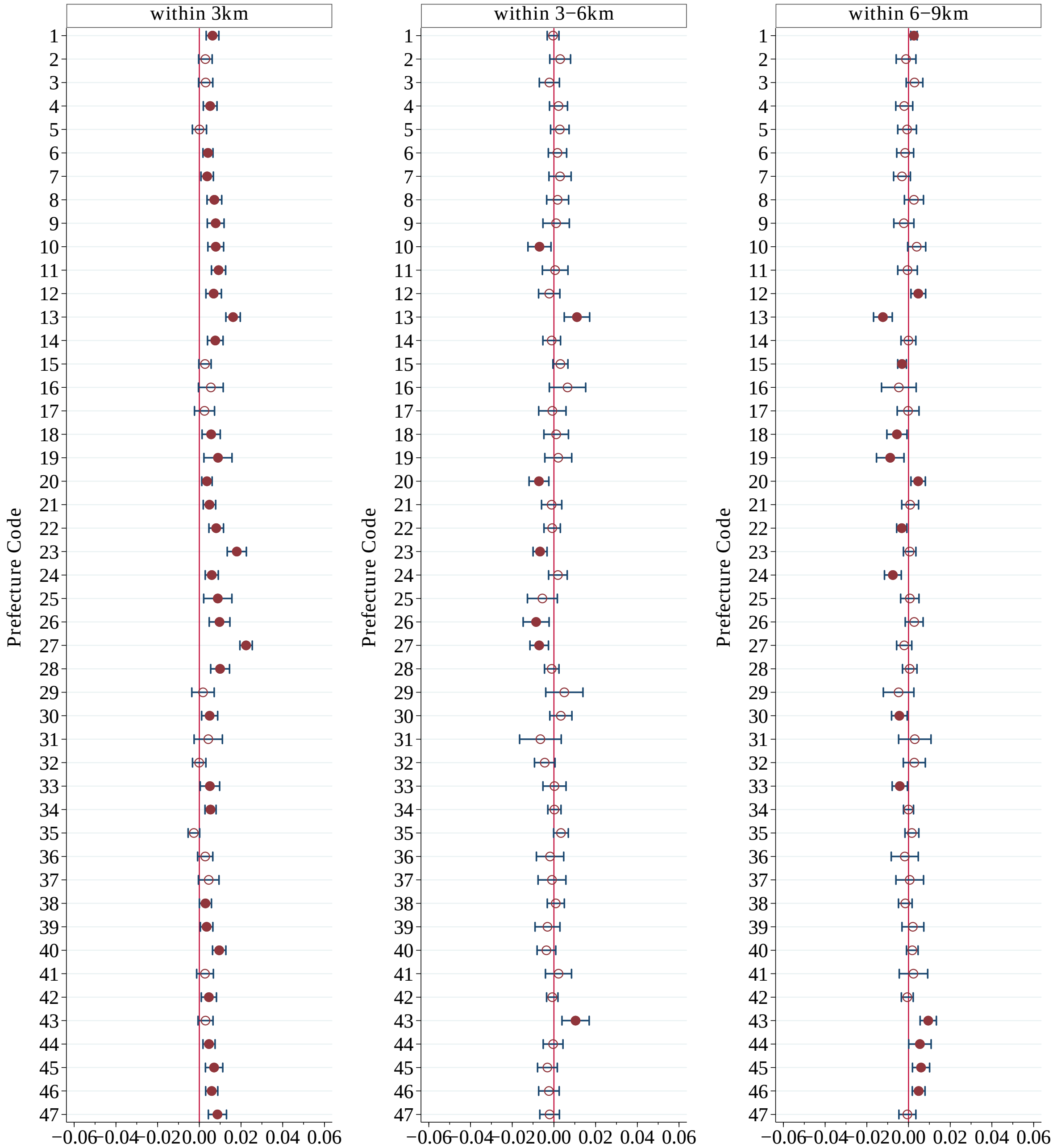

Figure OA.D. 5: Impacts of Local Agglomeration on Firm Exit by Prefecture in 2016

Note: The coefficient estimates of local market size by prefecture are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The blue lines represent the 95% confidence intervals.

Online Appendix E. Firm Exit by Service Industry

Figures OA.E. 1–OA.E. 5 show full estimation results by two-digit level service industry in the 2006–2016 periods.

[Figures OA.E. 1–OA.E. 5]

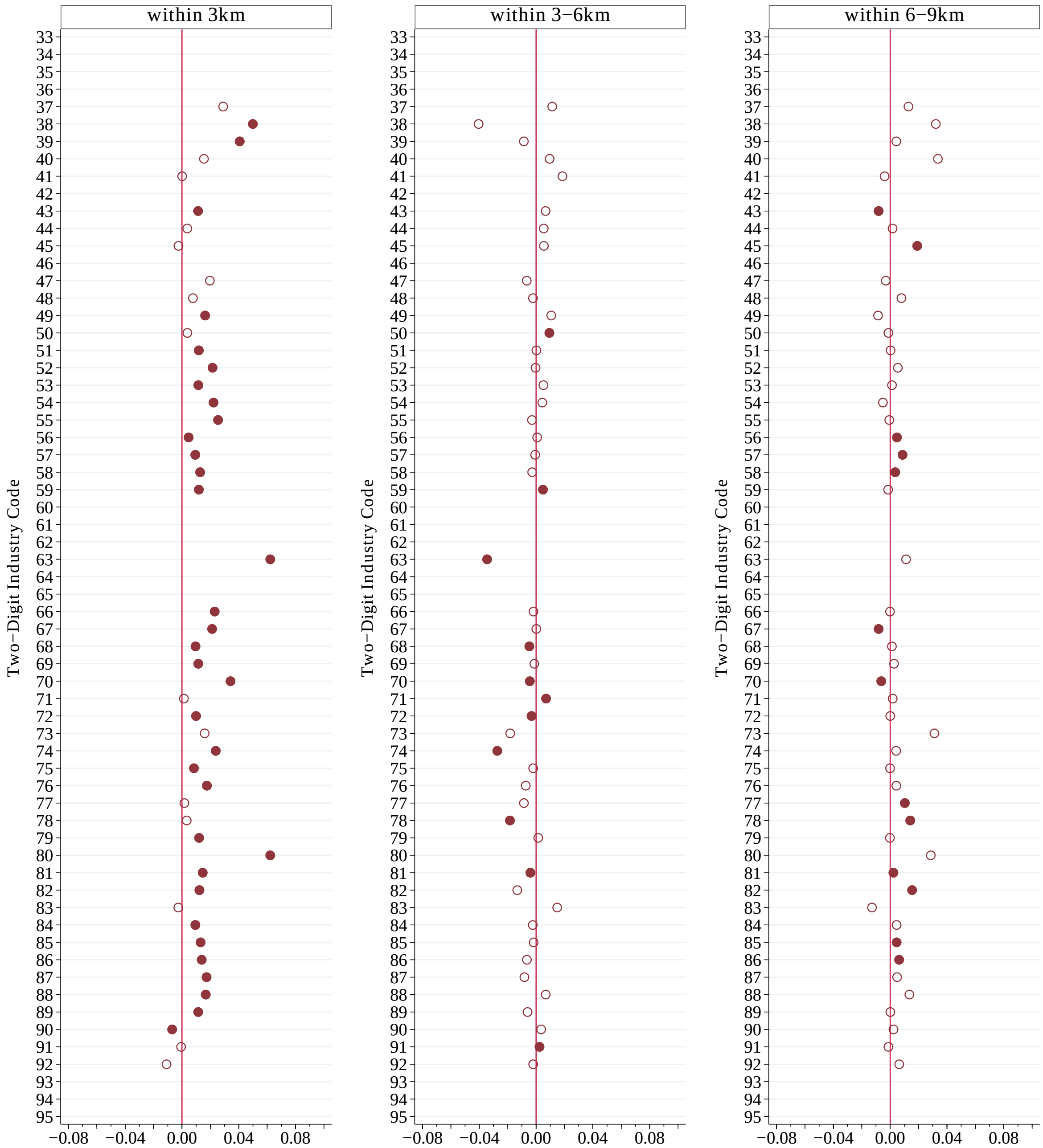

Figure OA.E. 1: Estimated Impacts of Local Agglomeration across Industries in 2006

Note: The coefficient estimates of local market size by two-digit service industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

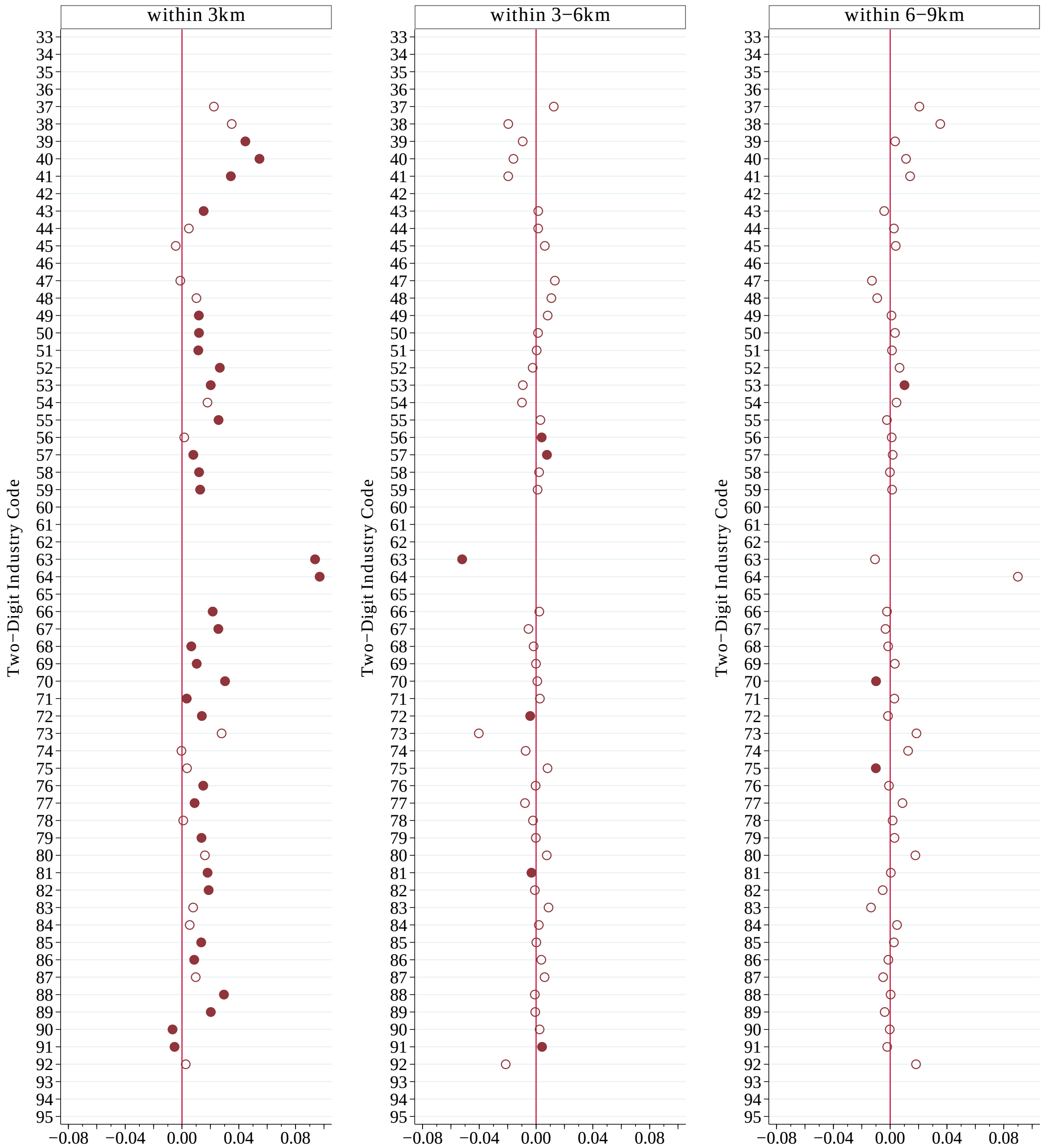

Figure OA.E. 2: Estimated Impacts of Local Agglomeration across Industries in 2009

Note: The coefficient estimates of local market size by two-digit service industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

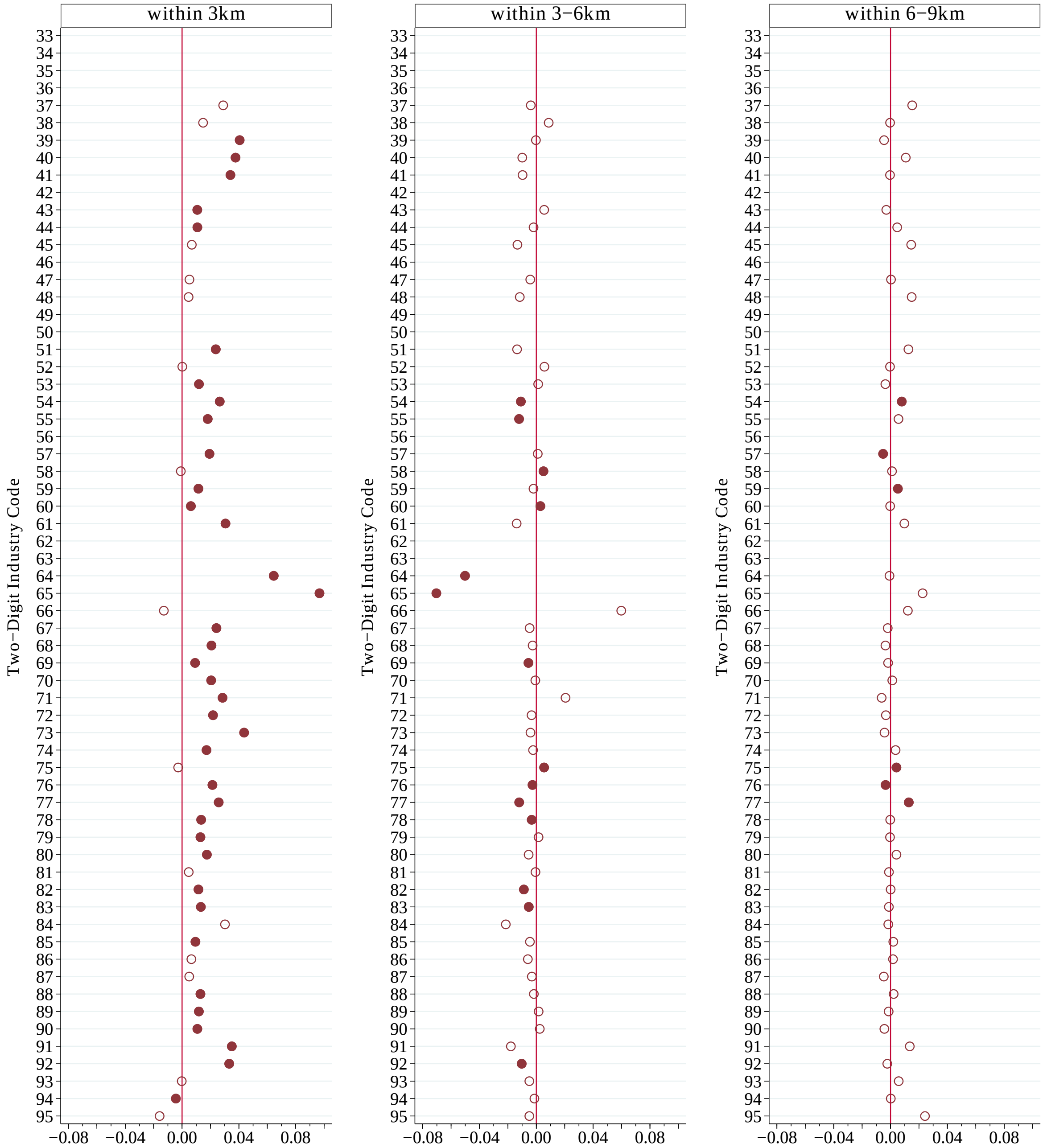

Figure OA.E. 3: Estimated Impacts of Local Agglomeration across Industries in 2012

Note: The coefficient estimates of local market size by two-digit service industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

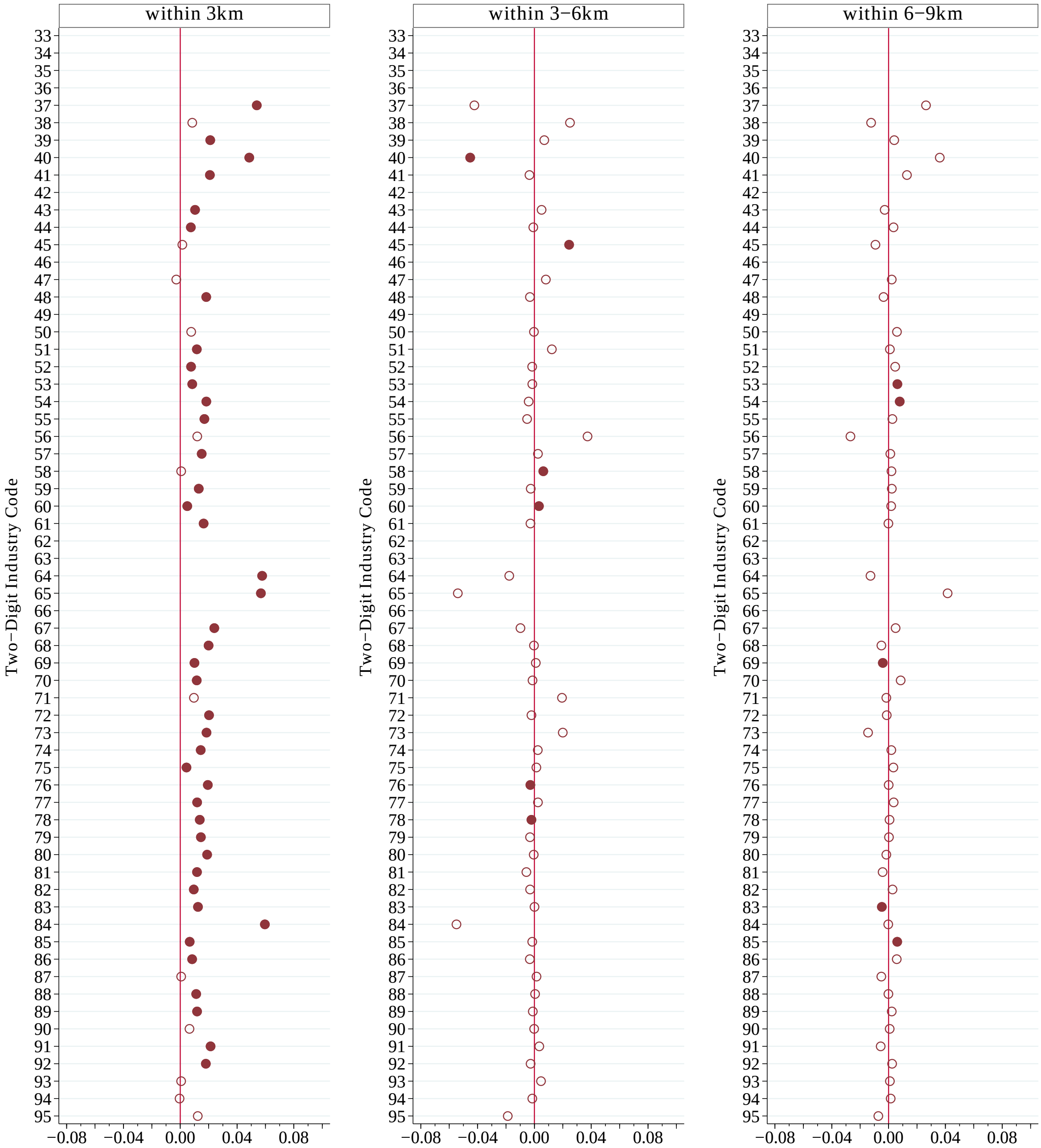

Figure OA.E. 4: Estimated Impacts of Local Agglomeration across Industries in 2014

Note: The coefficient estimates of local market size by two-digit service industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

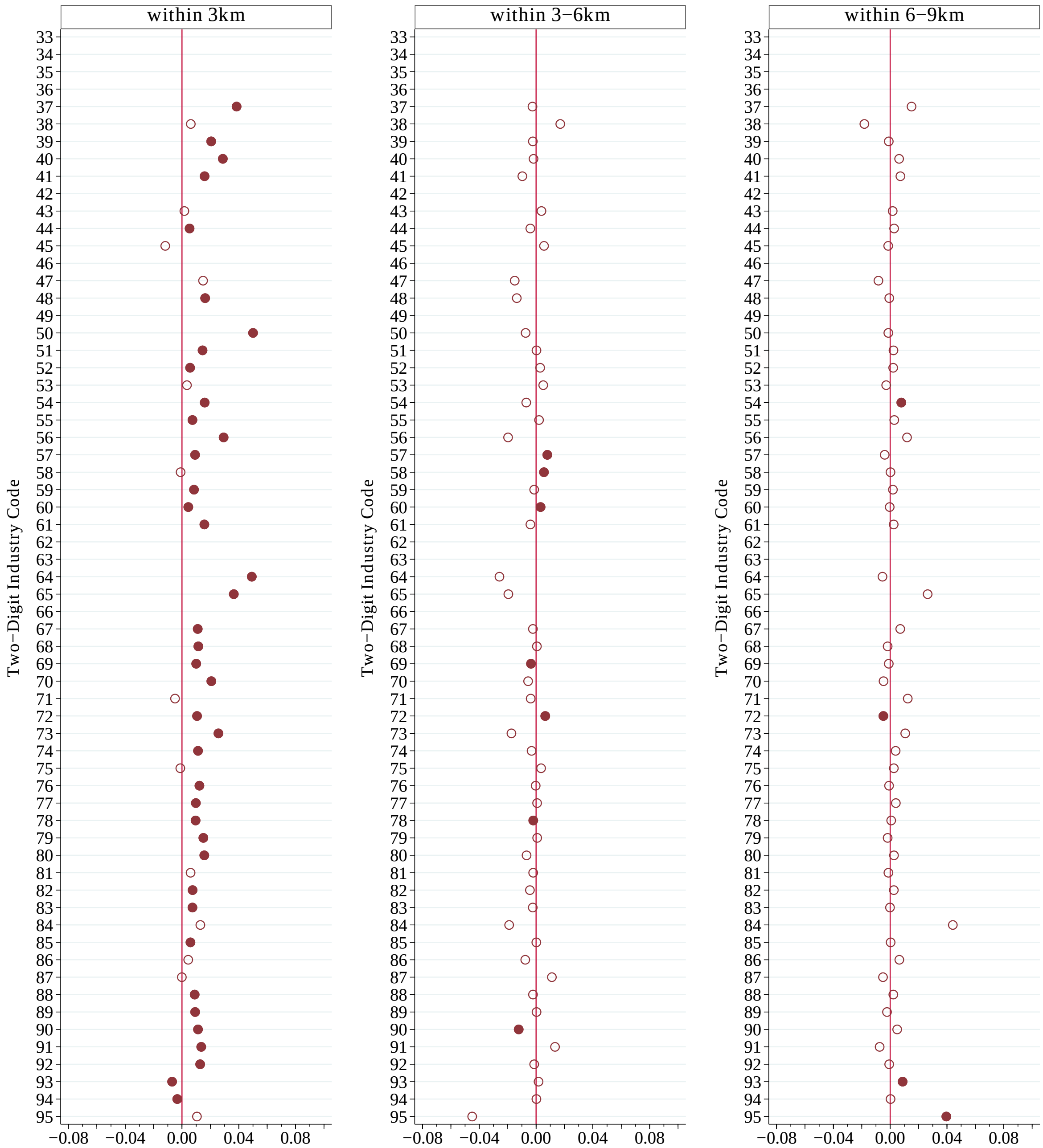

Figure OA.E. 5: Estimated Impacts of Local Agglomeration across Industries in 2016

Note: The coefficient estimates of local market size by two-digit service industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

Online Appendix F. Firm Exit by Manufacturing Industry

Figures OA.F. 1–OA.F. 5 show full estimation results by two-digit level service industry in the 2006–2016 periods.

[Figures OA.F. 1–OA.F. 5]

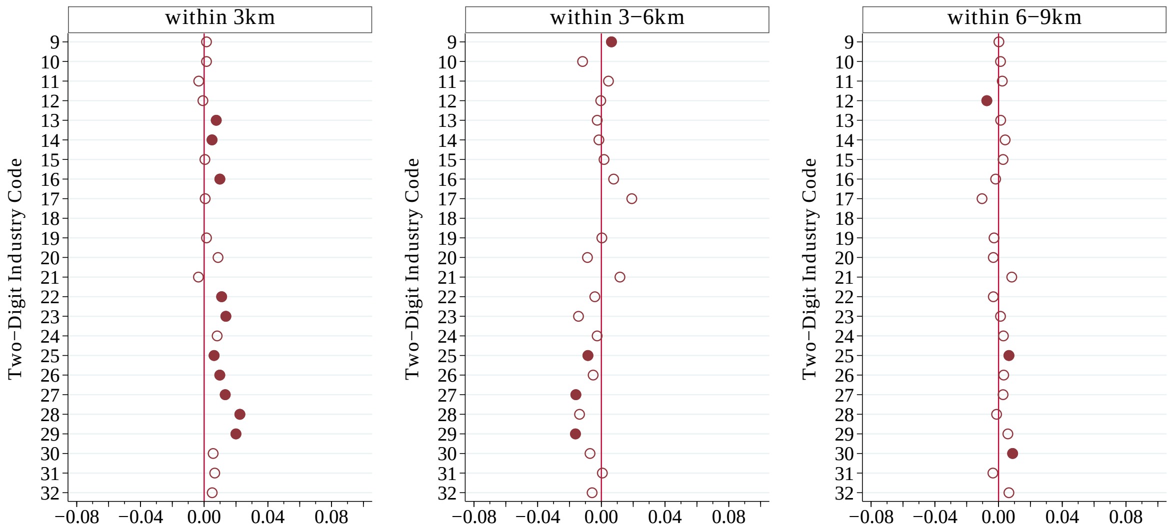

Figure OA.F. 1: Estimated Impacts of Local Agglomeration across Industries in 2006

Note: The coefficient estimates of local market size by two-digit manufacturing industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (○) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

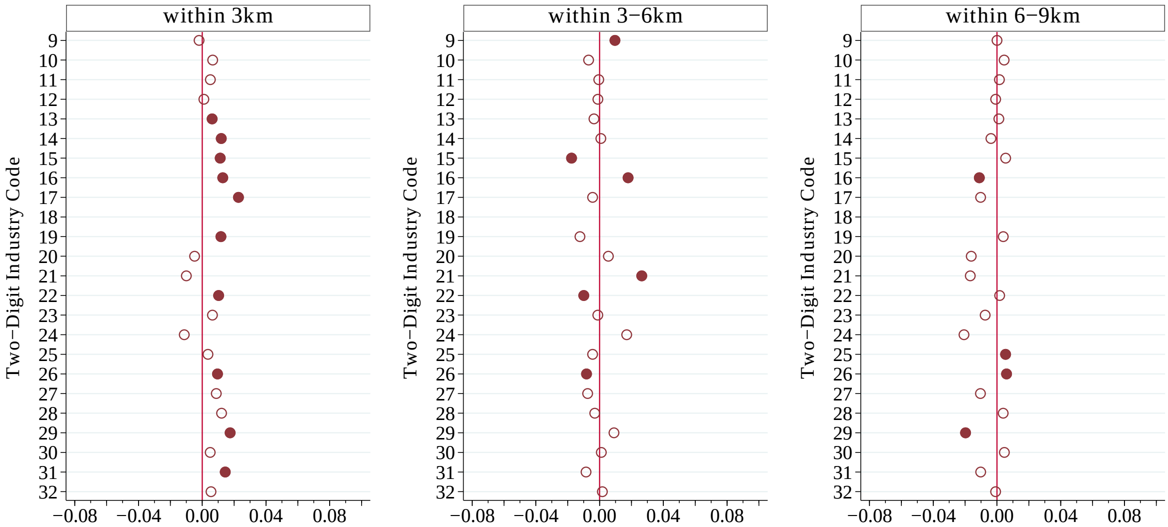

Figure OA.F. 2: Estimated Impacts of Local Agglomeration across Industries in 2009

Note: The coefficient estimates of local market size by two-digit manufacturing industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (∘) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

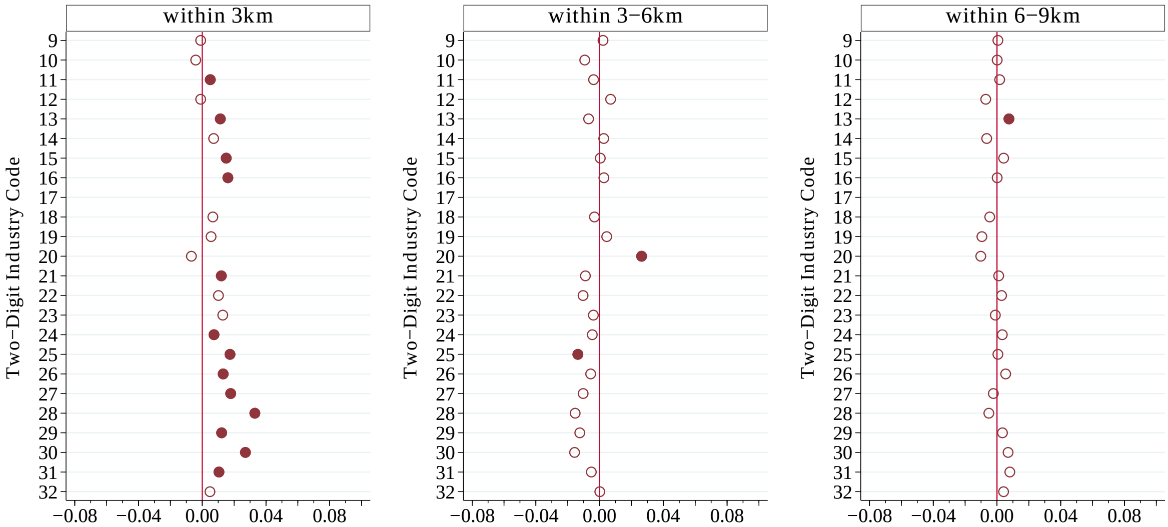

Figure OA.F. 3: Estimated Impacts of Local Agglomeration across Industries in 2012

Note: The coefficient estimates of local market size by two-digit manufacturing industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

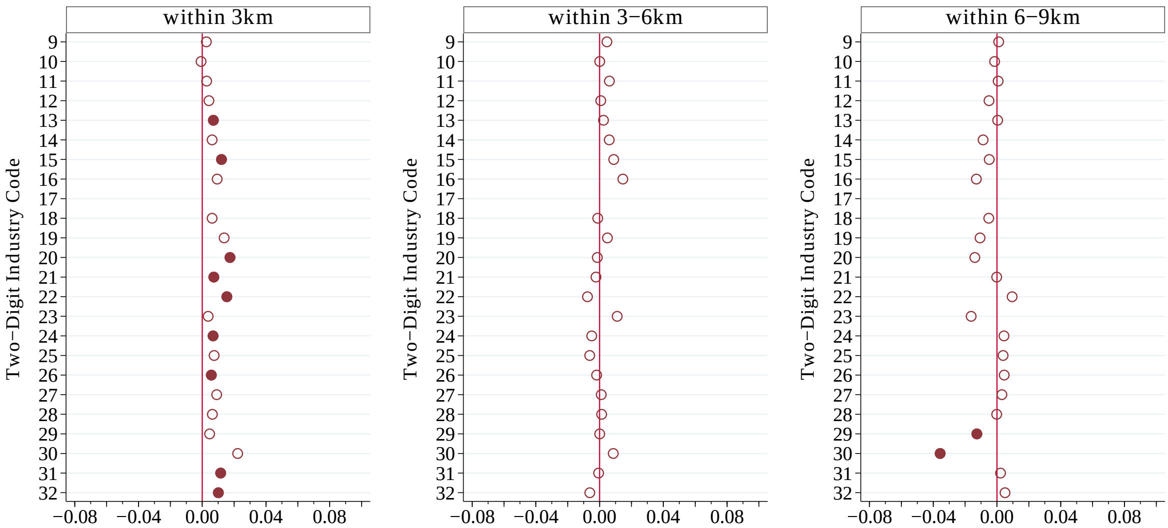

Figure OA.F. 4: Estimated Impacts of Local Agglomeration across Industries in 2014

Note: The coefficient estimates of local market size by two-digit manufacturing industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (◦) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.

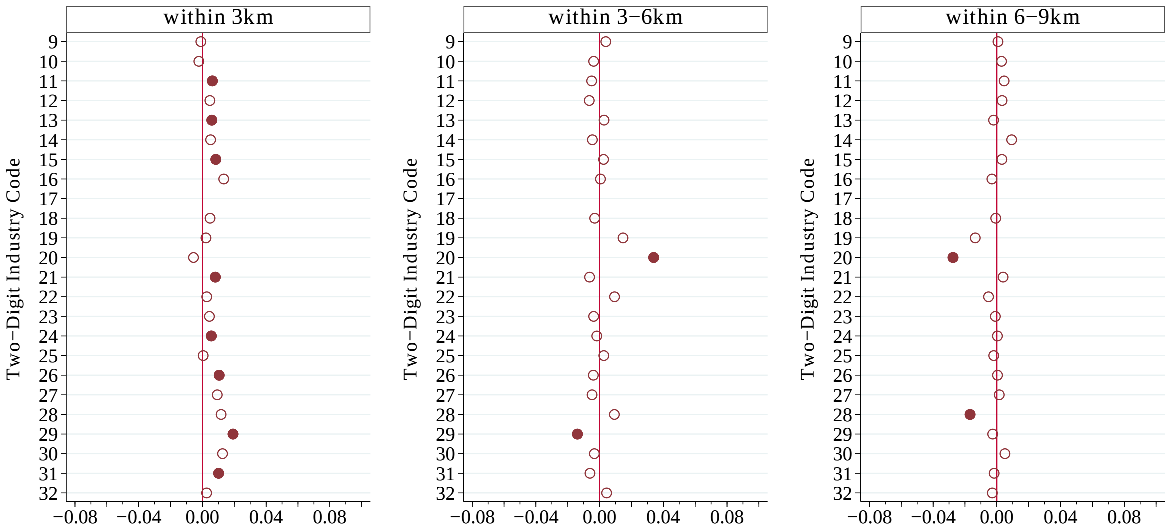

Figure OA.F. 5: Estimated Impacts of Local Agglomeration across Industries in 2016

Note: The coefficient estimates of local market size by two-digit manufacturing industry level are plotted (Tables are not presented.). "within 3 km" indicates the neighboring employment within a 3 km radius from the firm's location. "within 3–6 km" indicates the neighboring employment between a 3 km and a 6 km radius from the firm's location. "within 6–9 km" indicates the neighboring employment between a 6 km and a 9 km radius from the firm's location. The solid circle marker (•) indicates statistical significance at the 5% level and the hollow circle marker (∘) does not. The 95% confidence intervals are omitted due to limitations of space. Some two-digit industries with a small sample size (500) are not shown.