The Effects of FDI on Domestic Employment and Workforce Composition

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国内雇用と労働者構成への外国直接投資の効果

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This study uses propensity score matching techniques to examine the effects on domestic employment of Japanese manufacturing, wholesale, and service sector firms that initiated foreign direct investment (FDI) during 2003–2005. Results reveal that in all three sectors employment growth was higher among firms that initiated FDI than among firms that remained exclusively domestic. Moreover, manufacturing firms experienced higher growth in the share of non-regular workers. In addition, empirical results indicate that FDI's positive employment effects were accompanied by positive impacts on overall sales and/or exports. I find positive impacts on export sales in manufacturing and wholesale sectors and positive impacts on overall sales in manufacturing and services sectors.

Key Words : foreign direct investment, propensity score matching, services, employment, non-regular workers

I　Introduction

An increasing number of Japanese firms have become multinational enterprises (MNEs) through foreign direct investment (FDI). The lay public and policymakers fear that relocating activities to foreign countries will reduce domestic employment among firms that invest abroad. Given the recent heated policy debate in Japan, it is essential to investigate the causal effects of FDI empirically. This study determines the sign and size of firm-level effects on domestic employment from initiating FDI. Many previous studies have examined the link between domestic employment and initiating FDI; however, this study makes three singular contributions to the literature.

First, Hijzen et al. (2011) point out that evidence concerning the effects of FDI

by services sector firms is scant, even though their FDI has become more important in recent years. This study addresses that scarcity of evidence by including Japan's wholesale, manufacturing, and services sectors in its analysis. Further, to my knowledge, no study examines the effects of FDI by firms in the wholesale sector.

Second, this study tries to identify the effects of FDI on the parent firms' workforce composition. In particular, it analyzes the causal effects of FDI on the share of non-regular workers in their workforce. As Esteban-Pretel et al. (2011) point out, developed countries such as France, Japan, and Spain have experienced dramatic increase in the share of non-regular workers in recent years. Asano et al. (2013) report that the share of non-regular (contingent) workers among all workers in Japan increased from 17% in 1986 to some 34% in 2008. In Japan, several studies investigated what causes the increase in the share of non-regular workers. Among others, Asano et al. (2013) explain about one quarter of the increase of non-regular workers by the increase of female labor-force participation and the change of industrial composition. Tanaka (2013) reveals that there is little evidence for the effects of exporting on the share of non-regular workers. This study provides the first evidence that manufacturing firms initiating FDI experienced higher growth in the share of non-regular workers than do firms that remained domestic.

Third, this paper employs weighted sum of the number of workers as the firm-level measure of employment. The weight of regular worker is one, while the weights of non-regular workers are less than one based on their hours worked. This adjusted measure of employment is better than the simple non-adjusted number of workers used by previous studies such as Edamura et al. (2011) because hours worked vary substantially across categories of workers. Thus, this paper can estimate more precise effects of FDI on domestic employment than previous studies.

Notwithstanding the lay public's anxiety, this study provides econometric evidence that the Japanese firms that initiated FDI during 2003–2005 increased their domestic employment more than firms that remained exclusively domestic. They may have been able to do so because—as this study also demonstrates—firms that initiated FDI during the period enjoyed remarkably higher growth in exports and/or overall sales than firms that remained exclusively domestic. Facing rapid increases in overall and export sales, manufacturing firms that initiated FDI during the period increased the share of non-regular employees in their workforce. These results sug-

gest that foreign investment had positive consequences for Japanese firms' domestic performance.

The remainder of this paper is divided into six sections. Section Ⅱ reviews previous empirical studies. Section Ⅲ introduces my empirical strategy. Section Ⅳ describes the data and variables employed and presents descriptive statistics of the data. Section Ⅴ presents the estimation result of firms' decisions to initiate FDI. Section Ⅵ reports the causal effects of FDI. Section Ⅶ summarizes and concludes.

Ⅱ Related empirical literature

Numerous studies have investigated the causal effects of FDI or offshoring[1] using firm-level data. Most previous studies examine labor market issues, particularly FDI's employment effects. Recent studies include Barba Navaretti et al. (2010) for French and Italian firms, Castellani et al. (2008) for Italian firms, Debaere et al. (2010) for South Korean firms, Desai et al. (2009) for U.S. firms, Edamura et al. (2011) for Japanese firms, Hijzen et al. (2011) for French firms, and Wagner (2011) for German firms.

These studies suggest that offshoring need not have adverse effects on domestic employment, although Debaere et al. (2010) and Edamura et al. (2011) find that FDI directed to developing countries decreases the growth rate of a firm's domestic employment. As summarized in Wagner (2011), most previous studies reveal that effects in general employment are broadly neutral or result in a small net gain in offshoring firms.

However, the lay public in developed economies often fears that FDI will reduce domestic employment. In Japan, this potential drawback is called "hollowing out," and it remains a major topic in longstanding policy debates. Although a number of studies have analyzed the effects of Japanese firms' FDI using firm-level data, their results are mixed. Using data involving firms investing abroad for the first time between 1995 and 2000, Hijzen et al. (2007) find that Japanese FDI tends to boost both output and employment at Japanese parent firms. Yamashita and

1) Offshoring is a broader term that includes relocating any processes to a foreign country without distinguishing whether the provider is external or affiliated with the firm. Since this study analyzes the effects of initiating FDI, it focuses on insourcing to a foreign affiliate and does not include outsourcing to non-affiliated foreign firms.

Fukao (2010) estimate the labor demand equation of parent firms and find no evidence that outward FDI reduces domestic employment. To the contrary, they find evidence that overseas operations may have helped to maintain domestic employment in Japanese manufacturing during 1991–2002. In contrast to Hijzen et al. (2007) and Yamashita and Fukao (2010), Edamura et al. (2011) find no positive effects of FDI on employment growth using data for Japanese firms investing abroad for the first time between 1995 and 2005. Rather, they find that when Japanese firms direct FDI to other Asian countries, there are small negative consequences on employment growth in Japan.

Extending earlier scholarship, this study seeks to uncover the causal effects of FDI, using Japanese firm-level data and matching methods. Unlike previous studies in Japan, this more rigorous study includes wholesalers and services firms, not only manufacturers, because the economic importance of non-manufacturers has risen. It tests the hypothesis that initiating FDI affects employment adversely and examines its impact on sales and exports to investigate why any employment effects might have occurred.

In addition, this study explores FDI's effect on composition of the workforce, specifically changes in the share of non-regular workers. Non-regular or contingent employment are considered to be the status of a worker with a job contract different from regular employment, while regular employment is considered to be the status of a worker holding a permanent, full-time jobs (Esteban-Pretel et al., 2011). Among non-regular workers, the feature of part-time workers is lower scheduled hours or day of work. Dispatched workers are employees of temporary job agencies and are sent to work for other firms on short-term contracts.

Although the standard firm heterogeneity model assume that firms initiating FDI incur some forms of fixed costs for FDI, we do not know whether firms initiating FDI prefer permanent and full-time workers than non-permanent, part-time workers. Using a Japanese firm-level data, this study tries to answer this unexplored question.

This study relates to a few studies which examine the impacts of FDI on workforce composition. As one of those studies, Simpson (2012) points out that firms' overseas investment strategies may have differential effects on different categories

of workers within firms in the home economy. In particular, the theory of vertical FDI suggests that low-skilled workers in developed countries are most likely to be affected adversely by their employers investing in low-wage foreign economies. In the Japanese context, this implies that non-regular workers might be adversely affected by FDI.[2)]

However, firms initiating FDI may prefer non-regular workers than regular workers for several reasons. First, firms initiating FDI avoid increasing the number of regular workers by using non-regular workers when they are unsure to their success of FDI. Second, they may prefer non-regular workers to compete with local firms in low-wage countries since non-regular workers tend to be less-skilled but their wages are low. Third, firms initiating FDI cannot find adequate workers in frictional labor market immediately after the FDI decision. Thus, they may use non-regular workers until they can find the adequate regular workers.

Ⅲ Empirical strategy: propensity score matching

Following previous studies, I use propensity score matching (PSM) to evaluate the causal effects of FDI on employment growth and growth in share of non-regular workers as well as growth in overall and export sales. Many previous trade studies have adopted this technique, including Wagner (2011) and Hijzen et al. (2011).

The causal effects of firm i's FDI on the outcome variables, Δy, can be written as

$$\Delta y^1_{i,t+s} - \Delta y^0_{i,t+s} \tag{1}$$

where y are log of sales, exports, employment, and the share of non-regular workers. Superscript 0 refers to the non-treatment case (non-MNEs), and 1 refers to the treatment case (initiating FDI). t is the year in which the switch occurred. The fundamental problem of the causal inference is that $\Delta y^0_{i,t+s}$ is unobservable. I adopt PSM techniques to construct an appropriate counterfactual that can be used instead of $\Delta y^0_{i,t+s}$.

Using such techniques, I examine the average effect of treatment on the treated (ATT) as

2) Most Japanese first-time FDI firms invest in Asian low-wage countries.

$$\begin{aligned}\delta &= E(\Delta y^1_{i,t+s} - \Delta y^0_{i,t+s} | D_{it} = 1) \\ &= E(\Delta y^1_{i,t+s} | D_{it} = 1) - E(\Delta y^0_{i,t+s} | D_{it} = 1),\end{aligned} \tag{2}$$

where D_{it} indicates whether firm i initiated FDI for the first time in year t. Using PSM techniques, I construct the counterfactual for the last term, $E(\Delta y^0_{i,t+s}|D_{it} = 1)$.

To construct the counterfactual, I first estimate the propensity score to initiate FDI. Then firms are matched with several matching methods. In the case of the nearest-neighbor (one-to-one) matching method with replacement, the non-MNEs $c(i)$ that has the closest propensity score to start FDI is selected for each switcher i as follows:

$$c(i) = \min_{j \in \{D_{jt}=0\}} ||\hat{P_{it}} - \hat{P_{jt}}||. \tag{3}$$

Firms are matched separately for each year, each two-digit industry, and exporting status. After constructing the control group by this matching, the ATT is estimated.

Ⅳ Data

I use firm-level data from *the Basic Survey of Japanese Business Structure and Activities* by the Japanese Ministry of Economy, Trade, and Industry (METI survey). The survey covers both manufacturing and non-manufacturing industries. Subjects of the METI survey are firms with more than 50 employees and more than 30 million yen in capital. Even though it excludes small firms, it is the most comprehensive survey available for the purposes of this study, and earlier studies have engaged it, including Nishimura et al. (2005), Kimura and Kiyota (2006), and Wakasugi et al. (2008).

1 Panel of cohort

Following Hijzen et al. (2011), I construct a three-year panel of the cohort of FDI initiators and non-switchers among panel data for Japanese firms for 2001–2008. Cohorts are defined as six-year windows, $[t-2, t+3]$, where t is the year in which non-MNEs may initiate FDI. In my data, the switch year t lies within the range $[2003, 2005]$. I impose the condition that within a six-year window the panel is balanced.

表 1 Firm types in Japan (2003–2005 cohorts)

	Non-MNEs	Switcher	MNEs	Others	Total
Agriculture, etc.	80	2	22	8	112
Manufacturing	19,647	292	5,139	2,034	27,112
Wholesale	8,987	76	1,452	739	11,254
Retail	5876	11	154	184	6225
Services	5,554	49	386	373	6,362
Other services	1,533	7	103	81	1,724
Total	41,677	437	7,256	3,419	52,789

Notes: The number of firms is based on the three-year panel cohort of treated and control firms from panel data of Japanese firms for 2001–2008. Switchers are defined as firms that initiated FDI during 2003–2005. Non-MNEs are firms that had no foreign subsidiaries during all six years, $[t-2, t+3]$, whereas MNEs are firms that had foreign subsidiaries during all six years.

Table 1 reports the total number of non-MNEs, switchers, and MNEs in the data. Switchers are firms that initiated FDI between 2003 and 2005 and retained their foreign subsidiaries for the three subsequent years. Non-MNEs are firms that had no foreign subsidiary during any of the six years, $[t-2, t+3]$, and MNEs are firms that had a foreign subsidiary during all six years. MNEs and switchers are prevalent in manufacturing, wholesale, and services sectors. I therefore restrict my analysis to those three sectors. My dataset includes 292 switchers in manufacturing, 76 in wholesale, and 49 in services.

2 Labor variables

Japanese firms can employ three categories of workers: regular, part time, and dispatched.[3)] The wages of and hours worked by these three categories differ substantially. Table 2 reports the countrywide average wage and hours worked for the three categories of workers. It shows that regular workers work more hours than part-time or dispatched workers and receive more than double the hourly wage. The difference between part-time and dispatched workers is that the latter work many more hours than the former. Regular workers, in turn, work more hours than dispatched workers.

I use the weighted sum of the number of workers as a firm-level measure of labor, L.[4)] As already explained, the weight of regular worker is one, while the weights

3) See Asano et al. (2013) for a more detailed explanation.

4) Labor includes only workers in Japan and excludes workers at foreign subsidiaries.

表 2 Countrywide average of wage and hours worked in Japan (2008)

	(A) wage per hour	(B) hours worked per year	(B) / 260 days hours worked per day
Regular worker	2,712.1	1,995.1	7.7
Part-time worker	1,082.0	1,167.1	4.5
Dispatched worker	1,290.0	1,829.5	7.0

Notes: Data concerning regular and part-time workers are from the *Monthly Labor Survey*. Data concerning dispatched workers are from the *General Survey on Dispatched Workers*.

of non-regular workers are less than one based on their hours worked. I use this adjusted number of workers rather than the non-adjusted number of workers because hours worked vary substantially across the three categories of workers shown in Table 2. Dividing total hours worked by the regular workers' yearly total hours worked, I define firm-level employment (L) as follows:

$$L = \frac{N_r \times H_r + N_p \times H_p + N_d \times H_d}{H_r}, \tag{4}$$

where N and H are the number of workers and yearly total hours worked, respectively. Subscripts r, p, and d indicate regular, part-time, and dispatched workers, respectively. This measure of employment can be regarded as the number of workers in the unit of regular workers.

The industry average yearly hours worked for regular and part-time workers are provided by the Japanese Ministry of Health, Labor, and Welfare's *Monthly Labor Survey*. The country average hours worked for dispatched workers are calculated as their yearly wage divided by the hourly wage. Both the averages are from the Ministry's *General Survey on Dispatched Workers*.

The descriptive statistics of wage, labor, and workforce composition are presented in Tables 3, 4, and 5 in the sectors of manufacturing, wholesale, and services, respectively for 2005. $NONREGR$, $DISPATCHR$, and $PARTR$ are defined as

$$\begin{aligned} NONREGR &= \frac{N_p \times H_p + N_d \times H_d}{L} \times 100, \\ DISPATCHR &= \frac{N_d \times H_d}{L} \times 100, \text{ and} \\ PARTR &= \frac{N_p \times H_p}{L} \times 100, \end{aligned} \tag{5}$$

respectively. Assuming that part-time and dispatched workers' wages are deter-

表 3 Descriptive statistics of labor variables in manufacturing (2005)

		W_r (yen)	L	$NONREGR$ (%)	$DISPATCHR$ (%)	$PARTR$ (%)
Non-MNEs	Mean	2903.2	218.8	12.8	5.3	7.6
	SD	1249.2	398.2	15.7	9.7	13.0
	N	6156	6207	6207	6207	6207
Switcher	Mean	3081.1	420.5	14.4	8.4	6.0
	SD	1268.5	469.9	14.6	11.6	8.5
	N	88	88	88	88	88
MNEs	Mean	3531.6	1354.5	11.5	6.1	5.5
	SD	1363.7	4014.8	11.6	8.6	8.8
	N	1669	1713	1713	1713	1713
Others	Mean	3251.9	429.1	12.8	5.9	6.9
	SD	1319.1	1009.2	14.5	9.6	11.4
	N	607	618	618	618	618
Total	Mean	3053.0	461.4	12.6	5.5	7.1
	SD	1302.2	1894.6	14.9	9.5	12.2
	N	8520	8626	8626	8626	8626

表 4 Descriptive statistics of labor variables in the wholesale sector (2005)

		W_r (yen)	L	$NONREGR$ (%)	$DISPATCHR$ (%)	$PARTR$ (%)
Non-MNEs	Mean	2783.0	196.2	9.4	2.2	7.2
	SD	855.2	368.9	13.2	5.0	12.4
	N	2962	2964	2964	2964	2964
Switcher	Mean	2897.6	172.5	8.0	2.4	5.6
	SD	1109.3	121.4	10.3	2.7	10.8
	N	21	21	21	21	21
MNEs	Mean	3404.5	630.8	8.6	4.1	4.6
	SD	1047.1	2265.1	9.8	5.8	8.6
	N	494	500	500	500	500
Others	Mean	3132.8	335.6	10.0	4.0	6.0
	SD	984.5	730.0	12.2	7.1	10.7
	N	235	235	235	235	235
Total	Mean	2888.5	263.3	9.3	2.6	6.8
	SD	919.3	923.4	12.7	5.3	11.9
	N	3712	3720	3720	3720	3720

表 5 Descriptive statistics of labor variables in the services sector (2005)

		W_r (yen)	L	$NONREGR$ (%)	$DISPATCHR$ (%)	$PARTR$ (%)
Non-MNEs	Mean	2783.0	196.2	9.4	2.2	7.2
	SD	855.2	368.9	13.2	5.0	12.4
	N	2962	2964	2964	2964	2964
Switcher	Mean	2897.6	172.5	8.0	2.4	5.6
	SD	1109.3	121.4	10.3	2.7	10.8
	N	21	21	21	21	21
MNEs	Mean	3404.5	630.8	8.6	4.1	4.6
	SD	1047.1	2265.1	9.8	5.8	8.6
	N	494	500	500	500	500
Others	Mean	3132.8	335.6	10.0	4.0	6.0
	SD	984.5	730.0	12.2	7.1	10.7
	N	235	235	235	235	235
Total	Mean	2888.5	263.3	9.3	2.6	6.8
	SD	919.3	923.4	12.7	5.3	11.9
	N	3712	3720	3720	3720	3720

mined by the labor market apart from any individual firm,[5] I construct the firm-level hourly real wage of regular workers, W_r, as follows:

$$W_r = \frac{WC - N_p \times H_p \times W_p}{N_r \times H_r} \tag{6}$$

where WC is the real wage cost of a firm from the METI survey and W_p is the industry average hourly real wage of part-time workers from the *Monthly Labor Survey*. WC includes only the real wage cost of regular and part-time workers.[6] In all three sectors, wages of regular workers are on average highest among MNEs, followed by switchers. The wage is lowest among non-MNEs. MNEs generally employ the most workers in all three sectors. Among manufacturers, switchers employ more workers than non-MNEs, whereas among wholesalers and service sector firms, switchers employ fewer workers than non-MNEs. The standard deviation for the share of non-regular workers is too large to determine an ordering. However, on

5) Although this assumption is plausible, it is well known that hourly wages of part-time workers vary across regions in Japan. I, however, cannot control this regional effect because data are lacking.

6) Wages and wage cost are deflated by the industry deflator, which is taken from the Cabinet Office's *System of National Accounts (SNA) Statistics*.

average, the share of dispatched workers is lower and the share of part-time workers is higher among non-MNEs than among switchers and MNEs in all sectors.

3 Measurement of firm productivity

Next, I explain the measure of total factor productivity (TFP) used later in this study. I obtain Japanese parent firms' TFP from an estimated two-digit, industry-specific production function using techniques from Levinsohn and Petrin (2003).[7] For output, I use Japanese parent firms' real value added, which is deflated using the industry-level deflator. The value added in my data reflects a parent firm's domestic and export sales but not foreign subsidiaries' sales in host countries. I employ Japanese parent firms' domestic employment (L) and fixed tangible assets (K) as inputs. Following Arnold and Hussinger (2010), I use the relative TFP obtained by dividing the TFP estimates by the average TFP in the corresponding industry and year because I use TFP from various industries.

V Decision to initiate FDI

To construct the control group, I estimate the propensity score to initiate FDI using a sample of non-MNEs and switchers:

$$\begin{aligned} P(D_{it}=1) = F(&\ln TFP_{i,t-2}, \ln L_{i,t-2}, \ln KAPINT_{i,t-2}, \\ &RDINT_{i,t-2}, \ln AGE_{i,t-2}, FOREIGN_{i,t-2}, \\ &\ln EXPORTS_{i,t-2}, year, industry), \end{aligned} \tag{7}$$

where F is a logistic cumulative distribution function. TFP, L, $KAPINT$, $RDINT$, AGE, $FOREIGN$, and $EXPORTS$ are TFP, labor, capital intensity (capital-labor ratio), R&D intensity (R&D-sales ratio), firm age, foreign-ownership ratio, and export sales, respectively. $year$ and $industry$ denote year and industry fixed effects, respectively. The choice of explanatory variables follows previous studies such as Hijzen et al. (2007) and Ito (2007). Following Hijzen et al. (2011), I use explanatory variables with two years lag. Hijzen et al. (2011) pointed out that

7) Following Tanaka (2012a), I use transportation and packaging costs to proxy unobserved productivity shocks since my data do not contain costs of electricity, materials, or fuels.

表 6　Decision to initiate FDI

	(1) Manufacturing	(2) Wholesales	(3) Services
ln TFP (t-2)	0.003	1.196***	0.026
	[0.144]	[0.304]	[0.216]
ln L (t−2)	0.675***	−0.932**	0.495**
	[0.172]	[0.371]	[0.251]
ln KAPINT (t−2)	0.177**	−0.039	0.106
	[0.071]	[0.072]	[0.114]
RDINT (t−2)	6.950***	−15.048	5.221***
	[2.364]	[11.405]	[1.263]
ln AGE (t−2)	0.228*	0.186	−0.125
	[0.131]	[0.257]	[0.261]
FOREIGN (t−2)	−0.856**	−1.383	−0.603
	[0.427]	[0.868]	[1.404]
ln EXPORTS (t−2)	0.190***	0.251***	0.308***
	[0.026]	[0.042]	[0.117]
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Observations	18511	8962	4581
Pseudo-R-squared	0.119	0.121	0.078

Notes: Standard errors are shown in brackets. Constants are suppressed. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

the traditional approach which uses explanatory variables with one years lag may be unsatisfactory. This is because part of the causal effect due to the decision to invest abroad may actually occur before the year of the investment if the investment decision is taken one or two years before the investment takes place and if the investment decision is taken in conjunction with other decisions that affect the observable characteristics of the firm. Thus, I employ the specification with two years lag.

Table 6 shows the estimation results of equation (7). Although they suggest that remarkable differences exist in determinants of FDI among the three sectors, uncovering the underlying reasons is beyond this study.

The coefficients for TFP are positive and statistically significant for wholesalers[8)]

8) This result is consistent with Tanaka (2011).

but not significant in manufacturing and services. The coefficients of TFP are not significant in manufacturing. This might be surprising given that the standard firm heterogeneity model of FDI by Helpman et al. (2004) predicts that more-productive manufacturing firms conduct FDI.

Firm size, measured as the adjusted number of workers, is significant in all sectors, although its signs vary across sectors. They are positively significant in manufacturing and services and negatively significant in wholesale. Therefore, larger manufacturing and services firms tend to initiate FDI, whereas wholesale firms that initiate FDI tend to be smaller but more productive.

In addition, R&D intensity significantly influences manufacturing and services firms' decisions to initiate FDI, whereas it has no significant influence on wholesalers. Capital-labor ratio, firm age, and foreign ownership ratio have positive coefficients, suggesting that capital-intensive, older, and foreign-owned manufacturers are more likely to initiate FDI. These variables are not significant in the wholesale and services sectors. Finally, exports sales significantly influence the decision to initiate FDI in all sectors.

Ⅵ Causal effects of FDI

Constructing the counterfactual on the basis of an estimated propensity score, I examine the causal effects of FDI. Here, I present the results from the one-nearest-neighbor matching[9] only. Results from other matching, including three-nearest-neighbors matching and kernel matching, are reported in Tanaka (2012b). The balancing property is satisfied for almost all matching.[10] Namely, the difference in means of the variables used to compute the propensity score is never statistically significant between firms that initiated FDI and the matched domestic-only firms. The common support condition is imposed by dropping the firms that initiate FDI whose propensity score is higher than the maximum or lower than the minimum propensity score of the non-firms that initiate FDI.

Tables 7, 8, and 9 report the results in manufacturing, wholesale, and services, respectively. First, three years after manufacturers initiated FDI, their domestic

9) Graphical analyses of the causal effects of FDI appear in Tanaka (2012b).

10) The balancing property is not satisfied for kernel matching with the bandwidth 0.03 in wholesale.

表 7　The causal effect of FDI in manufacturing: one-nearest-neighbor matching

Outcome		(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value
ln Sales	t+1	0.300	0.241	0.060	2.02**	2.93**
	t+2	0.382	0.310	0.071	2.15**	3.08**
	t+3	0.441	0.364	0.077	1.99**	2.40**
ln Exports	t+1	1.102	0.181	0.921	5.71**	6.57**
	t+2	1.356	0.293	1.063	6.27**	6.87**
	t+3	1.543	0.319	1.224	6.72**	8.58**
ln Employment	t+1	0.136	0.041	0.096	5.22**	5.00**
	t+2	0.171	0.053	0.119	5.89**	8.07**
	t+3	0.177	0.051	0.126	5.48**	11.01**
Share of dispatched workers	t+1	3.587	1.756	1.831	2.68**	2.48**
	t+2	4.033	1.933	2.100	2.78**	2.48**
	t+3	3.266	1.669	1.597	2.03**	1.54
Share of part-time workers	t+1	0.118	−0.083	0.200	0.30	0.27
	t+2	0.131	0.044	0.087	0.16	0.08
	t+3	0.148	0.478	−0.330	−0.56	−0.32

Notes: The figures in columns (1) and (2) are the change from $t-2$ in the log of variables for sales, exports, and employment, whereas they are the change from $t-2$ in the variables (percentage) for the shares. The number of treated firms is 288. The common support condition is imposed. ATT is the average treatment effect on the treated; bootstrapped t-values are based on 100 replications. ** indicates significance at the 5% level. The balancing property is satisfied.

表 8　The causal effect of FDI in the wholesale sector: one-nearest-neighbor matching

Outcome		(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value
ln Sales	t+1	0.130	0.122	0.008	0.13	0.21
	t+2	0.151	0.158	−0.007	−0.13	−0.13
	t+3	0.132	0.137	−0.005	−0.08	−0.09
ln Exports	t+1	1.140	−0.065	1.206	3.00**	4.61**
	t+2	1.185	0.037	1.149	2.79**	4.43**
	t+3	1.084	−0.101	1.185	3.22**	3.48**
ln Employment	t+1	0.091	0.038	0.053	1.33	1.62
	t+2	0.131	0.053	0.079	1.80*	2.83**
	t+3	0.158	0.064	0.095	2.07**	2.97**
Share of dispatched workers	t+1	0.269	0.393	−0.124	−0.24	−0.18
	t+2	0.853	0.590	0.263	0.45	0.63
	t+3	0.388	0.242	0.145	0.26	0.26
Share of part-time workers	t+1	0.513	−0.199	0.713	0.81	0.76
	t+2	0.364	−0.209	0.573	0.69	0.62
	t+3	1.035	0.492	0.542	0.62	0.43

Notes: Figures in columns (1) and (2) are the change from $t-2$ in the log of variables for sales, exports, and employment, whereas they are the change from $t-2$ in the variables (percentage) for the shares. The number of treated firms is 75. The common support condition is imposed. ATT is the average treatment effect on the treated; bootstrapped t-values are based on 100 replications. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

表 9 The causal effect of FDI in the services sector: one-nearest-neighbor matching

Outcome		(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value
ln Sales	t+1	0.201	0.097	0.104	1.66	1.24
	t+2	0.266	0.119	0.148	2.06**	1.71*
	t+3	0.288	0.111	0.176	2.30**	2.03**
ln Exports	t+1	0.125	0.121	0.003	0.01	0.02
	t+2	0.028	0.164	−0.137	−0.45	−0.55
	t+3	−0.035	0.228	−0.262	−0.78	−1.03
ln Employment	t+1	0.104	0.068	0.036	0.59	0.55
	t+2	0.145	0.088	0.057	0.73	0.60
	t+3	0.165	0.070	0.095	1.13	1.08
Share of dispatched workers	t+1	1.689	0.331	1.358	1.03	0.61
	t+2	1.956	0.719	1.236	1.03	0.91
	t+3	1.783	1.025	0.758	0.58	0.32
Share of part-time workers	t+1	−1.032	−0.407	−0.626	−0.47	−0.52
	t+2	−2.361	−1.845	−0.516	−0.17	−0.18
	t+3	−0.936	−1.905	0.969	0.37	0.47

Notes: Figures in columns (1) and (2) are the change from $t-2$ in the log of variables for sales, exports, and employment, whereas they are the change from $t-2$ in the variables (percentage) for the shares. The number of treated firms is 48. The common support condition is imposed. ATT is the average treatment effect on the treated; bootstrapped t-values are based on 100 replications. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

employment growth was significantly higher (12.6%) and their growth in overall sales was significantly larger (7.7%) than firms that remained domestic. In addition, FDI substantially influenced manufacturers' growth in export sales: three years after initiating FDI, their average growth in export sales was 122.4%. This large increase in export sales was accompanied by an average 1.6% increase in the share of dispatched workers three years after initiating FDI. This average impact for the period was large because on average dispatched workers were 5.5% of the workforce in manufacturing in 2005. On the other hand, the impact of FDI on growth in the share of part-time workers is not significant. These results imply that first-time foreign direct investors among manufacturers have strong incentives to employ temporary dispatched workers.

Second, among wholesalers, first-time foreign direct investors experienced higher average growth in employment (9.5%) and higher average growth in export sales (118.5%) three years after investing. The average effects of FDI on growth of other variables are not significant. Initiating FDI had no significant effects on overall sales and growth of share of non-regular workers.

Finally, although FDI had a significantly positive effect on overall sales growth among services firms—17.6% increase in growth three years after investing—its effect was not significant for other variables in the case of one-nearest-neighbor matching. In some cases of three-nearest-neighbors and kernel matching, FDI showed significant and positive effects on employment growth, as shown in Tanaka (2012b). In the case of three-nearest-neighbors matching, the average effect of FDI on employment growth is 10.4%.

To summarize, for Japanese firms in manufacturing, wholesale, and services, I find no evidence that initiating FDI curtailed growth in sales and employment during the sampled period. Rather, I find many instances of a complementary relationship between foreign subsidiaries and domestic parent firms in the sense that initiating FDI increased growth in sales and growth of labor at home. Furthermore, the positive impact on sales and/or employment growth is on average quantitatively large.

Ⅶ Conclusion

This study employed a PSM technique to investigate the consequences for Japanese firms that initiated FDI using extensive firm-level data for 2001–2008. After opening overseas subsidiaries, Japanese manufacturing, wholesale, and services firms experienced greater domestic employment growth than firms that remained exclusively domestic. This finding should assuage the lay public's concerns about foreign investment. In addition, manufacturers employed more dispatched workers as a share of the workforce after initiating FDI. Manufacturers and services firms that initiated FDI reported greater growth in overall sales, and manufacturers and wholesalers reported extremely higher growth in export sales.

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