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Abstract

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 those 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. Positive impacts on export sales in manufacturing and wholesale sectors and on overall sales in manufacturing and services sectors were found.

Keywords: Foreign direct investment; Propensity score matching; Services; Employment;
Non-regular workers

JEL classification: F16, F21, F23

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1 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. (2011) 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. (2011) 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 (2012) 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 suggest that foreign investment had positive consequences for Japanese firms' domestic performance.

The remainder of this paper is divided into six sections. Section 2 reviews previous empirical studies. Section 3 introduces my empirical strategy. Section 4 describes the data and variables employed and presents descriptive statistics of the data. Section 5 presents the estimation result of firms' decisions to initiate FDI. Section 6 reports the causal effects of FDI. Section 7 summarizes and concludes.

2 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

^{*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.

“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 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 of Helpman et al. (2004) 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.

3 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

$$\Delta y_{i,t+s}^1 - \Delta y_{i,t+s}^0 \quad (1)$$

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 $\Delta y_{i,t+s}^0$ is unobservable. I adopt PSM techniques to construct an appropriate counterfactual that can be used instead of $\Delta y_{i,t+s}^0$.

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

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

^{*2}Most Japanese first-time FDI firms invest in Asian low-wage countries.

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, $E(\Delta y_{i,t+s}^0 | D_{it} = 1)$.

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:

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

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.

4 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).

4.1 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.

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

Table 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.

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.

4.2 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 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

^{*3}See Asano et al. (2011) for a more detailed explanation.

^{*4}Labor includes only workers in Japan and excludes workers at foreign subsidiaries.

Table 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*.

regular workers' yearly total hours worked, I define firm-level employment (L) as follows:

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

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

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

respectively. Assuming that part-time and dispatched workers' wages are determined by the labor market apart from any individual firm,^{*5} I construct

^{*5}Although this assumption is plausible, it is well known that hourly wages of part-

Table 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

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

		W_r	L	$NONREGR$	$DISPATCHR$	$PARTR$
		(yen)		(%)	(%)	(%)
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

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

		W_t	L	$NONREGR$	$DISPATCHR$	$PARTR$
		(yen)		(%)	(%)	(%)
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

the firm-level hourly real wage of regular workers, W_r , as follows:

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

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 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.

4.3 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.

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*.

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

5 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:

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

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 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} 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.

^{*8}This result is consistent with Tanaka (2011)

Table 6: Decision to initiate FDI

	(1)	(1)	(1)
	Manufacturing	Wholesales	Services
ln TFP (t-2)	0.003 [0.144]	1.196*** [0.304]	0.026 [0.216]
ln L (t-2)	0.675*** [0.172]	-0.932** [0.371]	0.495** [0.251]
ln KAPINT (t-2)	0.177** [0.071]	-0.039 [0.072]	0.106 [0.114]
RDINT (t-2)	6.950*** [2.364]	-15.048 [11.405]	5.221*** [1.263]
ln AGE (t-2)	0.228* [0.131]	0.186 [0.257]	-0.125 [0.261]
FOREIGN (t-2)	-0.856** [0.427]	-1.383 [0.868]	-0.603 [1.404]
ln EXPORTS (t-2)	0.190*** [0.026]	0.251*** [0.042]	0.308*** [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.

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.

6 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 Tables 14–22 of Appendix 3. 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 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

^{*9}Graphical analyses of the causal effects of FDI appear in Appendix 4.

^{*10}The balancing property is not satisfied for kernel matching with the bandwidth 0.03 in wholesale.

and kernel matching, FDI showed significant and positive effects on employment growth, as shown in Table 20–22 of Appendix 3. 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.

Table 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. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

Table 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
	t+2	0.151	0.158	-0.007	-0.13
	t+3	0.132	0.137	-0.005	-0.08
ln Exports	t+1	1.140	-0.065	1.206	3.00
	t+2	1.185	0.037	1.149	2.79
	t+3	1.084	-0.101	1.185	3.22
ln Employment	t+1	0.091	0.038	0.053	1.33
	t+2	0.131	0.053	0.079	1.80
	t+3	0.158	0.064	0.095	2.07
Share of dispatched workers	t+1	0.269	0.393	-0.124	-0.24
	t+2	0.853	0.590	0.263	0.45
	t+3	0.388	0.242	0.145	0.26
Share of part-time workers	t+1	0.513	-0.199	0.713	0.81
	t+2	0.364	-0.209	0.573	0.69
	t+3	1.035	0.492	0.542	0.62

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.

Table 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.

7 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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Appendix 1: firm type by industry

Table 10: Firm type by industry in manufacturing

code	description	Non-MNEs	Switcher	MNEs	Others	Total
121	Meat and meat products	511	1	19	12	543
122	Fish and fish products	364	1	34	11	410
123	Grain mill products	85	1	6	7	99
129	Other food products	1,574	11	154	105	1,844
131	Beverages and tobacco products	268	3	48	23	342
132	Prepared animal feeds	77	1	7	7	92
141	Spinning	34	0	7	4	45
142	Weaving	94	1	33	12	140
143	Dyeing	126	0	11	8	145
149	Other textiles	149	3	49	21	222
151	Knitted and crocheted fabrics and articles	282	2	61	31	376
152	Other wearing apparel	119	0	10	7	136
161	Sawmilling and planing of wood	194	2	18	12	226
169	Other products of wood	33	0	7	1	41
170	Furniture	241	4	35	23	303
181	Paper and paper products	170	1	34	10	215
182	Corrugated paper and paperboard	526	9	37	44	616
191	Publishing of newspapers	179	0	13	8	200
192	Publishing	184	3	15	19	221
193	Printing	1,103	5	61	49	1,218
201	Chemical fertilizer and inorganic chemistry	146	3	66	14	229
202	Organic chemistry	234	6	133	37	410
204	Soap and detergents	176	1	95	20	292
205	Pharmaceuticals and medicinal chemicals	366	0	82	45	493
209	Other chemical products	302	11	181	62	556
211	Refined petroleum products	41	1	15	7	64
219	Other petroleum products	31	3	15	7	56
220	Plastic products	948	20	288	129	1,385
231	Rubber tyres and tubes	9	0	15	5	29
239	Other rubber products	209	3	69	20	301
240	Leather and fur	32	1	10	5	48
251	Glass and glass products	176	2	44	23	245
252	Cement, lime and plaster	335	1	12	13	361
259	Other non-metallic mineral products	310	5	69	29	413
261	Basic iron and steel	317	3	81	35	436
262	Casting of iron and steel	394	8	32	29	463
271	Non-ferrous metals	93	0	36	8	137
272	Casting of non-ferrous metals	353	10	113	46	522
281	Structural metal products	559	2	45	26	632
289	Other fabricated metal products	1,012	13	287	108	1,420
291	Machinery for metallurgy	293	12	152	42	499
292	Other special purpose machinery	623	13	194	94	924
293	Office machinery	215	1	80	9	305
299	Other general purpose machinery	1,093	27	396	157	1,673
301	Industrial electricity machinery	676	12	163	64	915
302	Household electrical appliances	169	1	60	24	254
303	Communication equipment	344	2	146	38	530
304	Applied electronic apparatus	250	8	87	46	391
305	Electronic components	948	7	404	106	1,465
309	Other electrical equipment	330	7	124	46	507
311	Motor vehicles	1,125	43	579	186	1,933
319	Other transport equipment	355	5	87	29	476
321	Medical equipment	145	4	47	16	212
322	Optical instruments	94	0	56	16	166
329	Other precision instruments	245	5	65	41	356
340	Other manufacturing	386	4	152	38	580
Total		19,647	292	5,139	2,034	27,112

Table 11: Firm type by industry in wholesale

code	description	Non-MNEs	Switcher	MNEs	Others	Total
491	Wholesale of textiles	104	1	36	24	165
492	Wholesale of clothing	423	7	153	68	651
501	Wholesale of agricultural raw materials	894	1	55	32	982
502	Wholesale of food and beverages	921	2	66	40	1,029
511	Wholesale of construction materials	826	2	57	26	911
512	Wholesale of chemicals	486	9	184	76	755
513	Wholesale of metals and metal ores	846	8	145	66	1,065
514	Wholesale of waste and scrap	67	1	8	6	82
520	Wholesale of machinery, equipment and supplies	2,798	28	496	265	3,587
531	Wholesale of furniture, etc	236	4	27	23	290
532	Wholesale of medical goods and cosmetics	385	2	27	17	431
539	Wholesale on a fee or contract basis	1,001	11	198	96	1,306
Total		8,987	76	1,452	739	11,254

Table 12: Firm type by industry in services

code	description	Non-MNEs	Switcher	MNEs	Others	Total
600	Restaurants	580	6	21	62	669
720	Washing and cleaning of textile	46	0	0	0	46
730	Parking	3	0	0	0	3
741	Photographic activities	22	0	0	1	23
750	Hotels	89	0	2	5	96
762	Creative, arts and entertainment activities	6	0	3	0	9
766	Sporting activities	512	0	9	3	524
770	Maintenance and repair of motor vehicles	46	0	0	0	46
780	Repair of machinery and equipment	325	4	13	8	350
790	Rental and leasing activities	405	4	57	18	484
821	Software	1,614	23	141	171	1,949
822	Broadcasting and information service activities	625	4	56	36	721
830	Advertising	249	2	7	8	266
841	Engineering activities	150	2	23	19	194
842	Design activities	55	0	4	7	66
861	Services to buildings	64	0	0	0	64
862	Landscape activities	8	0	5	0	13
890	Education	755	4	45	35	839
Total		5,554	49	386	373	6,362

Appendix 2: descriptive statistics for logit estimation

Table 13: Descriptive statistics for logit estimation (2003?2005)

Panel A: Manufacturing					
variable	mean	sd	N	min	max
Firms that initiate FDI dummy	0.016	0.124	18596	0.000	1.000
ln TFP (t-2)	-1.327	0.994	18596	-7.315	3.669
ln L (t-2)	4.988	0.730	18596	3.743	9.590
ln KAPINT (t-2)	-5.739	1.111	18596	-14.780	-0.669
RDINT (t-2)	0.006	0.016	18596	0.000	0.593
ln Age (t-2)	3.521	0.621	18596	0.000	4.625
FOREIGN (t-2)	0.018	0.133	18596	0.000	1.000
ln Exports (t-2)	0.792	1.943	18596	0.000	11.712
Panel B: Whoelsale					
variable	mean	sd	N	min	max
Firms that initiate FDI dummy	0.008	0.091	8962	0.000	1.000
ln TFP (t-2)	-0.901	0.855	8962	-6.590	3.636
ln L (t-2)	4.889	0.712	8962	3.734	9.590
ln KAPINT (t-2)	-5.976	1.421	8962	-12.886	-1.748
RDINT (t-2)	0.001	0.005	8962	0.000	0.136
ln Age (t-2)	3.565	0.613	8962	0.000	4.654
FOREIGN (t-2)	0.021	0.144	8962	0.000	1.000
ln Exports (t-2)	0.672	1.838	8962	0.000	13.278
Panel C: Services					
variable	mean	sd	N	min	max
Firms that initiate FDI dummy	0.010	0.102	4581	0.000	1.000
ln TFP (t-2)	-1.037	1.139	4581	-5.724	4.634
ln L (t-2)	5.326	0.939	4581	3.698	10.084
ln KAPINT (t-2)	-7.560	2.242	4581	-14.157	0.043
RDINT (t-2)	0.003	0.025	4581	0.000	1.005
ln Age (t-2)	3.070	0.662	4581	0.000	4.489
FOREIGN (t-2)	0.017	0.131	4581	0.000	1.000
ln Exports (t-2)	0.136	0.838	4581	0.000	12.415

Appendix 3: causale effects of FDI

Table 14: The causal effect of FDI in manufacturing: three-nearest-neighbors matching

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value	
ln Sales	t+1	0.300	0.222	0.078	3.34	**
	t+2	0.382	0.293	0.089	3.33	**
	t+3	0.441	0.344	0.097	3.06	**
ln Exports	t+1	1.102	0.221	0.881	6.24	**
	t+2	1.356	0.248	1.108	7.36	**
	t+3	1.543	0.201	1.341	8.16	**
ln Employment	t+1	0.136	0.024	0.113	7.00	**
	t+2	0.171	0.041	0.131	7.29	**
	t+3	0.177	0.039	0.138	6.76	**
Share of dispatched workers	t+1	3.587	1.587	2.000	3.47	**
	t+2	4.033	2.019	2.013	3.14	**
	t+3	3.266	1.667	1.599	2.32	**
Share of part-time workers	t+1	0.118	0.116	0.002	0.00	0.00
	t+2	0.131	0.298	-0.167	-0.37	-0.20
	t+3	0.148	0.604	-0.456	-0.97	-0.60

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 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. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

Table 15: The causal effect of FDI in manufacturing: kernel matching (bwith = 0.01)

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value	
ln Sales	t+1	0.300	0.216	0.085	4.08	**
	t+2	0.382	0.292	0.090	3.81	**
	t+3	0.441	0.341	0.100	3.55	**
ln Exports	t+1	1.102	0.028	1.074	8.24	**
	t+2	1.356	0.046	1.310	9.35	**
	t+3	1.543	0.038	1.505	9.92	**
ln Employment	t+1	0.136	0.029	0.107	7.34	**
	t+2	0.171	0.049	0.123	7.61	**
	t+3	0.177	0.045	0.132	7.18	**
Share of dispatched workers	t+1	3.587	2.207	1.381	2.76	**
	t+2	4.033	2.832	1.201	2.15	**
	t+3	3.266	2.227	1.039	1.76	*
Share of part-time workers	t+1	0.118	0.230	-0.112	-0.27	-0.36
	t+2	0.131	0.467	-0.336	-0.82	-0.87
	t+3	0.148	0.743	-0.595	-1.44	-1.23

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 288. The common support condition is imposed. ATT is the average treatment effect on the treated; bootstrapped t-values are based on 100 replications. Kernel matching uses the Epanechnikov kernel. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

Table 16: The causal effect of FDI in manufacturing: kernel matching (bwith = 0.03)

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value	
ln Sales	t+1	0.300	0.207	0.093	4.52	**
	t+2	0.382	0.279	0.102	4.40	**
	t+3	0.441	0.327	0.114	4.11	**
ln Exports	t+1	1.102	0.040	1.063	8.18	**
	t+2	1.356	0.056	1.300	9.30	**
	t+3	1.543	0.054	1.488	9.84	**
ln Employment	t+1	0.136	0.028	0.108	7.50	**
	t+2	0.171	0.045	0.126	7.92	**
	t+3	0.177	0.041	0.135	7.44	**
Share of dispatched workers	t+1	3.587	2.094	1.493	3.00	**
	t+2	4.033	2.687	1.346	2.43	**
	t+3	3.266	2.173	1.093	1.86	*
Share of part-time workers	t+1	0.118	0.256	-0.138	-0.34	
	t+2	0.131	0.519	-0.388	-0.96	
	t+3	0.148	0.843	-0.695	-1.71	*

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 288. The common support condition is imposed. ATT is the average treatment effect on the treated; bootstrapped t-values are based on 100 replications. Kernel matching uses the Epanechnikov kernel. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

Table 17: The causal effect of FDI in wholesale: three-nearest-neighbors matching

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value
ln Sales	t+1	0.130	0.107	0.023	0.58
	t+2	0.151	0.125	0.026	0.57
	t+3	0.132	0.099	0.033	0.60
ln Exports	t+1	1.140	-0.058	1.198	3.81
	t+2	1.185	0.007	1.178	3.47
	t+3	1.084	-0.043	1.127	3.58
ln Employment	t+1	0.091	0.032	0.059	1.71
	t+2	0.131	0.048	0.083	2.18
	t+3	0.158	0.045	0.113	2.79
Share of dispatched workers	t+1	0.269	0.873	-0.604	-1.20
	t+2	0.853	0.988	-0.136	-0.25
	t+3	0.388	0.562	-0.175	-0.33
Share of part-time workers	t+1	0.513	0.977	-0.464	-0.66
	t+2	0.364	0.348	0.015	0.03
	t+3	1.035	0.867	0.168	0.24

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.

Table 18: The causal effect of FDI in wholesale: kernel matching (bwith = 0.01)

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value
ln Sales	t+1	0.130	0.082	0.048	1.50
	t+2	0.151	0.110	0.041	1.13
	t+3	0.132	0.101	0.031	0.67
ln Exports	t+1	1.140	-0.080	1.220	4.30
	t+2	1.185	-0.098	1.283	4.06
	t+3	1.084	-0.100	1.184	4.06
ln Employment	t+1	0.091	0.023	0.068	2.25
	t+2	0.131	0.036	0.096	2.86
	t+3	0.158	0.041	0.117	3.32
Share of dispatched workers	t+1	0.269	0.752	-0.483	-1.16
	t+2	0.853	0.870	-0.017	-0.04
	t+3	0.388	0.837	-0.449	-0.96
Share of part-time workers	t+1	0.513	0.518	-0.004	-0.01
	t+2	0.364	0.863	-0.499	-1.28
	t+3	1.035	1.206	-0.172	-0.37

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. Kernel matching uses the Epanechnikov kernel. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

Table 19: The causal effect of FDI in wholesale: kernel matching (bwith = 0.03)

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value	
ln Sales	t+1	0.130	0.074	0.056	1.78	*
	t+2	0.151	0.095	0.055	1.54	
	t+3	0.132	0.085	0.047	1.02	
ln Exports	t+1	1.140	-0.041	1.181	4.16	**
	t+2	1.185	-0.039	1.225	3.88	**
	t+3	1.084	-0.038	1.122	3.85	**
ln Employment	t+1	0.091	0.016	0.075	2.51	**
	t+2	0.131	0.027	0.105	3.13	**
	t+3	0.158	0.030	0.128	3.65	**
Share of dispatched workers	t+1	0.269	0.760	-0.491	-1.19	
	t+2	0.853	0.866	-0.013	-0.03	
	t+3	0.388	0.825	-0.437	-0.95	
Share of part-time workers	t+1	0.513	0.562	-0.048	-0.10	
	t+2	0.364	0.950	-0.587	-1.57	
	t+3	1.035	1.412	-0.378	-0.84	

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. Kernel matching uses the Epanechnikov kernel. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is not satisfied.

Table 20: The causal effect of FDI in services: three-nearest-neighbors matching

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value
ln Sales	t+1	0.201	0.114	0.088	1.47
	t+2	0.266	0.135	0.131	1.97
	t+3	0.288	0.138	0.150	2.22
ln Exports	t+1	0.125	0.043	0.082	0.28
	t+2	0.028	0.089	-0.062	-0.21
	t+3	-0.035	0.131	-0.166	-0.50
ln Employment	t+1	0.104	0.054	0.050	0.94
	t+2	0.145	0.049	0.096	1.35
	t+3	0.165	0.061	0.104	1.44
Share of dispatched workers	t+1	1.689	0.825	0.864	0.91
	t+2	1.956	1.163	0.793	0.87
	t+3	1.783	1.418	0.364	0.35
Share of part-time workers	t+1	-1.032	-0.942	-0.090	-0.07
	t+2	-2.361	0.310	-2.671	-1.03
	t+3	-0.936	0.064	-0.999	-0.48

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.

Table 21: The causal effect of FDI in services: kernel matching (bwith = 0.01)

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value
ln Sales	t+1	0.188	0.070	1.34	1.32
	t+2	0.250	0.099	1.67	* 1.80
	t+3	0.271	0.165	1.86	* 1.79
ln Exports	t+1	0.102	0.209	0.78	0.68
	t+2	0.002	-0.158	0.59	0.63
	t+3	0.084	-0.181	0.265	1.03
ln Employment	t+1	0.104	0.038	1.34	1.50
	t+2	0.143	0.059	1.22	1.61
	t+3	0.163	0.074	1.31	2.03
Share of dispatched workers	t+1	1.725	0.829	0.896	0.98
	t+2	1.961	1.314	0.647	0.71
	t+3	1.778	1.539	0.239	0.20
Share of part-time workers	t+1	-1.054	-0.212	-0.842	-0.72
	t+2	-2.858	0.385	-3.242	-1.43
	t+3	-1.400	0.838	-2.238	-1.45

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. Kernel matching uses the Epanechnikov kernel. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

Table 22: The causal effect of FDI in services: kernel matching (bwith = 0.03)

Outcome	(1) Treated	(2) Controls	(3) ATT	(4) t-value	(5) Bootstrapped t-value
ln Sales	t+1	0.188	0.072	1.38	1.39
	t+2	0.250	0.099	1.69	2.11 **
	t+3	0.271	0.164	1.08	1.90 *
ln Exports	t+1	0.102	-0.065	0.62	0.51
	t+2	0.002	-0.081	0.82	0.32
	t+3	0.084	-0.089	0.173	0.62
ln Employment	t+1	0.104	0.042	0.62	1.46
	t+2	0.143	0.064	0.079	1.16
	t+3	0.163	0.080	0.083	1.23
Share of dispatched workers	t+1	1.725	0.910	0.815	1.10
	t+2	1.961	1.298	0.663	0.96
	t+3	1.778	1.479	0.299	0.35
Share of part-time workers	t+1	-1.054	-0.100	-0.954	-0.90
	t+2	-2.858	0.427	-3.284	-1.34 *
	t+3	-1.400	0.948	-2.348	-1.23 *

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. Kernel matching uses the Epanechnikov kernel. ** and * indicate significance at the 5% and 10% levels, respectively. The balancing property is satisfied.

Appendix 4: Graphical assessment of the causal effects of FDI (one-nearest-neighbor matching)

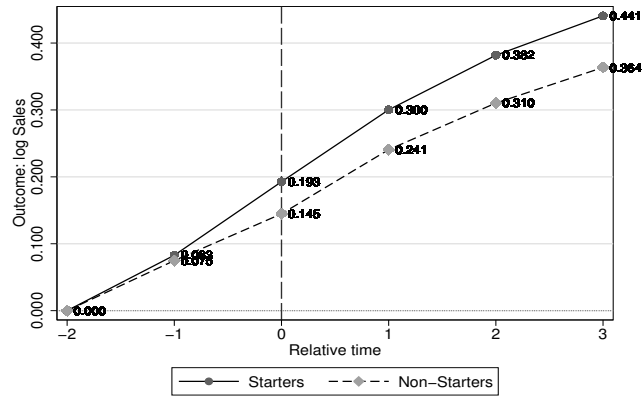


Figure 1: Impact of FDI on log of sales in manufacturing

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t - 2$ in the log of sales. The solid and dashed lines represent first-time investors and the matched control group, respectively.

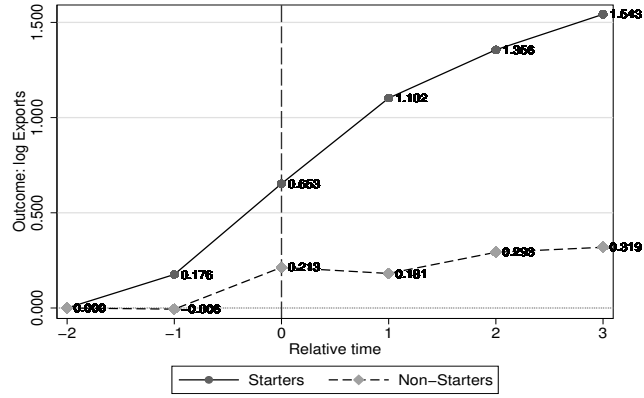


Figure 2: Impact of FDI on log of exports in manufacturing

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t - 2$ in the log of exports. The solid and dashed lines represent first-time investors and the matched control group, respectively.

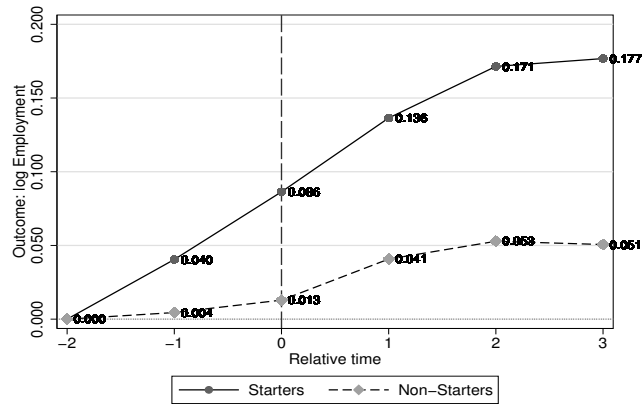


Figure 3: Impact of FDI on log of employment in manufacturing

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t - 2$ in the log of employment. The solid and dashed lines represent first-time investors and the matched control group, respectively.

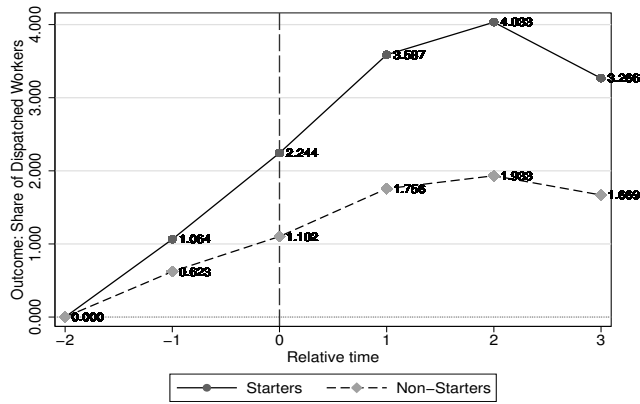


Figure 4: Impact of FDI on the share of dispatched workers in manufacturing

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t-2$ in the share of dispatched workers (percentage). The solid and dashed lines represent first-time investors and the matched control group, respectively.

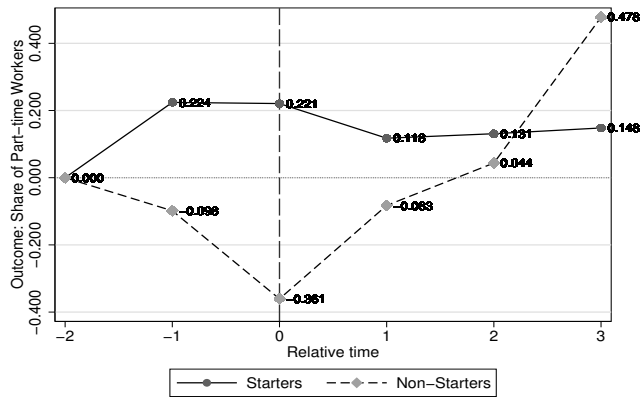


Figure 5: Impact of FDI on the share of part-time workers in manufacturing

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t-2$ in the share of part-time workers (percentage). The solid and dashed lines represent first-time investors and the matched control group, respectively.

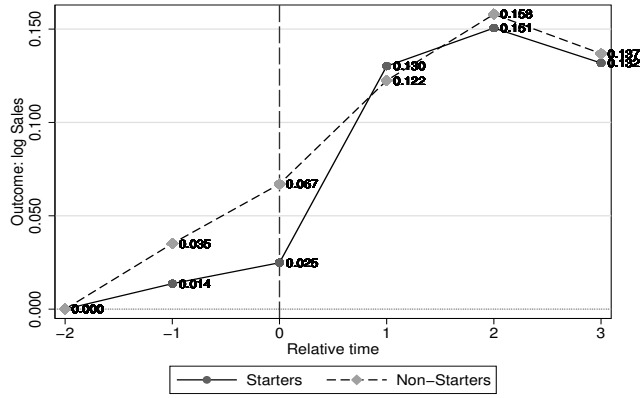


Figure 6: Impact of FDI on log of sales in wholesale

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t - 2$ in the log of sales. The solid and dashed lines represent first-time investors and the matched control group, respectively.

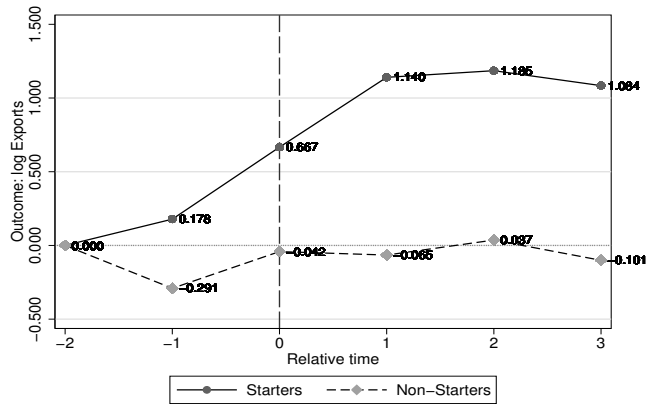


Figure 7: Impact of FDI on log of exports in wholesale

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t - 2$ in the log of exports. The solid and dashed lines represent first-time investors and the matched control group, respectively.

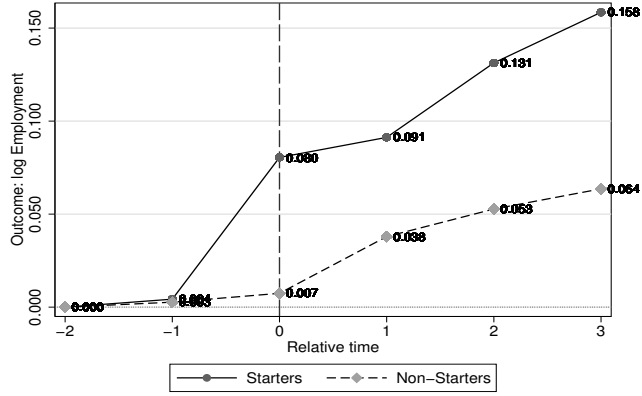


Figure 8: Impact of FDI on log of employment in wholesale

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t-2$ in the log of employment. The solid and dashed lines represent first-time investors and the matched control group, respectively.

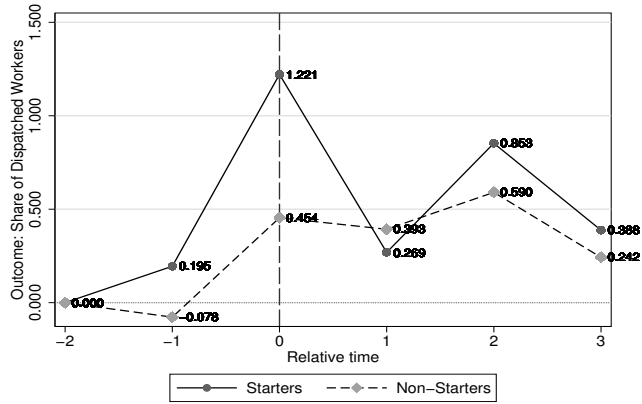


Figure 9: Impact of FDI on the share of dispatched workers in wholesale

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t-2$ in the share of dispatched workers (percentage). The solid and dashed lines represent first-time investors and the matched control group, respectively.

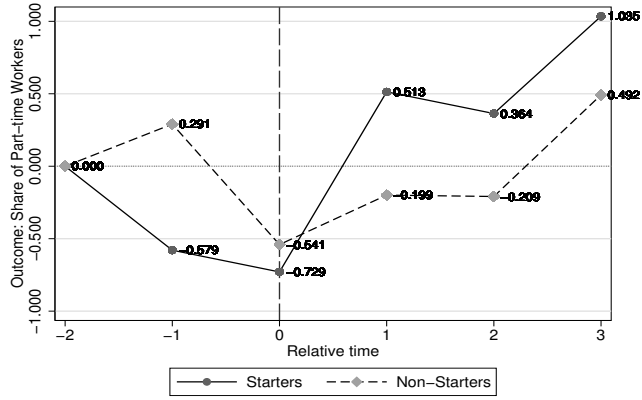


Figure 10: Impact of FDI on the share of part-time workers in wholesale
 Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t - 2$ in the share of part-time workers (percentage). The solid and dashed lines represent first-time investors and the matched control group, respectively.

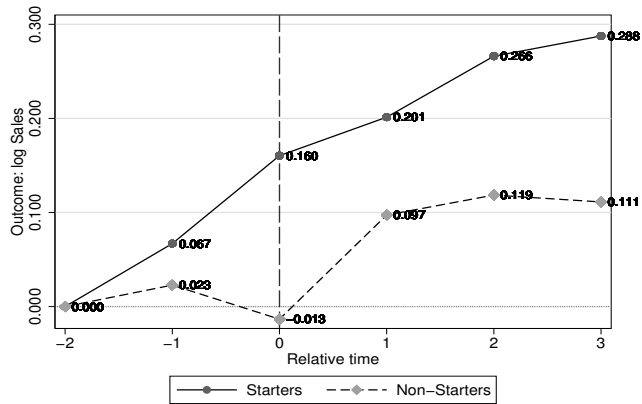


Figure 11: Impact of FDI on log of sales in services
 Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t - 2$ in the log of sales. The solid and dashed lines represent first-time investors and the matched control group, respectively.

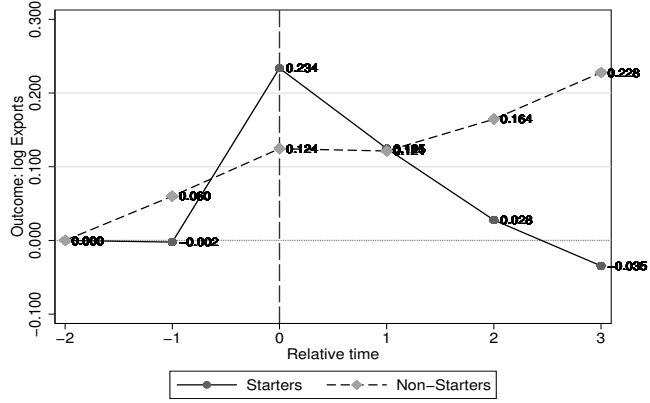


Figure 12: Impact of FDI on log of exports in services

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t-2$ in the log of exports. The solid and dashed lines represent first-time investors and the matched control group, respectively.

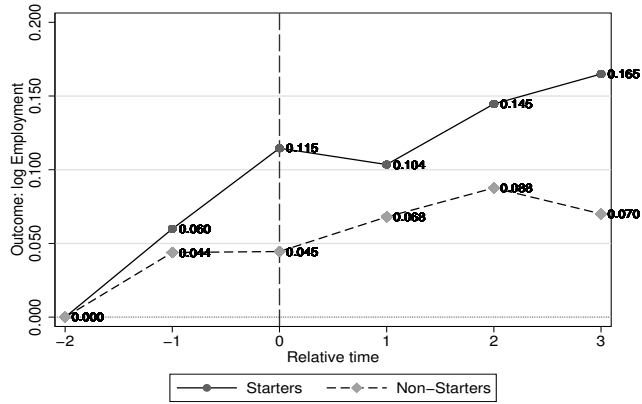


Figure 13: Impact of FDI on log of employment in services

Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t-2$ in the log of employment. The solid and dashed lines represent first-time investors and the matched control group, respectively.

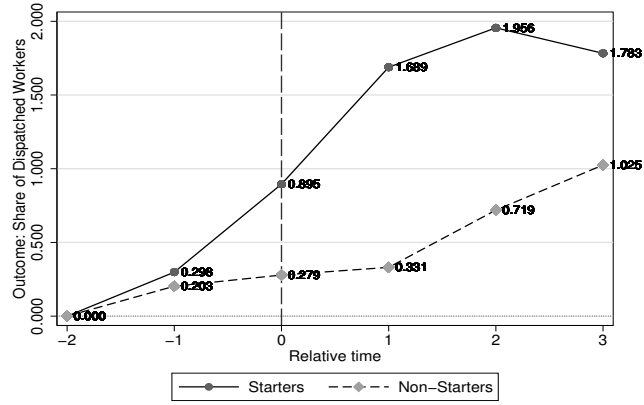


Figure 14: Impact of FDI on the share of dispatched workers in services
 Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t-2$ in the share of dispatched workers (percentage). The solid and dashed lines represent first-time investors and the matched control group, respectively.

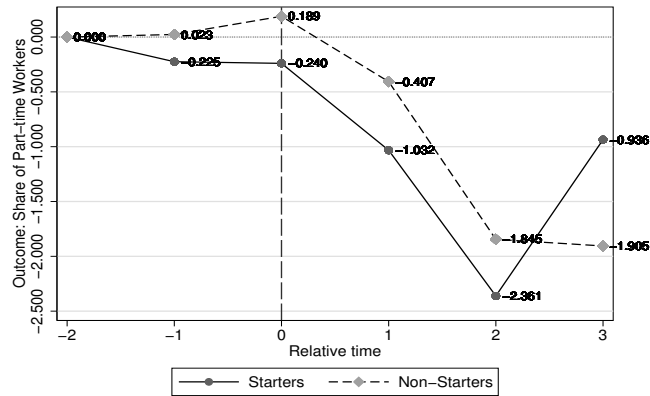


Figure 15: Impact of FDI on the share of part-time workers in services
 Notes: Relative time is zero for the year when FDI is initiated. The vertical axis represents the change from $t-2$ in the share of part-time workers (percentage). The solid and dashed lines represent first-time investors and the matched control group, respectively.