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Outward Foreign direct investment and Firm-level Employment Dynamics in Japanese Manufacturing Firms

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Abstract

The effects of overseas foreign direct investment (FDI) on domestic employment have drawn much academic and policy attentions. Most previous studies focused on the effect on net employment growth. However, the firm-level dynamic of "net employment growth = job creation − job destruction" means that the effects on job creation and destruction within firms are not clearly understood. For example, a positive effect on net employment growth could result from increasing job creation and decreasing job destruction, but it could also indicate decreasing job creation with a greater decrease in job destruction, for example. Furthermore, the mechanisms differ among effects on job creation and destruction. This study uses a unique dataset of Japanese firms' overseas activities to examine the individual effect of outward FDI on firm-level job creation and destruction, respectively. We found that investment in Asian countries has a positive impact on domestic job creation in Japan, whereas the impact of investment in European and North American countries is negative. In terms of job destruction, the impact is negative regardless of the FDI destination. The results are explained using the standard theory of job creation and destruction with FDI introduced.

Keywords: Outward FDI, Firm-level job creation, Job destruction, Japanese manufacturing firms
JEL classification: J21 J23

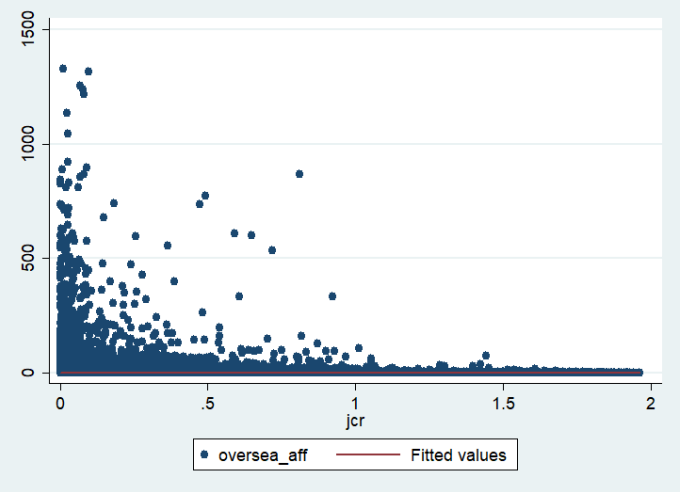
[1] This study is conducted as a part of the RIETI Data Management project undertaken at the Research Institute of Economy, Trade and Industry (RIETI). It utilises the data based on the "Basic Survey of Japanese Business Structure and Activities" (BSJBSA) which is conducted by the Ministry of Economy, Trade and Industry (METI).

1. Introduction

Expanding abroad in the 1980s and 1990s helped Japanese manufacturing firms develop their core competencies. Outward foreign direct investment (hereafter FDI) from Japan has benefited Asian countries such as China, Thailand, Vietnam, and even Myanmar nowadays, in terms of technology spillovers and employment opportunities. However, the rapid increase in the amount of resources reallocated to foreign countries has raised concerns because it may reduce domestic employment and lead to the so-called "hollowing-out" of manufacturing industries. Thus, the effects of overseas FDI on domestic employment have drawn much academic and policy interest.

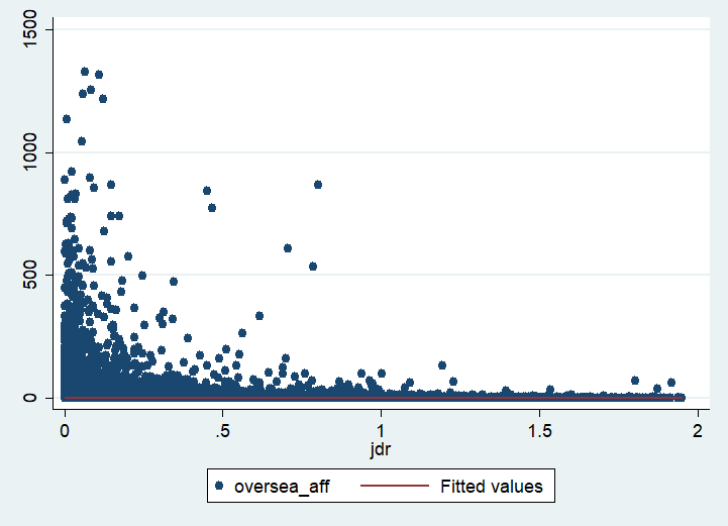
Contrary to most critics' expectations and despite some of the earlier literature identified a negative relationship between outward FDI and domestic operations, more recent studies find that net employment growth in FDI firms is higher than in non-FDI firms (Barba Navaretti et al. 2010; Hijzen et al. 2011; Desai et al. 2009; Hayakawa et al. 2013). However, because net employment growth is the difference between total job creation and destruction within a firm, existence of an overall effect does not necessarily reflect job creation and job destruction changes occurring in the same direction. For instance, a positive effect from FDI on net employment growth could have several ramifications: (1) increasing both job creation and job destruction, with a larger scale of the former than the latter; or (2) decreasing both job creation and job destruction, with a smaller scale of the former than the latter, and so on. Deviating from most previous studies that focus on net employment, the current study will explore FDI's impact on job creation and job destruction separately. In contrast to the conventional definition of job creation and destruction in the existing literature, this study defines job creation as the aggregated number of newly added jobs for all divisions within a firm. In a similar manner, job destruction is defined as the aggregated number of newly reduced jobs for all the divisions. One obvious advantage of such a measurement is that the individual impact of FDI on job creation and destruction can be captured, which helps elucidate firm decision-making from different perspectives.

Figure 1 plots the two-way relationship between the total number of overseas affiliates and the growth rate of domestic job creation at the firm level; therein, a negative correlation can be observed. Similarly, the total number of overseas affiliates and the growth rate of domestic job reductions are also negatively correlated, as shown in Figure 2. Under such circumstance, the following questions emerge: (1) do these observed correlations indicate causality; and (2) when we compare these pairwise relationships, which one's effect will predominate?



Source: Authors' calculation based on BSJBSA database

Figure 1 Correlation between total number of overseas affiliates and rate of domestic job creation



Source: Authors' calculation based on BSJBSA database

Figure 2 Correlation between total number of overseas affiliates and rate of domestic job reduction

To answer the questions above, a simple theoretical model is constructed to illustrate the mechanism through which FDI can endogenously affect job creation and job destruction. Based on the theoretical predictions, firm-level panel data collected by METI is used to conduct an empirical analysis. The results indicate that investment in Asian countries has a positive impact on domestic job creation in Japan, whereas investment in European and North American countries has a negative impact. In terms of job destruction, the impact is negative regardless of FDI destination.

The rest of the paper is organised as follows. Section 2 reviews prior related literature. Section 3 presents the theoretical model, followed by the data and estimation strategy in Sections 4 and 5, respectively. Section 6 presents the results, while Section 7 discusses further issues. The final section concludes.

2. Literature review

There is a wide body of literature that has investigated the relationship between outward FDI and employment in the home country. Markusen (1984) and Brainard (1997) show that theoretically, firms with moderate increasing returns should establish affiliates abroad to reduce transportation costs. Such expansion abroad would substitute for exports, and thus foreign labour would substitute for domestic labour. However, at the same time, moving to other markets could increase the headquarter services provided to affiliates and in fact lead to higher domestic employment in the long term. The empirical nature of such issues has motivated numerous studies recently; however, their results are quite mixed. Brainard and Riker (2001), Muendler and Becker (2006), Moser at al. (2010), and Hanson, Mataloni, and Slaughter (2003) find that jobs abroad do substitute for jobs at home, but the effect is small. Others such as Amiti and Wei (2005), Borga (2005), Desai, Foley, and Hines (2005), Barba Navaretti et al. (2010), Hijzen et al. (2011), and Desai et al. (2009) all suggest the opposite: expansion abroad stimulates job growth at home. In a more influential study, Harrison and McMillan (2011) use US firm data and verify that offshoring to low-wage countries does substitute for domestic employment. However, in firms engaged in more advanced tasks, the increase in foreign employment also promotes employment at home.

Due to the availability of firm-level data both home and abroad in Japan, there is a rising amount of literature on this topic.[2] Hijzen et al. (2007), Fukao and Yamashita (2010), and Tanaka (2012) all find that outward FDI has a positive effect on firms'

[2] Other related studies have used the same dataset. For instance, Hijzen et al. (2008), Todo and Shimizutani (2008) and Edamura et al. (2011) all investigate how overseas activities promote firm productivity.

domestic employment and performance. More recent studies such as those by Ando and Kimura (2015) and Kodama and Inui (2015) focus on gross job creation and job destruction, which are aggregated increases and decreases in firms' net employment changes, respectively. The former paper uses statistics to show that gross changes in domestic employment/operations are much larger than net changes, and that expanding multinational small and medium enterprises tend to increase domestic employment. Kodama and Inui (2015) apply parent–affiliate linked data and use a more rigorous method to show that decreases in net domestic employment mainly arise from firms without subsidiary companies, overseas, and non-expanding multinational enterprises. Furthermore, domestic employment rises when the number of overseas subsidiaries increases. Finally, job creation and net employment growth rates for small-sized firms are lower than those in large-sized firms.

The largest contribution of the current paper is its application of a more rigorous approach to calculate job creation and job destruction, while considering firms' endogenous decision-making regarding overseas expansion. The approach for calculating job creation and job destruction is similar to the one proposed by Davis and Haltiwanger (1999); however, the essential difference is our calculations are made at the division level, which allows us take advantage of the detailed information on labour variation for each division within firms.

Our second contribution is the inclusion of an analysis based upon FDI destination country. Although some newer theories on FDI focus on firm heterogeneity, while some earlier literature hinged upon the distinction between vertical and horizontal multinationals, the question of whether the particular destination country of FDI matters in terms of employment in the parent company remains empirically unaddressed. The current study is closest to that of Debaere et al. (2010) in the sense that the research of both focuses on how outward FDI affects employment at home and decompose FDI by destination country to investigate the impacts on vertical and horizontal multinational activities, respectively. We differ in that we carefully separate the job creation from job destruction, which they fail to take into account.

3. Theoretical model

This study's theoretical background adopts the models of job creation and endogenous job destruction of Pissarides (2000) (chapters 1 and 2), with the variable of FDI behaviour introduced.

First, the optimal number of jobs created by the firm, denoted by V, is determined using

the following equation:

$$\mathrm{y} - \mathrm{w} - \frac{(r+\psi)yc}{q(S/V)} = 0 \tag{1}$$

where y is the average product of all jobs in the firm, and w is the average wage. Further, r is the interest rate, ψ is the rate of exogenous shocks that destroy jobs, and c is the index of hiring costs. $q(S/V)$ denotes a matching function of S/V, in which S is the number of job seekers in the labour market.

Simultaneously, firms destroy jobs whose expected returns drop below 0, i.e., $\mathrm{J(x)} < 0$, and keep jobs whose expected returns are equal to or greater than zero, $\mathrm{J(x)} \geq 0$. *J(x)*, the expected return of a job with an idiosyncratic productivity level of x is a continuous function of x. Therefore, there exists an x with a value of R, namely, reservation productivity, satisfying $\mathrm{J(R)} = 0$. The optimal scale of job destruction is the number of jobs whose reservation productivities drop below R. Hence, in general, job destruction is determined by the level of reservation productivity of the firm, R, as well as the distribution of idiosyncratic productivities of all jobs in the firm, denoted by G(x) (Pissarides 2000, chapter 2).

Further, according to Pissarides (2000, chapter 2, page 40), the asset value of a job whose productivity is above reservation productivity, i.e., $1 \geq \mathrm{x} \geq \mathrm{R}$, is as follows:

$$\mathrm{rJ(x)} = \mathrm{yx} - \mathrm{w(x)} + \lambda \int_R^1 J(s)dG(s) - \lambda J(x) \tag{2}$$

where y is general productivity, i.e., average product of all jobs in the firm, and λ is an exogenous productivity shock.

Evaluating equation (2) at x=R, and noticing J(R)=0 (Pissarides 2000, page 40), job destruction can be determined as follows:

$$\mathrm{yR} = \mathrm{w} - \lambda \int_R^1 J(s)dG(s) \tag{3}$$

Among the determinants of job creation and destruction given in equations (1) and (3),

the variables of interest rate, hiring cost, exogenous shocks, and number of job seekers are generally not affected by FDI impacts. Furthermore, downward wage rigidity means that FDI should have a small effect on domestic wages and can thus be ignored.
As a result, we consider that FDI behaviour affects job creation and destruction in a firm by affecting product per job, y, as well as the distribution of productivity of jobs in the firm, G(x).

Assume a Cobb-Douglas production function

$$\mathrm{Y} = \mathrm{A}K^{\alpha}L^{1-\alpha} \tag{4}$$

Product per job, y, is obtained as follows:

$$\mathrm{y} = \mathrm{A}k^{\alpha} \tag{5}$$

where k is domestic capital per worker.
On the one hand, investment in other countries reduces domestic capital as follows:

$$\mathrm{k} = k^{T} - k^{o}(FDI) \tag{6}$$

where FDI is foreign direct investment behaviour.

However, investment in other countries could increase the firm's technology level. For instance, moving some low-tech production processes to other countries could enable a firm to assign domestic workers to do work with a higher level of technology; thus, the firm's domestic technology level could be increased

$$\mathrm{A} = \mathrm{A}(\mathrm{FDI}, \varphi) \tag{7}$$

where φ is other technologies
Substituting equation (5) with equations (6) and (7), the following relationship is obtained:

$$\mathrm{y} = \mathrm{A}(\mathrm{FDI}, \varphi)[k^{T} - k^{o}(FDI)]^{\alpha} \tag{8}$$

FDI behaviour can have two opposite effects on the product per job: a positive effect

through increasing technology, and a negative effect by reducing domestic capital level.

In addition, FDI behaviour affects the firm's internal distribution of job productivities as follows:

$$G = G(\text{FDI}) \tag{9}$$

Substituting equations (8) and (9) into equation (1), the effect of FDI on job creation is obtained as follows:

$$\text{y}(\text{FDI}, \varphi, k^T) - \text{w} - \frac{(r+\lambda)y(\text{FDI}, \varphi, k^T)c}{q(S/V)} = 0 \tag{10}$$

Similarly, substituting equations (8) and (9) into equation (3), the effect of FDI on job destruction is obtained as follows:

$$\text{y}(\text{FDI}, \varphi, k^T)\text{R} = \text{w} - \lambda \int_R^1 J(s)dG(\text{FDI})(s) \tag{11}$$

Overall, these models indicate that FDI behaviour reduces domestic capital, meaning FDI will have a negative effect on job creation, but a positive effect on job destruction. However, FDI behaviour also increases the average technology level of domestic jobs, which leads to more jobs created and fewer jobs destroyed. Third, FDI behaviour changes the distribution of job productivities in the firm, which leads to more or fewer jobs whose productivities are below the reservation level. The total effect of FDI on job creation/destruction thus depends on the comparative sizes of these effects by reducing domestic capital, changing the average technology level of domestic jobs, and affecting the distribution of idiosyncratic productivities of domestic jobs in the firm.

4. Data and methodology

This study uses firm-level data collected through the Basic Survey of Japanese Business Structure and Activities (BSJBSA), which is conducted annually by Ministry of Economy, Trade, and Industry, Japan. The survey covers almost all medium and large firms in Japan; small firms who employ ≥ 50 workers with ≥ 30,000,000 yen worth of capital are also

included. The response rate is over 80%, with around 30,000 firms completing the questionnaire each year. The samples of manufacturing firms are used for this study, covering the years 1996–2014.

The approach for calculating job creation and destruction is similar to that used by Davis and Haltiwanger (1999); the difference is that our calculations occur at the division level. Job creation in a firm is defined as the sum of all new jobs in the firm's expanding and newly opened divisions, meanwhile job destruction in a firm is defined as the sum of all eliminated jobs in the firm's downsizing or closed divisions. Furthermore, the firm's branches or plants are considered to be similar to divisions. Newly set up and closed firms are excluded; they are not within the scope of this study's objectives because such job creation/destruction instances are quite different from those in existing firms.

Summary statistics of the data are reported in Table 1. Capital per worker is the firm-level average of fixed capital per worker. R&D intensity is the ratio of R&D expenditures to sales. Patent number is the number of patents owned by the firm. Wage per worker is the firm-level average wage of all workers. Product is the firm's annual sales. The regular worker rate is the ratio of workers who are in lifetime employment. The regular worker rate is used as a proxy for hiring costs in determining the rate of job creation, since hiring a regular worker costs much more than hiring a non-regular worker. Similarly, in calculating the rate of job destruction, the regular worker rate is used as a control variable of firing restrictions, which are specialised to regular workers.

Finally, our macro-level data obtained from other sources. Job seekers is the sum of the annual numbers of new graduates and job seekers in labour agencies (*syokugyou anntei jyo* in Japanese); data on new graduates come from annual surveys conducted by Research Works Institute, and data on job seekers registered with labour agencies (excluding new graduates from universities) are from e-Stat. The GDP growth rate is real annual percent change according to the Cabinet Office, Government of Japan. The real exchange rate is the real effective exchange rate taken from the Bank of Japan database.

Variable	Obs	Mean	Std. Dev.	Min	Max
job creation (person)	209094	41.34	213.81	0	23064
job destruction(person)	266000	34.10	198.16	0	18929
net employment growth (person)	209094	-2.36	174.79	-18609	12799
Asian affiliates (number)	266000	0.71	4.19	0	436
EU & North American affiliates (number)	266000	0.46	6.92	0	1082
Total affiliates (number)	266000	1.26	10.96	0	1327
capital per worker	261110	10.84	16.53	0.001055	2322.081
R&D intensity	266000	0.01	0.06	0	23.19444
patent number	266000	58.75	866.99	0	94139
exchange rate	266000	103.13	15.50	73.84333	130.9183
wage per worker	224788	4.23	1.78	0.011628	105.2587
total product	266000	20534.56	143867.20	1	1.21E+07
regular worker rate	266000	0.34	0.43	0	1
total employment	254525	396.67	1647.04	50	80840
foreign capital rate	263730	0.02	0.11	0	1
firm age	265328	41.84	18.14	0	657

Table 1 Summary statistics

5. Estimation and results

When calculating estimations, fixed-effected models are preferred for the major result. The assumption of a random effect is rejected by the Hausman test.

The major destinations for FDI from Japanese firms are Asia, the EU, and North America. Based on the theoretical model, the following estimation equations for job creation and destruction are obtained:

$$job\_creation'_{it} = \gamma_1 Asian\_affiliate\_number_{it} + \gamma_2 EU\_NA\_affiliate\_number_{it} + \gamma_3 control\_variables_{it} + \gamma_i + \gamma_t + \varepsilon_{it}^{jc\prime}$$

$$job\_destruction'_{it} = \delta_1 Asian\_affiliate\_number_{it} + \delta_2 EU\_NA\_affiliate\_number_{it} + \delta_3 control\_variables_{it} + \delta_i + \delta_t + \varepsilon_{it}^{jd\prime}$$

where $Asian\_affiliate\_number_{it}$ is the number of Asian affiliates of firm i in year t, and $EU\_NA\_affiliate\_number_{it}$ is the number of EU and North American affiliates of firm i in year t.

Additionally, to avoid possible endogeneity problems in FDI behaviour, the instruments of annual real interest rate, as well as the numbers of Asian affiliates and EU/North American affiliates in the previous year, respectively, are introduced for comparison. Those variables are significantly correlated with FDI. In particular, in the first stage of the estimation, the estimated coefficients of annual real interest rate are negative and statistically significant at the 1% level, while estimated coefficients of lagged values are positive and statistically significant at 1% level. Furthermore, those variables do not directly affect current job creation and destruction levels. Thus, the endogeneity condition and exclusion restriction are satisfied.

Table 2 demonstrates that FDI in Asian countries has a positive effect on domestic job creation, but the effect is negative for FDI in EU/North American countries. According to the theoretical model, this outcome can be explained as follows. The negative effect of FDI in Asian countries on job creation occurs because the amount of reduction in domestic capital is probably smaller than its positive effect on job creation by increasing average technology level of domestic jobs. However, for FDI in the EU and North America, along with the negative effect of FDI on job creation by reducing domestic capital, it is possible that the average technology level of domestic jobs is reduced, which further reduces job creation. Even in the few cases where the average technology level of domestic jobs is increased, such positive effects on job creation could be smaller than the negative effects on job creation attributable to reductions in domestic capital.

The differences between Asia and the EU/North American can be explained as follows. First, the price level of capital is lower in Asian countries than in EU/North American countries, which leads to a smaller effect on job creation by reducing domestic capital for FDI in Asian countries than in EU/North American countries. For instance, when opening similar affiliates, the cost of capital investment is lower in Asian affiliates than in EU/North American affiliates; thus, the decrease in domestic capital is lower when investing in Asian than in the EU/North America in this case. Second, Asian affiliates usually share low-skilled work with parent firms, thus, they could increase the general technology level of jobs in the domestic firms, which is rare in EU/North American affiliates.

Further, the results in Table 3 show that the effect on domestic job destruction is

negative for FDI into Asian countries and into EU/North American countries. This suggests that fewer jobs are destroyed when carrying out FDI in Asian or EU/North American countries. This finding can be explained as follows. First, when investing in Asian countries, reservation productivity could be reduced because the effect of reducing domestic capital is smaller than the effect of increasing average technology level of domestic jobs, as discussed earlier; therefore, fewer jobs are destroyed. However, when investing in EU/North American countries, although the reservation productivity probably increases, [3] the distribution of job productivities could also change simultaneously, leading to fewer jobs whose productivities drop below the reservation level. This, in turn, could be attributed to expanded product markets and higher product prices when investing to EU/North American countries.

The effect on net employment growth, e.g., the difference between job creation and destruction, is given in Table 4. When investing in Asian countries, the positive effect on job creation is positive, while negative effect on job destruction means that the difference of the two effects are definitely positive, i.e., net employment grows when investing in Asian countries. When investing in EU/North American countries, the effects on job creation and destruction are both negative, although the magnitude of the former is larger than that of the latter; thus, the effect on net employment growth, which is the difference between the effects on job creation and destruction, is negative.

This result is in contrast with that of Harrison and McMillan (2011), who find offshoring to low-wage countries can substitute for domestic employment in the U.S. However, our findings are consistent with those of Navaretti et.al. (2009), who found that outward FDI to less developed countries can have a positive long- term effect on value added and employment in Italy, as well as a positive effect on the size of domestic output and employment in France. In Japan, it is commonly recognised that Japanese multinationals establish operations in Asian countries to exploit cheap labour and minimise production costs. Thus, although more jobs may be eliminated domestically due to such a substitution effect, these losses might be limited to “blue collar” jobs. As Higuchi and Genta (1999) indicate, even though outward FDI by Japanese firms leads to a larger loss of blue-collar employment, the number of white collar (regular employee) jobs has been increasing. One possible explanation is that as more low-skilled jobs are

[3] As discussed earlier, the possible reason could be that both domestic capital and average technology level of domestic jobs are reduced; however, although in some cases, the average technology level of domestic jobs could in fact rise, their positive effect on reservation productivity could be smaller than the negative effect of reducing domestic capital.

outsourced to Asian countries, this will create more room for employment of highly skilled workers. In other words, during this process, there will be a shift from demand for manual labour to demand for personal with professional skills, such as management. We will leave thorough verification of this point to future studies.

	jc_1	jc_2	jc_3	jc_4	jc_5	jc_6
Theoretical var.						
Asian affiliates	0.8602	0.9757	0.9115	1.6294	1.7045	1.6883
	[2.77]***	[3.13]***	[2.93]***	[7.05]***	[7.37]***	[7.29]***
EU_NA affiliates	-4.0914	-4.1075	-4.1033	-4.1463	-4.1601	-4.1667
	[-35.84]***	[-35.99]***	[-35.97]***	[-39.78]***	[-39.93]***	[-39.98]***
capital per worker	0.1249	0.1072	0.098	0.1278	0.1101	0.1014
	[1.33]	[1.14]	[1.04]	[1.36]	[1.17]	[1.08]
R&D intensity	-79.8463	-76.4291	-74.7345	-80.9098	-77.412	-75.8483
	[-3.55]***	[-3.40]***	[-3.32]***	[-3.59]***	[-3.44]***	[-3.37]***
patent number	-0.0262	-0.0261	-0.0266	-0.0269	-0.0268	-0.0273
	[-25.42]***	[-25.35]***	[-25.49]***	[-26.64]***	[-26.52]***	[-26.61]***
wage per worker	-5.5923	-5.5475	-5.6161	-5.5618	-5.5195	-5.5841
	[-11.64]***	[-11.45]***	[-11.58]***	[-11.58]***	[-11.39]***	[-11.51]***
hiring cost	-4.6551	-9.3207	-9.5232	-4.9338	-9.7038	-9.919
	[-2.77]***	[-1.84]*	[-1.88]*	[-2.94]***	[-1.92]*	[-1.96]**
job seekers	0.0000			0.0000		
	[-4.07]***			[-4.01]***		
Control var.						
total employment	0.1604	0.1607	0.158	0.1609	0.1611	0.1586
	[104.77]***	[104.91]***	[89.30]***	[105.52]***	[105.65]***	[90.04]***
foreign capital rate	-87.8818	-87.21	-87.1816	-87.8099	-87.1272	-87.084
	[-11.92]***	[-11.82]***	[-11.81]***	[-11.91]***	[-11.81]***	[-11.80]***
firm age	-0.2926	-0.068	-0.0697	-0.3072	-0.0764	-0.0786
	[-3.59]***	[-0.76]	[-0.77]	[-3.77]***	[-0.85]	[-0.87]
GDP growth	-1.0458			-1.0521		
	[-4.08]***			[-4.10]***		
product			0.0001			0.0001
			[2.95]***			[2.84]***
constant	38.9404	30.5563	31.3409	38.7324	30.9599	31.7407
	[3.23]***	[2.61]***	[2.67]***	[3.21]***	[2.64]***	[2.71]***
Year dummy	No	Yes	Yes	No	Yes	Yes
3-digit indus. dum.	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	Yes	Yes	Yes	No	No	No
R-squared	0.1039	0.1050	0.1050	0.1040	0.1050	0.1051
N.	167488	167488	167488	167488	167488	167488

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 2. Estimation of Asian and EU_NA affiliations on job creation (JC)

	jd_1	jd_2	jd_3	jd_4	jd_5	jd_6
Theoretical var.						
Asian affiliates	-13.1832	-13.0447	-13.5269	-8.6607	-8.6813	-8.9765
	[-42.03]***	[-41.55]***	[-43.10]***	[-41.09]***	[-41.26]***	[-42.74]***
EU_NA affiliates	-1.7252	-1.7423	-1.7065	-2.1349	-2.1327	-2.197
	[-14.83]***	[-15.00]***	[-14.71]***	[-21.98]***	[-22.03]***	[-22.75]***
capital per worker	0.446	0.4588	0.394	0.3658	0.3786	0.2859
	[4.79]***	[4.92]***	[4.23]***	[4.70]***	[4.87]***	[3.68]***
R&D intensity	-51.4926	-47.0374	-35.6744	-21.2371	-17.954	-5.8686
	[-2.30]**	[-2.10]**	[-1.60]	[-1.15]	[-0.98]	[-0.32]
patent number	-0.0111	-0.011	-0.0145	0.0011	0.0012	-0.0046
	[-10.62]***	[-10.52]***	[-13.65]***	[1.12]	[1.32]	[-4.79]***
wage per worker	5.0645	5.2132	4.7519	5.78	5.0087	4.389
	[10.58]***	[10.81]***	[9.85]***	[14.43]***	[12.39]***	[10.88]***
Control var.						
firing restrictions	2.9732	-11.8016	-13.243	0.7743	-12.7269	-15.0556
	[1.75]*	[-2.31]**	[-2.60]***	[0.51]	[-2.82]***	[-3.35]***
job seekers	0.0000			0.0000		
	[-6.61]***			[1.29]		
total employment	0.0456	0.0454	0.0273	0.0288	0.0286	0.0037
	[29.88]***	[29.77]***	[15.44]***	[21.26]***	[21.15]***	[2.41]**
foreign capital rate	-60.0069	-56.8221	-55.8162	-9.3826	-11.9114	-11.8581
	[-8.31]***	[-7.87]***	[-7.74]***	[-1.47]	[-1.87]*	[-1.87]*
firm age	-0.3641	-0.2359	-0.2459	0.0828	-0.0535	-0.0708
	[-4.47]***	[-2.63]***	[-2.75]***	[1.21]	[-0.71]	[-0.94]
GDP growth	0.636			-1.1121		
	[2.43]**			[-4.87]***		
product			0.0004			0.0006
			[19.88]***			[32.11]***
constant	55.2017	26.6405	32.1169	-5.1059	-40.8239	-33.4895
	[4.61]***	[2.30]**	[2.77]***	[-0.50]	[-4.15]***	[-3.41]***
Year dummy	No	Yes	Yes	No	Yes	Yes
3-digit indus. dum.	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	Yes	Yes	Yes	No	No	No
R-squared	0.0456	0.0491	0.0512	0.0276	0.0340	0.0394
N.	177556	177556	177556	207556	207556	207556

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3. Estimation of Asian and EU_NA affiliations on job destruction (JD)

	ec_1	ec_2	ec_3	ec_4	ec_5	ec_6
Theoretical var.						
Asian affiliates	15.1154	15.1144	15.4003	13.0097	13.0148	13.0891
	[50.60]***	[50.48]***	[51.46]***	[58.60]***	[58.55]***	[58.91]***
EU_NA affiliates	-2.3851	-2.3868	-2.4053	-1.7312	-1.735	-1.705
	[-21.75]***	[-21.76]***	[-21.95]***	[-17.29]***	[-17.33]***	[-17.04]***
capital per worker	-0.2933	-0.3256	-0.2847	-0.2971	-0.3298	-0.29
	[-3.25]***	[-3.61]***	[-3.15]***	[-3.30]***	[-3.66]***	[-3.21]***
R&D intensity	-26.8058	-24.5674	-32.1186	-23.6642	-21.504	-28.674
	[-1.24]	[-1.14]	[-1.49]	[-1.09]	[-0.99]	[-1.33]
patent number	-0.0157	-0.0157	-0.0134	-0.0156	-0.0156	-0.0133
	[-15.89]***	[-15.83]***	[-13.37]***	[-16.14]***	[-16.10]***	[-13.52]***
wage per worker	-10.8601	-10.9601	-10.6544	-10.9105	-11.0077	-10.7112
	[-23.52]***	[-23.54]***	[-22.87]***	[-23.65]***	[-23.65]***	[-23.00]***
regular worker rate	-3.889	3.0583	3.9609	-3.2543	3.9372	4.9243
	[-2.41]**	[0.63]	[0.81]	[-2.02]**	[0.81]	[1.01]
job seekers	0.0000			0.0000		
	[-1.98]**			[-2.11]**		
Control var.						
total employment	0.1111	0.1114	0.1231	0.1099	0.1103	0.1217
	[75.52]***	[75.69]***	[72.44]***	[75.07]***	[75.25]***	[71.96]***
foreign capital rate	-49.9051	-50.2571	-50.3838	-50.8609	-51.2398	-51.4382
	[-7.04]***	[-7.09]***	[-7.11]***	[-7.18]***	[-7.23]***	[-7.26]***
firm age	0.0016	0.0569	0.0645	0.0398	0.0794	0.0892
	[0.02]	[0.66]	[0.75]	[0.51]	[0.92]	[1.03]
GDP growth	-1.2864			-1.2694		
	[-5.22]***			[-5.15]***		
product			-0.0002			-0.0002
			[-13.69]***			[-13.55]***
constant	16.2336	4.1523	0.6558	16.4661	2.8798	-0.7001
	[1.40]	[0.37]	[0.06]	[1.42]	[0.26]	[-0.06]
Year dummy	No	Yes	Yes	No	Yes	Yes
3-digit indus. dum.	Yes	Yes	Yes	Yes	Yes	Yes
Instruments	Yes	Yes	Yes	No	No	No
R-squared	0.0628	0.0635	0.0646	0.0634	0.0641	0.0653
N.	167488	167488	167488	167488	167488	167488

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4. Estimation of Asian and EU_NA affiliations on net employment change (EC)

6. Robustness check

Endogeneity problems might arise from two sources. First, it might be argued that unobservable factors can also affect firms' decision-making regarding job creation and destruction. For example, a firm's financing situation will influence its capital portfolio and thus affect total employment in the next operating year. If the financing situation is time-variant, a fixed-effects model alone cannot solve the omitted variable problem. Second, firms choose to expand overseas because they are a priori more productive and earn higher profits. As a result, these firms can create more job opportunities due to those other attributes[4]. In other words, firms with more foreign affiliates might "self-select" to change the employment structure more frequently. Even if we use exchange rates or the lagged form of overseas affiliation as instruments for the IV specification, we cannot exclude the possibility that these proxies might also to some extent be correlated with firms' employment plans. If that is the case, the coefficient estimated using the IV method could still be biased.

To further identify the causal impact of foreign activity on job creation/destruction, we apply a quasi-experimental method. Specifically, we use the March 2011 earthquake in Japan as an exogenous economic shock and conduct a difference-in-difference analysis to explore the extent to which JC/JD can be explained by a firm' overseas expansion. The large-scale destruction caused by the earthquake (followed by a massive tsunami and the failure of the Fukushima Dai-ichi Nuclear Power Plant) exerted a significant negative impact on the economic performance of affected areas, mainly the four coastal counties of Miyagi, Iwate, Fukushima, and Aomori. Thus, we argue that firms located in these four counties (treatment group) may act differently from those located in the other counties (control group), because this externally caused economic damage will also influence their decision-making regarding foreign investment. This gives us the opportunity to investigate how firms' outward FDI affects JC/JD after we difference out the pre-trend of firms from both groups.

The 2011 earthquake provides several advantages for identifying a causal relation. First, the earthquake happened suddenly, making it unlikely that firms in our sample could influence the timing and location of the earthquake. Also, the unpredictability of natural disasters excludes the reverse causality issue. Nevertheless,

[4] A similar argument can be made concerning job destruction.

endogeneity concerns could still arise, so we further use the triple-difference method, following the approach used by Bernard et al. (2015). The estimation results are consistent with the findings of the baseline estimation. They are not shown in the current paper but are available upon request.

7. Conclusion

Firms create new jobs while eliminating old jobs to achieve optimal performance. Overseas FDI can play an important role in this employment adjustment process. On the one hand, foreign expansion can reduce a firm's domestic budget, leaving fewer funds to pay for domestic employees. On the other hand, FDI activities can contribute to greater technical progress and higher productivity, which help to create more new jobs or alleviate the destruction of existing jobs. This study used a unique dataset of Japanese firms' overseas activities to examine the individual effects of outward FDI on firm-level job creation and destruction, respectively. We found that investment in Asian countries has a positive impact on domestic job creation in Japan, whereas the impact of investment in European and North American countries is negative. When it comes to job destruction, the impact is negative regardless of FDI destination. The results were explained by the standard theory of job creation and destruction with FDI introduced.

This study is limited by the fact that the data do not include very small firms who employ <50 workers or with < 30,000,000 yen worth of capital. Most firms in this category could be immature firms or ventures, whose behaviours and FDI effects could differ from that of large and mature firms. Thus, the results are limited to median-sized and large firms in Japan. Further, detailed FDI activities and motivation of foreign investment are unavailable in the current data. Future studies using alternate data will be conducted to tackle those issues.

Declaration of interest:

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