Does it matter where you invest? The impact of FDI on domestic job creation and destruction[1]

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Abstract

This study uses a unique division-level data of Japanese firms to examine how foreign direct investment (FDI) affects domestic employment. In contrast to most previous studies focusing on the effect on net employment growth, we decompose it into gross job creation and gross job destruction. We find that FDI destination plays an important role: FDI to Asia increases job creation, while FDI to Europe or North America decreases it. The differential effects can be explained by a frictional search-and-matching model with heterogeneous jobs. The model gives additional predictions on job creation and destruction by job type, which are also empirically confirmed.

Keywords: Outward FDI, firm-level job creation, job destruction, high/low-skilled jobs
JEL classification: F23; 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

Along with the rapid globalization since the late 1990s, multinational firms have increased their influence in domestic labor market. In the period between 1990 and 2015, world foreign direct investment (FDI) flows increased 9.4-fold, or 2.8 times faster than world GDP and 1.9 times faster than world trade.[2] This trend have given risen to a skeptic view in developed countries that domestic jobs would be offshored to low-wage developing countries. Whether outward FDI contributes to home employment have drawn much academic and policy interest. The literature so far provides mixed evidences, reflecting the difference in sample countries and performance measures of foreign activities. Due to the data limitation, most of the studies focus on the effect of FDI on net employment growth, which is the difference of gross job creation (total employment gains in expanding estabilishments) from gross job destruction (total employment losses in contracting establishments).

Even when finding a positive effect of FDI on net employment growth, one should be cautious to conclude that FDI is always good for home employment. Net empoloyment growth can be positive both in the case (i) where gross job creation increases and gross job destruction unchages and in the case (ii) where job creation unchanges and gross job destruction decreases. The two cases illustrate very different labor markets; case (i) shows an active labor market favoring job seekers, while case (ii) shows a stable one rewarding existing employees. For a country benefitting from globalization, case (i) would be more preferable than case (ii), considering the fact that welfare gains are obtained through the reallocation of factors between sectors and firms to their most productive uses (Melitz, 2003; Autor, Dorn and Hanson, 2013; Dix-Carneiro and Kovak, 2017).

This paper studies the impact of outward FDI on job creation and job destruction using unique Japanese firm-estbalishment-division level data. Contrary to most existing studies, we can construct a measure of job creation and destruction within an establishment by exploiting information on division level employment. We count the number of newly added jobs for all divisions within a firm with potentially multiple establishments and use it to define job creation of the firm. Similarly, we define job destruction of a firm as the number of newly eliminated jobs for all divisions within the firm. This definition helps interpret our empirical results by illucidating firm-decision making, based on which we build a frictional search-and-matching theory with heterogeneous jobs. The theory highlights the roles of different jobs (or divisions) and its mechanism is further empirically confirmed.

The case of Japan is particulalry interesting not just for the unique data available, but

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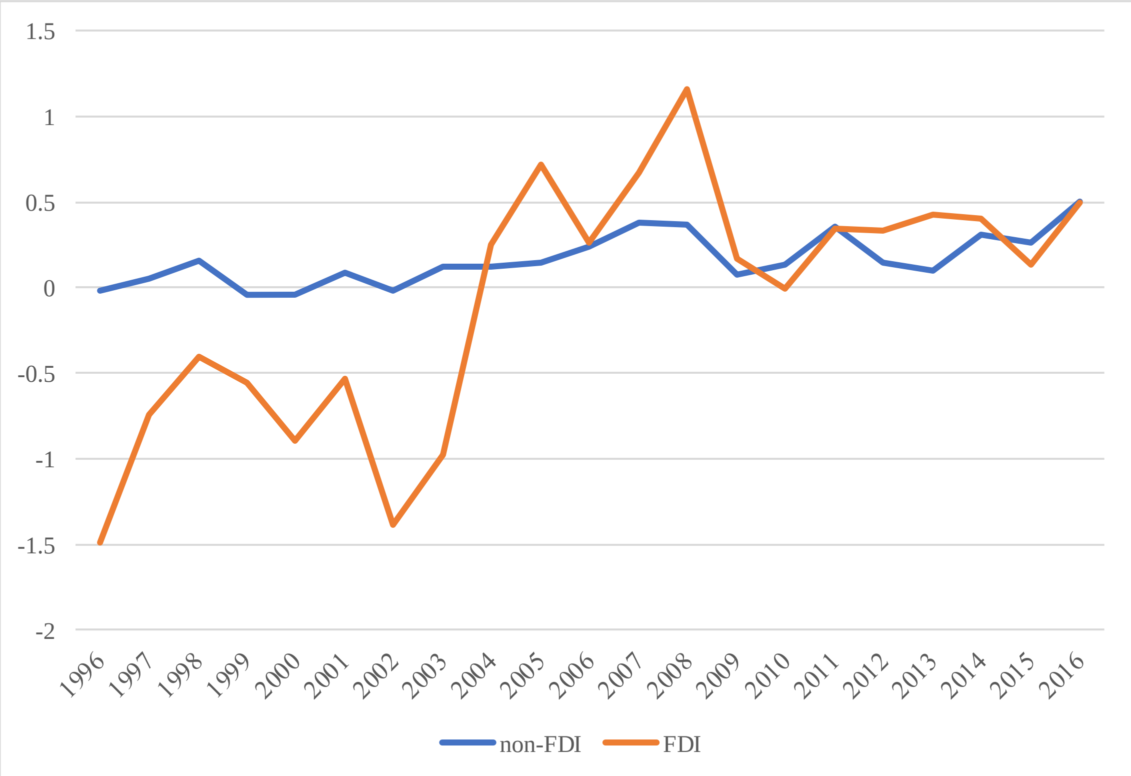
[2] The data are from the World Bank Development Indicators: https://databank.worldbank.org/home.aspx.

for . First, In contrast to the very low GDP growth rate since early 1990s, Japanese outward FDI has steadily increased. The big presence of FDI firms in the domestic market can be seen from Figure 1, where the average employment change over FDI firms exceeds that over non-FDI firms in magnitude. Moreover, the destination of Japanese FDI is geographically dispersed with **% of all affiliates in Asia and **% in Europe and North America, which allows us to compare the impact of FDI with different purposes.

Figure 1

Revenue-weighted average employment change for Japanese FDI/non-FDI firms



Source: Authors' calculation based on BSJBSA.

Specifically, we first apply establishment-division-level panel data of Japanese firms to examine the effect of FDI into Asia and Europe/North America, measured by the log number of foreign affiliates, on their domestic job creation and destruction. Our identification strategy is to use industry-mean FDI as an instrument for firm-level FDI.[3] There are two reasosns why we

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[3] Our strategy is partly inspired by studies on intergenerational persistence of economic status (Shea, 2000) and money and happiness (Luttmer, 2005; Pischke, 2011; Li et al., 2014). For example, to see whether higher income raises happiness, Pischke (2011) and Li et al. (2014) use industry-average wage as an instrument for family/individual income. In this context, Pischke and Schwandt (2012) give a

believe this is a plausible instrument. First, industry-mean FDI is an aggregate measure that is correlated with FDI by individual firm but is beyond the individual influences. Second, at least part of the variation in industry-mean FDI is attributed to industry characteristics rather than firm characteristics. For example, some industries such as chemical and machinary are by nature easier to fragment their production processes into finer stages and offshore some of them than other industries (Baldwin and Venables, 2013; Hummels et al., 2001 for a suggestive evidence). Another example to indicate industry-specific attributes is that factor costs within and across countries widely differ by industry (Du Caju et al., 2010). Du Caju et al. (2010) concluded that the inter-industry wage differentials in eight European countries could reflect the difference in labor market institutions. We further address potential concerns about the selection of firms into particular industries by controlling for many measures of firm characteristics such as productivity, R&D, and capital-labor ratio.

The results indicate that both investments into Asia and Europe/North America have a positive effect on net employment growth in Japan. The effect on gross employment changes, i.e., job creation and destruction, however, may differ from destinations. Investment in Asia has a positive effect on domestic job creation, whereas investment in European or North American countries has a negative effect. In terms of job destruction, the impact is negative regardless of FDI destination.

We then construct a search-and-matching model of unemployment based on Wasmer (1999), to illustrate the mechanism through which FDI to different destinations can affect domestic job creation and destruction differently. In the model, there are two types of jobs—high-skilled and low-skilled ones. Firms face a trade-off between paying high search costs and enjoying stable match with high-skilled workers, or paying low search costs but having unstable match with low-skilled workers. An exogenous increase in FDI of a firm requires more support from its domestic headquarters and branches, thereby making both types of job match more stable. This setting explains the empirical result that FDI, regardless of its destination, makes job destruction fewer.

The extent to which FDI to different regions increases the duration of job match is assumed to vary, given the fact that the purpose of FDI by Japanese multinationls differs by the region that they invest in. Japanese multinationals investing in Asia tend to export intermediate goods from home to affiliates for low-cost assembly (Fujita and Hamaguchi, 2012). Thus FDI to Asia is thought to be complmentary to domestic low-skilled workers engaging in production, creating more low-skilled jobs and fewer high-skilled jobs. Due to its low hiring cost, the increase in low-skilled job creation raises the overall job creation despite the decline in high-

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cautionary note on the industry-level instrument. Applications in the context of international trade can be found in, e.g., Hoekstra (2013).

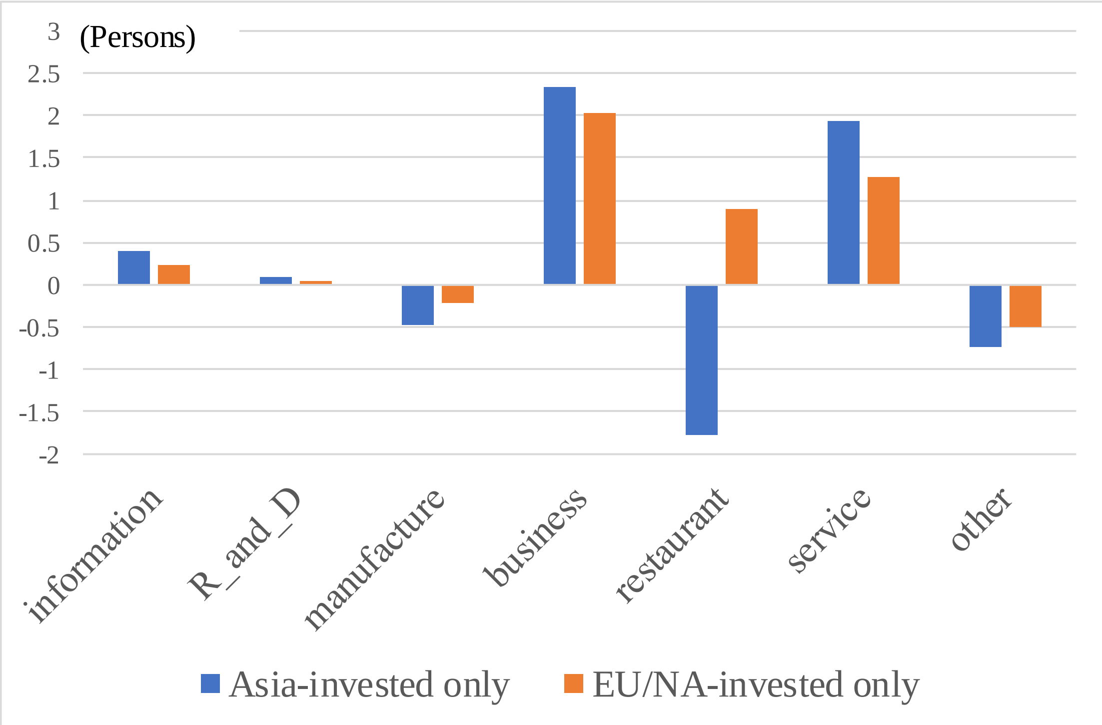
skilled job creation.

In constrast, Japanese multinationals investing in Europe/North America tend to substitute exports from Japan for local production to save transportation costs. FDI to Europe/North America is thought to be substitutable to domestic low-skilled workers, making firms create fewer low-skilled jobs and more high-skilled jobs. Because of the high hiring cost, the increase in high-skilled job creation is not as much as the decrease in low-skilled one. The overall job creation thus declines. This theoretical mechanism is further tested and cofirmed to be the case.

A further categorization of FDI by destination can help us see the connection between the labor reallocation and the targeting market. Figure 2 shows the sketch when we divide Japanese firms into the ones that invest in Asia only and in Europe or North America only. In our sample, there are firms that invest in Asia, Europe, and North America. To see the heterogeneity between investing in different regions, we remove these observations. We also aggregate the labor variation in both the headquarter and its branches. For Asia-invested only firms, information, business and service divisions hire more workers, and the magnitude is larger than that of Europe/North America-invested only firms. Asia-invested only firms decrease the number of the workers in manufacture division, more than Europe/North America-invested firms do. It seems that firms adjust the internal labor structure in accordance with the oversea FDI decisions, but how is the adjustment process affected by the investment destinations? How does the influence differ between job creation and job destruction within a firm?

Figure 2

Labor change by division: Asia-invested v.s. Europe/North-America-invested



Source: Authors' calculation based on BSJBSA.

Notes: We remove the observations that have both affiliates in Asia and Europe or North America (EU/NA) in the same year.

1.1. Relation to the literature

There is a wide body of literature that has investigated the relationship between outward FDI and employment in the home country. The empirical nature of such issues has motivated numerous studies that found mixed results. Hanson et al.(2003), Muendler and Becker (2006), and Moser et al. (2010) find that jobs abroad do substitute for jobs at home, but the effect is small. Others such as Amiti and Wei (2005), Borga (2005), Navaretti et al. (2010), Desai et al. (2009), and Hijzen et al. (2011), all suggest the opposite: expansion abroad stimulates job growth at home. From theoretical perspective, these mixed findings may be explained by different motives for FDI. Markusen (2004, Ch.8) suggest that FDI in search of low-factor-cost, known as vertical FDI, is complementary to production of parent in the high-factor-cost countries, whereas FDI in search of final demand, known as horizontal FDI, is substitutable to parent's production. Since production needs labor, vertical FDI is good for domestic employment, but horizontal FDI is not. When it comes to the case of Japan, thanks to the availability of firm-level data both home and abroad, there is a rising amount of literature to investigate this topic. Hijzen et al. (2007), Fukao and Yamashita (2010), and Tanaka (2012) all find that outward FDI has a positive effect on firms' 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 foreign subsidiary companies 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 main contribution of the current paper lies in its application of a more rigorous approach to separate job creation from job destruction. We follow the approach by Davis and Haltiwanger (1999) to calculate job creation and job destruction. However, the essential difference is that our calculations are conducted at division level rather than establishment level, which allows us take advantage of the detailed information on labor variation for each division within firms.

Another contribution is that we make further analysis to investigate the different impacts of FDI destinations. Compared to the large number of theoretical studies that attempt to explain the purpose of different types of FDI, few empirical studies ask whether the particular destination country of FDI matters in terms of employment in the parent company. Two studies closely related to ours are worth mentioning. Using US firm-level data, Harrison and McMillan (2011) find a negative (or positive) link between foreign affiliate's wage in high-income (or low-income) countries and US parent's employment. They conclude that offshoring to high-wage (or low-wage) countries substituts for (or complments) domestic employment. Debaere et al. (2010) reach a similar conclusion that Korean firms' investing in low-income countries decreases the growth rate of domestic employment, whereas moving to high-income countries does not significantly affect the domestic employment growth. Our study differs from them in two aspects. First, in contrast to their findings, our results indicate that FDI, regardless of its destination, contributes to domestic employment. Second, our data allow us to further decompose changes in net employment into gross changes, i.e., job creation and destruction. This decomponsition informs us how different jobs from marketing to production are reallocated within a firm. The differential effects of FDI on job creation and destruction are then explained by search-and-matching framework with a specific focus on heterogeneous jobs.

The rest of the paper is organised as follows. Next section introduces the data and estimation strategy. Section 3 presents the estimaton results. To rationalize the findings, Section 4 builds a frictional search-and-matching model. The model gives additional testable implications, which we further empirically confirm. The final section concludes.

2. Data and methodology

2.1. Data, job creation, and job destruction

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 both manufacturing non-manufacturing firms are used for this study, covering the years 1995–2017. Summary statistics of the data are reported in the Appendix Table A1. We removed outliers that record negative value terms such as R&D, revenue or export.

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 and thus capture the job creation and destruction within the firm. 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.

First, the magnitude of job creation in firm i in year t is defined as the sum of all new jobs in expanding divisions in firm i in year t, represented as follows (the number of divisions in firm i is d):

$$JC_{i,t} = \sum_{d=1}^{S} \Delta N_{i,d,t}^{C},$$

where

$$\Delta N_{i,d,t}^{C} = N_{i,d,t} - N_{i,d,t-1},$$

conditioned on

$$N_{i,d,t} - N_{i,d,t-1} > 0.$$

In the above equations, S is the number of divisions in firm i, $N_{i,d,t}$ is the number of workers employed in division d in firm i in year t.

The magnitude of job destruction in firm i in year t is defined as the sum of all diminished jobs in diminishing divisions in firm i in year t, represented as follows (the number of divisions in firm i is d):

$$JD_{i,t} = \sum_{d=1}^{S} \Delta N_{i,d,t}^{D}$$

where

$$\Delta N_{i,d,t}^{D} = -(N_{i,d,t} - N_{i,d,t-1}),$$

conditioned on

$$N_{i,d,t} - N_{i,d,t-1} < 0$$

In practice, we will use JC and JD as our main dependent variables. Furthermore, to make the analysis comparable to the previous literature, we also calculate the within-firm net employment, and investigate how Japanese multinational firms' oversea investment will affect these measurements.

2.2. Estimation strategy

Our baseline regression of job creation takes the following form:

$$JC_{it} = \gamma_1 Asia\_affiliate_{it} + \gamma_2 EU\_NA\_affiliate_{it} + \gamma_3 Controls_{it} + \gamma_i + \gamma_t + e_{it}, \quad (1)$$

$$JC_{it} = \delta_1 Asia\_affiliate_{it} + \delta_2 EU\_NA\_affiliate_{it} + \delta_3 Controls_{it} + \delta_i + \delta_t + \varepsilon_{it}, \quad (2)$$

The regressions for job destruction and the net employment, i.e., job creation minus job destruction, are defined analogously. $Asia\_affiliate$ is the log of the number of Asian affiliates of firm i in year t, and $EU\_NA\_affiliate$ is the log of the combined number of affiliates that are located in Europe or North America for firm i in year t. *Controls* is the vector of control variables including capital-labor ratio, R&D expenditure share with respect to revenue, foreign capital share, firm age, revenue (log) and total factor productivity.[4] Firm and year fixed effects are also included.

[4] In the baseline specification, we use the method as in Levinsohn and Petrin (2003). As robustness checks, we apply Olley and Pakes (1996), and stochastic frontier methods as well.

Because both FDI decisions and domestic employment decision are made by the same firm, our estimation may be subject to endogeneity bias. One might consider that firms who are actively engaged in foreign investment need to make adjustment on the within-firm employment more frequently, because these firms are more sensitive to cost variation and labor reallocation is an efficient way to alleviate cost shocks. If that is the case, our baseline estimation may suffer from self-selection biases. To mitigate this problem, we apply a two-stage instrumental variable (IV) method. An ideal instrument is the one that is closely related to firms' FDI decision, but does not affect the employment dynamics within firms. Thus, the instrument we can think of naturally is the industry level FDI trend. In practice, we use the (log) average number of Asian affiliates and European/North American affiliates in industry j in year t, $mean\_Asia\_affiliate_{jt}$ and $mean\_EU\_NA\_affiliate_{jt}$, as a instrument for $Asia\_affiliate_{it}$ and $EU\_NA\_affiliate_{it}$, respectively. The fitted value obtained in the first stage will be used in the second stage to measure the elasticity of within-firm employment with respect to FDI.

The industry-mean FDI is correlated with but is not directly affected by individual firm FDI as long as industry is sufficiently large. In addition, at least part of the variation of industry-mean FDI comes from industry characteristics rather than from firm characteristics, so that the instrument is plausibly exogeneous to firm-decision making on domestic employment. There are two arguments why we think this is the case. First, how easily firms expand foreign activities crucially depend on the nature of products and services of their industry. Some industries are more amenable to the spatial separation of production processes and thus tend to establish more foreign affiliates than other industries (Baldwin, 2016). As a suggetive evidence for the industry variation of the easiness of the so-called unbundling, Hummels et al. (2001) reported that the use of imported intermediates in producing goods that are exported, which they call vertical specialization, widely varies across industries within a country in 10 OECD countries and four emerging economies (see Johnson and Noguera, 2012; Johnson, 2018 for recent developments).[5] Second, inter-industry factor costs, wage in particular, have wide variation across countries, which is mainly due to difference in institutions (Du Caju et al, 2008; 2010). Du Caju et al. (2010) observed huge inter-industry wage differential across eight memebr countries in the European Union and attributed this to the difference in rent-sharing rule determined by countries' labor market instituitons.

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[5] A concept related to vertical specialization is vertical intra-industry trade (Fontagne and Freudenberg, 2002 for a survey). Studies on Japan include Fukao et al. (2003); Ando (2006); Kimura and Obashi (2011).

3. Estimation results

Table 1 demonstrates the baseline estimation results as in Eqs. 1 and 2. It shows that FDI in Asian countries has a positive effect on domestic job creation, but the effect is negative for FDI in European/North American countries. As indicated in columns (3) and (4), FDI in Asian countries prevents firms from removing the jobs, and so does the investment in Europe/North American countries. When we combine these two effects, as presented in columns (5) and (6), FDI in Asia has an overall positive impact on the net employment of Japanese firms, which is easy to follow because the job creation effect is much larger. In the meantime, FDI in Europe/North America is also associated with a net employment growth. If we compare the magnitude of the coefficient of *EU_NA_affiliate* between the case of JC and JD, it can be concluded that the decrease in JD surpasses that in JC, which leads to the positive net employment growth.

Table 1

Baseline results

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	JC	JC	JD	JD	Net	Net
Asia_affiliate	20.68***	17.24***	-1.204	-1.256	29.27***	25.80***
	(3.627)	(3.633)	(3.712)	(3.719)	(3.653)	(3.662)
EU_NA_affiliate	-8.457*	-10.44**	-41.34***	-41.55***	50.14***	48.46***
	(4.568)	(4.570)	(4.674)	(4.678)	(4.532)	(4.536)
Capital_labor_ratio	-50.71***	-46.48***	9.713***	11.59***	-68.94***	-66.80***
	(2.809)	(2.856)	(2.874)	(2.924)	(2.903)	(2.954)
R&D share	-8.842	6.761	9.776	7.041	-22.95	1.454
	(18.72)	(18.69)	(19.16)	(19.13)	(20.58)	(20.55)
Foreign_capital_share	-0.0899***	-0.0904***	-0.0976***	-0.0985***	-0.0439*	-0.0413
	(0.0212)	(0.0212)	(0.0217)	(0.0217)	(0.0257)	(0.0257)
Firm_age	-0.00673	-0.00665	-0.00309	-0.00321	-0.00333	-0.00277
	(0.0151)	(0.0151)	(0.0154)	(0.0154)	(0.0223)	(0.0223)
TFP_LP	-2.843		25.15***		-37.98***	
	(4.431)		(4.534)		(4.566)	
ln_Revenue		29.94***		19.25***		5.855
		(3.905)		(3.997)		(4.036)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Observations	151,727	151,727	151,727	151,727	128,763	128,763
R-squared	0.007	0.007	0.006	0.006	0.009	0.009
Number of eternal_no	23,368	23,368	23,368	23,368	20,579	20,579

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.
Notes: Net in column (5) and (6) is defined as the difference between JC and JD.

As for the instrumental variable estimation, to test the credibility of the instruments, we calculate the correlation between IVs and major variables of interest. As can be seen from Table 2, *mean_Asia_affiliate* and *mean_EU_NA_affiliate* have almost no correlation with the dependent variables, whereas the correlation with the instrumented variables are relatively high.

The first stage results are presented in Table 3. *mean_Asia_affiliate* is shown to positively affect *Asia_affiliate* and *EU_NA_affiliate*, but the same does not apply to *mean_EU_NA_affiliate*. When it comes to the second stage estimation, as indicated in Table 4 *Asia_affiliate* has a positive effect on job creation, and the effect is negative for *EU_NA_affiliate*. As indicated in columns (3) and (4), both the investment in Asian and EU/North American countries, negatively affect JD. If we combine these two effects (impact on JC and JD), because the magnitude on JC is larger than that on JD, for both *Asia_affiliate* and *EU_NA_affiliate*, we should expect their impact on the net employment is following the trend of JC. The results in columns (5) and (6) verify our predictions.

Table 2

Correlation between the IVs and variables of interest

	JC	JD	Net
mean_Asia_affiliate	-0.0107	-0.0093	-0.0026
mean_EU_NA_affiliate	-0.0032	0.001	-0.0048

	Asia_affiliate	EU_NA_affiliate
mean_Asia_affiliate	0.2441	0.1591
mean_EU_NA_affiliate	0.2202	0.1666

Table 3

IV estimation-First stage results

	(1)	(2)	(3)	(4)
Dependent variable	Asia_affiliate	Asia_affiliate	EU_NA_affiliate	EU_NA_affiliate
mean_Asia_affiliate	0.0726***	0.0694***	0.0161***	0.0141***

	(0.00352)	(0.00351)	(0.00284)	(0.00284)
mean_EU_NA_affiliate	-0.0331***	-0.0307***	0.0158***	0.0174***
	(0.00363)	(0.00362)	(0.00293)	(0.00293)
Capital_labor_ratio	0.0327***	0.0499***	0.0232***	0.0331***
	(0.00300)	(0.00304)	(0.00242)	(0.00246)
R&D share	0.177***	0.181***	0.134***	0.139***
	(0.0229)	(0.0228)	(0.0185)	(0.0184)
Foreign_capital_share	-0.000170***	-0.000173***	-0.000178***	-0.000179***
	(3.05e-05)	(3.04e-05)	(2.46e-05)	(2.46e-05)
Firm_age	6.24e-05***	6.27e-05***	3.55e-05*	3.57e-05*
	(2.37e-05)	(2.36e-05)	(1.91e-05)	(1.91e-05)
TFP_LP	0.152***		0.0818***	
	(0.00468)		(0.00378)	
ln_Revenue		0.164***		0.0932***
		(0.00410)		(0.00332)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	99,260	99,260	99,260	99,260
R-squared	0.181	0.186	0.039	0.042
Number of eternal_no	12,602	12,602	12,602	12,602

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

Table 4

IV estimation-Second stage results

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	JC	JC	JD	JD	Net	Net
Asia_affiliate	185.5**	144.1**	-9.466	-14.01	197.1***	154.1**
	(73.31)	(72.90)	(74.02)	(74.03)	(73.67)	(74.04)
EU_NA_affiliate	-339.2***	-301.6**	-241.5*	-239.3*	-71.84	-32.92
	(130.0)	(128.2)	(131.3)	(130.2)	(117.7)	(116.4)
Capital_labor_ratio	-49.02***	-43.71***	14.52***	18.66***	-71.70***	-70.59***
	(3.305)	(3.776)	(3.337)	(3.834)	(3.302)	(3.777)
R&D share	-1.332	16.93	30.04	28.73	-35.23	-9.651
	(20.34)	(20.37)	(20.54)	(20.69)	(22.66)	(22.77)
Foreign_capital_share	-0.0964***	-0.0998***	-0.123***	-0.125***	-0.0403	-0.0366

	(0.0233)	(0.0233)	(0.0235)	(0.0237)	(0.0280)	(0.0279)
Firm_age	-0.00544	-0.00511	0.000261	9.79e-05	-0.00832	-0.00701
	(0.0155)	(0.0154)	(0.0156)	(0.0156)	(0.0227)	(0.0226)
TFP_LP	-1.948		42.37***		-53.81***	
	(7.816)		(7.891)		(8.075)	
ln_Revenue		35.48***		39.12***		-7.736
		(8.079)		(8.204)		(8.465)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	147,152	147,152	147,152	147,152	124,758	124,758
Number of eternal_no	18,793	18,793	18,793	18,793	16,574	16,574
Weak Instrument Ident.	76.68	78.00	76.68	78.00	73.57	74.38

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.
Notes: We use *mean_Asia_affiliate* and *mean_EU_NA_affiliate* as IVs.

3.1. Robustness checks and further issues

As robustness checks, we use alternatative instruments—exchange rate and lagged values of *Asia_affiliate* and *EU_NA_affiliate* (Keller and Yeaple, 2009). From both theoretical and empirical standpoints, exchange rates are knowns as one of the significant determinants of FDI, either through relative costs or relative wealth (Froot and Stein, 1991; Blonigen, 1997). Similar identification strategies can be found in Alfaro et al. (2004) who examine the effect of FDI on economic growth; Keller and Yeaple (2009) who examine the effect of FDI on firm productivity. We will follow these practices and use real effective exchange rates of Japanese Yen against Asian and EU/NA regions as the instruments to verify. The results are presented in Table 5. In general, the impact of *Asia_affiliate* and *EU_NA_affiliate* on JC and JD have the same signs as in the previous results, and are statistically significant. Both have positive influence on the net employment, which is also consistent with the previous findings.

Table 5

Results using alternative IVs (exchange rates and lagged FDI measurements)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	JC	JC	JD	JD	Net	Net
Asia_affiliate	16.46***	12.00**	-13.27**	-13.41**	26.62***	22.12***
	(5.904)	(5.920)	(6.081)	(6.099)	(5.172)	(5.188)

EU_NA_affiliate	-33.63***	-36.27***	-43.25***	-43.56***	7.003	4.560
	(7.610)	(7.617)	(7.839)	(7.846)	(6.666)	(6.675)
Capital_labor_ratio	-63.71***	-59.34***	5.601	7.462**	-69.96***	-67.20***
	(3.470)	(3.533)	(3.574)	(3.640)	(3.039)	(3.096)
R&D share	-17.71	4.154	5.804	2.879	-18.23	7.259
	(24.69)	(24.65)	(25.43)	(25.39)	(21.63)	(21.60)
Foreign_capital_share	-0.0507	-0.0489	-0.0128	-0.0138	-0.0473*	-0.0445
	(0.0311)	(0.0311)	(0.0320)	(0.0320)	(0.0272)	(0.0272)
Firm_age	0.0313	0.0318	0.0357	0.0357	-0.00137	-0.000969
	(0.0266)	(0.0266)	(0.0274)	(0.0274)	(0.0233)	(0.0233)
TFP_LP	-11.64**		24.52***		-35.45***	
	(5.492)		(5.656)		(4.810)	
ln_Revenue		27.92***		19.35***		10.55**
		(4.869)		(5.016)		(4.267)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	122,577	122,577	122,577	122,577	122,577	122,577
Number of eternal_no	19,253	19,253	19,253	19,253	19,253	19,253

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.
Notes: We use *RER_Asia, RER_EU/NA, Lag_Asia_affiliate* and *Lag_EU/NA_affiliate* as IVs.

In the meantime, changes in exchange rate may directly affect domestic employment dynamics through changes in export prices and the export behavior of firms (Klein et al., 2003). To shut down this direct channel from exchange rate to job creation and destruction through exports, we rerun equations (1) and (2) while including export intensity of firms, which is defined as the export value over total revenue. The results prestend in Appendix A1 are similar to those in Table 1.

One might also argue that foreign-owned firms might have different decision-making on foreign investment from firms that are fully operated by Japanese oweners. To deal with such concern, we limit our samples to firms that have foreign capital and repeat the practice aforementioned. The IV estimation results using both the inital instrument (mean_FDI_affiliate) and the new specification (exchange rate & lag_FDI) are presented in Table A2 and A3 respectively. The main predictions remain unchanged.

Another point is the coverage of industries. In the previous estimations, we have been using the full sample, which includes both manufacturing and non-manufacturing industries (we use two-digit code and there are 27 industries in total). However, the imapct of FDI on employment can be considered different between manufacturing and non-manufacturing industries. To confirm whether our previous findings are robust to industry heterogeneity, we limit the estimation to firms that are located to manufacturing industries only. The results are presented in the Appendix Table A4, where the predictions remain unchanged.

In summary, the empirical findings suggest that the effect of FDI on job creation and destruction may differ depending on where investment goes: an increase in FDI to Asia raises job creation and reduces job destruction, while that to Europe/North America reduces both job creation and destruction. But through what kind of channels does the causality exist? What is the mechanism behind the phenomenon? A further explanation from the theoretical perspective can help us disentangle the puzzle.

4. Theoretical model

We will provide a simple model to explain the empirical findings on the effect of FDI on domestic job creation and destruction. The base model is a search-and-matching model with heterogeneous jobs developed by Wasmer (1999). Firms have two types of jobs in domestic activities, a skilled one and an unskilled one. We assume that an exogeneous increase in FDI raises labor demand in a way that makes the separation (or destruction) of both types of domestic jobs less likely. The expansion of foreign activities needs support of headquarters and branches in home through administration, customization, production for exports and so forth. How much the demand for skilled job increases relative to the other, however, depends on the destination of FDI. This differential impact of FDI on demand for heterogeneous jobs is the key to our theoretical mechanism. We will here give a sketch of the model and relegate derivations to Theory Appendix.

4.1. Overview of a search-and-matching model with two types of jobs

The economy consists of a continuum of risk-neutral, infinitely lived workers of size L and a continuum of risk-neutral, infinitely lived firms of size one. The representative firm produces output Y from capital stock K and employment N. The production function, $Y = G(K, N)$, is specified as a constant-returns-to-scale in both factors.[6] The employment N consists of the two-types of workers: $N = N_h + N_l$, where N_j is the mass of type-$j \in \{h, l\}$ workers. The firm posts V_j of vacancies for type-j job at a cost c_j. The matching process between firms and workers is costly in a way that unemployed workers and vacancies meet each other randomly. The existing match of type-j job breaks with an exogenous Poisson separation (destruction) rate

[6] Because all firms are symmetric and the mass of firms is one, variables for individual firms are also aggregate ones. We thus omit the index of firms.

s_j. The two types of jobs differ in the following way; the firm finds it more costly to search for high-skilled workers than low-skilled workers: $c_h > c_l$, but she tends to continue the match with high-skilled workers longer than that with low-skilled workers: $s_h < s_l$. The higher hiring cost for the high-skilled worker pays off in the longer continuation of match, while the lower hiring cost for the low-skilled worker comes at the expense of the shorter continuation.

The matching process is governed by a constant-returns-to-scale matching function: $m(U, V) = U^{\eta} V^{1-\eta}$, where U is the mass of unemployed workers; and $V = V_h + V_l$ the mass of vacancies and $\eta \in (0,1)$ the matching elasticity. $m(\cdot)$ is the Poisson arrival rate so that there are on average $m\Delta t$ matches during a short time interval Δt. We assume that matching is formed sequentially. First, $m(U, V)$ matches are formed on average per unit of time between ex-ante identical unemployed workers and total vacancies. Then, $m(U, V_h)$ matched workers out of $m(U, V)$ get employed in the high-skilled job, while the remaining $m(U, V) - m(U, V_h)$ matched workers in the low-skilled job. The Poisson arrival rate of matching for a vacancy $j \in \{h, l\}$ with an unemployed worker, denoted by q_j, is thus

$$q_h \equiv \frac{m(U,V)}{V_h} \cdot \frac{m(U,V_h)}{m(U,V)} = (\theta v_h)^{-\eta}, \tag{3}$$

$$q_l \equiv \frac{m(U,V)}{V_l} \cdot \frac{m(U,V) - m(U,V_h)}{m(U,V)} = \frac{q - v_h q_h}{1 - v_h} = \frac{\theta^{-\eta}\left(1 - v_h^{1-\eta}\right)}{1 - v_h}, \tag{4}$$

where $\theta \equiv V/U$; $v_j \equiv V_j/V$; and $q \equiv m(U,V)/V = m(1/\theta, 1) = \theta^{-\eta}$. Given the vacancy-unemployment share θ, both arrival rate decreases with the share of high-skilled vacancy v_h. Higher v_h makes each high-skilled vacancy more difficult to match with an unemployed worker (lower q_h). It also raises the mass of high-skilled match (higher $m(U, V_h)/V = v_h q_h$) and thus crowds out low-skilled matches (lower q_l). The Poisson arrival rate of matching for an unemployed worker with a vacancy j is defined similarly.

Job creation is measured by the number of vacancies that find workers. Aggregate job creation and high/low-skilled job creations (per unit of time) are given by

$$JC = q \cdot V = \theta^{-\eta} V, \tag{5}$$

$$JC_h = q_h \cdot V_h = \theta^{-\eta} {v_h}^{1-\eta} V, \tag{6}$$

$$JC_l = q_l \cdot V_l = \theta^{-\eta}\left(1 - v_h^{1-\eta}\right) V, \tag{7}$$

Similarly, job destruction is measured by the mass of newly separated matches. Aggregate job destruction and high/low-skilled job destructions (per unit of time) are given by

$$JD = (s_h + s_l) \cdot N,$$
$$JD_j = s_j \cdot N_j,$$

where $n_j \equiv N_j/N$ is the employment share of job j.

Firm's problem and labor demand

Each firm maximizes an expected value of discounted lifetime profits by choosing time schedules of capital investment I, capital stock K, each type of vacancy V_j, and each type of employment N_j. I and V_j are the control variables and can change instantaneously, while V_j and N_j are the state variables and can change only gradually.[7] Solving the maximization problem gives the usual marginal productivity condition for each type of job:

$$G_N = w_h + \frac{(r + s_h)c_h}{q_h}, \quad \text{(LDh)}$$

$$G_N = w_l + \frac{(r + s_l)c_l}{q_l}, \quad \text{(LDl)}$$

where $G_N \equiv \partial G/\partial N = \partial G/\partial N_j$ is the marginal product of labor; w_j is the wage of labor j; r is the exogenous interest rate; and q_j is the filling rate of job j defined in Eqs.(3) and (4). The marginal product of labor j, F_N, must be equal to the marginal cost of hiring a worker j that consists of the wage, w_j, and the expected recruitment cost for the worker, $(r + s_j)c_j/q_j$, since the expected duration of a high-skilled-job vacancy finding a worker is $1/q_j$. Given the share of high-skilled vacancy, v_j, both equations show a downward-sloping curve in (θ, w_j) space. Higher wage w_j discourages firms to post vacancies, leading to a less tighter labor market (lower θ). We will call the two equations the *labor demand curves*.

Wage setting and the share of high-skilled vacancy

When a new match is formed, the firm and the worker engage in a bargain to determine wage in a way of a generalized Nash bargaining, in which the equilibrium wage maximizes a weighted product of each party's return from the job match. The resulting outcome is

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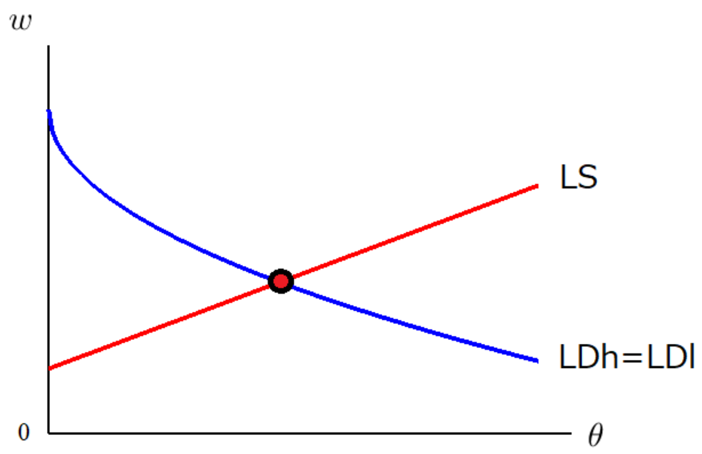
[7] Letting $\dot{N}_j$ be the time derivative of employment j, employment j evolves according to $\dot{N}_j = JC_j - JD_j$, where JC_j is job creation of j Eqs. (4) and (5)) and JD_j is job destruction of j (Eq.(7)).

$$w_j = (1-\beta)z + \beta\left[G_N + \sum_{j=h,l}(\theta v_j)c_j\right], \qquad \text{(WS)}$$

where $\beta \in (0,1)$ is a parameter capturing the worker's bargaining power and z is an unemployment benefit. $\sum_{j=h,l}\theta v_j c_j = \sum_{j=h,l} c_j V_j/U$ represents the average cost of posting vacancies for each unemployed worker and increases with the high-skilled-vacancy share v_h because of $c_h > c_l$. The worker demands a higher wage when her outside payoff is greater (higher z) and/or firm's opportunity cost of keeping vacancies unfilled is greater (higher G_N and $\sum_{j=h,l}\theta v_j c_j$). We also note that the right-hand side of (WS) does not depend on the job type, implying $w_h = w_l = w$, partly because both types of job have the same marginal product. The equation (WS), which we call the *wage setting curve*, has an upward-slope in (w, θ) space. The steady-state equilibrium is the intersection of the labor supply and demand curves, as shown in Figure 3.

Figure 3

Labor demand and wage setting curves



From (LDh) and (LDl), we have

$$G_N - \frac{(r+s_h)c_h}{q_h} = G_N - \frac{(r+s_l)c_l}{q_l},$$

or,

$$v_h^{\eta} + (\tilde{c}-1)v_h - \tilde{c} = 0, \qquad (8)$$

where $\tilde{c} \equiv (r+s_l)c_l/[(r+s_h)c_h]$ measures a hiring cost of low-skilled job relative to high-skilled job: it is greater when the relative hiring cost is high (higher c_l/c_h) and/or the realtive duration of match is shorter (higher s_l/s_h). Eq. (8) is the condition under which the firm finds it indifferent to post either a high-skilled vacancy or a low-skilled vacancy in steady state. The marginal product of labor net of the expected flow of hiring cost must be equal between the two jobs, determining the high-skilled-vacancy share v_h. If the relative hiring cost of a low-skilled worker is low enough such that $\tilde{c} < 1-\eta$, Eq. (8) has a solution of $v_h \in (0,1)$. In the following, we will assume this inequality for the two types of jobs to coexist in steady state. As $\tilde{c}$ is higher, the firm shifts emphasis on recruiting high-skilled workers rather than low-skilled ones, leading to higher v_h.

In steady state, the outflows from and the inflows to the unemployment pool for each type of worker must be equal. That is, for each type j, $JC_j = JD_j$ must hold:

$$(\theta v_h)^{1-\eta} uL = s_h n_h (1-u)L,$$
$$\theta^{1-\eta}\left(1-v_h^{1-\eta}\right)uL = s_l(1-n_h)(1-u)L,$$

where we note $JC_j = q_j V_j = \theta_j q_j U$. These equations are also known as the Beveridge Curves (Pissarides, 2000). In summary, the high-skilled-vacancy share v_h is pinned down by the indifference condition (8); the vacancy-unemployment ratio θ and the wage w are by labor supply (LS) and labor demand (LD); the high-skilled-employment share n_h and the unemployment rate u are by the Beveridge Curves.

5.2. Effect of FDI on domestic job creation and destruction

We model FDI as an exogenous shock to the firm. We assume that FDI decreases the separation rate s_j, considering the fact that FDI increases demand for both types of jobs in home. Domestic headquarters and branches need to support expanding foreign activities in terms of both high-skill intensive and low-skill intensive activities through administration, product/service customization, production for exports, and so forth.

However, the effect is assumed to vary in the destination of FDI. Japanese firms establish affiliates in Asian countries mainly for seeking low-cost factors such as labor and land, which is known as vertical FDI. Headquarters and plants in Japan concentrate on the production of highly value added parts and components, and export the intermediate goods to their plants in Asia for assembly (Fujita and Hamaguchi, 2012). FDI to Asia promotes exports and domestic production, thereby making low-skilled job more valuable than high-skilled job. The relative reduction of separation rate of low-skilled job can be considered sufficiently high, i.e.,

$\partial s_l / \partial FDI^{Asia} << \partial s_h / \partial FDI^{Asia} < 0$.[8]

On the other, Japanese multinationals engage in FDI in European and North American countries mainly for saving trade costs and seeking new markets, known as horizontal FDI. They tend to replace exports by local production to save transportation costs, reducing domestic production. FDI to Europe and North America does not much increase the need for unskilled jobs relative to the one for skilled job.[9] This implies that the relative reduction of separation rate of skilled job is sufficiently high, i.e., $\partial s_h / \partial FDI^{EU,NA} << \partial s_l / \partial FDI^{EU,NA} < 0$.[10]

Responding to a decline in the separation rate, the high-skilled-vacancy share v_h and the vacancy-unemployment ratio θ change immediately because firms can instantaneously adjust vacancies V_j. By contrast, the adjustment of employment N_j and the unemployment rate u takes time and change gradually. In the following, we will consider the effect of FDI in the short run where vacancies can react while un/employment remains unchanged.

FDI to Asia

When the separation rate of the low-skilled match declines more sharply than that of the skilled match as a result of FDI to Asia, firms find it more profitable to match with low-skilled workers than with high-skilled ones. To equalize the profitability of hiring the two types of workers, firms increase the share of low-skilled vacancy, $v_l = 1 - v_h$, with lower search cost of $c_l (< c_h)$. This change in the composition of vacancies then reduces the average search cost per unemployed worker (lower $\sum_{j=h,l} c_j \theta v_j = \sum_{j=h,l} c_j V_j / U$) and strengthens the bargaining position of firms against workers. Workers are unable to demand higher wage than before, making (WS) shift down. In addition, based on the setting where high-skilled vacancies are filled first and the low-skilled ones next, the filling rate of low-skilled vacancy, q_l, increases due to the fewer high-skilled vacancies. Firms thus increase low-skilled vacancies more than they reduce high-skilled vacancies, making the labor market tighter as reflected in the rightward shift of (LD). Both shifts of (WS) and (LD) result in a higher vacancy-unemployment ratio θ, as shown in Figure 4.

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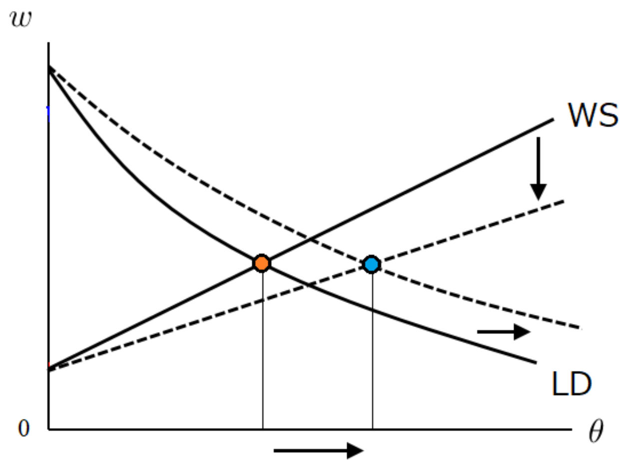
[8] The exact condition is given by $\frac{\partial s_h}{\partial FDI^{Asia}} / \frac{\partial s_l}{\partial FDI^{Asia}} \in [0, S^a)$, where $S^a \equiv \Gamma_2 / \Gamma_1$; $\Gamma_1 \equiv c_h (r + s_h)[x\{\eta \tilde{c} - v_h (1-\eta)(1-\tilde{c})\} + \beta\theta c_l \tilde{c}(1 - v_h)]$; $\Gamma_2 \equiv \beta\theta c_l^2 (r + s_h)(1 - v_h)$; and $x \equiv (1-\beta)(G_N - z) - \beta\theta \sum_j v_j c_j$, which we assume to be positive. See Theory Appendix for details.

[9] Hayakawa et al. (2013) found that Japanese firms that started horizontal FDI, defined as FDI to developed countries, increased demand for non-production workers in home.

[10] The exact condition is given by $\frac{\partial s_h}{\partial FDI^{EU,NA}} / \frac{\partial s_l}{\partial FDI^{EU,NA}} \in [S^d, \infty)$, where $S^d \equiv \Theta_2 / \Theta_1$; $\Theta_1 \equiv v_h c_h (r + s_h)[\beta\theta(1 - v_h)\, \tilde{c}(c_h - c_l) + x]$; and $\Theta_2 \equiv c_l (r + s_h)(1 - v_h)[\eta x + \beta\theta v_h (c_h - c_l)]$. See Theory Appendix for details.

Figure 4

The effect of FDI to Asia



From Eqs. (3) and (6), the effect of FDI on domestic job creation and destruction is given by

$$\frac{\partial JC}{\partial FDI^{Asia}} = (1-\eta)\theta^{-\eta}\theta' U > 0,$$

$$\frac{\partial JD}{\partial FDI^{Asia}} = \sum_{j=h,l} s_j{}' N_j < 0,$$

where $\theta' \equiv \partial\theta/\partial FDI^{Asia} > 0$ and $s_j' \equiv \partial s_j/\partial FDI^{Asia} < 0$. Due to FDI to Asia, both types of job match are likely to continue longer so that fewer existing matches are destroyed. The effect of longer duration is greater for low-skilled job with lower search cost. The total vacancies firms post increases, resulting in more job creation. The result is in line with our empirical findings.

By decomposing the effect into job creation and destruction of each type of job (Eqs. (4), (5) and (7)), we can see

$$\frac{\partial JC_h}{\partial FDI^{Asia}} = q_h' V_h + q_h V_h' = (1-\eta)(\theta v_h)^{1-\eta}(\theta'/\theta + v_h'/v_h)U < 0, \quad (5)$$

$$\frac{\partial JC_l}{\partial FDI^{Asia}} = \frac{\partial JC}{\partial FDI^{Asia}} - \frac{\partial JC_h}{\partial FDI^{Asia}} > 0, \quad (6)$$

$$\frac{\partial JD_j}{\partial FDI^{Asia}} = s_j{}' N_j < 0 \quad \text{for } j \in \{h, l\}, \quad (7)$$

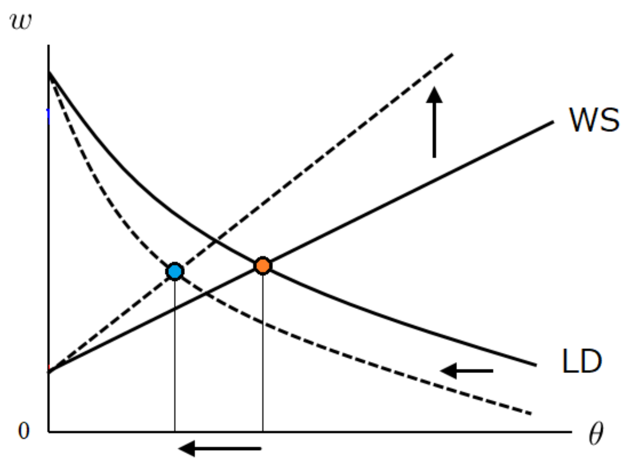
where $v_h' \equiv \partial v_h / \partial FDI^{Asia} < 0$; $v_h^{\eta-1} > 1$; and $\theta'/\theta + v_h'/v_h > 0$. The proofs are given in Theory Appendix. Although FDI to Asia increases total job creation, it decreases the creation of skilled job by shifting the share of vacancies from skilled job to unskilled job.

FDI to Europe and North America

In contrast to FDI to Asia, FDI to Europe and North America causes a much greater decline in the separation rate of the high-skilled match than that of the low-skilled match. The effect here is exactly opposite to the effect of FDI to Asia. Due to the higher profitability of high-skilled job, a firm raises its share out of total vacancies (higher v_h). Higher v_h increases the average search cost per unemployed worker and thus the firms' opportunity cost of keeping vacancies unfilled. Firms have to agree on a higher wage demanded by workers, shifting (WS) up. Due to higher v_h reducing the filling rate of high-skilled vacancies, firms reduce both high-skilled and low-skilled vacancies, making (LD) shift leftward. These shifts translate into a lower vacancy-unemployment ratio θ, as shown in Figure 5.

Figure 5

The effect of FDI to Europe/North America



From Eqs. (3) and (6), the effect of FDI on total job creation and destruction is then

$$\frac{\partial JC}{\partial FDI^{EU,NA}} = (1-\eta)\theta^{-\eta}\theta' U < 0,$$

$$\frac{\partial JD}{\partial FDI^{EU,NA}} = \sum_{j=h,l} s_j{}' N_i < 0,$$

where $\theta' \equiv \partial\theta / \partial FDI^{EU,NA} < 0$ and $s_j' \equiv \partial s_j / \partial FDI^{EU,NA} < 0$. This is consistent with our empirical findings.

From Eqs.(4), (5) and (7), we derive the effect of FDI on each type of job creation and destruction as.

$$\frac{\partial JC_h}{\partial FDI^{EU,NA}} = q_h' V_h + q_h V_h' = (1-\eta)(\theta v_h)^{1-\eta}(\theta'/\theta + v_h'/v_h)U > 0, \tag{5}$$

$$\frac{\partial JC_l}{\partial FDI^{EU,NA}} = \frac{\partial JC}{\partial FDI^{EU,NA}} - \frac{\partial JC_h}{\partial FDI^{EU,NA}} < 0, \tag{6}$$

$$\frac{\partial JD_j}{\partial FDI^{EU,NA}} = s_j' N_j < 0 \quad \text{for } j \in \{h, l\}, \tag{7}$$

where $v_h' \equiv \partial v_h / \partial FDI^{EU,NA} < 0$; $v_h^{\eta-1} > 1$; and $\theta'/\theta + v_h'/v_h > 0$. The proofs are given in Theory Appendix. In contrast to FDI to Asia, FDI to Europe and North America induces firms to create more skilled jobs and fewer unskilled jobs.

5.3. Empirical evidence on the mechanism

To explain why the effect of FDI on domestic jobs varies in its destination, the theoretical model here highlights the role of heterogenous jobs and gives new testable implications. That is, (i) an increase in FDI in Asia creates more unskilled jobs and fewer skilled jobs (Eqs. (8) and (9)); (ii) an increase in FDI in EU/North America creates more skilled jobs and fewer unskilled jobs (Eqs. (11) and (12)); (iii) an increase in FDI in either destination reduces the destruction of both types of jobs (Eqs. (10) and (13)).[11]

We take a step further to empirically investigate the three predictions from (i) to (iii). Because the detailed information on the skill level of employees is not available, we instead use information on division-level characteristics. We suppose that employees working in some divisions are skilled labor, while those in other divisions are unskilled labor. The classification closely follows the one proposed by Autor and Dorn (2013) and is given in Table 5.

Table 6 (eliminate the distinction btw HQ and branch)
Classification of skilled and unskilled job

Division		Skill type
	Research & planning	High
	Information	High

[11] We start from our theory by assuming that FDI has different impacts on the job separation rate, s_i. Ideally, we need to check this to verify the mechanism. However, our limited data does not enable us to further investigate s_i. We instead take an indirect approach; we derive new theoretical predictions on FDI impact of domestic job creation and destruction of *each type of job* and then empirically test them.

Research & development	High
International business	High
Human resources, accounting, other management	Low
Manufacturing, mining, electricity, gas	Low
Commerce	Low
Restaurants	Low
Research	High
Services	Low
Warehouse, transportation, delivery	Low
Other domestic	Low

We then construct the measures of firm-skill level job creation and destruction and repeat the same regressions as in Section 3. The results are summarized in Table 7. The signs of coefficients of interest are consistent with our predictions, although some of them are statistically insignificant. From columns (1) and (2), we see that an increase in the number of Asian affiliates has a negative effect on skilled-job creation and a positive effect on unskilled-job creation, which is line with (i). As predicted by (ii), we also see that an increase in the number of European/North American affiliates has an exactly opposite effect on un/skilled-job creation. We confirm the third prediction: the negative effect of FDI into Europe/North America on high/low skilled-job destruction from columns (3) and (4).

Table 7

Analysis by high skilled and low skilled divisions (IV method)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	JC_high	JC_high	JC_low	JC_low	JD_high	JD_high	JD_low	JD_low
Asia_affiliate	-0.396	-0.859	16.86***	12.86**	-1.081	-1.257	-12.19**	-12.16**
	(2.009)	(2.015)	(5.408)	(5.424)	(1.897)	(1.903)	(5.753)	(5.770)
EU_NA_affiliate	6.619**	6.297**	-40.24***	-42.56***	-0.0560	-0.165	-43.20***	-43.40***
	(2.590)	(2.592)	(6.972)	(6.978)	(2.446)	(2.448)	(7.416)	(7.423)
Capital_labor_ratio	-5.654***	-4.841***	-58.06***	-54.50***	-2.108*	-1.903*	7.709**	9.366***
	(1.181)	(1.202)	(3.179)	(3.237)	(1.115)	(1.136)	(3.381)	(3.443)
R&D share	3.277	4.793	-20.99	-0.640	2.310	3.106	3.494	-0.228
	(8.402)	(8.387)	(22.62)	(22.58)	(7.934)	(7.921)	(24.06)	(24.02)
Foreign_capital_share	-0.0228**	-0.0228**	-0.0279	-0.0261	0.0101	0.0102	-0.0229	-0.0239
	(0.0106)	(0.0106)	(0.0285)	(0.0285)	(0.00998)	(0.00998)	(0.0303)	(0.0303)

Firm_age	-0.000979	-0.000934	0.0323	0.0327	-0.00430	-0.00429	0.0400	0.0400
	(0.00906)	(0.00906)	(0.0244)	(0.0244)	(0.00855)	(0.00855)	(0.0259)	(0.0259)
TFP_LP	3.977**		-15.61***		0.00725		24.52***	
	(1.869)		(5.031)		(1.765)		(5.351)	
ln_Revenue		6.743***		21.18***		1.450		17.90***
		(1.657)		(4.461)		(1.565)		(4.746)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	122,578	122,578	122,578	122,578	122,578	122,578	122,578	122,578
Number of eternal_no	19,254	19,254	19,254	19,254	19,254	19,254	19,254	19,254

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.
Notes: We use *mean_Asia_affiliate* and *mean_EU_NA_affiliate* as IVs.

6. Conclusion

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, suggesting that fewer jobs are destroyed when carrying out FDI in Asian or Europe/North American countries. We use a search and match framework, embedded with FDI decision to better illustrate the mechanism, arguing that the variation arises because FDI into difference regions may lead to different labor reallocation decisions between high skilled labor and low skilled labor.

Our results are in sharp contrast with that of Harrison and McMillan (2011). However, our findings are consistent with those in 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 Genda (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 outsourced to Asian countries, this will create more room for employment of highly skilled workers. We verify this phenomenom by conducting the division-level analysis, and relate our findings to the standard horizontal/vertical FDI framework.

The limitation of this study is 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 findings are only limited to median-sized and large firms in Japan. Furthermore, 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.

Appendices

Appendix 1. Summary statistics

Table A0 Summary statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Job creation (person)	642463	47.48	379.43	0	126237
Job destruction (person)	642463	44.54	351.13	0	99996
Net employment (person)	546261	3.64	388.48	-99691	126132
Revenue (million yen)	642463	22869.31	177307.10	1	1.59E+07
R&D expense/revenue	286415	0.01	0.16	0	57.10
Firm age	642461	44.53	96.36	0	2005
Total regular employee (person)	642463	432.45	1775.64	50	153405
Foreign capital share (100%)	642384	2.09	12.23	0	100
Capital/labor ratio (log)	642463	-0.28	1.22	-7.34	7.96
TFP_LP (log)	642463	6.71	1.12	-1.74	13.28
Total number of affiliate	284125	2.92	18.33	0	1346
Total number of oversea affiliate	284125	2.32	18.41	0	1327
Number of Asian affiliate	284125	1.29	7.21	0	524
Number of European affiliate	284125	0.38	4.57	0	360
Number of North American affiliate	284125	0.42	5.54	0	735
Exchange rate	642463	97.47	15.97	71.28	130.91
Export/revenue	642463	0.02	0.10	0	1

Appendix 2.

Table A1

Baseline results with export control

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	JC	JC	JD	JD	Net	Net
Asia_affiliate	20.53***	17.31***	-0.373	-0.451	28.28***	25.10***
	(3.649)	(3.654)	(3.734)	(3.740)	(3.677)	(3.685)
EU_NA_affiliate	-8.509*	-10.41**	-41.07***	-41.29***	49.79***	48.21***
	(4.570)	(4.572)	(4.676)	(4.679)	(4.534)	(4.538)
Capital_labor_ratio	-50.75***	-46.46***	9.907***	11.84***	-69.18***	-67.02***

	(2.810)	(2.859)	(2.876)	(2.926)	(2.905)	(2.957)
R&D share	-8.925	6.795	10.22	7.454	-23.52	1.079
	(18.72)	(18.70)	(19.16)	(19.14)	(20.58)	(20.55)
Foreign_capital_share	-0.0900***	-0.0904***	-0.0969***	-0.0979***	-0.0446*	-0.0417
	(0.0212)	(0.0212)	(0.0217)	(0.0217)	(0.0257)	(0.0257)
Export_intensity	-0.00672	-0.00665	-0.00312	-0.00325	-0.00322	-0.00269
	(0.0151)	(0.0151)	(0.0154)	(0.0154)	(0.0223)	(0.0223)
Firm_age	5.134	-2.238	-27.78**	-27.25**	31.78**	22.89*
	(13.26)	(13.26)	(13.57)	(13.57)	(13.36)	(13.36)
TFP_LP	-2.955		25.76***		-38.72***	
	(4.441)		(4.544)		(4.576)	
ln_Revenue		29.99***		19.79***		5.379
		(3.914)		(4.006)		(4.046)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	151,727	151,727	151,727	151,727	128,763	128,763
R-squared	0.007	0.007	0.006	0.006	0.009	0.009
Number of eternal_no	23,368	23,368	23,368	23,368	20,579	20,579

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

Table A2

Results using FDI-only samples and inital IVs (mean_Asia_affiliate and mean_EU_NA_affiliate)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	JC	JC	JD	JD	Net	Net
Asia_affiliate	366.5*	318.3	-309.0	-323.9*	593.1***	549.7***
	(194.7)	(201.8)	(188.8)	(196.7)	(198.3)	(206.1)
EU_NA_affiliate	-394.1***	-389.0***	-224.3*	-226.9*	-147.7	-135.4
	(140.5)	(140.3)	(136.3)	(136.7)	(136.6)	(135.7)
Capital_labor_ratio	-162.9***	-156.9***	4.857	14.46	-185.7***	-187.4***
	(14.41)	(17.14)	(13.98)	(16.71)	(14.44)	(17.23)
R&D share	-5.964	29.03	34.93	38.02	-47.83	-8.209
	(51.11)	(51.90)	(49.58)	(50.59)	(55.53)	(56.47)
Foreign_capital_share	-0.0243	-0.0174	-0.00729	-0.00636	-0.106	-0.0881
	(0.0533)	(0.0532)	(0.0517)	(0.0518)	(0.0706)	(0.0710)
Firm_age	0.0875	0.0902	0.0791	0.0802	-0.0272	-0.0212
	(0.0825)	(0.0823)	(0.0800)	(0.0802)	(0.128)	(0.128)

TFP_LP	-65.39**		61.13*		-127.9***	
	(32.82)		(31.83)		(33.17)	
ln_Revenue		20.53		68.23*		-36.92
		(38.25)		(37.28)		(38.75)
Export_intensity	26.25	28.98	112.0	114.7	-78.91	-79.74
	(81.36)	(82.29)	(78.91)	(80.21)	(80.92)	(81.72)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	25,135	25,135	25,135	25,135	23,279	23,279
Number of eternal_no	2,681	2,681	2,681	2,681	2,521	2,521

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

Notes: We use *mean_Asia_affiliate* and *mean_EU_NA_affiliate* as IVs.

Table A3

Results using FDI-only samples and alternative IVs (exchange rates and lagged FDI measurements)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	JC	JC	JD	JD	Net	Net
Asia_affiliate	51.40***	47.38***	-26.64	-26.10	74.02***	69.18***
	(17.16)	(17.15)	(16.76)	(16.75)	(15.07)	(15.06)
EU_NA_affiliate	-73.95***	-75.27***	-79.59***	-78.98***	18.76	16.69
	(20.60)	(20.64)	(20.12)	(20.15)	(18.10)	(18.12)
Capital_labor_ratio	-179.1***	-175.3***	-17.51	-20.31	-164.8***	-157.8***
	(15.11)	(15.50)	(14.75)	(15.13)	(13.27)	(13.61)
R&D share	-12.65	13.18	-6.491	-9.858	-1.405	29.65
	(59.82)	(59.71)	(58.41)	(58.30)	(52.54)	(52.44)
Foreign_capital_share	-0.0295	-0.0191	0.0301	0.0299	-0.0746	-0.0632
	(0.0635)	(0.0634)	(0.0620)	(0.0619)	(0.0558)	(0.0557)
Firm_age	0.409***	0.411***	0.265*	0.263*	0.146	0.150
	(0.152)	(0.152)	(0.148)	(0.148)	(0.133)	(0.133)
TFP_LP	-45.58**		-9.601		-37.78*	
	(22.28)		(21.76)		(19.57)	
ln_Revenue		17.38		-17.64		37.74**
		(20.18)		(19.70)		(17.72)
Export_intensity	81.64	71.98	-83.22	-82.69	132.8***	122.0***
	(53.28)	(53.23)	(52.03)	(51.97)	(46.79)	(46.74)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,050	21,050	21,050	21,050	21,050	21,050
Number of eternal_no	2,294	2,294	2,294	2,294	2,294	2,294

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.

Notes: We use *RER_Asia, RER_EU/NA, Lag_Asia_affiliate* and *Lag_EU/NA_affiliate* as IVs.

Table A4

OLS results using samples in manufacturing industries only

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	JC	JC	JD	JD	Net Δ	Net Δ
ln_number_Asia_affiliate	17.75***	15.34***	-0.823	-1.105	27.44***	25.16***
	(3.516)	(3.523)	(3.462)	(3.469)	(3.835)	(3.844)
ln_number_						
EU_Northam_affiliate	-14.42***	-15.76***	-34.12***	-34.36***	31.41***	30.29***
	(4.435)	(4.437)	(4.366)	(4.369)	(4.738)	(4.741)
Capital_labor_ratio	-36.41***	-32.83***	6.399**	7.701**	-50.71***	-48.29***
	(3.050)	(3.103)	(3.002)	(3.055)	(3.396)	(3.456)
R&D share	-31.95	-20.72	-5.664	-6.570	-35.81	-19.94
	(25.55)	(25.51)	(25.15)	(25.12)	(30.19)	(30.15)
Foreign_capital_share	-0.119***	-0.120***	-0.136***	-0.137***	-0.0474	-0.0471
	(0.0220)	(0.0220)	(0.0216)	(0.0216)	(0.0293)	(0.0293)
Firm_age	-0.000735	-0.000454	0.00645	0.00644	-0.00443	-0.00388
	(0.0144)	(0.0144)	(0.0141)	(0.0141)	(0.0235)	(0.0235)
TFP_LP	1.299		14.70***		-18.94***	
	(4.562)		(4.491)		(5.029)	
ln_Revenue		23.40***		13.57***		7.984*
		(4.025)		(3.964)		(4.446)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	93,040	93,040	93,040	93,040	80,626	80,626
R-squared	0.007	0.008	0.008	0.008	0.008	0.008
Number of eternal_no	12,279	12,279	12,279	12,279	11,017	11,017

Standard errors in parentheses. *** Significant at 1%. ** Significant at 5%. * Significant at 10%.