

# Does It Matter Where You Invest?

## The Impact of FDI on Domestic Job Creation and Destruction

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# The Roadmap

- 1 Introduction
- 2 Literature Review
- 3 Data and Methodology
- 4 Empirical Findings
- 5 Theoretical Explanation
- 6 Evidence on the Mechanism
- 7 Conclusions

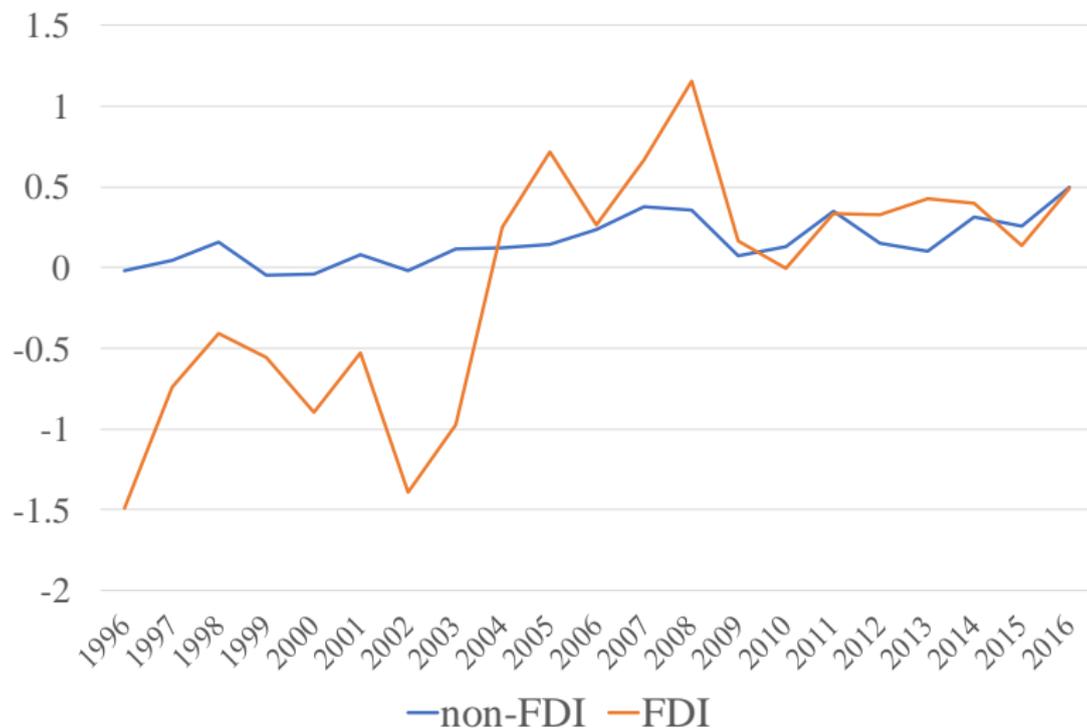
# Introduction

- The past few decades have witnessed the overseas expansion of Japanese manufacturing firms in terms of foreign direct investment.
  - It is believed to have benefited the host countries through technology spillover and job creation.
  - On the other hand, it might lead to the “hollowing-out” domestically.
- However, mixed results have been found concerning the “hollowing-out” phenomenon.
  - Earlier literature show a negative relationship between outward FDI and employment at home.
  - More recent studies find that **net employment growth** in FDI firms are higher than that in non-FDI ones (Barba Navaretti et al. 2010; Hijzen et al. 2011; Desai et al. 2009; Hayakawa et al. 2013).

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Figure 1: Revenue-weighted average labor change by FDI



Source: Authors' calculation based on BSJBSA.

# Introduction

One caveat in the existing literature is that:

Net employment (NE)  $\neq$  Job creation (JC) or Job destruction (JD)



- The variation in NE is the combined result of JC and JD.
- There are many possibilities:
  - increase in JC + unchanged JD  $\Rightarrow$  positive NE
  - unchanged JC + decrease in JD  $\Rightarrow$  positive NE

$\Rightarrow$  This study aims at solving this problem by differentiating JC from JD. And we measure **within-firm** job reallocation by aggregating the **division level** (marketing, production, R&D, etc.) labor variation.

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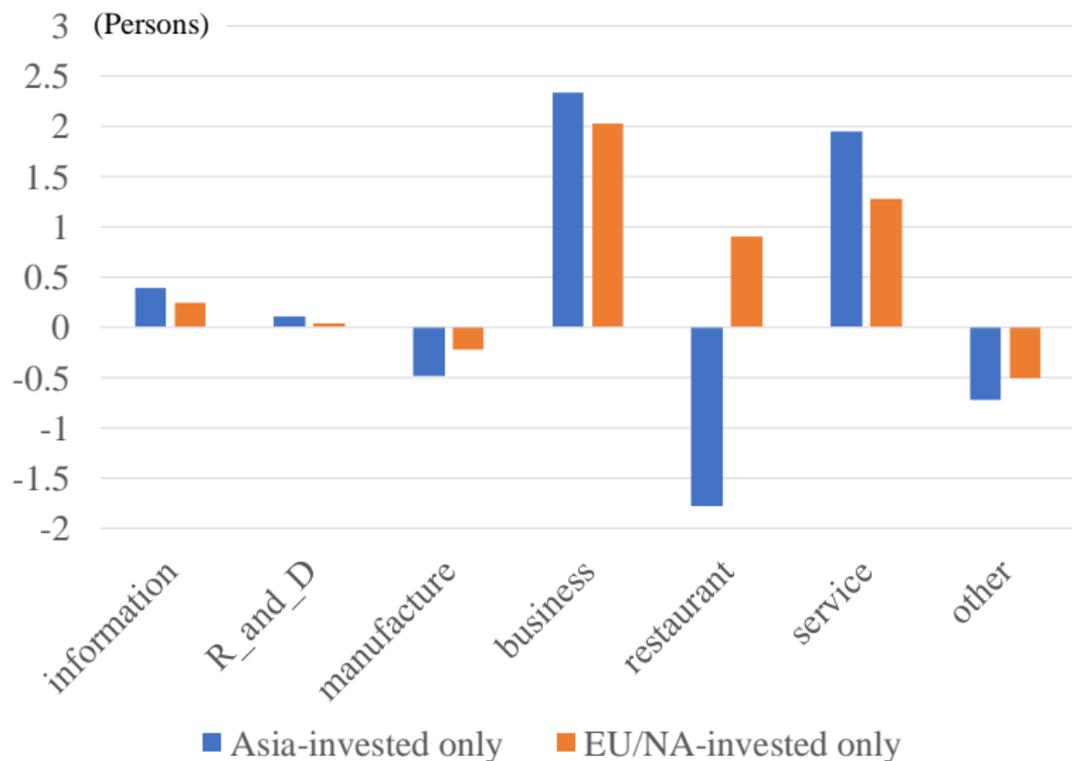
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Figure 2: Does FDI destination matter?



# Research questions

- What is the causality between Japanese firms' foreign expansion and JC/JD?
- Is there any heterogeneity among different investment destinations (Asia, Europe/North America, etc.)? And why?

# Major findings

- We find that **outward FDI** did **lead to an increase** in net employment at the firm level.
- The investment in **Asia** has a **positive impact** on Japan's job creation, whereas the impact in Europe and North America is negative.
- When it comes to **job destruction**, the impact is **negative regardless of the destination**.
- We show that such heterogeneity is caused by the reallocation between **high-skilled/low-skilled** labors.

# Contributions

- Few studies have investigated the relationship between **decomposed** JC/JD and outward FDI at the **firm-level**.
- We further explore the possible reasons of why the patterns differ **by destination**, and provide the evidence.

# Literature review

Theoretical explanation:

- Markusen (1984), Brainard (1997)
  - Firms should set up affiliates abroad to reduce transportation costs.
  - Going abroad would substitute for exports, and thus foreign labor would substitute for domestic labor.
  - However, moving to other markets could increase the headquarter services provided to affiliates and increase employment in the long term.

# Literature review (Cont.)

## Empirical evidence

- Substitute effect: Brainard and Riker (2001), Hanson et al. (2003), Muendler and Becker (2006), and Moser et al. (2010).
- Complement effect: Amiti and Wei (2005), Borja (2005), Desai, Foley, and Hines (2005), Barba Navaretti et al. (2010), Desai et al. (2009), Hijzen et al. (2011), and Kovak et al. (2020).
- More sophisticated verification—Harrison and McMillan (2011):  
Investing in low-wage countries  $\Rightarrow$  home employment  $\downarrow$   
Investing in advanced countries  $\Rightarrow$  home employment  $\uparrow$ .
- The closest to our study: Moser et al. (2010).

## Literature review (Cont.)

### Evidence in the context of Japan

- Outward FDI and NE: Hijzen et al. (2007), Fukao and Yamashita (2010), and Tanaka (2012).
- Outward FDI and JC/JD: Ando and Kimura (2015), and Kodama and Inui (2015). But their measurements do not separate the variation in JC from that in JD.

### Other related studies:

- Debaere, Lee and Lee (2010JDE); Hayakawa, Matsuura, Motohashi and Obashi (2013JWE).

# Data

- Basic Survey of Japanese Business Structure and Activities (BSJBSA), METI, Japan.
  - It covers year 1995-2017, including almost all industries.
  - The survey covers all firms that employ  $\geq 50$  workers &  $\geq 30,000,000$  yen worth of capital.
  - The response rate is approximately 85% with around 30,000 firms completing the questionnaire each year.
- Each firm reports the number of employees in its divisions of headquarters and branches such as marketing, IT, production, services, etc.
- Destinations of FDI are reported in region level: Asia, Europe, North America, etc.

## Methodology: how to measure JC and JD

Following Davis and Haltiwanger (1999), **Job creation** is defined as

$$JC_{i,t} = \sum_{d=1}^S \Delta N_{i,d,t}^C, \quad (9)$$

where

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

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

- $S$ : number of divisions in firm  $i$ .
- $N_{i,d,t}$ : number of workers employed in division  $d$  in firm  $i$  in year  $t$ .

# Methodology: how to measure JC and JD

## Job destruction

$$JD_{i,t} = \sum_{d=1}^S \Delta N_{i,d,t}^D, \quad (11)$$

where

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

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

# Specification Strategy

## Baseline equation to be estimated:

$$\begin{aligned}
 \text{job\_creation}_{it} = & \alpha_1 \text{Asian\_affiliate}_{it} + \alpha_2 \text{EU\&NorthAme\_affiliate}_{it} \\
 & + \alpha_3 \text{control\_variables}_{it} + \alpha_i + \alpha_t + \varepsilon_{it}^{jc}
 \end{aligned} \tag{12}$$

- *Asian\_affiliate<sub>it</sub>*: firm *i*'s number of affiliates in Asia in year *t*.
- *EU&NorthAme\_affiliate<sub>it</sub>*: firm *i*'s total number of affiliates in EU and North America in year *t*.
- *control\_variables*: capital/labor ratio, R&D share, foreign capital share, firm age, TFP and revenue (log), etc.

## Econometric concerns

- Omitted variable: E.g. the financing situation might influence the firm's capital portfolio and thus affect the employment in the new operating year.
- Self-selection: firms with more active foreign investment activities might choose to change their employment structure more frequently.

# Possible solutions

## Instrumental variable method

- 1 The average number of foreign affiliates in each region by industry.

$$\begin{aligned} \textit{Asian\_affiliate}_{ijt} &\leftarrow \textit{Mean\_Asian\_affiliate}_{jt} \\ \textit{EU\&NorthAme\_affiliate}_{ijt} &\leftarrow \textit{Mean\_EU\&NorthAme\_affiliate}_{jt} \end{aligned}$$

- 2 Real effective exchange rate + 1st/2nd lag of no. of foreign affiliates.  
(Alfaro et al., 2004; Keller and Yeaple, 2009)

Table 1: Baseline results

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	JC	JC	JD	JD	Net $\Delta$	Net $\Delta$
ln_Asia_affiliate	20.68*** (3.627)	17.24*** (3.633)	-1.204 (3.712)	-1.256 (3.719)	29.27*** (3.653)	25.80*** (3.662)
ln_EU_Northam_affiliate	-8.457* (4.568)	-10.44** (4.570)	-41.34*** (4.674)	-41.55*** (4.678)	50.14*** (4.532)	48.46*** (4.536)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.007	0.007	0.006	0.006	0.009	0.009
N	151,727	151,727	151,727	151,727	128,763	128,763

Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

- Control variables include capital-labor ratio, R&D share, foreign capital ratio, firm age, revenue, TFP.
- The effect of FDI on job creation is different depending on its destination.

Table 2: Results using IV ①

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	JC	JC	JD	JD	Net $\Delta$	Net $\Delta$
ln_Asia_affiliate	185.5** (73.31)	144.1** (72.90)	-9.466 (74.02)	-14.01 (74.03)	197.1*** (73.67)	154.1** (74.04)
ln_EU_Northam_affiliate	-339.2*** (130.0)	-301.6** (128.2)	-241.5* (131.3)	-239.3* (130.2)	-71.84 (117.7)	-32.92 (116.4)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	147,152	147,152	147,152	147,152	124,758	124,758

Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

We use *mean\_Asia\_affiliate* and *mean\_EU\_NA\_affiliate* as IVs.

- Control variables are the same as in the baseline estimation.
- Weak Ident. and Sargen tests are cleared.

Table 3: Results using IV ②

Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
	JC	JC	JD	JD	Net $\Delta$	Net $\Delta$
ln_Asia_affiliate	16.46*** (5.904)	12.00** (5.920)	-13.27** (6.081)	-13.41** (6.099)	26.62*** (5.172)	22.12*** (5.188)
ln_EU_Northam_affiliate	-33.63*** (7.610)	-36.27*** (7.617)	-43.25*** (7.839)	-43.56*** (7.846)	7.003 (6.666)	4.560 (6.675)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	122,577	122,577	122,577	122,577	122,577	122,577

Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

We use *RER\_Asia*, *RER\_EU/NA*, *Lag\_Asia\_affiliate* and *Lag\_EU/NA\_affiliate* as IVs.

- Control variables are the same as in the baseline estimation.
- Weak Ident. and Sargen tests are cleared.

# Theory

- ▶ Frictional search-and-matching model a la Pissarides (2000).
- ▶ Workers and vacancies posted by firms meet with certain probability.
- ▶ The existing match breaks down if it is hit by a shock with rate  $s_j$ .
  
- ▶ One-to-many matching: Each firm matches with multiple workers.
  
- ▶ Heterogeneous jobs (Wasmer, 1999EJ):  
High skilled job  $h$ ;  
Low skilled job  $l$ .

## Firm

- The representative firm chooses the time-schedule of investment and hiring,  $\{K(t), I(t), N_h(t), N_l(t), V_h(t), V_l(t)\}_t$ , to maximize its lifetime profit,  $\int_0^\infty e^{-rt} \Pi(t) dt$ :

$$\Pi \equiv \underbrace{F(K, N_h + N_l)}_{\text{Sales/outputs}} - \underbrace{\sum_{j=h,l} w_j N_j}_{\text{Wage bill}} - \underbrace{\sum_{j=h,l} c_j V_j}_{\text{Search cost}} - \underbrace{I}_{\text{Investment}},$$

subject to

$$\dot{K} = I - \delta K, \quad (\text{Law of motion of capital})$$

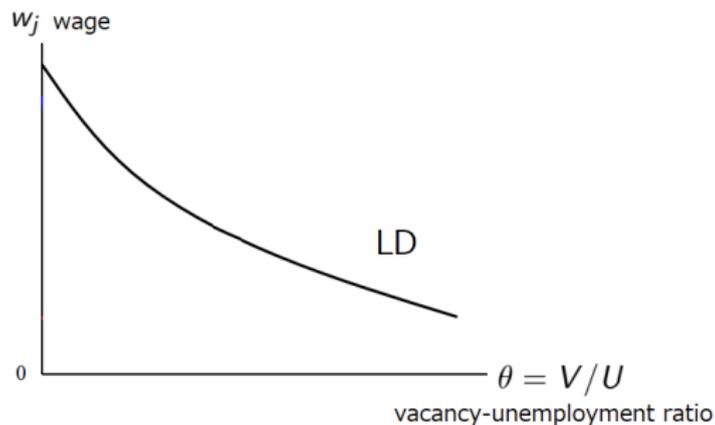
$$\dot{N}_j = \underbrace{q_j V_j}_{\text{Job creation}} - \underbrace{s_j N_j}_{\text{Job destruction}}. \quad (\text{Law of motion of employment } j)$$

- 1 High-skilled job: high vacancy cost  $c_h$  and low separation rate  $s_h$ .
- 2 Low-skilled job: low vacancy cost  $c_l$  and high separation rate  $s_l$ .

$$\rightarrow c_h > c_l; \quad s_h < s_l.$$

# Labor demand

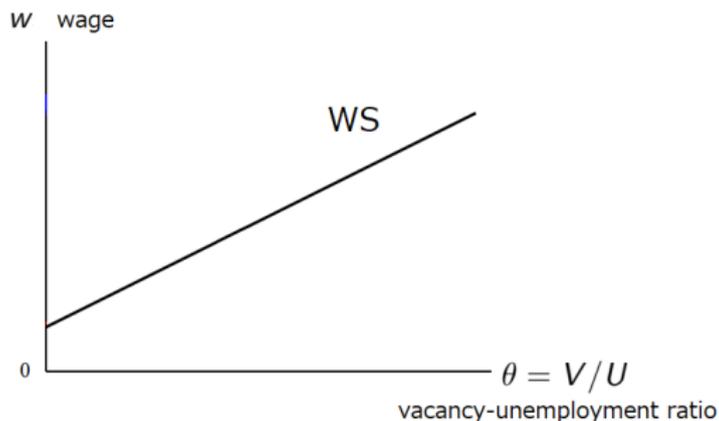
- ▶ From the firm's lifetime profit maximization problem,
- the marginal product of worker  $j \in \{h, l\}$  = the marginal cost of searching and employing worker  $j \Rightarrow$  **labor demand curve**



- Higher wage  $w_j \uparrow \rightarrow$  fewer vacancies being posted  $\theta \downarrow$ .

# Wage setting

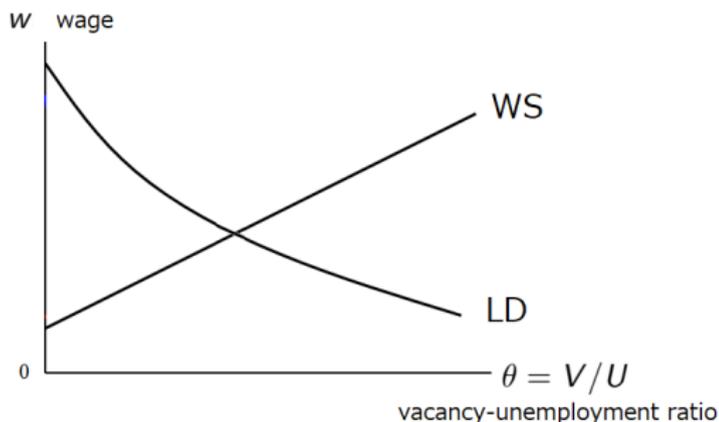
- ▶ The surplus generated by a match is shared between the firm and the worker according to a Nash bargaining rule  $\Rightarrow$  **wage setting curve**



- Tighter labor market  $\theta \uparrow \rightarrow$  worker's bargaining position being stronger  $\rightarrow$  workers' demanding higher wage  $w \uparrow$ .

# Equilibrium

- ▶ The intersection of the two curves is the equilibrium  $(w, \theta)$ :



Other endogenous variables are also determined (not shown here).

- ▶ The share of high-skilled vacancy:  $\mathbf{v}_h \equiv \mathbf{V}_h / (\mathbf{V}_h + \mathbf{V}_l)$ .
- ▶ Unemployment (employment):  $U (N)$ .
- ▶ Total vacancies:  $V = V_h + V_l$ .

# Effect of FDI

- ▶ FDI is modeled as an exogenous shock to the firm and makes domestic jobs more valuable, i.e., job destruction less likely:

$$s'_j \equiv \frac{\partial s_j}{\partial FDI} < 0, \quad j \in \{h, l\}.$$

- ▶ However, the magnitude of the effects varies in the destination of FDI.

FDI by Japanese MNEs to Asia:

- ▶ Seeking low-price factors such as labor and land, a.k.a., **vertical FDI**.
- ▶ To export intermediate inputs to affiliates for assembly, Japanese MNEs expand domestic production, making **production/low-skilled workers more valuable**.

$$\rightarrow s'_l \ll s'_h < 0.$$

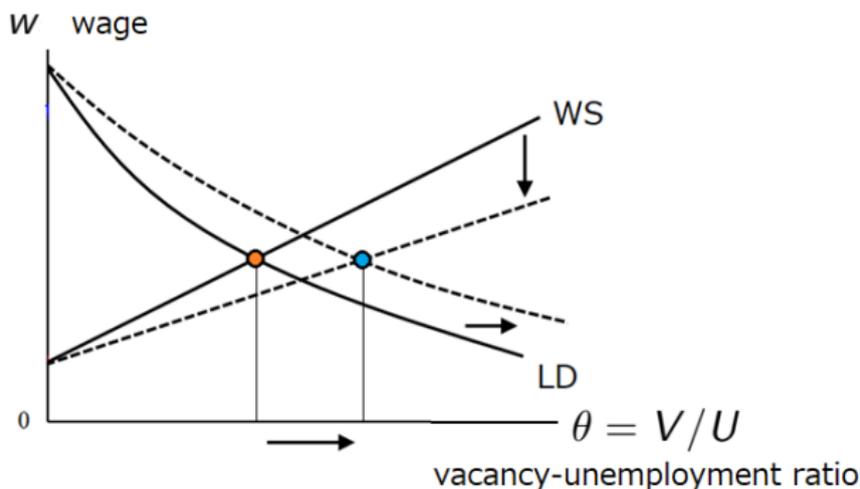
FDI by Japanese MNEs to Europe/North America:

- ▶ Saving trade costs and seeking final demand, a.k.a., **horizontal FDI**.
- ▶ Japanese MNEs does not expand domestic production, making **non-production/high-skilled workers more valuable**.

$$\rightarrow s'_h \ll s'_l < 0.$$

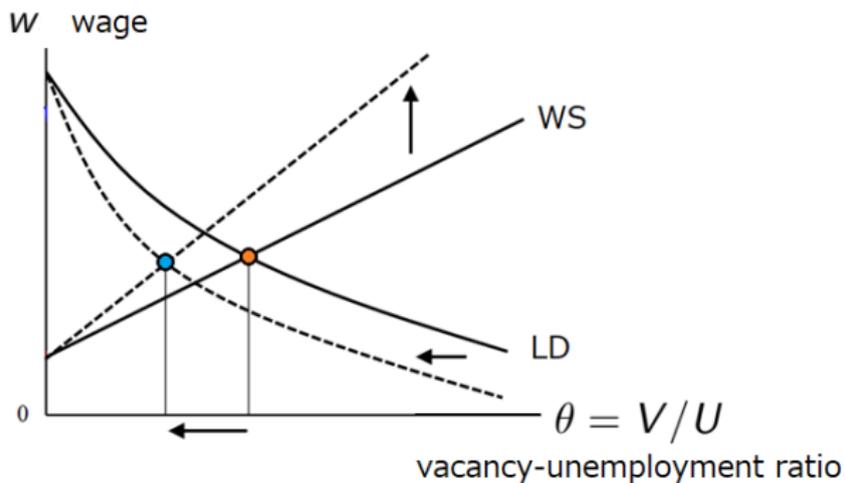
# Effect of FDI to Asia on domestic jobs

- ▶ Hiring unskilled workers is more profitable than hiring skilled workers.
- Lower share of skilled vacancy  $v_h = V_h/V \downarrow$ .
- Lower average search cost  $(\sum_{j=h,l} c_j V_j/U)$  shifts WS down.
- **Higher vacancy-unemployment ratio  $\theta \uparrow$ .**



# Effect of FDI to EU/NA on domestic jobs

- ▶ Hiring high-skilled workers is more profitable than hiring low-skilled workers.
- Higher share of high-skilled vacancy  $v_h = V_h/V \uparrow$ .
- Higher average search cost  $(\sum_{j=h,l} c_j V_j/U)$  shifts WS up.
- **Lower vacancy-unemployment ratio  $\theta \downarrow$ .**



- ▶ FDI to Asia: vertical FDI
- Low-skilled job becomes more important.
- Share of low-skilled vacancies out of total vacancies  $\uparrow$ .
- Average search cost  $\downarrow$  →  $\mathbf{JC_h} \downarrow$ ,  $\mathbf{JC_l} \uparrow$ .  $JD \downarrow$ .
  
- ▶ FDI to Europe and North America: horizontal FDI.
- High-skilled job becomes more important.
- Share of high-skilled vacancies out of total vacancies  $\uparrow$ .
- Average search cost  $\uparrow$  →  $\mathbf{JC_h} \uparrow$ ,  $\mathbf{JC_l} \downarrow$ .  $JD \downarrow$ .

## Implications

- ▶ FDI favors existing employees.
- ▶ Vertical FDI favors unemployed workers with (potentially) low skill.
- ▶ Horizontal FDI favors unemployed workers with (potentially) high skill.

Table 4: The impact of FDI on employment by skill

Dependent variable	(1)	(2)	(3)	(4)
	JC_high	JC_low	JD_high	JD_low
ln_Asia_affiliate	-0.859 (2.015)	12.86** (5.424)	-1.257 (1.903)	-12.16** (5.770)
ln_EU_Northam_affiliate	6.297** (2.592)	-42.56*** (6.978)	-0.165 (2.448)	-43.40*** (7.423)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	122,578	122,578	122,578	122,578

Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

We use *RER\_Asia*, *RER\_EU/NA*, *Lag\_Asia\_affiliate* and *Lag\_EU/NA\_affiliate* as IVs.

- The results are consistent with the previous predictions.

# Robustness Checks

- To include export intensity (export/revenue) to control for the substitution between trade and FDI.
- To verify by using the samples in manufacturing industries only.
- To limit the analysis to FDI-invested firms (in terms of HQ) only.
- To apply different control variables, and try industry\*year FE.

## To summarize

- Outward FDI leads to decline in both job creation and job destruction within the firm, and the effect on the JD is larger, thus causing positive impact on NE.
- The impact on within-firm labor reallocation depends on FDI destination.
- Vertical FDI (Asia) favors job searchers with low skills, whereas horizontal FDI (EU/NA) favors those with high skills.

## To do list

- To take into account labor transfer among branches of the same firm.
- To combine the affiliate information for more detailed verification.
- To conduct further sensitivity checks to ensure the robustness of the results.

Thank you for listening.