Global Sourcing and Domestic Production Networks

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What do we know about the domestic segment of global value chains?

- Production has never been more fragmented across countries.
- An extensive literature on the causes and consequences of global sourcing.
- Research on the evolution of the domestic segment of global value chains has been sparse.
- Who is trading with whom in the domestic economy? How foreign sourcing complements or substitutes for domestic sourcing?
- Broad implications: propagation of shocks; knowledge spillover; the aggregate effects of misallocation of resources; welfare gains from trade.

What we do?

- Use Japanese firms' production network data (4.5 million buyer-supplier links):
  - Study the spatial and industrial patterns of firms' global and domestic sourcing;
  - Study how firms' offshoring decisions affect their choices of domestic suppliers.
- Build a model based on Antràs, Fort, and Tintelnot (2017) (EK at the firm level):
  - Heterogeneous buyers and sellers;
  - Fixed and variable costs for both domestic and foreign trade;
  - Multiple input industries with varying degrees of product differentiation;
  - Firms' endogenous trade costs that depend on the intensity of face-to-face communication.

Main Empirical Findings

- Firms are less likely to source inputs from distant suppliers and foreign suppliers (countries), especially for differentiated inputs. s
- Based on a firm-level instrument (based on world export supply shocks) for offshoring:
  1. Offshoring (for exogenous reasons) triggers firms to add and drop domestic suppliers; the net effect is positive.
  2. After offshoring, firms are less likely to drop domestic suppliers, but more likely to drop distant and larger suppliers (relative to the existing sellers).
  3. More likely to add suppliers that are larger, more proximate, and from differentiated input industries (relative to the existing sellers).
- These choices of suppliers reduce the average distance of domestic sourcing (i.e., localization of domestic production networks).

▸ Literature Review

Literature Review

- Domestic production networks
  - Acemoglu et al. (2012); Oberfield (2013); Carvalho and Gabaix (2013); Carvalho, Nirei, and Saito (2014); Bernard, Moxnes and Saito (2016); Boehm, Flaaen, Pandalai-Nayar (2015); Baqaee (2016); Lim (2017); Kikkawa, et al. (2017).
- Firms' global sourcing and endogenous firms' performance
  - Ramanarayanan (2014); Blaum, Lelarge, and Peters (2016); Kee and Tang (2016); Antràs, Fort, and Tintelnot (2017).
- Network and trade
  - Rauch (1999); Rauch and Trindade (2002); Chaney (2014); Eaton et al. (2014); Carballo, Ottaviano, and Volpe Martincus (2016); Bernard, Moxnes and Ulltveit-Moe (2017); Sugita, Teshima, Seira (2017).
- Non-efficiency aspect of firm performance
  - Jensen and Kletzer (2005); Holmes and Stevens (2015).
- Economic Georgraphy
  - Davis and Weinstein (2002); Duranton and Overman (2005); Redding and Turner (2015); Davis and Dingel (2016), etc.

Data

Data from the Tokyo Shoko Research, Ltd. (TSR)

- 800,000 firms in Japan, for 2005 and 2010.
- Info on between-firm relationships: the names of a firm's top *domestic* suppliers (up to 24) and buyers (up to 24).
- Use a two-way matching method to construct the domestic production network in Japan.
- The top seller (an intermediary) in our constructed production network has over 11,000 buyers in 2010; the top buyer (construction company) has close to 8,000 suppliers.
- Basic firm-level balance sheet info:
  - employment, sales, location, up to three main industries (4-digit), establishment year, number of factories.

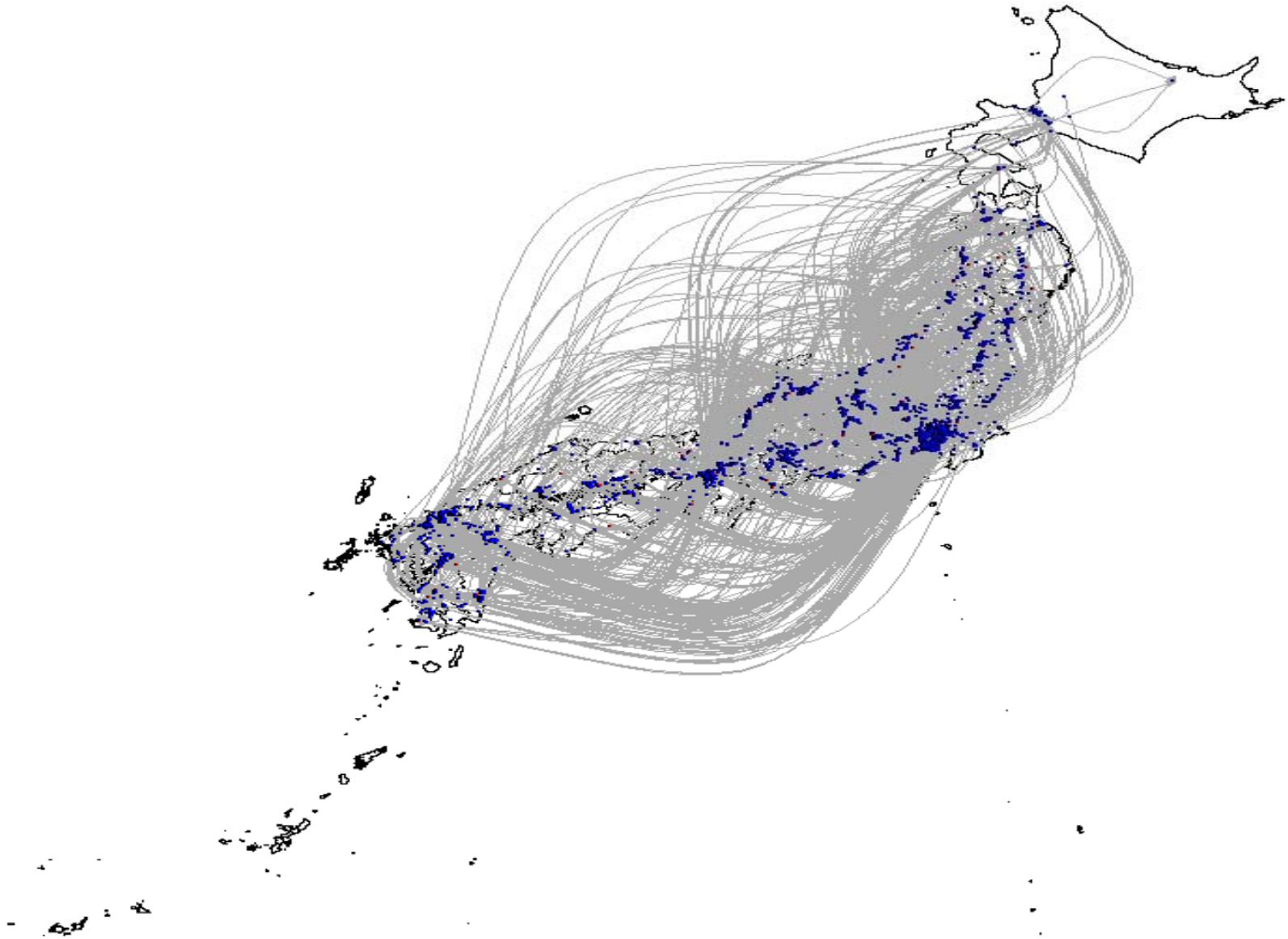
Data

Basic Survey on Business Structure and Activities (BSBSA), from Japan's Ministry of Economy, Trade and Industry (METI).

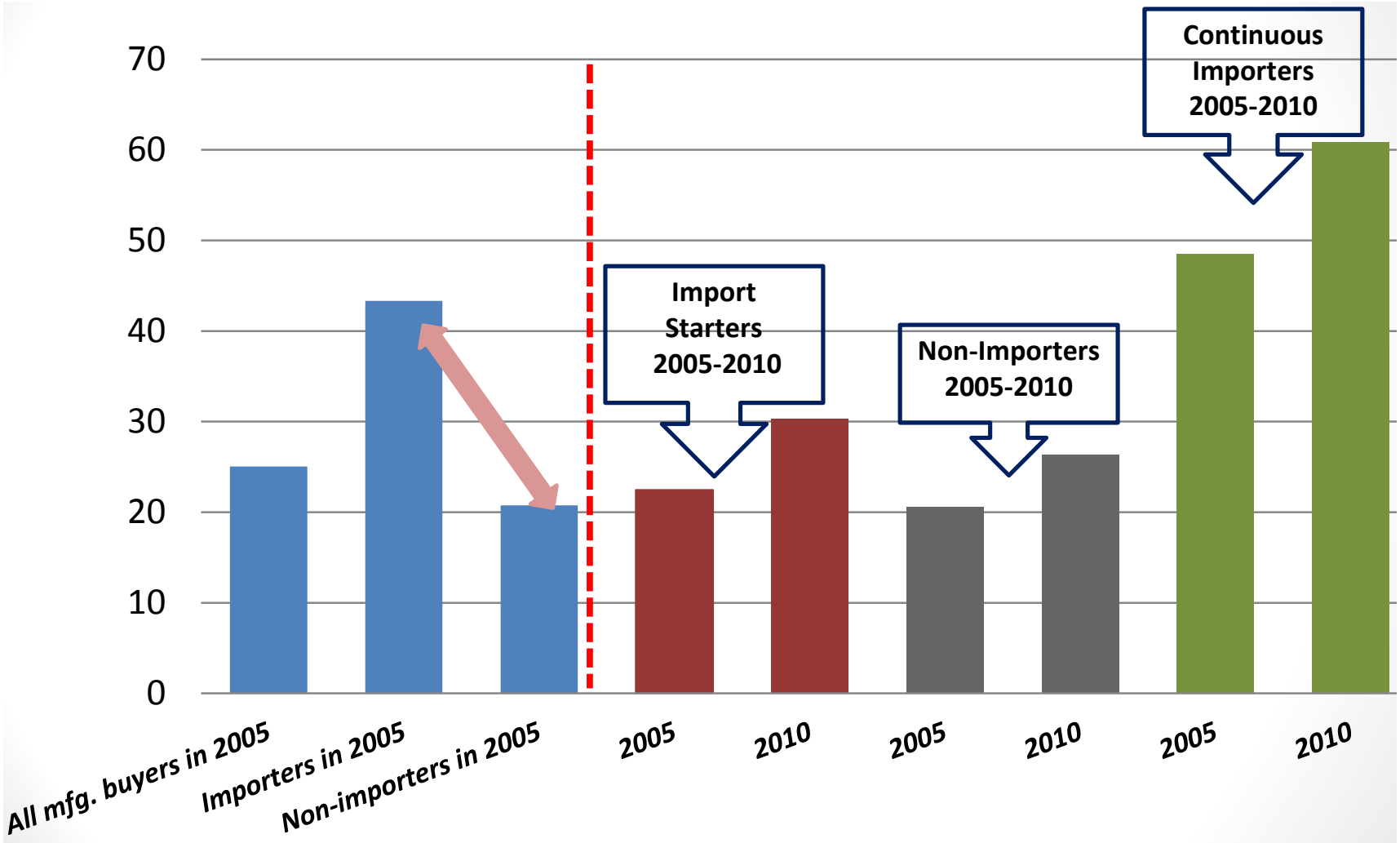
- All firms with at least 50 employees or 30 million yen of paid-in capital in the Japanese manufacturing, mining, wholesale and retail, and several other service sectors.
- 22,939 and 24,892 firms in 2005 and 2010, respectively.
- Detailed information on firms' business activities: main industry code (3 digit), employment, sales, purchases, exports, and imports (by 5 continents and 12 broad sectors).

▸ Firm-Size Rank

Production Networks of Electronics Producers



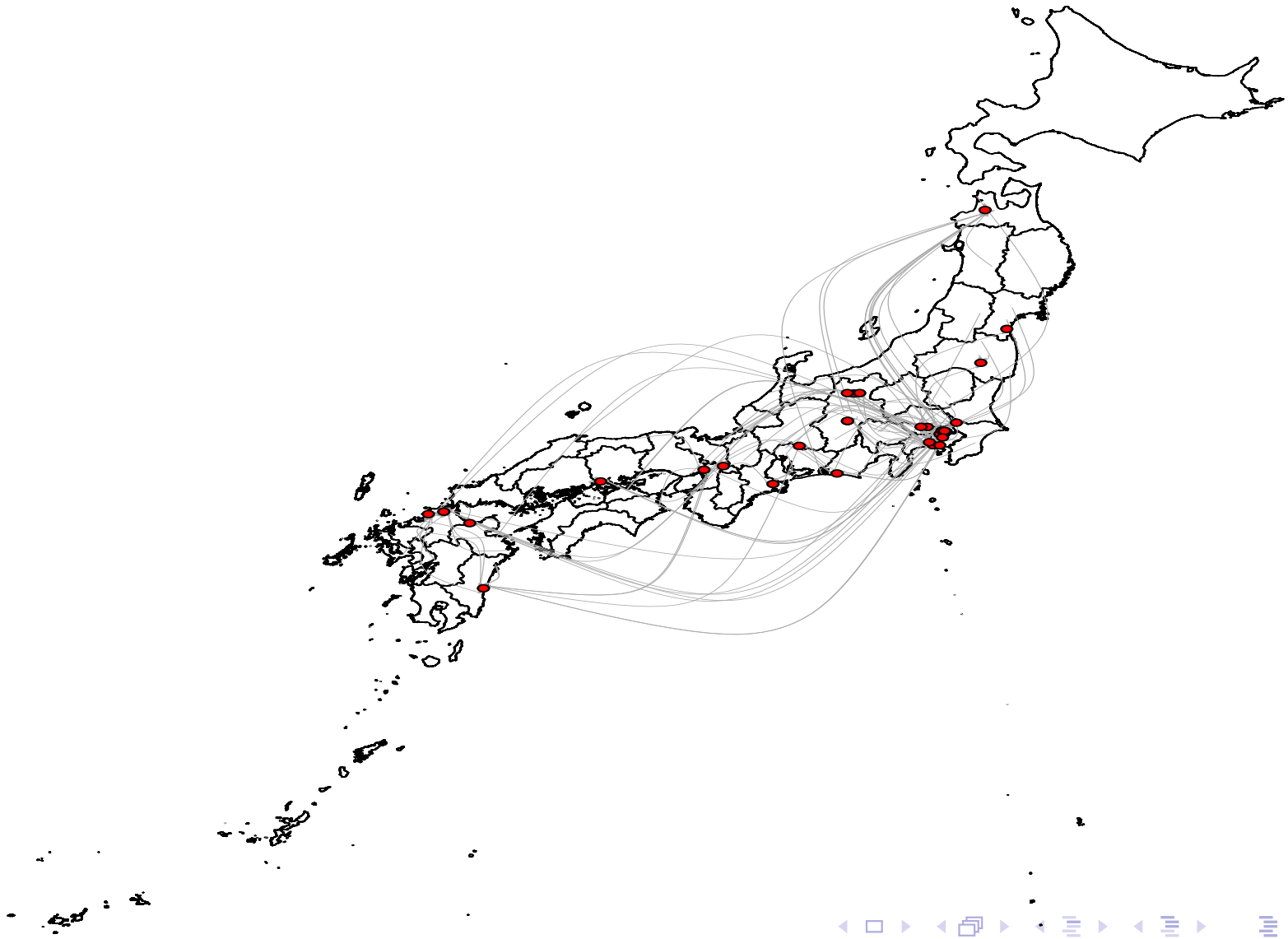
Number of Suppliers by Buyer Type



▸ Number of Sellers

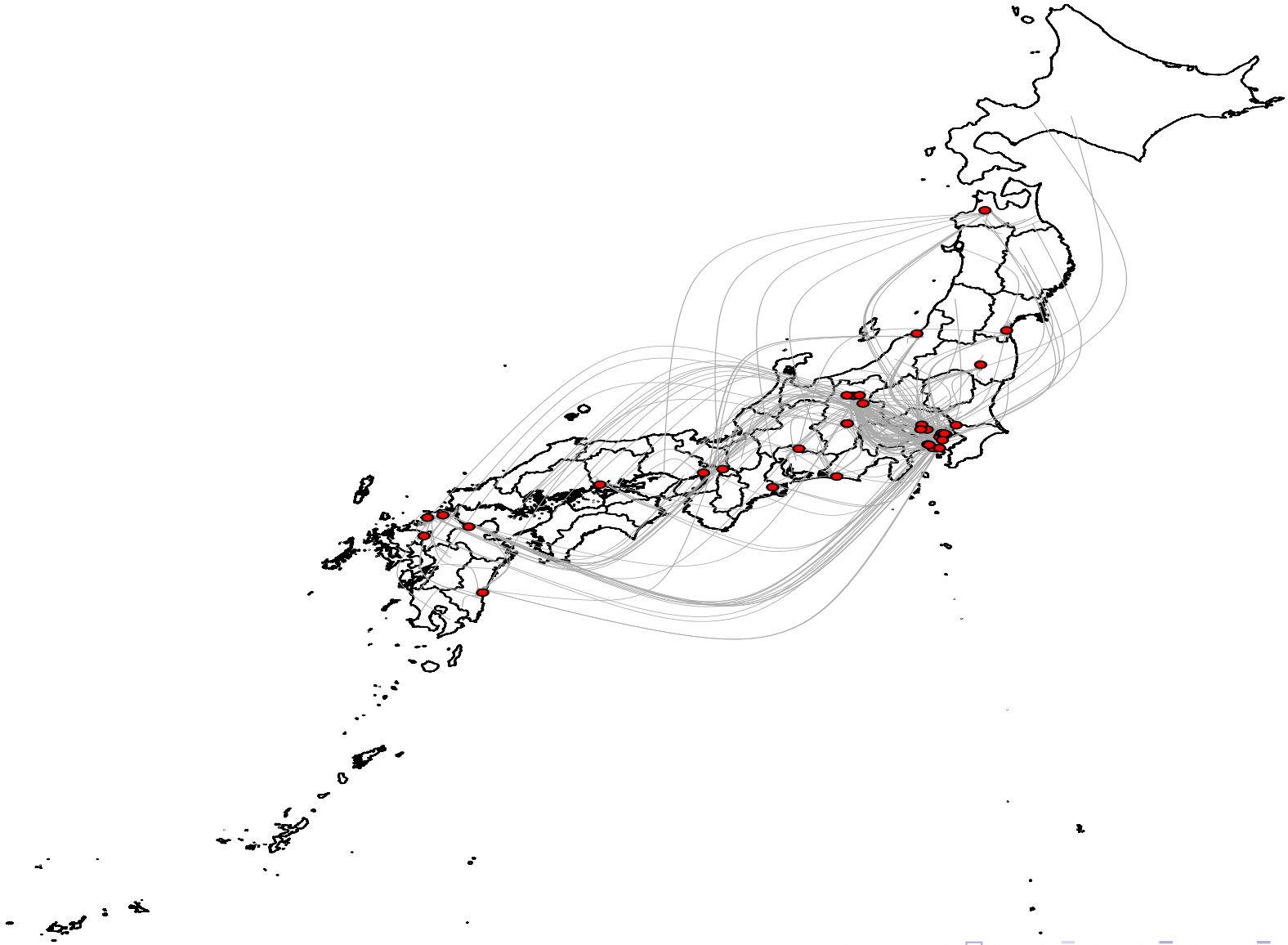
Newly Offshoring Electronics Producers

Dropped Suppliers

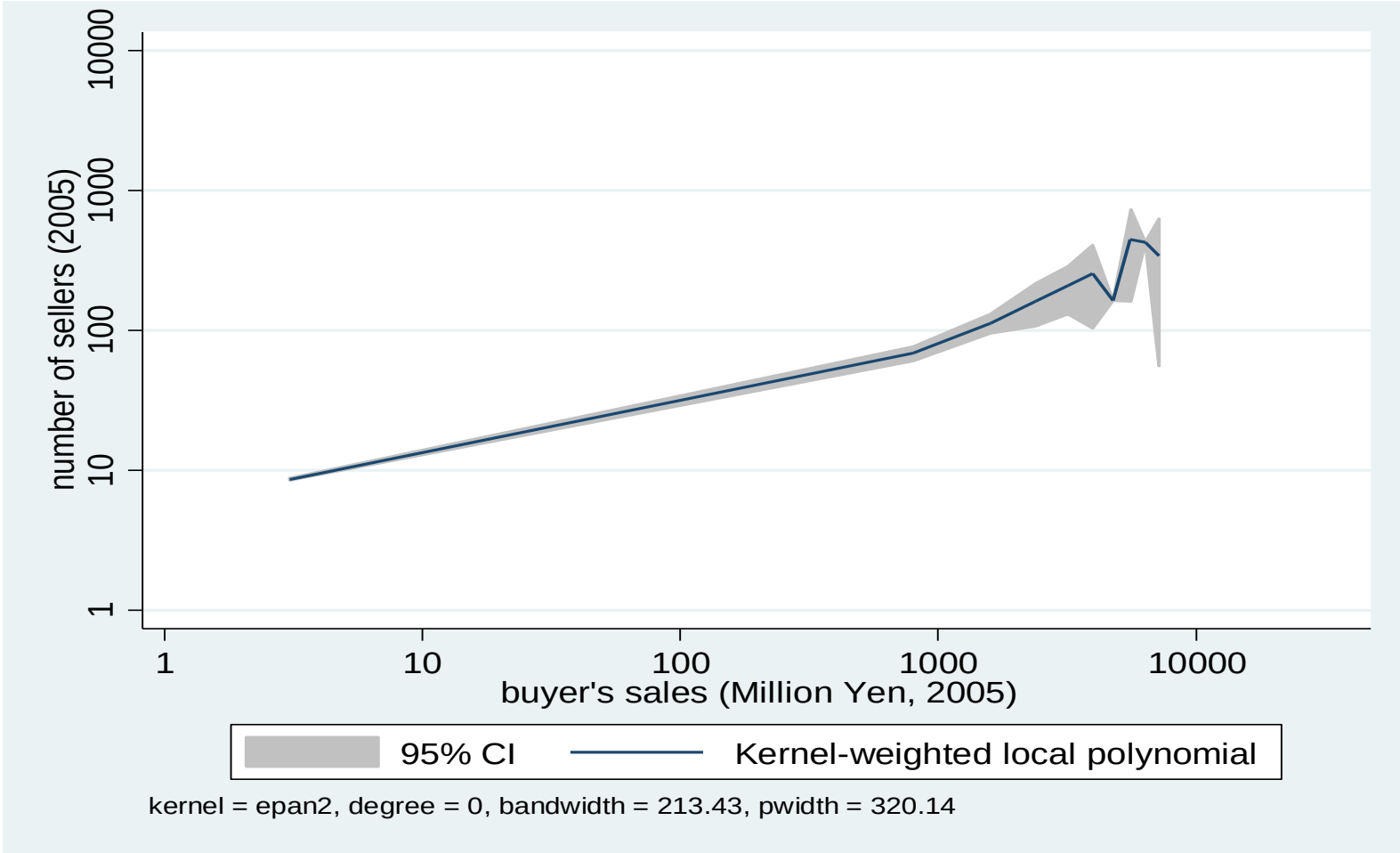


Newly Offshoring Electronics Producers

Added Suppliers

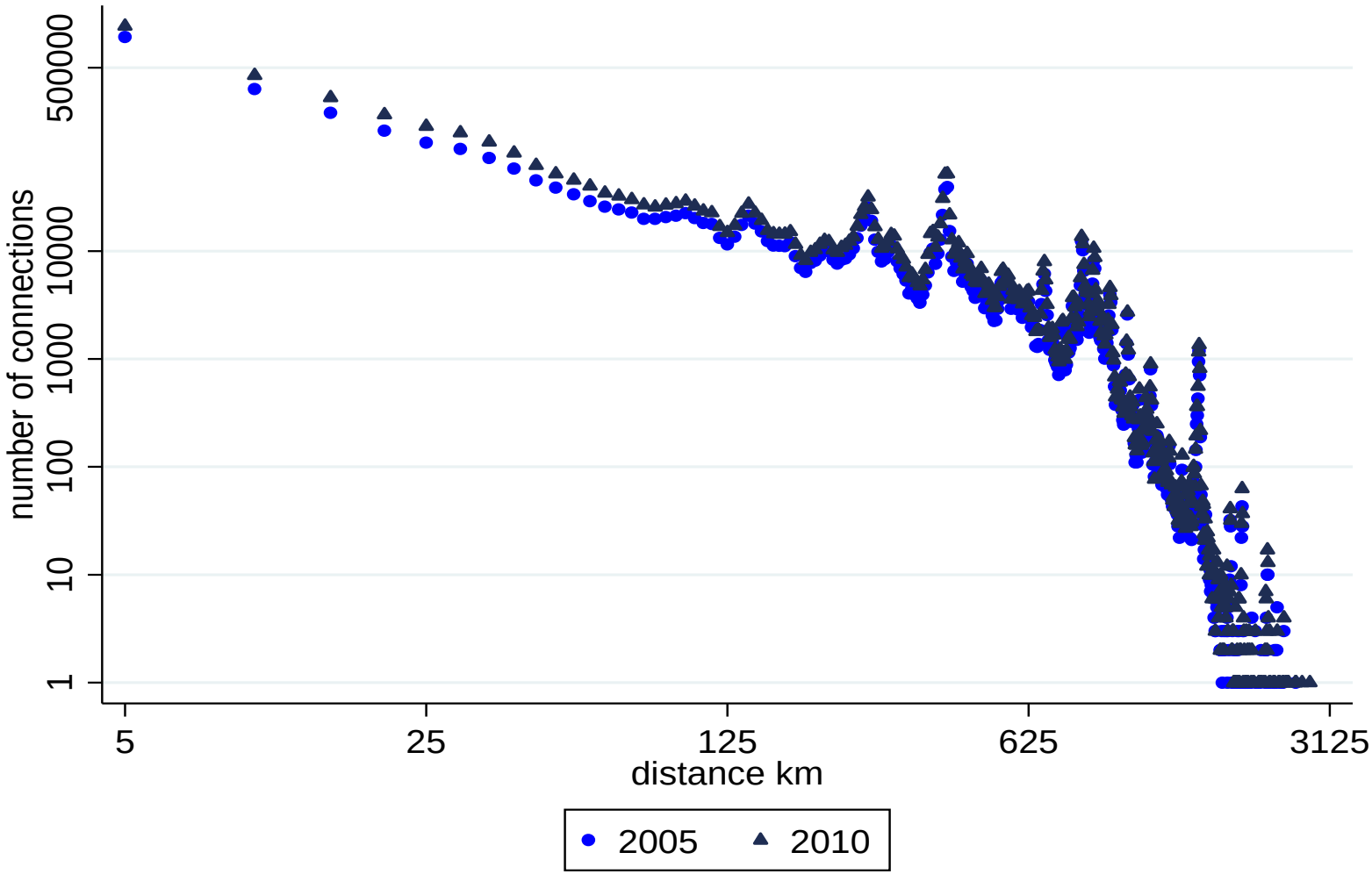


Productivity and the Scope of Sourcing



▸ regressions ▸ map

Distance and the Number of Sellers



Post-offshoring Firm Performance

$$\Delta y_i = \alpha + \beta \Delta imp_i + \gamma \ln TFP_i + [FE_s + FE_r] + \varepsilon_i,$$

Table 3: Buyer's Offshoring and Changes in the Pattern of Domestic Outsourcing

Dep. Var.: First Difference beween 2005 and 2010	Δln(Sales)	Δln(Nb. Sellers)	Δln(Nb. Input Industries)	Δln(Nb. Source Regions)	$\frac{\Delta \text{dist}}{\text{avg(dist)}}$	Δln(dist)	$\frac{\text{dist}^{add} - \text{dist}^{drop}}{1/2(\text{dist}^{add} + \text{dist}^{drop})}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Imp Starter Dummy$_{buyer}$	0.0572***	0.0677***	0.0422***	0.0413**	-0.0336*	-0.0405*	-0.0794**
	(0.017)	(0.016)	(0.015)	(0.016)	(0.017)	(0.023)	(0.035)
ln(TFP)$_{buyer,2005}$	0.00627	0.0279**	0.0204**	0.0104	-0.00401	-0.00369	-0.0156
	(0.011)	(0.011)	(0.009)	(0.009)	(0.011)	(0.015)	(0.027)
Fixed Effects	Buyer (4-digit) Industry and Buyer Region						
R-sq	.161	.125	.128	.103	.0971	.104	.107
Nb Obs	4881	4765	4765	4765	4740	4739	3338

s.e. clustered by buyer's region.

Model

Primitives

- Antràs, Fort and Tintelnot (2017; AFT) + Bernard, Moxnes and Saito (2016; BMS) + multiple input industries.
- Dixit-Stiglitz preferences with $\sigma > 1$; monopolistic competition in the final goods market.
- Production of final goods requires intermediates (S different types), which can be in-sourced and outsourced (to domestic or foreign suppliers).
- There are M domestic regions + $M*$ foreign regions. Each region has an exogenous number n_{sr} of input suppliers.

Final-good Producers (Buyers)

- First, aggregates input varieties to composites:

$$\tilde{x}_{is} = \left[\int_0^1 x_{is}(j)^{\frac{\rho_s - 1}{\rho_s}} dj \right]^{\frac{\rho_s}{\rho_s - 1}},$$

  where ρ_s is the elasticity of substitution between different intermediate varieties.

- Then assemble the composite inputs into final goods:

$$y_i = \varphi_i \prod_{s=1}^{S} \left(\frac{\tilde{x}_{is}}{\beta_s} \right)^{\beta_s},$$

- where φ is the buyer's core productivity.

Buyer's Problem

1. Buyer i and each potential supplier draw input productivities (z's) from an industry-specific Fréchet distribution, before making sourcing decisions.

2. Choose to pay f to outsource in each industry; and pay f_s to look for an additional region for a possibly lowest cost supplier of an input variety. Based on φ_i, choose Ω_{is}. ▸ Trade Costs

3. For each input variety $j \in [0, 1]$ of industry s that it has chosen to outsource, choose the lowest-cost (inclusive of trade costs) supplier in Ω_{is} + itself.

4. For each region $r \in \Omega_{is}$, choose the optimal intensity of communication with the sellers.

5. Buyer i optimally sets its final-good price (= constant mark-up over marginal cost).

Input Quality and Endogenous Communication

- An input supplier j_s will produce high-quality input with probability q ($q = 1$ for insourcing).
- With probability $1 - q$, the supplier produces low quality inputs, which are useless for the buyer.
- Firms can engage in (face-to-face) communication with the supplier to increase (q).
- Communication is costly (assumption: more so for inputs sourced from a more distant location):
- The iceberg trade cost is multiplied by $e^{m(d)q}$, where m is an increasing function of distance.

Buyer' Unit Cost of Production and Endogenous Communication Intensity

- For input composite s, conditional on the set of sourcing regions chosen, the marginal cost is

$$\tilde{c}_{is} = \left[\mu(I_{is0}) \int_0^{\infty} p^{1-\rho_s} dG_{is0}(p) + \sum_{r \in \Omega_{is}} \mu(I_{isr}) \int_0^{\infty} \left(q_{isr}^{\frac{\rho_s}{1-\rho_s}} p \right)^{1-\rho_s} dG_{isr}(p) \right]^{\frac{1}{1-\rho_s}}.$$

- where p denotes the lowest cost the buyer pays for each unit of input variety j.
- The optimal communication intensity:

$$q_{isr} = \frac{\rho_s}{(\rho_s - 1) m(d_{ir})}.$$

q_{isr} is decreasing in ρ_s and d_r.

Firms' Equilibrium Sourcing Patterns

- Thanks to Fréchet and Eaton and Kortum (2002), the share of inputs k sourced from region r:

$$s_{isr} = \frac{\Phi_{isr}}{\Phi_{is}}$$

- where sourcing capability:

$$\Phi_{isr} = \begin{cases} T_{s0}(w_0 c_s)^{-\theta_s} & \text{if } r = 0 \\ n_{sr} T_{sr}(\tau_s(d_{ir}) w_r c_s)^{-\theta_s} \left[\frac{\rho_s}{(\rho_s - 1) m(d_{ir})}\right]^{\frac{\rho_s \theta_s}{\rho_s - 1}} e^{-\frac{\rho_s \theta_s}{\rho_s - 1}} & \text{if } r > 0, \end{cases}$$

- $\Phi_{is} \equiv \Phi_{is0} + \sum_{r \in \Omega_{is}} \Phi_{isr}$.

Buyer's Profit

- Buyer i's profits:

$$\pi_i(\varphi_i) = B\psi_i^{1-\sigma} - \sum_{s=1}^{S} \delta_{is} \left[f + \sum_{r \in \Omega_{is}} f_s \right]$$

where

- $$\psi_i \equiv \varphi_i^{-1} \Pi_{s=1}^{S} \gamma_s^{\beta_s} \Phi_{is}^{-\frac{\beta_s}{\theta_s}}.$$

- and δ_{is} is a dummy equal to 1 if sourcing in industry s.

Hypothesis

The share of inputs insourced and the share of inputs sourced to closer regions are both greater for the more differentiated inputs.

Effects of Firms' Offshoring

- Direct Replacement Effect: When triggered by foreign cost shocks, firms start offshoring inputs from foreign suppliers, which replace their less productive domestic suppliers in the same industry.
- Productivity Effect: The resulting decline in the firms' marginal costs induces the firm to expand domestic sourcing to the more productive suppliers located farther away.
- Industry Composition Effect: Outsourcing in new input industries (tend to be more differentiated).

Testable Predictions

Restructuring of Production Networks

Hypothesis

1. *Relative to non-importers, import starters drop the less productive suppliers in the same industry-region. The replacement effect is more profound in the newly-offshored industries. Since such industries tend to be more generic, the dropped sellers tend to larger and more distantly-located.*
2. *Relative to non-importers, import starters add sellers that are larger and more distantly-located within industries. They may start sourcing in new input industries, which tend to be more differentiated than the industries that have been already outsourced. Thus, the newly added sellers tend to be more closely-located than sellers in other industries.*

The Pattern of Domestic Sourcing

- $$\log \frac{\Phi_{isr}}{\Phi_{isr_s(i)}} = \underbrace{-\log n_{sr_s(i)} - \log T_{sr_s(i)} + \theta_s \log w_{r_s(i)} + \frac{\rho_s \theta_s}{\rho_s - 1} \log m(d_{ir_s(i)})}_{\text{input-industry base-region-specific}}$$
$$+ \underbrace{\log n_{sr} + \log T_{sr} - \theta_s \log w_r}_{\text{input-industry source-region-specific}}$$
$$- \theta_s \frac{\rho_s}{\rho_s - 1} \times \log m(d_{ir}) - \theta_s \log t_s(d_{ir})$$

- Suppose
$$\log m(d_{ir}) = \log d_{ir}^{\beta}$$
$$\log t_s(d_{ir}) = \log d_{ir}^{\gamma \phi_s}$$

- where ϕ_s stands for the time sensitivity of the input delivery.
- Empirical counterpart:

$$\log \frac{N^s_{irs}}{N^s_{isr(i)}} = -\beta \left[\frac{\rho_s \theta_s}{\rho_s - 1} \log (d_{ir}) \right] - \gamma \left[\phi_s \theta_s \log (d_{ir}) \right] + \left[FE_{sr(i)} + FE_{sr} \right] + \varepsilon_{irs}$$

Distance, Product Differentiation, and Domestic Sourcing

Table 4: Distance, Scope of Domestic Outsourcing, and Product Differentiation of Inputs

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	$\ln(N_{\text{source pref}}/N_{\text{nearest pref}})_{\text{input ind}}$			$\ln(N_{\text{source pref}}/N_{\text{home pref}})_{\text{input ind}}$		
$\ln(\text{dist})_{i,\text{source pref}} \times \theta_{\text{input-ind}}$	-0.00535***	0.00262		-0.00819***	0.00214	
	(0.001)	(0.002)		(0.001)	(0.003)	
$\ln(\text{dist})_{i,\text{ source pref}} \times \theta\rho/(\rho-1)_{\text{input-ind}}$		-0.00565***	-0.00516***		-0.00727***	-0.00712***
		(0.002)	(0.002)		(0.002)	(0.002)
$\ln(\text{dist})_{i,\text{source pref}} \times \theta_{\text{input-ind}} \times \text{air}_{\text{input-ind}}$			-0.000379			-0.000388
			(0.000)			(0.000)
Input Ind FE x Closest Region FE	√	√	√			
Input Ind FE x Source Region FE	√	√	√	√	√	√
Input Ind FE x Buyer Region FE				√	√	√
R-sq	.278	.275	.274	.302	.299	.297
Nb of Obs	49485	48735	48550	36560	36013	35860

s.e. clustered by input-industry-source-region. Parent-child pairs were removed (5%).

- Results are robust to clustering by buyer; restricting to single-plant buyers or single-plant sellers.

Back of the Envelope Calculation

- Relative to the nearest region, a 10% increase in the distance lowers the number of sellers by 0.5% for an industry with a mean value of θ_s (9.82).
- -0.47%=-0.00535*0.1*9.82.
- A one standard-deviation increase in $\rho_s/(\rho_s - 1)$ (0.262) from the sectoral mean is associated with an additional 0.13% decline in the relative number of sellers.

Extensive Margin of Sourcing

Table 5: Global Sourcing and Product Differentiation of Inputs (Extensive Margin)

	(1)	(2)	(3)	(7)	(8)
Dependent Variable:	$Dummy_{source\ pref,\ input\ industry}$			$Dummy_{off,\ input\ industry}$	
$\ln(dist+1)_{from\ seller's\ pref} \times \theta_{input\text{-}ind}$	-0.00100***	0.00402***			
	(0.000)	(0.000)			
$\ln(dist+1)_{from\ seller's\ pref} \times \theta\rho/(\rho-1)_{input\text{-}ind}$		-0.00401***	-0.00158***		
		(0.000)	(0.000)		
$\ln(dist+1)_{i,source\ pref} \times \theta_{input\text{-}ind} \times air_{input\text{-}ind}$			-0.000195***		
			(0.000)		
Domestic sourcing (yes=1)				0.0747***	0.0681***
				(0.002)	(0.002)
$TFP_{buyer,2005}$				0.0109***	
				(0.001)	
$TFP_{buyer,2005} \times \theta\rho/(\rho-1)_{input\text{-}ind}$				-0.000414***	-0.000408***
				(0.000)	(0.000)
Buyer FE	√	√	√	-	√
Input Ind (12) FE x Source Region FE	√	√	√		
Input Ind (12) FE				√	√
R-sq	0.087	0.092	0.09	.03	0.136
Nb of Obs	7773612	7773612	7773612	257208	257208

s.e. clustered by buyer.

Offshoring and Restructuring of Production Networks

- Does a buyer's offshoring decision affect its choices of domestic suppliers?
- What kind of domestic suppliers are most affected?

$$I_{ij} = \alpha + \beta \Delta imp_i \times (x_{ij}/\overline{x}_i) + [FE_i + FE_s + FE_r] + \varepsilon_{ij}$$

- i and j are buyer, domestic seller.
- $I_{ij} = Drop_{ij} = 1$ if i and j are linked in 2005, but not anymore in 2010.
- $I_{ij} = Add_{ij} = 1$ if a link between i and j was formed since 2005.
- $(x_{ij}/\overline{x}_i)$ is a measure of seller characteristics relative to the i's 2005 mean.
- $\triangle imp_i$, is the i's importing dummy (since 2005).

Back

Instrument

- Following Hummels et al. (2014)

$$shock_i = \sum \phi_{is} WES_s$$

- $WES_s = ln(exp)_{s,2010} - ln(exp)_{s,2005}$. Japan is excluded from the set of destination countries.
- $\phi_{is} = 1$ if firm i outsources inputs in industry s in year 2005.

Supplier Dropping

Table 6: Offshoring and Supplier Dropping (Seller Characteristics)

Dependent Variable	$Drop_{ij}$							
	OLS				2SLS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Seller's Characteristics (x_j)		log(dist)	log(sales)	log(emp)		log(dist)	log(sales)	log(emp)
Imp Starter$_i$	0.00218	0.00226	0.00224	0.00227	-0.653***	-0.696***	-0.667***	-0.674***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.222)	(0.238)	(0.225)	(0.226)
Imp Starter$_i$ × (x_j - x_{i05})		0.000773	0.000762	0.00232		-0.0298	0.0873***	0.129**
		(0.002)	(0.002)	(0.003)		(0.059)	(0.030)	(0.052)
x_j - x_{i05}		0.0104***	0.00522***	0.00685***		0.0141*	-0.00676	-0.0110
		(0.001)	(0.001)	(0.001)		(0.008)	(0.004)	(0.007)
Input Industry FE	√	√	√	√	√	√	√	√
Buyer Industry FE	√	√	√	√	√	√	√	√
Source Region FE	√	√	√	√	√	√	√	√
Buyer Home Region FE	√	√	√	√	√	√	√	√
Buyer's ln(sales)$_{2005}$	√	√	√	√	√	√	√	√
Nb of Buyers	4375	4354	4375	4375	4375	4354	4375	4375
Nb of Buyers that Offshore	477	476	477	477	477	476	477	477
Nb of Obs	86716	86019	86716	86716	86716	86019	86716	86716
R-squared	.047	.0491	.0476	.0477				
Kleibergen-Paap F statistic					41.697	18.588	20.880	20.875

The sample includes only manufacturing buyers that did not import in 2005. Newly added sellers are removed from the sample. The unit of observation is a buyer-seller pair. Parent-child relationships are removed from the sample. The dependent variable of the first stage of the 2SLS model is the buyer's import starting dummy, with various firm-industry-specific export supply shocks interacted with the seller characteristics as regressors. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

s.e. clustered by input industry.

▸ First Stage

Supplier Adding

Table 7: Offshoring and Supplier Adding (Seller Characteristics)

Dependent Variable	Add_{ij}							
	OLS				2SLS			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Seller's Characteristics (x_j)		log(dist)	log(sales)	log(emp)		log(dist)	log(sales)	log(emp)
$Imp\ Starter_i$	0.0439***	0.0447***	0.0438***	0.0438***	0.112	0.125	0.0917	0.0950
	(0.005)	(0.005)	(0.005)	(0.005)	(0.178)	(0.182)	(0.180)	(0.181)
$Imp\ Starter_i \times (x_j - x_{i05})$		-0.00475**	0.0005	-0.0006		-0.123***	0.167***	0.252***
		(0.002)	(0.002)	(0.003)		(0.037)	(0.025)	(0.039)
$x_j - x_{i05}$		0.0160***	-0.0087***	-0.00945***		0.0337***	-0.0321***	-0.0460***
		(0.001)	(0.001)	(0.001)		(0.006)	(0.004)	(0.006)
Input Industry FE	√	√	√	√	√	√	√	√
Buyer Industry FE	√	√	√	√	√	√	√	√
Source Region FE	√	√	√	√	√	√	√	√
Buyer Home Region FE	√	√	√	√	√	√	√	√
$Buyer's\ ln(sales)_{2005}$	√	√	√	√	√	√	√	√
Nb of Buyers	4995	4903	4995	4995	4995	4903	4995	4995
Nb of Buyers that Offshore	516	509	516	516	516	509	516	516
Nb of Obs	109407	108520	109407	109407	109407	108520	109407	109407
R-squared	.0513	.0546	.0524	.0521				
Kleibergen-Paap F statistic					95.897	45.412	47.947	47.916

The sample includes only manufacturing buyers that did not import in 2005. Dropped sellers are removed from the sample, so that the comparison is between new suppliers and continuing suppliers. The unit of observation is a buyer-seller pair. Parent-child relationships are removed from the sample. The dependent variable of the first stage of the 2SLS model is the buyer's import starting dummy, with various firm-industry-specific export supply shocks interacted with the seller characteristics as regressors. Robust standard errors, clustered at the input-industry level, are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

s.e. clustered by input industry.

Supplier Adding and Dropping (across input industries)

Table 8: Offshoring and Industry Adding and Dropping

Dependent Variable	$Drop_{is}$				Add_{is}			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS		2SLS		OLS		2SLS	
Imp $Starter_i$ x Rauch	-0.000418		-0.268**		0.00485***		0.133***	
	(0.023)		(0.131)		(0.001)		(0.019)	
Imp $Starter_i$ x $\rho/(\rho\text{-}1)_{input\text{-}ind}$		-0.00979		-0.109		0.00374*		0.115***
		(0.033)		(0.102)		(0.002)		(0.020)
Input Industry FE	√	√	√	√	√	√	√	√
Buyer FE	√	√	√	√	√	√	√	√
Number of Obs.	21230	20880	20882	20880	701632	687784	701632	687784
R-sq	.273	.274	.266	.273	.0718	.0723	.0718	.0723
		KP F stat:	10.40	32.873		KP F stat:	3.385	3.385

s.e. clustered by buyer.

Concluding Remarks

- How offshoring shapes firms' domestic production networks?
- We show that differentiated inputs are less likely to be sourced from distant regions or abroad.
- Upon firms' offshoring, the resulting reduction in variable cost of production expands the geographic scope of domestic outsourcing within each industry;
- but the increased need to communicate with suppliers in the newly added (differentiated) industries encourage the offshoring firms to source more locally from smaller suppliers.
- Global sourcing is a possible source of regionalization of global value chains.

The Spatial Pattern of Domestic Sourcing

Table A3: Firm Productivity, Distance, and the Scope of Domestic Sourcing (2010)

Panel A. 2005 Cross-section Sample								
Dependent Variable	ln(# sellers' prefectures)$_{buyer}$		ln(# sellers)$_{buyer}$		ln(# jsic 4-digit outsourced)$_{buyer}$		ln(# sellers)$_{pref}$	ln(Sales/Emp)$_{seller}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Measure of Buyer's Productivitiy	TFP (OP)	VA/Emp	TFP (OP)	VA/Emp	TFP (OP)	VA/Emp	-	-
Productivity$_{buyer}$	0.104***	0.344***	0.141***	0.553***	0.110***	0.485***		
	(0.021)	(0.016)	(0.027)	(0.025)	(0.023)	(0.021)		
ln(distance)							-0.168***	0.0543***
							(0.001)	(0.001)
Buyers' (4-digit) Industry FE	Y	Y	Y	Y	Y	Y		
Buyer's Prefecture FE	Y	Y	Y	Y	Y	Y		
Buyer FE							Y	Y
Sellers' (4-digit) Industry FE								Y
Sellers' Prefecture FE							Y	Y
Parent-subsidiary dummy								Y
Distance							b/w prefecture	b/w buyer-seller
SE clustering			Buyers' (4-digit) Industry				Buyer	Buyer
R_sq	.191	.247	.191	.261	.2	.271	.584	.646
Nb of Obs	8701	8742	8701	8742	8701	8742	205628	598946

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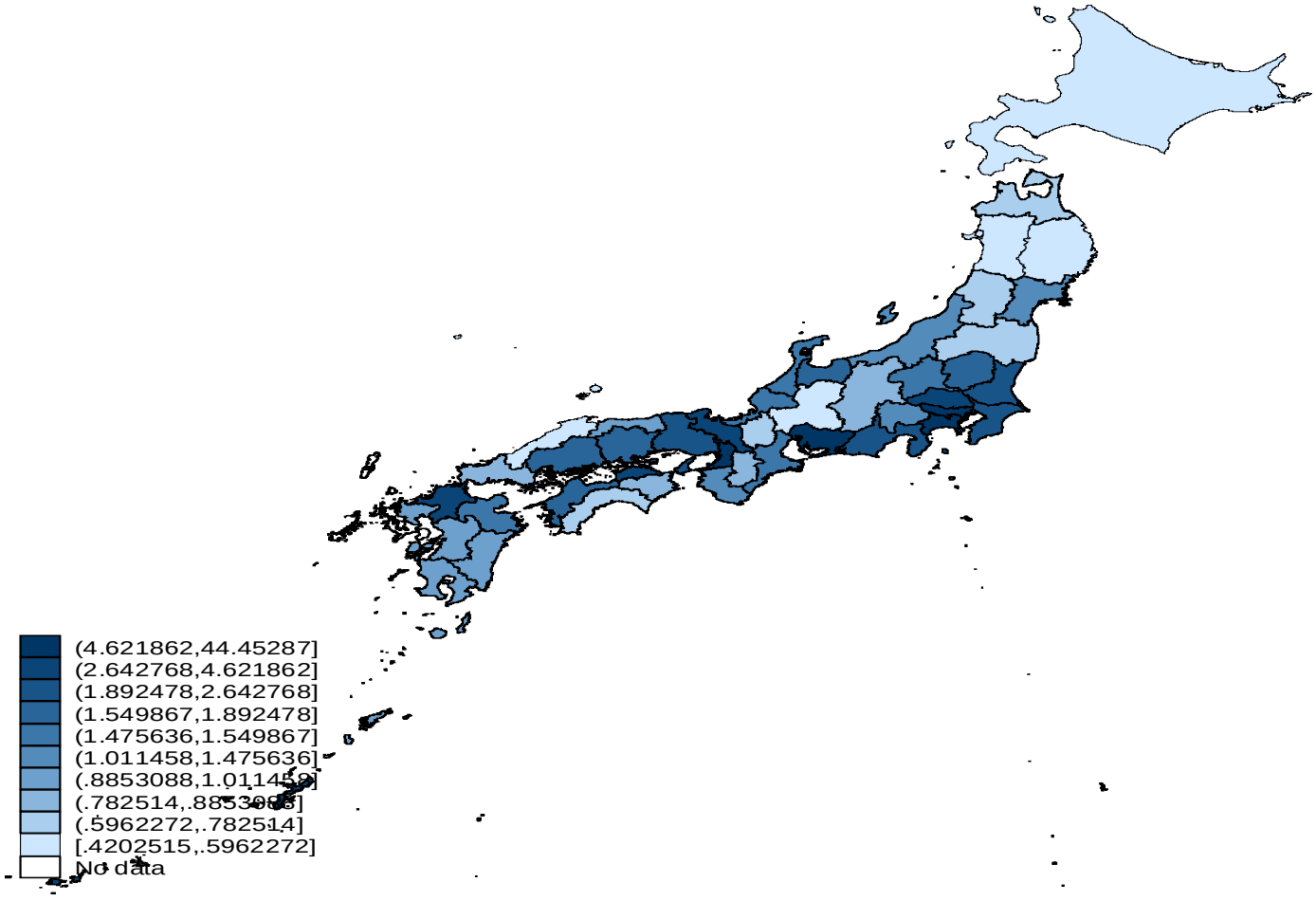
nb of buyers per sq km by prefecture



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First Stage of the Supplier Dropping Regressions

Table A6: First-Stage of the FE-IV Regressions Reported in Table 6

Dependent Variable	Imp Starter$_i$	Imp Starter$_i$	Imp Starter$_i$ × (ln(dist)$_j$-ln(dist)$_{05}$)	Imp Starter$_i$	Imp Starter$_i$ × (ln(dist)$_j$-ln(dist)$_{05}$)	Imp Starter$_i$	Imp Starter$_i$ × (ln(emp)$_j$-ln(emp)$_{05}$)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Seller's Characteristics (x_j)	-	log(dist)	log(dist)	log(sales)	log(sales)	log(emp)	log(emp)
WES$_i$	0.117***	0.112***	-0.007	0.117***	0.011	0.117***	0.011
	(0.018)	(0.018)	(0.031)	(0.018)	(0.044)	(0.018)	(0.033)
WES$_i$ × (x_j-x_{i05})		-0.006	0.497***	-0.003	0.781***	0.001	0.575***
		(0.018)	(0.058)	(0.014)	(0.071)	(0.018)	(0.065)
x_j-x_{i05}		0.000	0.052	0.000	0.000	-0.000	0.037***
		(0.003)	(0.010)	(0.003)	(0.012)	(0.003)	(0.012)
Input Industry FE	√	√	√	√	√	√	√
Buyer Industry FE	√	√	√	√	√	√	√
Buyer Home Region FE	√	√	√	√	√	√	√
Buyer's ln(sales)$_{2005}$	√	√	√	√	√	√	√
Nb of Obs	86716	86716	86716	86716	86019	86716	86,716
R-squared	0.1729	0.1736	0.1522	0.1729	0.1392	0.1729	0.1387

The sample includes only manufacturing buyers that did not import in 2005. Newly added sellers are removed from the sample. The unit of observation is a buyer-seller pair. Parent-child relationships are removed from the sample. Robust standard errors are reported in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively.

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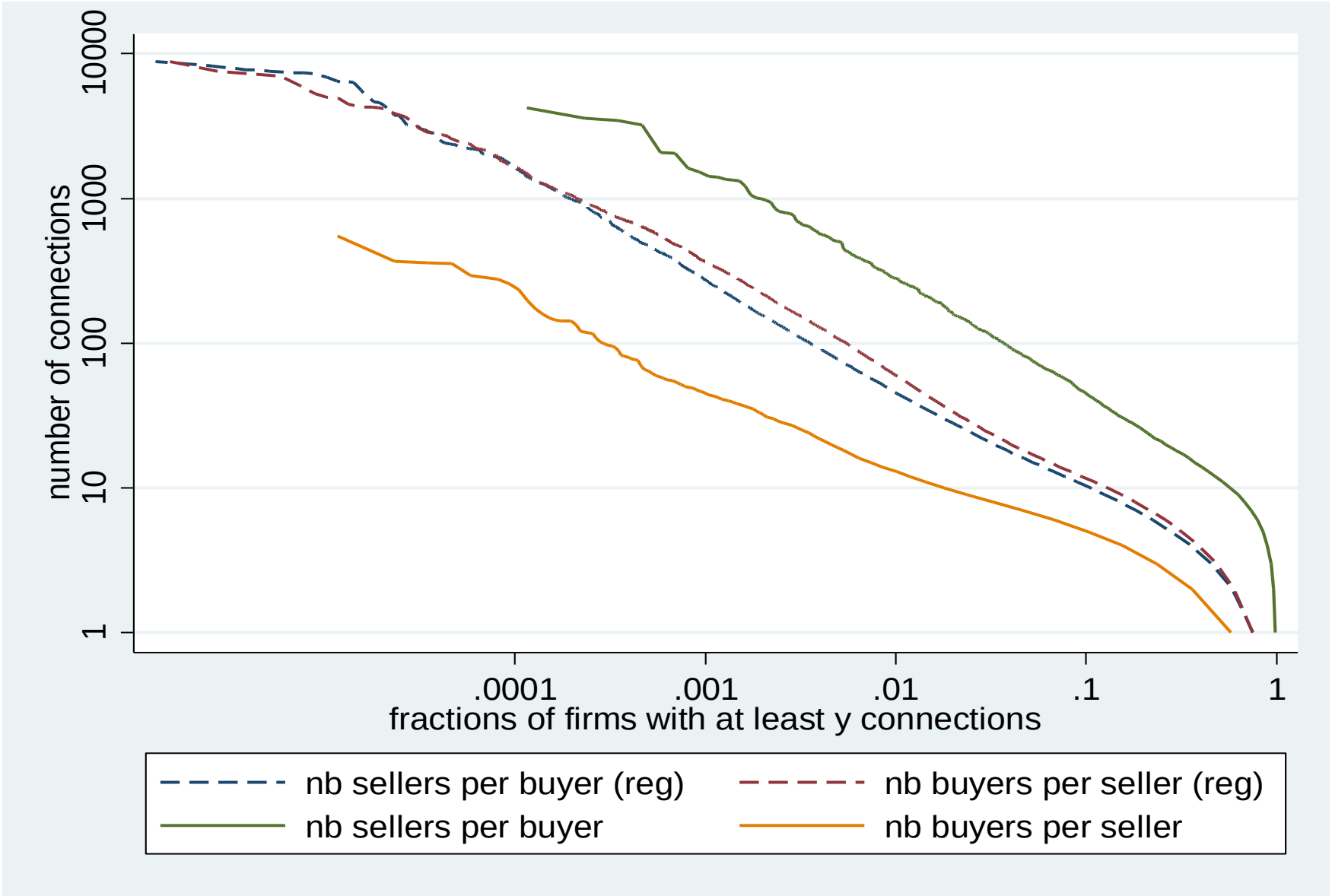
Firm-size Rank Distribution



Number of Sellers

Summary Statistics (Number of Buyers and Sellers)

Sample:	All mfg. buyers	Continuing importers 2005-2010	Import starters between 2005-2010	Continuing Non-importers 2005-2010
A. Number of buyers in 2005				
Count	13,784	1,807	1,024	10,135
Share	(1.00)	(0.13)	(0.07)	(0.74)
B. Number of sellers per buyer in 2005				
Mean	25.05	48.50	22.47	20.58
Median	10	16	11	9
Max.	4,724	4,026	1,471	4,724
C. Number of sellers' prefectures per buyer in 2005				
Mean	5.17	7.49	5.34	4.62
Median	4	5	4	4
Max.	47	47	40	46

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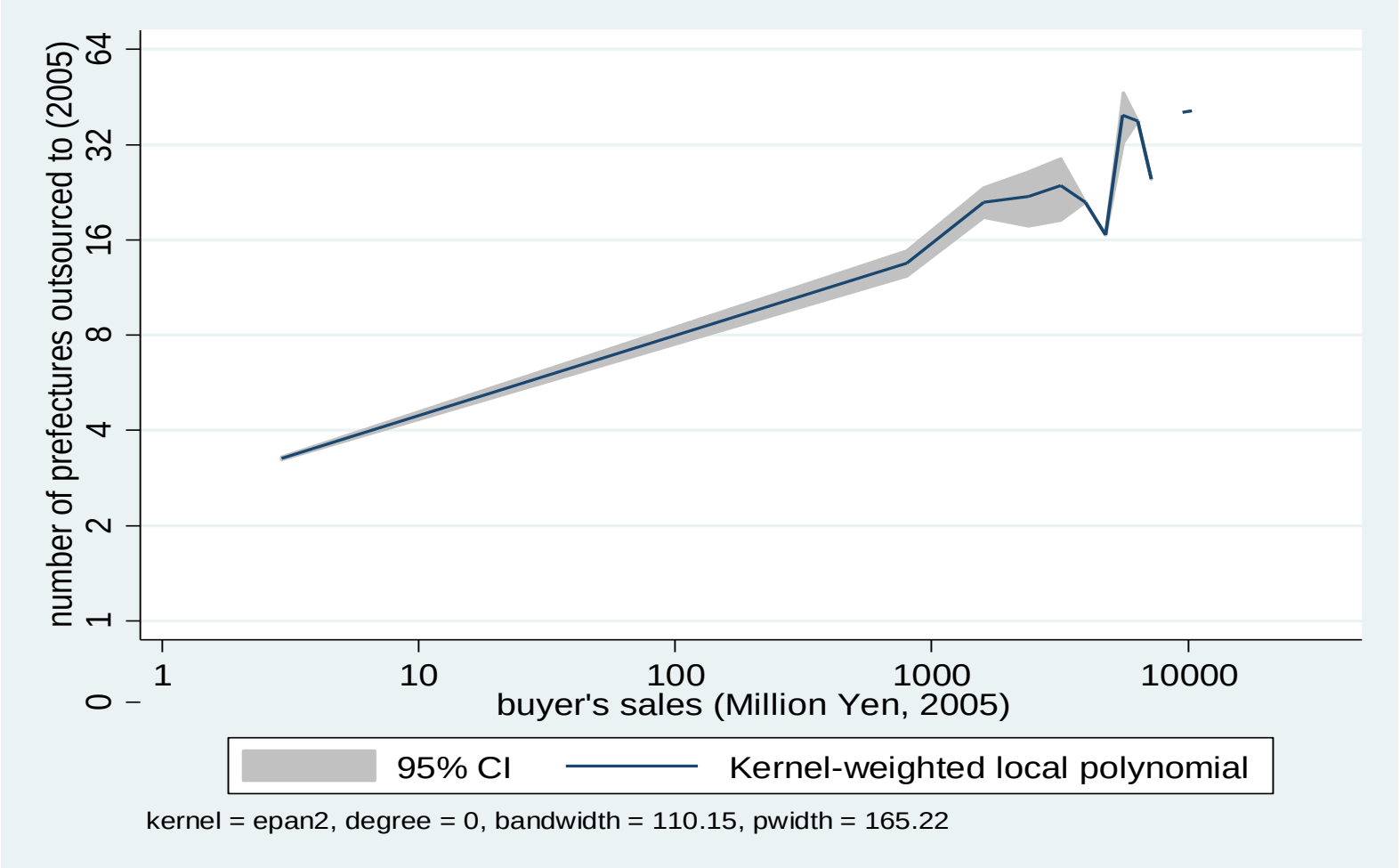
Productivity and the Scope of Outsourcing



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Trade Costs

- For each input type outsourced, the buyer pays a fixed cost, f, and an additional f_s for each source region.
- No fixed cost for in-house production of inputs.
- Shipping intermediates entails iceberg transport cost $\tau_s(d) = e^{t_s(d)} \geq 1$, where t_s is an industry-specific increasing function of the distance d between a pair of buyer and seller.

Expected outcomes:

- The combination of firm productivity and incremental fixed costs gives rise to the standard scope-productivity relationship.
- Firms will always insource part of the input production in each input type.

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