Indirect Exports and Wholesalers: Evidence from Interfirm Transaction Network Data

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Section 1

Introduction

Motivation

- Wholesalers play an important role in facilitating international trade
  - U.S: Wholesale and retail firms account for 11 and 24% of exports and imports (Bernard et al. 2007)
  - Japan: Wholesalers account for 25% of exports in 2014 (Kikatsu)
- Studies on a mechanism behind firms' export mode choices are important in understanding
  - factors that expand a market scope for firms/ role of wholesalers
- Still not many empirical evidence is accumulated other than Bernard et al. (2012, 2014) and Ahn (2011)

Goal of this paper

We examine manufacturers' choice of export mode to understand the mechanism behind their choice and wholesalers' roles

- Use Japanese interfirm transaction network data and analyze the features of non-, indirect, and direct exporters
  - firms' productivity (sales, sales per employment)
  - domestic transaction network (N of suppliers, N of customers)
- Run multinomial logit regressions to see the determinants of different export status
  - Build a simple Melitz-type model in which firms can also export via wholesalers (indirect exporting)
- Investigate industry heterogeneity

Role of wholesalers

Wholesalers can reduce the fixed cost of exporting for manufacturing firms

- distribution (for sellers) and procurement (for buyers)
  - efficient matching
  - risk sharing
  - mitigating adverse selection: guarantee payment (for sellers) and quality (for buyers)

Literature review

- Empirics of intermediated trade
  - Ahn et al. (2011), Bernard et al. (2012, 2014), Feenstra and Hanson (2001)
  - Theory of intermediated trade
    - Antras and Costinot (2010, 2011), Ackerman (2014)
  - Value-added exports and input-output model
    - WIOD, Caliendo and Parro (2014)
- Our study uses large Japanese firm-level data
- We also incorporate information on domestic transaction network

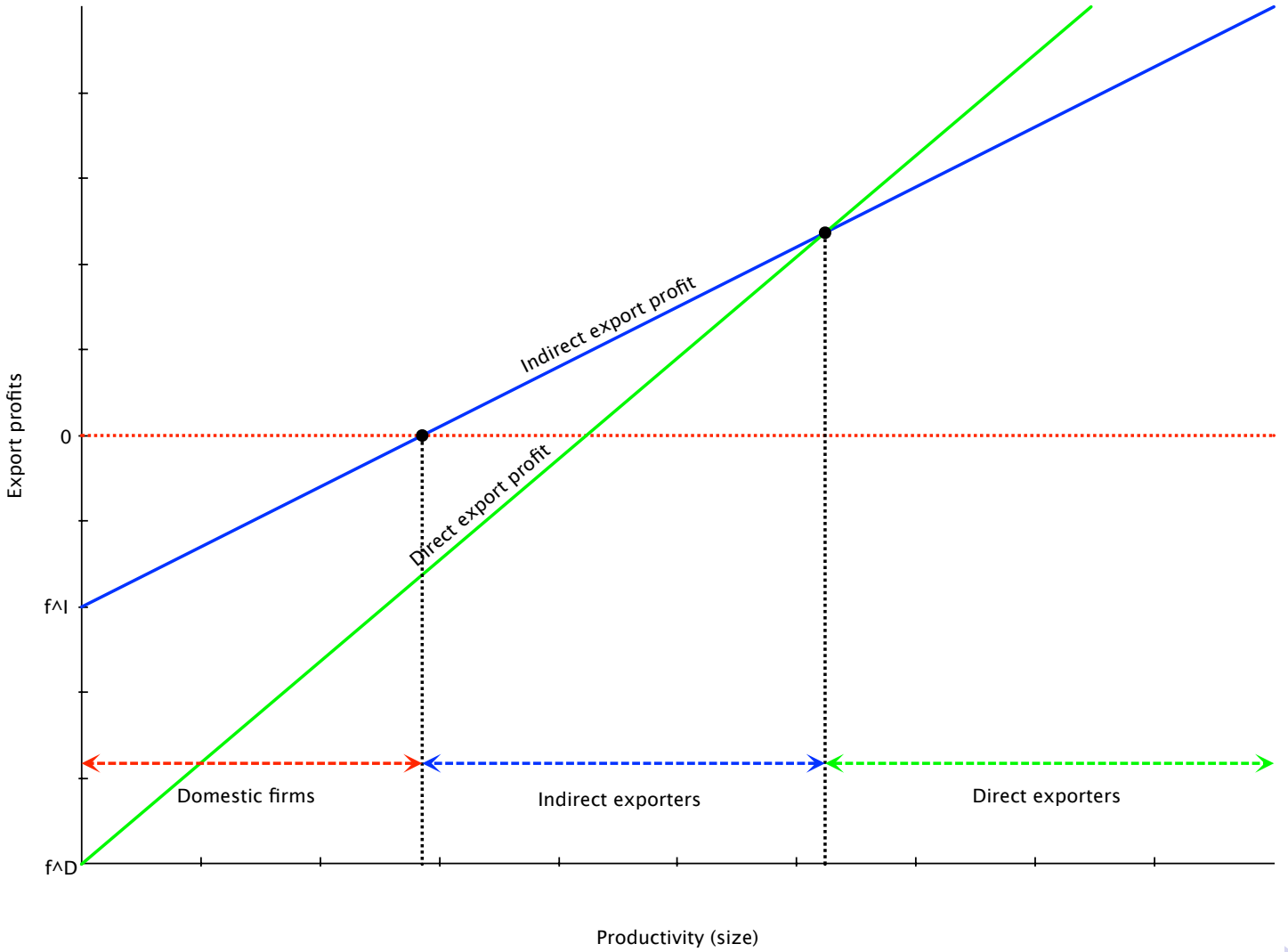
Section 2

Model

Summary

- A simple trade model with heterogeneous firms, but firms can also export indirectly via wholesalers
  - Direct export: a large fixed cost, but small variable cost
  - Indirect export: a small fixed cost (due to cost sharing through wholesalers) but high variable cost (due to double marginalization)
  - Implication –> Sorting of firm size/productivity into direct, indirect and non-export status

Export profits and sorting



Section 3

Data and Summary Statistics

Data

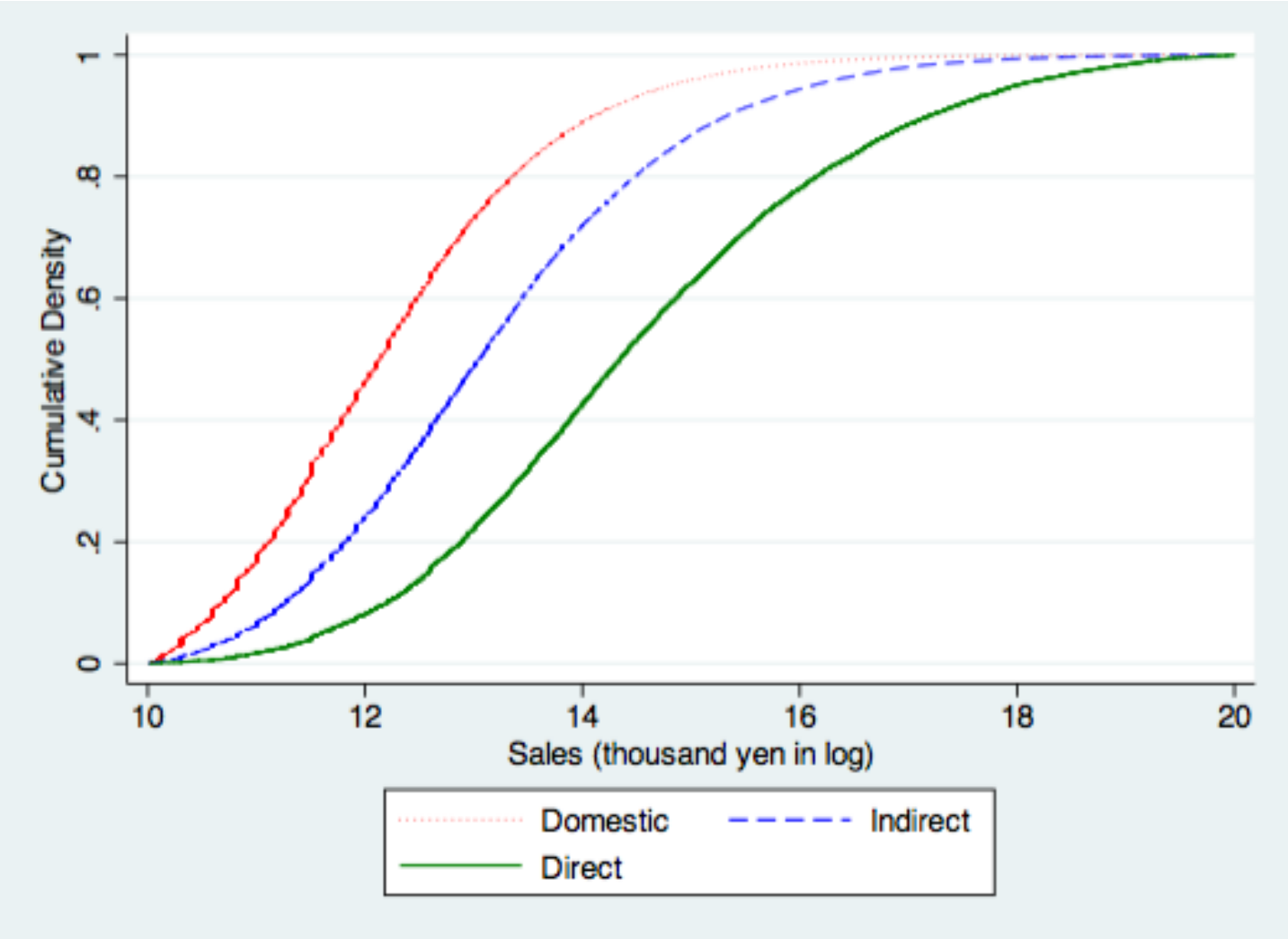
- TSR firm-level data in 2014
  - We focus on manufacturing and wholesaling sectors (they account for more than 80% of exporters) –> 120,000 manufacturing firms
  - For each firm, we observe sales, employment, industry (4-digit JSIC), address, and whehter a firm exports or not, etc.
  - Transaction partner information
    - We can identify firms that supply their goods to exporting wholesalers
  - Export mode
    - Direct: manufacturing firms who report they are exporting
    - Indirect: manufacturing firms who supply their products to exporting wholesalers
    - Domestic: other manufacturing firms

Summary statistics

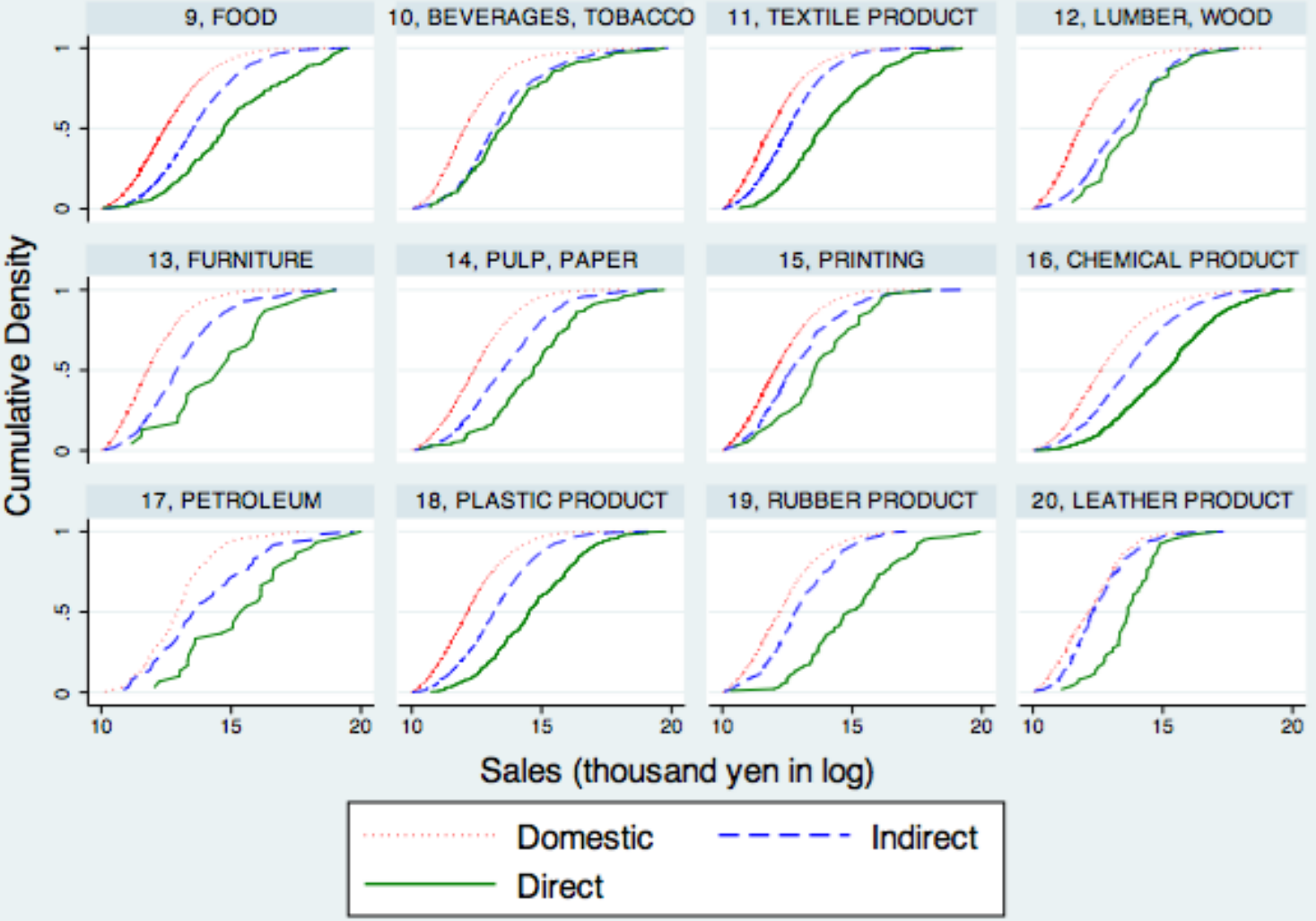
	# of firms	Mean of log sales	Median	SD
domestic	91363	12.09	11.99	1.52
indirect	22368	13.13	13.02	1.68
direct	6820	14.57	14.36	2.04
Total	120551	12.43	12.25	1.72

	Total sales	Sales share	Total Employment	Emp share
domestic	7.76E+10	0.22	2425321	0.37
indirect	7.98E+10	0.22	1469724	0.23
direct	2.04E+11	0.56	2585678	0.40
Total	3.61E+11	1.00	6480723	1.00

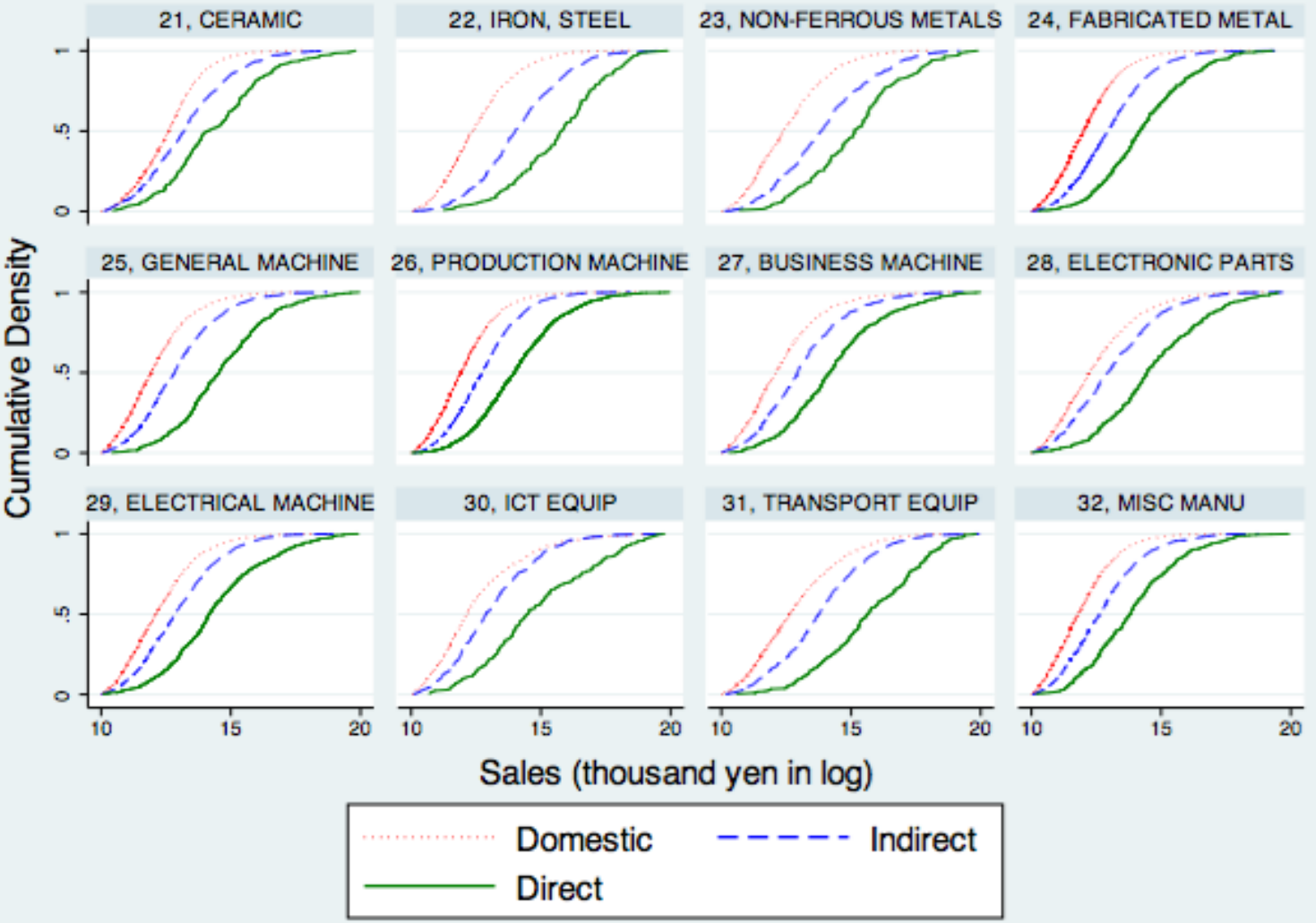
CDF of sales


Cumulative Density
0
.2
.4
.6
.8
1
10
12
14
16
18
20
Sales (thousand yen in log)
Domestic
Indirect
Direct

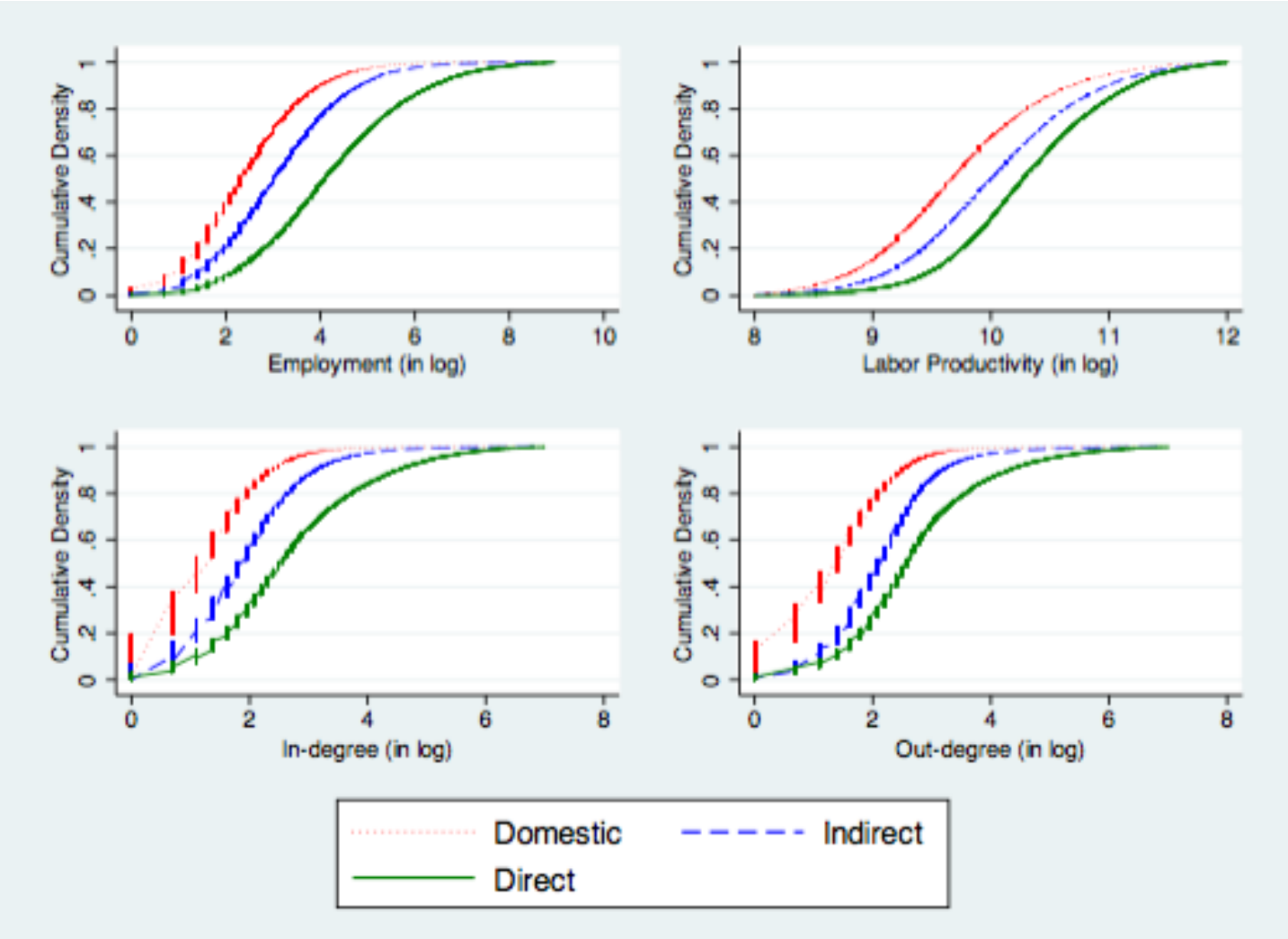
CDF of sales by industry



CDF of sales by industry



CDF of other variables



Section 4

Empirical Analysis

Multinomial logit model

- Firms' discrete choice problem –> latent utility model
- Type I extreme value distribution –> multinomial logit model
- Probability of direct exporting is

$$\Pr\left[\text{i=direct}\right] = \frac{\exp\left(X_i'\beta_D\right)}{1+\exp\left(X_i'\beta_I\right)+\exp\left(X_i'\beta_D\right)}$$

- Probability of indirect exporting is

$$\Pr\left[\text{i=indirect}\right] = \frac{\exp\left(X_i'\beta_I\right)}{1+\exp\left(X_i'\beta_I\right)+\exp\left(X_i'\beta_D\right)}$$

Baseline estimates

	(1)		(2)		(3)		(4)	
export type	indirect	direct	indirect	direct	indirect	direct	indirect	direct
log sales	0.404***	0.805***	0.190***	0.452***	0.133***	0.536***	0.104***	0.403***
	(0.00484)	(0.00773)	(0.00715)	(0.0135)	(0.00626)	(0.0101)	(0.00754)	(0.0138)
log in-degree			0.486***	0.729***			0.102***	0.361***
			(0.0122)	(0.0223)			(0.0138)	(0.0253)
log outdegree					0.781***	0.781***	0.739***	0.647***
					(0.0112)	(0.0174)	(0.0125)	(0.0196)
Intercept	-6.488***	-13.22***	-4.536***	-9.883***	-4.420***	-11.16***	-4.131***	-9.806***
	(0.0626)	(0.109)	(0.0782)	(0.149)	(0.0699)	(0.121)	(0.0812)	(0.153)
Observations	120,551		120,551		120,551		120,551	
2-digit JSIC FE	No		No		No		No	
prefecture FE	No		No		No		No	
Pseudo R2	0.104		0.118		0.142		0.144	

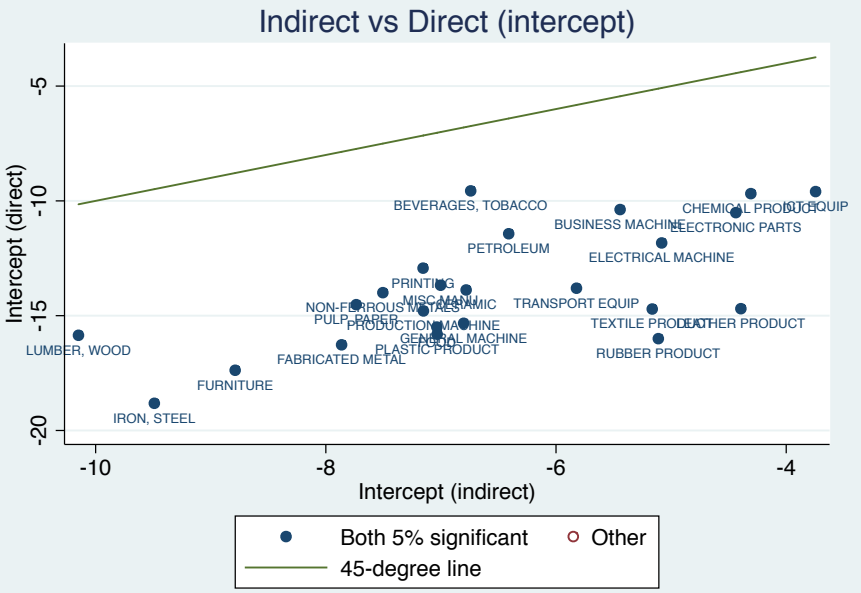
Estimates with fixed effects

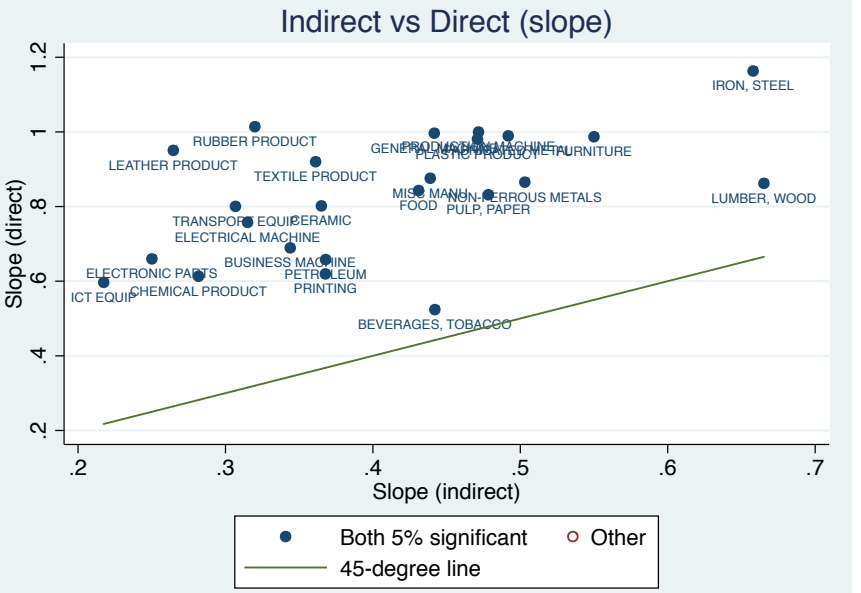
	(1)		(2)		(3)		(4)	
export type	indirect	direct	indirect	direct	indirect	direct	indirect	direct
log sales	0.408***	0.826***	0.147***	0.441***	0.110***	0.530***	0.0539***	0.386***
	(0.00512)	(0.00859)	(0.00751)	(0.0146)	(0.00661)	(0.0111)	(0.00794)	(0.0149)
log in-degree			0.593***	0.793***			0.186***	0.398***
			(0.0129)	(0.0236)			(0.0145)	(0.0269)
log outdegree					0.867***	0.871***	0.791***	0.715***
					(0.0120)	(0.0193)	(0.0133)	(0.0219)
Intercept	-6.477***	-15.21***	-4.081***	-11.52***	-4.056***	-12.83***	-3.519***	-11.35***
	(0.0767)	(0.158)	(0.0910)	(0.193)	(0.0846)	(0.168)	(0.0945)	(0.196)
Observations	120,549		120,549		120,549		120,549	
2-digit JSIC FE	Yes		Yes		Yes		Yes	
prefecture FE	Yes		Yes		Yes		Yes	
Pseudo R2	0.157		0.175		0.199		0.201	

Results: productivity measures

- Intercepts for "Direct" and "Indirect" are lower than "Doemstic"
  - Existence of fixed export-costs
- Intercept for "Direct" is lower than "Indirect"
  - Fixed export-costs are lower for indirect than direct trades => Shared by other firms using the same wholesaler)
- Sales slope are positive: higher variable costs
  - Transportation costs, tariff etc.)
- Sales slope for "Indirect" is steeper than "Direct"
  - Marginal costs might be higher for "Indirect" trade
- Results are robust and consistent with the theoretical model and robust

Intercept and slope by industry





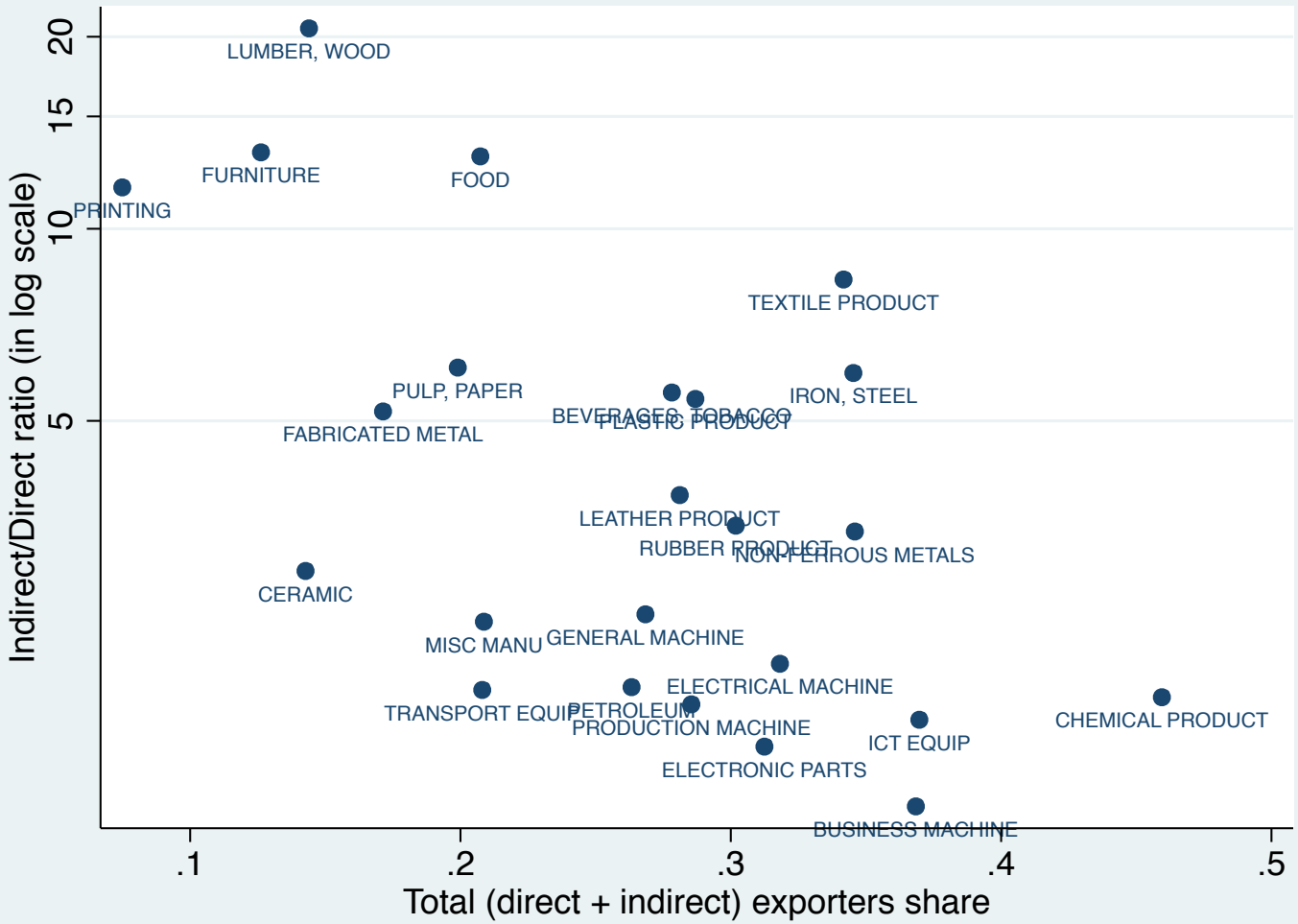
Results: domestic transaction network

- Higher in-degree raises the probability of both indirect and direct exporting but more for direct exporting
  - A possible explanation is the cost sharing
- Higher out-degree raises the both probability for about the same magnitude
  - higher out-degree promotes export in general; demand side explanation?

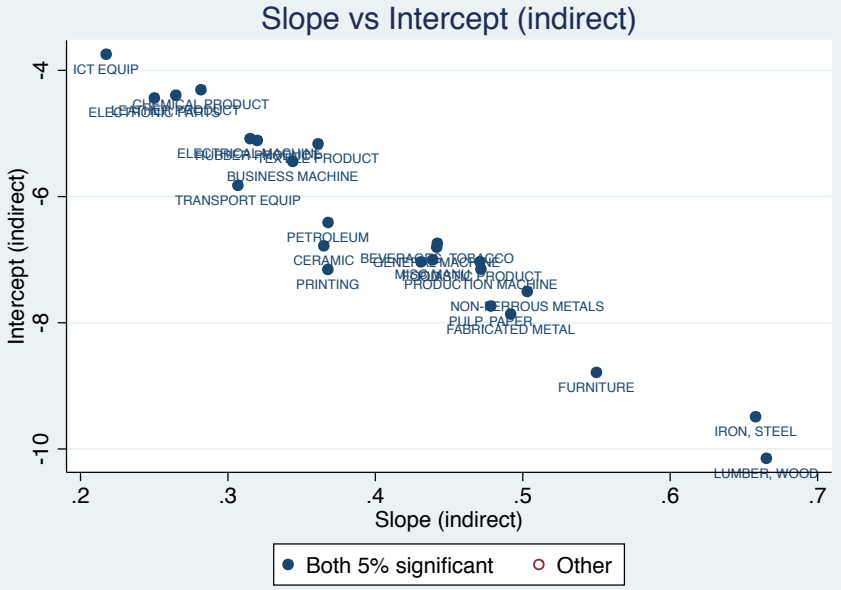
Conclusion

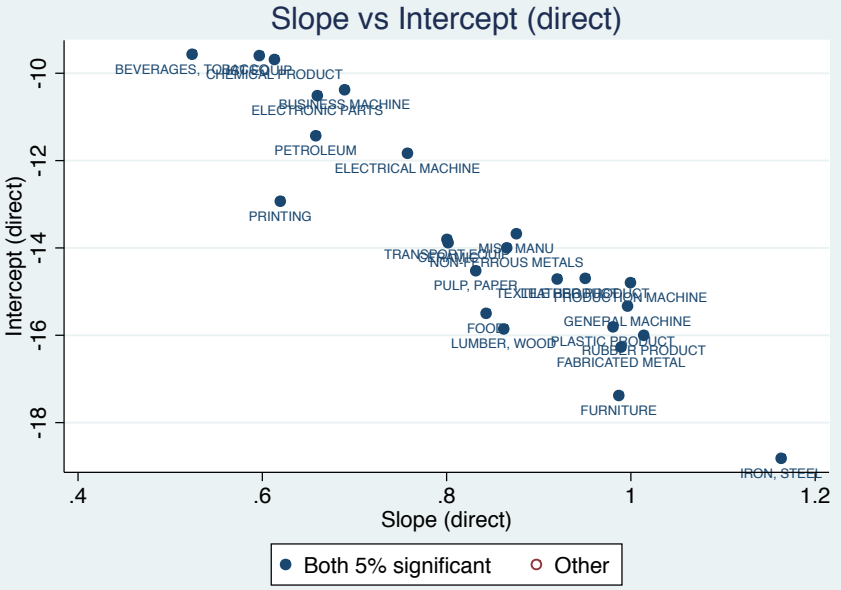
- Sorting of size into three export status (consistent with the model)
  - Lower intercept and steeper slope of sales for Direct than Indirect Exporting
    - Consistent with our model setup: Fixed costs are lower, and marginal costs are higher for Indirect than Direct exporting
- In-degree: promotes direct exporting
  - Sharing of fixed costs with other firms using the same wholesaler
- Out-degree: promotes trade in general

Exporters share by industry



Multinomial logit by industry





Scatter plots by industry