On the Determinants of Sales Modes of Korean Affiliates in China

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APEA Presentation Version: June 25, 2015
Place: Taipei, Taiwan

Contents

Introduction

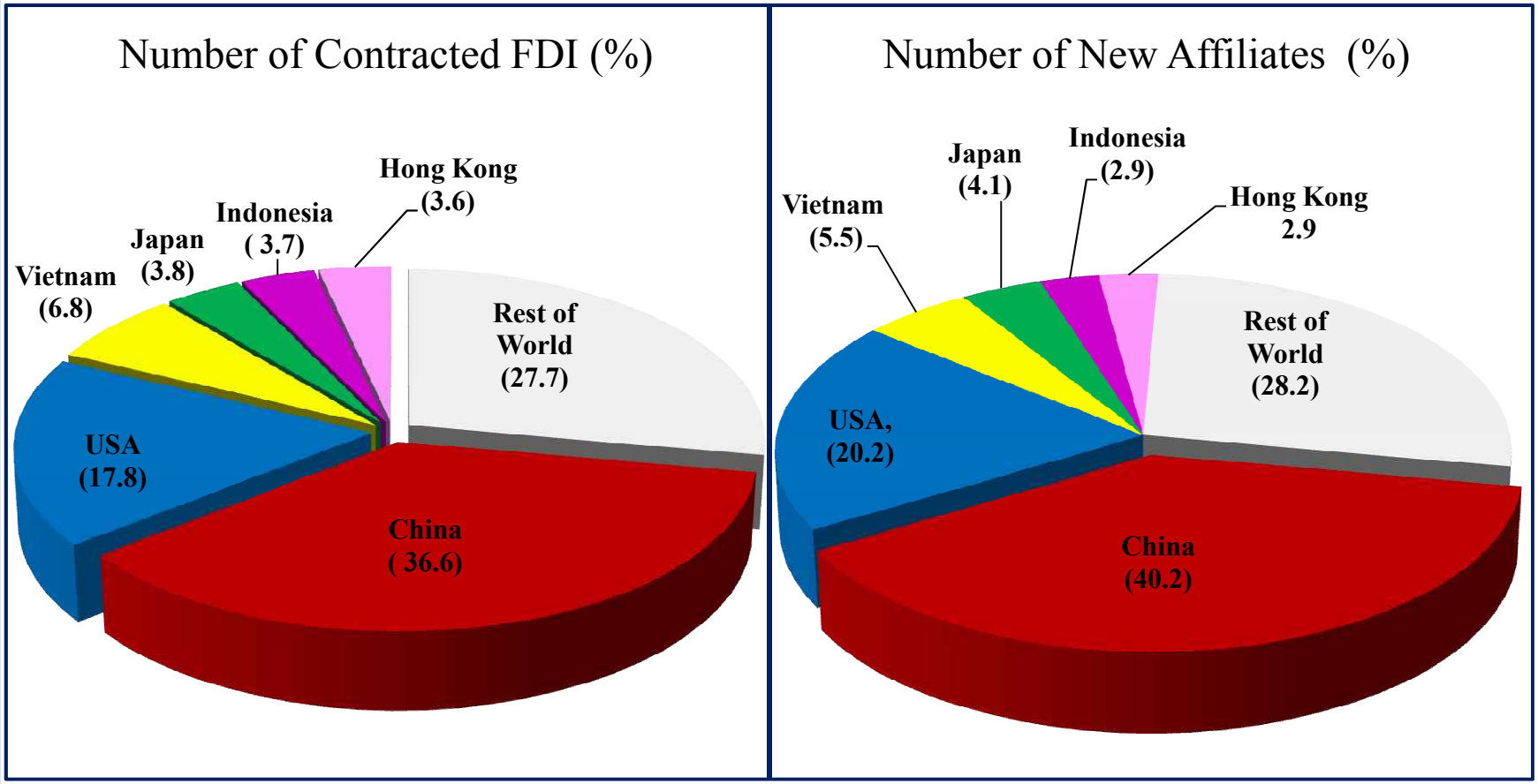
- **Motivations**

– China and Korea have heavily engaged in trade and investment with each other since 2001, i.e., its trade dependency on China has steadily increased (China has become the largest trading partner for Korea by 2003)➔ China has been the most important economic partner for Korea since then

– The main reason for close economic tie between China and Korea lies on complementary production structure between the two via offshoring

– China has become the center of global outsourcing (notable characteristic of Chinese economy)➔ Korea takes advantage of this feature

<Figure 1> Korea's FDI to the World (Top 6)



Source: The Export-Import Bank of Korea
Note: Cumulative FDI by the end of 2014

Introduction

- **Motivations**

– Korea has invested most heavily in China: <Figure 1>➔ Given the size of FDI, we need to scrutinize more detailed reasons (i.e., regional conditions) why Korea invests in China via analyzing the determinants of sales modes of Korean affiliates in China

– Notice that Korean affiliates in China produce mostly intermediate inputs and sell them either by intra-firm sales (exports) or within China

– Then it would be interesting to analyze the determinants of sales modes of Korean affiliates in order to explore the complementary production structure between the two

Introduction

- **Objectives**

– The objective of this paper is to analyze the determinants of sales modes of Korean affiliates in China➔ To do so, we scrutinize regional conditions as well as parent/affiliate characteristics

– In doing so, this paper aims to examine the interactions between complementary production structure between China and Korea and sale modes of Korean affiliates

– Our analysis can extend to the business strategy of the Korean affiliates in China and provide some clues to those who plan to invest in China

Background and Overview

- **Some Definitions**

− In this paper, we use the following definitions from the perspective of Korean affiliates in China and similar definitions were used in Marin(2005)

(1) Intra Firm Export: sales of intermediates to affiliated firms (including parent firm)

(2) Intra-Firm Import: purchase of intermediates from affiliated firms (including parent firm)

(3) Sales within China: sales of intermediates by Korean affiliate to the firms (including foreign invested) located in China

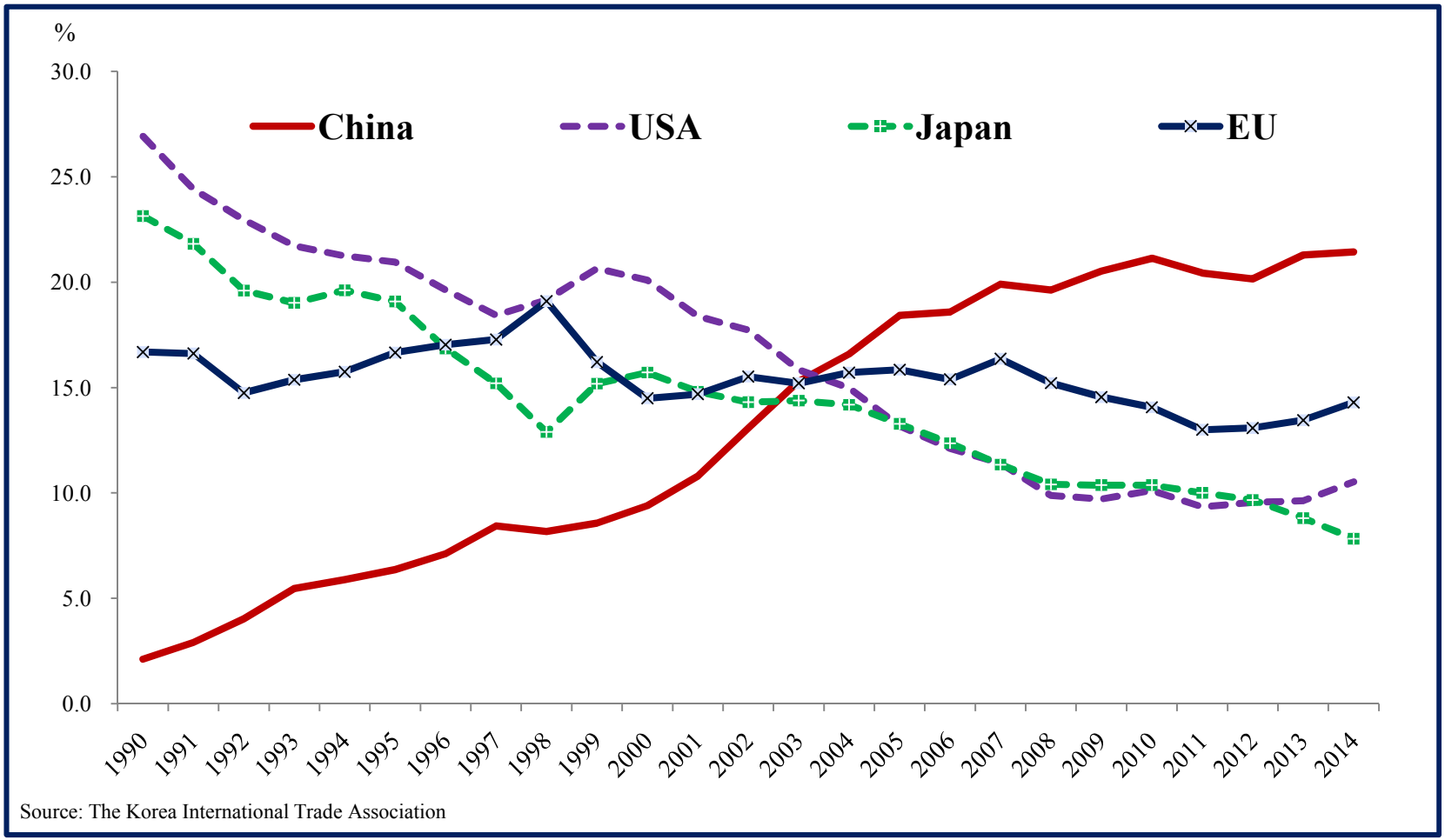
(4) Purchase within China: purchase of intermediates by Korean affiliates from the firms located in China

Background and Overview

- **China: Korea's Largest Economic Partner**

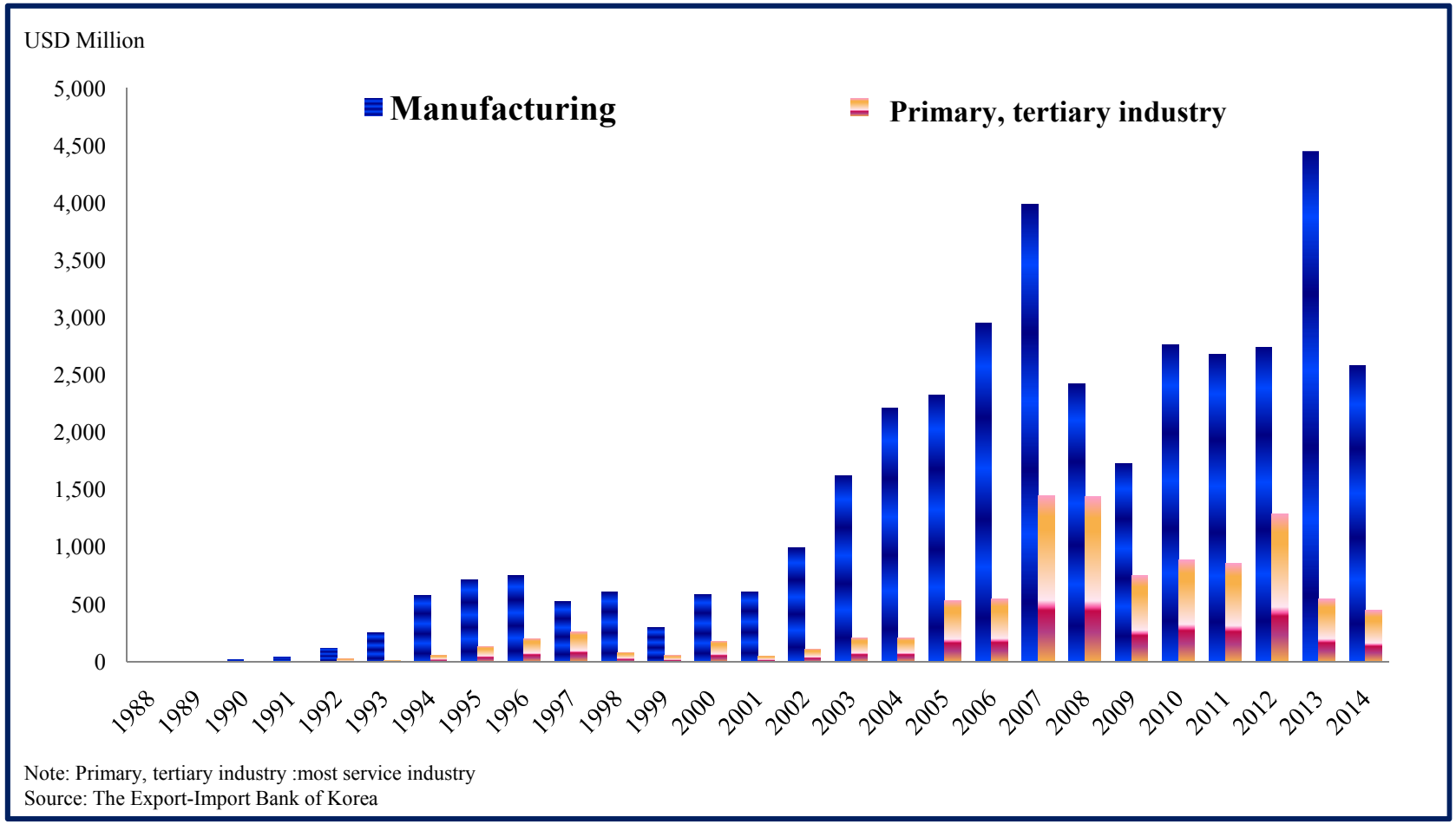
- Korea's trade with China have steadily increased over time: <Figure 2>
- Korea's FDI into China is mostly manufacturing industry but service FDI is increasing fast: <Figure 3>
- Notice that trade and FDI between the two countries are highly correlated➔ This implies that global outsourcing and offshoring between the two also have increased with each other
- FDI locations are mostly in coastal and Eastern part of China from Korea into China nn small medium sized firms and large firms also have steadily increased even though declined slightly due to the recent global financial crisis: <Figure 4>

<Figure 2> China: Korea's Largest Trade Partner



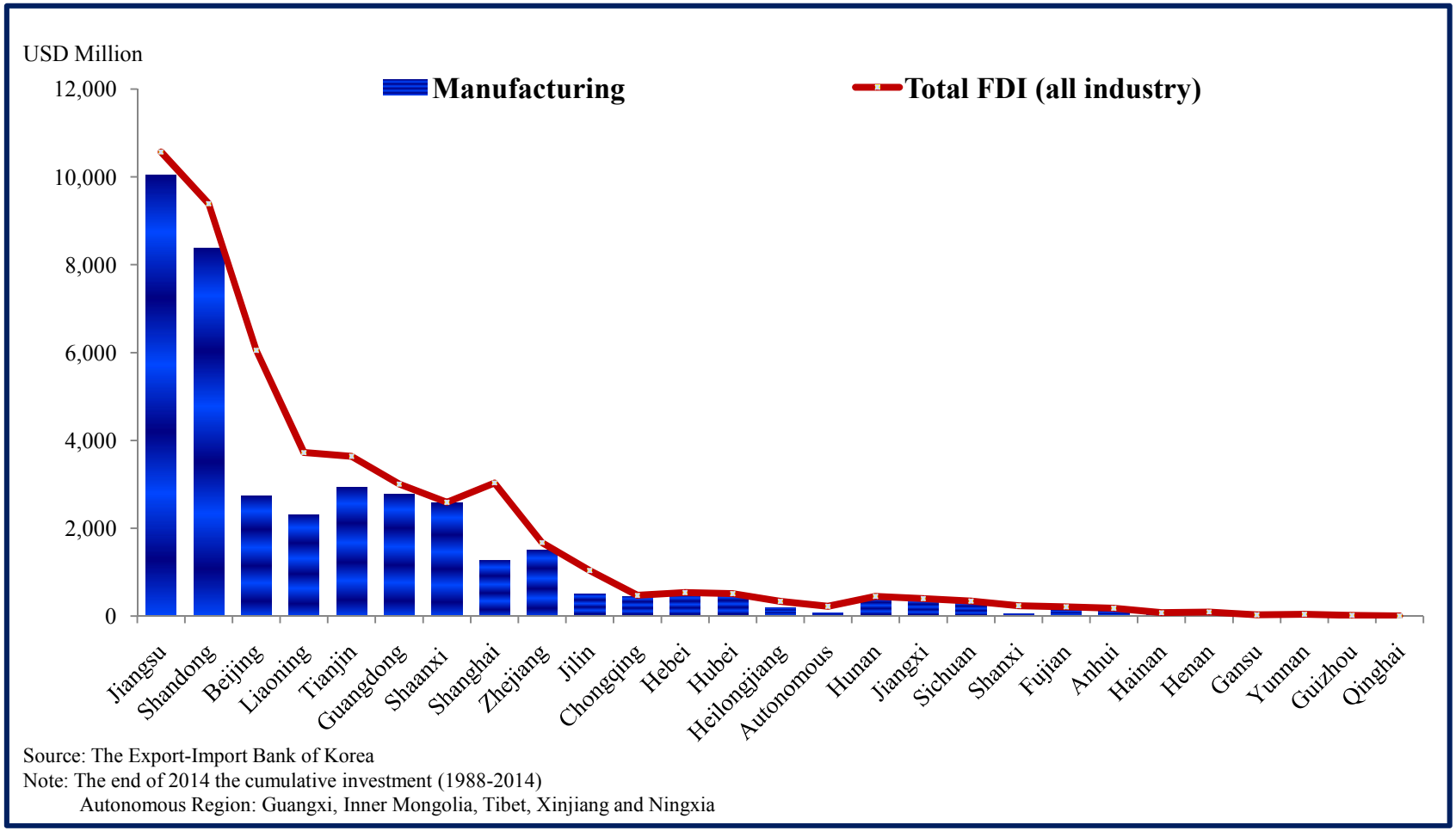
Source: The Korea International Trade Association

<Figure 3> Korea's FDI into China by Industry



Note: Primary, tertiary industry :most service industry
Source: The Export-Import Bank of Korea

<Figure 4> Korea's FDI into China by Locations



Source: The Export-Import Bank of Korea
Note: The end of 2014 the cumulative investment (1988-2014)
Autonomous Region: Guangxi, Inner Mongolia, Tibet, Xinjiang and Ningxia

Background and Overview

- **Intra Firm Trade vs. (Domestic) Sales within China**

− <Figure 5A> describes the sales structures (of six modes) by Korean affiliates in China

A: Affiliates in Korea

B: Non-affiliates in Korea

C: Affiliates located in the third countries

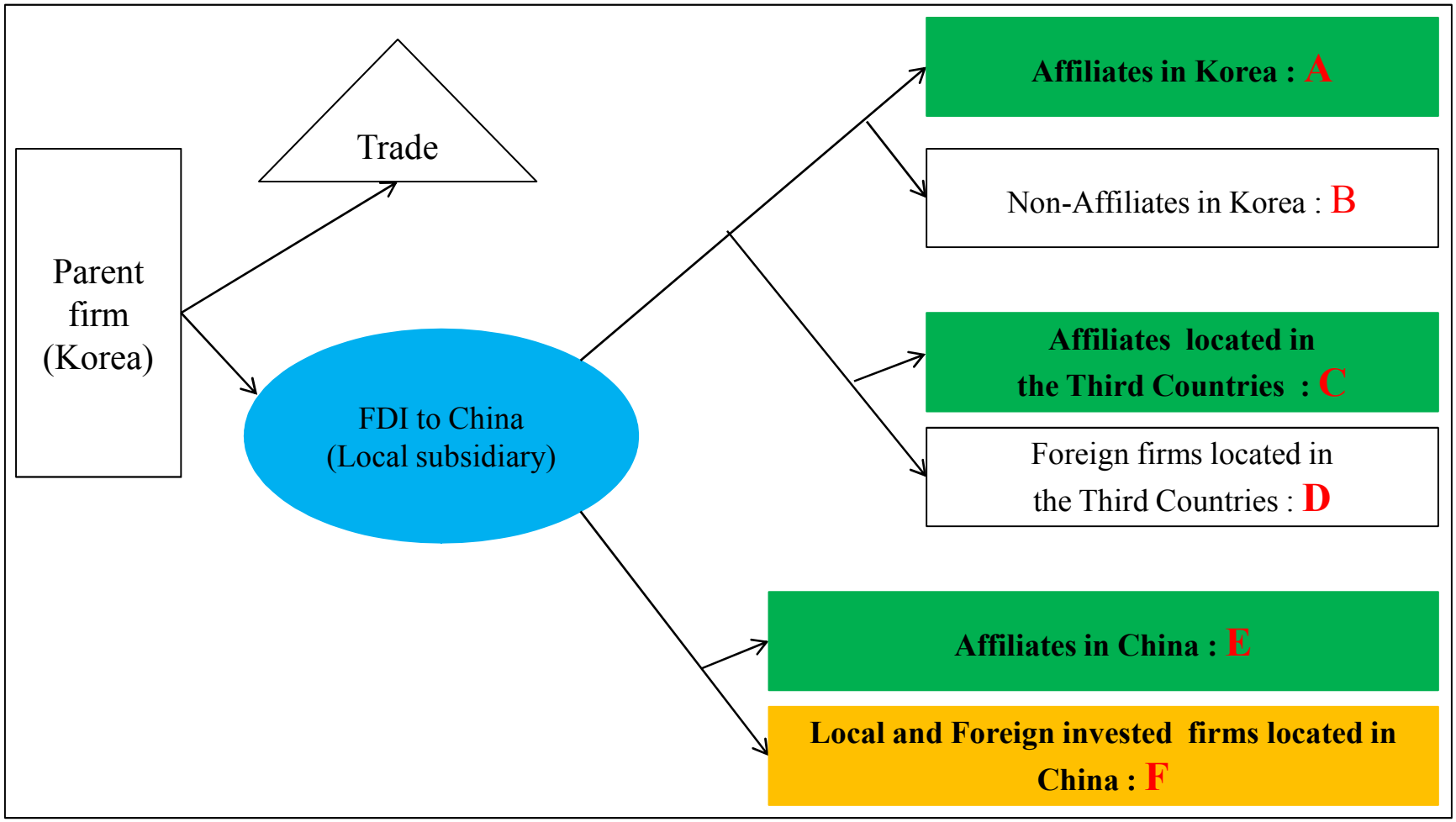
D: Foreign firms located in the third countries

E: Affiliates in China

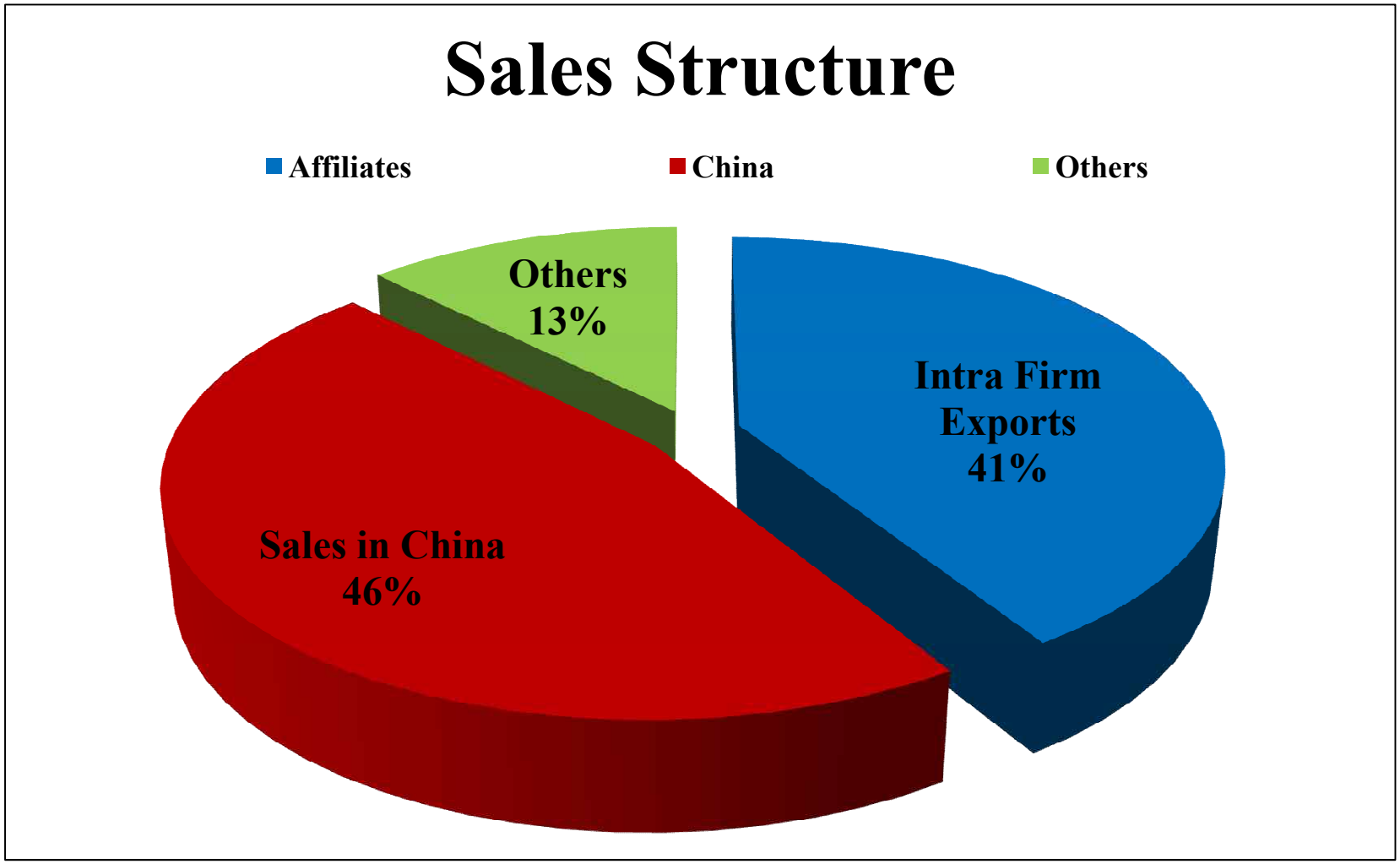
F: Local and foreign firms located in China

− <Figure 5A> provides the sales proportions by Korean affiliate firms in China➔ Approximately 46% of the total sales go to local and foreign firms in China (F), 41% of sales can be identified as intra firm exports (A+C+E), and 13% others (B+D)

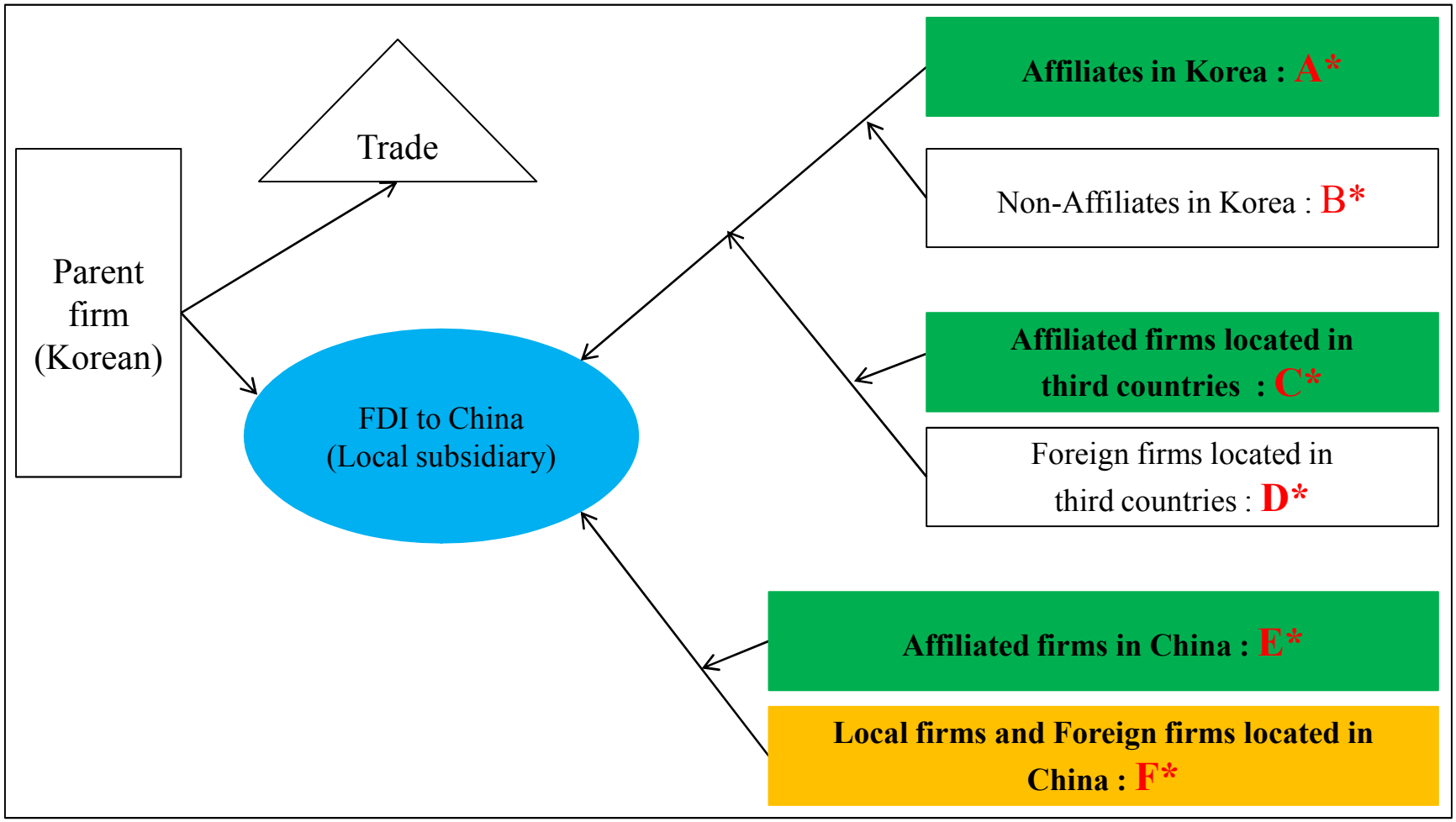
<Figure 5A> Sales Structure of Affiliates in China



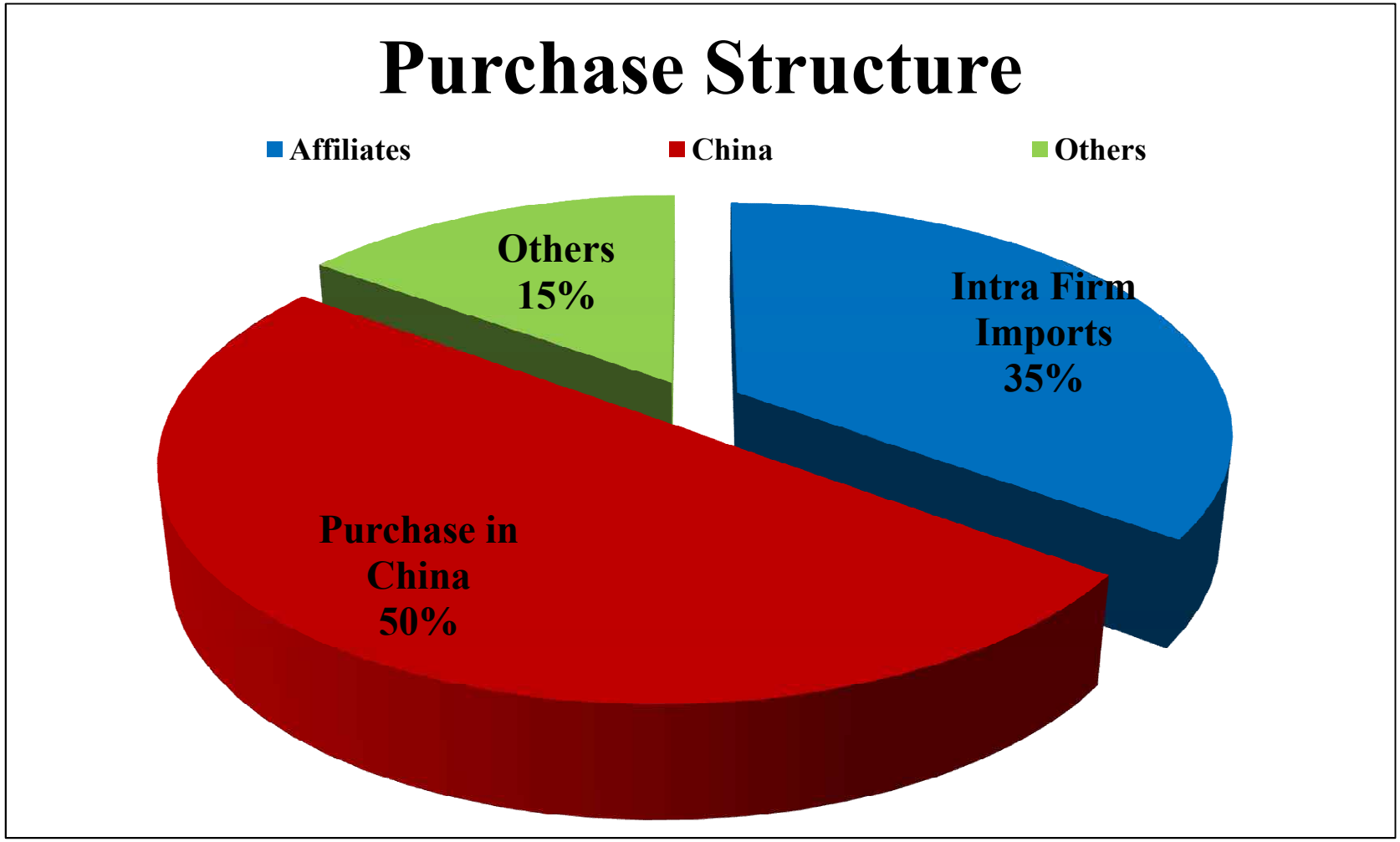
<Figure 5B> Sales Proportions: Intra-Firm Export vs. (Domestic) Sales in China



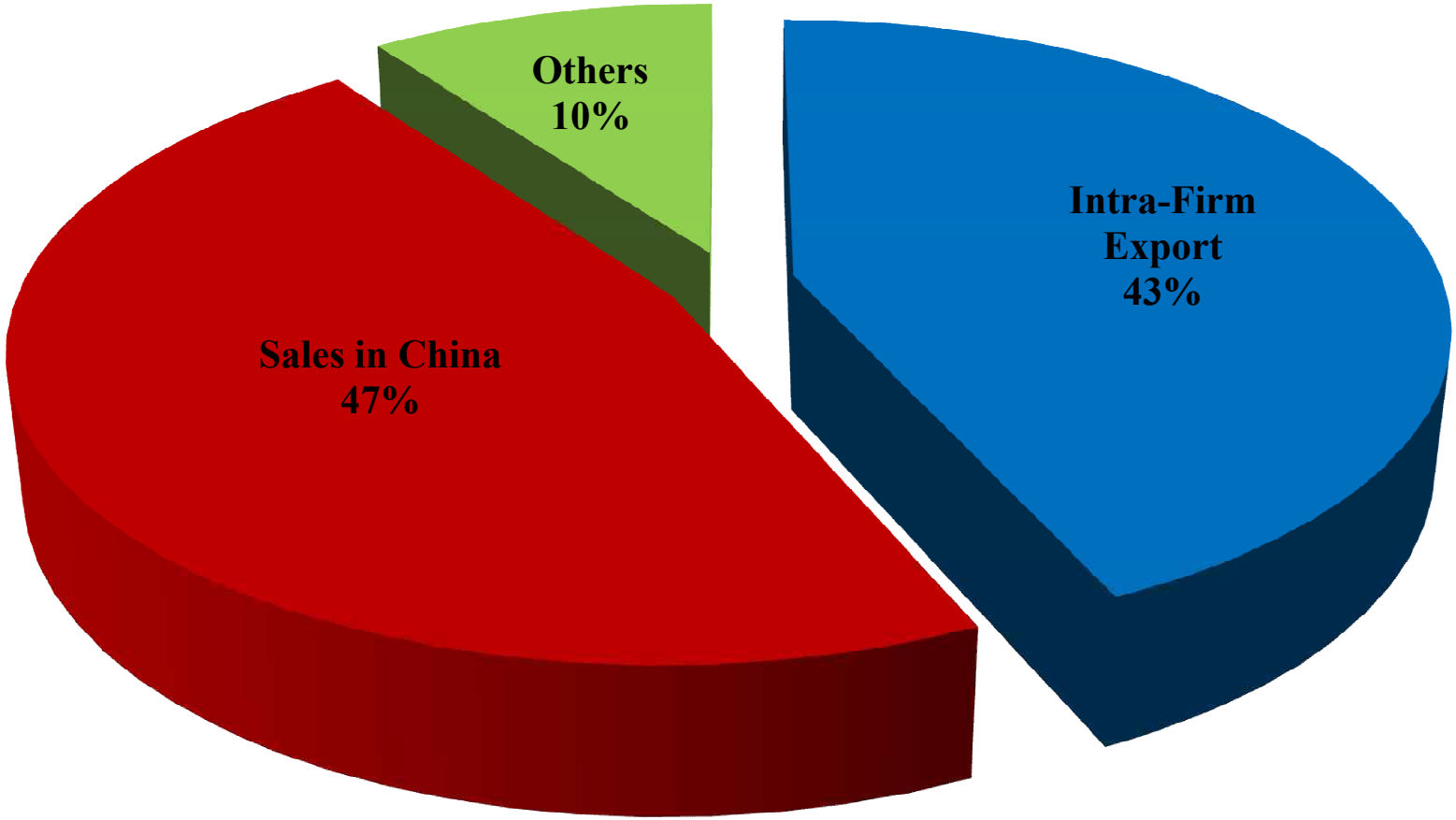
<Figure 6A> Purchase Structures of Korean Affiliates in China



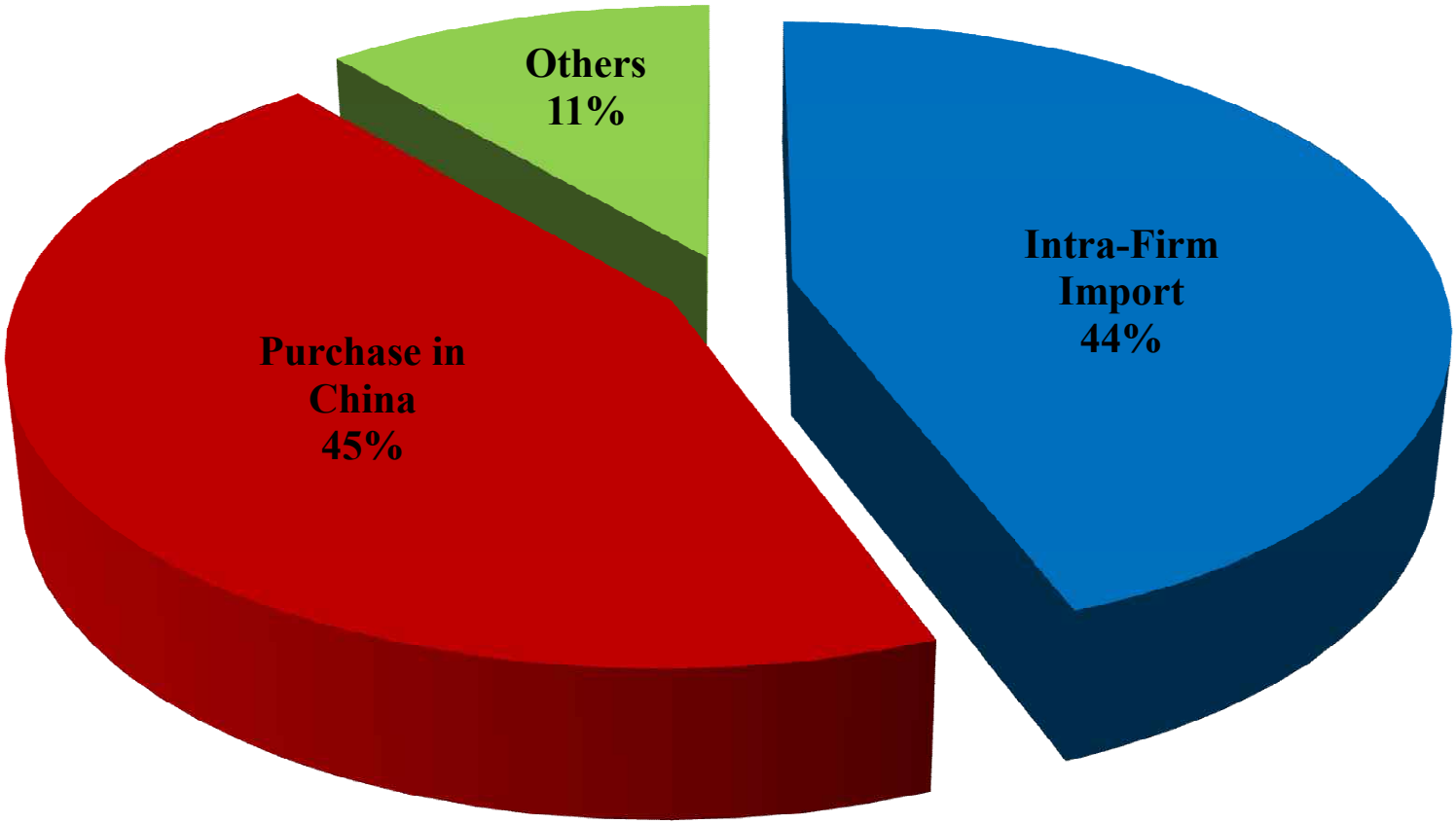
<Figure 6B> Purchase Structure: Intra-Firm Imports vs. (Domestic) Purchase in China



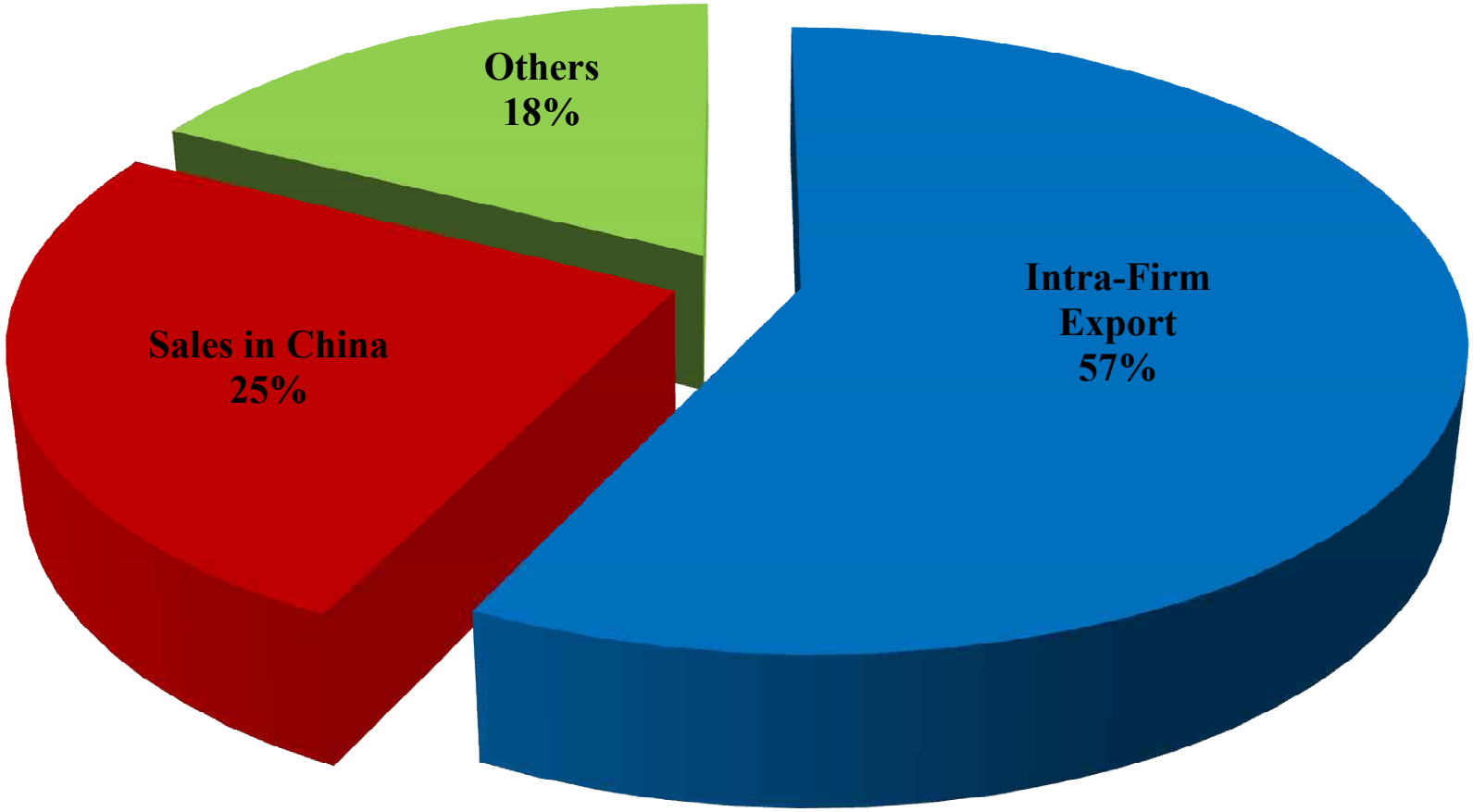
<Figure 7A> Sales Proportions: Electrical and Electronic Industry



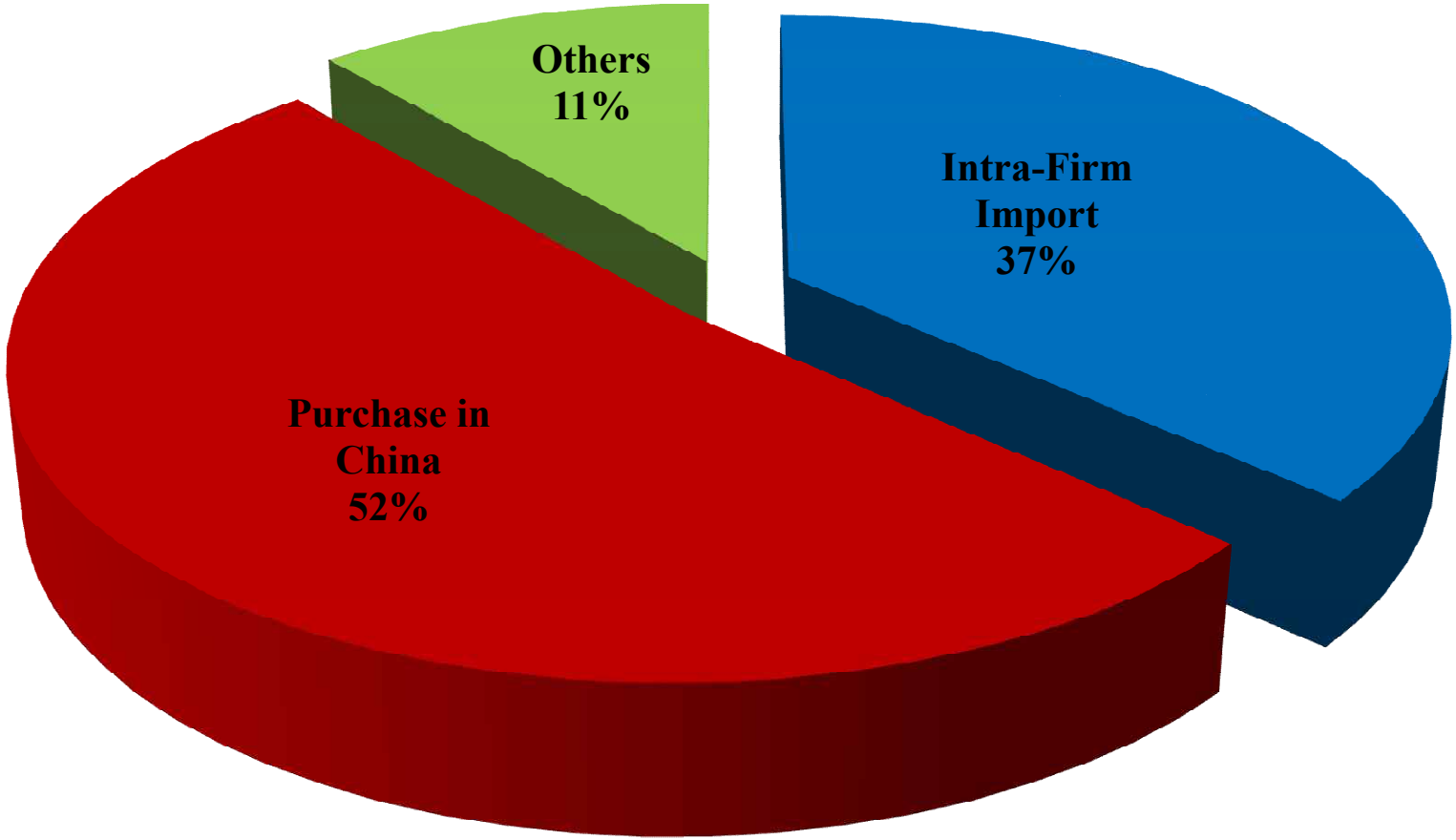
<Figure 7B> Purchase Proportions: Electrical and Electronic Industry



<Figure 8A> Sales Proportions: Apparel and Textile Industry



<Figure 8B> Purchase Proportions: Apparel and Textile Industry



Background and Overview

- **Summary**

- Sales within China and intra-firm export are the most important sales modes of Korean affiliates in China (This paper explains the purpose of setting up Korean affiliates in China and what determines specific mode of trade)
- Even though service sector have invested in few large cities, Korean FDI in China is mostly in manufacturing sector
- Sales and purchase structures may be different across industries

Data

- **Data Descriptions**

- Period : 2011 (1 year)
- Source of data: Export-Import Bank of Korea
- The total number of Korean affiliates located in China: 1,671 samples
- Out of 1671 samples, we only consider both parent firms and affiliates are manufacturing: 1,139 samples
- We further exclude the following samples➔ The final number of data are 741 samples

  1) No of parent firm's size happens to be an individual enterprise: 14 samples

  2) Either no sale or no purchase: 306 samples

  3) 0 total ownership interest: 77 samples

  4) Located in autonomous region: 1 sample

Model

- Model 1: Intensive Margin (Tobit Model)

1) Intra-firm Export Firm

- Share of sales to affiliated firms in world

2) Sales within China Firm

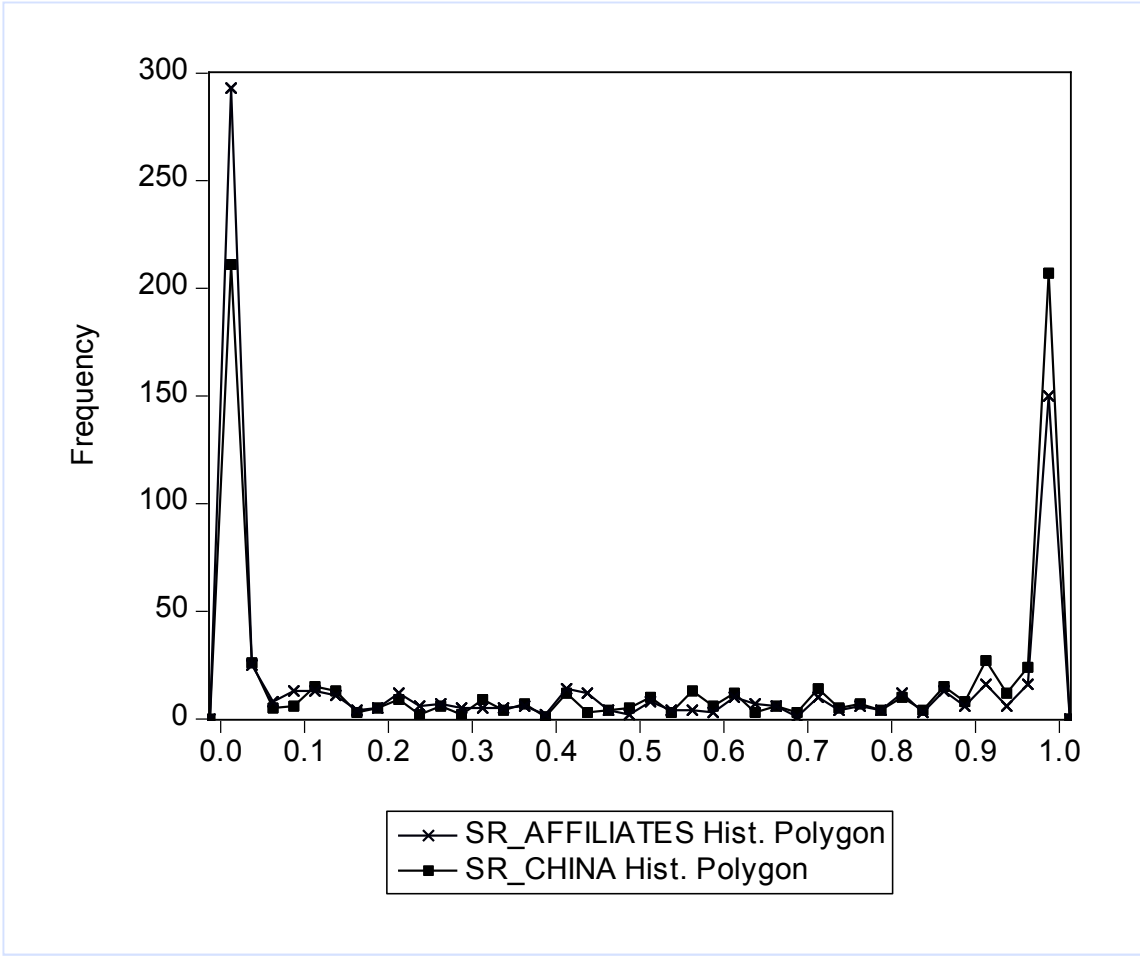
- Share of sales to non-affiliated firms within China

- Model 2: Extensive Margin (Logistic Model)

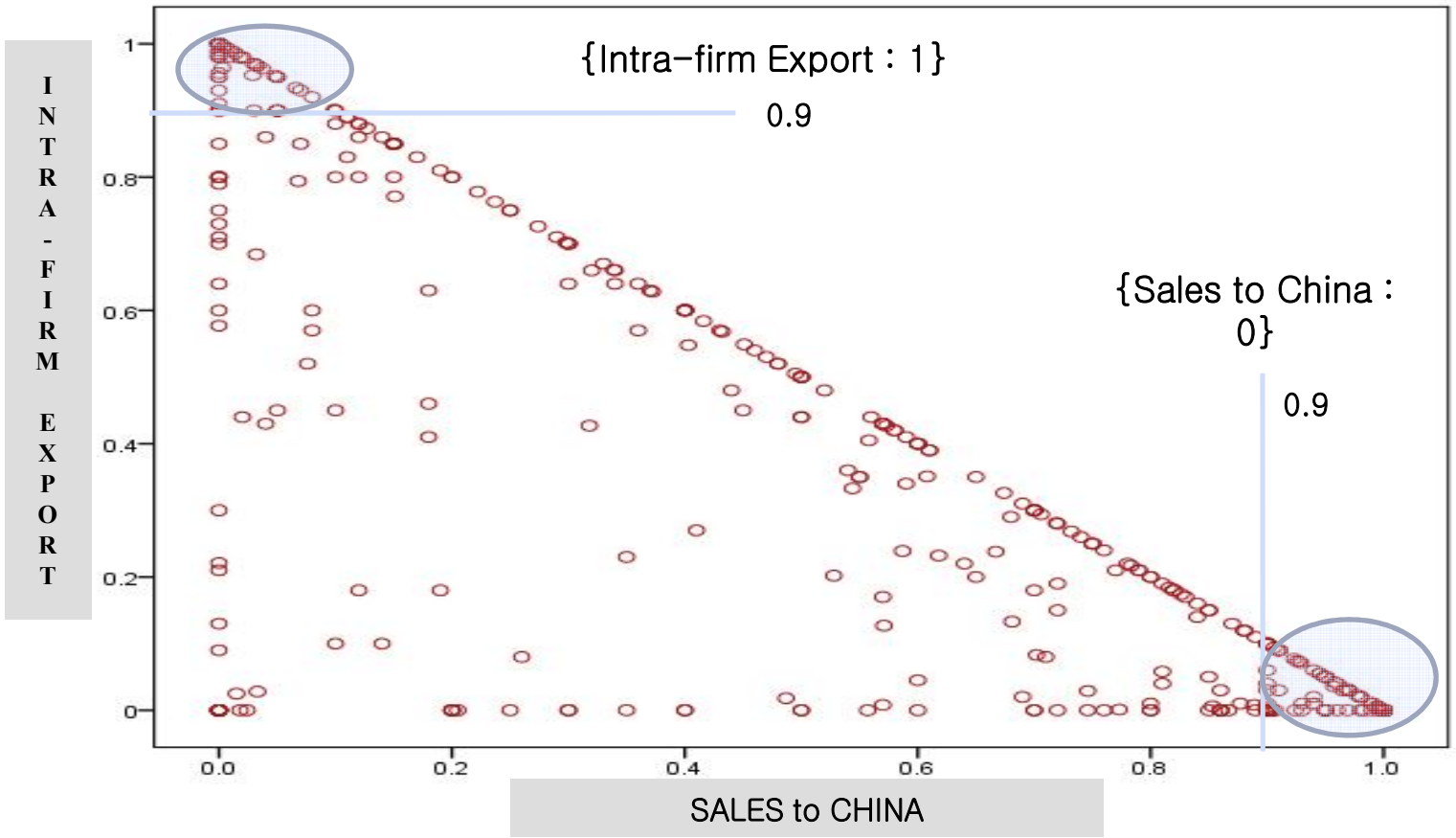
- 1 if share of sales to affiliated firms in world is more than 90%
i.e., (A+C+E/A+B+C+D+E+F) is more than 90%

- 0 if share of sales to non-affiliated firms in China is more than 90%

<Figure 9> Distribution of Sales Mode via Tobit



<Figure 10> Logistic Analysis



<Table 11> Definitions of Variables

Variables			Definitions
Dependent	Model 1 Tobit	Intra-Firm Export	Log (Share of Sales to Affiliated Firm in world)
		Sales to China	Log (Share of Sales to None Affiliated Firm in China)
	Model 2 Logistic	Dummy {1, 0}	1 if Share of Sales to Affiliated Firm in world is more than 90% 0 if Share of Sales to none Affiliated Firm in China is more than 90%
Independent	Parent	Parent Size	Dummy-Parent firm size {1 if Large, 0 if SME}
		LN FDI Stock	Log (Total FDI stock of parent firm)
		LN Ownership	Log (Ownership share of parent firm)
	Affiliates	LN K/L	Log (Capital/ Total Employment)
		LN CEMP	Log (Local employment rate)
		LN Productivity	Log (Total Sales/ Total Employment)
		LN PR China	Log (Share of Purchases from local and foreign firms located in China)
		LN PR Affiliate	Log (Share of Purchases from Affiliated firms in world)
	Regional	LN Wage	Log (Average wage of region)
		LN per GRP	Log (per capita GRP)
		LN 3 GRP-r	Log (Tertiary industries GRP/ Total GRP)
		LN per Rail	Log (Rail per square meter of region)
		LN per Water	Log (Waterway per square meter of region)
		LN per Highway	Log (Highway per square meter of region)
		LN Telephone	Log (Business volume of Postal and Telecommunication Sevice of region)
		LN Mobile	Log (Number of Mobile Subscribers of region)
		SEZs	Number of Special Economic Zones of region

<Table 12> Frequencies of Dummy variable

			Frequencies
Logistic Model	Intra-firm Export	{1}	188
	Sales to China	{0}	270
Parent Firm Size	Large Enterprises		273
	SME		468

<Table 13> Descriptive Statistics

Variable	N	mean	median	maximum	minimum	Std.Dev.
LN Intra-firm export	740	0.288	0.171	0.693	0.000	0.294
LN Sales to China	740	0.371	0.451	0.693	0.000	0.298
LN FDI Stock	740	15.639	15.478	21.308	13.821	1.156
LN Ownership	740	4.485	4.605	4.605	1.758	0.303
LN K/L	740	10.695	10.792	16.864	3.180	1.377
LN CEMP	740	0.666	0.682	0.693	0.000	0.077
LN Productivity	740	11.512	11.450	17.939	5.591	1.438
LN PR China	740	0.399	0.470	0.693	0.000	0.262
LN PR Affiliate	740	0.276	0.223	0.693	0.000	0.260
LN Wage	740	10.718	10.716	11.233	10.351	0.231
LN per GRP	740	10.937	10.836	11.353	9.706	0.278
LN 3 GRP-r	740	3.790	3.770	4.345	3.424	0.192
LN per Rail	740	0.034	0.026	0.072	0.005	0.020
LN per Water	740	0.075	0.008	0.301	0.000	0.098
LN per Highway	740	0.833	0.910	1.067	0.241	0.143
LN Telephone	740	6.528	6.696	7.543	4.541	0.596
LN Mobile	740	8.488	8.808	9.287	6.510	0.616
SEZs	740	0.261	0.000	3.000	0.000	0.830

<Table 14> Results

Variables		Tobit Model								Logistic Model			
		Intra-Firm Export		Local Sales		Intra-Firm Export		Local Sales		Sales Mode 90% (Intra-Firm Export = 1)			
		Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Parent	Parent Size	-0.002	0.04	-0.001	0.03	-1.690	1.43	1.580	1.21	-0.214	0.28	-18.090	11.60
	LN FDI Stock	0.088***	0.01	-0.064***	0.01	0.083***	0.01	-0.061***	0.01	0.579***	0.12	0.576***	0.12
	LN Share	-0.065	0.05	0.053	0.05	-0.067	0.05	0.055	0.05	-0.900**	0.44	-0.858*	0.45
Affiliates	LN K/L	-0.022	0.02	0.035**	0.01	-0.025*	0.02	0.040***	0.01	-0.188	0.12	-0.199*	0.12
	LN LocalEmp	-0.194	0.20	0.271	0.17	-0.209	0.20	0.307*	0.17	-0.959	1.68	-1.120	1.70
	LN Productivity	-0.042***	0.01	0.054***	0.01	-0.042***	0.01	0.054***	0.01	-0.334***	0.11	-0.353***	0.11
	LN PR China	0.091	0.10	0.744***	0.09	0.279*	0.15	0.580***	0.13	-2.553***	0.88	-1.750	1.28
	LN PR Affiliates	0.550***	0.10	0.281***	0.09	0.725***	0.14	0.103	0.13	0.660	0.88	1.663	1.28
Regional	LN Wage	-2.404***	0.76	1.741***	0.67	-1.752**	0.79	0.863	0.70	-13.303***	6.14	-10.584	6.67
	LN per GRP	-0.085	0.11	0.019	0.10	-0.295**	0.13	0.253**	0.12	-0.807	0.87	-2.429**	1.06
	LN 3GRP	0.161	0.43	-0.158	0.37	0.026	0.43	0.093	0.38	1.318	3.29	-1.190	3.53
	LN per Rail	13.356***	5.12	-9.549**	4.38	14.656***	5.09	-10.089**	4.34	73.805*	40.75	100.430**	44.43
	LN per Water	0.309	0.51	-0.051	0.44	0.394	0.51	-0.047	0.44	0.773	3.99	0.348	4.25
	LN per Hihgway	0.214	0.27	-0.101	0.24	-0.022	0.28	0.156	0.24	0.687	2.28	-0.464	2.28
	LN Telephone	1.275**	0.61	-0.911*	0.54	0.920	0.63	-0.532	0.55	7.136	5.41	7.517	5.27
	LN Mobile	-1.235*	0.63	0.834*	0.55	-0.780	0.65	0.348	0.57	-6.692	5.61	-6.114	5.47
	SEZs	-0.041	0.04	0.046	0.03	-0.181**	0.07	0.199***	0.07	-0.339	0.30	-1.505**	0.66
Size Slope	D Wage					-0.379	0.24	0.444**	0.20			-4.273*	2.22
	D per GRP					0.546***	0.20	-0.596***	0.17			5.945***	2.17
	D PR China					-0.301	0.21	0.219	0.19			-1.613	1.93
	D PR Affiliates					-0.348**	0.21	0.316*	0.19			-2.581	1.92
SEZs Slope	M K/L					0.049**	0.02	-0.063***	0.02			0.337*	0.20
	M PR China					-0.224	0.28	0.360	0.26			-0.855	2.45
	M PR Affiliates					-0.022	0.29	0.234	0.25			-0.314	2.35
	constant	27.366***	8.70	-19.464**	7.65	21.776**	8.96	-12.133	7.88	155.597**	75.80	146.104**	77.17
	/sigma	0.371	0.01	0.330	0.01	0.366	0.01	0.324	0.01				
N		740		740		740		740		457		457	
Log Likelihood		-413		-336.5		-404.5		-323.85		-242.27		-234.81	
LR Chi-squard (Prob.)		149.13 (0.000)		212.99 (0.000)		166.13 (0.000)		134.55 (0.000)		134.55 (0.000)		149.47 (0.000)	
Pseudo R-squard		0.152		0.24		0.17		0.268		0.217		0.241	
Hosmer-Lemeshow Chi-squard										15.86 (0.044)		14.01 (0.081)	

Implications

- **Some Robust Results**

1. Capital investments: As Antras (2003), Antras and Helpman (2004), and Corcos *et al.* (2013) demonstrate, capital investment may be an important determinant of intra-firm trade: Positive significant and robust signs confirm the above

− Large capital investment may be subject to hold up problem➔ In this case, vertical integration is optimal

2. Productivity: Productivities of local sales firms are consistently higher than intra firm export firms➔ This may be inconsistent with the existing literatures (Antras, 2003 and Corcos *et al.*, 2013)

Implications

- **Some Robust Results**

– Rationale: Possibly due to intrinsic characteristics of Korean affiliates in China, i.e., Most Korean affiliates in China happen to be vertical FDI instead of horizontal FDI (Similar interpretations can be made for capital-labor ratios even though not so robust)

3. Wage: As wages increase, it is either more likely to be local sales firms or share of local sales increase➔ We can provide similar rationales as the above (2)

– Or less incentives may be provided for intra firm trade firms than local sales firms

– Notice that local sales in China may be competitive➔ Unless affiliates have competitive edge, they cannot survive in the local markets

Implications

- **Some Interesting Results**

1. Rail: It is interesting to note that the coefficient is positive for intra-firm export but negative for local sale

- Rails can be important when they are connected to export transportation modes (either air or ship) but not for local sales

2. SEZ: As the number of SEZ increases within a region, intra firm exports decline while local sales increase

- Many Korean affiliates in China utilize SEZs to make local sales ➔ Notice that many multinational firms as well as local firms operate in SEZs

Implications

- **Some Interesting Results from Multiplier Dummy**

- As the number of SEZs in a region and an affiliate's capital-labor ratio also increase, then the share of intra-firm export increases (and the probability that it is an intra-firm export firm increases) while local sales shares decline
- Note that the number of SEZs alone have opposite signs➔ However, the combined effects may change as capital-labor ratio increases
- From <Table 15>, we can see that more technologically sophisticated industries tend to exhibit high capital-labor ratios➔ Within SEZs in China, the contractibility substantially improves and, in return, more technologically sophisticated firm in SEZ favors intra-firm export (Corcos et al, 2013 and Nunn & Trefler, 2008)

<Table 15> Capital/Labor Ratios of Korean Affiliates in China

Industry	Capital/Labor(K/L)
Apparel and Textiles	77,049
Chemical	144,045
Electrical and Electronic	163,189
Iron or steel, Metals	129,923
Machinery	122,487
Vehicles, aircraft and vessels	99,731

Implications

- **Some Interesting Results from Slope Dummy**

– Notice that the size of parent firm in Korea plays an important role in determining its capacity, financial constraint and business strategy

– If the size of parent firm is large and its purchase from parent firm increases, the share of intra-firm exports tend to decline while local sales shares increase

– This result highlights the purpose of setting up its Korean affiliates in China by large-sized parent firms➔ It is less likely to receive intermediates from its affiliates for intra-firm export firms while more likely for local sales firms

Implications

- **Some Interesting Results from Slope Dummy**

– Notice that GRP can be considered as the extent of the regional market ➔ It is likely that coastal (Eastern) regions tend to exhibit high GRP in China

– If the size of parent firm is large and its GRP increases, then share of intra-firm exports also increases (and the probability that this firm is an intra-firm export firm increases) however local sales share declines

– A region with large GRP tends to have good contract enforcement➔ Then it creates a better environment for large parent firm to establish its affiliate and then engage in intra-firm trade

Concluding Remarks

- Some Interesting Features of this Paper

– This paper extends the existing literature to explain specific sales modes (intra-firm exports and domestic sales) by Korean affiliates in China

– The intrinsic transaction cost may be an important implicit barrier in doing business in China➔ Contract enforcement problem may play a role in doing business in China

– Our results back up to highlight these features (as the existing literatures support our results)

Concluding Remarks

- Policy Implications

– Recently China-Korea FTA has been in effect➔ FTA can reduce trade and investment barriers, then FTA can impact not only intra-firm trade but also domestic sales within the host country (China)

– It would be interesting to note how our results may change due to China-Korea FTA

– Especially, if we can document how this FTA impacts on production fragmentation and outsourcing strategy, then it would generate some interesting implications➔ This direction can be a topic of the future study

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