

Multi-Product Exporters, Carry-Along Trade and the Margins of Trade

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Outline

- This paper focuses on the role of multi-product exporters in international trade
- What accounts for the differences in exports
 - Across firms
 - Within firms, over time
 - Across destinations
 - Within destinations, over time
- Two parts to the paper
 - All exporters
 - Manufacturing exporters

Manufacturing exporters in 2005

- What is the relationship between domestic production and exporting?
 - The range of products produced
 - The range of products exported
 - The value of production and exports

Manufacturing exporters in 2005

Prodcom Survey

- 2 types of firms in the production survey
 - Firms with primary activity in manufacturing
 - 10+ employees
 - Firms with primary activity outside manufacturing
 - production of manufactured goods
 - 20+ employees
- Value of domestically produced sales by product
 - Products classified at the Prodcom 8-digit level (PC8)

Manufacturing exporters in 2005

Export Data – NBB Trade Database

- Value of exports by firm by country by product by year
 - Products classified at the Combined Nomenclature 8-digit level (CN8)

Manufacturing exporters in 2005

Prodcom Sample

- 3899 exporters
 - €118B of production
 - €82B of exports (38% of total Belgian exports)
 - 83% of exports by “primary = NACE2” manufacturing firms

Summary Statistics, Prodcom Firms

Table 7

<i># Exported Products</i>	<i># Firms</i>	<i>Value of Exports (million €)</i>	<i>Value of Production (million €)</i>	<i>Value of Exports per Firm (million €)</i>	<i>Average # Destinations</i>
1	617	1,121	4,032	1,817	3.71
2	407	1,310	4,412	3,219	6.76
3	303	1,582	3,978	5,221	7.84
4	269	2,608	5,101	9,695	9.67
5	220	4,337	5,850	19,714	11.11
6-10	805	11,298	18,056	14,035	14.78
11-20	636	15,972	24,545	25,113	20.28
21-30	264	12,100	17,032	45,833	26.53
31-50	207	9,049	10,278	43,715	32.15
>51	171	22,895	25,406	133,889	44.77
Total	3,899	82,276	118,689	21,102	15.02

“Normal” multi-product exporters

- Exports per firm increasing in the number of products
- # of destinations higher for multi-product firms

Summary Statistics, Prodcom Firms

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Single-product exporters

- produce more goods than they export

Summary Statistics, Prodcom Firms

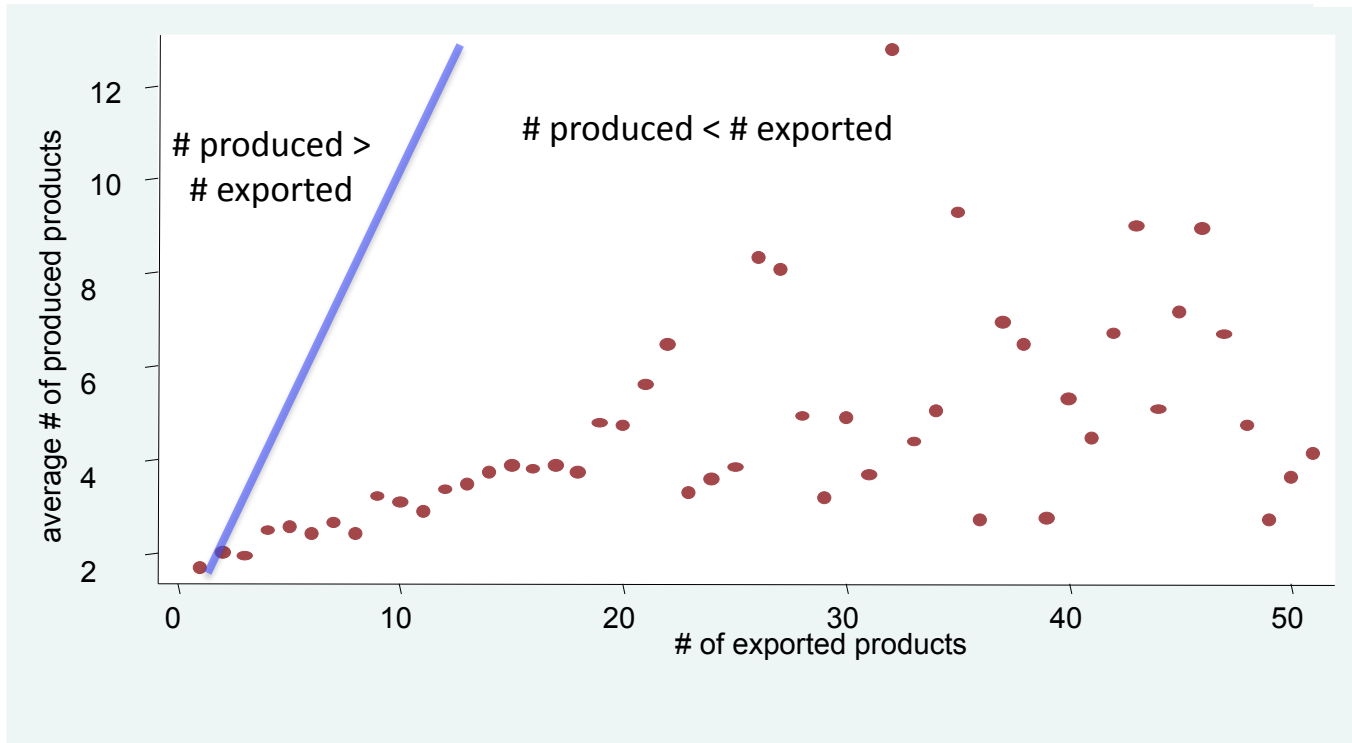
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Multi-product exporters

- Export more goods than they produce

Produced and Exported Products



Number of exported products rises faster than the number of produced products

Carry-Along Trade (CAT)

- *Firm-Product Carry-Along Trade*
 - Exports $>$ production (by the firm in the product)
 - 2 types
 - Pure CAT
 - Positive exports, no production
 - Mixed CAT
 - Positive exports, positive production, exports $>$ production

Carry-Along Trade (CAT)

- *Carry-Along Trade Firm*
 - At least one product exported as CAT by the firm
- *Carry-Along Trade Product*
 - At least one firm has CAT exports in the product

CAT Firms, Products and Exports

Table 8

	<i>Total Firms</i>	<i>CAT Firms</i>	<i>Mixed CAT Firms</i>	<i>Firms with at least 1 Pure CAT product</i>	<i>Total Products</i>	<i>CAT Products</i>
8-digit	3,899	3,563	722	3,509	4,093	3,716
		<i>Firm-Products</i>	<i>CAT Firm-Products</i>	<i>CAT Exports (million €)</i>	<i>Mixed CAT Exports (million €)</i>	<i>Pure CAT Exports (million €)</i>
8-digit		60,253	45,449	30,693	6,117	24,576

- 91 percent of exporters have Carry-Along Trade in at least one product
- 90 percent of products are exported as Carry-Along Trade by at least one firm
- 37 percent of the value of exports of these firms are Carry-Along Trade (14 percent of the total value of Belgian exports)

Cookies

<u>CN Code</u>	<u>Description</u>
1905 31	Sweet biscuits
1905 31 11	Completely or partially coated or covered with chocolate or other preparations containing cocoa in immediate packings of a net content not exceeding 85 g
1905 31 19	Completely or partially coated or covered with chocolate or other preparations containing cocoa – other
1905 31 30	Containing 8 % or more by weight of milkfats
1905 31 91	Sandwich biscuits
1905 31 99	Other

<u>PC Code</u>	<u>Description</u>
10.72.12.53	Sweet biscuits, waffles and wafers completely or partially coated or covered with chocolate or other preparations containing cocoa
10.72.12.55	Sweet biscuits (including sandwich biscuits, excluding those completely or partially coated or covered with chocolate or other preparations containing chocolate)

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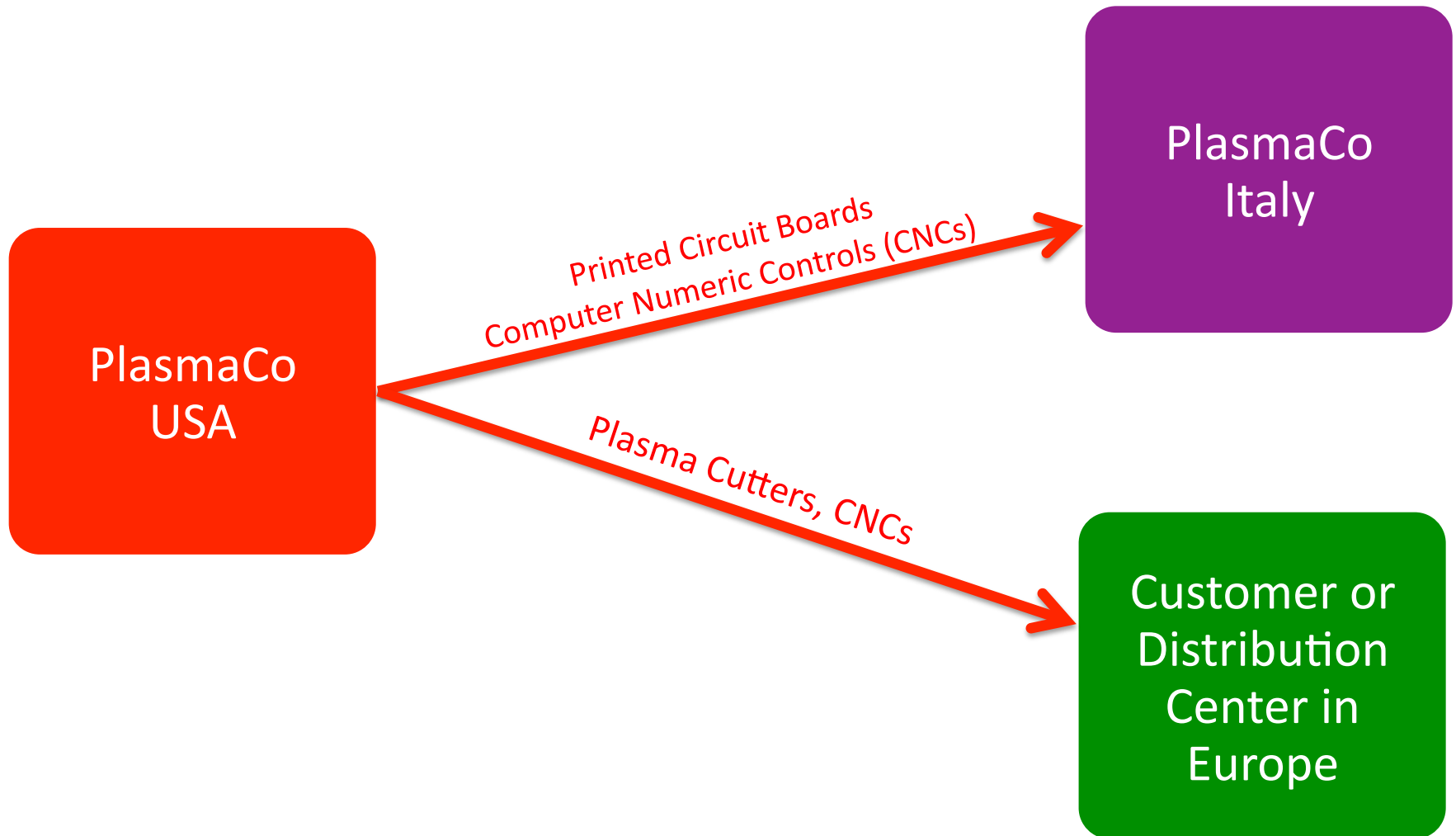
	<i>CAT Firms</i>	<i>Mixed CAT Firms</i>	<i>Firms with at least 1 Pure CAT product</i>	<i>Total Products</i>	<i>CAT Products</i>
8-digit	3,563	722	3,509	4,093	3,716
5-digit	3,350	647	3,287	534	456
	<i>Firm-Products</i>	<i>CAT Firm-Products</i>	<i>CAT Exports (million €)</i>	<i>Mixed CAT Exports (million €)</i>	<i>Pure CAT Exports (million €)</i>
8-digit	60,253	45,449	30,693	6,117	24,576
5-digit	37,345	27,660	19,569	6,699	12,870

- 86 percent of exporters have Carry-Along Trade in at least one product
- 85 percent of products are exported as Carry-Along Trade by at least one firm
- 24 percent of the value of exports of these firms are Carry-Along Trade (9 percent of the total value of Belgian exports)

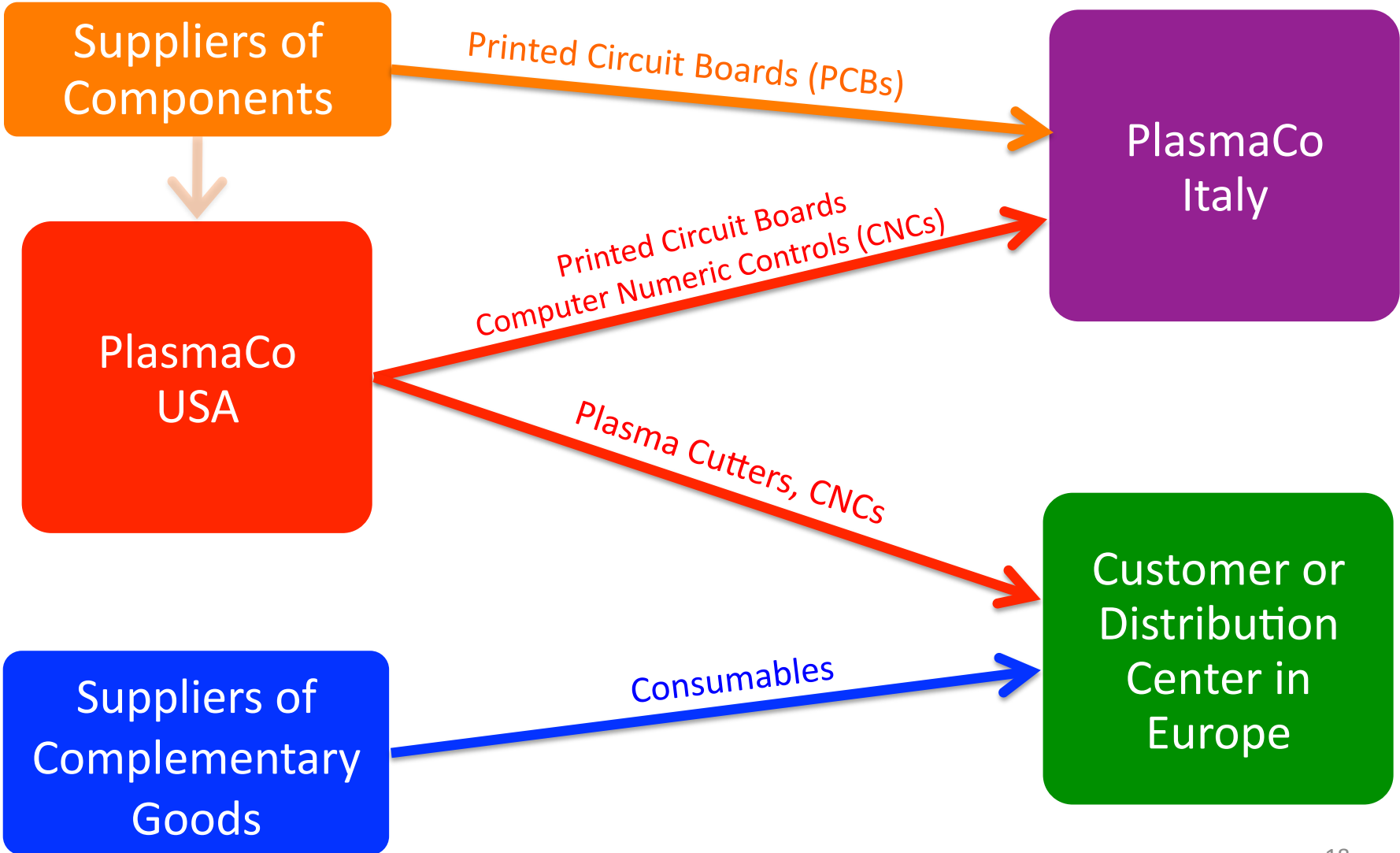
PlasmaCo

- Manufacturer of plasma cutting tools
- Based in Hanover, NH USA
- 1000 employees worldwide
- Sales (mostly exports) in 60+ countries
- Laser cutting subsidiary in Bologna, Italy

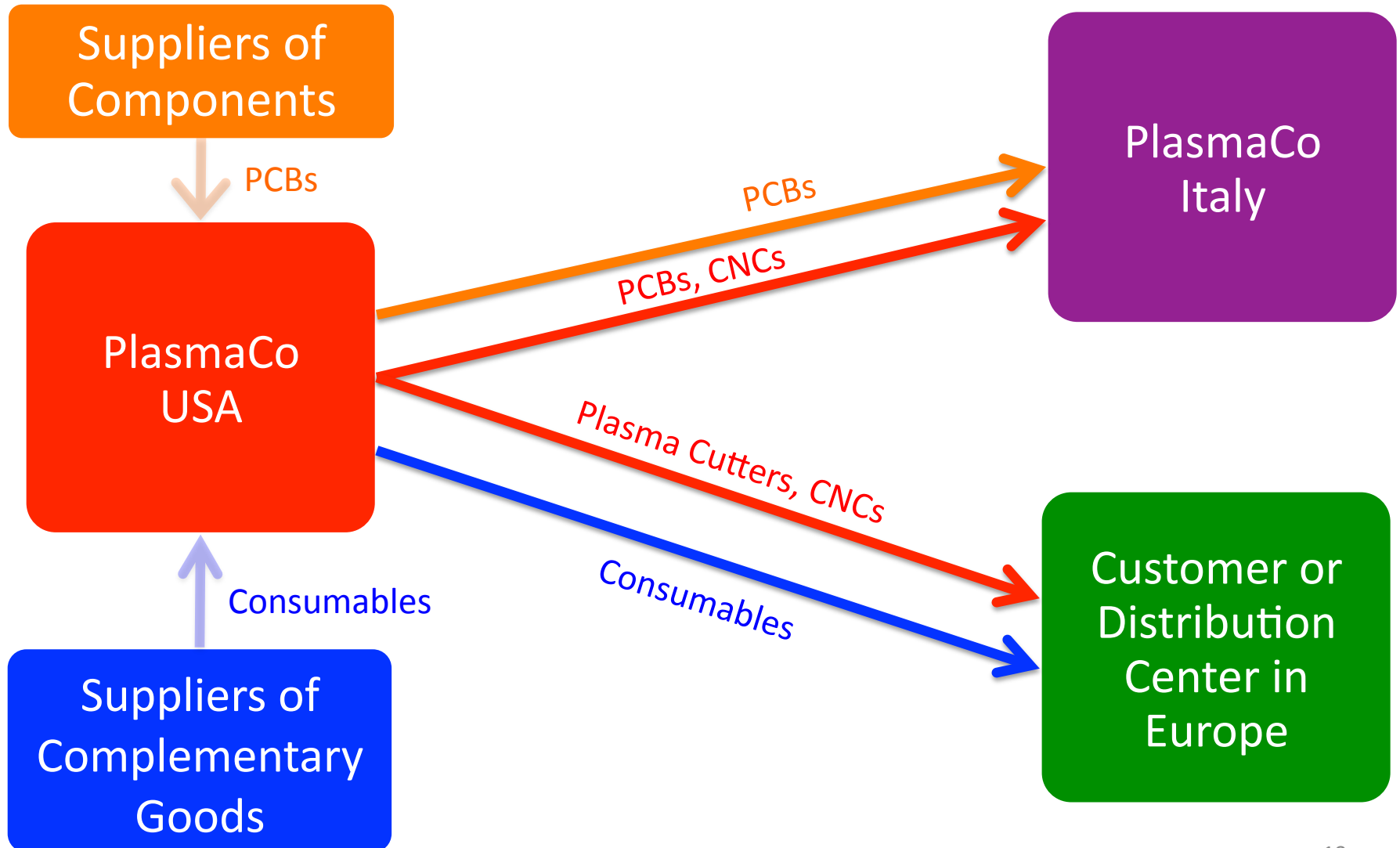
PlasmaCo – Traditional View



PlasmaCo – Traditional View



PlasmaCo - Actual



PlasmaCo

- Regular exports (Production \geq Exports)
 - Plasma Cutters (largest product by value)
 - Computer Numeric Controls (2nd largest product)

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- Carry-Along Trade (Production $<$ Exports)
 - Pure CAT (no production)
 - Consumables (same destinations as plasma cutters)

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- Regular exports (Production \geq Exports)
 - Plasma Cutters (largest product by value)
 - Computer Numeric Controls (2nd largest product)
- Carry-Along Trade (Production $<$ Exports)
 - Pure CAT (no production)
 - Consumables (same destinations as plasma cutters)
 - Mixed CAT (some production)
 - Printed Circuit Boards (sent to affiliate abroad)

Belgian Exporters

- Foreign pharmaceutical subsidiary
 - Domestic outsourcing of simple medicines
 - Packaging materials
 - No exports from foreign parent (shipped directly)
- Frozen food exporter
 - Accommodates requests for additional products
 - Similar products to satisfy excess demand
- Large beer company
 - Bottles for special/seasonal beers
- Cookie manufacturer
 - Different varieties produced in different countries
 - Occasionally exported by Belgian parent (special export certificate)

Explanations of Carry-Along Trade

- Pure Intermediaries
- Parts/Inputs
- Complementary Products
- Branded Products
- Bundling (market power)

CAT and Firm Characteristics

- What types of firms do CAT?

Characteristics of Regular and CAT Exporters

Table 10

	<i>Regular Exporters</i>	<i>CAT Exporters</i>	<i>Mixed CAT Exporters</i>
Employment	34	136	220
Produced Sales	8,068,190	32,550,698	66,924,530
All Exports	2,832,827	22,824,574	59,065,974
Exports of Regular Products	2,832,827	11,250,939	22,607,751
Exports of CAT Products	-	11,573,635	36,458,224
ln(TFP)	0.64	0.74	0.75
ln(VA/worker)	10.92	11.06	11.10
# of Firms	336	3,563	722

- CAT exporters are larger, more productive than regular exporters
- Exporters of mixed CAT products are the largest CAT exporters

Characteristics of Regular and CAT Exporters

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	<i>Regular Exporters</i>	<i>CAT Exporters</i>	<i>Mixed CAT Exporters</i>
Multinational	0.04	0.15	0.25
Foreign Ownership	0.04	0.14	0.23
# Regular products	1.32	1.56	3.23
# Mixed CAT products	-	0.45	2.21
# Pure CAT products	-	12.31	19.05
# destinations Regular products	4.95	9.29	14.46
# destinations Mixed CAT prods	-	3.64	17.98
# destinations Pure CAT products	-	10.10	14.64
# destinations Exported products	4.95	15.97	27.17
# of Firms	336	3,563	722

- CAT exporters are more likely to have foreign affiliates, have foreign ownership, and reach more destinations with more products.

Firm Productivity (TFP); Carry-Along Trade and the Margins of Trade

- How does CAT vary with firm productivity?
 - Do regular exports and Pure CAT exports respond differently
 - Total value of exports of firm
 - # destination countries
 - # products per country
 - Average value of exports per product-country

Firm Productivity (TFP); Carry-Along Trade and the Margins of Trade

$$x_f = c_f p_f \frac{o_f}{c_f p_f} \left(\frac{1}{o_f} \sum_p \sum_c x_{fpc} \right)$$

- Decompose exports of firm f , x_f , into four components

- c_f number of unique firms
- p_f number of unique products
- d_f “density” of trade
- $\text{avg}x_f$ mean value per observation

} Extensive Margins
 } Intensive Margin

where

$$d_f = \text{observations}_c / (\text{possible country-product pairs}_f) = o_f / (c_f p_f)$$

$$\text{avg}x_f = x_f / o_f$$

note: $p_f d_f = o_c / c_f = \text{products/country}$

Firm Productivity (TFP); Carry-Along Trade and the Margins of Trade

$$x_f = c_f p_f \frac{o_f}{c_f p_f} \left(\frac{1}{o_f} \sum_p \sum_c x_{fpc} \right)$$

$$\ln Z_f = \alpha + \beta \ln \text{productivity}_f + \varepsilon_f$$

Firm Productivity (TFP); Carry-Along Trade and the Margins of Trade

Table 11

Regular Exports						
	$\ln(value_f)$	$\ln(\# countries_f)$	$\ln(\# products_f)$	$\ln(density_f)$	$\ln(average value_f)$	$\ln(value_{fpc})$
$\ln(TFP_f)$	0.196***	0.068**	0.026***	-0.015***	0.117***	0.074
Fixed effects	Industry	Industry	Industry	Industry	Industry	Product-country
Clustering	no	no	no	No	no	firm
Observations	2,581	2,581	2,581	2,581	2,581	50,965
R-squared	0.194	0.233	0.189	0.150	0.192	0.667
Pure CAT Exports						
	$\ln(value_f)$	$\ln(\# countries_f)$	$\ln(\# products_f)$	$\ln(density_f)$	$\ln(average value_f)$	$\ln(value_{fpc})$
$\ln(TFP_f)$	0.302***	0.160***	0.147***	-0.098***	0.094*	0.172***
Fixed effects	Industry	Industry	Industry	Industry	Industry	Product-country
Clustering	no	no	no	no	no	firm
Observations	3,322	3,322	3,322	3,322	3,322	129,971
R-squared	0.125	0.175	0.167	0.191	0.122	0.512

Firm Productivity (TFP); Carry-Along Trade and the Margins of Trade

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Firm Productivity (TFP); Carry-Along Trade and the Margins of Trade

- In the cross-section as firm productivity rises
 - The value of pure CAT exports and regular exports both increase
 - CAT exports increase more due to extensive margin effects
 - # of countries
 - # products per country

Gravity, Carry-Along Trade and the Margins of Trade

- How does CAT respond to trade costs (distance) and market size (GDP) in a simple gravity regression?
 - Do regular exports and Pure CAT exports respond differently
 - Total value of exports to country c
 - # firms exporting
 - # products per firm
 - Average value of exports per firm-product

Gravity, Carry-Along Trade and the Margins of Trade

- Use a “gravity” specification to examine how the margins of trade vary with trade costs (distance) in a cross-section of countries

$$x_c = f_c p_c \frac{o_c}{f_c p_c} \left(\frac{1}{o_c} \sum_p \sum_f x_{cpf} \right)$$

- Decompose exports (from Prodcos firms) to country c , x_c , into four components

- f_c number of unique firms
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- d_c “density” of trade
- $\text{avg}x_c$ mean value per observation

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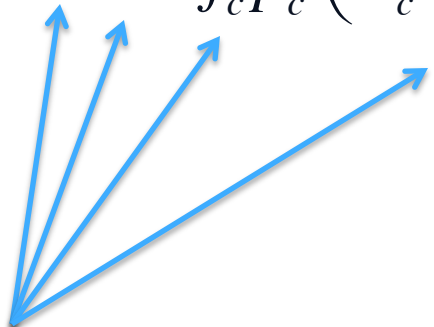
$$d_c = \text{observations}_c / (\text{possible firm-product pairs}_c) = o_c / (f_c p_c)$$

$$\text{avg}x_c = x_c / o_c$$

note: $p_c d_c = o_c / f_c = \text{products/firm}$

Gravity, Carry-Along Trade and the Margins of Trade

$$x_c = f_c p_c \frac{o_c}{f_c p_c} \left(\frac{1}{o_c} \sum_p \sum_f x_{cpf} \right)$$


$$\ln Z_c = \gamma + \delta \ln \text{distance}_c + \lambda \ln \text{GDP}_c + \varepsilon_c$$

Gravity, Carry-Along Trade and the Margins of Trade

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Regular Exports						
	$\ln(value_c)$	$\ln(\# firms_c)$	$\ln(\# products_c)$	$\ln(Density_c)$	$\ln(average value_c)$	$\ln(Value_{fpc})$
$\ln(Distance_c)$	-0.839***	-0.665***	-0.596***	0.542***	-0.119**	-0.470***
$\ln(GDP_c)$	0.975***	0.580***	0.568***	-0.532***	0.359***	0.458***
Fixed effects	none	none	none	none	none	firm-product
Observations	176	176	176	176	176	51,470
R-squared	0.870	0.860	0.843	0.841	0.537	0.532
Pure CAT Exports						
	$\ln(value_c)$	$\ln(\# firms_c)$	$\ln(\# products_c)$	$\ln(Density_c)$	$\ln(average value_c)$	$\ln(Value_{fpc})$
$\ln(Distance_c)$	-1.032***	-0.673***	-0.689***	0.497***	-0.164***	-0.250***
$\ln(GDP_c)$	1.051***	0.621***	0.641***	-0.546***	0.335***	0.328***
Fixed effects	none	none	none	none	none	firm-product
Observations	174	174	174	174	174	134,976
R-squared	0.854	0.852	0.825	0.805	0.520	0.692

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Gravity, Carry-Along Trade and the Margins of Trade

- Pure CAT exports are more sensitive to market size and trade costs
 - Result is driven by the extensive margins, particularly, *products per firm*

Conclusions: Carry- Along Trade

- Most manufacturing firms export products they do not produce – Carry-Along Trade
- Widespread activity across firms and products
- Large fraction of exports by manufacturing firms
- The largest, most productive firms are the most likely to engage in Carry-Along Trade

Conclusions: Carry- Along Trade

- CAT exports are different from regular exports
- CAT exports
 - Increase more as firm productivity rises
 - Respond more to market size and trade costs