

Do Rules of Origin Hurt Third Countries?

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WTO Trade Dialogues Lecture Series,
Geneva, 31 January 2018

Motivation

- Two important trends in international trade in recent decades:
 - Emergence of **global value chains** (GVCs) 

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- **GVCs** are actually **regional**: trade in intermediates is concentrated within “Factory North America, Factory Europe, and Factory Asia” (Baldwin, 2013)
- **FTAs** can **distort sourcing decisions** through two channels:
 - **Lower tariffs** when importing from FTA partners
 - **Rules of Origin** (RoO)

Some information about RoO

- Preferential RoO define the **conditions that products must satisfy to obtain preferential tariff treatment**, to avoid that products from non-FTA members are transhipped from low-tariff to high-tariff FTA partners.

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- Defining the origin of a good is difficult in a world with GVCs: between the “conception” of a product and its “delivery” to the final consumer, there is a wide range of activities often involving intermediates from different countries.
- Two main types of rules:

Value-added requirements

At least $X\%$ of the the value of the final good must be “domestic” VA

Change of tariff classification

Some inputs cannot be sourced (at all) from outside the FTA

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- In a large survey by the ITC (2015), RoO emerge as the **most problematic non-tariff measure** faced by manufacturing firms.

Conconi, García-Santana, Puccio and Venturini (AER, 2018)

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- Identifying the **causal effect** of RoO

- We focus on the effects of NAFTA RoO on Mexican imports from third countries (NAFTA RoO were to a large extent inherited from CUSFTA)
 - We employ a triple-difference approach, exploiting cross-product and cross-country variation in RoO treatment over time
 - As a robustness check, we use CUSFTA RoO as an instrument

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- On average, **Mexican imports of treated goods** from third countries relative to NAFTA partners **would have been 45% higher** with no RoO.
- Our results challenge those by Caliendo and Parro (2015): abstracting from RoO, they find that “the rest of the world was hardly affected by NAFTA.”

Related literature

- **Empirical studies** on the effects of FTAs abstract from RoO (e.g. Kehoe and Ruhl, 2013, Caliendo and Parro, 2015).
- **Theoretical studies** emphasize that RoO can distort trade in intermediaries (e.g. Grossman, 1981; Falvey and Reed, 2002).
- Direct evidence of this effect has been lacking, due to the **legal complexity of the rules**, which makes measurement difficult.
- To measure the restrictiveness of RoO, previous studies use **synthetic indices** (e.g. Estevadeordal, 2000; Cadot *et al*, 2006).
- This is the first paper to map the **input-output linkages** embedded in RoO and examine how they affect trade in intermediaries.

Outline of the talk

1 Introduction

2 **Brief history of NAFTA**

3 Construction of the dataset on NAFTA RoO

4 Empirical methodology and results

5 Next steps and conclusions

Brief history of NAFTA

- 1988: Canada and US signed Canada-US Free Trade Agreement.
- 1990: Mexico approached the US to form a free trade agreement.
- 1991: Canada joined the negotiations, with the goal of creating one free trade area in North America.
- 1994: entry into force of NAFTA. Around 50% of tariffs eliminated upon entry; most other tariffs phased out within 10 years.

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Construction of dataset on NAFTA RoO

- Four steps to codify sourcing restrictions in NAFTA RoO:

- 1 NAFTA RoO in Annex 401

- 2 Coding Annex 401

- 3 Mapping input-output linkages in NAFTA RoO

- 4 Construction of RoO variables

Step 1: Annex 401

- **NAFTA RoO on textile fabric HS 6203.42 (men's or boys' trousers):**
“change[s] to subheadings 6203.41 through 6203.49 from any other chapter, except from headings 5106 through 5113, 5204 through 5212, 5307 through 5308 or 5310 through 5311, chapter 54, or heading 5508 through 5516, 5801 through 5802 or 6001 through 6002.”

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- **Additional requirements** (from “except from headings 5106” to the end): any input falling into the listed tariff items must be sourced within NAFTA (e.g. 5106 through 5113: yarn or fabrics of wool).
- In some cases, alternative or complementary **value added rules** are used, but only in combination with change of classification rules.

Step 2: Coding Annex 401

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Figure 1: RoO on HS 6203.42

Output	Rule Type	Alternative VA	Complementary VA	Main Input Req	AdReq 1	AdReq 2	AdReq 3
62.03.41-62.03.49	CC	0	0	chapter 62	51.06-51.13	52.04-52.12	53.07-53.08
62.04.11-62.04.13	CC	0	0	chapter 62	51.06-51.13	52.04-52.12	53.07-53.08

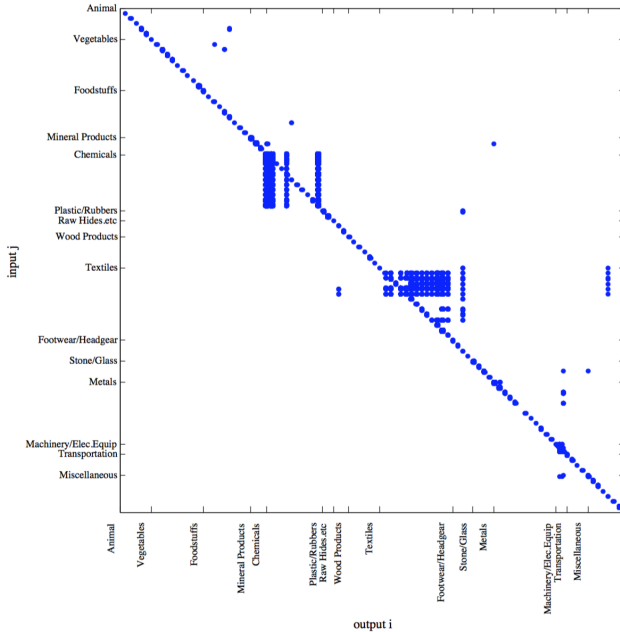
Step 3: Mapping output-input linkages in NAFTA RoO

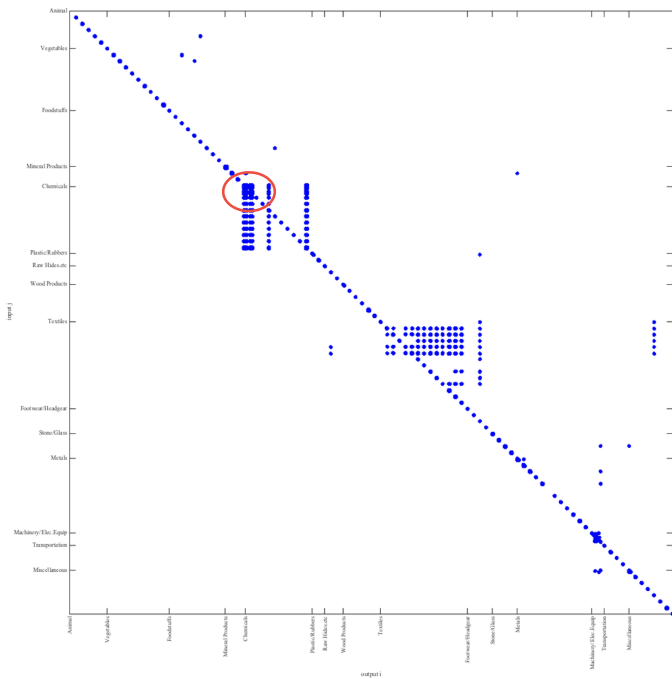
output	input
620342	550810
620342	550820
620342	550911
620342	550912
620342	550921
620342	550922
620342	550931
620342	550932
620342	550941
620342	550942
620342	550951
620342	550952
620342	550953
620342	550959
620342	550961
620342	550962
620342	550969
620342	550991
620342	550992

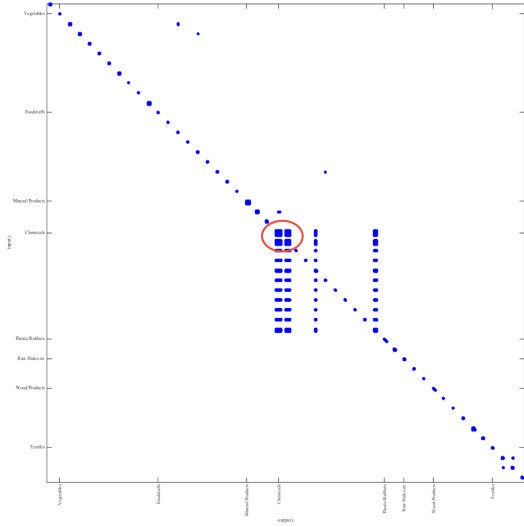
Step 4: Constructing RoO variables

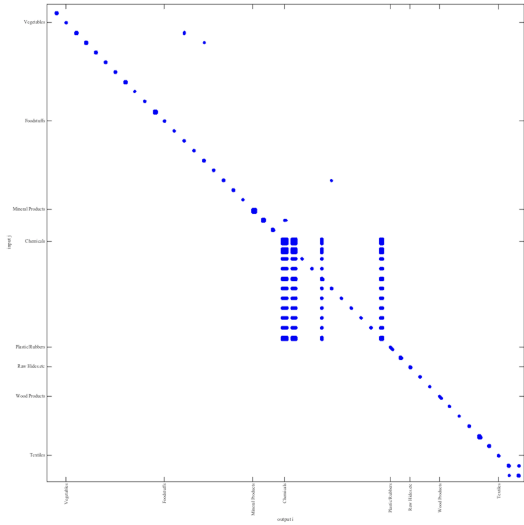
input	output
550810	620342
550810	620343
550810	620349
550810	620411
550810	620412
550810	620413
550810	620419
550810	620421
550810	620422
550810	620423
550810	620429
550810	620431
550810	620432
550810	620433
550810	620439
550810	620441
550810	620442

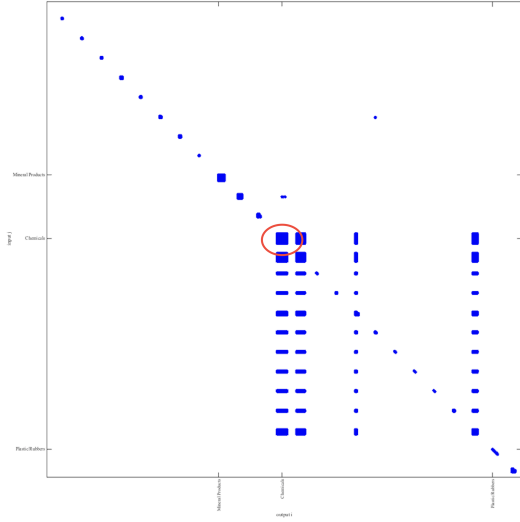
- RoO_{ij} : dummy equal to 1 is RoO on final good i restricts sourcing of j .

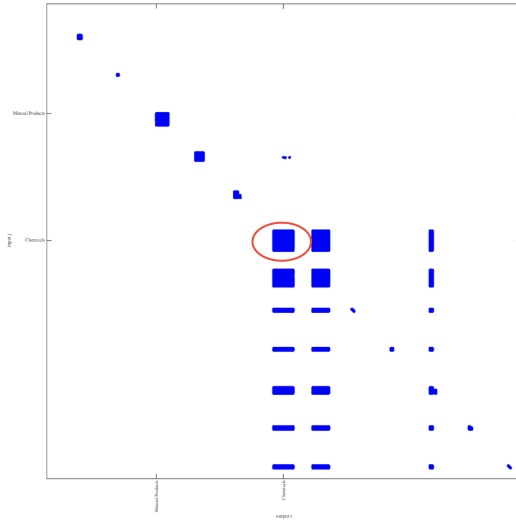
NAFTA Rules of Origin (RoO_{ij})

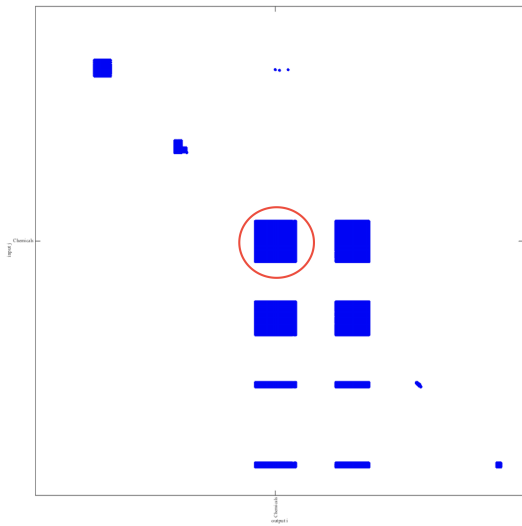


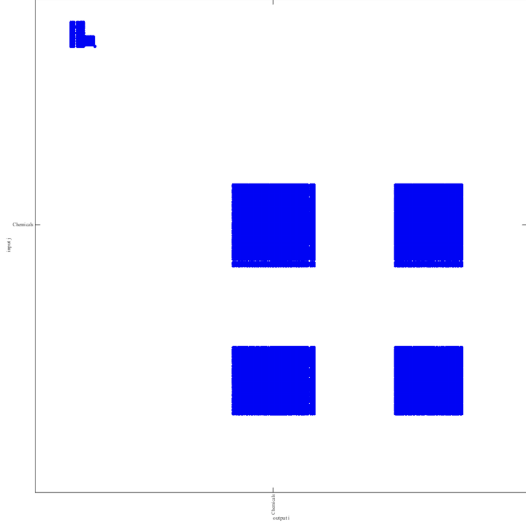


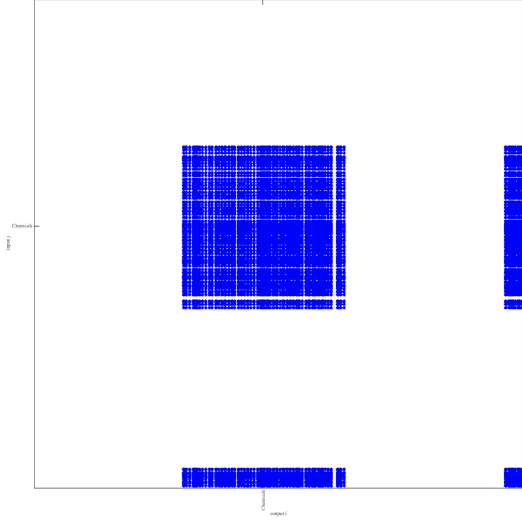


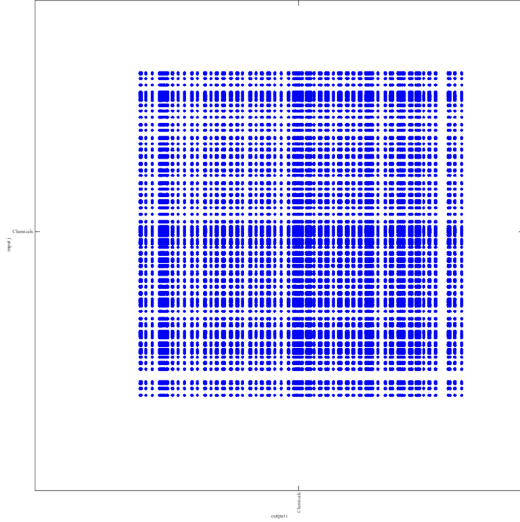


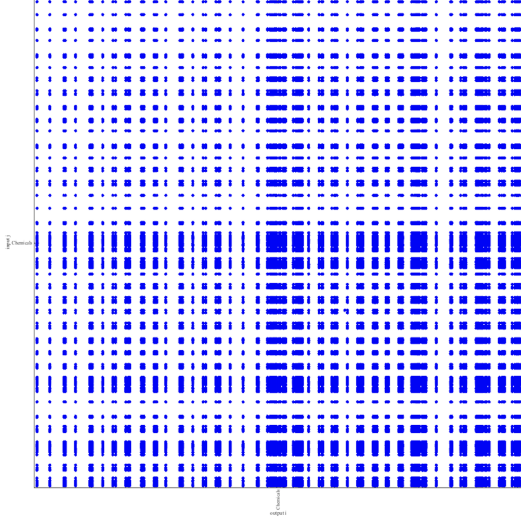


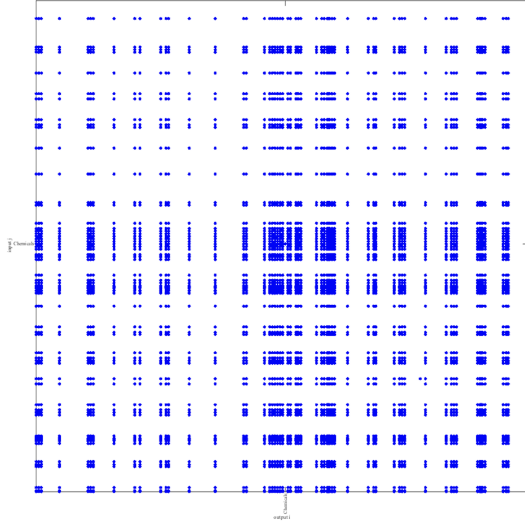


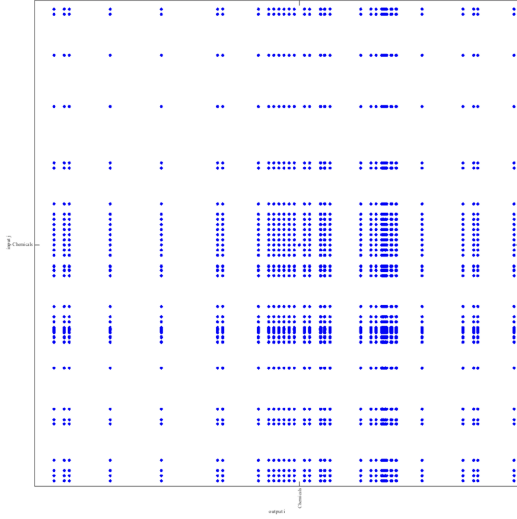


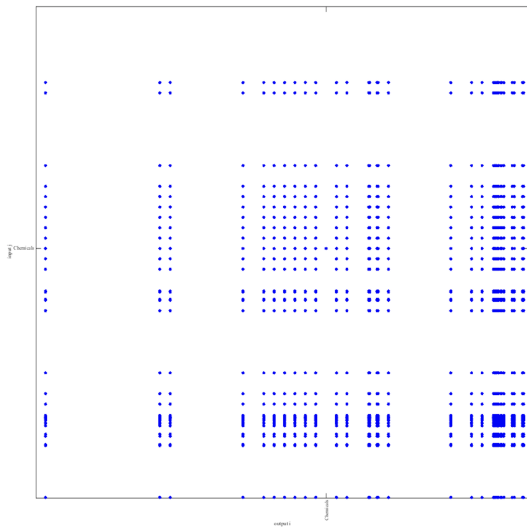


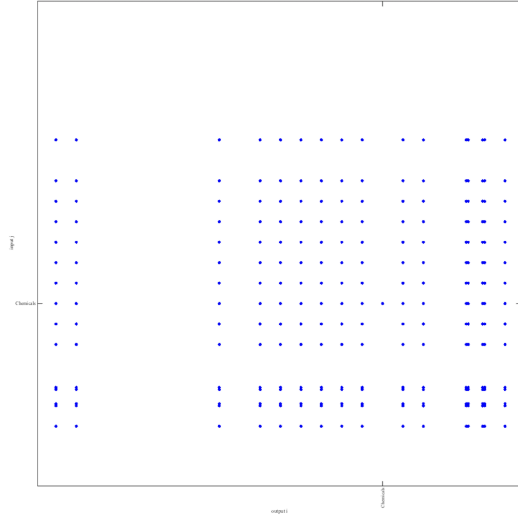


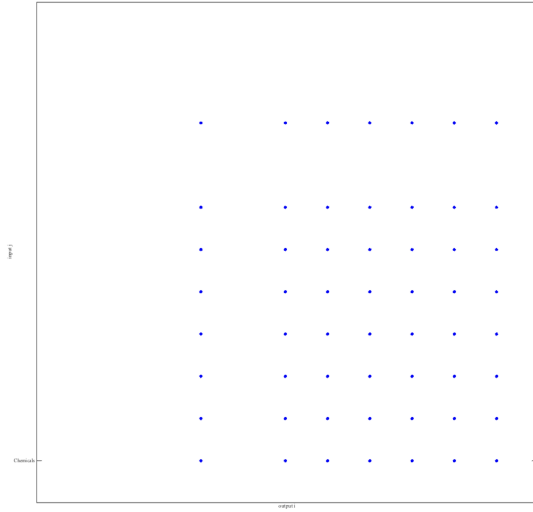


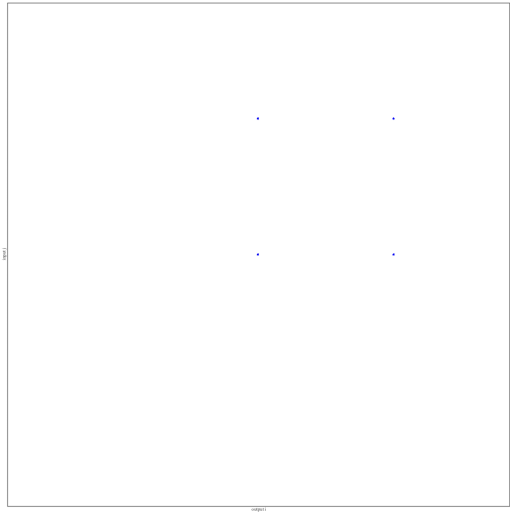












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- $x = 1$: all final goods i with sourcing restrictions on j
- $x = 2$ excludes final goods i with zero preference margin
- $x = 3$ further excludes final goods i with alternative VA rules

Input-output linkages

- RoO should only have an impact if they apply to vertically-related goods, i.e. if j is actually an input in the production of i . [▶ example](#)

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- We have converted Input-Output tables into HS classification. [▶ conversion](#)
- Percentage of rules RoO_{ij} that apply to vertically-related goods:
 - Rules written at 2 digits (chapter): around 50% of the cases
 - Rules written at 4 digits (heading): around 68% of the cases
 - Rules written at 6 digits (sub-heading): around 96% of the cases
- We use IO coefficients to eliminate rules not applying to vertically-related goods.

Table 1
Descriptive statistics on NAFTA RoO

HS	Panel A: RoO _i ¹					Panel B: RoO _i ²					Panel C: RoO _i ³				
	mean	st. dev	min	max	percent.	mean	st. dev	min	max	percent.	mean	st. dev	min	max	percent.
01-05: Animal Products	57.69	28.78	15.00	87.00	100.00	18.11	5.81	5.00	24.00	100.00	18.11	5.81	5.00	24.00	100.00
06-15: Vegetables	40.15	14.57	0.00	57.00	99.37	23.65	12.32	0.00	43.00	99.37	23.65	12.32	0.00	43.00	99.37
16-24: Foodstuffs	23.73	12.79	0.00	44.00	99.44	18.60	12.17	0.00	37.00	99.44	18.60	12.17	0.00	37.00	99.44
25-27: Mineral Products	54.36	21.06	0.00	74.00	98.82	13.64	10.76	0.00	32.00	98.82	13.64	10.76	0.00	32.00	98.82
28-38: Chemicals	559.02	30.26	0.00	591.00	99.73	449.82	24.38	0.00	483.00	99.73	2.00	6.17	0.00	33.00	48.74
39-40: Plastics/Rubbers	21.39	9.40	9.00	34.00	100.00	18.82	9.49	4.00	30.00	100.00	18.82	9.49	4.00	30.00	100.00
41-43: Raw Hides. Skins. Leathers	21.39	9.40	9.00	34.00	100.00	18.82	9.49	4.00	30.00	100.00	18.82	9.49	4.00	30.00	100.00
44-49: Wood Products	39.04	32.81	0.00	93.00	99.11	28.26	28.50	0.00	77.00	81.33	28.26	28.50	0.00	77.00	81.33
50-63: Textiles	280.21	241.03	4.00	722.00	100.00	276.66	238.99	1.00	715.00	100.00	276.66	238.99	1.00	715.00	100.00
64-67: Footwear/Headgear	37.38	9.85	0.00	57.00	99.47	27.57	12.08	0.00	52.00	99.47	27.57	12.08	0.00	52.00	99.47
68-71: Stone/Glass	37.38	9.85	0.00	57.00	99.47	27.57	12.08	0.00	52.00	99.47	27.57	12.08	0.00	52.00	99.47
72-83: Metals	40.30	26.06	0.00	96.00	93.97	33.53	22.80	0.00	81.00	92.41	33.32	23.00	0.00	81.00	92.41
84-85: Machinery/Electrical	9.54	6.69	1.00	22.00	100.00	8.30	5.93	0.00	20.00	90.91	6.83	5.62	0.00	20.00	90.91
86-89: Transportation	9.54	6.69	1.00	22.00	100.00	8.30	5.93	0.00	20.00	90.91	6.83	5.62	0.00	20.00	90.91
90-97: Miscellaneous	20.00	14.37	0.00	44.00	99.48	15.63	11.67	0.00	41.00	99.48	14.02	12.28	0.00	41.00	99.48
All sector categories	148.89	218.93	0.00	722.00	98.92	124.87	192.10	0.00	715.00	95.13	57.25	136.85	0.00	715.00	86.54
Total number of RoO			746,393					625,967					287,016		

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Table 2
Descriptive statistics on imports and tariffs

HS Code	Description	Panel A		Panel B			Panel C	
		Mexican imports		Mexican tariffs			US and Canadian tariffs	
		1991	2003	MFN 1991	MFN 2003	NAFTA 2003	MFN 2003	NAFTA 2003
01-05	Animal Products	105.01	396.70	13.91	32.70	1.22	2.11	0.23
06-15	Vegetables	163.74	245.05	12.46	18.21	0.00	3.35	0.02
16-24	Foodstuffs	81.74	133.05	17.06	25.84	0.11	8.74	0.51
25-27	Mineral Products	122.19	718.77	9.34	11.67	0.00	0.44	0.01
28-38	Chemicals	166.60	1194.19	11.21	12.56	0.01	2.67	0.00
39-40	Plastic/Rubbers	164.09	1365.55	13.46	16.31	0.00	3.71	0.00
41-43	Raw Hides,Skins,Leathers	22.95	222.964	13.05	20.82	0.00	3.95	0.00
44-49	Wood Products	39.23	359.85	11.80	15.70	0.00	0.65	0.00
50-63	Textiles	325.96	1468.04	16.78	24.47	0.00	10.21	0.00
64-67	Footwear/Headgear	82.53	260.92	19.17	29.85	0.00	9.28	0.48
68-71	Stone/Glass	39.36	525.58	15.65	18.47	0.00	2.85	0.14
72-83	Metals	192.86	1585.28	12.65	16.83	0.00	2.01	0.00
84-85	Machinery/Electrical	1224.04	21999.53	13.61	13.25	0.00	1.55	0.00
86-89	Transportation	135.93	1444.66	14.28	18.38	0.00	4.28	0.00
90-97	Miscellaneous	324.50	1839.53	15.05	18.44	0.00	2.76	0.01

Table 2
Descriptive statistics on imports and tariffs

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- 1 Introduction
- 2 Brief history of NAFTA
- 3 Construction of the dataset on NAFTA RoO
- 4 **Empirical methodology and results**
- 5 Next step and conclusions

Identifying the trade diverting effect of NAFTA RoO

- We examine changes in Mexican imports between 1991 and 2003.
- We use a triple-difference approach, comparing the growth rate of Mexican imports of “treated” intermediate goods from “treated” countries (outside NAFTA) and “non-treated” countries (NAFTA partners).

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$$\Delta Imports_{j, non-NAFTAo} - \Delta Imports_{j, NAFTA} = \alpha_0 + \alpha_1 RoO_j^x + \alpha_2 \Delta Preferential Tariff_j + \delta_o + \epsilon_{j, NAFTAo, NAFTA} \quad (1)$$

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which can be written as the difference between the following two equations:

$$\Delta Imports_{j,non-NAFTAo} = \beta_0 + \beta_1 RoO_j^x + \beta_2 \Delta Preferential Tariff_j + X_j + \delta_o + \epsilon_{j,non-NAFTAo} \quad (2)$$

$$\Delta Imports_{j,NAFTA} = \gamma_0 + \gamma_1 RoO_j^x + \gamma_2 \Delta Preferential Tariff_j + X_j + \epsilon_{j,NAFTA} \quad (3)$$

- We first consider all rules contained in the NAFTA Agreement

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Table 3

NAFTA RoO and change in Mexican imports, triple-difference results
(all rules)

	(1)	(2)	(3)
RoO_j^1	-0.114** (0.054)		
RoO_j^2		-0.117** (0.052)	
RoO_j^3			-0.161*** (0.047)
$\Delta Preferential\ Tariff_j$	-0.279* (0.151)	-0.254* (0.149)	-0.150 (0.138)
Country of origin FE	Yes	Yes	Yes
Observations	28,053	28,053	28,053
R-squared	0.150	0.150	0.153

- Similar results when excluding rules that do not apply to vertically related goods

Table 4

NAFTA RoO and change in Mexican imports, triple-difference results
(excluding rules for which $dr_{i,j} = 0$)

	(1)	(2)	(3)
RoO_j^1	-0.116** (0.051)		
RoO_j^2		-0.120** (0.049)	
RoO_j^3			-0.170*** (0.045)
$\Delta Preferential\ Tariff_j$	-0.276* (0.152)	-0.254* (0.150)	-0.151 (0.140)
Country of origin FE	Yes	Yes	Yes
Observations	28,053	28,053	28,053
R-squared	0.151	0.151	0.155

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Table 5

NAFTA RoO and change in Mexican imports, triple-difference results
(comparison between different types of rules)

	(1)	(2)
<i>RoO Placebo_j ($RoO_j^1 - RoO_j^2$)</i>	-0.019 (0.043)	-0.004 (0.039)
<i>RoO Flexible_j ($RoO_j^2 - RoO_j^3$)</i>	0.002 (0.041)	-0.005 (0.042)
<i>RoO Strict_j (RoO_j^3)</i>	-0.164*** (0.047)	-0.171*** (0.044)
<i>ΔPreferential Tariff_j</i>	-0.157 (0.138)	-0.153 (0.140)
Country of origin FE	Yes	Yes
N	28,053	28,053
R ²	0.153	0.155

- The impact of RoO is driven by rules that are both **relevant** (the preference margin on good i is positive) and **strict** (there is no alternative VA rule).

How large was the trade diverting effect of NAFTA RoO?

Table 6
Quantification of the effect of RoO

	(1)	(2)
$\hat{\beta}_1$	-0.161	-0.170
Mean RoO_j^3	3.004	2.842
$\Delta Imports_j$	1.094	1.067
Effect of RoO_j^3 (in log points)	-48.364	-48.314
Effect of RoO_j^3 (as % of $\Delta Imports_j$)	44.209%	45.280%

NAFTA RoO decreased the growth rate of Mexican imports from third countries relative to NAFTA partners by around 50 log points, representing around 45% of the average actual change in imports of treated goods.

- **The negative impact** of NAFTA sourcing restrictions was larger when Mexican producers had **stronger incentives to comply**, i.e. larger preference margin on the final good and greater importance of North American export market.

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- NAFTA RoO reduced the growth rate of imports from non-members relative to members
 - by 142 log points for goods falling in the 90th percentile of *Average Margin NAFTA_j*
 - by 159 log points for goods falling in the 90th percentile of *Exports NAFTA_j*

Additional robustness checks

- Different **start and end years**
- Use different methodologies to construct the **dependent variable**
- Use different methodologies to construct the **RoO treatment variables**
- Use **CUSFTA RoO** to instrument for NAFTA RoO
- ...

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- We have constructed a **unique dataset** mapping all input-output linkages embedded in NAFTA RoO.
- Our analysis allows us to identify the **negative impact of sourcing restrictions embedded in FTAs** on imports of intermediate goods from non-member countries.
- Input tariffs are low compared to tariffs on final goods (Miroudot *et al.*, 2009). Because of RoO, the **actual level of protection on intermediates** is much higher than what implied by input tariffs.

Policy implications

- Our analysis has important implications for

Multilateral trade rules 

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Brexit negotiations 

Avenue of future research

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Include preferential tariffs and RoO in a model of global sourcing à la Antràs *et al.* (2017) or in a framework that accounts for input-output linkages à la Caliendo and Parro (2015)

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 - **Productivity and welfare**

Include preferential tariffs and RoO in a model of global sourcing à la Antràs *et al.* (2017) or in a framework that accounts for input-output linkages à la Caliendo and Parro (2015)
 - **Foreign Direct Investment**

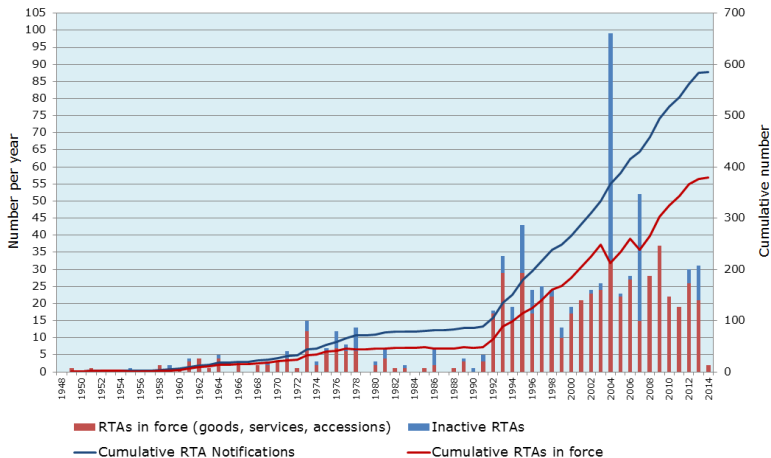
Study whether NAFTA sourcing restrictions led to “RoO-jumping” FDI, using disaggregated data on Mexican inward FDI

Thank you!

The emergence of Global Value Chains (GVCs)

- Advances in information and communication technology and falling trade barriers have led to the emergence of GVCs: different **stages of a production process** (e.g. R&D, design, production of parts, assembly, marketing and branding) are increasingly **fragmented across firms and countries**.
 - A Honda is made of 20,000 to 30,000 parts produced by hundreds of different plants and firms (Bartelme and Gorodnichenko, 2015)
 - iPhone's software and product design are done by Apple, most parts are produced by independent suppliers around the world (Xing, 2011)

Figure 2: Number of RTA notifications and RTA in force (source, WTO Secretariat)



NAFTA Rules of Origin

- Example of RoO: **watches** (HS 91.02) can only be traded duty free among members if **watch movements** (HS 91.08), **watch straps** (HS 91.13) **watch cases** (HS 91.12) used to produce them are sourced within NAFTA.

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- We construct a **new dataset on NAFTA RoO**: for every final good, we can trace all the inputs that are subject to RoO requirements; similarly, for every intermediate good, we can link it to all final goods that impose RoO requirements on its sourcing.

Do RoO apply to vertically related goods?

- In the case of HS 6203.42 (men's or boys' trousers)
 - Some of the restricted goods are likely to be inputs
 - HS 530810 (Coir Yarn)
 - HS 520419 (Cotton Sewing Thread)
 - Reasonable doubts about others ...
 - HS 620920 (Babies Garments and Clothing Accessories)
 - HS 590410 (Linoleum, floor coverings)

- Converting **Input-Output tables into HS classification**:
 - Match NAICS goods (I-O tables from BEA) with HS6 goods (RoO)
 - Problem! Each NAICS good may match into multiple HS6 goods.
 - Randomly pick one good to convert I-O table into HS6 classification.
 - Iterate procedure 1000 times.

Implications for multilateral trade rules

- Ongoing debate about the legality of RoO (e.g. Mavroidis and Vermulst, 2018)
- Paragraph 5 (b) of Article XXIV of the GATT:

The duties and other regulations of commerce maintained in each of the constituent territories and applicable at the formation of such free-trade area (...) shall not be higher or more restrictive than the corresponding duties and other regulations of commerce existing in the same constituent territories prior to the formation of the free trade area.

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- Our findings show that **RoO in FTAs may violate Article XXIV**, by substantially raising the level of protection faced by non-members.
- **Flexible RoO** are less likely to distort sourcing decisions and give rise to trade diversion in intermediates.

RoO in a UK-EU FTA

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 - Example from the car industry:

Over 70% of the cars Honda sells in Europe are produced in Swindon, with various inputs (e.g. computer chips, brakes) coming from Japan.

Honda may have to stop importing key inputs from Japan to qualify for origin and avoid tariffs when exporting to the EU. [▶ details](#)

This is a major concern for Japanese companies, who may decide to **relocate production within the EU customs union** to avoid RoO.

EU Common External Tariffs

Figure 3: MFN tariffs applied by the EU, by broad category of goods

Product category	Maximum tariff currently applied to certain products within specified category, %	Simple average tariff currently applied to all products within specified category, %
Textiles	12.2	6.6
Clothing	12.0	11.5
Leather, footwear	17.0	4.2
Non-electrical machinery	10.0	1.9
Electrical equipment	14.0	2.8
Transport equipment	22.0	4.3
Other manufacturing	14.0	2.7