The Long-Term Impact of Steel Tariffs on U.S. Manufacturing

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Econ 824: International Trade

Question and answer

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Cox (2026), pp. 1–4 and 31–33

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Data: steel inputs by industry, from 54,818 requests for exclusion from 2018 tariffs

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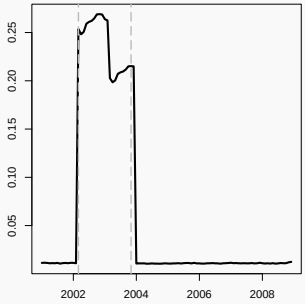
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Bush steel tariffs

A large tariff on steel, removed after almost two years

- Jun 2001: Section 201 probe, 33 steel categories

Import-weighted tariff rate



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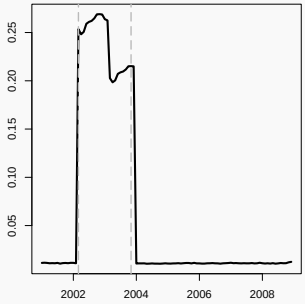
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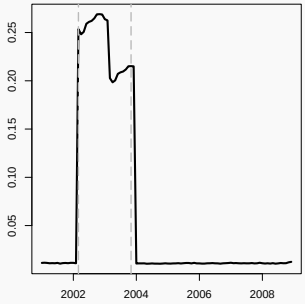
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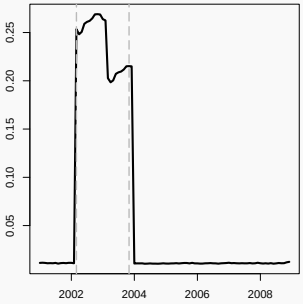
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- Steel users: 80 jobs per steel-making job

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Pass-through to steel users

Foreign suppliers did not cut prices, so U.S. steel users paid the tariff

	Unit value		Import	Import
	excl. tariff	incl. tariff	value	quantity
$\ln(1+\Delta\tau_{sj})$	-0.20	0.37	-3.08	-2.86
	(0.13)	(0.13)	(0.33)	(0.35)

Log change since 2001, HS10 steel product s from country j, 2002–03

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- Producer prices of protected steel rose relative to unprotected steel

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Roadmap

1. Setting: a large steel tariff, lifted after almost two years
2. Model: how a switching cost makes a temporary shock persist
3. Measurement: which downstream industries the tariff hit
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Model: one buyer, two suppliers

A switching cost can turn a temporary tariff into a permanent loss

- Each period a myopic buyer of good d picks H (U.S.) at p_H or F at $p_H + \varepsilon$, $\varepsilon > 0$
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Loss persists if $\varepsilon < \bar{\kappa} < \tau - \varepsilon$: tariff beats switching cost, which beats price gap

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Model predictions

Where losses should persist: new relationships, close competitors, costly switching

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$\bar{\kappa} = 0$: sharp drop, immediate rebound. Large $\bar{\kappa}$: smaller drop, no rebound.

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Cost shocks depend on each industry's steel product mix, absent from public tables

$$\Delta \text{Costs}_d := \underbrace{\ln\left(1 + \Delta\tau_d^{\text{Steel}}\right)}_{\text{tariff on } d\text{'s steel inputs}} \times \underbrace{\alpha_{d,\text{Steel}}^{\text{BEA}}}_{\text{steel share of } d\text{'s input costs}}$$

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- In 2018 tariffs were nearly uniform, so steel shares sufficed (Flaaen and Pierce, 2024)

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Steel-specific input-output table

Requests for exclusion from the 2018 tariffs reveal what each steel product is used for

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Saw blades (HS 8202): 10 inputs from 6 firms, 7 at the 30% tariff, 3 not covered $\Rightarrow$ $\Delta\tau_d^{\text{Steel}} = 25.6\%$

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VALIDATING THE COST SHOCK

The cost shock predicts higher material costs while the tariffs were in place

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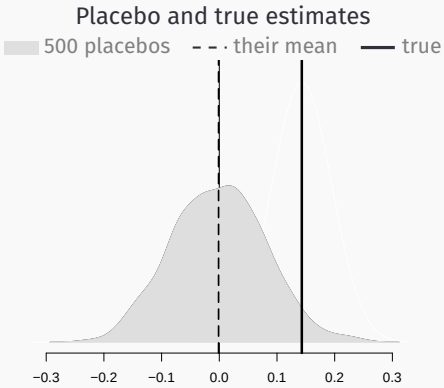
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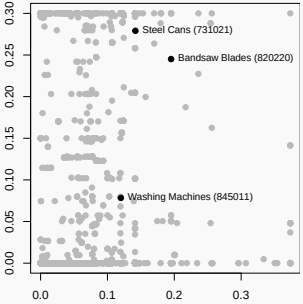


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WHY THE PRODUCT MIX MATTERS

Industries with similar steel shares faced very different tariffs

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one dot per HS6 industry



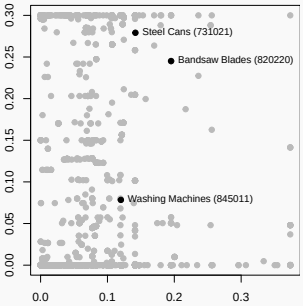
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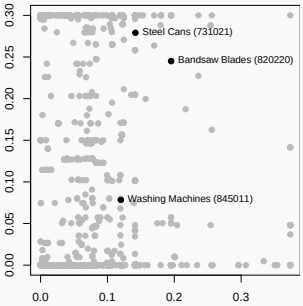
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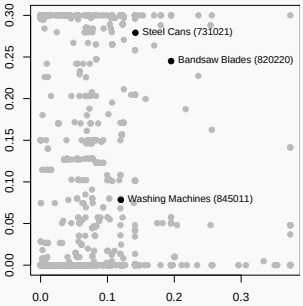
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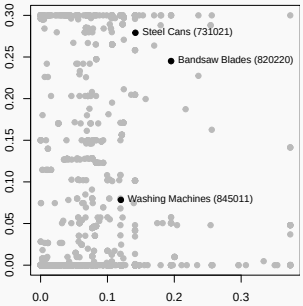
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- Steel share alone: no export loss [Figure]

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Specification

Local projections compare industries with larger and smaller cost shocks, year by year

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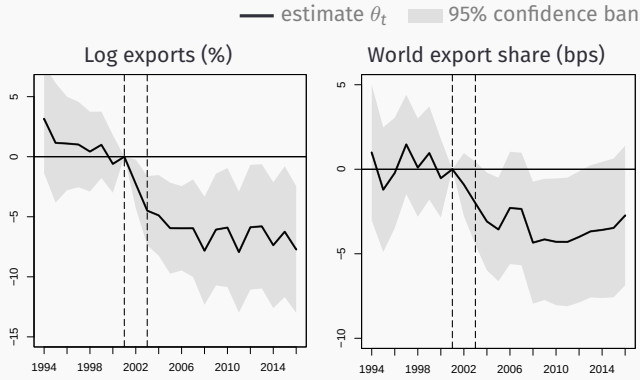
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Outcomes: exports and world share by HS6, employment and hours by NAICS6

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Exports and world share

Exposed industries lost exports and world share and did not recover after 2003

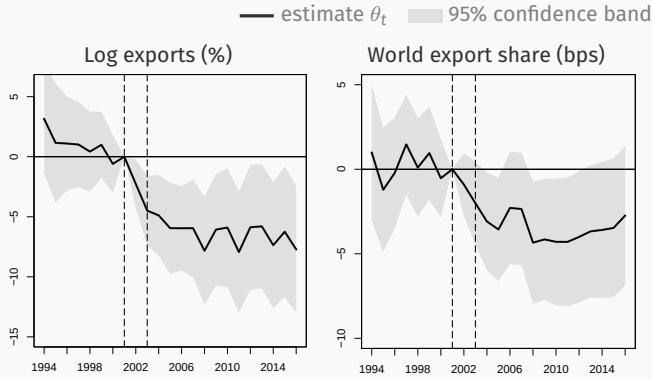


- Before 2002: no significant gap

Cox (2026), pp. 31–32, Figure 7. Responses per 1% cost shock. [Units of share figures]

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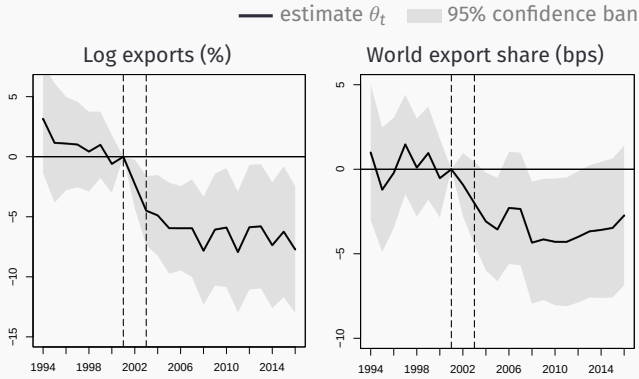


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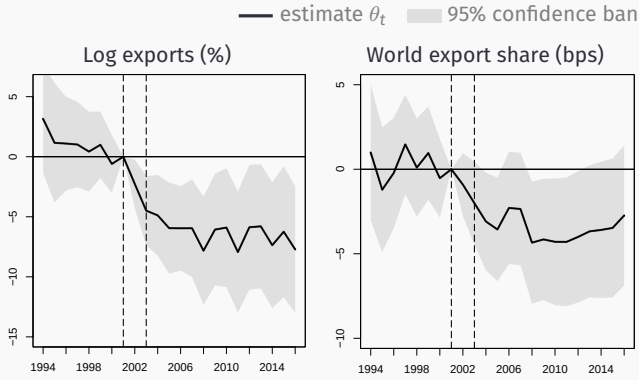


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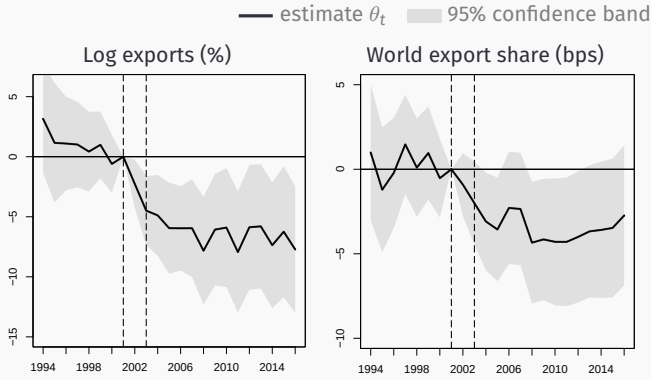


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Magnitudes

A 1% cost shock acts like a 2% tariff on U.S. exports

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Cox (2026), pp. 1–2 and 32–33, Table C1. Elasticities: Fajgelbaum et al. (2020), Handley et al. (2025)

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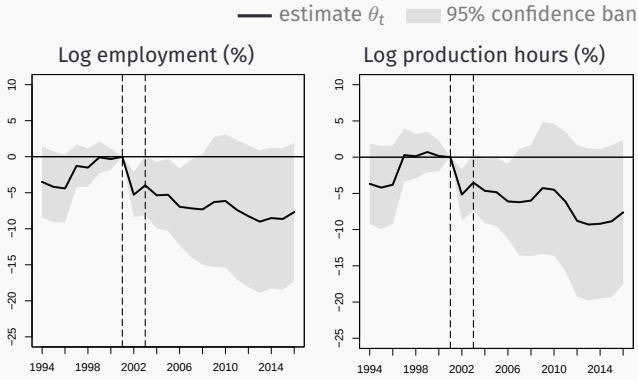
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- A 1% cost shock is large: at the mean steel share of 2.7%, it needs a 37-point steel tariff
- Sample mean of ΔCosts_d is 0.2%, maximum 9.8% [Statistics]

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Employment and hours

Employment and hours fell and stayed lower, with wide confidence bands

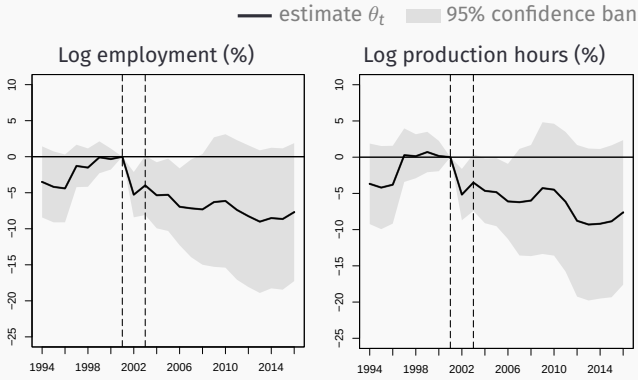


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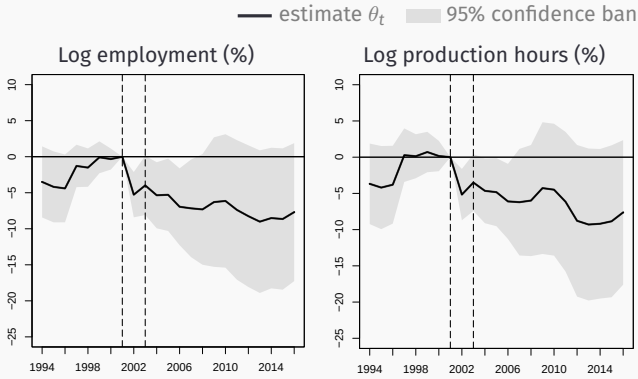


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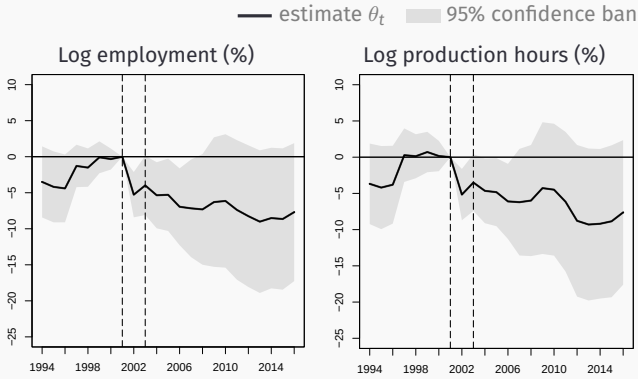


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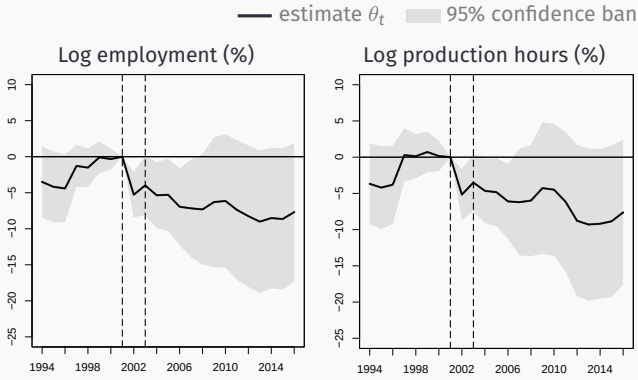


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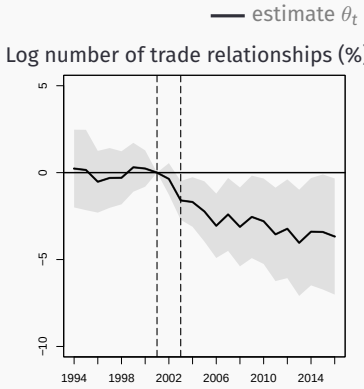


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Prediction 1: extensive margin

Exposed industries lost trade relationships and did not regain them

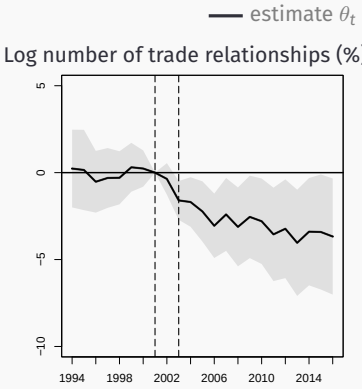


- **Trade relationship**: HS10 product × U.S. customs district × destination, e.g. golf carts from Savannah to Japan

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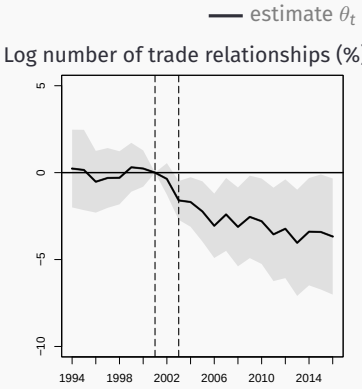


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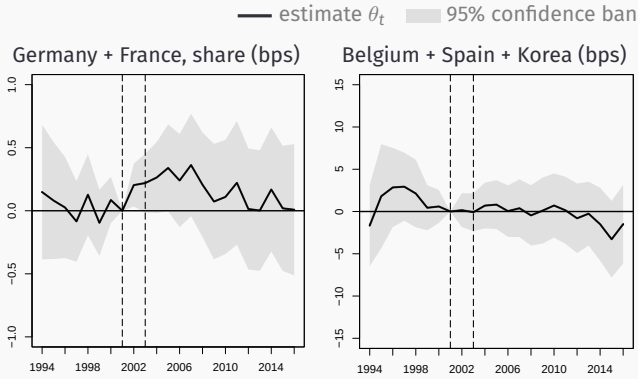


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Prediction 2: close competitors

Losses concentrate where the U.S. faced close competitors

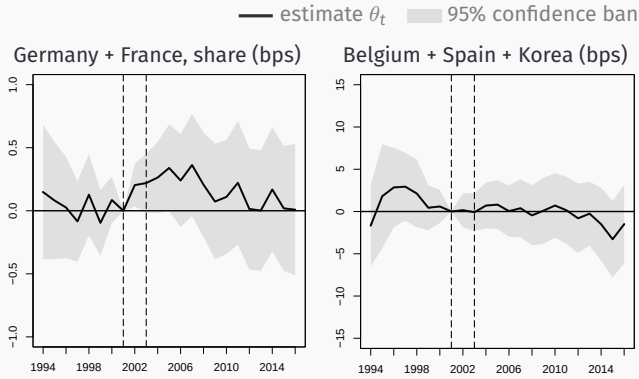


- Top exporters of exposed goods, 2001: Germany, U.S., Japan, France

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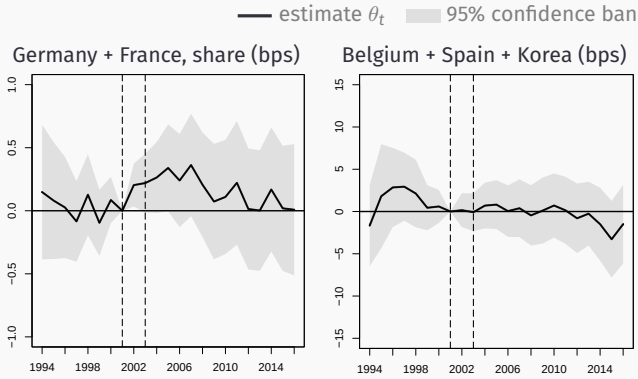


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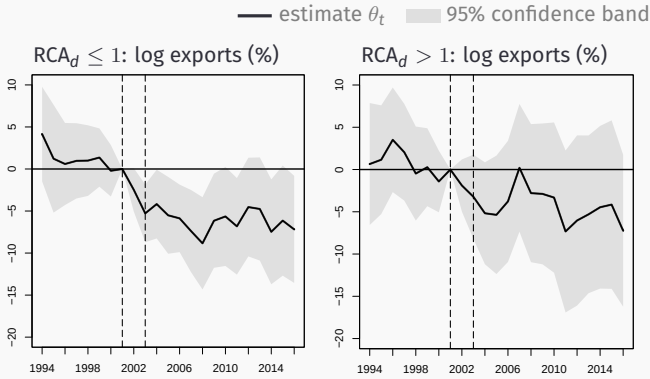


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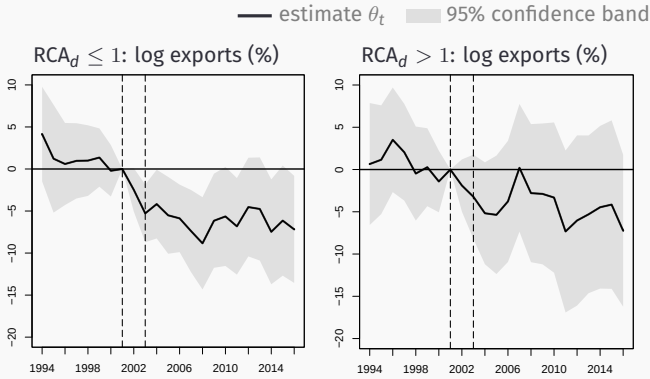


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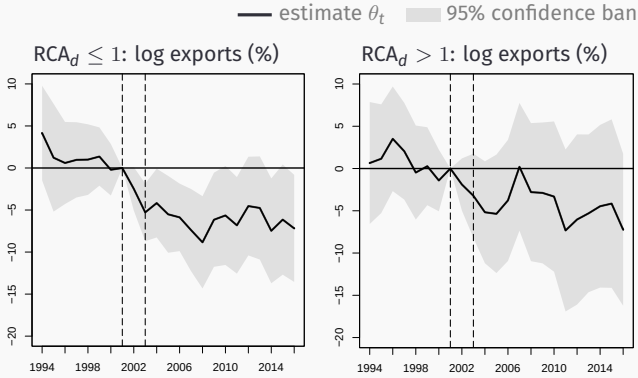


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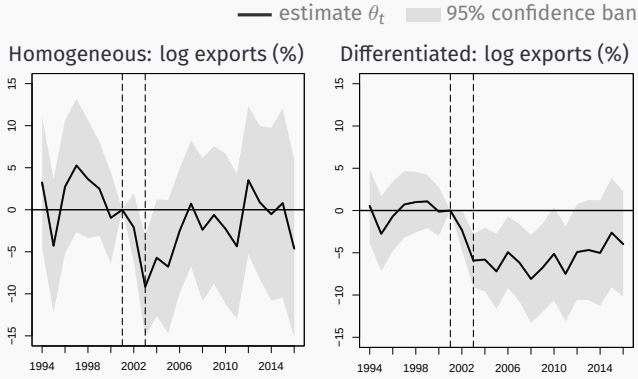


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Prediction 3: size of switching costs

Differentiated goods show a smaller drop and no rebound

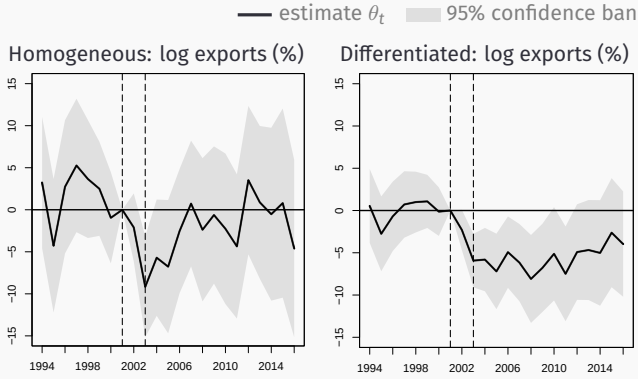


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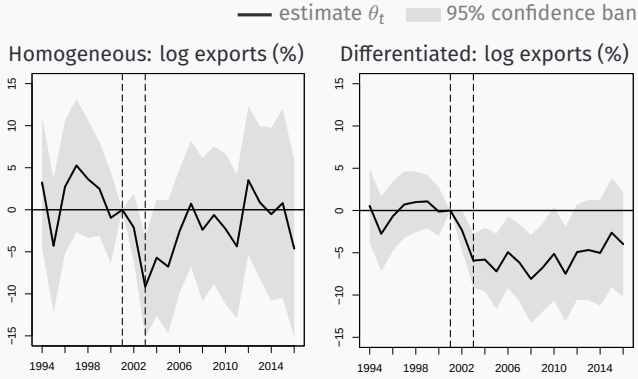


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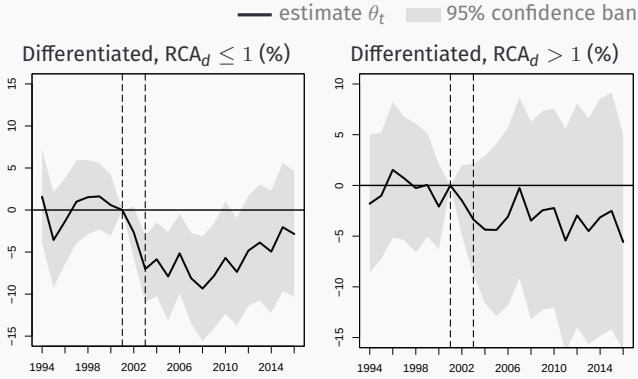


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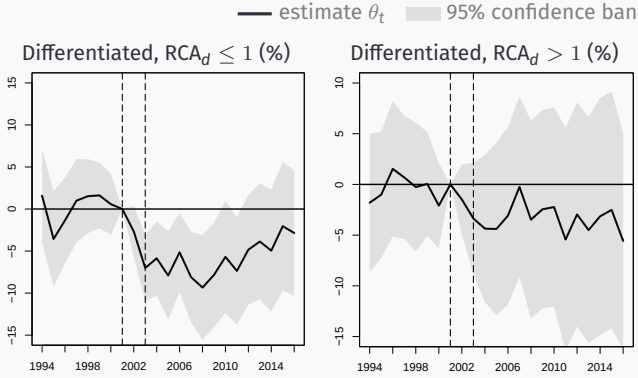


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Roadmap

1. Setting: a large steel tariff, lifted after almost two years
2. Model: how a switching cost makes a temporary shock persist
3. Measurement: which downstream industries the tariff hit
4. Evidence: lasting losses, and where they concentrate
5. Assessment: alternative explanations and limitations

Alternative explanations for the export loss

The export loss survives the main confounders

- **Steel users lobbied tariffs down**: Bush rates met or exceeded the ITC majority's recommendation for all categories but stainless bar

Cox (2026), pp. 25–31 and 51–59

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Mechanism: what remains open

Industry data cannot yet isolate buyer switching costs

- **Seller-side stories**: sunk export costs and exit of weak exporters, both cited in the paper, also give persistence and fewer relationships

Cox (2026), pp. 2 fn. 3, 31 fn. 29 and 34–41, Figures 7b, 10a, 11b and 12a

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2. **Untested contrasts**: splits compare significance levels. $\text{RCA}_d > 1$ still shows mostly -3 to -7%, homogeneous bands span ± 8 points
3. **Fading gains**: Germany and France gain most in 2005–07, while the U.S. share loss deepens until 2012
4. **Myopic buyer**: buyers who expected a three-year safeguard to end would switch less

Cox (2026), pp. 2 fn. 3, 31 fn. 29 and 34–41, Figures 7b, 10a, 11b and 12a

Contribution and limitations

A tariff that lasted under two years left export losses a decade later

Contribution

- Steel input mix by industry, built from public sources

Limitations

Cox (2026), pp. 2–5, 25–27 and 42, Table C1

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Lesson: price a temporary tariff by its permanent downstream effects

Cox (2026), pp. 2–5, 25–27 and 42, Table C1

Pass-through: full estimates

Imports fell at every level of aggregation, so substitution was partial

Level	Regressor	Unit value		Import	Import
		excl. tariff	incl. tariff	value	quantity
HS10 × country	$\ln(1+\Delta\tau_{sj})$	-0.20	0.37	-3.08	-2.86
		(0.13)	(0.13)	(0.33)	(0.35)
HS10	$\ln(1+\sum_j \omega_{sj}\Delta\tau_{sj})$	-0.03	0.25	-1.22	-1.22
		(0.13)	(0.14)	(0.33)	(0.39)
HS6	HS6 average			-1.04	
				(0.10)	
HS4	HS4 average			-0.63	
				(0.16)	

HS chapters 72–73, 2002–03. ω_{sj}: 2001 import shares. Whole HTS: import value -2.21 (0.20). [Back]

Steel mix vs. ITC survey

Constructed shares match the ITC survey for cans and parts, less well for vehicles and appliances

Share of steel use (%)	Plate	Hot rolled	Cold rolled	Corrosion resistant	Tin mill	Hot bar	Cold bar	Welded pipe	Stainless bar	Stainless wire	Other
Motor vehicle parts	1	5	8	15	0	16	2	7	6	1	40
ITC, 2002–03	1	6	7	8	1	25	1	1	0	1	50
Motor vehicles	0	3	56	40	0	0	0	2	0	0	0
ITC, 2002–03	0	21	16	72	0	1	0	0	0	0	0
Steel barrels and cans	0	0	14	17	68	0	0	0	0	0	1
ITC, 2002–03	0	0	8	0	83	0	0	0	0	0	9
Household appliances	0	0	14	58	0	0	1	0	0	1	25
ITC, 2002–03	0	2	47	33	1	0	1	0	0	0	17

ITC does not publish its category definitions, e.g. where stainless steel falls. [Back]

Cox (2026), pp. 18–20, Table 5. ITC: U.S. International Trade Commission (2003), Table D-1

Coverage of exclusion requests

Requests cover products worth 95% of 2001 imports of Bush-tariffed steel

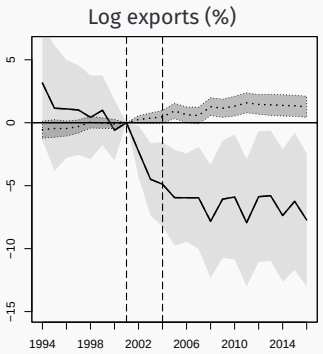
Category	HS8 products	Share of 2001 imports
Full BEA steel product set	273	100%
Excluded upstream steel inputs	5	0.5%
Products covered by 2018 steel tariffs	268	99.5%
Exclusion requests filed (HS8)	88%	96%
Covered at HS6	96%	98%
Covered at HS4	100%	100%
Products covered by Bush steel tariffs	161	–
Exclusion requests filed (HS8)	87%	95%
Covered at HS6	97%	99%
Covered at HS4	100%	100%

Covered at HS6 (HS4): another HS8 product in the same HS6 (HS4) has a request. [Back]

Cox (2026), pp. 25–26, Table 8

Exposure from steel shares alone

Steel shares alone show no export loss



- Regress exports on $\alpha^{\text{BEA}}_{d,\text{Steel}}$ and HTS Section $\times$ year effects only
- Steel share is not exogenous to industry outcomes, so this is a descriptive contrast
- Standard input-output exposure would have missed the export loss

[Back]

Cox (2026), pp. 58–59, Figure D9b

Summary statistics

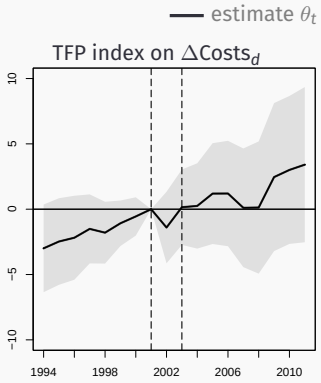
The mean cost shock is 0.2%, far below the 1% unit of the figures

	N	Mean	SD	Min	Max
$\Delta\tau_d^{\text{Steel}}$	5081	0.023	0.071	0.000	0.300
$\alpha_{d,\text{Steel}}^{\text{BEA}}$	4973	0.028	0.052	0.000	0.373
ΔCosts_d	5081	0.002	0.007	0.000	0.098
$\text{Exempt}_{d,2001}$	5081	0.941	0.188	0.000	1.000
U.S. exports (USD million)	5081	131	710	0.008	23464
U.S. share of world exports	5069	0.118	0.127	0.000	0.950

One observation per HS6 industry. [Back]

Productivity of exposed industries

Exposed industries' TFP did not fall before the tariffs



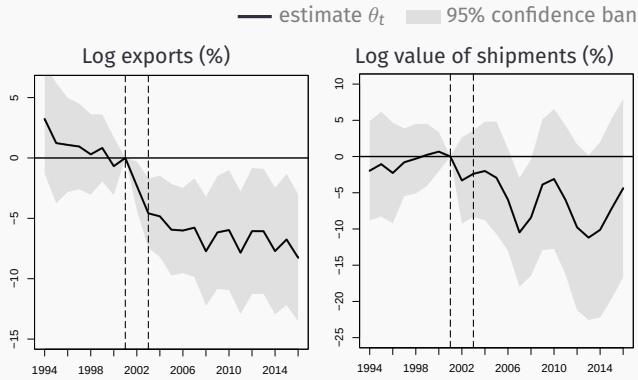
- NBER-CES four-factor TFP index as the outcome of the baseline specification
- No significant relation, before or after 2002. If anything, TFP rises in exposed industries
- Same with $\Delta\tau_d^{\text{Steel}}$ alone and NAICS3 effects, and with TFP growth

[Back]

Cox (2026), pp. 51–53, Figure D2a

Controlling for the China shock

With the NTR gap as a control, the export loss is unchanged



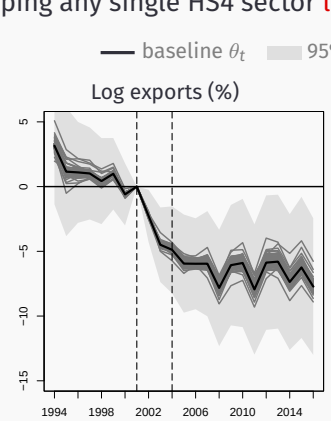
- NTR gap: column 2 minus MFN tariff (Pierce and Schott, 2016)
- Exports: same path as the baseline
- Shipments: insignificant, so the paper drops them
- Employment: imprecise after 2002

[Back] [Employment]

Cox (2026), pp. 56–58, Figure D8

Robustness of the weights

Dropping any single HS4 sector leaves the export path intact



- 100 draws of weights perturbed by up to 5% stay inside the baseline band
- Weights from 2015–17 consumption in place of requested amounts: little change
- Control for substitutability, the gap between 2001 import shares and request shares: little change

[Back]

Cox (2026), pp. 25–27 and 53–57, Figures D3–D5 and D7

Top exporters of exposed products

Germany, Japan and France were the U.S.'s closest competitors in 2001

	Total exports (USD million)	Average exports (USD million)
Germany	200750	290
USA	172480	249
Japan	157671	228
France	77512	112
Canada	76916	111
Italy	70668	102
UK	51896	75
Belgium	44598	64
Spain	41234	60
China	37834	55
Korea	37710	54

- Exposed products: HS6 goods with a positive tariff on their steel inputs
- Top competitors: Germany and France. Japan's share does not respond
- Lower-ranked: Belgium, Spain and Korea, the bottom three of the top ten excluding China

[Back]

Cox (2026), pp. 38 and 61, Table E1 and Figure E1. UN Comtrade, 2001

Inconsistencies in the January 2026 draft

Main slides follow Figure 7b, which matches the text's "around 4 basis points"

1. Share trough: ≈ -4 bps in Figure 7b, ≈ -0.4 bps for the same baseline in Figures D4a and D5a. Figure 10a uses the smaller scale
2. Text: 4 bps is "between 6 and 7 percent" of a median share of "roughly 7 percentage points". It is $\approx 0.6\%$. The introduction has the same tenfold gap
3. Text: differentiated goods' peak decline is "almost half" the homogeneous drop. Figure 12: $\approx -8\%$ vs. $\approx -9\%$
4. Table 3 repeats Table 2's HS10 import-value estimate, -1.22, with standard error 0.14 for 0.33
5. Matched requests by number of industries, 86, 9, 3 and 4%, sum to 102% [Back]

Cox (2026), pp. 1–2, 9–10, 15, 32, 38, 40–41 and 54–55