Direct-to-Consumer Trade and the Value of De Minimis
Preliminary

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Motivation

- US tariffs on Chinese imports have increased dramatically since 2018

- Section (§) 321 of the 1930 Trade Act
  - $800/person per day can arrive duty-free and w/ minimal customs burden

- Use of "de minimis" import channel has exploded in recent years. In 2022:
  - 685m shipments entered through §321 vs 39.1m formal entries
  - §321 imports are 6% of consumer imports, and 18% of E-commerce sales
  - in 2023,1 *billion* §321 shipments, collectively valued at $49.4b

- Driven by
  - emergent "direct-to-consumer" trade integral to online retailers/platforms
  - higher tariffs

§321 Importance in US Imports

year	CBP Official Statistics		US Consumer Spending	
	§321 value ($b) (1)	§321 BOLs (mil) (2)	consumer imports (%) (3)	e-commerce (%) (4)
2012	0.05	110.5	0.01%	0.1%
2013	0.07	117.9	0.01%	0.1%
2014	0.7	122.8	0.1%	1%
2015	1.6	138.9	0.3%	2%
2016	9.2	224.0	1.6%	9%
2017	13.0	332.3	2.1%	11%
2018	29.2	410.6	4.4%	22%
2019	56.2	503.1	8.9%	37%
2020	67.0	636.7	9.4%	30%
2021	43.5	771.5	5.3%	18%
2022	46.5	685.4	6.0%	18%
2023	49.4	1,000.0		

Notes: Panel reports official statistics for §321 imports (columns 1-2) obtained through a FOIA, CBP Publication 2036-1022 and CBP E-Commerce Statistics. Column 3 reports the share of §321 import values to aggregate US spending on consumer imports (excluding autos and food), and column 4 reports the share relative to aggregate E-commerce sales. The latter two statistics are from Census and pulled the FRED database. BOLs means bill of ladings.

Research Questions

- What are the aggregate consequences of allowing for §321 imports?

- Which consumers benefit more vs less from §321 imports?

De Minimis Trade Policy: Key Forces

- What are the economic impacts of a minimum value threshold for trade policy?

- Shipments above threshold face tariffs and customs processing fees:
  - standard tariff distortion: tariffs make imports more expensive
  - fees could be sizeable relative to value of cheap packages

- However, a de minimis tax notch is a novel source of gains from trade
  - high-price firms bunch at notch, thereby lowering consumer prices
  - a finite de minimis threshold could be preferred to free trade

- Tradeoffs vary across consumer groups based on on their de minimis expenditures

Data

- Census data exclude de minimis shipments (contain shipments above $2000)

- We analyze international shipments into the US handled by three carriers
  - shipments range from $0 to ~$100m
  - analyze 414m shipments, valued at $709b

- in 2021, these carriers are 36.1% of total §321 value and 17.0% of §321 shipments

- have obtained 1w of §321 shipments from CBP through FOIA, 2017-22
  - can compare carrier data with a snapshot of the universe of §321 shipments
  - future versions will use CBP sample to adjust welfare estimates

Research Design

- Framework
  - ▶ heterogeneous consumers vary in expenditures over DM goods by origin
  - ▶ heterogeneous exporters operate subject to de minimis rules

- Quantification requires two key empirical moments:
  - ▶ density of shipments over values by consumer group (e.g., zipcode income)
  - ▶ change in density from pre-2016 ($200 threshold, low tariffs) to post-2016 ($800 threshold, high tariffs)

- Changes in notches and tariffs identify key elasticities:
  1. within origins across package values
     - ★ exploit change in bunching at the notch Kleven 16
  2. across origins facing different US tariffs future versions

Preliminary Findings

1. §321 spending as a share of income is U-shaped
   - the lowest and highest income zips have highest spending shares
   - §321 spending shares higher in zips with a high percentage of non-white hh
   - within §321, lower-income zipcodes import more from China

2. Simulate eliminating §321: direct shipments ≤$800 face tariffs and processing fees
   - prices rise 1.5% (or 2.1% with higher fee)
   - increased consumer costs: $33.9/yr (or $46.8/yr with higher fee)
     * compare to ↑ $160/yr costs from 2018 trade war tariffs FKGT 2020
   - accounting for tariff gains, welfare loss per capita: $14.9/yr

3. Distributional impacts from policy experiment:
   - as % of income, lowest & highest median income zips lose more than middle
   - zipcodes with higher share of non-white households lose more
   - if tariff revenue rebated equally, eliminating §321 is regressive:
     * zipcodes with highest white share gain
     * zipcodes with highest non-white share lose

- future versions
  - calibrate to sample of shipments obtained from CBP
  - estimate impacts across more demographic characteristics (pop density, broadband access)

Road Map

- §321 Policy, Data and Descriptive Statistics

- Framework

- Moments and Estimation

- Policy Experiment

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§321 Import Policy

- Most countries have a de minimis policy (avg $145)

- US streamline procedures for two types of low-value shipments:
  - informal entries ($801-$2500)
    - ⋆ subject to tariffs & merchandise processing fees ($2.22, $6.66, or $9.99)
    - ⋆ CBP Form 7501
    - ⋆ immediately released by CBP, unlike formal entries (>$2500)

  - §321 entries ($0-$800)
    - ⋆ not subject to tariffs or processing fees
    - ⋆ minimal paper work (simply present BOL or commercial invoice)

- §321 provision
  - $800 limit per consignee per day (change from $200 in March 2016)
  - CBP captures origin, value, address, item descriptions, no HS codes
  - cannot break up a single order across shipments that span multiple days

- §321 shipments not present in Census data
  - Census data pulls from CBP Form 7501, so captures shipments above $2000

Carrier Data

- Carriers' universe of international air shipments to US
  - date, origin, value, address/postal code, items description, entry code
  - for >$800 shipments, have HS codes
  - 2014–22, but incomplete coverage across carriers
  - across years and carriers, observe 414m shipments valued at $709b
  - shipments delivered to virtually all ZCTAs

- Sample also contains shipments to non-US destinations trans-shipped through US
  - entry codes: 62 "transportation & exportation"   63 "immediate export"

- Representativeness:
  - 85.7% of §321 shipments enter by air, and 29.9% by private carriers CBP
  - in 2021, our data are:
    - ★ 17.0% of total §321 shipments
    - ★ 36.1% of total §321 value
  - can benchmark to sample of ≤$1500 shipments obtained via a FOIA from CBP for 1 week in 2017-22

- Zipcode median income, population, demographics from Michigan ICPSR

Carrier Data

| year | carrier | §321 Shipments to USA | | Non §321 Imports [$801,$5,000] | | Shipments to OECD (≤$5,000) | |
| | | §321 value ($b) | §321 BOLs (m) | value ($b) | BOLs (m) | value ($b) | BOLs (m) |
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
2014	A	0.2	7.0	1.2	1.1	0.2	0.4
2015	A	0.6	16.1	2.7	2.6	0.5	3.3
2016	A	1.4	18.3	2.4	1.4	0.5	3.4
2017	A	2.8	30.0	3.5	1.7	0.8	5.3
2018	A	3.6	34.3	4.3	2.0	1.0	6.2
2019	A	4.2	36.5	4.6	2.1	1.1	6.5
2020	A B* C	7.9	68.5	8.5	3.9	2.2	11.1
2021	A B C	15.7	130.9	17.3	8.0	2.8	11.0
2022	B* C*	3.6	31.3	5.1	2.4	0.01	0.01

Notes: The table reports summary statistics from the carrier data. Column 1 reports the source carrier; "*" denotes incomplete data that year. Columns 2-3 report total value and BOLs for §321 imports into US. Columns 4-5 report stats for non-§321 imports under $5,000 . Columns 6-7 report statistics of transshippments under $5,000 handled by the carriers to OECD.

§321 Spending and Demographics

- From 2021 official CBP statistics, §321 spending pc was $131

- in carrier data, average zipcode §321 spending pc is $32.6
  - ▶ ratio of zipcode at the 90th vs 10th percentile of §321 spending pc is 10.0

- zipcodes' §321 per capita spending share:
  - ▶ of zipcode median household income: avg 0.04% (90-10 ratio: 7.4)
  - ▶ of zipcode apparel/electronic spending: avg 3.6% (90-10 ratio: 9.6)

§321 Spending and Demographics
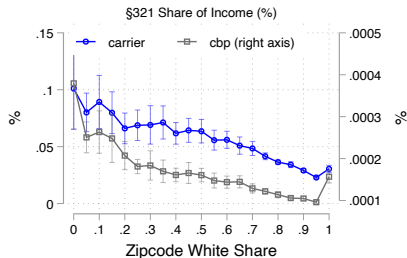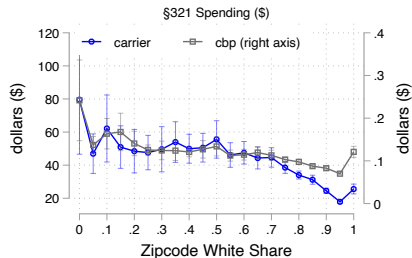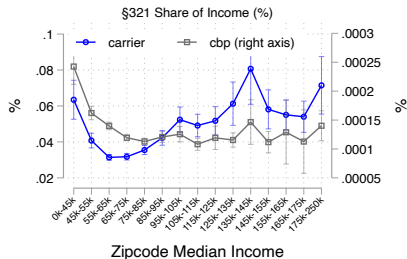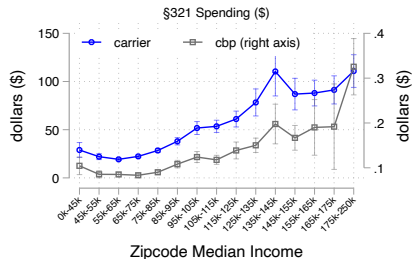
Notes: Top panel: left column plots **§321** per-capita expenditures in 2021 from carrier data (blue), right column scales **§321** per-capita expenditure by zipcode median household income. Bottom panel: plots series against zipcodes' share of non-hispanic white households. Grey denotes the correlations using the 1w CBP sample. 5/95% error bands reported.

§321 China Shares in DM Spending
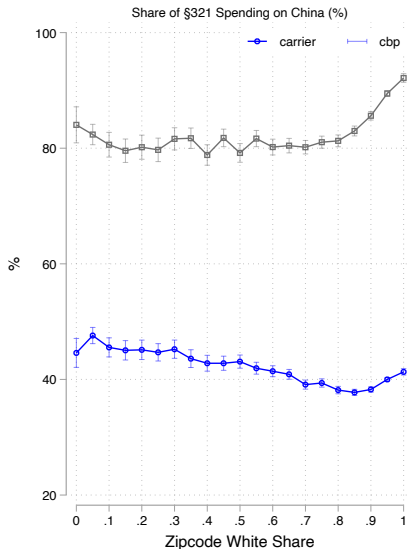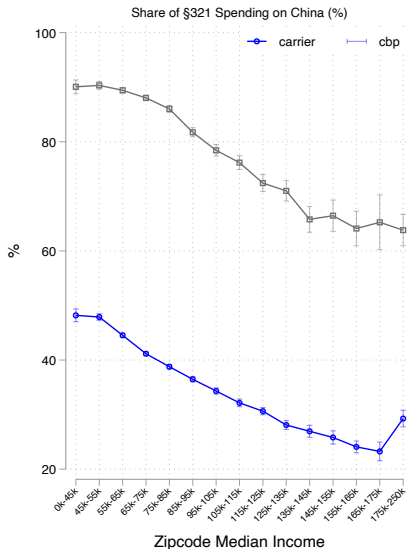
Notes: both columns plots **§**321 share of expenditures on imports from China for 2021. 5/95% error bands reported.

Road Map

- §321 Policy, Data and Descriptive Statistics
- Framework
- Moments and Estimation
- Policy Experiment

Heterogeneous Consumers

- Heterogeneous consumer groups ω with preferences over packages
  - preferences on direct shipments x^ω:

  $$u^\omega = A^\omega \left(x^\omega\right)^{\frac{\kappa}{1+\kappa}} - P^\omega x^\omega + y^\omega$$

  - CES (γ) across origins:

  $$x^\omega = \left(\sum_o \left(a^\omega\right)^{\frac{1}{\gamma}} \left(x_o^\omega\right)^{\frac{\gamma-1}{\gamma}}\right)^{\frac{\gamma}{\gamma-1}}$$

  - CES (σ_o) across varieties from o:

  $$x_o^\omega = \left(\int_{i \in \Omega_o} \left(a_i^\omega\right)^{\frac{1}{\sigma_o}} \left(n_i^\omega\right)^{\frac{\sigma_o-1}{\sigma_o}} di\right)^{\frac{\sigma_o}{\sigma_o-1}}$$

    - ⋆ n_i^ω: # packages of product i purchased by consumers in group ω

- Heterogeneity in $\{A^\omega, a^\omega, a_i^\omega\}$ across groups $\omega \to$ heterogeneous welfare impacts

Firms

- From each o, firms are heterogeneous:
  - in unit cost z_i
  - group-specific demand shock $\{a_i^\omega\}$

- "Sophisticated" (S) firms solve:

$$\max_v \left[(1 - 1_{v \geq v_{DM}} \tau_o) v - (z_i + 1_{v \geq v_{DM}} T) \right] D_i^\omega v^{-\sigma_o}$$

  - D_i^ω are demand shifters
    - ★ function of price indexes, spending, and size of consumer groups
  - leads to bunching (next slide)

- "Naive" (N) firms do not bunch
  - uses high-tariff pricing when low-tariff pricing puts it above v_{DM}
  - deals with apparent lack of hole above the notch in the data (see below)

Pricing

- Choice by "sophisticated" firms to send through §321 or not:
    - §321 shipments
        - ★ (below-threshold prices, no tariffs)→ chosen by low unit cost firms
        - ★ (price at threshold, no tariffs)→ chosen by intermediate cost (bunchers)
    - non-§321 shipments
        - ★ (high prices and high tariffs) −> chosen by high unit cost firms

- Formally, optimal pricing is:

$$v_{o,S}(z) = \begin{cases} \frac{\sigma_o}{\sigma_o-1} z & z < \underline{z}_o \\ v_{DM} & \underline{z}_o \leq z < \bar{z}_o \\ \frac{\sigma_o}{\sigma_o-1} \frac{z+T}{1-\tau_o} & \bar{z}_o \leq z \end{cases}$$

- $\underline{z}_o$ (lowest cost buncher) such that $\frac{\sigma_o}{\sigma_o-1}\underline{z}_o = v_{DM}$
- pricing jumps discretely at $\bar{z}_o$ (highest cost buncher)
- implies a "hole" in distribution of values on $\left[v_{DM}, \frac{\sigma_o}{\sigma_o-1}\frac{\bar{z}_o+T}{1-\tau_o}\right]$

- NB: pricing/selection into §321 independent from demand shifters (due to CES)

Formal versus Informal Tradeoff
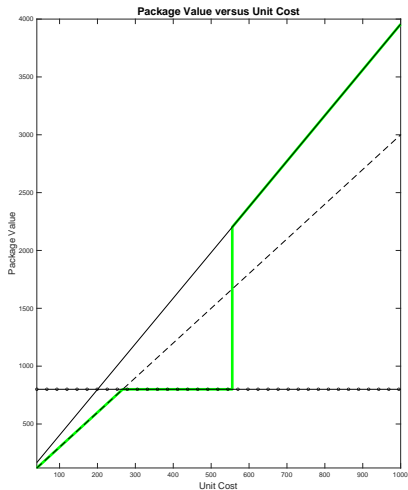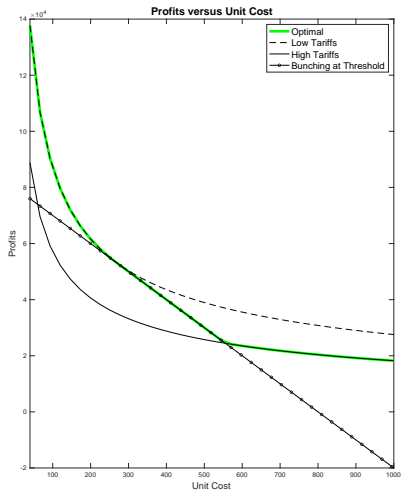
Measurement of Consumer Impacts

Suppose tariffs or DM threshold change:

- **Cost increase** over all direct shipments from origin o for group ω:

$$\hat{P}_o^\omega = \left(\sum_{j=S,N} \int_z \lambda_{o,j}^\omega(z) \hat{v}_{o,j}(z)^{1-\sigma_o} \, dz \right)^{\frac{1}{1-\sigma_o}}$$

  - $\hat{v}_{o,j}(z)$ is the price increase of firms with unit cost z
  - $\lambda_{o,j}^\omega(z)$ is the group-ω (pre-shock) import share in those firms
    - $\star$ depends on joint density over (z, a_o^ω)

- **Cost increase** of basket of direct shipments for group ω:

$$\hat{P}^\omega = \left(\sum_o \lambda_o^\omega \left(\hat{P}_o^\omega \right)^{1-\gamma} \right)^{\frac{1}{1-\gamma}}$$

  - λ_o^ω is (pre-shock) import share from o (among consumers ω)

- **Welfare impact** in USD per consumer of group ω:

$$\Delta u^\omega = \frac{\left(\hat{P}^\omega \right)^{-\kappa} - 1}{\kappa} e^\omega + \Delta tr^\omega$$

  - e^ω is pre-shock expenditures in all direct shipments
  - Δtr^ω is tariff revenue allocated to the group

Parametrization Strategy

- Iterative procedure over $\left\{\sigma_o, \lambda_{o,j}^\omega(z)\right\}$

  1. Given σ_o, recover $\lambda_{o,S}^\omega(z)$ and $\lambda_{o,N}^\omega(z)$ from observed densities by consumer group in post-2016 period
     - ⋆ match fraction of "naive" firms to observed density of shipments within model-implied hole

  2. Simulate shocks back to pre-period
     - ⋆ change de minimis threshold from \$800 to \$200
     - ⋆ change high trade-war tariffs to pre-period (low) tariffs

  3. Calibrate σ_o to match observed relative change in package density between \$200 and \$800 due to bunching

- γ and κ reflected in associated changes in import shares
  - ▶ for now, calibrated to Fagelbaum et al (2020)
  - ▶ future versions: tariffs across origins can recover γ, and direct shipments over imports recover κ

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Impacts of §321 thresholds

- Observe the density of §321 shipments relative to two controls
  - $\implies$ changes in the density when the threshold changes from \$200 to \$800

  - pre vs post
  - shipments to US vs shipments to OECD

- In levels

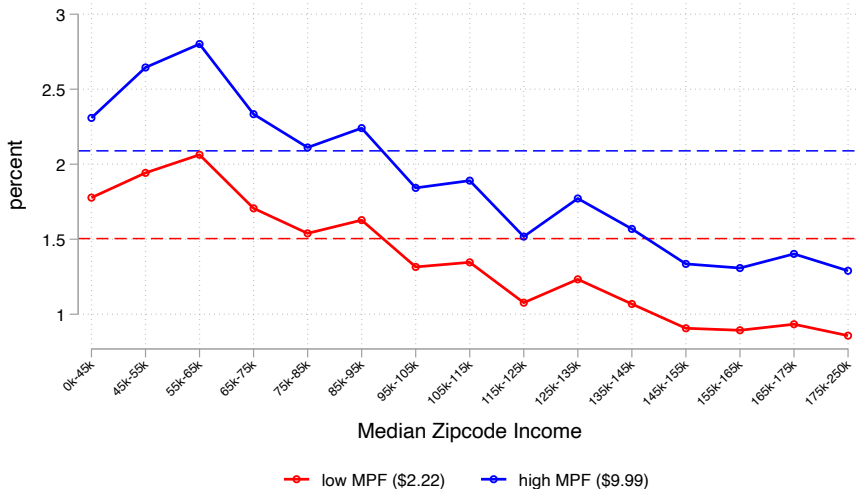$$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$$

  - b: \$10 bin
  - o: origin
  - d: destination (US vs OECD)
  - x: carrier (A,B,C)
  - t: month
  - fixed effects: α_{xt} and α_o
  - leave-out bin: \$120
- plot the bin FEs β_b to show the density of shipments

USA Shipment Density: Pre-Period

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==1 & post==0
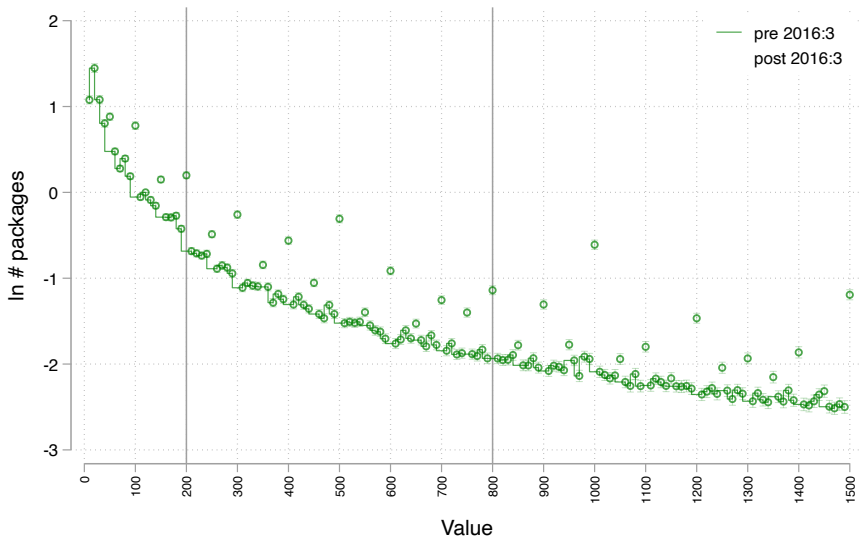
normalized to # packages at $120

USA Shipment Density: Post Period

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==1 & post==1
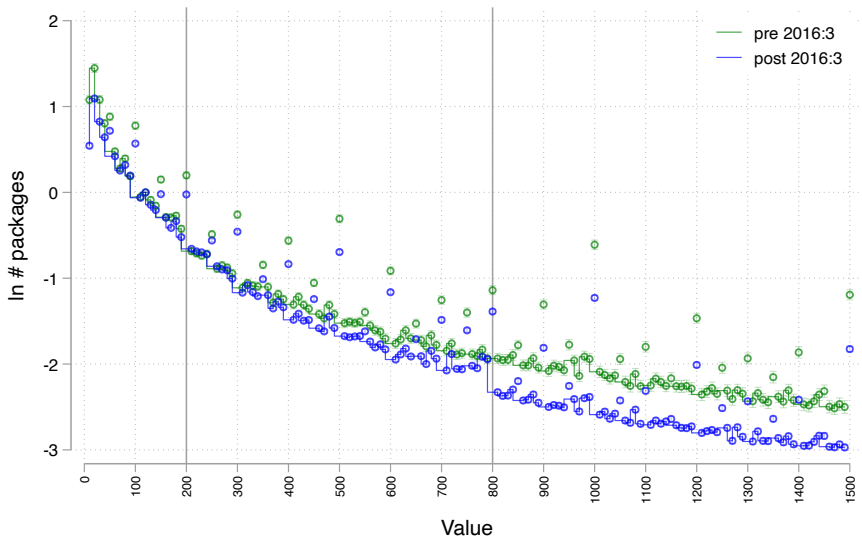
normalized to # packages at $120

OECD Shipment Density: Pre Period

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==0 & post==0

normalized to # packages at $120

OECD Shipment Density: Post Period

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==0 & post==1

- pre 2016:3
- post 2016:3

Value

ln # packages

normalized to # packages at $120

Δ Density: USA vs OECD in Post

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times USA_d + \epsilon_{bodxt}$ if post==1
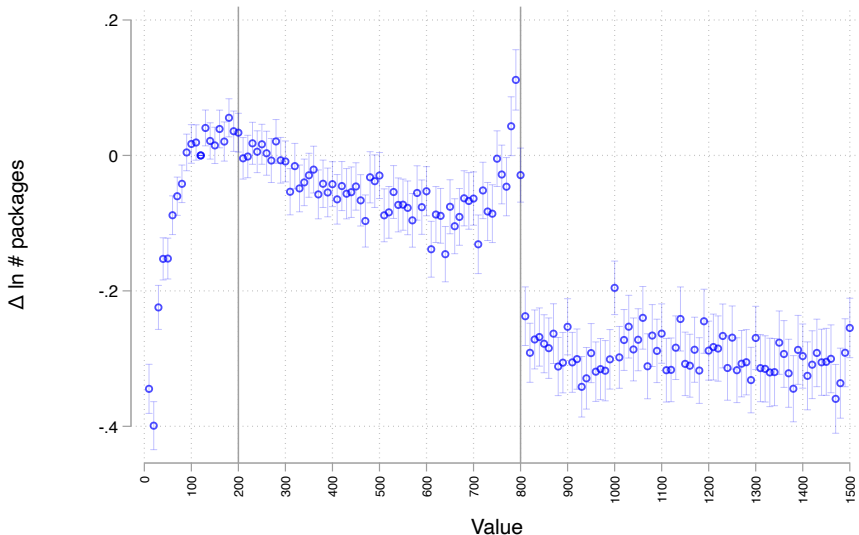
normalized to Δ # packages at $120

Δ Density: USA vs OECD in Post, By Origin

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times USA_d + \epsilon_{bodxt}$ if post==1
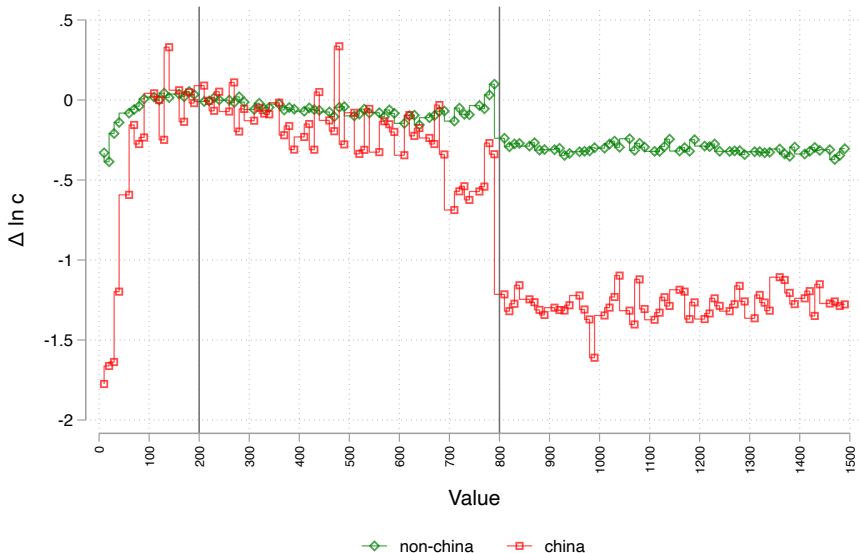
DM Share of Shipments, and China Share of DM

Zipcodes' §321 expenditures divided by direct shipments & §321 import share from China
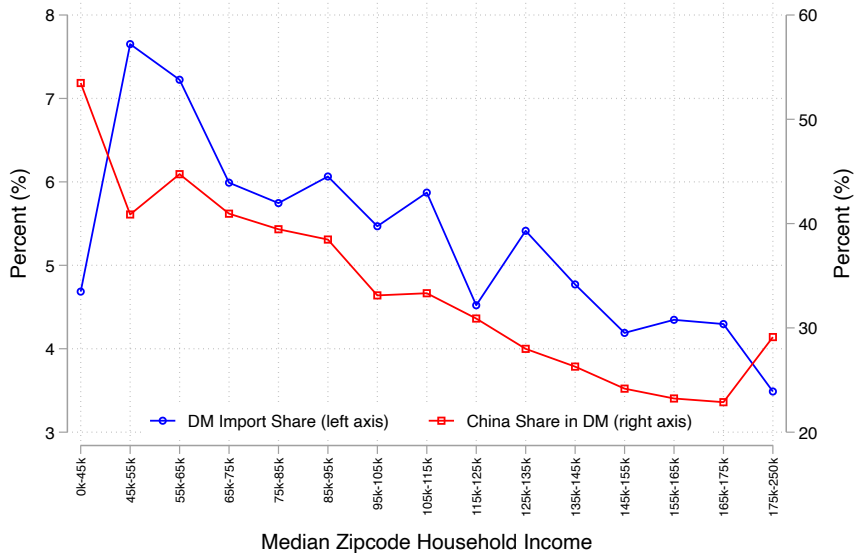
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Policy Experiment

- Eliminate §321 from current equilibrium, so shipments below $800:
  - subject to tariffs
  - subject to per-shipment "merchandise processing fee" of $2.22 or $9.99 (current fee for informal shipments, $801-$2500)

- Two origins: China and non-China
  - processing fee paid on imports from both origins
  - tariffs on China imports: 24.0%
  - tariffs on Non-China imports: 1.6%

- Procedure finds:
  - low fee case: $\sigma_{chn} =$ 4.30, $\sigma_{non-chn} =$ 3.42
  - high fee case: $\sigma_{chn} =$ 4.22, $\sigma_{non-chn} =$ 4.90
    - ★ set $\gamma =$ 2.53 Fajgelbaum et al. 2020

- Examine impacts across zipcode median income, % white household share

Price Index Increase from Removing §321

change in price index for basket of direct shipments

% change in prices

Median Zipcode Income

low admin: σ(china) = 4.30 σ(non-china) = 3.42 γ = 2.53
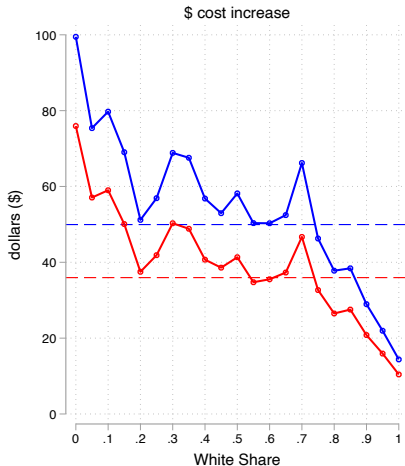high admin: σ(china) = 4.22 σ(non-china) = 4.90 γ = 2.53
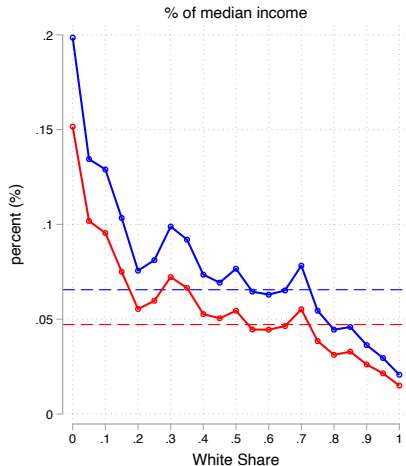
low MPF ($2.22)   high MPF ($9.99)

Horizontal dash lines denote price index change for the representative consumer.

Dollar Cost Increase from Removing §321

increase in cost of direct shipments (change price index $\times$ amount spent)

Horizontal dash lines denote dollar cost changes for the representative consumer.

Dollar Cost Increase from Removing §321

increase in cost of direct shipments (change price index $\times$ amount spent)

$ cost increase

% of median income

low admin: σ(china) = 4.30 σ(non-china) = 3.42 γ = 2.53
high admin: σ(china) = 4.22 σ(non-china) = 4.90 γ = 2.53

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low MPF ($2.22)   high MPF ($9.99)

Horizontal dash lines denote dollar cost changes for the representative consumer.

Welfare Impacts from Removing §321

includes tariff revenues equally rebated to consumers

$ welfare impacts

welfare impacts (% of income)

low admin: σ(china) = 4.30 σ(non-china) = 3.42 γ = 2.53
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Median Zipcode Income

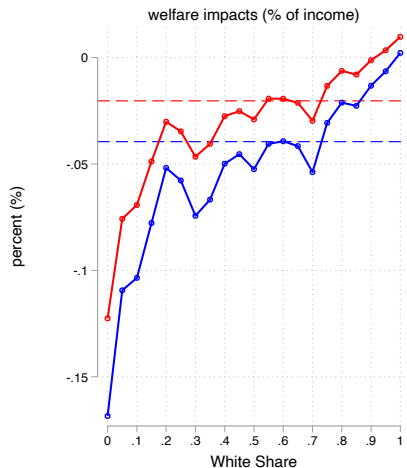Median Zipcode Income
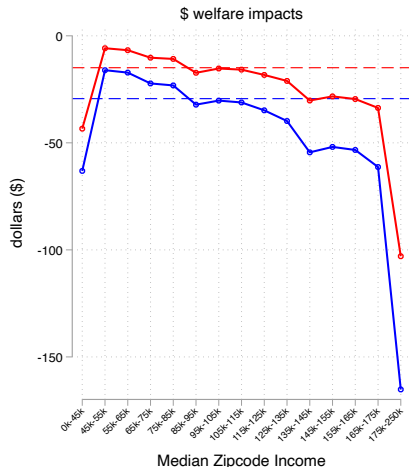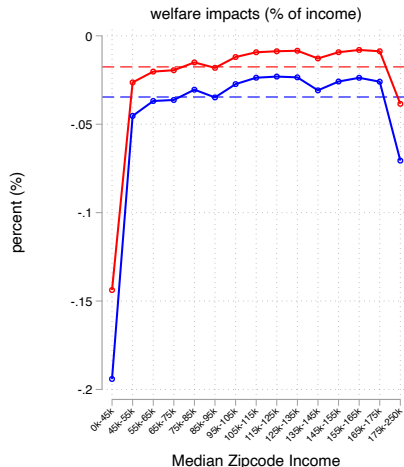
low MPF ($2.22) ● high MPF ($9.99)

Horizontal dash lines is the weflare impact for the representative consumer (negative value means a loss).

Welfare Impacts from Removing §321

includes tariff revenues equally rebated to consumers

$ welfare impacts

welfare impacts (% of income)
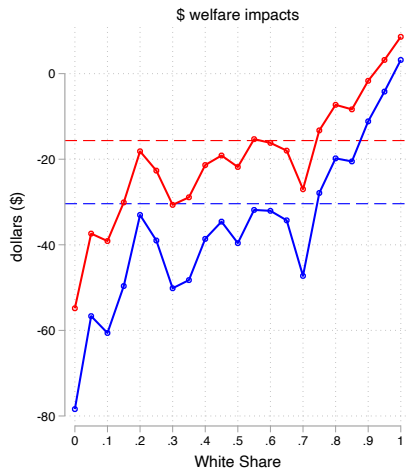
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● low MPF ($2.22)   ● high MPF ($9.99)

Horizontal dash lines is the weflare impact for the representative consumer (negative value means a loss).
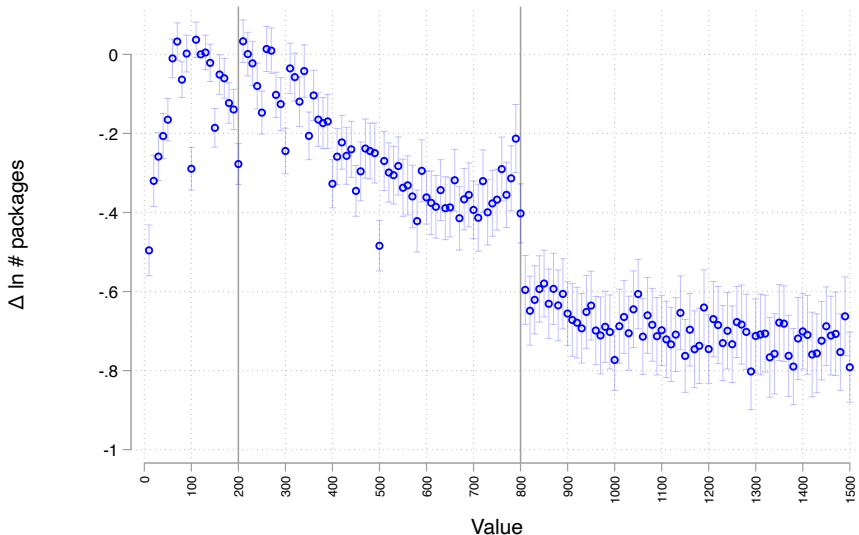
Preliminary Conclusions

- Eliminating §321 raises consumers' costs of buying a basket of direct shipments:
  - by \$36.0/yr from §321 in low fee case
  - by \$50.0/yr from §321 in high fee case
  - tariff revenue gain does not offset consumer loss

- Unequal impacts of §321:
  - zips at the lowest and highest median income more than middle-income zips
  - zips with higher shares of non-white households

- Future versions will examine distributional consequences §321 on additional zipcode demographics, and consider impacts on US producers

Appendix Slides

Δ Density: Post vs Pre (Households Points)

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \textcolor{red}{\beta_b} \times \textcolor{red}{\boldsymbol{post_b}} + \epsilon_{bodxt}$ if USA==$\textcolor{red}{1}$ & household==$\textcolor{red}{1}$
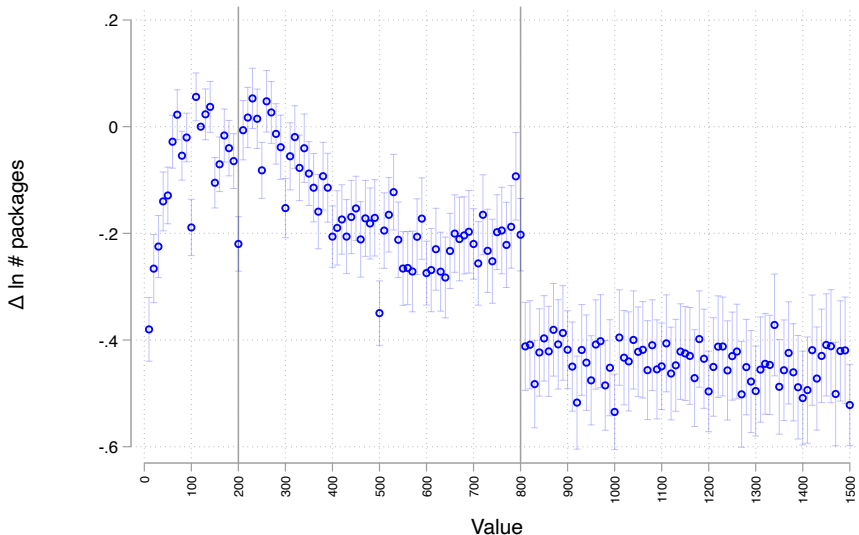

normalized to Δ # packages at $120

Δ Density: Post vs Pre (Commercial Points)

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times \textbf{\textit{post}}_b + \epsilon_{bodxt}$ if USA==1 & commercial==1
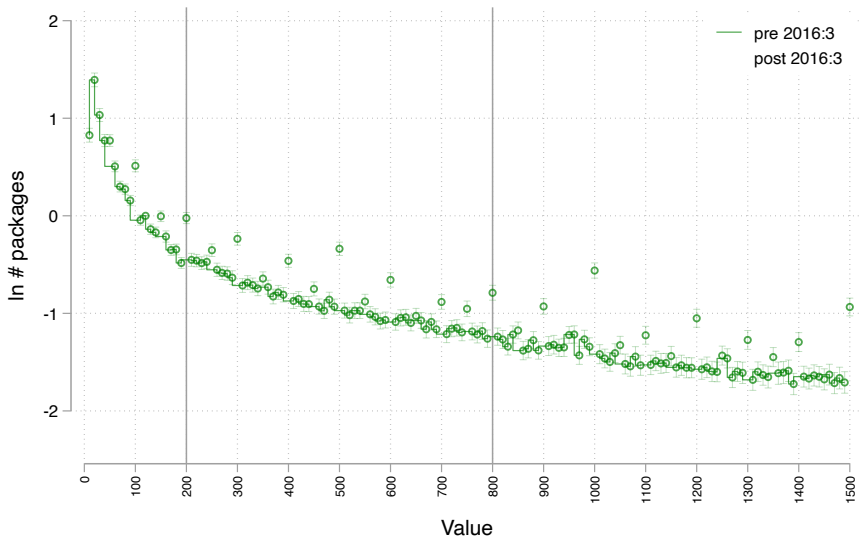

normalized to Δ # packages at $120

OCED Shipment Density: Before March 2016

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==0 & post==0
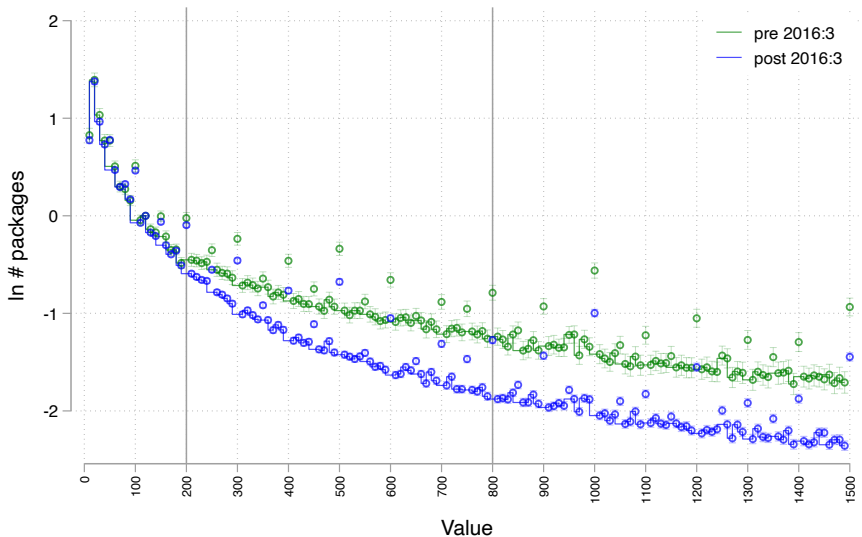

normalized to # packages at $120

OECD Shipment Density: After March 2016

$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==0 & post==1

Legend:
- pre 2016:3
- post 2016:3

Y-axis: ln # packages
X-axis: Value

normalized to # packages at $120

Δ Density: USA vs OECD in Pre

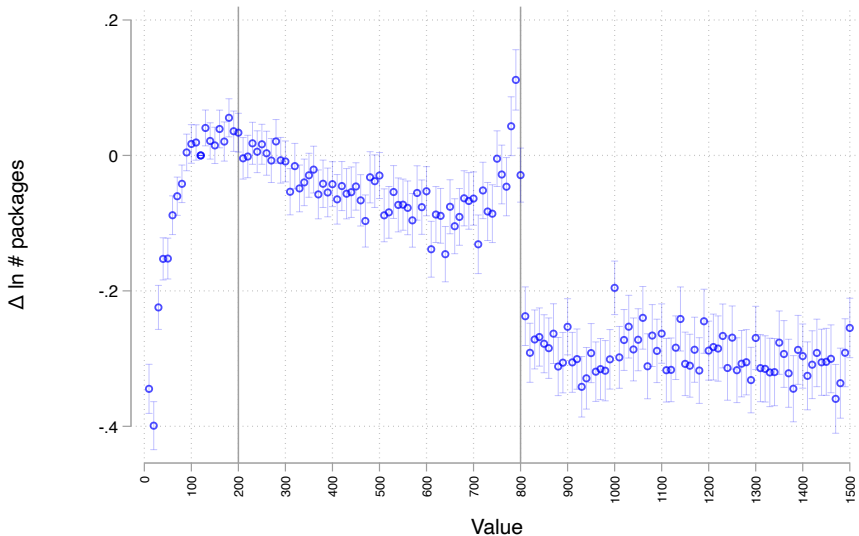$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times USA_d + \epsilon_{bodxt}$ if post==0

normalized to Δ # packages at $120

Δ Density: USA vs OECD in Post

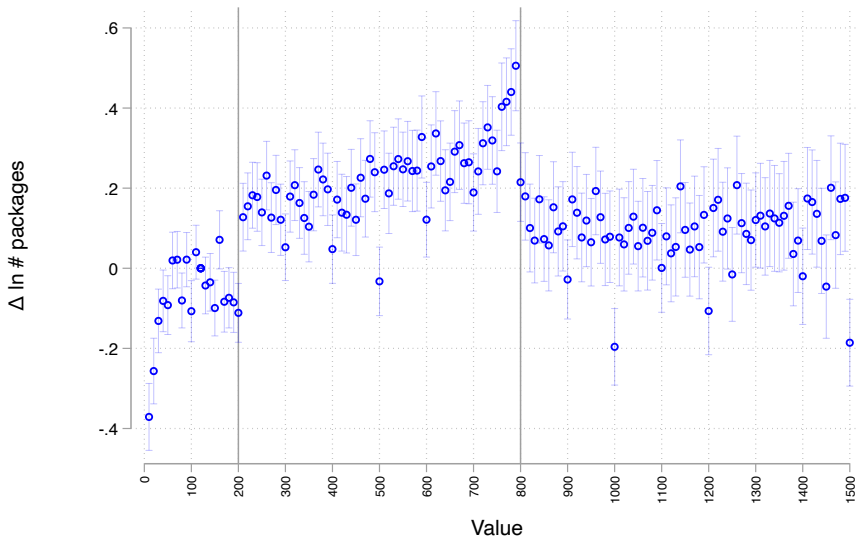$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times \textbf{\textit{USA}}_d + \epsilon_{bodxt}$ if post==1

normalized to Δ # packages at $120

Difference in Differences (USA vs OECD) vs (Post vs Pre)

$$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times post_b \times USA_d + \epsilon_{bodxt}$$

normalized to Δ # packages at $120

CBP Sample

$$\ln c_{bot} = \alpha_o + \alpha_t + \beta_b + \epsilon_{bot}$$