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

## Preliminary, Draft Available Soon

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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

| | CBP Official Statistics | | US Consumer Spending | |
|---|---|---|---|---|
| year | §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 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 $\leq$\$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

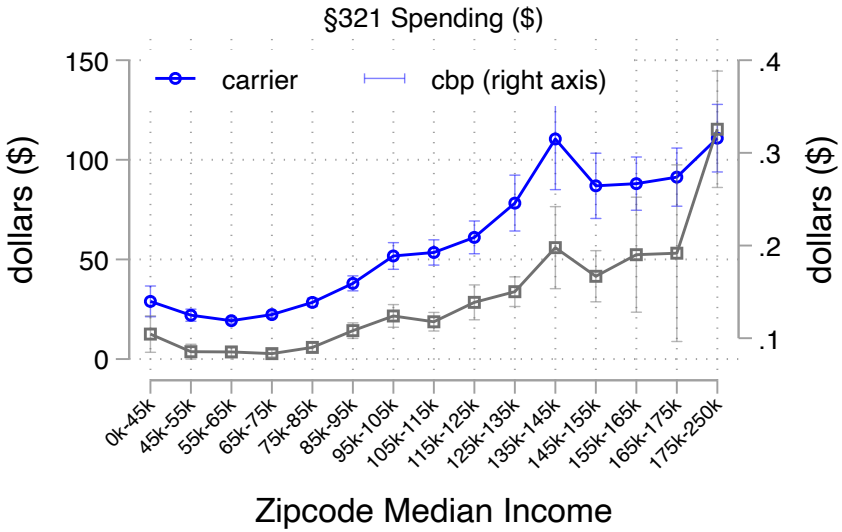
| | | §321 Shipments to USA | | Non §321 Imports [$801,$5,000] | | Shipments to OECD ($\leq$$5,000) | |
|---|---|---|---|---|---|---|---|
| year | carrier | §321 value ($b) | §321 BOLs (m) | value ($b) | BOLs (m) | value ($b) | BOLs (m) |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| 2014 | A | 0.2 | 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 |

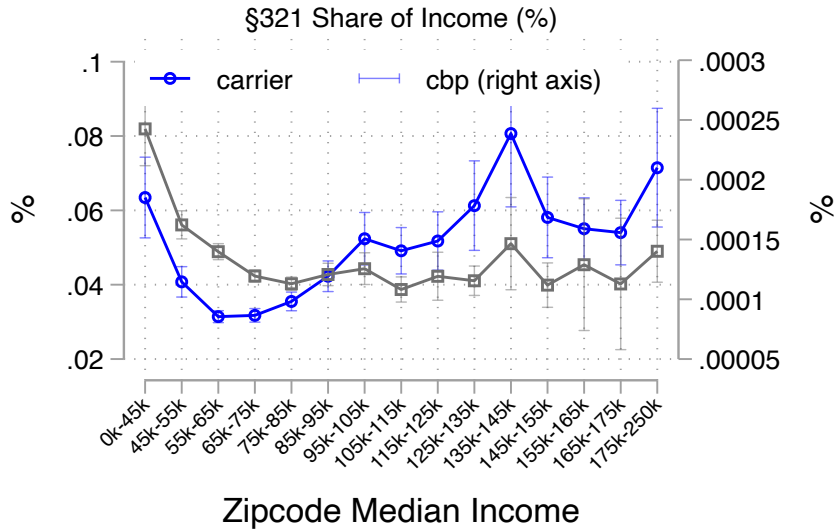
Notes: The table reports summary statistics from the carrier data. Column 1 reports the source carrier; "*" denotes incomplete data that year. Columns 2-3 report total value and BOLs for §321 imports into US. Columns 4-5 report stats for non-§321 imports under $5,000 . Columns 6-7 report statistics of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

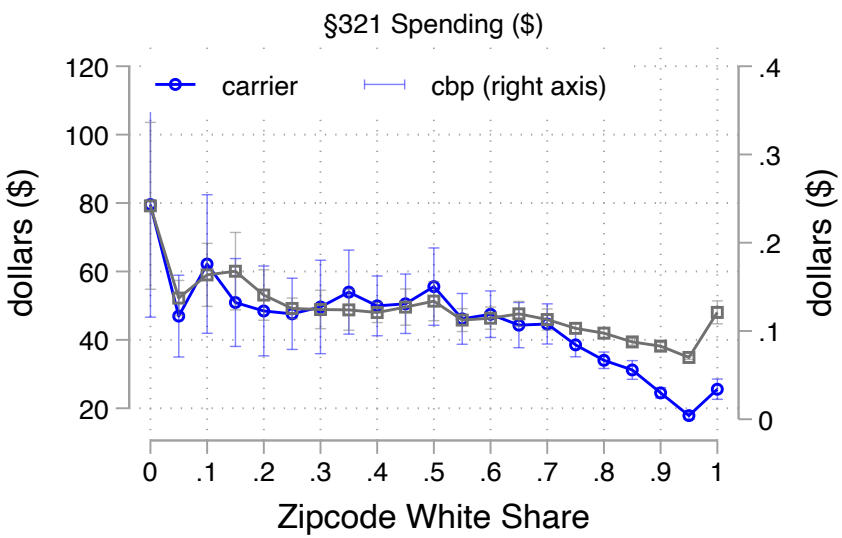
# §321 Spending and Demographics

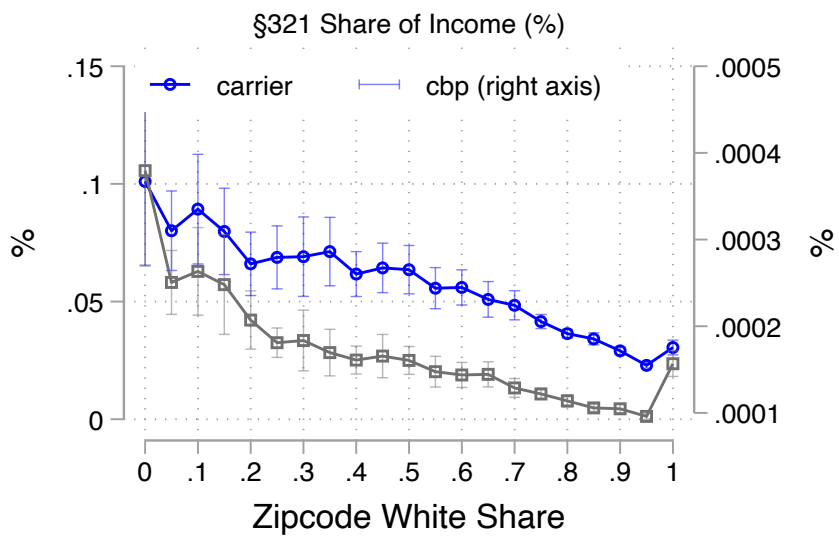
- From 2021 official CBP statistics, §321 spending pc was $131
- in carrier data, average zipcode §321 spending pc is $32.6
  - ratio of zipcode at the 90th vs 10th percentile of §321 spending pc is 10.0
- zipcodes' §321 per capita spending share:
  - of zipcode median household income: avg 0.04% (90-10 ratio: 7.4)
  - of zipcode apparel/electronic spending: avg 3.6% (90-10 ratio: 9.6)

# §321 Spending and Demographics



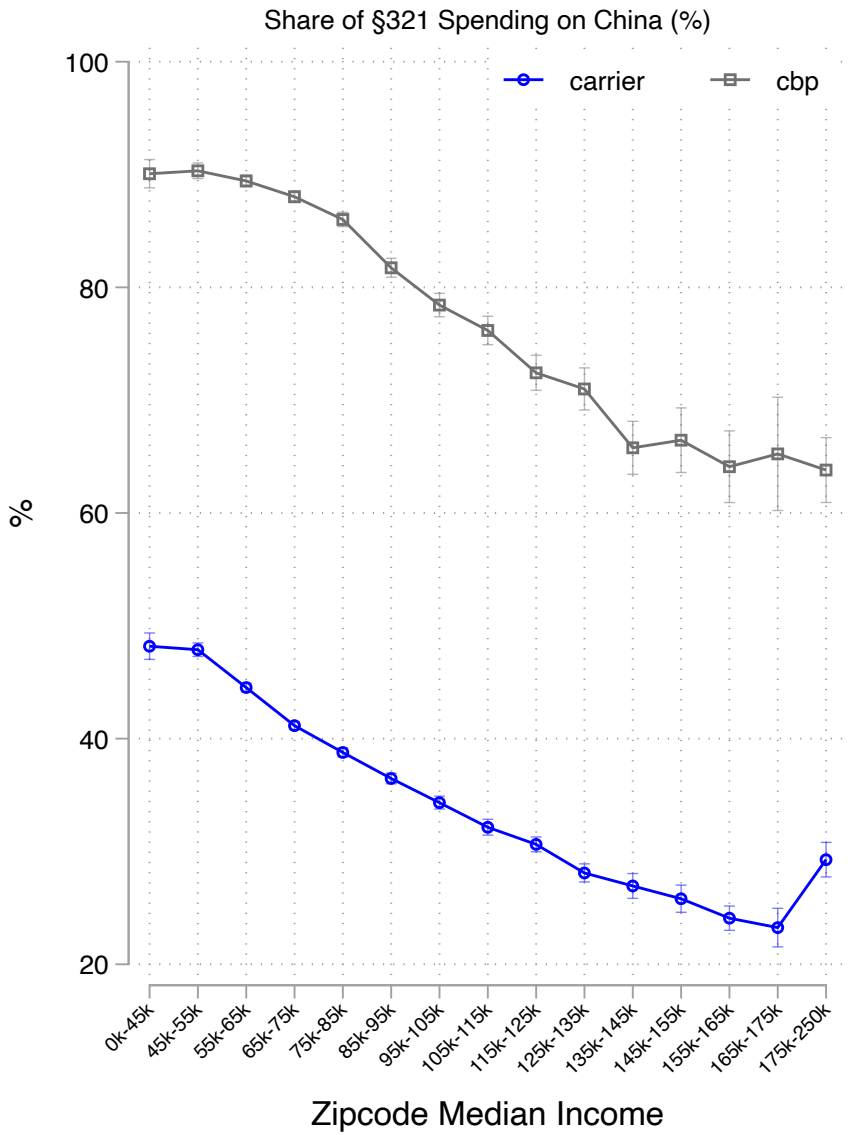



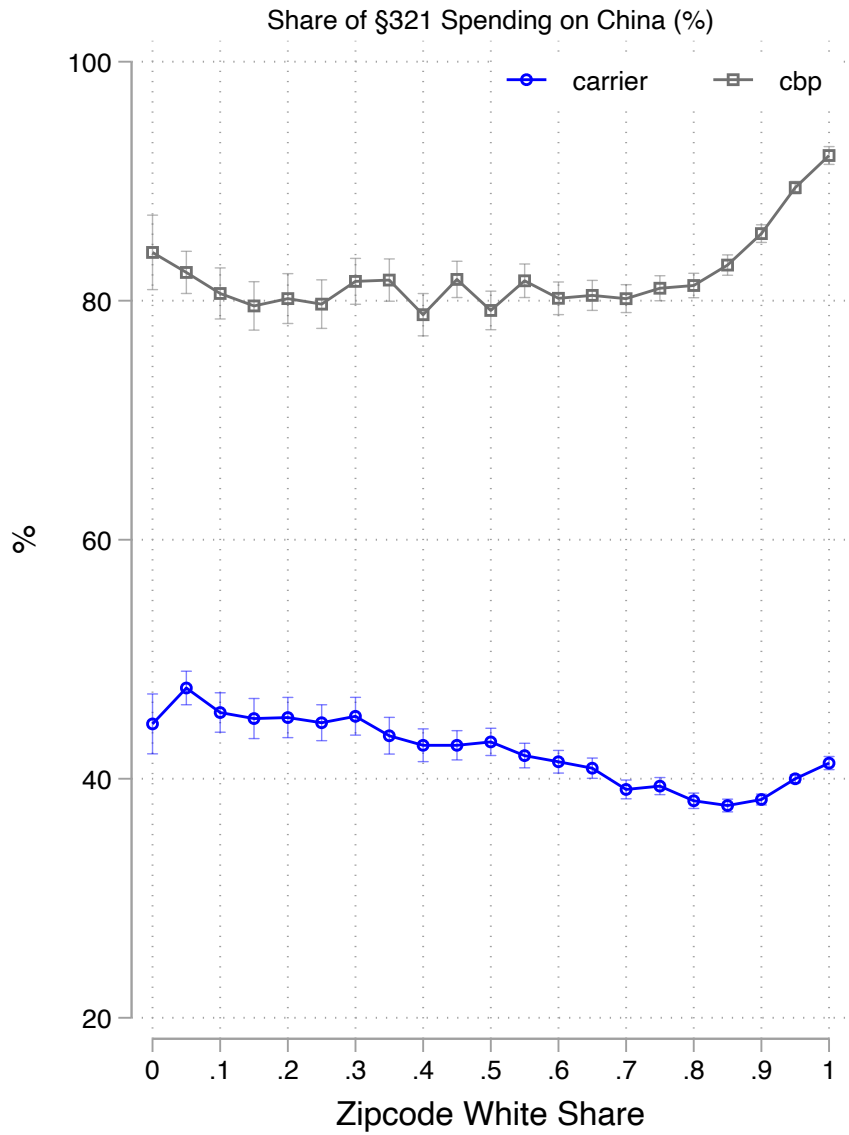




Notes: Top panel: left column plots §321 per-capita expenditures in 2021 from carrier data (blue), right column scales §321 per-capita expenditure by zipcode median household income. Bottom panel: plots series against zipcodes' share of non-hispanic white households. Grey denotes the correlations using 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 $\omega$ with preferences over packages
  - preferences on direct shipments $x^\omega$:

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

  - CES ($\gamma$) 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 ($\sigma_o$) across varieties from $o$:

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

    - ★ $n_i^\omega$: # packages of product $i$ purchased by consumers in group $\omega$

- Heterogeneity in $\{A^\omega, a^\omega, a_i^\omega\}$ across groups $\omega \rightarrow$ 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:

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

  - $D_i^\omega$ 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

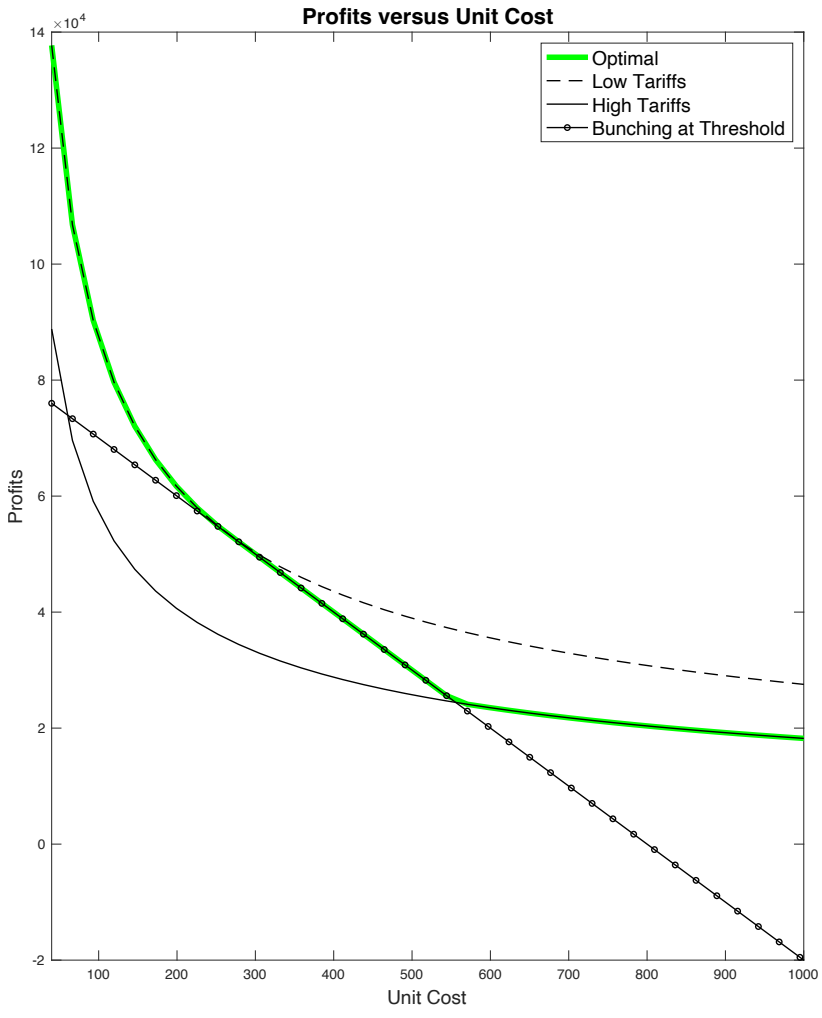
- Formally, optimal pricing is:

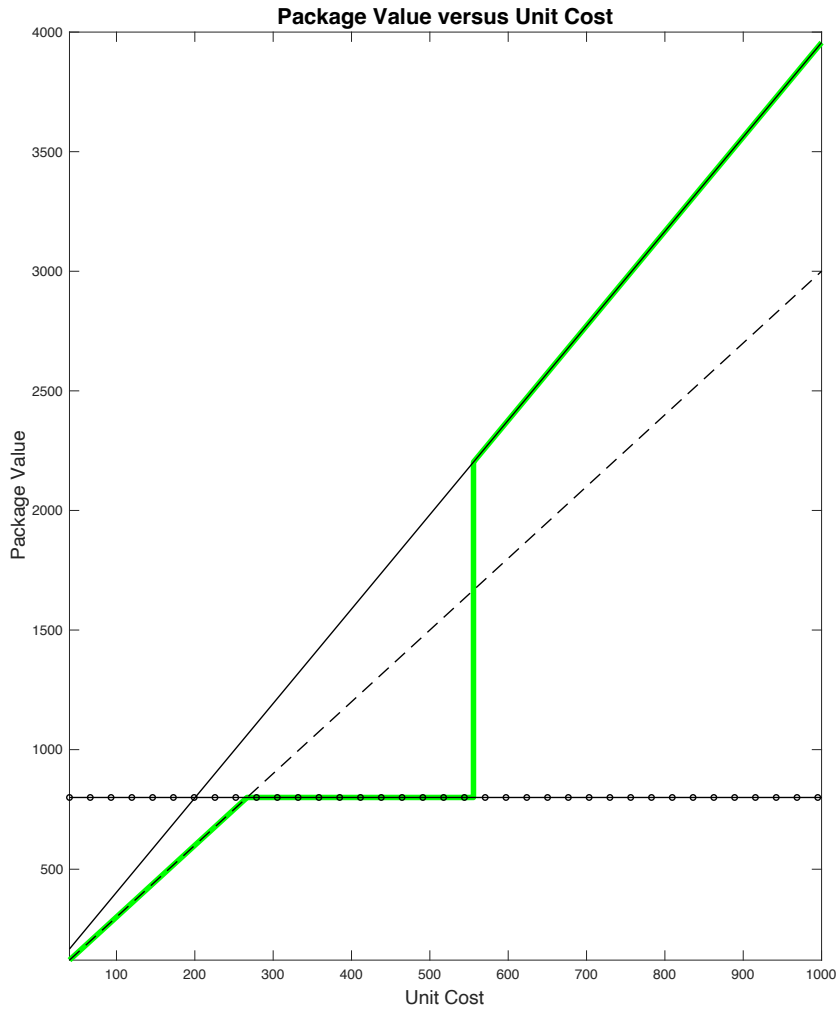
$$v_{o,s}(z) = \begin{cases} \frac{\sigma_o}{\sigma_o - 1} z & z < \underline{z}_o \\ v_{DM} & \underline{z}_o \leq z < \bar{z}_o \\ \frac{\sigma_o}{\sigma_o - 1} \frac{z + T}{1 - \tau_o} & \bar{z}_o \leq z \end{cases}$$

  - $\underline{z}_o$ (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 $\omega$:

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

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

- **Cost increase** of basket of direct shipments for group $\omega$:

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

  - $\lambda_o^\omega$ is (pre-shock) import share from $o$ (among consumers $\omega$)

- **Welfare impact** in USD per consumer of group $\omega$:

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

  - $e^\omega$ is pre-shock expenditures in all direct shipments
  - $\Delta tr^\omega$ is tariff revenue allocated to the group

# Parametrization Strategy

- Iterative procedure over $\left\{\sigma_o, \lambda^{\omega}_{o,j}(z)\right\}$
  1. Given $\sigma_o$, recover $\lambda^{\omega}_{o,S}(z)$ and $\lambda^{\omega}_{o,N}(z)$ 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 $\sigma_o$ to match observed relative change in package density between \$200 and \$800 due to bunching
- $\gamma$ and $\kappa$ reflected in associated changes in import shares
  - for now, calibrated to Fagelbaum et al (2020)
  - future versions: tariffs across origins can recover $\gamma$, and direct shipments over imports recover $\kappa$

# Road Map

- §321 Policy, Data and Descriptive Statistics
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# Impacts of §321 thresholds

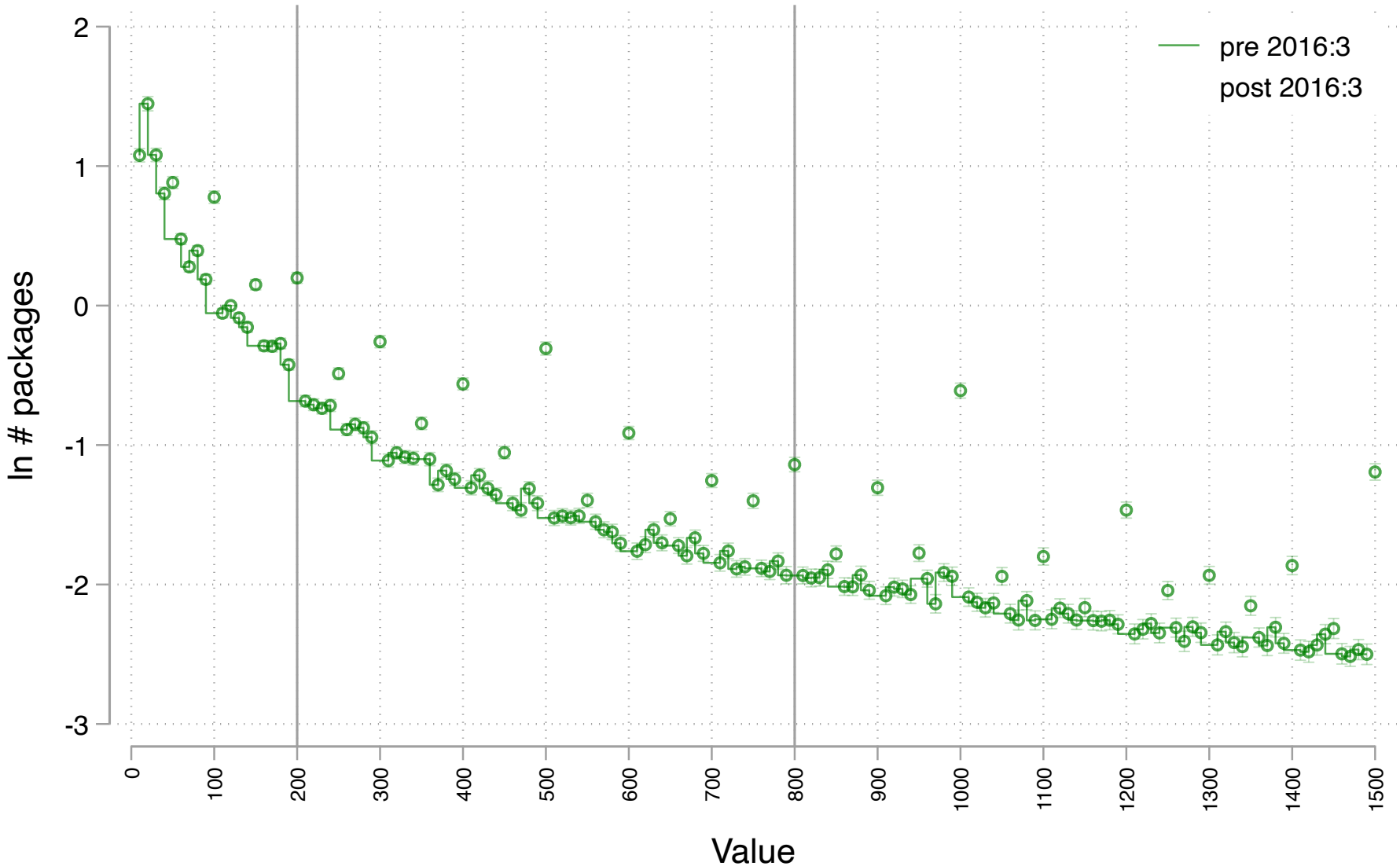
- Observe the density of §321 shipments relative to two controls
  - $\Longrightarrow$ changes in the density when the threshold changes from \$200 to \$800
  - pre vs post
  - shipments to US vs shipments to OECD
- In levels

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

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

# USA Shipment Density: Pre-Period

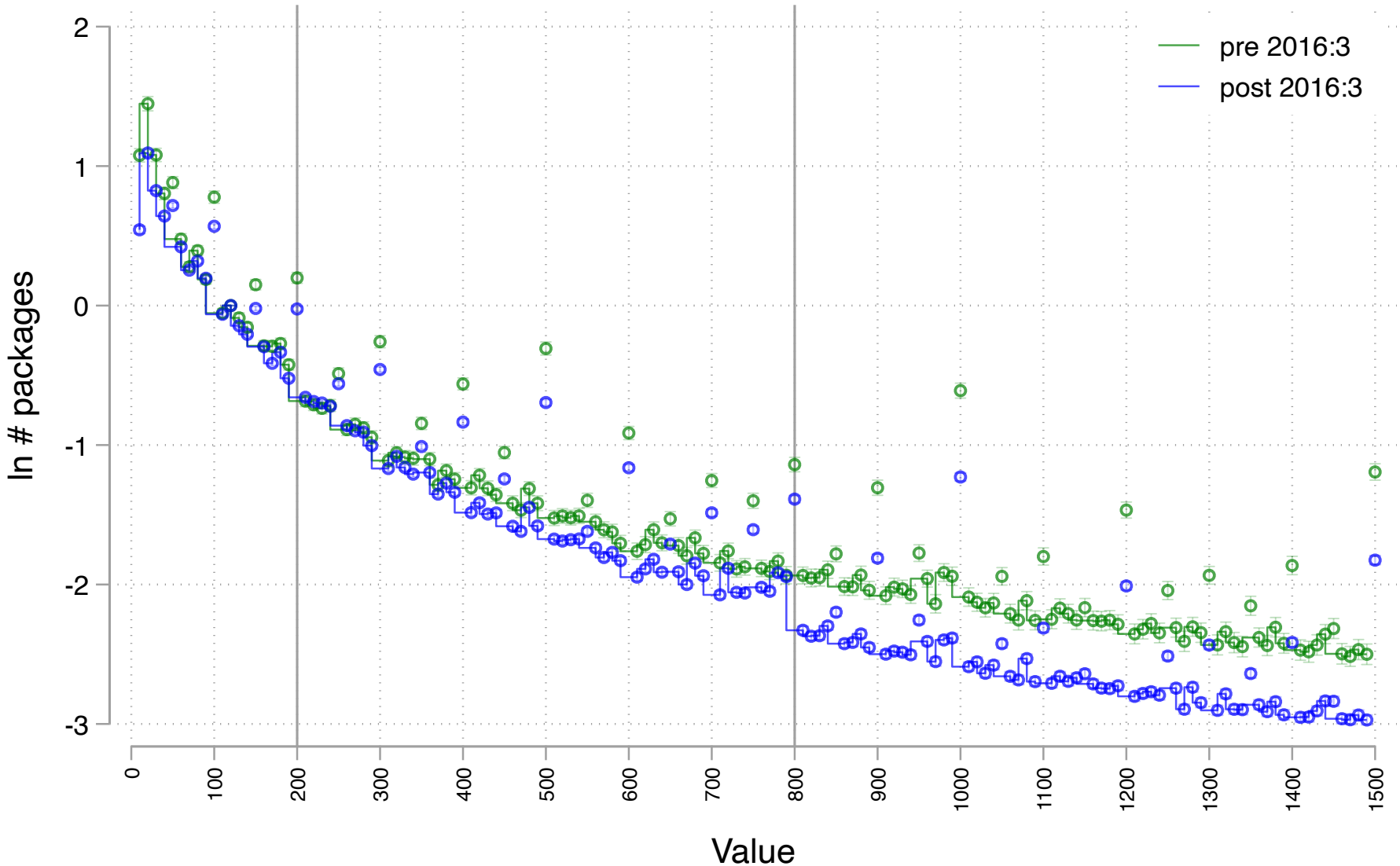
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==1 & post==0




normalized to # packages at $120

# USA Shipment Density: Post Period

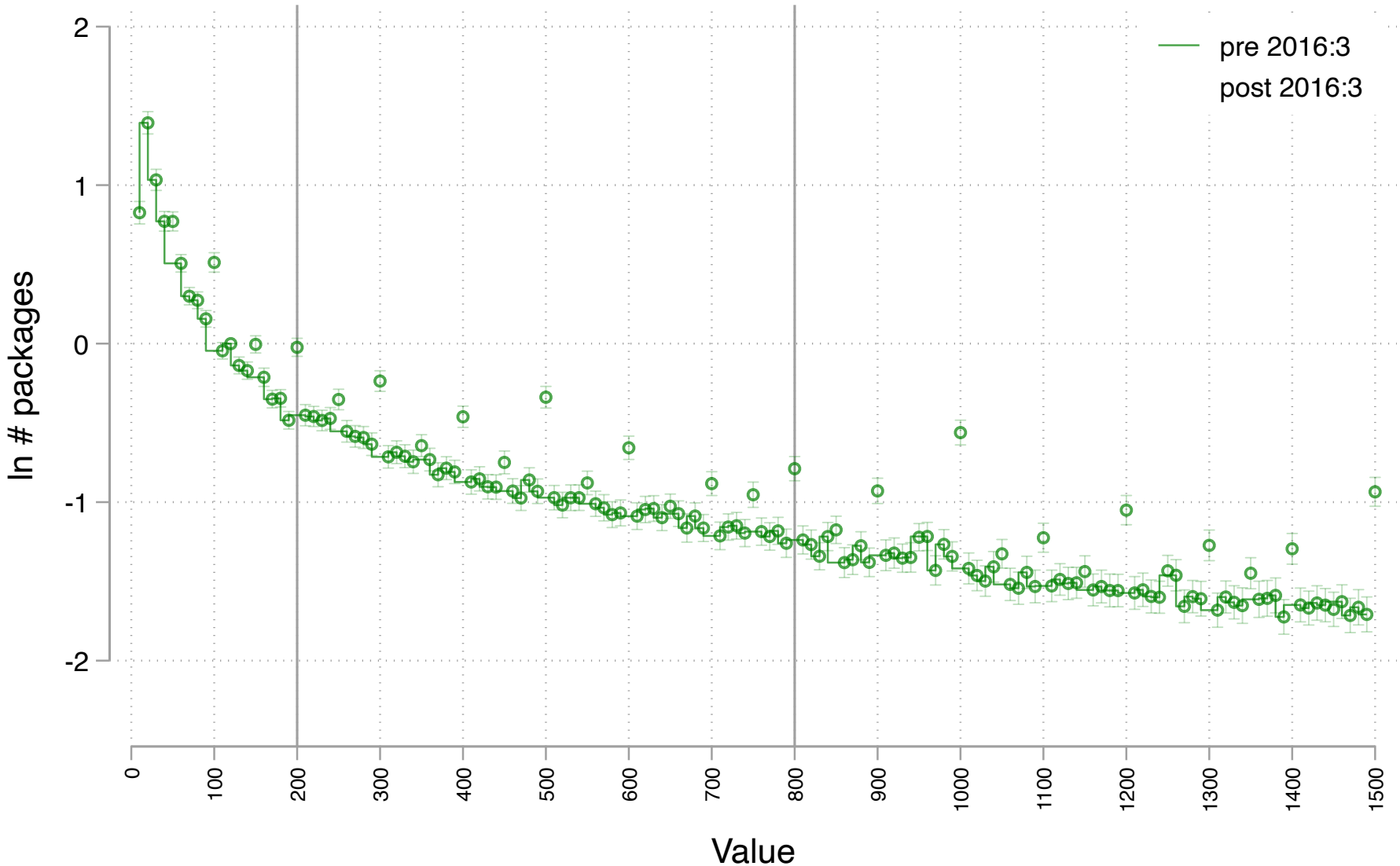
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==1 & post==1




normalized to # packages at $120

# OECD Shipment Density: Pre Period

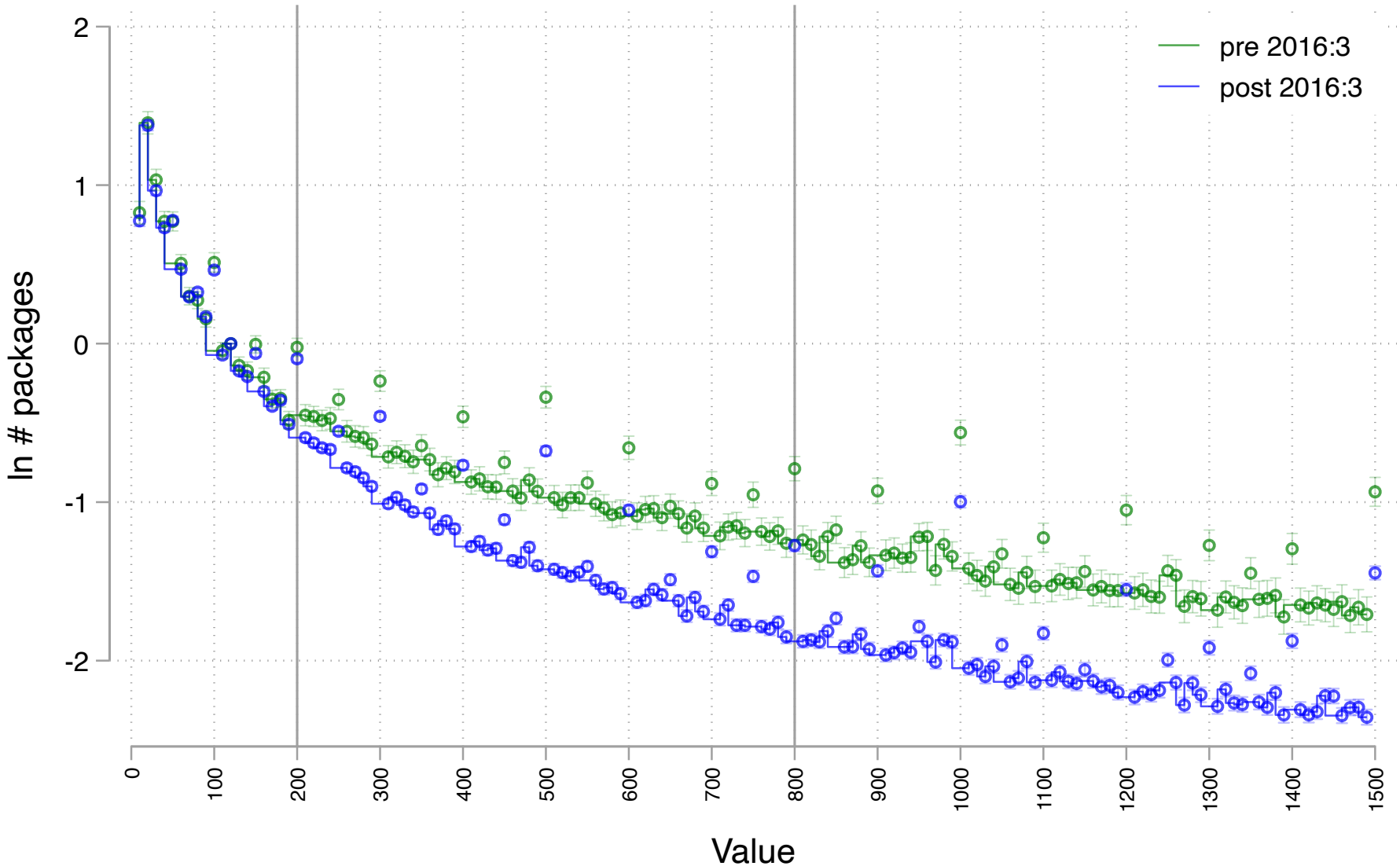
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==0 & post==0




normalized to # packages at $120

# OECD Shipment Density: Post Period

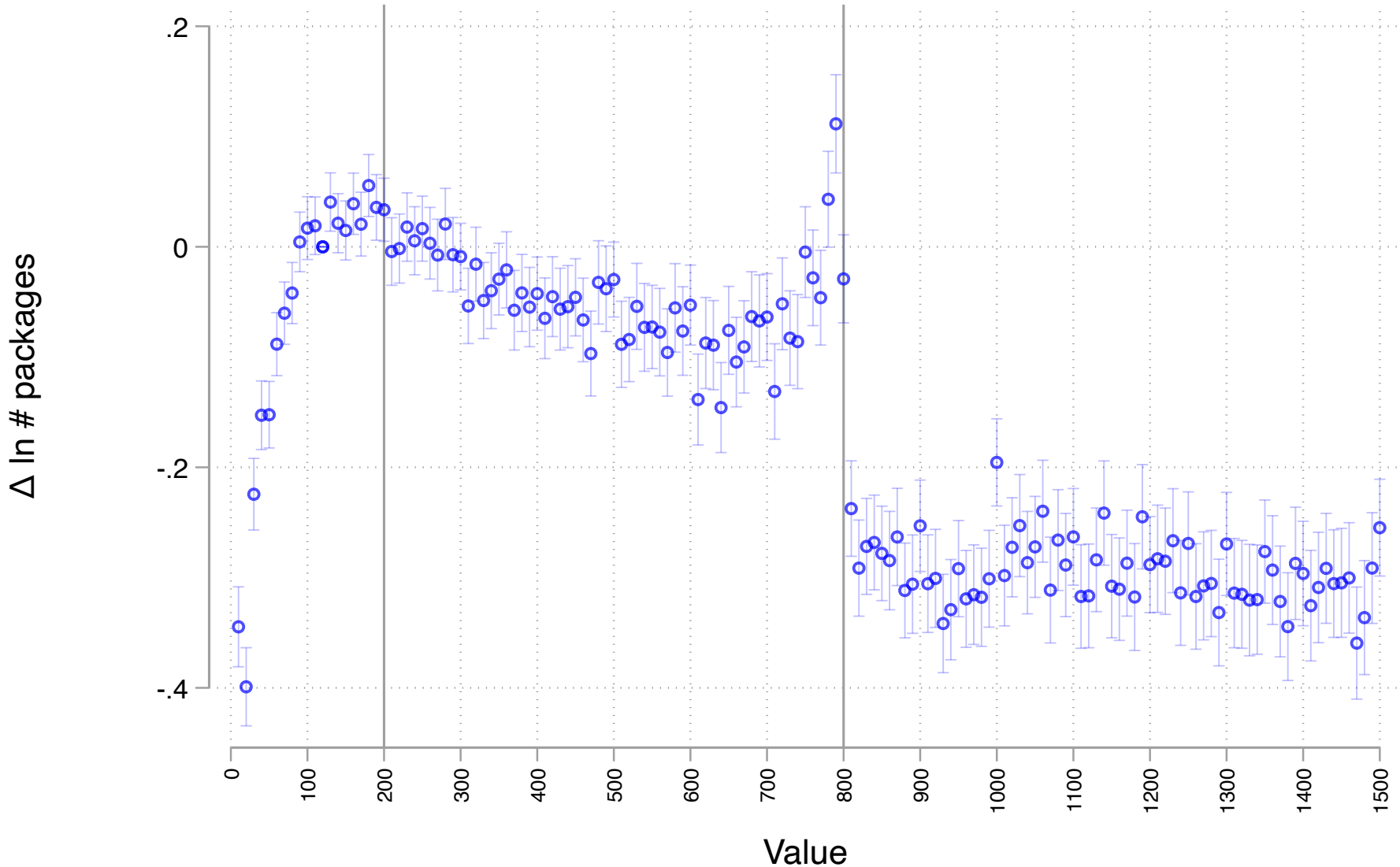
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==0 & post==1




normalized to # packages at $120

# Δ Density: USA vs OECD in Post

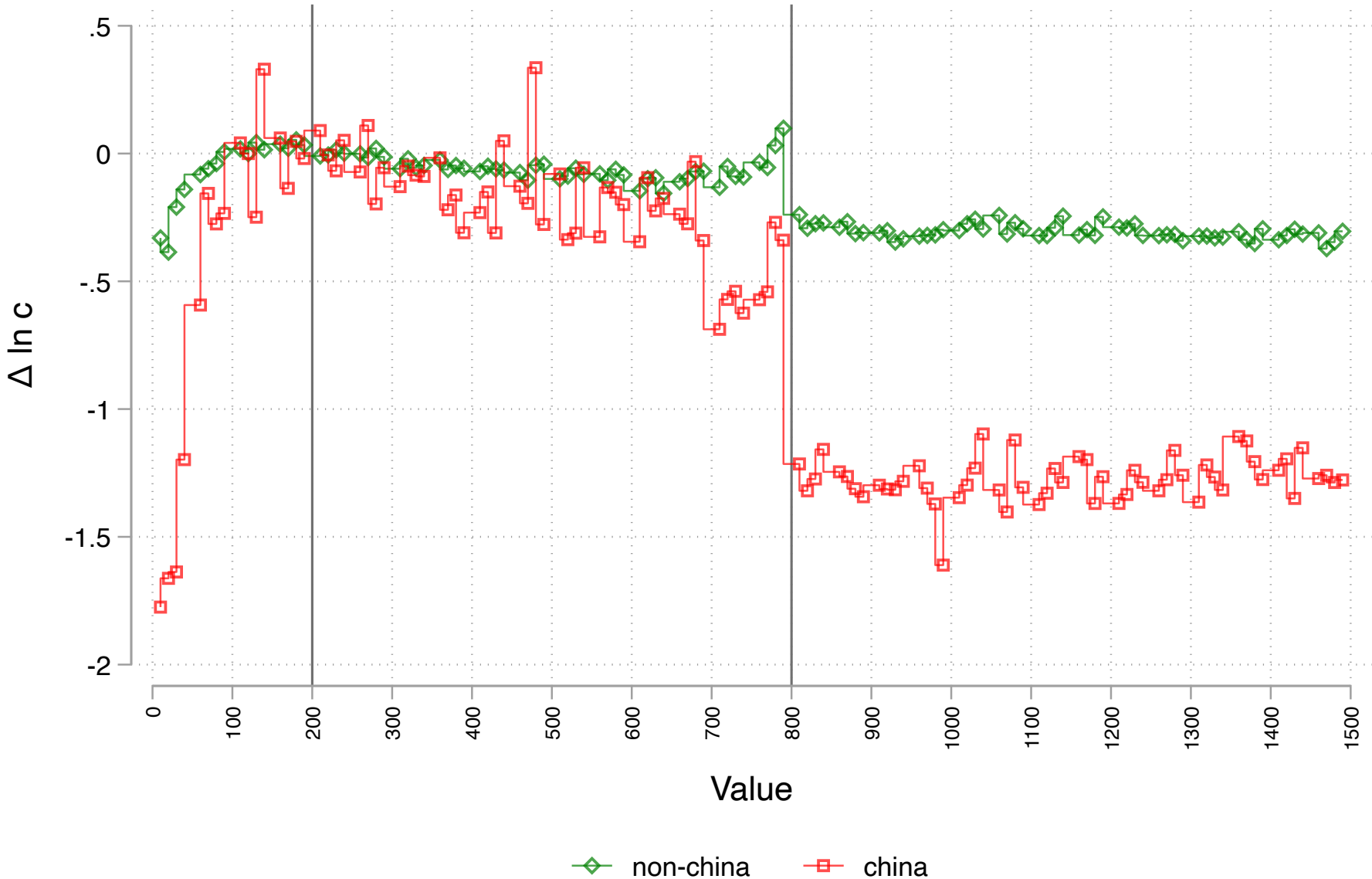
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times USA_d + \epsilon_{bodxt}$ if post==1




normalized to Δ # packages at $120

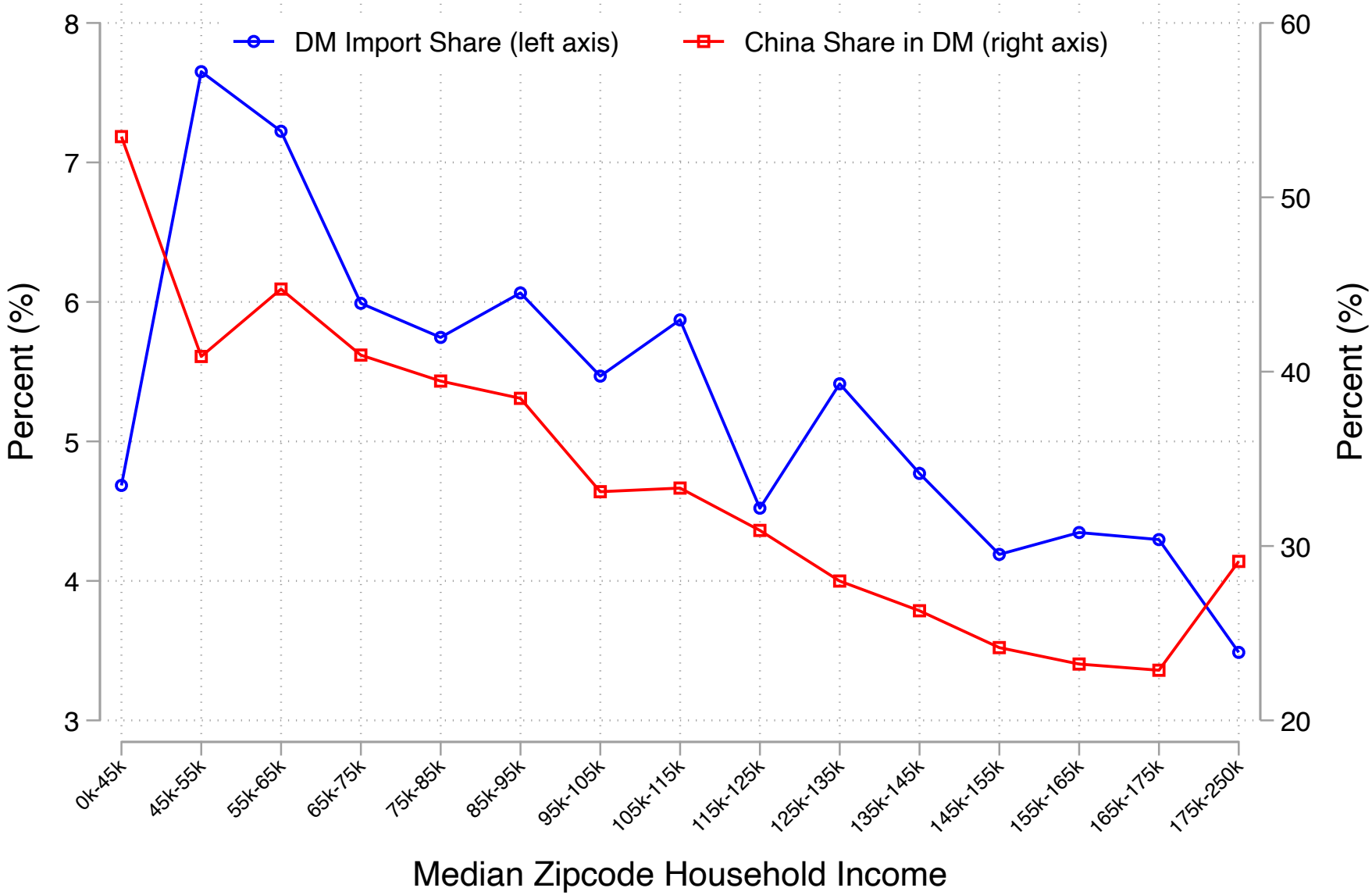
# Δ Density: USA vs OECD in Post, By Origin

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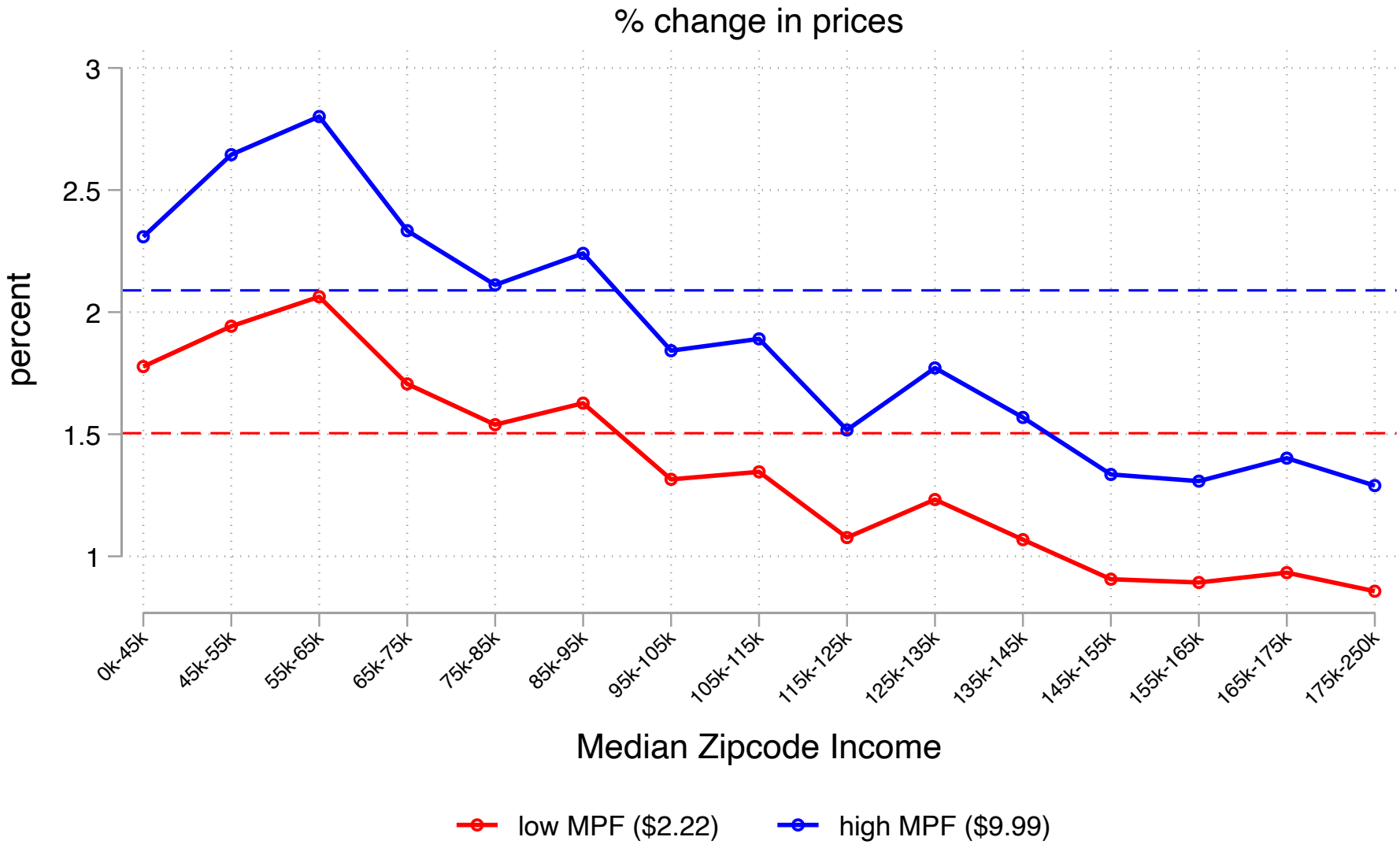
# Policy Experiment

- 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

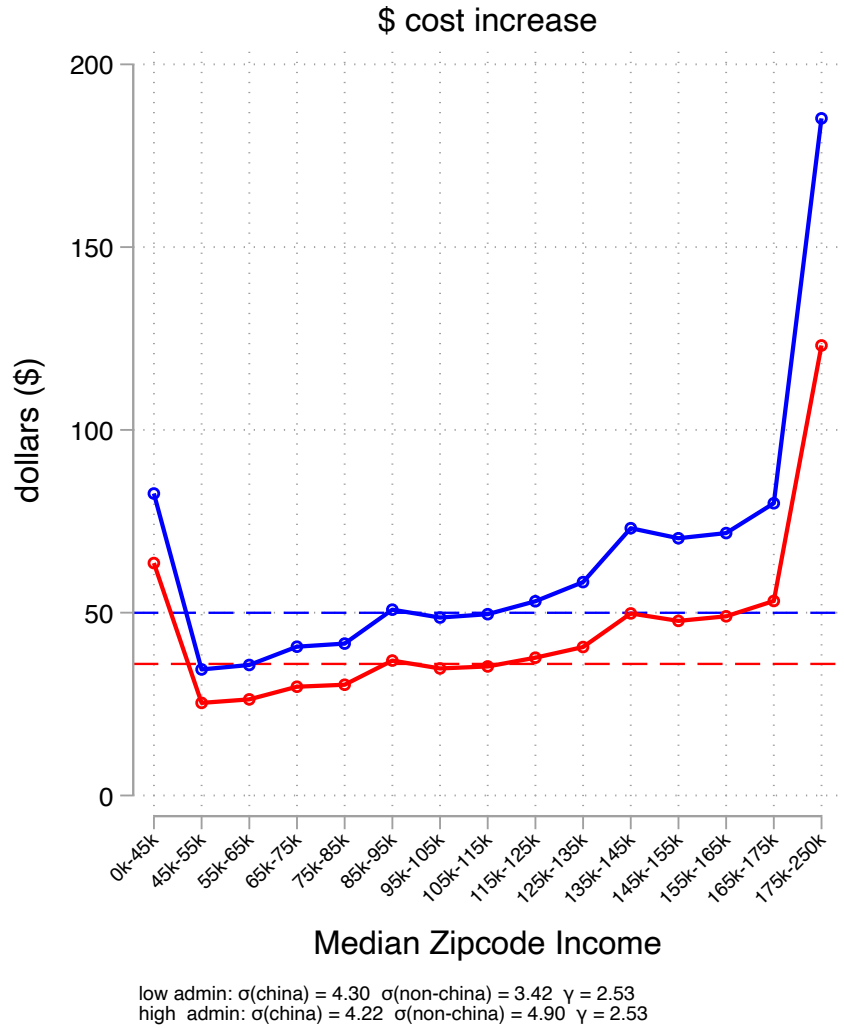


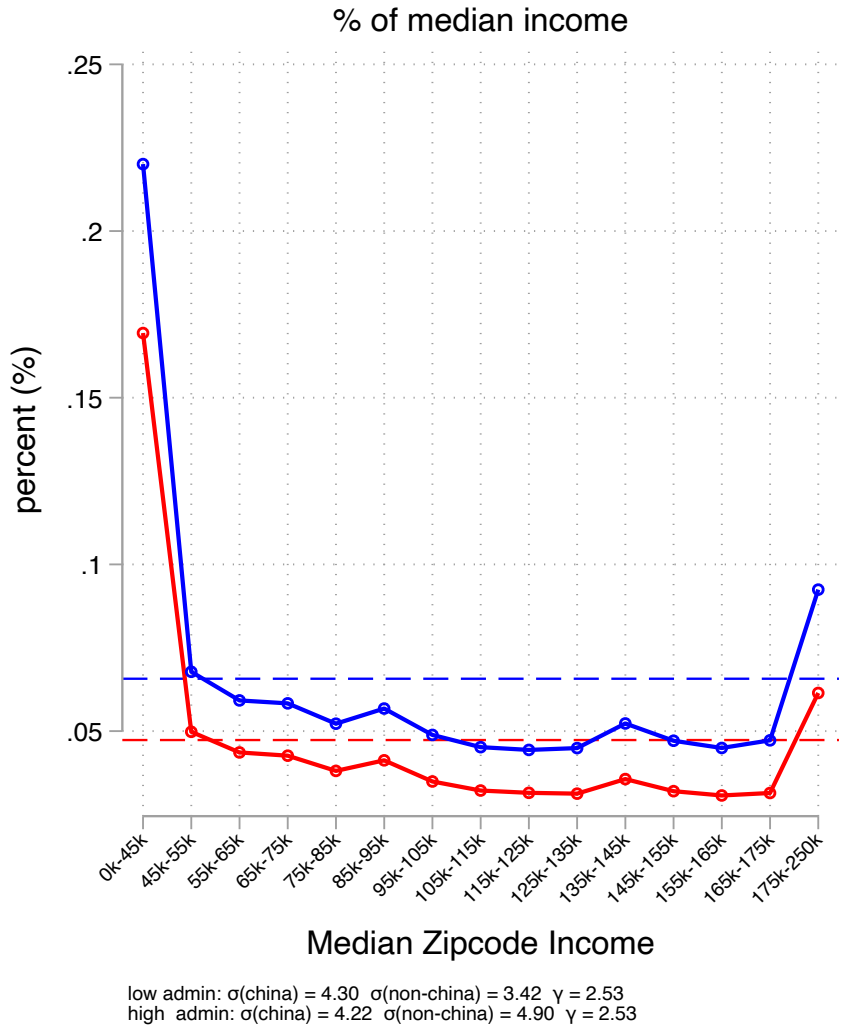

low admin: $\sigma$(china) = 4.30 $\sigma$(non-china) = 3.42 $\gamma$ = 2.53
high admin: $\sigma$(china) = 4.22 $\sigma$(non-china) = 4.90 $\gamma$ = 2.53

Horizontal dash lines denote price index change for the representative consumer. "MPF" is merchandise processing fee.

# Dollar Cost Increase from Removing §321

## increase in cost of direct shipments (change price index ×amount spent)




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

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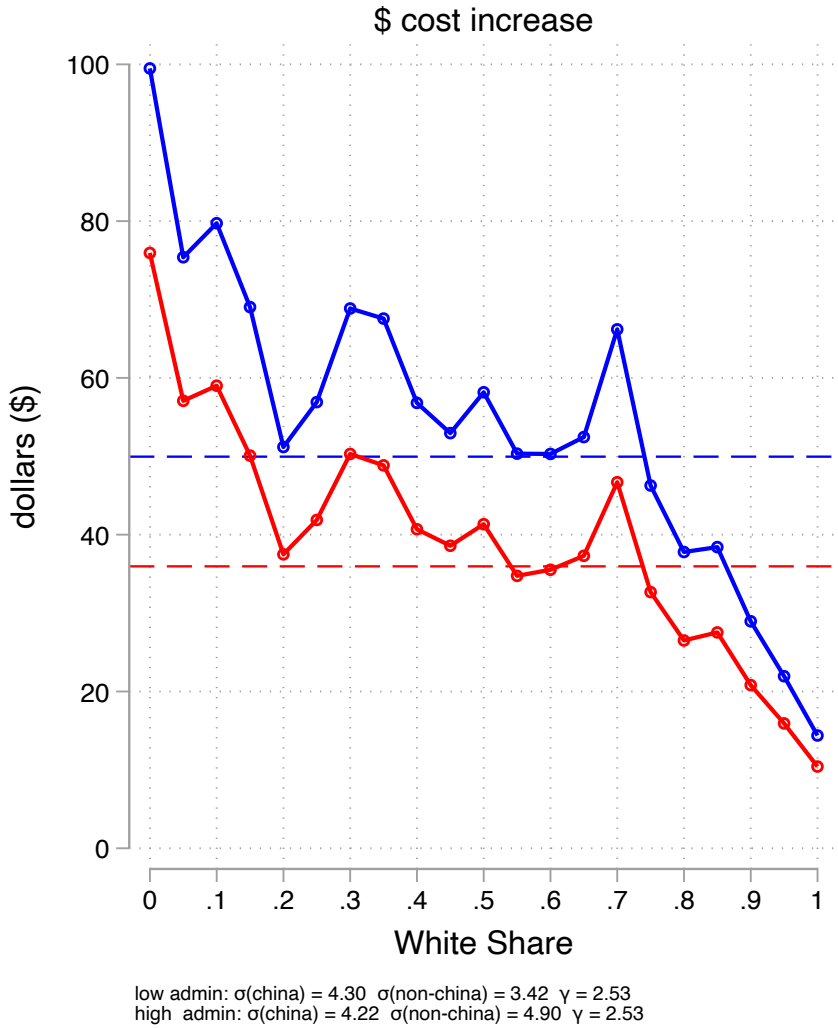
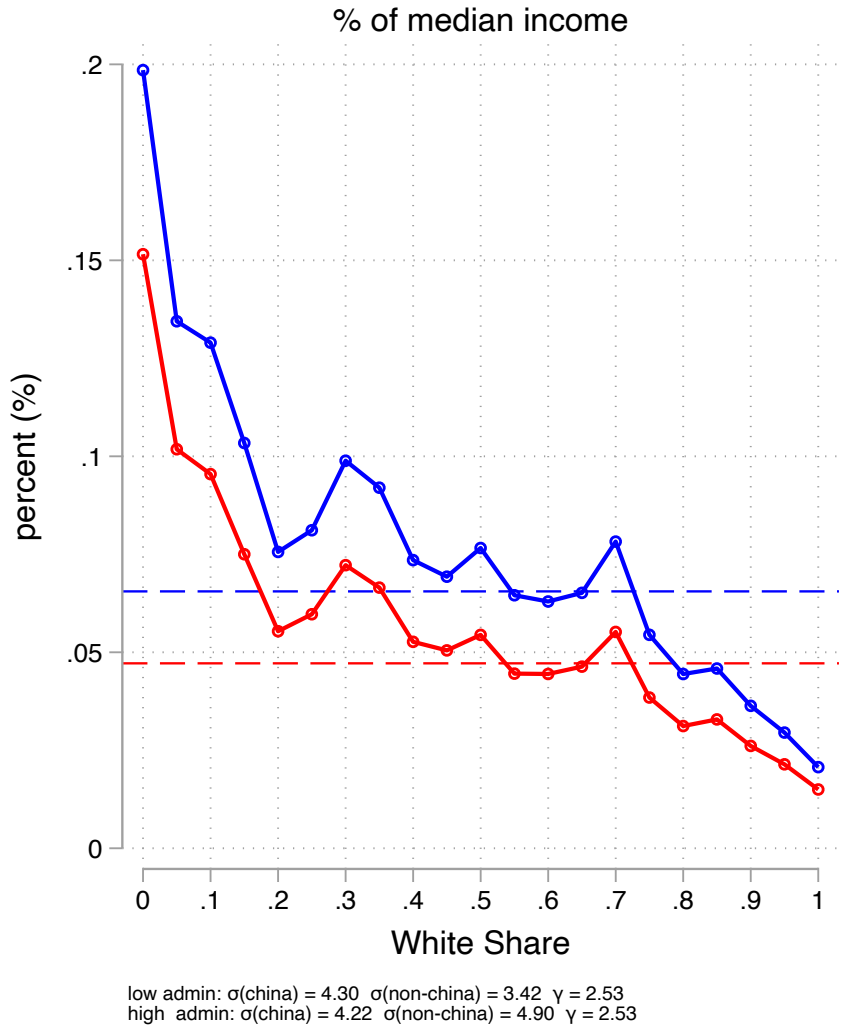


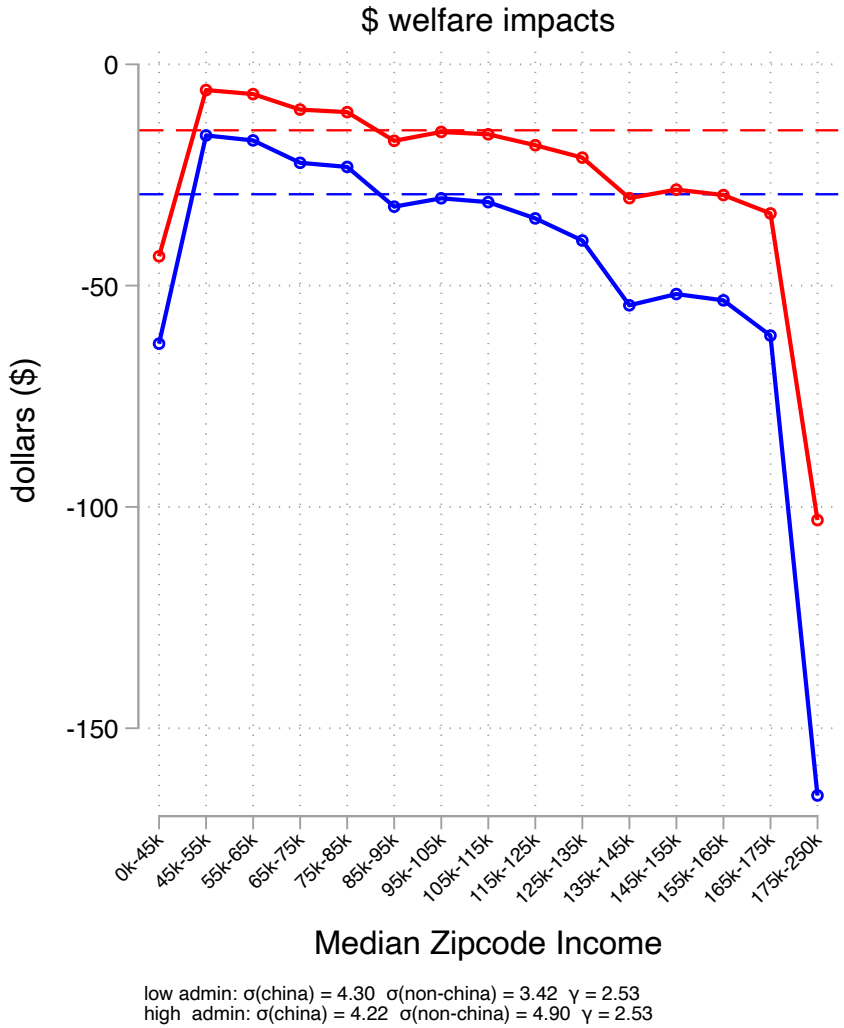



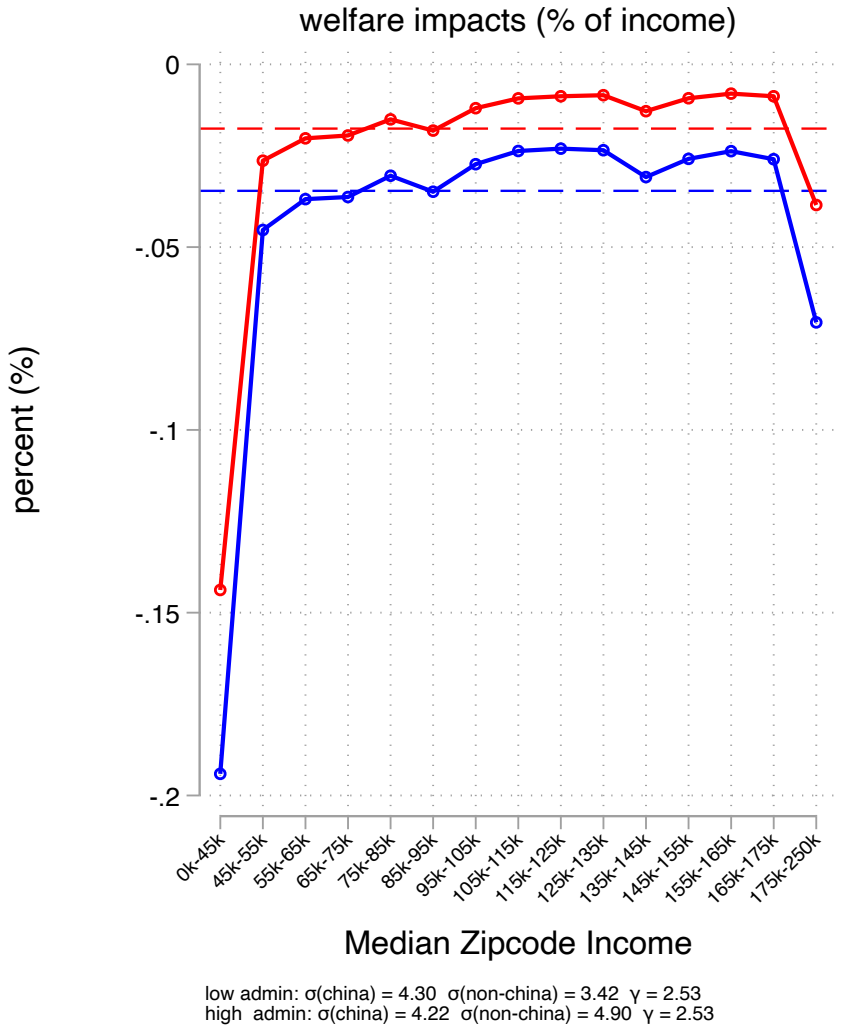

low MPF ($2.22)  high MPF ($9.99)

Horizontal dash lines denote dollar cost changes for the representative consumer. "MPF" is merchandise processing fee.

# Welfare Impacts from Removing §321

## includes tariff revenues equally rebated to consumers



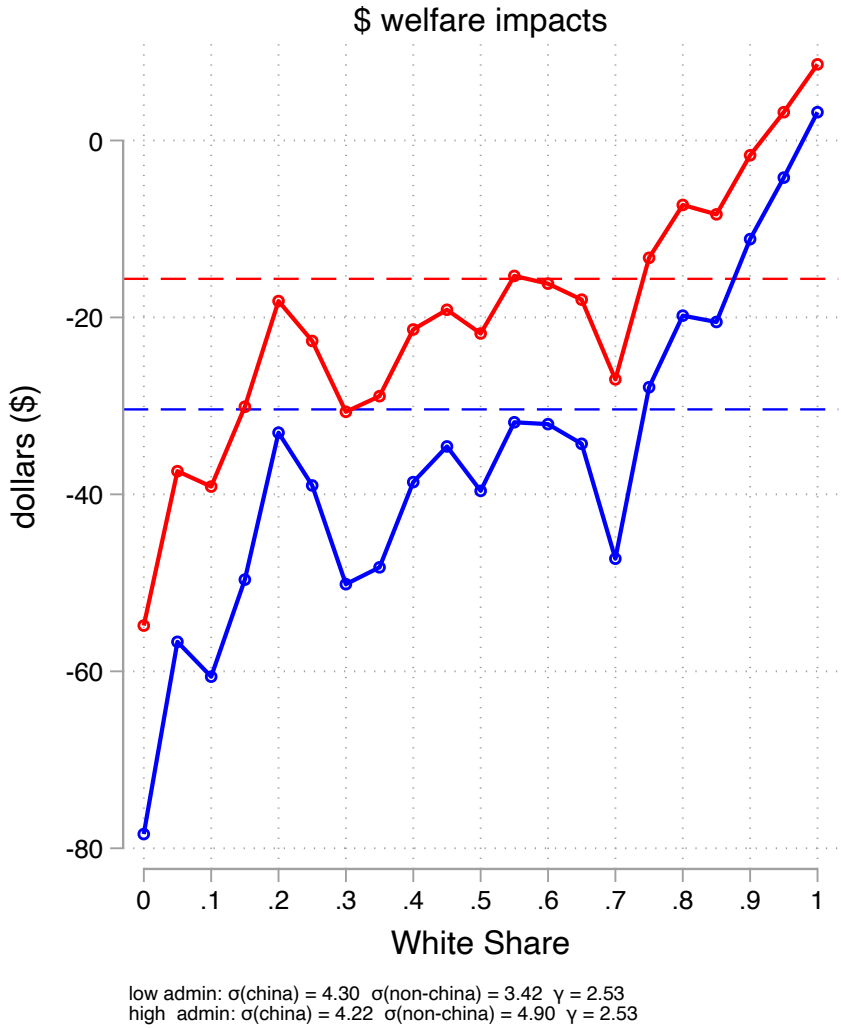



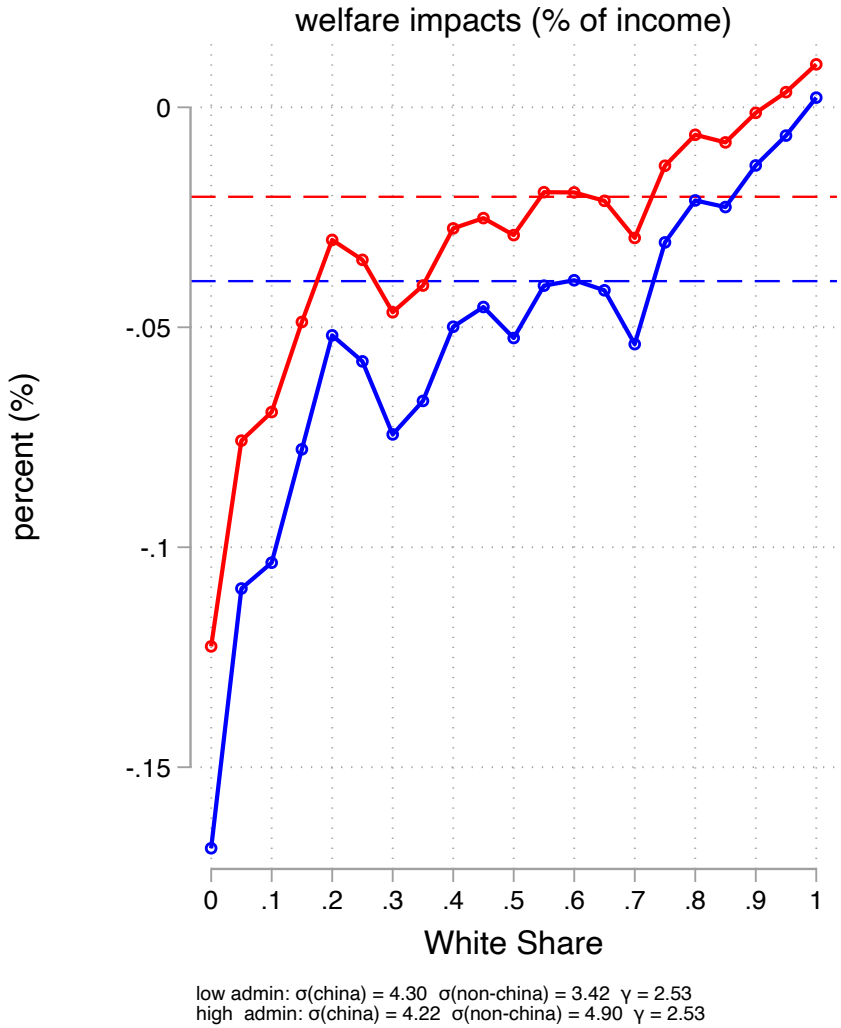

low MPF ($2.22)  high MPF ($9.99)

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




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

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

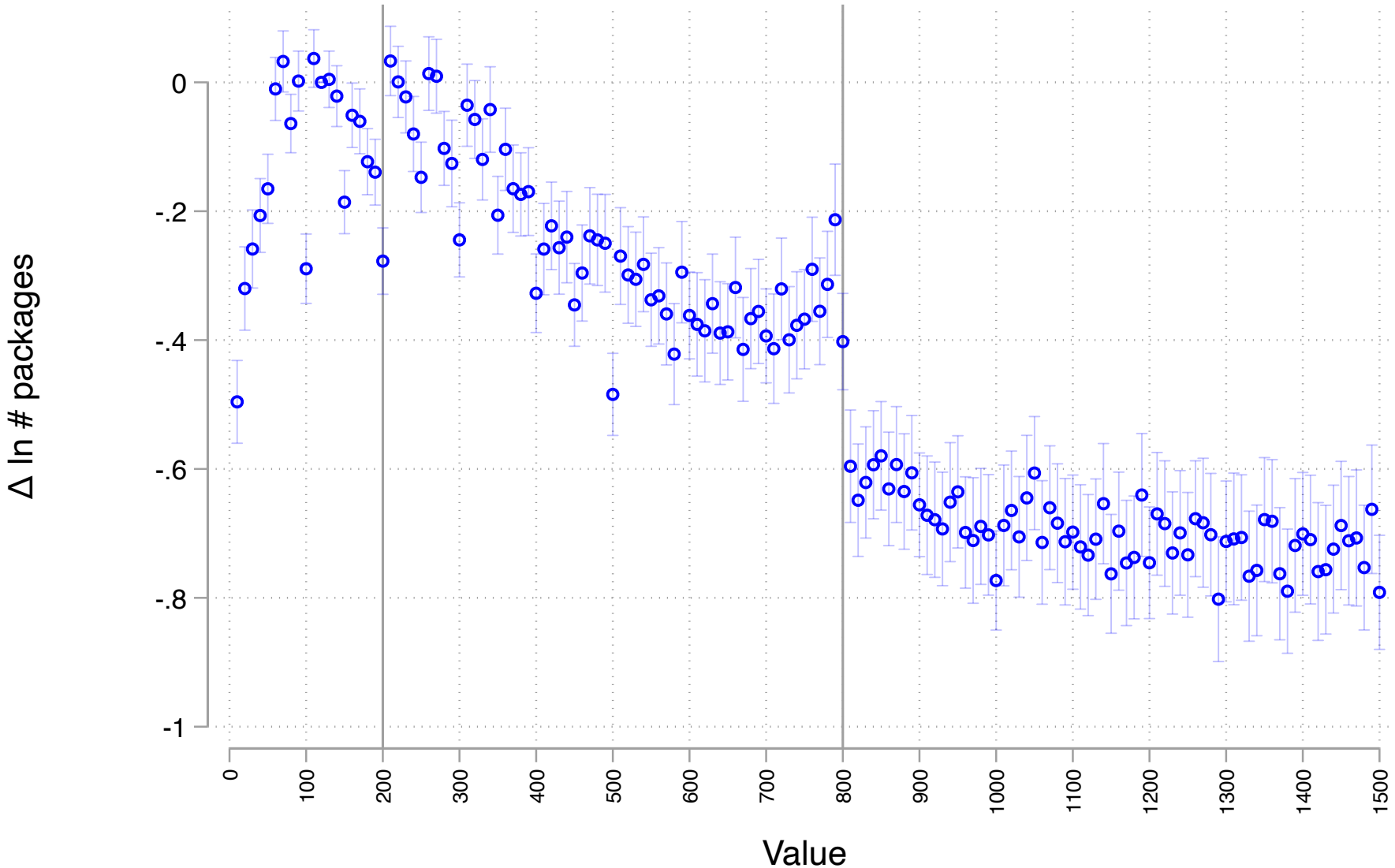
# Preliminary Conclusions

- 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 gain more from §321 than middle-income zips
  - ...as do 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)

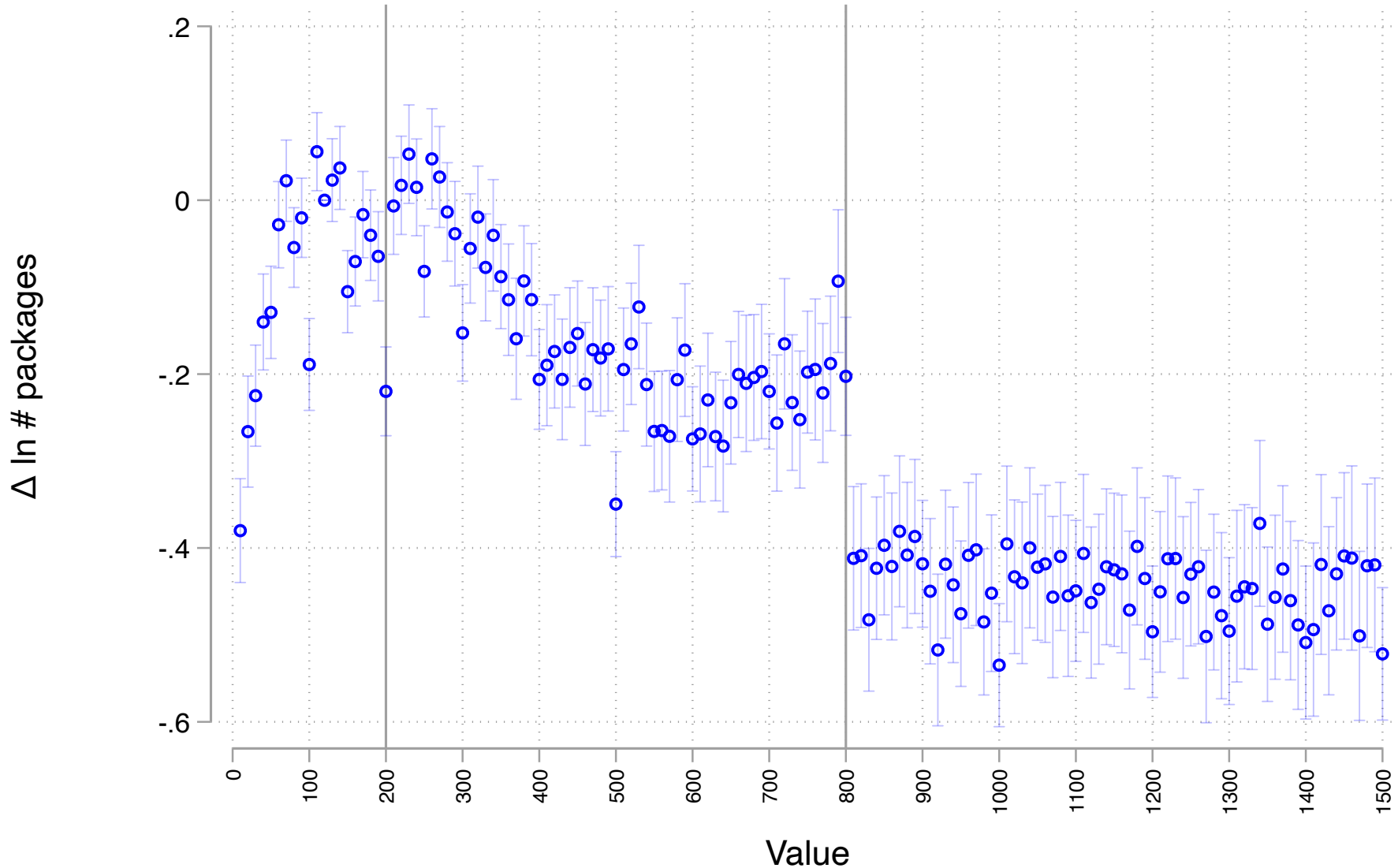
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times post_b + \epsilon_{bodxt}$ if USA==1 & household==1




normalized to Δ # packages at $120

# Δ Density: Post vs Pre (Commercial Points)

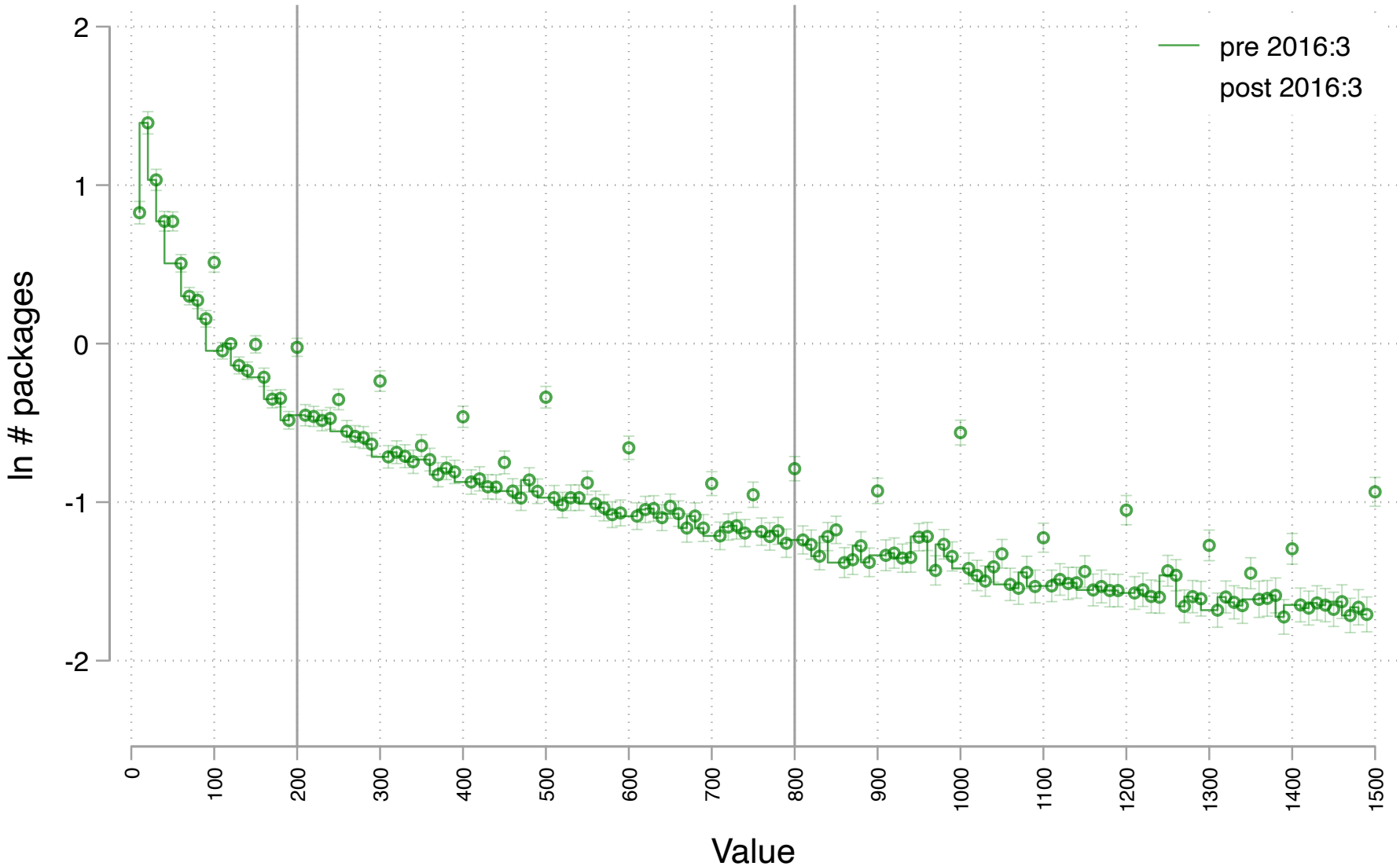
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times post_b + \epsilon_{bodxt}$ if USA==1 & commercial==1




normalized to Δ # packages at $120

# OECD Shipment Density: Before March 2016

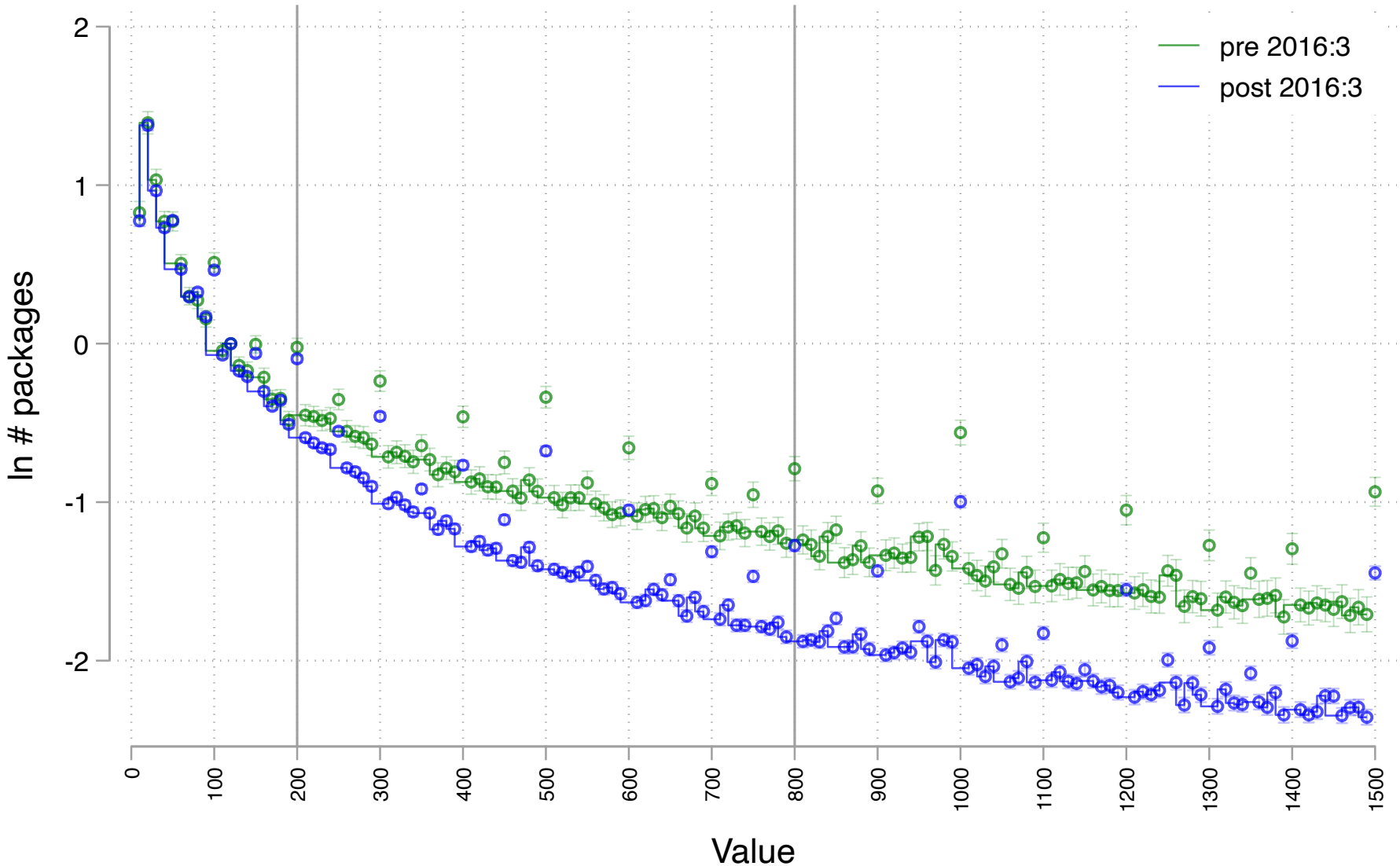
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==0 & post==0




normalized to # packages at $120

# OECD Shipment Density: After March 2016

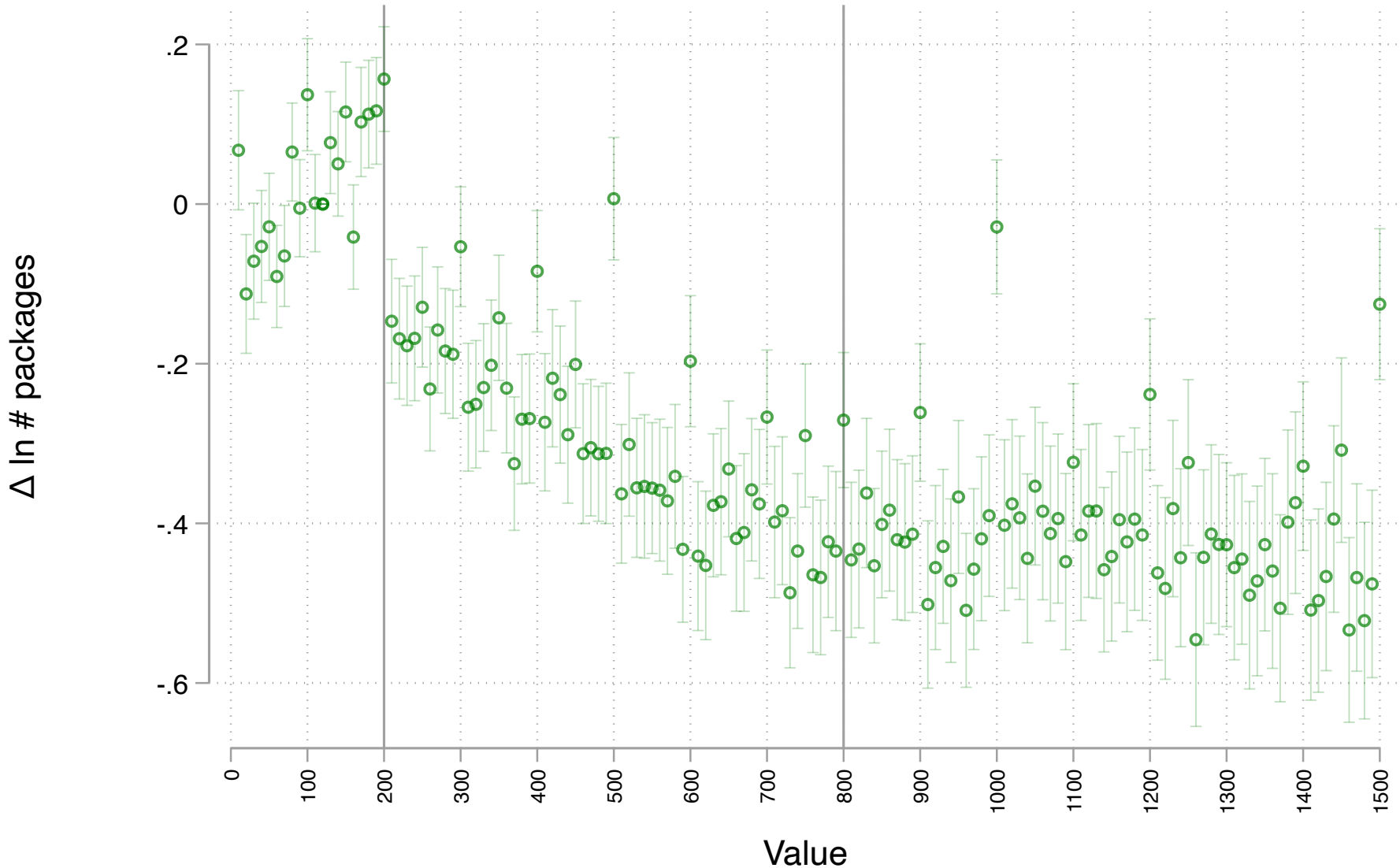
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b + \epsilon_{bodxt}$ if USA==0 & post==1




normalized to # packages at $120

# Δ Density: USA vs OECD in Pre

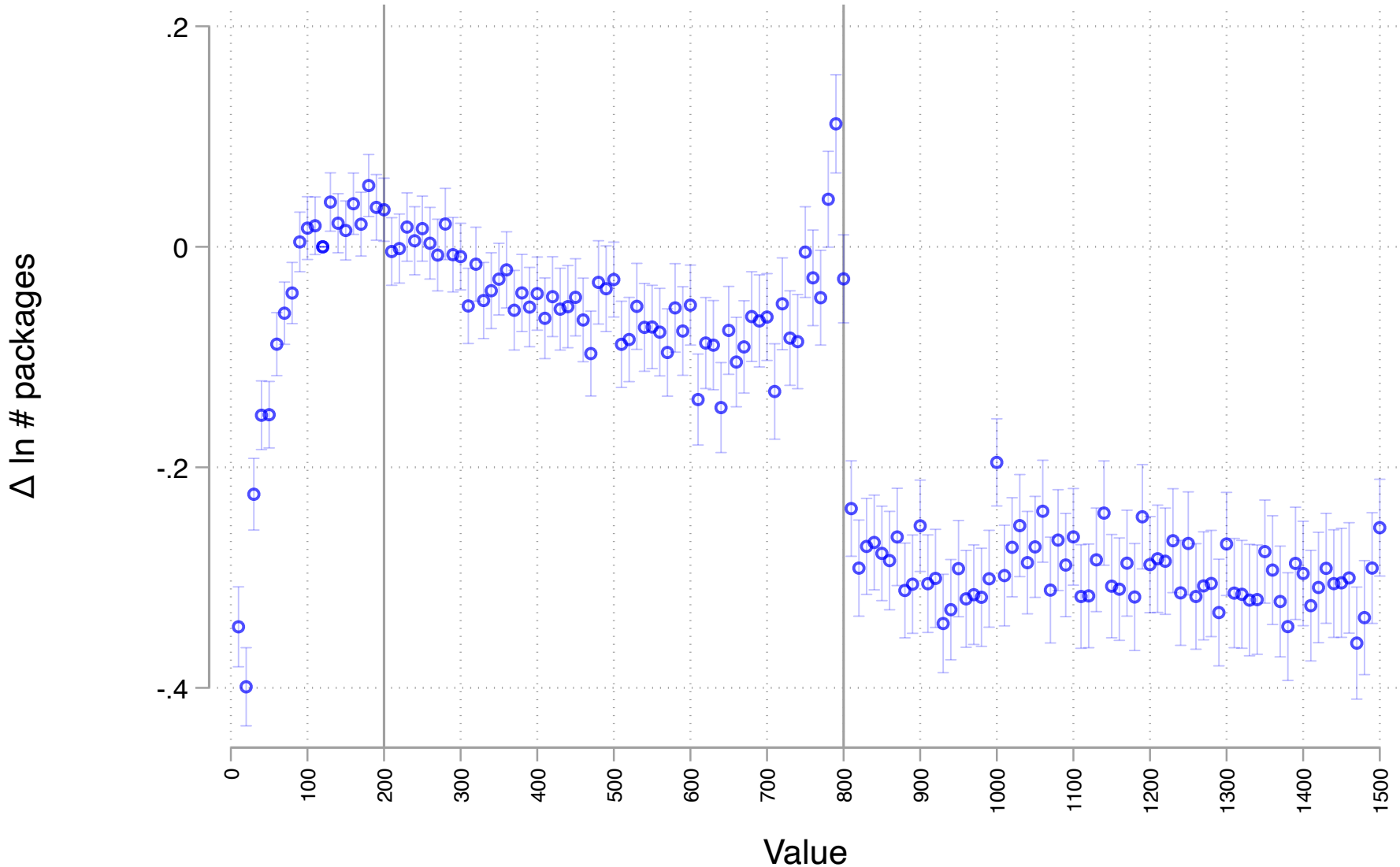
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times USA_d + \epsilon_{bodxt}$ if post==0




normalized to Δ # packages at $120

# Δ Density: USA vs OECD in Post

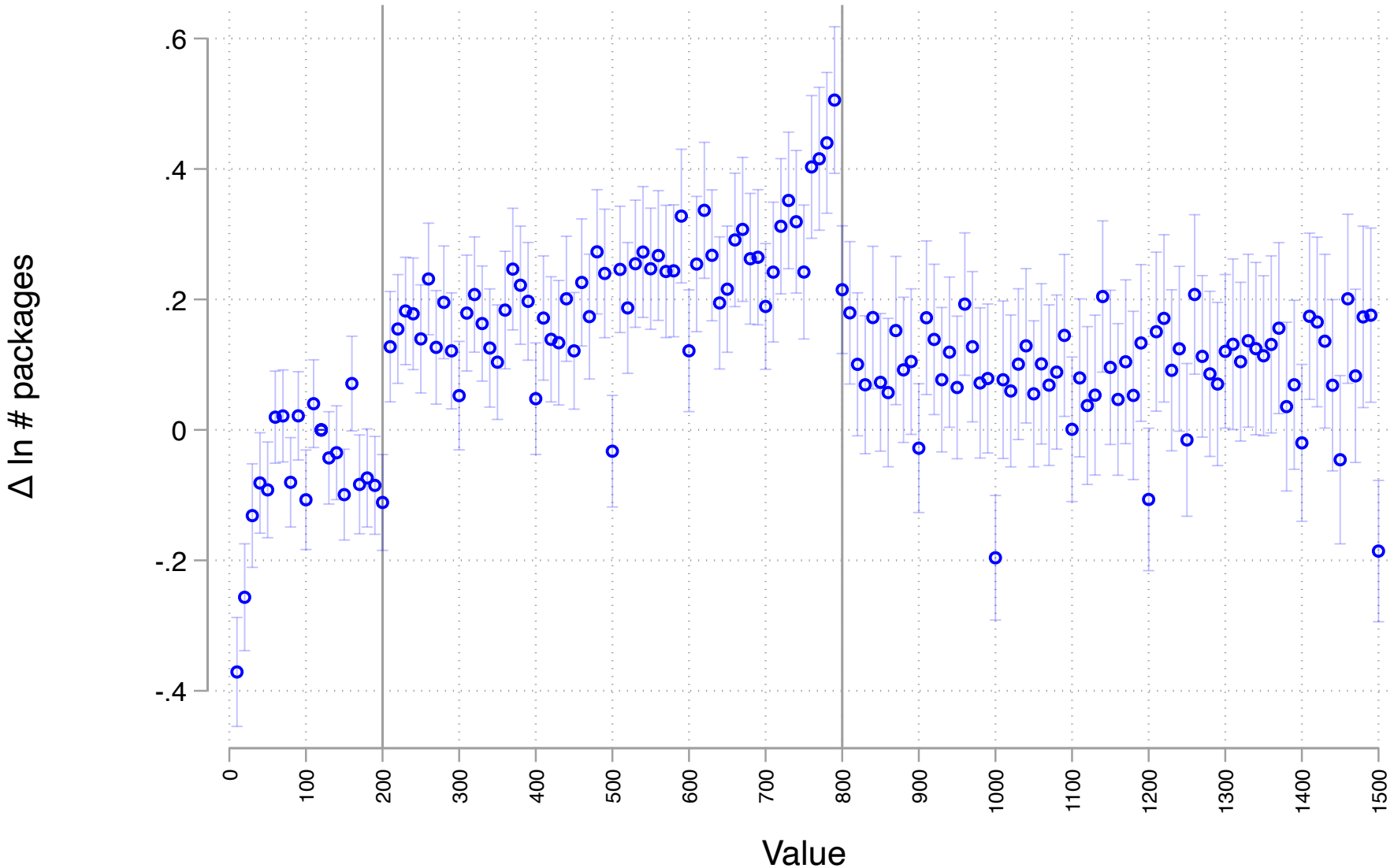
$\ln c_{bodxt} = \alpha_{xt} + \alpha_o + \alpha_{dt} + \beta_b \times USA_d + \epsilon_{bodxt}$ if post==1




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

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