The Effects of Service Integration on Platform Competition and Welfare

Evidence from Fulfillment by Amazon

Kyungho Lee

Yale IO Workshop (November 17, 2026)



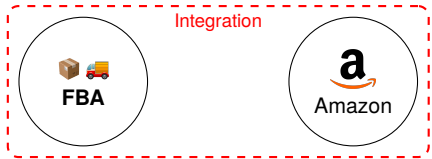
Amazon's Logistics Integration

- Amazon delivered 6.7B packages to U.S. households in 2025. (Shipmatrix, '26)
  - = 18.3M per day, 765K per hour, 212 per second; > USPS (6.6B), UPS (4.4B), FedEx (3.6B)

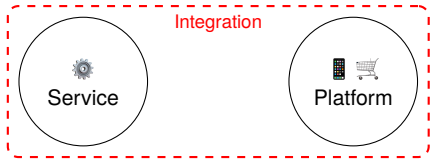
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- **Fulfillment by Amazon (FBA)** is a major part:
  - Amazon stores and delivers sellers' products and charges fees.

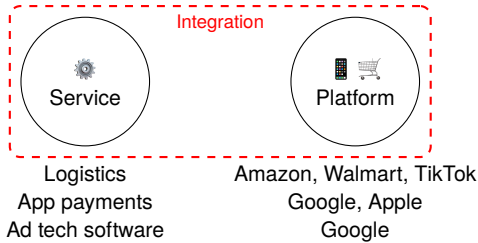


Digital Platform's Integration



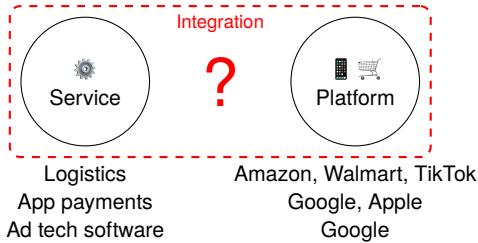
Digital Platform's Integration

- Platforms extend their role beyond intermediation by integrating service provision.



Digital Platform's Integration

- Platforms extend their role beyond intermediation by integrating service provision.
- Policy concerns: (1) **Excessive fees** and (2) **Lock-in**
  - *FTC v. Amazon*, 2023; *Epic v. Apple*, 2020; *Epic v. Google*, 2020; AGCM, 2021; EC, 2022; *United States v. Google*, 2023; CMA, 2023
- Vertical integration theory is on input–output chain ⇒ applicable to a platform market?



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   - leveraging jumps in Amazon's logistics fee schedule.

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2. Examine logistics usage on market outcomes (e.g., multihoming) through a regression discontinuity,
   - leveraging jumps in Amazon's logistics fee schedule.

3. Develop a model of consumers, sellers, and platforms and run counterfactuals.
   - key: (1) platforms' commission and logistics fees pricing; (2) sellers' entry and logistics choices.

Preview of Results

Trade-off:

$(-)$ Exclusive logistics $\Rightarrow$ foreclosure weakens platform competition.

- effect $\propto$ sellers' logistics adoption on multihoming costs.

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Findings:

$(-)$ FBA use deters sellers' multihoming.

- RD + cost estimates $\Rightarrow$ supports the FTC's concern.

$(+)$ Decomposing platform's logistics fee pricing:

$$\text{Logistics fee} = \text{Cost} + \text{Markup} - \underbrace{\text{Commission incentives}}_{\text{substantially offset markup}} + \cdots$$

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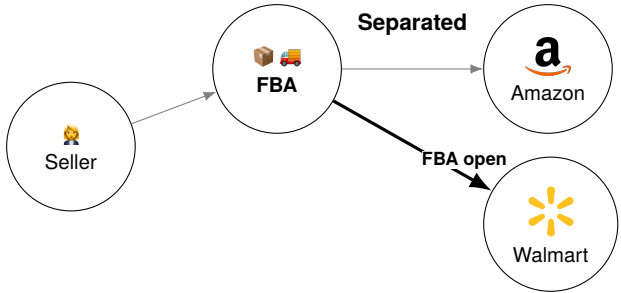
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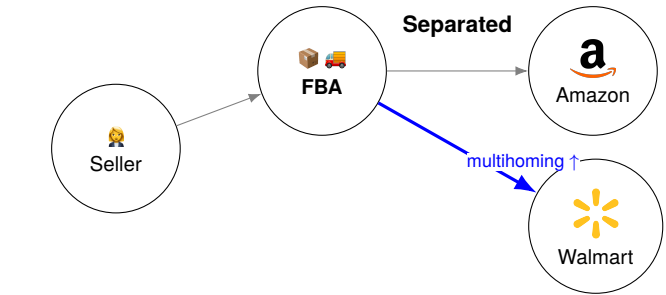


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(+) Multihoming (+92%) ↑ ⇒ more cross-platform competition

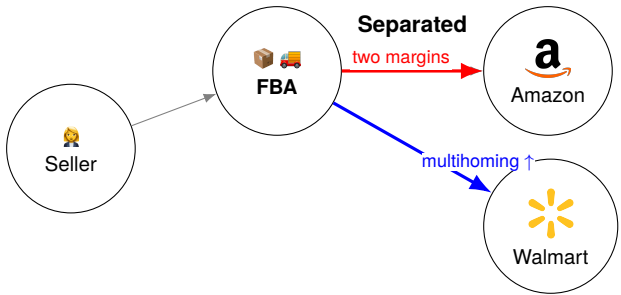
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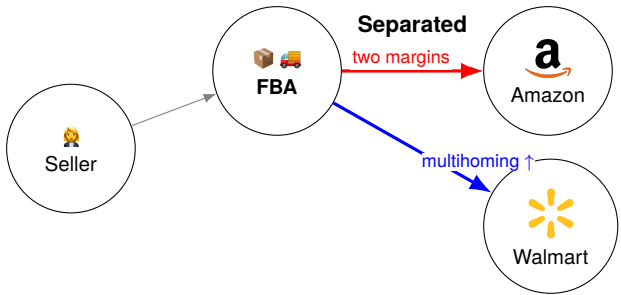
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⇒ Policy direction: remove exclusivity while preserving integration (interoperable logistics)

Related Literature

- Economics of Amazon: "Amazon's Antitrust Paradox" Khan ('16), Zhu and Liu ('18), Scott Morton ('18, '23), Gutiérrez ('21), Lam ('21), Crawford, Courthoud, Seibel, and Zuzek ('22), Etro ('22), Raval ('22), Hunold et al. ('22), Chen and Tsai ('23, '24), Houde, Newberry and Seim ('23), Farronato, Fradkin and MacKay ('23, '25), Bennati ('24), Yu ('24), Lee and Musolff ('25), ...

  $\leftrightarrow$ Examine Amazon's cross-platform competition.

- Platform (multi-sided) markets: Rochet and Tirole ('03), Caillaud and Jullien ('03), Rysman ('04), Armstrong ('06), Weyl ('10), Lee ('13), Wang and Wright ('17), Schaefer and Tran ('20), Jullien, Pavan and Rysman ('21), Castillo ('22), Calder-Wang ('22), Farronato and Fradkin ('22), Hagiu, Teh and Wright ('22), Anderson and Bedre-Defolie ('24), Sullivan ('24), Allcott et al. ('25), Bar-Isaac and Shelegia ('25), ...

- Vertical integration: Spengler ('50), Williamson ('71), Salop and Scheffman ('83), Salinger ('88), Ordover et al. ('90), Hart and Tirole ('90), Chipty ('01), Hortaçsu and Syverson ('07), Lee ('13), Crawford, Lee, Whinston and Yurukoglu ('18), Luco and Marshall ('20, '21), Beck and Scott Morton ('21), Chen, Yi and Yu ('24), Cuesta, Noton, and Vatter ('25), Hodgson and Sun ('25), ...

  $\leftrightarrow$ Empirical framework to evaluate the welfare effects of vertical integration of services by platforms, with a timely application.

Institutional Background

U.S. E-commerce Industry

- Marketplaces:
  - Amazon holds 40% of US e-commerce sales; Walmart is second with 10%.
  - No other marketplace exceeds 4% $\Rightarrow$ main competitors to each other.
  - Active sellers in 2025: Amazon 2M, Walmart 200K.
    (DigitalCommerce 360, '25; RedStagFulfillment, '26)
- Integrated logistics:
  - Fulfillment by Amazon (FBA); Walmart Fulfillment Services (WFS).
- First-party retail:
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$\Rightarrow$ **Platform's main revenue channels**: (1) commission, (2) logistics, and (3) retail.

E-commerce logistics: a seller's perspective



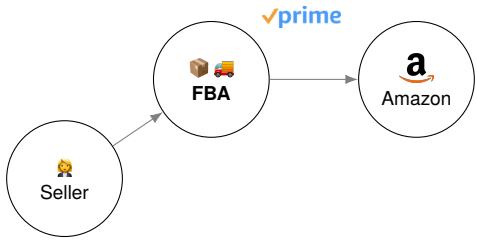
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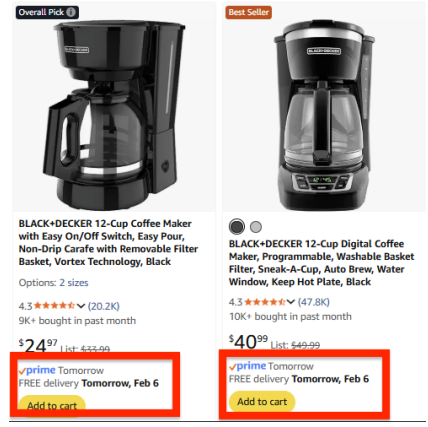
E-commerce logistics: a seller's perspective



- **Where** to sell? $\Rightarrow$ Amazon.

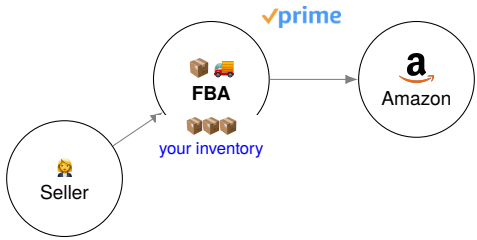
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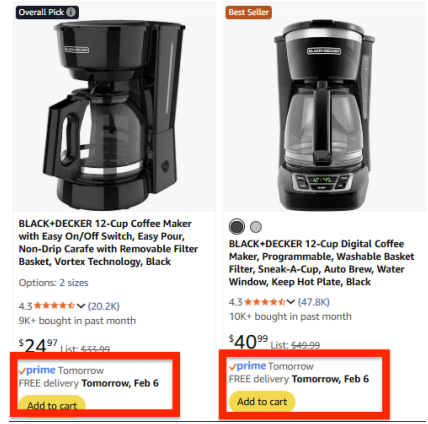




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- **How** to store and deliver? ⇒ **FBA** ⇒ Prime eligibility ⇒ higher sales.

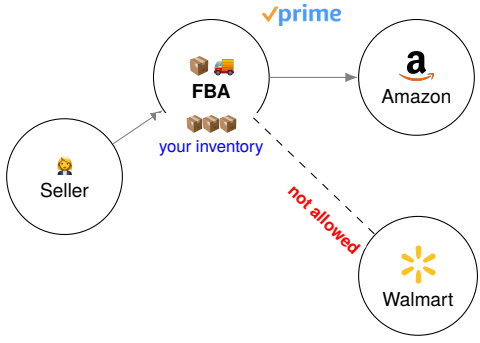
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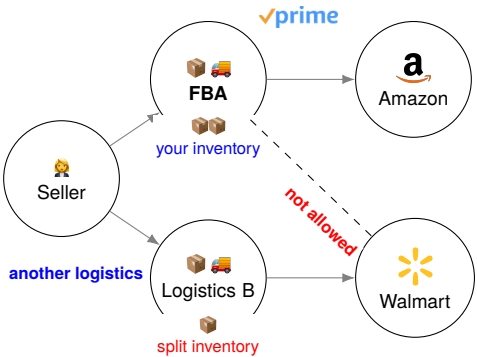
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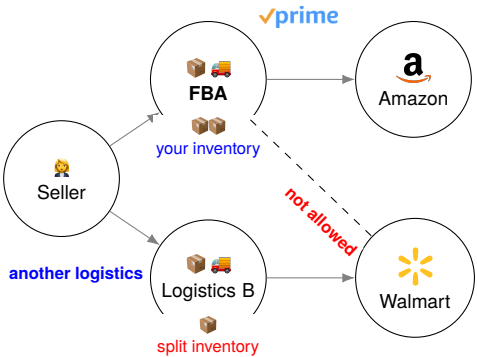
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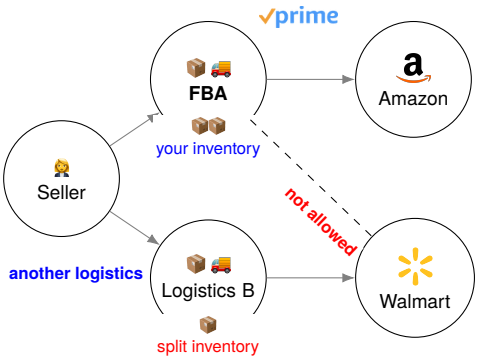
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"… stifling multihoming and thus harming competition…"

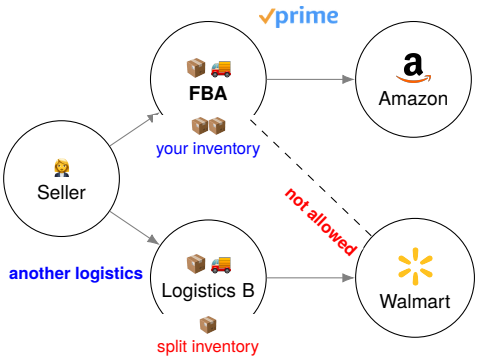
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cf. Independent logistics allows inventory pooling (single logistics for multiple platforms) ⇒ lower costs.

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⇒ **Key competition margin: FBA and multihoming**

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Data and Descriptive Analysis

Data

Matching | Stats | Kitchen Stats

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Product Web Page

Home & Kitchen › Kitchen & Dining › Small Appliances › Ovens & Toasters › Toasters



Click to see full view



Chefman Stainless Steel 2-Slice Wide Slot Toaster w/Bagel, Defrost, and 5 Shade Settings Quickly Toasts Muffins, Bagels, Bread and More

Visit the Chefman Store

3.6 ★★★½☆ (331)

$29.99

Get $50 off instantly: Pay $0.00 ~~$29.99~~ upon approval for Amazon Visa. No annual fee.

Get **Fast, Free Shipping** with Amazon Prime

FREE Returns

Brand	Chefman
Color	Silver
Material	Stainless Steel
Specific Uses For Product	Bagel, Bread
Wattage	850 watts

About this item

- NEW AND IMPROVED: The Chefman 2 Slice Stainless Steel Toaster has a modern look with classic brushed stainless steel and blue LED indicators to form a timeless upgrade for your countertop. 5 different shade settings plus bagel, reheat, and warm functions lets each person toast their preferable way.
- WIDE SLOTS AND CONVENIENT CRUMB TRAY: The 2 extra wide slots, auto-adjust to fit all types of foods like thick artisanal breads, bagels, muffins, white bread, buns, waffles, pancakes, and thinly sliced snacks from the cabinet or freezer.
- TOAST YOUR WAY: The shade control setting offers a full range of browning options to allow perfect customization of any bread. Settings 1-2 creates a light shade of toast, settings 3-4 creates a medium shade of toast and setting

prime

Enjoy fast, free delivery, exclusive deals, and award-winning movies & TV shows.

Join Prime

$29.99

Get **Fast, Free Shipping** with Amazon Prime

FREE delivery **Friday, September 11** on orders shipped by Amazon over $35

Delivering to New Haven 06511 - Update location

Only 2 left in stock - order soon.

Quantity: 1

Add to cart

Buy Now

Ships from	Amazon
Sold by	Chefman Direct
Returns	FREE 30-day refund/replacement
Payment	Secure transaction

See more

Product Web Page

Home & Kitchen › Kitchen & Dining › Small Appliances › Ovens & Toasters › Toasters



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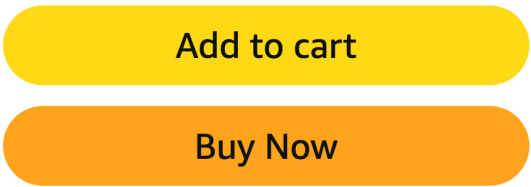
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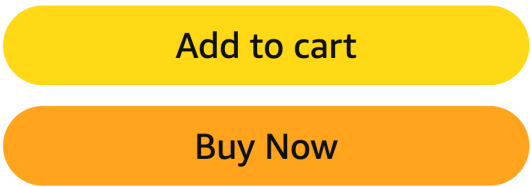


Walmart

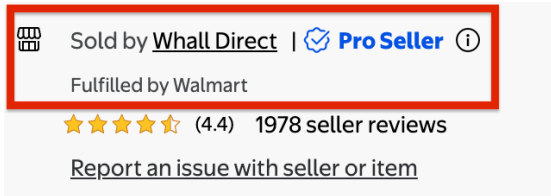


Product Web Page

Amazon



Walmart



⇒ Logistics usage

Seller Web Page

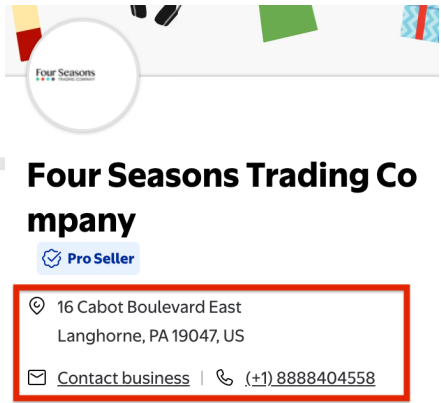


Seller Web Page

Amazon



Walmart



⇒ Seller identifier: name, address and phone number ⇒ Multihoming

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Panel	Coverage	Amazon	Walmart
Full-category Keepa, DataSpark, BlueCart	100k bestsellers 9 categories Jan 2021 – Aug 2025	Rich characteristics	Verify entry of products and sellers from Amazon (UPC + seller ID match)

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Kitchen appliance Web Scraping, Bizmetrica, Jungle-Scout	1.3k bestsellers 13 subcategories Apr – Jun 2025	Rich characteristics on both platforms.	
Consumer Numerator	U.S. households Jan – Dec 2025	Transaction records across retailers income and memberships (e.g., Prime, Walmart+).	

- Key variables: prices, logistics, fees, and sales ranks.
- Kitchen appliances have large variation in size and weight, hence in logistics fees.

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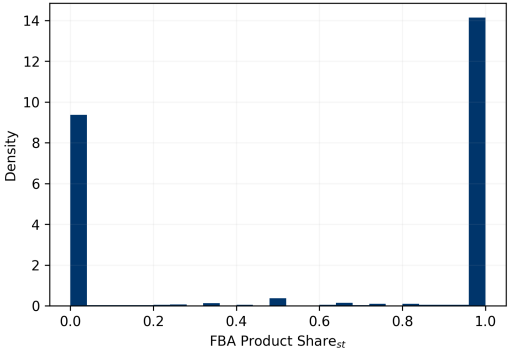
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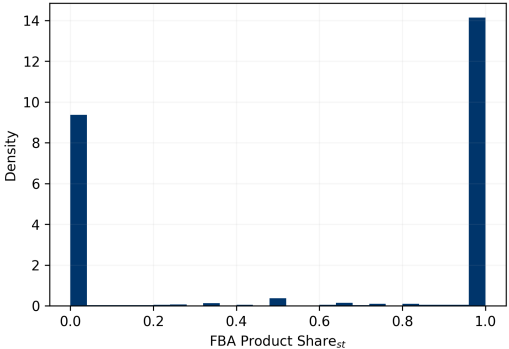
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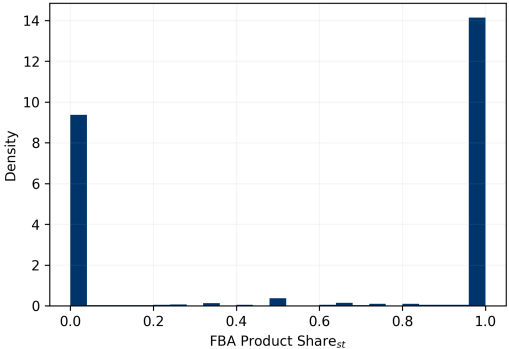


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- Majority of Amazon sellers use Amazon logistics.

$\Rightarrow$ Some profitable reasons.

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$\Rightarrow$ Some profitable reasons.

- Sellers use Amazon logistics for all or none.

$\Rightarrow$ Sellers prefer to pool inventory.

Stylized Facts: Multihoming

- 7.6% of Amazon *products* have Walmart sellers;
- 2.3% of Amazon *sellers* enter Walmart.

Stylized Facts: Multihoming

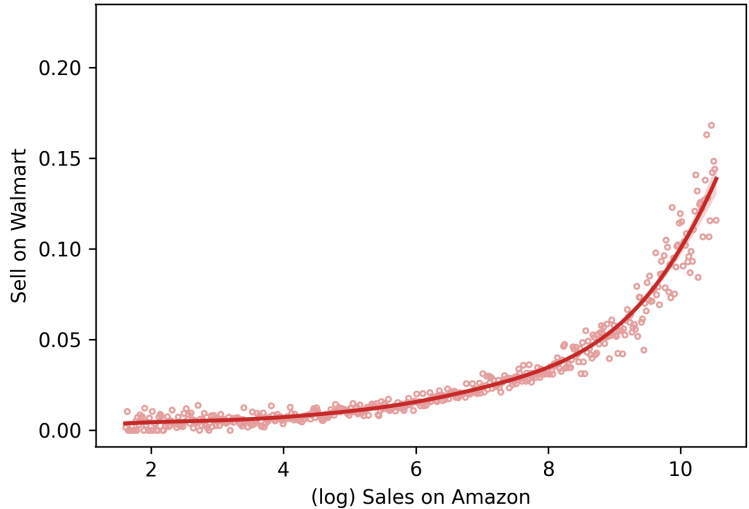
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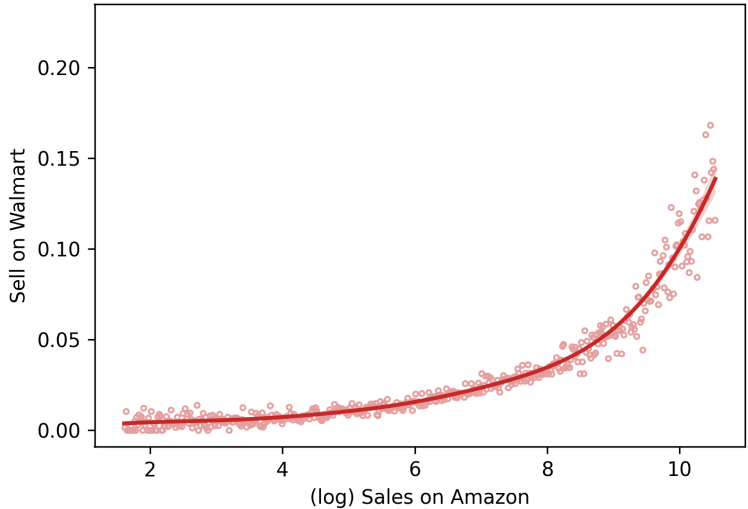


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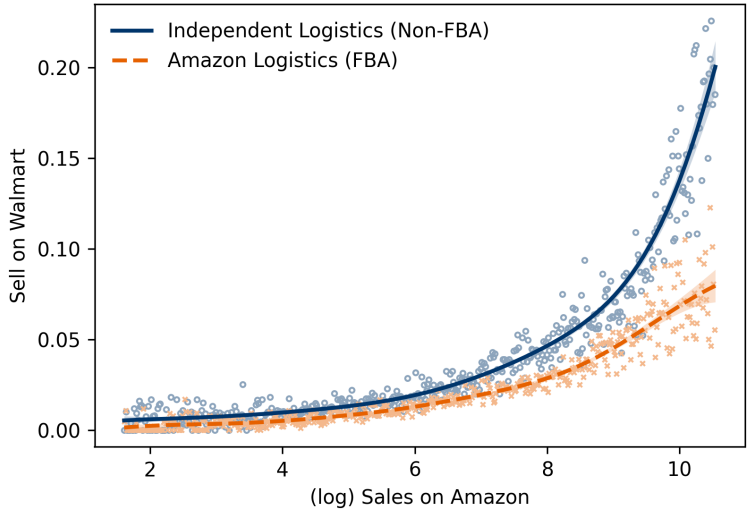
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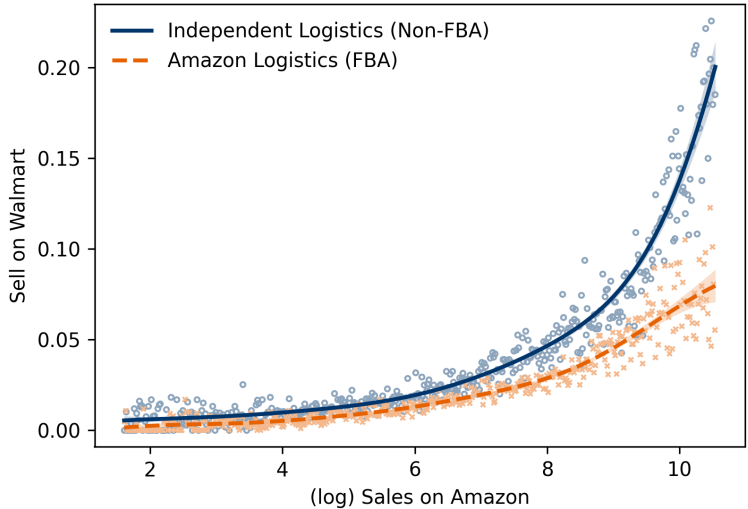
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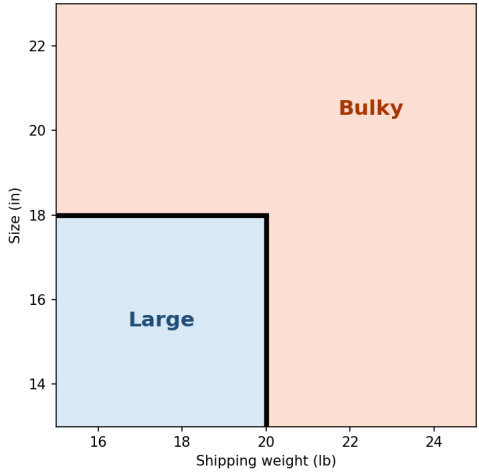
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- **Weaker correlation among FBA sellers.**

$\Rightarrow$ **More direct evidence for FBA on Multihoming?**

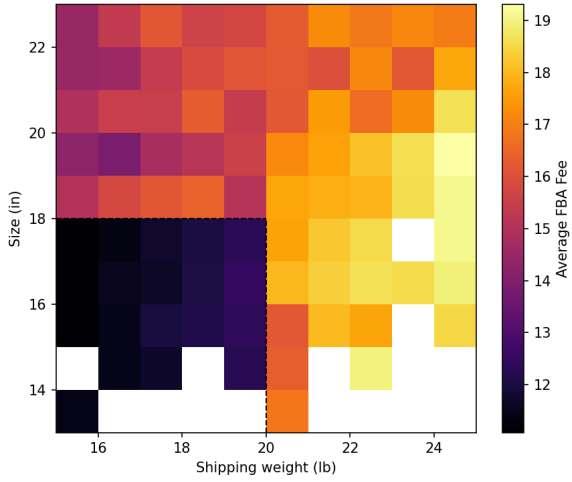


Amazon classifies products into tiers based on size and weight.



Product classifications

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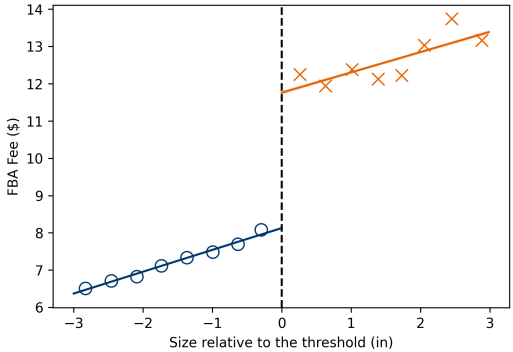
FBA fees ($)

- Fee increases about 30–50% by crossing any threshold. Density Running Variable

Regression Discontinuity Design

Product j month t. (Cattaneo et al., '14; Cattaneo et al., '17) Other Cutoffs

$$\Rightarrow \quad y_{jt} = \beta_0 + \beta_1 \underbrace{\mathbf{1}(x_j \geq 0)}_{\text{passing threshold}} + \underbrace{m(x_j)}_{\text{local polynomial}} + \tau_{year(t)} + u_{jt}$$

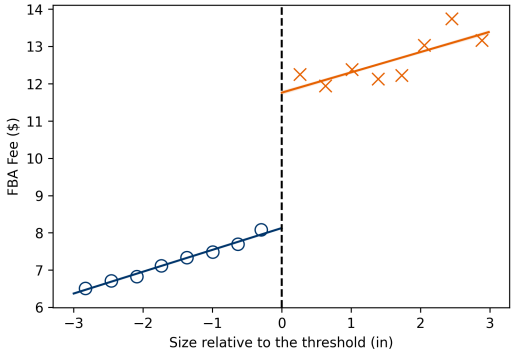


Amazon Logistics Fees

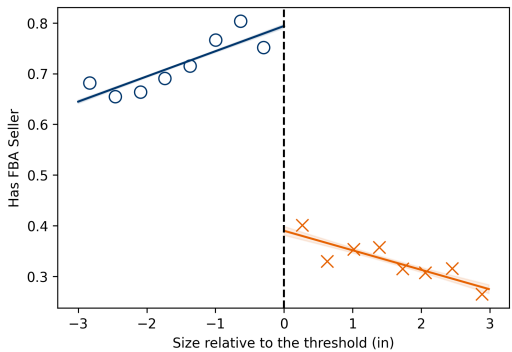
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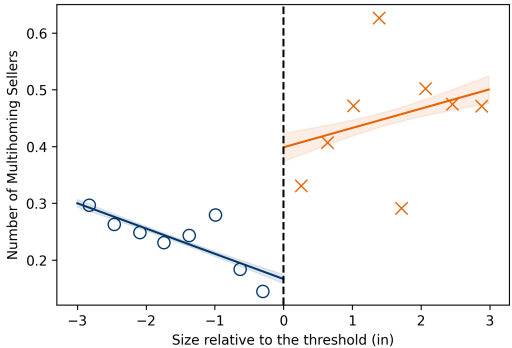


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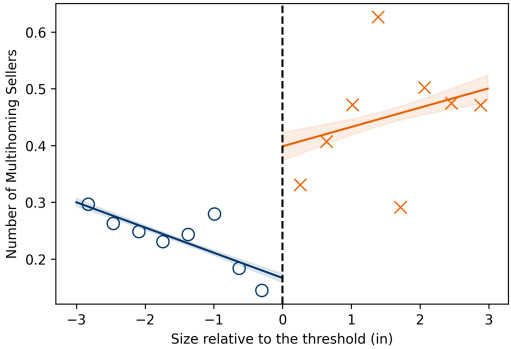


Has FBA Seller

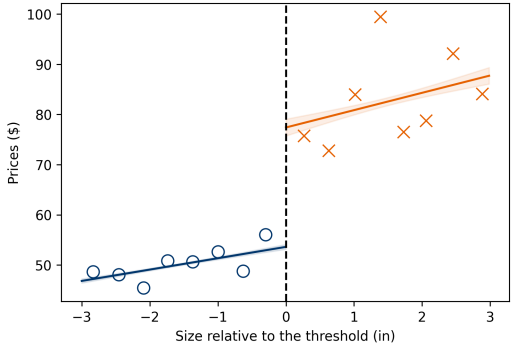
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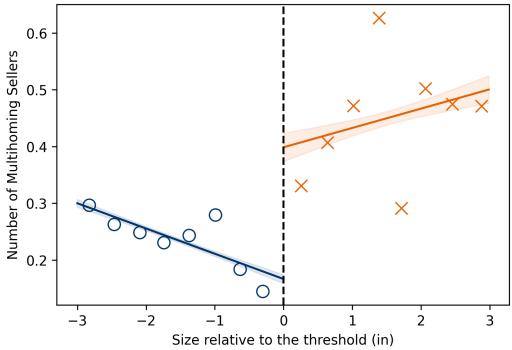


Multihome

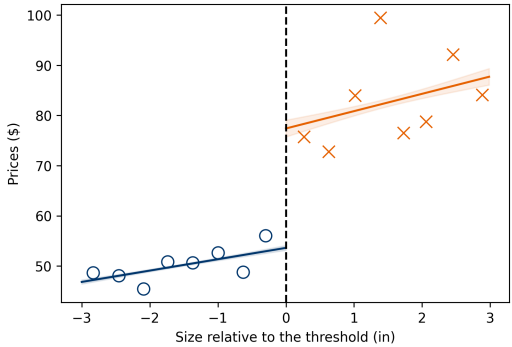


Consumer Prices on Amazon

Regression Discontinuity Design



Multihome



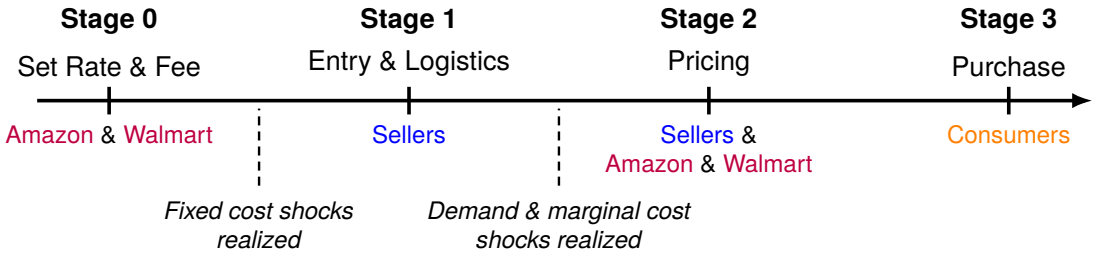
Consumer Prices on Amazon

- Sellers facing higher FBA fees use FBA less and multihome more.
- FBA fees are passed through to consumer prices.

$\Rightarrow$ **FBA affects consumer welfare and platform competition through seller multihoming.**

Model

Model Overview



- Market is subcategory (c) $\times$month (t) (e.g., Air fryer $\times$ Apr 2025)
  - $\Rightarrow$ Platforms aggregate markets and set the rates and fees.



- **Key objective to capture:**

  (1) price sensitivity, (2) logistics valuation and (3) cross-platform substitution.

Demand Model Details Nests Market Size

Random coefficient nested logit with demographic interactions (BLP '95; Petrin '02)

Indirect utility of consumer purchasing a product on a platform:

$$U = \text{Prices} + \text{Logistics} + \text{Platform} + \text{Other Product Characteristics} + \text{Unobserved}$$

3 Key Parts:

1. Prices :
2. Logistics :
3. Platform :

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Demand Model

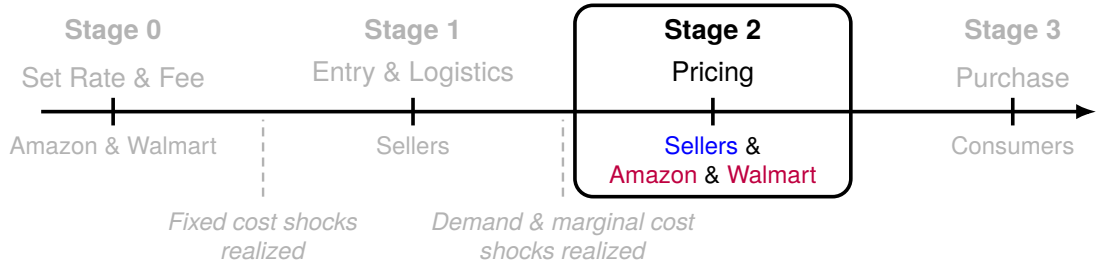
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2. Logistics: FBA valuation varies by Prime membership.
   - Prime members get fast shipping on FBA products.
3. Platform: (1) Walmart valuation varies by Walmart+ membership; (2) Platform-nest



- **Key objective to capture:**

  Sellers' marginal costs, depending on (1) fees and (2) scale economies.

Pricing and Variable Profits

Recovering MC

Seller s, product j, platform f

- **Pricing**:

$$\mathbf{p}_s^* = \arg\max_{\mathbf{p}_s} \pi_s(\mathbf{p}_s, \mathbf{p}_{-s})$$

- **Variable profit** of product j on platform f:

$$\pi_{jf} = \underbrace{Q_{jf}}_{\text{Sales Quantity}} \times \left[(1 - \underbrace{\phi_{jf}}_{\text{Commission Rate}}) \times \underbrace{p_{jf}}_{\text{Price}} - \underbrace{mc_{jf}}_{\text{Marginal Cost}} \right]$$

Marginal Cost Function of Sellers

Details

product j, platform f

Marginal cost function:

$$mc_{jf} = \text{Logistics Fees} + \text{Scale} + \text{Cost Shifters} + \text{Unobserved}$$

2 key parts depend on the seller's **logistics choice**.



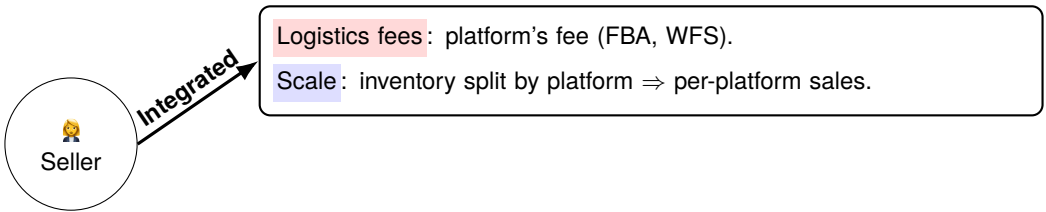
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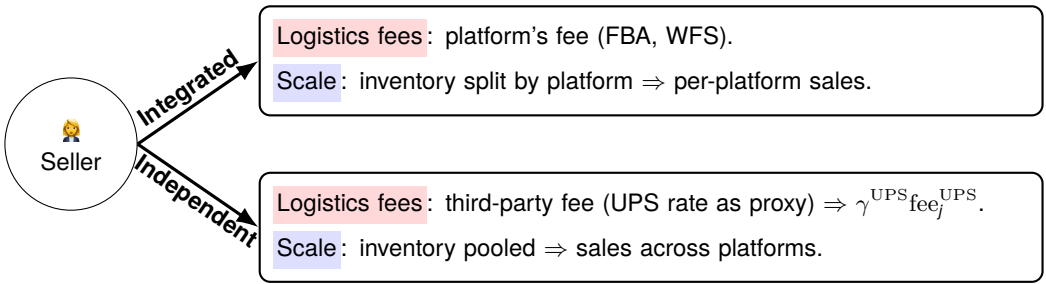
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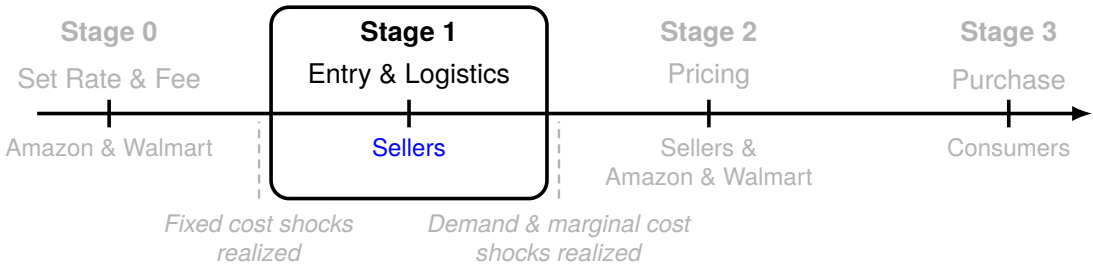
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- **Key objective to capture:**

  Seller's fixed costs.

Entry, Logistics Adoption, and Fixed Costs

- **Entry & logistics** $\mathbf{d}_s = (\underbrace{e_{s\text{Amz}}, e_{s\text{Wmt}}}_{\text{Entry}}, \underbrace{\ell_{s\text{Amz}}, \ell_{s\text{Wmt}}}_{\text{Platform logistics}})$:

  e.g., $(1,0,1,0)$ = Amazon only with FBA; $(1,1,0,0)$ = Multihoming with independent logistics

$$\mathbf{d}_s^* = \arg\max_{\mathbf{d}_s} \mathbb{E}[\underbrace{\pi_s(\mathbf{d}_s, \mathbf{d}_{-s})}_{\text{Variable Profit}} - \underbrace{FC_s(\mathbf{d}_s)}_{\text{Entry Cost}}]$$

- Fixed costs of entry:

$$FC_j(\mathbf{d}_s) = \underbrace{\overline{FC}(\mathbf{d}_s)}_{\text{Mean}} + \underbrace{\nu_j(\mathbf{d}_s)}_{\text{Unobserved}}$$

  - $\overline{FC}(\mathbf{d}_s)$ is a target parameter of interest, a function of entry and logistics adoption in $\mathbf{d}_s$.

  e.g., Inventory management, wholesaling, labor, operations, marketing, etc.



- **Key objective to capture:**

The effects of integration on platform pricing

Platform Profits and Pricing

- **Platform profit**:

$$\underbrace{\Pi_f}_{\text{Platform Profit}} = \underbrace{\Pi_f^{\ell}}_{\text{Logistics}} + \underbrace{\Pi_f^{\text{Com}}}_{\text{Commissions}} + \underbrace{\Pi_f^{\text{1P}}}_{\text{Own Retail}}$$

- At Stage 0, platforms set logistics fees (fee_f^{ℓ}) & commission rates (ϕ_f):

$$(\text{fee}_f^{\ell,*}, \phi_f^*) = \arg \max_{\text{fee}_f^{\ell},\, \phi_f} \mathbb{E}[\Pi_f(\text{fee}_f^{\ell}, \phi_f;\, \text{fee}_{-f}^{\ell}, \phi_{-f})]$$

- $(\text{fee}_f^{\ell,*}, \phi_f^*)$ are best-responses to rival's $(\text{fee}_{-f}^{\ell}, \phi_{-f}) \Rightarrow$ Nash equilibrium

Decomposing Platform's Logistics Fee Pricing Details

From the FOC :

$$\text{Logistics Fee} = \text{Cost} + \text{Markup} + \text{Commission Incentive}(\Pi_f^{\text{Com}}) + \text{Retail Diversion}(\Pi_f^{\text{1P}})$$

- Markup :

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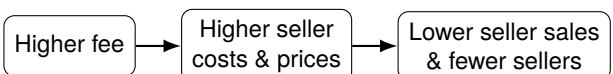
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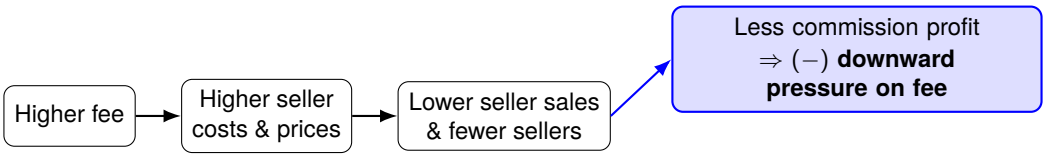


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Effect of Separation on Logistics Fee Pricing

Integrated logistics:

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Effect of Separation on Logistics Fee Pricing

Vertical Separation Details

Integrated logistics:

$$\text{Logistics Fee} = \text{Cost} + \text{Markup} + \text{Commission Incentive}(\Pi_f^{\text{Com}}) + \text{Retail Diversion}(\Pi_f^{\text{1P}})$$

Separated (or independent) logistics:

$$\text{Logistics Fee} = \text{Cost} + \text{Markup}$$

$\Rightarrow$ No commission (Π_f^{Com}) or retail profit (Π_f^{1P}) at stake $\Rightarrow$ fee set by cost and markup only.

Identification and Estimation

Identification and Estimation: Consumer Demand Details

- Micro moments (Petrin '02; BLP '04; Berry & Haile '24): $\underbrace{\mathcal{M}(\hat{\theta})}_{\text{model}} \approx \underbrace{\bar{m}}_{\text{sample}}$
  - Demographic interactions $\Rightarrow$
    Match model predictions to sample moments by group,
    e.g., share of Prime members' purchases made on Amazon.
- Instrument variables (IV):
  - Price endogeneity $\Rightarrow$ logistics fees as IV.
  - Nested-logit correlation $\Rightarrow$ number of products by platform as IV.
- Stack moment conditions and run **GMM**.

Identification and Estimation: Costs

Marginal Costs | Fixed Costs

Marginal Costs (TSLS):

- Endogenous scale $\Rightarrow$ rivals' demand shifters as IVs

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Fixed Costs (Moment inequalities): revealed preference

$$\mathbb{E}[\pi_s(\mathbf{d}_s^*, \mathbf{d}_{-s}) - FC_s(\mathbf{d}_s^*)] \geq \mathbb{E}[\pi_s(\mathbf{d}_s', \mathbf{d}_{-s}) - FC_s(\mathbf{d}_s')]$$

$\mathbf{d}_s^*$: observed, $\mathbf{d}_s'$: deviation

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$\Rightarrow$ **One-sided bound** on the fixed-cost difference $\overline{FC}_s(\mathbf{d}_s^*) - \overline{FC}_s(\mathbf{d}_s')$.

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$\Rightarrow$ **One-sided bound** on the fixed-cost difference $\overline{FC}_s(\mathbf{d}_s^*) - \overline{FC}_s(\mathbf{d}_s')$.

- The other side needs a **support restriction** (Eizenberg '14):

$$\underbrace{\text{Support of fixed-cost differences}}_{\substack{\text{narrow: standardized wholesaling,} \\ \text{warehousing}}} \subset \underbrace{\text{Support of variable-profit differences}}_{\substack{\text{wide: skewed e-commerce sales distributions} \\ \text{(Chevalier \& Goolsbee '03; Brynjolfsson et al. '03, '25)}}}$$

  - I extend Eizenberg's binary choice to multiple discrete choices.

Estimation Results

Estimation Results: Demand

Demand Detail

Key parts	Quantity	Interpretation
Price sensitivity	Mean own-price elasticity (-4.2)	Consumers are price sensitive.
Logistics valuations	FBA { Prime: $+12\%$ ($+\$8$); non-Prime: -23% ($-\$15$) }	Prime consumers value FBA; non-Prime consumers do not.
	WFS: ≈ 0	Walmart logistics not significant.
	(WTP % of price, avg. USD)	
Platform substitution	Cross-platform diversion ratios (2 to 5%) Figure	Limited cross-platform substitution, segmented by membership.

cf. Shipping speed: Prime (within 2 days), non-Prime (5 business days), WFS (2 business days, regardless of Walmart+).

$\Rightarrow$ **Seller's perspective:**

- Each platform has its own customer base.
- Using FBA attracts Prime subscribers (80% of households).

Estimation Results: Marginal Costs

Estimates | Up to 50 lb

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Opposing views on FBA usage costs

"… sellers using Amazon's costly fulfillment service, which has made it substantially more expensive for sellers on Amazon …"

— *FTC v. Amazon* ('23)

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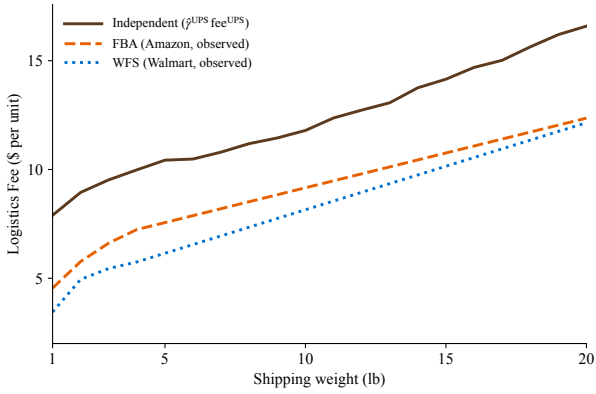
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Fee comparison



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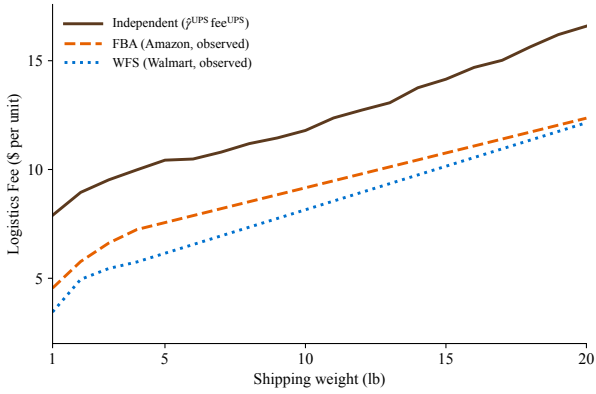
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1. **Fees**: Independent $>$ Amazon $>$ Walmart.

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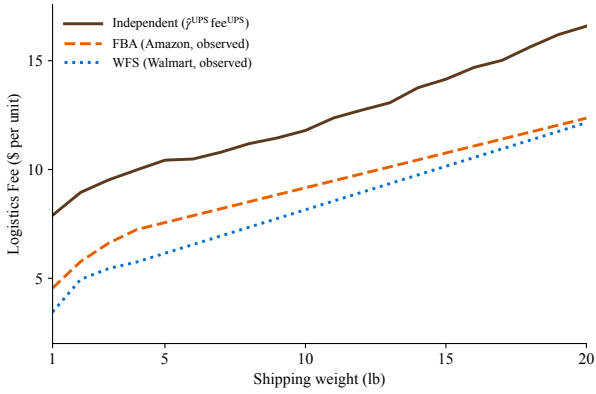
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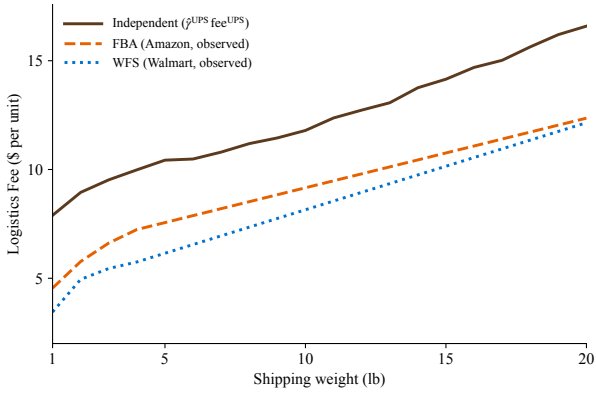
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1. **Fees**: Independent > Amazon > Walmart.
2. **Scale**: 1,000 Q ↑ ⇒ mc ↓ by 0.144 (on average 3.8% savings, up to 20% for large sellers)
   ⇒ Splitting inventory across platforms raises costs.

Estimation Results: Marginal Costs

Estimates | Up to 50 lb

Fee comparison



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— *FTC v. Amazon* ('23)

"… cost-effective option."

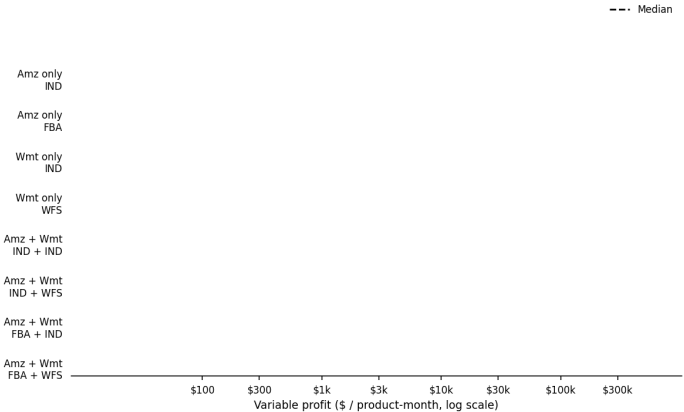
— Amazon's response ('23)

⇒ **MC estimates alone cannot determine.**

1. **Fees**: Independent > Amazon > Walmart.
2. **Scale**: 1,000 Q ↑ ⇒ mc ↓ by 0.144 (on average 3.8% savings, up to 20% for large sellers)
   ⇒ Splitting inventory across platforms raises costs.

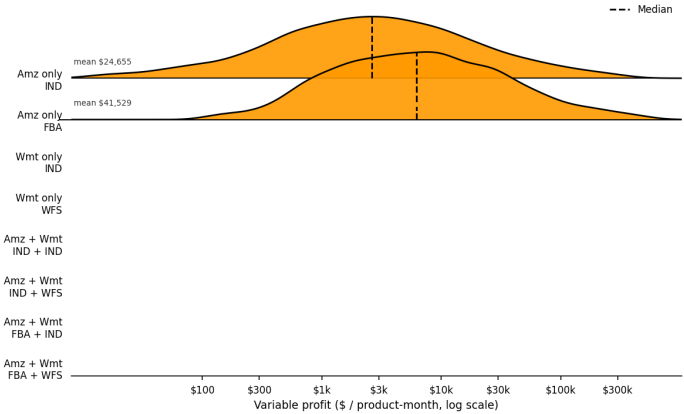
Effects of Entry and Logistics Choice on Variable Profits

- Simulate sellers' variable profits for each decision using demand and cost estimates.



Effects of Entry and Logistics Choice on Variable Profits

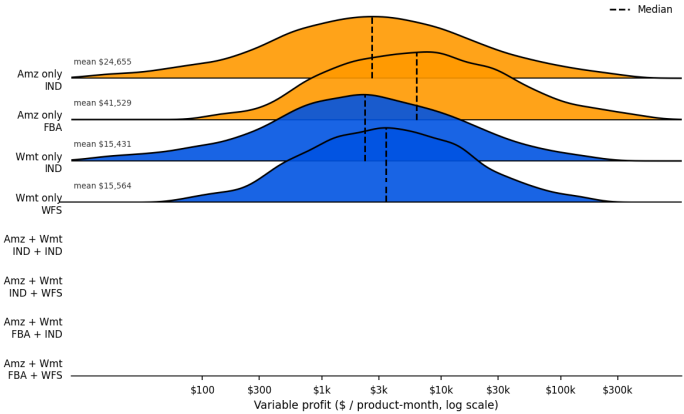
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- Amazon logistics raises average profits from $25K to $42K.

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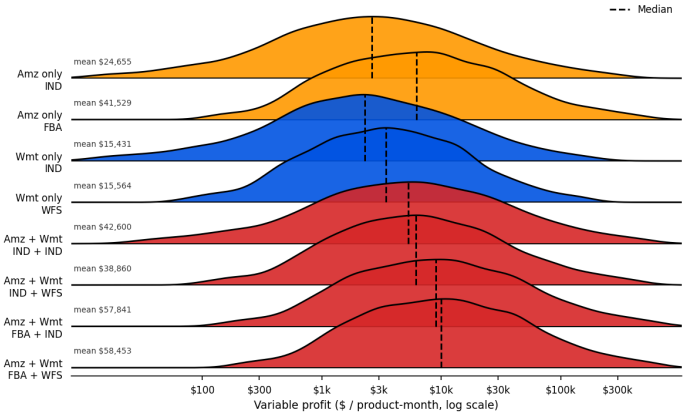
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Effects of Entry and Logistics Choice on Variable Profits

- Simulate sellers' variable profits for each decision using demand and cost estimates.



- Amazon logistics raises average profits from $25K to $42K.
- Walmart profits are smaller ($15K), and Walmart logistics adds little.
- Multihoming raises profits ($39K–$58K across combinations), yet it is rare. **Why?**

Fixed Cost Estimates by Entry and Logistics

- Fixed costs rationalize observed entry and logistics adoption beyond variable profits.
  e.g., Inventory management, wholesaling, labor, operations, marketing, etc.

- **Estimation results**:
  - Limited evidence that adopting integrated logistics reduces fixed costs of entering the platform.
  - Using FBA makes sellers face large entry costs into Walmart $\Rightarrow$ restricts multihoming.
    $\Rightarrow$ Support FTC's competition concern.

- **Seller's main trade-off**:
  - FBA boosts profits on Amazon, yet raises the cost of entering Walmart.
  - Walmart profits are not high enough to multihome.

$\Rightarrow$ Most sellers operate only on Amazon and use FBA.

Measuring Pricing Incentives of Platforms

- Demand, marginal costs, and fixed costs are estimated $\Rightarrow$ recover platform's FOCs.
- Fees normalized to 1.0.

$$\text{Logistics Fee} = \text{Cost} + \text{Markup} + \text{Commission Incentive}(\Pi_f^{\text{Com}}) + \text{Retail Diversion}(\Pi_f^{\text{1P}})$$

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- Commission incentive offsets much of the logistics markup.
- Walmart prices logistics closer to cost than Amazon.

Counterfactuals

Q. Does a platform's logistics integration benefit or harm consumers and sellers?

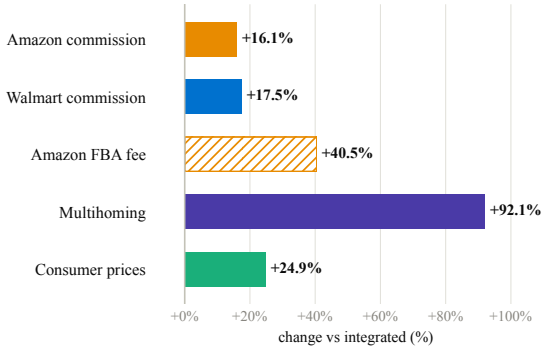
Q. Does a platform's logistics integration benefit or harm consumers and sellers?

$\Rightarrow$ To answer, simulate separation of FBA from Amazon



Welfare definition | Details | Fees

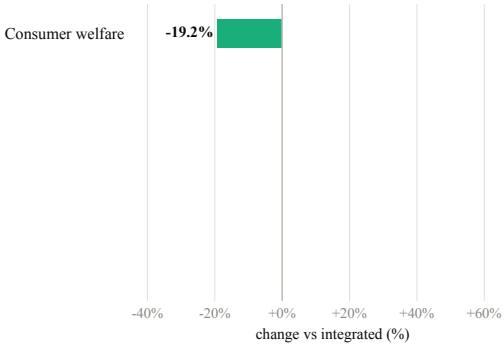
Effects of Separation on Consumer Welfare



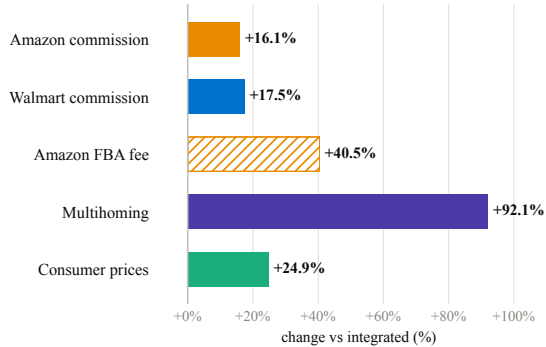
(b) Fees, rates, multihoming, and prices (%)

- Fees, rates, and consumer prices (+25%) all rise and sellers multihome more.

Effects of Separation on Consumer Welfare



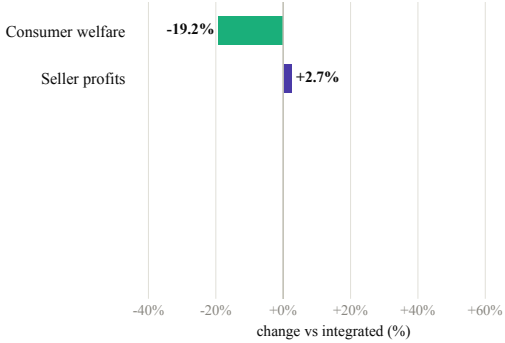
(a) Welfare change (%)



(b) Fees, rates, multihoming, and prices (%)

- Fees, rates, and consumer prices ($+25\%$) all rise and sellers multihome more.
- Consumer welfare falls by 19%.

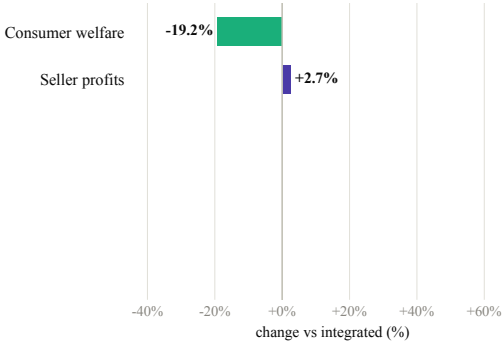
Effects of Separation on Sellers



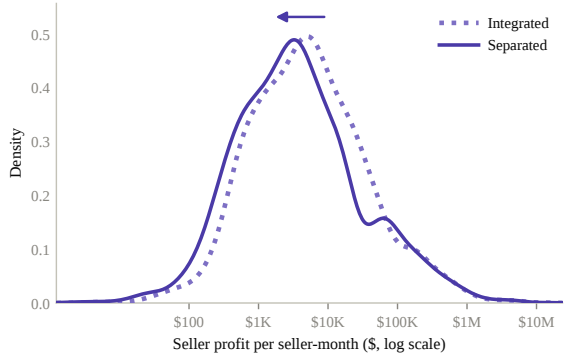
(a) Welfare change (%)

- Aggregate seller profits $\approx$ unchanged ($+2.7\%$).

Effects of Separation on Sellers



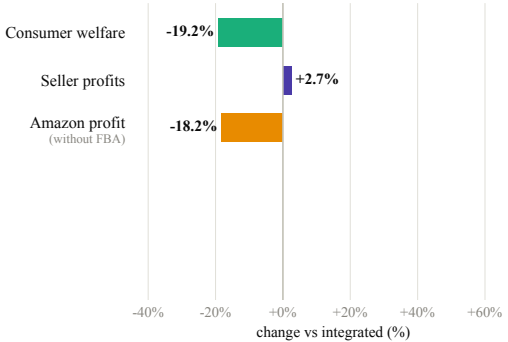
(a) Welfare change (%)



(c) Distribution of seller profits

- Aggregate seller profits $\approx$ unchanged ($+2.7\%$).
- Distributional impacts: small and medium sellers $\downarrow$; top sellers $\uparrow$ via scale and multihoming.

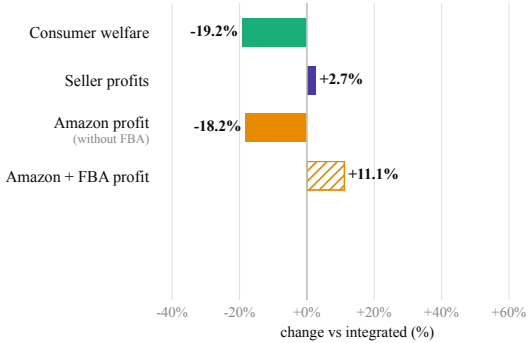
Effects of Separation on Platform Profits and Total Welfare



(a) Welfare change (%)

1. **Profit changes:**
   - Amazon w/o FBA: -18%.

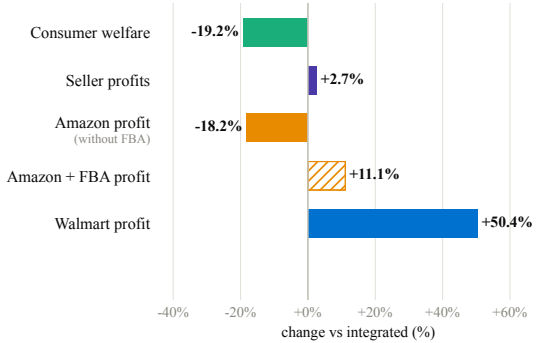
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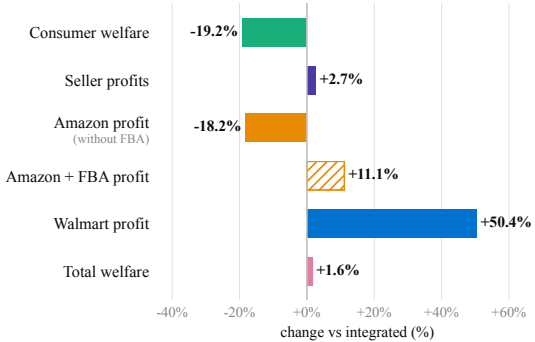
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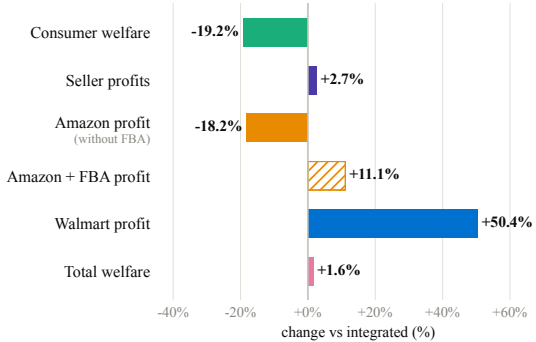


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2. **Total welfare changes little** ($+1.6\%$).

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   - Amazon w/o FBA: -18%.
   - Amazon & FBA: $+11\%$.
   - Walmart: $+50\%$.
2. **Total welfare changes little** ($+1.6\%$).
3. **Welfare redistribution:**
   Consumers and Amazon
   $\Longrightarrow$ Separated FBA and Walmart.

Can a policy targeting anti-competitive effects improve welfare?

Interoperable Logistics

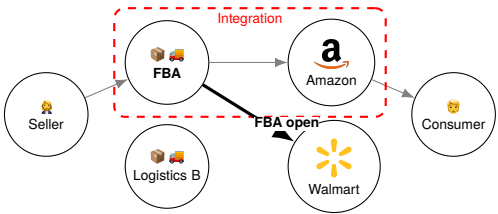
Interop Results

Can a policy targeting anti-competitive effects improve welfare?

Interoperable Logistics Interop Results

FBA remains integrated with Amazon but is opened to Walmart without discriminatory fees.

Counterfactual change



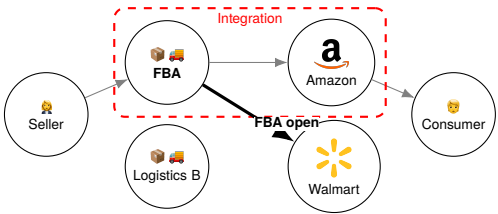
Interoperability in Digital Markets



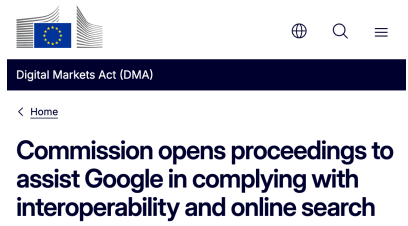
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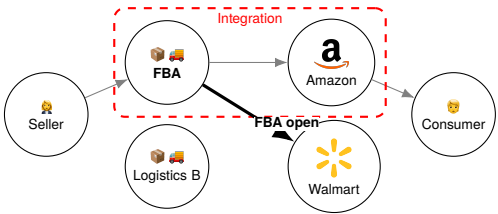


1. **Welfare gains** to consumers ($+38\%$) and sellers ($+30\%$) when platform pricing is fixed.

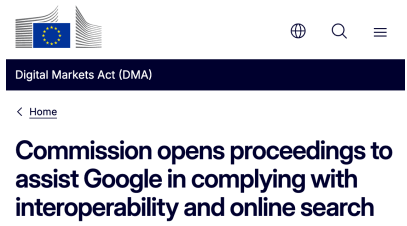
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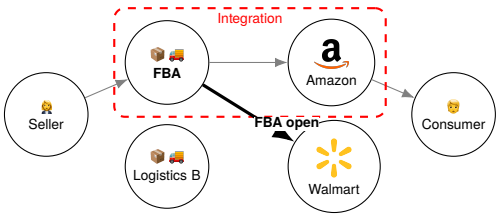


1. **Welfare gains** to consumers ($+38\%$) and sellers ($+30\%$) when platform pricing is fixed.
2. But **repricing substantially decreases** welfare, especially for consumers.
   - Market power of FBA $\Rightarrow$ increase in logistics fees.
   - More multihoming $\Rightarrow$ less need to compete for exclusive sellers $\Rightarrow$ soften commission rate pricing.

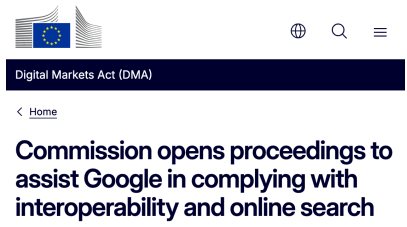
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$\Rightarrow$ **Fee regulation**, such as fee caps, is necessary to protect the welfare gains.

Further Counterfactuals

Amazon Monopoly | Pass-Through | All Welfare

1. Platform competition

Epic v. Google ('25) orders Google to allow rival app stores.

Q. How much does a rival platform discipline pricing and improve welfare?

$\Rightarrow$ Remove Walmart and make Amazon a monopoly.

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$\Rightarrow$ Improves consumer and seller welfare (without Walmart: consumers -28%, sellers -29%).

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2. Incidence of logistics efficiency gains Market power affects who captures the efficiency gains.

Q. How much of Amazon's cost gains pass through to consumers?

$\Rightarrow$ Raise its logistics cost to Walmart's level.

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2. Incidence of logistics efficiency gains

Market power affects who captures the efficiency gains.

Q. How much of Amazon's cost gains pass through to consumers?

$\Rightarrow$ Raise its logistics cost to Walmart's level.

A. Amazon's efficiency gains benefit consumers, but only modestly.

$\Rightarrow$ 1% logistics cost $\downarrow \Rightarrow$ consumer welfare $\uparrow$ 0.15%; sellers ≈ 0.

Conclusions

This paper

- **Data**: unique cross-platform dataset.
- **Welfare effects**: Amazon's FBA integration benefits consumers and small sellers.
  - But FBA restricts cross-platform competition $\Rightarrow$ room for policy intervention.

Research agenda: Technology and Competition

$\Rightarrow$ This paper;

$+$ "Automation with market power," focusing on Amazon's robotic warehouses;

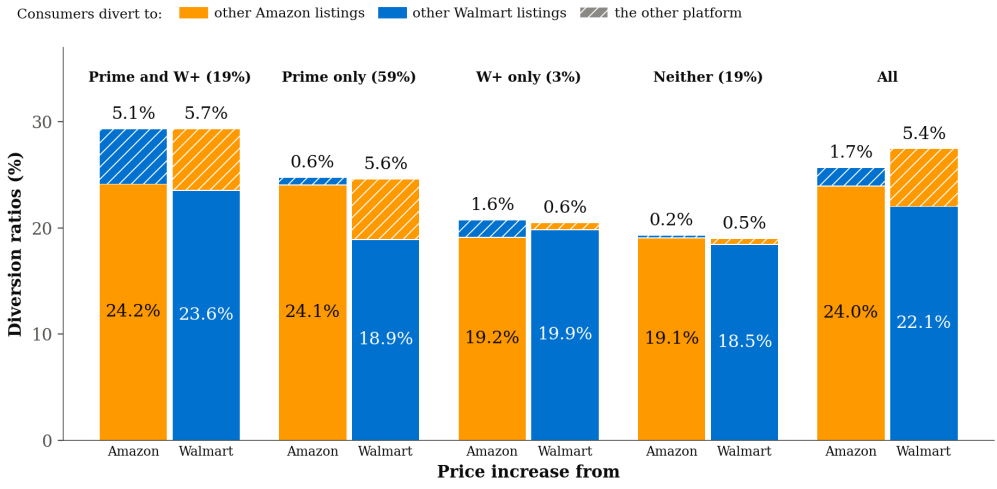
$+$ Designing copyright policy using unstructured data (e.g., images and text)
(with Sukjin Han)

Appendix

Diversion Ratios by Consumer Membership

Return

Share of a product's lost demand diverted to each alternative, by Prime and Walmart+ status



Recovering Marginal Costs

Return

Inverting the Bertrand–Nash pricing FOCs (seller s, product j, platform f)

- FOCs of seller s's pricing problem, stacked over its products on all platforms:

$$\mathbf{p}_s = \tilde{\mathbf{mc}}_s - \Omega_s^{-1}\,\mathbf{s}_s, \qquad \tilde{mc}_{jf} = \frac{mc_{jf}}{1-\phi_f}$$

  - $\Omega_{jk} = \partial s_{jf}/\partial p_{kf'}$: own- and cross-price derivatives from the estimated demand.
  - Nonzero across platforms ($f \neq f'$) for multihoming sellers $\Rightarrow$ cross-platform cannibalization.

- Recover $mc_{jf} = (1-\phi_f)\,\tilde{mc}_{jf}$ for every product.
  - Independent sellers: used to estimate the marginal cost function. MC Function
  - Platform own-retail: same inversion with $\phi_f = 0$; used as recovered.

Marginal Cost Estimation Results

Return

Main specification: 2SLS with leave-one-out IVs; category and month FE

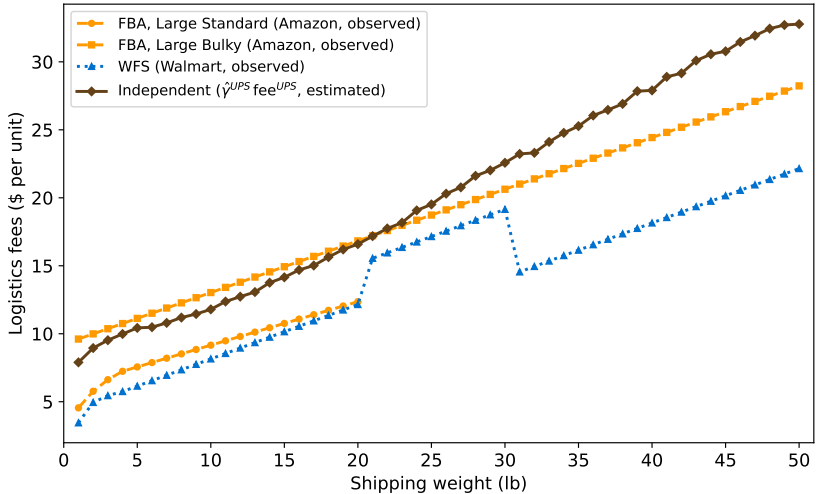
Variable	Parameter	Estimate
$\text{fee}^{\ell} \times \ell_{sf}$	γ^{ℓ}	1.000
$\text{fee}^{\text{UPS}} \times (1 - \ell_{sf})$	γ^{UPS}	0.607^{***}
		(0.090)
Scale Economy ($\bar{Q}$)	γ^{Q}	-0.144^{***}
		(0.047)
Control Variables		Yes
Category FE		Yes
Month FE		Yes
Weak IV *F*-stat		50.6
Observations		4,092

Notes. γ^{ℓ} is constrained to one. fee^{UPS} is the posted 2025 UPS Ground rate at the product's shipping weight. Scale is in 1,000 units. Heteroskedasticity-robust standard errors in parentheses. *** $p < 0.01$.

Fee Comparison by Logistics: Up to 50 lb

Back

FBA switches from Large Standard to Large Bulky above 20 lb



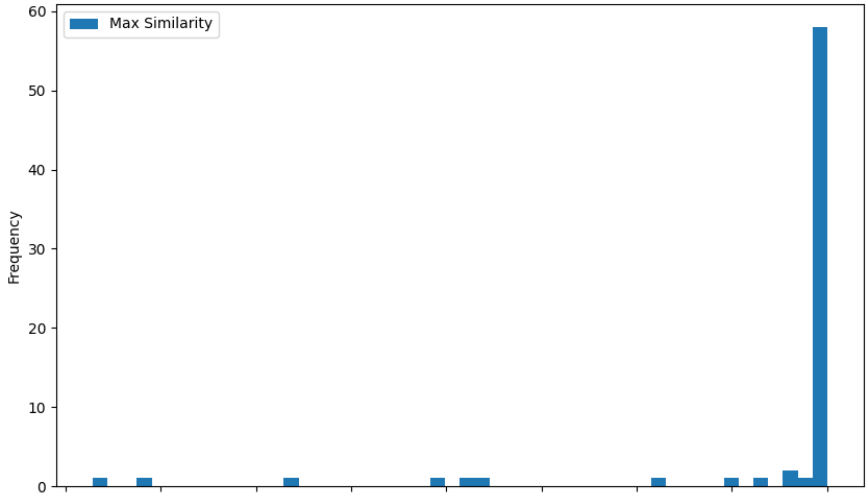
Matching Sellers

Back to Data Similarity

- Let $S^f(j)$ denote the set of sellers offering j on $f \in \{Amz, Wmt\}$.
  - we focus on products j that are listed on both marketplaces.
- Seller $s \in S^{Amz}(j)$ is matched with a seller $s' \in S^{Wmt}(j)$ if:
  1. they share the same phone number
  2. or their addresses or names are the same
- Measuring similarity through embeddings
  - Pre-trained LLM (Sentence-BERT, Reimers and Gurevych. 2019)
  - Calculate cosine similarity between the embeddings

Similarity Distributions of Phone-Number-Matched Sellers

Matching Seller

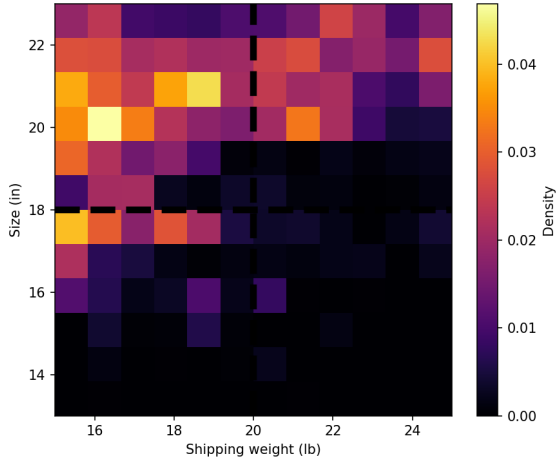


Choice set of decision vector d_s Back

d_s			
d_s^{Amz}	d_s^{Wmt}	FBA_s	Wmt_s
1	1	1	1
1	1	1	0
1	1	0	1
1	1	0	0
1	0	1	0
1	0	0	0
0	1	0	1
0	1	0	0

Density Estimates Around Product Size-Tier Cutoffs

Return

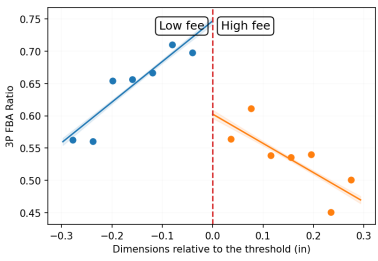


Large to Bulky Tier

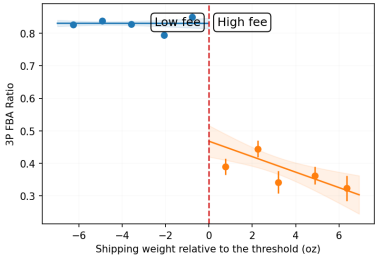
Sellers use FBA less in every cutoff

Return

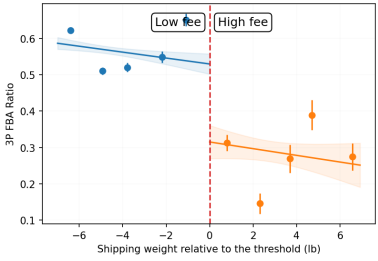
Outcome: FBA Seller Ratio



Small to Large (dim)



Small to Large (shwgt)



Large to Bulky (shwgt)

Regressing multihoming on FBA

Multihome$_{st}$ $= 1\{$Seller s appears on Walmart at month $t\}$

$$\text{Multihome}_{st} = \alpha^{FBA}\text{FBA}_{st} + \alpha_t + \alpha_s + u_{st}$$

	OLS			WLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Multihome$_{st}$					
FBA$_{st}$	-0.0097***	-0.0110***	-0.0020**	-0.1602***	-0.1660***	-0.0110**
	(0.001)	(0.001)	(0.001)	(0.021)	(0.022)	(0.005)
Intercept	0.0330***			0.2214***		
	(0.001)			(0.021)		
R-squared	0.001	0.002	0.600	0.041	0.050	0.809
Time FE	X	O	O	X	O	O
Seller FE	X	X	O	X	X	O
Weighted	X	X	X	O	O	O
Observations	882,210	882,210	882,210	882,210	882,210	882,210

Notes. The number of product offerings on Amazon is used for running weighted least square estimation. The simple and weighted averages

Regressing multihoming on FBA

Multihome$_{st}$ $= 1\{$Seller s appers on Walmart at month $t\}$

$$\text{Multihome}_{st} = \alpha^{FBA}\text{FBA}_{st} + \alpha_t + \alpha_s + u_{st}$$

	OLS			WLS		
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Multihome$_{st}$					
FBA$_{st}$	-0.0097***	-0.0110***	-0.0020**	-0.1602***	-0.1660***	-0.0110**
	(0.001)	(0.001)	(0.001)	(0.021)	(0.022)	(0.005)
Intercept	0.0330***			0.2214***		
	(0.001)			(0.021)		
R-squared	0.001	0.002	0.600	0.041	0.050	0.809
Time FE	X	O	O	X	O	O
Seller FE	X	X	O	X	X	O
Weighted	X	X	X	O	O	O
Observations	882,210	882,210	882,210	882,210	882,210	882,210

Notes. The number of product offerings on Amazon is used for running weighted least square estimation. The simple and weighted averages

Summary Statistics: Full Panel

Back

Variables	Mean	SD	Observations
Panel A: Monthly-product			
Price ($)	55.97	106.23	1,599,657
FBA fee ($)	7.83	13.76	1,589,115
Shipping weight (lb)	7.03	27.32	1,479,075
Has FBA seller	0.67	0.47	1,599,657
Has non-FBA seller	0.36	0.48	1,599,657
Has multihoming seller	0.08	0.27	849,250
Panel B: Monthly-seller			
Products offered	4.17	47.89	1,557,204
FBA seller	0.61	0.49	1,557,204
Multihomes	0.02	0.15	1,066,053

Summary Statistics: Kitchen Appliance Panel

Back

Platform	Amazon			Walmart		
Logistics	All	FBA	Independent	All	WFS	Independent
Sales	2751.2	2841.1	2022.2	3114.5	3035.2	3411.8
	(5265.1)	(5407.3)	(3852.2)	(8051.7)	(7547.5)	(9720.8)
Price ($)	75.9	70.2	121.9	65.7	57.9	95.0
	(84.2)	(79.1)	(107.1)	(59.0)	(46.5)	(85.7)
FBA/WFS	0.89	1.00	0.00	0.79	1.00	0.00
	(0.31)	(0.00)	(0.00)	(0.41)	(0.00)	(0.00)
Shipping weight (lb)	12.7	11.7	21.3	11.9	10.5	17.2
	(15.2)	(13.8)	(21.5)	(14.2)	(12.1)	(19.5)
FBA/WFS fee ($)	13.1	12.3	19.0	9.6	11.8	16.4
	(10.6)	(9.5)	(15.6)	(6.3)	(8.1)	(14.1)
Platform Own Retail	0.27	0.31	0.00	0.39	0.50	0.00
	(0.45)	(0.46)	(0.00)	(0.49)	(0.50)	(0.00)
Observations	4529	4032	497	1458	1151	307

Definition of RD Running Variables

Return

For each tier $\in \{T^S, T^L\}$,

$$x_j^{\text{shwgt,tier}} = \text{shwgt}_j - c_{\text{shwgt}}^{\text{tier}}.$$

$$x_j^{\text{dim,tier}} = \max\left\{l_j - c_l^{\text{tier}},\ h_j - c_h^{\text{tier}},\ w_j - c_w^{\text{tier}}\right\}$$

Market Size Definition

Return

Market = subcategory c × month t

$$M_{ct} = \underbrace{N_t^H}_{\text{purchasing households}} \times \underbrace{\text{GoogleTrends}_{ct}}_{\in[0,1]}$$

- N_t^H: number of U.S. households that purchased *any* kitchen appliance in month t.
- GoogleTrends_{ct}: search interest for the subcategory keyword (e.g., “air fryers”), daily series averaged to the month and scaled to $[0, 1]$.
- M_{ct} scales market shares sh_{jft} into quantities, $Q_{jft} = M_{ct}\,\text{sh}_{jft}$.

Demand Model Details

Consumer types, utility, and taste heterogeneity

- **Consumer types:** 4 income groups (<50k, 50–100k, 100–150k, >150k) × Prime × Walmart+
- **Indirect utility** (consumer i, product j, platform f, month t):

$$U_{ijft} = \beta_i^p \log(p_{jft}) + \beta_i^{\text{FBA}} \text{FBA}_{jft} + \beta^{\text{WFS}} \text{WFS}_{jft} + \beta_i^{\text{Wmt}} \text{Wmt}_{jft} + X'_{jft}\beta^X + \xi_{b(j)} + \xi_{jft} + \epsilon_{ijft}$$

- **Heterogeneous coefficients:**

$$\beta_i^p = \beta_0^p + \sum_{k=1}^{3} \beta_k^p \mathbf{1}\{i \in \text{Inc}_k\} + \beta_{\text{Prime}}^p \text{Prime}_i + \beta_{\text{W}^+}^p \text{W}_i^+ + \sigma^p u_i^p \qquad u_i^p \sim N(0,1)$$

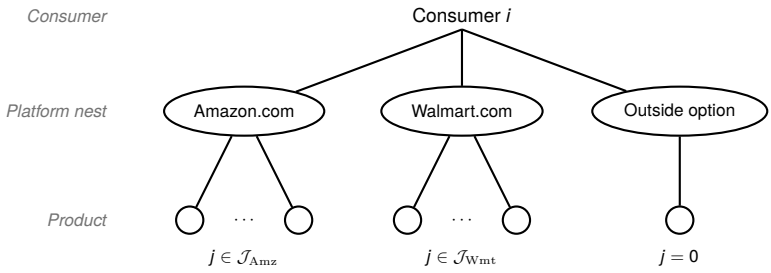
$$\beta_i^{\text{FBA}} = \beta_0^{\text{FBA}} + \beta_{\text{Prime}}^{\text{FBA}} \text{Prime}_i \qquad \text{(fast, reliable FBA shipping is Prime-exclusive)}$$

$$\beta_i^{\text{Wmt}} = \beta_0^{\text{Wmt}} + \beta_{\text{W}^+}^{\text{Wmt}} \text{W}_i^+ \qquad \text{(W+ perks: grocery, fuel; WFS 2-day is for everyone)}$$

- **Demand shifters X_{jft}:**
  - organic search-ranks, star rating, number of reviews, log shipping weight, material dummies, sold by the platform (1P).

Nest Structure

Consumers choose a platform, then a product within it



- **Nests = platforms:** $\mathcal{F} = \{\text{Amz}, \text{Wmt}\}$, outside option in its own nest.
- **Nested-logit error** (Cardell '97): $\epsilon_{ijft} = \bar{\epsilon}_{ift} + (1-\rho)\,\bar{\epsilon}_{ijft}, \quad \rho \in [0, 1)$
  - Higher ρ: substitution is stronger within a platform than across.

Market Shares

Back Return

Aggregating consumer choice probabilities

- Aggregate over the 16 consumer types τ with household weights $w_{\tau t}$ and the random price taste u:

$$\mathrm{sh}_{jft} = \sum_{\tau} w_{\tau t} \int \underbrace{\mathrm{sh}_{ijft}(\tau, u)}_{\text{consumer } i\text{'s choice probability}} \underbrace{f(u)}_{\text{standard normal density}} \, du$$

- Integral simulated with $R = 100$ Halton draws.
- Quantities: $Q_{jft} = M_{ct}\,\mathrm{sh}_{jft}$ with market size M_{ct}. Market Size

Demand Estimation Results

Return

		Interactions with Demographics					
Variable	Mean	50–100k	100–150k	150k+	Prime	W+	σ/ρ
log Prices	−3.790***	0.020	0.043***	0.057***	0.354***	0.033**	0.000
	(0.367)	(0.014)	(0.015)	(0.015)	(0.039)	(0.014)	(0.005)
FBA	−0.873***				1.310***		
	(0.237)				(0.191)		
WFS	−0.183						
	(0.180)						
Walmart Platform	−1.300***					2.070***	
	(0.242)					(0.099)	
Platform Nests (ρ)							0.190***
							(0.066)

Notes. Product characteristics and fixed effects are included. The numbers of observations and markets are 5,585 and 39, respectively.

- Consumers are sensitive to prices (mean own price elasticity $\approx$ -4.2).
- FBA valued by Prime consumers (WTP $\approx$ \$9.4/delivery); insignificant WFS

Identification and Estimation: Demand

Back

IV Construction Micro Moments

$$U_{ijf} = \underbrace{\beta_i^p \log(p_{jf})}_{\text{(log) Prices}} + \underbrace{\beta_i^{\text{FBA}} \text{FBA}_{jf} + \beta^{\text{WFS}} \text{WFS}_{jf}}_{\text{Integrated Logistics Dummies}} + \underbrace{\beta_i^{\text{Wmt}} \text{Wmt}_f}_{\text{Walmart Platform Dummy}}$$
$$+ \underbrace{\mathbf{X}'_{jf}\beta^X}_{\text{Demand Shifters}} + \underbrace{\xi_{jf}}_{\text{Unobserved}} + \underbrace{\bar{\epsilon}_{if} + (1-\rho)\bar{\epsilon}_{ijf}}_{\text{Nested Logit Error}}$$

Key part	**Parameter**	**Instruments** (BLP '95; Berry & Haile '14)	**Micro moments** (Petrin '02; BLP '04)
1. Price sensitivity	β_i^p	Cost shifters (logistics fees); rival characteristics for σ^p	by income, Prime, Walmart+
2. Logistics	β_i^{FBA}	—	by Prime
3. Within-platform subst.	ρ, β_i^{Wmt}	Number of products by platform	by Walmart+

Micro moments: match model predictions to sample moments by demographic group (e.g., Prime members' likelihood of purchasing on Amazon).

$\Rightarrow$ GMM

Identification and Estimation: Marginal Costs

Back Details

$$mc_{jft} = \text{fee}^{\ell}_{jf}\,\ell_{jft} + \gamma^{\text{UPS}}\text{fee}^{\text{UPS}}_{jf}(1-\ell_{jft}) + \underbrace{\gamma^{Q}\,\bar{Q}_{s(j)ft}}_{\text{Scale}} + \mathbf{W}'_{jf}\gamma^{W} + \underbrace{\omega_{jft}}_{\text{Unobserved}}$$

Key part	Parameter	Instruments
Scale economies	γ^{Q}	Excluded demand shifters of rivals

$\Rightarrow$ TSLS

Demand Identification: IV Construction

Back

- Aggregate moment condition with instruments $\mathbf{Z}_{jft}^{\mathrm{D}}$:

$$\mathbb{E}\left[\xi_{jft} \mid \mathbf{Z}_{jft}^{\mathrm{D}}\right] = 0$$

- Endogenous prices $\Rightarrow \log(\mathrm{fee}_{jf})$ as a cost-shifter IV:
  1. *Exclusion & relevance* by construction:
     - fee excluded from utility, enters seller marginal cost $\Rightarrow$ shifts prices.
  2. *Exogeneity* from institutional fee-setting:
     - schedules announced $\approx$ annually, applied uniformly across marketplace
     - $\Rightarrow$ predetermined, unlikely correlated with idiosyncratic ξ_{jft}.

- Non-price characteristics: exogenous $\Rightarrow$ instrument for themselves.

- Nest parameter (ρ) $\Rightarrow$ number of products in each market's choice set:
  - varies within-nest shares; exogenous under the timing assumption.

Demand Identification: Micro Moments

Back

- Targets: demographic interactions and σ^p

  $(\beta^p_1, \beta^p_2, \beta^p_3, \beta^p_{\text{Prime}}, \beta^p_{\text{W}^+},\ \beta^{\text{FBA}}_{\text{Prime}},\ \beta^{\text{Wmt}}_{\text{W}^+},\ \sigma^p)$

- Micro moments from the Numerator consumer panel:

$$\mathbb{E}\left[\log(p_{jf}) \mid \text{Inc}_i, \text{Prime}_i, \text{W}_i^+\right] \rightarrow \text{price interactions } (\beta^p_1, \beta^p_2, \beta^p_3, \beta^p_{\text{Prime}}, \beta^p_{\text{W}^+})$$

$$\Pr\left(\text{Amz} \mid \text{Prime}_i, \text{W}_i^+\right) \rightarrow \text{membership sorting } (\beta^{\text{FBA}}_{\text{Prime}},\ \beta^{\text{Wmt}}_{\text{W}^+})$$

$$\mathbb{E}\left[(\log(p_{jf}))^2\right] \rightarrow \sigma^p \text{ (with income-group price averages)}$$

  - Amazon inside share by membership $\Rightarrow$ how subscriptions tilt choices.

- Estimation: GMM stacking aggregate and micro moments.
  - Two-step procedure approximating optimal micro moments (Chamberlain '87; Conlon & Gortmaker '25)

Marginal Cost Identification: IV Construction

Back

- Moment condition with instruments $\mathbf{Z}_{jft}^{\mathrm{MC}}$:

$$\mathbb{E}\left[\omega_{jft} \mid \mathbf{Z}_{jft}^{\mathrm{MC}}\right] = 0$$

- Endogenous variable: effective scale $\bar{Q}_{s(j)ft}$
  - $\Rightarrow$ IVs: excluded demand shifters (Berry & Haile '14) + Google Trends popularity.

- *Concern:* reviews & star ratings may correlate with ω_{jft}

  e.g., negative cost shock $\Rightarrow$ lower *mc* $\Rightarrow$ more sales $\Rightarrow$ more reviews.

$\Rightarrow$ Leave-one-out IVs: average each shifter over
  - other products of the *same* seller, and
  - products of *rival* sellers.

- Estimation: two-stage least squares (2SLS).

Marginal Cost Details (1/2)

Specification (seller s, product j, platform f, month t)

$$mc_{jft} = \underbrace{\text{fee}_{jf}^{\ell}\,\ell_{jft}}_{\text{Integrated logistics fee}} + \underbrace{\gamma^{\text{UPS}}\text{fee}_{j}^{\text{UPS}}(1-\ell_{jft})}_{\text{Independent logistics fee}} + \underbrace{\gamma^{Q}\bar{Q}_{s(j)ft}}_{\text{Scale economies}} + \mathbf{W}_{jf}'\gamma^{W} + \omega_{c(j)} + \omega_{t} + \omega_{jft}$$

- $\ell_{jft} = 1$ if j uses the platform's integrated logistics (FBA on Amazon, WFS on Walmart).
- Logistics Fees:
  - Integrated: fee_{jf}^{ℓ} is the platform logistics fee, paid per unit.
  - Independent: $\text{fee}_{j}^{\text{UPS}}$ is the posted UPS rate, a proxy since actual rates are unobserved.
- Scale: $\bar{Q}_{s(j)ft}$ is effective scale; volume discounts in storage, shipping, and procurement.
- $\mathbf{W}_{jf}$: material dummies, major-brand indicator, cubic in shipping weight, Amazon dummy; $\omega_{c(j)}$, ω_{t}: category and month FE;
- ω_{jft}: cost shock.

Marginal Cost Details (2/2)

Back

Effective scale (seller s, platform f, month t)

- Effective scale $\bar{Q}_{sft}$ entering marginal cost:

$$\bar{Q}_{sft} = \begin{cases} Q_{sft} & \text{if } \ell_s = 1 \quad \text{(fragmented if } s \text{ uses integrated logistics)} \\ \sum_{f' \in \mathcal{F}} Q_{sf't} & \text{if } \ell_s = 0 \quad \text{(pooled if } s \text{ uses independent logistics)} \end{cases}$$

where $\ell_s = \max_f \ell_{sf}$ and $Q_{sft} = \sum_{j \in J_{sf}} Q_{jft}$.

Logistics Fee Pricing: Details

Back

Omit expectation notation; pricing for commission rate (ϕ) is similar.

- Rearranging the FOC of the logistics fee:

$$\underbrace{\text{fee}_f^\ell}_{\text{Logistics Fees}} = \underbrace{mc_f^\ell}_{\text{Costs}} + \underbrace{\left(\frac{-\,\mathrm{d}Q_f^\ell/\mathrm{d}\text{fee}_f^\ell}{Q_f^\ell}\right)^{-1}}_{\text{Markup (+)}} + \underbrace{\frac{\mathrm{d}\Pi_f^{\mathrm{Com}}/\mathrm{d}\text{fee}_f^\ell}{-\,\mathrm{d}Q_f^\ell/\mathrm{d}\text{fee}_f^\ell}}_{\text{Commission Incentive (-)}} + \underbrace{\frac{\mathrm{d}\Pi_f^{\mathrm{1P}}/\mathrm{d}\text{fee}_f^\ell}{-\,\mathrm{d}Q_f^\ell/\mathrm{d}\text{fee}_f^\ell}}_{\text{Retail Diversion (+)}}$$

where Q_f^ℓ is the quantity of sales processed by integrated logistics.

- Markup: fee sensitivity of sellers to platform logistics adoption.
- Commission Incentive: degree of commission decrease.
- Retail diversion: degree of retail profit increase
  - cf. classic foreclosure (or raising rivals' costs) incentives.

Fee Pricing Incentives: Ranges

Back

Point estimates and ranges over the estimated fixed-cost set

$$\underbrace{\mathrm{fee}_f^\ell}_{\text{Logistics Fees}} = \underbrace{mc_f^\ell}_{\text{Costs}} + \underbrace{\left(\frac{-\,\mathrm{d}Q_f^\ell/\mathrm{dfee}_f^\ell}{Q_f^\ell}\right)^{-1}}_{\text{Markup (+)}} + \underbrace{\frac{\mathrm{d}\Pi_f^{\mathrm{Com}}/\mathrm{dfee}_f^\ell}{-\,\mathrm{d}Q_f^\ell/\mathrm{dfee}_f^\ell}}_{\text{Comm. Incentive (-)}} + \underbrace{\frac{\mathrm{d}\Pi_f^{1\mathrm{P}}/\mathrm{dfee}_f^\ell}{-\,\mathrm{d}Q_f^\ell/\mathrm{dfee}_f^\ell}}_{\text{Retail Diversion (+)}}$$

$\mathrm{fee}^\ell_{\mathrm{Amz}}$ = 1.000	0.543 [0.377, 1.374]	+	0.636 [0.138, 0.784]	+	(−0.355) [−0.693, −0.212]	+	0.176 [0.039, 0.217]
$\mathrm{fee}^\ell_{\mathrm{Wmt}}$ = 1.000	0.895 [0.367, 1.752]	+	0.431 [0.070, 0.983]	+	(−0.412) [−0.839, 0.010]	+	0.086 [0.014, 0.193]

- Point estimates use the best-fit fixed-cost estimate.
- 50 fixed-cost vectors sampled uniformly from the estimated set.
- Observed fee schedule normalized to 1.000 ($\lambda_f = 1$).

Commission Rates Pricing Incentives

Logistics Fees

$$\underbrace{\phi_f}_{\text{Commission Rates}} = \underbrace{\left(\frac{-\partial R_f^{3P}/\partial \phi_f}{R_f^{3P}}\right)^{-1}}_{\text{Markup (+)}} + \underbrace{\frac{\partial \Pi_f^{\ell}/\partial \phi_f}{-\partial R_f^{3P}/\partial \phi_f}}_{\text{Logistics Erosion (-)}} + \underbrace{\frac{\partial \Pi_f^{1P}/\partial \phi_f}{-\partial R_f^{3P}/\partial \phi_f}}_{\text{Retail Diversion (+)}}$$

where R_f^{3P} is third-party sales revenue (the commission base).

Commission Rates Pricing Incentives

Logistics Fees

$$\underbrace{\phi_f}_{\text{Commission Rates}} = \underbrace{\left(\frac{-\partial R_f^{3P}/\partial \phi_f}{R_f^{3P}}\right)^{-1}}_{\text{Markup (+)}} + \underbrace{\frac{\partial \Pi_f^{\ell}/\partial \phi_f}{-\partial R_f^{3P}/\partial \phi_f}}_{\text{Logistics Erosion (-)}} + \underbrace{\frac{\partial \Pi_f^{1P}/\partial \phi_f}{-\partial R_f^{3P}/\partial \phi_f}}_{\text{Retail Diversion (+)}}$$

$$\underset{0.228}{\phi_{\text{Amz}}} = \underset{[0.058,\, 0.381]}{0.322} + \underset{[-0.142,\, 0.070]}{(-0.130)} + \underset{[0.007,\, 0.043]}{0.036}$$

where R_f^{3P} is third-party sales revenue (the commission base).

Commission Rates Pricing Incentives

Logistics Fees

$$\underbrace{\phi_f}_{\text{Commission Rates}} = \underbrace{\left(\frac{-\partial R_f^{3P}/\partial \phi_f}{R_f^{3P}}\right)^{-1}}_{\text{Markup (+)}} + \underbrace{\frac{\partial \Pi_f^{\ell}/\partial \phi_f}{-\partial R_f^{3P}/\partial \phi_f}}_{\text{Logistics Erosion (-)}} + \underbrace{\frac{\partial \Pi_f^{1P}/\partial \phi_f}{-\partial R_f^{3P}/\partial \phi_f}}_{\text{Retail Diversion (+)}}$$

$\phi_{\text{Amz}} =$ 0.228	0.322	+	(-0.130)	+	0.036
	[0.058, 0.381]		[−0.142, 0.070]		[0.007, 0.043]
$\phi_{\text{Wmt}} =$ 0.248	0.253	+	(-0.022)	+	0.017
	[0.021, 0.356]		[−0.058, 0.126]		[0.001, 0.024]

where R_f^{3P} is third-party sales revenue (the commission base).

Welfare Measures

Back

- Consumer surplus (Small and Rosen '81; Petrin '02):

$$\mathrm{CS} = \sum_{ct} \left[M_{ct} \sum_{i \in I_{ct}} w_{ict} \frac{\bar{p}_{ct}}{|\beta_i^p|} \log\left(1 + \sum_{f \in \mathcal{F}} \exp V_{ifct}\right) \right], \quad V_{ifct} = (1-\rho) \log \sum_{j \in J_f} \exp\left(\frac{V_{ijct}}{1-\rho}\right)$$

  - w_{ict}: consumer weights; V_{ijct}: deterministic utility; V_{ifct}: platform-nest inclusive value.
  - Money metric via share-weighted market price $\bar{p}_{ct}$ (log-price utility)
    - $\Rightarrow$ $\bar{p}_{ct}$ held fixed across scenarios for comparability.

- Seller surplus (SS): variable profits net of fixed costs.

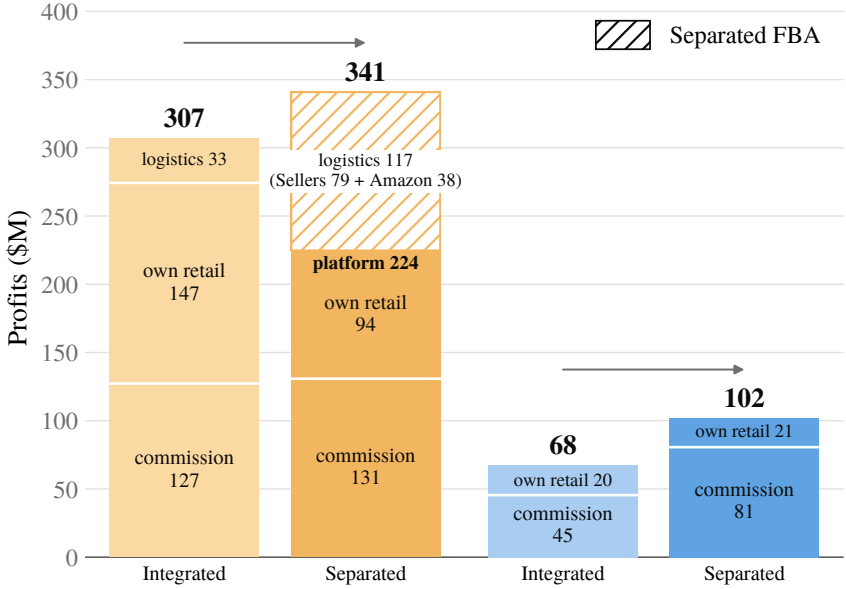
- Platform profit (Π_f): commissions + own retail + logistics profits.

- Total welfare:

$$\mathrm{W} = \mathrm{CS} + \mathrm{SS} + \Pi_{\mathrm{Amz}} + \Pi_{\mathrm{Wmt}} \quad (+ \Pi_{\mathrm{AmzLogistics}} \text{ under separation})$$

Platform Profit Decomposition under Separation

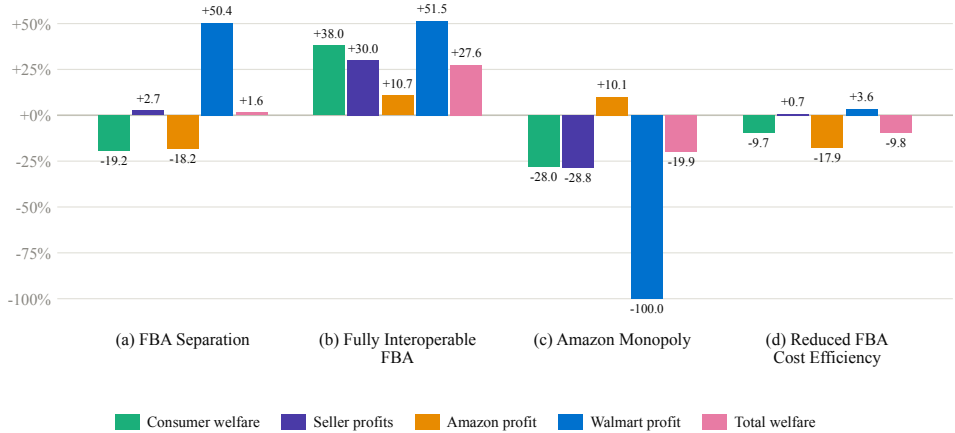
Back



Welfare Effects of the Counterfactuals

Back

% change relative to the integrated benchmark



(a) Separated FBA serves both marketplaces. (b) Interoperable FBA at equal fee and quality. (c) Walmart removed. (d) Amazon's logistics cost set to Walmart's.

Interoperable FBA: Details

Back All Welfare

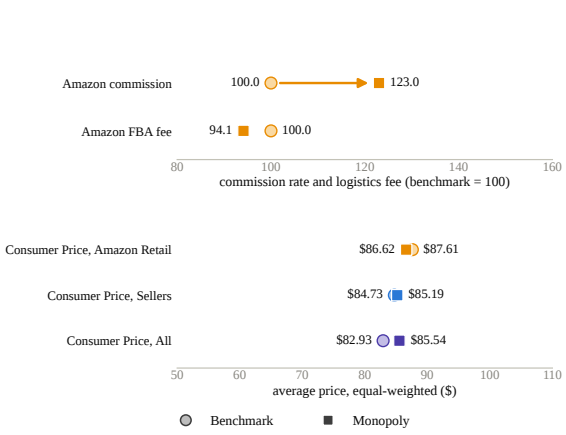
FBA multihomers pool inventory, pay the posted FBA fee and the independent-logistics fixed cost; Prime quality applies on Walmart



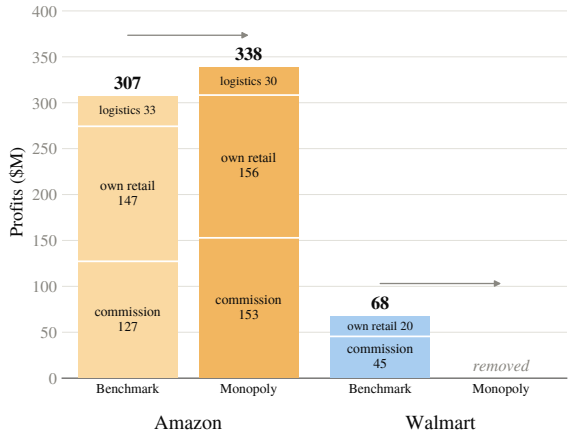
Amazon Monopoly: Details

Back | All Welfare

Remove Walmart's marketplace and WFS; sellers re-choose entry and logistics, Amazon re-prices



(a) Fees, Rates and Prices

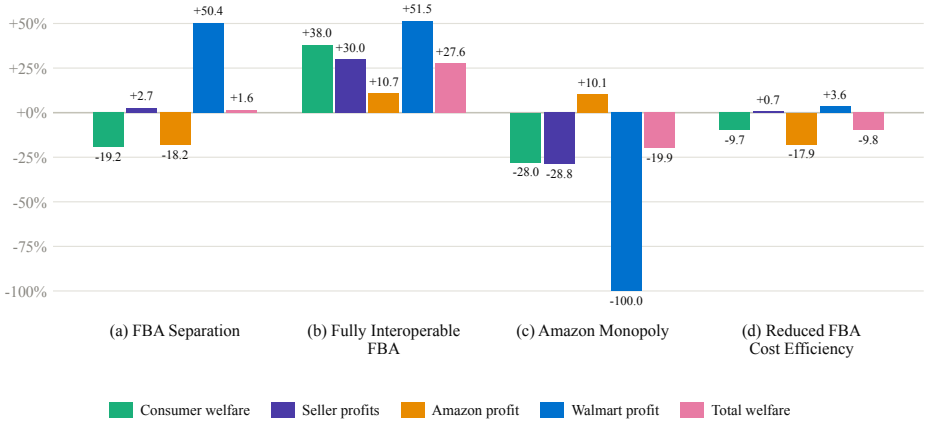


(b) Platform Profits

Pass-Through of FBA Cost Efficiency: Details

Back All Welfare

Set Amazon's logistics cost equal to Walmart's (≈ 65% higher) and re-solve the model

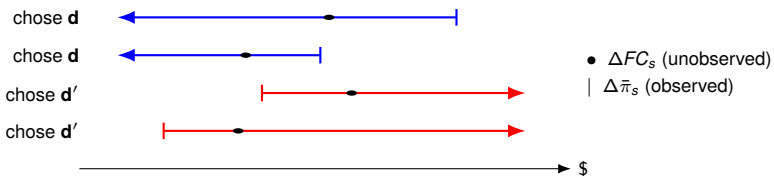


- Panel (d): Amazon -17.9%; consumers -9.7%; sellers ≈ 0; total $-9.8\% \Rightarrow$ modest pass-through to consumers.

Identification and Estimation: Fixed Costs

Fix a decision pair $(\mathbf{d}, \mathbf{d}')$ and sellers who choose either two:

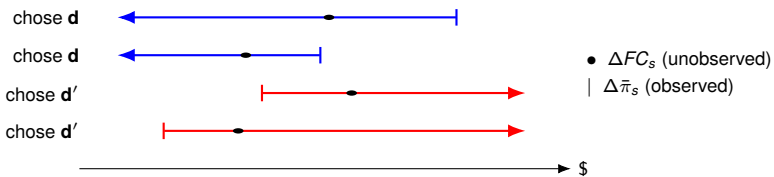
chose $\mathbf{d}$: $\Delta FC_s \leq \Delta\bar{\pi}_s$ chose $\mathbf{d}'$: $\Delta FC_s \geq \Delta\bar{\pi}_s$ with $\Delta FC_s = \Delta\bar{FC} + \Delta\nu_s$.



Identification and Estimation: Fixed Costs

Fix a decision pair $(\mathbf{d}, \mathbf{d}')$ and sellers who choose either two:

chose $\mathbf{d}$: $\Delta FC_s \leq \Delta\bar{\pi}_s$ chose $\mathbf{d}'$: $\Delta FC_s \geq \Delta\bar{\pi}_s$ with $\Delta FC_s = \Delta\bar{FC} + \Delta\nu_s$.

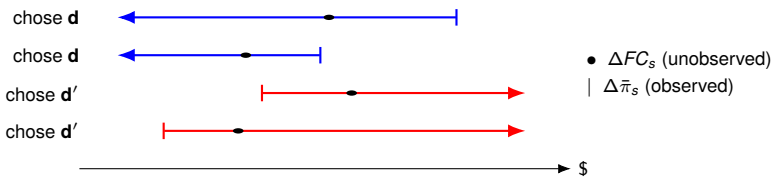


- Each choice gives a *one-sided* bound on ΔFC_s. Target: the mean $\Delta\bar{FC} = \mathbb{E}[\Delta FC_s]$.

Identification and Estimation: Fixed Costs

Fix a decision pair $(\mathbf{d}, \mathbf{d}')$ and sellers who choose either two:

chose $\mathbf{d}$: $\Delta FC_s \leq \Delta\bar{\pi}_s$ chose $\mathbf{d}'$: $\Delta FC_s \geq \Delta\bar{\pi}_s$ with $\Delta FC_s = \Delta\bar{FC} + \Delta\nu_s$.



- Each choice gives a *one-sided* bound on ΔFC_s. Target: the mean $\Delta\bar{FC} = \mathbb{E}[\Delta FC_s]$.
- Naive average leads to *selection bias*: $\mathbb{E}[\Delta\bar{\pi}_s \mid \mathbf{d}^* = \mathbf{d}] \;\geq\; \Delta\bar{FC} + \underbrace{\mathbb{E}[\Delta\nu_s \mid \mathbf{d}^* = \mathbf{d}]}_{\neq 0}$

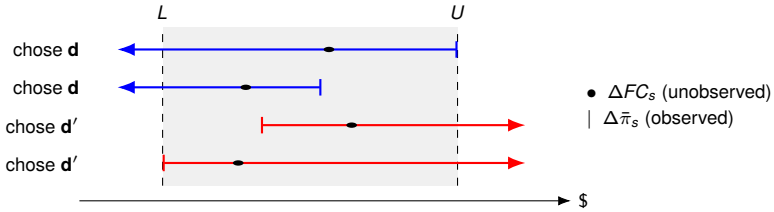
Identification and Estimation: Fixed Costs

Return

Support restriction (Eizenberg '14): ΔFC_s lie within the range of profit differences,

$$\Delta FC_s \in [L, U], \qquad L = \inf_s \Delta\bar{\pi}_s, \quad U = \sup_s \Delta\bar{\pi}_s.$$

Using long-tail sales in e-commerce: (Chevalier–Goolsbee '03; Brynjolfsson et al. '03, '25).



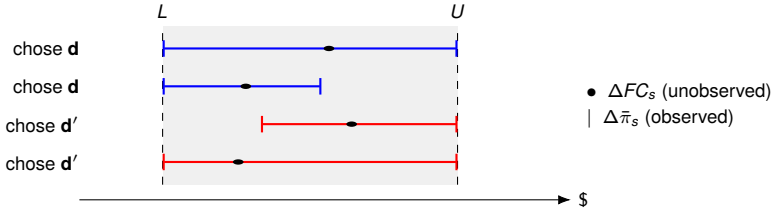
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- Every seller is bracketed by observables, whatever ν_s is:

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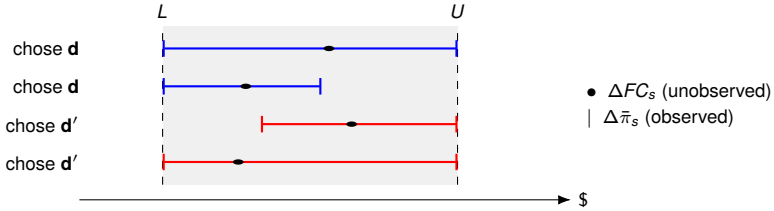
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$$\mathbb{E}\big[L\,\mathbf{1}\{\mathbf{d}\} + \Delta\bar{\pi}_s\,\mathbf{1}\{\mathbf{d}'\}\big] \;\le\; \Delta\bar{FC} \;\le\; \mathbb{E}\big[\Delta\bar{\pi}_s\,\mathbf{1}\{\mathbf{d}\} + U\,\mathbf{1}\{\mathbf{d}'\}\big]$$

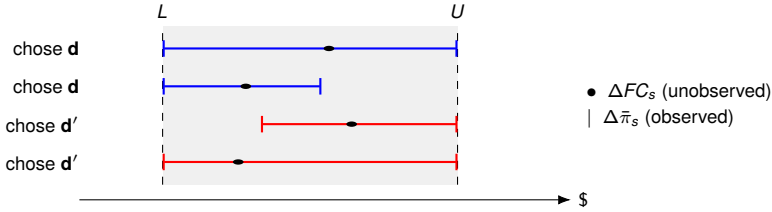
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- Moment inequality estimation (Eizenberg '14; Pakes et al. '15).

Amazon's Fees Do Not Co-move with UPS and FedEx

1. **Cumulative fee changes by parcel class** (2022–25), across weight classes:

$$\rho\left(g^{\text{Amz}}, g^{\text{UPS}}\right) = -0.12, \quad \rho\left(g^{\text{Amz}}, g^{\text{FedEx}}\right) = -0.19, \quad \rho\left(g^{\text{UPS}}, g^{\text{FedEx}}\right) = +0.85$$

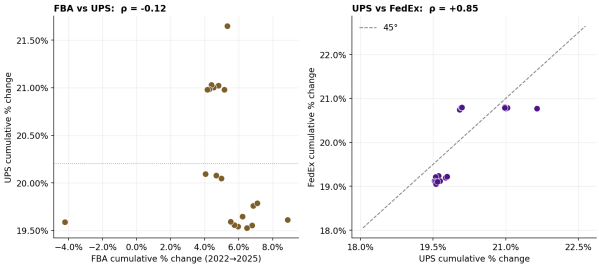
   $\hookrightarrow$ carriers co-move almost perfectly *with each other* — not with Amazon.

2. **Two-way FE panel** (weight class $\times$ year): regress carrier fees on Amazon's fee.
   $\hookrightarrow$ level $\hat{\beta} = 0.46$ (s.e. 0.56); elasticity $\hat{\eta} = -0.03$ (s.e. 0.04) $\Rightarrow$ no relationship, both carriers.

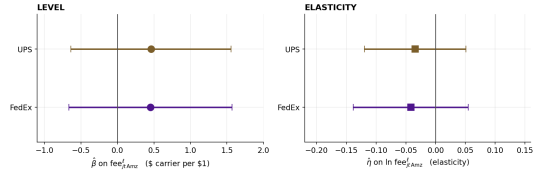
Figures Back

Carrier Comparison — Figures

1. Fee changes by parcel class



2. Two-way FE estimates



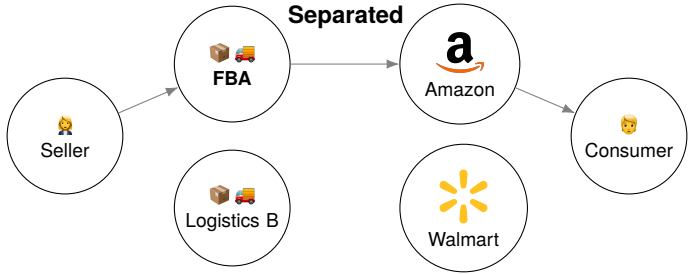
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Separating FBA from Amazon, yet Exclusive to Amazon

Return Next

Isolates double marginalization from removing exclusivity

FBA is **separated** from Amazon but remains **exclusive** to Amazon.



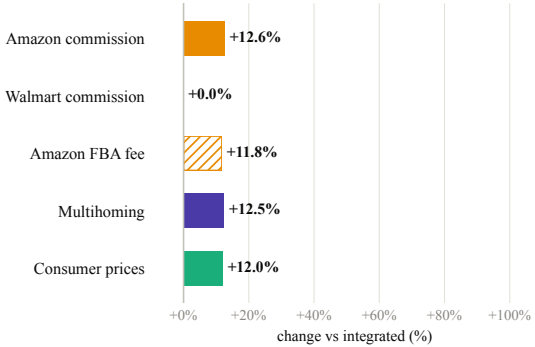
- Double Marginalization:

  Separated FBA sets its own fee; Amazon sets commission and retail prices.

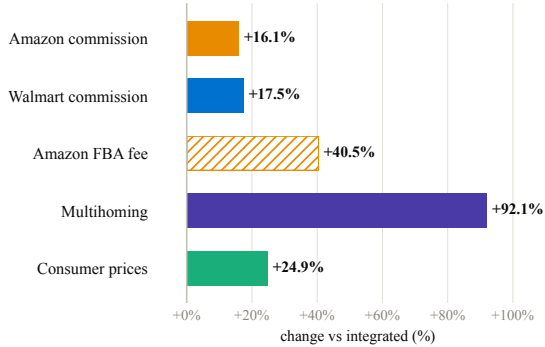
- Exclusive to Amazon:

  FBA still serves Amazon orders only ⇒ no access for Walmart sellers.

Separated, yet Exclusive (1/2): Charges and Prices Next



(a) Separated, yet exclusive

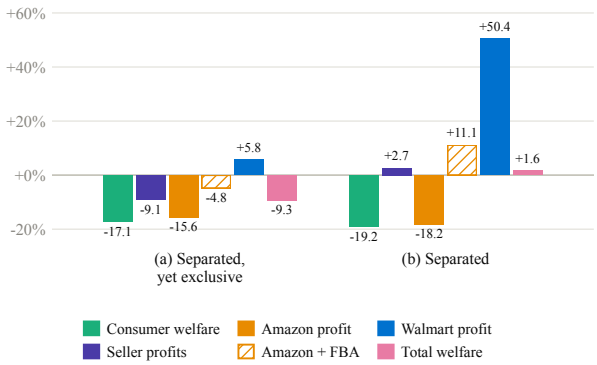


(b) Separated (open to Walmart)

Separated, yet Exclusive (2/2): Welfare

Return

Removing exclusivity, holding separation fixed

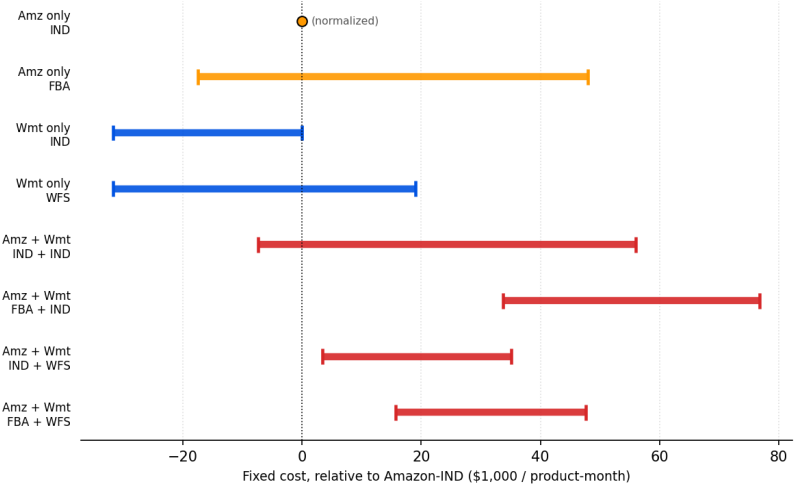


Welfare change vs. integrated (%)

- **Consumers**: removing exclusivity gives FBA quality on Walmart, but the separated FBA charges more $\Rightarrow$ little net effect.
- **Sellers and Walmart**: profits rise substantially once FBA is open to Walmart.
- **Amazon**: loses further, as sellers shift toward multihoming.

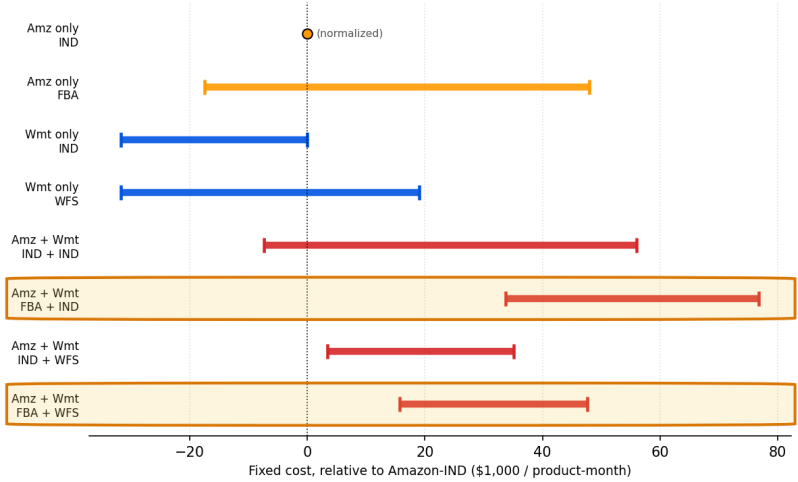
Fixed Cost Estimates by Entry and Logistics

Return



Fixed Cost Estimates by Entry and Logistics

Return



- Using FBA makes sellers face large entry costs into Walmart.