# eBay books auctions prices

## An Experiment



CHRISTIE'S AUCTION ROOM.

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# Research Question

- With rational customers, the division between item price and shipping cost is irrelevant - only total price matters.

- 2006 research found the opposite.

**How do customers behave when presented with a division between item price and shipping cost in 2023?**

# Hypothesis

On eBay auctions, for a fixed total price, charging a high shipping cost and starting with low opening bid leads to more revenues

# Treatment

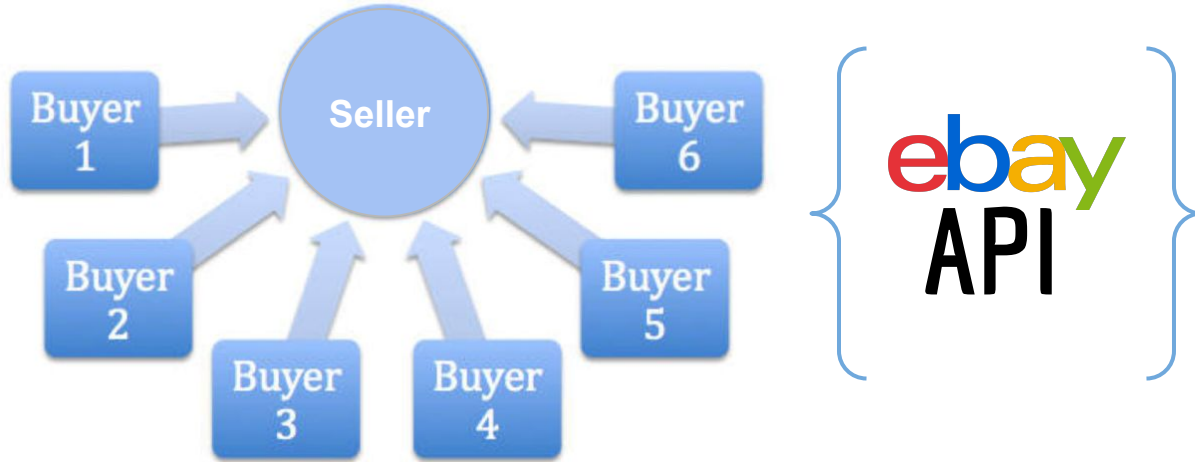12 book titles were auctioned, two treatments each, running on same days. (24 observations)

| Treatment A: High Opening Bid | | Treatment B: Low Opening Bid | |
|---|---|---|---|
| Opening Bid | S&H | Opening Bid | S&H |
| $4.00 | $1.00 | $1.35 | $3.65 |

Total "reserve price" in both treatments: **$5**

Treatment B made more revenue in the 2006 research (positive treatment effect)

**Revise listing**
**Sell a similar item**
**Create shipping discounts**

**Listing info**

Duration: 7 days
Start time: Mar 27, 2023 08:11:42 PM PDT
Start price: US $4.00

**The Seven Husbands of Evelyn Hugo : A Novel by Taylor Jenkins Reid (2018, Trade**

Condition: Brand New
Time left: 6d 23h | Monday, 09:11 PM

Starting bid: **US $4.00** [0 bids]

Place bid

♡ Add to Watchlist

🚚 Fast and reliable. Ships from United States.

Shipping: US $1.00 Economy Shipping. See details
Located in: Naperville, Illinois, United States

Delivery: Estimated between Sat, Apr 8 and Thu, Apr 13 to 60565 ⓘ

Returns: Seller does not accept returns. See details

Payments: PayPal G Pay VISA Mastercard American Express Discover

Earn up to 5x points when you use your eBay Mastercard®. Learn more

$ Have one to sell? Sell now

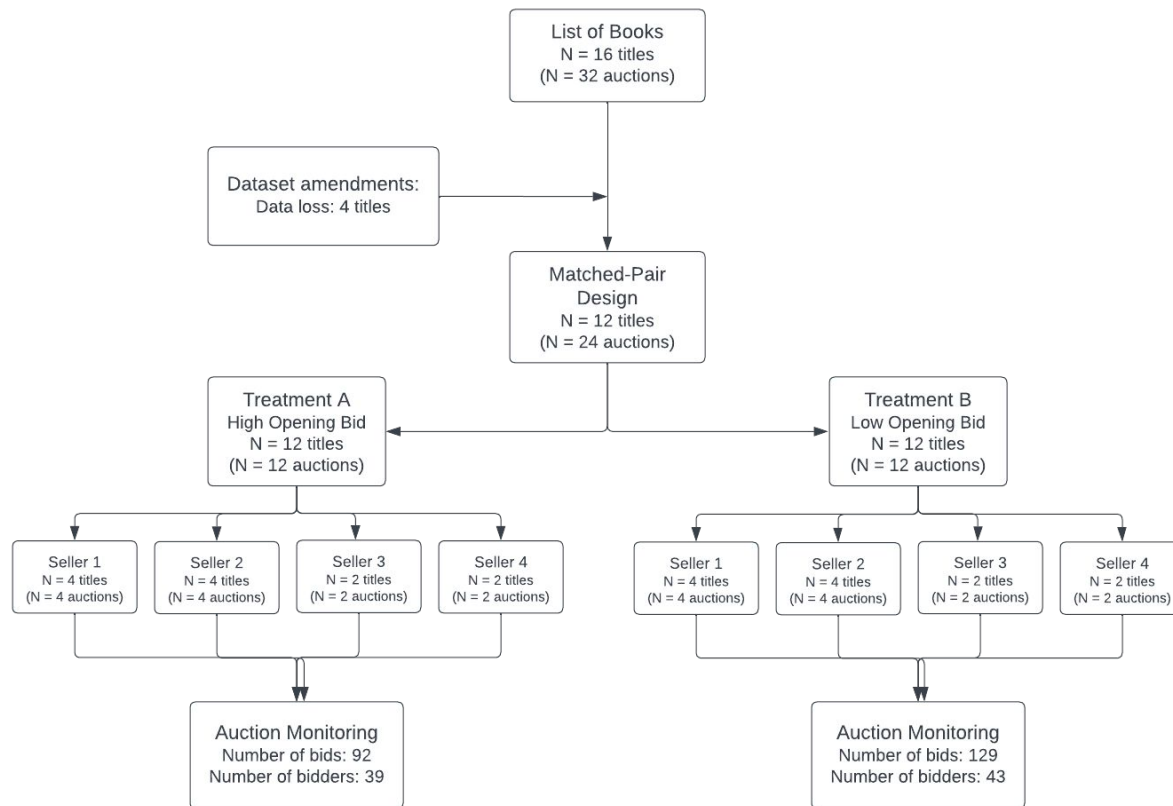# eBay Auctions

AUCTION TAKES PLACE



**VARIABLES**

- BID AMOUNT
- AUTOMATED
- DATE
- BIDDER (proxy)
- BIDDER'S SCORE
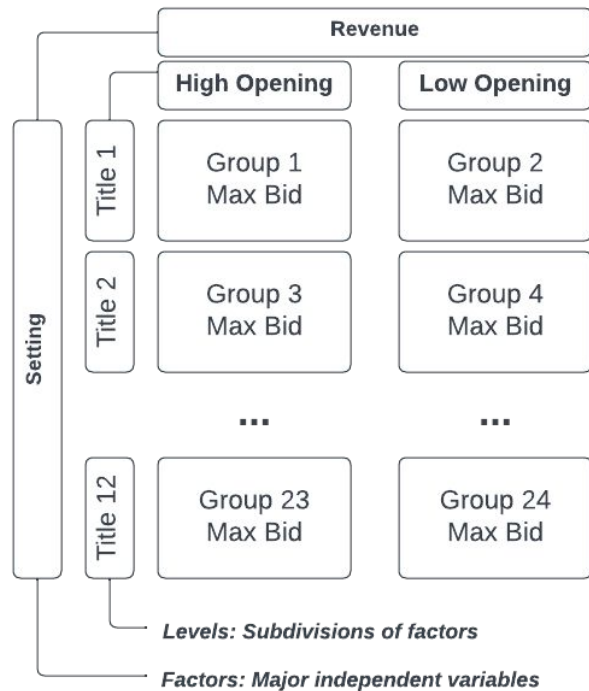- BIDDER'S LOCATION
- ITEM (Book Title)

**Units of measurement:** Bidders on eBay

**Randomization:** through eBay platform
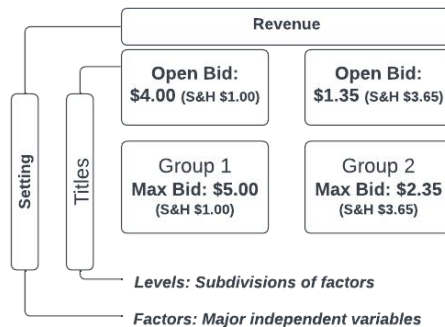
# Tracking Observations

# ROXO Grammar



Design notation for matched-pairs treatments (for outcome revenue)

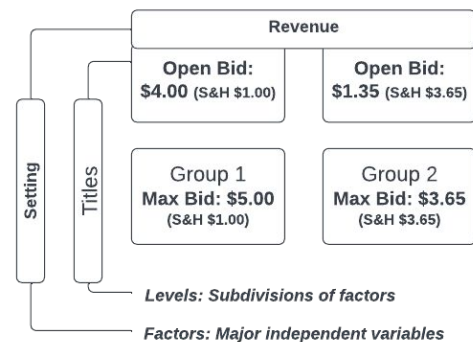| R | X~A~ | O |
|---|------|---|
| R | X~B~ | O |



**NULL CASE**
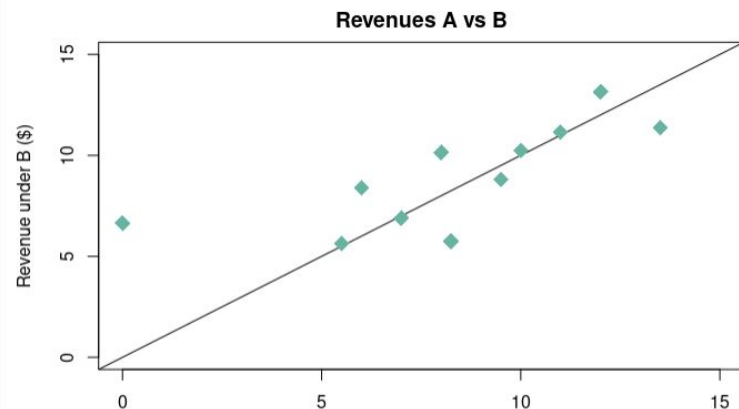


Null Effect in matched-pairs design

**MAIN EFFECT**



Main effect of 7-day auction in treatment

# Outcome Measures: Revenue (winning bid + shipping)

Overview of experiment results

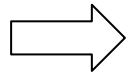| Book | RevA | RevB | DiffRev |
|---|---|---|---|
| A COURT OF FROST AND STARLIGHT | 10.00 | 10.24 | 0.24 |
| A COURT OF MIST AND FURY | 13.50 | 11.38 | -2.12 |
| A COURT OF THORNS AND ROSES | 11.00 | 11.15 | 0.15 |
| A COURT OF WINGS AND RUINS | 10.75 | 16.15 | 5.40 |
| HEIR OF FIRE | 0.00 | 6.65 | 6.65 |
| IT ENDS WITH US | 5.50 | 5.65 | 0.15 |
| THE SEVEN HUSBANDS OF EVELYN HUGO | 6.00 | 8.40 | 2.40 |
| THRONE OF GLASS | 9.50 | 8.80 | -0.70 |
| THINGS WE NEVER GOT OVER | 7.00 | 6.90 | -0.10 |
| THINGS WE HIDE FROM THE LIGHT | 12.00 | 13.15 | 1.15 |
| HEART BONES | 8.00 | 10.15 | 2.15 |
| ALL ABOUT LOVE | 8.25 | 5.75 | -2.50 |
| Average | 8.45 | 9.53 | 1.07 |



Revenues A vs B

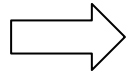Revenue under Treatment B seems to be higher than under A for most books

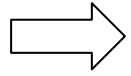# Analysis & Results: RI on regression residuals

Covariates only (not treatments) →
$$Revenue_i = \alpha + \beta Seller_i + \gamma Reputation_i + \theta Book_i + e_i$$
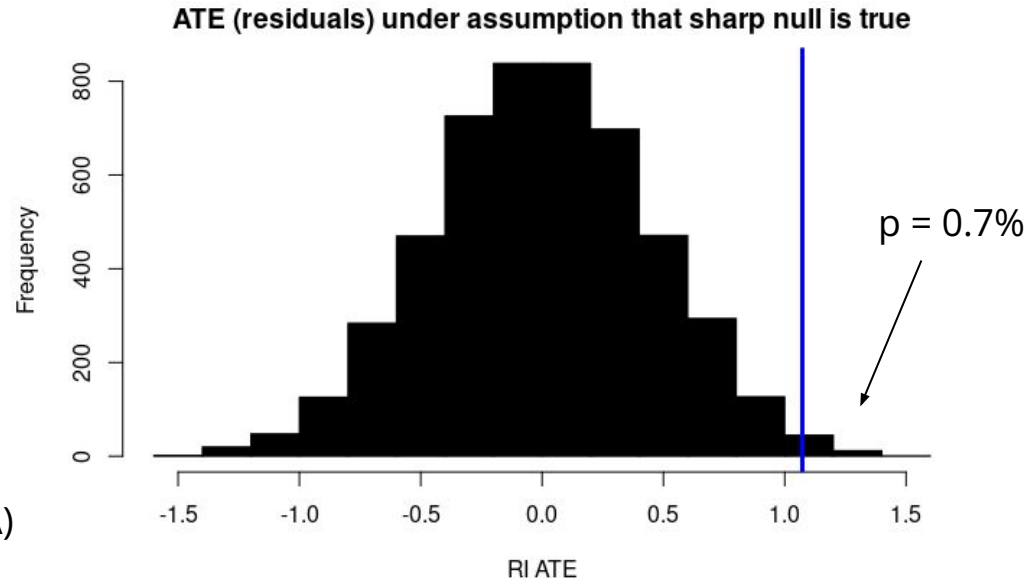
**1.** From regression on covariates, we get residuals

**2.** Randomization Inference (using our treatments) on residuals

**3.** Experimental ATE (on residuals) = mean(residualsB) - mean(residualsA) = 1.07
(blue line)



ATE (residuals) under assumption that sharp null is true

p = 0.7%

Frequency / RI ATE

We reject sharp null of equality of revenue between treatments. Therefore our hypothesis is confirmed.

# Questions & Concerns

**Questions:**

- Randomness
- Attrition (unsold book)

**Concerns:**

- Sample Size
- Budget
- Generalizability

# Thank you

# Appendix

# Regression on covariates

| | Dependent variable: |
|---|---|
| | Rev |
| factor(Seller)Erik | -3.809 |
| | (2.340) |
| factor(Seller)Jess | -4.659** |
| | (2.340) |
| factor(Seller)Oswaldo | -2.129 |
| | (1.399) |
| factor(Reputation)23 | |
| factor(Book)A COURT OF MIST AND FURY | 2.320 |
| | (1.914) |
| factor(Book)A COURT OF THORNS AND ROSES | 0.955 |
| | (2.494) |
| factor(Book)A COURT OF WINGS AND RUINS | 3.330* |
| | (3.264) |
| factor(Book)ALL ABOUT LOVE | 0.050 |
| | (1.795) |
| factor(Book)HEART BONES | 2.125 |
| | (1.518) |
| factor(Book)HEIR OF FIRE | -6.795** |
| | (4.125) |
| factor(Book)IT ENDS WITH US | -4.545** |
| | (2.656) |
| factor(Book)THE SEVEN HUSBANDS OF EVELYN HUGO | -2.920 |
| | (1.927) |
| factor(Book)THINGS WE HIDE FROM THE LIGHT | 5.625** |
| | (2.088) |
| factor(Book)THINGS WE NEVER GOT OVER | |
| factor(Book)THRONE OF GLASS | -0.970 |
| | (2.235) |
| Constant | 11.184*** |
| | (2.038) |

| | |
|---|---|
| Observations | 24 |
| R2 | 0.889 |
| Adjusted R2 | 0.746 |
| Residual Std. Error | 1.693 (df = 10) |
| F Statistic | 6.185*** (df = 13; 10) |

Note: *p<0.1; **p<0.05; ***p<0.01