Regression Discontinuity

project by:

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1 Summary

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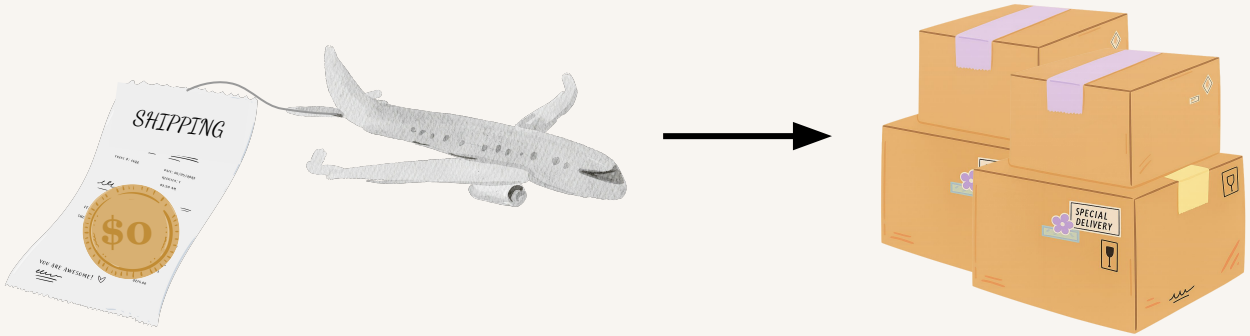
Summary

Hypothesis

If a customer receives **free shipping** on their *first* order,
it **causes** them to have ***more orders*** moving forward



Data

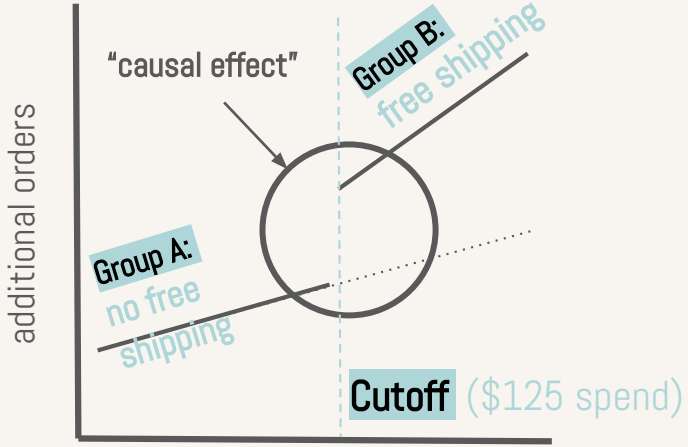
Shopping data
for online department store

Generated synthetic data:

- **200,000 customers**
- Assigned price ranges for items
- Randomized # of items in 1st purchase
- Set **$125 cutoff to receive free shipping**
- Assigned # of orders in next year

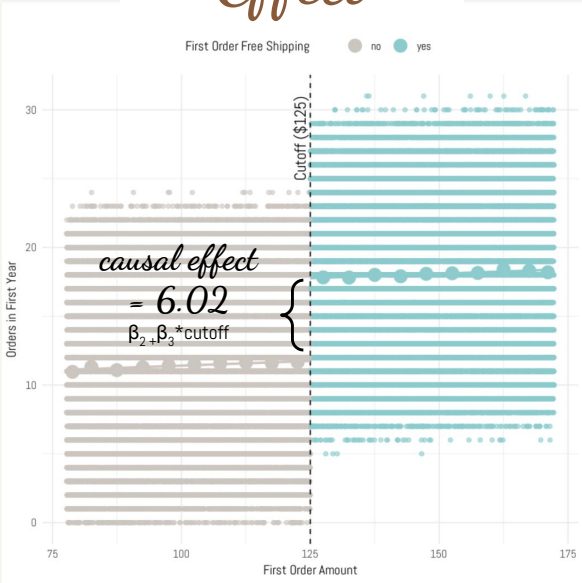
Methodology

Use **RDD** *regression discontinuity design* to **calculate** the ***causal effect*** of "first order free shipping" on "additional orders in first year"



Results

Effect



Findings

If a customer **receives free shipping** on their first order, they will order

~6x more

on average in their first year

notebook link:

Technical Setup

Data

Source: Generated in R

Type: Structured

Features:

- customer_id
- first order amount
- first order_free_shipping
- age

Target: Additional orders in first year

Setup

Language: R

Packages: rddensity, rdrobust

Compute: R CPU in Google Colab

Evaluation Metrics

Causal Effect:

- Significance of discontinuity: $\beta 2 + \beta 3^*$ cutoff
- Also evaluated:
  - Sensitivity
  - Balance Test
  - McCrary Test

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