Panel: Learning about Substitution and Welfare from Data

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What can we learn from experiments?

What are experiments informative about? (for substitution and welfare)

Substitution / Diversion Ratios:

$$\text{MTE}_p = \frac{\frac{@s_k}{@p_j}}{\frac{@s_j}{@p_j}}; \quad \text{MTE}_q = \frac{\frac{@s_k}{@\ _j}}{\frac{@s_j}{@\ _j}}; \quad \text{ATE} = \frac{s_k(J \ n\, j) \quad s_k(J)}{j s_j(J \ n\, j) \quad s_j(J) j}; \quad \text{Logit} = \frac{s_k(J)}{1 \quad s_j(J)}$$

What are experiments informative about? (for substitution and welfare)

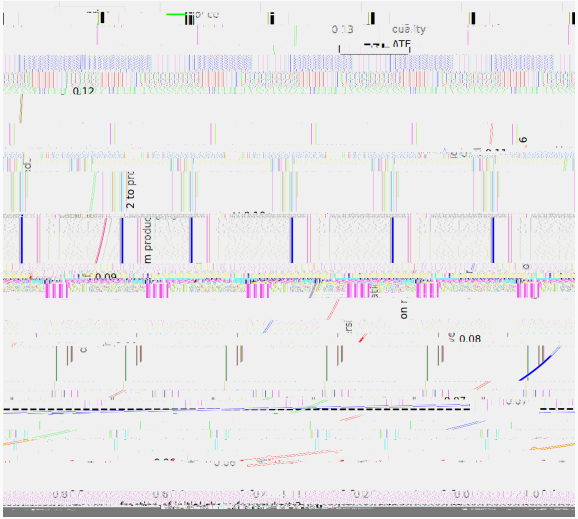
Consumer Welfare is largely about how outside good share responds

$$CS_i \propto \log\left(1 + \underbrace{\sum_{j \in J} \exp[\nu_{ij} - \alpha_i p_j]}_{s_{i0}^{-1}}\right) + C_i$$

$$\text{price} = \frac{\partial \log s_{i0}}{\partial p_j}; \quad \text{quality} = \frac{\partial \log s_{i0}}{\partial \nu_j}; \quad \text{variety} = \frac{s_{i0}(J \cup j) - s_{i0}(J)}{s_{i0}(J)}$$

Caveat: outside good s_{i0t} unfortunately mostly about assumptions.

How do these objects look?



[Plot #2]

Examples of Experiments

1. Small price changes: \course of business" by rms, or by researchers
2. Second choice Surveys: \Where would you shop if we closed this Tesco?"
3. Product Removals: (easier online), stockouts as quasi-experiments

The hard part:

Need to pay careful attention to which e ect our experiments informs us about

Small price change?

Experiments: Complements or Substitutes?

Can we do antitrust with experiments only and without empirical models?

- Farrel Shapiro (2010) suggest maybe we can observe diversion in \course of business" or in discovery.
  - Is this measuring the right economic object?
  - Our experience suggests we need all substitutes (not merging parties) alone to measure diversion.
- Asking merging parties to submit to an experiment designed by a third party to measure substitution is unlikely to be feasible.
- Can use experiments as a source of exogenous variation to identify our parametric demand models
  - How to combine them?
  - How to balance experiments and observational data?

Notes on Best Practices

Best Practices

Need (at minimum) heterogeneity in taste for constant and price.

Instruments necessary for prices and random tastes:

1. Start with di erentiation IV of (Gandhi Houde, 2019)
2. Construct Approximate IV (Chamberlain (1987), Raeynart Verboven (2014))

Impose supply conditions when appropriate

Add micro-moments (Covariance between price paid and income, Covariance between characteristics and demographics).

Shameless pyBLP plug

An Advertisement

Available on PyPI

```
pip install pyblp
```

Extensive documentation: https://pyblp.readthedocs.io/en/stable/

Long list of features

A Famous Example

```
blp_problem = pyblp.Problem(
    product_formulations=(
        pyblp.Formulation( 1 + hpwt + air + mpd + space ),                        # Linear demand
        pyblp.Formulation( 1 + prices + hpwt + air + mpd + space ),               # Nonlinear demand
        pyblp.Formulation( 1 + log(hpwt) + air + log(mpg) + log(space) + trend )  # Supply
    ),
    agent_formulation=pyblp.Formulation( 0 + I(1 / income) ),                     # Demographics
    product_data=pandas.read_csv(pyblp.data.BLP_PRODUCTS_LOCATION),
    agent_data=pandas.read_csv(pyblp.data.BLP_AGEN(read_csv 0.4 0.4 RG [(.)]TJ0.13725 0.2157 0.23137 rg 0.13725 0.2157 0.23137 RG [(re
```

What can we do?

```
blp_results=blp_problem.solve()

blp_results.compute_elasticities()
blp_results.compute_diversion_ratios()
blp_results.compute_consumer_surpluses()


blp_results.compute_costs()
blp_results.compute_prices(ownership=post_merger)

opt_results = blp_results.compute_optimal_instruments().to_problem().solve()
```

And much more...