Examining the Impact of Ridehailing Services on Public Transit Use

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Are ridehailing and transit complements or substitutes?
Existing Research

  - Taxis don’t compete with Transit.
  - Substitutable trips
- Murphy, Colin. 2016. Shared Mobility and the Transformation of Public Transit
  - Different intents of travel
  - Last Mile argument: Possible complementarity – extending current transit.
What do we expect to happen?

- Substitute over the road short haul transit.
- Augment long haul transit and independent ROW.
Empirical examination

- **Transit Data**: NTD per city per agency per mode per month.
- **Ridehailing**: Spatio temporal variation in ridehailing entry across US cities
  - Diff-In-Diff analysis
  - Controls: LaborForce, GasPrice, Unemployment
- Compare the change in utilization (demand per unit supply) within and between city per mode.
- Find good controls for ridehailing treated cities by matching them to others on past utilization.
  - CEM, Kmeans, Parallel Trends
Example of Matching: Parallel trends in bus service utilization.
\[ \log(Ut) = \beta.X + \alpha.RH + \text{FES (city + time*strata)} \]
Results

Monthly Estimates

- Bus(-1.05%)
- CR(+7.24%)
- HR(+2.6%)
- LightRail
Secondary Analysis

- Moderation of impact by transit quality (AllTransit)
  - Substitutes low (<75th %tile) quality service
  - Complements higher quality service
- Augmented impact with Google Maps updates (-4.9%)
- Similar results irrespective of provider (Lyft & Uber)
- Robust to random shuffling of ridehailing treatment
Discussion

- Projected losses and gains by city and mode.
  - Conditional on sustained supply despite changing demand
  - Costs = Fare loss/gains + Additional cost per consumer with reduced ridership.

- Limitations
  - Binary indicator of RH presence.
  - No direct evidence of the mechanism of interaction.
    - Need transactional data.

<table>
<thead>
<tr>
<th>Mode</th>
<th>MonetaryChange</th>
<th>MonetaryChange,1</th>
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<tbody>
<tr>
<td>CityBus</td>
<td>-163,212$</td>
<td>-68,592$</td>
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<tr>
<td>CommRail</td>
<td>548,148$</td>
<td>829,500$</td>
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<td>DemTaxi</td>
<td>-94,788$</td>
<td>-122,316$</td>
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<td>LightRail</td>
<td>-273,690$</td>
<td>-3,835,896$</td>
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<tr>
<td>Subways</td>
<td>6,945,192$</td>
<td>5,347,284$</td>
</tr>
</tbody>
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Babar, Yash and Burtch, Gordon, Examining the Impact of Ridehailing Services on Public Transit Use (September 25, 2017). Available at SSRN: https://ssrn.com/abstract=3042805