Setting & Context

Delhi, India: Infamously known as the “rape capital” of India

- 95% of females aged 16 to 49 years in Delhi feel unsafe in public spaces (ICRW, 2012)

Delhi University, India (DU): one of India’s largest & top non-technical universities (BRICS Univ. Rankings, 2015)

- Composed of 77 colleges with over 180,000 undergraduate students
  - Each college operates independently with its own campus, staff, classes and placements
  - Majority of students live at home and travel to college everyday (71% of my sample)

Admissions in DU: Based primarily on national high school exam scores

- Each college has separate exam cut-off score lists
- Cut-offs determine each student’s college choice set (conditional on major choice)

Theoretical Predictions

Relative to men, women:
- Attend worse ranked colleges
- Travel by safer routes
- Travel by more expensive routes

Introduction

- Women attend worse ranked colleges in Delhi – in absolute terms and within their choice set, across achievement levels and levels of ambition
- Misallocation has consequences for economic growth (Hesh et al., 2016)
- Can perceived risk of street harassment explain women’s college choice in Delhi?
- Exploits spatial variation in students’ origin, college locations, route choices and area safety between men and women’s choices
- First quantitative study to evaluate educational costs of harassment

Data Sources

1. DU Student Information: Primary Survey Data: 4,889 students (January - April 2016)
   - Full Survey: 4,008 students from 8 colleges
   - Short Survey: 881 students from 32 colleges
   - Residential location, travel routes and modes, subject-wise high school exam scores, siblings, exposure to harassment

2. Route Mapping using Google Maps: routes to chosen college and all colleges in choice set

3. Safety Data: SafetiPin mobile app data on perceived safety; Analytical data from Safeti mobile app on harassment by mode

Construct safety score for each travel route as a distance weighted average of area safety and safety of travel mode

Summary Statistics

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<tr>
<th></th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Prob. Ratio</th>
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<tbody>
<tr>
<td>Full Survey Sample</td>
<td>4,088</td>
<td>4,794</td>
<td>0.84</td>
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<tr>
<td>Gender Distribution</td>
<td>0.48</td>
<td>0.52</td>
<td>1.08</td>
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Empirical Model & Identification

Additive random utility framework with a rational, utility-maximizing student i (McFadden 1977)

Student i faces a choice of:

- N_i mutually exclusive colleges denoted by C_i, ..., C_N, and
- travel routes to each college in choice set r_i1, ..., r_iN_i, ..., r_iN, ..., r_iN, ...

Student i’s utility: \( U_i = \sum_{r_i} v_{ir} - \sum_{C_i} \rho_i \)

- \( v_{ir} = \gamma Q_i + \delta_i F_i + \eta_i S_i + \zeta_i T_i + \xi_i \)

Nestled Logit Model: \( \gamma \) is GEV distribution with CDF \( \exp \left(-\sum_{r_i} \gamma_i \right) \)

- \( \lambda_i \) measures the degree of independence among \( \varepsilon \) for routes in a college nest
- IIA within colleges but not across colleges

Identification Assumption: Differences between men & women’s unobserved preferences for a college’s travel route uncorrelated w/ observed college quality, travel safety, costs & time

Results

Women willing to attend a college that
- is 5 ranks lower for a 1 SD safer route
  - more than double of men’s WTP

Women willing to spend an additional Rs. 23,000 ($360) per year on travel costs to travel by a 1 SD safer route
- almost triple of men’s WTP
  - 8.2% of avg. annual p.c. income in Delhi (2016)

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