Background

Bogotá, Colombia’s TransMilenio BRT system has been widely recognized for its positive impacts on transit use, congestion, safety, and air quality. However, recent research suggests that access to the BRT is also associated with an unexpected increase in motor vehicle ownership in the city’s low-wealth neighborhoods. A possible explanation, supported by anecdotal evidence, for this result is that low-wealth, BRT-served households have capitalized on their location by renting out spare rooms, generating extra income that can be used to buy a vehicle. Alternatively, the reorganization of Bogotá’s traditional transit services into the BRT may have reduced transit service levels among the city’s low-wealth households, increasing the pressures on those households to motorize.

The present study tests the latter hypothesis by examining changes in mobility patterns among car-less, low-wealth households from before to after TransMilenio’s introduction.

Hypothesis

Households with BRT access complete more tours and fulfill a greater variety of travel purposes than households without TransMilenio access, controlling for pre-BRT travel patterns.

Study Area

Research Design & Methods

Design

I use a difference-in-differences research design, with treatment & control groups and independent pre- & post-tests. The present study tests the latter hypothesis by examining changes in mobility patterns among car-less, low-wealth households from before to after TransMilenio’s introduction.

Independent variables

- Year dummy: 0 (pre-test) vs. 1 (post-test)
- BRT trunk & feeder access dummies: 0 (control) vs. 1 (treatment)
- Year*BRT access interactions
- Urban form (density, bikeway access, destination proximity, nonmotorized travel supports) & sociodemographics

Dependent variables

- Total, non-car, & discretionary tour frequency (# of tours completed by household members on survey day)
- Travel purpose diversity (# of travel purposes fulfilled via non-car modes by the household on survey day; range: 0-3)

Analysis

Multiple regression via maximum likelihood estimation

Basic model:

\[ \text{outcome} = f(\text{year, BRT access, year*BRT access, controls}) \]

- Total & non-car tour frequency: count (Poisson, controls)
- Discretionary tour frequency: count (negative binomial)
- Travel purpose diversity: generalized ordered logit

Results

<table>
<thead>
<tr>
<th></th>
<th>Total Tours</th>
<th>Non-car Tours</th>
<th>Disc. Tours</th>
<th>Purpose Diversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary statistics</td>
<td></td>
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<tr>
<td>1995 [mean (st. dev)]</td>
<td>2.61 (3.77)</td>
<td>2.47 (1.36)</td>
<td>0.74 (0.94)</td>
<td>1.52 (0.58)</td>
</tr>
<tr>
<td>2005 [mean (st. dev)]</td>
<td>1.95 (1.06)</td>
<td>1.48 (1.06)</td>
<td>0.29 (0.59)</td>
<td>1.16 (0.43)</td>
</tr>
<tr>
<td>Observations</td>
<td>14,085</td>
<td>14,085</td>
<td>14,085</td>
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<tr>
<td>Regression results</td>
<td></td>
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<tr>
<td>Year*trunk(0-800m)</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
<td>ns</td>
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<tr>
<td>Year*feeder(0-400m)</td>
<td>ns</td>
<td>ns</td>
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<tr>
<td>Year*feeder(400-800m)</td>
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</tbody>
</table>

Mobility (tour frequency & travel purpose diversity) decreased from pre-test to post-test.

Mobility was not significantly related to BRT access.

Conclusions

- Bogotá’s BRT investment doesn’t appear to have influenced the ability of carless, low-wealth households to meet mobility needs (tour frequency & travel purpose diversity).
- This supports the idea that motorization among low-wealth, BRT-served households is driven not by mobility supply but by extra income resulting from BRT proximity, raising questions about TransMilenio’s longer-term mobility impacts, esp. if proximity encourages/enables motorization.

Implications for scholarship

Using travel survey data to assess mobility among resource-constrained populations is challenging, as observed travel patterns may poorly reflect both actual & desired mobility. This research takes a step toward understanding how to construct travel behavior variables to measure mobility by introducing a new variable, travel purpose diversity. Rather than measuring quantity or quality of travel, diversity aims to capture the extent to which that travel helps households meet activity participation needs.

Further research is still needed to improve understanding of suppressed travel demand and of the relationships between revealed travel behaviors and motorization pressures.