Using Census Data to Identify Areas of High-Transit Propensity

TRB Using Census Data for Transportation

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Principal Question

Where should transit service be provided?
Principal source

- Examined characteristics of transit riders
- Analyzed at county level
- Identified factors of highest propensity
- Considered different operating environments
Demographic factors

- Zero vehicle housing units
- Mobility limitations (going outside the home)
- Employment disabilities
- Minorities ("White alone, not Hispanic/Latino")
- Recent immigrants (<10 years)
- Low income households (<$15,000)
- Females

All were found to be relevant when controlling for income
Caveats

- Analysis focused on journey-to-work data
- Little data available on non-work trips
- Based upon 1990 Census
  - Recent trends indicate some changes
  - Some, such as minorities, may have changed but recently reversed
Limitations

- Identified traditional transit markets
  - Little to no information on higher-income commuters
- Did not control for service levels
- Only looked at home end; no employment or shopping
- Did not consider density
  - Found to account for 37% of transit ridership
Other factors rejected

- Younger workers & older workers
  - Data not available on block group level
  - Little weight compared with other factors
- Education level
  - Significant in larger markets (more income = more riders) but likely related to service levels, particularly rail
- Renters & non-licensed drivers
  - Significant in some studies, but not controlled for income
Propensity model

- 7 weighted demographic factors
  - Weights based upon relative propensity
  - Income adjusted to $20K for 2000
- 8th factor for density
  - Weighted based upon 37% of ridership projections
- Index developed for each factor
  - 100 for highest value, proportionally reduced for others
  - Percent of demographic group or pop/square mile
- Composite score for each block group
  - Calculated by multiplying indexes by weights
  - Grouped into 5 categories
## Propensity weights

- Population density: 370
- Zero vehicle housing units: 217
- Mobility limitations: 174
- Work disability: 66
- Minorities: 65
- Recent immigrants: 39
- Low income households: 38
- Female: 31
- **TOTAL**: 1000

Theoretical range: 0 to 100,000
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<tbody>
<tr>
<td>Hoke County</td>
<td>201,000</td>
<td>203,500</td>
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<td>198,500</td>
<td>196,000</td>
<td>194,500</td>
<td>193,000</td>
<td>191,500</td>
<td>190,000</td>
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**Note:** The table above contains sales data for various counties in North Carolina for the year 2010. The data includes sales amounts and additional metrics, but the specific values are not provided here.
Wake County, NC example

- Part of the Triangle Region
- 3 counties (Wake, Durham, Orange)
- 4 principal cities (Raleigh, Cary, Durham, Chapel Hill)
- 3 universities (NC State, UNC-Chapel Hill, Duke)
Wake County Agencies

- CAT  Capital Area Transit
- TTA  Triangle Transit Authority
- C-Tran  Cary Transit
- Wolfline  NC State
Census challenges

- 3 factors based upon SF 1
  - Density
  - Minority population
  - Female

- 5 factors based upon SF 3
  - Mobility limitations
  - Work disability
  - Recent immigrants
  - Low income households
  - Zero vehicle housing units

- How to adjust for switch to ACS?
Other enhancements

- Adjust for other service products
  - Rail, commuter bus, demand-response
- Service level changes since 1990
  - More rail systems, greater transit ridership
- Exogenous factors
  - Gas price changes, millennials
Questions?