The Effect of Demographic Changes on Transit Ridership Trends

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October 2018 • Planning Session 7C
Introduction

- Despite growing population and improving economy, **transit ridership** has been in an **accelerated decline** for the past 3+ years.
- Analysts are attempting to diagnose why, so service can be adapted.
- We believe **two demographic considerations** – aging and **population distribution** – are contributing to the decline.
National Bus and Rail Transit Ridership and Ridership per Capita, 1980-2016

Billions of Transit Trips

Transit Trips per Capita

- Ridership
- Per Capita Ridership

National Bus and Rail Transit Ridership and Ridership per Capita, 1980-2016
Population and Transit Investment (2014 dollars), Percent Changes from 1992

Note: Investment includes operating and capital expenses. Bus and rail only.
Why is Ridership Declining?

- TNC Use
  - 6% Reduction Transit
- Immigrant Behavior
- Reliability
- Telecommuting
- SmartBenefits Reduction
- Traffic Delay
- Reduced Fuel Prices
- Housing Cost
- And Many Other Reasons...
How Do Age Demographics Affect Transit Use Tendency?

• U.S. Population has been aging.
• Travel behavior characteristics change with age.
• Has more of the population been moving to different age cohorts less conducive to transit use?

• Data used:
  – Census
  – NHTS
NHTS Trips per Person per Day by Age Group, 2009

5-14: 3.2
15-24: 3.5
25-34: 4.0
35-44: 4.3
45-54: 4.2
55-64: 4.0
65-74: 3.6
75-84: 2.9
85+: 2.0
NHTS Shares of Trips Via Transit by Age Group, 2009

Share of Trips Taken Via Transit

- 5-14: 2.9%
- 15-24: 2.6%
- 25-34: 1.8%
- 35-44: 2.0%
- 45-54: 1.6%
- 55-64: 1.5%
- 65-74: 1.2%
- 75-84: 1.1%
- 85+: 1.0%

5-14, 15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75-84, 85+
Select U.S. Census Population Age Distributions, 1980-2015

Number of trips per day
Share of trips using transit
Theoretical Transit Trips by Age Group

Note: Adjusted for population growth (2015).
Theoretical Transit Trips by Year

Accounts for 0.03 out of 0.16 trips per capita per year decline.

Billions of Transit Trips

Note: Adjusted for population growth (2015).
National average transit commuting share is **5.1%**.

Top 10 counties **increasing** population: average transit commute share was **4.4%**.

Top 10 counties **decreasing** population: average commute share was **11.4%**.

Is population moving out of areas with quality transit?

Data used
- ACS
- APTA
# ACS Transit Commuting Share by Largest Nominal Population Increase

<table>
<thead>
<tr>
<th>County</th>
<th>Population 2016</th>
<th>Population Change (Percent Change) 2013-2016</th>
<th>2015 Commuting, Share Using Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harris County, Texas</td>
<td>4,589,928</td>
<td>243,045 (5.6%)</td>
<td>2.9%</td>
</tr>
<tr>
<td>Maricopa County, Arizona</td>
<td>4,242,997</td>
<td>231,778 (5.8%)</td>
<td>2.4%</td>
</tr>
<tr>
<td>Clark County, Nevada</td>
<td>2,155,664</td>
<td>130,568 (6.4%)</td>
<td>4.0%</td>
</tr>
<tr>
<td>Los Angeles County, California</td>
<td>10,137,915</td>
<td>122,479 (1.2%)</td>
<td>6.8%</td>
</tr>
<tr>
<td>Bexar County, Texas</td>
<td>1,928,680</td>
<td>106,624 (5.9%)</td>
<td>2.8%</td>
</tr>
<tr>
<td>Tarrant County, Texas</td>
<td>2,016,872</td>
<td>104,371 (5.5%)</td>
<td>0.6%</td>
</tr>
<tr>
<td>King County, Washington</td>
<td>2,149,970</td>
<td>104,096 (5.1%)</td>
<td>12.1%</td>
</tr>
<tr>
<td>San Diego County, California</td>
<td>3,317,749</td>
<td>99,330 (3.1%)</td>
<td>3.0%</td>
</tr>
<tr>
<td>Riverside County, California</td>
<td>2,387,741</td>
<td>96,289 (4.2%)</td>
<td>1.4%</td>
</tr>
<tr>
<td>Dallas County, Texas</td>
<td>2,574,984</td>
<td>95,174 (3.8%)</td>
<td>2.9%</td>
</tr>
<tr>
<td><strong>Weighted Average:</strong></td>
<td></td>
<td></td>
<td><strong>4.4%</strong></td>
</tr>
</tbody>
</table>
## ACS Transit Commuting Share by Largest Nominal Population Decrease

<table>
<thead>
<tr>
<th>County</th>
<th>Population 2016</th>
<th>Population Change (Percent Change) 2013-2016</th>
<th>2015 Commuting, Share Using Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook County, Illinois</td>
<td>5,203,499</td>
<td>-36,784 (-0.7%)</td>
<td>18.4%</td>
</tr>
<tr>
<td>Wayne County, Michigan</td>
<td>1,749,366</td>
<td>-25,257 (-1.4%)</td>
<td>3.2%</td>
</tr>
<tr>
<td>Cuyahoga County, Ohio</td>
<td>1,249,352</td>
<td>-13,982 (-1.1%)</td>
<td>4.9%</td>
</tr>
<tr>
<td>San Juan County, New Mexico</td>
<td>115,079</td>
<td>-11,439 (-9.0%)</td>
<td>0.3%</td>
</tr>
<tr>
<td>Allegheny County, Pennsylvania</td>
<td>1,225,365</td>
<td>-8,266 (-0.7%)</td>
<td>9.1%</td>
</tr>
<tr>
<td>Baltimore City, Maryland</td>
<td>614,664</td>
<td>-8,194 (-1.3%)</td>
<td>18.6%</td>
</tr>
<tr>
<td>Suffolk County, New York</td>
<td>1,492,583</td>
<td>-8,193 (-0.5%)</td>
<td>6.5%</td>
</tr>
<tr>
<td>Genesee County, Michigan</td>
<td>408,615</td>
<td>-6,938 (-1.7%)</td>
<td>1.2%</td>
</tr>
<tr>
<td>St. Louis City, Missouri</td>
<td>311,404</td>
<td>-6,543 (-2.1%)</td>
<td>9.4%</td>
</tr>
<tr>
<td>Caddo Parish, Louisiana</td>
<td>248,851</td>
<td>-6,373 (-2.5%)</td>
<td>1.8%</td>
</tr>
<tr>
<td><strong>Weighted Average:</strong></td>
<td></td>
<td></td>
<td><strong>11.4%</strong></td>
</tr>
</tbody>
</table>
2015 Transit Commuting Share by County

Legend
Net Population Change 2000-2016
-311,796 to -5,000
-5,000 to 0
0 to 10,000
10,000 to 50,000
50,000 to 200,000
200,000 to 1,189,350
Theoretical Commute Trip Method, 2013-2016

Using the following assumptions:

- Constant workforce participation rate
- 2015 transit commute share for both years
- 1.53 unlinked trips per linked trip
- 235 working days per year
This equation was calculated for every county in the U.S. for 2016 under 2 conditions:

1. 2016 county populations derived from 2013 county populations given a 0.7% annual growth rate for every county.

2. Real 2016 county populations.
Theoretical Commute Trip Method, 2013-2016

- Estimated commute ridership for:
  - Condition 1: 5,334 million
  - Condition 2: 5,314 million

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Makes up 6.7 million commute trips out of 73.0 million total trips per year decline.

Commute trips make up fewer than half of all transit trips, so expect the real effect of geographic distribution to make up more of the total.
Policy Implications

• Consider tailoring portions of service toward addressing older cohorts’ needs and preferences.

• Shift service nationally to meet population growth in traditionally transit-deprived counties.
Areas for Future Research

• Use 2016 NHTS, upon release, to study changing travel behavior among age groups.

• Perform similar geographical distribution analyses with areas smaller than counties.

• Compare the heterogeneity of other demographic characteristics such as income level and immigrant population with age.
Thank you!

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