Transit Practices: Lunch and Learn

June 30, 2016
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Quick Overview

- Transit's share of the modal market
- Factors that influence transit use
- Test yourself!
- Transit elsewhere in Virginia
Virginia's Transit Market: A Bit More than 1% of all Trips Statewide

Transit = local public transit, shuttle bus, commuter train, subway or elevated train, or streetcar/trolley

Virginia transit mode share by trip purpose (2009)
Relative Changes in Virginia Transit Use for the Work Trip

The absolute change is small

The percent change is high

a 12% increase

a 28% increase
Absolute Changes in Northern Virginia Transit Use for the Work Trip

Modal shares in Northern Virginia

- Drove Alone
- Carpoled
- Public transport + taxi + motorcycle
- Bike or walk
- Worked at home

Percent of Workers Age 16+

1990 CTPP
2000 CTPP
2012 ACS
Bottom Line for the Transit Market

• If we define transit broadly (bus, commuter train, shuttle), then, in Virginia:

   Transit accounts for 4.7% mode share for the home-work trip (VA) compared to 5.2% (U.S.)

   For the home-work trip, this mode share has increased by 28% from its 2005 value

   Large increases in this small mode share are observed at the national level as well
First Factor: *Immediate* Densities that "Support" Transit

<table>
<thead>
<tr>
<th>Mode (headway)</th>
<th>Residential Density</th>
<th>Commercial Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus (60 min)</td>
<td>5 du/acre</td>
<td>6 M ft²</td>
</tr>
<tr>
<td>Bus (30 min)</td>
<td>7</td>
<td>14 M</td>
</tr>
<tr>
<td>Light Rail (5 min)</td>
<td>9</td>
<td>42 M</td>
</tr>
</tbody>
</table>

You want these densities near the service
Local Density Examples

- Johnson Village: 5 units/acre
Local Density Examples

- Cherry Hill: >9 units/acre
Transit service begins to become feasible.

Virginia Jurisdiction Densities that "Support" Transit

Transit service begins to become feasible.
Variation in Densities that "Support" Transit

People per acre: 4, 200,000, 400,000, 600,000

- Atlanta (4%)
- NYC (25%)
- LA (5%)

"Support" = An Acceptable Subsidy

<table>
<thead>
<tr>
<th>Mode</th>
<th>Trip Cost</th>
<th>Farebox Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus rapid transit</td>
<td>$2.30</td>
<td>32%</td>
</tr>
<tr>
<td>Light rail</td>
<td>$3.60</td>
<td>28%</td>
</tr>
<tr>
<td>Bus</td>
<td>$3.90</td>
<td>26%</td>
</tr>
<tr>
<td>Commuter bus</td>
<td>$10.50</td>
<td>56%</td>
</tr>
<tr>
<td>Demand response</td>
<td>$35.20</td>
<td>7%</td>
</tr>
</tbody>
</table>

Source: FTA. National Transit Summary & Trends, 2015
Bottom Line for Density

- One needs higher residential densities to support higher levels of transit service

- But

  - Difference between density near the transit line and density of the entire jurisdiction

- Other factors matter.
Second Factor: Getting to the Transit Stop

Grid Pattern

Hybrid

Most people will walk only about a $\frac{1}{4}$ to $\frac{1}{2}$ mile—at most

Other factors:
- Pedestrian access
- Grade
Third Factor: Service Frequency

• Doubling the frequency of service may increase ridership by 30%-50%.

• Higher "elasticity" is noted when
  – Existing service has 30 min headways or worse
  – Incomes are in the middle to high range
  – Trips are shorter
Fourth Factor: Comfort

Example of Information

Courtesy GRTC
Bottom Line for Some Factors Affecting Ridership

• Some factors include
  – Density
  – Getting to the stop
  – Service frequency

• Factors not quantified per se (but they matter)
  – Branding and perception
  – Quality of the stops and information
  – Reliability and service coverage
Interlude: Test Yourself!

- Each of the following popular perceptions about rail vs. bus is one of these:
  - An **intrinsic difference** between bus and rail
  - A **misidentified difference** (not intrinsic)
  - A **cultural feedback effect** *(a result of perceptions, rather than a cause)*
Q1. Capacity

*Rail provides higher capacities than buses to serve high-demand corridors.*

Intrinsic difference

Misidentified difference
Q2. Maneuverability

*Buses are more able than rail to maneuver around obstacles or take a detour.*

Intrinsic difference
Misidentified difference
Cultural feedback effect

Q3. Permanence

*Rail systems are more permanent than bus systems.*

Intrinsic difference
Misidentified difference
Cultural feedback effect
Q4. Frequency

Rail provides more frequent service than buses.

Intrinsic difference
Misidentified difference
Cultural feedback effect

7/6/2016
Q5. Exclusive Rights of Way

*Rail is faster than bus because it has an exclusive right of way.*

Intrinsic difference
Misidentified difference
Q6. Emissions

Rail has lower emissions than bus.

Intrinsic difference
Misidentified difference
AND (limited) backfire effect difference

Train wheel image from https://en.wikipedia.org/wiki/Train_wheel
Q7. Ride Quality

*Rail has a smoother ride than bus.*

Intrinsic difference
Misidentified difference
Cultural feedback effect

7/6/2016

image from https://www.reddit.com/r/pics/comments/35dx52/how_smooth_the_bullet_train_is_in_japan/
Q8. Legibility

It is easier to understand a rail network.

Intrinsic difference
Misidentified difference
Cultural feedback effect

Some Policy Questions

- Travel time competitiveness
- Urban form
- Route directness

This figure is not current!
Example of a Policy Challenge

• Service allocation
  – Provide **coverage** to the whole community
  – Maximize **ridership** with fixed budget
  – Allocate service proportional to population?

• Choice among these is a value judgment
• We’re back to urban form and density
  – Density allows more people and activities within walking distance of transit
  – What’s more, transit ridership *per person* rises directly with density
That *Other* Virginia University

- **Fleet:** 41
  - Serves VT, Blacksburg, Christiansburg, and Montgomery County

That *Other* Virginia University

- 95,000 square-foot facility
- FY 15 ridership: 3.7 million passenger trips
- 90%+ of riders are VT students, 2-5% are faculty/staff
Transit Systems Differ in Scale

Source: National Transit Database
Questions?

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