Some Observations on Transit Ridership and Productivity Trends

Steven E. Polzin, PhD.

Outline:

- Some data
- Some thoughts

Primary Data Sources:
APTA 2016 Fact Book Appendix data set, NTD, ACS, EIA, BTS

Thanks to Jodi Godfrey, Kurt Lehmann, Richard Driscoll and Xuehao Chu for data development. NCTR for financial support.
National VMT Trend
Moving 12-Month Total

The 7-8 year pause

Moving 12-Month Total on ALL Roads
Percent Change from 1992
Incremental Annual Change in VMT

Incremental Growth in VMT by Year

+2.8%

U.S. Transit Ridership and Ridership/Capita Trends

Transit trips per capita in 2016 the same as in 1973
### Current National Trends

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2015 versus 2014</th>
<th>2016 YTD</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Population</td>
<td>+0.8%</td>
<td>+0.69%</td>
<td>Census</td>
</tr>
<tr>
<td>Total Employment</td>
<td>+1.7%</td>
<td>+1.6%</td>
<td>BLS</td>
</tr>
<tr>
<td>Real GDP</td>
<td>+2.4%</td>
<td>+1.6%</td>
<td>BEA (advanced estimate)</td>
</tr>
<tr>
<td>Gas Price</td>
<td>-28%</td>
<td>-12.0%</td>
<td>EIA</td>
</tr>
<tr>
<td>VMT</td>
<td>+3.5%</td>
<td>+2.8% thru Dec</td>
<td>FHWA</td>
</tr>
<tr>
<td>Public Transit Ridership</td>
<td>-1.3% to -2.5%</td>
<td>-2.33% thru Dec</td>
<td>BTS and NTD</td>
</tr>
<tr>
<td>Rail Passenger Miles(FY)</td>
<td>-2.06%</td>
<td>-0.22%</td>
<td>BTS</td>
</tr>
<tr>
<td>Airline Passenger Miles</td>
<td>+5.9%</td>
<td>+4.62% thru Nov</td>
<td>BTS</td>
</tr>
</tbody>
</table>

### U.S. Non-POV Commute Market Shares

Sources: Census, ACS
Industry Concern

“Billions Spent, But Fewer People Are Using Public Transportation in Southern California.”

Metro’s multimillion-dollar mystery: Where have our riders gone?
Scripps, October 1, 2016

Key Highlights:
Daily ridership on bus and rail declined significantly in FY2016 in response to poor service quality and reliability, and the impacts of SafeTrack are likely to keep ridership at this lower level throughout FY2017 and into FY2018. Metro is also facing broader market challenges related to changing trip-making behavior, lower gasoline prices, and the emergence of transportation alternatives.
WMATA Board Package, October 13, 2016.

Industry Concern

The New York Times
New Jersey Transit, a Cautionary Tale of Neglect

The swift decline of one of the nation’s busiest commuter railroads is a story of failures and mismanagement, and ominous for mass transit systems across the country.

By EMMA G. FITZSIMMONS and PATRICK McGEEHAN OCT. 13, 2016
Quarterly National Ridership by Mode (000s)

- Total Ridership (000s)
- Heavy Rail (000s)
- Light Rail (000s)
- Commuter Rail (000s)
- Trolleybus (000s)
- Bus (000s)
- Demand Response (000s)
- Other (000s)

APTA: http://www.apta.com/resources/statistics/Pages/ridershipreport.aspx
Changes in Quarterly National Ridership by Mode (000)

Percent Change in Quarterly National Ridership Since 1990 by Mode
Average Fare Revenue per Passenger Trip and Passenger Mile (in 2014 Dollars)


Gas Prices and Transit Ridership, 1994-2016

U.S. Transit Supply and Demand

- Rail Trips and Passenger Miles are growing
- Bus mostly flat
- Excludes demand response.
- Fixed guideway trips are longer and increasing in length faster

Service Supply

- Rail has grown considerably faster in percentage terms plus has larger vehicles.
- No readily available data on “place” miles of service.
Service Supply

Vehicle Miles of Service, Millions

Bus
Heavy Rail
Commuter Rail
Light Rail

Percent Change in Service Supply by sub-mode

Bus
Heavy Rail
Commuter Rail
Light Rail
Denver RTD. The SD-160's dimensions are 81.37 ft by 8.71 ft by 12.50 ft and can be used in trains of up to six cars. It is powered by four AC motors which provide a maximum of 580 kW and a maximum speed of 50 mph. It has a passenger capacity of 236 passengers (including standees) with 64 seats.

Light Rail Transit – Passenger Miles per Vehicle Mile 2013

Percent Change in Transit Ridership and Vehicle Miles of Service Relative to 1970
Expenditures

And the loser is bus capital

Note: Costs exclude unfunded benefits/pensions, unfunded maintenance or other liabilities and expenditures by other entities not reported to NTD. Inflation-adjusted 2014 dollars 2014 dollars.

Trends in Service Supply, Use and Investment

*Inflation adjustment performed with Bureau of Labor Statistics inflation calculator using CPI
Changes Since 1992

- Spending outpaces Vehicle Miles and Trips

![Graph showing percent change in total trips, capital cost, and operating cost from 1992 to 2014.]

*Inflation adjustment performed using Bureau of Labor Statistics inflation calculator using CPI

Changes Since 1992

- Capital Spending outpaces Trips, Passenger Miles and Operating Spending

![Graph showing percent change in total trips, passenger miles, capital cost, and operating cost from 1992 to 2014.]

*Inflation adjustment performed using Bureau of Labor Statistics inflation calculator using CPI
Changes Since 1992

- Inflation adjustment performed using Bureau of Labor Statistics inflation calculator using CPI

Bus, Percent Changes Since 1988

- Inflation adjustment performed using Bureau of Labor Statistics inflation calculator using CPI
Light Rail, Percent Change Since 1988

*Inflation adjustment performed using Bureau of Labor Statistics inflation calculator using CPI

Heavy Rail, Percent Change Since 1988

*Inflation adjustment performed using Bureau of Labor Statistics inflation calculator using CPI
Commuter Rail, Percent Change Since 1988

*Inflation adjustment performed using Bureau of Labor Statistics inflation calculator using CPI

Average Trip Length

*Inflation adjustment performed using Bureau of Labor Statistics inflation calculator using CPI
Capital Intensiveness

- Transit is getting slightly more capital intensive.

Rail Intensiveness

- Transit spending is getting more rail intensive.
So What Does This All Mean?

- Ridership growth has been moderate with softness the past two years.
- Passenger miles is growing somewhat faster than trips reflecting expansion of commuter and other rail services.
- Fares have been flat per passenger mile.
- Service supply has exceeded rider growth but the mismatch is dependent on the time frame of comparison and the submode.
- Operating cost growth has surpassed growth in service and use but varies by sub-mode.

The Shift to Rail

The shift to rail has several implications:
- Favors longer distance commute trips
  - Sometimes serves a less needy travel market?
  - Reduces more roadway VMT
  - Enables sprawl?
  - Shapes land use?
- Risks diverting resources from important safety net services?
- Increases the assets that the transit agency has to manage/maintain.
- Locks agencies into long term commitments to a given technology.
So What Does This All Mean?

Are we growing into systems such that we are getting ridership synergies or operating economies of scale?

- System utilization has remained relatively constant.
- Densification, increased mode split or self selection of transit travelers to transit areas (locally or regionally) have not resulted in proven system ridership growth and/or we are expanding supply such that average utilization remains constant.
- Are “Big City” costs and congestion effects offsetting the benefits of density?

So What Does This All Mean?

- Are new high capacity modes well enough utilized for the operator labor savings to offset the infrastructure maintenance and operations cost. (vehicles, guideway, stations, security, fare handling, gates and doors, information systems, drainage and ventilation, communications, horizontal and vertical passenger handling, restrooms, heating and air conditioning, etc. are expensive)
- Are traditional NTD based metrics failing to capture unfunded benefits liabilities or maintenance replacement liabilities?
The Tipping Point for Ridership?

We are presumably serving our best geographic markets with optimal frequency and span of service now.

- Any additions are by definition going to be less productive than the current average in the short term?

What is the elasticity of demand with respect to service supply?

- TCRP 95: Traveler Response to Transportation System Changes Handbook - it all depends – but it’s less than 1.

The Tipping Point?

- Is there some threshold level of service where transit becomes sufficiently attractive to be synergistic (demand grows faster than service)?

- If half of transit ridership is captive then doubling ridership means approximately tripling choice ridership.
### Strong Market Improve?

**Table 13-2 Metro Areas with Major Changes in Public Transit Share, 2000–2010**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>6.55 Las Vegas -0.20</td>
<td>Miami</td>
<td>-0.28</td>
</tr>
<tr>
<td>San Francisco</td>
<td>5.27 Miami -0.28</td>
<td>Louisville</td>
<td>-0.30</td>
</tr>
<tr>
<td>Washington, DC</td>
<td>4.83 Louisville -0.30</td>
<td>Indianapolis</td>
<td>-0.34</td>
</tr>
<tr>
<td>Boston</td>
<td>2.97 Indianapolis -0.34</td>
<td>Jacksonville</td>
<td>-0.35</td>
</tr>
<tr>
<td>Chicago</td>
<td>1.88 Jacksonville -0.35</td>
<td>Dallas</td>
<td>-0.39</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>0.95 Pittsburgh -0.50</td>
<td>Grand Rapids</td>
<td>-0.51</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>0.72 Columbus -0.54</td>
<td>Charlotte</td>
<td>-0.62</td>
</tr>
<tr>
<td>Greensboro</td>
<td>0.50 Raleigh -0.67</td>
<td>Portland</td>
<td>-0.67</td>
</tr>
<tr>
<td>Portland</td>
<td>0.44 Memphis -0.75</td>
<td>Buffalo</td>
<td>-0.75</td>
</tr>
<tr>
<td>Tampa</td>
<td>0.31 New Orleans -2.09</td>
<td>Minneapolis</td>
<td>-0.77</td>
</tr>
</tbody>
</table>

Source: Census, ACS 2010 from *Commuting in America 2013*, Brief 13, Transit Commuting

### People are Moving from Higher to Lower Transit Areas

**Top 10 Largest-Gaining Counties (Numeric Change): July 1, 2015 to July 1, 2016**

<table>
<thead>
<tr>
<th>County</th>
<th>Population</th>
<th>Numeric Change</th>
<th>Percent Change</th>
<th>Transit Commute Share 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maricopa County, Arizona</td>
<td>4,242,997</td>
<td>81,360</td>
<td>1.95</td>
<td>2.3%</td>
</tr>
<tr>
<td>Harris County, Texas</td>
<td>4,589,928</td>
<td>56,507</td>
<td>1.25</td>
<td>2.8%</td>
</tr>
<tr>
<td>Clark County, Nevada</td>
<td>2,155,664</td>
<td>46,375</td>
<td>2.2</td>
<td>4.2%</td>
</tr>
<tr>
<td>King County, Washington</td>
<td>2,149,970</td>
<td>35,714</td>
<td>1.69</td>
<td>12.6%</td>
</tr>
<tr>
<td>Tarrant County, Texas</td>
<td>2,016,872</td>
<td>35,462</td>
<td>1.79</td>
<td>0.6%</td>
</tr>
<tr>
<td>Riverside County, California</td>
<td>2,387,741</td>
<td>34,849</td>
<td>1.48</td>
<td>1.4%</td>
</tr>
<tr>
<td>Bexar County, Texas</td>
<td>1,928,680</td>
<td>33,198</td>
<td>1.75</td>
<td>2.6%</td>
</tr>
<tr>
<td>Orange County, Florida</td>
<td>1,314,367</td>
<td>29,503</td>
<td>2.3</td>
<td>3.2%</td>
</tr>
<tr>
<td>Dallas County, Texas</td>
<td>2,574,984</td>
<td>29,209</td>
<td>1.15</td>
<td>2.9%</td>
</tr>
<tr>
<td>Hillsborough County, Florida</td>
<td>1,376,238</td>
<td>29,161</td>
<td>2.16</td>
<td>1.7%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>3.4%</td>
<td></td>
</tr>
</tbody>
</table>

**Largest-Declining Counties or County Equivalents (Numeric Change): July 1, 2015 to July 1, 2016**

<table>
<thead>
<tr>
<th>County</th>
<th>Population</th>
<th>Numeric Change</th>
<th>Percent Change</th>
<th>Transit Commute Share 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook County, Illinois</td>
<td>5,203,499</td>
<td>-21,324</td>
<td>-0.41</td>
<td>18.8%</td>
</tr>
<tr>
<td>Wayne County, Michigan</td>
<td>1,749,368</td>
<td>-7,696</td>
<td>-0.44</td>
<td>2.5%</td>
</tr>
<tr>
<td>Baltimore city, Maryland</td>
<td>614,664</td>
<td>-8,738</td>
<td>-1.08</td>
<td>19.8%</td>
</tr>
<tr>
<td>Cuyahoga County, Ohio</td>
<td>1,249,352</td>
<td>-5,673</td>
<td>-0.45</td>
<td>5.1%</td>
</tr>
<tr>
<td>Suffolk County, New York</td>
<td>1,492,583</td>
<td>-5,320</td>
<td>-0.36</td>
<td>6.8%</td>
</tr>
<tr>
<td>Milwaukee County, Wisconsin</td>
<td>951,448</td>
<td>-4,906</td>
<td>-0.51</td>
<td>6.2%</td>
</tr>
<tr>
<td>Allegheny County, Pennsylvania</td>
<td>1,225,365</td>
<td>-3,933</td>
<td>-0.32</td>
<td>9.1%</td>
</tr>
<tr>
<td>San Juan County, New Mexico</td>
<td>115,079</td>
<td>-3,622</td>
<td>-3.05</td>
<td>0.3%</td>
</tr>
<tr>
<td>St. Louis City, Missouri</td>
<td>311,404</td>
<td>-3,471</td>
<td>-1.1</td>
<td>9.7%</td>
</tr>
<tr>
<td>Jefferson County, New York</td>
<td>114,006</td>
<td>-3,254</td>
<td>-2.78</td>
<td>0.0%</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td>7.8%</td>
<td></td>
</tr>
</tbody>
</table>
Top Agencies Vehicle Miles of Service Trend, 2002-2015

What Transit Quality of Service is Required to Make it Attractive?

What do these curves really look like?

Better service attracts travelers but capacity overwhelms market size and resources unless densely developed.

Transit expansion fails to attract many new travelers?
Contact Information

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