

How Demographic and Urban Area Characteristics Influence Mass Transit Ridership

Parfait Gasana, Sociology and Economics, University of North Carolina at Chapel Hill

Urban Institute Summer Academy for Public Policy Analysis and Research

Mentors: Kim Rueben, Brett Theodos



ABSTRACT

America's reliance on automobiles persistently contributes to high levels of traffic congestion, carbon emissions, and a declining public infrastructure. One solution involves alternative mode choices when it comes to passenger travel such as mass transit. However, public transportation is an infrequently used service. Therefore, the purpose of this study is to examine which particular demographic variables, urban area characteristics, and spending such as government funding and gas prices influence mass transit travel (particularly bus, light, and heavy rail systems) in order to strengthen the service. Correlating ridership statistics from the National Transit Database to U.S. Census data across urban areas, higher usage of public transit systems correlate to higher share of the working age population (18-64), larger household size, larger population, certain commuting times, more densely populated central cities, and higher government funding for mass transit. These findings illustrate how responsive public transportation is to urban area environments. As a result, future investment and implementation of cost-effective transit systems must work in tandem with urban planning decisions such as land-use policies, demographic and density studies.

METHODS

$$y = d + UA + \$ + \mu$$

Unit of Analysis: urbanized areas (N=350)

y = {per capita passenger trips/ passenger miles of bus, light rail, and heavy rail system (National Transit Database, 2005 & 2006)}

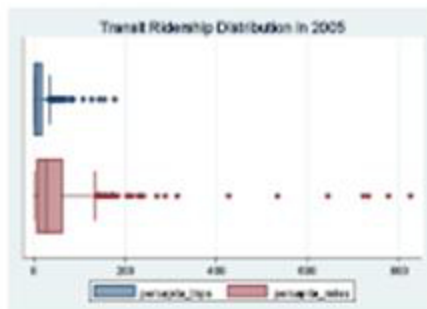
d = {age, race, educ, household size, median income, occupation}

UA = {region, population, central place density (Census Bureau, 2000)}

$\$$ = {gas prices (EIA.doe.gov), govt. funding: FTA grants (NTD)}

DESCRIPTIVE STATISTICS

Variable	2005			2006		
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
Per Capita Trips	13.23	7.33	20.76	23.9	9.61	45.13
Per Capita Miles	56.30	36.37	102.67	150	38.51	378.9



Jefferson City, MO transit bus



Houston, TX light rail



New York City subway

RESULTS

OLS Regression	2005		2006	
	Per Capita Trips	Per Capita Miles	Per Capita Trips	Per Capita Miles
Young Age	-140.5*	-766.8*	15.16	-2968.7*
Prof Educ.	171.0**	149.4	44.38	-1775.7
Household 1	161.9*	1146.5**	-148.7	-758.5
Household 4+	220.2***	1275.1***	10.58	1197.3
High Commute	-27.42	-151.6	187.3**	1406.2**
Real Hi Comm	-116.4	-276.2	-520.6*	2321.6
Population	5.819***	14.78*	-13.54***	-101.4***
Cntrl. Pl. Den	1.677*	5.145	0.407	-7.139
Cntrl. Pl. Share	-2.451	-39.38	22.24	233.2*
Govt. Fund	0.00680	0.0888**	0.0759**	0.417***
Gas Growth	-195.6**	-838.7*	-1581.3**	-11102.6*
Northwest	-7.819*	-34.35	12.44	97.58
South	1.563	6.258	-6.216**	-45.41*
N	350	350	349	349
adj. R-sq	0.481	0.385	0.292	0.348

* p<0.05, ** p<0.01, *** p<0.001
Omitted categories: working age (18-64yrs); hs educ level; household of 2 or 3; medium commute (30-44min); midwest
Scale: population and govt. fund in per million terms

POLICY IMPLICATIONS

- Urban area environments influence mass transit use (land-use → travel choices/patterns)
- Transportation and urban planners must collaborate
- Network routes and time scheduling must configure to spatial realities of 21st century (i.e. job dispersion, sprawl)
- Promote transit systems to choice riders (car owners)
- Demystify cultural stigma of dependent riders (low-income, elderly, handicapped, young)