Public Transit in America:

Findings from the 1995 Nationwide Personal Transportation Survey

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16. Abstract

This report has been prepared as an information base for people involved in planning, operating, marketing, and decision-making for public transit in America. It characterizes public transit as it is today from a number of perspectives that are believed to be useful to their professional activities.

The scale of analysis is limited to the 1995 NPTS, which includes a number of enhancements to the survey content and method and the resulting data base over previous surveys. The most notable enhancements include the addition of questions on public attitudes about transportation, the change from recollection to travel diary for trip recording, and the addition of characteristics for both residential and employment sites. The scale of analysis is also limited to describing various aspects of transit markets, rather than explaining the causality of various relationships observed.

The scope of analysis is limited to eight perspectives of characterizing public transit, including:

1) Public attitudes about public transit;
2) Perceived availability and proximity of public transit;
3) Extent of transferring;
4) Perceived characteristics of public transit trips (distance, travel time, speed, and waiting time);
5) Public transit's market shares;
6) Public transit's sub-markets;
7) Propensity for transit use by people who perceive public transit to be available to them; and
8) Public transit's market penetration.

Statistics provided on these perspectives complement those from other sources on transit at the national level, such as the decennial censuses from the U.S. Bureau of the Census, the American Housing Survey from the Department of Housing and Urban Development, or the National Transit Data Base from the Federal Transit Administration.

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CHAPTER **1**

INTRODUCTION

During the past 30 to 40 years, the portion of personal trips carried by public transit has declined in America. Along with other factors, this decline has recently created a strong interest in a better understanding of transit markets, both current and future, in this country. This interest is evident by three recent reports produced for the Transit Cooperative Research Program: *Building Transit Ridership: An Exploration of Transit's Market Share* (Charles River Associates, 1997), *The Public Policies That Influence It and Transit Markets of the Future: The Challenge of Change* (Rosenbloom, 1998), and *A Handbook: Using Market Segmentation Strategies to Increase Transit Ridership* (Northwest Research Group, 1998). The first report examines policies that have some potential for increasing transit's market share and might be pursued by local agencies. The second report identifies potential transit markets that may emerge as a result of expected demographic, socio-economic, and technological changes in the future. The third report provides guidelines to help transit agencies implement market segmentation strategies to better understand their transit sub-markets and increase their ridership.

This document has been prepared as an information base for people involved in the planning, operating, marketing, and decision-making of public transit to help them better understand current transit markets in America. It characterizes public transit as it is today from a number of perspectives that are believed to be useful to their professional activities.

The characterization of public transit in America is based on an analysis of the Nationwide Personal Transportation Survey (NPTS) data base, which includes information from five surveys conducted in 1969, 1977, 1983, 1990, and 1995. The NPTS data base provides an opportunity to develop current and useful information to aid in public transit planning and analysis. Information from the NPTS data base can help the transit industry hone their understanding of travel behavior and reflect this knowledge in their policy and service planning. While the NPTS data base is a relatively small sample of public transit trips in the nation and inappropriate for service planning in a specific geography, an understanding of travel behavior provides knowledge that can be used to shape the transit industry's understanding of customer needs and behavior.

The scale of this analysis is limited to the 1995 NPTS. While it is desirable to have good knowledge on how travel behavior has evolved over time, changes in survey method, especially between the 1995 and earlier surveys, have made direct comparisons across surveys less meaningful. The 1995 NPTS was chosen for this analysis because it is the most recent and it includes a number of enhancements to survey content, survey method, and the resulting data set over previous surveys. The most notable enhancements include the addition of questions on public attitudes about transportation, the change from recollection to travel diary for trip recording, and the addition of characteristics for both residential and employment sites. These enhancements have dramatically improved data quality and enriched the data base for analyzing issues related to public transit in America.

The scale of this analysis is also limited to describing transit's trips, users, and markets, rather than determining the causality of various relationships related to public transit markets.

The scope of analysis is limited to eight perspectives of public transit, including:

- Public attitudes about public transit;
- Perceived availability and proximity of public transit;
- Extent of transferring;
- Perceived characteristics of public transit trips (distance, travel time, speed, and waiting time);
- Public transit's market shares;

- Public transit's sub-markets;
- Propensity for transit use by people who perceive public transit to be available to them; and
- Public transit's market penetration.

The first four perspectives describe public transit markets in terms of its share in the overall travel market, the distribution of public transit trips among groups of its users, the relative level of usage among population groups, and its penetration into the general population. Propensity for transit use measures the relative usage of public transit by a given population group, taking into account the number of persons from this population group who perceive public transit to be available. Equivalently, it measures the per capita use of public transit for a given population group relative to the per capita use of public transit nationwide. Propensity for transit use is calculated by dividing the proportion of public transit trips a given population group makes by the proportion that group represents of all persons who perceive public transit to be available. Public transit's market penetration represents the share of persons in the general population who use public transit during a given period of time.

The last four perspectives describe various characteristics of public transit trips and its users. Five types of public attitudes are included: public transit users' attitudes about highway performance; public attitudes about public transit in general; public transit users' reasons for using public transit for all purposes; people's reasons for not using public transit to travel to work; and public transit users' attitudes about the severity of problem areas in using public transit.

Availability and proximity of public transit are closely related. In NPTS, availability measures a macro-level of transit being available, while proximity measures a micro-level of transit being available. Specifically, availability gives the proportion of people who perceive public transit to be available in the city or town in which they live, while proximity gives the proportion of people who perceive that their residence is within a quarter mile of the nearest transit stop.

The NPTS data base is the only nationwide source that contains information on modal choice for each component of a linked trip. Transferring is examined from two aspects: 1) distribution of linked trips with respect to the number of transfers involved; and 2) percent of unlinked trips that are transfer trips.

Five characteristics of public transit trips are examined, including perceived trip distance, travel time (excluding waiting time), waiting time, travel speed (excluding waiting time), and overall speed (including waiting time). While the National Transit Data Base may be used to characterize public transit trips in terms of their length in distance, length in time, and travel speed, this characterization is limited to actual values of these characteristics and is for unlinked trips. It is believed that perception rather than reality drives behavior.

These perspectives will be described through the use of statistics at the national level and by population groups, land use characteristics, scale of metropolitan areas, and area density.

Information provided in this document complements other data sources at the national level related to public transit in America, such as the decennial censuses from the U.S. Bureau of the Census, the American Housing Survey from the Department of Housing and Urban Development, and the National Transit Data Base from the Federal Transit Administration. Both the decennial censuses and the American Housing Survey focus on commuting trips. The National Transit Data Base provides an important information base on the physical system of public transit, services provided and consumed, and financial characteristics of service provision.

This document is presented in five chapters and three appendices. This chapter introduces the topics in the document. Chapter 2 describes the statistical sources used in the study, issues in using the data sources, and the major terms used to aggregate and present data. Chapter 3 places public transit in proper context with trends in demographics, vehicle ownership, and personal travel over the 26 years between 1969 and 1995. Chapter 4 shows the results. The objective is to present findings on public attitudes, transit availability, transit proximity to residents, the extent of transferring, trip characteristics, and market penetration and to summarize the findings on transit market shares, transit sub-markets, and propensity for transit use. Chapter 5 draws implications from the results presented in the report.

Appendices A through C provide detailed statistics on transit's market share, sub-markets, and propensity for transit use. The primary objective is to show the influence of the scale and density of areas and transit dependency on transit markets.

CHAPTER 2

DATA RESOURCES

INTRODUCTION

Two of the challenges in better understanding public transit are fully understanding the data sources for the statistics presented and the technical language used by analysts in characterizing public transit. The sole data source in this report is the Nationwide Personal Transportation Survey series, which includes five surveys that were conducted in 1969, 1977, 1983, 1990, and 1995, respectively. The main body of this document relies on the 1995 NPTS, which is the focus of the description here. The earlier surveys are briefly discussed in terms of differences between them and the 1995 NPTS. Technical terms include definitions of personal, household, and land use characteristics and geographical areas that are used to assemble and present the statistics.

1995 NPTS

The 1995 NPTS is a sample survey of the nation's daily personal travel. It is the only authoritative source of national data on daily trips including, but not limited to:

- purpose of the trip (e.g., work, shopping);
- means of transportation used (e.g., car, bus);
- how long the trip took, i.e., travel time;
- time of day the trip took place; and
- day of week the trip took place.

These data were collected for all trips, all modes, all purposes, all trip lengths, and all areas of the country.

The 1995 NPTS was conducted during the period from May 1995 through June 1996. Like all large-scale sample surveys, it involved several stages of data collection (FHWA, 1997a). First, a stratified random sample of telephone numbers were obtained. To control sampling variation and increase coverage of transit trips, the sampling frame was stratified by geography (Census division), metropolitan area size, and the presence of subway or elevated rail systems. Second, the sample of telephone numbers was screened to identify residential households. People living in college dormitories, nursing homes, other medical institutions, prisons, and on military bases were excluded from the sample. Third, an adult member of the household was asked a series of questions about the persons and vehicles of the household. Following this household interview, the household was assigned a travel day for trip reporting. Then, travel diaries for each person 5 years and older were prepared and mailed to the household. Following the household's travel day, interviewers called to conduct the person interview for each eligible household member. A six-day window was established to obtain the travel day data. During the person interviews, travel diary information was recorded in a computer, along with responses to a number of additional questions.

The 1995 NPTS response rates are summarized in Table 2-1, which includes the partial response rate obtained at each stage of the survey, and the cumulative response rate up to that stage in the process. Almost 113,000 telephone numbers were sampled initially for household screening. Of these numbers, 73.2 percent were from residential households. Household interviews were completed for 75.6 percent of the residential households. Over 93 percent of the households that completed household interviews accepted the travel diaries, and sufficient person interviews were completed for 72.1 percent of these households to classify them as useable for the 1995 NPTS. Within the useable households, person interviews were completed with 92.2 percent of the eligible persons. The overall response rates were 55.3

percent for household interviews and 34.3 percent for person interviews.

Of the useable households in the final data base, about half of the households are in the base sample and the other half represent the add-on areas of New York State; Commonwealth of Massachusetts; Oklahoma City, Oklahoma; Tulsa, Oklahoma; and Seattle, Washington. Each useable household in the sample was assigned a specific 24-hour "Travel Day" and a 14-day "Travel Period" for which detailed data on all travel were collected. Travel days were assigned to all seven days of the week, including holidays. The intent was to represent travel across an entire year.

Table 2-1. Response Rates for the 1995 NPTS.

Stages	Responses	Single Stage Rate	Cumulative Rate
Total Sample of Telephone Numbers	112,960	NA	NA
Residential Households	82,663	73.2	73.2
Household Interviews Completed	62,468	75.6	55.3
Diary Accepted	58,276	93.3	51.6
Usable Households	42,033	72.1	37.2
Person Interviews Completed	95,360	92.2	34.3

Source: Chapter 3, FHWA (1997a). NA means not applicable.

Data from the 1995 NPTS are available from the U.S. Department of Transportation in six separate files, four of which are used for this study. These four files include "Household File," "Person File," "Travel Day File," and "Segmented File" (Table 2-2). The Household File contains data on household demographic, socio-economic, and residence location characteristics for 42,033 households. The Person File contains data on personal and household characteristics, attitudes about transportation, and general travel behavior characteristics such as usual modes of transportation to travel to work for 95,360 persons. The Travel Day File contains trip-based data on trip purposes, modes, trip lengths in terms of time and distance, and trip start times for 409,025 trips. The Segmented File contains data on 3,779 public transit trips that had 'segments." Segmented trips will be discussed more later in this chapter. Each file has its own weighting variable to expand the sample to provide national estimates in the case of the Household and Person Files, and annualized national estimates in the case of the Travel Day and Segmented Files.

Table 2-2. Sample Size of 1995 NPTS Files Used.

Data Files	Sample Size
Household File	42,033
Person File	95,360
Travel Day File	409,025
Segmented File	3,779

Source: Chapter 3, FHWA (1997a).

COMPARABILITY WITH EARLIER NPTS SURVEYS

The 1995 NPTS data set includes a number of enhancements to earlier NPTS's in survey methodology, survey content, and the resulting data base. The most notable enhancements include the change in survey methodology from recollection to travel diary for trip recording, the addition of a series questions on public

attitudes about public transit and other components of the U.S. transportation system, and the addition of characteristics for both residential and employment sites into the data base. Table 2-3 shows the additions to survey content and the data base and Table 2-4 shows the changes in survey methodology.

The changes in survey methodology make the 1995 NPTS incomparable to earlier ones. When comparing the 1995 and 1990 NPTS data sets directly, there is an increase of about 1.1 trips per person per day, which represents a 35 percent increase. Using selected regional surveys, FHWA's research indicates that one-third of this increase is a real increase in travel, and two-thirds due to changes in survey methods implemented in the 1995 survey (FHWA, 1997b). FHWA, however, has not yet developed adjustment factors for more complicated analysis. For example, it is unclear exactly how the changes in survey methods have affected trip reporting by purpose, travel mode, or other attributes of travel. Since adjustment factors have not been made available for analysis that is more complicated than computing aggregate travel, this study relies predominantly on the 1995 NPTS in characterizing public transit.

Table 2-3. Additions to the 1995 NPTS Content and Data Base.

Category	Addition	Description
Survey Content	Public Attitudes about Public Transit	Person File: 1. Reasons for not using public transit to travel to work; 2. Problems that users face in using public transit.
	Frequency of Use	Person File: Number of times used public transit during the two months before interview.
Data Base	Area Density	All files: Rural, Small Town, Suburb, Second City, and Urban .
	Housing Density	Household File: Residential housing units per square mile.
	Employment Density	Person File: Jobs per square mile at work sites.
	Neighborhood Characteristics	Household File: Distribution of households with certain characteristics.

Source: FHWA (1997a).

Table 2-4. Changes in the 1995 NPTS Survey Methodology.

Topic	Changes		Probable Impacts
	From	To	
Respondent Contact	No advance letters	Advance letters	Improved response. Legitimizes the survey with respondents.
	No incentive	$2 per person	Improved response.
Trip Reporting	Recall	Travel Diary	More trips reported. More shorter, incidental trips. More trips for family & personal business. and social & recreational purposes.
	All trips for each person collected independently	Household roster of trips	Include trips that may have been forgotten. More consistent trip data. Lower respondent burden. More coherent picture of household trip making.
	Did not specifically confirm zero trips	Specifically confirmed zero trips	More accurate count of persons who made no trips on their travel day.
	Proxy from memory	Proxy from diary	More trips reported. More accurate reporting of trip characteristics.
	Trip definition	Clearer trip definition	Easier for respondent to report trips . Interviewers more attuned to pick up incidental trips.
	On-line edits	Additional on-line edits	More coherent trip reporting. Improved data quality.
Completed household definition	At least one person completed the travel day trip section	At least 50 percent of the adults completed the travel day trip section	A more accurate representation of travel by the household unit.

Source: Exhibit 3.1, FHWA (1997a).

ISSUES

Introduction

Three broad issues affect the analysis of the 1995 NPTS data set and the interpretation of its results: the definition of public transit, the nature of trips collected from the 1995 NPTS, limitations of sample estimates, and sample size. Understanding the nature of trips collected from the 1995 NPTS is critical for understanding public transit trips because transit trips often involve multiple modes and segments. Understanding some of the sampling issues is also critical primarily for understanding the fact that estimates based on a sample will, in general, differ from those based on a census.

Definition of Public Transit

Public transit in this report includes four categories of transit mode: Bus, Commuter Train, Streetcar/Trolley, and Subway/Elevated Rail.

The bus category includes intercity buses, mass transit systems, and shuttle buses that are available to the general public. Also, Dial-A-Bus and Senior Citizen buses that are available to the public are included. However, shuttle buses operated by a government agency or private industry for the convenience of employees, contracted or chartered buses, and school buses are excluded.

The commuter train category includes commuter trains and passenger trains other than elevated rail transits and subways. Amtrak intercity service is excluded, however.

The streetcar/trolley category includes trolleys, streetcars, and cable cars.

The subway/elevated rail category includes elevated railways and subway trains in a city.

The statistics presented in this report include intercity buses, which the 1995 NPTS does not separate from other bus services. For those bus trips in the 1995 NPTS that have information on trip length in terms of distance, 1.78 percent are over 100 miles and 2.55 percent are over 75 miles. Because of their distance, including these trips can result in over-estimation of certain averages, such as average trip distance for buses.

Nature of NPTS Trips

To understand the nature of NPTS trips, one needs to understand how trips that involve multiple modes are reported. Consider an example. You are dropped off at a bus stop to take a bus, then transfer to rail, and finally walk to work. For you, this entire sequence of home to work is viewed as one trip for the sole purpose of reaching the work destination. For the FTA National Transit Database, it is counted as 2 transit trips. For the transportation planner, it is viewed as one linked trip composed of four unlinked trips. For the 1995 NPTS, it is recorded as one travel day trip.

One problem with this approach of recording those trips that involve multiple modes as single trips is that it may underestimate transit usage. Consider, for example, a linked trip that started with a bus ride to a car rental site and continued with a drive. The bus ride would not be counted in the Travel Day File if the drive is longer in distance.

In order to collect more complete data on multi-modal trips, with particular emphasis on the use of public transit, the 1995 NPTS, as in the 1990, segmented certain travel day trips into their component parts. A travel day trip was segmented if both of these two conditions were met:

- there was a change of vehicle or a change of mode on the trip; and
- one of the modes used was a public transit mode or Amtrak. Public transit includes bus, subway, elevated rail, commuter train, streetcar, or trolley.

Trips in which the respondent went from one private vehicle to another were not segmented. There was a limit of 4 segments per trip, and the typical day trip information was collected, along with the mode, start time, and duration of each of the segments.

Table 2-5 shows the number of travel day trips that involved public transit and separates them by whether they are segmented. A total of 7,546 travel day trips involve public transit, of which 3,779 are segmented and 3,767 are not segmented. For non-segmented trips, public transit is the main means of transportation and no transfers are involved between public transit vehicles. Among the segmented trips, 47 involve public transit only as a minor mode. Without segmentation, these 47 transit trips would be undercounted.

The implications of segmentation are significant. To illustrate, the total numbers for linked and unlinked public transit trips are derived from the 1995 NPTS (Table 2-6). First, the total annual number of linked trips is 6,666 million, of which 3,441 million are segmented trips and 3,225 million are non-segmented trips. The total number of unlinked trips is 8,327 million. Of these unlinked trips, 3,225 million are unsegmented trips and 5,102 million are made as part of 3,440 million segmented trips.

Table 2-5. Sample Public Transit Trips by Trip Segmentation.

Public Transit Mode	Segmented	Non-Segmented	Total
Bus as main mode	1,957	2,724	4,681
Subway/elevated rail as main mode	1,254	732	1,986
Streetcar/trolley as main mode	21	33	54
Commuter train as main mode	500	278	778
Public transit as minor mode	47	0	47
Total	3,779	3,767	7,546

Sources: Appendix C, Day Trip File Code Book, FHWA (1997a).

Table 2-6. Estimated Number of Linked and Unlinked Public Transit Trips from the 1995 NPTS.

Type of Trips	Segmentation		Total
	Segmented	Unsegmented	
Linked	3,440,664,924	3,225,024,781	6,665,689,705
Unlinked	5,101,651,439	3,225,024,781	8,326,676,220

Source: Travel Day File and Segmented File.

Comparability with FTA and APTA Data

The total number of unlinked trips derived from the 1995 NPTS is higher than that from either FTA or APTA (Table 2-7). The 1995 NPTS number is 8,327 million, compared with 7,763 million from APTA and 7,504 million from FTA.

It is not clear specifically what produced the differences. Several reasons may be conjectured. One possible reason is that the three sources cover different periods of time. FTA's number is based on data for individual transit agencies' fiscal years ending during the Calender Year 1995. Individual transit agencies' fiscal years vary. Thus, a portion of the trips included in FTA's number took place during Calender Year 1994. On the other hand, the 1995 NPTS number is based on trips that took place during the period from May 1995 to June 1996. It is likely that more trips were made in 1995 than in 1994.

Table 2-7. Comparison of Unlinked Trips among 1995 NPTS, FTA, and APTA Estimates.

Source	Unlinked Trips in 1995 (Millions)
1995 NPTS	8,327
APTA	7,763
FTA	7,504

Sources: The FTA number comes from Table 26, *Data Tables for the 1995 National Transit Database Reporting Year* (FTA, no date specified). The APTA number comes from Table 32, *1998 APTA Transit Fact Book*. The 1995 NPTS number comes from Table 2-6.

Another possible reason for the differences in Table 2-7 is that the three sources cover different numbers of public transit agencies. FTA's number is an account of unlinked trips for 469 agencies in the

nation. All applicants and direct beneficiaries of Federal assistance under 49 USC 5307 (formerly Section 9 of the Federal Transit Act, as amended) are subject to the National Transit Database Reporting System. FTA received data from 537 transit agencies for 1995. Of this number, 55 received exemptions from detailed reporting and 13 were deleted due to incomplete data.

On the other hand, APTA's number is an estimate of national totals. APTA supplements the number of unlinked trips from its member agencies and those agencies subject to the National Transit Database Reporting System by an estimate of unlinked trips from other agencies that do not report to either APTA or FTA. These agencies, whose annual unlinked trips are unavailable, are small but account for 9 out of every 10 agencies in the nation (Table 2-8). They are agencies operating in rural areas or providing specialized transportation, and other agencies.

The 1995 NPTS number is also an estimate of national totals. Public transit in the 1995 NPTS includes bus, subway, elevated train, commuter train, or streetcar service. Transit services include only those that are available for use by the general public for local or commuter travel, including dial-a-bus and senior citizen bus service. Long distance services or those chartered for specific trips are excluded.

It is also possible that the 1995 NPTS number may include trips made on jitneys and other forms of bus services provided by the private sector that are not included in the APTA or FTA number.

Table 2-8. Number of Public Transit Agencies.

Federally Funded Agencies			Other Agencies	Total
NTD Agencies	Rural Agencies	Specialized Transportation Agencies		
552	1,074	3,594	753	5,973

Source: Table 5, APTA (1997).

Households without Telephone Services

The issue of excluding households without telephone services is relevant because it may result in undercounting transit trips. There is concern that the 1995 NPTS data collection undercounted low-income households because the 1995 NPTS sample included only households with telephone services. Households without telephone services are more likely to be low income than high income.

Table 2-9 shows three distributions of household income. The first column is based on the 1995 Current Population Survey (CPS) of the Census. The middle column is the non-weighted distribution from the 1995 NPTS. The last column is the weighted distribution from the 1995 NPTS. Both households with very low and very high incomes are undercounted in the income-reporting sample of the 1995 NPTS. Weighting lessens the undercounting for low-income households but worsens the undercounting for high-income ones. One function of weighting is that all households are accounted for in the distribution, with or without telephone services. However, the cause of undercounting low-income and high-income households is unclear. About 17 percent of the households in the 1995 NPTS did not report their income. It is possible that those not reporting income were households with either very low or very high incomes.

Table 2-9. Comparison of Distributions of 1995 Household Income between 1995 NPTS and Census.

1995 Household Income	1995 Census CPS	1995 NPTS Sample	1995 NPTS Weighted
Below $5,000	3.66%	2.34%	2.84%
$5,000 - $9,9	8.57%	6.27%	7.36%
$10,000 - $14,999	8.75%	6.86%	7.68%
$15,000 - $19,999	8.33%	8.65%	9.28%
$20,000 - $24,999	7.58%	6.81%	7.19%
$25,000 - $34,999	14.22%	16.60%	17.33%
$35,000 - $49,999	16.94%	22.17%	21.29%
$50,000 - $74,999	17.10%	17.35%	15.43%
$75,000 - $99,999	7.71%	7.62%	6.73%
Above $100,000	7.14%	5.33%	4.87%

Sources: The Census distribution comes from Table No. 720, Bureau of the Census (1997). The distributions from the 1995 NPTS were derived from the Household File.

Limitation of Sample Estimates

Most statistics in this report are sample estimates, i.e., they refer to an entire universe of units (households, persons, or trips), but are constructed from the 1995 NPTS, a sample survey. In constructing a sample estimate, an attempt is made to come as close as is feasible to the corresponding value that would be obtained from a complete census of the universe. Estimates based on a sample will, however, generally differ from the values from a census. As a result, sample estimates involve errors.

Two classifications of errors are associated with sample estimates: sampling error and non-sampling error. The sampling error of an estimate arises from the use of a sample, rather than a census, to estimate the universe value. The particular sample used in a survey is only one of a large number of possible samples of the same size which could have been selected using the same sampling procedure. Estimates derived from the different samples would, in general, differ from each other. The standard error is a measure of the variation among the estimates derived from all possible samples. The standard error is the most commonly used measure of the sampling error of an estimate.

Non-sampling errors arise from non-sampling sources. Two kinds of non-sampling errors exist: random and non-random. Random non-sampling errors arise because of the varying interpretation of questions (by respondents or interviewers) and varying actions of coders, keyers, and other processors. Some randomness is also introduced when respondents must estimate values. Non-random non-sampling errors result from:

- Total non-response (no usable data obtained for a sampled unit),
- Partial or item non-response (only a portion of a response may be usable),
- Inability or unwillingness on the part of respondents to provide correct information,
- Difficulty interpreting questions,
- Mistakes in recording or keying data,
- Errors of collection or processing, and
- Coverage problems (over-coverage and under-coverage of the target universe).

For an estimate calculated from a sample survey, the total error in the estimate is composed of the sampling error and the non-sampling error. Ideally, estimates of the total error associated with statistics presented in this report should be given. However,

neither sampling errors nor non-sampling errors are presented in this report. The magnitudes of non-sampling errors cannot be estimated from the 1995 NPTS. While sampling errors can be estimated from the 1995 NPTS with specially designed software, the most commonly used statistical software, such as SAS and SPSS, do not correctly calculate sampling errors because of the complex sample designs in the 1995 NPTS (FHWA, 1997a, Appendix G).

Number of Cases on Transit Related Questions

The issue of case numbers is relevant because a relatively small number of cases results in relatively large sampling errors. Consequently, we are less confident in differences in the measurement of a particular variable for different population groups. Variables related to attitudes, service quality, and usage are discussed separately below.

Related to Public Attitudes

Tables 2-10 through 2-12 show the number of cases related to public attitudes about transportation systems. Some of the variables have relatively small numbers of cases, including several variables measuring reasons for not using public transit as the usual mode of travel to work and those variables measuring reasons for using public transit.

Table 2-10. Number of Cases Related to Problems Public Transit Users Experience.

Variables	Valid Cases			Legitimate Skip	Unknown or Refused
	Large Problem	Small Problem	No Problem		
Having access to a car when you need it	836	749	2,372	91,382	21
Cost of travel by public transit	850	1,108	2,013	91,382	7
Transit stations and vehicles not clean	1,016	1,256	1,532	91,544	12
Difficulty with crowding or getting a seat	1,732	2,319	3,723	87,566	20
Worry with crime on public transit	682	1,350	1,773	91,544	11
Time spent on public transit	1,809	2,755	3,192	87,566	38
Public transit available time of day needed	779	1,222	1,962	91,382	15
Time and aggravation with transfers	561	1,170	2,039	91,544	46

Sources: Appendix C, Person File Code Book, FHWA (1997a). The total number of persons is 95,360 for all variables. Those legitimately skipped are primarily non-users.

Table 2-11. Number of Cases for Reasons Not Using Public Transit as Usual Mode of Travel to Work.

Variables	Valid Cases		Legitimate Skip	Unknown or Refused
	Yes	No		
Public transit too expensive	122	8,899	86,321	18
Public transit not available at work	3,381	5,641	86,321	17
Public transit takes too much time	1,070	7,952	86,321	17
Need own vehicle to do other things	1,373	7,648	86,321	18
Public transit schedule not convenient	2,182	6,840	86,321	17
Public transit stops too far from home	778	8,244	86,321	17
Have company car	27	8,995	86,321	17
Don't like to use	3,395	5,629	86,321	15
Have own car	186	8,836	86,321	17
Short distance trip	496	8,526	86,321	17

Sources: Appendix C, Person File Code Book, FHWA (1997a). The total number of persons is 95,360 for all variables.

Table 2-12. Number of Cases Related to Reasons for Using Public Transit.

Reasons	Valid Cases
I can do something else	67
It is faster than a private vehicle	68
I don't drive or don't like to drive	68
Avoids buying a car	65
It is better for the environment	32
It avoids stress of driving in congested roads	34
Do not have access to a car	33
Costs less than driving	65
It is the most convenient way for me	34

Source: Table 9, FHWA (1997c).

Related to Service Quality

Tables 2-13 and 2-14 show the number of cases for variables that are related to perceived availability and proximity of public transit, respectively. These numbers are reasonably good. Table 2-15 shows the number of cases that are related to the waiting time for public transit as the actual mode used or as the usual mode to travel to work.

Table 2-13. Number of Cases Related to Availability of Public Transit Service.

Variables	Valid Cases		Legitimate Skip	Unknown or Refused
	Yes	No		
Bus service available	27,420	13,791	0	866
Non-bus transit service available	8,231	18,970	14,606	226
Streetcar service available	999	7,232	33,576	226
Subway service available	3,561	4,670	33,576	226
Commuter train service available	5,594	2,637	33,576	226

Source: Appendix C, Household File Code Book, FHWA (1997a). The total number of households is 42,033 for all variables.

Table 2-14. Number of Cases Related to Proximity of Public Transit Service.

Variables	Valid Cases	Legitimate Skip	Unknown or Refused
Miles to nearest bus stop	26,160	14,613	1,260
Miles to nearest streetcar stop	907	40,808	318
Miles to nearest subway stop	3,647	38,246	320
Miles to nearest commuter train stop	5,388	36,213	432

Source: Appendix C, Household File Code Book, FHWA (1997a). The total number of households is 42,033 for all variables.

Table 2-15. Number of Cases Related to Waiting Time for Public Transit.

Variables	Valid Cases	Legitimate Skip	Unknown or Refused	Total
Time waited for transportation (actual mode)	6,774	401,567	684	409,025
Time waited for bus (usual mode to work)	1,837	93,465	58	95,360
Time waited for subway (usual mode to work)	456	94,167	737	95,360
Time waited for streetcar (usual mode to work)	26	95,330	4	95,360
Time waited for commuter train (usual mode to work)	684	94,660	16	95,360

Sources: Appendix C, Person File Code Book and Day Trip File Code Book, FHWA (1997a). The first variable is based on the following question about day trips: How many minutes did you wait for the transportation means of the trip? The last four variables are based on the following question in the person interview: How many minutes do you usually wait for the means of transportation if your main, usual means to get to work is public transit?

Related to Public Transit Use

Tables 2-16 through 2-20 show the number of cases for variables measuring public transit use. These include frequency of public transit use, modal choice for segmented trips, and modal choice for non-segmented trips.

Table 2-16. Number of Cases Related to Frequency of Public Transit Use.

Two or more days a week (11+ times)	5,172
About once a week (5-10 times)	1,457
Once or twice a month (2-4 times)	2,817
Less than once a month (one time)	2,048
Never	38,541
Transit Unavailable	27,982
Legitimate Skip	17,082
Unknown or Refused	261
Total	95,360

Sources: Appendix C, Person File Code Book, *1995 NPTS User Guide* (FHWA, 1997). Those legitimately skipped are persons to whom the following question was not asked because the interviewer knew that public transit service was unavailable. The question states: In the past two months, about how often have you used public transit such as buses, subways, streetcars, or commuter trains?

Table 2-17. Number of Cases Related to Usual Modes to Work.

Get to work usually by	Valid Cases		Legitimate Skip	Unknown or Refused
	Yes	No		
Bus	1,895	44,734	48,681	50
Subway/elevated rail	1,193	45,436	48,681	50
Streetcar/trolley	30	46,599	48,681	50
Commuter train	700	45,930	48,681	49

Sources: Appendix C, Person File Code Book, FHWA (1997a). The total number of persons is 95,360 for all variables. The question is: How do you usually get to work? Please tell me all the kinds of transportation you usually use.

Table 2-18. Number of Cases Related to Main Means of Transportation to Work.

Bus	1,161
Subway/elevated rail	825
Streetcar/trolley	15
Commuter train	547
Others	44,131
Legitimate skip	48,681
Unknown or refused	52
Total	95,412

Sources: Appendix C, Person File Code Book, FHWA (1997a). The question is: What is the main means of transportation you usually use to get to work--that is, the one used for most of the distance?

Table 2-19. Number of Cases Related to Main Means of Transportation for Travel Day Trips.

Bus	4,681
Subway/elevated rail	1,986
Streetcar/trolley	54
Commuter train	778
Others	387,685
Legitimate skip	0
Unknown or refused	13,868
Total	409,025

Sources: Appendix C, Person File Code Book, FHWA (1997a). The question is: What is the main means of transportation you used for the day trip--that is, the one used for most of the distance?

Table 2-20. Number of Cases Related to Mode of Transportation for Segmented Trips.

Mode	Segment 1	Segment 2	Segment 3	Segment 4
Bus	1,084	1,538	282	56
Subway/elevated rail	458	1,107	208	39
Streetcar/trolley	15	19	8	1
Commuter train	148	425	82	12
Private vehicle	193	59	105	45
Walk	1,798	549	1,145	295
Others	43	65	49	7
Legitimate skip	0	0	1,884	3,314
Unknown or refused	39	15	13	6
Total	3,779	3,779	3,779	3,779

Sources: Appendix C, Segment File Code Book, FHWA (1997a). The question is: What is the means of transportation you used for the segment? The legitimately skipped cases in segments 3 and 4 are for trips that had ended.

TERMS

The terms used in this document to describe public transit can be grouped into four categories: personal characteristics, household characteristics, land use characteristics, and geography.

Personal Characteristics

Five personal characteristics are used in presenting the statistics in this document: person age, gender, driver's license status, working status, and frequency of using public transit in general. Gender and license status need no further explanation. Person age is grouped into three categories: under 18, 18 to 64, and 65 or older. The same age grouping is used by APTA (1992) in its profiling of Americans in public transit. Working status refers to whether one was working full time, working part time, not working, or retired during the week before the interview for the 1995 NPTS. Frequency of using public transit refers to how frequently a person used public transit during the two months before the interview. It has four categories: two or more times a week, about once a week, once or twice a month, and less than once a month.

Household Characteristics

Six household characteristics are used in describing public transit usage in this document: race, ethnicity, household income, household vehicle ownership, home ownership, and household life cycle. Race has three categories: White, Black, and others. Ethnicity has two categories: Hispanic and non-Hispanic. Household income is grouped into three ranges: under $15,000, $15,000 to $49,999, and $50,000 or over. These three income groups are mutually exclusive. The same grouping for household income is used by APTA (1992) in its profiling of Americans in public transit. Household vehicle ownership is divided into three ranges: 0 vehicles, 1 vehicle, and 2 vehicles or more. Home ownership has two categories: owner versus renter. Household life cycle also has two categories: single-adult households versus multi-adult households.

Land Use Characteristics

Three land use characteristics are used in describing public transit in this document: housing density, population density, and employment density. Housing density refers to residential housing units per square mile. Population density refers to residential population density in terms of residents per square mile. Employment density refers to jobs per square mile at work sites. Information on employment density is available only for workers. Both housing density and population density are based on census block group data, while employment density is based on census tract data. These land use characteristics are part of the added content of the 1995 NPTS (Table 2-3).

Geography

Two geographic units are used, including metropolitan statistical areas (MSAs) and urbanization classification. The general concept of a metropolitan statistical area is that of a core area containing a large population nucleus, together with adjacent communities having a high degree of economic and social integration with that core.

Currently defined MSAs are based on application of 1990 standards to 1990 decennial census data. Specifically, each MSA must include at least: (a) one city with 50,000 or more inhabitants, or (b) a Census Bureau-defined urbanized area (of at least 50,000 inhabitants) and a total metropolitan population of at least 100,000 (75,000 in New England).

The 1995 NPTS divides all areas in the United States into six categories: Outside MSA and five ranges of population size for MSAs, including under 250 thousand, 250,000 to 49,999, 500,000 to 999,999, 1 million to 2,999,999, and three million and over. The variable describing MSA population size is used to measure the scale of areas.

In addition to metropolitan statistical areas, urban classification is the other unit of geography for presenting data. Five categories are included: rural areas, small towns, second cities, suburban areas, and urban areas. Second cities in this classification resemble edge cities conceptually but differ in how they are defined. Edge cities are subjectively defined with community perceptions and measurements of space. On the other hand, second cities can be quantitatively defined with population densities.

This urbanization classification was developed by Miller and Hodges (1994). Their methodology defines a grid system of roughly 900,000 cells of about four square miles each across the United States. The total population of a given cell and its eight surrounding cells (a 3 x 3 grid) divided by the total area of all nine cells determines the given cell's grid density. In addition, the highest grid cell density in a 5-mile radius (5x5 grid, excluding the corners) determines the local density maximum in an area. Population centers emerge where grid cell densities only decrease moving away from a local maximum and no other maximum with a greater density appears in closer proximity. All grid cells are then ranked for the nation into one hundred equal groups with the scale from 0 to 99.

Area classifications depend on the grid cell density scale and population center densities. Simple grid cell densities define rural areas and small towns. This classification results in groupings similar to the groups created by the Urbanized Area definition of 1,000 persons per square mile minimum. Population center densities define urban areas and second cities. Areas around second cities and urban areas form suburban areas. Table 2-21 shows the definitions in detail.

The 1995 NPTS data base includes two variables on urbanization classifications. One results from using census tracks as the basic unit of geography for measuring population density. The other results from using census block groups as the basic unit of geography for measuring population density. The second is used for this study.

Table 2-21. Definition of Urban Classification.

Classification	Criteria	
	Grid Cell Density (GCD)	Population Center Density (PCD)
Rural	GCD<=19	Not Used
Small Town	20<=GCD<=39	Not Used
Urban Area	GCD>=40 & 0.80 PCD + 9.8	PCD>=79
Second City	GCD>=40 & 1.7368 PCD - 64.208	PCD<79
Suburban Area	GCD>=40 & non-urban areas & non-second cities	

Source: Ross and Dunning (1997).

CHAPTER 3

TRENDS

INTRODUCTION

This chapter presents trends in population, vehicles, vehicle travel, person travel, and public transit's market share over the 26 years from 1969 and 1995. These trends are based on the NPTS data base. The purpose of this chapter is to place the following chapters in proper context so that the statistics there are better understood.

CHANGES IN POPULATION AND VEHICLES

Much of the material in this section comes from Federal Highway Administration's *Our Nation's Travel: 1995 NPTS Early Results Report* (FHWA, 1997b).

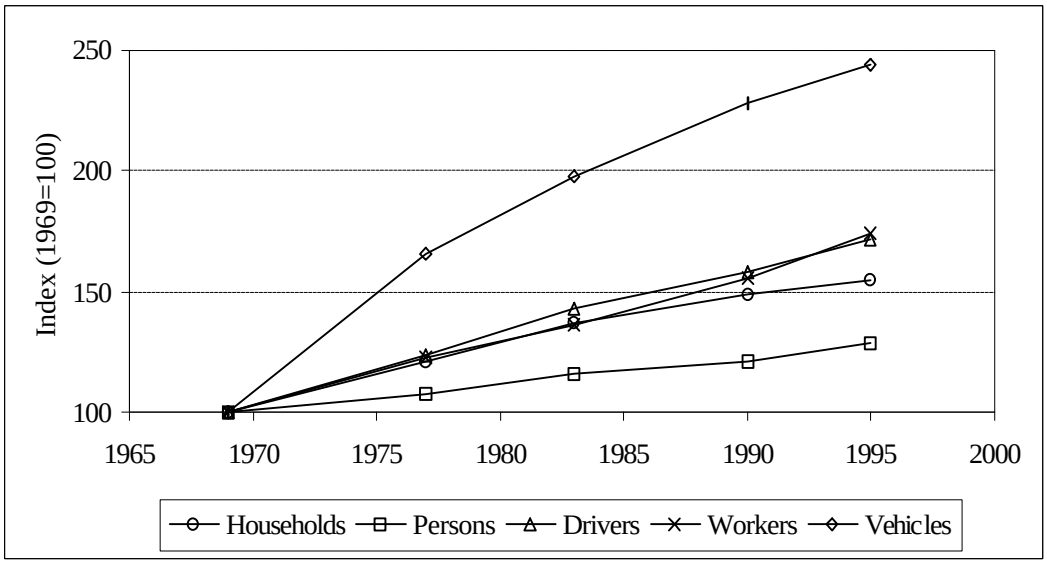
Growth of Population and Vehicles

Table 3-1 and Figure 3-1 show growth in population and vehicles. Over the past twenty-six years (1969-1995) population increased relatively modestly (29 percent). The increases in households (55 percent), workers (74 percent), and drivers (72 percent) are much larger. The most striking change in the data is the 144 percent increase in household vehicles since 1969. The nation went from a society of one car per household in 1969 to a society of close to two cars per household in 1995, in a time during which household size declined by 17 percent. The most dramatic increase in household vehicle ownership occurred between 1969 and 1977, with steady growth since then.

Table 3-1. Index of Changes in Population and Vehicles.

Year	Households	Persons	Drivers	Workers	Vehicles
1969	100	100	100	100	100
1977	121	108	124	123	166
1983	137	116	143	136	198
1990	149	121	158	156	228
1995	155	129	172	174	244

Source: Technical Appendix, FHWA (1997b).



Source: Table 3-1.

Figure 3-1. Index of Changes in Population and Vehicles.

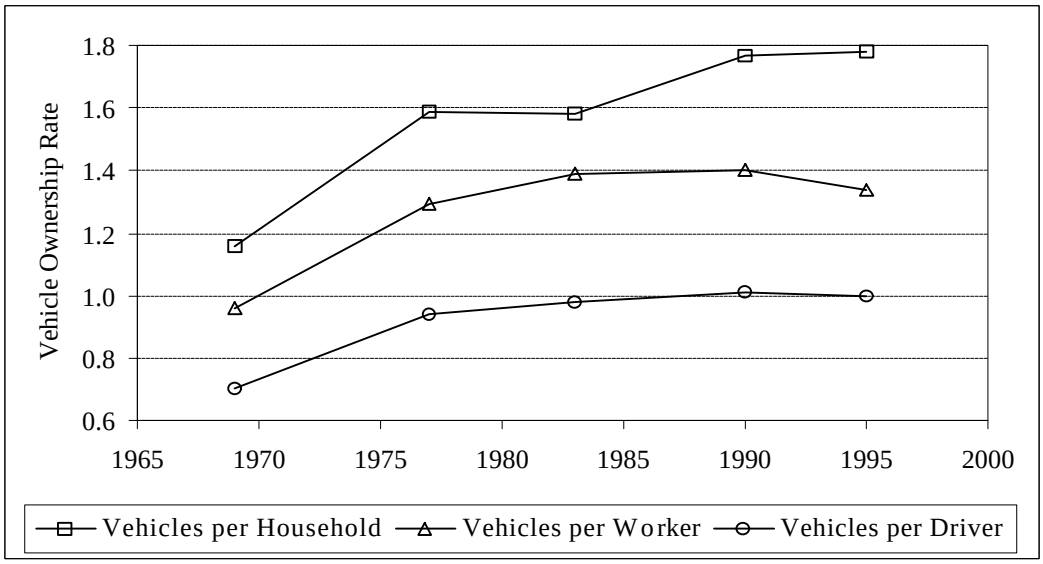
Stabilization of Vehicle Ownership Rates

Despite the significant growth in the number of household vehicles over time, the data from the 1995 survey indicate that household vehicle ownership is beginning to stabilize (Table 3-2 and Figure 3-2). This trend can be seen in the rates of vehicles per household, vehicles per driver, and vehicles per worker.

Table 3-2. Changes in Vehicle Ownership Rates.

Year	Vehicles per Household	Vehicles per Worker	Vehicles per Driver
1969	1.16	0.96	0.70
1977	1.59	1.29	0.94
1983	1.58	1.39	0.98
1990	1.77	1.40	1.01
1995	1.78	1.34	1.00

Source: Technical Appendix, FHWA (1997b).



Source: Table 3-2

Figure 3-2. Index of Changes in Vehicle Ownership Rates.

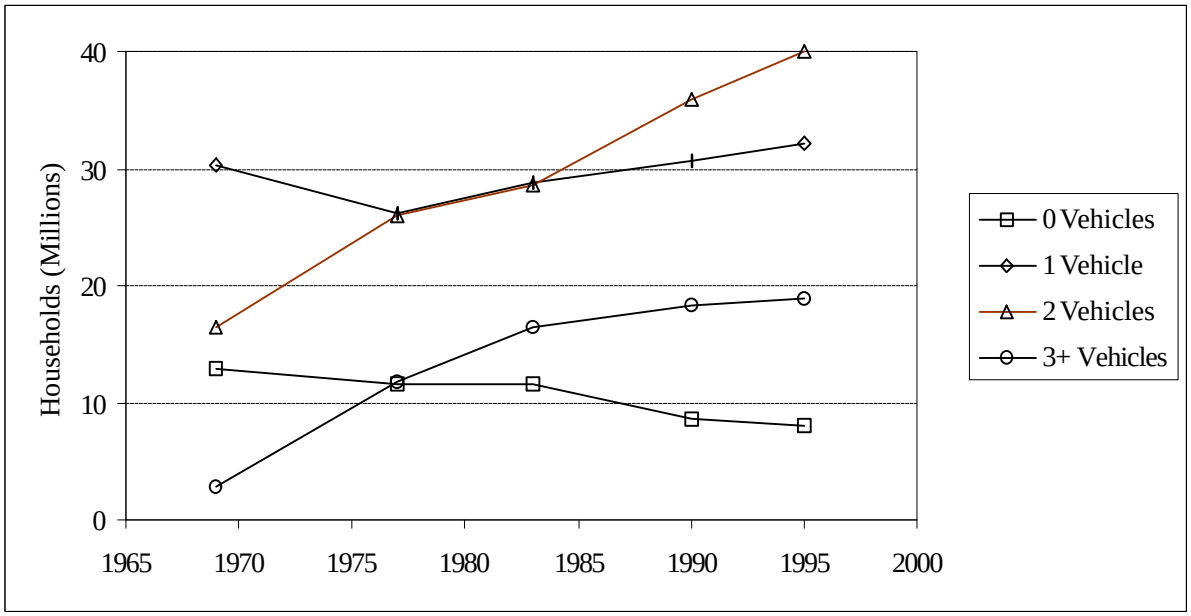
Decline of Zero-Vehicle Households

The number of households without a vehicle has decreased from almost 13 million to 8 million from 1969 to 1995 (Table 3-3 and Figure 3-3). The number of one-vehicle households has remained almost stable over time, at approximately 30 million. The number of two-vehicle households has grown from 17 million in 1969 to 40 million in 1995. Forty percent of all U.S. households in 1995 were two-vehicle households. The most startling change in vehicle ownership has been in the number of households with three or more vehicles, which as grown from 3 million households in 1969 to 19 million in 1995.

Table 3-3. Changes in Number of Households by Vehicle Availability.

Year	0 Vehicles (Millions)	1 Vehicle (Millions)	2 Vehicles (Millions)	3+ Vehicles (Millions)
1969	12.9	30.3	16.5	2.9
1977	11.5	26.1	25.9	11.8
1983	11.5	28.8	28.6	16.4
1990	8.6	30.7	35.9	18.2
1995	8.0	32.1	40.0	18.9

Source: Technical Appendix, FHWA (1997b).



Source: Table 3-3.

Figure 3-3. Changes in the Number of Households by Vehicle Availability.

CHANGES IN TRAVEL

Statistics included in this section are intended to show overall trends. The exact numbers in the trends should not be taken literally because of changes in survey methodology across the different NPTSs. Despite this caveat, the dramatic upward or downward trends are undisputable.

Table 3-4. Index of Changes in Travel (1969=100).

Year	Person Trips	Person Miles	Vehicle Trips	VMT
1969	100	100	100	100
1977	146	134	125	117
1983	155	139	145	129
1990	172	165	182	182
1995	267	243	263	266

Source: Hu and Young (1993) and 1995 NPTS.

Growth of Overall Travel

Personal travel increased dramatically during the 26 years between 1969 and 1995 (Table 3-4), regardless whether personal travel is measured by person trips, person miles, vehicle trips, or vehicle miles traveled (VMT).

Decline of Transit Market Share

In contrast to this increase in overall personal travel, the proportion of person trips made on public transit has declined by almost half during the same period (Table 3-5 and Figure 3-5).

It is interesting to note that this decline in the market share of public transit has been highly correlated with the decline in both the share of non- licensed drivers in the population and the share of zero-vehicle households among all households.

Two characteristics of this decline are worth noting (Pisarski, 1992). First, in the general context of the decline of all alternatives to driving alone, transit has fared better than other alternatives, including carpooling and walking. This is true at least in the case for the

journey to work. Second, this decline in public transit's market share has been uniform across all the traditional users of public transit: women; all age groups, especially younger and older travelers; geographic area types; and demographic groups.

Table 3-5. Index of Changes in Shares of Transit Trips, Non-drivers, and 0-vehicle Households (1969=100).

Year	Transit Trips	Non-Drivers	0-Vehicle Households
1969	100	100	100
1977	79	84	74
1983	79	75	66
1990	65	67	45
1995	56	57	39

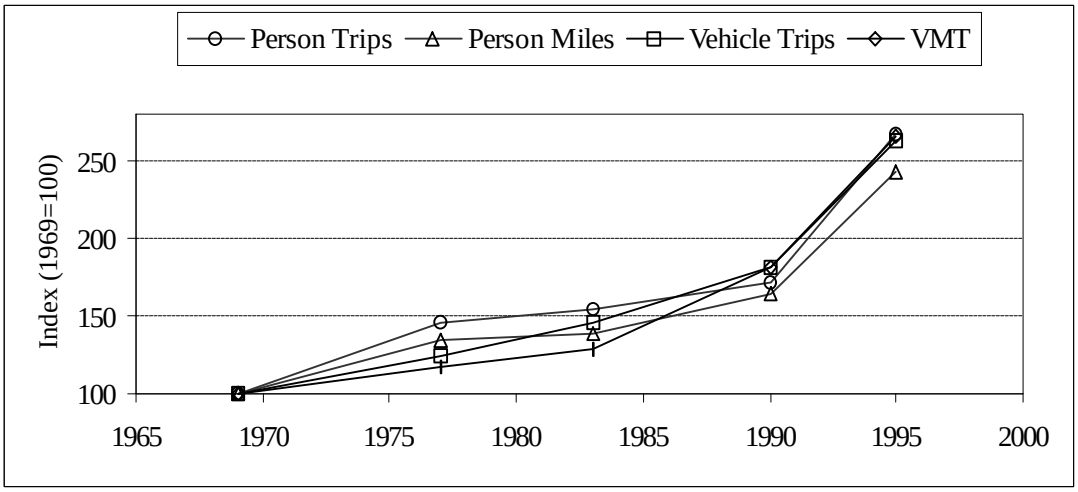
Source: Data on zero-vehicle households from Table 3-3. Data on non-drivers from Hu and Young (1993). Data on transit market share for 1969-1990 from Hu and Young (1992) and for 1995 from the Travel Day File of the 1995 NPTS. Walk and bicycle trips are excluded in computing modal splits because they were not included in the 1969 survey.

On the other hand, the trend tells a positive story if one looks at the **numbers** of public transit trips, non-licensed drivers, and zero-vehicle households (Table 3-6 and Figure 3-6). Non-licensed drivers and zero-vehicle households declined not only in shares but also in absolute numbers. Despite this decline in the number of potential captive riders of public transit, the number of linked transit trips has not declined. This seems to indicate that trips made by choice riders have grown, and have grown faster than the decline in the number of trips made by captive riders.

Table 3-6. Index of Changes in Numbers of Transit Trips, Non-drivers, and 0-vehicle Households (1969=100).

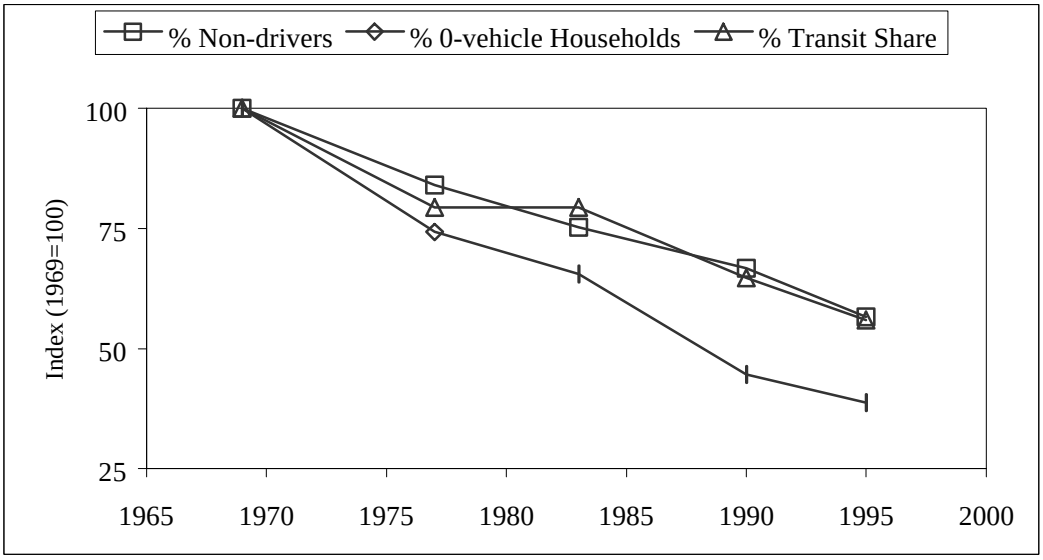
Year	Transit Trips	Non-Drivers	0-Vehicle Households
1969	100	100	100
1977	99	91	90
1983	112	87	90
1990	123	81	67
1995	135	69	62

Source: Data on zero-vehicle households from Table 3-3. Data on non-drivers from Hu and Young (1993). Data on transit trips for 1969-1990 from Hu and Young (1992) and for 1995 from the Travel Day File of the 1995 NPTS.



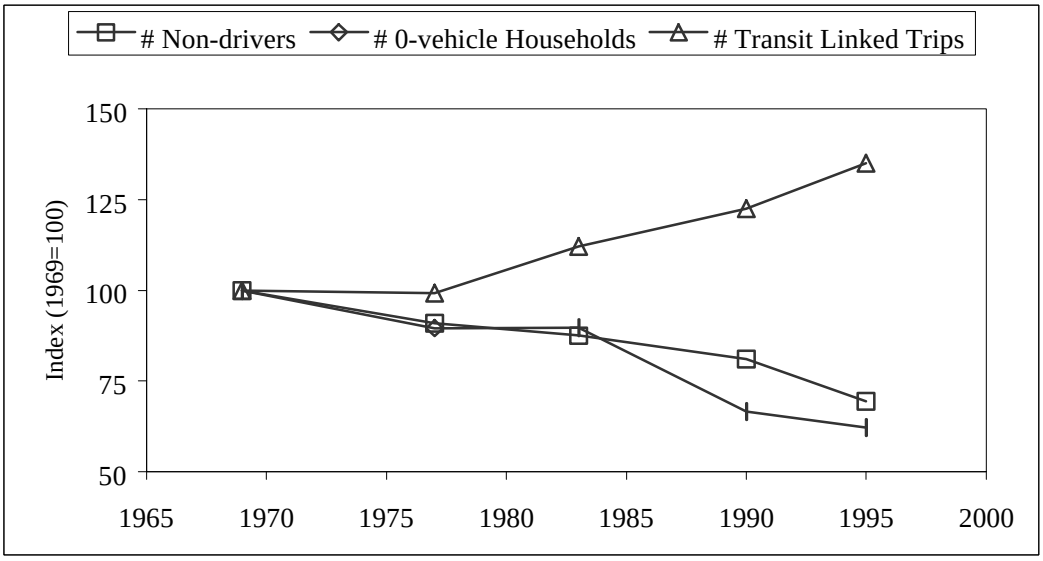
Source: Table 3-4

Figure 3-4. Index of Changes in Overall Travel.



Source: Table 3-5

Figure 3-5. Index of Changes in Shares of Transit Trips, Non-drivers, and 0-vehicle Households.



Source: Table 3-6

Figure 3-6. Index of Changes in Numbers of Transit Trips, Non-drivers, and 0-vehicle Households.

Changes in Trip Characteristics

While the average commute has increased in distance, the travel time to work has not shown corresponding increases (Table 3-7). Between 1983 and 1995, commuting trips grew 37 percent longer in miles, while the travel time increased by only 14 percent. This comparison is meaningful because FHWA believes that work trip characteristics have not been significantly impacted by the survey changes.

This trend seems to fly in the face of the reality of congested roads. There are three reasons most often cited for the increase in speed of travel to work:

- the continued decentralization of metropolitan areas;
- the expansion of the peak period, because of greater flexibility in hours of work; and
- the switch from carpool and transit to single occupant vehicle trips, which are usually more time-efficient for the individual worker, even though they may be less efficient for the overall transportation systems.

Table 3-7. Changes in Commuting Characteristics.

Characteristics	1983	1990	1995	'83 -'95 % Change
Average Distance in Miles	8.5	10.6	11.6	36.5
Average Time in Minutes	18.2	19.7	20.7	13.7
Average Speed in MPH	28.0	32.3	33.6	20.0

Source: Figure 11, FHWA (1997b).

CHAPTER **4**

RESULTS

INTRODUCTION

This chapter presents findings from the research on eight perspectives of public transit in America:

- Public attitudes about public transit;
- Availability and proximity of public transit;
- Extent of transferring;
- Perceived characteristics of public transit trips (distance, travel time, speed, and waiting time);
- Public transit's share of the travel market;
- Public transit's sub-markets;
- Propensity for transit use by people who perceive public transit to be available to them; and
- Public transit's market penetration.

The focus is on public transit's market share, sub-markets, propensity for transit use, and market penetration. The findings regarding public attitudes, availability, proximity, transferring, and trip characteristics help our understanding of these four issues. For more detailed statistics on market share, sub-markets, and propensity for transit use, the reader is referred to the appendices.

The rest of this chapter is divided into eight sections, one for each of the perspectives.

PUBLIC ATTITUDES ABOUT TRANSIT

Introduction

Public attitudes reflect public perceptions of reality, which are often considered to be important determinants of travel behavior. Customer satisfaction is increasingly on the mind of transit agencies as they try to increase transit ridership and maintain transit's share of the overall travel market. A better understanding of public attitudes enables the industry to stress to the public the positive aspects of public transit, and to work on improving aspects with which customers are not satisfied.

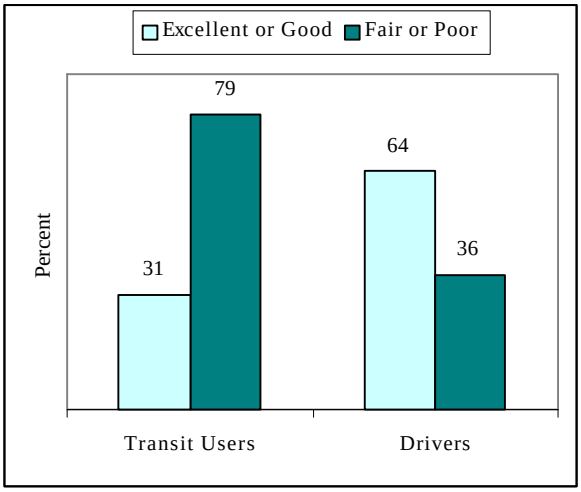
Five types of attitudes are included: public transit users' attitudes about highway performance; people's attitudes about public transit in general; public transit users' reasons for using public transit; people's reasons for not using public transit to travel to work; and public transit users' attitudes toward problem areas in using public transit. Results on each of these attitude types are presented separately below. The section ends with highlights of these results.

Highway Performance

Figure 4-1 shows public attitudes about highway performance by their usual mode of travel for both work and non-work travel. People who usually use public transit feel that highway delays are much worse than do those people who usually drive. Only 31 percent of people who usually use public transit gave a rating of excellent or good for highway performance in terms of time delays. In contrast, 64 percent of people who usually drive gave a positive rating.

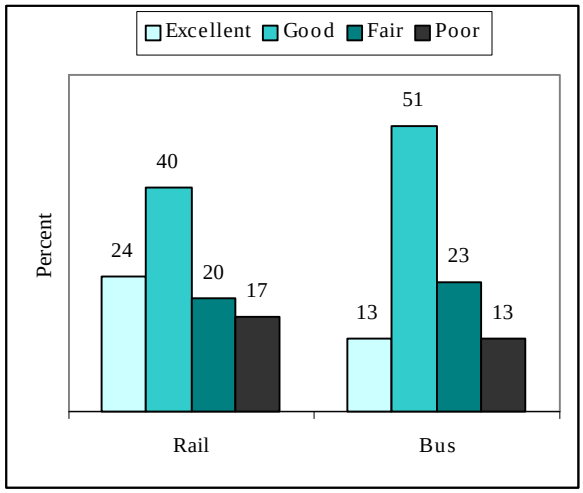
Transit in General

Table 4-1 and Figure 4-2 show public attitudes about transit in general. Both local bus and rail services were rated positively. Over 60 percent gave a combined rating of excellent or good for both bus and rail. However, more people rated rail in both extremes of the scale than they did for the bus mode. Specifically, 24 percent and 17 percent rated rail excellent and poor, respectively. In contrast, only 13 percent rated bus as excellent, while an identical percentage of respondents rated this mode as poor.



Source: Table 4, FHWA (1997c). Results are based on the pre-test of the 1995 NPTS. The number of responses is out of a national sample size of over 4,000 adults. Weights were not created to expand the sample to the national population.

Figure 4-1. Attitudes about Highway Delays by Usual Mode of Transportation.



Source: Table 4-1.

Figure 4-2. Overall Rating of Local Bus and Rail Services.

Table 4-1. Overall Rating of Local Bus and Rail Services.

Rating Category	Rail	Bus
Excellent	24%	13%
Good	40	51
Fair	20	23
Poor	17	13
Total	100	100

Source: Table 1, FHWA (1997c). Results are based on the pre-test of the 1995 NPTS. In addition to highway travel and intercity travel, respondents were asked to rate local rail transit and bus service as excellent, good, fair, or poor in their area. The number of responses is out of a sample size of at least 1,350 people. Weights were not available to expand the sample to the national population.

Reasons for Using Transit

Table 4-2 shows the proportions of respondents who either agreed or strongly agreed with each of the nine reasons as to why they use public transit as their usual mode of travel for both work and non-work purposes. Over 80 percent of the respondents agreed that they use public transit because it is the most convenient way for them to get around. In contrast, only half as many agreed that they use transit because they can do something else in public transit vehicles or because it is faster than a private vehicle. Between the two extremes, more people agreed that they use public transit because they do not have access to a car, it avoids the stress of driving on congested roads, or it is better for the environment. About 60 percent of the people agreed that they use public transit because they do not drive or do not like to drive or it avoids buying a car.

Table 4-2. I Use Public Transit Because ...

Reasons	Agree or Strongly Agree
I can do something else	41%
It is faster than a private vehicle	43
I don't drive or don't like to drive	60
Avoids buying a car	65
It is better for the environment	72
It avoids stress of driving on congested roads	74
Do not have access to a car	74
Costs less than driving	78
It is the most convenient way for me	82

Source: Table 9, FHWA (1997c). Results are based on the pre-test of the 1995 NPTS. A question was asked in the form: "I use public transit because:" followed by the nine statements listed in the table with which the respondent could agree or disagree on a five-point scale, including "strongly disagree," "disagree," "unknown," "agree," and "strongly agree." The number of responses is out of a sample size of over 4,000 adults. Weights were not created to expand the sample to the national population.

Reasons for Not Using Transit

Table 4-3 shows the results for why people do not use public transit as their usual mode of transportation for commuting. Overall, none of the reasons is a dominant factor because none of them represent a majority. The most significant reasons for not using public transit for travel to work include simple dislike of it, its unavailability at work, and its inconvenient schedules. Almost 40 percent do not use public transit for travel to work because they simply do not like to use it. About 35 percent do not use public transit for travel to work because it is unavailable at work. A total of 24 percent do not use public transit because of its inconvenient schedules. Among the other reasons, few do not use public transit for travel to work because it is too expensive, they have access to a car, trips are short in distance, or public transit stops are too far from home. Relatively large proportions do not use public transit for travel to work because they need their own vehicle to do other things or public transit takes too much time.

Table 4-3. I Do Not Use Public Transit to Travel to Work Because ...

Reasons	Agree
I don't like to use it	39%
It is not available at work	35
Its schedule is not convenient	24
I need own vehicle to do other things	17
It takes too much time	14
It stops too far from home	7
I travel short distances	5
I have own car	2
It is too expensive	1
I have a company car	0

Source: Person File. Weights were used to expand the sample to the national population.

Problem Areas in Using Transit

Table 4-4 shows the results on perceived problem areas in using public transit by people who use public transit at least once a month for all purposes. There is no strong consensus on big problems. The problem that is perceived to be the most serious has only a 29 percent share indicating that it is a "big problem." Overall, four of the eight problem areas have a majority indicating that it is not a problem. These include "having access to a car when you need it," "cost of travel by public transit," "public transit available time of day needed," and "time and aggravation with transfers." The two problem areas with the lowest proportions indicating no problem are "worry about crime on public transit" and "time spent on public transit."

Transferring does not seem to be a serious problem relative to other problem areas. Over the years, the time and aggravation involved in transfers has been

believed to be one of the primary problem areas for people using public transit. The results, however, indicate that "time and aggravation with transfers" is among those areas with the lowest proportions indicating a big problem. Transferring has the lowest proportion indicating that it is a big problem among all users combined. In contrast, worrying about crime on public transit has a much larger proportion indicating this to be a big problem.

However, the results on transferring need to be interpreted with care. As shown later in the section on transferring, the proportion of linked public transit trips involving transfers is small. As a result, many of those who responded to the question about problem areas in using public transit do not experience much transferring. They are less likely to be critical of transferring as a problem area, then, than those who have to transfer a lot. Furthermore, when a transit network is sparse, there are fewer trips for which transfers will even present a reasonable option. The transferring "problem" is then so big that possible trips are not even seriously considered--hence, no problem is acknowledged.

There are substantial differences in the perceptions of these problem areas between population groups such as women versus men, frequent users versus infrequent users, and captive versus choice users (Table 4-5). Captivity is defined as those who are not licensed drivers or who live in households without vehicles. With each of the pairs of population groups, the group that has a higher concentration of public transit users views each problem area as being a bigger problem than the other group in the same pair. The difference is most significant between captive and choice users.

Summary

This section has presented results on five types of public attitudes about public transit. Some of the highlights include:

- People who usually use public transit feel that highway congestion is a more serious problem than do the people who usually use other modes.

- Both local bus and rail services were rated positively, with over 60 percent giving a combined rating of excellent or good.

- People do not use transit for commuting most likely because of their dislike of public transit, because transit is unavailable at their work, or because of transit's inconvenient schedules. Least likely to have been a factor was high cost, having access to a car, or stops being too far from their home.

- People use transit most likely because it is the most convenient way for them to get around, it costs less than driving, they do not have access to a car, it avoids the stress of driving, or it is better for the environment. Least likely to have been factors are because they can do something else in a transit vehicle or because it is faster than a car.

- The time and aggravation involved in transferring seem to be less of a problem than other issues, such as worrying about crime, the cost of travel, having access to a car when it is needed, and difficulty with crowding.

- People who rely on transit tend to view public transit more negatively than do others. For example, women, more frequent users, non-licensed drivers, and people without household vehicles perceive public transit more negatively than men, less frequent users, licensed drivers, and people with household vehicles, respectively.

Table 4-4. Perception of Problem Areas in Using Public Transit for All Purposes.

Problem Areas	Percent Indicating Big, Small, or No Problem			
	Big Problem	Small Problem	No Problem	Total
Worry with crime on public transit	29%	32%	39%	100%
Time spent on public transit	25	34	41	100
Having access to a car when you need it	23	20	56	100
Difficulty with crowding or getting a seat	22	30	48	100
Cost of travel by public transit	21	27	52	100
Public transit available time of day needed	20	29	51	100
Transit stations and vehicles not clean	17	34	49	100
Time and aggravation with transfers	16	30	54	100

Source: Person File.

Table 4-5. Differences in Percent Indicating Each Area as a Big Problem by Gender, Frequency of Use, and Captivity.

Problem Areas	Gender		Frequency of Use		Captivity	
	Male	Female	Infrequent	Frequent	Choice	Captive
Worry with crime on public transit	20%	35%	28%	30%	20%	38%
Time spent on public transit	22	27	22	27	21	29
Having access to a car when you need it	18	28	17	29	11	36
Difficulty with crowding or getting a seat	18	24	16	27	17	27
Cost of travel by public transit	18	24	14	27	16	27
Public transit available time of day needed	19	21	19	21	16	24
Transit stations and vehicles not clean	14	19	10	23	12	22
Time and aggravation with transfers	16	16	15	17	14	18

Source: Person File. Frequent users are those who use public transit at least two or more times a week in a typical two-month period. Captive users are those who either are not a licensed driver or live in households without vehicles. Choice users are those who are licensed drivers and live in vehicle-owning households.

AVAILABILITY AND PROXIMITY

Introduction

Availability and proximity of public transit are closely related. In the NPTS, availability measures a macro-level of transit being available, while proximity measures a micro-level of transit being available. Specifically, availability gives the proportion of people who perceive public transit to be available in the city or town in which they live, while proximity gives the proportion of people who perceive that they live within a quarter mile of the nearest transit stop.

It is important to point out that availability and proximity measured here are perceived and spatial in nature. It is unclear how perceived proximity would compare with actual proximity, which is frequently measured by local transportation planning agencies and transit operators. On the other hand, neither availability nor proximity measured here incorporates temporal features of public transit services, such as service frequency, daily service span, or whether weekend services are provided.

Nationwide results are discussed first. Results on the effects of MSA scale and area density on availability and proximity are presented next, followed by results on the effects of personal, household, and land use characteristics on transit availability and proximity.

Nationwide Availability and Proximity

About 60 percent of Americans perceive public transit to be available in the city or town in which they live and approximately half of Americans perceive themselves as living within a quarter mile of a transit stop.

Effects of MSA Scale and Area Density

Table 4-6 and Figure 4-3 show how transit availability varies with both MSA scale and area density. At the national level, the percent of people who perceive that public transit is available in the city or town they live increases with the scale of MSAs. It is only 20 percent for areas outside MSAs. It increases from 55 percent in MSAs with a population under 250,000, to 69 percent in MSAs with a population between 500,000 and 1 million, and to 79 percent in MSAs with a population of at least 3 million.

Availability is similar across suburban areas, second cities, and urban areas but is substantially lower in rural areas and small towns. The proportion of the population perceiving public transit to be available is around 20 percent, 40 percent, 90 percent, 85 percent and 100 percent in rural areas, small towns, suburban areas, and urban areas, respectively.

Availability varies little across different sizes of metropolitan areas for a given level of area density except for those areas outside MSAs. Availability between MSAs and outside MSAs differs most dramatically in suburban areas, where only 19 percent of people outside MSAs perceive public transit to be available, compared with approximately 90 percent within MSAs. On the other hand, availability between MSAs and outside MSAs is almost the same in urban areas at about 100 percent.

Table 4-7 and Figure 4-4 show how transit proximity varies with both MSA scale and area density. At the national level, about 37 percent of people perceive that they live within a quarter mile of transit stops. This ranges between 42 percent to 46 percent for both small and medium sized MSAs and jumps to about 53 percent in the largest MSAs with a population of at least 3 million.

The difference in transit proximity is much larger between suburban and urban areas than it is in transit availability. On the other hand, the difference in transit proximity is much smaller between less urbanized areas (rural areas and small towns) and more urbanized areas (suburbs, second cities, and urban areas) than it is in transit availability.

As in the case of transit availability, transit proximity varies little across MSAs of different scales.

Effects of Personal, Household, and Land Use Characteristics

Availability and proximity vary systematically across population groups and modes. Table 4-8 shows this variation. The first and second columns show the different types of characteristics and the population groups for the given characteristics. The first block of columns shows availability by mode, i.e., the percent of population who perceive that each transit mode is available in the city or town in which they live. The second block of columns shows proximity, i.e., the

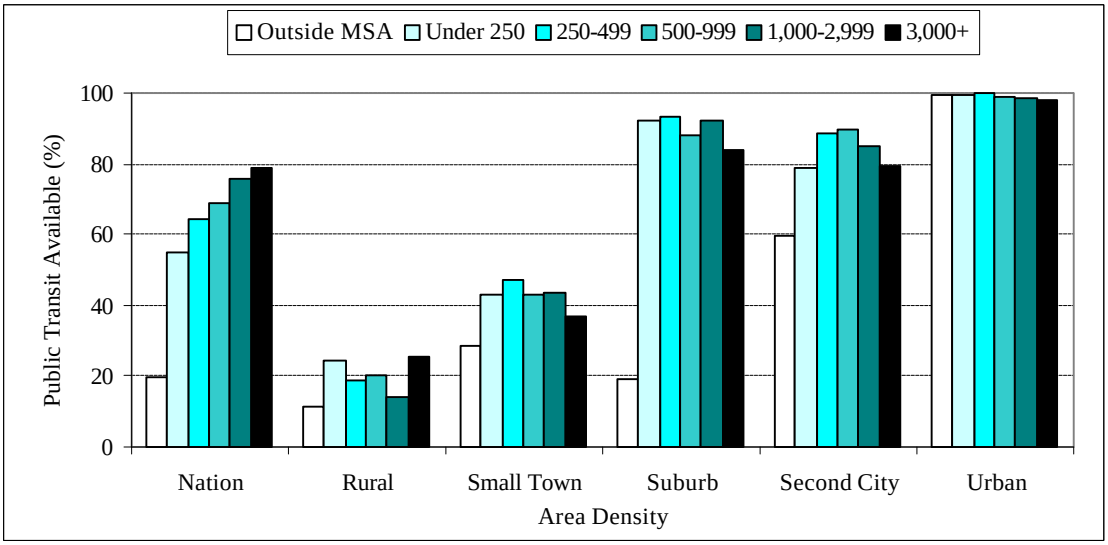
percent of population who perceive that they live within a quarter mile of the nearest stop for each transit mode.

In general, a smaller proportion of Americans perceive that they live within a quarter mile of transit stops than perceive that public transit is available in the city or town in which they live. Most of the population groups that are considered to have high concentrations of public transit users show both high availability and close proximity, including non-drivers, females, non-Whites, Hispanics, people living in households with low income, people living in households without vehicles, renters, people living in single-adult households, and areas with high densities of housing, population, or employment.

Table 4-6. Percent Population Perceiving Public Transit to be Available by MSA Scale and Area Density.

Area Density	MSA Scale (Population in Thousands)						Nation
	Outside MSA	Under 250	250-499	500-999	1,000-2,999	3,000+	
Rural	11%	24%	19%	20%	14%	25%	20%
Small Town	29	43	47	43	43	37	40
Suburb	19	92	93	88	92	84	90
Second City	60	79	89	89	85	79	85
Urban	100	99	100	99	98	98	100
Nation	20	55	64	69	76	79	63

Source: Person File.



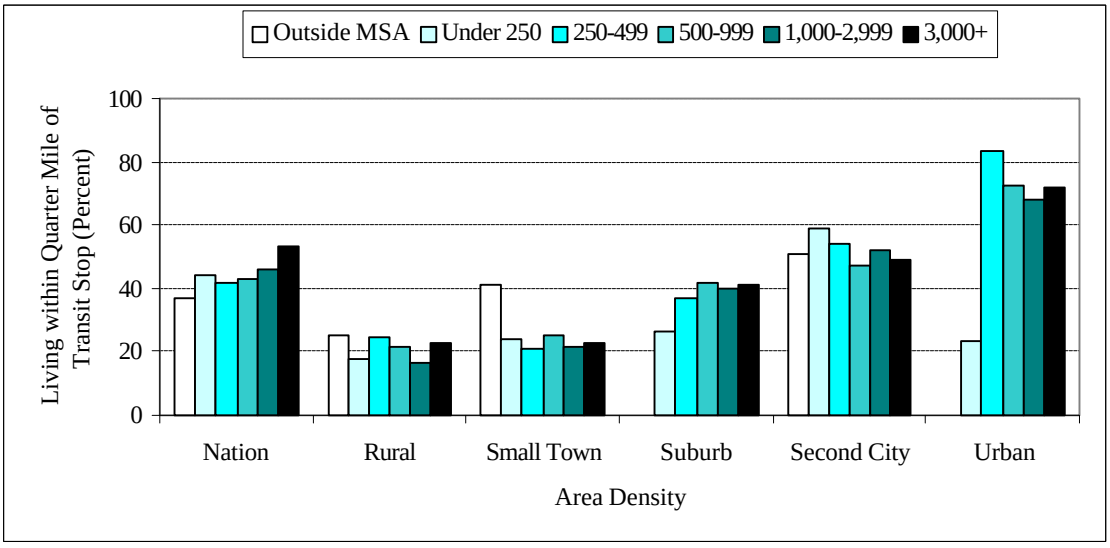
Source: Table 4-6.

Figure 4-3. Perceived Availability by MSA Scale and Area Density.

Table 4-7. Percent Population Living within Quarter Mile of Transit Stop by MSA Scale and Area Density.

Area Density	MSA Scale (Population in Thousands)					
	Outside MSA	Under 250	250-499	500-999	1,000-2,999	3,000+
Rural	25%	18%	25%	22%	17%	23%
Small Town	41	24	21	25	22	23
Suburb	0	26	37	42	40	41
Second City	51	59	54	47	52	49
Urban	0	23	83	72	68	72
Nation	37	44	42	43	46	53

Source: Person File.



Source: Table 4-7.

Figure 4-4. Perceived Proximity by MSA Scale and Area Density.

Table 4-8. Availability and Proximity by Personal, Household, and Land Use Characteristics.

Characteristics	Sub-groups	Availability					Proximity				
		Bus	Streetcar/ Trolley	Subway/ Elevated Rail	Commuter Train	All	Bus	Streetcar/ Trolley	Subway/ Elevated Rail	Commuter Train	All
Person Age	Under 18	60	13	38	69	60	47	21	16	6	47
	18-64	64	16	42	65	64	48	22	17	6	48
	65+	61	15	42	65	61	53	27	13	5	53
License Status	Driver	61	15	37	67	61	46	19	13	5	46
	Non-Driver	65	16	49	63	65	55	29	22	7	55
Gender	Male	62	16	40	66	62	47	22	16	5	48
	Female	63	15	42	66	63	49	23	17	6	50
Working Status	Full Time	63	15	41	66	63	47	20	16	5	47
	Part Time	64	17	37	68	64	48	22	19	6	48
	Not Working	65	18	48	62	65	53	26	19	7	53
	Retired	60	16	42	65	60	52	28	13	5	52
Race	White	58	13	32	71	58	43	15	13	4	43
	Black	79	20	59	55	79	68	32	18	10	68
	Others	78	21	47	62	78	55	28	24	7	55
Ethnicity	Hispanic	76	17	43	65	76	55	22	24	7	56
	Non-Hispanic	61	15	41	66	61	47	23	15	5	48
Household Income	Under $15,000	62	22	49	61	62	64	26	29	8	64
	$15,000-$49,999	61	18	41	62	61	51	21	16	6	52
	$50,000+	64	11	37	72	64	40	21	12	4	40
Vehicle Ownership	None	83	20	71	55	83	81	47	34	13	82
	One	71	16	47	64	71	57	20	17	7	57
	Two+	58	14	29	70	58	41	15	5	3	41
Home Ownership	Owner	58	13	34	70	58	42	17	9	4	42
	Renter	76	19	51	61	76	63	28	25	9	64
Life Cycle	Single-Adult	69	17	48	63	69	61	32	23	9	61
	Multi-Adult	61	15	39	67	61	46	20	15	5	46
Housing Density (Units per Square Mile)	Under 50	18	21	15	54	18	20	11	21	5	20
	50-250	34	12	16	79	34	21	1	1	0	20
	250-999	62	9	27	69	62	32	7	1	3	31
	1,000-1,999	77	10	25	73	77	44	13	3	3	44
	2,000+	93	19	50	63	93	65	26	21	8	66
Population Density (Persons per Square Mile)	Under 500	24	17	16	67	24	20	7	8	2	20
	500-1,999	55	10	20	74	55	29	4	0	2	29
	2,000-3,999	73	10	29	68	73	41	15	2	3	41
	4,000-9,999	88	15	26	71	88	55	16	7	5	55
	10,000+	98	19	65	59	98	74	31	24	9	76
Employment Density (Jobs per Square Mile at Work)	Under 50	29	15	15	57	29	38	41	10	4	38
	50-499	50	15	21	74	50	38	10	5	4	38
	500-1,999	69	17	25	70	69	45	14	8	3	45
	2,000-9,999	78	14	38	68	78	50	20	12	7	50
	10,000+	87	17	62	61	87	59	29	23	7	60
All		63	16	41	66	63	48	23	17	6	49

Source: Household File and Person File.

Summary

This section has presented results on the availability and proximity of public transit. Among the key findings are:

- Availability and proximity vary little across different sizes of metropolitan areas for a given level of area density except in the smallest metropolitan areas. Around 90 percent of people living in suburbs perceive public transit to be available where they live and about 40 percent of them perceive that they live within a quarter mile of public transit.

- Availability is similar across suburban areas, second cities, and urban areas, while proximity is much higher in urban areas than in second cities and suburban areas.

- In general, a larger proportion of Americans perceive public transit to be available to them than live within a quarter mile of the nearest transit stop. At the national level, two-thirds perceive public transit to be available, while about half perceive themselves to be living within a quarter mile of the nearest transit stop. However, these two proportions are about the same for areas with very low density, for people living in households with low income, or for people living in zero-vehicle households.

- Most groups considered to have high concentrations of public transit users show both high availability and close proximity: non-drivers, female, non-Whites, Hispanics, people living in households with low income, people living in households without household vehicles, renters, people living in single-adult households, and areas with high density.

TRANSFERRING

Introduction

Over the years, the time and aggravation involved in transfers have been believed to be one of the primary problem areas for people using public transit. In mode choice models, the coefficients on transfer waiting time and the number of transfers often are several times greater than that of in-vehicle travel time.

Transferring is examined from two aspects:

- Distribution of linked trips with respect to the number of transfers involved; and
- Percent of unlinked trips that are transfer trips.

The NPTS is the only nationwide data source that has information on transferring. Nationwide results are discussed first. Results of the effect of MSA scale and area density on the extent of transferring are presented next. Results of the effect of personal, household, and land use characteristics on transferring are discussed lastly.

Transferring Nationwide

The extent of transferring is limited. At the national level, over 79 percent of linked trips do not have transfers; eighteen percent involve one transfer; and about 3 percent involve two or more transfers (Table 4-9). In terms of unlinked trips, about 20 percent are transfer trips.

Table 4-9. Nationwide Distribution of Linked Transit Trips by Transfers.

Transfers	Distribution (%)
Zero	79
One	18
Two or More	3

Source: Segmented File and Travel Day File.

Effects of MSA Scale and Area Density

As would be expected, the extent of transferring varies by MSA scale and area density. Tables 4-10 and 4-11 show the distribution of linked transit trips with respect to the number of transfers for MSA scale and area density, respectively.

Table 4-10. Distribution of Linked Transit Trips by Number of Transfers and MSA Scale.

MSA Scale (000)	Percent by Number of Transfers		
	0	1	2+
Outside MSA	96	4	0
Under 250	94	5	1
250-499	81	17	2
500-999	80	19	1
1,000-2,999	81	17	2
3,000+	78	19	3

Source: Segmented File and Travel Day File.

Table 4-11. Distribution of Linked Transit Trips by Number of Transfers and Area Density.

Area Density	Percent by Number of Transfers		
	0	1	2+
Rural	96	4	0
Small Town	94	4	0
Suburb	82	13	5
Second City	80	15	5
Urban	77	20	3

Source: Segmented File and Travel Day File.

For areas outside MSA or for MSAs with a population under 250,000, about 95 percent of linked trips do not involve transferring. There seems to be little difference in the distribution among the medium-sized categories of MSAs: 80 percent with no transfers, 18 percent with one transfer, and 2 percent with two or more transfers. Transferring occurs slightly more frequently in the largest MSAs: 78 percent with no transfers, 19 percent with one transfer, and 3 percent with two or more transfers.

For rural areas or small towns, about 95 percent of linked transit trips involve transferring; about 4 percent involve one transfer; and less than one percent involve two or more transfers. Suburbs and second cities are similar in the distribution of linked transit trips with respect to the number of transfers: about 81 percent with no transfers, 14 percent with one transfer, and 5 percent with two or more transfers. Transfers occur more frequently in urban areas: 77 percent without any transfers, 20 percent with one transfer, and 3 percent with two or more transfers.

Effects of Personal, Household, and Land Use Characteristics

The extent of transferring varies systematically across population groups within various personal, household, and land use characteristics. Table 4-12 shows this variation. Specifically, the first column of the table shows the different types of characteristics. The second column lists the population groups for the given characteristics. The next three columns show the distribution of linked transit trips by the number of transfers. The last column shows the percent of unlinked trips that are transfer trips.

Most population groups that are considered to have high concentrations of public transit users show a high proportion of their linked trips involving transfers. This is true for non-drivers, non-Whites, Hispanics, people living in low-income households, people living in households with low vehicle ownership, and renters.

Both the young and old have smaller proportions of their linked trips involving transfers than does the rest of the population. Full-time workers and people who are not working have higher proportions of their linked trips involving transfers than do part-time workers or retirees. People living in single-adult households have a slightly lower proportion of their linked trips involving transfers than do people living in multi-adult households.

Similar to the relationship between transferring and area density, the extent of transferring increases with higher levels of housing or population density.

Summary

This section has presented results on the extent of transferring in public transit. Findings include:

- Most linked trips do not involve transfers. At the national level, over 79 percent of linked trips do not have transfers; eighteen percent involve one transfer; and about 3 percent involve two or more transfers. In terms of unlinked trips, about 20 percent of all trips nationwide are transfer trips.

- The extent of transferring varies with land use characteristics and geography. Higher proportions of linked trips involve transfers in areas with high density (housing, population, or employment) or large population. Beyond those areas with very low density or a small population, this distribution differs only somewhat.

- Most population groups that are considered to have high concentrations of public transit users show a high proportion of their linked trips involving transfers. This is true for non-drivers, non-Whites, Hispanics, people living in low-income households, people living in households with low vehicle ownership, and renters.

- Both the young and old have smaller proportions of their linked trips involving transfers than does the rest of the population. Full-time workers and people who are not working have higher proportions of their linked trips involving transfers than do part-time workers or retirees. People living in single-adult households have a slightly lower proportion of their linked trips involving transfers than do people living in multi-adult households.

Table 4-12. Extent of Transferring by Personal, Household, and Land Use Characteristics.

Characteristics	Population Groups	Percent by Number of Transfers			Transfer Trips (%)
		Zero	One	Two or More	
Person Age	Under 18	85	13	2	15
	18-64	77	19	4	21
	65+	82	17	1	16
License Status	Driver	82	16	2	17
	Non-Driver	77	19	4	22
Gender	Male	79	17	4	20
	Female	79	18	3	20
Working Status	Full Time	76	19	5	23
	Part Time	83	14	3	17
	Not Working	77	20	3	21
	Retire	84	15	1	14
Race	White	87	12	1	12
	Black	73	21	6	25
	Others	74	24	2	22
Ethnicity	Hispanic	74	24	2	23
	Non-Hispanic	80	16	4	19
Household Income	Under $15,000	75	21	4	23
	$15,000-$49,999	80	18	2	18
	$50,000+	86	13	1	14
Vehicle Ownership	Zero	75	21	4	22
	One	80	16	4	20
	Two+	85	12	3	14
Home Ownership	Owner	81	15	4	19
	Renter	78	19	3	21
Life Cycle	Single Adult	80	18	2	18
	Multi-Adult	78	17	5	21
Housing Density (Units per Square Mile)	Under 50	93	7	0	7
	50-250	92	7	1	8
	250-999	88	8	4	14
	1,000-1,999	82	8	10	23
	2,000+	77	20	3	20
Population Density (Persons per Square Mile)	Under 500	92	7	1	8
	500-1,999	87	9	4	15
	2,000-3,999	87	9	4	14
	4,000-9,999	77	19	4	22
	10,000+	77	20	3	21
Employment Density (Jobs per Square Mile at work sites)	Under 50	100	0	0	0
	50-499	62	24	14	34
	500-1,999	79	17	4	21
	2,000-9,999	73	20	7	26
	10,000+	80	19	1	18
All		79	18	3	20

Source: Travel Day File, Segmented File, Person File, and Household File.

TRIP CHARACTERISTICS

Introduction

Understanding the characteristics of public transit trips is part of a richer understanding of public transit markets. This report examines five characteristics of public transit trips including trip distance, travel time (excluding waiting time), waiting time, travel speed (excluding waiting time), and overall speed (including waiting time).

It is important to point out that statistics on these characteristics are based on reported data and, hence, reflect perceived values. Some have argued that travelers, especially public transit users, may know little about these characteristics of their trips. This argument is likely to be valid for those who use public transit infrequently. However, over 84 percent of public transit trips are taken by people who use public transit two or more times a week.

Results are shown at the national level first, followed by the variation of trip characteristics with MSA scale, area density, and personal, household, and land use characteristics.

National Distributions

It is common practice to present national averages of modal trip characteristics, regardless of how these characteristics are distributed. Following this tradition, Table 4-13 shows national averages of selected trip characteristics by transit modes as derived from the NPTS. Compared with national averages of unlinked transit trips from other sources, the national average length of linked trips for transit modes seems to be larger than expected. APTA (1997) shows a national average of 5.1 miles for unlinked trips, which is less than half of the national average of linked trips computed from the 1995 NPTS. Differences between linked versus unlinked would not explain all of this discrepancy. Recall that the nationwide ratio between linked and unlinked trips is about 0.8. The average waiting time for all transit modes, 9.8 minutes, is about a quarter of the average travel time, 38.8 minutes. Accounting for waiting time increases total travel time and lessens overall speed of linked transit trips. In fact, accounting for waiting time increases average travel time to 48.7 minutes, while average speed falls from 19.2 miles per hour without accounting for waiting time to 15.3 miles per hour with accounting for waiting time. These national averages of trip characteristics, as expected, vary significantly among the transit modes.

However, knowing the mean of a distribution alone is not very meaningful when the distribution is unusual (asymmetric, for example). To complement the average values presented in Table 4-13, Figures 4-5 through 4-8 show the distributions of trip distance in miles, travel time in minutes (excluding waiting time), waiting time in minutes, and travel speed in miles per hour (excluding waiting time) by transit mode.

A large proportion of transit trips are short in distance. In fact, about 40 percent of linked transit trips are under three miles. About 60 percent are under six miles. About 75 percent are under 10 miles. Overall, about 80 percent of linked trips are shorter than the national average of 12.4 miles. About seven percent of the trips are more than 30 miles long.

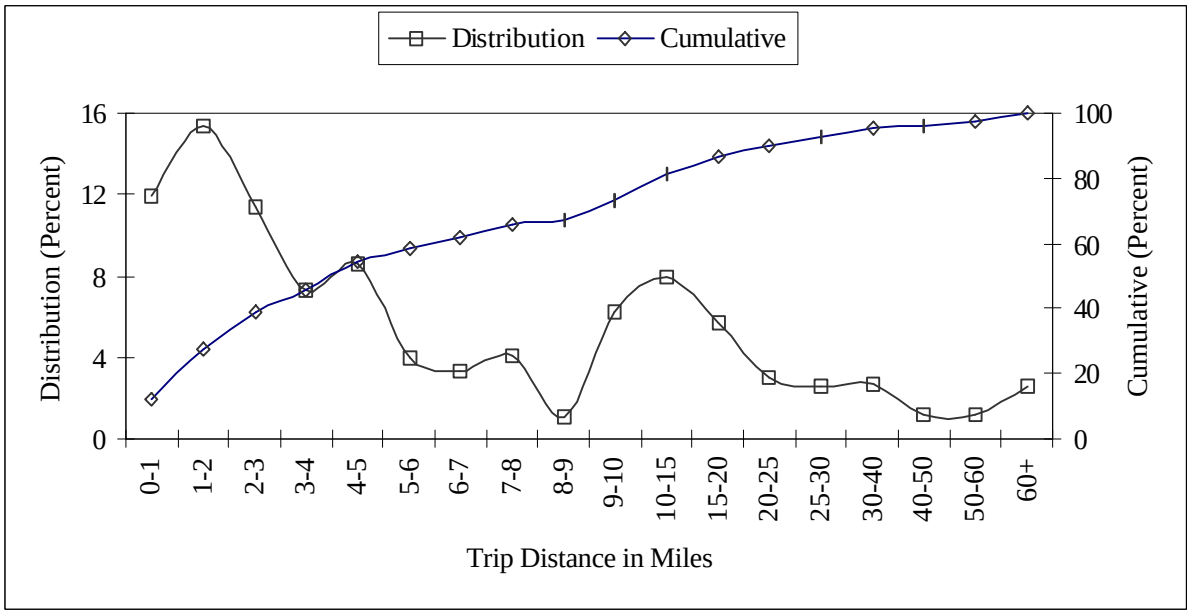
Travel time has a slightly different distribution than trip distance. Less than four percent of linked trips take less than five minutes. A quarter of linked trips take less than 15 minutes. Over half take less than 30 minutes. About three quarters take no more than 45 minutes. About 14 percent of linked trips take over an hour to complete. Overall, about two thirds of linked trips take no more time than the national average transit duration.

Over half of all linked transit trips involve less than five minutes of waiting. About 13 percent of trips involve more than 15 minutes of waiting. Overall, about three quarters of linked trips involve no more than the national average amount of waiting time.

Table 4-13. Average Public Transit Trip Characteristics Nationwide by Transit Mode.

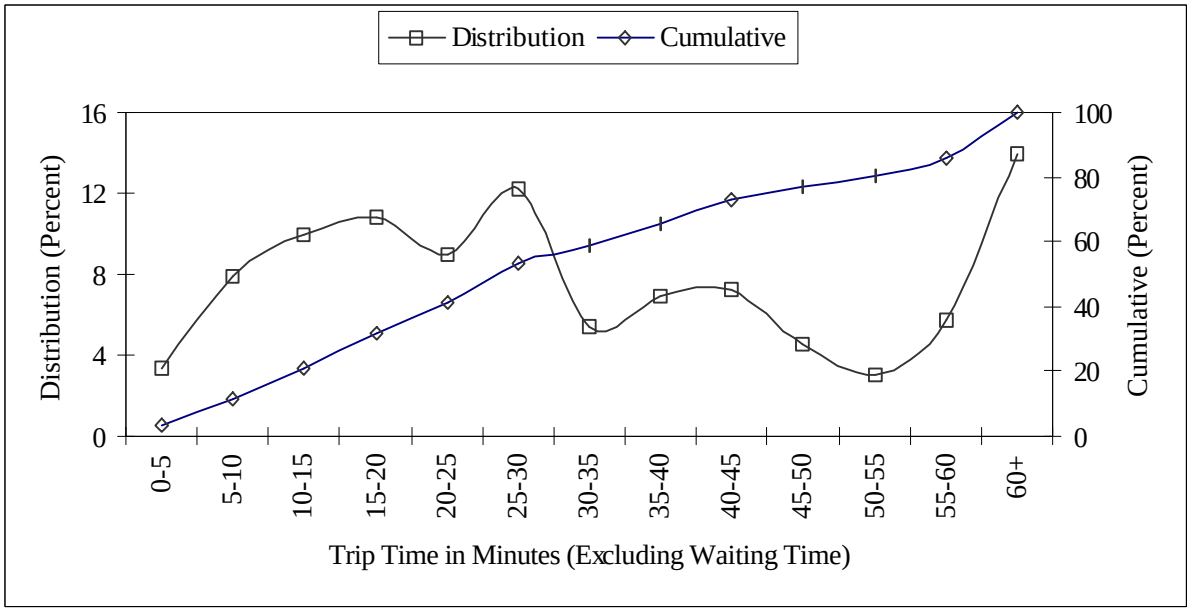
Characteristics	Bus	Commuter Train	Streetcar/ Trolley	Subway/ Elevated Rail	All Transit
Trip Distance in Miles	11.7	24.3	3.6	10.0	12.4
Travel Time in Minutes	37.5	50.0	26.2	38.6	38.8
Travel Speed in Miles per Hour	18.7	29.2	8.3	15.5	19.2
Waiting Time in Minutes	10.8	9.1	6.3	7.4	9.8
Overall Time in Minutes	49.3	59.1	324	46.0	48.7
Overall Speed in Miles per Hour	14.6	24.7	6.7	13.0	15.3

Source: Travel Day File.



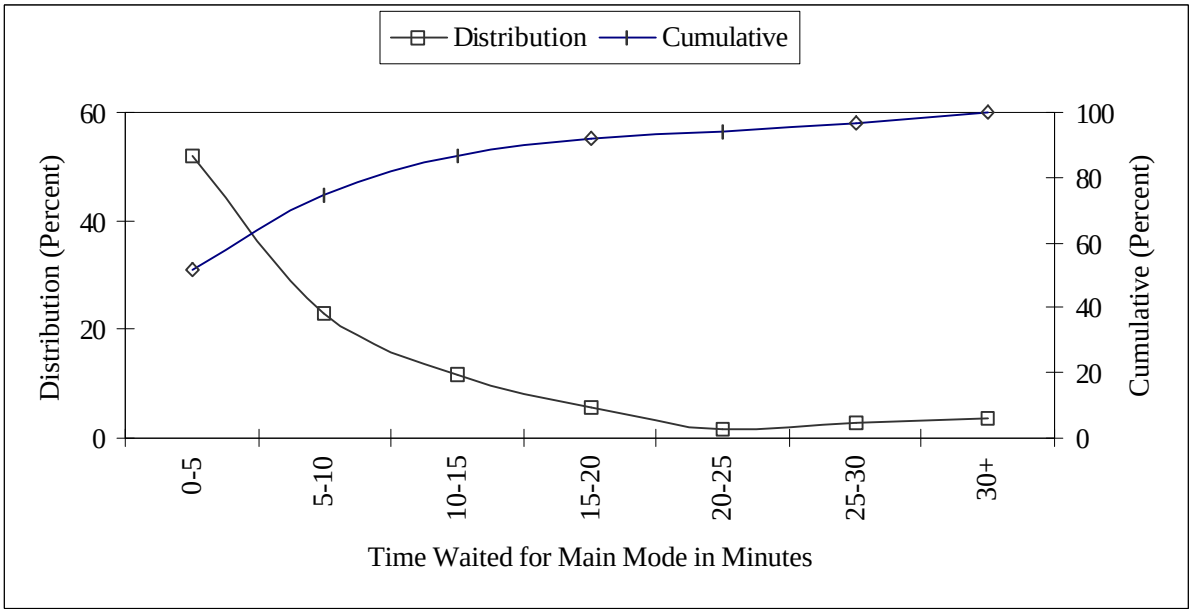
Source: Travel Day File.

Figure 4-5. National Distribution of Linked Transit Trip Distance in Miles.



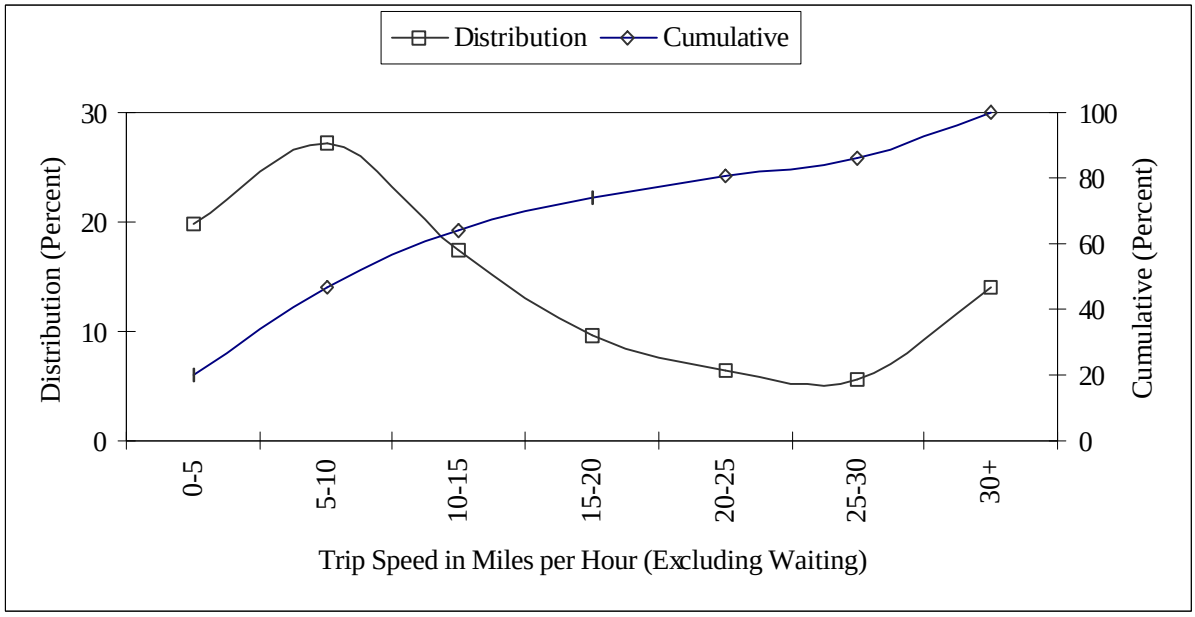
Source: Travel Day File.

Figure 4-6. National Distribution of Travel Time for Linked Transit Trips.



Source: Travel Day File.

Figure 4-7. National Distribution of Waiting Time for Linked Transit Trips.



Source: Travel Day File.

Figure 4-8. National Distribution of Trip Speed of Linked Transit Trips.

Effects of MSA Scale and Area Density

Figure 4-9 shows public transit trip characteristics for selected MSA sizes: outside MSA, MSAs with a population under 250,000, MSAs with a population between 500,000 and 1 million, and MSAs with at least 3 million population. Public transit trips outside MSAs are long in both distance and travel time. The average speeds for trips outside MSAs are unreasonably high, however. Linked transit trips are similar between the medium-sized and the largest MSAs in terms of distance, travel time, waiting time, and average speed. Linked transit trips in MSAs with a population under 250,000, however, are slightly longer in terms of distance but shorter in terms of travel time because of their higher speeds than those in larger MSAs. Waiting time, on average, is similar across areas of different MSA scale.

Figure 4-10 shows trip characteristics for selected levels of area density: rural areas, suburbs, and urban areas. On average, trip distance, travel time (excluding waiting time), and trip speeds all decrease with area density: linked transit trips are longest and fastest in rural areas, while they are shortest and slowest in urban areas. Waiting time, on average, increases with area density.

It seems counter-intuitive that waiting time shows increases with area density.

It seems counter-intuitive that waiting time shows no decrease with MSA scale and a slight increase with area density. Transit services tend to have higher frequencies in areas with a larger population or higher density than in areas with a smaller population or lower density. It is believed that higher frequencies result in lower waiting times for transit users. However, it is conceivable that transit users in areas with higher frequencies may not target their arrivals as well as those in areas with lower service frequencies. When transit service is infrequent, users typically pay more attention to the schedule, and time their access modes accordingly.

Effects of Personal, Household, and Land Use Characteristics

Transit trip characteristics vary systematically across modes and population groups with various personal, household, and land use characteristics. Table 4-14 shows this variation. Specifically, the first column of the table shows the different types of characteristics. The second column lists the population groups for each given characteristic. The final five blocks of columns show average trip distances, average travel time, average waiting time, average speed (excluding waiting), and average overall speed (including waiting). For each type of trip characteristic, averages are shown for bus, rail, and bus and rail combined.

Population groups considered to have high concentrations of public transit users seem to make transit trips that are shorter in distance, shorter in travel time, longer in waiting time, and slower speed. These include non-drivers, female persons, not working, non-Whites, Hispanics, people living in households with low income, people living in households with low vehicle ownership, renters, and single-adult households.

Trips made by persons under 18 years old tend to be the shortest in both distance and time and slowest among the three age groups. Trips made by persons 65 years or older tend to be the longest in both distance and time and fastest among the age groups.

As in the case of MSA scale and area density, waiting time shows a tendency to increase with neighborhood housing density and population density. On the other hand, waiting time shows a decreasing relationship with employment density. This unique relationship between average waiting time and employment density may be explained by the following. While the relationships between MSA scale and other measures of density are for all persons and all transit trips, the relationship between waiting time and employment density is for workers only. Workers, on average, make a larger proportion of repeated trips than other people. People who make repeated trips may target their arrivals better than other people.

Summary

This section has presented results on selected characteristics of linked public transit trips. Some of the highlights include the following:

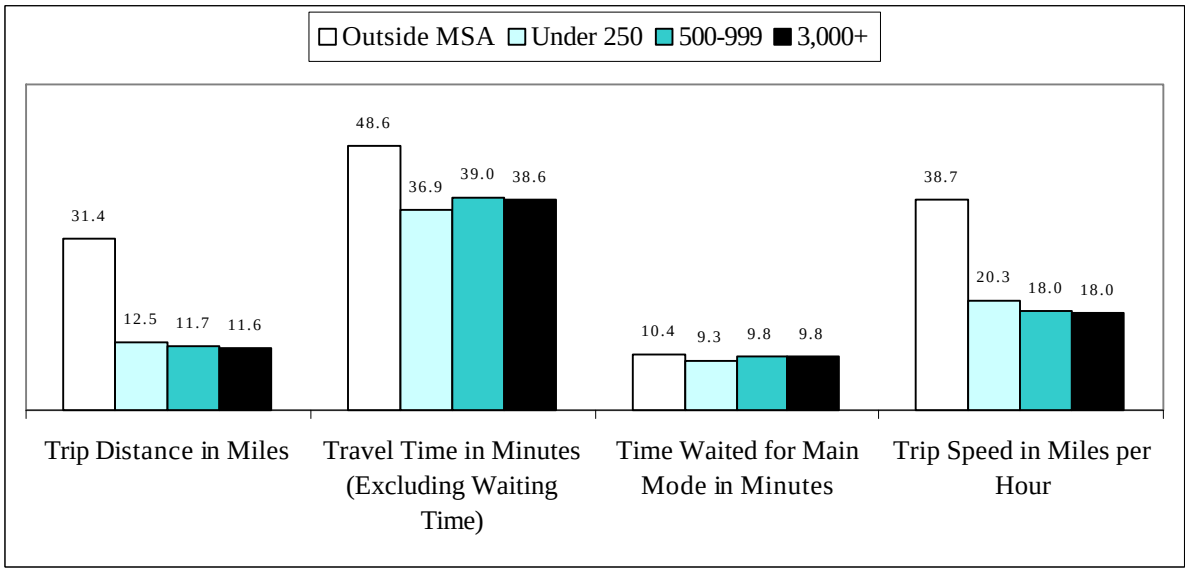
- At the national level, linked transit trips average 12 miles in distance, 39 minutes in travel time (excluding waiting time), 19 miles per hour in travel speed (excluding waiting time), and 10 minutes in waiting time for the main mode.

- At the national level, about 75 percent of linked transit trips are no more than 10 miles in length. About 55 percent are no more than 30 minutes long in duration. About 65 percent are no more than 15 miles per hour in terms of travel speed. And, about 76 percent are no more than 10 minutes in terms of waiting time for the main mode.

- Characteristics of linked transit trips do not show systematic differences across MSA scales. However, they differ systematically across different levels of area density. Linked transit trips decrease in distance, travel time, and travel speed as area density increases.

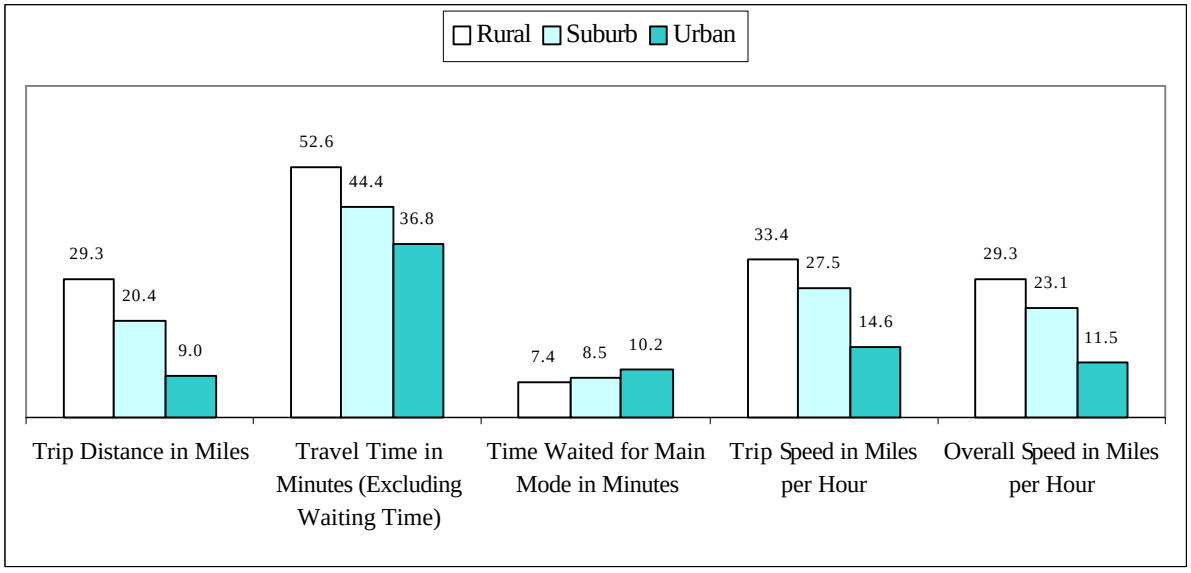
- Waiting time shows a slight increase with area density, which seems to be counter-intuitive because transit services tend to have higher frequencies in areas with higher density than in areas with lower density. It is often believed that higher frequencies result in lower waiting times for transit users. However, it is conceivable that transit users in areas with higher service frequencies may not target their arrivals as well as those transit users in areas with lower service frequencies.

- Population groups considered to have high concentration of public transit users seem to make transit trips that are shorter in distance, shorter in travel time, longer in waiting time, and slower. These include non-drivers, female, not working, non-Whites, Hispanics, people living in households with low income, people living in households with low vehicle ownership, renters, and single-adult households.



Source: Travel Day File.

Figure 4-9. Characteristics of Linked Transit Trips by MSA Scale.



Source: Travel Day File.

Figure 4-10. Characteristics of Linked Transit Trips by Area Density.

Table 4-14. Characteristics of Linked Transit Trips by Personal, Household, and Land Use Characteristics.

Characteristics	Sub-groups	Distance (Miles)			Time (Minutes, Excluding Waiting)			Waiting (Minutes)			Speed (MPH, Excluding Waiting)			Overall Speed (MPH)		
		Bus	Rail	Total	Bus	Rail	Total	Bus	Rail	Total	Bus	Rail	Total	Bus	Rail	Total
Person Age	Under 18	10	10	10	33	37	34	11	9	11	17	16	17	13	13	13
	18-64	11	15	12	38	42	39	11	8	10	17	21	18	13	17	15
	65+	20	12	19	43	40	42	9	8	9	28	18	27	23	15	22
License Status	Driver	16	16	16	42	43	42	8	7	8	23	22	23	19	19	19
	Non-Driver	9	11	9	35	40	36	12	9	11	15	17	16	11	14	12
Gender	Male	14	14	14	40	42	41	10	8	9	21	21	21	16	17	17
	Female	10	14	11	36	41	37	11	8	10	17	20	18	13	17	14
Working Status	Full Time	12	15	13	40	43	41	10	7	9	18	21	19	14	18	16
	Part Time	10	15	12	36	42	38	10	9	9	17	22	19	14	18	15
	Not Working	9	12	10	35	40	36	13	9	12	15	18	16	11	15	12
	Retired	21	11	20	42	42	42	9	12	9	29	16	28	24	12	23
Race	White	14	15	15	38	42	40	8	7	8	23	21	22	18	18	18
	Black	10	13	11	38	40	38	13	8	12	16	19	17	12	16	13
	Others	9	14	11	33	42	37	11	10	11	15	20	17	12	16	14
Ethnicity	Hispanic	7	11	9	33	41	36	13	11	12	14	16	15	10	13	11
	Non-Hispanic	12	15	13	38	42	39	10	7	9	20	21	20	15	18	16
Household Income	Under $15,000	10	12	10	35	40	36	14	10	13	17	18	17	12	15	13
	$15,000-$49,999	12	11	11	38	38	38	9	8	9	19	17	18	15	14	15
	$50,000+	15	18	16	42	45	43	6	6	6	22	24	23	19	21	20
Vehicle Ownership	None	7	10	8	33	38	35	13	9	11	13	16	14	9	13	10
	One	12	14	12	39	43	40	11	8	10	18	19	19	14	16	15
	Two+	21	21	21	46	48	46	6	6	6	28	27	28	25	24	24
Home Ownership	Owner	18	19	18	43	48	44	9	7	8	25	24	24	20	21	20
	Renter	8	11	9	34	39	36	12	8	11	14	18	15	10	15	12
Life Cycle	Single-Adult	7	10	8	31	37	33	10	7	9	14	16	15	11	13	11
	Multi-Adult	14	16	14	40	43	41	11	8	10	20	22	21	16	18	17
Housing Density (Units per Square Mile)	Under 50	26	5	23	47	39	46	4	7	4	33	8	30	31	7	27
	50-250	15	33	19	37	55	41	6	4	6	24	36	28	20	34	25
	250-999	23	24	24	46	52	48	8	7	8	30	28	30	26	25	25
	1,000-1,999	19	26	20	42	50	44	12	9	11	27	31	28	21	27	22
	2,000+	9	12	10	35	40	37	11	8	10	14	18	16	11	15	12
Population Density (Persons per Square Mile)	Under 500	22	22	22	45	54	47	5	6	5	30	24	29	27	22	26
	500-1,999	18	24	20	42	48	43	9	5	8	26	30	27	21	27	23
	2,000-3,999	24	22	23	46	50	47	9	7	8	31	26	30	26	23	25
	4,000-9,999	11	20	13	36	45	38	11	7	10	18	27	20	14	24	16
	10,000+	8	11	9	35	40	37	11	8	10	14	16	15	10	13	12
Employment Density (Jobs per Square Mile at Work)	Under 50	25	57	26	43	83	46	12	9	12	35	41	34	28	37	27
	50-499	12	11	12	34	33	34	8	4	8	21	21	21	17	19	17
	500-1,999	11	20	13	38	52	40	11	9	10	18	24	19	14	20	15
	2,000-9,999	10	14	11	39	38	39	10	6	9	15	22	17	12	19	14
	10,000+	8	15	12	35	43	40	9	7	8	14	21	18	11	18	15
All		12	14	12	38	42	39	11	8	10	19	20	19	15	17	15

Source: Travel Day File, Person File, and Household File.

MARKET SHARES

Introduction

One important aspect of understanding transit markets is public transit's share of the overall travel market. This section presents selected statistics to show the influence of scale, density, and transit dependency on transit's market share.

The market share of public transit within a given population group answers the following question: What proportion of linked person trips by this population group is made on public transit relative to all other modes of passenger transportation? To be precise, let S be the percent market share of public transit within a particular population group, V_T be the number of linked person trips for all purposes this population group makes on public transit, and V_O be the number of linked person trips for all purposes this population group makes on all other modes. The following holds: $S=100V_T/(V_T+V_O)$.

It is important to point out that modal market shares here are defined by the actual mode used for individual trips rather than the usual mode used by a given person. The concept of the usual mode is used in the Census Journey-to-Work data to derive modal splits for commuting.

Effects of Dependency

A number of population groups depend heavily on public transit, i.e., a large proportion of their trips are made on public transit (Table 4-15). At the national level, the largest market shares for public transit are found to be people who use public transit two or more times a week and people who live in households without vehicles. People who use public transit two or more times a week make a quarter of all their person trips on public transit, while people who live in households without vehicles make over one- fifth of all their person trips on public transit. Other population groups that depend highly on public transit include Blacks (7 percent), persons with an annual household income below $15,000 (5 percent), non-licensed drivers (5 percent), and renters (4.6 percent).

Transit dependency, however, is far from uniform across geographical areas. The transit dependency of the seven groups mentioned above is much higher in the largest MSAs or in urban areas, but dramatically lower in smaller areas or areas with lower density. The most frequent users, persons without household vehicles, Blacks, persons with low income, non- licensed drivers, and renters make 27.5 percent, 28.9 percent, 11.4 percent, 11.8 percent, 9.4 percent, and 8.4 percent of their trips on public transit, respectively, in the largest MSAs. These same six groups make 30.4 percent, 31.5 percent, 16.0 percent, 17.0 percent, 18.3 percent, and 13.0 percent of their trips on public transit, respectively, in urban areas. However, Blacks, persons with low income, non-licensed drivers, and renters in rural areas, areas outside MSAs, and the smallest MSAs make no more than the national average percentage of their trips on public transit. In the suburbs, these same four groups make 3.9 percent, 3.4 percent, 2.4 percent, and 2.3 percent of their trips on public transit, respectively.

Effects of MSA Scale and Area Density

The effects of area scale and density can be examined in two different ways. The effects of area scale and density may be examined either independently or simultaneously.

Independent Effects

One way to see the effects of area scale or density is to examine how the degree of transit dependency depends on area scale or area density in Table 4-15. Transit dependency increases dramatically from MSAs with a population between 500,000 to 1 million to the largest MSAs, and from suburbs to urban areas. To illustrate, consider persons without household vehicles and non-licensed drivers. For persons without household vehicles, transit's market share jumps from 13.0 percent in MSAs with a population between 500,000 and 1 million to 28.9 percent in the largest MSAs, and jumps from 10.5 percent in the suburbs to 31.5 percent in urban areas. For non-licensed drivers, transit market share jumps from 2.7 percent to 9.4 percent between MSAs with a population between 500,000 to 1 million and the largest MSAs; it also jumps from 2.4 percent to 18.3 percent from suburbs to urban areas.

Another way to see the separate effects of area scale and area density is to examine how transit market share changes with different levels of area scale or area density. For example, transit market share increases from 0.2 percent outside MSAs to 0.6 percent in the

smallest MSAs, to 0.9 percent in medium-sized MSAs, and to 3.8 percent to the largest MSAs. On the other hand, transit market share increases from 0.2 percent in rural areas to 1.2 percent in the suburbs and to 8.3 percent in urban areas.

Simultaneous Effects

The simultaneous effects of area scale and density on transit market shares are shown in Table 4-16 and Figure 4-11. The effects of area scale are much larger for areas with higher density than for areas with lower density. For example, transit market share for the suburbs is around 0.4-0.6 percent between the smallest to MSAs with a population of 1 to 3 million, and then increases to 1.6 percent in the largest MSAs. On the other hand, transit market share for urban areas jumps from less than one-tenth of a percent outside MSAs to almost 10 percent in the largest MSAs. Similarly, the effect of area density is much greater for larger areas than smaller areas.

For areas outside MSAs, the effects of area density may even be negative on transit market share. In fact, transit market share is 0.2 percent in rural areas, 0.3 percent in small towns, 0.2 percent in second cities, and only 0.1 percent in urban areas. Similarly, the effects of area scale may be minimal or even negative on transit market share for rural areas and small towns.

Table 4-15. Summary of Public Transit Market Share (Percent).

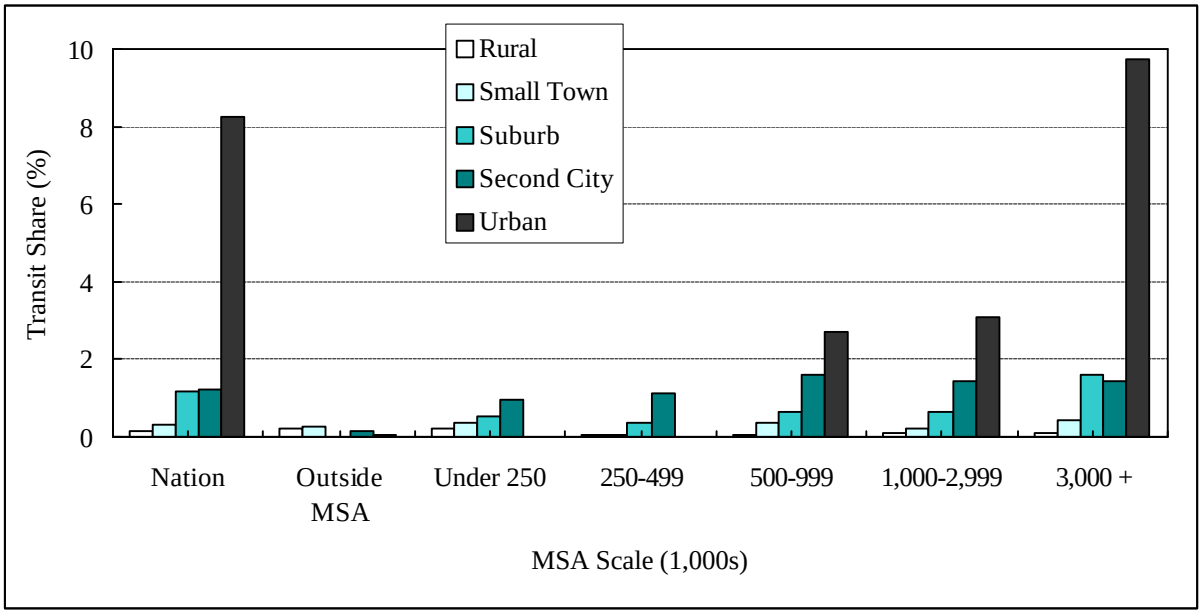
Characteristics	Nation	MSA Scale (1,000s)				Area Density		
		Outside MSA	Under 250	500-999	3,000+	Rural	Suburb	Urban
Use Transit Two or More Times a Week in the Two Months before Interview	24.8	5.5	15.9	19.8	27.5	2.8	17.1	30.5
Living in Zero-Vehicle Households	21.0	1.8	9.6	13.0	28.9	1.0	10.5	31.5
Black	7.0	0.1	1.8	3.2	11.4	0.0	3.9	16.0
Medical/Dental Trips	5.0	0.7	1.1	1.1	9.0	NA	2.1	21.4
Household Income < $15,000	5.0	0.3	1.6	2.2	11.8	0.1	3.4	17.0
Within One Block of Transit Stop	5.0	0.8	1.2	2.3	8.0	0.1	2.0	10.7
Non-Licensed Driver	4.9	0.6	1.4	2.7	9.4	0.4	2.4	18.4
Renter	4.6	0.4	1.1	2.0	8.4	0.2	2.3	13.0
Living in Single-Adult Households	3.4	0.3	1.4	1.5	6.7	0.2	1.5	12.2
Hispanic	3.2	0.4	1.2	0.5	5.4	0.5	1.0	8.7
Not Working in the Week before Interview	3.0	0.3	0.8	1.6	6.0	0.2	1.1	12.4
Female	2.0	0.2	0.5	1.1	4.1	0.2	1.2	9.2
Person Age 18-64	1.9	0.1	0.6	0.9	3.9	0.1	1.2	8.4
All	1.8	0.2	0.6	0.9	3.8	0.2	1.2	8.3

Source: Appendix A. NA represents no sampling.

Table 4-16. Influence of MSA Scale and Area Density on Transit Market Share.

MSA Scale (1,000s)	Area Density					Nation
	Rural	Small Town	Suburb	Second City	Urban	
Outside MSA	0.2	0.3	NA	0.2	0.1	0.2
Under 250	0.2	0.4	0.5	0.9	NA	0.6
250-499	0.1	0.1	0.4	1.1	NA	0.5
500-999	0.1	0.4	0.6	1.6	2.7	0.9
1,000-2,999	0.1	0.2	0.6	1.5	3.1	1.0
3,000 +	0.1	0.4	1.6	1.4	9.7	3.8
Nation	0.2%	0.3%	1.2%	1.2%	8.3%	1.8%

Source: Travel Day File. NA indicates that transit trips were not sampled in the 1995 NPTS.



Source: Table 4-16.

Figure 4-11. Influence of MSA Scale and Area Density on Transit Market Share.

Summary

This section has presented selected results on public transit's share of the overall travel market. Overall, the results show overwhelming effects of area scale, area density, and transit dependency on transit market share. Some of the results include:

- Public transit in America captures 1.8 percent of all personal trips. This amounts to 6,666 million linked transit trips and 8,327 million unlinked transit trips.

- The largest market shares are found to be comprised of people who use public transit two or more times a week and people who live in households without vehicles. People who use public transit two or more times a week make a quarter of all their person trips on public transit, while people who live in households without vehicles make over one-fifth of all their person trips on public transit. Transit market share for these two groups remains relatively high at 17.1 percent and 10.5 percent in the suburbs and 15.9 percent and 9.6 percent in the smallest MSAs (with a population under 250,000), respectively.

- Transit's market share drops dramatically between urban areas and suburban areas and between the largest MSAs (with at least 3 million in population) and medium-sized MSAs (with 500,000-1 million in population). Transit share falls from 8.3 percent in urban areas to 1.2 percent in suburbs and from 3.8 percent in the largest MSAs to 0.9 percent in medium-sized MSAs.

- The effects of area density on transit market share are much greater in larger MSAs than in smaller MSAs. Similarly, the effects of area scale on transit market share are much larger in areas with higher density than in areas with lower density.

- Public transit does not have a significantly large market share among those who live in close proximity to public transit.

SUB-MARKETS

Introduction

Another important aspect of understanding public transit markets is the proportion of public transit trips made by various population groups. A population group that makes a large share of its trips on public transit is only operationally significant when it captures a reasonably large proportion of all public transit trips. This section presents selected results on the distribution of public transit trips among various population groups, geographical areas, and between bus and rail modes.

Sub-Markets by Population Groups

Table 4-17 presents the proportion of public transit trips made by each of the population groups listed in the first column for a given level of MSA scale or area density. The second column gives the size of public transit markets represented nationwide by each of the population groups in the first column. The next four columns give the size of public transit markets represented by each population group for a given MSA scale. The last three columns give public transit markets within each of these population groups for given levels of area density. The last row gives the nationwide markets represented by different levels of MSA scales and different levels of area density.

For example, persons without household vehicles make half of all public transit trips in the largest MSAs, with the other half made by persons with household vehicles in the largest MSAs. Similarly, Blacks make 30 percent of all public transit trips in the suburbs, with the other 70 percent being made by other racial groups in the suburbs.

The ranking of the population groups considered differs significantly between public transit's share of the overall travel market and the proportion of transit trips captured by each population group. At the national level, the most frequent users represent the largest market, capturing 84 percent of all public transit trips. Persons age 18-64 represent the second largest market, capturing almost three-quarters of all transit trips. Following these groups are renters, persons living within one block of a transit stop, females, non-licensed drivers, persons without household vehicles, Blacks, and persons with low incomes, who capture 62 percent, 59 percent, 57 percent, 56 percent, 47 percent, 44

percent, and 32 percent of al public transit trips, respectively.

Some of these sub-markets are relatively stable across different levels of MSA scale or area density, while others change significantly. Dramatic changes are found among persons without vehicles and Blacks. For example, Blacks make about half of public transit trips in the largest MSAs or in urban areas, while they make less than five percent of public transit trips in rural areas or outside MSAs. Relatively small changes are found among the most frequent users, non-licensed drivers, and females. For example, non-licensed drivers make 40 to 60 percent of all public transit trips across different geographical areas.

Sub-Markets by Geographical Areas

Urban areas capture 65.9 percent of all public transit trips (Table 4-18), of which 60.7 percent are captured by urban areas in the largest MSAs and less than 4.5 percent are captured by urban areas of the second largest MSAs. Second cities capture 12.3 percent of all public transit trips, of which 4.5 percent occur in second cities in the largest MSAs and about 2 percent occur in second cities in each of the other categories of MSAs. Suburbs capture 16 percent of all public transit trips, of which over 12 percent occur in suburbs in the largest MSAs. Small towns capture 4 percent of all public transit trips, while rural areas capture only 2 percent of all public transit trips.

In terms of MSA scale, the largest MSAs capture 79 percent of public transit trips. Of this percentage, urban areas, suburbs, and second cities in the largest MSAs capture 60.7 percent, 4.5 percent, and 12.5 percent, respectively. MSAs with a population between 1 and 3 million only capture about 10 percent of all public transit trips. Of this percentage, urban areas, second cities, and suburbs capture 4.5 percent, 2.4 percent, and 2.4 percent, respectively. Most of the trips captured by the small MSAs are made in their second cities. Most trips captured outside MSAs are made in rural areas and small towns.

Sub-Markets by Mode

Buses capture 68 percent of all public transit trips in the nation (Table 4-19). This percentage varies across personal, household, and geographic characteristics. In suburbs, for example, Whites make 58 percent of their transit trips by bus, versus 82 percent for Blacks. In metropolitan areas with at least 3 million people, people with household incomes over $50,000 make 43 percent of their transit trips by bus, versus 75 percent for people with household incomes under $15,000.

Summary

- Almost 90 percent of transit trips nationwide are made in MSAs with a population of at least 1 million. On the other hand, two-thirds of transit trips are made in urban areas and another one-sixth are made in suburbs.

- Population groups representing half of the transit market include: people who use transit two or more times a week, persons age 18 to 64, renters, people who live within one block of a transit stop, females, and non-licensed drivers.

- Some of the sub-markets are relatively stable across geographical areas. Examples include frequent users and non-licensed drivers. People who use public transit two or more times a week make 84 percent of all public transit trips nationwide. This percentage remains relatively stable in all metropolitan areas (regardless of size) and in urban areas. People who are not licensed to drive make 56 percent of all public transit trips nationwide. This group's share of transit trips remains around 50 percent in rural areas and outside MSAs.

- Some of the sub-markets are relatively unstable across geographical areas. Examples include Blacks and people with no household vehicles. Blacks make 44 percent of all public transit trips nationwide. This percentage drops to below five percent in rural areas and in areas outside MSAs. People who live in households without vehicles make 47 percent of all public transit trips nationwide. This percentage increases to 60 percent in urban areas, but drops to about 10 percent in rural areas, small towns, or suburban areas.

Table 4-17. Summary of Public Transit Sub-Markets (Percent).

Characteristics	Nation	MSA Scale (1,000s)				Density		
		Outside MSA	Under 250	500-999	3,000+	Rural	Suburb	Urban
Use Transit Two or More Times a Week in the Two Months before Interview	84	63	91	84	85	60	72	87
Person Age 18-64	74	39	74	68	76	41	77	76
Renter	62	32	41	53	66	14	41	71
Within One Block of Transit Stop	59	52	42	66	59	8	42	63
Female	57	53	39	64	56	51	53	58
Non-Licensed Driver	56	51	40	60	56	50	38	60
Living in Zero-Vehicle Households	47	18	25	35	50	11	11	60
Black	44	4	19	37	46	1	30	51
Household Income < $15,000	32	21	33	32	30	10	15	36
Living in Single-Adult Households	31	21	40	26	29	14	18	35
Unemployed in the Week before Interview	27	27	21	30	27	25	15	29
Hispanic	17	10	13	6	19	17	8	21
All	100	3	3	4	79	2	16	66

Source: Appendix D. NA represents no sampling.

Table 4-18. Public Transit Sub-Markets by MSA Scale and Area Density.

MSA Scale (1,000s)	Area Density					Total
	Rural	Small Town	Suburb	Second City	Urban	
Outside MSA	1.4	1.0	NA	0.1	0.0	2.6
Under 250	0.2	0.5	0.1	1.9	NA	2.7
250-499	0.1	0.1	0.3	1.6	NA	2.0
500-999	0.0	0.5	0.9	1.9	0.8	4.1
1,000-2,999	0.1	0.4	2.4	2.4	4.4	9.8
3,000 +	0.1	1.3	12.5	4.5	60.7	79.0
Nation	1.9	3.7	16.2	12.3	65.9	100.0

Source: Travel Day File. NA means no trips sampled in the 1995 NPTS.

Table 4-19. Percent Transit Trips Made on Bus by Personal, Household, and Geographic Characteristics

Characte-ristics	Sub-groups	Nation	MSA Scale (1,000s)				Area Density		
			Outside MSA	Under 250	500-999	3,000+	Rural	Suburb	Urban
Person Age	Under 18	85	100	100	100	80	100	85	81
	18-64	63	98	95	98	55	87	62	57
	65+	68	92	95	98	61	85	67	64
Licensure Status	Driver	56	84	92	96	46	92	99	53
	Non-Driver	78	100	100	100	73	100	98	67
Gender	Male	62	89	92	99	53	86	59	56
	Female	73	95	100	98	67	85	74	69
Working Status	Full Time	55	87	89	95	47	70	50	51
	Part Time	70	100	100	100	63	99	79	63
	Not Working	73	86	100	100	67	76	84	67
	Retired	91	88	100	99	89	65	94	91
Race	White	63	92	98	100	51	85	58	56
	Black	77	100	100	100	72	100	82	73
	Others	60	100	78	100	54	100	78	52
Ethnicity	Hispanic	62	97	100	98	97	100	91	54
	Non-Hispanic	70	92	95	100	83	79	88	66
Household Income	Under $15,000	82	100	100	100	75	100	94	77
	$15,000-$49,999	68	99	100	99	61	99	83	60
	$50,000+	50	58	94	90	43	60	46	45
Vehicle Ownership	None	68	100	100	100	62	100	94	63
	One	69	99	100	98	61	98	67	64
	Two+	69	87	88	96	59	80	60	68
Home Ownership	Owner	71	89	92	97	62	83	63	69
	Renter	66	100	100	100	60	100	71	62
Life Cycle	Single-Adult	72	100	100	96	63	100	80	67
	Multi-Adult	67	90	92	99	60	83	64	62
All		68	92	95	98	61	85	67	64

Source: Travel Day File, Person File, and Household File.

PROPENSITY FOR TRANSIT USE

Introduction

The implications for transit planning, marketing, and operations can be very different with population groups that capture the same proportion of public transit trips but represent different shares in the population. For example, Whites and Blacks make about the same proportion of public transit trips nationwide (around 43 percent). However, Whites represent about 76 percent of the population, while Blacks only represent about 16 percent of the population. Such differences among population groups reflect differences in these groups' propensity for transit use.

The propensity for transit use by a given population group measures its level of transit usage, taking into account the number of persons from this population group who perceive public transit to be available. Equivalently, it measures the per capita use of public transit for a given population group relative to the per capita use of public transit nationwide. It is calculated by dividing the proportion of public transit trips a given population group makes by the proportion that group represents of all persons who perceive public transit to be available.

A few hypothetical examples may help understand the propensity for transit use by population groups who perceive public transit to be available. A value of 1.0 for a population group would mean that persons in this group make as many public transit trips per person as the national average. A value of 0.5 for the same population group would mean that persons in this group make half as many public transit trips as the national average. Finally, a value of 2.5 would mean that persons in the group make two and a half times as many public transit trips as the national average.

Only the number of persons who perceive public transit to be available is used in computing propensity for transit use because using all persons would result in an overestimation of the true levels of propensity for transit use, in general. Furthermore, using all persons in computing propensity for transit use would result in biases across population groups. Such biases occur because larger proportions of certain groups perceive public transit to be available than other groups. For example, about 83 percent of persons without household vehicles perceive public transit to be available, while only 58 percent of persons with two or more household vehicles perceive public transit to be available. Consequently, using all persons would underestimate the propensity for transit use by population groups that have a smaller proportion perceiving public transit to be available than other groups. In the first example discussed in this section, the propensity for transit use by Whites would be underestimated, relative to that for Blacks.

Effects of Dependency

Those population groups that most heavily depend on public transit tend to have higher levels of propensity for transit use (Table 4-20). At the national level, persons who live in households without vehicles have the highest propensity for transit use. In fact, persons without household vehicles have a propensity of almost 6.0, meaning that they make 6 times as many public transit trips as the national average. Other population groups that show high values of propensity include Blacks (2.7), persons with an annual household income below $15,000 (2.3), non-licensed drivers (2.0), and renters (2.0).

The propensity for transit use among the most frequent users is 1.9, a low value compared to the transit market share within this population group. This low value results from the fact that all of the most frequent users perceive public transit to be available because they are users of public transit, while only a proportion of the other population groups in Table 4-20 perceive public transit to be available.

Propensity for transit use, however, is far from uniform across geographical areas. The propensity for transit use by the six groups mentioned above is much higher in the largest MSAs or in urban areas but dramatically lower in smaller areas or areas with lower density. The propensity for transit use by persons without household vehicles, Blacks, persons with low income, non-licensed drivers, and renters is 7.2, 3.6, 3.6, 2.9, and 3.0, respectively, in the largest MSAs, and is 7.8, 4.5, 4.6, 3.9, and 4.3, respectively, in urban areas. Except persons without household vehicles, the propensity for transit use by Blacks, persons with low income, non-licensed drivers, and renters in rural areas, areas outside MSAs, and the smallest MSAs is less than 1.0, the national average. The propensity for transit use by persons without household vehicles is 1.8 outside MSAs, 2.9 in the smallest MSAs, and 1.0 in rural

areas. Even in the suburbs, renters and non- licensed drivers make fewer public transit trips per capita than the national average.

Effects of MSA Scale and Area Density

As in the case with transit market share, the effects of area scale and density on propensity for transit use can also be examined at two levels. At one level, one may examine the effects of area scale and density independently. At the other level, the effects of area scale and density may be examined simultaneously.

Independent Effects

One way to see the independent effects of area scale or area density is to examine how propensity for transit use by transit-dependent groups depends on area scale or area density in Table 4-20. Propensity for transit use increases between MSAs with a population between 500,000 to 1 million to the largest MSAs and from suburbs to urban areas. To illustrate, consider again persons without household vehicles and non-licensed drivers. For persons without household vehicles, their propensity for transit use jumps from 3.2 in MSAs with a population between 500,000 and 1 million to 7.2 in the largest MSAs, and jumps from 2.4 in suburbs to 7.8 in urban areas. For non- licensed drivers, their propensity for transit use jumps from 1.1 in MSAs with a population between 500,000 to 1 million to 2.9 in the largest MSAs, and jumps from 0.8 in suburbs to 4.3 in urban areas.

Another way to see the separate effects of area scale or area density is to examine how propensity for transit use changes with different levels of area scale or area density for all population groups combined. For example, propensity for transit use stays relatively stable around 0.4 through the medium-sized MSAs and increases to 1.6 in the largest MSAs. On the other hand, propensity for transit use increases from 0.4 in rural areas to 0.5 in the suburbs and to 2.6 in urban areas.

Simultaneous Effects

The simultaneous effects of area scale and density on propensity for transit use are shown in Table 4-21 and Figure 4-12. Outside rural areas or small towns, the effects of area scale is much larger for areas with higher density than for areas with lower density. For example, propensity for transit use for suburbs increases from 0.2 in the smallest MSAs, to 0.3 in the medium-sized MSAs, and to 0.7 in the largest MSAs. On the other hand, propensity for transit use for urban areas jumps from less than 0.1 outside MSAs to 3.0 in the largest MSAs. Similarly, the effects of area density is much greater for larger areas than smaller areas within MSAs.

Outside MSAs, the effects of area density may even be negative on propensity for transit use. In fact, propensity for transit use is 0.6 in rural areas, 0.4 in small towns, and drops below 0.2 in suburbs, second cities, and urban areas. Similarly, the effects of area scale may be minimal or even negative on propensity for transit use for rural areas and small towns.

Summary

This section has presented selected results on propensity for transit use. Some of the highlights of the results include:

- People who live in households without vehicles have the largest propensity for transit use among the population groups considered. Nationwide, they make 6 times as many transit trips per capita as the national average. In urban areas or the largest MSAs (with a population of at least 3 million), they make around seven and a half times as many transit trips as the national average. Their propensity for transit use remains relatively high even in suburbs (2.37), the smallest MSAs (2.88), or outside MSAs (1.77).

- Propensity for transit use drops dramatically between urban areas and suburbs and between the largest MSAs (with at least 3 million persons) and medium-sized MSAs (with 500,000-1 million persons). It falls from 2.6 in urban areas to 0.5 in suburbs and from 1.6 in the largest MSAs to 0.5 in medium-sized MSAs.

- People who live within one block of a transit stop do not have a significantly large propensity for transit use. In fact, their propensity is 1.7, almost the same as that of people in single-adult households. This may have implications to policies that encourage residential development near public transit stops.

Table 4-20. Summary of Propensity for Transit Use.

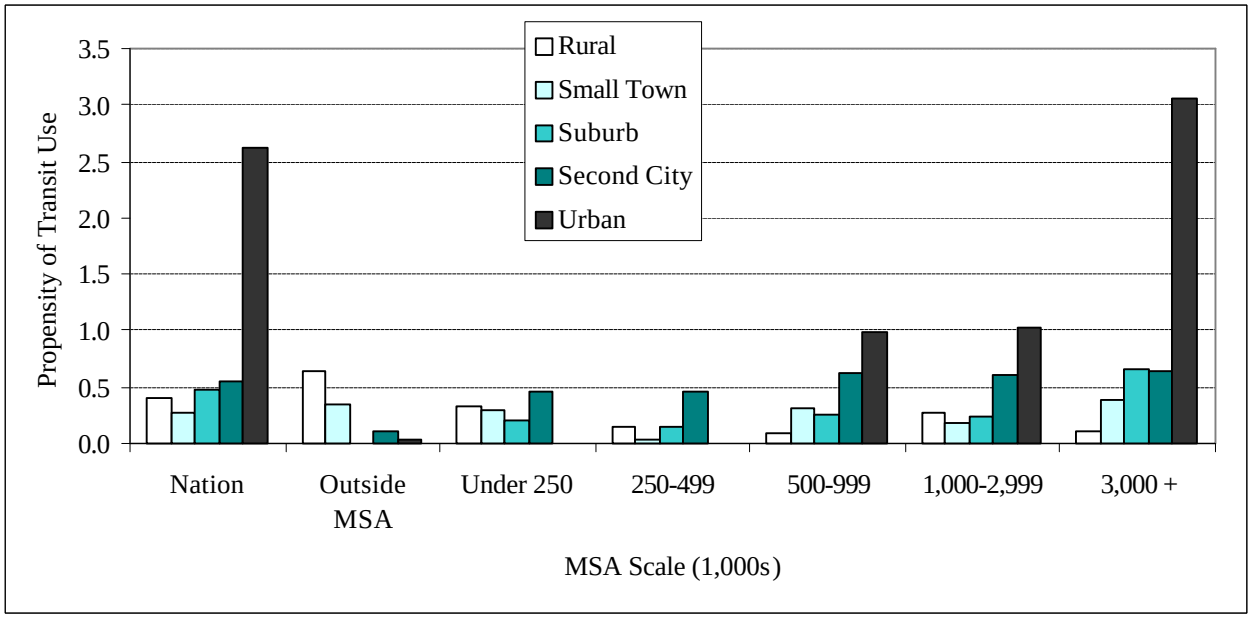
Characteristics	Nation	MSA Scale (1,000s)				Density		
		Outside MSA	Under 250	500-999	3,000+	Rural	Suburb	Urban
Living in Zero-Vehicle Households	5.9	1.8	2.9	3.2	7.2	1.0	2.4	7.8
Black	2.7	0.4	0.9	1.2	3.6	0.1	1.4	4.5
Household Income < $15,000	2.3	0.5	0.8	0.9	3.6	0.3	1.1	4.6
Renter	2.0	0.6	0.6	0.9	3.0	0.3	0.9	3.9
Non-Licensed Driver	2.0	0.8	0.7	1.1	2.9	0.7	0.8	4.3
Use Transit Two or More Times a Week in the Two Months before Interview	1.9	0.5	1.4	1.6	2.0	0.2	1.3	2.2
Within One Block of Transit Stop	1.7	0.3	0.5	0.8	2.6	0.0	0.7	3.4
Living in Single-Adult Households	1.7	0.5	0.9	0.6	2.5	0.4	0.6	3.8
Hispanic	1.4	0.6	0.8	0.2	2.0	0.9	0.4	2.7
Unemployed in the Week before Interview	1.4	0.5	0.4	0.7	2.1	0.4	0.4	3.3
Person Age 18-64	1.1	0.2	0.4	0.5	1.8	0.3	0.5	2.9
Female	1.1	0.4	0.3	0.6	1.7	0.4	0.5	2.9
All	1.0	0.4	0.4	0.5	1.6	0.4	0.5	2.6

Source: Appendix C. NA represents no sampling.

Table 4-21. Influence of MSA Scale and Area Density on Propensity for Transit Use.

MSA Scale (1,000s)	Area Density					Total
	Rural	Small Town	Suburb	Second City	Urban	
Outside MSA	0.6	0.4	0.0	0.1	0.0	0.4
Under 250	0.3	0.3	0.2	0.5	0.0	0.4
250-499	0.1	0.0	0.2	0.5	0.0	0.3
500-999	0.1	0.3	0.3	0.6	1.0	0.5
1,000-2,999	0.3	0.2	0.2	0.6	1.0	0.5
3,000 +	0.1	0.4	0.7	0.6	3.1	1.6
Nation	0.4	0.3	0.5	0.5	2.6	1.0

Source: Travel Day File and Person File.



Source. Table 4-21.

Figure 4-12. Influence of MSA Scale and Area Density on Propensity for Transit Use.

MARKET PENETRATION

Introduction

The transit industry has had relatively good national data on transit mode share, which is now 1.8 percent for all non-intercity person trips. What is less well known within the transit industry is an estimate of the share of the population that are users of transit on any regular basis. This share represents a potential constituency for transit interests and a base market from which transit can build. As transit increases its service to new destinations such as airports, sports stadiums, malls, and convention centers, as well as continues to expand into suburbs, it increases the exposure of new potential customers to transit services. A richer understanding of the exposure of the population to transit services can help in planning strategies for service delivery and marketing.

The 1995 NPTS asked persons who said public transit is available to them about their frequency of transit use during the two months before the interview. This information is used to estimate two other data items. One is the number of users and their share in the general population in a typical two-month period. The other is the conversion factors that are measured in terms of the number of linked and unlinked trips per user. Information on transit penetration and conversion factors can be used by local agencies to estimate the number of transit users in their area for a given period of time.

Tables 4-22 and 4-23 show such information across various levels of MSA scale and area density, respectively. In each table, the bottom row shows the information at the national level. The first column lists the various levels of MSA scale or area density. The next two columns show the information about market penetration, presenting both the number of users and their share in the population. The last two columns show the information about conversion factors, presenting both linked trips per user and unlinked trips per user. Results on market penetration and conversion factors are discussed separately below.

Penetration Rate

Nationwide, over 28 million people use public transit one or more times during a typical two-month period (Table 4-22). This represents 11.6 percent of the population. Public transit's market penetration varies significantly across geographical areas. Across different levels of population scale, transit's market penetration rate is 1.4 percent outside MSAs, 5.4 percent in the smallest MSAs, 6.1 percent in MSAs with a population between 250,000 and 1 million, 10.0 percent in MSAs with a population between 1 and 3 million, and 21.0 percent in the largest MSAs. The corresponding numbers of users are around 660,000 outside MSAs, a little over 1 million in areas with a population between 250,000 and 1 million, over 4 million in MSAs with a population between 1 and 3 million, and almost 20 million in the largest MSAs.

Across different levels of area density, transit's market penetration rate is 0.8 percent in rural areas, 2.7 percent in small towns, 12.5 percent in suburbs, 11.5 percent in second cites, and 36.5 percent in urban areas. The corresponding number of users is 380,000 in rural areas, 1.4 million in small towns, 7.4 million in the suburbs, 4.8 million in second cities, and 13.8 million in urban areas.

Conversion Factors

At the national level, people make about 17 linked trips per capita or equivalently 26 unlinked trips per capita during a typical two-month period. These conversion factors typically increase with the scale of an MSA or the level of area density. For example, the conversion factor in terms of unlinked trips per user increases from 4.1 outside MSAs, to about 10.9 in MSAs with a population under 500,000, to about 16 in MSAs with a population between 500,000 and 3 million, and to 31.2 in the largest MSAs. The increases in the conversion factors with area density is even more dramatic than the increases with MSA scale.

Summary

Nationally, over 28 million people use public transit in a typical two-month period. This number is much larger than the 6 million who use public transit at least once on a typical weekday (APTA, 1997). If both numbers are correct, the large difference between them indicates high turnover rates among public transit riders. The large difference may also mean a large pool of infrequent users in a two-month period, most of whom do not use transit on a given weekday.

Table 4-22. Penetration Rate and Conversion Factors for a Two-Month Period by MSA Scale.

MSA Scale (1,000s)	Market Penetration		Conversion Factors	
	Number of Users	Share of Population	Linked Trips per User	Unlinked Trips per User
Outside MSA	663,115	1.4%	3.2	4.1
Under 250	1,009,910	5.4%	9.0	10.9
250-499	1,048,253	6.1%	6.9	11.5
500-999	1,277,698	6.4%	11.2	17.2
1,000-2,999	4,136,286	10.0%	10.6	16.1
3,000+	19,929,540	21.0%	20.5	31.2
Nation	28,064,802	11.6%	17.2	26.2

Source: Person File, Travel Day File, and Segmented File.

Table 4-23. Market Penetration and Conversion Factors for a Two-Month Period by Area Density.

Area Density	Penetration Rate		Conversion Factors	
	Number of Users	Share of Population	Linked Trips per User	Unlinked Trips per User
Rural	380,067	0.8%	1.4	1.4
Small Town	1,431,792	2.7%	2.3	3.0
Suburb	7,391,188	12.5%	10.4	15.0
Second City	4,827,054	11.5%	10.6	17.4
Urban	13,828,863	36.5%	25.1	37.9
Nation	28,064,799	11.6%	17.2	26.2

Source: Person File, Travel Day File, and Segmented File.

SUMMARY

This chapter has presented findings from the 1995 NPTS about public transit in America from eight perspectives. Some of the highlights of the results include:

- Overall, the public is positive about public transit and its services. Over 60 percent of a sample of 476 people rated local bus services as being excellent or good. An equal percent of a sample of 212 persons rated local rail services excellent or good. Among eight problem areas related to using public transit services, the biggest problem has only a 29 percent share of the population indicating that it is a "big" problem. In addition, people do not use transit for commuting most likely because of their dislike of public transit, while people who use transit for all purposes most likely do so because it is the most convenient way for them to get around.

- About 40 percent of Americans perceive that public transit is available in the city or town in which they live, while half perceive that they live within a quarter mile of the nearest transit stop.

- The extent of transferring is lower than expected. About 79 percent of all linked public transit trips do not involve transfers. About 18 percent of them involve one transfer. Only three percent involve two or more transfers.

- Some of the characteristics of linked public transit trips include: 12.4 miles in distance, 38.8 minutes of travel time, 9.8 minutes of waiting time, and an overall speed of 15.3 miles per hour.

- Some of the largest sub-markets include: people who use transit two or more times a week (make 84 percent of all public transit trips); renters (make 62 percent of all public transit trips); and persons who live in households without vehicles (make 47 percent of all public transit trips).

- Public transit's market share and the propensity for transit use are highly dependent on the population scale of an area, the population density of an area, and socio-economic dependency on public transit.

- Over 28 million people, or 11.6 percent of the nation's population, use public transit at least once in a typical two-month period.

CHAPTER 5

IMPLICATIONS

INTRODUCTION

Analysis of the 1995 NPTS provides a wealth of information for the transit planner and policy maker. A careful review will refine perspectives and hone the understanding of the reader regarding the characteristics of the transit-using population.

As indicated earlier, most of the information is restricted to an analysis of the 1995 data and, as such, does not provide trend analysis. Subsequent materials may address trends in instances when it is believed that the different survey methodologies still will allow meaningful trend comparisons.

This chapter is arranged by perceived significance of the findings in the reviewers' eyes. Thus, it does not parallel the earlier part of this report but rather synthesizes the finding into some hopefully useful insights about public transit.

TRANSIT USE VARIES DRAMATICALLY ACROSS CONTEXTS

The 1995 NPTS data verify the significance of the impact of various factors on transit use. Area density, frequency of usage, auto availability, driver's license status, and income are extremely powerful factors in understanding transit use. To each individual that may be dependent on transit, transit becomes a very important means of transportation; however, at the local level, transit's significance in the transportation system varies dramatically depending on the context. Transit captures a relatively large travel market in some of our largest urban areas, like New York and Chicago, but becomes an insignificant component of the travel networks' capacity in many of our suburban or smaller urban areas.

Clearly, aggregate data are interesting but most certainly not uniformly relevant in areas across the country that are significantly different in terms of their travel demand characteristics and travel supply networks. Thus, the levels of investment and planning attention paid to transit might legitimately vary significantly across contexts. Even in aggregate at the urban area level, the share of trips on transit can vary by more than an order of magnitude between urban areas.

Transit mode share in urban areas larger than 3 million persons is 3.8 percent, while for urban areas smaller than 250,000 it averages 0.6 percent, and it is 0.2 percent outside metropolitan statistical areas. Thus, the range for markets, objectives, and impacts of transit can vary significantly across urban and non-urban contexts as well. The market for transit services is not equal and the investments, services, and policy commitments need not be the same either.

STRONGLY DEPENDENT ON CAPTIVE TRAVELERS

The transit market is strongly shaped by the captive rider. While the concept of captivity is variously interpreted, those without licenses and those in zero-vehicle households continue to be a dominant and critical transit market. In fact, captivity defined in this way captures almost 70 percent of all linked transit trips, while they represent only 26 percent of the general population five years or older, 30 percent of those who perceive public transit to be available, and 39 percent of those who use public transit at least once in a typical two-month period. In the older metropolitan areas with rail services, captivity represents an even higher share of users. For example, captivity as defined above represents as high as 58 percent of all unlinked transit

trips in Chicago based on a customer satisfaction survey of CTA users in 1995 (Northwest Research Group, Inc., 1997)

Furthermore, the trends in transit ridership have been tied to these segments and as they have declined over the years so has the share of travel on transit. The decline of the captive market, no doubt partially due to economic growth, the changing age profile of the population, and increasing availability and affordability of automobiles, has resulted in transit needing to replace lost riders with choice travelers. While transit has made some headway in that area, the consequence of declining transit dependency has resulted in generally flat ridership levels for transit and declining mode shares. Transit has not thrived as a mode of choice.

While this finding supports the value of transit as a social investment that provides economic and quality of life benefits for captive users, it also reinforces the significant challenges that exist if transit is to become a more significant mover of people. The ability to attract choice travelers will determine whether or not transit travel shares nationwide continue to decline or whether transit can become a more significant component of the transportation system in the future.

Having acknowledged the importance of transit dependency to transit use and specifically the fact that zero-vehicle households are major sources of transit consumers, it should be noted that we appear to be near or at saturation with respect to auto ownership per licensed driver and auto ownership per household. If these trends are sustained near or at saturation, it may bode well for transit going forward by suggesting that the decline of the transit dependent ranks may have stabilized. If this market stabilizes, then there may be an opportunity for transit use to grow with increasing choice ridership.

DENSITY AND SCALE ARE IMPORTANT DETERMINANTS OF TRANSIT USE

Over the years there have been numerous studies that point out the strong relationship between density and transit use. Density, at both the origin and destination ends, affords a higher level of service and, hence, enables transit to be more attractive. Density is often associated with other characteristics such as pay parking, lower income, and urban environments with sidewalks, that tend to be associated with higher transit use. The 1995 NPTS data confirm the relationship between density and transit use. As larger shares of the population and employment moved to suburban subdivisions and office parks and strip development the transit industry has tried to accommodate these development patterns with neighborhood circulators, park-n-ride services, timed transfer systems, and other services designed to try and meet the travel needs of the dispersed population. While these may be helping sustain ridership levels, the importance of density has not been ameliorated by service design or technical innovation. Density enables quality services and implicitly provides the urban environment that enhances the competitive position of transit. We have not found or implemented a substitute for high density.

The NPTS data also make it clear that there is nearly as powerful a relationship between urban area size and transit use. The issue of urban area size, independent of density, has received less attention in the research literature. Size can support a larger network of service to provide accessibility by transit to a larger range of activities. Size may also be correlated with parking availability and cost, hours of available service, service frequency, and other factors that support transit use. However, size appears to be important independently of density and perhaps independent of some other factors known to influence transit use. The size of urban areas is an important factor in understanding transit use. Larger areas can support transit better that smaller areas.

TRANSFERRING

The importance of transferring between public transit vehicles has received increased attention over the past few years. This attention on intermodalism is symbolized by the passage of the Intermodal Surface Transportation Efficiency Act, but derives from a desire to effectively utilize all components of the transportation system in a manner that is responsive to traveler needs. Understanding transferring is typically difficult as the quality of data on transferring is limited by the difficulty in both posing questions about transferring and having respondents clearly communicate transfer activities. The 1995 NPTS provides an interesting profile of transfer behavior for public transit users. The data indicate that 79 percent of transit trips do not involve a transfer between public

transit vehicles, 18 percent involve one transfer, and 3 percent involve two or more transfers. Not surprisingly, transferring is more common in larger, more urban, more transit intensive environments.

This limited extent of transferring seems to be consistent with public attitudes. Transferring does not seem to be a big problem relative to other problem areas people face in using public transit. The results indicate that "time and aggravation with transfers" is among those areas with the lowest proportions indicating a big problem. In contrast, worrying about crime on public transit has a much larger proportion indicating this to be a big problem.

However, the transfer rate suggested by the 1995 NPTS does seem to be low in the largest metropolitan areas.

CUSTOMER SATISFACTION

Customer satisfaction is increasingly on the mind of transit agencies as they try to increase transit ridership and maintain transit's share of the overall travel market. Overall, the public seems to be satisfied with local public transit in America.

While knowing that the public is happy with public transit is important, knowing the reasons why people are using public transit is more interesting. The public has a strong consensus about why they use public transit in general. In order of significance, the most important reasons are: it is the most convenient way for them, it costs less than driving, they do not have access to a car, it avoids the stress of driving on congested roads, it is better for the environment, it avoids buying a car, they do not drive or do not like to drive, or it is faster than a private vehicle.

The public, however, does not have strong consensus about why they do not use public transit to travel to work. In order of significance, the most important reasons are: they do not like to use it, it is unavailable at their work sites, transit's schedule is inconvenient, they need own vehicle to do other things, it takes too much time, transit stops too far from their homes, or transit is too expensive.

Additionally, the users of public transit do not have strong consensus about which problems they experience are big problems. The biggest problems are: crime on public transit, time spent on public transit, having access to a car when they need it, difficulty with crowding or getting a seat, cost of travel by public transit, time of day availability when they need to use it, transit stations and vehicles not being clean, and time and aggravation with transfers.

The implications are clear. The industry needs to stress to the public the positive aspects of public transit, while it works on improving the negative aspects.

ACCESS TO TRANSIT

Approximately half of Americans perceive themselves as living within a quarter mile of a transit stop. Yet, accessibility is more complex than knowing how close a home end of a trip is to transit. As other questions reveal, transit service to the destination end, hours of service, and frequency of service all contribute to accessibility on transit. The NPTS reveals information about many of these aspects. The more urban an area, the better transit access is. Not surprisingly, more transit dependent groups indicated that transit was more accessible. This might be expected due to both the tendency of these population segments to locate nearer transit and by the virtue of the fact that they are probably better informed as to the availability of transit due to the fact that they are more likely to use it. Suburban non-users of transit could be oblivious to the fact that transit may actually run on nearby streets.

TRANSIT USE PENETRATION

The transit industry has no good national data on the share of the population that are users of transit on any regular basis. The 1995 NPTS provides a perspective that can help increase our understanding of how broad the market of users of transit is. Nationwide, over 11.6 percent of the population used transit one or more times within the 60 days before the 1995 NPTS interview. The percentage decreases to the 5-10 percent range in small- and medium-sized MSAs and outside urban areas, but increases to over 20 percent in MSAs with at least 3 million population and in urban areas. This represents a potential constituency for transit interests and a base market from which transit can build. As transit increases its service to new destinations such as airports, sports stadiums, malls and convention centers, as well as continues to expand into

suburbs, it increases the exposure of new potential customers to transit services. A richer understanding of the exposure of the population to transit services can help in planning strategies for service delivery and marketing.

SUMMARY

While this analysis provides a thorough look at transit issues in the context of the 1995 NPTS data set, there remains a great deal of additional analysis of the NPTS data set that can shed light on transit use and traveler behavior. Specifically, additional review of trend data will provide useful insight in understanding the shifts in the transit market.

The 1995 NPTS data set is now available at the following web site: www-cta.ornl.gov/npts.

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