Public Transportation is Not Going to Work:
Non-Work Travel Markets for the Future of Mass Transit

by

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ABSTRACT

For public transportation agencies to attract new riders in an automobile-dominated environment, niche markets must be targeted. The downtown journey to work is already recognized as a successful niche for transit. This thesis seeks to identify non-work travel markets with strong ridership potential.

Nationwide data sources indicate that about half of all transit trips in the largest US cities are non-work trips, and that non-work travel has contributed to transit ridership growth in 13 of 20 large US cities. Based on these findings, St. Louis and Chicago are selected as cases for further analysis. St. Louis is the successful case, in which non-work travel contributed to overall ridership growth in the 1990's. Chicago is the baseline case, in which overall ridership declined in the 1990's, with no evidence of growth in non-work ridership.

Detailed case studies of St. Louis and Chicago are conducted. First, an overview is presented, providing a description of transit routes; a profile of transit riders; and an understanding of recent ridership changes. Next, non-work ridership markets are identified, based on original analysis of travel survey data and off-peak ridership data. Finally, the characteristics of those markets are reviewed, based on secondary sources, press articles, and existing market research. This is done in order to evaluate the benefits of providing transit service to each market, and the effectiveness of current transit service to each market.

Five non-work travel markets are identified in the case studies as strong sources of ridership. These markets are: tourists; large events; shopping; younger adults without children, living in urban areas; and people who prefer not to own cars. To pursue non-work ridership growth, transit agencies must be proactive about improving service to meet the unique needs of these markets. Doing so can yield a variety of social, political, and economic benefits for the transit agency, transit riders, and the general public.

In conclusion, recommendations are offered for effective transit service to each non-work travel market. General recommendations are offered, as well as specific applications to the Chicago Transit Authority and to Tren Urbano in San Juan, Puerto Rico.

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Jane Chuang
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Max Cohen

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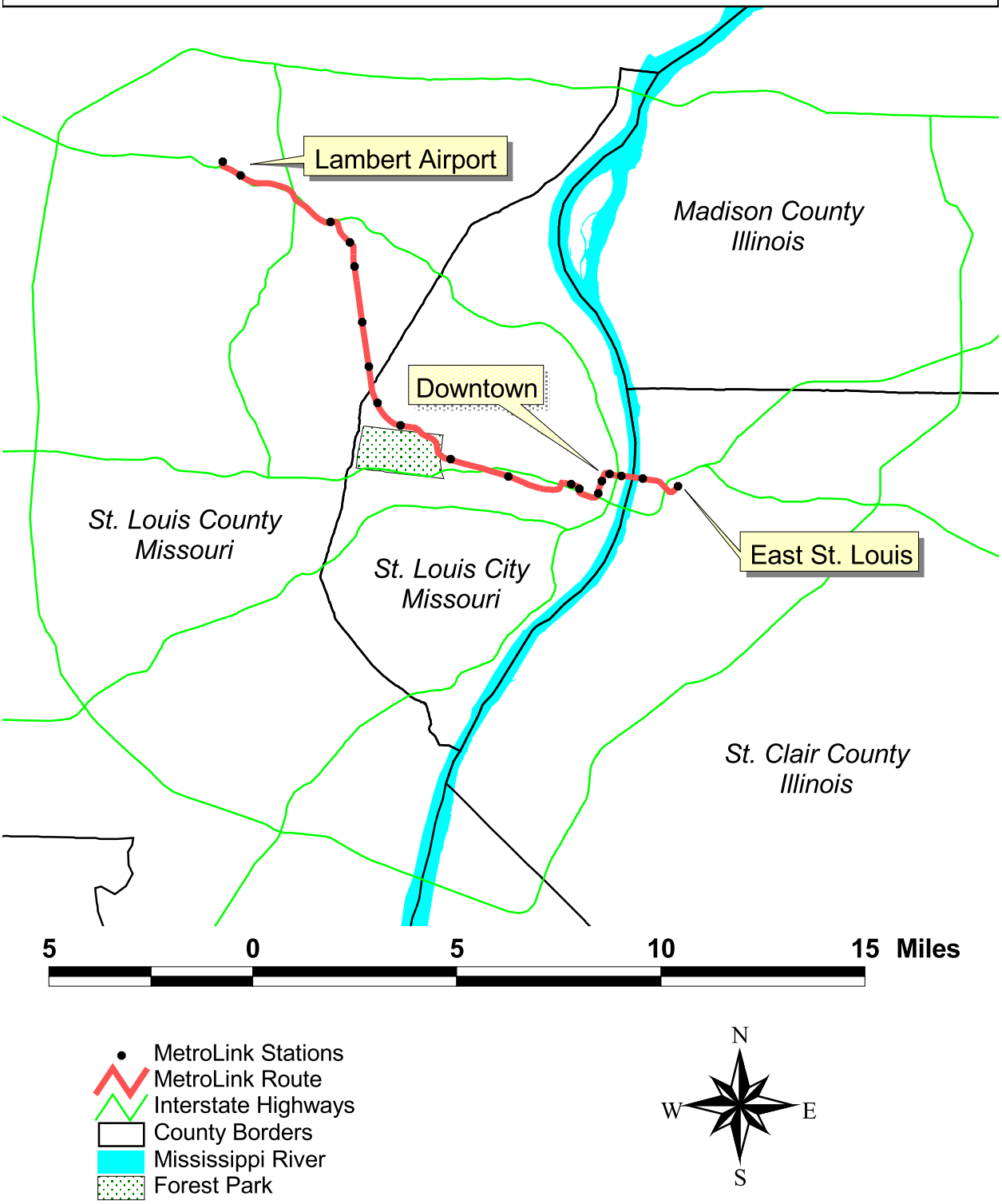

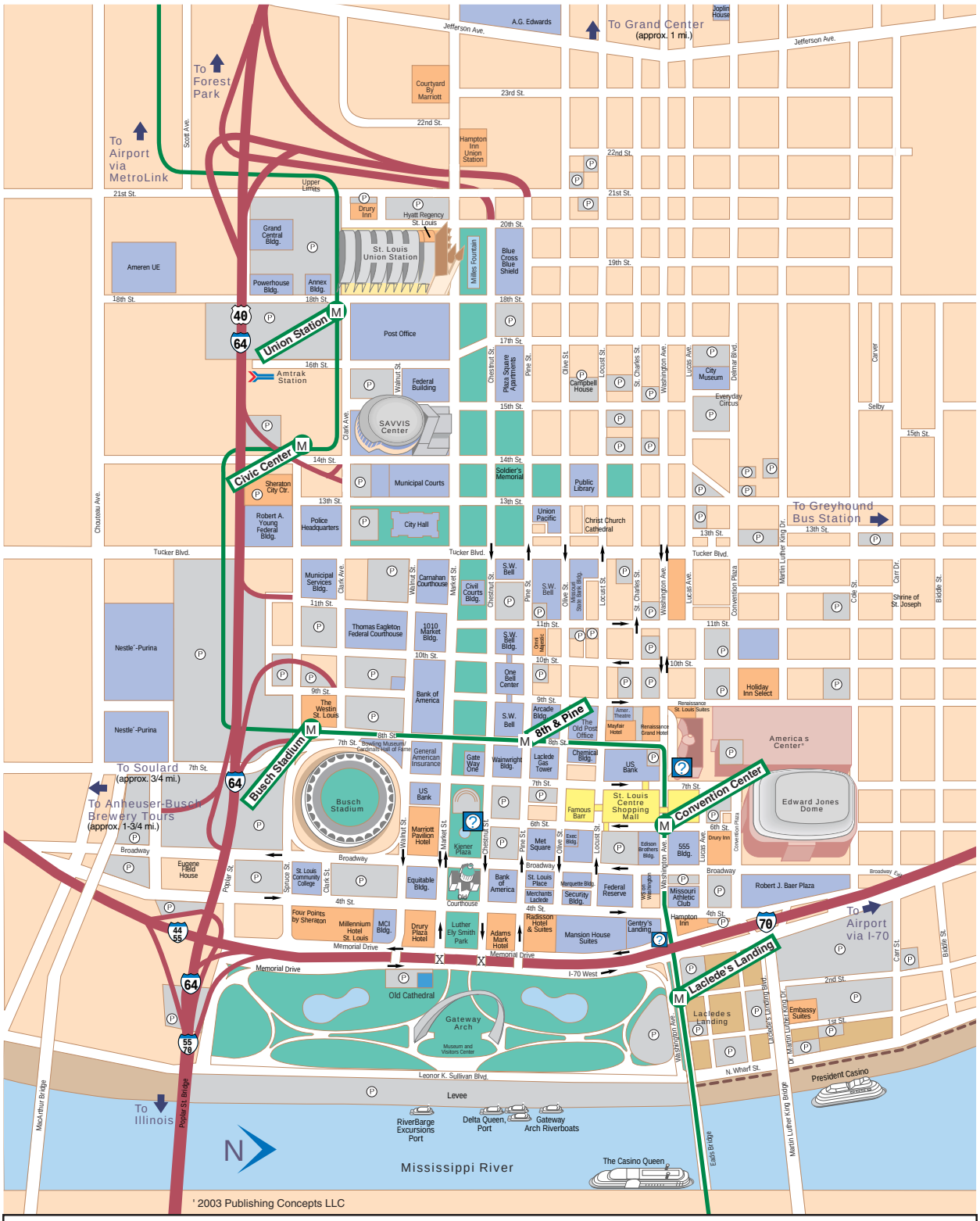

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Courtesy of the St. Louis Convention & Visitors Commission
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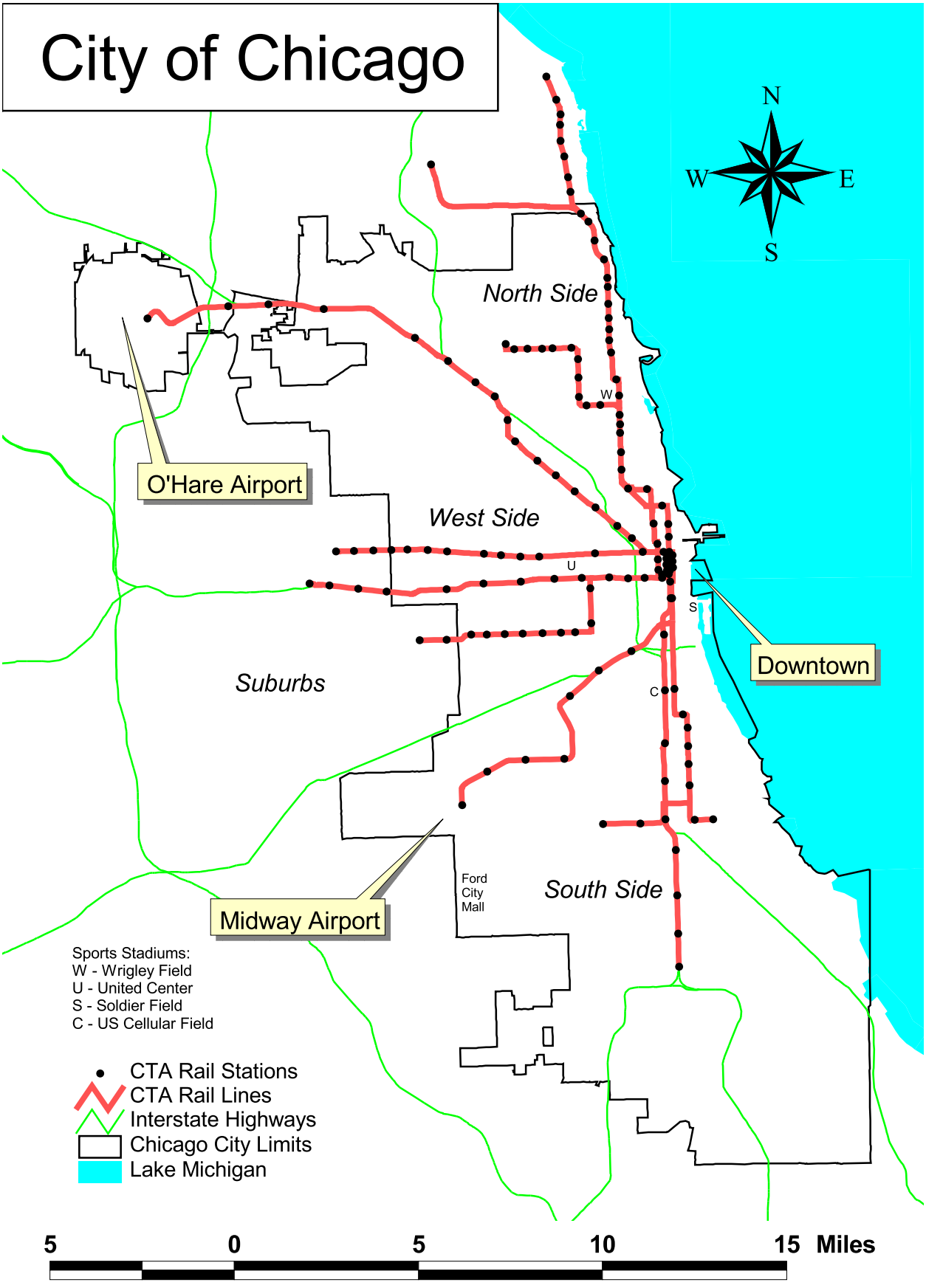
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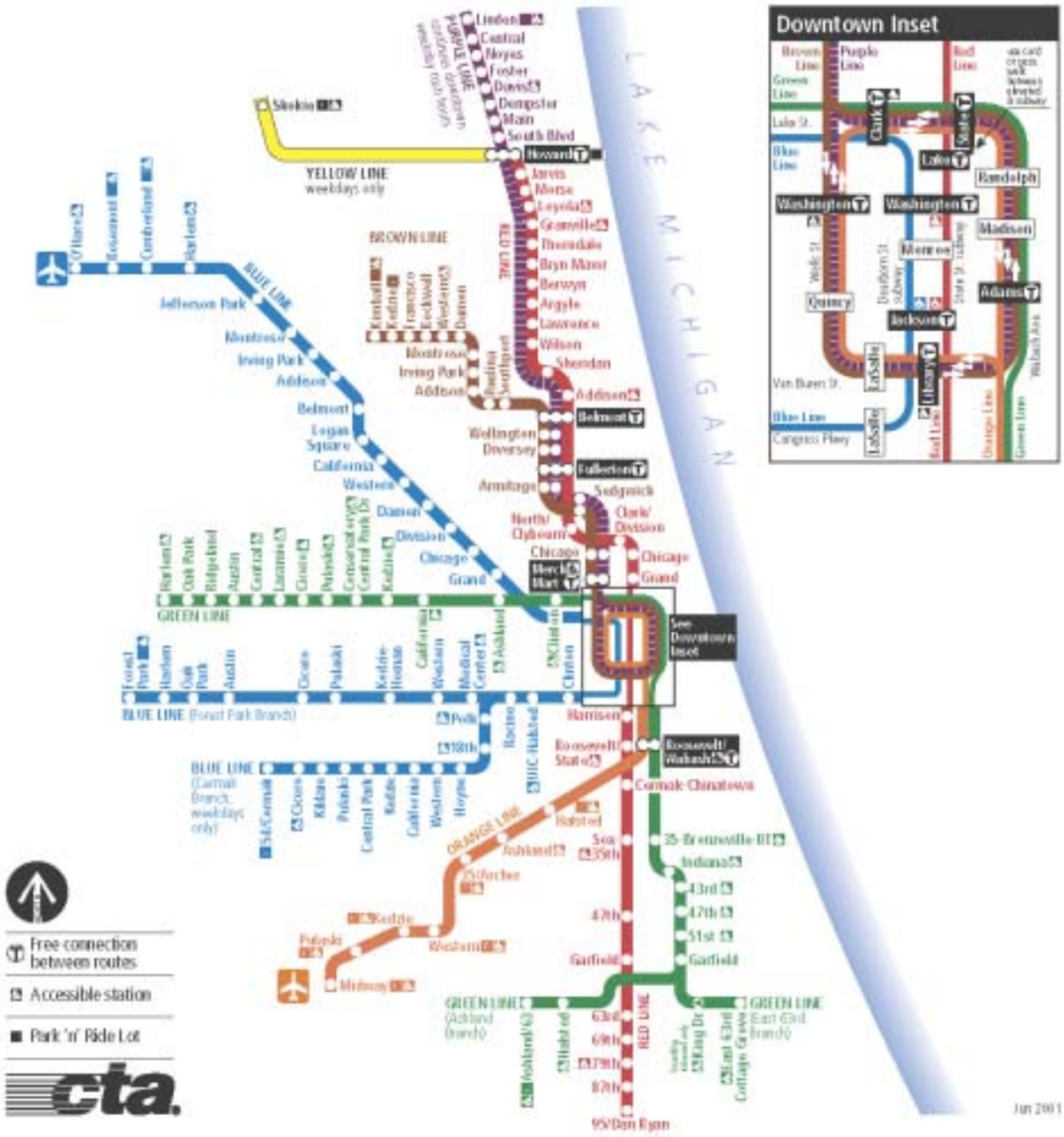

The CTA Rail System

Courtesy of the Chicago Transit Authority
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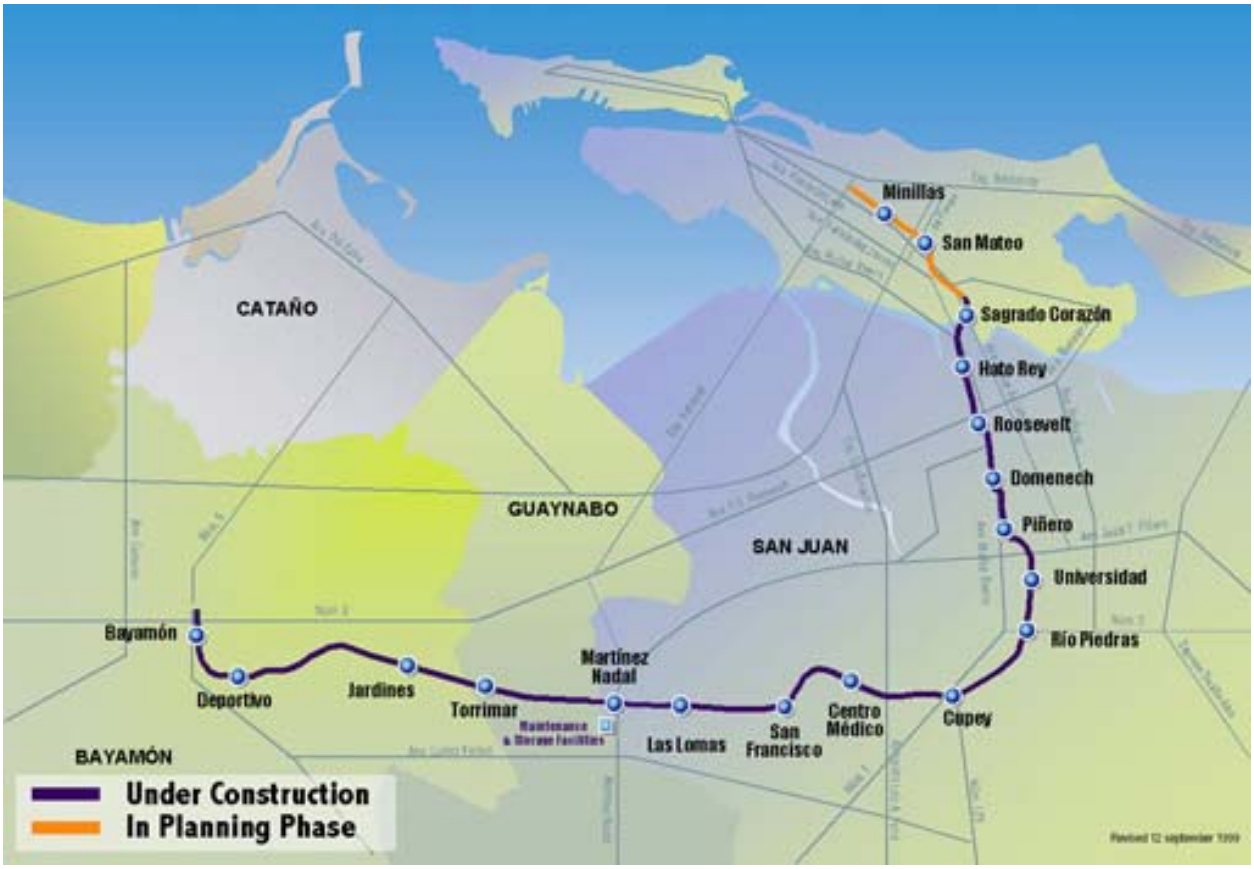

Tren Urbano - Phase I

Courtesy of Javier Mirandes, AIA
Tren Urbano UPR-MIT Professional Development Program

I. Introduction

Public transportation is not going to work! More precisely, many transit riders are not going to work; rather they are making non-work trips. Urban trains and buses are commonly regarded as means of commuting to work during rush hour, but they also serve riders engaged in travel for personal business, recreation, shopping, and other many purposes. This thesis seeks to identify non-work travel markets that are potentially strong sources of transit ridership.

Motivation

The American transit industry is at a crossroads. The good news is that transit agencies themselves have emerged from the crisis conditions of recent decades. Revenue streams have been secured, fares and service levels have been stabilized, and decrepit infrastructure has been repaired. As a result, transit ridership is no longer falling in most US cities, and in many places it is increasing. In fact, thirteen US metropolitan areas with populations of two million or more experienced transit ridership increases in the 1990's.[1] Nine of these areas saw ridership growth of 10% or more. Conventional wisdom holds that ridership growth is good, because there are economies of scale and external benefits associated with transit ridership.

Nevertheless, transit is increasingly irrelevant to the lives of most Americans. Low-density, auto-oriented suburban sprawl is the paradigm, and new development of this kind has proceeded virtually unchecked. As a result, transit's already-low market share for personal travel has continued to erode. In 2001, only 1.6% of person trips in the United States were made by transit, down from 2.2% in 1990.[2] Likewise, the share of American workers who commute to work on transit declined from 5.3% in 1990 to 5.0% in 2000.[3]

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[1] See Chapter 3, Table 3.6
[2] Steven E. Polzin and Xuehao Chu, "NHTS Early Findings on Public Transportation Travel Trends," unpublished presentation, Center for Urban Transit Research, National Center for Transit Research, University of South Florida, 27 March 2003, Slide 29. http://nhts.ornl.gov/2001/presentations/index.shtml
[3] Polzin and Chu, Slide 29

Transit agencies today face the challenge of sustained ridership growth, but in the context of increasing automobile dominance. Thus far, new rail extensions have been widely pursued as a means of improving transit's competitiveness and attracting new riders. In the 1990's, new heavy rail lines or extensions opened in Baltimore, Chicago, Los Angeles, suburban San Francisco, and Washington.[4] All-new light rail systems opened in Baltimore, Denver, Los Angeles and St. Louis, and extensions of existing systems opened in several other cities.[5] Additional rail projects have been proposed in virtually every large US metropolitan area, and some are presently under construction.

These new rail lines have been the subject of intense debate, because there are several competing viewpoints about the role of transit in today's auto-dominated environment. Wendell Cox, an independent consultant, is perhaps the most outspoken opponent of new rail projects. He argues that recent rail projects should be judged as failures, because transit's mode share for total travel remains very low, despite billions of dollars of investment.[6] In his view, the problem is that rail lines are built to serve travel to and from downtown areas, but downtown travel is now just a small share of total travel.[7] Cox believes that the transit industry needs to look beyond downtown, and provide good service throughout a metropolitan area, particularly to suburban employment centers.[8] Because it would be prohibitively expensive to build rail systems in every corner of the suburbs, Cox advocates forgoing rail transit altogether in favor of privatized bus service.[9] He acknowledges that buses would not displace the car as the dominant means of travel.

Proponents of new rail investment counter that mode share for total travel is not a relevant measure of transit's success. Espousing this point of view are Paul Weyrich and William

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[4] metroPlanet, "Metros in America." http://metroplanet.elan.net/am/america.htm
Profiles of each city show the opening dates of lines and extensions
[5] Light Rail Central, "North American Light Rail Systems." http://www.lightrail.com/LRTSystems.htm
[6] Wendell Cox, "The Illusion of Transit Choice," *Veritas: A Quarterly Journal of Public Policy in Texas*, March 2002, p. 34
[7] Cox, p. 37
[8] Cox, pp. 37-8
[9] Cox, p. 40

Lind, conservative social commentators and transit advocates associated with the Free Congress Foundation.[10] Weyrich and Lind explain that "we need to ask not what percentage of total trips transit carries, but what percentage it carries of trips for which it can compete."[11] They believe that transit is competitive with automobile travel only in places where "high-quality" transit service (i.e. rail or express bus) is available, and only for journey-to-work and entertainment trips. Weyrich and Lind note that work travel is widely acknowledged as a strong market for transit service. As for entertainment travel, the authors single out that market by recalling that in transit's heyday, the early 1900's, streetcars carried large numbers of people to amusement parks, baseball games, and country picnic sites.[12] Weyrich and Lind argue that many of today's newly-opened rail lines are successful because they have attracted significant numbers of work and entertainment travelers in the corridors in which they operate.[13] To build upon this success, they propose that more new rail lines be built to serve work and entertainment destinations, with large park-and-ride lots to attract suburbanites who would still drive for nearly all other trip purposes.[14]

Robert Cervero, professor of City and Regional Planning at Berkeley, offers a more liberal perspective. He argues that rail transit investments make sense only if they help to achieve a more "harmonious fit between mass transit services and their cityscapes."[15] Nodes of compact, mixed-use urban development should be created around suburban rail stations.[16] Alternatively, rail transit investments could be concentrated in the inner city as a tool for the revitalization of historic urban neighborhoods.[17] In lieu such urban development, Cervero argues that innovative flexible bus services are better-suited than rail to serve existing low-density sprawl.

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[10] This thesis should not be construed as an endorsement of Weyrich and Lind's conservative social views.
[11] Paul M. Weyrich and William S. Lind, *Does Transit Work? A Conservative Reappraisal* (Washington, DC: Free Congress Foundation, 1999)
[12] Weyrich and Lind
[13] Weyrich and Lind
[14] Weyrich and Lind
[15] Robert Cervero, *The Transit Metropolis: A Global Inquiry* (Washington, DC: Island Press, 1998), p. 3
[16] Cervero, p. 5
[17] Cervero, pp. 5-6

The viewpoints of Cox, Weyrich and Lind, and Cervero are presented here because they represent virtually the entire spectrum of thought about public transportation in America today. On the surface, their views seem quite different, but at a fundamental level, they all agree that in the context of inevitable automobile dominance, niche markets hold the greatest potential for transit ridership growth. These authors prescribe radically different policies because they each emphasize the importance of different types of niche markets. Cox implies that transit is most competitive among a subset of the total population, who would appreciate the general-purpose mobility afforded by a metropolitan-wide bus system. Weyrich and Lind argue that a transit is competitive for a subset of all trip purposes, specifically work and entertainment travel. Cervero argues that transit is most competitive in subset of urban neighborhoods, specifically in those with mixed uses and higher densities. In fact, it is entirely plausible that particular demographic groups, trip purposes, and neighborhoods all could be strong markets for transit ridership growth.

The idea of a niche market as a strong source of transit ridership is nothing new. Downtown journey-to-work travel is one such market. Needless to say, this market has been the subject of most transit research, and has been the target of most transit investment. All of the new rail lines and extensions mentioned above were designed in large part to serve downtown work commuters. When planners do consider transit access to destinations outside of downtown, their interest is usually still work travel, typically by transit-dependent workers. For example, much has been written about the ability of transit to help low-income city dwellers "reverse commute" to suburban jobs. Obviously, bringing people to work is a core mission of public transportation, and will continue to be a strong source of ridership. Still, there is no reason to believe that work travel is the only market in which transit can be competitive.

This thesis adopts the premise that transit agencies must pursue ridership in specific niche markets, but it does not seek to add to the already-considerable body of knowledge about the downtown journey-to-work market. Instead, inspiration is drawn from recent events in New York City. According to a recent analysis of census and household travel survey data, bus and

subway ridership for non-work trips increased by a remarkable 62% in New York in the 1990's, meaning that non-work travel now accounts for more than half of all ridership on the city's bus and subway systems.[18] Were such an increase to occur nationwide, it would be a true coup for public transportation. Of course, New York is different from every other US city, especially with regards to transit service. Nevertheless, the findings from New York clearly indicate that there exist non-work travel markets that are strong sources of transit ridership.

Approach

The primary objective of this thesis is to identify non-work travel markets that are strong sources of transit ridership, and to help transit agencies build ridership in those markets. Types of markets include demographic groups, trip purposes, and neighborhoods. First, literature about non-work travel behavior is reviewed, to place this thesis within the context of existing research and to raise issues for consideration throughout the thesis. Next, nationwide data sources are analyzed, to identify major US metropolitan areas in which growth in non-work travel contributed to overall transit ridership growth in the 1990's. The results of this analysis are used to select two cities to be case studies. St. Louis is selected as the successful case, in which non-work travel helped to increase transit ridership. Chicago is selected as the baseline case, in which non-work travel did not have such an effect.

Each case study is presented in three parts: Overview, Identification of Markets, and Characteristics of Markets. (A fuller description of the case study research methodology can be found at the end of Chapter 3). The "Overview" chapter provides a description of transit routes, a profile of transit riders, and an understanding of transit ridership changes that occurred in the 1990's. The "Identification of Markets" chapter consists of an analysis of travel survey data and off-peak ridership data, to identify who makes non-work transit trips and where those people

[18] Schaller Consulting, *Commuting, Non-Work Travel and the Changing City: An Analysis of Census 2000 Commuting Results for New York City* (Brooklyn, NY, 2002), p. 1

travel. Based on this analysis, it is possible to identify specific non-work travel markets that are strong sources of ridership in St. Louis and Chicago. The "Characteristics of Markets" chapter reviews known facts about each of these markets, and concludes with a discussion of the benefits of providing transit service to each market, and an evaluation of the effectiveness of current transit service to each market in St. Louis or Chicago.

Following the case studies, the concluding chapter of this thesis synthesizes the lessons of the case studies, and offers generalized recommendations for all transit agencies about how to serve non-work travel markets. This chapter also makes an explicit comparison between St. Louis and Chicago, to offer a final assessment of why St. Louis succeeded in building non-work ridership in the 1990's, while Chicago did not. Furthermore, there is a brief discussion of the costs and benefits of pursuing ridership growth in non-work travel markets.

This concluding chapter also presents recommendations to two institutional clients, who maintain collaborative research programs with MIT and who helped to fund this research. One client is Tren Urbano, which is a new rail transit system now in the final stages of construction in San Juan, Puerto Rico. The final chapter of this thesis applies the lessons of the case studies to Tren Urbano, and to transit in San Juan generally. Specific recommendations are offered for serving each of the non-work travel markets identified in this thesis.

The other client is the Chicago Transit Authority (CTA). Findings that will interest this agency are contained within the Chicago case study. Much of this work was produced during a summer internship at CTA in 2003. The "Identification of Markets" and "Characteristics of Markets" chapters should interest CTA officials, while the "Overview" chapter would not tell them anything that they do not already know. In addition to the analytical findings of the Chicago case study, the concluding chapter of this thesis presents applications to the CTA – specifically, recommendations both for immediate service changes and for future market research.

II. Literature Review

Why do people travel? What kinds of people travel more than others? How has travel grown and changed in recent years? How do people decide which mode of transportation to use? For the journey to work, some of these questions are trivially simple, while others have been researched extensively. For non-work travel, all of these questions are still ripe for exploration. This chapter reviews existing academic literature that addresses such questions.

Scope of this literature review

Internet databases such as TRIS Online were consulted, to locate papers on non-work travel that were published in the past ten years. Searches did not identify any existing broad-based works on non-work transit ridership. Thus this thesis is entering uncharted academic territory. To provide some guidance to such an ambitious inquiry, two related bodies of work are reviewed in this chapter: literature on non-work travel by automobile, and literature on mode choice for non-work travel. (Papers about mode choice are reviewed only if they explicitly consider transit as an option). The former body of work provides a good discussion of overall non-work travel behavior and trends, but its findings are not automatically applicable to transit. The latter provides some specific insight into why people make non-work transit trips. Still, the amount of existing literature is remarkably sparse. This chapter reviews three works on non-work travel by automobile, and two works on mode choice for non-work travel.

Only papers offering a broad discussion of non-work travel in America are included in this review. Papers only about specific trip purposes, such as shopping or sporting events travel, are not discussed here. (Literature about some specific non-work travel markets is discussed in the forthcoming "Characteristics of Markets" chapters). Also not included are papers that discuss non-work travel as it relates to the journey to work, such as articles about non-work stops made during the work commute. Anything related to the journey to work is beyond the scope of this thesis. Also beyond the scope of this thesis are internationally-themed articles. It is assumed that

non-work travel is related to personal tastes and lifestyle choices, and such factors could vary across different cultures. A final constraint on this literature review is that multiple papers by the same author are not discussed here. Two authors – Susan Handy, and the team of Dick Nelson and John Niles – have each prepared several papers about non-work travel. For each author, one recent comprehensive work is reviewed in this chapter.

Non-work travel by automobile

Lockwood and Demetsky (1994) conducted a study of non-work travel in two suburban neighborhoods in Northern Virginia, within the Washington, DC metropolitan area.[1] This study is unique because it does not rely on a preexisting data source. Instead, the authors conducted a household travel survey that was designed explicitly for understanding non-work travel. Travel diary surveys were mailed to each household residing in the two neighborhoods under study. 118 households completed their travel diaries, recording all trips made by household members on a Wednesday in April, 1992. The following tables present highlights of these authors' results.

Personal Characteristics		**Average Trips Per Person, By Gender**	
Employment Status	Marital Status	Male	Female
Employed	Married	1.71	2.96
	Single	0.96	2.55
Unemployed	Married	2.00	3.83
	Single	2.29	4.00
All persons		2.32	

Table 2.1 Average daily non-work trips per person, by personal characteristics[2]

Table 2.1, above, shows the average daily number of non-work trips made by individual persons, by gender, employment, and marital status. Overall, the average person made 2.32 non-work trips each day, but the rates vary widely. Married, unemployed women averaged more than four times as many non-work trips as single, employed men, for example. Most striking is that

[1] Philomena Lockwood and Michael Demetsky. *Methodology for Nonwork Travel Analysis in Suburban Communities* (Charlottesville, VA: Virginia Transportation Research Council, 1994).
[2] Lockwood and Demetsky, p. 22, Table 12, and p. 35

the average trip rates for women are consistently higher than those for men, regardless of employment or marital status.

Household Characteristics		Average Trips Per Household
Neighborhood	Falls Church	6.00
	Herndon	4.73
Income	$20,000-$39,000	5.50
	$40,000-$59,000	5.33
	$60,000-$79,000	4.96
	$80,000-$99,000	5.04
	Over $100,000	4.70
	Not reported	5.20
Structure	Single adult with kids	4.67
	Dual adult with kids	5.75
	Single occupant	2.80
	Couple without kids	3.79
Presence of homemaker	Yes	5.81
	No	4.80
Presence of children	Yes	5.75
	No	3.74
All Households		5.03

Table 2.2 Average daily non-work trips per household, by household characteristics[3]

Table 2.2, above, shows the average daily number of non-work trips made by all members of a household, for households of various characteristics. Overall, the average household made 5.03 non-work trips each day. The average trip rate differs considerably for the two neighborhoods included in the study, suggesting that neighborhood characteristics can influence tripmaking behavior. Herndon is an outer suburb, near Dulles Airport, whereas Falls Church is close to Washington and is more urban. The average trip rate also appears to decline as household income increases, which is surprising. This result may be an artifact of the small sample size, particularly since the study was conducted in neighborhoods with "homes of similar value" so as to "neutralize the influence of income on travel behavior."[4]

Clearly, household structure influences non-work tripmaking. Nuclear families – two adults, with kids – made an average of 5.75 non-work trips per day, more than any other type of household structure. Similarly, households with children averaged more non-work trips than

[3] Lockwood and Demetsky, p. 16, Table 11
[4] Lockwood and Demetsky, p. 4

households without, and households with a homemaker averaged more non-work trips than households without. These findings, coupled with the fact that women averaged more non-work trips than men, suggest that there is some truth to the cliché of the "soccer mom." It is likely that a large portion of non-work travel in suburban communities consists of mothers driving their children to and from activities, and running household errands.

It is important to be cognizant of the limitations of this study. The survey was conducted on a weekday in April and thus is not useful for understanding non-work travel on weekends, or in different seasons. Also, the survey only counted automobile travel, even though Falls Church has some transit service. Despite the very narrow targeting of the survey, however, the sample size is too small for meaningful statistical analysis of the results. Indeed, some of the differences in the average trip rates shown in Tables 2.1 and 2.2 may not be statistically significant. These limitations are typical of household travel surveys – because they are expensive undertakings, the scope and sample size of such surveys are invariably limited.

Lockwood and Demetsky present a static snapshot of non-work travel at a particular place and time. In contrast, Nelson and Niles (2000) begin a discussion of how non-work travel has grown over time.[5] First, these authors use the Nationwide Personal Transportation Survey (NPTS) to demonstrate that non-work travel nationwide is a growing share of total person trips and vehicle trips. Table 2.3, below, breaks down the distribution of person trips and vehicle trips by trip purpose, for each year that the NPTS was conducted. Aside from the fact that non-work trips clearly outnumber work trips, this table shows how work trips are a declining share of total trips. Non-work trips increased from 63.8% of vehicle trips in 1969 to 72.8% in 1995. A similar but slightly more modest increase occurred in the non-work share of personal trips. It appears that all of this growth can be attributed to shopping and other family and personal business. The

[5] Dick Nelson and John Niles. "Observations on the Causes of Nonwork Travel Growth." Paper presented at the Transportation Research Board 79th Annual Meeting, Washington, DC, January 9-13, 2000.

authors note that from 1969 to 1995, VMT per capita more than doubled for each of these two trip categories.[6] An issue of concern, which the authors do not mention, is that time series comparisons using the NPTS can produce misleading results, because of changes in the methodology of the survey from year to year. For example, the increase in "other family and personal business" trips is nearly symmetrical with the decrease in "other" trips. This could reflect changes in the wording of the survey, rather than actual changes in behavior.

Trip Purpose	**Person Trips – By Survey Year**				**Vehicle Trips – By Survey Year**				
	1977	1983	1990	1995	1969	1977	1983	1990	1995
Shopping	17.1	18.0	18.9	20.2	15.2	17.0	20.0	20.3	21.6
Other family/pers. business	14.0	17.4	22.7	25.6	14.0	14.0	18.3	24.1	27.0
Social and recreational	24.4	27.7	24.8	24.9	22.4	19.3	22.6	20.5	18.4
Other	21.4	14.1	12.1	9.0	12.2	16.8	8.4	7.0	5.8
All nonwork	76.9	77.2	78.4	79.7	63.8	67.1	69.3	71.9	72.8
Work and work-related	23.1	22.8	21.6	20.3	36.2	32.9	30.7	28.1	27.2
Total trips	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 2.3 Person trips and vehicle trips by purpose, as a percentage of total trips, 1969-1995[7]

Next, the authors consider the causes of non-work travel growth. They begin with an extensive critique of Gordon, Kumar, and Richardson's (1988) decentralization hypothesis, which posits that "as the suburbanization of jobs and retail and consumer services increased,…residents of these areas reduced their time of commuting and applied it to nonwork activities."[8] Thereafter, Nelson and Niles offer their own hypothesis for the growth of non-work travel. They argue that changes in the retail marketplace have created "ever more variety and opportunity for consumers, and consequently more trip generators."[9] These changes include "the upsurge in mass retailing, including the entrance of superstores; the decreasing number and increasing size of grocery stores;

[6] Nelson and Niles, p. 5
[7] Nelson and Niles, p. 5, Table 2
Note that in this tabulation, the following trip purposes are included in the "Other" category: school, religious activities, medical/dental, take someone somewhere, and pick up someone. Return trips, i.e. trips with a destination and purpose of "home" or "return to work," are excluded from the total trip count.
[8] Nelson and Niles, p. 7
[9] Nelson and Niles, p. 11

and the continuing trend toward more meals eaten away from home."[10] The authors offer some miscellaneous evidence of these retail trends, but they fail to provide any evidence of a link between trends in retail structure and non-work travel growth. Instead, they merely write that "the increasing variety of shopping, eating out, and other nonwork activities almost certainly causes more trips per capita."[11] Nelson and Niles' hypothesis is consistent with the growth in shopping travel as evidenced in the NPTS, but much more evidence is needed for their argument to be convincing.

Handy, DeGarmo, and Clifton (2002) take a much more comprehensive look at the growth in non-work travel.[12] The authors' point of departure is that according to anecdotal evidence, "Americans are driving more than ever."[13] To determine if this is the case, the authors begin with a review of available data on VMT trends, including Federal Highway data and NPTS data. Among their key findings are that:[14]

- Total VMT per capita has increased by an average of 2.8% per year since 1970, including VMT for freight movement.
- Household VMT has increased for both work travel and non-work travel.
- The average length of non-work trips has not increased, so all of the increase in non-work VMT is attributable to increased trip frequency.
- The frequency of non-work vehicle trips has increased faster than the frequency of non-work personal trips, because average vehicle occupancies have decreased.

The authors warn that these findings may not be entirely credible, however, because of biases and year-to-year methodological changes in the NPTS.

Next, the authors explore many factors that may have contributed to the apparent increase in non-work travel. These include demographic and social factors ("demand-side" factors), and

[10] Nelson and Niles, p. 12
[11] Nelson and Niles, p. 14
[12] Susan Handy, Andrew DeGarmo, and Kelly Clifton. *Understanding the Growth in Non-Work VMT* (College Station, TX: Southwest Region University Transportation Center, 2002).
[13] Handy, DeGarmo, and Clifton, p. 1
[14] Handy, DeGarmo, and Clifton, pp. 3-7

factors related to urban spatial structure ("supply-side" factors). For each factor, the authors discuss the trend in that factor, the likely impact of that trend on travel behavior, and the evidence to support that travel impact. In most cases, the trend is unambiguous, but the travel impact of the trend is hypothetical, and the evidence of the travel impact is inconclusive. Table 2.4, below, provides a brief summary. In some cases, the authors have conflicting hypotheses about the travel impact of a trend. For example, the increasing use of online alternatives might lead people to make fewer trips (by enabling people to shop online instead of traveling to stores), but it might also lead people to make more trips (by freeing up more time for additional leisure travel).

Factor	**Trend in Factor**	**Hypothetical Travel Impact**	**Evidence**
Income	increasing	more trips; longer trips	moderate
Household size	decreasing	more trips per person	weak
Age of population	increasing	fewer trips, but declining impact	moderate
Auto ownership	increasing	more travel, but declining impact	strong
Employment	increasing for women	shifts in timing; fewer trips	moderate
Leisure time	decreasing (perceived)	fewer trips -or- more trips	weak
Approach to leisure	more active; more purchased	more trips	weak
Household responsibilities	driven by children	more trips	moderate
Eating habits	more prepared food; more eating out	more trips	weak
On-line alternatives	increasing use	fewer trips -or- more trips	moderate
Highway orientation	increasing but stabilizing	longer trips; more VMT	weak
Concentration	increasing, but some decentralization	fewer trips; longer trips	weak
Homogenization	increasing, but some differentiation	fewer trips; shorter trips	weak

Table 2.4 Factors that may have contributed to the increase in non-work travel[15]

In their discussion of the "supply-side" factors (the last three items in Table 2.4), the authors focus specifically on the retail industry. Echoing Nelson and Niles, the authors cite the emergence of superstores; the increasing size and decreasing number of grocery stores; and the growth of national chain stores. Unlike Nelson and Niles, these authors argue that such trends would lead to fewer non-work trips, not more. Noting that stores have grown larger and offer a

[15] Handy, DeGarmo, and Clifton, p. 44, Table 6-1

wider variety of products under one roof, the authors argue that "shoppers can accomplish several purposes with one trip" and would thus make fewer trips.[16] Since these large stores are fewer in number, however, people would need to make longer trips in order to reach them. They also argue that chain retail has resulted in a "homogenization" of retail options, in which "consumers have less reason to bypass local stores, because the next closest store may be a copy of the first, and less reason to shop at more than one store, because all the stores are essentially the same."[17] Thus, chain retail may have reduced trip frequencies and lengths. This argument is in direct conflict with Nelson and Niles' stipulation that consumers now have an increased variety of retail options. Unfortunately, like Nelson and Niles, the authors provide no concrete evidence of the link between retail trends and travel patterns.

Finally, the authors review previous studies of non-work travel. These studies are cross-sectional, and are intended to aid in the development of travel demand models. The authors' main finding is that the existing models do not adequately explain the factors underlying non-work tripmaking. The authors found only eight studies to review, including four that were produced in Great Britain in the 1970's, and one from Canada. Each of these models includes only a few independent variables – typically straightforward, readily-measured personal characteristics such as age and employment status. None of these studies achieved an R-square value of greater than 0.24, indicating that most of these models failed to explain most of the variation in their respective datasets. The models do not incorporate most of the factors listed in Table 2.4, largely because data on factors related to broad social and lifestyle changes do not exist. Overall, the authors conclude that the growth in non-work travel is not well understood.

[16] Handy, DeGarmo, and Clifton, p. 28
[17] Handy, DeGarmo, and Clifton, p. 30

Mode choice for non-work travel

Polzin, Chu, and Rey (1999) examine differences in non-work travel mode choice across racial and ethnic groups.[18] They use the 1995 NPTS for this analysis. Table 2.5, below, shows the nationwide mode share for non-work person trips, according to the 1995 NPTS, by race and ethnicity. Clearly, use of a privately-owned vehicle, either as the driver or as a passenger, is the dominant mode for all groups. Transit's share varies considerably across the groups, however. African Americans used transit for 5.8% of non-work trips, the highest rate of any group. As the authors note, "African Americans are over 9 times as likely as Whites to use public transit for non-work travel, while other people of color are about 2 to 4 times as likely as Whites to use public transit for non-work travel."[19] The authors believe that these differences stem largely from differences in auto ownership and driver's licensure rates. Looking at persons age 16 or older, the authors note that while 91% of Whites have a driver's license and live in a household with a vehicle, only 68% of African Americans do so.[20]

		Non-Hispanic				
Mode	**Hispanic**	**White**	**Afr. American**	**Asian**	**Other**	**All**
POV Driver	49.8%	59.6%	48.9%	55.0%	55.2%	57.3%
POV Passenger	34.1%	31.1%	29.6%	28.8%	30.8%	31.2%
Public Transit	2.6%	0.6%	5.8%	2.4%	1.5%	1.4%
Bicycle	1.0%	1.1%	1.0%	0.7%	1.3%	1.0%
Walk	9.8%	5.1%	10.6%	10.8%	8.9%	6.4%
Others	2.7%	2.5%	4.1%	2.2%	2.4%	2.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Group Size	10%	75%	11%	2%	2%	100%

Table 2.5 Mode share for non-work trips, nationwide, by race and ethnicity[21]

Table 2.6, below, compares the public transit mode share for persons who do or do not have the option of driving. For people who have the option of driving – licensed drivers who live in households with vehicles – transit's mode share for non-work travel is miniscule. For people

[18] Steven Polzin, Xuehao Chu, and Joel Rey. "Mobility and Mode Choice of People of Color for Non-Work Travel." In: Transportation Research Board. *Personal Travel: The Long and Short of It*. Conference Proceedings, June 28-July 1, 1999, pp. 391-412.
[19] Polzin, Chu, and Rey, p. 396
[20] Polzin, Chu, and Rey, Table 3
[21] Polzin, Chu, and Rey, Table 2

who do not have the option of driving – including those without drivers' licenses, and those who live in households without vehicles – transit's mode share for non-work travel is dramatically higher. Even for these people who cannot drive their own cars, transit's mode share is far less than 100 percent, however. The non-driving population relies on a wide variety of complementary modes for everyday mobility – including walking, transit, and riding as passengers in private vehicles. It is unfortunate that the authors chose to combine the data for persons without drivers' licenses and persons in households without vehicles. Those two groups may be fundamentally different, even though both are restricted in their ability to drive.

Driving Status	**Hispanic**	**Non-Hispanic**				**All**
		White	**Black**	**Asian**	**Other**	
Licensed drivers in households with cars	0.5%	0.3%	1.3%	0.6%	0.4%	0.4%
Non-drivers, or anyone in households without cars	14.1%	6.0%	20.8%	16.4%	11.6%	11.7 %
Under age 16	2.1%	0.7%	5.8%	2.0%	1.0%	1.5%
Group Size	10%	75%	11%	2%	2%	100%

Table 2.6 Transit mode share for non-work trips, by race/ethnicity, and by driving status[22]

It is striking that African Americans have the highest transit mode share in all categories of driving status. A plausible hypothesis is that African Americans are more inclined to take transit because they are more likely to live in inner cities where good transit service is available. Using regression analysis, the authors attempt to control for differences in factors such as geography and income, but the crude variables used in the regression (e.g. "1 for people living in urban areas; 0 otherwise") are insufficient to explain the statistical differences between Whites and African Americans.[23] More research is needed to understand how other factors, such as neighborhood-level geography, explain the marked behavioral differences between Whites and African Americans. Alternative data sources are needed, because NPTS sample sizes are too small for local-level analysis.

[22] Polzin, Chu, and Rey, Table 4
[23] Polzin, Chu, and Rey, p. 398 and Table 5

Rajamani, et. al., (2003) directly tackle the question of how neighborhood characteristics affect mode choice for non-work travel.[24] The authors analyze data from a 1995 household travel diary survey from the Portland, Oregon metropolitan area. Like most surveys of this type, data was collected on weekdays only, in the spring and fall. The authors use this data to develop a multinomial logit model of mode choice for home-based non-work travel. This model shows how the urban form of a residential neighborhood can affect neighborhood residents' mode choices for non-work travel. To develop the model, the authors tested the statistical significance of several measures of urban form, including measures of land use type and mix, local and regional accessibility, population density, and the local street network. As control measures, the authors also included several additional variables that are not related to urban form. These include measures of individual and household sociodemographic characteristics, and measures of travel time and cost.

Four urban form variables were found to be significant, and are included in the final version of the model. The first variable is an *index of land use mix diversity*. The number of acres of land in residential, commercial, industrial, and other uses are inputted into a mathematical function. The resulting index value ranges from 0 to 1, where 1 represents an even balance of all four land uses, and 0 means that all land in the neighborhood is devoted to a single use. The second variable is the *percentage of households within walking distance of a bus stop*. This is a simple, but fairly crude, measure of the transit accessibility of a neighborhood. It does not take into account the fact that widely divergent levels of service may be provided on different bus routes. The third variable is *population density*. By controlling for other neighborhood characteristics that seem more directly related to travel behavior, the authors hope to "isolate the 'true' impact of density."[25] The fourth variable is the *percentage of cul-de-sac streets* in the

[24] Jayanthi Rajamani, et. al. "Assessing the Impact of Urban Form Measures in Nonwork Trip Mode Choice After Controlling for Demographic and Level-of-Service Effects." Paper presented at the Transportation Research Board 82nd Annual Meeting, Washington, DC, January 12-16, 2003.
[25] Rajamani, et. al., p. 5

neighborhood. A low percentage of cul-de-sacs implies a grid-like urban street pattern. Such a grid offers greater connectivity and thus has been hypothesized to be more conducive to walking. The inclusion of these four urban form variables improved the predictive power of the model, as compared to a model based on the control measures alone.[26]

The model indicates the following relationships between these measures of urban form and non-work travel mode choice:[27]

- Mixed land uses are positively related to walking.
- The percentage of households within walking distance of bus stops is positively related to transit use.
- Population density is negatively related to driving, and positively related to transit use.
- The percentage of cul-de-sac streets is negatively related to walking.

These findings are not surprising. Mixed uses and gridiron streets – the characteristics of traditional urban neighborhoods – promote walking for non-work travel. Transit accessibility promotes transit use for non-work travel. Density also promotes transit use, but the authors caution that there is a "high degree of correlation between the 'percentage of households within walk distance from bus stops' and the residential density variable."[28] In other words, density may simply be a proxy for the availability of transit.

The model also indicates the following relationships between the sociodemographic control variables and non-work travel mode choice:[29]

- The effect of household income is non-linear. Among upper income households, income is positively related to driving alone.
- The number of vehicles per adult in a household is positively related to driving alone.

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[26] Rajamani, et. al., p. 6
The authors note that "the log-likelihood value at convergence of the market share model is -2067.1, while the log-likelihood value of the final model specification is -1798.45. The likelihood ratio test value to compare the final model with the market share model is 537.3, which exceeds the critical chi-square value corresponding to 34 degrees of freedom at any reasonable level of significance."
[27] Rajamani, et. al., pp 7-8, 16
[28] Rajamani, et. al., p. 7
[29] Rajamani, et. al., pp. 6-7, 16

- The number of adults in a household is negatively related to walking.
- The number of children in a household is positively related to ridesharing (driving with passengers).
- The age of an individual traveler is positively related to ridesharing.
- Being Caucasian is negatively related to walking.

Many of these relationships are intuitive as well. Automobile ownership promotes driving for non-work travel. Having children in the household promotes ridesharing for non-work travel, because adults and children would travel together in the car. Some of these relationships are puzzling, however. Why does the number of adults in a household affect the likelihood of walking? Why are Caucasians less likely to walk? The authors do not offer any suggestions. It may well be that these variables indirectly are capturing the effects of urban form. For example, single adults and racial minorities may be more likely to live in central cities, where urban form is conducive to walking for non-work travel.

Clearly, the characteristics of cities and neighborhoods may affect non-work travel mode choice. Some of the effects are quantified in the model, while other subtler effects may remain hidden. Regardless, the authors caution that these relationships may be largely the result of "individuals selecting neighborhoods that support their intrinsic mode preferences."[30] People who want the option of walking or taking transit to non-work destinations may choose to live in traditional urban neighborhoods with transit service, while people who are happy to drive everywhere may choose to live in automobile-oriented suburbs. On the other hand, people may choose to live somewhere for unrelated reasons, and then adapt their transportation choices accordingly. The authors propose that a joint model of mode choice and residential location choice would be helpful in understanding this complex problem.

[30] Rajamani, et. al., p. 10

Implications of the literature

Collectively, these studies suggest that non-work travel is quite a broad subject. People make non-work trips in order to satisfy a wide range of individual and family needs and desires. As a result, personal and household characteristics – such as age, income, gender, and family structure – influence non-work tripmaking behavior. Economic trends, such as the increasing dominance of chain retail, influence the type and location of non-work destinations. Neighborhood characteristics – such as land use, transit accessibility, and pedestrian friendliness – influence the range of modes that are available for travel to different kinds of non-work destinations. Similarly influential are more explicit transportation factors, such as automobile ownership and the level of transit service provided to different neighborhoods and destinations.

Given that there are so many factors involved, the small body of literature on non-work travel hardly provides a complete understanding of the subject. Non-work transit ridership is especially ripe for further study, since none of the papers reviewed in this chapter directly address the issue. Even in the mode choice papers considered above, transit is discussed only in the vaguest of terms. There is no mention of differing levels of transit service, or service quality. It also remains to be seen whether the typical non-work transit rider is similar to the suburban "soccer mom" who is the most frequent non-work automobile traveler, and whether retail industry trends that seem relevant to non-work automobile travel are relevant to non-work transit ridership as well. Indeed, this thesis may be one of the first comprehensive studies of non-work transit ridership. As a result, this thesis will be broad in scope, and somewhat exploratory in approach. A number of data sources will be explored in the upcoming chapters, but statistical techniques will not be employed to test specific hypotheses. Rather, one of the major aims of this thesis will be to identify more narrowly focused areas for further research.

Sparse as it may be, the body of literature reviewed in this chapter nevertheless aids in formulating the research approach of this thesis. Literature indicates that non-work automobile travel is growing, especially shopping travel. Is non-work transit ridership growing as well? In

the upcoming "Nationwide Findings" chapter, that question is answered through an examination of nationwide data sources. Because the factors influencing non-work travel are so varied, and some are quite specific to local conditions, the bulk of this thesis will delve into greater depth in two case studies of particular cities. For each case, an "Identification of Markets" chapter asks: Who is using transit for non-work travel, and where are those people traveling? The "who" is meant to reveal the personal and household characteristics of non-work transit riders, while the "where" is meant to reveal the types of neighborhoods and destinations that generate non-work transit ridership. The case study format also allows for a consideration of transit service quality – an issue that has not been addressed at all in the existing body of literature on non-work travel. For each case, a "Characteristics of Markets" chapter discusses the effectiveness of current transit service at meeting the needs of non-work travelers.

III. Nationwide Findings and Selection of Case Studies

As noted in the preceding literature review, non-work travel seems to be growing overall. Has this growth translated into increased non-work transit ridership? This chapter looks at major metropolitan areas in the United States and asks:

- What share of total transit trips are non-work transit trips?
- In the 1990's, how did the growth in transit journeys to work compare to the growth in total transit ridership?

Three data sources are analyzed to answer these questions – the Nationwide Personal Transportation Survey, the United States Census, and the National Transit Database. These data sources are ideal for comparisons among metropolitan areas, because they are maintained by the Federal government. The ultimate goal of this analysis is to select two cases for closer study – one metropolitan area in which non-work travel contributed to transit ridership growth in the 1990's, and one in which it did not. The research methodology used for each case study is discussed at the end of this chapter.

Selection of major metropolitan areas

First, twenty major metropolitan areas were identified. In brief, these are big cities with big transit systems. Specifically, this set of twenty metropolitan areas includes every US metropolitan area that meets both of the following criteria: (1) has a population of at least two million; and (2) contains one of the 35 largest transit agencies in the US.

Table 3.1, below, shows the 35 largest transit agencies in fiscal year 2000, ranked by the number of unlinked passenger trips, according to the American Public Transportation Association. (To conserve space, this table only lists each agency's rank, not its actual level of ridership; for counts of unlinked trips by metropolitan area, refer to Table 3.6, later in this chapter). Table 3.2, below, shows all metropolitan areas with population of at least two million, according to the 2000 Census. Each of the 23 metropolitan areas listed in Table 3.2 contains one or more transit

agencies listed in Table 3.1, except for Phoenix, San Juan, and Tampa. The remaining twenty metropolitan areas are examined further.

Rank	Transit Agency	Area Served
1	Metropolitan Transportation Authority*	New York, NY
2	Regional Transportation Authority*	Chicago, IL
3	Los Angeles County Metropolitan Transportation Authority	Los Angeles, CA
4	Massachusetts Bay Transportation Authority	Boston, MA
5	Washington Metropolitan Area Transit Authority	Washington, DC
6	Southeastern Pennsylvania Transportation Authority	Philadelphia, PA
7	San Francisco Municipal Railway	San Francisco, CA
8	New Jersey Transit Corporation	New York, NY
9	Metropolitan Atlanta Rapid Transit Authority	Atlanta, GA
10	New York City Department of Transportation*	New York, NY
11	Mass Transit Administration, Maryland DOT	Baltimore, MD
12	King County Department of Transportation	Seattle, WA
13	Metropolitan Transit Authority of Harris County	Houston, TX
14	San Francisco Bay Area Rapid Transit District	San Francisco, CA
15	Tri-County Metropolitan Transportation District of Oregon	Portland, OR
16	Miami-Dade Transit Agency	Miami, FL
17	San Diego Metropolitan Transit Development Board*	San Diego, CA
18	Port Authority of New York and New Jersey	New York, NY
19	Port Authority of Allegheny County	Pittsburgh, PA
20	Regional Transportation District	Denver, CO
21	Metro Transit	Minneapolis, MN
22	Milwaukee County Transit System	Milwaukee, WI
23	Dallas Area Rapid Transit Authority	Dallas, TX
24	Alameda-Contra Costa Transit District	San Francisco, CA
25	City and County of Honolulu Department of Transportation	Honolulu, HI
26	Greater Cleveland Regional Transit Authority	Cleveland, OH
27	Orange County Transportation Authority	Los Angeles, CA
28	Santa Clara Valley Transportation Authority	San Jose, CA
29	Regional Transit Authority of Orleans and Jefferson	New Orleans, LA
30	Bi-State Development Agency	St. Louis, MO
31	Regional Transportation Commission of Southern Nevada	Las Vegas, NV
32	VIA Metropolitan Transit	San Antonio, TX
33	City of Detroit Department of Transportation	Detroit, MI
34	Capital Metropolitan Transportation Authority	Austin, TX
35	Connecticut Transit	Hartford, CT
*Umbrella agency overseeing multiple semi-autonomous service providers		

Table 3.1 35 Largest US Transit Agencies by Number of Unlinked Passenger Trips, 2000[1]

[1] American Public Transportation Association, *2002 Public Transportation Fact Book* (Washington, DC, 2002), Table 2, p. 28

Metropolitan Area from the 2000 Census	Population
New York–Northern New Jersey–Long Island, NY–NJ–CT–PA CMSA	21,199,865
Los Angeles–Riverside–Orange County, CA CMSA	16,373,645
Chicago–Gary–Kenosha, IL–IN–WI CMSA	9,157,540
Washington–Baltimore, DC–MD–VA–WV CMSA	7,608,070
San Francisco–Oakland–San Jose, CA CMSA	7,039,362
Philadelphia–Wilmington–Atlantic City, PA–NJ–DE–MD CMSA	6,188,463
Boston–Worcester–Lawrence, MA–NH–ME–CT CMSA	5,819,101
Detroit–Ann Arbor–Flint, MI CMSA	5,456,428
Dallas–Fort Worth, TX CMSA	5,221,801
Houston–Galveston–Brazoria, TX CMSA	4,669,571
Atlanta, GA MSA	4,112,198
Miami–Fort Lauderdale, FL CMSA	3,876,380
Seattle–Tacoma–Bremerton, WA CMSA	3,554,760
Phoenix–Mesa, AZ MSA	3,251,876
Minneapolis–St. Paul, MN–WI MSA	2,968,806
Cleveland–Akron, OH CMSA	2,945,831
San Diego, CA MSA	2,813,833
St. Louis, MO–IL MSA	2,603,607
Denver–Boulder–Greeley, CO CMSA	2,581,506
San Juan–Caguas–Arecibo, PR CMSA	2,450,292
Tampa–St. Petersburg–Clearwater, FL MSA	2,395,997
Pittsburgh, PA MSA	2,358,695
Portland–Salem, OR–WA CMSA	2,265,223

Table 3.2 US metropolitan areas with population of at least than 2 million, 2000[2]

Non-work transit trips as a share of total transit trips

The Nationwide Personal Transportation Survey (NPTS) is used to determine the share transit trips that are non-work trips. The NPTS is a national travel diary survey, conducted at irregular intervals by the Federal Highway Administration.[3] The most recent survey for which complete results are available was conducted in 1995. Slightly more than 400,000 trips were recorded nationwide. For each trip, information is recorded on the trip purpose, the modes of travel used, and the metropolitan area where the trip took place.

Table 3.3, below, shows non-work transit trips as a percentage of total transit trips, in each of the seven largest metropolitan areas in the US. The table is sorted by metropolitan area

[2] United States Census Bureau, Census 2000 Summary File 3, Table P1. Total Population
[3] In 2001, the new National Household Travel Survey (NHTS) replaced the NPTS. Complete results from the NHTS were not available at the time of this writing.

population. "Total transit trips" are trips in which public transportation was used for any part of the trip. Trips recorded in the NPTS are linked trips, so multiple modes of travel could be used to complete a single trip. "Non-work transit trips" are transit trips with a non-work trip purpose, assigned based on the destination of each trip. Non-work trip purposes include: shopping, school, religious activity, medical/dental, other family/personal business, take someone somewhere, pick up someone, vacation, visit friends or relatives, went out to eat, and other social/recreational.

	Non-Work Transit Trips* as a % of…				
	Total Transit Trips	**Non-Home Transit Trips**	**Total Transit Trips**	**Non-Home Transit Trips**	
Metro Area	*Including Trips to School		*Excluding Trips to School		**n**
New York	39%	65%	34%	56%	3812
Los Angeles	45%	72%	34%	55%	126
Chicago	36%	60%	32%	53%	272
Washington	40%	58%	37%	54%	230
San Francisco	38%	62%	33%	53%	172
Philadelphia	44%	75%	40%	69%	217
Boston	33%	53%	27%	45%	783

Table 3.3 Non-work transit trips as a % of total transit trips in the largest metro areas, 1995[4]

It is standard practice in a travel diary survey to classify the purpose of a trip based on the destination of the trip. A difficulty with this approach, however, is that about 30% to 40% of all transit trips have a destination of "home." Because the NPTS assigns a purpose to each trip based on the destination of the trip, home trips are not classified as work or non-work trips. Consider a situation in which a person takes three sequential transit trips – to work, then to a restaurant, and then home. Is the trip home a work-related trip? There is no easy answer. The home trip originates from a non-work location (the restaurant), but work travel is the primary motivation behind the person's use of transit.

Table 3.3 shows non-work transit trips both as a share of total transit trips, and as a share of non-home transit trips (all transit trips with a destination other than home). Should non-work transit trips be measured as a share of total transit trips? This approach tacitly assumes that all home trips are work-related. This clearly understates non-work transit use, because obviously

[4] Federal Highway Administration, Nationwide Personal Transportation Survey, 1995

some home trips are unambiguously related to non-work activities. Should non-work transit trips be measured as a share of non-home transit trips? This approach tacitly assumes that the work/non-work breakdown of home trips is the same as the work/non-work breakdown of non-home trips. This may overstate non-work transit use modestly, because home trips may be disproportionately work-related.[5] Nevertheless, this approach is preferred.

Another question is whether to count trips to school as non-work trips. In a literal sense, of course they are non-work trips, but they are like work trips in the sense that they are daily commute trips. Moreover, transit agencies typically have little control over school trips. The left part of Table 3.3 includes trips to school as non-work trips, while the right part of the table does not include trips to school as non-work trips. Throughout the table, trips to school are included in the counts of total transit trips and non-home transit trips.

Looking at non-work trips as a percentage of non-home transit trips, with school trips not counted as non-work trips, there is a remarkable consistency among metropolitan areas. Non-work trips represent between 53% and 56% of transit trips in each of the five largest metropolitan areas. The share of non-work trips is somewhat larger in Philadelphia (69%) and somewhat lower in Boston (45%). Overall it is fair to say that in large US metropolitan areas, about half of all transit trips are non-work trips.

The NPTS is intended for national-level analysis, particularly of automobile travel. Sample sizes of transit trips in individual metropolitan areas are far too small for any meaningful analysis. The column labeled "n" in Table 3.3 shows the size of the sample of transit trips in each metropolitan area. In the each of these seven largest metropolitan areas, only a few hundred transit trips were recorded in the survey. In smaller metropolitan areas, only a handful of transit trips were recorded. That is why results for metropolitan areas smaller than Boston are not shown

[5] Excluding home trips would exclude half of the trips in a home-work-home journey, but only one-third of the trips in a home-shopping-restaurant-home journey. If trip-chaining is less common during the journey to work than during non-work journeys, then excluding home trips disproportionately excludes trips from journeys to work. This hypothesis about trip chaining could be tested through careful analysis of the NPTS data, but such a test is beyond the scope of this thesis.

in this table. Another problem with the NPTS is that time series comparisons are difficult, because of major methodological changes from survey to survey. Other data sources that do not suffer from these deficiencies are examined in the remainder of this chapter.

Growth in transit journeys to work

Data on non-work transit ridership is not available directly, so changes in transit journeys to work are compared to changes in total transit ridership in order to identify the metropolitan areas that experienced non-work transit growth. The US Census reports the number of workers in each metropolitan area who usually take public transportation to work.[6] This is not the share of workers, but the actual number of workers commuting on transit. Table 3.4, below, compares these numbers from the 1990 Census and the 2000 Census (under the heading of "Take Transit to Work") to show how transit journeys to work changed in each metropolitan area. For example, the 2000 Census found that more than 2.3 million workers in the New York metropolitan area usually take transit to work, an increase of more than 48,000 workers from the 1990 Census.

In Table 3.4, metropolitan areas are ranked by the percentage change in the number of people who take transit to work. Western cities – Portland, Seattle, and Denver – experienced large increases in the number of people taking transit to work. Most likely this is a result of population increases and expanded transit systems in those cities. In contrast, Rust Belt cities – Detroit, St. Louis, Philadelphia, Pittsburgh, and Cleveland – experienced considerable decreases in the number of people taking transit to work. Most likely this is the result of declining central city population and employment. Overall, the journey to work is a growing market for transit in only about half of the major metropolitan areas considered here.

[6] In the Census, "Public Transportation" includes bus, trolley bus, streetcar, trolley car, subway, elevated, railroad, ferryboat, and taxicab. "Workers" include workers age 16 and over.

Metro Area (brief name)	Population, 2000	Take Transit to Work		Change, 1990-2000	%Change, 1990-2000
		1990	2000		
Portland	2,265,223	39,259	63,126	23,867	60.79%
Seattle	3,554,760	82,619	119,919	37,300	45.15%
Denver	2,581,506	40,961	58,471	17,510	42.75%
Boston	5,819,101	227,948	261,862	33,914	14.88%
San Francisco	7,039,362	297,363	325,212	27,849	9.37%
San Diego	2,813,833	40,378	43,757	3,379	8.37%
Atlanta	4,112,198	69,822	75,272	5,450	7.81%
Minneapolis	2,968,806	69,125	71,146	2,021	2.92%
Houston	4,669,571	66,540	68,249	1,709	2.57%
New York	21,199,865	2,271,949	2,320,155	48,206	2.12%
Los Angeles	16,373,645	310,563	315,544	4,981	1.60%
Miami	3,876,380	64,240	64,135	-105	-0.16%
Dallas	5,221,801	46,504	45,765	-739	-1.59%
Chicago	9,157,540	524,756	484,835	-39,921	-7.61%
Washington	7,608,070	393,527	361,877	-31,650	-8.04%
Detroit	5,456,428	50,568	45,119	-5,449	-10.78%
St. Louis	2,603,607	33,994	29,915	-4,079	-12.00%
Philadelphia	6,188,463	284,579	245,909	-38,670	-13.59%
Pittsburgh	2,358,695	75,995	65,345	-10,650	-14.01%
Cleveland	2,945,831	56,675	47,111	-9,564	-16.88%

Table 3.4 Growth in transit journeys to work in major metro areas, 1990-2000[7]

Several caveats have to accompany these findings. Foremost is that the boundaries of metropolitan areas changed from the 1990 Census to the 2000 Census. As a city's population and employment sprawls outward, additional outlying counties are brought into the metropolitan area. Although the intent is to include newly developed suburbs in the metropolitan area, long-established outlying cities and towns are unwittingly folded into the metropolitan area as well. As a result, metropolitan population growth from one census to the next may be overstated. In theory, some of the growth in the number of people taking transit to work in 2000 could be the result of boundary redefinitions – i.e. people living in outlying areas who always took transit to work might seem like new people taking transit to work within a metropolitan area, simply because the boundaries of the metropolitan area were expanded for the 2000 Census. Fortunately,

[7] United States Census Bureau, 1990 Summary Tape File 3, Table P049. Means of Transportation to Work; United States Census Bureau, Census 2000 Summary File 3, Table P1. Total Population, and Table P30. Means of Transportation to Work for Workers 16 Years and Over

this effect is likely to be small, because transit ridership is strongly concentrated in central cities, not in outlying areas.

An extreme example of this phenomenon occurred in the Washington, DC metropolitan area. The 1990 Census includes separate metropolitan areas for Washington and Baltimore. By 2000, the suburbs of these two cities had grown together, so the 2000 Census incorporates Baltimore and its suburbs into the Washington metropolitan area. Without an awareness of this change, there would appear to be a tremendous increase in the population – and in the number of transit commuters – in the Washington metropolitan area from 1990 to 2000. To correct for this problem in Table 3.4, the number of people listed who took transit to work in 1990 in Washington is the sum of those who took transit to work in the Washington metropolitan area and in the Baltimore metropolitan area. In all of the forthcoming tables in chapter, Baltimore is included in the Washington metro area.

Another caveat is that the Census counts workers, not trips. The Census asks respondents how they "usually" commute to work. The fact that automobile commuters might occasionally take transit to work, or vice versa, is not captured. Similarly, the Census does not distinguish between people who commute five days a week, and people who work part-time or who work from home sometimes. Thus the Census counts of people who usually take transit to work are imperfect proxies for journey-to-work transit ridership.

Finally, some critics question the accuracy of the Census counts of workers. Schaller (2002) argues that the Census "clearly undercounts employed New York City residents." He observes that the Census "shows only 9,000 additional workers age 16 and over living in New York City in 2000 compared with 1990, a tiny gain of 0.3%," whereas Bureau of Economic Analysis figures show an 8.1% increase in employment in the city over the same time period.[8] As a result of undercounting workers, the number of workers who take transit to work might also

[8] Schaller Consulting, *Commuting, Non-Work Travel and the Changing City: An Analysis of Census 2000 Commuting Results for New York City* (Brooklyn, NY, 2002), p. 6

be undercounted. It is not clear to what extent the Census undercounts workers in different metropolitan areas, nor is it clear how the problem might be corrected. Therefore, Table 3.4 presents Census data at face value, under the assumption that it is generally accurate.

Growth in total transit ridership

Data on total transit ridership is available from the Federal Transit Administration. Transit agencies report their annual ridership to the National Transit Database (NTD). Adding up the ridership figures for all of the major transit agencies in a metropolitan area yields the approximate total level of transit ridership in that area. For this calculation, a transit agency is considered to be "major" if it is one of the 35 largest transit agencies (listed in Table 3.1 above), or if it operates heavy rail, commuter rail, or light rail transit (excluding vintage trolleys).

Table 3.5, below, lists all of the major transit agencies serving each of the twenty major metropolitan areas. For each agency, the table indicates if it is one of the 35 largest transit agencies, and if it operates rail transit. Note that there is not a perfect match between transit agencies and metropolitan areas. The Census Bureau defines the boundaries of metropolitan areas. A transit agency might provide service that extends beyond the official boundaries, although that is unlikely because metropolitan boundaries tend to be defined very broadly.

A more common problem is that in addition to the major transit agencies listed in Table 3.5, metropolitan areas typically include a variety of small bus and paratransit operators, which typically serve the suburbs and outlying small cities. This problem is particularly acute in California, where there are numerous municipal and county transit agencies. It would take a considerable amount of work to determine which small agencies serve which metropolitan areas. Furthermore, not all small agencies report to the NTD. As a result, ridership at small agencies is not included in the calculation of total ridership in a metropolitan area. Fortunately, in most areas, the small agencies collectively handle just a small fraction of the region's total transit ridership.

Metro Area	Transit Agency	Top 35	Rail
Atlanta	Metropolitan Atlanta Rapid Transit Authority	Yes	Yes
Boston	Massachusetts Bay Transportation Authority	Yes	Yes
Chicago	Regional Transportation Authority*	Yes	Yes
	Northern Indiana Commuter Transportation District	No	Yes
Cleveland	Greater Cleveland Regional Transit Authority	Yes	Yes
Dallas	Dallas Area Rapid Transit Authority	Yes	Yes
	Fort Worth Transportation Authority	No	Yes
Denver	Regional Transportation District	Yes	Yes
Detroit	City of Detroit Department of Transportation	Yes	No
Houston	Metropolitan Transit Authority of Harris County	Yes	No
Los Angeles	Los Angeles County Metropolitan Transportation Authority	Yes	Yes
	Orange County Transportation Authority	Yes	No
	Southern California Regional Rail Authority (Metrolink)	No	Yes
Miami	Miami-Dade Transit Agency	Yes	Yes
	Tri-County Commuter Rail Authority	No	Yes
Minneapolis	Metro Transit	Yes	No
New York	Metropolitan Transportation Authority*	Yes	Yes
	New Jersey Transit Corporation	Yes	Yes
	Port Authority of New York and New Jersey	Yes	Yes
	New York City Department of Transportation*	Yes	No
Philadelphia	Southeastern Pennsylvania Transportation Authority	Yes	Yes
	Pennsylvania Department of Transportation	No	Yes
	Port Authority Transit Corporation	No	Yes
Pittsburgh	Port Authority of Allegheny County	Yes	Yes
Portland	Tri-County Metropolitan Transportation District of Oregon	Yes	Yes
San Diego	San Diego Metropolitan Transit Development Board*	Yes	Yes
	North San Diego County Transit Development Board	No	Yes
San Francisco	San Francisco Bay Area Rapid Transit District	Yes	Yes
	San Francisco Municipal Railway	Yes	Yes
	Santa Clara Valley Transportation Authority	Yes	Yes
	Alameda-Contra Costa Transit District	Yes	No
	Altamont Commuter Express	No	Yes
	Peninsula Corridor Joint Powers Board (Caltrain)	No	Yes
Seattle	King County Department of Transportation	Yes	Yes
	Central Puget Sound Regional Transit Authority	No	Yes
St. Louis	Bi-State Development Agency	Yes	Yes
Washington	Mass Transit Administration, Maryland DOT	Yes	Yes
	Washington Metropolitan Area Transit Authority	Yes	Yes
	Virginia Railway Express	No	Yes
*Including all service providers under the umbrella of this agency			

Table 3.5 Major transit agencies serving the twenty major metropolitan areas[9]

[9] American Public Transportation Association, pp. 28, 133, 141;
Federal Transit Administration, National Transit Database, 2000

Annual ridership in 1990 and in 2000 at each of the aforementioned major transit agencies is aggregated to produce ridership totals for each metropolitan area.[10] These totals are shown in Table 3.6, below. This table is sorted by percentage change in ridership from 1990 to 2000. Western cities – Portland, Denver, and San Diego – experienced the largest gains in transit ridership. Rust belt cities – Philadelphia, Pittsburgh, Cleveland, and Detroit – experienced the largest declines in transit ridership. St. Louis is a striking exception, in that it experienced double-digit percentage growth in ridership despite being a Rust Belt city. New York also is striking in that it achieved double-digit percentage growth in ridership on top of a very large base of existing ridership. New York added more than 423 million trips, equal to 84% of the total ridership growth that occurred in all twenty metropolitan areas.

Metro Area	Ridership, 1990	Ridership, 2000	Change	%Change
Portland	54,420,245	86,917,412	32,497,167	59.72%
Denver	53,261,785	76,823,292	23,561,507	44.24%
San Diego	68,201,979	95,110,106	26,908,127	39.45%
Seattle	80,317,915	103,130,504	22,812,589	28.40%
Dallas	50,717,120	64,376,727	13,659,607	26.93%
St. Louis	44,577,653	52,137,324	7,559,671	16.96%
New York	2,740,139,789	3,163,559,988	423,420,199	15.45%
Atlanta	147,882,193	167,067,140	19,184,947	12.97%
Miami	77,711,940	86,363,970	8,652,030	11.13%
Boston	323,563,782	354,860,333	31,296,551	9.67%
San Francisco	423,845,661	451,191,181	27,345,520	6.45%
Los Angeles	455,082,265	482,676,094	27,593,829	6.06%
Minneapolis	69,588,432	73,477,709	3,889,277	5.59%
Houston	88,366,786	87,379,125	-987,661	-1.12%
Washington	474,186,260	465,073,554	-9,112,706	-1.92%
Chicago	646,989,719	593,640,622	-53,349,097	-8.25%
Philadelphia	367,487,274	328,039,280	-39,447,994	-10.73%
Pittsburgh	86,718,756	75,130,612	-11,588,144	-13.36%
Cleveland	74,322,938	63,561,916	-10,761,022	-14.48%
Detroit	83,653,204	44,042,397	-39,610,807	-47.35%

Table 3.6 Transit ridership in major metro areas, unlinked passenger trips, 1990-2000[11]

[10] In some cases, the administrative structure of transit agencies changed between 1990 and 2000. The 1990 totals include ridership at transit agencies that are predecessors to the transit agencies listed in Table 3.4

[11] Federal Transit Administration, National Transit Database, 1990 and 2000

The measure of ridership used in this table is unlinked passenger trips. This measure tends to be reported accurately; however, if transit service changes in such a way that passengers make a different number of transfers than they did previously, this measure can be misleading. Every time a passenger boards a bus or enters a rail system, he or she makes an unlinked trip. Suppose a new express bus service is implemented, that provides direct service to the downtown for passengers who previously took a local bus and transferred to a different local bus. Although there might be the same number of passengers making this journey, the number of unlinked trips would decline, simply because passengers now only board one bus to complete their journeys. Conversely, suppose a new rail line opens, and buses that used to travel all the way to the downtown are rerouted to feed the rail line. Passengers traveling downtown would now ride a bus and the train, whereas they previously rode only a bus, so the number of unlinked trips would increase.

The NTD also includes data on passenger miles. Passenger miles are more representative of some of the benefits of transit ridership, and they are not subject to the problems related to transfers. Unfortunately, data on passenger miles tends to be less accurate than data on unlinked passenger trips, because it is harder for transit agencies to measure passenger miles. This was especially true in the earlier years of the NTD program. Passenger mile data for 1990 is missing altogether for some transit agencies.[12] Because of these problems, passenger mile data is not used here.

Non-work travel as a driver of transit ridership growth

Tables 3.7 and 3.8, below, compare the growth in rates in transit journeys to work and total transit ridership. Where total transit ridership increased faster than transit journeys to work, it stands to reason that non-work travel helped to increase ridership. Where total transit ridership increased slower than transit journeys to work, it stands to reason that non-work travel did not

[12] Federal Transit Administration, National Transit Database, 1990

help to increase ridership. It appears that non-work travel was responsible for ridership growth in thirteen of the twenty metropolitan areas. The "Difference in Growth Rates" columns in the tables below indicate the magnitude of this effect.[13] Overall, it seems that non-work travel is indeed a growing market for mass transit in many areas.

Metropolitan Area	Journey to Work % increase (A)	Unlinked Trips % increase (B)	Difference in Growth (B-A)
San Diego	8.37 %	39.45 %	31.09 points
New York	2.12 %	15.45 %	13.33 points
Atlanta	7.81 %	12.97 %	5.17 points
Los Angeles	1.60 %	6.06 %	4.46 points
Minneapolis	2.92 %	5.59 %	2.67 points
Denver	42.75 %	44.24 %	1.49 points
St. Louis	-12.00 %	16.96 %	28.96 points
Dallas	-1.59 %	26.93 %	28.52 points
Miami	-0.16 %	11.13 %	11.30 points
Washington	-8.04 %	-1.92 %	6.12 points
Philadelphia	-13.59 %	-10.73 %	2.85 points
Cleveland	-16.88 %	-14.48 %	2.40 points
Pittsburgh	-14.01 %	-13.36 %	0.65 points

Table 3.7 Metro areas where non-work travel helped to increase transit ridership[14]

In the areas listed in the uppermost part of the table – San Diego, New York, Atlanta, Los Angeles, Minneapolis, and Denver – journeys to work increased, but unlinked trips increased faster. In these areas, growth in non-work travel contributed to increasing ridership. The best example of this phenomenon is San Diego, where unlinked trips increased by more than 39%, even though the number of people taking transit to work increased by only 8%.

In the areas listed in the middle part of the table – St. Louis, Dallas, and Miami – journeys to work decreased, but unlinked trips increased anyway. In these areas, growth in non-work travel avoided declines in ridership. The best example of this phenomenon is St. Louis, where unlinked trips increased by nearly 17%, even though the number of people taking transit to work actually declined by 12%.

[13] A word of caution: the "Difference in Growth" figures are produced by subtracting percentages that have different bases. The resulting figures are useful for ranking metropolitan areas (as in Tables 3.7 and 3.8), but the numbers themselves have no inherent meaning.
[14] Synthesis of results cited earlier in Tables 3.4 and 3.6

In the areas listed in the bottom part of the table – Washington, Philadelphia, Cleveland, and Pittsburgh – journeys to work decreased, but unlinked trips decreased slower. In these areas, growth in non-work travel kept ridership losses from being worse. In none of these cities is the effect particularly pronounced, however.

Metropolitan Area	Journey to Work % increase (A)	Unlinked Trips % increase (B)	Difference in Growth (B-A)
Portland	60.79 %	59.72 %	-1.08 points
San Francisco	9.37 %	6.45 %	-2.91 points
Boston	14.88 %	9.67 %	-5.21 points
Seattle	45.15 %	28.40 %	-16.74 points
Houston	2.57 %	-1.12 %	-3.69 points
Chicago	-7.61 %	-8.25 %	-0.64 points
Detroit	-10.78 %	-47.35 %	-36.58 points

Table 3.8 Metro areas where non-work travel did not help increase transit ridership[15]

In the areas listed in the uppermost part of the table – Portland, San Francisco, Boston, and Seattle – journeys to work increased but unlinked trips increased slower. In these areas, non-work travel was not responsible for increasing ridership. This is not to suggest that the transit agencies in those cities failed to attract more non-work riders. Rather, these agencies were successful in increasing the attractiveness of transit for the journey to work. They attracted new work riders to a greater degree than they attracted new non-work riders.

In the area listed in the middle part of the table – Houston – journeys to work increased, but unlinked trips decreased anyway. In this area, declines in non-work travel negated possible ridership growth. The effect is very modest, however, as both journeys to work and unlinked trips essentially remained flat.

In the areas listed in the bottom part of the table – Chicago and Detroit – journeys to work decreased, but unlinked trips decreased faster. In these areas, declines in non-work travel made ridership losses worse. The most striking example of this phenomenon is Detroit, where unlinked trips declined by more than 47%, even though journeys to work declined by less than 11%. The extreme loss of non-work ridership in Detroit indicates a fundamental failure of the

[15] Synthesis of results cited earlier in Tables 3.4 and 3.6

transit agency to meet the needs of its riders. Additionally, the extreme economic distress, population loss, and crime that Detroit has experienced undoubtedly have helped to deter non-work transit use.

Selection of case study areas

Non-work travel is a growth opportunity for transit, but cities have not been equally successful at building non-work transit ridership. The following chapters consist of detailed case studies of two metropolitan areas – one in which non-work travel helped to increase transit ridership, and one in which it did not. The following criteria were used to select metropolitan areas for case studies:

- Look at only two cases in depth
- Look at growth in non-work ridership ("Difference in Growth" in Tables 3.7 and 3.8)
- Pick one baseline case, and one successful case
- Percentage changes should be large, but outliers should be avoided
- Cities should be similar to each other, to control for external effects
- Cities should be similar to other US cities, to make results generalizable
- Cases should be relevant to Tren Urbano and the Chicago Transit Authority

Using these criteria, Chicago was chosen as the baseline case, and St. Louis was chosen as the successful case.

Chicago was chosen as the baseline case – where non-work travel did not contribute to increasing ridership – because MIT has a joint research program with the Chicago Transit Authority (CTA). Chicago is a suitable case for other reasons, as well. Portland, San Francisco, Boston, and Seattle should not be considered to be unsuccessful examples, even though non-work travel was not responsible for increasing ridership, because those cities were successful at increasing transit use for work travel. The only other cities where non-work travel did not

contribute to ridership growth are Houston, Chicago, and Detroit. With a 47% decline in unlinked trips, Detroit is clearly the most unsuccessful example, but seems like something of an outlier. Houston does not have any rail transit, and would therefore be less relevant to Tren Urbano. Thus, Chicago was selected as the most appropriate baseline case.

There are quite a few successful examples. San Diego, New York, St. Louis, Dallas, and Miami all have double-digit differences in growth, suggesting that non-work travel was a major contributor to ridership growth. New York is an interesting case in its own right, and is somewhat comparable to Chicago in size and urban form, but it is not similar to other US cities. New York has a much larger population, a much denser central city, and a much more extensive transit system than any other US city.

Of the remaining three successful examples, St. Louis was chosen as the successful case because is the most comparable to Chicago. Both are Midwestern cities with rail transit, that have faced economic challenges in recent decades. Transit journeys to work declined by comparable percentages in both Chicago and St. Louis, but St. Louis nevertheless exhibited strong growth in unlinked trips, whereas Chicago saw unlinked trips decline by about the same percentage as journeys to work. The St. Louis case also is relevant to Tren Urbano, because St. Louis unveiled an entirely new, and highly successful, rail system in the early 1990's. Furthermore, the St. Louis metropolitan area has roughly the same population as the San Juan metropolitan area.

It is important to note, however, that while St. Louis and Chicago are relatively comparable, there are some significant differences as well. Chicago is several times larger than St. Louis. It also has an older and more extensive rail transit network, and has proportionally much higher transit ridership. Finally, Chicago also as a much larger and more prosperous downtown office market.

Case study research methodology

The St. Louis and Chicago case studies are presented in upcoming chapters. What follows here is a brief description of the format and research methodology of each case study. Remember that the ultimate goal of each case study is to identify markets that are strong sources of non-work transit ridership, and to help transit agencies build ridership in those markets. Types of markets could include demographic groups, neighborhoods, or trip purposes.

Each case was selected for study because of the difference in growth between transit ridership and transit journeys to work, as shown in Tables 3.7 and 3.8 above. Each case study begins by verifying that difference in growth through a closer look at ridership and census data. Ridership data is examined by mode, for every year from 1990 to 2000. Census journey-to-work data is examined by mode and by county of residence. It is expected that ridership and journey-to-work trends are more complicated that the analysis in Tables 3.7 and 3.8 would suggest.

It is also expected that the most significant ridership changes occurred on only part of each metropolitan area's transit system, such as on a particular mode or transit agency. That part of the system becomes the focus of further study. Background information is presented about this part of the transit system. Such information includes a description of the transit system's routes, a demographic profile of its riders, and a listing of non-work trip generators that it serves. This background information is based on maps, interviews, published and online sources, and site visits conducted in the summer of 2003. Ancillary data is presented to aid in understanding why ridership changed in the 1990's.

Armed with such background information, each case seeks to identify the non-work travel markets that are strong sources of ridership on that particular part of the transit system. This identification of markets involves determining who is using transit for non-work travel, and where those people are traveling. The "who" question is answered through the an analysis of survey data. For the St. Louis case, the data source is the East-West Gateway Coordinating Council's 2002 Onboard Passenger Survey. For the Chicago case, two surveys from the Chicago

Transit Authority are analyzed: the 2000 Traveler Behavior and Attitudes Survey, and the 2001 Customer Satisfaction Survey. The "where" question is answered through an analysis of ridership data. Individual rail stations and, in Chicago, individual bus routes are ranked by ridership in four off-peak time periods. For this analysis, off-peak ridership is used as an imperfect proxy for non-work ridership. Note that all of these analyses are similar to format of this chapter, i.e. databases are mined, and numerous tables of relevant findings are presented, but no statistical techniques are attempted.

The overview and identification of markets is presented in one chapter for the St. Louis case study, but is divided into two chapters for the Chicago case study. The Chicago case is much larger, both because Chicago has a larger and more complicated transit network, and because a greater amount of data was made available for analysis from the Chicago Transit Authority. The review of journey-to-work and ridership trends and other background information are presented in an "Overview" chapter, while the analysis of survey and ridership data and the identification of markets are presented in an "Identification of Markets" chapter. This dichotomy is appropriate because this research is being conducted partly on behalf of the Chicago Transit Authority. CTA officials should be interested in reading the original results presented in the "Identification of Markets" chapter, but there is no need for them to read the lengthy description of the Chicago transit system presented in the "Overview" chapter.

Each non-work travel market identified in the two case studies is then discussed in the "Characteristics of Markets" chapters. These chapters (one for St. Louis and one for Chicago) briefly explore the existing body of knowledge about each market. Key characteristics of each market are discussed, based on secondary sources, press articles, and existing market research. Only sources that are specific to the St. Louis and Chicago experiences are considered. For the Chicago chapter, an extensive body of CTA market research is consulted. Based on these general discussions of market characteristics, conclusions are offered about the benefits of providing

transit service to each market, and about the effectiveness of current transit service to each market in St. Louis or Chicago.

Following the "Characteristics of Markets" chapters, the concluding chapter of this thesis synthesizes the lessons of the case studies, and offers generalized recommendations for all transit agencies about service to non-work markets. This concluding chapter also makes an explicit comparison between St. Louis and Chicago, to offer a final assessment of why St. Louis succeeded in building non-work ridership in the 1990's, while Chicago did not.

IV. St. Louis Case Study: Overview and Identification of Markets

The St. Louis metropolitan region straddles the Mississippi river, and has been dubbed the "Gateway to the West." The City of St. Louis is located west of the river in Missouri, as is most of the metropolitan population. Across the river is Illinois, which includes East St. Louis. With a population of 2.6 million, St. Louis was the eighteenth largest US metropolitan area in 2000.[1] The St. Louis region's major transit agency is the Bi-State Development Agency (BSDA).[2] BSDA operates bus, light rail, and paratransit systems in the City of St. Louis and three surrounding suburban counties.

Transit ridership by mode, 1990 to 2000

St. Louis was selected for study because preliminary inquiry suggests that transit ridership increased by nearly 17% in the 1990's, even though the number of people taking transit to work actually declined by 12%. The first order of business in this chapter is to verify that premise through a closer look at ridership and journey to work data. Table 4.1, below, shows the annual ridership on each BSDA mode of transit, from 1990 to 2000. Although ridership grew system-wide by 17%, the growth followed strikingly different trajectories on each mode.

Year	Bus	Rail	Paratransit	Total
1990	44,350,361	-	227,292	44,577,653
1991	46,578,442	-	249,459	46,827,901
1992	42,584,868	-	288,263	42,873,131
1993	40,485,809	-	272,086	40,757,895
1994	39,912,552	8,004,883	263,495	48,180,930
1995	38,680,630	12,488,222	283,735	51,452,587
1996	37,607,202	12,870,102	332,313	50,809,617
1997	38,427,490	14,485,795	363,603	53,276,888
1998	39,566,282	14,560,291	377,005	54,503,578
1999	38,198,287	14,980,696	403,925	53,582,908
2000	37,535,636	14,165,766	435,922	52,137,324

Table 4.1 Ridership on Bi-State Development Agency transit, unlinked trips, 1990-2000[3]

[1] See Chapter 3, Table 3.2
[2] In February 2003, Bi-State Development Agency renamed itself "Metro St. Louis."
[3] Federal Transit Administration, National Transit Database, 1990 through 2000

The bus system lost 15% of its ridership over the decade. Ridership declined steadily from 46.6 million unlinked trips in 1991 to 37.6 million in 1996. Bus ridership then remained relatively stable in the late 1990's, but amounted to only 37.5 million unlinked trips in 2000, the lowest level achieved throughout the decade. In contrast to the bus system, paratransit ridership nearly doubled from 1990 to 2000. Even in 2000, though, paratransit represented less than 1% of total BSDA ridership.

Other than paratransit, all of the ridership growth occurred on the rail system. Known as MetroLink, the rail system is a single light rail line that opened in July 1993. This line features nineteen stations, including two that did not open until 1994, and one that was added in 1998.[4] It follows a seventeen mile route from Lambert Airport (northwest of the city) to downtown, and then across the Mississippi River to East St. Louis.[5] From when it opened, ridership increased steadily to a peak of 15.0 million unlinked trips in 1999, then declined slightly to 14.2 million trips in 2000. In 2000, MetroLink carried 27% of total BSDA ridership. This is remarkable, considering that MetroLink is just one rail line, while the bus system consists of dozens of routes and covers all of the City of St. Louis as well as much of the suburbs.

Projected Average Weekday Ridership		**Actual Average Weekday Ridership**	
Time	Ridership	Ridership	Time
Outset of service	12,000	26,500	First month of service
End of first year of service	17,000	44,414	12th month of service (7/94)
2010	35,000	44,500	1998

Table 4.2 MetroLink ridership: projected vs. actual[6]

[4] Center for Transportation Excellence, "Transit Profile: The St. Louis area MetroLink light rail system." http://www.cfte.org/success/success_stlouis.pdf
The Lambert Airport East station opened in 1998, as part of an airport expansion.

[5] In 2001, MetroLink was extended further into suburban St. Clair County, Illinois. Because this extension opened after 2000, it is beyond the scope of this thesis. In this thesis, descriptions of MetroLink refer only to the initial segment that opened in 1993-1994.

[6] Center for Transportation Excellence;
Robert Cervero, *The Transit Metropolis: A Global Inquiry* (Washington, DC: Island Press, 1998), p. 431;
Surface Transportation Policy Project, "OP/ED: A Light Rail Letter to the Editor." http://www.transact.org/progress/dec01/letter.asp;
Paul M. Weyrich and William S. Lind, *Does Transit Work? A Conservative Reappraisal* (Washington, DC: Free Congress Foundation, 1999)

Not only is MetroLink responsible for essentially all transit ridership growth in St. Louis, ridership on MetroLink has exceeded projections by a considerable margin. Table 4.2, above, shows how actual rail ridership compares to the forecasts that were made before service began. Ridership at the outset of service was more than double what was predicted. By 1998, just five years after opening, ridership was 27% higher than what had been predicted for the year 2010.

Some critics charge that BSDA's ridership growth is an illusion. Wendell Cox, a private consultant and outspoken opponent of most new US rail transit projects, resides in the St. Louis region. He charges that:

> The Bi-State Development Agency undertook an aggressive program to coordinate bus and rail services, truncating many routes at light rail stations. As a result, many trips that formerly required a single boarding now require two boardings, as transfers are forced from buses to light rail. This effect is to exaggerate the apparent increase in total transit boardings and per capita boardings.[7]

Cox reviews passenger mile statistics, as reported to the National Transit Database. He finds that total passenger miles on BSDA services (bus and MetroLink) increased by 3.3% from 1990 to 1995, "considerably less than the 15.8% increase in boardings" over the same period[8] He concludes that the "net increase in transit ridership" is equal to a 3.3% increase in 1990 bus unlinked trips – a figure that "represents approximately 1/8 of gross light rail ridership."[9] In other words, Cox insinuates that seven-eighths of light rail riders are former bus riders, now double-counted as they transfer from bus to rail.

Cox makes a valid point that the introduction of a new rail line could have a misleading impact on the number of unlinked trips. Cox's analysis is suspect, however, because of the implicit assumptions that he makes. Cox assumes that passenger mile data is accurate. In fact, transit passenger mile data tends to be much less reliable than unlinked trip data. In calculating the "net increase in transit ridership," Cox also assumes that average transit passenger trip lengths

[7] The Public Purpose (Wendell Cox Consultancy), "St. Louis Public Transport Trend in Passenger Miles: 1990-1995." http://www.publicpurpose.com/ut-stlpm.htm
[8] The Public Purpose
[9] The Public Purpose

remained constant between 1990 and 1995. In fact, there is no good reason to assume that average trip lengths on MetroLink are the same as average trip lengths were on pre-MetroLink bus service. Indeed, it may not even be valid to assume that average bus trip lengths remained constant from 1990 to 1995. Bus ridership declined over that period, and it may be that there was a greater loss of long bus trips, since such trips are less competitive with automobile travel.

A detailed analysis of passenger mile data would be needed to test Cox's assumptions. Meanwhile, all other evidence suggests that the double-counting of former bus riders accounts for just a small portion of MetroLink ridership. A 1995 BSDA survey indicates that 85% of MetroLink riders are new to transit; only 15% rode the bus before MetroLink opened.[10] Thus the great majority of MetroLink ridership is new ridership. Of the 15% who did ride the bus previously, not all necessarily had direct bus rides before MetroLink opened. Some of these riders may have replaced a bus-to-bus transfer with a bus-to-rail transfer, and did not actually start making additional unlinked trips once MetroLink opened. Thus fewer than 15% of MetroLink riders are former bus riders now forced to transfer to rail. That figure is much smaller than the seven-eighths of ridership estimated by Cox.

To be fair, some double-counting of riders does occur, but the exact magnitude of the phenomenon is unknown. Exact data on bus-rail transfers is not available because BSDA uses low-technology fare media such as paper flash passes, and a proof-of-payment system on MetroLink. Surveys of riders disagree about what percentage of MetroLink trips involve a bus transfer. One case study of St. Louis transit reports that "the rate of transfer from train to buses has moved from 26 percent in 1993 to 43 percent in 1995," according to BSDA rider surveys.[11] A more comprehensive 2002 rider survey found that between 13% and 23% of trips on MetroLink involve a bus transfer. Unfortunately, this latter survey was conducted in 2002, after a

[10] Weyrich and Lind
[11] Weyrich and Lind

new MetroLink extension opened in suburban St. Clair county.[12] In the 1990's, before this extension opened, the percentage of MetroLink riders transferring to or from buses may have been higher. The wide range of values – 13% to 43% – illustrates the fallibility of rider surveys, but in any case the level of double-counting is far less than seven-eighths of ridership.

Moreover, since 85% of MetroLink riders are new riders, many of those transferring are new MetroLink riders who started taking the bus for the first time in order to access the train. BSDA estimated in 1995 that between 5% and 9% of local bus riders started using transit altogether because of MetroLink.[13] Applying those percentages to 1995 bus and MetroLink ridership figures suggests that more than 15% of MetroLink riders are "new" bus riders, in addition to the 15% of MetroLink riders who are "old" bus riders. Overall, it seems that the majority of MetroLink riders do not transfer between rail and bus; and of those who do transfer, more than half are new transit riders who did not ride the bus before MetroLink opened. MetroLink really has brought new riders to transit.

Census journey-to-work data by mode and county

As discussed in the previous chapter, census data indicate that the number of people who take transit to work decreased by 12% in the St. Louis metropolitan area from 1990 to 2000. How does that finding compare to the ridership trends shown in Table 4.1 above? It is necessary to break down census journey-to-work data by mode and county of residence. The 12% finding was based on a count of transit commuters throughout the metropolitan region, but BSDA service is concentrated in the city and inner suburbs. Specifically, BSDA operates bus service in St.

[12] NuStats, *Bi-State Development Agency, St. Clair County Transit District and Madison County Transit District On-Board Passenger Survey: Final Report*, prepared for the East-West Gateway Coordinating Council, 15 October 2002, pp. 27-30
This survey found that 11% of MetroLink riders transfer from a bus to the train, and 12% of MetroLink riders transfer from the train to a bus. Adding those two percentages together, 23% of MetroLink rides involve a bus transfer (assuming that there are no bus-rail-bus trips). The survey also asked MetroLink riders how many transit vehicles (including the MetroLink train) were needed to complete a one-way trip, and responses indicate that only 13% of MetroLink trips involve a bus transfer.
[13] Weyrich and Lind

Louis City and St. Louis County in Missouri, and in St. Clair and Madison Counties in Illinois. (St. Louis County surrounds the City of St. Louis to the west, but the city itself is not part of any county). Each county borders the city, and each has MetroLink stations, except Madison. More than 90% of the transit commuters in the St. Louis metropolitan region live in these four areas.[14]

Place of Residence	1990	2000	Change	%Change
St. Louis City, MO	18,631	13,941	-4,690	-25%
St. Louis County, MO	7,544	6,546	-998	-13%
St. Clair County, IL	3,776	2,675	-1,101	-29%
Madison County, IL	1,517	1,537	20	1%
Total	31,468	24,699	-6,769	-22%

Table 4.3 Number of people who take bus transit to work, 1990 and 2000[15]

Table 4.3, above, shows the number of people who take the bus to work, in each of the counties in which BSDA operates bus service, in 1990 and 2000. The number of people taking the bus to work declined overall by 22%. Such a decline is consistent with the 15% decline in bus ridership that occurred over the decade. The fact that actual bus ridership declined by a smaller percentage than the number of bus commuters suggests that non-work bus ridership did not decline as sharply as journey-to-work bus ridership.

The decline in bus ridership can be explained by population loss and weak economic conditions in the City of St. Louis. The city experienced a 12% decline in population from 1990 to 2000, and a similar 11% decline in the total number of workers living there.[16] The other counties did not experience similar declines, but city population trends have a greater effect on bus ridership because the route network is concentrated in the city, and most bus riders live there. Economically, as a Rust Belt city, St. Louis lost a great number of jobs in the 1970's and 1980's., and these losses continued into the 1990's. From 1986 to 1996, the City of St. Louis lost 30,000

[14] The 1990 total in Table 4.3 equals 93% of the 1990 total for St. Louis in the previous chapter's Table 3.4
[15] United States Census Bureau, 1990 Summary Tape File 3, Table P049. Means of Transportation to Work; United States Census Bureau, Census 2000 Summary File 3, Table P30. Means of Transportation to Work for Workers 16 Years and Over
[16] United States Census Bureau, Census 2000 Ranking Tables for Incorporated Places of 100,000 or More: 1990 and 2000, Table 2. Incorporated Places of 100,000 or More, Ranked by Population: 2000; United States Census Bureau, Census 2000 Summary File 3, Table P30. Means of Transportation to Work for Workers 16 Years and Over

jobs, and its share of jobs in the metropolitan region declined from 27% to 21%.[17] Downtown St. Louis and some surrounding neighborhoods had 29% fewer businesses in 1996 than in 1990, according to the city assessor's office.[18] A 1996 report in the *St. Louis Post-Dispatch* found that out of 641 buildings downtown, 91 were completely vacant and 52 were more than half empty.[19] Downtown employment partially rebounded from 1996 to 2000, increasing by 8%, but nearly all of that growth occurred at the western fringe of downtown in areas that are more auto-oriented and that have less transit service than the historic core.[20] In light of these conditions, it is easy to understand why bus ridership declined in the 1990's.

Place of Residence	"Streetcar or Trolley Car"	"Subway or Elevated"	"Railroad"	Total Rail Commuters
St. Louis City, MO	168	413	103	684
St. Louis County, MO	222	1,217	187	1,626
St. Charles County, MO	0	167	8	175
St. Clair County, IL	80	399	66	545
Madison County, IL	10	86	33	129
Total	480	2,282	397	3,159

Table 4.4 Number of people who take rail transit to work, as recorded in Census 2000[21]

Rail transit did not exist as an option for St. Louis area commuters in 1990, but it did in 2000. Table 4.4, above, shows the number of people who commute to work on rail transit, as reported by Census 2000. This table also includes St. Charles County, even though BSDA does not operate service there, because the North Hanley park-and-ride station on MetroLink is particularly convenient for St. Charles commuters. St. Charles County is northwest of St. Louis County, and does not border the city at all, but North Hanley is located along the main freeway that connects St. Charles to downtown St. Louis.

[17] Downtown Now!, *City of St. Louis Downtown Development Action Plan, Phase II: Understanding of the Physical Setting and Market Opportunities*, August 1998, Section IV, p. 1
[18] Charlene Prost, "Not Everyone Agrees on What Downtown Covers," *St. Louis Post-Dispatch*, 8 December 1996, p. 4B
[19] Charlene Prost, "Silent, Empty, Shabby," *St. Louis Post-Dispatch*, 8 December 1996, p. 1B
[20] Charlene Prost, "Survey Gets Handle on Downtown," *St. Louis Post-Dispatch*, 9 October 1997, p. 1A; Charlene Prost, "Downtown St. Louis Shows Net Growth in Commerce; Survey Reveals Gain of 67 Businesses and 2,902 Employees," *St. Louis Post-Dispatch*, 25 March 2001, p. E1
[21] United States Census Bureau, Census 2000 Summary File 3, Table P30. Means of Transportation to Work for Workers 16 Years and Over

The results in Table 4.4 should be a cause for alarm. The total number of people reported to take rail transit to work is far too low. As will be discussed below, surveys indicate that 47% of MetroLink trips are work trips. Based on that fact, and MetroLink's average weekday ridership, it is estimated that slightly more than 10,000 people commute to work on MetroLink. This estimate is presented in Table 4.5, below. The "Source" column in the table explains how the estimate is calculated. This estimate is much higher than the 3,159 people who commute to work on rail transit according to the census. The census data appear to be erroneous.

Variable	Label	Source	Estimate
Average weekday MetroLink ridership	A	Table 4.2 above	44,500
% of work trips on MetroLink	B	Table 4.11 below	47%
No. of one-way work trips on MetroLink	C	A*B	20,915
MetroLink commuters (no. of daily round trips)	D	C/2	10,458

Table 4.5 Estimate of the number of people who commute to work on MetroLink

One reason for the disparity is that MetroLink is widely referred to as "light rail," but the census does not include "light rail" as a choice in its "How did you usually get to work last week?" question.[22] The only rail transit options are "streetcar or trolley car," "subway or elevated," and "railroad." Table 4.4 shows that respondents in the St. Louis region did not know which to select. Most selected "subway or elevated" – perhaps because MetroLink runs through a short subway tunnel downtown – but some selected each of the other options. Many other light rail commuters must have left the question blank, thereby leading to an undercount of riders.

The census asks respondents to select the mode used "usually used," and the mode used "for the most distance" if more than one mode is used in the journey to work.[23] People who sometimes drive to work and sometimes take MetroLink may have indicated that they commute by auto. Park-and-ride users may have indicated that they commute by auto, since they may drive considerable distances to reach MetroLink stations. Similarly, people who transfer from the bus to MetroLink may have indicated that they commute by bus. These are legitimate reasons why

[22] Schaller Consulting, *Commuting, Non-Work Travel and the Changing City: An Analysis of Census 2000 Commuting Results for New York City* (Brooklyn, NY, 2002), p. 13
[23] Schaller Consulting, p. 13

people may have indicated that they commute by a mode other than rail, but they still lead to an undercount of people who use rail in their commutes.

The fact that MetroLink commuters are undercounted in the census has serious ramifications. Across the country, opponents of rail transit present census journey-to-work data as evidence that transit fails to capture significant numbers of commuters. Most new rail transit projects in the US – both recently-opened and proposed – are light rail systems. Census data that make light rail look bad undermine support not only for light rail, but for transit investments more generally. Although beyond the scope of this thesis, journey-to-work data for all cities with light rail should be analyzed carefully to see if a similar undercount of riders exists. Regardless, the census questionnaire should be reworded to include "light rail" as an option.

Variable	Label	Source	Low Est.	High Est.
MetroLink commuters (daily round trips)	D	Table 4.5	10,458	10,458
% of riders who transfer from the bus	E	Earlier Cite	43%	13%
% of riders who do not transfer	F	100-E	57%	87%
Gross no. of new rail transit commuters	G	D*F	5,961	9,098
Gross no. of lost bus commuters	H	Table 4.3	6,769	6,769
Net no. of new transit commuters	I	G-H	-808	2,329
No. of bus commuters in 1990	J	Table 4.3	31,468	31,468
% increase in transit commuters	K	I/J	-3%	7%

Table 4.6 Estimate of the percentage increase in transit commuters (rail and bus), 1990-2000[24]

Using the estimate of 10,458 people who commute to work on MetroLink, it is possible to recalculate the percentage change in transit commuters from 1990 to 2000. Table 4.6, above, presents this calculation and finds that the number of transit commuters did not actually decline by 12% over the decade. It may have declined by 3%, or it may actually have increased by up to 7%. (There is a range of estimates because of uncertainty about how many MetroLink riders transfer between rail and bus). In contrast, actual BSDA ridership increased by 17% from 1990 to 2000. Actual ridership did increase faster than the number of transit commuters, but the difference in growth rates is not as great as was previously thought.

[24] This estimate assumes that all MetroLink riders who transfer from the bus are correctly counted in the census as bus commuters. In other words, only riders who just use rail are counted as rail commuters. The number of bus commuters, as reported in the census, is assumed to be accurate.

Description of the MetroLink route

Since MetroLink alone is responsible for essentially all of the transit ridership growth in the St. Louis region, MetroLink alone is the focus of further study in this chapter. Background information about where MetroLink goes and who rides it is key to understanding why it has attracted new transit riders.

Neighborhood	**Station**	**Intersecting Buses** No. of routes	**Park-and-Ride** No. of spaces
Lambert Airport St. Louis County,	Lambert Airport Main	3	none
	Lambert Airport East	none	none
St. Louis County (not at airport)	North Hanley	4	937
	UMSL North	2	100
	UMSL South	2	130
	Rock Road	4	183
	Wellston	3	243
St. Louis City (not downtown)	Delmar Loop	5	362
	Forest Park	2	none
	Central West End	5	none
	Grand	5	none
Downtown, St. Louis City	Union Station	5	none
	Civic Center	12	none
	Stadium	3	none
	8th & Pine	12	none
	Convention Center	9	none
	Arch-Laclede's Landing	none	none
East St. Louis, St. Clair County	East Riverfront	none	100
	5th & Missouri	9	435

Table 4.7 MetroLink stations in line order by neighborhood, with connecting bus and parking[25]

Table 4.7, above, lists MetroLink stations in line order. The line begins with two stops at Lambert-St. Louis International Airport, which is the region's main commercial airport. It then makes five stops in the neighborhoods of suburban St. Louis County, before proceeding into the City of St. Louis. The line makes four stops in city neighborhoods, and five more stops downtown. The line passes through downtown in a short subway tunnel built from an unused freight rail tunnel, so the 8th & Pine and Convention Center stations are underground and right in

[25] Metro St. Louis, "MetroLink Station List." http://www.metrostlouis.org/MetroLink/stationlist.asp; Metro St. Louis, "MetroLink: Effective September 1, 2003." http://www.metrostlouis.org/MetroLink/MapsScheds/MLmap09012003.pdf

the heart of the business district.[26] Finally, the line crosses the Mississippi River into Illinois and makes two stops in East St. Louis, in St. Clair County. Trains run along dedicated railroad right-of-way for nearly the entire route. Speeds and stop spacing are is similar to heavy rail.

Table 4.7 also shows the number of intersecting bus routes and the number of park-and-ride spaces at each station. The North Hanley and 5th & Missouri park-and-ride facilities are especially important. Not only are they the largest, they are located adjacent to interstate highway interchanges. Other than those two, however, MetroLink park-and-ride lots are generally small, so most of the ridership must come from local neighborhoods and attractions, as well as the bus services connecting with almost every station.

Berkeley urban planning professor Robert Cervero observes that "much of MetroLink's success stems from smart routing."[27] Nearly every one of the stations serves a major travel demand generator. Table 4.8, below, lists MetroLink stations in line order, along with the major attractions. All in all, the MetroLink serves three professional sports stadiums; three lively districts for shopping, dining and entertainment; two medical centers; two universities; two shopping malls; two riverboat casinos; a convention center; the city's largest park (which is home to several museums, a zoo, an opera house, and other attractions); the downtown business district; more than a dozen hotels; the world-famous Gateway Arch; and the airport. That is an impressive collection of attractions for a single rail line in a medium-sized city.

In most cases, MetroLink does a superb job of bringing riders very close to the attractions that it serves. Each of the attractions listed in Table 4.8 is within one-half mile of a MetroLink station, but most are much closer. Each of the downtown stadiums and malls and the convention center is within about three short blocks of a MetroLink station. Many are directly adjacent to a station. At the airport, there is direct, convenient pedestrian access from the rail stations to the airline terminals – something found at only a handful of US airports.

[26] Alexander N. Cohen, personal observations, July 2003
[27] Cervero, p. 431

Station	Demand Generators
Lambert Airport Main	Lambert-St. Louis International Airport
Lambert Airport East	Lambert-St. Louis International Airport
North Hanley	
UMSL North	University of Missouri-St. Louis
UMSL South	University of Missouri-St. Louis
Rock Road	
Wellston	
Delmar Loop	University City Loop (shopping/dining/entertainment district)
Forest Park	Forest Park (park; site of museums, zoo, opera)
Central West End	Central West End (shopping/dining/entertainment district) Washington University Medical Center
Grand	St. Louis University (campus and medical center)
Union Station	Union Station (shopping mall and hotel complex)
Civic Center	Savvis Center (Blues NHL hockey, college basketball)
Stadium	Busch Stadium (Cardinals Major League baseball)
8th & Pine	Downtown business district (offices and hotels)
Convention Center	America's Center (conventions) Edward Jones Dome (Rams NFL football) St. Louis Centre (shopping mall)
Arch-Laclede's Landing	Gateway Arch Laclede's Landing (shopping/dining/entertainment district) President Casino (riverboat gambling)
East Riverfront	Casino Queen (riverboat gambling)
5th & Missouri	

Table 4.8 Major demand generators at MetroLink stations[28]

There are really only four destinations that have mediocre station access. St. Louis University's main campus is about a half mile north the Grand station, on the other side of a freeway interchange and a major arterial road. Its medical center is also a full half-mile from the station, but to the south, on the same side of the freeway as the station. The University City Loop district ("the Loop") is about half a mile from the Delmar Loop station, on the other side of a dilapidated neighborhood. The least convenient access surely is at Forest Park. The park is quite large (about two square miles), and its attractions are scattered throughout. The Forest Park station is a block away from the northern edge of the park, and is more than a mile from some attractions. In each of these cases, it is possible to avoid the walk by taking a connecting bus.

[28] Alexander N. Cohen, personal observations, July 2003;
Rand McNally, "St. Louis EasyFinder," 2001;
Metro St. Louis, "MetroLink Ride Guide," Summer 2003;
Metro St. Louis, "MetroLink Station List." http://www.metrostlouis.org/MetroLink/stationlist.asp;
Metro St. Louis, "Metro System Guide," June 2003

Demographic profile of MetroLink riders

All of those demand generators have attracted a very different set of riders to MetroLink, compared to the riders of the BSDA bus system. Table 4.9, below, presents the demographic characteristics of both groups, based on two BSDA on-board rider surveys that were conducted in 1995 and 1997. MetroLink mainly serves choice riders – people who have the option of driving, but choose to take transit instead. Most MetroLink riders live in the suburbs; few are poor; most are white; and nearly all have a car in their household. In contrast, the bus system mainly serves transit dependent riders – people who are unable to drive, or without a car available. Most bus riders live in the city; most are poor; most are black; and many do not own a car. The stark differences between MetroLink and bus riders are further evidence that MetroLink has attracted new riders to transit, and has not merely forced existing bus riders to transfer to the train. These differences also suggest that MetroLink and the bus system serve very different travel markets.

Personal/Household Characteristics		**MetroLink Riders**		**Bus Riders**
		1995	1997	1997
Place of residence	City of St. Louis	29%	25%	61%
	St. Louis County	40%	50%	25%
	Other	31%	25%	14%
Transit dependence ("Why do you ride?")	Don't drive or no car available	29%	27%	61%
	Choice rider	71%	73%	39%
Auto ownership	0	18%	9%	38%
	1	30%	36%	30%
	2 or more	52%	55%	32%
Race	White	60%	62%	32%
	Black	35%	34%	63%
	All other	5%	4%	5%
Income	Less than $25,000	33%	24%	59%
	$25,000 to $55,000	42%	44%	33%
	More than $55,000	25%	32%	8%

Table 4.9 Characteristics of MetroLink and BSDA bus riders, 1995-1997[29]

Note the subtle differences between the 1995 and 1997 survey results. The demographics of MetroLink riders shifted modestly but consistently. White, affluent, suburban, choice riders

[29] Downtown Now!, Section II, p. 44;
Mei-Ling Hopgood, "Destination Work or Play? MetroLink Decision Will Reply," *St. Louis Post-Dispatch,* 17 September 1997, p. 1A;
Weyrich and Lind

dominated MetroLink ridership even more heavily in 1997 than in 1995. MetroLink ridership increased steadily from 1994 to 1999, and these survey results suggest that ridership increased because MetroLink attracted greater numbers of suburban choice riders.

On the other hand, the differences between the 1995 and 1997 surveys could reflect methodological problems with one or both of the surveys. For example, the 1997 survey may have oversampled choice riders. Other evidence points to this conclusion. The 1995 survey found that 53% of MetroLink trips are work trips and 20% recreational trips, while the 1997 survey found 69% work trips and only 7% recreational trips.[30] MetroLink ridership increased from 1995 to 1997, but not by enough to change these trip purpose rates so profoundly, even in the unlikely event that work travel accounted for all of the ridership growth. Conservative social commentators and transit advocates Paul Weyrich and William Lind observe that the 1995 and 1997 surveys were conducted at different times of year. That is not a good market research practice. Weyrich and Lind attribute the differences in survey results to seasonal factors. Whatever the exact reasons, the 1995 and 1997 surveys seem questionable.

All transit surveys have some problems. Typical challenges include small sample sizes, low response rates, and questions that confuse or mislead respondents. Some surveys are better than others, however. East-West Gateway Coordinating Council, which is the Metropolitan Planning Organization for the St. Louis region, recently conducted a comprehensive onboard survey of transit riders. 1,786 questionnaires were collected from MetroLink passengers on weekdays in the spring of 2002, with data collected throughout the day.[31] Riders on every bus route were surveyed as well. This appears to be the best source of information about transit rider behavior in St. Louis, and is used as a primary data source for the remainder of this chapter.

An important caveat is that a MetroLink extension further into St. Clair County opened in 2001 – outside the scope of inquiry of this chapter (which is limited to the 1990's), but prior to

[30] Citizens for Modern Transit, "Metrolink." http://www.cmt-stl.org/metro/metro.html; Weyrich and Lind
[31] NuStats, *Final Report*, p. i

the completion of the East-West Gateway survey. This extension mainly serves low-density suburban residential neighborhoods, not major destinations, and it has attracted a relatively small number of riders compared to the original segment. The 2002 survey results should therefore be generally reflective of conditions prior to the opening of the extension, but not exactly so.

Personal/Household Characteristics		**MetroLink**	**Bus**
Residence status	St. Louis area resident	87%	97%
	Out-of-town visitor	13%	3%
Car availability for this trip	Car available	64%	22%
	No car available	36%	78%
Cars in household	0	24%	57%
	1	27%	25%
	2	32%	12%
	3	11%	3%
	4 or more	5%	2%
Sex	Male	50%	50%
	Female	50%	50%
Age	< 16	6%	2%
	16-18	6%	9%
	19-24	19%	18%
	25-34	19%	19%
	35-49	35%	34%
	50-64	14%	15%
	65+	1%	3%
Race/ethnicity	African American	43%	75%
	White	45%	19%
	Hispanic	3%	2%
	Asian American	4%	1%
	Native American	1%	1%
	Other	3%	2%
Household income	< $15,000	28%	48%
	$15,000 to $25,000	17%	28%
	$25,000 to $45,000	22%	15%
	$45,000 to $75,000	20%	7%
	> $75,000	13%	3%

Table 4.10 Characteristics of MetroLink and BSDA bus riders, 2002[32]

The East-West Gateway survey confirms that MetroLink riders are mainly choice riders, while bus riders are mainly transit-dependent riders. Table 4.10, above, shows the demographic characteristics of MetroLink and BSDA bus riders according to this survey. These results generally mirror the previous finding that MetroLink mainly carries choice riders, while the bus

[32] NuStats, *Final Report,* pp. 13, 34, 36, 40-1, 44-5

system mainly carries transit-dependent riders. Compared to Table 4.9, however, Table 4.10 shows greater percentages of low-income riders, non-white riders, and riders from households without cars. These greater percentages are shown on both MetroLink and the bus system. It is likely that the 1995 and 1997 surveys oversampled choice riders on both modes.

Table 4.10 shows some other interesting demographic results from the East-West Gateway survey. Although MetroLink mainly carries choice riders while the bus system mainly carries transit-dependent riders, the age and gender makeup of riders are essentially the same on both modes. A major difference between rail and bus, however, is that 13% of MetroLink riders are out-of-town visitors, compared to only 3% of bus riders. This finding suggests that tourists may represent a significant non-work travel market for MetroLink.

Non-work riders: Analysis of East-West Gateway survey results

Who rides MetroLink, and where do those people travel? The preceeding background information answers these questions about MetroLink service overall. Here, the East-West Gateway Coordinating Council's aforementioned 2002 On-Board Passenger Survey is used to answer these questions about non-work trips in particular. This survey includes data on MetroLink and bus trip purposes, and the demographic characteristics of riders by trip purpose.

Table 4.11, below, shows the purpose of MetroLink and bus trips. Trip purposes are defined by the destination of each trip. The original East-West Gateway survey report includes "Home" as a trip purpose. Trips with a destination of home represent just over 40% of both MetroLink and bus trips. To create Table 4.11, the breakdown of trip purposes was recalculated to include only trips with a destination other than home.

It is important to recall that this survey was conducted on weekdays in the spring. There is nothing unusual about such an approach. Travel surveys are conducted at such times because these are the most "average" times. It is likely that peak demand for some types of non-work travel occurs on weekends or in the summer, and this survey does not capture such peaks. The

survey does, of course, capture the peak weekday demand for work travel. On an annual, seven-day-a-week basis, non-work trips may be a higher share of total trips than this survey indicates.

Trip Purpose by Destination of Trip	MetroLink Trips	Bus Trips
Work	47%	49%
Sporting event	12%	1%
Personal business	11%	21%
School	8%	10%
Recreation/entertainment	6%	4%
Airport	5%	1%
Hotel/motel lodging	5%	1%
Shopping/dining	4%	9%
Work-related	2%	3%

Table 4.11 Purpose of MetroLink and bus trips, excluding trips to home, 2002[33]

Just over half of all trips are non-work trips on both MetroLink and the bus system, but the types of non-work trips that predominate on each system are quite different. Travel to sporting events, hotel/motel lodging, and the airport accounts for almost half of all non-work trips on MetroLink, but these trip purposes are negligible on the bus system. Recreation/entertainment trips have a slightly higher share on MetroLink as well. Meanwhile, travel for personal business and shopping/dining dominates non-work bus travel. On MetroLink, those trips' share of total travel is half its share on the bus system. School travel also has a slightly higher share on the bus.

Generally speaking, non-work travel on MetroLink tends to be travel for fun, while non-work travel on the bus tends to be travel for practical reasons. Of course, there are some exceptions to this characterization. Airport and hotel trips seem "fun," but they include business travel as well as leisure travel. (It is believed, however, that trips by people who are employed at the airport are classified as work trips, not airport trips). Personal business, which is thought to be "practical," is still the second-largest non-work trip purpose on MetroLink even though its share of total trips is much larger on the bus system. Shopping/dining travel, which represents a

[33] NuStats, *Bi-State Development Agency, St. Clair County Transit District and Madison County Transit District On-Board Passenger Survey: Data Tabulations – Bi-State Development Agency Bus System*, prepared for the East-West Gateway Coordinating Council, 15 October 2002, p. 27;
NuStats, *Bi-State Development Agency, St. Clair County Transit District and Madison County Transit District On-Board Passenger Survey: Data Tabulations – MetroLink Rail*, prepared for the East-West Gateway Coordinating Council, 15 October 2002, p. 6

large share of bus trips, could be for fun or practical reasons. Overall, however, the sense that MetroLink trips tend to be "fun," and therefore discretionary, is consistent with the earlier finding that most MetroLink riders are choice riders.

Demographic Characteristics		Sports	Hotel	Rec/Ent	Shop	Pers Bus	Air
Car available for this trip	Car available	83%	44%	41%	37%	50%	64%
	No car available	17%	56%	59%	63%	50%	36%
Sex	Male	60%	58%	45%	48%	54%	43%
	Female	40%	42%	55%	52%	46%	57%
Age	< 16	12%	4%	7%	3%	7%	3%
	16-18	7%	3%	5%	17%	13%	2%
	19-24	22%	27%	25%	11%	26%	18%
	25-34	14%	23%	27%	30%	15%	22%
	35-49	24%	36%	20%	19%	27%	44%
	50-64	21%	7%	17%	18%	11%	11%
	65+	1%	0%	0%	3%	1%	0%
Race/ ethnicity	African American	11%	22%	38%	51%	60%	16%
	White	76%	56%	41%	49%	28%	73%
	Hispanic	5%	9%	6%	0%	5%	1%
	Asian American	7%	8%	8%	0%	1%	6%
	Native American	1%	2%	2%	0%	2%	0%
	Other	1%	4%	6%	0%	4%	5%
Household income	< $15,000	33%	36%	39%	36%	44%	13%
	$15,000 to $25,000	7%	10%	17%	25%	23%	3%
	$25,000 to $45,000	22%	16%	17%	15%	8%	31%
	$45,000 to $75,000	14%	13%	14%	11%	10%	16%
	> $75,000	23%	25%	13%	14%	15%	36%

Table 4.12 Demographic characteristics of MetroLink riders making non-work trips, 2002[34]

Further evidence of the relationship between non-work travel and choice ridership is presented in Table 4.12, above. This table shows the demographic characteristics of MetroLink riders by trip purpose, and there are indeed differences between people who ride for different non-work trip purposes. These results (and the results shown in Table 4.13) are taken from published reports of East-West Gateway survey cross-tabulations, without any further calculation. Unfortunately these reports do not document the number of survey observations by trip purpose, so it is possible that small sample sizes may have produced misleading results. This would

[34] NuStats, *Data Tabulations – MetroLink Rail*, pp. 37, 68, 100-1, 147, 177

especially be a matter of concern for small trip purposes. For the relative size of each trip purpose, refer to Table 4.11, above.

Since non-work riders are the focus of this thesis, only their characteristics are shown in this table. Work, work-related, and school trip purposes are not shown. Work-related trips are not considered because they obviously have much to do with work travel. School trips are not considered because, while technically non-work trips, they are very similar to work trips. School riders commute to fixed locations on a daily basis, typically during the peak travel period.

Sporting event travel is the largest non-work trip purpose on MetroLink, while shopping/dinging travel is the smallest. A sharp contrast can be drawn between sporting event riders and shopping/dining riders. Sporting event riders are overwhelmingly choice riders. 83% reported having a car available for the trip, the highest percentage of choice riders among all non-work trip purposes. Sporting events riders overwhelmingly are white, and most are male. Indeed, sporting events travel has the highest percentage of riders who are white, and the highest percentage of riders who are male. The percentages of shopping/dining riders are less lopsided than those of sporting events riders; nevertheless, most shopping/dining riders are transit-dependent, African-American, and female. Of all trip purposes, shopping/dining travel has the greatest concentration of riders without a car available.

Other than sporting event travel, airport travel is the only trip purpose for which a majority of riders are choice riders, and for which an overwhelming majority of riders are white. Airport travel also has highest percentage of riders who are middle aged (35-49 years old); the highest percentage of riders who are in the top income bracket (over $75,000 annual household income); and the highest percentage of riders who are female. Airport riders may tend to be rich, but personal business riders tend to be poor. Personal business travel has the highest percentage of riders who are in the bottom income bracket (under $15,000 annual household income). It also has the highest percentage of riders who are African-American.

Demographic Characteristics		Sports	Hotel	Rec/Ent	Shop	Pers Bus	Air
Car available for this trip	Car available	31%	26%	25%	21%	17%	30%
	No car available	69%	74%	75%	79%	83%	70%
Sex	Male	72%	59%	51%	44%	48%	58%
	Female	28%	41%	49%	56%	52%	42%
Age	< 16	4%	3%	6%	3%	2%	10%
	16-18	15%	2%	10%	16%	8%	3%
	19-24	45%	18%	16%	18%	15%	24%
	25-34	3%	24%	22%	16%	21%	21%
	35-49	17%	38%	31%	27%	32%	13%
	50-64	11%	13%	11%	15%	17%	21%
	65+	5%	2%	3%	6%	5%	7%
Race/ ethnicity	African American	67%	73%	67%	74%	76%	71%
	White	25%	20%	26%	20%	19%	19%
	Hispanic	1%	3%	2%	2%	2%	0%
	Asian American	7%	0%	2%	1%	0%	0%
	Native American	0%	0%	1%	2%	1%	3%
	Other	0%	4%	2%	2%	2%	6%
Household income	< $15,000	49%	49%	55%	58%	57%	52%
	$15,000 to $25,000	26%	36%	21%	23%	23%	17%
	$25,000 to $45,000	17%	10%	12%	12%	12%	10%
	$45,000 to $75,000	5%	1%	8%	3%	6%	10%
	> $75,000	3%	3%	4%	5%	2%	10%

Table 4.13 Demographic characteristics of bus riders making non-work trips, 2002[35]

For contrast, the same demographic breakdown of non-work trip purposes on the bus system is presented in Table 4.13, above. There is very little variation by trip purpose among non-work bus riders. For every trip purpose, large majorities of riders are transit-dependent, African-American, and low-income. Personal business, perhaps the most "practical" trip purpose, has the highest percentage of riders with no car available, with shopping/dining travel a close second. Sporting event travel has the highest percentage of choice riders, but still less than one-third of sporting event riders reported having a car available. Sporting event travel also stands out in that it has unusually large concentrations of male riders and riders in the 19-24 age bracket. Otherwise there are few differences worthy of comment. What differences do exist may be the result of small sample sizes, rather than real differences. Sporting event, hotel/motel lodging, and airport trips each represent a very small percentage of total bus trips, so the number of trips

[35] NuStats, *Data Tabulations – Bi-State Development Agency Bus System*, pp. 453, 476, 499, 533, 556

sampled from each of those three trip purposes would be expected to be quite small. For the relative size of each trip purpose, refer to Table 4.11, above.

Non-work destinations: Analysis of MetroLink ridership data

These survey results provide a good breakdown of the kinds of non-work trips made on MetroLink, and the kinds of people who make those trips. The classification of trip purposes used in the survey is specific enough that in many cases it is easy to guess the destinations of trips. Clearly, airport trips bring riders to the two MetroLink stations at Lambert Airport, and sporting event trips bring riders to the three downtown sports stadiums. It is not always possible to make such assumptions, however. Personal business is one of the largest non-work trip purposes on MetroLink, but that category of travel is so general that it could involve a wide variety of destinations. Shopping/dining is a relatively small trip purpose, despite the fact that MetroLink serves two shopping malls and three neighborhoods with plentiful local shopping and dining opportunities. It is not clear whether any of these shopping destinations attract many transit riders. Overall, the survey provides rich information about who makes non-work trips on MetroLink, but unsatisfactory information about where those people travel.

To learn more about the destinations of non-work trips, MetroLink ridership data is analyzed by station and time period. Data on boardings at MetroLink stations was obtained from BSDA for the month of March 2003. The East-West Gateway survey was conducted in the spring as well, so this ridership data should be comparable. For each MetroLink station, this ridership data consists of average passenger boardings by day type (weekday, Saturday, Sunday) and by time period (AM peak, midday, PM peak, and late PM). Such data exists because all MetroLink cars are equipped with automatic passenger counters.[36]

Ridership at each the nineteen stations on the original MetroLink alignment is examined, and off-peak ridership is used as a proxy for non-work ridership. This analysis identifies stations

[36] David Beal (Metro St. Louis), e-mail to Alexander N. Cohen, 7 October 2003

that generate the most off-peak ridership. These are stations with the highest off-peak ridership in terms of absolute numbers of passengers. This analysis also identifies stations where most of the ridership occurs in the off-peak. These are stations with the highest off-peak ridership as a percentage of average weekday ridership. Four time periods are considered to be off-peak: midday (weekdays 9 am to 3 pm), late PM (weekdays after 6 pm), Saturday (all day) and Sunday (all day). Of course, off-peak ridership is an imperfect proxy for non-work ridership. Some non-work travel occurs in the peak, and some work travel occurs in the off-peak. Care is taken to identify stations where work travel is the likely source of off-peak ridership.

Ridership Measure	Union Station	Central West End	Convention Center	Grand	Lambert Airport Main
Midday	373	894	733	821	590
Midday Rank (A)	15	2	5	4	8
Late PM	789	560	774	493	711
Late PM Rank (B)	1	7	2	11	3
Saturday	2,783	2,155	2,442	2,301	2,416
Saturday Rank (C)	1	5	2	4	3
Sunday	2,279	3,143	1,742	2,540	1,743
Sunday Rank (D)	3	1	7	2	6
Index (product of ABCD)	45	70	140	352	432
Index Rank	1	2	3	4	5

Table 4.14 Top five stations with high off-peak ridership absolutely[37]

To identify stations that generate the most off-peak ridership, all nineteen MetroLink stations are ranked by ridership in each of the four off-peak time periods. For each time period, the station with the highest ridership in that time period is ranked "1" and so forth. Each station thus has four rankings, one for each time period. These four rankings are multiplied to create an index of off-peak ridership generation. Low index scores indicate high off-peak ridership, relative to other stations. The five stations with the lowest index scores are: Union Station, Central West End, Convention Center, Grand, and Lambert Airport Main. Details about off-peak ridership at these stations are shown in Table 4.14 above.

[37] Metro St. Louis, unpublished spreadsheet of MetroLink average ridership by station, day type, and time period, March 2003

Ridership Measure	Civic Center	Union Station	East Riverfront	Arch-Laclede's Landing	Stadium
Weekday	1,080	2,218	1,959	1,816	1,631
Midday	205	373	822	502	312
Midday as % of weekday	19%	17%	42%	28%	19%
Midday Rank (A)	18	19	1	6	17
Late PM	486	789	499	623	588
Late PM as % of weekday	45%	36%	25%	34%	36%
Late PM Rank (B)	1	3	9	5	2
Saturday	1,306	2,783	1,794	2,113	1,588
Saturday as % of weekday	121%	125%	92%	116%	97%
Saturday Rank (C)	2	1	7	3	5
Sunday	1,408	2,279	575	1,146	1,031
Sunday as % of weekday	130%	103%	29%	63%	63%
Sunday Rank (D)	1	4	18	15	14
Index (product of ABCD)	36	228	1,134	1,350	2,380
Index Rank	1	2	3	4	5

Table 4.15 Top five stations with high off-peak ridership as a % of weekday ridership[38]

A similar process is used to identify stations where most of the ridership occurs in the off-peak. For each of the nineteen stations, ridership in each of the four off-peak time periods is taken as a percentage of average weekday (peak and off-peak) ridership. Stations are ranked by each of those four percentages. For each time period, the station with the highest ridership in that time period as a percentage of weekday ridership is ranked "1" and so forth. Once again, each station has four rankings, one for each time period. These four rankings are multiplied to create an index of off-peak ridership dominance. Low index scores indicate that off-peak ridership is a high share of total ridership, relative to other stations. The five stations with the lowest index scores are: Civic Center, Union Station, East Riverfront, Arch-Laclede's Landing, and Stadium. Details about off-peak ridership at these stations are shown in Table 4.15 above.

These indices intentionally place equal importance on each of the four off-peak time periods. Ridership is generally higher overall on Saturdays and Sundays than during weekday middays and evenings, but the percentage of non-work trips during each time period is not known. It would be presumptuous to assume that more non-work travel occurs on weekends than in

[38] Metro St. Louis, unpublished spreadsheet of MetroLink average ridership by station, day type, and time period, March 2003

weekday off-peak periods, just because total ridership is higher on weekends. Different kinds of non-work trips may occur on weekends rather than middays or evenings, and these indices are intended to give equal treatment to those different kinds of trips.

Looking at Tables 4.14 and 4.15, Union Station is the only station to appear in both tables, and it is at or near the top of the list in both cases. It has the highest off-peak ridership in terms of absolute numbers, and also has the second highest off-peak ridership relative to average weekday ridership. Indeed, ridership at Union Station is actually higher on weekend days than it is on weekdays. The prominence of Union Station is striking, since the primary attraction at that MetroLink station is the Union Station shopping mall. That mall is known for its wide selection of restaurants as well as its retail stores. The East-West Gateway survey shows shopping/dining to be the smallest non-work trip purpose on MetroLink, but this one shopping and dining venue in particular seems to be a strong source of ridership. The MetroLink station at Union Station is sandwiched between the mall and a freeway, and there is not much other development nearby, so it is likely that the mall is the main generator of ridership at this station.[39] There are, however, four hotels in the vicinity of Union Station, including a Hyatt Regency hotel that is attached to the shopping mall complex, so tourists could be a source of some of this off-peak ridership.[40]

Several other stations in Tables 4.14 and 4.15 are tourist-oriented as well. The Lambert Airport Main station, for instance, has high off-peak ridership and appears in Table 4.14. Not only do tourists use the airport to fly in and out of St. Louis, there are twenty-seven hotels located near the airport.[41] Guests staying at these hotels can take free shuttle buses to the airport terminal and access MetroLink there. Of course, St. Louis area residents could be a source of off-peak airport ridership as well. Indeed, work travel could be a source of off-peak airport ridership, because airports are known for having unconventional work shifts.

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[39] Alexander N. Cohen, personal observations, July 2003;
Rand McNally, "St. Louis EasyFinder," 2001
[40] Alexander N. Cohen, personal observations, July 2003;
Metro St. Louis, "MetroLink Ride Guide," Summer 2003
[41] Metro St. Louis, "MetroLink Ride Guide," Summer 2003

Besides the airport, the Arch-Laclede's Landing and East Riverfront stations both have high off-peak ridership as a percentage of weekday ridership, and appear in Table 4.15. These stations both serve non-work destinations of interest to tourists – the Gateway Arch, riverboat gambling, and the historic Laclede's Landing waterfront shopping and dining district. It is no surprise that off-peak ridership is dominant at these stations. Each station is located right on the riverfront, where there little development other than the aforementioned non-work attractions.

Other stations in Table 4.15 point to the importance of sporting event ridership. The Civic Center and Stadium stations both serve professional sports venues. These stations are shown to have high off-peak ridership as a percentage of weekday ridership. Off-peak ridership is dominant because these stadiums draw large crowds, and because both stadiums are located on the southern fringe of downtown, near a freeway, at some distance from the heart of the business district.[42] The only reason why these two stations do not appear in Table 4.14 as well is that the BSDA ridership dataset used for this analysis excludes ridership believed to be associated with "sport, concert and large audience events."[43]

Shopping, tourism, and sporting events have been discussed as sources of off-peak ridership. The Convention Center station, which has high off-peak ridership and appears in Table 4.14, serves all three of these markets. It serves a professional sports stadium and the St. Louis Centre shopping mall. Of course it serves the convention center, which attracts convention-goers visiting from out-of-town. There are also six hotels near the convention center, which represent another likely source of tourist ridership.[44] (More than half of all downtown hotels are located by Union Station or the convention center).[45]

The only two stations appearing in Tables 4.14 or 4.15 that have not yet been discussed are Central West End and Grand. Both of these stations have high off-peak ridership absolutely,

[42] Rand McNally, "St. Louis EasyFinder," 2001
[43] Beal
[44] Metro St. Louis, "MetroLink Ride Guide," Summer 2003
[45] Metro St. Louis, "MetroLink Ride Guide," Summer 2003

but not as a percentage of weekday ridership. Each of these stations serves non-work attractions. Central West End serves the shopping and dining district of the same name, providing a bit more evidence that shopping travel is a strong source of off-peak ridership. Grand serves St. Louis University (SLU), and while it makes sense that university students would make a lot of non-work trips on transit, a countervailing fact is that the nearby University of Missouri-St. Louis (UMSL) does not appear to be a major source of off-peak ridership. UMSL has 16,000 students, compared to 11,000 at SLU, yet neither of the UMSL MetroLink stations rank highly in terms of off-peak ridership.[46] Even if the off-peak ridership at both UMSL stations were combined, the total would rank ninth among MetroLink stations, using the same index as in Table 4.14.[47]

Despite the presence of the Central West End district and St. Louis University, it is believed that work travel, rather than non-work travel, is responsible for the off-peak ridership at these two stations. Each of these stations serves a major medical center – Washington University Medical Center at Central West End, and the St. Louis University medical campus at Grand. Medical centers are known for having unconventional work shifts, which generate a lot of off-peak work trips. Indeed, this phenomenon has proved to be a challenge for many transit agencies, and is the subject of a previous MIT graduate thesis written in the CTA/Tren Urbano program.[48]

Identification of MetroLink non-work travel markets

All of the information presented thus far points to three non-work travel markets that have contributed to transit ridership growth in St. Louis. These markets are:

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[46] Timothy McBride, "How Does UMSL Compare? Comparisons Across the University of Missouri System of Student Enrollments, Faculty Growth and Revenues," February 1999. http://www.umsl.edu/~mcbride/compare.htm
St. Louis University, "St. Louis University Profile." http://www.slu.edu/pr/slu_facts.pdf;

[47] Metro St. Louis, unpublished spreadsheet of MetroLink average ridership by station, day type, and time period, March 2003

[48] Lillian C. Shuey, "Improving Relationships Between Public Transit Authorities and Medical Centers: Case Sudies and Applications to the Illinios Medical District (Chicago, Illinois) and Centro Medico (San Juan, Puerto Rico)," Thesis (M.C.P.), Massachusetts Institute of Technology, Dept. of Urban Studies and Planning, 2003

- Sporting Events
- Tourists
- Shopping

Because essentially all of the ridership growth in St. Louis occurred on MetroLink, these are markets relevant to MetroLink, not the bus system. Each of these markets will be explored in greater depth in the forthcoming "Characteristics of Markets" chapter.

What follows is a brief explanation of the rationale for selecting each of these markets. While the identification of markets is guided by the survey and ridership data presented earlier, it is ultimately a subjective process. Markets can be defined in different ways. Sporting events and shopping are types of travel, while tourists are a type of traveler. These markets could be defined differently, and one could make a case for selecting altogether different markets instead.

Sporting events travel is identified as a strong non-work travel market because it accounts for 12% of MetroLink trips, according to the East-West Gateway Survey results shown in Table 4.11. Under the fairly specific classification of trips used in the survey, sporting events travel is the single largest non-work trip purpose on MetroLink. The off-peak ridership data confirm the importance of sporting events travel. Each of the three stations serving professional sports stadiums – Civic Center, Stadium, and Convention Center – appears in either Table 4.14 or Table 4.15. The only reason why these stations do not figure more prominently in those tables is because ridership believed to be associated with major sports events is excluded from the data set.

Tourist travel is not a trip purpose; rather, it is all types of travel by a certain segment of riders. Overall, out-of-town visitors make 13% of all MetroLink trips according to Table 4.10, meaning that tourist travel is an even greater source of ridership than sporting event travel. In terms of specific trip purposes, airport and hotel/motel lodging trips collectively represent 10% of MetroLink trips. Of course, local residents make some airport trips, but that is offset by the fact that tourists also make trips for other purposes, such as recreation/entertainment and shopping/dining trips. Many of the stations with notable off-peak ridership serve tourist-oriented

destinations, including the airport, the Gateway Arch, the convention center, the two riverboat casinos, and numerous hotels.

Compared to sporting events and tourists, evidence of shopping travel as a major source of MetroLink ridership is more mixed. The East-West Gateway survey results in Table 4.11 show shopping/dining travel to be the smallest non-work trip purpose on MetroLink, and relatively less important to MetroLink than to the bus system. Union Station, however, is the only MetroLink station that appears in both Table 4.14 and Table 4.15. Thanks to the Union Station shopping mall, that station has high off-peak ridership, both absolutely and as a percentage of weekday ridership. It is possible that the St. Louis Centre shopping mall also contributes to the high off-peak ridership at the Convention Center station. Shopping travel is worth investigating further because it seems to have a big effect at one or two stations, even if it is a small share of ridership overall.

V. Chicago Case Study: Overview

The Chicago metropolitan region lies along the southwestern shore of Lake Michigan in Illinois, and is often referred to as "Chicagoland." With a population of 9.2 million, it was the third largest US metropolitan region in 2000.[1] Although the city's longtime "Second City" moniker is no longer strictly true in terms of population, Chicago still has the second-largest transit system in the nation. Only New York has more transit riders.[2]

Transit ridership by mode, 1990 to 2000

Chicago was selected as a base case because preliminary inquiry suggests that total transit ridership and the number of transit commuters both declined by about 8% in the 1990's. The first order of business in this chapter is to verify that premise through a closer look at ridership and journey to work data. This inquiry is complicated by the fact that Chicago's transit system is large and is divided among several agencies.

Chicagoland's major transit agency is the Regional Transportation Authority (RTA), but this is just an umbrella agency with three largely autonomous subsidiaries. These subsidiaries are the Chicago Transit Authority (CTA), Pace, and Metra. CTA operates bus and heavy rail systems in the City of Chicago and some nearby suburbs. Pace operates the bus system that serves most suburban areas. Metra operates commuter rail between the suburbs and downtown Chicago. There is also a fourth transit agency, the Northern Indiana Commuter Transportation District (NICTD), which is not affiliated with the RTA. This agency operates a single longer-distance commuter rail line between South Bend, Indiana and downtown Chicago. Because it is much smaller than any of the RTA agencies, and because it is more of a regional railroad than an urban transit system, NICTD is not considered in this chapter.

[1] See Chapter 3, Table 3.2
[2] See Chapter 3, Table 3.6

Year	CTA Bus	CTA Rail	Total CTA	Metra	Pace	Total
1990	423.2	146.7	569.9	69.3	40.3	679.5
1991	394.1	135.3	529.4	69.0	40.5	638.9
1992	373.3	120.6	493.9	70.0	39.3	603.2
1993	328.1	118.5	446.6	69.9	38.3	554.8
1994	327.3	120.9	448.2	72.0	38.6	558.8
1995	307.3	119.3	426.6	70.4	37.2	534.2
1996	303.3	124.0	427.3	70.6	37.5	535.4
1997	289.2	130.0	419.2	72.3	37.9	529.0
1998	291.7	132.4	424.1	74.5	39.3	537.9
1999	300.2	141.7	441.9	76.6	40.2	558.7
2000	303.3	147.2	450.5	78.8	38.6	567.9

Table 5.1 RTA system ridership, millions of unlinked trips, 1990-2000[3]

Table 5.1, above, shows the annual ridership for each RTA subsidiary, from 1990 to 2000. This table also breaks down CTA ridership by mode. Overall, this table shows that RTA ridership declined by 16% from 1990 to 2000. That decline is much larger than the 8% decline found in Chapter 3.[4] The reason for the disparity is that the 8% decline is based on ridership as recorded in the National Transit Database (NTD), whereas Table 5.1 shows ridership as recorded in RTA's own database. (Both databases are considered to be reliable, but they employ slightly different methodologies). RTA's 1990 ridership figure is higher than what is listed in the NTD for that year, while RTA's 2000 figure is lower than what is listed in the NTD.[5] A 16% decline in ridership looks even less favorable compared to the 8% decline in the number of people taking transit to work, and reinforces the notion that Chicago was not effective at attracting non-work travelers to transit in the 1990's.

CTA is by far the largest of the three RTA agencies, with about 80% of total RTA system ridership. CTA also experienced the most turbulent changes in ridership over the decade, posting a 21% decline overall from 1990 to 2000. CTA bus ridership declined steadily from 1990 to 1997, and despite a modest rebound from 1997 to 2000, it lost 28% of its ridership over the decade. CTA rail ridership also declined at the outset of the decade, from 1990 to 1993, but then

[3] Regional Transportation Authority, Regional Transit Asset Management System (RTAMS) online database, 1990 through 2000
[4] See Chapter 3, Table 3.6
[5] See Chapter 3, Table 3.6

remained roughly constant through 1995, and then increased steadily to return to 1990 levels by the end of the decade. Mirroring CTA somewhat, Pace bus ridership declined by 4% from 1990 to 2000, while Metra rail ridership increased by 14%. Most of the decline on Pace occurred between 1991 and 1995, while most of the increase on Metra occurred between 1996 and 2000. Clearly ridership trends differed in early and later years of the 1990's, with ridership on all agencies making a comeback toward the end of the decade. Ridership trends also differed on bus and rail, with declines on bus compared to gains or at least stability on rail.

On the basis of ridership data alone, it is difficult to identify which agency or mode is most relevant to the study of non-work transit ridership. The 1990 Chicago Area Transportation Study Household Travel Survey (CATS HHTS) provides additional insight. CATS is the Metropolitan Planning Organization for the Chicago region. The CATS HHTS is a household travel diary survey that was conducted on one weekday in 1990. A sample of households were surveyed in a seven-county region. The survey contains information on 19,314 households, 40,568 travelers, and over 162,755 trips, and is the most recent survey of its kind in Chicago.[6]

Mode	All Trips	Work	Shop/Eat/Bank	Recreation	Other
Pace	0.5%	0.3%	0.6%	0.3%	0.6%
Metra	1.3%	3.2%	0.2%	0.3%	0.5%
CTA bus	5.4%	5.7%	3.5%	3.6%	5.8%
CTA rail	2.4%	4.2%	1.0%	0.7%	1.7%
Total transit	9.5%	13.4%	5.2%	4.9%	8.6%
Walk	8.4%	6.6%	10.5%	12.1%	8.4%
Auto	79.8%	78.6%	83.5%	79.5%	79.4%
Other	2.3%	1.4%	0.9%	3.6%	3.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Table 5.2 Mode share by trip purpose, seven-county metropolitan region, 1990[7]

Table 5.2, above, shows travel mode share by trip purpose for trips throughout the metropolitan region, based on the 1990 CATS HHTS. The four transit modes have a combined mode share of 9.5% for all trips in the region. The mode share for all trips of each of the four

[6] Siim Sööt and Ashish Sen. *Non-Work and Off-Peak Trips by Transit, Walk and Bicycle Modes: An Understanding of Existing and Potential Markets* (Edwardsville, IL: Illinois Transportation Research Center, 1999) p. 41

[7] Sööt and Sen, p. 47, Table 3

transit modes is consistent with the relative level of ridership on each mode. CTA bus has the highest mode share, while Pace has the lowest.

Pace is the only transit mode that has a smaller share for work trips than it has for all trips. This implies that Pace ridership is less work-oriented than on the other transit modes. Still, Pace has a very small mode share – less than 1% – even for non-work trips. Metra, in contrast, has the most work-oriented ridership. Its mode share for work trips is more than ten times its mode share for either shop/eat/bank trips or recreation trips. Metra's mode share for work trips is respectable, in light of the fact that the only employment destination that it serves effectively is downtown Chicago, but like Pace its mode share for non-work trips is negligible.

Though its ridership is more work-oriented than Pace's, CTA carries the lion's share of non-work transit trips in the Chicago region. For each of the non-work trip purposes shown in Table 5.2, the sum of the CTA bus and rail mode shares equals 87% of the total transit mode share. In other words, CTA carries 87% of all non-work transit trips in Chicagoland. CTA will thus be the focus of further study for the remainder of this chapter. CTA bus and rail form an interesting study in contrasts. CTA rail is much more work-oriented than CTA bus, but ridership on CTA rail remained stable throughout the 1990's while ridership on CTA bus dropped sharply. This is again consistent with the premise that Chicago did not effectively attract non-work riders to transit in the 1990's.

Table 5.2 does not really emphasize the prominence of CTA enough. This table shows CTA bus and rail to have a combined 7.8% mode share for all trips. This figure seems small, but that is because the CATS HHTS was conducted across a broad seven-county region, including a wide swath of low-density, auto-oriented suburban areas. CTA does not provide any service in most of those areas. CTA only serves Cook County, and the vast majority of CTA service is concentrated in the City of Chicago, which is a subset of Cook County.[8] Only a handful of CTA

[8] A small part of O'Hare Airport is within the Chicago city limits but outside Cook County. Otherwise, the City of Chicago is wholly contained within Cook County.

bus routes and rail stations serve the close-in suburban parts of Cook County. The rest of the suburbs, both suburban Cook County and five surrounding Illinois "collar counties," receive service from Pace and Metra instead.[9]

Residence	Purpose	Walk	Auto	Transit	Other	Total
Chicago CBD	All Trips	42.4%	32.6%	17.4%	7.6%	100.0
	Work	46.0%	26.7%	20.4%	6.9%	100.0
	Shopping	56.4%	29.4%	11.1%	3.1%	100.0
	Recreation	34.8%	42.5%	11.0%	11.7%	100.0
Rest of Chicago	All Trips	16.3%	58.5%	22.9%	2.3%	100.0
	Work	11.2%	58.5%	28.0%	2.2%	100.0
	Shopping	24.3%	60.0%	14.5%	1.3%	100.0
	Recreation	22.0%	59.2%	14.6%	4.3%	100.0
Suburban Cook County	All Trips	5.2%	88.6%	4.1%	2.1%	100.0
	Work	4.6%	86.6%	7.7%	1.2%	100.0
	Shopping	5.6%	91.5%	2.2%	0.7%	100.0
	Recreation	8.4%	87.3%	1.1%	3.2%	100.0
Six "Collar Counties" (low to high)	All Trips	1.8 to 3.7%	92.1 to 95.4%	0.4 to 2.6%	1.8 to 2.9%	n/a
	Work	1.2 to 2.7%	90.9 to 95.6%	1.1 to 6.0%	0.4 to 1.0%	n/a
	Shopping	1.5 to 3.3%	95.0 to 98.1%	0.1 to 0.8%	0.3 to 1.6%	n/a
	Recreation	4.4 to 8.6%	86.8 to 92.9%	0.0 to 2.4%	2.5 to 3.5%	n/a
Seven County Total	All Trips	8.4%	79.8%	9.5%	2.3%	100.0
	Work	6.6%	78.6%	13.4%	1.4%	100.0
	Shopping	10.5%	83.5%	5.2%	0.9%	100.0
	Recreation	12.1%	79.5%	4.9%	3.6%	100.0

Table 5.3 Mode share by trip purpose and place of residence, 1990[10]

Table 5.3, above, breaks down the CATS HHTS results by place of residence. In the City of Chicago, where CTA service is concentrated, transit's mode share for work and non-work trips is much higher than 7.8%. Among people who live downtown (in the Chicago central business district), transit has a 17.4% mode share for all trips. Among people who live in the rest of the city, transit has a 22.9% mode share for all trips. Transit's mode share then drops to 4.1% among the suburban residents of Cook County, some of whom may have access to CTA service. In the collar counties, transit has a mode share of less – usually much less – than 3%. In Chicago, non-work transit use is a distinctly urban phenomenon, and CTA is the urban transit provider. Even in the city, though, transit's mode share for work trips is about double it's share for non-work trips.

[9] The five collar counties are: DuPage, Kane, Lake, McHenry and Will. Kendall County, the seventh county included in the CATS HHTS, does not receive any RTA service.
[10] Sööt and Sen pp. 46, 49-50, Tables 2, 4-5

Census journey-to-work data by mode and county

As discussed in Chapter 3, census data indicate that the number of people who take transit to work decreased by 8% in the Chicago metropolitan region from 1990 to 2000. How does that finding compare to the CTA ridership trends shown in Table 5.1 above? It is necessary to consider census journey-to-work data focused on the CTA service area. The 8% finding was based on a count of transit commuters throughout the metropolitan region, but CTA provides service only in Cook County and has the highest mode share in the City of Chicago.

Year	Mode of Transit	City of Chicago	Suburbs	Total Cook County
1990	Bus	228,222	20,830	249,052
	Subway or Elevated	93,824	22,806	116,630
	Total	322,046	43,636	365,682
2000	Bus	163,874	18,758	182,632
	Subway or Elevated	115,388	20,199	135,587
	Total	279,262	38,957	318,219
Change	Bus	-64,348	-2,072	-66,420
	Subway or Elevated	21,564	-2,607	18,957
	Total	-42,784	-4,679	-47,463
%Change	Bus	-28%	-10%	-27%
	Subway or Elevated	23%	-11%	16%
	Total	-13%	-11%	-13%

Table 5.4 Cook County residents who take selected transit modes to work, 1990 and 2000[11]

Table 5.4, above, shows the number of people in Cook County who take selected modes of transit to work, in 1990 and 2000. Data is broken down between the City of Chicago and the suburban parts of Cook County. The selected modes of transit, bus and subway/elevated, are the modes that CTA operates. There is, however, some overlap in service area between the CTA and Pace bus systems.[12] Nearly all bus service within the City of Chicago is CTA, but Pace does provide some intra-city trips in the outer reaches of the city. In the suburbs, CTA provides some bus service, but Pace provides most. Census data do not distinguish between people who ride CTA and Pace buses. Indeed, some people may ride both systems as part of their commutes.

[11] United States Census Bureau, 1990 Summary Tape File 3, Table P049. Means of Transportation to Work; United States Census Bureau, Census 2000 Summary File 3, Table P30. Means of Transportation to Work for Workers 16 Years and Over

[12] Chicago Transit Authority, "Bus & Rail Map," March 2003

This table does not include people who commute by railroad, since such people would be expected to ride Metra rather than CTA. Commuters who use the CTA rail system should be recorded accurately as "subway or elevated" commuters, because the terminology used on census forms matches the local parlance. The CTA rail system is known locally as the "L," which is short for "elevated." Downtown, two of the rail lines travel through subway tunnels. These routes are referred to as the State Street Subway and the Dearborn Street Subway.

In both Cook County as a whole, and in the City of Chicago, the number of bus, subway and elevated transit commuters declined by 13% from 1990 to 2000. This is a slightly greater decline than the 8% drop in transit commuters region-wide, but less than the 21% decline in total CTA ridership over the same period, as shown in Table 5.1 above. In terms of the individual modes of transit, CTA rail ridership should be compared to the number of subway/elevated commuters in all of Cook County, because CTA is the exclusive operator of subway and elevated service in both the city and suburbs. CTA bus ridership should be compared to the number of bus commuters in the city only, because Pace provides most of the bus service in the suburbs.

The 28% decline in bus commuters in the City of Chicago is consistent with the 28% decline in CTA bus ridership in the 1990's. It is not surprising that the decline in bus commuters in the suburbs is smaller, because Pace ridership declined by only 4% in the 1990's. The decline in bus ridership cannot be explained by a decline in population, because both the population and the number of workers in both the city and the county increased from 1990 to 2000.[13]

The increase in subway/elevated commuters is more of an enigma. County-wide, the number of subway/elevated commuters increased by 16%, in marked contrast to the decline in bus commuters. This increase is not consistent with the change in CTA rail ridership. Table 5.1 shows that CTA rail ridership in 2000 was barely higher than it was in 1990. The rail ridership

[13] United States Census Bureau, 1990 Summary Tape File 3, Table P001. Persons, and Table P049. Means of Transportation to Work;
United States Census Bureau, Census 2000 Summary File 3, Table P01. Total Population, and Table P30. Means of Transportation to Work for Workers 16 Years and Over

statistics provide no hint of an increase in commuting on the CTA rail system. It is possible that that the CTA rail system may have gained commuters, but lost non-work riders.

Another possible explanation for this disparity rests on the fact that the CTA bus and rail systems are a complex, interconnected network. The census data do not reflect the fact that many people ride both the bus and the train in the course of their commutes. Service changes during the 1990's could have changed riders' transfer patterns, leading some people who identified themselves as bus commuters in the 1990 census to identify themselves as rail commuters instead in 2000. If these commuters already rode both bus and rail in 1990, an increase in rail unlinked trips would not accompany such a shift in commuter self-identification.

Without a better understanding of the CTA's route network and service changes, it is difficult to reconcile the changes in ridership with the changes in the number of transit commuters. Overall CTA ridership declined more sharply than the overall number of transit commuters in the city and county, so there is still no evidence that non-work ridership increased in the 1990's. That is essentially the only conclusion that can be drawn for now.

Description of the CTA route network

Michael Shiffer, the Vice President of Planning at CTA, has characterized Chicago as "Manhattan surrounded by Los Angeles."[14] Chicago is an expansive city, built around a gridiron system of arterial streets that stretches seemingly endlessly across the uninterrupted plains of the Midwest. This low-density sprawl is punctuated by the city's downtown, which is the second only to Midtown Manhattan as the largest downtown office district in the US.[15] With 57% of the office space in the entire metropolitan area, downtown Chicago is a major economic focal point.[16]

[14] Michael Shiffer (Chicago Transit Authority), presentation to the CTA/Tren Urbano research group at the Center for Transportation and Logistics, Massachusetts Institute of Technology, 21 February 2003
[15] Arthur Andersen, LLP, *Economic Base and Sector Analysis, Central Area, Chicago, Illinois, 2000-2020*, prepared for the City of Chicago, Department of Planning and Development March 2001 (Revised 21 May 2001), p. 38
[16] Arthur Andersen, LLP, p. 38

Because Chicago is quite large, it is common to refer to "sides" of the city – North Side, South Side, and so forth – and of course the directions of these "sides" are relative to downtown. (There is no East Side because Lake Michigan is to the east).

The CTA route network is closely attuned to the city's geography. The rail system is focused on serving downtown. It consists of seven color-coded lines with a total of eleven branches, all but one of which radiate from downtown.[17] The rail system is a medley of historic elevated lines (some of which date back to the nineteenth century); lines built in freeway medians during the postwar period; and more recent extensions to the city's two airports.[18] Today there are 144 CTA rail stations in active use, all but eighteen of which are inside the city limits.[19] Most stations are designed primarily for pedestrian access; only 15 stations feature park-and-ride lots.[20] The condition of the older rail infrastructure varies widely. Some parts are dilapidated, while others have been brought up to a state of good repair.

The heart of the rail system is an elevated loop downtown. It has nine stations and serves the Brown, Green, Orange, and Purple Lines. It is such a prominent feature of the downtown business district that the district itself is nicknamed "the Loop." There are also two downtown subways, each with several stations, which serve the Blue and Red Lines. The Yellow Line, which is the only line that does not go downtown, is merely a shuttle connecting the northern end of the Red Line to suburban park-and-ride facility.

The bus system, meanwhile, provides fairly uniform coverage across the entire city. It consists of numerous long North-South and East-West bus routes that traverse the city's arterial street grid with few deviations. Forty-six "key" bus routes, generally spaced one-mile apart from each other, form the backbone of the CTA bus system.[21] These routes carry about 70% of all

[17] Chicago Transit Authority, "Bus & Rail Map," March 2003
[18] metroPlanet, "Chicago, Illinois, USA." http://metroplanet.elan.net/am/chic/chicago.htm
[19] Chicago Transit Authority, "Bus & Rail Map," March 2003;
Chicago Transit Authority, "Facts at a Glance," May 2003
[20] Chicago Transit Authority, "Bus & Rail Map," March 2003
[21] Chicago Transit Authority, *Service Standards*, Technical Report PSP-x01005, July 2001, p. 12

CTA bus ridership.[22] CTA is committed to maintaining headways of 30 minutes or less on all of these key routes, throughout the day, seven days a week.[23] There are also more than 90 "support" and "special" bus routes, which provide supplemental service during busy travel periods and to specific travel demand generators.[24]

Although the rail system is radial, while the bus system is a grid, the two are complementary. Most rail stations are located at regular intervals at major cross streets, and these are typically the arterial streets on which bus routes operate. At a few rail stations, particularly at the outer reaches of the system, there are intermodal terminals serving several bus routes.

This interconnectivity allows many riders to transfer between rail and bus. A 2001 telephone survey asked CTA customers which transit modes they use to complete "the trip they take most often" on CTA.[25] According to this survey,

- 32% of CTA customers transfer between bus and rail (or vice versa)
- 22% of CTA customers ride the bus, with no transfers
- 19% of CTA customers ride the train, with no transfers
- 14% of CTA customers transfer within the bus system
- 6% of CTA customers transfer within the rail system

Thus more than half of all CTA riders transfer within the CTA system, and the largest type of transfer is between bus and rail.

Given the scope and complexity of the CTA network, it is not possible to identify all of the major demand generators in the catchment area of each route or station, was done for MetroLink in the St. Louis case. Generally speaking, downtown is the biggest attraction for the CTA rail system. Downtown Chicago is not only a large office district, it is a thriving area with

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[22] Chicago Transit Authority, *Service Standards*, p. 9
Two-thirds of CTA ridership is on the bus system, and 47% of all CTA ridership (bus and rail) is on the 46 key routes. 47% divided by 67% equals 70%.
[23] Chicago Transit Authority, *Service Standards*, pp. 15, 18
[24] Chicago Transit Authority, *Service Standards*, pp. 9, 16
[25]Northwest Research Group, Inc., *2001 Customer Satisfaction Survey*, prepared for the Chicago Transit Authority, Technical Report MR02-05, August 2002, Table 12, p. 67

numerous hotels, colleges, cultural institutions, tourist attractions, restaurants, department stores, and other shopping opportunities.[26] This mix of activity exists both in the Loop, which is the heart of the business district, and in the Near North. The latter is a neighborhood just north of the Loop, across the Chicago River, that is partly a continuation of the downtown business district and partly and upscale residential neighborhood. Unlike downtown St. Louis, there are far more than a handful of non-work attractions in downtown Chicago.

Outside downtown, rail stations and bus routes mainly serve residential and industrial areas. Many neighborhoods have active local commerce that could attract non-work travelers. Local commerce in Chicago typically exists in long strips along the city's grid of arterial streets.[27] Bus routes traverse these strips, and rail stations often are located amid them. Practical attractions such as supermarkets and chain retail stores are abundant. Some neighborhood commercial areas feature unique attractions that draw patrons from across the city. Ethnic neighborhoods, such as Chinatown and Greektown, are popular dining destinations. Other neighborhoods are known for their nightlife, including Lakeview ("Boys' Town"), Lincoln Park, Rush Street and Wrigleyville. CTA rail stations serve each of these six particular neighborhoods, but of course this is hardly a complete list of local-level non-work activity.

The St. Louis case identified major travel destinations such as sports stadiums, medical centers, universities, shopping malls, visitor attractions, the convention center, and the airport. In Chicago, there is a smattering of such attractions that are located outside of downtown but still accessible by CTA rail. These destinations are listed in Table 5.5, below. This table lists destinations by type. It shows the side of the city where they each destination is located (based on cardinal directions from downtown), and the rail stations and lines serving each destination. Where the side of the city is shown in parentheses, that destination is located in the suburbs. For example, Northwestern University is located in Evanston, a suburb just north of the city.

[26] Alexander N. Cohen, personal observations, Summer 2003
[27] Alexander N. Cohen, personal observations, Summer 2003

Type	Destination	Side	Rail Stations
Medical Ctr.	West Side Medical Center	W	Polk, Medical Center (Blue)
Major Universities (10,000+ students)	DePaul University	N	Fullerton (Red, Brown, Purple)
	Loyola University Chicago	N	Loyola (Red)
	Northwestern University	(N)	Davis, Foster, Noyes (Purple)
	Univ. of Illinois-Chicago	W	UIC-Halsted (Blue)
Stadiums (pro sports)	U.S. Cellular Field (baseball)	S	Sox-35th (Red)
	United Center (basketball, hockey)	W	Medical Center (Blue)
	Wrigley Field (baseball)	N	Addison (Red)
Airports	Midway Airport	SW	Midway (Orange)
	O'Hare International Airport	NW	O'Hare (Blue)
Visitor Attractions	Baha'i Temple	(N)	Linden (Purple)
	Frank Lloyd Wright District	(W)	Harlem, Oak Park (Green)
	Garfield Park Conservatory	W	Conservatory (Green)
	Stephens Convention Center	(NW)	Rosemont (Blue)

Table 5.5 Major attractions outside of downtown that are served by CTA rail[28]

The CTA rail system serves four major universities, three professional sports arenas, the city's two commercial airports, a large medical center, and some miscellaneous visitor attractions. While this seems like an impressive list, it looks diminutive compared to the size of the CTA rail system. Unlike MetroLink in St. Louis, the vast majority of CTA rail stations do not serve any of these special attractors. Another problem is that, with the exception of DePaul University, each sites is served by only one of the seven rail lines. Given the radial nature of the rail system, most Chicagoans would either have to hub through downtown or take crosstown buses to reach these destinations by transit.

A final issue is that while each attraction is within one-half mile of a CTA rail station, pedestrian access to some key attractions is not very convenient. The United Center, home of the Bulls NBA basketball team and the Blackhawks NHL football team, is nearly one-half mile from the rail station. Most transit-riding sports fans take buses to access this stadium instead.[29] At both airports, the walk between the airport terminals and the rail station is a bit long. At O'Hare, a single subway station serves all of the airline terminals at this huge airport, and riders must

[28] Chicago Transit Authority, "Bus & Rail Map," March 2003;
Illinois Board of Higher Education, *Data Book on Illinois Higher Education*, 2003, Tables I-2, I-4;
Rand McNally, *Chicago & Cook County StreetFinder*, 2003
The listing of universities excludes community colleges and for-profit insititutions.
[29] Adam Rahbee (Chicago Transit Authority), personal communication, Summer 2003

proceed underground via an extensive network of moving walkways. At Midway, riders must walk through the airport parking garage to connect between the station and the terminal.

Of course, lengthy pedestrian access is better than no access at all. Table 5.6, below, highlights some of the weaknesses of the rail system. This table shows attractions that have CTA bus service, but no rail service. This list includes five regional shopping malls, five popular visitor attractions, two major universities, and the football stadium. This list does not include the countless other destinations that are located in the suburbs and have no CTA service whatsoever.

Type	Destination	Side	Bus Routes
Major Universities	Northeastern Illinois University	NW	82
	University of Chicago	S	1, 4, 6, 55, X55, 59, and more
Stadiums	Soldier Field (football)	S	12, 127, 128, 130, 146
Visitor Attractions	Lincoln Park Zoo/Conservatory	N	151, 156
	McCormick Place (conventions)	S	3, 21
	Museum Campus (3 museums)	S	12, 127, 130, 146
	Museum of Science and Industry	S	1, 6, 10, 55, X55, and more
	Navy Pier	N	29, 56, 65, 66, 120, 121, 124
Regional Shopping Malls	Evergreen Plaza	(S)	X49, 95E
	Ford City Mall	SW	54B, 79
	Harlem/Irving Plaza	(NW)	78, 80, 90
	North Riverside Park Mall	(W)	X21, 25
	Westfield Old Orchard	(N)	97

Table 5.6 Major attractions that are served by CTA bus only[30]

In terms of visitor attractions, rail serves a variety of lesser-known, mainly suburban destinations while omitting some of Chicago's most prominent destinations. For example, McCormick Place is the largest convention center in the nation, and has no CTA rail service.[31] The Stephens Convention Center, which does have rail service, is a much smaller facility located near the airport. In terms of shopping, rail serves downtown department stores and the very upscale Water Tower Place mall also located downtown, but it does not serve any of the five regional malls that can be reached by CTA buses. In terms of sporting event venues, rail access is

[30] Chicago Transit Authority, "Bus & Rail Map," March 2003;
Illinois Board of Higher Education, *Data Book on Illinois Higher Education*, 2003, Tables I-2, I-4;
Rand McNally, *Chicago & Cook County StreetFinder*, 2003
The listing of universities excludes community colleges and for-profit insititutions.
[31] McCormick Place, "Facilities." http://www.mccormickplace.com/SubLink.cfm?Main_ID=1&Sub_ID=4

mixed. The rail system provides good access to the city's two baseball stadiums, mediocre access to the basketball and hockey stadium, and no access to the football stadium.

There are three distinct geographic areas that are rich in non-work attractions but that lack CTA rail service. Soldier Field, McCormick Place, the Museum Campus, and the Navy Pier are all located on the lakefront close to downtown, but more than half a mile from the nearest rail station. The University of Chicago and the Museum of Science and Industry are located in Hyde Park, a South Side neighborhood that is rich in cultural institutions but that lacks CTA rail service for historical reasons.[32] The shopping malls are located in the inner suburbs or, in the case of the Ford City Mall, at the periphery of the city. Multiple bus routes serve all of these areas, to compensate for the lack of rail service.

Demographic profile of CTA riders

CTA bus and rail systems are complementary and closely integrated, and some major destinations outside of downtown are accessible by rail while others are accessible only by bus. These facts mean that, unlike in St. Louis, CTA rail riders are not dramatically different from CTA bus riders. Table 5.7, below, presents the demographic characteristics of both groups, as well as CTA riders as a whole. These results are based on the CTA's 2001 Customer Satisfaction Survey, a telephone survey of 2,505 CTA customers residing in the CTA service area.[33] A CTA customer is defined as someone who rode the CTA system at least once in the week prior to the survey. The CTA service area is defined as a subset of Cook County, including the city and some inner suburbs. Being a telephone survey rather than an onboard survey, a perfect division of bus and rail riders was not possible. Respondents were classified as rail or bus customers based on which mode they rode most frequently in the week prior to the survey.

[32] Jeff Sriver (Chicago Transit Authority), personal communication, Summer 2003
[33] Northwest Research Group, Inc., *2001 Customer Satisfaction Survey*, p. 32

Personal/Household Characteristics		Most Frequent Mode		All CTA Customers
		CTA Rail	CTA Bus	
Access to automobile	No automobile available	19%	36%	28%
	Have automobile available	81%	64%	72%
Transit dependence ("Why do you ride CTA?")	Have car / Prefer transit sometimes	66%	36%	47%
	Don't have car / Prefer transit	11%	13%	12%
	Don't have car available	18%	37%	29%
	Can't / don't know how to drive	6%	15%	11%
Sex	Male	46%	37%	41%
	Female	54%	63%	59%
Age	16-17	3%	10%	7%
	18-24	17%	16%	16%
	25-34	32%	20%	25%
	35-44	21%	17%	19%
	45-54	16%	15%	15%
	55-64	6%	9%	8%
	65 and up	5%	13%	9%
Household income	< $10,000	5%	13%	10%
	$10,000-$20,000	9%	18%	14%
	$20,000-$30,000	12%	17%	15%
	$30,000-$40,000	18%	18%	18%
	$40,000-$50,000	14%	12%	13%
	$50,000-$60,000	9%	8%	8%
	> $60,000	33%	15%	23%
Race/ethnicity	Caucasian	59%	40%	48%
	African-American	22%	35%	29%
	Hispanic	12%	18%	16%
	Other	7%	7%	7%
Place of residence	Downtown	2%	3%	2%
	North Side	31%	25%	28%
	Northwest Side	13%	13%	13%
	South Side	17%	30%	24%
	Southwest Side	8%	7%	8%
	West Side	11%	13%	12%
	Suburbs	18%	10%	13%
Frequency of riding	Frequent	52%	50%	51%
	Infrequent	48%	50%	49%

Table 5.7 Characteristics of CTA customers, 2001[34]

The overall CTA customer base is split between choice riders and transit-dependent riders. The exact split depends on how the question is asked. Nearly three-quarters of all riders have one or more automobiles "available for [their] use," but fewer than say that they ride CTA

[34] Northwest Research Group, Inc., *2001 Customer Satisfaction Survey*, pp. 52-4, 56, 60

because they "have a car available but prefer to take the train or bus for some purposes."[35] Many customers must have interpreted the word "available" to include automobiles that could be borrowed from friends or relatives. This survey does not explicitly ask about household auto ownership, so the "Why do you ride CTA?" question is a better measure of transit dependence. Interestingly, 12% of the customers say that they "don't have a car available because [they] prefer to take the bus or train."[36] This is a market that defies the usual choice/dependent rider distinction. These people could afford to own cars, but choose not to because the transit system meets their travel needs.

In terms of demographic characteristics, a clear majority of CTA riders are female. Most riders are working age, between 18 and 54 years old, with 25 to 34 year olds as the single largest age group. Customers are fairly evenly distributed across different income levels, with low-income households (below $20,000 annual income) and high-income households (above $60,000) each representing just under one-quarter of all riders. A clear plurality of customers are Caucasian, but racial and ethnic minority groups collectively form a slight majority. Overall, CTA seems to attract a wide spectrum of travelers.

CTA riders live all over the City of Chicago. The North Side and South Side are the two neighborhoods with the most riders, but that largely reflects the greater population of those two areas. (Geographic areas are defined in the survey by amalgamations of ZIP codes). Only 10% of CTA customers live in the suburbs, reflecting the concentration of CTA service in the city. Actually, this percentage of suburbanites is artificially low because only residents of the CTA service area were surveyed. It is likely that many residents of the outer suburbs ride CTA when traveling within the city, but the survey does not capture that ridership. Similarly, the survey provides no insight into the magnitude or characteristics of tourist ridership.

[35] Northwest Research Group, Inc., *2001 Customer Satisfaction Survey*, pp. 52-3, 60, 160, 179
[36] Northwest Research Group, Inc., *2001 Customer Satisfaction Survey*, pp. 60, 160

There are some differences between bus and rail riders. Rail riders are more likely to be choice riders. Consistent with that finding, household income levels tend to be higher for rail riders, and a greater percentage of rail riders are Caucasian. More rail riders live in the predominantly white North Side and in the suburbs, while more bus riders live in the predominantly African-American South Side. Rail riders are more evenly distributed by gender – women are a slight majority of rail riders, but a strong majority of bus riders. Bus riders, however, are more evenly distributed by age; the 25 to 34 age group is more dominant on the rail system.

All of these differences are reminiscent of the St. Louis case, where the MetroLink rail riders were found to be overwhelmingly choice riders, versus bus riders who were found to be overwhelmingly transit-dependent. On CTA, however, the differences between bus and rail are much more slight. Although CTA rail customers tend to be choice riders, while CTA bus customers tend to be transit-dependent, there is a thorough mix of both groups on each mode. It seems that both CTA transit modes serve a wide variety of ridership markets.

Note that these results are based on a telephone survey of customers, and are not weighted by the number of CTA trips that people take. The bottom lines in Table 5.7 show that about half of the customers surveyed are "frequent" CTA riders, while about half are "infrequent" riders. That breakdown holds true for both bus and rail customers. A frequent customer is defined as someone who rode CTA on five or more days in the week prior to the survey, while an infrequent customer is defined as someone who rode CTA on one to four days in the week prior to the survey.[37] Other survey results, not presented here, show that the demographic differences between frequent and infrequent customers are generally modest. Frequent riders are somewhat younger, somewhat less affluent, and somewhat more likely to be African-American.[38] These

[37] Northwest Research Group, Inc., *2001 Customer Satisfaction Survey*, pp. 55
[38] Northwest Research Group, Inc., *2001 Customer Satisfaction Survey*, pp. 56-8

differences reflect the fact that frequent riders include more work and school commuters, while infrequent riders include more people who are not employed outside the home.

CTA service changes in the 1990's

The scope and complexity of the CTA network, the wide range of destinations with CTA service, and the diversity of the CTA customer base make it difficult to pinpoint the source of recent ridership changes. In the St. Louis case, it was obvious that virtually all new ridership could be attributed to the opening of MetroLink. In Chicago, the tumultuous ridership changes that occurred in the 1990's must be considered in the context of several major CTA service changes that were implemented over the decade. Table 5.8, below, provides a brief summary.

Date	**Brief Description of Service Changes**
February 1992	System-wide service cuts, including station closures and reduced frequencies
February 1993	Realignment of through service on two rail lines
October 1993	Orange Line opens, between Midway Airport and the Loop
January 1994	Green Line is closed for reconstruction
May 1996	Green Line reopens, with faster service but fewer stations
June 1997	Booz-Allen Hamilton service cuts adopted by CTA board

Table 5.8 Major CTA service changes in the 1990's[39]

Two of these service changes were actually broad-based service reductions, which of course would be expected to have a deleterious effect on ridership. The February 1992 changes have been described as "classic-style service cuts" in which poorly performing services and stations were targeted for budgetary reasons, with little thought given to the structure of the overall network.[40] Service frequencies on rail and bus routes were reduced. Five rail stations were closed altogether, and some bus routes were eliminated. Many of the cuts targeted off-peak service. For example, two rail stations were closed on weekends, late night rail service was reduced, and a tourist-oriented service known as the "Culture Bus" was eliminated.[41]

[39] Chicago "L".org, "The CTA Reinvents Itself: The 'L' Heads Into the 21st Century (1990-present)," http://www.chicago-l.org/history/CTA4.html
[40] Chicago "L".org
[41] Chicago "L".org;
Peter Foote (Chicago Transit Authority), personal communication, Summer 2003

The Booz-Allen Hamilton service cuts of 1997 are viewed as more strategic, designed to bring "service levels into alignment with current population."[42] The consulting firm of Booz-Allen Hamilton analyzed the entire CTA network, and made the following recommendations:

- Suspension of overnight rail service on the Green and Purple Lines
- Suspension of weekend service on the Cermak branch of the Blue Line
- Elimination of 15 bus routes
- Reduction of off-peak service on 24 "key" bus routes
- Shortening of five bus routes in off-peak periods

Once again, service cuts fell heavily on off-peak service. All of these cuts were phased in, in the months following CTA board approval.

Other than these two rounds of service cuts, the rest of the service changes listed in Table 5.8 involve major capital investments in the rail system. The first project opened in February 1993. For many years prior to that time, the high-ridership North Elevated line was connected to the low-ridership South Elevated line, and the high-ridership Dan Ryan Expressway line (serving the South Side) was connected to the low-ridership Lake Street line (serving the West Side). CTA provided North-South and West-South through service on these lines, via downtown, and thus was forced to maintain high levels of service even on the lightly traveled branches. A new track connection was built to realign these mismatched rail lines. The North Elevated and Dan Ryan lines were connected to form the current Red Line, and the Lake and South Elevated lines were connected to form the current Green Line. This connection allowed CTA to reduce service on the low-ridership branches while maintaining service on the high-ridership branches. Of course, from the point of view of Green Line riders, service was cut.

The Green Line took another hit in January 1994, when it was closed entirely for reconstruction until May 1996. The aging elevated line was badly in need of repair, but the

[42] Chicago "L".org

decision to close the line completely for more than two years was very unpopular. Riders were forced to seek alternate means of transportation, and many never returned. Another problem with this project was that the CTA lacked the money to rebuild every station, so out of a total of 29 Green Line stations outside of the downtown loop, five stations never reopened.[43] One more station was lost because a local bishop successfully demanded that CTA demolish a half-mile segment of elevated track at the end of one of the Green Line's two South Side branches.[44] Since the completion of the Green Line rehabilitation, service has been faster and more reliable, but ridership has remained substantially lower.[45]

Of all the service changes listed in Table 5.8, only the opening of the Orange Line in October 1993 was unequivocally a service improvement. The Orange Line is an all-new rail line from the Loop to Midway Airport. Aside from serving the airport, the Orange Line brought rail service to Chicago's southwest neighborhoods for the first time, with seven intermediate stations between the Midway and downtown. Another unique feature of the Orange Line is that six of its stations feature park-and-ride lots.[46] Only nine other stations across the entire CTA rail system have such facilities.

Although the Orange Line has increased rail ridership, CTA planners believe that much of the gain has come at the expense of bus ridership.[47] Prior to the Orange Line, express buses served the same corridor, so many riders simply switched from bus to rail. Rather than taking the express buses, many riders who now take the Orange Line used to take crosstown buses to the Red or Green Lines on the South Side, or to the Blue Line on the West Side. Since ridership is measured by unlinked passenger trips, the Orange Line actually lowered ridership counts by

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[43] Chicago "L".org;
Chicago Transit Authority, "Chicago Transit Map," January 1997
The total of 29 stations includes California station, which was closed during the February 1992 service cuts but reinstated as part of the Green Line reconstruction
[44] Chicago "L".org
[45] Foote
[46] Chicago Transit Authority, "Bus & Rail Map," March 2003
[47] Foote

eliminating a bus-rail transfer for those riders. The Orange Line's park-and-ride lots have exacerbated this problem, because they have attracted riders who previously rode buses to access the rail system. Paradoxically, Orange Line riders are getting much better service than they had before the line opened, but like all of the other service changes discussed here, the line seems to have had a neutral or negative impact on ridership numbers.

Understanding CTA ridership changes in the 1990's

How have these service changes translated into ridership changes? The Orange Line shifted some ridership from bus to rail, and helps to explain why the number of rail commuters in Chicago increased from 1990 to 2000 while the number of bus commuters decreased. Broad-based service cuts most likely depressed ridership on both bus and rail, and help to explain why bus ridership decreased in the 1990's and why rail ridership did not increase proportionally with the increase in rail commuters. With service cuts especially prevalent in off-peak hours, non-work ridership may have been more profoundly affected.

CTA market research provides additional insight into the 1990's ridership changes. The Traveler Behavior and Attitudes Survey (TBAS) was conducted both in 1990 and in 2000. Similar to the aforementioned Customer Satisfaction Survey, the 2000 TBAS is a telephone survey of 2,768 residents of the CTA service area.[48] Respondents were asked to recall all of the trips that they made within the metropolitan region on the weekday prior to the survey, to create a retrospective travel diary.[49] All trips at least two blocks long were included, regardless of the mode of travel used, so the survey provides data about CTA mode share. The 1990 TBAS employed a comparable methodology, so by comparing the results of the two surveys, it is possible to see how CTA mode share changed over the decade.

[48] Northwest Research Group, Inc., *Traveler Behavior and Attitudes Survey: CTA Riders and Nonriders*, prepared for the Chicago Transit Authority, Technical Report MR01-09, July 2001, p. 17
[49] Northwest Research Group, Inc., *Traveler Behavior and Attitudes Survey*, p. 58

Measure of CTA Market Share	1990	2000
Households with CTA riders as a share of all households	59%	48%
CTA riders as a share of all persons age 12 and older	40%	29%
CTA trips as a share of all trips at least two blocks long	30%	19%

Table 5.9 Change in CTA market share in the CTA service area, 1990 to 2000[50]

By several measures, CTA lost market share in the 1990's, as Table 5.9, above, shows. A smaller share of residents in the CTA service area are CTA riders – defined as people who rode CTA at least once in the week prior to being surveyed. Similarly, a smaller share of households in the service area are home to at least one CTA rider. Most emphatically, CTA's share of total trips made by residents of the service area declined by more than one-third, from 30% to 19%.

Trip Orientation	Transit Mode	1990	2000
CBD Trips	CTA Bus	28%	17%
	CTA Rail and Bus/Rail Hybrid	22%	40%
	CTA Total	51%	57%
Non-CBD Trips	CTA Bus	20%	8%
	CTA Rail and Bus/Rail Hybrid	4%	5%
	CTA Total	24%	13%
Total Trips	CTA Bus	22%	9%
	CTA Rail and Bus/Rail Hybrid	8%	10%
	CTA Total	30%	19%

Table 5.10 Change in CTA market share by transit mode and trip orientation, 1990 to 2000[51]

Focusing on that latter measure, CTA's share of total trips did not decline uniformly. Table 5.10, above, shows the CTA market share by transit mode and by trip orientation. Overall CTA mode share declined from 30% in 1990 to 19% in 2000, but loss of mode share on the CTA bus system was responsible for all of that decline. CTA bus mode share declined by more than half, from 22% to 9%, while CTA rail mode share increased slightly. (The CTA rail mode share shown here includes trips made only on CTA rail, and trips made using a combination of bus and rail). This finding is consistent with previously-discussed ridership trends – sharp declines in bus ridership, and roughly stable rail ridership.

Mode share trends also differ based on the orientation of trips. CTA mode share increased for trips to and from or wholly within the Chicago central business district, but

[50] Northwest Research Group, Inc., *Traveler Behavior and Attitudes Survey*, pp. 27, 29, 63
[51] Northwest Research Group, Inc., *Traveler Behavior and Attitudes Survey*, pp. 63, 68

decreased for all other trips. The modal pattern holds true regardless of trip orientation. For both CBD and non-CBD trips, the bus system lost mode share, while the rail system gained mode share. For CBD trips, the gain in rail share was enough to offset the loss in bus share, but not so for all other trips. The most damning loss that CTA suffered in the 1990's was a loss of bus ridership for non-CBD trips.

These trends are not favorable with regards to CTA's ability to serve non-work trips. CTA carries an impressive 57% of all CBD-oriented trips made by residents of the CTA service area, but CBD-oriented trips account for only 15% of those residents' total weekday travel.[52] Moreover, work trips are more heavily concentrated in the CBD than non-work trips. 21% of all "commute" trips (to or from work or school) have an origin or destination in the CBD, compared to only 8% of all other trips.[53]

While unfavorable, these trends nevertheless make sense in light of the CTA's route structure and recent service changes. For CBD trips, the addition of rail trips on the Orange Line more than offset the loss of bus trips in that corridor. The Orange Line markedly improved the CTA's ability to serve the CBD trip market. For non-CBD trips, most service is provided by the gridiron bus network, so declines in non-CBD mode share are keyed to declines in bus ridership. Across-the-board service cuts hurt the CTA's ability to serve non-CBD travel markets. Though the Orange Line serves Midway Airport, an important non-CBD travel destination, the opening of the line did not do enough to bolster CTA's market share for non-CBD trips.

Of course, service changes are not the only factor that influenced ridership in the 1990's. Economic changes, changing population demographics, and fare policy changes must have been influential as well. CTA planners have suggested that the following events and conditions negatively affected ridership levels in the 1990's:

[52] Northwest Research Group, Inc., *Traveler Behavior and Attitudes Survey*, p. 68
[53] Northwest Research Group, Inc., *Traveler Behavior and Attitudes Survey*, pp. 80, 93

- CTA's transfer policy was changed to allow no more than two reduced-fare transfers within two hours of boarding[54]

- Following a severe flood in the Loop in 1994, a freeze on the addition of parking spaces downtown was lifted temporarily[55]

- High-rise public housing projects on the South and West Sides were demolished, to be redeveloped as lower-density townhouse-style housing[56]

CTA planners have also suggested that the following had a positive effect on ridership:

- Electronic fare cards were introduced in 1997, including stored value cards and a greater variety of unlimited-ride passes[57]

- Downtown Chicago shared in the strong national economy of the late 1990's, which led to increased employment and sharp increases in downtown parking prices[58]

- Increased numbers of immigrants moved to Chicago throughout the decade[59]

- Formerly depressed and/or industrial neighborhoods close to downtown experienced gentrification and saw the construction of new housing[60]

A detailed examination of the impact of each of these countervailing factors is beyond the scope of this thesis. The important point is that CTA is not necessarily to blame for the ridership declines of the 1990's. Many factors were beyond the agency's control. CTA service changes had an impact as well, but most of the changes listed in Table 5.8 were necessary for the long-term health of the transit system, even though they may have resulted in fewer unlinked trips in the short run. In contrast to St. Louis, where simply opening a new rail line led to a surge in ridership, a morass of service changes and external factors in Chicago led to a turbulent decade for CTA ridership.

Current CTA President Frank Kruesi took office in 1997, and has presided over ridership increases since then.[61] Under Kruesi's leadership, CTA has been more proactive about improving

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[54] Foote
[55] Foote
[56] Shiffer
[57] Northwest Research Group, Inc., *Traveler Behavior and Attitudes Survey*, pp. 14-5
[58] Foote
[59] Sriver
[60] Sriver
[61] Chicago "L".org

bus service, rebuilding aging rail infrastructure, and planning new rail extensions to increase ridership and serve new markets. CTA planner Peter Foote observes that a closer examination of mode share and ridership losses that occurred under the agency's previous leadership does not help Kruesi in building support for his forward-looking initiatives.[62] Thus the upcoming "Identification of Markets" chapter does not identify non-work travel markets in which CTA lost ground over the 1990's. Rather, it identifies non-work travel markets that are strong sources of ridership at present. Whether CTA has been effective at realizing the full ridership potential of these markets is a question that will be addressed in the "Characteristics of Markets" chapter ahead.

[62] Foote

VI. Chicago Case Study: Identification of Markets

Who rides CTA and where do those people travel? Chapter 5 answered those questions about CTA service overall. Now, in this chapter, CTA market research and ridership data is used to answer those questions about non-work trips in particular, in order to identify strong markets for non-work transit ridership. Most of the work presented here was undertaken during a summer internship at the Chicago Transit Authority in 2003, under the guidance of Peter Foote.

Non-work riders: Analysis of recent CTA survey results

Two comprehensive CTA surveys are analyzed to learn about CTA non-work trip purposes; the demographic characteristics of non-work riders; and non-work transit mode share. These surveys are the 2000 Traveler Behavior and Attitudes Survey (TBAS) and the 2001 Customer Satisfaction Survey, both of which were introduced in Chapter 5. TBAS is the better source of data on CTA trips, because respondents were asked to recall all of their trips from the previous weekday, to create a retrospective travel diary. The Customer Satisfaction Survey is a better source of data on CTA riders, because its sample of riders is much larger. Both surveys sampled a bit more than 2,000 residents of the CTA service area, but the Customer Satisfaction Survey only sampled CTA riders while TBAS sampled riders and non-riders. All of the survey results presented in this chapter are based on original queries of the survey databases.

Table 6.1, below, shows the purpose of CTA trips. These results are from the Traveler Behavior and Attitudes Survey. Trip purposes are shown for each CTA mode of travel – trips involving CTA bus only; trips involving CTA rail only; and trips involving both CTA bus and rail.[1] Trip purposes are defined by the destination of each trip. Trips with a destination of "Home" are excluded from the calculation, as are trips with "Don't Know/Refused" listed as the trip purpose. Trips with the purpose of "To Work at Airport" are aggregated with work trips, and

[1] For consistency with Table 6.3, trips involving both CTA and Pace or Metra are not included in this table. According to TBAS, such trips represent only 6% of all CTA trips made by residents of the CTA service area, and inclusion of such trips in Table 6.1 would not change any of the Total percentages.

trips with a purpose of "Air Travel: Work Related" are aggregated with work-related business trips. There are no CTA trips with the purpose of "Air Travel: Non-Work Related." Each of these airport trip purposes represents less than one percent of total CTA travel, according to TBAS. Considering that CTA serves both of Chicago's passenger airports, it is likely that most airport-related travel on CTA is classified under the other, less specific, trip purposes.

Purpose	Bus	Rail	Both	Total
Work	41%	68%	65%	54%
School	22%	10%	12%	16%
Personal Business	10%	7%	6%	8%
Recreation/Entertainment/Social/Eat Out	8%	7%	9%	8%
Doctor/Dentist/Medical Appointment	8%	1%	2%	5%
Shopping	7%	2%	6%	5%
Work-Related Business	2%	2%	0%	2%
Other	2%	2%	0%	2%

Table 6.1 Purpose of CTA trips by mode of travel, 2000[2]

On CTA as a whole, work trips are a bit more than half of all trips. That is a slightly higher share of work trips than on St. Louis MetroLink. Work trips are much more dominant on the CTA rail system than on the CTA bus system, however. Work trips represent about two thirds of rail-only trips and trips involving both bus and rail. On the bus, work trips are less than half of all trips. School trips are more dominant on the bus, however, and school trips are like work trips in the sense that they are daily commute trips to fixed locations.

As shown in Table 6.1, the survey includes four main non-work trip purposes, not counting school, work-related business, and other trips. On CTA overall, non-work travel is divided relatively evenly among each of these trip purposes – each individual purpose represents between 5% and 8% of total CTA travel. Each of these four non-work trip purposes is more prevalent on bus than on rail, particularly shopping and medical trips. Unfortunately the classification of trip purposes used in the TBAS is not specific enough for individual destinations to be identified, especially since the CTA network is so expansive. In the St. Louis case, it was

[2] Northwest Research Group, Inc., 2000 Traveler Behavior and Attitudes Survey, database of survey data, prepared for the Chicago Transit Authority, database queried by Alexander N. Cohen

possible to identify the percentage of trips destined for sporting events, the airport, and hotel/motel lodging. While these trips no doubt occur on CTA as well, they are lumped into the four general non-work trip purposes included in TBAS, and cannot be readily quantified.

Personal/Household Characteristics		**Why These Customers Ride CTA**		
		Primarily for Non-Work	Also for Non-Work	Only for Work
Transit dependence ("Why do you ride?")	Have car / Prefer transit sometimes	48%	45%	59%
	Don't have car / Prefer transit	10%	15%	10%
	Don't have car available	28%	31%	24%
	Can't / don't know how to drive	14%	10%	7%
Sex	Male	40%	40%	45%
	Female	60%	60%	55%
Age	16-17	3%	8%	9%
	18-24	13%	17%	20%
	25-34	20%	29%	26%
	35-44	15%	20%	22%
	45-54	15%	16%	15%
	55-64	10%	7%	7%
	65 and up	24%	3%	2%
Household income	< $10,000	17%	7%	6%
	$10,000-$20,000	18%	14%	8%
	$20,000-$30,000	14%	15%	15%
	$30,000-$40,000	17%	19%	18%
	$40,000-$50,000	9%	13%	17%
	$50,000-$60,000	7%	8%	10%
	> $60,000	19%	24%	27%
Race/ ethnicity	Caucasian	51%	51%	38%
	African-American	28%	28%	35%
	Hispanic	14%	15%	18%
	Other	7%	6%	9%
Place of residence	Downtown	4%	2%	2%
	North Side	27%	31%	22%
	Northwest Side	14%	12%	13%
	South Side	25%	21%	28%
	Southwest Side	8%	7%	9%
	West Side	11%	12%	12%
	Suburbs	12%	14%	14%
Frequency of riding	Frequent	15%	67%	66%
	Infrequent	85%	33%	34%
Percent of CTA customers (sum horizontally)		31%	48%	22%

Table 6.2 Characteristics of CTA customers by trip purpose, 2001[3]

[3] Northwest Research Group, Inc., 2001 Customer Satisfaction Survey, database of survey data, prepared for the Chicago Transit Authority, database queried by Alexander N. Cohen

Further analysis of these CTA trip purposes is not possible with TBAS, because the sample sizes are too small. TBAS includes more than 5,000 trips overall, but that includes trips by all travel modes (not just transit) and of all trip purposes. Fewer than 50 trips are sampled for each non-work trip purpose on CTA. The Customer Satisfaction Survey, with its larger sample of CTA riders, is used to identify the demographic characteristics of non-work transit riders. These results are shown in Table 6.2, above.

In the Customer Satisfaction Survey, each respondent was asked for the purpose of his or her most frequent trip on CTA. Besides the most frequent trip, respondents were asked for the other purposes for which they ride CTA. Trip purposes are defined as in TBAS.[4] Customers who ride most frequently for non-work purposes are listed in the Table 6.2 above under the heading of "Primarily for Non-Work." Customers who ride most frequently for work, school, or work-related business, but who also ride for non-work purposes, are listed in the table above under the heading of "Also for Non-Work." Customers who ride most frequently for work, school, or work-related business, but who do not also ride for non-work purposes, are listed in the table above under the heading of "Only for Work."

As shown in the last line of the table, almost half of all CTA customers are primarily work or school commuters who also ride for non-work purposes. Nearly one-third of CTA customers ride primarily for non-work purposes. The smallest group are those who do not ride for non-work purposes at all. Note, however, that these results are not weighted by the number of trips that weighted by the number of trips that each rider makes. All customers surveyed rode CTA at least once in the week prior to the survey, but customers who primarily make non-work trips are much less likely to be frequent riders (riding at least five days per week in the week prior to the survey). Taking frequency of riding into account, by far the biggest group of customers are those who ride primarily for work or school, who also ride for non-work purposes.

[4] Trip purposes in the Customer Satisfaction Survey that are considered to be non-work purposes are: shopping, visiting/recreation, personal business, doctor/dentist/medical appointment, to air travel: non-work related, other, and everything/only means of transportation.

For the most part, the demographic characteristics of these three customer groups are very similar to each other, and similar to the characteristics of all CTA riders as shown in Table 5.7 in the previous chapter. The subtle differences that do exist among these three groups are somewhat contradictory. Compared to other CTA customers, those who primarily ride CTA for non-work purposes are more likely to be transit-dependent and to live in low-income households, but they are also more likely to be Caucasian. Conversely, customers who only ride for work are more likely to be choice riders (59% of these customers say that they have a car, but prefer transit sometimes) and to live in upper-income households, but they are also more likely to be non-white and to be residents of the predominantly non-white and economically distressed South Side of Chicago. These contradictions suggest that a wide spectrum of people ride CTA for both work and non-work purposes, including affluent and less affluent people.

There are also some differences in age among the three customer groups, which make intuitive sense. Customers who ride primarily for non-work purposes are more likely to be age 55 and older – an age when many people are retired, and do not need to commute to work. Customers who ride primarily for work, who also ride for non-work purposes, are more likely to be age 25 to 54 – the prime age for being employed. Customers who ride only for commuting, not for non-work purposes, are more likely at be under age 25. This latter group most likely includes people who commute on CTA to school, but who have no other reason to ride CTA.

Perhaps the most interesting finding from this table is that customers who ride primarily for work and who also ride for non-work purposes are more likely to be transit dependent by choice. 15% of customers in this group do not own cars because they prefer to take transit, compared to only 10% in each of the other two customer groups. This group of customers also has the greatest percentage of North Side residents – 31%, compared to only 22% among those who only ride CTA for work or school. It could be that the North Side has more neighborhoods where it is feasible to live without a car by choice, because of a combination of good transit service and local amenities. This supposition requires further investigation.

Personal/Household Characteristics		CTA			CTA Total	Auto	Walk	Other	n
		Bus	Rail	Both					
Everyone surveyed		5%	2%	2%	9%	80%	8%	3%	1581
Household size	1	8%	4%	2%	14%	67%	13%	6%	240
	2	6%	3%	3%	12%	75%	9%	4%	362
	3 or more	5%	1%	1%	7%	85%	6%	2%	978
Children in household	Yes	4%	0%	0%	5%	88%	5%	2%	674
	No	6%	3%	2%	12%	74%	10%	4%	907
Employment status	Employed	5%	2%	1%	8%	79%	9%	4%	780
	Not Empl.	6%	0%	2%	9%	84%	6%	2%	543
	Student	12%	4%	6%	21%	57%	15%	6%	91
Household auto ownership	0	32%	8%	9%	48%	23%	20%	8%	94
	1	6%	2%	1%	10%	76%	10%	4%	493
	2 or more	2%	1%	1%	4%	88%	5%	3%	988
Reason for no auto	Prefer CTA	30%	13%	10%	53%	24%	8%	15%	69
	Dependent	43%	4%	10%	57%	19%	18%	7%	94
Sex	Female	6%	1%	1%	9%	81%	7%	3%	999
	Male	4%	3%	2%	9%	79%	9%	3%	582
Age	18-24	17%	5%	4%	26%	54%	15%	6%	148
	25-34	4%	2%	1%	8%	75%	13%	2%	322
	35-44	2%	1%	1%	4%	91%	2%	2%	423
	45-54	3%	1%	1%	5%	88%	6%	1%	295
	55-64	11%	2%	1%	14%	76%	5%	5%	168
	65 and up	5%	1%	4%	10%	80%	8%	2%	204
Household income (thousands)	< $20	25%	3%	4%	33%	52%	14%	2%	105
	$20-$30	14%	3%	2%	19%	68%	10%	3%	92
	$30-$40	6%	1%	4%	11%	75%	7%	8%	184
	$40-$50	4%	3%	1%	8%	78%	9%	4%	206
	$50-$75	2%	1%	1%	5%	88%	6%	2%	388
	> $75	1%	2%	0%	4%	85%	8%	3%	383
Place of residence	Downtown	6%	4%	0%	9%	66%	25%	0%	23
	North	10%	7%	2%	19%	61%	14%	7%	279
	Northwest	4%	1%	1%	5%	85%	7%	3%	327
	South	10%	0%	3%	13%	79%	6%	2%	298
	Southwest	4%	0%	2%	6%	83%	7%	4%	146
	West	8%	5%	5%	18%	65%	8%	9%	68
	Suburbs	1%	1%	0%	2%	92%	4%	2%	440

Table 6.3 Mode share for non-work trips, by personal and household characteristics[5]

Because these results from the Customer Satisfaction Survey only partially elucidate who rides CTA for non-work travel, the Traveler Behavior and Attitudes Survey is revisited to provide another perspective. An angle that is possible with TBAS, that was not possible with the survey used in the St. Louis case study, is to consider CTA's mode share for non-work travel among

[5] Northwest Research Group, Inc., 2000 Traveler Behavior and Attitudes Survey, database of survey data, prepared for the Chicago Transit Authority, database queried by Alexander N. Cohen

different segments of the population. This is possible because the TBAS asks about all trips made by residents of the CTA service area, including trips made by modes other than CTA.

Table 6.3, above, shows the mode share for non-work travel by residents of the CTA service area. The table shows the mode share for CTA bus-only trips; CTA rail-only trips; and trips involving both CTA bus and rail. The total CTA mode share is the sum of these three columns. The table also shows the mode share of all other modes of travel, including auto and pedestrian travel, so each table row sums horizontally to 100%. The "Other" mode column includes travel by Metra, Pace, (including Metra/Pace trips with a transfer to/from CTA), taxi, bicycle, and other bus (not CTA or Pace). This column also includes responses of "Other" and "Don't Know/Refused." Note that all of the figures in this table are mode shares for non-work travel only. The only trip purposes included in the calculation are shopping, recreation, personal business, medical, non-work air travel, and other. These are the same trip purposes classified as non-work travel in Tables 6.1 and 6.2 above.

Most of the demographic classifications used in Table 6.3 are the same as those used in Table 6.2 above, and in Table 5.7 in the previous chapter, but there are a few differences. Some age and income brackets have been aggregated differently or are not included, to avoid small sample sizes. Race/ethnicity is not shown in Table 6.3 because race or ethnicity should not affect mode choice decisions. Apparent correlations between race or ethnicity and travel behavior should be explained by factors such as the income and place of residence of different racial and ethnic groups. Household auto ownership, which is measured in TBAS, is shown in Table 6.3 instead of the earlier statements about transit dependence. The "Reason for no auto" breakdown maintains the distinction between people who do not own cars because they prefer to take transit ("Prefer CTA") and people who cannot drive or do not have a car available ("Dependent"). Frequency of riding is not shown because this table is based on an analysis of trips, not customers. Results are already weighted by the number of trips that each respondent makes.

A few new categories have been added in Table 6.3. These are: household size, presence of children (age 12 and under) in the household, and employment status. These factors are shown here because in the literature review, back in Chapter 2, they seemed to be important determinants of personal travel behavior and thus could affect mode choice decisions. For employment status, the idea is to distinguish between people who leave during the day to go to work or school, and people who stay at home and thus have the flexibility to make more non-work trips. "Employed" includes persons who are employed full-time or part-time outside the home. "Not Employed" includes persons who are retired, not employed outside the home, or currently unemployed. "Student" includes students, who may or may not be employed as well. Self-employed persons are not included in any category in this table, because it is not clear whether they work outside the home.

A wide range of interesting findings can be found in this table, particularly with regards to the total CTA mode share. There is a clear negative relationship between CTA mode share and household income. Persons with household income below $20,000 make 33% of their non-work trips on CTA. That mode share declines steadily to just 4% among persons with household income above $75,000. There is also a clear negative relationship between CTA mode share and household auto ownership. Persons living in households with no cars make 48% of non-work their trips on CTA. That mode share declines to just 4% among persons living in households with two more cars. The income and auto ownership patterns must be interrelated. Low-income households cannot afford to own cars, so the members of these households must rely on CTA for a large share of their everyday travel. Clearly, providing mobility to non-work destinations for Chicago's transit-dependent population is an important role for CTA.

Not everyone who lives without a car is poor, however. Part of the relationship between auto ownership and non-work mode share may be the result of self-selection – people who are happy to use CTA for non-work travel see no need to acquire cars. Interestingly, there is little difference in CTA mode share between those who have no car because they prefer CTA, and

those who have no car because they are transit-dependent. Both groups use CTA for more than 50% of their non-work trips. Fostering conditions that enable people to choose to forgo auto ownership may be the best way for CTA to win large mode shares among more affluent residents.

The breakdown by household size also yields useful results. Smaller households have higher CTA mode shares for non-work travel. The sharpest difference is between households with two persons and households with three or more persons. This suggests that after couples have children, they use CTA for fewer of their non-work trips. Confirming this theory is the fact that CTA mode share among those living in households with children is less than half what it is among those living in households without children.

The age cohort results are consistent with this theory as well. CTA mode share is highest, at 26% of all non-work trips, for 18 to 24 year olds. It then declines to just 4% of non-work trips among 35 to 44 year olds – prime child-rearing age. CTA mode share rebounds somewhat among those over 55, suggesting that once the children have moved away, parents may return to CTA for more of their travel. The 21% CTA mode share among students, compared to shares below 10% among the other employment groups, also points to greater non-work transit use among younger adults.

One reason why CTA mode share may be lower in households with children is that those households may make more trips overall, with transit travel a relatively smaller share of those households' total travel. Recall from the literature review that households with children make more daily non-work trips than households without. The difference in CTA mode share between households with and without children is so great, however, that households with children must also be making a smaller number of transit trips in an absolute sense.

It could be that transit-riding is a hassle with children in tow, so parents avoid it. A broader social explanation, however, is that CTA mode share could change with a person's lifecycle. Students and other young adults move into city neighborhoods. They rely on CTA for much of their non-work travel because they do not have much money. As they get older, they

earn more money, buy cars, buy cars, get married, move to the suburbs, and have children. At that point, there is little reason to use CTA for non-work travel. Is this an inexorable process? CTA should investigate how well it provides service to the young, urban adult market to see if there is any way that these people can be maintained as transit riders as they get older.

CTA mode share for non-work travel is highest in three city neighborhoods – the North and West Sides, and to a lesser extent, the South Side. It is common knowledge in Chicago that the North Side is the most affluent part of the city, while wide swaths of the South and West Sides are economically distressed. In light of the other findings from Table 6.3, It is likely that CTA mode share is high in the South and West Sides because these areas are home to many transit-dependent residents, but that CTA mode share is high in the North Side because this area is home to many young professional adults.

This discussion so far has focused exclusively on total CTA mode share. Mode share trends are less obvious for the individual modes of transit – bus, rail, and both. For almost every cohort, the CTA bus mode share is more than half of the total CTA mode share, reflecting the fact that the bus system is more extensive and has higher total ridership than the rail system. There are only a few exceptions to this rule: men, the wealthy, and West Side residents. For West Side residents, there is a simple explanation. The rail system provides unusually good rail coverage of the West Side compared to other areas of Chicago, with three radial lines in close proximity to each other. The other exceptional cases require a bit more explanation, however.

Men use the bus for less than half of their non-work transit trips, even though men and women both have the same total CTA mode share for non-work trips. Men may prefer the speed of rail over the door-to-door service of the bus, whereas women may have the opposite preferences. Men may also be less sensitive to crowding on rail, and they may be more accustomed to traveling on rail because they may be more likely to work downtown.

Members of households in the top income brackets – $50,000 to $75,000, and over $75,000 – also use the bus for less than half of their non-work transit trips, although their total

CTA mode share is very low (4% to 5%). Only in the very topmost income bracket does rail mode share alone (not just a combination of "rail" and "both" mode shares) exceed bus mode share. The wealthy may avoid bus travel because they value their time more highly, or because they view the bus as a low-class service. This could suggest that CTA should focus on the rail system as a means of attracting more choice riders, but the members of the top income brackets do not use rail for a large share of their non-work trips either.

In an absolute sense, the highest CTA bus mode share for non-work trips (43%) can be found among transit-dependent riders. Members of low-income and zero-car households also have particularly high bus mode shares. Not surprisingly, the bus system is particularly important at providing mobility to the transit-dependent. The single highest CTA rail mode share for non-work trips (13%) can be found among those who do not own cars because they prefer to take transit. Access to rail may be an important factor in choosing a car-free lifestyle. Even among this group of choice autoless riders, however, CTA bus mode share exceeds CTA rail mode share.

A final comment on Table 6.3 is that some results may be misleading because sample sizes are small. The column labeled "n" shows the weighted number of non-work trips on all travel modes made by all survey respondents with the given personal or household characteristics. (The number of trips is weighted to adjust for non-random sampling). Essentially, these are the sample sizes for each cohort. n varies in magnitude for different segments of the population. For example, n = 999 for females, and n = 582 for males. This difference could reflect a greater number of females than males in the population of the CTA service area. It could also reflect a greater propensity of females to make non-work trips. Finally, it could reflect a bias in the survey by which males were underrepresented in the sample. In some cases, a small n could reflect the fact that many respondents declined to answer that particular question. Where n is particularly small, more study is needed to verify the mode share results shown in this table.

Non-work destinations: Analysis of CTA ridership data

These survey results provide a good breakdown of the kinds of people who make non-work trips on CTA, but very little information about where these people travel. To learn more about the destinations of non-work trips, CTA ridership data is analyzed by rail station or bus route and by time period. A database of ridership at CTA rail stations and on CTA bus routes was obtained from CTA for the year of 2002.[6] CTA automated fare collection equipment reports rail station entries every half hour, and reports bus boardings every hour. Thus the database includes data for every hour of the day, for every day of the year. This data had to be aggregated into a format that could be analyzed easily.

To generate data on average passenger boardings by day type (weekday, Saturday, Sunday), 2002 annual ridership by day type on each route and at each station was divided by the number of days of each day type that occurred in that year. The year included 255 weekdays, 52 Saturdays, and 58 Sundays (including holidays classified as Sundays by CTA). Note that a small number of bus routes did not operate throughout the year (e.g. seasonal routes). For these routes, the averages are not meaningful, because ridership is divided by the total number of days in the year, not by the number of days during which the bus actually operated. Similarly, if for some reason a rail station was not open throughout the year (e.g. closed for reconstruction), the averages would not be meaningful for this station.

To generate data on average passenger boardings by time period, average weekday ridership for each route and station was subdivided into the following time periods: AM peak (6 am to 9 am), midday (9 am to 3 pm), PM peak (3 pm to 6 pm), and overnight (6 pm to 6 am). Since not all services operate 24 hours a day, in many cases the "overnight" time period is actually a combination of early morning and late evening periods. These time periods are based

[6] This database was received from Kevin O'Malley at the Chicago Transit Authority, in an unprocessed format not intended for public use. Although unprocessed, the data in this database already were adjusted to include estimated boardings not counted by the automated fare collection equipment.

on the CTA's standard definition of the AM and PM peaks, and are roughly consistent with the time periods used in the St. Louis case.

Since rail station boardings are listed in the original database according to half hour, boardings listed under 6:00 am, 6:30 am, 7:00 am, 7:30 am, 8:00 am, or 8:30 am are included in the AM peak period. The assumption is that these six half-hours include all boardings that occurred between 6:00 am and 9:00 am but not the boardings that occurred in the half-hour beginning at 9:00 am. Since bus boardings are listed in the original database according to hour, boardings listed under 6:00 am, 7:00 am, or 8:00 am are included in the AM peak period. The assumption is that these three hours include all boardings that occurred between 6:00 am and 9:00 am, but not the boardings that occurred in the hour beginning at 9:00 am. The same procedures are used to allocate rail station and bus route boardings to each of the other time periods.

Off-peak ridership at rail stations is considered first. Off-peak ridership on bus routes is considered later in this chapter. Off-peak ridership is used as a proxy for non-work ridership, but of course it is an imperfect one. Some non-work travel occurs in the peak, and some work travel occurs in the off-peak. Care is taken to identify routes and stations where work travel is the likely source of off-peak ridership.

Ridership is examined at each CTA rail station, using the exact same method of analysis used in the St. Louis case. The stations that generate the most off-peak ridership are identified. These are stations with the highest off-peak ridership in terms of absolute numbers of passengers. Also identified are stations where most of the ridership occurs in the off-peak. These are stations with the highest off-peak ridership as a percentage of average weekday ridership. Midday, overnight, Saturday and Sunday are considered to be off-peak time periods.

To identify stations that generate the most off-peak ridership, an index is created exactly as in the St. Louis case. All CTA rail stations are ranked by ridership in each of the four off-peak time periods. For each time period, the station with the highest ridership in that time period is ranked "1" and so forth. Each station thus has four rankings, one for each time period. These

four rankings are multiplied to create an index of off-peak ridership generation. Low index scores indicate high off-peak ridership, relative to other stations.

The ten stations with the lowest index scores are: Chicago (Red Line), 95th/Dan Ryan (Red Line), Lake (Red Line), O'Hare (Blue Line), Belmont (Brown, Purple, and Red Lines), Grand (Red Line), Jackson (Red Line), Fullerton (Brown, Purple, and Red Lines), Clark/Lake (Blue Line and the downtown loop), and State/Lake (downtown loop). Details about off-peak ridership at these stations are shown in Table 6.4, below. Ten stations are shown, rather than five as in the St. Louis case, because the CTA rail system is so much larger than MetroLink.

Ridership Measure	**Chicago**	**95th**	**Lake**	**O'Hare**	**Belmont**
	Red Line	Red Line	Red Line	Blue Line	Multiple
Midday	2,823	3,979	3,246	2,573	2,388
Midday Rank (A)	6	1	3	7	9
Overnight	4,862	2,715	3,929	3,114	2,486
Overnight Rank (B)	1	7	2	5	8
Saturday	11,507	7,550	7,106	6,328	8,224
Saturday Rank (C)	1	3	5	6	2
Sunday	7,636	5,278	4,691	6,972	5,805
Sunday Rank (D)	1	4	6	2	3
Index (product of ABCD)	6	84	180	420	432
Index Rank	1	2	3	4	5

Table 6.4a Top ten stations with high off-peak ridership absolutely (1-5)

Ridership Measure	**Grand**	**Jackson**	**Fullerton**	**Clark/Lake**	**State/Lake**
	Red Line	Red Line	Multiple	Loop	Loop
Midday	1,516	3,177	3,011	3,489	1,941
Midday Rank (A)	23	4	5	2	13
Overnight	3,553	3,292	2,214	2,983	2,375
Overnight Rank (B)	3	4	10	6	9
Saturday	7,264	4,766	6,293	2,902	4,624
Saturday Rank (C)	4	11	7	28	12
Sunday	5,101	3,012	4,152	2,063	3,290
Sunday Rank (D)	5	12	7	25	11
Index (product of ABCD)	1,380	2,112	2,450	8,400	15,444
Index Rank	6	7	8	9	10

Table 6.4b Top ten stations with high off-peak ridership absolutely (6-10)[7]

[7] Chicago Transit Authority, database of rail system ridership by station, day, and time, 2002, database queried by Alexander N. Cohen

Ridership Measure	O'Hare	Cermak-Chinat'n	Conser-vatory	Grand	North/ Clyb'n
	Blue Line	Red Line	Green Line	Red Line	Red Line
Weekday	8,105	2,881	645	9,135	3,800
Midday	2,573	986	244	1,516	987
Midday as a % of weekday	32%	34%	38%	17%	26%
Midday Rank (A)	29	15	2	141	79
Overnight	3,114	638	78	3,553	1,062
Overnight as a % of weekday	38%	22%	12%	39%	28%
Overnight Rank (B)	2	28	127	1	9
Saturday	6,328	2,941	580	7,264	3,237
Saturday as a % of weekday	78%	102%	90%	80%	85%
Saturday Rank (C)	9	1	2	8	4
Sunday	6,972	2,142	368	5,101	2,259
Sunday as a % of weekday	86%	74%	57%	56%	59%
Sunday Rank (D)	1	2	7	9	4
Index (product of ABCD)	522	840	3,556	10,152	11,376
Index Rank	1	2	3	4	5

Table 6.5a Top ten stations with high off-peak ridership as a % of weekday ridership (1-5)

Ridership Measure	Chicago	Clark/ Division	Addison	Sox-35th	Belmont
	Red Line	Red Line	Red Line	Red Line	Multiple
Weekday	13,906	6,848	6,368	3,724	9,843
Midday	2,823	1,772	1,203	998	2,388
Midday as a % of weekday	20%	26%	19%	27%	24%
Midday Rank (A)	133	82	138	72	103
Overnight	4,862	1,894	1,414	1,066	2,486
Overnight as a % of weekday	35%	28%	22%	29%	25%
Overnight Rank (B)	3	10	27	5	16
Saturday	11,507	5,510	5,566	2,699	8,224
Saturday as a % of weekday	83%	80%	87%	72%	84%
Saturday Rank (C)	6	7	3	17	5
Sunday	7,636	4,065	4,023	2,088	5,805
Sunday as a % of weekday	55%	59%	63%	56%	59%
Sunday Rank (D)	10	5	3	8	6
Index (product of ABCD)	23,940	28,700	33,534	48,960	49,440
Index Rank	6	7	8	9	10

Table 6.5b Top ten stations with high off-peak ridership as a % of weekday ridership (6-10)[8]

As in the St. Louis case, a similar process is used to identify stations where most of the ridership occurs in the off-peak. For each CTA rail station, ridership in each of the four off-peak time periods is taken as a percentage of average weekday (peak and off-peak) ridership. Stations

[8] Chicago Transit Authority, database of rail system ridership by station, day, and time, 2002, database queried by Alexander N. Cohen

are ranked by each of those four percentages. For each time period, the station with the highest ridership in that time period as a percentage of weekday ridership is ranked "1" and so forth. Once again, each station has four rankings, one for each time period. These four rankings are multiplied to create an index of off-peak ridership dominance. Low index scores indicate that off-peak ridership is a high share of total ridership, relative to other stations.

The ten stations with the lowest index scores are: O'Hare (Blue Line), Cermak-Chinatown (Red Line), Conservatory-Central Park Drive (Green Line), Grand (Red Line), North/Clybourn (Red Line), Chicago (Red Line), Clark/Division (Red Line), Addison (Red Line), Sox-35th (Red Line), and Belmont (Brown, Purple, and Red Lines). Details about off-peak ridership at these stations are shown in Table 6.5, above.

As noted in the St. Louis case, these indices intentionally place equal importance on each of the four off-peak time periods. Ridership is generally higher overall on Saturdays and Sundays than during weekday middays and early mornings/late nights, but the percentage of non-work trips during each period is not know. It would be presumptuous to assume that more non-work travel occurs on weekends than in weekday off-peak periods, just because total ridership is higher on weekends. Different kinds of non-work trips may occur on weekends rather than middays or nights, and these indices are intended to give equal treatment to those different kinds of trips.

Four of the stations listed in Table 6.4 also appear in Table 6.5. These stations are: Chicago, O'Hare, Belmont, and Grand. It is reassuring to know that many of the stations with high off-peak ridership as a percentage of average weekday ridership also have high off-peak ridership in an absolute sense. Otherwise, Table 6.4 is not particularly informative. Four of the stations are in the heart of the downtown office district. These stations are: Lake, Jackson, Clark/Lake, and State/Lake. So much activity occurs downtown that it is difficult to associate off-peak travel at these stations with any particular trip purposes. One would hope that the CTA rail system already serves downtown non-work destinations effectively, since the Loop is its focal point of all rail lines. It is also difficult to associate the 95th/Dan Ryan station with any particular

trip purposes. Ridership at this station is high at all times, because it is the southernmost station in the entire rail system, and is a major bus-rail transfer point.

Turning to Table 6.5, some striking patterns emerge. Neighborhoods of the Chicago's North Side, particularly those closer to downtown, are extremely well-represented in this table. The Red Line is the primary CTA rail line serving the North Side. Heading northbound from downtown, the Red Line makes the following stops, in line order: Grand, Chicago, Clark/Division, North/Clybourn, Fullerton, Belmont, Addison, and onward. Addison is four and a half miles north of the center of downtown.[9] All of the stops from Grand to Addison appear in Table 6.5, except for Fullerton – and Fullerton appears in Table 6.4. These stations serve a variety of North Side neighborhoods, including the Near North, Lincoln Park, Lake View, and Wrigleyville. All of these neighborhoods are known to be popular residential locations among younger adults.[10] High off-peak ridership at these Red Line stations is consistent with the earlier finding that younger adults without children, residing in the North Side, are a strong market for non-work transit ridership. These neighborhoods are also known for their mixed-use activity and pedestrian friendliness, so they may be places where people choose to live without cars.

One of the many "uses" found in these neighborhoods is nightlife, which attracts the same younger adults who reside in these areas. Clark/Division, Belmont, and Addison each serve major concentrations of bars and nightclubs.[11] Clark/Division serves the concentration of bars on Rush Street; Belmont serves the gay-oriented nightlife of Boy's Town, and Addison serves numerous sports bars. Taking transit is feasible because the Red Line runs 24 hours a day.[12]

The reason why there are so many sports bars near the Addison station is because, nestled among residences and businesses, this neighborhood includes Wrigley Field – home of the Cubs

[9] This fact is based on the address numbering system used in the city street grid. Addison is located at 3600 North, and there are 800 units per mile.
[10] Alexander N. Cohen, personal observations, Summer 2003
[11] Alexander N. Cohen, personal observations, Summer 2003
[12] Chicago Transit Authority, "Bus & Rail Map," March 2003
The Red and Blue Lines are the only CTA rail lines that operate overnight

baseball team. Chicago's other Major League Baseball team, the White Sox, play at U.S. Cellular Field, which is located adjacent to the Sox-35th station in the South Side. Thus both of the CTA rail stations that directly serve big-league sports stadiums appear in Table 6.5.

Among all of the North Side Red Line stations discussed here, the Grand and Chicago stations are closest to downtown, and serve an area that is much more densely developed than the rest of the North Side. These stations serve North Michigan Avenue, which is the city's most fashionable shopping street, home to many upscale department stores and boutiques as well as the Water Tower Place shopping mall.[13] The North/Clybourn station serves retail destinations of a different kind. Several "big box" chain stores are located within a few blocks of the station.[14] Most of these chains would otherwise be inaccessible without a car. Shopping travel may therefore be a contributor to the high off-peak ridership at these stations.

There is some evidence that tourist travel may be a source of off-peak ridership at some of the stations listed in Table 6.5. In addition to shopping, the Grand and Chicago stations serve various hotels located on and around North Michigan Avenue, so tourist travel could be partly responsible for off-peak ridership there.[15] The O'Hare station serves O'Hare International Airport, and could be serving as a point of entry for tourists. Like the Grand and Chicago stations, it has high ridership both absolutely and as a percentage of weekday ridership. Much of this ridership at O'Hare may be work-related travel, however. Airports are known for their unconventional work shifts. O'Hare is a particularly large employment destination, relative to the number of travelers to or from Chicago, because it is a hub for American and United Airlines.

The Conservatory-Central Park Drive station represents an explicit attempt by CTA to serve a tourist/recreational attraction with the rail system. This station opened in the summer of 2001.[16] Unlike most CTA rail stations, it does not serve any intersecting bus routes. The primary

[13] Alexander N. Cohen, personal observations, Summer 2003
[14] David Urbanczyk (Chicago Transit Authority), personal communication, Summer 2003
[15] Alexander N. Cohen, personal observation, Summer 2003
[16] metroPlanet, "Chicago, Illinois, USA." http://metroplanet.elan.net/am/chic/chicago.htm

attraction at this station is Garfield Park, located in the West Side, including the Peace Museum and the Garfield Park Conservatory.[17] Although these attractions are very close to the rail station, they do not seem to be attracting many CTA riders. Ridership at Conservatory is very low – just 645 riders on an average weekday. This is the only station in Table 6.5 with very low ridership.

The last station in Table 6.5 to be considered is Cermak-Chinatown. Naturally this station serves Chinatown, a small ethnic enclave in the South Side. Some of the off-peak ridership may be generated by residents of this neighborhood, who may be transit-dependent; however, Chinatown is more of a destination for ethnic dining and shopping than it is a working residential neighborhood.[18] More likely, it is a destination for non-work travel.

Now consider off-peak ridership on bus routes. A similar method of analysis is used, but there are some complications. Bus routes span long distances, so an individual bus route may serve a much wider variety of neighborhoods and attractions than a single rail station. Bus routes also vary considerably in length. As extreme examples, some routes that provide local circulation within particular neighborhoods are only one or two miles long, while the longest crosstown routes exceed twelve miles in length.[19] The length of a route is one of the major determinants of its ridership, including its off-peak ridership. Using the index methodology to rank CTA bus routes by their absolute levels of off-peak ridership merely produces a list of some of the longest routes in the system, including the 9 Ashland and the 49 Western routes.[20]

Bus routes also vary considerably in terms of span of service – that is, the hours in which they operate. Some routes operate only during weekday peak hours, while others operate 24 hours a day, seven days a week. The percentage of ridership that occurs during off-peak hours on each route is partly a function of the extent to which the route operates in the off-peak. This

[17] Alexander N. Cohen, personal observation, Summer 2003
[18] Alexander N. Cohen, personal observations, Summer 2003
[19] CTA bus route 9 runs along Ashland from 9500 South to 4000 North, and is more than 12 miles long.
[20] Chicago Transit Authority, database of rail system ridership by station, day, and time, 2002, database queried by Alexander N. Cohen

problem does not really exist for rail stations, because nearly all rail stations are open all day, including early mornings and late evenings, seven days a week.[21]

The routes with the highest percentage of ridership occurring in the off-peak are special routes that only operate in the off-peak. CTA operates a variety of these routes, which typically provide specialized express service to particular non-work destinations. For example, the 124 Navy Pier Express route shuttles between the Navy Pier (a waterfront shopping, dining, and entertainment venue) and two downtown Metra stations. This route only operates Friday nights and weekends from late May to Labor Day, plus service to special events at other times.[22] Using the index methodology to rank CTA bus routes by off-peak ridership as a percentage of average weekday ridership merely produces a list of these special off-peak services, including the 10 Museum of Science and Industry Express the 19 United Center Express routes.[23] Of course these routes exist to serve non-work travel markets, but they are well-known and do not need to be rediscovered through a complicated analysis of ridership data.

One way to avoid this problem is to focus only on the 46 "key" bus routes. Nearly all of these routes operate throughout the day, seven days a week, so it is meaningful to rank these routes by off-peak ridership as a percentage of weekday ridership. It would still not be very informative to rank the key bus routes by absolute off-peak ridership, since the key bus routes vary in length. Doing so is less necessary, however, because the key bus routes are considered to be the backbone of the CTA bus system with strong ridership overall. There is no risk that small, niche market off-peak services would top the list of routes where off-peak ridership is dominant.

[21] Exceptions are the Yellow Line and the Cermak branch of the Blue Line, which are closed weekends.
[22] Chicago Transit Authority, "Bus & Rail Map," March 2003
[23] Chicago Transit Authority, database of rail system ridership by station, day, and time, 2002, database queried by Alexander N. Cohen

Ridership Measure	21	36	81	155	54B
	Cermak	Broadway	Lawrence	Devon	S. Cicero
Weekday	7,496	15,094	14,335	6,864	4,875
Midday	2,945	5,480	4,939	2,500	1,685
Midday as a % of weekday	39%	36%	34%	36%	35%
Midday Rank (A)	1	7	20	6	19
Overnight	1,281	3,482	3,530	1,478	1,072
Overnight as a % of weekday	17%	23%	25%	22%	22%
Overnight Rank (B)	42	7	3	22	16
Saturday	8,590	13,384	11,479	5,548	4,717
Saturday as a % of weekday	115%	89%	80%	81%	97%
Saturday Rank (C)	1	3	7	6	2
Sunday	5,534	9,303	8,372	3,990	2,753
Sunday as a % of weekday	74%	62%	58%	58%	56%
Sunday Rank (D)	1	2	3	4	6
Index (product of ABCD)	42	294	1,260	3,168	3,648
Index Rank	1	2	3	4	5

Table 6.6a Top ten routes with high off-peak ridership as a % of weekday ridership (1-5)

Ridership Measure	63	95W	95E	29	54
	63rd	West 95th	93rd-95th	State	Cicero
Weekday	21,629	5,076	6,272	17,777	11,771
Midday	7,669	1,785	2,147	6,589	3,874
Midday as a % of weekday	35%	35%	34%	37%	33%
Midday Rank (A)	12	15	22	5	27
Overnight	4,739	1,143	1,643	3,854	2,660
Overnight as a % of weekday	22%	23%	26%	22%	23%
Overnight Rank (B)	17	14	1	20	12
Saturday	17,150	4,422	4,427	13,918	9,966
Saturday as a % of weekday	79%	87%	71%	78%	85%
Saturday Rank (C)	8	4	27	12	5
Sunday	12,357	2,733	3,057	9,045	6,331
Sunday as a % of weekday	57%	54%	49%	51%	54%
Sunday Rank (D)	5	11	23	16	12
Index (product of ABCD)	8,160	9,240	13,662	19,200	19,440
Index Rank	6	7	8	9	10

Table 6.6b Top ten routes with high off-peak ridership as a % of weekday ridership (6-10)[24]

Thus the same process used above for CTA rail stations is used to identify CTA key bus routes where most of the ridership occurs in the off-peak. Once again, an index is created. All routes identified as "key" routes in the ridership database are indexed, except route 39, which does not operate on weekends. Low index scores indicate that off-peak ridership is a high share

[24] Chicago Transit Authority, database of rail system ridership by station, day, and time, 2002, database queried by Alexander N. Cohen

of total ridership, relative to other key bus routes. The ten routes with the lowest index scores are: 21 Cermak, 36 Broadway, 81 Lawrence, 155 Devon, 54B South Cicero, 63 63rd, 95W West 95th, 95E 93rd-95th, 29 State, and 54 Cicero. Details about off-peak ridership at these stations are shown in Table 6.6, above.

To get an idea of the kinds of attractions located along each of these bus routes, an effort was made to ride each of these routes during the summer of 2003.[25] Large portions of each of these routes were ridden, with the exception of 54 Cicero, which was not ridden at all. (No comments are offered here about route 54). Based on these observations, it is clear that shopping travel is a major trip generator for several of these routes. Routes 54B and 95W both serve regional shopping malls. 54B serves the Ford City Mall, and 95W serves Evergreen Plaza. Besides the self-contained malls themselves, each of these routes serves a wide range of auto-oriented strip shopping development located along major thoroughfares near each mall. This is particularly true of route 54B, which serves a wide range of "big box" chain stores on Cicero Avenue, in the immediate vicinity of the Ford City Mall, including one of the only CTA-accessible Wal-Mart stores in Chicagoland.[26]

Route 95E also serves a major strip shopping development, known as Stony Island Plaza, although it does not serve an enclosed regional mall. In an effort to improve bus service for shoppers, route 95E was recently rerouted to pull into the parking lot of the shopping plaza and stop right at the entrance to one of the largest stores.[27] This eliminates the need for shoppers to walk across the large parking lot that lies between the shopping plaza and the street corner.

Geographically, the Ford City, Evergreen Plaza, and Stony Island Plaza developments are all located to the south or southwest, and bus routes 54B, 95E, and 95W are key links between these shopping centers and the economically distressed neighborhoods of the South Side. It is likely that many of those who ride these bus routes for shopping are transit-dependent.

[25] Alexander N. Cohen, personal observations, Summer 2003
[26] Wal-Mart, "Store Finder." http://www.walmart.com
[27] Peter Foote (Chicago Transit Authority), personal communication, Summer 2003

Several of the other routes listed in Table 6.6 serve shopping destinations of a different sort. Routes 21, 81, and 155 each serve immigrant neighborhoods. These routes are lined with numerous small-scale ethnic stores and restaurants. Route 21 serves the Mexican communities of Little Village and Pilsen in the West Side, and also serves Chinatown. Route 81 serves a multiethnic but largely Korean community in the North Side, and route 155 serves an Indian community in the North Side. These immigrant neighborhoods may contain many residents who are transit-dependent, and rely on the bus for local shopping.

Route 63 definitely serves a transit-dependent population. It runs crosstown through one of the most economically distressed areas of the South Side. This route serves a node of shopping activity at the intersection of 63rd and Halsted Streets. "Once a major regional center with several department stores, this center is still a large community center with several clothing and shoe stores," according to a 1993 study of South Side retail.[28] This is, however, just one destination along a rather long bus route. Note that a bus route serving an economically distressed neighborhood could have high off-peak ridership as a percentage of weekday ridership for two reasons. Off-peak ridership could be unusually high, because the local population rides the bus for non-work purposes. Alternatively, peak ridership could be unusually low, because the local population may suffer from a high rate of unemployment. It is likely that a combination of these factors earns route 63 its place in Table 6.6.

Route 36 serves a very different population. It begins downtown and runs north, close to the lakefront, and serves the same types of neighborhoods that the northerly portion of the Red Line serves. In other words, it serves the same younger adult population as the North Side Red Line stations listed in Tables 6.4 and 6.5, and discussed above. Route 36 terminates more than seven miles north of downtown. For much of its route, it parallels the Red Line very closely, but

[28] Applied Real Estate Analysis, Inc., *Retailing in Chicago's South Side Neighborhoods*, prepared for the City of Chicago, Department of Planning and Development, June 1993, p. 44

in the neighborhoods of Lincoln Park and Lake View, it runs significantly closer to the lakefront than the Red Line and thus provides more thorough coverage of those densely populated areas.

Complicating this discussion of bus routes is that fact that large portions of several of the routes in Table 6.6 closely parallel CTA rail lines. Besides route 36, which parallels the northern portion of the Red Line, the entirety of route 29 runs alongside the southern portion of the Red Line. Much of route 21 parallels the Cermak branch of the Blue Line in the West Side. A portion of route 81 parallels the Brown Line, and a portion of route 63 parallels the Green Line. It is possible that riders use the rail system for peak-hour downtown commuting, and only use the parallel bus routes for off-peak local travel. This effect could explain why these routes have high off-peak ridership as a percentage of weekday ridership, but is not helpful for understanding the kinds of non-work travel markets that these routes serve.

Indeed, this effect almost certainly explains why route 21 is at the top of the list in Table 6.6, and why it is the only route is which average Saturday ridership exceeds average weekday ridership. The Cermak branch of the Blue Line does not operate on weekends, so riders who use the rail line on weekdays must use the bus instead on weekends. Unlike the Blue Line branch, route 21 does not go downtown, so bus riders wishing to access downtown or other points via the rail system must transfer to the Red Line at the Cermak-Chinatown station. This is another reason why Cermak-Chinatown appears in Table 6.5, and why it too has higher average Saturday ridership than average weekday ridership.

Finally, several routes in Table 6.6 serve destinations known to be non-work trip generators. Route 21 serves the McCormick Place convention center; route 29 serves the Navy Pier; and routes 54B and 63 serve Midway Airport. In each case, the trip generator is just one site along a long bus route, so it is difficult to determine how much bus ridership each attraction generates. Route 29 connects the Navy Pier to downtown, so tourists might use this route, but none of the other routes connect directly to downtown. It is especially unlikely that tourists would use routes 54B or 63 to access Midway Airport, since the Orange Line provides direct

service between the airport and the Loop, but airport workers might use these bus routes, and that could be a source of off-peak ridership.

Overall this analysis of bus routes with high off-peak ridership is not very satisfying. Only key bus routes are examined. Moreover, most of the routes in Table 6.6 serve a wide variety of neighborhoods and destinations, and many of them parallel rail lines, so it is difficult to identify the specific non-work travel markets that are the sources of off-peak ridership. CTA could learn more by conducting a detailed origin-destination study of the riders on these routes, but that would be a costly endeavor and is well beyond the scope of this thesis.

Identification of CTA non-work travel markets

All of the information presented thus far points to four non-work travel markets that are strong sources of transit ridership in Chicago. These markets are:

- Younger adults without children, living in North Side neighborhoods near downtown
- People who choose not to own cars because they prefer to ride CTA
- Shopping travel, particularly by transit-dependent riders
- Sporting events travel

Each of these markets will be explored in greater depth in the forthcoming "Characteristics of Markets" chapter. What follows is a brief explanation of the rationale for selecting each of these markets. While the identification of markets is guided by the survey and ridership data presented earlier, it is ultimately a subjective process. Markets can be defined in different ways, and one could make a case for selecting altogether different markets instead.

The first market is younger adults without children, living in North Side neighborhoods near downtown. To be concise, but a bit imprecise, these people simply could be called "yuppies." This market is identified because young adults, households without children, and North Side residents each use CTA for a notably high share of their non-work travel. North Side

areas close to downtown, such as the Near North, Lincoln Park, and Lake View, are known to be popular residential neighborhoods among young professionals. All of the Red Line stations serving these neighborhoods have high off-peak ridership – in absolute terms and/or as a percentage of average weekday ridership. Bus route 36, which also serves these areas, also has high off-peak ridership as a share of average weekday ridership. All told, the evidence pointing to this market is compelling.

The next market is people who choose not to own cars because they prefer to ride CTA. Though there is really no concise term to describe these people, they are a small but significant share (12%) of CTA customers. This market is identified because it has a very high CTA mode share for non-work travel, and has the single highest CTA rail mode share for non-work travel. Since rail ridership grew in the late 1990's, this market could have potential for growth. These people use CTA for almost as much of their non-work travel as do people who are transit-dependent, but unlike the transit-dependent population, this market segment would not be expected to shrink as Chicago develops economically.

Shopping travel is identified as an important non-work travel market because most of the bus routes listed in Table 6.6 as having high off-peak ridership serve different types of shopping destinations. Because these routes serve immigrant neighborhoods or South Side neighborhoods, it is believed that many of their riders are transit-dependent. Intuitively it makes sense that people who are transit-dependent would especially need CTA access to shopping, since shopping travel is a necessity of everyday life, and survey results show that transit-dependent customers use CTA for a very large share of their non-work travel.

Though this is an important non-work market from a social perspective, it is not necessarily a growing market. As discussed in the previous chapter, most shopping destinations outside of downtown are accessible only by CTA bus, not by CTA rail. The trip purpose results in Table 6.1 confirm that shopping travel is especially common on the bus. Bus ridership declined markedly in the 1990's, however, and as discussed in the previous chapter, bus travel to

and from non-downtown destinations is the type of travel where CTA lost the most ground in the 1990's. A better understanding of shopping travel by transit-dependent riders could help CTA to stem these ridership losses.

Finally, sporting events travel is identified as a strong non-work travel market because Addison and Sox-35th, the two rail stations that serve Chicago's two Major League baseball stadiums, each have high off-peak ridership as a percentage of weekday ridership. Rail service to these ballparks is worth examining further, as the CTA considers how best to serve the other two professional sports stadiums in the city, United Center and Soldier Field, neither of which is adequately accessible by rail.

Sporting events and shopping have been identified in both the St. Louis and Chicago case studies as strong non-work travel markets. The third market identified in the St. Louis case, tourist travel, is not identified in Chicago as well. Tourism could in fact be a strong source of ridership for CTA, but convincing evidence is lacking. The Traveler Behavior and Attitudes Survey and the Customer Satisfaction Survey are both telephone surveys of Chicago area residents, so they cannot be used to quantify CTA tourist ridership. Most hotels and tourist attractions are located downtown, so ridership to tourist-oriented destinations cannot be easily isolated. The O'Hare Airport rail station has high off-peak ridership, both absolutely and as a percentage of weekday ridership, but much of that may be airport employee travel. Conservatory-Central Park Drive is the one station designed specifically to serve a tourist/recreational destination, and it has very low total ridership. In the face of such mixed evidence, this thesis does not identify tourist travel as strong non-work market for CTA, but CTA may nevertheless wish to study the tourist market and learn more about its ridership potential.

VII. St. Louis Case Study: Characteristics of Markets

Ultimately, the goal of this thesis is to help transit agencies build ridership in non-work travel markets, so as to realize social, political, and economic benefits. Identifying several strong markets for non-work ridership, as was done in the preceding chapters, is only the first step in achieving this goal. Transit agencies need to know what kinds of service to provide, in order to realize the full ridership potential of each market. Before providing such service, agencies need to be convinced that building ridership in each market would yield valuable benefits – for the transit agency, for transit riders, and for the general public.

This chapter briefly explores the existing body of knowledge about each of the St. Louis markets. Key characteristics of each market are discussed, based on secondary sources, press articles, and existing market research.[1] After a general discussion of these characteristics, conclusions are offered about the benefits of providing transit service to the market, and about the effectiveness of transit service to the market. Note that the existing body of knowledge about each market is by no means complete, so not all of this chapter's findings are proved rigorously.

Sporting events

MetroLink mode share and ridership for sporting events travel in St. Louis is shown in Table 7.1, below. These numbers are based on an analysis of ridership data that was conducted by Multisystems, a transit consulting firm, in the late 1990's. MetroLink carries the most traffic to baseball games, both in terms of the number of fans riding the train and in terms of mode share. Average attendance at a Cardinals baseball game exceeds 42,000, and MetroLink carries nearly 8,000 of those fans. Thus MetroLink has a 19% mode share for travel to baseball games. In contrast, MetroLink's mode share for downtown journeys to work is only 10% to 15%.[2]

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[1] Only sources that are specific to the St. Louis experience are considered.

[2] Downtown Now!, *City of St. Louis Downtown Development Action Plan, Phase II: Understanding of the Physical Setting and Market Opportunities,* August 1998, Appendix A, p. 1;
Charlene Prost, "Downtown Gains Workers and Businesses, Survey Shows," *St. Louis Post-Dispatch*, 4 March 1999, p. A1

Event	Average Attendance	MetroLink Riders	MetroLink Share
Baseball	42,470	7,930	19%
Football/Dome Events	49,500	7,058	14%
Hockey/Ice Shows	15,750	1,571	10%
College Basketball	16,000	1,073	7%
Roller Hockey	10,500	296	3%

Table 7.1 MetroLink ridership and mode share for sporting events travel in St. Louis[3]

Among all sports, baseball is even more dominant as a source of ridership when the number of annual games is considered. Current schedules (2003 or 2003-2004) for each St. Louis professional sports team were consulted to determine the number of regular-season home games scheduled for each team in a year, not counting playoff games that may or may not occur in St. Louis. The Cardinals baseball team has 82 games scheduled for play in St. Louis; the Blues hockey team has 41 games; and the Rams football team has just eight games.[4] Multiplying the number of games by the average number of MetroLink riders per game (Table 7.1) indicates that over the course of a year, MetroLink carries more than ten times as many fans to baseball games than it carries to either football or hockey games.

Not only are sporting events a significant source of MetroLink ridership, they are also one of the chief reasons why ridership exceeded projections by a large margin, according to a comparison of projected and actual ridership volumes that Multisystems conducted. Recall from Chapter 4 that the rail line was projected to carry 35,000 average daily riders by 2010, but actually carried more than 44,000 average daily riders by the end of its first year in service.[5] Thus MetroLink carries 9,000 riders – 20% of weekday ridership – more than what was forecast. Sporting events travel accounts for 12% of MetroLink ridership, so clearly sporting events are not

[3] Larry Englisher, "Extending Light Rail to Serve New Markets in Cleveland, Ohio and St. Clair County, Illinois: Reaching Out to Nontraditional Markets." TRB/APTA 8th Joint Conference on Light Rail Transit, November 2000, Table 2, p. 9

[4] Major League Baseball, "2003 St. Louis Cardinals Schedule."
http://www.cardinals.mlb.com/NASApp/mlb/stl/schedule/stl_schedule_calendar.jsp;
National Football League, "St. Louis Rams Team Schedule."
http://www.nfl.com/teams/schedule/STL;
National Hockey League, "Team Schedules: St. Louis Blues."
http://nhl.com/lineups/team/stl/schedule.html

[5] See Chapter 4, Table 4.2

the sole reason why ridership exceeded projections.[6] Nevertheless, Multisystems found that ridership at the stations serving sports stadiums were among "the most under-forecast."[7]

Larry Englisher of Multisystems explains that the regional model used to forecast MetroLink ridership was inadequate because "the only special generator in the model was the airport. All other travel was estimated based on the characteristics of population and employment."[8] The model especially failed to represent sports events travel because:

> [Events] tend to draw attendees from a wide catchment area, including many who do not regularly travel to downtown St. Louis. During these large events, parking costs are high and traffic is unusually congested. While the events may not occur in typical peak hours, the conditions are quite unlike the normal off-peak conditions and the trips are not the typical nonwork trip. Many of these riders use park-and-ride services that offer free parking rather than driving into downtown, paying jacked-up parking fees at nearby ramp garages, and facing congestion at the start and end of games and concerts.[9]

In effect, large events cause localized traffic congestion, and they influence the price of parking at local facilities. Although St. Louis is generally uncongested and has ample parking downtown, large events concentrate travel demand at a very specific point, and create localized strains on the system. Indeed, parking rates for downtown events in St. Louis can be as high as $12, much higher than the $3 daily average paid by downtown workers in the city.[10] These phenomena are obvious to anyone who has ever attended a large event in an urban setting, but they may not be adequately represented in a regional transportation model. The fact that sports events draw riders from "a wide catchment area," not just inner city neighborhoods, also explains why sports events riders are overwhelmingly choice riders. As noted in Chapter 4, 83% of sports events riders on MetroLink reported having a car available for the trip.[11]

In addition to the inadequacies of the regional model, another reason why special events ridership has exceeded projections is because the Rams football team moved to St. Louis from

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[6] See Chapter 4, Table 4.11
[7] Englisher, p. 4
[8] Englisher, p. 5
[9] Englisher, p. 4
[10] Downtown Now!, Section II, pp. 21, 46
[11] See Chapter 4, Table 4.12

Los Angeles in 1997.[12] Trips to and from pro football games were not included in the ridership forecasts. Berkeley urban planning professor Robert Cervero calls the arrival of the Rams a bit of "good fortune" for MetroLink, but notes that "transit proponents contend that the relationship has worked both ways: downtown reinvestment – notably in new sports facilities – has likewise occurred because of MetroLink."[13]

Benefits

MetroLink service to sporting events has several benefits. Because the rail line carries a sizeable share of event patrons, especially to baseball games, it helps to relieve traffic congestion associated with those games. The severity of event-related congestion is not known, however, so the magnitude of MetroLink's congestion reduction is difficult to estimate. It is possible that the added transportation capacity provided by MetroLink was a factor in the Rams' decision to move to St. Louis, but only the team owners know for certain. Congestion reduction and capacity to support economic development are the same kinds of benefits that are touted for transit service to downtown business districts. MetroLink mode share for baseball games is higher than for the downtown journey-to-work, suggesting that baseball-related congestion may be more severe than everyday peak hour congestion.

Most of the popular discussion of MetroLink in St. Louis has not concerned its ability relieve congestion or stimulate sports-related development. Rather, the most oft-cited sign of MetroLink's "success" is fact that its ridership has exceeded projections. For example, St. Louis Mayor Freeman Bosley writes that "MetroLink has become a tremendous success. Original ridership was predicted to be 4.8 million in its first year of operation, but we nearly doubled that number."[14] MetroLink's proponents also relish the fact that the train mainly carries choice riders.

[12] Pro Football Hall of Fame, "St. Louis Rams Team History." http://www.profootballhof.com/index.cfm?section=history&cont_id=187771
[13] Robert Cervero, *The Transit Metropolis: A Global Inquiry* (Washington, DC: Island Press, 1998), p. 431
[14] Freeman R. Bosley, Jr., "MetroLink Is Study in Cooperation." *U.S. Mayor*, 26 August 1996

The sentiment of Les Sterman, the executive director of the East-West Gateway Coordinating Council, is that "it's not that 43,000 people per day are riding MetroLink. Look at who is riding it. That's what amazes me, and it's something to celebrate."[15] These facts are not very sophisticated measures of a transit system's success, but they have been repeated frequently in the press and have helped to convince a skeptical public that rail transit can "work" in St. Louis. Sporting events travel has contributed to MetroLink's greater-than-expected ridership and to its preponderance of choice riders. By doing so, sporting events travel has helped to build political support for rail transit in St. Louis.

Of course, it is rather silly to credit sporting events travel for helping MetroLink to exceed its ridership projections, when really the model used to generate those projections was flawed. As models become more sophisticated, sporting events travel should not have the same unexpected effect on ridership. Attracting choice riders, however, is a legitimate way in which sporting events have built political support for transit. Reports of choice riders strengthen the image of MetroLink as a desirable service. More importantly, by attracting riders from a wide catchment area, sporting events attract people who might not otherwise ride transit, and thus broaden public support for transit. Of course, these occasional riders must perceive MetroLink service as high-quality in order to be supportive of it.

Effectiveness

In several respects pertinent to transit service, sporting events are similar to downtown employment. Sporting events generate large volumes of traffic with sharp temporal peaks. Sporting events attract residents from across the metropolitan region, including suburbanites who have the option of driving. Choice riders use transit to access sporting events, to avoid traffic and parking costs. Finally, transit's mode share to sporting events is significant, trying the capacity of

[15] Center for Transportation Excellence, "Transit Profile: The St. Louis area MetroLink light rail system." http://www.cfte.org/success/success_stlouis.pdf

the transit system. In St. Louis, the comparison between sporting events and downtown employment is even more apt, because the region's major stadiums are all located downtown.

Since MetroLink was designed in large part for the downtown journey-to-work, it is also successful at handling sporting events traffic. The rail system has the capacity to handle fairly large crowds. Suburbanites can access the system through park-and-ride lots or connecting buses. Trains operate on their own right-of-way, and stop within a short walk of each stadium, making transit an efficient alternative to driving in congested conditions. Overall, it is no surprise that the MetroLink mode share for sporting events compares favorably to that for downtown work trips.

Could MetroLink do more to attract sporting events riders? MetroLink's capacity to move crowds may be limited. The capacity of park-and-ride lots and the unavailability of feeder bus services may place limitations on access for suburban residents. These limitations would need to be analyzed in greater detail than can be afforded here. The important lesson is that transit service to sporting events should be treated as a peak-hour service, even though the events may occur during traditional off-peak time periods. Peak-hour headways may be essential for handling large sporting event crowds, and peak-hour connecting bus services may be essential for making the rail system accessible to suburban residents.

Tourists

The St. Louis metropolitan area had 16.7 million out-of-town visitors in 2000, including 7.5 million leisure travelers.[16] Not much is known about tourists' reasons for riding transit, but it is clear that tourists are choice riders. According to the East-West Gateway Survey that was discussed earlier in the St. Louis case study, 13% of MetroLink riders are out-of-town visitors, and of those, 41% said that they did not have a car available for the trip.[17] Many tourists arrive in

[16] St. Louis Convention & Visitors Commission, *Annual Report & Plan of Work: 2002-2003,* p. 22
[17] NuStats, *Bi-State Development Agency, St. Clair County Transit District and Madison County Transit District On-Board Passenger Survey: Data Tabulations – MetroLink Rail*, prepared for the East-West Gateway Coordinating Council, 15 October 2002, p. 31

a city via their own cars, and therefore have cars available for local travel. Those who arrive by other means have the option of renting a car or taking taxis, as well as taking transit.

Though tourists' motivations for using transit are not entirely clear, tourists' travel needs are likely to be rather straightforward. Important trip generators for tourists include: the Gateway Arch, other tourist attractions, the airport, and hotels. What follows is a brief discussion of MetroLink service to these destinations. Further research is needed to determine the extent to which tourists actually do use MetroLink to access these destinations.

The Gateway Arch is by far the most popular tourist attraction in St. Louis. Promotional literature claims that the Arch is the "4th most-visited tourist attraction in the world," although it is not clear how such a fact is derived.[18] It is known that the Arch had 4.0 million visitors in 2001.[19] One might speculate that nearly all visitors to the Arch are out-of-town leisure travelers; if so, then a majority of leisure travelers to St. Louis visit the Arch.

Not only does MetroLink serve the Arch, via the nearby Arch-Laclede's Landing station, but there is an unusual institutional relationship between the Arch and MetroLink as well – both are under the Bi-State Development Agency umbrella. In cooperation with the National Park Service, BSDA operates the Gateway Arch Tram which brings visitors to the top of the Arch, as well as the 1,250 space Arch parking garage.[20] Together, these activities earned a profit of $2 million in 2000.[21] This money helps to subsidize the transit system, but otherwise there is no evidence of any coordination between BSDA's transit and Arch operations. In fact, BSDA constructed the Arch parking garage in 1986, only several years before MetroLink opened, thus making it easier for people to drive rather than take transit to the Arch and to downtown.[22]

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[18]GatewayArch.com, "Little Known Fun Facts About the Arch." http://www.gatewayarch.com/games/funfacts.html
[19] St. Louis Convention & Visitors Commission, p. 24
[20] Metro St. Louis, "Inside The Gateway Arch, Gateway Arch Riverboats, & the St. Louis Downtown Airport." http://www.metrostlouis.org/InsideMetro/insidearchboatsairport.asp
[21] Bi-State Development Agency, *Fiscal 2001 Annual Report*, p. 23
[22] Metro St. Louis, "Inside The Gateway Arch, Gateway Arch Riverboats, & the St. Louis Downtown Airport." http://www.metrostlouis.org/InsideMetro/insidearchboatsairport.asp

Top Tourist Attractions	Rank	2001 Attendance	Location	MetroLink Access
Gateway Arch	1	3,978,392	Downtown	Direct
Union Station	2	6,000,000	Downtown	Direct
Zoo	3	2,753,684	Forest Park	Via shuttle bus
Anheuser-Busch Brewery	4	280,000	City	None
Science Center	5	1,585,245	Forest Park	Via shuttle bus
Botanical Garden	6	702,000	City	None
Grant's Farm	7	500,000	Suburbs	None
Art Museum	8	676,774	Forest Park	Via shuttle bus
Cardinals Baseball	9	1,585,245	Downtown	Direct
Riverboat casinos	10	n/a	Various	Some casinos only

Table 7.2 MetroLink access to the most popular St. Louis area tourist attractions[23]

Of course, the Gateway Arch is not the only tourist attraction in St. Louis. Table 7.2, above, lists the ten most visited tourist attractions in metropolitan St. Louis, based on surveys of out-of-town visitors. MetroLink provides direct service to the three attractions located downtown, including the Arch, but to the other attractions it provides indirect access only, or none at all. This may not be such a problem, however, because the lower-ranked attractions are much less popular with tourists than the Arch. Table 7.2 also lists 2001 attendance figures for each attraction, but keep in mind that these are total attendance figures, including visits by area residents as well as tourists. The Anheuser-Busch Brewery had only 280,000 total visitors in 2001, and is ranked fourth in terms of tourist patronage. Logically, the attractions ranked fifth through tenth could not have had more than 280,000 out-of-town visitors (though their total patronage is higher), and probably had far fewer. Thus with the possible exceptions of Union Station and the Zoo, no other attractions come close to attracting the same number of tourists as the Arch – not even the same order of magnitude.

Union Station is discussed below as part of the "Shopping" non-work travel market. The Zoo is worth mentioning because it is located in Forest Park, as are the Science Center, the Art Museum, and several other cultural institutions not among the Top 10 tourist attractions.

[23] St. Louis Convention & Visitors Commission, pp. 23-4
This report separately lists the percentages of "Traditional" and "Internet" out-of-town visitors who visit each attraction, based on separate surveys. To generate the single set of rankings for Table 7.2, the two percentages for each attraction were averaged, and attractions were then ranked by the average percentages.

Although MetroLink has a stop at the edge of Forest Park, the most popular attractions are more than one-half mile from the station. When MetroLink opened in July 1993, BSDA began operating shuttle buses to circulate through Forest Park and connect the park's various attractions with the rail station.[24] Known as the "Shuttlebug," each bus was painted like a ladybug, in order to seem more appealing and recognizable to tourists and other recreational travelers.

Unfortunately the Shuttlebug service was discontinued in 2001, as part of a round of broad-based BSDA bus service cuts necessitated by a large budget deficit at the transit agency.[25] When such cuts were proposed, the *St. Louis Post-Dispatch* ran a remarkably in-depth article about the importance of serving tourists and cultural institutions with public transportation, and how the demise of the Shuttlebug raises "philosophical questions" about the objectives of transit.[26] Transit advocates and leaders of Forest Park's institutions were quoted as being highly supportive of the Shuttlebug. Despite this strong support in the press for preserving the Shuttlebug, BSDA proceeded with its plan to terminate the service. Today, the only bus connection between MetroLink and Forest Park's attractions is a conventional bus route that happens to pass through the park en-route to other destinations. Unlike the Shuttlebug, this route is not specially designed to appeal to tourists; it does not serve all of the park's attractions; and it runs on thirty minute headways on weekends.[27]

Besides the Arch, Lambert Airport is obviously an important destination for many tourists. 5% of Lambert airport passengers use MetroLink to access the airport, including some out-of-town visitors and area residents.[28] That mode share sounds very low, but it is actually relatively high compared to other airports with rail transit access. A 1999 MIT student thesis

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[24] Charlene Prost, "'Ladybug' Buses to Motor in Park," *St. Louis Post-Dispatch*, 25 March 1993, p. 3A
[25] Ken Leiser and Eric Stern, "Changes May Leave 10,000 Passengers Without a Ride," *St. Louis Post-Dispatch*, 7 July 2001, p. 10
[26] Robert Duffy, "Proposed Bi-State Cuts Could Affect Cultural Attractions," *St. Louis Post-Dispatch*, 15 July 2001, p. B4
[27] Metro St. Louis, "MetroBus is your ride to Forest Park Attractions," pamphlet distributed Summer 2003
[28] Joshua Schank, "Airport Access by Rail Transit: What Works and What Doesn't," Thesis (M.C.P.), Massachusetts Institute of Technology, Dept. of Urban Studies and Planning, 1999, p. 55

considered 12 major US airports, and found that at only four does rail transit carry a larger share of airport passengers than it does at Lambert.[29] Three of these four airports – Washington National, Chicago Midway, and Boston Logan – serve cities with much more extensive rail transit networks. MetroLink's high mode share has been achieved despite the fact that passengers boarding the rail line at the airport are charged $3.00 instead of the standard $1.25 fare.[30] It has been hypothesized that tourist ridership is one reason why MetroLink carries a relatively high share of airport passengers in St. Louis, but more research is needed to determine if that is actually the case.[31] Also working in favor of MetroLink is the fact that it provides a relatively fast ride between the airport and downtown – it is a 39 minute ride, only 9 minutes slower than auto travel in uncongested conditions.[32]

Regardless of how widely it is used, the mere existence of an airport-downtown transit link seems to be having a positive effect. The downtown hotel market has remained vibrant in St. Louis, with four new hotels constructed in the late 1990's and early 2000's.[33] Citizens for Modern Transit (CMT), a St. Louis transit advocacy group, cites new Westin and Sheraton downtown hotels as successful examples of transit-oriented development.[34] Both are located directly adjacent to MetroLink stations, near two of the city's downtown sports arenas, somewhat farther afield of the Arch and the convention center than most of the city's downtown hotels. Both are adaptive reuses of historic structures, and are components of large mixed-use developments. CMT says that "MetroLink, with direct access to the airport, was one of the key reasons that Westin Hotels chose this site for one of their luxury hotels."[35] This anecdotal evidence suggests that, at least in a small way, MetroLink service between downtown and the

[29] Schank, p. 65
[30] Metro St. Louis, "Metro System Guide," June 2003
[31] Schank, p. 65
[32] Schank, p. 65
[33] St. Louis Convention & Visitors Commission, pp. 12-14
[34] Citizens for Modern Transit, "TOD in St. Louis." http://www.cmt-stl.org/issues/stltod.html
[35] Citizens for Modern Transit, "TOD in St. Louis." http://www.cmt-stl.org/issues/stltod.html

airport has helped to promote hotel development downtown – regardless of how many hotel guests actually use the rail service.

Benefits

Ever since the Gateway Arch was built in the mid-1960's as an urban renewal project, St. Louis has been pursuing an economic development strategy based in part on attracting tourists downtown. There is some evidence that MetroLink has helped to foster tourist-oriented downtown development by stimulating hotel construction.

Nevertheless, it seems that the transit agency has little incentive to maintain good service for tourists. BSDA overcharges tourists boarding MetroLink at the airport; it discontinued the tourist-oriented Shuttlebug service; and it prefers to collect parking fees from Arch visitors rather than encouraging them to take MetroLink. BSDA seems to view tourists a revenue source, to be served cheaply, rather than an important constituency. Most likely this is because tourists do not vote or attend public meetings, and generally have little stake in transit system of St. Louis.

Effectiveness

Why do tourists choose to ride MetroLink, when they have other transportation options available? A plausible hypothesis is that tourists principally need to travel among a discrete set of destinations, and that they especially concerned with the simplicity of transit service. MetroLink satisfies both needs quite effectively. MetroLink interconnects the airport, the region's biggest tourist attractions (the Gateway Arch and Union Station), and downtown hotels. One rail line serves all destinations, so there is never a need to transfer, and service is frequent enough that there is never a need to consult the schedule. One can easily imagine a tourist concluding that riding MetroLink is more convenient and less foreboding than driving and parking in an unfamiliar city. Unfortunately, the discontinuance of the Shuttlebug has made MetroLink a less convenient alternative for travel to a host of second-tier attractions.

Shopping

Although shopping is not large trip purpose on MetroLink overall, the Union Station shopping mall appears to a major non-work trip generator. It is worth considering the impact that MetroLink has had on Union Station and on the city's other downtown mall, St. Louis Centre. At first blush, these malls are similar. Both were built as downtown revitalization projects, using Urban Development Action Grant funds.[36] Both malls opened within days of each other, in August 1987.[37] The similarities end there, however.

St. Louis Centre located in the heart of the core downtown office district. It is a traditional retail mall. It is connected by pedestrian skybridges to the city's two downtown department stores, Famous-Barr and Dillard's, which serve as the mall's anchors. It is also connected to large parking garages. With 1.4 million square feet of space (including the two large department stores), it is the second-largest mall in the St. Louis metropolitan area.[38]

Union Station, in contrast, lies at the southwestern outskirts of downtown. An adaptive reuse of the city's historic railroad station, it is now a complex including a shopping mall and a Hyatt hotel. With 170,000 square feet of retail space, the mall is relatively small and has no major anchor stores.[39] Instead, it is described as a "tourist-oriented festival marketplace."[40] It includes a dozen full-service restaurants, some of which feature live entertainment, in addition to the shops and standard mall food court.

Because of their differences, the two malls have attracted different clienteles. St. Louis Centre was intended to be premier shopping destination for the entire metropolitan region, but it has failed to attract shoppers from the suburbs. Suburban residents find that they can visit similar

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[36] "How to Help Downtown Thrive," *St. Louis Post-Dispatch*, 28 August 1995, p. 16B
[37] Susan Thomson, "5 Years Later, City Shopping is a Success," *St. Louis Post-Dispatch*, 22 August 1990, p. 1B
[38] City of St. Louis, "St. Louis Market Economic Information," Spring 1999, p. 13. http://stlouis.missouri.org/development/marketinfo/Retail.html
[39] Charlene Prost, "A Decade Later, Union Station Shines," *St. Louis Post-Dispatch*, 20 August 1995, p. 1B
[40] William Flannery, "Searching: Malls Adjust to Mix of Shoppers," *St. Louis Post-Dispatch*, 10 September 1990, Business Section, p. 3

malls closer to home.[41] As a result, the mall quickly came to depend on downtown office workers and tourists for most of its business. In 1990, it was estimated that 40% of the mall's customers were downtown office workers; 30% were tourists; and 30% were other St. Louis area residents, mainly from the city and some from Illinois.[42] Such a formula has not proved to be a successful business model, however. The mall has been unprofitable ever since it opened.[43] Today the mall is 35% to 41% vacant, despite the fact that the price for leasing space in the mall has been reduced from $35 to $10 per square foot since the mall opened.[44] The Dillard's department store is vacant as well. Today, a Walgreen's drug store is one of the busiest stores in the mall, largely because it is the only store of its kind downtown.[45]

Unlike St. Louis Centre, Union Station was always expected to depend heavily on tourist traffic, and it has done so successfully. 50% of the mall's customers are tourists, and the mall is now the second most popular tourist attraction in the city (after the Arch).[46] Of the 50% who are area residents, many are "in-city" tourists, such as residents bringing visiting family and friends on tour of St. Louis. Many others are downtown office workers, even though Union Station is somewhat removed from the heart of the business district. A 1990 survey found that the typical downtown office worker visited Union Station 30 times per year.[47] This combination of customers has been sufficient to keep the mall profitable, with vacancies of less than 10%.[48]

It appears that MetroLink has led to increased business at Union Station. Merchants reported that business increased by 20% after the rail line opened in 1993.[49] The makeup of

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[41] Flannery, p. 3
[42] Flannery, p. 3
[43] Margaret Jackson, "St. Louis Center Owner Says No to 'Fire Sale,'" *St. Louis Business Journal*, 19 May 2003
[44] Downtown Now!, Section III, p. 6
[45] Heather Cole, "St. Louis Centre Back on Sale Block," *St. Louis Business Journal*, 28 October 2002
[46] Flannery, p. 3
[47] Flannery, p. 3
[48] Charlene Prost, "A Decade Later, Union Station Shines," *St. Louis Post-Dispatch*, 20 August 1995, p. 1B; Rob Donaldson, "Union Station Plans Outlet Stores to Attract Area Residents," *St. Louis Post-Dispatch*, 26 October 1999, p. B2
[49] Gregory Freeman, "Business Booms With MetroLink," *St. Louis Post-Dispatch*, 19 September 1993, p. 4B

Union Station's customer base has not changed, however, so MetroLink has brought both tourists and local residents to the mall.[50] MetroLink helped to increase business at St. Louis Centre as well, but to a lesser degree. Sales increased by about 8% to 9% after MetroLink opened.[51] At St. Louis Centre, however, the customer base has changed substantially since MetroLink opened. The percentage of "other area residents" (not tourists or downtown workers) increased from 30% to 64%, while mall management has complained that tourist traffic is declining.[52]

What explains the change in customer makeup at St. Louis Centre? It is possible that MetroLink has helped to bring more St. Louis area residents to St. Louis Centre. Most likely, these would be transit-dependent customers. As noted earlier the St. Louis case study, a majority of those who ride MetroLink for shopping trips are transit-dependent.[53] Moreover, suburban shopping was upgraded and expanded in the 1990's, giving auto-owning suburban residents even less reason to choose St. Louis Centre over local options.[54]

Another possible explanation, however, is that MetroLink has drawn tourists and downtown office workers away from St. Louis Centre, leaving other area residents to be a larger share of a smaller customer base. Tourists and downtown workers who may have walked to St. Louis Centre for shopping and dining prior to MetroLink may now be taking MetroLink to Union Station instead. Rides on MetroLink between downtown stations are free of charge during the midday, precisely to encourage downtown workers to patronize different businesses in the lunch hour, and there is anecdotal evidence that many workers are doing just that.[55] This explanation is consistent with the increase in business at Union Station that occurred after MetroLink opened; the fact that Union Station is more than a mile from the Arch and much of the downtown office

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[50] Charlene Prost, "A Decade Later, Union Station Shines," *St. Louis Post-Dispatch*, 20 August 1995, p. 1B
[51] Fleishman Hillard, "Bi-State Development Agency."
http://www.fleishman.com/overview/reputation/silver_anvil/bistate.html
[52] Downtown Now!, Section III, p. 6;
Charlene Prost, "A Decade Later, Union Station Shines," *St. Louis Post-Dispatch*, 20 August 1995, p. 1B
[53] See Chapter 4, Table 4.12
[54] Charlene Prost, "End of the Line; Owners Will Give Up Union Station to Lender; Regency Savings Bank Begins Foreclosure Today," *St. Louis Post-Dispatch*, 19 March 2003, p. C1
[55] Freeman, p. 4B

district; and the fact that the financial condition of St. Louis Centre has continued to deteriorate, to the point where today the city is considering condemning the property.[56]

Other than the two downtown malls, shopping opportunities near MetroLink stations are scarce. There is very little street-level retail downtown.[57] None of the nation's five largest broadline discount store or department store chains – Wal-Mart, Target, Sears, J.C. Penney, and KMart – has stores within walking distance of any MetroLink station.[58] A few MetroLink stations serve neighborhood shopping districts, but Chapter 4 did not find any compelling evidence that such districts are strong sources of non-work ridership.

Benefits

MetroLink access has helped bring customers to Union Station, but not to St. Louis Centre. This mixed record suggests that shopping, per se, is not actually a strong market for MetroLink. Rather, Union Station should be viewed as another component of the city's tourist-oriented downtown development strategy. MetroLink's impact at Union Station is a further illustration of how transit can help to support tourist-oriented development. In the case of St. Louis Centre, however, MetroLink can do little to make that suburban-style mall competitive with actual suburban malls featuring highway access and ample parking.

One might expect that a major benefit of transit access to shopping would be to provide a basic level of mobility for the transit-dependent population. The need for this kind of service in St. Louis is readily apparent. In East St. Louis, which is an economically distressed community that has MetroLink service, virtually every storefront on the city's main shopping street is

[56] Jackson
[57] Alexander N. Cohen, personal observations, July 2003
[58] Chain Store Age, "Top 100 U.S. Retailers," August 2003. http://www.chainstoreage.com/industry_data/pdfs/top100retailers/2003_top100_rank.pdf; The lack of MetroLink-accessible branches was verified by using the "Store Locator" tools on each retailer's own website, in consultation with maps of St. Louis.

vacant.[59] Although most riders who make shopping trips on MetroLink are transit-dependent, MetroLink is not totally helpful to these people. It can take riders to a tourist-oriented downtown mall or to a financially unviable one, but it cannot take them to the chain discount stores and department stores that have come to dominate the American retail industry, and that offer a broader selection of affordable merchandise.

Effectiveness

Union Station caters mainly to tourists and downtown office workers. MetroLink provides effective service to Union Station, presumably for the same reasons that it has succeeded in serving other tourist destinations. Additionally, the midday free fare policy seems to be successful at attracting downtown office workers to MetroLink as well. Despite this success, it is important to remember that Union Station is a niche retail venue. There is no attempt to provide MetroLink service to the outlying auto-oriented retail centers, such as regional malls and national chain discount stores, that are far more archetypical of the American retail industry. (Readers interested in lessons for transit service to auto-oriented retail centers can look forward to a lengthy discussion in the Chicago case study).

[59] Alexander N. Cohen, personal observations, July 2003

VIII. Chicago Case Study: Characteristics of Markets

As was done in Chapter 7 for the St. Louis markets, this chapter briefly explores the existing body of knowledge about each of the Chicago markets. Key characteristics of each market are discussed, based on secondary sources, press articles, and existing market research.[1] After a general discussion of these characteristics, conclusions are offered about the benefits of providing transit service to the market, and about the effectiveness of transit service to the market.

In the St. Louis case, each market was discussed with some level of detail, despite a lack of data on travel behavior in those markets. This was possible because each of the St. Louis markets involves only a small number of travel destinations – sports stadiums, top tourist attractions, downtown shopping malls, and so forth. In Chicago, the non-work travel markets are more complex. One market, shopping travel, involves a wide variety of shopping destinations located throughout the city and region. Two other markets cannot even be named concisely, much less described thoroughly. These markets are younger adults without children, living in North Side neighborhoods near downtown, and people who choose not to own cars because they prefer to ride CTA. Each of these markets is a demographic group that may rely on transit for a wide variety of trip purposes, and for travel to a wide variety of destinations.

To penetrate the complexity of these markets, existing CTA market research is consulted. Data from some studies are processed to generate original tabulations. As with earlier work in the Chicago case study, most of this market research analysis was undertaken during a summer internship at the Chicago Transit Authority in 2003, under the guidance of Peter Foote. Existing market research on shopping travel is especially rich, and is discussed at greater length. Still, existing data are inadequate at explaining how and why people use transit in each non-work travel market, so not all of this chapter's conclusions are proved rigorously. In the upcoming "Conclusions and Applications" chapter, recommendations are offered to the CTA for further market research.

[1] Only sources that are specific to the Chicago experience are considered.

Younger adults without children, living in North Side neighborhoods

Younger adults without children, living in North Side neighborhoods near downtown, are the first non-work travel market to be considered. The Central Area Transit Needs Assessment Survey, which was produced in 2002 for CTA's market research department, provides a preliminary understanding of this market. Residents of Central Area neighborhoods – adjacent to downtown, to the North, West, and South – were surveyed and participated in focus groups. Of course, the scope of this research was not limited to younger adults without children, nor was it concentrated in the North Side. Still, this project offers some useful insight about travel preferences of residents in urban neighborhoods near downtown. Key points include:[2]

- The population of the Central Area is growing rapidly, including in formerly industrial neighborhoods located to the South and West.
- Many people have moved to the Central Area specifically "seeking an urban environment in which they would not have to rely on their cars" for all of their travel needs.[3]
- Nevertheless, most residents have cars available, and use them for selected trip purposes, including grocery shopping and trips to the suburbs.
- Central Area residents rely on a wide variety of transportation modes for everyday mobility, including walking, transit, taxis, and driving.
- Often mode choice decisions are made on the spur of the moment, based on factors such as weather conditions, or whether a bus is visible on the horizon.

Based on these findings, the report concludes by citing the "relative adequacy" of existing CTA service.[4] In fact, that conclusion is premature, and this study only just begins to explain the travel behavior of Central Area residents. Given that there is a wide selection of modes available for travel in neighborhoods near downtown, what factors influence residents' choice to take transit? Can transit become more competitive relative to other modes? Where do residents travel for non-work purposes, and does CTA provide convenient service to those destinations?

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[2] Applied Real Estate Analysis, Inc., and Schaller Consulting, *Central Area Transit Needs Assessment Survey*, prepared for the Chicago Transit Authority, Technical Report MR 02-08, May 2002, pp. 5, 10-12, 14

[3] Applied Real Estate Analysis, Inc., and Schaller Consulting, p. 11

[4] Applied Real Estate Analysis, Inc., and Schaller Consulting, p. 9

More importantly, this study does not address the particular role of transit in the lifestyle of younger adults without children. Do these people, like other Central Area residents, also have cars but choose to use transit for some non-work trips? Do these people move to the urban neighborhoods of the North Side because they do not want to be dependent on cars for all travel, or do they move to such neighborhoods for reasons unrelated to transportation?

Finally, the most vexing question is why people use transit for less of their non-work travel as they get older and have children. In Chapter 6, it was hypothesized that CTA mode share could change with a person's lifecycle. Young adults move into city neighborhoods, but as they get older, they earn more money, buy cars, get married, move to the suburbs, and have children. Is there any way that CTA could retain these people as transit riders, even as they get older? Perhaps if CTA provided better service to younger adults living in the city, those people would be less likely to switch away from CTA, and maybe even less likely to move out of the city.

Benefits

Even with so many unanswered questions, one can speculate with some confidence about the impact of providing transit service to this market. If the growth in Central Area population is being driven in part by younger adults, and if those people are attracted to such neighborhoods in part because of the good transit access, than serving this market is a central component of the revitalization of Chicago's urban neighborhoods. If the younger adults tend to be well-educated professionals (an assertion that would have to be investigated), there could be further benefits to the city from expanding the population of the "creative class." There could, however, be opposition from established residents to gentrification. Despite these potential economic benefits, CTA may feel little pressure to provide good service to this market because younger adults are not, by and large, a politically powerful constituency. CTA should reconsider, however, because by serving this market effectively, it could develop a population of lifetime transit users – or at

least a population of people who understand the benefits of transit, even after they get older and have children and use transit less often.

Effectiveness

It is hard to judge the effectiveness of current CTA service to this market, without knowing where these younger adults need to travel, and what factors lead them to choose transit. Without a greater knowledge of specific needs, current CTA service provided in the close-in North Side neighborhoods seems good overall. A dense network of bus routes serve these neighborhoods, as well as the Red, Brown, and Purple Lines. The Red Line operates 24 hours a day, as do some of the local bus routes.[5] Of course, crowding, bus bunching, and traffic congestion are persistent problems, and may be especially severe in the urban neighborhoods of the North Side because of the high population density of these areas. Recently, in the summer of 2003, lakefront express bus routes were reconfigured to address some of these problems. This project was mainly undertaken to improve commuter service to the central business district, but many of the lakefront routes do serve North Side neighborhoods and serve non-work trips as well.

Still, the Central Area survey provides some clues about additional steps that CTA could take to improve service to this market. Central Area residents have a variety of transportation modes available, and make mode choice decisions often on the spur of the moment. Real-time information about bus arrivals could encourage people to wait for the bus instead of walking or hailing a cab. Currently, CTA does not even post printed schedules are posted at most bus stops, much less real time information. Getting unlimited-ride transit passes in the hands of more younger adults would also help to influence mode choice decisions, by lowering the marginal cost of an additional transit trip to zero. CTA's unlimited-ride passes historically have been priced very high relative to the base fare, leading few commuters to purchase them. A promising development, taking effect in January 2004, is that CTA has chosen to hold its pass prices

[5] Chicago Transit Authority, "Bus & Rail Map," March 2003

constant while raising the base fare by 25 cents.[6] CTA also makes discount passes available to university students through its popular U-Pass program.

A final issue is whether the CTA has done enough to respond to population increases in Central Area neighborhoods. The well-established neighborhoods of the North Side have good CTA service, but younger adults often are attracted to neighborhoods in transition, where less expensive housing can be found. Recently, substantial population growth has occurred in the formerly industrial neighborhoods located immediately South and West of downtown. According to some local perceptions, CTA has been slow to rework its service to meet the new needs of these neighborhoods.

People who choose not to own cars because they prefer to ride CTA

It is also a difficult task to understand why some people choose not to own cars because they prefer to ride CTA. This market defies the traditional dichotomy of choice riders and transit-dependent riders. Like transit-dependent customers, these people use transit for a very large share of their everyday travel, but unlike transit-dependent customers, they do not resent their reliance on transit, and should not be expected to stop using transit as soon as they can afford to buy cars.

Popular opinion holds that all Americans love their cars, and that only youths, the elderly, and the poor would make do without owning cars. In fact, a wide spectrum of people choose not to own cars because they prefer CTA. Table 8.1, below, shows the demographic characteristics of these riders, based on the Customer Satisfaction Survey. For comparison, the demographic characteristics of all CTA riders are shown as well (and are identical to the results shown in Chapter 5, Table 5.7). The gender, age, income, and racial makeup of people who do not own cars because they prefer CTA is very similar to that of CTA riders as a whole. For whatever reason, there are people from all walks of life who prefer transit to driving.

[6] Chicago Transit Authority, "A Guide to the CTA's New Fare Structure," Effective January 1, 2004

Personal/Household Characteristics		Don't Have Car / Prefer CTA	All CTA Customers
Sex	Male	44%	41%
	Female	56%	59%
Age	16-17	5%	7%
	18-24	17%	16%
	25-34	28%	25%
	35-44	18%	19%
	45-54	16%	15%
	55-64	9%	8%
	65 and up	6%	9%
Household income	< $10,000	10%	10%
	$10,000-$20,000	17%	14%
	$20,000-$30,000	17%	15%
	$30,000-$40,000	20%	18%
	$40,000-$50,000	10%	13%
	$50,000-$60,000	8%	8%
	> $60,000	19%	23%
Race/ethnicity	Caucasian	53%	48%
	African-American	22%	29%
	Hispanic	18%	16%
	Other	8%	7%
Place of residence	Downtown	5%	2%
	North Side	41%	28%
	Northwest Side	9%	13%
	South Side	21%	24%
	Southwest Side	6%	8%
	West Side	10%	12%
	Suburbs	9%	13%
Frequency of riding	Frequent	67%	51%
	Infrequent	33%	49%

Table 8.1 Characteristics of riders who do not have cars because they prefer CTA[7]

The two categories in Table 8.1 where there are noteworthy differences are frequency of riding and place of residence. People who do not have cars because they prefer CTA are much more likely to be frequent riders (i.e. riding CTA on five or more days in the week prior to the survey), a fact that is not at all surprising. They are also much more likely to live in the North Side of the city, which suggests that neighborhood characteristics are an important determinant of auto ownership. A similar conclusion can be drawn from other research about auto ownership. For example, Holtzclaw, et. al. (2002) find that in three metropolitan areas, including Chicago,

[7] Northwest Research Group, Inc., 2001 Customer Satisfaction Survey, database of survey data, prepared for the Chicago Transit Authority, database queried by Alexander N. Cohen

"there is a very strong relationship of residential density to auto ownership" because "to some extent density captures the effects of local shopping, transit and pedestrian and bicycle friendliness."[8] There is a growing body of research about the influence of each of these factors on auto ownership, but the results so far are by no means conclusive.

The important point is that in Chicago, there exist neighborhoods in which living without a car is a viable lifestyle choice. Such neighborhoods stand in contrast to the vast majority of the American landscape, where an automobile is required for basic mobility, and provide attractive residential choices for anyone who wishes to live without owning a car. It could be that people move to these neighborhoods because they prefer not to drive. Alternatively, people may locate in these neighborhoods for other reasons, and they find that they do not need to drive. Either way, more research is needed to determine whether these people could be better served.

Benefits

The social impact of serving this non-work travel market is significant. It provides a rare choice for people who, for whatever reasons, do not wish to be dependent on automobile ownership. Politically, however, it is difficult to serve people who prefer not to own cars. This market consists of a disparate group of people, who may have little in common other than their preference for transit, and who do not appear to be an organized or vocal constituency.

Effectiveness

Currently, 12% of CTA customers do not own cars because they prefer transit.[9] The mere existence of people who prefer transit to driving suggests that CTA provides good service. It

[8] John Holtzclaw, et. al., "Location Efficiency: Neighborhood and Socioeconomic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles and San Francisco.," *Transportation Planning and Technology*, Vol. 25, 2002, p. 13

[9] See Chapter 5, Table 5.7

should nevertheless be possible to serve this market more effectively, by strengthening the factors that enable people to forgo auto ownership.

It is likely that a combination of land use and transportation characteristics make particular neighborhoods viable places to live without cars. Land use attributes that are likely to be important include pedestrian friendliness, the availability of local amenities within walking distance, and the convenience (or rather, the inconvenience) of residential parking. Transportation attributes that are likely to be important include the level of CTA service provided, accessibility by transit to major regional trip generators, and the availability of alternatives such as rental cars and taxicabs.

Chicago is a sprawling city, and most of its neighborhoods do not have the right mix of these attributes. It will never be possible to make all of Chicago a hospitable place for people who prefer not to own cars, but it should be possible to make incremental improvements to neighborhoods that already have most of the required attributes. More research is needed to determine which neighborhoods these are, and which attributes need to be strengthened.

A daunting challenge is that city agencies and private actors determine most local land use and transportation characteristics, other than CTA service itself. In the past, CTA has made little effort to influence the factors outside of its direct control. There are, however, steps that the agency could take if it were willing to be more proactive about developing this market. CTA could serve as a vocal advocate for appropriate city policies, such as zoning rules that would limit residential parking in neighborhoods where car-free living is a viable choice. CTA could also participate in joint business ventures, such as with Zipcar or similar car-sharing companies.

Shopping travel, particularly by transit-dependent riders

Of all the Chicago non-work travel markets discussed in this chapter, shopping is the best understood. Broadly speaking, there are three types of shopping areas with CTA service:

downtown, outlying neighborhood centers, and outlying auto-oriented centers. Each has been the subject of city planning studies or CTA market research over the past decade.

Downtown Chicago is one of the single largest concentrations of retail activity in the region. There are two main shopping areas in the Chicago Central Area: the State Street and Wabash Avenue corridor in the Loop, with nearly 2.3 million square feet of retail space; and the more upscale North Michigan Avenue in the Near North, with more than 3 million square feet of retail space.[10] While both areas continue to grow at a healthy pace – retail space in the State/Wabash corridor grew by 15% in the 1990's, for example – downtown is no longer a magnet for shoppers from across the region.[11] Table 8.2, below, shows who is shopping in the Central Area, based on a 2000 survey. The great majority of shoppers either live or work in the Central Area – downtown and the immediately surrounding neighborhoods – or are visitors from out-of-town. Only 17% of Central Area shoppers are residents of other parts of the City of Chicago and are not employed downtown. In other words, few people come downtown from across Chicagoland just to go shopping. Of course, CTA provides good service to downtown shopping areas, but those areas are not necessarily where city shoppers want to go.

Location or Submarket	**From Central Area**		**Other Residents**		**Visitors**
	Workers	Residents	Chicago	Suburban	
Total shoppers in the Central Area	38%	14%	17%	8%	23%
Shoppers on State/Wabash	32%	13%	19%	10%	26%
Shoppers on N. Michigan Avenue	27%	15%	16%	7%	35%
Top 20% of shoppers by $ spent	18%	24%	21%	10%	41%

Table 8.2 Demographics of Central Area Shoppers, Fall 2000[12]

Nor do city residents find their shopping needs met in their own neighborhoods, at least not the residents of Chicago's South Side. Many South Side neighborhoods are economically distressed and lack adequate local retail opportunities. A 1993 study explains that:

[10]Arthur Andersen, LLP, *Economic Base and Sector Analysis, Central Area, Chicago, Illinois, 2000-2020*, prepared for the City of Chicago Department of Planning and Development, March 2001 (Revised 21 May 2001), pp. 96, 101
[11] Arthur Andersen, LLP, p. 103
[12] Arthur Andersen, LLP, pp. 111-114

> Socioeconomic trends within Chicago's South Side neighborhoods – along with dramatic changes in the retail industry over time – have resulted in vast amounts of obsolete, underused retail space. Yet, many South Side residents lack convenient, good-quality retail shops; retail store owners and developers searching for locations use criteria that exclude most city sites; and the City of Chicago suffers an annual loss of several hundred million dollars in retail sales to adjacent suburbs.[13]

Casual observations suggest that these conditions have not improved much in the decade since the study was undertaken.[14] As a result, the estimated retail "potential" of the South Side exceeds actual retail sales in the South Side by $1.2 billion annually.[15] This difference implies that South Side residents are either shopping in other parts of the city or region, or are simply buying less than they might desire, because they lack access to stores close to home.

The greatest difference between retail potential and actual sales is in the "comparison goods" category, including apparel, accessories, home furnishings, and household supplies. These are the kinds of products typically sold department stores, "big box" discount stores, and regional malls. There is also a large difference between potential and actual sales of groceries. This is, disturbingly, because much of the South Side lacks full-service supermarkets or even decent convenience food stores. Ill-kempt "food and liquor" stores fill the gap, but the 1993 study laments that "although liquor sales provide the profit margins that keep so many of these stores in business, the majority of the stores do not adequately meet the food needs of their neighborhoods."[16] Supermarkets, like malls and discount stores, tend to be auto-oriented facilities at the outskirts of the city rather than in the heart of inner city neighborhoods. Without adequate amenities in their own neighborhoods, the transit-dependent residents of the South Side must rely on CTA to access these outlying auto-oriented shopping centers.

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[13] Applied Real Estate Analysis, Inc., *Retailing in Chicago's South Side Neighborhoods*, prepared for the City of Chicago, Department of Planning and Development June 1993, p. i
[14] Alexander N. Cohen, personal observations, Summer 2003
[15] Applied Real Estate Analysis, Inc., *Retailing in Chicago's South Side Neighborhoods*, pp. 9, 27-8
Note that estimated potential is based on typical spending patterns in Midwest households. It takes into account the income of South Side residents, but does not take into account possible lifestyle differences that would lead inner city households to desire a different variety of goods from other Midwest households.
[16] Applied Real Estate Analysis, Inc., *Retailing in Chicago's South Side Neighborhoods*, p. 29

In 2001, CTA commissioned a study of the financial impacts of transit ridership on Central Area and outlying retail centers.[17] Shoppers were surveyed at three outlying auto-oriented shopping centers: 87th Street/Chatham Ridge, which is a pair of large strip malls adjacent to a Red Line station and the Dan Ryan Expressway in the South Side; Ford City, which is an enclosed regional mall just inside the city limits in the Southwest Side, with CTA bus service only; and Harlem/Irving Plaza, which is an enclosed regional mall just outside the city limits in the Northwest Side, with CTA bus service only. Shoppers were also surveyed in the Central Area, on North Michigan Avenue and in the Loop (State Street and vicinity). At the outlying centers, shoppers who arrived by CTA and by auto were surveyed, while in the Central Area, only those who arrived by CTA were surveyed. The data sets from these surveys were obtained from the consultants who conducted the study, and were processed to produce the tables shown below.

Respondent Characteristics	**Trip Purpose**	**Central Area**		**Outlying Retail Centers**		
		N. Mich.	Loop	87th St.	Ford City	Harlem/Irving
Trip purpose of riders	Work	71%	76%	46%	30%	33%
	Shopping	10%	6%	29%	46%	51%
	All Other	19%	18%	25%	24%	16%
% of riders who spend any money	Work	70%	74%	65%	58%	67%
	Shopping	84%	88%	92%	84%	83%
	All Other	71%	62%	64%	65%	59%
Mean spent per rider	Work	$28	$26	$41	$59	$64
	Shopping	$124	$131	$111	$116	$117
	Other	$74	$31	$40	$45	$25
Median spent per rider	Work	$7	$7	$6	$4	$7
	Shopping	$60	$66	$44	$61	$58
	Other	$19	$9	$10	$6	$4

Table 8.3 Trip purpose and expenditures of CTA riders surveyed at selected shopping areas[18]

Table 8.3, above, shows the trip purposes and expenditures of people who ride CTA to the selected shopping areas. In the Central Area, an overwhelming majority of CTA riders travel there to work; only 6% to 10% travel there to shop. At the outlying retail centers, there is more of

[17] Cambridge Systematics, Inc., *Financial Impacts of Transit Ridership in the Chicago Central Area*, prepared for the Chicago Transit Authority, Technical Report MR02-06, 31 July 2002;
Cambridge Systematics, Inc., *Financial Impacts of Transit Ridership on Outlying Retail Centers*, prepared for the Chicago Transit Authority, Technical Report MR02-07, 15 August 2002

[18] Cambridge Systematics, Inc., Financial Impacts of Transit Ridership (2002), database of survey data, prepared for the Chicago Transit Authority, database queried by Alexander N. Cohen

an even split among CTA riders between those going there for work and those going there to shop. Thus transit access to shopping areas is important for work travel as well as for non-work travel.

A few points of clarification about trip purpose definitions are in order. Survey respondents were instructed to identify only one trip purpose, but about 10% selected multiple trip purposes. In Table 8.3, The "Work" bracket includes all responses of "Work" or "School," even if another trip purpose was selected additionally. The "Shopping" bracket does not include responses including "Work" or "School" in addition to "Shopping," but does include all other responses of "Shopping," including those in which another trip purpose was selected additionally. The "Other" bracket includes responses of "Medical," "Personal Business," "Social/Recreation," "Religious," "Home" (constituting a very small number of responses), "Other," and any combination of multiple responses not including "Work," "School," or "Shopping."

Table 8.3 also shows that when CTA riders spend a considerable amount of money when they go shopping.[19] Regardless of trip purpose, a majority of those surveyed reported spending some money at the shopping area on that trip. Not surprisingly, those with a shopping trip purpose are most likely to spend money at the shopping area, and also tend to spend more money per trip. Each CTA rider visiting a shopping area for the purpose of shopping spends more than $100 at the shopping area, with relatively little variation among the five shopping areas. Riders with other trip purposes spend less, on average. Of course, these mean values are skewed by a small number of high-value purchases. The median values are more representative of what a typical CTA rider spends on a trip to each shopping area. Not surprisingly, the median expenditure of work travelers is $4 to $7 – about the price of lunch – while the median expenditure of shopping travelers is considerably higher. Note that expenditures are lowest at the 87th Street/Chatham Ridge shopping area, but CTA riders are most likely to make a purchase

[19] Excluded from the expenditure calculations are a very small number of respondents who reported spending more than $5,000 on their shopping trip. Such responses would skew the average amounts spent, and are generally not believable.

there. This is most likely because 87th St./Chatham Ridge is a strip mall, where people go to buy everyday necessities rather than to browse for apparel or other higher-priced items.

Spending Per Respondent	87 St./Chatham Ridge		Ford City Mall		Harlem/Irving Plaza	
	CTA	Auto	CTA	Auto	CTA	Auto
% who spend	92%	80%	84%	84%	83%	87%
Mean spent	$111	$75	$116	$126	$117	$98
Median spent	$44	$30	$61	$80	$58	$70

Table 8.4 Expenditures by mode of arrival at each shopping area, shopping trip purpose only[20]

At the outlying shopping areas, the expenditures of shoppers who arrive by CTA compare favorably to the expenditures of shoppers who arrive by car. Table 8.4, above, compares the spending habits of those with a shopping trip purpose, by mode of arrival at the shopping area. At the Ford City and Harlem/Irving malls, median expenditures are somewhat lower for CTA travelers than for auto travelers, but average expenditures for both groups are comparable, as are the percentages of people who spend any money. At 87th Street, CTA riders are more likely to spend money than auto travelers, and they spend considerably more money too. This may reflect the fact that it is more difficult and time consuming to reach the strip malls by CTA than by auto, so CTA riders may try to shop there only when definitely needing to make a major purchase.

It is a bit surprising that CTA riders' expenditures are comparable to those of automobile travelers, considering that transit service to automobile-oriented outlying retail centers would be expected to appeal primarily to transit-dependent riders. Table 8.5, below, provides a profile of those who ride CTA to the each of the selected retail centers, for the purpose of shopping only. CTA riders visit each shopping area frequently, once again highlighting the importance of transit access to shopping destinations. A majority of riders visit each shopping area at least once a month, and a large percentage of riders visit each shopping area at least once a week. The frequencies of taking CTA to each shopping area are very similar to the overall frequencies of visiting each shopping area, suggesting that people who take CTA to go shopping always do so – i.e. it is not common to drive sometimes, and take CTA sometimes.

[20] Cambridge Systematics, Inc., Financial Impacts of Transit Ridership (2002), database of survey data, prepared for the Chicago Transit Authority, database queried by Alexander N. Cohen

Personal/Household and Travel Characteristics		North Mich.	Loop	87th St.	Ford City	Harlem /Irving
Frequency of visiting this shopping area	Less than once a month	12%	12%	2%	18%	17%
	Once/Week to Once/Month	53%	34%	23%	51%	41%
	More than once a week	35%	54%	75%	31%	41%
Frequency of taking CTA to this shop. Area	Less than once a month	11%	12%	3%	12%	18%
	Once/Week to Once/Month	47%	29%	20%	41%	37%
	More than once a week	42%	59%	77%	47%	45%
Modes used to travel to the shopping area on this shop trip	CTA bus only	40%	27%	45%	74%	85%
	CTA rail only	42%	41%	19%	3%	2%
	CTA bus and rail	14%	26%	34%	19%	11%
	CTA and Pace/Metra	3%	6%	2%	4%	1%
Auto available for this shop trip	Yes	47%	40%	17%	26%	26%
	No	53%	60%	83%	74%	74%
Sex	Female	74%	66%	57%	76%	76%
	Male	26%	34%	43%	24%	24%
Age	Less than 20	21%	24%	24%	48%	41%
	20-29	38%	29%	20%	33%	12%
	30-39	18%	15%	11%	6%	10%
	40-49	10%	17%	23%	6%	7%
	50-59	6%	7%	12%	3%	10%
	60 and up	7%	9%	9%	3%	20%
Race/ethnicity	African American	20%	39%	94%	87%	13%
	Caucasian	68%	43%	0%	4%	59%
	Hispanic	4%	6%	1%	3%	19%
	Other	8%	12%	4%	7%	9%
Household income	< $15,000	14%	16%	24%	25%	29%
	$15,000 to $25,000	9%	19%	25%	23%	18%
	$25,000 to $35,000	14%	14%	22%	20%	18%
	$35,000 to $45,000	15%	10%	14%	9%	17%
	$45,000 to $55,000	9%	10%	8%	12%	8%
	> $55,000	39%	32%	8%	12%	9%
Place of residence	Downtown	6%	4%	0%	1%	1%
	North	67%	23%	1%	1%	8%
	Northwest	3%	2%	0%	1%	78%
	South	16%	44%	88%	76%	3%
	Southwest	0%	8%	3%	17%	0%
	West	7%	19%	5%	3%	8%
	Outside the City	0%	1%	2%	1%	1%

Table 8.5 Characteristics of those who took CTA to each area, shopping trip purpose only[21]

Table 8.5 also shows that there are key differences between those who take CTA to shop in the Central Area, and those who take CTA to shop at outlying centers. Rail is more commonly

[21] Cambridge Systematics, Inc., Financial Impacts of Transit Ridership (2002), database of survey data, prepared for the Chicago Transit Authority, database queried by Alexander N. Cohen

used to access the Central Area, while the bus is the dominant mode of access to the outlying areas. This is entirely predictable, reflecting the availability of different modes within walking distance of each shopping area. A more telling difference is that in the Central Area, close to half of shoppers taking the CTA are choice riders, with an automobile available for the shopping trip. At the outlying retail centers, and overwhelming majority of riders are transit-dependent. Similarly, shoppers in the outlying areas tend to be in the lower income brackets, with very few in the top income bracket. In the Central Area, a plurality of shoppers are in the top income bracket, especially at the more upscale North Michigan Avenue shopping area. CTA service to the Central Area seems to be competitive with automobile travel, even for shopping trips. Service to outlying areas may be inferior, but it is crucial to the mobility of transit-dependent riders.

The place of residents of CTA shoppers is predictable, reflecting the geographic location of each shopping area. The Central Area attracts shoppers from all over the city. The 87th Street/Chatham Ridge shopping area principally attracts riders from the South Side, where it is located. Similarly, Harlem/Irving Plaza principally attracts riders from the North Side, where it is located. Ford City is located in the Southwest Side, but it mainly attracts riders from the adjacent South Side, which is more populous and less affluent. This is not to say that Southwest Side residents do not patronize the mall in large numbers, but they are probably less likely to take CTA go shopping. These geographic differences explain the racial and ethnic makeup of CTA shoppers at each shopping area. Shoppers at 87th Street and Ford City are overwhelmingly African-American, mirroring the population of the South Side. Shoppers at Harlem/Irving Plaza are predominantly white, mirroring the population of the Northwest Side. The Central Area attracts a diverse group of shoppers from throughout the city.

At all shopping areas, most shoppers arriving by CTA are women, and most are young. Younger shoppers are especially dominant at the two regional malls, where more than 40% of the shoppers are under the age of twenty. At the Ford City mall, more than 80% of shoppers are

under the age of thirty. These facts are consistent with the notion of malls as places where young people, especially teenagers, go to spend their free time and have fun.

87th Street/Chatham Ridge stands out in several categories in Table 8.5, compared to the other shopping areas. Riders are most likely to be transit-dependent. The mix of riders by age and sex is most balanced. Riders are most likely to visit this shopping area more than once a week. These differences reflect the fact that 87th Street/Chatham Ridge is a place to shop regularly, for everyday necessities, rather than a place to go shopping for fun. Clearly, transit access to strip shopping developments is of critical importance to transit-dependent riders.

These data provide a good summary of who rides CTA to different types of shopping areas. It is now worth considering, briefly, some of the physical conditions that riders face when taking transit to go shopping, specifically at the auto-oriented shopping outlying areas. Several regional malls with CTA service were visited in the summer of 2003.[22] Generally malls are terminals for CTA buses. At almost every mall, CTA buses pull into the mall parking lot, and stop at a reasonably comfortable waiting area located in close proximity to one of the mall's main entrances. Earlier findings suggest, however, that access to strip malls may be even more important to the transit-dependent population than access to regional malls. Transit access to these strip malls is far inferior. Buses stop along the arterial streets serving the strip malls, but do not pull up to the strip mall entrances. At each strip mall, patrons must cross a wide parking lot, and sometimes must cross a busy arterial street, to get from the bus stop to the storefronts. It is worth noting that many strip malls and "big box" stores, also with large parking lots, are clustered near each regional mall, and are served by some of the same bus routes as the regional malls. For example, one of the only CTA-accessible Wal-Mart stores is located on Cicero Avenue very near to the Ford City Mall.

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[22] Alexander N. Cohen, personal observations, Summer 2003
Regional malls visited: Evergreen Plaza Ford City Mall, North Riverside Park Mall, Harlem/Irving Plaza, and Westfield Shoppingtown Old Orchard. Also visited: strip developments at 87th Street/Chatham Ridge and Stony Island Plaza (95th/Stony Island), and the historic shopping district at 63rd/Halsted

A recent routing change to the 95E bus route provides an example of how bus service to strip malls can be improved. In 2001, riders were surveyed on bus routes 28 and 95E, both of which serve the Stony Island Plaza strip mall in the South Side. This survey found that nearly 75% of riders on those two routes ride the bus to Stony Island Plaza on four or more days each week, but that about 50% of riders reported being "discouraged" from doing so by the walk between the bus stop and the shopping plaza.[23] In response, a routing change on the 95E route was initiated in December 2002, in which buses would detour into the mall parking lot and stop directly in front of the store entrances.[24] With this change, customers accessing the strip mall would not have to walk across the parking lot or a busy arterial; however, riders not traveling to or from the mall would endure slightly longer trip times.

CTA was carried out this change very conservatively. Of the two bus routes stopping near Stony Island Plaza, routes 28 and 95E, only route 95E was rerouted to serve the shopping center directly. This route only detours to the shopping plaza between 9:00 am and 3:00 pm, and on weekdays only.[25] CTA, it seems, was reluctant to interfere with rush hour service. Even as a limited experiment, however, the rerouting has proven popular with riders. A follow-up survey of riders on route 95E in May 2003 found that 63% of riders on the route were "satisfied" or "very satisfied" with the change, while only 4% were "unsatisfied" or "very unsatisfied."[26] Clearly the benefits to riders traveling to or from the mall have outweighed the added delay to through travelers. Moreover, 39% of bus riders said that they shop at Stony Island Plaza more frequently now that the route has changed.[27] It seems that the routing change has produced benefits in the form of greater mobility for bus riders and higher ridership for CTA. Asked for

[23] Chicago Transit Authority, "Stony Island Plaza Travel Survey: #28 Stony Island & #95E 93rd-95th Bus Routes," Technical Report MR02-01, 4 January 2002, pp. 1-2
[24] Chicago Transit Authority, "Customer Response to Routing Change: Bus Route #95E," Technical Report MR03-22, 1 July 2003, p. 1
[25] Alexander N. Cohen, personal observations, Summer 2003
[26] Chicago Transit Authority, "Customer Response to Routing Change: Bus Route #95E," Technical Report MR03-22, 1 July 2003, p. 2
[27] Chicago Transit Authority, "Customer Response to Routing Change: Bus Route #95E," Technical Report MR03-22, 1 July 2003, p. 3

comments, 61% of riders asked for the bus to serve the shopping center at other times – especially on weekends and holidays, and weekday evenings.[28] A small number of riders suggested that a similar routing change be implemented at Wal-Mart near the Ford City mall. Given the popularity of this routing change, CTA would do well to explore the implementation of similar changes at strip shopping developments across the city, as warranted by customer demand.

Benefits

The social impact of providing transit service to shopping areas is obvious. Many neighborhoods, especially the economically distressed neighborhoods of the South Side, totally lack decent local shopping. Transit-dependent customers rely on CTA for all of their shopping needs, potentially even for grocery shopping. These transit-dependent shoppers are a vulnerable segment of urban society, tending to be young, female, and poor. Improving service to shopping destinations would enhance these riders' quality-of-life, and could bolster ridership by inducing them to shop more frequently.

Effectiveness

Though there are clear social benefits to serving this market, the effectiveness of current CTA service is questionable. CTA is most competitive with the automobile for downtown shopping travel, but although downtown retail is large and growing, few people who do not live or work nearby want to shop there. Bus service to regional malls is relatively convenient, with bus routes terminating inside the mall parking lots, but malls especially appeal to young, recreational shoppers. Transit-dependent customers have the greatest need to access discount stores located in outlying auto-oriented developments, where CTA service is a poor alternative to driving. Presently, CTA riders are second-class citizens at auto-oriented strip malls; they have to

[28] Chicago Transit Authority, "Customer Response to Routing Change: Bus Route #95E," Technical Report MR03-22, 1 July 2003, p. 5

traverse wide swaths of pedestrian-unfriendly territory just to get from store entrances to the nearest bus stop. Poor accommodations for pedestrians are especially problematic because shoppers often have to carry heavy or unwieldy packages.

Simple reroutes to bring buses into the parking lots of strip malls would help considerably. The recent routing change on route 95E is a good example of what can be done. Unlike the 95E reroute, however, bus service to shopping areas should operate throughout the hours in which stores are open. CTA has yet to implement these kinds of service improvements on a wide scale. In fact, mall managers themselves may resist the changes. Because CTA shoppers tend to be very young, they may be perceived to be bad customers – i.e. potentially threatening or disruptive, and unlikely to spend much money – when in fact CTA shoppers are regular customers who spend comparable amounts of money to those who drive. CTA might do well to emphasize the fact that store workers use transit as well as shoppers.

The ease with which service to shopping destinations can be improved depends largely on trends in the retail industry. Recall from the literature review (Chapter 2) that there is a debate among scholars about whether the US retail industry is increasingly varied or increasingly homogenized.[29] Homogenization of retail means that transit need not serve every store, because many stores are replicas of each other. Good transit service to just a few shopping centers would be sufficient to provide access to the entire breadth of chain retail. On the other hand, if there is in fact an increasing variety of retail, then transit faces a daunting challenge, especially if these many and varied stores are scattered throughout the suburbs.

Ideally, low-income residents would be well-served by shopping in their own neighborhoods, but in many neighborhoods they are not. Paradoxically, improvements in CTA service to outlying chain retail stores helps to undermine the locally-accessible independent merchants remaining in business. Perhaps the ideal solution would be to encourage chain

[29] In Chapter 2, refer to the reviews of work by Nelson and Niles, and Handy, DeGarmo, and Clifton

retailers to open stores within inner city neighborhoods, or in urban areas with better transit access, but CTA's influence over store location decisions is very slight at best.

There already have been a few instances of "big box" chain stores locating in urban neighborhoods. For example, several are located near the North/Clybourn station on the Red Line, in the North Side. CTA planner David Urbanczyk has described this area as "pedestrian unfriendly, but not automobile friendly" because the stores are foreboding to pedestrians and sources of traffic congestion for cars.[30] If this is to be pursued as a model for the development of inner city retail, more research is needed into how CTA serves this area, and what can be done to encourage walking and transit use instead of driving.

One aspect of the shopping market not discussed in this chapter is immigrant-oriented neighborhood retail. Earlier in the Chicago case study, it was found that bus routes serving such areas – such as the Korean community in Kimball, and the Indian community along Devon – have high off-peak ridership. Unlike the neighborhoods of the South Side, those neighborhoods feature vibrant, pedestrian-friendly retail strips that cater to local immigrant communities. This thesis is not prepared to comment on the effectiveness of CTA service to neighborhood retail strips, because existing market research offers little insight. Further research is needed to explore the synergies between transit and neighborhood retail districts.

Sporting events

There is much less to say about sporting events travel. As discussed in the Chicago Overview chapter, there are four major sports arenas in Chicago, only two of which have very convenient rail service. Driving is the primary means of access to the United Center (basketball and hockey) and to Soldier Field (football), and ample parking is available at each facility. CTA does operate express buses to these venues from downtown. United Center is also about half a mile from the Medical Center rail station on the Blue Line. In contrast, the city's two baseball

[30] David Urbanczyk (Chicago Transit Authority), personal communication, Summer 2003

stadiums, Wrigley Field and U.S. Cellular Field, are each located within a block of the Red Line. Data about who rides these various CTA services to different sports events does not appear to be available. As this thesis was being written, however, CTA was initiating a travel survey of Wrigley Field patrons. Fans attending events at the other stadiums should be surveyed as well.

It is known that CTA rail service is critical to moving baseball fans, especially at Wrigley Field. That ballpark is located in the heart of a densely populated North Side residential neighborhood. There are only about 3,000 parking spaces in lots near Wrigley Field, even though the stadium seats nearly 39,000 spectators.[31] Crowding has been an issue at Addison station. The station was completely rebuilt from 1992 to 1994, to give it a much wider island platform and a much larger fare control area.[32] To help alleviate crowds on game days, CTA employs additional customer assistants at the station, who staff auxiliary portable fareboxes.[33] Besides the Red Line station at Addison, CTA serves Wrigley Field with local bus routes. For night games, CTA operates a special express bus service to off-site parking lots at schools about two miles from the stadium, and bus fare is included in the cost of parking.[34] At U.S. Cellular Field, parking is not so constrained, but the Sox-35th station on the Red Line still serves a large number of fans. That ballpark is located next to the Dan Ryan Expressway, at the edge of a South Side residential area.

Unlike in St. Louis, there has been no attempt in Chicago to concentrate sports facilities downtown. The four stadiums are dispersed throughout the city for historical reasons. Wrigley Field dates back to 1914.[35] The other facilities are much newer, but each was built at or adjacent to the site of an historic stadium that was to be replaced. U.S. Cellular Field opened in 1991 to replace the original Comiskey Park.[36] United Center opened in 1994 to replace the Chicago

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[31] Steven H. Abrams, "Moving Crowds in Chicago: Baseball and the Fourth of July," *Transportation Research Record*, No. 1735, 2000, p. 54
[32] Abrams, p. 55
[33] Abrams, p. 55
[34] Abrams, p. 55
[35] Abrams, p. 54
[36] Ballparks by Munsey & Suppes, "U.S. Cellular Field." http://www.ballparks.com/baseball/american/comis2.htm

Stadium.[37] Soldier Field opened in 2003 on the site of an older stadium of the same name.[38] Thus it is almost an accident of history that Wrigley Field and U.S. Cellular Field are located adjacent to the Red Line, while Soldier Field and the United Center are not.

Benefits

There is definitely a positive impact of CTA service to Wrigley Field. That ballpark is a Chicago landmark. It is one of the last major league ballparks of its era that is still in use, and it defines the character of the surrounding Wrigleyville neighborhood. CTA service is necessary for sustaining Wrigley Field, given the lack of off-street parking nearby, and the infeasibility of swamping the neighborhood with parking lots and game-related traffic.

Effectiveness

At Wrigley Field and, to a lesser extent at U.S. Cellular Field, CTA rail service effectively provides some congestion relief. The bus service provided to the United Center and Solider Field is less effective, however. One of the chief reasons why people take transit to sporting events is to avoid traffic congestion, but buses suffer through the same traffic as cars. Bus service also is less adept than rail at absorbing the sharply peaked sporting event crowds. Ideally, Soldier Field and United Center should have been built at more transit-accessible locations. These stadiums represent missed opportunities for transit. The lack of rail access to the United Center is especially problematic because that stadium is home to both basketball and hockey teams, and is used for a large number of games throughout the year.

It was noted in the St. Louis case that another chief benefits of transit service to sporting events is to broaden the regional appeal of transit, by attracting suburbanites who would not

[37] Abrams, p. 54;
The United Center, "Arena Information: Introduction and History."
http://www.unitedcenter.com/pagetemp.php?copy=arenintro
[38] SoldierField.net, "History." http://www.soldierfield.net/history.html

otherwise ride. CTA cannot realize this benefit, because suburbanites cannot easily access the CTA system. CTA routes do not reach far into the suburbs, and do not feature many park-and-ride lots. The Red Line, which serves the two baseball fields, especially lacks park-and-ride lots. There are 328 parking spaces at the Howard station at the northern end of the Red Line, and no parking spaces whatsoever on the southern portion of the line.[39] Suburbanites could take Metra to downtown Chicago, but because the city's stadiums are not located downtown, riders would then have to transfer to CTA to complete their trips. Notoriously poor off-peak headways on Metra, coupled with notoriously poor intermodal connections between Metra and CTA, make this an unlikely mode choice. Thus, CTA service to sporting events can do little to attract infrequent suburban riders, although it may attract some city residents who do not regularly use transit.

[39] Chicago Transit Authority, "Bus & Rail Map," March 2003

IX. Conclusions and Applications to Tren Urbano and the CTA

By now, it should be clear that non-work transit ridership is an important subject. About half of all transit trips in the largest US cities are non-work trips, and non-work travel has contributed to transit ridership growth in 13 of 20 large US cities.[1] It is also a broad subject. A wide range of factors influence non-work travel behavior: personal and household characteristics, the characteristics of neighborhoods, the type and location of non-work destinations, and the type and quality of transportation services available. The preceding case studies have illustrated the importance and breadth of non-work transit ridership, in the contexts of St. Louis and Chicago. This final chapter synthesizes the findings of the case studies, to provide lessons for all transit agencies that may be interested in learning how and why to promote non-work transit ridership. At the end of this chapter, such lessons are applied specifically to Tren Urbano and to the Chicago Transit Authority.

How to serve non-work travel markets

This thesis is motivated by the premise that to attract new transit riders in an increasingly automobile-dominated environment, niche markets must be targeted. Several non-work travel markets have been identified in the case studies as strong sources of transit ridership in St. Louis or Chicago. What follows is a consolidated and generalized list of markets for non-work transit ridership, based on the markets identified in the case studies:[2]

- Tourists
- Large Events
- Shopping
- Younger adults without children, living in urban areas
- People who prefer not to own cars

[1] See Chapter 3
[2] Based on findings in Chapters 4 and 6

These five markets are potential sources of non-work ridership for all transit agencies, not just those in St. Louis and Chicago. Each market is a unique type of trip, or type of traveler, for which transit can be competitive. To succeed in attracting non-work riders, transit agencies must provide service that meets the particular needs of each market. What follows is a short description of strategies recommended for each market, based on the effectiveness (or ineffectiveness) of existing service to these markets in St. Louis and Chicago.[3]

The easiest market to serve is tourists. Transit agencies simply need to provide easy-to-use service that interconnects the airport, hotels, and major tourist attractions. Providing effective service to the four other markets is progressively more challenging, however.

To serve large events, transit agencies should provide service that is convenient to event venues; that can handle large crowds with sharp temporal peaking; and that is unaffected by heavy automobile congestion. It is also crucial that service be accessible to suburban residents – not to exclude city residents, but because large events draw patrons from across the metropolitan area. Rail service linking event venues with suburban park-and-ride lots would be ideal.

To serve shopping trips, transit agencies should focus on the needs of transit-dependent riders. These customers need access to outlying regional malls and strip malls, particularly those featuring chain discount stores and supermarkets. Transit agencies should provide better bus service to these auto-oriented areas. Buses should pull into the mall parking lots, rather than stopping at the nearest intersection, so that riders need not carry their purchases across expansive asphalt and foreboding arterials. Bus service also should match the hours in which stores are open for business. To overcome resistance from mall operators, agencies need to make the case that transit riders are good customers – they shop frequently and spend as much money as those who drive – and that mall employees also rely on transit to get to work.

To serve younger adults in urban areas, transit agencies need to be aware that these riders use a variety of urban transportation options, often making mode choices on the spur of the

[3] Based on findings in Chapters 7 and 8

moment. To influence these riders' choices, transit agencies should provide real-time information about bus arrivals, and should promote the use of unlimited-ride passes. Agencies also need to learn more about the origin-destination patterns of younger adults in urban areas, and determine whether the existing route structure meets these travelers' needs. This type of analysis should be undertaken not only for well-established neighborhoods of younger adults, but also for transitional neighborhoods with burgeoning younger adult populations.

To serve people who prefer not to own cars, transit agencies need to identify specific neighborhoods in which forgoing automobile ownership is a viable lifestyle choice. Most likely, these neighborhoods share a unique set of land use and transportation attributes, such as: pedestrian friendliness, available local amenities within walking distance, inconvenient residential parking, transit accessibility to regional destinations, and available transportation alternatives such as taxicabs and rental cars. Incremental improvements to such attributes would make these neighborhoods even more attractive to people who would prefer not to own cars. The challenge that transit agencies face is how to influence critical land use and transportation factors that they do not control directly. Agencies can serve as a vocal advocate for appropriate city policies, such as zoning rules that would limit residential parking in neighborhoods where car-free living is a viable choice. They also can participate in joint business ventures, such as with Zipcar or similar car-sharing companies. Still, there is no question that this is the most difficult non-work travel market for transit agencies to pursue.

Why St. Louis succeeded while Chicago did not

St. Louis and Chicago were chosen as case studies because of their divergent experiences in the 1990's. St. Louis enjoyed double-digit transit ridership growth, driven in large part by growth in non-work ridership. Chicago endured ridership losses over the same period, and there is no evidence of any growth in non-work ridership. Based on what has been learned about non-

work travel markets, it is now possible to assess why St. Louis succeeded in attracting non-work riders, and why Chicago did not.

In St. Louis, non-work ridership growth occurred on the new MetroLink light rail system. In Chicago, the largest and most turbulent changes in non-work ridership occurred on the CTA bus and rail system. Of course, the CTA system is much larger, while MetroLink is much newer. Still, lessons can be drawn from the comparison. Looking at current levels of service, these transit systems clearly differ in their ability to serve the different non-work travel markets. Tellingly, a different mix of non-work travel markets are dominant on MetroLink and CTA.

On MetroLink, tourists and large events are strong sources of ridership. Shopping is another source of ridership, but only at the tourist-oriented Union Station mall. There is no evidence of significant MetroLink ridership from younger urban residents or people who prefer not to own cars. On CTA, there is no evidence that tourists are a strong source of ridership. Nor has CTA realized the full ridership potential of large events, although baseball games do generate significant ridership for the agency. Instead, CTA largely draws non-work ridership from shopping; people who choose not to own cars; and younger adults without children, living in urban areas. Thus the non-work markets that are dominant on MetroLink and on CTA are almost mutually exclusive sets.

Tourists and large events should be the easiest non-work markets to serve, because they involve only a small set of well-defined trip generators. The single MetroLink rail line is sufficient to provide good service to these markets. The line directly connects all of the relevant destinations: the airport, hotels, the most popular tourist attractions, and all major stadiums. MetroLink service is simple enough to meet the needs of the tourist market, while having the speed, capacity, and suburban accessibility to meet the needs of the event market.

Curiously, CTA is not very effective at serving tourists and large events, even though the needs of those markets are relatively straightforward. Service to tourist attractions is confusing and inconsistent. For example, seven different CTA bus routes serve the Navy Pier, Chicago's

most popular attraction.[4] These buses travel in a variety of directions; they have widely divergent hours of operation; and they have uninformative route numbers (29, 56, 65, 66, 120, 121, and 124).[5] It is no surprise that most tourists eschew CTA, preferring to use a system of color-coded faux trolleys operated by the City of Chicago.[6] Service to large events also leaves much to be desired.[7] At two stadiums, CTA bus service is a dubious competitor to driving, especially since ample parking is available. Two other stadiums have convenient CTA rail service, but few suburbanites have access to the rail line.

CTA actually provides better service to the three other markets – shopping, younger adults, and people who prefer not to own cars. The agency does so even though these three markets are more complex, involving the rich variety of everyday travel needs of residential populations. The gridiron CTA bus system is fairly effective at serving these markets, by connecting a diffuse set of origins and destinations. In sum, while MetroLink serves the straightforward non-work travel markets, CTA serves the complex non-work travel markets.

In addition to current levels of service, it is also necessary to consider the changes in MetroLink and CTA service to these non-work travel markets in the 1990's. In St. Louis, the biggest change was, of course, the introduction of MetroLink in 1993. MetroLink was routed intelligently to serve all of the tourist and sports facilities that have been concentrated in downtown St. Louis. By design, MetroLink was a new and attractive service for tourists and large event travel.

In contrast, there is little evidence that CTA took proactive steps to improve service to non-work travel markets in the 1990's. The most visible non-work service improvement was the

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[4]Arthur Andersen, LLP, *Economic Base and Sector Analysis, Central Area, Chicago, Illinois, 2000-2020*, prepared for the City of Chicago Department of Planning and Development, March 2001 (Revised May 21, 2001), p. 128

[5] Chicago Transit Authority, "Bus & Rail Map," March 2003;

[6] David Urbanczyk (Chicago Transit Authority), personal communication, Summer 2003

[7] To the agency's credit, CTA does make a concerted effort to serve large annual civic events, particularly the Fourth of July fireworks celebration. It is service to frequently recurring events, such as sports games and concerts, that is more problematic.

introduction of rail service to Midway Airport, which came with the opening of the Orange Line in 1993. No doubt the Orange Line has attracted some additional tourist ridership to CTA, but surveys show that only about 7% of CTA riders at Midway are tourists.[8] Other non-work service improvements in the 1990's, if there were any at all, are not obvious. Meanwhile, two rounds of broad-based bus service cuts hurt CTA's ability to serve its three more dominant markets – shopping, younger adults without children, and people who prefer not to own cars.

Non-work ridership is a large component of total CTA ridership, but not thanks to any CTA service improvements of the 1990's. Unlike on MetroLink, where non-work ridership occurs by design, non-work ridership on CTA is an accident of history. Stadiums stand at their historical locations; some are near rail stations, and some are not. Buses ply their historical routes, and happen to pass by shopping centers that were built for convenient access by car. Younger adults without children have flocked to historic urban neighborhoods, relying on CTA service designed for those neighborhoods' prior inhabitants and land uses. Some people choose to live without cars in Chicago, but it is likely that they do so in neighborhoods whose land use and transportation characteristics evolved in an earlier era of transit dominance.

Ultimately, history is the biggest difference between St. Louis and Chicago. St. Louis has the all-new MetroLink rail system, which could be routed to serve contemporary tourist and event destinations. This has been an advantage for St. Louis, but Chicago has had its own advantage as well. Because CTA has maintained a high level of overall transit service throughout history, Chicago has a much wider selection of urban neighborhoods with transit-oriented urban

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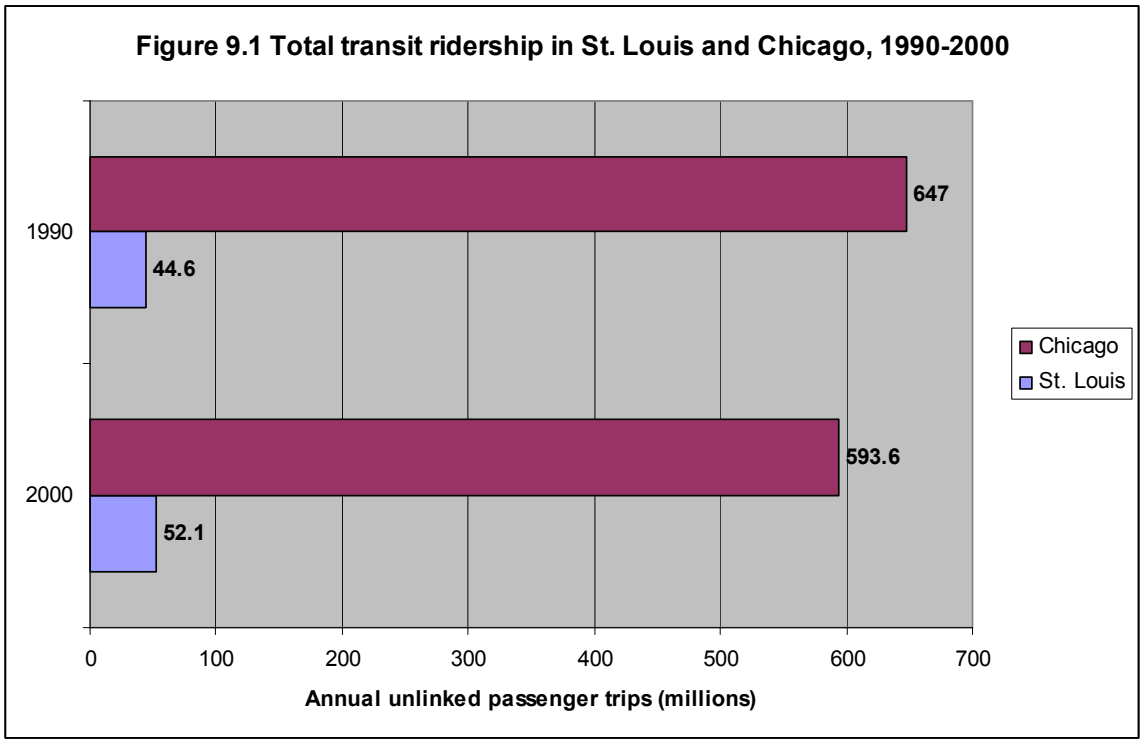
[8] Chicago Transit Authority, "Travel Characteristics of CTA Customers at O'Hare and Midway Airports," Technical Report MR01-13A, June 2001, pp. 9-10
Only 27.7% of riders at the Midway rail station are air travelers (because the station features a park-and-ride facility and a bus terminal, most riders are downtown commuters; some also are airport employees). Of those who are air travelers, most take CTA to/from their home or workplace in Chicagoland. Only 21% of those riding the Orange Line to the airport take CTA from a hotel or other non-home accommodation, and only 27.5% of those riding the Orange Line from the airport take CTA to a hotel or other non-home accommodation. (27.7%) * ((21% + 27.5%) / 2) = 6.7%, so approximately 7% of Orange Line riders at Midway are tourists.

fabric. These are the neighborhoods that attract younger adults without children, and people who prefer not to own cars.



In light of the historical differences between St. Louis and Chicago, some might argue that the two cities are not a fair comparison. Figure 1, above, offers perspective by showing the total levels of transit ridership in St. Louis and Chicago, in 1990 and 2000.[9] St. Louis achieved rapid growth, but off of a very small base. Chicago did not achieve ridership growth, but maintains total ridership that is higher by an order of magnitude, even in 2000. Though this figure shows total ridership (all modes and trip purposes), it is reasonable to say that CTA still carries far more non-work riders than MetroLink. Some, but not all, of this difference in magnitude is due to the fact that Chicago is a larger city. In 2000, the metropolitan population of Chicago was 9.2 million, compared to 2.6 million in St. Louis.[10] Thus Chicago had 65 annual unlinked passenger trips per capita in 2000, compared to 20 trips per capita in St. Louis. Clearly Chicago remains a much more transit-oriented metropolitan region than St. Louis.

[9] Data in Figure 9.1 are drawn from Chapter 3, Table 3.6
[10] See Chapter 3, Table 3.2

With so much more ridership in Chicago than in St. Louis, can it really be argued that St. Louis succeeded in the 1990's while Chicago did not? The answer is yes. Although CTA already provides effective transit service to some complex non-work travel markets, there is more that could be done. The most germane difference between the two case cities is that in St. Louis, but not in Chicago, proactive steps were taken to pursue new non-work ridership. Non-work travel markets have unique service needs. By addressing the unmet needs of those markets, CTA could build upon its base of existing non-work ridership.

The costs and benefits of pursuing non-work ridership

The fundamental story of St. Louis's success is not the age or size of its transit system, but that it has had the will to provide service to non-work travel markets. This raises a critical question: Why should a transit agency pursue non-work ridership? Indeed, why has St. Louis shown interest in pursuing non-work ridership, while Chicago has not?

Generation of farebox revenue is an obvious reason why a transit agency might want to increase ridership. Ideally, a transit agency would like to accommodate new ridership on existing underutilized services. That way, the agency could earn new revenue at no additional cost. Working in the agency's favor is the fact that non-work travel is not concentrated during the morning and evening rush hours. Spare capacity normally is available in the off-peak, and could accommodate non-work riders. By filling that capacity with non-work travelers, transit agencies could realize economies of scale.

A problem, however, is that non-work markets need services tailored to their unique needs, and meeting those needs almost certainly would entail some additional cost. Consider, for example, some of the recommendations discussed earlier in this chapter. Some ideas, such as routing buses through mall parking lots, might involve only a marginal extra cost. Extending the hours of bus service would be more costly. Building new rail stations to serve sports stadiums would be more costly still. Ideas such as unlimited-ride passes might come at no direct financial

cost to the agency, but would generate ridership without producing additional revenue. For any given proposal to improve non-work service, a transit agency would have to conduct a detailed analysis of the financial costs and benefits. Its seems clear, however, that in many strategies to build non-work ridership cannot be justified solely on the basis of generating farebox revenue.

Non-Work Travel Market	**Benefits of Transit Service**
Tourists	Pursue tourist-oriented economic development strategies
Large Events	Reduce congestion associated with large events Attract choice riders who would not otherwise use transit Pursue sports-oriented economic development strategies
Shopping	Provide access to shopping for transit-dependent riders
Younger adults without children, living in urban areas	Attract new residents to older central city neighborhoods Develop a population of lifetime transit users
People who prefer not to own cars	Create choices for people who prefer not to own cars

Table 9.1 Benefits of transit service to non-work travel markets[11]

A more enlightened (and financially sound) transit agency might seek to pursue non-work ridership in order to realize social, political, and economic benefits. Serving non-work travel markets can yield a variety of such benefits, as summarized in Table 9.1, above. Non-work transit ridership can be a "win-win-win" situation for the transit agency, transit riders, and the general public. The agency wins by broadening the political appeal for transit service. Service to large events attracts choice riders who would not otherwise use transit, and service to younger adults helps to cultivate a population of lifetime transit users (or at least a population that is aware of the benefits of transit even as it gets older). Transit riders win by gaining greater freedom of choice. Transit-dependent riders can choose to shop at a wider range and quality of stores, while more affluent riders can choose not to own cars if they so desire. Finally, the general public wins by gaining a more vibrant urban environment. Transit service helps to support economic development strategies based on sports and tourism, and can help to revitalize older urban residential neighborhoods. Transit also plays a more direct role in reducing congestion associated with large events, for the benefit of everyone attending such events, and for the benefit of everyone living or working nearby.

[11] Based on findings in Chapters 7 and 8

Assigning a monetary value to these benefits would be a challenging task, and is beyond the scope of this thesis. Suffice it to say, however, that some weighing of the social costs and benefits of non-work transit service would have to be made through the political process. In other words, for public money to be spent on non-work transit service, there must be a public consensus that the benefits of such service are worth attaining. This is especially true because so many crucial elements of successful non-work transit service are outside the transit agency's direct control – from the siting of stadiums, hotels, and tourist attractions to the myriad of neighborhood land use and transportation characteristics that enable people to live without cars by choice.

This brief discussion of the costs and benefits of non-work transit service helps to explain why St. Louis pursued non-work ridership in the 1990's while Chicago did not. In brief, St. Louis had public support for non-work transit service, and money to pay for it. Public and private actors coalesced around a shared desire to revitalize the city's flagging downtown. Tourism and events were promoted as economic development strategies, with MetroLink designed to play a supporting role. Federal funds were used to pay for the capital cost of MetroLink, and the cost of building stations at tourist and event destinations was only a portion of the total project cost.

In Chicago, there was no public consensus about the benefits of non-work transit service, and hence no money to pay for more of it. Transit continued to be widely recognized as an efficient means of commuting to the city's already-vibrant downtown business district. Outside of downtown, however, there was no public effort to create transit-oriented stadiums, shopping areas, or neighborhoods. Working within tight funding formulas, CTA made some new investments in the downtown-oriented rail system, but made broad service cuts to the crosstown bus system. Partly as a result, CTA gained market share for downtown work trips in the 1990's, but lost market share for all other trips.[12]

The lack of public support for non-work transit service in Chicago is striking in light of the fact that CTA already serves a large base of non-work riders. The problem is that non-work

[12] See Chapter 5, Table 5.10

transit riders tend not to be politically powerful. Tourists do not vote locally, or attend public meetings. Transit-dependent shoppers tend to be young, poor, female, and African-American – quite a different demographic from a typical policymaker. Younger adults in urban areas may not be politically well-connected, especially if they are a transitory population. People who prefer not to own cars are a disparate group from all walks of life, and do not appear to be an organized or vocal constituency.

Conclusion: The multiple objectives of public transportation

In conclusion, the basic lessons for transit agencies are clear and straightforward. To pursue non-work ridership growth, transit agencies must be proactive. They must continue to improve service to meet the unique needs of non-work travel markets. By doing so, transit agencies can realize valuable benefits for itself, for its riders, and for its broader public community. Service to non-work markets is not necessarily inexpensive, however, and political support for such service may not be broad enough to maintain a high level of investment.

In light of the fiscal constraints on transit in America, transit agencies might pursue two strategies for improving service to non-work markets. First, large capital projects should be designed to meet multiple objectives – that is, to serve both work and non-work travel. This was done in St. Louis, and is at the heart of that city's success in growing non-work ridership. A second strategy, in lieu of major capital projects, is for a transit agency to make incremental improvements to the existing transit network. An agency can pursue a hierarchy of improvements, beginning with the least costly, under the assumption that early success would gradually lead to increased public support for larger changes. This strategy could have been pursued in Chicago in the 1990's, but unfortunately was not.

To evaluate a transit agency's ability to serve non-work trips, there is a need for new measures of success. MetroLink and CTA each serve very different non-work travel markets, yielding very different public benefits, but those differences are not readily apparent from

ridership data. It is time to stop judging transit solely on the basis of unlinked trips, or mode share for the journey to work, or farebox recovery ratios. It is time for a more explicit public discussion about the multiple objectives of transit service. Transit agencies can help to initiate such a discussion by adopting service standards that reflect the goals of non-work transit service. For example, there might be standards for accessibility to shopping centers in low-income areas. Of course, elevating public debate about transit is no easy task, considering that most of the American public now has very little firsthand experience with transit.

Opportunities for future research

This thesis has been broad in scope, and exploratory in approach. There is ample opportunity for future research into each of the individual non-work markets. In fact, each market could easily be the subject of a thesis in its own right. Several big questions about the non-work markets have been raised in this thesis, but not answered satisfactorily:

- Why do tourists ride transit? Is simplicity of service the most important factor, as is hypothesized in the St. Louis case? What are tourists' modal splits for travel to different types of destinations?
- To what extent does transit help to promote tourist and sports-oriented economic development? Are tourism and sports effective as urban development strategies?
- What are the transit needs of neighborhood shopping districts, including those catering to immigrant communities?
- What are the travel patterns, in terms of origins and destinations, of younger adults without children, living in urban areas?
- Why do younger adults seem to stop riding transit as they get older and have children? Can transit agencies do anything to retain these riders throughout their adult lives?
- Can anything be done to provide transit service to "soccer moms"? They are frequent non-work tripmakers by automobile, but do not appear to be a large market for transit.
- In which neighborhoods do people choose to live without cars – in Chicago, and in other cities? What are the land use and transportation characteristics of these neighborhoods?

- Do people prefer not to own cars, and seek out neighborhoods where that lifestyle is possible? Alternatively, do people move to those neighborhoods for other reasons, and then discover that auto ownership is not necessary there?

- More generally, to what extent does non-work travel occur in off-peak hours? This question has important ramifications for the cost of serving non-work markets.

- To what extent do concerns about public safety affect non-work ridership? This issue has not been addressed at all in this thesis, but is salient because transit service in off-peak periods may be perceived as especially unsafe.

These questions, and many more, are ripe for future research. Note that while the body of academic literature on non-work transit ridership is quite small, in some cases there may be existing papers that address some of these issues. This thesis has not evaluated academic works about specific non-work travel markets, except for works focused on St. Louis and Chicago.

A final consideration for future researchers is the vexing problem of data. This thesis has analyzed a number of travel surveys. To varying degrees, all of these surveys suffer from several endemic problems: small sample sizes, low response rates, biases, questions that confuse or mislead respondents, and inconsistent time series data. Additional problems arise when using these surveys to analyze non-work travel. There is no data on seasonal and weekend data, because surveys are conducted on weekdays in the fall or spring. It is difficult to compare different surveys, because there is no consistent set of trip purpose definitions, and often sample sizes are far too small within individual trip purpose classifications. A new large-scale survey of non-work transit trips would be an invaluable first step for future research.

Applications to Tren Urbano

The lessons of this thesis can be applied to Tren Urbano, the new rapid transit line in San Juan, Puerto Rico. Recommendations are offered for each of the five non-work travel markets discussed in this thesis. Knowledge of Tren Urbano and the geography of San Juan is assumed. These recommendations are based on the earlier findings of this thesis, as well as on visits to San Juan in January and December, 2003. There is no attempt to perform an analytical analysis of

current transit riding behavior in San Juan. Data for such an analysis is not available and, furthermore, Tren Urbano is expected to alter ridership patterns dramatically.

Tourists

The initial segment of Tren Urbano, which is soon to open, is unlikely to attract significant tourist ridership. It does not serve the airport or the great majority of San Juan's hotels and tourist attractions. Extensions of Tren Urbano to the airport and Old San Juan – with intermediate stops in Isla Verde and Condado – would serve tourists, but at a very high capital cost. These extensions should not be pursued for the sake of serving tourists alone, unless there is compelling evidence that transportation problems are retarding further hotel development.

Improvements to the AMA bus system would be more cost-effective and more rapidly implemented. Presently, the A5 and B21 routes connect most beachfront hotels with Old San Juan. The B40 and C45 buses serve the airport. An easy first step would be to improve the signage along these routes. Bus stops should be clearly marked in English with signs similar to: "A5 bus to Old San Juan." Signs should also indicate the headway, hours of operation, and fare.

A more ambitious step would be to design a single bus route that runs between Old San Juan and the Airport, via the Condado and Isla Verde beachfront hotel districts. Given that these areas lie along a linear east-west axis, serving them all with a single bus route would not be challenging. Service should be frequent enough, and the hours of operation should be long enough, that it would not be necessary to consult a schedule. To support such good headways, this route could replace portions of the existing A5, B21, B40, and C45 routes. Although this new route would not be directly related to Tren Urbano, it could be implemented as part of the overall restructuring of bus routes to take place prior to the opening of Tren Urbano.

Large events

Tren Urbano will serve two major event venues: the Coliseum of Puerto Rico, near the Hato Rey station, and the sports complex in Bayamón, near the Deportivo station. Just as in St. Louis, events can be an easy source of ridership for a new transit system. Tren Urbano service to events would help to mitigate congestion, and would help to introduce San Juan residents to the convenience of riding transit. The latter benefit is especially important, since much of the San Juan public remains skeptical about whether Tren Urbano will succeed at attracting new riders.

Tren Urbano should have the capacity to handle the large crowds that will be generated before and after each stadium event, provided that trains are scheduled with sufficient headways. In the case of some evening events, Tren Urbano service may need to be extended beyond its normal hours of operation. So that residents from across the metropolitan area will have access to Tren Urbano for special event service, the hours of operation of some feeder buses may need to be extended as well. The benefits of providing service to large events should justify these marginal additional operating costs.

In addition to events held at the two aforementioned stadiums, numerous civic festivals and nighttime events are held in Old San Juan throughout the year. Congestion associated with these events can be severe, and would create a powerful incentive for riding transit to these events, so long as good transit service is provided. Although Tren Urbano will not serve Old San Juan directly, it could connect with express bus service to Old San Juan from the Sagrado Corazón station, or with Acua-Expreso high-speed ferry service from the Hato Rey station. Buses would need to be routed to avoid the worst congestion, and should take advantage of the existing contra-flow bus lanes and dedicated busway for access to Old San Juan. Most importantly, both Tren Urbano and the connecting bus or ferry services need to operate late enough during festival nights so that people can rely on transit to get home.

Shopping

The transit-dependent population of San Juan is substantial. Out of 660,720 occupied housing units in the San Juan-Bayamón primary metropolitan statistical area, fully 28%, or 181,728 housing units, do not have a vehicle available.[13] These households currently rely on AMA buses and públicos for everyday access to shopping. Could Tren Urbano provide additional access to shopping that would be valuable the transit-dependent population?

Randy Knapick, in an earlier MIT thesis, discusses retail industry trends in San Juan and their implications for Tren Urbano.[14] As in the mainland US, regional malls and freestanding chain stores increasingly dominate the San Juan retail industry. These malls and chain stores have helped to undermine traditional neighborhood shopping districts such as Río Piedras, which will have Tren Urbano service. Knapick offers suggestions for how new chain retail might be developed around Tren Urbano stations, but he believes that such development will not be immediately forthcoming. In the meantime, the transit-dependent population would be well-served by access to Plaza las Américas. Not only is this the largest shopping mall in the entire Carribbean, it is also adjacent to "big box" stores such as KMart.[15] The mall is approximately one mile from the Roosevelt station on Tren Urbano, but the walking environment in between is not very amenable to pedestrians, especially shoppers carrying bags.

There is a real need for bus service, to connect Plaza las Américas with Tren Urbano. Unlike existing AMA and Metrobus service, buses should loop around the mall, and enter the parking lots of the mall and adjacent superstores. The service should operate during all hours in which stores are open. Finally, because this service will cater to transit-dependent riders, it is important that the fare be affordable (or ideally, free). The $1.50 proposed fare on Tren Urbano

[13] United States Census Bureau, Census 2000 Summary File 3, Table H44. Tenure by Vehicles Available
[14] Randy J. Knapick, "The Business and Spatial Evolution of Retailing: Implications for Tren Urbano," Thesis (M.S.T.), Massachusetts Institute of Technology, Dept. of Civil and Environmental Engineering, 2000
[15] Knapick, pp. 52-3

will be six times the current local bus fare on AMA. If shoppers are asked to pay another steep fare on the connecting bus to Plaza las Américas, many will avoid making the trip.

There is similarly a need for a shuttle bus to loop around the Bayamón area. Buses should connect Tren Urbano with the area's several malls: Santa Rosa, Plaza del Sol, and El Canton. The same principles recommended for the Plaza las Américas bus service should apply.

Finally, it is important to note that the transit-dependent population of San Juan already relies on existing bus service for access to shopping – especially access to local neighborhood shopping districts. Tren Urbano access to malls must not come at the expense of existing service. A matter of some concern is that in the zeal to reroute residential-area buses to feed Tren Urbano, existing service to local shopping areas might be compromised. Some level of service to these shopping areas must be maintained even after Tren Urbano opens. At least during midday periods, if not throughout the day, the AMA bus fleet should be sufficient for some service to be provided to local shopping areas in addition to commuter-oriented Tren Urbano feeder service.

Younger adults without children, living in urban areas

Urban neighborhoods that are rich in nightlife, with appeal for younger adults, include Condado, Miramar, and Santurce. The initial phase of Tren Urbano will not serve any of these areas, except for the Sagrado Corazón at the southernmost edge of Santurce. Thus, at present time there is limited potential for attracting younger adults to Tren Urbano for non-work travel. In the future, however, decisions will be made about how best to extend Tren Urbano to serve additional areas. The likely candidates for the next phase include the proposed extension into the heart of Santurce, or the proposed extension to the suburb of Carolina. These projects meet very different objectives. The Carolina extension would run along a highway in an auto-dominated area. It might attract work commuters (via park-and-ride lots), but it would not be expected to have much of a favorable impact on the urban fabric. The Santurce extension, however, would increase the attractiveness of centrally-located urban neighborhoods. By attracting more younger

adults to Santurce, an extension of Tren Urbano would help to revitalize those neighborhoods. In deciding between the Carolina and Santurce extensions, there must be a public discussion about the goals of the Tren Urbano project. It is the position of this thesis that serving younger adults could yield benefits worthy of the significant expense of building new rail..

In the meantime, the initial segment of Tren Urbano does serve one destination of interest to younger adults – the University of Puerto Rico at Río Piedras. A good way to attract students to Tren Urbano would be to make available a discounted unlimited-ride transit pass to university students. This could be similar to the successful U-Pass program in Chicago, as well as similar programs in many other US cities. There are current proposals for reduced student fares on Tren Urbano, but unlimited-ride passes would do more to encourage frequent student ridership – both for commuting to school and for other trip purposes.

People who prefer not to own cars

There is no evidence of a large population in San Juan that currently chooses not to own cars. While it would be a laudable goal to make such a lifestyle more viable, a single rail line such as Tren Urbano is unlikely to be sufficient. Serving this market might be embraced as a long-term vision, but the other markets described in this thesis are more realistic targets for near-term ridership growth.

Applications to the Chicago Transit Authority

The Chicago Transit Authority has been studied extensively in this thesis, but it can also benefit from the lessons of this thesis. As was done for Tren Urbano, recommendations are offered for each of the five non-work travel markets discussed in this thesis. Because CTA has a sophisticated in-house market research department, recommendations are offered for targeted future research as well as for service improvements. Knowledge of current planning issues facing the CTA is assumed.

Tourists

As noted earlier in this chapter, CTA service to many of Chicago's top tourist attractions is confusing and inconsistent. A plethora of bus routes serve the Navy Pier, the Museum Campus, and the Museum of Science and Industry, to name a few of the city's most popular attractions. These buses travel in a variety of directions; they have widely divergent hours of operation; and they have uninformative route numbers. Many tourists find this service baffling, especially those who rarely use transit at home. It is no surprise that many tourists eschew CTA, preferring to use a system of color-coded faux trolleys operated by the City of Chicago.

CTA does make some attempt to woo tourists, particularly through its signage and advertising at the airports, and through its sales of visitor passes. Incremental improvements to these activities could help to increase tourist ridership, albeit modestly. For example, the vending machines that dispense visitor passes at the airports currently require exact change. Either these machines should be redesigned, or change machines should be provided.

The problem remains, however, that the sheer scope and complexity of the CTA network makes transit a daunting experience for tourists. There may always be a need for simplified, dedicated tourist services such as the color-coded trolley system that is now in place. CTA might find it attractive to operate these services itself, so as to count tourist riders as CTA riders. History shows, however, that dedicated tourist services are not necessarily a good fit for CTA. In the 1980's, CTA operated a service aimed at sightseers, known as the "Culture Bus." Though the service was popular with customers, ridership did not meet the agency's performance standards because there was not enough passenger turnover.[16] Perhaps dedicated tourist services are best left in the hands of the City of Chicago, or the private sector. CTA would do well to focus its resources on the other non-work travel markets, in which the agency already has a strong base of existing ridership to build upon.

[16] Peter Foote (Chicago Transit Authority), personal communication, Summer 2003

Large Events

To the agency's credit, CTA does make a concerted effort to serve large annual civic events, particularly the Fourth of July fireworks celebration. There is a critical need, however, for improved service to sporting events. CTA is currently striving to build political support for itself in suburban areas. Sporting events have the potential to attract suburbanites who would not otherwise ride CTA, thus broadening support for the transit agency.

In the short run, there is an opportunity to attract new riders to the existing rail service to Wrigley Field and U.S. Cellular Field. The Red Line already carries large crowds of city residents to and from these ballparks, but the service is not readily accessible to suburbanites. There is a need for greater park-and-ride access.

For Cubs games at Wrigley Field, there is especially a need for access from the northern suburbs. The hours of operation of the Yellow Line should be extended, to enable patrons to park-and-ride at Skokie. The Yellow Line should operate on weekend days on which games are held, and its hours of operation should be extended further into the evening for weekday night games. Fans should be guaranteed service after every game, even when games go into extra innings. This kind of guarantee should be widely advertised, since it deviates from customers' expectations of Yellow Line service.

For White Sox games at U.S. Cellular Field, there is especially a need for access from the southern suburbs. Here, some new investment would be required. CTA should consider building a sizeable park-and-ride facility at 95th/Dan Ryan. Such a facility could be built in a relatively short timeframe, and need not preclude an eventual extension of the Red Line further south to 130th Street. The long-term benefit of increased suburban political support for CTA would likely outweigh the one-time cost of building a parking garage.

In the long term, the proposed Circle Line would greatly improve suburban access to CTA for travel to sporting events. Suburbanites would be able to transfer from Metra to the Circle Line, and connect to the Red Line for access to Wrigley Field or U.S. Cellular Field. The

Circle Line also would feature a station at the United Center, solving the problem of access to that stadium. Overall, the Circle Line is a good example of a major project that meets multiple objectives – serving both work and non-work trips – and CTA is smart to pursue it.

The one remaining major stadium in Chicago is Soldier Field, and service improvements there might be more difficult to realize. A large capital investment could not be justified, because as a football stadium, Soldier Field is home to only a small number of sports games each year. CTA should consider ways to improve its existing bus service to Soldier Field, ideally with the aim of keeping buses out of congestion. With the cooperation of the City of Chicago, there may be an opportunity to create exclusive bus lanes or give buses signal priority.

Shopping

Thanks to extensive market research efforts that CTA and the City of Chicago, shoppers' transit service needs are well-understood.[17] Contrary to popular belief, downtown Chicago is not the epicenter of retail activity for CTA riders. Transit-dependent riders need access to modern regional malls and strip malls, particularly those featuring chain discount stores and supermarkets. Many transit-dependent riders totally lack access to decent shopping opportunities in their own neighborhoods, so they rely on CTA service to reach outlying auto-oriented shopping areas. Unfortunately, existing CTA bus service is a distinctly second-class alternative to the automobile for access to many of these shopping areas. Service improvements would help to stabilize bus ridership, by bolstering existing riders' quality of life and satisfaction with CTA. Improvements could even lead to increased ridership, by encouraging riders to shop more frequently.

CTA should begin with a program of modest enhancements to conventional bus service. At selected strip malls, buses should pull into the parking lots of the malls, rather than just stopping at the nearest street corner. The recent change to route 95E at Stony Island Plaza is a good prototype, but this kind of service change should be implemented at all times when stores

[17] Refer to Chapter 8 for an extensive review of existing research on this market

are open for business, not just in the midday period. Indeed, the hours of bus service should be extended to match the hours in which stores are open.

CTA needs to develop a methodology for determining which strip malls should receive these bus service enhancements. For a given mall, consideration should be given to: existing levels of bus ridership, accessibility from low-income communities, and the mix of retail stores. Of course, another crucial factor will be the cooperation of mall management. In this regard, CTA needs to take a proactive role in pressing for bus service enhancements at shopping areas. To overcome resistance from mall operators, CTA needs to make the case that transit riders are good customers – they shop frequently and spend as much money as those who drive – and that mall employees also rely on transit to get to work.

To complement the aforementioned improvements to conventional bus service, a more ambitious service change would be to create a series of "shoppers' shuttles," to loop around the vicinity of regional malls. "Big box" stores and strip development is clustered around many of the regional malls in the Chicago area. Although many of the regional malls themselves already have good CTA bus service, there is little or no pedestrian access to the surrounding developments. Hence there is a need for shuttle bus service to connect regional malls with nearby retail opportunities. Of course, shuttles should pull into store parking lots, and should operate whenever stores are open for business.

A shuttle based around the Ford City Mall would be the ideal prototype. This mall already attracts a large number of transit riders from the impoverished areas of Chicago's South Side. The surrounding developments include Wal-Mart, which should be an especially attractive destination for transit-dependent shoppers. The shuttle would connect with CTA routes 54B and 79, which already terminate at the Ford City Mall. Sunday hours of service on route 54B may need to be extended, to allow shoppers to connect with the Orange Line and other buses at Midway Airport. Alternatively, the shoppers' shuttle could be extended to Midway at times when

route 54B does not operate. In the long term, the proposed extension of the Orange Line from Midway to Ford City would make this shoppers' shuttle even more valuable.

Younger adults without children, living in urban areas

Not much is known about younger adults without children, living in urban areas, but all evidence suggests that this is a very strong market for CTA. These customers should be the subject of intensive market research efforts, building upon the 2002 Central Area Transit Needs Assessment Survey. CTA lacks data on riders' origins and destinations, but an origin-destination study would aid greatly in understanding the travel needs of this market. A narrowly-targeted origin-destination study should be conducted, focusing on the residents of selected North Side neighborhoods with high concentrations of younger adults without children. A similar study might be conducted in transitional urban areas, such as the Near West Side and Wicker Park, in which the population of younger adults is increasing. In contrast to many prior CTA market research efforts, sufficient resources must be allotted not only to produce these studies, but also conduct a full analysis of the results, with the aim of translating the research into actionable service improvements.

There would also be value to a focus group study of North Side and transitional urban area residents. Three sub-populations should be brought into focus groups: single adults, couples without children, and couples with children. The goal should be to learn why younger adults stop using CTA after they get married and have children, and whether there are any steps that CTA could take to reverse this trend. CTA's ultimate goal should be to create a population of lifetime transit users, who will remain politically supportive of CTA even as they get older.

Even in the absence of this proposed market research, there are some specific steps that CTA can begin to take to strengthen ridership in this market. Fare policies should be designed to promote the use of unlimited-ride passes, by lowering pass prices relative to the base fare. Passes would help to influence younger adults' spur-of-the-moment decisions about whether to ride

transit. During the recent fare increase, the right decision was made to hold pass prices constant, but CTA still has high pass prices compared to other cities.

Another way to influence younger adults' spur-of-the-moment decisions would be to disseminate more information about bus arrivals. Full schedules should be posted at bus stops. Ideally, this should be done system-wide, but North Side neighborhoods would be a good place to start. A more ambitious step would be to make real-time information available about bus arrivals. As a prototype project, real-time information could be made available for selected high-ridership routes serving the North Side near Lake Michigan. Although it would be expensive to outfit buses with necessary technology, CTA could save some capital costs by making information available to riders via their cellular phones, rather than via electronic displays at bus stops. Younger adults tend to be technologically savvy, so cell phones should be an effective vehicle for conveying information.

People who prefer not to own cars

People who prefer not to own cars are a complex market. Improving service to this market is necessarily challenging, but doing so is critical for maintaining Chicago as a transit-oriented city. As a first step, more research is needed to identify neighborhoods with high concentrations of people without cars by choice. Further analysis of the Customer Satisfaction Survey could help to reveal such neighborhoods. Another approach would be a thorough review of academic literature about the factors that influence auto ownership.

Once these neighborhoods are identified, CTA should determine if it owns any local real estate that could be put to better use. For example, vacant land or parking lots might be better developed as local retail. CTA should also participate in joint ventures to increase the diversity of transportation options in these neighborhoods. For example, CTA could work with a car-sharing company such as Zipcar. CTA could make parking spaces available, and customers could be offered a combined package of CTA monthly passes and monthly car membership. CTA

could also increase the variety of transportation options simply by creating taxi stands at CTA rail stations.

Ultimately, however, CTA cannot act alone to strengthen this market. Rather, it must be an active participant in the urban planning and development process. In the ongoing Chicago rezoning process, CTA needs to be a vocal participant in the debate. Ideally, zoning should limit the supply of residential parking, and promote the development of local retail amenities, at least in neighborhoods that already attract significant numbers of people who prefer not to own cars. CTA also needs to be less timid about its role in the urban development approval process, and should demonstrate a willingness to oppose inappropriate developments in neighborhoods where people live without cars by choice.

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