

Counting Transit So That Transit Counts

Prepared by

TransManagement

for the

American Public Transportation Association

May, 2004

Acknowledgements

This report was prepared by TransManagement, Inc., a Washington DC transportation consulting firm. Principal authors are Sarah Campbell and Dennis Leach. John Neff, APTA senior policy analyst, provided invaluable technical information and comments on the draft report that helped clarify key points. The authors are indebted also to William Ankner, Transportation Solutions; Tom Downs, Eno Foundation; and Susan Perry, consultant, who were willing to take the time to review sections of the draft and whose insightful comments were extremely helpful in finalizing the report. Interviews with staff of the Census Bureau, Bureau of Transportation Statistics, Federal Highway Administration, and Federal Transit Administration helped frame the report and each were extremely responsive and helpful in pointing out sources and other relevant material.

Counting Transit So that Transit Counts

Contents

1. Introduction
2. Executive Summary
3. Counting with National Surveys
 - Census
 - NPTS/NHTS
 - Other
4. Looking to Other Surveys:
The experience in three regions
5. Making Transit Count
6. Appendix
 - Three Regions' Experience
 - Denver, Colorado
 - Los Angeles, California
 - Washington, D.C.
 - Metropolitan Transportation Surveys
 - Bibliography

Counting Transit So That Transit Counts

Section 1: Introduction

High quality public transportation depends on sound information for planners to link homes with jobs, services, recreation and all daily needs. Without a good understanding of the demography at a small area level, defining and refining transit service is a gamble. Since 1960, transportation planners have come to depend on data on commuting from the long-form survey, which the US Bureau of the Census (Census) conducts as part of the population census every ten years. Other federal surveys help fill in the details that can't be realized with such a limited focus survey. But how well do these data sources serve the current needs of the transit industry in terms of national policy making or of metropolitan planning required for federal funding?

The results of the Census 2000 underscore questions about the adequacy of planning data and the need for improvements. At the time transit data were released, transit operators in many of the nation's large and medium sized metropolitan areas were coping with capacity problems due to increased numbers of riders. The census figures, however, showed that the share of commuters using transit had dropped to below five percent for the first time, nationally and had increased in only a hand full of metropolitan areas. The census results were interpreted by some transportation analysts as a vote of no-confidence for transit as a congestion solution. To those in the industry trying to increase capacity to meet demand, the numbers didn't make sense.

To add to the confusion, other surveys conducted by Census are more consistent with the industry's experience. Information from a supplementary survey to the decennial census released in August 2001, Census 2000 Supplementary Survey (C2SS)¹, shows an increase of 8.3 percent of people commuting via public transportation during the 1990's. The survey, involving 700,000 households nationwide, is reasonably consistent with annual data reported by American Public Transportation Association (APTA), which identifies a 6.9 percent increase in transit ridership over the same period.² Two subsequent surveys, the Census 2001 Supplementary Survey (SS01) and Census 2002 American Community Survey (ACS02), also show transit commuting increases similar to industry data.

Evaluations by Census show changes in procedures between Census 2000 and prior long-form surveys. Measures of accuracy for responses to individual long-form questions, also indicate areas of difference between the 1990 and 2000 censuses. These differences may help explain the inconsistency between the industry experience and the 2000 long-form data on transit commuting.

So what do the numbers mean? What are we missing? How might we avoid data gaps and conflicts in the future? And, what are possible alternatives to the present situation. The Executive Summary highlights key issues followed by more detailed explanations in sections 3-5 and the Appendix.

¹ Census 2000 Supplementary Survey, known as C2SS, was a test for a new, continuous survey, which asks generally the same questions as the long-form, and is known as the American Community Survey. The ACS is replacing the long form. Revised data were released in November 2001, which increased the percentage of transit commuters to 9.1 percent.

² From a presentation by John Neff, APTA Senior Policy Researcher, at the annual meeting of the Transportation Research Board of the National Academies, 2003.

The Study Methodology

The release of commuting data from the 2000 census signaled a slightly declining market share for transit. This news caught the transit industry by surprise as nationwide transit ridership was up at least six percent. The differences between the industry experience and the long-form results were clear, but the possible reasons were less so. Given the importance of the issue and the level of concern, APTA conducted its own review of Census 2000 issues and then contracted for a closer examination of Census results and other related data sources. This report is the result of those efforts. The study has three related goals: to gauge how well transit use is captured by recent national household surveys; to better understand when and how to rely on these sources and possibly other sources of data; and to understand possible steps to take to improve how transit is counted in the future.

As part of this study, we considered sources of national data on transportation other than the long-form for their value in characterizing transit's use. Here we were interested not only in comparing commute trips, but also the availability of data on other transit trip purposes beyond the commute, such as school, shopping, medical, and social trips. These other sources help benchmark the long-form data and may add to our understanding of the transit trip purpose and whether, on average, commuting is declining relative to other purposes. For example, more detailed information is available from the National Household Transportation Survey (NHTS) conducted periodically by the US Department of Transportation (US DOT). An examination of the NHTS is especially important as this survey, done about every seven years since 1969, attempts to capture all trip purposes and has been promoted by US DOT for a number of analytical purposes. US DOT's Omnibus survey, done now six times yearly, provides another set of data. The Department of Housing and Urban Development's American Housing Survey, done in cooperation with Census, also includes information on commute patterns, but like the long-form, it is a very limited set of questions.

We also looked at state and local surveys and data sources used by the transportation industry in three major metropolitan areas to see how they compared with the national data. These comparisons also included other federal labor surveys from the Bureau of Economic Analysis and the Bureau of Labor Statistics. The regions reviewed are Denver, Los Angeles, and Washington, DC.

Section 2: Executive Summary

The Issue

Transit system managers had every reason to believe that 2002 would be another big year for public transportation. For six years, ridership nationwide ticked steadily upward, even through 2001, with a sluggish economy and the uncertain effects of the terrorist attacks of September 11, 2001.

Large gains in the number of transit riders could be seen in small communities as well as the traditional transit centers of New York, Chicago and Washington. Many of the booming metropolitan areas of the south and west, which had not previously embraced transit, were enjoying the benefits of long-planned investments in services that began operating in the 1990s. The managers of the Dallas Area Rapid Transit system (DART) saw ridership climb almost 40 percent between 1990 and 2000. In fact, despite a recession, over 9.5 billion trips were taken on transit in 2001, the highest level since 1960. Public investments in new equipment, new rail services and better information about services seemed to be paying off.

The headlines were rewarding for transit officials in many metropolitan areas. Responding to an American Public Transportation Association (APTA) release of the ridership levels in 2001, the Washington Post, Washington, D.C. had this to say in April 2002:

Transit Ridership Jumps Again in US, Region; Metro, VRE, Buses Show Most Growth.

“Transit ridership is experiencing the longest sustained growth in the nation’s history, and new riders are boarding the Washington region’s subway, commuter trains and buses at a rate three times the national average, according to new figures released yesterday.”

A news article on April 18, 2002

Masses in Transit

“On the rails and in the buses, riders are coming aboard in Metrothrongs these days – part of a region-wide transit boom that doesn’t seem to quit.”

An editorial on April 25, 2002

Moreover, early data from the US Bureau of the Census (Census) seemed to agree with this assessment. Information from a supplementary survey to the decennial census released in August 2001³ showed an increase of 8.3 percent of people commuting via public transportation during the 1990’s. The survey, involving 700,000 households nationwide, was reasonably consistent with annual data reported by APTA, which identified a 6.9 percent increase in transit ridership over the same period.⁴

Then a new set of national data appeared.

The results of the long-form survey of the decennial census in 2000 (also known as Demographic Profile data) were released by Census in late spring 2002. And, suddenly, the news was different in many of the communities that were celebrating transit's renaissance. The long-form survey is Census’ official source of information about household commuting patterns and, while also a

³ Census 2000 Supplementary Survey, known as C2SS, was a test for a new, continuous survey, which asks generally the same questions as the long-form, and is known as the American Community Survey. The ACS is replacing the long form.

⁴ From a presentation by John Neff, APTA Senior Policy Researcher, at the annual meeting of the Transportation Research Board of the National Academies, 2003.

sample, the sample size is about 19 million, or 1 in 6 households⁵. The long-form showed a modest decline in the number of people commuting via transit (1,900) between the 1990 and 2000 census. But with the growth in jobs, transit's commute market share dipped below five percent nationally for the first time.

Now, many of the systems, whose ridership had been growing, had to defend themselves from the news that the number of people using public transit to get to work had declined in their region, rather than increased. Washington, DC, Dallas, Atlanta, Miami, Boston were forced to explain programs that a few weeks earlier were being praised.

In Washington, DC the headlines now read:

Metro Says Census Missed Some Riders

"In the back offices of the region's subway and bus systems and commuter railroads, where men and women calculate under fluorescent light, the most recent US census figures make little sense.

The census reported a drop from 1990 to 2000 in the number of people in the region who ride public transportation to work.

'It runs counter to everything we are seeing,' said Richard Stevens, Metro's director of business planning and development."

- A news article in the Washington Post, June 17, 2002

In Los Angeles, where over \$8 billion was invested in subway, light rail and commuter rail between the mid-1980's and 2000, the region's metropolitan planning organization (Southern California Association of Governments, or SCAG) also took issue with a modest 0.1 percent gain in ridership over the decade estimated by the long-form. However, this small gain in transit commuters occurred against an estimated overall decline in commuters by all other modes in Los Angeles County, where the census showed that the number of County residents commuting to work declined during the 1990s by over 500,000.

"SCAG questions whether the census undercounted public transportation commuters, reminding that the census was widely criticized for an undercount in 1990.

'The transit ridership isn't nearly as bleak as the census might make it seem,' said SCAG's Lustgarten (spokesman for the agency), pointing to a 13 percent rise in trips on all forms of regional public transportation over the decade."

- Article from Knight-Ridder/Tribune Business News, May 17, 2002

In Dallas, the chairman of the Dallas Area Rapid Transit (DART) in a July 21, 2002 article in the Dallas Business Journal stated that:

"The excitement is understandable; DART is a big hit. Those of us who live here see firsthand how DART is making life better. So it was puzzling to read the new census data claiming that transit use had actually declined over the past 10 years."

⁵ The long-form has provided information on household commuting patterns since 1960 among other demographic detail not included in the short form, which most households fill out; it has the same questions as the short-form but then adds questions on income, housing, commuting, education, employment status, etc.

Not all of the news was negative. The long-form showed a dozen of the larger metro regions with gains in transit commuters. The census numbers and the industry's data were in agreement in some areas such as Palm Beach and Northern Virginia, but the census numbers were much lower than would be expected, even when still a gain, in most regions including San Diego and Los Angeles.

This confused picture led to a variety of explanations. Transit critics leapt at the new census findings to skewer transit and recent investments in rail systems in particular. Wendell Cox, Senior Fellow at the Texas Public Policy Foundation, and Ronald Utt, a Senior Research Fellow at the Heritage Foundation, frequent critics of transit, described the declining market share of transit as “a public policy failure of staggering dimensions” and called on Washington to re-examine the federal role in transit⁶. Others, such as Alan Pisarski, long-time consultant on transportation data, believes the census data reflect the reality that the share of transit boardings for work has been declining over time relative to other trip purposes⁷.

Both critics and transit operators agreed that the growing suburb to suburb commutes are harder for transit to serve. But industry leaders pointed to the full buses and trains and, as a whole, were skeptical of the Census 2000 results, as were metropolitan planners in many of the regions where the numbers did not appear to add up.

As the industry spokesman, APTA responded with these points:

- Ridership increased over 22 percent between 1996 and 2001, which reversed a decline earlier in the decade;
- Census counts only commute trips, while transit serves many needs;
- Industry data shows that commute trips make up 54 percent of trips;
- Transit serves those who have no car or who can not or do not drive;
- In addition to APTA data showing substantial gains, the Federal Transit Administration data document the overall growth trend for transit from 1996.

In addition to the bad PR, transit interests had to worry about what lower census numbers might mean for future plans. Census data is heavily relied on for transportation plans and for studies required for federal funding. In explaining the importance of the transportation information from Census 2000, the Census identifies⁸ four federal uses and six community impacts of the data, including:

- Needed to plan highway improvements, develop public transportation services, design programs to ease traffic problems, conserve energy, and reduce pollution (federal use)
- Forms the database used by state departments of transportation and the more than 350 metropolitan planning organizations responsible for comprehensive transportation planning activities required by the Intermodal Surface Transportation Efficiency Act of 1991 (community impact)

⁶ Ronald Utt and Wendell Cox, *Census Shows Commuters are Rejecting Transit*, Executive Memorandum #832, Heritage Foundation, September 5, 2002.

⁷ Alan Pisarski, *Some Thoughts on the Census – Transit Statistical Matchup*, Eno Transportation Foundation, 57.3, p. 12.

⁸ *United States Census 2000: “D. Transportation,”* Available at: <http://www.census.gov/dmd/www.pdf/05d_tr.pdf>

The Study

The differences between the industry experience and the long-form results are clear, but the possible reasons are less so. Given the importance of the issue and the level of concern, APTA conducted its own review of Census 2000 issues and then contracted for a closer examination of Census results and other related data sources. This report is the result of those efforts. The study has three related goals: to gauge how well transit use is captured by recent national household surveys; to better understand when and how to rely on these sources and possibly other sources of data; and to understand possible steps to take to improve how transit is counted in the future.

As part of this study, we considered sources of national data on transportation other than the long-form for their value in characterizing transit's use. Here we were interested not only in comparing commute trips, but also the availability of data on other transit trip purposes beyond the commute, such as school, shopping, medical, and social trips. These other sources help benchmark the long-form data and add to our understanding of the transit trip purpose and whether, on average, commuting is declining relative to other purposes. For example, more detailed information is available from the National Household Transportation Survey (NHTS) conducted periodically by the US Department of Transportation (US DOT).

We also looked at state and local surveys and data sources used by the transportation industry in three major metropolitan areas to see how they compared with the national data. These comparisons also included other federal labor surveys from the Bureau of Economic Analysis and the Bureau of Labor Statistics. The regions reviewed are Denver, Los Angeles, and Washington, DC.

Why the Differences?

In fact, there are a number of good reasons why the long-form survey might not track with industry ridership data. To start, ridership and census data are clearly two very different types of information, with different purposes, so that the actual numbers should never be close. However, there are certain relationships between the numbers that also mean they should not be going in opposite directions. Here are the key points:

- Census JTW measures only commute trips, which APTA analysis shows have traditionally, and continue to, account for over half of transit trips;
- Census JTW measures only the usual mode used for the longest portion of the trip as shown in the accompanying box. Thus leaving out multi-mode trips or frequent, but not daily use, of another mode;
- Industry counts boardings (unlinked trips), which on average are 1.3 per individual trip (linked trips), so boardings will always be greater than trips;
- The demographic characteristics of many transit riders make it more likely that they will be underrepresented in any household survey, including the long-form. Continuing changes in demographics, especially the high rate of immigration in the 1990's also may have increased the relevance of some of these issues to transit use;
- The transit modes identified in question 23 are not applicable in many areas, are outdated, and may be confusing to the reader;

23 a. How did this person usually get to work LAST WEEK?

If this person usually used more than one method of transportation during the trip, mark X the box of the one used for most of the distance.

- Car, truck, or van
- Bus or trolley bus
- Streetcar or trolley car
- Subway or elevated
- Railroad
- Ferryboat
- Taxicab
- Motorcycle
- Bicycle
- Walked
- Worked at home (skip to 27)
- Other method

- The Census 2000 geographic definitions changed in a number of regions and in some cases made comparisons between 1990 and 2000 misleading;

These issues have been debated for each census since the journey-to-work questions were first asked in 1960. The usual argument against including the multi-mode question (or allowing for multimodal answers) is that the “real estate is expensive⁹”, which reflects a legitimate concern that response rates go down as the number of questions increase. Conversely, in 1980 and again in 1990 a follow-on question was added concerning commute time. Whether commute time is more important than a full picture of the modes used for commuting is worth debating.

Survey Quality

Survey non-response is widely accepted as an important measure of survey quality. In assessing mode split, the issue of survey non-response may be more important to transit than to other modes simply because the profile of the individuals or households who do not respond is so similar to the profile of the traditional transit rider. The table below illustrates the relationship.

Why Non-response Matters to Transit

Census Non-Response:	The Core Transit Rider:
● Renter	● Renter
● Single head of household	● Single head of household
● Minority	● Minority
● Multi-family or mobile home as residence	● Lower income
● Geographically clustered	● Female
	● Central City
David Word, <i>Who Responds: 1990 Census</i> , Commerce Department, Bureau of Census, 1997.	APTA, <i>Americans in Transit, A Profile of Public Transit Passengers</i> . Washington, DC 1992

As the government implements the replacement for the long-form, the American Community Survey (ACS), it is important to look at current policy and planning needs and determine if long-form type data is adequate for the future. The ACS will fix one important problem, timeliness.¹⁰ It will provide continuous data through three million surveys annually that can be aggregated over several years. It may even improve response rates by having a staff trained and focused on one instrument rather than the decennial enumeration. What else needs to be done? What are the prospects? What else should we know about Census 2000 as the new survey is implemented?

What Is Different About Census 2000?

Census 2000 differed from the 1990 census in ways that may have a bearing on counting transit commuters. There were changes to key employment questions, which are the basis for the journey to work questions, and changes in the processes for reviewing and verifying questionnaire data and for following up with households that did not mail back the survey.

⁹ Pisarski, Alan, *Some Thoughts on the Census – Transit Statistical Matchup*, Eno Transportation Foundation, 57.3, p.12.

¹⁰ While the trade offs of getting three million surveys annually rather than some 19 million every ten years are being debated, the fact is that this change will make data available on a regular basis.

For what ever reason, the resulting long-form survey data indicated lower levels of employed people and far higher unemployment levels than a key federal labor survey. The difference between the long-form and the Current Population Survey (CPS)¹¹, from that same period was over 7 million (civilian employed) nationwide – a number greater than the total number of transit commuters counted by the long-form.

The CPS is a much more detailed survey than the long-form and is considered the authoritative source of employment data and trends for the country. The main employment question for the long-form, number 21, is the basis for the journey to work questions (numbers 22-24 covering location of work, mode, auto occupancy and time). A problem with the employment question could then affect how the follow-on journey to work questions are interpreted and answered, or possibly, skipped (item non-response).

Almost half of the undercount, according to Census analysis¹² is concentrated in five large states: California; Texas; Florida; Illinois; and Michigan. The gap between the two surveys in California equates to 1.3 million people. In terms of the unemployed, the census counted 53 percent more than the CPS.

Reproduction of the Questions on Employment Status

From Census 2000:

21. LAST WEEK, did this person do ANY work for either pay or profit?

From Census 1990:

Did this person work at any time last week?

Census Data on Traffic Questioned

“While the trend toward increased economic independence in Orange, Riverside, San Bernardino and Ventura counties is unquestioned, census estimates of employment levels and commuter patterns conflict sharply with established jobs surveys and regional transportation studies.

The question confronting demographers now is, if census conclusions about Southern California employment and commuter patterns are wrong, what other census conclusions are off kilter?

. . . The problem appears to be rooted in a possible undercount of people with jobs.”

-- Los Angeles Times, 3-9-2003

The gap in employed persons is not surprising as there has been some difference since the comparisons began in 1950. What is surprising is the size of the gap and how it now affects so many demographic groups. An initial Census review of the employment data is inconclusive¹³ but does indicate that improvements to survey questions and review procedures may be needed. According to the report, responses of residents in group quarters (college dorms, nursing homes, barracks, etc.), seem to have caused much higher unemployment levels when compared to the CPS. But “a comprehensive explanation for the differences noted above is not now available”. The report calls for more probing research to understand the factors involved.

Among the questions left open about the Census/CPS gap is whether the undercount varies at the sub-state level, such as cities or

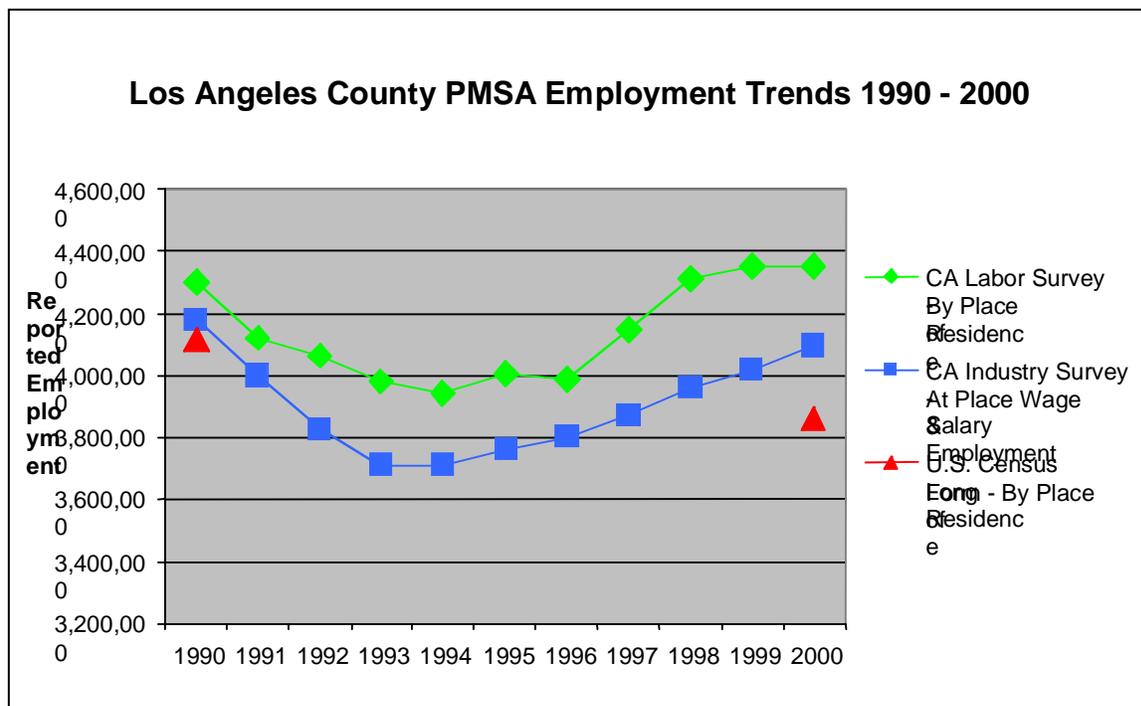
¹¹ The CPS is the Bureau of Labor Statistics official labor survey conducted monthly and is much more detailed in terms of probing for employment status.

¹² US Census Bureau, *Comparing Employment, Income, and Poverty: Census 2000 and the Current Population Survey*, September 2003.

¹³ US Census Bureau, *Comparing Employment, Income, and Poverty*, September 2003.

counties. With transit service so concentrated in metropolitan areas, the sub-state question is important to public transportation. For this reason, this report looks at available state and other federal employment data¹⁴ for three metropolitan areas: Denver, Los Angeles, and Washington, DC. In these cases the gap between Census 2000 and federal and state labor data examined was statistically significant and as much as 13 percent. Comparing this data over the decade between 1990 and 2000 for Los Angeles and Washington, DC, the 2000 gap is substantially greater than in 1990. (Similar data for 1990 in Denver were not available.) This growing difference is shown in the accompanying graph of Los Angeles County. Note that for the County alone the gap in 2000 was about 500,000 – very close to the amount of decline in commuting estimated by census between 1990 and 2000. Knowing the travel patterns of these half-million missing commuters is important to local transportation decisions.

Beyond the employment data, Census 2000 has higher rates of imputed¹⁵ data for most data items than in 1990, raising more questions about data quality and comparability. The rates for many housing and income items were more than double 1990 rates, as were items important to journey to work: employment status, vehicle occupancy and vehicles available.



Looking to Other Sources

When questions about census or any survey come up in other domestic policy arenas – housing, labor, health, education – there are separate, detailed federal surveys to look to for clarification and for a more complete picture. Not so in transportation. For help, transportation professionals have the National Household Travel Survey or NHTS (formerly Nationwide Personal Transportation Survey) to turn to. The NHTS is conducted by US DOT about every 6 or 7 years (1969, 1977, 1983, 1990, 1995, 2001).

¹⁴ See data note in Section Four.

¹⁵ Imputed data essentially means that Census supplied the data for items where it was missing or not comprehensible. This often takes the form of substituting item values from complete surveys with similar respondent characteristics.

NHTS' advantage is that it probes all trip purposes not just commutes. The disadvantages are that it is sporadic, under-funded, and the methodology and sample size have changed substantially, almost as often as the survey is taken. This makes trend assessment questionable. According to a US DOT report, due to a series of changes for the 2001 survey, "a limited amount of direct comparisons can be made between data from the 1995 surveys and the data from the 2001 NHTS, as presented in this report."¹⁶ Nevertheless, powerpoints detailing NHTS trends proliferated after the initial release of the data in January 2003. An additional concern is that with a low response rate – 41 percent – the quality of the NHTS needs to be carefully assessed.

The DOT's other general travel survey, Omnibus Household Survey, is a relatively recent and very different type of survey. Omnibus is a semi-monthly, telephone survey of approximately 1000 households (monthly in the early years), which asks core questions about transportation and supplementary questions to assess achievement of DOT's strategic goals: safety, mobility, economic growth, the human and natural environment, and national security.

It has been a short and challenging run. The survey has been revamped several times and was the subject of criticism by a special committee of the National Academies¹⁷ due to questions of survey design and quality. The Omnibus also has a low response rate. At the same time, the committee recognized the value of the survey for timely data that reflect public opinion and that can be helpful in capturing the dynamics of the transportation system more frequently than the NHTS allows.

The American Housing Survey of the US Department of Housing and Urban Development provides some of the same detail on journey to work as the long-form from what are two surveys. In the annual Housing Survey 55,000 households are surveyed every other year on the details of their housing, neighborhood, demographics and related topics like transportation. The second survey covers 45 metropolitan areas, which are surveyed on the same topics every six years, except for the six largest, which are covered every four years during the National Survey. The value of the AHS is its frequency, but the commuting questions and detail provided are similar to the long-form.

An invaluable source of personal travel data comes from local and metropolitan surveys, including transit rider surveys. These surveys are tailored to the region and are designed by knowledgeable local staff – no questions about trolley buses in regions where they disappeared 40 years ago. Unfortunately, due primarily to lack of funds, these surveys are infrequent, with most regions finding the funds only every 12 to 15 years. A few like San Francisco have managed to get on a regular schedule of every five years.

Due to increased planning funding from recent federal transportation legislation, there was a spike in the number of metropolitan surveys in the 1990s. It is not clear if this can be sustained. These surveys also have their own methodological issues, including a tendency to low response rates, with which the user needs to be familiar. Nevertheless, where these surveys are available, they provide extremely useful data and a fuller picture than is available from census journey to work data.

¹⁶ US Department of Transportation, Bureau of Transportation Statistics, *NHTS 2001 Highlights Report*, BTS03-05, Washington, D.C. 2003, p. 1.

¹⁷ National Research Council of the National Academies, *Measuring Personal Travel and Goods Movement*, Transportation Research Board Special Report 277, Washington, DC, 2003, p. 79-100.

Conclusions

Totaling it all up, there are plenty of reasons to seek new and better data sources to support transportation planning and decision-making. The counts of employed persons from the 2000 long-form deserve much more attention and raise legitimate concerns with the journey to work data. The NHTS needs greatly increased support, as well as evaluation to bring it to the point where it can fill in the information gap.

What the current short-comings illustrate most is the more important, longer term issue: the lack of comprehensive information on travel that is of high quality and timely. This should not have been expected from the decennial census, which is primarily designed and conducted for enumeration – after all only every 10 years. Nor are we likely to get the detail needed from the new continuous, American Community Survey, where the “real estate” still will be expensive. The reality is that, despite the importance of travel data to transportation planning and investment, there is a dearth of good information on most aspects of local and intercity travel. We have relied heavily on the census because there is not much else out there for the transportation industry. The demographic and transportation data from census are extremely valuable, but inadequate to meet all the primary information requirements on transportation today. The purpose of the NHTS is laudable, but the delivery is too variable. Significant improvement is needed to bring it up to standard with other federal household surveys.

There is much at stake for the transit community in making sure that transit and supportive modes, such as walking, get properly counted in travel surveys. Some issues of survey design are important technical questions that should always reside with the statisticians, but there are policy decisions imbedded in the census and other transportation surveys like the NHTS that deserve to be debated outside of narrow technical disciplines. For these reasons, transit leaders should join forces with other transportation interests to support and ensure the quality of survey efforts. Recent U. S. DOT discussions with Census have included the question of allowing multimodal answers as part of the limited journey to work data. This discussion gives transit an opportunity to weigh in to improve the information from the new ACS and to support continued efforts to ensure quality data.

Given the limited scope of information provided by the ACS, however, it is important to support steps to substantially improve the quality of the NHTS or similar broader surveys to ensure more detailed, and frequent information on which to make sound policy decisions. With funding always a concern, getting good information more frequently across the country may be unrealistic. Instead, the survey could focus on the top 50 congested metropolitan areas every two years and conduct a nationwide survey regularly every six years – the current average. This would provide a focus on the greatest areas of concern, but continue to provide a national travel picture.

These policy decisions do influence how transit is counted – in transportation investment analysis, in local development plans, in project development, as well as politically.

Section 3: Counting with National Surveys

US Census

Purpose

The long-form data are heavily relied on by the transportation profession for plans and studies required for federal funding. In describing the need for the long-form questions on place of work and journey to work (referred to collectively as journey to work or JTW), Census identifies statutes affecting seven agencies including: Title VI of the Civil Rights Act, Clean Air Act Amendments, Job Training Partnership Act, in addition to a host of transportation laws affecting the US Department of Transportation (US DOT)¹⁸. The same publication points to four federal uses and six community impacts of the data, including:

Federal Use -

- Needed to plan highway improvements, develop public transportation services, design programs to ease traffic problems, conserve energy, and reduce pollution
- Used to forecast vehicle miles of travel in areas that are designated 'non-attainment' with respect to ambient air quality standards under the Clean Air Act Amendments of 1990

Community Impact -

- Forms the database used by state departments of transportation and the more than 350 metropolitan planning organizations responsible for comprehensive transportation planning activities required by the Intermodal Surface Transportation Efficiency Act of 1991
- Needed by public transit agencies to plan transit investments, identify areas needing better transit service, determine the most efficient routes, and plan services for disabled persons

The journey to work information from the long-form (and subsequently from the American Community Survey, which replaces the long-form) includes data on place of work, usual mode, time and duration of the usual commute and related socio-economic information about the travelers. The data are available at the small area level – even to the block level – making it of great interest to local planners – as Census indicates. Because this type of data have been collected since 1960,¹⁹ they are used to show trends over the last 40 years, on such issues as changing modal shares of commute trips and increasing time involved in commuting.

While the data is essential for meeting many federal requirements, the issue of timeliness has been a long standing complaint of users. Given the lag in release of the data, planners may be relying on data a dozen years old before the new decade's information is available. For Census 2000, the long-form data was released in stages between April and June 2002.

Uses for Transportation Planners

In state and metropolitan planning agencies throughout the country, the long-form data is in fact being used for the purposes outlined by Census. It is in many communities – and not just the small-

¹⁸ A detailed description of uses of the data for federal purposes is provided at: US Department of Transportation, *The Long Form/American Community Survey – Questions and Their Relevance to Transportation*, March 2001. Available at: <<http://www.fhwa.dot.gov/ctpp/omb2.htm>>.

¹⁹ The time and duration of the commute are two questions added in 1980 and 1990, respectively.

size metro areas - the only data set for transportation at the small area level and one of the few sources of data for household and transportation at all. Because of the dependence on the information, the release of new data is eagerly awaited.

Recognizing the lack of other good data sources for transportation planning, the US DOT with Census and the American Association for State Highway and Transportation Officials (AASHTO) has done special tabulations from the census for planners since 1980. Now known as the Census Transportation Planning Package (CTPP), it is used for numerous planning activities, including: evaluate existing conditions, analyze trends over decades, plan new transit services, project congestion along a specific corridor; build and calibrate travel demand models; and design and weight travel surveys.²⁰ The Federal Transit Administration (FTA) suggests on its planning website that transit operators will use the year 2000 CTPP tables for transit market studies, and that it could also be used to identify impacts of proposed service changes. This broad use of the data makes survey quality a critical issue for good policy and planning results.

Survey Question Limitations

The scope of the journey-to-work survey questions is limited even in terms of describing commuting. The data do not capture the multimodal nature of many peoples' commute, nor tell us what they may do regularly (one or two days) a week such as telecommute, drive alone, or take transit. US DOT recently asked Census to consider allowing for the multimode answers to the question in future surveys. For now planners must look to other surveys for information on the multi-mode trip or regular use of other modes.

Mary Peters, the Federal Highway Administrator, illustrates the importance of the multi-modal trip by asking audiences: "How many people only used one mode to get to this meeting this morning?" At one Washington conference, only a few people out of an audience of 70 raised their hands – those who had stayed in the hotel and someone who had walked to the meeting.

Adding to the data gap, census data do not tell us about the commute to the second job – a growing necessity for many millions of Americans. All of this limits the utility of the data, especially for the local planner who must address the full trip, not just the longest segment of the usual mode.

As important, other national surveys – notably the US DOT's National Household Travel Survey (NHTS) – indicate that the commute trip is declining as a percentage of total trips, regardless of mode. If we accept this premise, then there is a greater need for more comprehensive data about travel - data that tell us about patterns for shopping, school, medical and social trips. In this context, the commute data remain a useful, but reduced, input for some of the intended uses of the data, such as the federal purpose of "forecasting ambient air quality under the Clean Air Act Amendments of 1990." It is important to note, though, that analysis of local and regional transit surveys and other data by the FTA and APTA do not show that commuting is declining as a reason for using transit.

Comparing the Numbers

In considering the apparent conflict between industry data and the Census 2000, the first point is that the data are not the same and represent a classic apples and oranges comparison. Transit

²⁰ US Department of Transportation, Federal Highway Administration. *CTPP 2000, Using Census 2000 Data to Support Transportation Planning and Policy Development*, FHWA-EP-02-001.

ridership data – both APTA and FTA’s²¹ – show boardings of transit systems for all purposes, while the census data show the usual means of commuting for persons surveyed. These are different types of information, gathered for different purposes, but there are certain relationships between the numbers so that they also should not be going in opposite directions.

As APTA Senior Policy Analyst, John Neff sees it, “The discrepancy between the Census journey-to-work data trend for 1990 to 2000 and the FTA and APTA ridership trend over the decade has been explained in two different ways by researchers. The first reaction was that both data sets were right and the difference could be explained. The second view was that the census data understated transit commuters.²²” Because of the sensitivity of public policy to mode share information, the underlying differences among the data sources and the opportunity for improvement in data quality need to be far better understood.

Here are the key points to consider when looking at these different data sources:

- **Census JTW measures only commute trips.** The FTA’s Transit Performance Monitoring System (TPMS) shows that half of all transit trips are for commuting to work; 55 percent for large systems and 40 percent for small systems. This is generally the same proportion that has existed over the last several decades and is consistent with recent APTA analysis, as well as other recent Census surveys, namely the 2000 and 2001 Supplementary Surveys and the first American Community Survey in 2002, “which showed increases similar to those expected from transit ridership data”²³. However, the NHTS shows commuting as less than 40 percent of transit trip purposes.
- **Census JTW measures only the usual mode** used for the longest portion of the trip as shown in the accompanying box. Thus leaving out multi-mode trips or frequent, but not daily use, of another mode. The TPMS also shows that for every daily rider there are three other regular users. In essence, the census question makes the dominant mode more dominant;
- **The social and economic characteristics of many transit riders are closely aligned with the characteristics of persons who are underrepresented in surveys,** making it more likely that transit will be underrepresented in any household survey, including the long-form. (See chart on p.15.) Continuing changes in demographics, whereby the country is

23a. How did this person usually get to work LAST WEEK? If this person usually used more than one method of transportation during the trip, mark X the box of the one used for most of the distance.

- Car, truck, or van
- Bus or trolley bus
- Streetcar or trolley car
- Subway or elevated
- Railroad
- Ferryboat
- Taxicab
- Motorcycle
- Bicycle
- Walked
- Worked at home (skip to 27)
- Other method

²¹ In fact, APTA and FTA data differ from each other primarily in that APTA counts all publicly available transit systems, while FTA requires only systems with nine or more vehicles and receiving federal funds to report.

²² Neff, John, *Accuracy of Estimates of the Number of Persons Who Ride Transit, Preliminary Draft*, Washington, D.C. March 16, 2004, p. 11.

²³ Neff, John, *Accuracy of Estimates*, p. 10.

becoming more diverse, especially the high rate of immigration in the 1990's have increased the possibility of missing transit riders in surveys;

- **The transit industry counts boardings, which on average are 1.3 per individual trip (origin to destination)**, so industry data will always be greater than census defined commuter trips. Or as one well-known metropolitan demographer, Chuck Purvis of the Metropolitan Transportation Commission in Oakland California, puts it²⁴: “census counts workers not trips”, and also reminds us that “transit boardings count each time a person boards a transit vehicle, including transfers.”
- **The transit modes identified in question 23 are not applicable in many areas**, are outdated and may be confusing to the reader. One researcher²⁵ explains "Census choices are not tailored to what exists in any individual area, but are uniform for all urban areas nationwide—putting forth the possibility of erroneous choices by respondents. . . ."
- **The Census 2000 geographic definitions changed in a number of regions** and in some cases comparisons between 1990 and 2000 can be misleading because the area covered and the characteristics of the newly added area differ markedly. This led to confusion in some regions about how to compare 2000 to prior years and resulted in some analysts comparing the results between these periods for areas that grew substantially in physical size in 2000, with proportionally less population and transit service growth. In these cases, the comparison reduces the proportion of commuters (market) using transit in that geographic unit. In Washington DC, for example, over 2500 square miles of mostly rural territory (or more than a 50 percent increase) were added to the 1990 Metropolitan Statistical Area to create the Primary Metropolitan Statistical Area (PMSA) in 2000, but the transit service area increased much more modestly. If the presumption is that transit's market should be assessed where transit serves, then comparisons between old and new metropolitan boundaries should be made carefully.

These issues have been relevant and often debated for each census since the journey-to-work questions were first asked in 1960. For example, the usual argument against including the multi-mode question (or allowing for multimodal answers) is that the “real estate is expensive²⁶”, which reflects a legitimate concern that response rates go down as the number of questions increases. Conversely, in 1980 and again in 1990 a follow-on question was added concerning commute time. Whether commute time is more important than a full picture of the modes used for commuting is worth debating.

As the government implements the replacement for the long-form, the American Community Survey (ACS), it is time to look at current policy and planning needs and determine if long-form type data is adequate for the future. Recently, as part of the planning for future American Community Surveys starting in 2008, US DOT staff raised the question of obtaining multi-mode information on the regular commute. If the issue is pursued, testing of multi-modal questions would be done in 2006 for inclusion in the 2008-2012.

²⁴ Purvis, Charles, “Journey to Work Trends: 1960-2000,” *CTPP 2000 Status Report*. Washington DC, US Department of Transportation, 2002, p. 4.

²⁵ Henry, Lyndon, “Light Rail and Urban Mobility: Is Light Rail Transit Justifying Its Investment,” *Transportation Research Circular Number E C058 Experience, Economics and Evolution: From Starter Lines to Growing Systems*, Washington DC, Transportation Research Board, 2003, p. 375.

²⁶ Pisarski, Alan, “Some Thoughts on the Census – Transit Statistical Matchup,” *Transportation Quarterly*, Vol. 57, No. 3, Eno Transportation Foundation, p.12.

What else needs to be done to ensure quality data? Is the scope of information adequate to meet the statutory requirements? What are the prospects for improvement? And what else should we know about Census 2000 as the new survey, the ACS, is implemented?

How was Census 2000 Different

While none of the issues raised at this point are new, some may have increased in importance due to increasing diversity of the population. With Census 2000, however, there are new issues that have a bearing on the journey to work data – and on how transit use is counted. These include changes to key employment questions; a documented concern with the employment data; and changes in the processes both for reviewing and verifying questionnaire data and for following up with households that did not mail back the survey.

Question Changes

As in other years, there were some wording changes between the 1990 and 2000 census. A key change from the standpoint of the journey to work data was a revision to the employment question (#21), shown in the accompanying box. This question had been the same since 1970. Also a second question on hours worked last week, designed to verify the answer to the first question, was dropped from the Census 2000. Anyone answering yes to question 21 goes on to answer the questions relating to commuting (numbers 22 – 24 for Census 2000, covering location of work, mode, auto occupancy and time involved in commuting); if answering no, the respondent is directed to skip the questions and go to question 25 about absence from work. Thus, confusion with question 21 also should affect answering questions 22-24.

Although recent Census analysis indicates changing the question wording may have had some effect on responses on employment, it is not clear to what degree or how. No analysis on the impact on the journey to work questions was identified by the research for this report.

Employment Responses

For whatever reason, a problem occurred in counting workers (employed and unemployed). In a September 2003 report²⁷, the Census Bureau identified a concern with the 2000 employment data: the long-form results indicated much lower employment levels and correspondingly higher unemployment levels than the Bureau of Labor Statistics' Current Population Survey (CPS) from that same period. The difference in employed persons between the long-form and the CPS is over 7.2 million people nationwide.

The CPS is a much more detailed survey than the long-form and is considered the authoritative source of employment data and trends for the country. It asks more detailed questions about employment than the long-form in order to clearly determine employment status. Because question 21 is the basis for the journey to work questions, a problem with responses to this question could

Reproduction of the Questions on Employment Status

From Census 2000:

21. LAST WEEK, did this person do ANY work for either pay or profit?

From Census 1990:

Did this person work at any time last week?

²⁷ US Bureau of the Census, Housing and Household Economic Statistics Division. *Comparing Employment, Income, and Poverty: Census 2000 and the Current Population Survey*. Washington DC, September 2003, p. vi. Available at: <<http://www.census.gov/hhes/www/laborfor.html>>.

then affect how the follow-on journey to work questions are interpreted and answered, or possibly, skipped (item non-response).

For the nation as a whole, the relative difference in estimated employed persons between the CPS and the Census 2000 as measured as a percent of CPS was 5.3 percent, but the distribution is not uniform. An analysis by state shows the greatest differences (lowest counts) in 2000 tend to be in the most populous states and the District of Columbia. Some of the states most affected include:

- California – a 1,300,000 person difference or 8.3 percent less than the CPS estimate
- Florida – 525,000 person difference or 7 percent less than the CPS estimate
- Illinois – 411,000 person difference or 6.6 percent less than the CPS estimate
- Michigan – 351,000 person difference or 7 percent less than the CPS estimate
- Texas – 716,000 person difference or 7.2 percent less than the CPS estimate

A sub-state analysis – county or metropolitan area – has not yet been done on the employment data. Because the District of Columbia is a city and is considered a state for the purposes of the Census Bureau, it was the only central city (or wholly metropolitan community) that was analyzed in the September report evaluating the employment data. It is also a city with a substantial transit commuter share of more than 33 percent (or more, depending on the survey). In percentage terms, the greatest discrepancy between the two surveys among the states was in the District of Columbia, where the following differences are noted²⁸:

Employed persons – 263,000 census to 293,000 CPS, or an 11.4 percent difference
Unemployment rate – 10.8 percent census to 5.7 percent CPS

The analysis leaves open key questions, including whether there are sub-state variations that may help explain the differences. With transit service so concentrated in metropolitan areas, the sub-state issue is important to understanding how public transportation data may have been affected. In attempting to shed light on this issue, this report looks at available state and other federal employment data²⁹ for three metropolitan areas: Denver, Los Angeles, and Washington, DC. In these cases the gap between Census 2000 and other government labor data was statistically significant and as much as 13 percent. Moreover in Los Angeles and Washington, DC where the comparable data is available monthly since 1990, the 2000 gap is substantially greater than in 1990. Similar 1990 data were not available for Denver. While the Census report acknowledges that there have always been some differences between the decennial census and the CPS, the gap widened considerably in 2000.

For Los Angeles County alone, the gap in 2000 between the surveys was about 500,000, which is very close to the number by which all commuting declined in Los Angeles County between 1990 and 2000 according to Census 2000. Detailed comparisons between employment data sources and census long-form data, as well as comparisons of other sources of transit ridership data are provided in Section 3 of this report. One example from the Washington DC region shows how the CTPP data stack up against other available federal and local data. In Arlington County Virginia, the CTPP 2000 showed a slight decline in employment over 1990. At the same time, the Federal Bureau of Economic Analysis, showed almost a three percent increase, or about 6,000 new workers. Local data for the same period showed a tremendous building boom: 4.4 million new office space; 1.62 million square feet of retail and 1200 new hotel rooms, or enough for 19,000 new jobs. And, vacancy rates were among the lowest in the region.

²⁸ *Comparing Employment, Income and Poverty*, Table 20.

²⁹ See data note in Section Four, p. 37.

The initial analysis of the Census 2000 employment data is inconclusive. That there is a gap is not surprising as there has been some difference since the comparisons began in 1950. What is surprising is the size of the gap and how it now affects so many demographic groups. The report points out that survey differences can be seen “across demographic categories of sex, age, and race and Hispanic origin. A smaller gap in 1990 was primarily among males in the 16 – 44 age range.”³⁰ According to the report, there may be a problem with responses of residents in group quarters (college dorms, nursing homes, barracks, etc.), but “a comprehensive explanation for the differences noted above is not now available”³¹. However, the Census report does indicate that “refining the employment questions and editing and imputation procedures may significantly improve the employment data collected in a census-like context, but producing accurate unemployment data . . . will likely remain a challenge.”³²

The September 2003 Census report calls for more penetrating analysis, particularly studies at the micro level. Depending on the availability of money and staff, Census is looking to conduct a series of research studies to better identify the problem including, among others:

- Research into new census edit and imputation procedures
- Research into how methods used to weight the census and CPS data to population totals may affect observed differences
- Assessment of census estimates for geographic areas below the state level by comparing with small-area estimates from BLS

Survey Process

Beyond the changes to questions and the problems with employment data, Census 2000 differed markedly from past surveys in how long form responses were processed and how non-response to the mail-back survey was handled. In general these changes reduced staff time for addressing consistency and acceptability of responses and for following up with households not mailing back their surveys. A report documenting the quality of long form data³³ noted these changes:

“Mail return questionnaires were not subjected to clerical review and households were not contacted, as in previous censuses, to collect data that were missing from the census returns.”

How these procedural changes may have affected long-form data is discussed in a subsequent section, Survey Quality Issues Related to Counting Transit.

Comparability

Concerning the level of public transportation commuters, the Census 2000 results were inconsistent with three other Census Bureau surveys conducted as part of the start-up of the new ACS data collection, as shown in the chart below by John Neff³⁴. As indicated, the three surveys are in line with industry data from these three years, although industry data do not show ridership dipping until 2002. It should be recognized that only one of the surveys (C2SS) occurred in the Census 2000 timeframe.

³⁰ *Comparing Employment, Income, and Poverty*, September 2003, p. 16.

³¹ *Comparing Employment, Income, and Poverty*, p. vi.

³² *Comparing Employment, Income and Poverty*, p. 19.

³³ US Bureau of the Census. *Chapter 8. Accuracy of the Data*, Washington DC, 2002, p. 8-21.

³⁴ Neff, John, *Accuracy of Estimates*, Table III.A.3, Part 1, p. 10.

**Total Census Commuters on Transit Compared to
APTA Annual Transit Trips, 1960-2002, Commuter and Trip Data**

Number of Commuters or Trips							
Measurement	1960	1970	1980	1990	2000	2001	2002
Decennial Census Demographic Profile Transit Commuters(Long-Form)	7,806,932	6,514,012	6,007,728	5,890,155	5,867,559	---	---
Census 2000 Supplementary Survey Transit Commuters (C2SS)	---	---	---	---	6,425,403	---	---
Census 2001 Supplementary Survey Transit Commuters (SS01)	---	---	---	---	---	6,331,191	---
Census 2002 American Community Survey Transit Commuters (ACS02)	---	---	---	---	---	---	6,202,191
APTA Annual Transit Unlinked Trips (Millions)	9,395	7,332	8,567	8,799	9,327	9,507	9,387

Neff also analyzed the results of a fourth survey conducted biennially by Census called the American Housing Survey. The AHS, sponsored by HUD, includes a similar question on the principal means of transportation to work last week. The results of the 1999 and 2001 surveys are similar, but somewhat higher than the C2SS and the SSO1 at 6,766,000 and 6,654,000, respectively. Again, Census 2000 is at the lower end of surveys.

National Household Travel Survey (NHTS)

Many domestic policy issues – housing, labor, health, education – are supported by detailed federal surveys in addition to census long-form to look to for clarification and for a more complete picture of their subject area. Surveys for these policy areas are conducted at least biennially. Not so for transportation. For help, transportation professionals have the National Household Travel Survey or NHTS, to turn to. Formerly known as the Nationwide Personal Transportation Survey (NPTS) and American Travel Survey (ATS), the NPTS/NHTS is conducted by US DOT about every 6 or 7 years (1969, 1977, 1983, 1990, 1995, 2001), or when the money is available³⁵.

NPTS/NHTS’ advantage is that it probes all trip purposes not just commutes and all means of transportation. The disadvantages are that it is sporadic, under-funded, and the methodology and sample size have changed substantially, almost as often as the survey is taken. This makes trend assessment questionable. According to a US DOT report, due to a series of changes for the 2001 survey, “a limited amount of direct comparisons can be made between data from the 1995 surveys and the data from the 2001 NHTS, as presented in this report.³⁶” There were major changes between the 1983 and 1990 and between 1990 and 1995, as well. Nevertheless, since the initial release of the data in January 2003, numerous research studies have used the 2001 data for comparison to the earlier surveys.

Charting the trends from the NPTS/NHTS series indicates a steadily declining transit use. The 2001 survey (NHTS) shows transit with only a 1.6 percent share of total trips. The NHTS press releases fail to note any problems with the series or with evaluating market share on a national basis, when half the American population lacks reasonable access to transit. For the diligent, the recent User’s Guide, however, provides considerable information on changes between the surveys – a big improvement for the users of the data.

³⁵ Letter to Dr. Sen, p. 3.

³⁶ US Department of Transportation, Bureau of Transportation Statistics. *NHTS 2001 Highlights Report*, BTS03-05, Washington, D.C. 2003, p.1.

The NHTS represents the combining of US DOT's two major household surveys: the NPTS, which sought information on daily household trips under 75 miles; and the ATS, conducted only in 1977 (as the National Travel Survey) and in 1995 as the ATS. The ATS sought information on trips 100 miles or greater. The long distance definitions represent only one of many differences in content and methodology between the two surveys that made data difficult to combine or compare, and one of the reasons the US DOT sought to combine the two in this latest effort.

The survey covered 26,000 households, with approximately 40,000 more included in special additions in five states and four metropolitan areas that were paid for by state DOTs or MPOs. It was conducted over a 14 month period (March 2001 – May 2002) in part due to the events of 9/11/01 and the subsequent mail problems due to anthrax.

There are two big issues with the NHTS that deserve close attention by the transit industry. The first is the importance to federal policy making of the type of detailed trip making information that NPTS/NHTS seeks to capture and whether there are other sources. Due to the importance of the data, the second issue to focus on is the quality of that information from the several surveys and its reliability.

Available Information

First, regarding the scope of the survey, NPTS/NHTS is designed to provide much greater trip-making information at the national level, as well as attitudinal information about travel that is needed for good policy formulation. Like the census, the survey captures important demographic, social and economic data, in addition to more comprehensive transportation data that includes: number of vehicles and drivers, driver status, views on transportation, and use of public transit, biking and walking. For daily trips taken on a designated travel day, data include: primary means of transportation, vehicle used, wait and transit times for transit trips, trip purpose, travel times and distances. In 2001, long-distance travel – over 50 miles – was included in the survey with daily, local trips (under 50 miles). Information sought on long distance trips over a specific four week period include: primary means to destination and return, destination, travel day and time, means of travel during stay, reasons for travel, etc. The survey probes for attitudes toward transportation issues such as concerns about highway congestion, driver behavior, number of large trucks, availability of sidewalks, as well as frequency of bicycling and walking for exercise.

For more than 20 years, there has been a substantial effort by the US DOT, through the FTA, to measure transit's effectiveness and to benchmark transit performance over time. For those purposes, the FTA maintains its own reporting system, now known as the National Transit Database, but previously referred to as Section 15 data. As described in Section 3, these data are focused on federal transit grantees in urbanized areas with more than 9 vehicles. While it is not a complete description of national transit, it provides a good picture of the majority of transit operations and of transit ridership. Additionally, there are periodic household surveys in many metropolitan areas that are tailored to the individual area that provide the same detail on trips and trip purposes, etc. Transit operators also make good use of on-board surveys as an important means to refine services and operations.

What could NPTS/NHTS give us that the FTD does not? Or, that local surveys do not? In other words: Why bother?

In an ideal survey world, NHTS-type surveys provide a market picture; they tell us how much of household travel is by transit and how much is by other modes. NTD for all its detail about transit

operations is only about transit. For national policy making, this market share information for all modes is always sought after. Like it or not, it is a way of assessing how limited federal dollars are spent across the transportation spectrum.

The local household travel surveys provide invaluable information, but they too are infrequent except in a very few metropolitan areas, namely San Francisco and Portland Oregon. And despite efforts to standardize core questions, the survey types, methods, and questions vary so much that they can not be successfully combined into a “national picture”. The appendix includes a list of known travel surveys in metropolitan areas for the past four decades.³⁷

Like the NTD, on-board transit surveys are focused on the transit mode and lack information about broader trip patterns and behavior. However, both of these local surveys and the NTD (as well as APTA ridership estimates) do collect data that overlap with the national surveys and provide an excellent means of assessing the data for the individual metropolitan transportation environment³⁸. But whether or not the NHTS gives a reasonably accurate picture of transit use at the national level, or market share, is a fair question. Read on.

Changing Methodology

The second issue of real importance is the many changes over time to the NPTS/NHTS surveys methodology, universe, sample size, questions, and timing. These variations raise substantial issues of comparability from one survey to another, as well as survey quality. And for counting transit some of these changes matter more due to the general characteristics of the transit rider and their concentration in major metropolitan areas. The chart that follows shows how the surveys have evolved since the first one in 1969.

³⁷ The list was compiled as part of research for the National Center for Smart Growth and Education at the University of Maryland under a grant from the Packard Foundation.

³⁸ Both Chuck Purvis, head statistician for the San Francisco Bay Areas Metropolitan Transportation Commission, and John Neff use local surveys to analyze the comparability of transit ridership and transit commuter data from national sources. See Purvis 2003, and Neff, *Accuracy of Estimates*, 2004.

Key Changes in NPTS/NHTS/ATS Household Surveys³⁹

Year	Survey	Method	Sample Size (Hhshld)	Persons Included	Conducted By	Major Question, Terms Changes
1969	NPTS	Personal Interview ¹	15,000	over 5 years	Census	Concise list of questions
1977	NPTS	Personal Interview	18,000	over 5 years	Census	Expanded hshld vehicles covered & updated others; more on long trips
1977	NTS/ATS	Personal Interview	Subset of NPTS sample	over 5 years	Census	Long Distance of 100 + mi. over 1 year
1983	NPTS	Personal Interview	6,500	over 5 years	Census	New safety, seatbelt questions
1990	NPTS	Phone – RDD ²	18,000 + 4,300 add on ⁴	over 5 years;	Research Triangle Inst.	Some additional on accidents and other
1995	NPTS	RDD, travel diary, rostering of trips ³	21,000 + 21,000 add on	over 5 years	Research Triangle Inst.	Many new questions; daily trips under 75 mi
1995	ATS	telephone with personal follow up	67,000	all persons in Hshld ⁶	Census	Long distance of 100 mi + over a calendar year
2001	NHTS	telephone, travel diary;	26,000 + 40,000 add on ⁵	all persons in Hshld, including under 5 years	2 Contractors	Combined long distance over 50 mi., other refinements
Note 1	<i>First three surveys were conducted using primary sampling units. Depended on respondent recall during one interview</i>					
Note 2	<i>First completely phone based, used Computer Assisted Telephone Interviewing (CATI)</i>					
Note 3	<i>Substantial changes made in method included travel diary and household rostering, See US DOT, 1995 NPTS Summary of Travel Trends: Appendix 2, 1997. The changes improved trip reporting but impacted interpretations and comparability of travel data with earlier surveys; 1990 data were adjusted to try to reflect these changes but not the earlier surveys.</i>					
Note 4	<i>First inclusion of add-on surveys for sponsorship by DOTs and MPOs, included NY State, Connecticut and Indianapolis; subsequent surveys have included other locales, but NY State is only one that has been in all three.</i>					
Note 5	<i>Two contractors were used for the survey. The primary contractor was NuStats and the contractor for the add-ons was Morpace. The number of add ons per location varied according to the sponsors interests and budget. For example, Wisconsin – 16,000 samples; Texas -3,500.</i>					
Note 6	<i>NPTS/NHTS excludes group quarters, including college dormitories over 10 residents; the ATS included college dorms.</i>					

³⁹ Research for this table was conducted for the National Center for Smart Growth and Education at the University of Maryland under a grant from the Packard Foundation. Detailed descriptions of earlier surveys, especially the 1969 NPTS and 1977 NTS are not easily found. Two sources are the Inter-university Consortium for Political and Social Research, U of Michigan and the 2001 NHTS Users Guide, Chapter 1 and Appendix L at: <<http://nhts.ornl.gov/2002/usersguide/htm>>.

For transit, two of the biggest concerns with the many and frequent changes indicated on the chart are the early clustered samples and the change to phone interviews. While many of these changes are improvements, the change itself can make comparability a challenge, or inappropriate. According to US DOT analysis,⁴⁰ the clustered samples used prior to 1990 “are problematic for household travel surveys because the nature of some mode choices is highly dependent on very small geographic areas. For example, people who live within a half-mile of public transit will use it considerably more than people who live 2 miles away from transit.”

The solution to the clustered sampling of random digit dialing meant telephone interviews. The switch to telephone interviews obviously leaves out those without phones, which generally means the poor or highly transient, a notable component of transit riders in most systems. The rate of households without phones varies substantially by place. In 1990, for example, 7.3 percent of households in New York City were without phones, 4.2 percent of the households in Washington, DC, 14.4 percent in Hartford, CN, but only 0.7 percent in Fairfax County, VA and 2.9 percent in Pittsburgh. Thus, dependence on phones could mean the probability of undercounting transit in New York City or Hartford in 1990 was certainly higher than in Fairfax County. The analyst needs to know the local situation to assess the impact.

A big improvement of the 2001 survey was the availability of Spanish language interviewers. Because of the higher use of transit by recent immigrants and the tremendous growth in immigrants in the 1990's, the availability of surveys in other languages can be important for counting transit riders. DOT reports, however, that less than two percent of those interviewed requested the Spanish speaker; Census 2000 found that 8.7 percent of the population speaks English less than well.

Two other changes from the NPTS in 1995 are worth noting when considering comparisons between the two: the inclusion of children under five in the sampled households, and an additional probe to ensure that walking trips were captured. The sponsors believed that continuing to ignore children under five meant overlooked trips with “day care providers as part of a preschool activity, or with other nonhousehold members.” With regard to walking trips, the proportion of walk trips among all trips increased substantially. The sponsors point out that the increase may be “due to this additional probe, rather than a true increase in the actual numbers of walk trips.”⁴¹ This also would serve to reduce the transit mode share (as well as that of other modes).

A significant issue for transit is that the response rate for the last several surveys has been among the lowest of federal household surveys: 37.2 percent in 1995 and 41 percent in 2001, whereas most other surveys are in the range of mid-50 percent to as much as 90 percent. It should be acknowledged that household travel surveys have typically lower response rates due to the relatively high burden placed on the respondent, among other factors. Researchers also have been faced with declining survey rates from telephone surveys in the 1990s as the American public has grown weary of telemarketers, etc. But the response rate for the NPTS surveys was relatively high until the improvements of the 1995 survey, when the response rate dropped to barely half of the 73.1 percent in 1990. (The rate in 1983 was 94 percent.)

⁴⁰ US Department of Transportation. *2001 National Household Travel Survey User's Guide, Version 1*, January 2003, p. 1-11.

⁴¹ Highlights of the 2001 NHTS, methodological Considerations, Data Reliability, and Data Comparability, US DOT, Bureau of Transportation Statistics and Federal Highway Administration. Available at: http://www.bts.gov/publications/national_household_travel_survey/highlights_of_the_2001_national_household_travel_survey/html/section_04.html.

It is not entirely clear what caused the drop, but the addition of the travel diary required a second interview. Since there is a non-response rate associated with each interview, a decline would seem inevitable, but the degree of decline is still high. Even if everyone contacted in the first interview had responded in the second, the rate would have only been 51.6 percent.

A significant effort by the sponsors in 2001 only raised the rate to 41 percent. Another important reference in considering NPTS/NHTS non-response is the American Travel Survey (ATS). When conducted independently of the NPTS in 1995, it had a response rate of 85 percent despite the four interviews required of each household (generally 1 interview every three months over one year). Here a special TRB committee on DOT's Bureau of Transportation Statistics noted several differences between the NPTS/NHTS surveys and the ATS, which included:

1. Use of a sample of households recently used by Census in the Current Population Survey, rather than an RDD sample.
2. The ATS also primarily used telephone interviews, but also conducted in-person interviews for initial non-respondents.
3. The 1995 NPTS used a stricter definition of usable household and timeframe for data collection than did the ATS.⁴²

A close examination of each of these recent surveys is needed in preparing for the next NHTS due in 2006. In presentations to the special committee on BTS, the US DOT staff committed to detailed evaluations of key quality issues such as non-response. Such analysis is needed soon if it is to be relevant to the planning for the next survey, which was anticipated to begin in 2003.

Survey Quality Issues Related to Counting Transit

Broad measures of survey quality include: survey content (statistical unit, comparability with other statistics); timeliness; accuracy; and accessibility⁴³. In terms of accuracy, federal statistical agencies have increasingly focused on the importance of non-response as a key measure.

Non-response occurs when individuals in the sample fail to respond to a survey (unit non-response) or fail to complete all questions on a survey (item non-response). Survey non-response is a growing concern for policy makers because response rates are declining for many types of surveys and as they decline, the potential for bias increases.

Respondent burden appears to be an important factor in response rates to surveys in general. Thus, it is not surprising that the census long-form has a lower rate of response⁴⁴ overall than the short form. In 2000, the respective response rates were 59 percent to 69 percent. This meant that the non-response caseload for long-forms was about 22 percent versus 17 percent of all housing units selected for non-response follow-up, making the quality of follow-up that much more important to long-form results.

⁴²National Academies. Committee to Review the Bureau of Transportation Statistics' (BTS) Survey Programs. Letter to Dr. Sen, director of BTS, June 18, 2002, p. 6-7.

⁴³Federal Committee on Statistical Methodology, Office of Management and Budget. Seminar on Statistical Methodology in the Public Service, 1997 – Parts 1 and 2; Session 6 – *Reviewing and Reporting Quality in Survey Data*.

⁴⁴US Census Bureau, Decennial Statistical Division. *Census 2000 Mail Response Rates*, Washington DC, January 2003, p.10.

Household travel surveys are among the most complex survey instruments requiring recall of numerous trips for each member of the household. Filling out these surveys generally places a significant burden on the respondent. As noted in the prior section, travel surveys often require two or more interviews to complete the process, which increases non-response because there are non-response factors associated with each interview. This is at least one factor explaining why response rates to the NPTS/NHTS have tended to be lower than for other federal household surveys.⁴⁵ The 1995 NPTS response rate of only 37.2 percent in 1995 caused OMB to consider withholding approval of the 2001 survey. Response rates of other federal household surveys in the mid-1990's averaged well over 50 percent, with some in the 90 percent range according to the special committee examining the quality of the BTS surveys, including NHTS.⁴⁶

The Committee also noted that there is reason to believe that the travel patterns of survey non-respondents are significantly different from those of respondents. This introduces the potential for survey bias and, thus, the quality of the data may be affected.

For surveys intending to include transit users, the non-response issue is extremely important because the profile of the traditional or core transit rider is very close to the typical non-respondent's characteristics. The table below makes the comparison between transit users and non-respondents to 1990 Census.

Why Non-response Matters to Transit

Census Non-Response:	The Core Transit Rider:
<ul style="list-style-type: none"> ▪ Renter ▪ Single head of household ▪ Minority ▪ Multi-family or mobile home as residence ▪ Geographically clustered 	<ul style="list-style-type: none"> ▪ Renter ▪ Single head of household ▪ Minority ▪ Lower income ▪ Female ▪ Central City
<small>David Word, <i>Who Responds: 1990 Census</i>, Commerce Department, Bureau of Census, 1997.</small>	<small>APTA, <i>Americans in Transit, A Profile of Public Transit Passengers</i>, Washington, DC 1992</small>

With regard to Census 2000, there was a change from procedures of prior censuses for non-response follow-up, which may have impacted the response rate. There was no clerical review of questionnaires mailed back where items were left blank, unless the missing items were short-form questions. Incomplete information was imputed, which generally meant allocating, or assigning a value consistent with “entries for other household members or people with similar characteristics in a nearby household”.⁴⁷

⁴⁵ Letter to Dr. Sen, 2002.

⁴⁶ Letter to Dr. Sen, 2002, p. 7.

⁴⁷ US Census Bureau. Chapter 8: *Accuracy of the Data*, Washington, DC, 2000, p. 8-21.

The actual impact of this change is not known, but it could affect the quality of long-form data, especially when compared to 1990 or to the surveys in the new ACS series, where a greater effort has gone into having the respondent fill in the missing information. Allocation rates (the primary means of adjusting data for item non-response for the long-form) for Census 2000 were double those of the 1990 Census for many sample items, including journey to work items of employment status, vehicle occupancy, and vehicles available. In fact, all but eight of 57 population items from the long-form had higher allocation rates than the 1990 Census. The table, which follows, shows these rates for the decennial census in 1990 and in 2000 and for the C2SS.

Allocation Rates for Key Transportation Data from Three Census Surveys

<i>Item</i>	<i>Census 2000(%)</i>	<i>1990 Census(%)</i>	<i>C2ss (2000) (%)</i>
Employment Status	11	3.8	6
Place of work: State	9.7	7.2	5.8
County	10.1	7.9	6.2
Place	10.6	9.7	6.7
Means of transport.	7.6	4.6	4.6
Vehicle occupancy	10	4.9	5.8
Time left home	15	10.8	11.3
Travel time	11.8	6.9	8.7
Vehicles Available	6.2	2.2	1.6

From: *Content and Data Quality in Census 2000*, Tables 1 & 2.

Funding

The scope of the research did not allow a close examination of the costs of these surveys. However, the issue of budget (and costs) and its effect on survey methodology was referenced in interviews with US DOT staff, both FHWA and BTS, with Census staff, and with outside experts. A review of the budgets of statistical agencies within the federal government shows great variety and gives some sense of relative level of effort, but the issue of available resources would require a considerable study effort to draw any useful conclusions.

Because cost is certainly perceived to be an issue, the availability of cost information for the recent NPTS, ATS and NHTS is of interest. The chart below is included in the report of the special committee on the BTS surveys.

Survey	Total Cost	No. of Households	Cost/Household
1995 NPTS	\$ 4,096,000	21,000	\$195
1995 ATS	\$18,000,000	67,000	\$269
2001 NHTS	\$10,275,000 (est.)	25,000	\$411

Letter to Dr. Sen, 2002, p.2. Given the source, the NHTS estimated cost is not a final cost.

The estimated cost of the NHTS is less than half that of the earlier NPTS and ATS combined⁴⁸ and raises the question of how big a role budget played in decisions of quality such as sample size and

⁴⁸ Dollars are actual 1995 for NPTS/ATS and 2001 for NHTS.

efforts to reduce the refusal and non-response rates. The committee noted that just under half of the NHTS budget went for design, pretesting, and dataset preparation. Thus, there is a large component of fixed costs for the survey regardless of sample size and increasing the size of the sample or increasing efforts to reduce non-response would not have resulted in proportionally higher per household costs (\$411). Without more information, the likely increase can not be known, but a more robust sample should have a high policy and public value. Certainly the high non-response rate of the recent NPTS/NHTS devalues the results.

American Community Survey (ACS)

Looking to the future, the ACS will help fix an important quality issue of the long-form: timeliness.⁴⁹ It will ask the same type of questions as the long-form from three million households annually. The data for all cities, counties, metropolitan areas, and population groups of 65,000 people or more will be available each year. For areas of 20,000 to 65,000, data will be averaged over three years. While, for areas less than 20,000, data will be accumulated over five years before being reported; this is still less than half the time for the past Census long-form. Data from the first full, 3 million household sample will be collected in 2004.

While there are concerns about the reduction in sample size, there is also a lot of enthusiasm for having state and metropolitan area information every one to three years rather than waiting for a decade. In address at a 2002 conference on the American Community Survey, one statistician summed up the support for continuous data collection and availability:

“Over the years it’s become clear that most estimates of almost any series are good only when nothing happens. I’ve yet to see estimating procedures that capture fast in or out migration, or sudden increases or drops in economic conditions.”

-- Edward J. Spar, Executive Director Council of Professional Associations on Federal Statistics⁵⁰

Some researchers, including some Census analysts, believe the quality of the data may also be improved over the long-form because the ACS staff will be permanent, professional interviewers with extensive training for this one survey instrument. Census staff has touted the potential for improved data quality with the ACS, despite a much lower sample size in any one year.

Collecting data from households is a formidable task. Because the long form is part of the decennial census enumeration, Census Bureau managers are dependent on the hiring and training of hundreds of thousands of temporary employees. Due to schedule and budget constraints, these employees undergo limited training, and as only 1 in every 5 nonresponse cases are long form households, there is less focus on long form data collection than if it were the only questionnaire being used. In contrast, C2SS/ACS staff are permanent professional interviewers (though a substantial fraction were new hires in late 1999 to handle C2SS). These professional interviewers are typically experienced and have undergone extensive training, including methods to encourage participation in the survey.

⁴⁹ While the trade offs of getting three million surveys annually rather than some 19 or more million every ten years are being debated, the fact is that this change will make data for most metropolitan areas available on a frequent, even annual basis.

⁵⁰ Spar, Edward J. *The American Community Survey: Where it Currently Stands*, Council of Professional Associations on Federal Statistics. Available at: <<http://members.aol.com/copafs/acs.htm>>.

This better level of preparedness is expected to lead to both higher response rates and better interview quality.⁵¹

Collection methods also differ from the long-form in that there are two efforts to collect data from households that don't respond to the initial mail-back form. These measures should also improve response rates. The first effort occurs about six weeks after the mail out survey. At this point, interviewers try to contact non-responding households via telephone. For those not responding to the phone attempt, Census will sample approximately one-third of the households through computer assisted personal, or home, interviews. Moreover in areas with high non-response rates, Census will increase the proportion of contacted households and correspondingly reduce the ratio of households contacted in areas with high initial response rates.

Census reports stress the importance of improving both the timeliness and the quality of socioeconomic and demographic data typically produced by the long-form. The agency has adopted the strategy of ensuring a high level of quality to reduce the increase in sampling error that will occur because of the reduced sample size. Early indications are that they are succeeding.

“Over the decade, Census 2000 long form data products will continue to age as ACS data products begin providing an ongoing profile of the nation’s people and economy. However, replacing the decennial census long form implies that the ACS must achieve an acceptable level of quality. The expected outcome is that while sampling error will slightly increase, nonsampling error should be decreased when compared to the decennial census long form. . . . Accuracy measures indicate that the Cwss was of high quality, indicating that the ACS will have the quality to replace the decennial census long form⁵².”

⁵¹ US Census Bureau. *Preliminary Assessment of the Comparability of Census 2000 Long Form Estimates with Census 2000 Supplementary Survey Estimates*, Washington DC. 2001 Refer to: <<http://www.census.gov/acs/www/Downloads/Comparability.pdf>>.

⁵² US Census Bureau, Department of Commerce. *Meeting 21st Century Demographic Data Needs – Implementing the American Community Survey: May 2002*, p. 1.

Section 4. Summary of Findings from Regional Case Studies

To better understand how Census 2000 results compare with other data sources at the metropolitan level, the research included a review of descriptions and data sources for three regions: Washington, DC, Denver, Colorado, and Los Angeles, California. This section summarizes those findings in five areas: 1) Geographic definitions of regions, 2) Economic and demographic conditions, 3) Economic, demographic, and transportation survey limitations, 4) Transportation infrastructure investments, 5) Transit service characteristics. The full research results are included as Appendix A.

1. Geographic Definition of the Region

The geographic definition of a region is important to how transit use is characterized. Current Federal Office and Management & Budget (OMB) definitions of consolidated metropolitan statistical areas (CMSAs), primary metropolitan statistical areas (PMSAs), and metropolitan statistical areas (MSAs) are defined by jurisdictional boundaries (city and county boundaries) and often include large tracts of rural agricultural, rural undeveloped, and protected lands. These boundaries are informed by economic relationships between jurisdictions, including work location. In many cases, newly added counties have a growing relationship, not with a region's core jurisdictions, but with counties at the periphery of the region as defined by the prior Census.

Based on OMB definitions, some regional boundaries were greatly expanded between 1990 and 2000. Much of the outlying territory in CMSAs, MSAs, and PMSAs, feature very dispersed settlement patterns with little or no transit service. In the Washington DC PMSA, for example, over 2,500 square miles of mostly rural territory were added to the 1990 MSA to create the PMSA in 2000. The inclusion of these areas in regional definitions tends to de-emphasize the relevance of transit in regions.

Using the urbanized area boundary definition of regions better aligns with settlement patterns, transit service areas, and transportation system use. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) planning requirements specify that Metropolitan Planning Organizations (MPOs) plan for the existing urbanized area and the area likely to become urbanized in 20 years.

"Although the urbanized area statistics are not used extensively in this report, they have real value - particularly in transit analysis, which often predominately focuses on the densely built-up parts of metropolitan areas."

- Alan Pisarski,
Commuting in America II

2. Economic and Demographic Conditions

Economic conditions and cycles can have a major impact on transportation system use. Economic recessions can have a more severe impact on core jurisdictions in a region where transit service is provided and necessary as an alternative to driving during periods of peak congestion. (This was the case in both the Los Angeles and Washington, DC regions in the recession of the early 1990's.) Economic recessions have a more pronounced impact on wage and salary employment, which is easier to track than measures of total employment (including part time and self-employed persons).

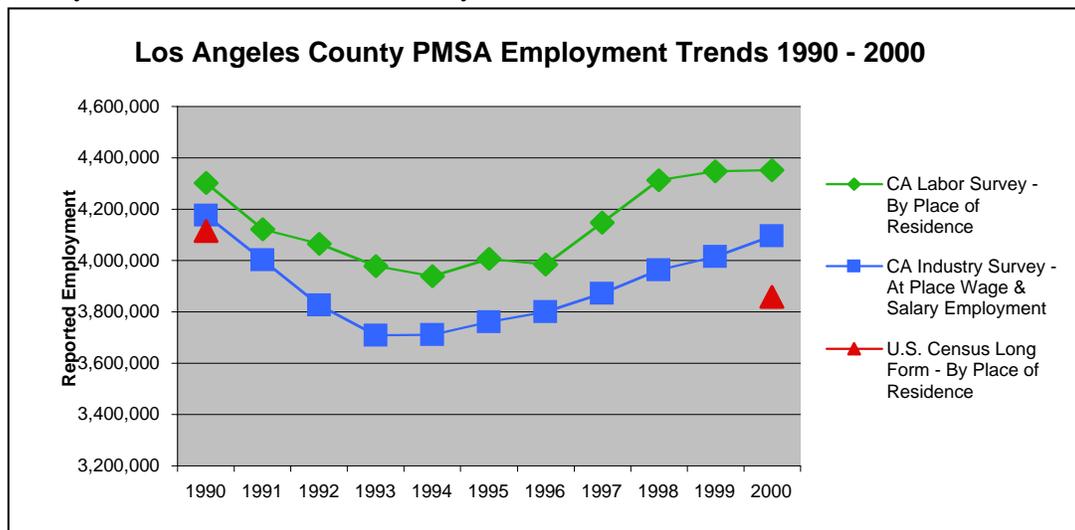
There is considerable literature on the fact that economic recessions often impact transit service, which in turn affects ridership. Jurisdictions that are experiencing economic stress often cut back on operating expenses for transit through cuts in service and increases in fares (both of which can have a dramatic negative effect on transit ridership).

Demographic conditions also vary dramatically by region and can impact how we survey and characterize conditions in regions. Regions with high rates of household turnover (large, very mobile populations in rental housing), high rates of international immigration, a large percentage of non-English speaking households, and households with low incomes all make it more difficult to accurately capture key regional characteristics such as transportation use. These characteristics apply to Los Angeles County, which experienced a severe economic recession in the early to mid-1990's, and to many other core jurisdictions in major metropolitan areas in the US. For example, in Los Angeles:

- The region faced net domestic out-migration in the 1990's (about 1.5 million), which originated almost exclusively from Los Angeles County.
- Net foreign in-migration and natural increase (births - deaths) more than offset the domestic out-migration, with the Los Angeles CMSA gaining 446,387 households and 1,842,116 people according to the census. Even in the Los Angeles County PMSA, which bore the brunt of domestic out-migration, an increase of 119,431 households and 656,174 people occurred according to the Census 2000.
- In 2000, 3.5 million residents or 36.8 percent of Los Angeles County PMSA residents were foreign born, up from 2.9 million or 32.7 percent in 1990.

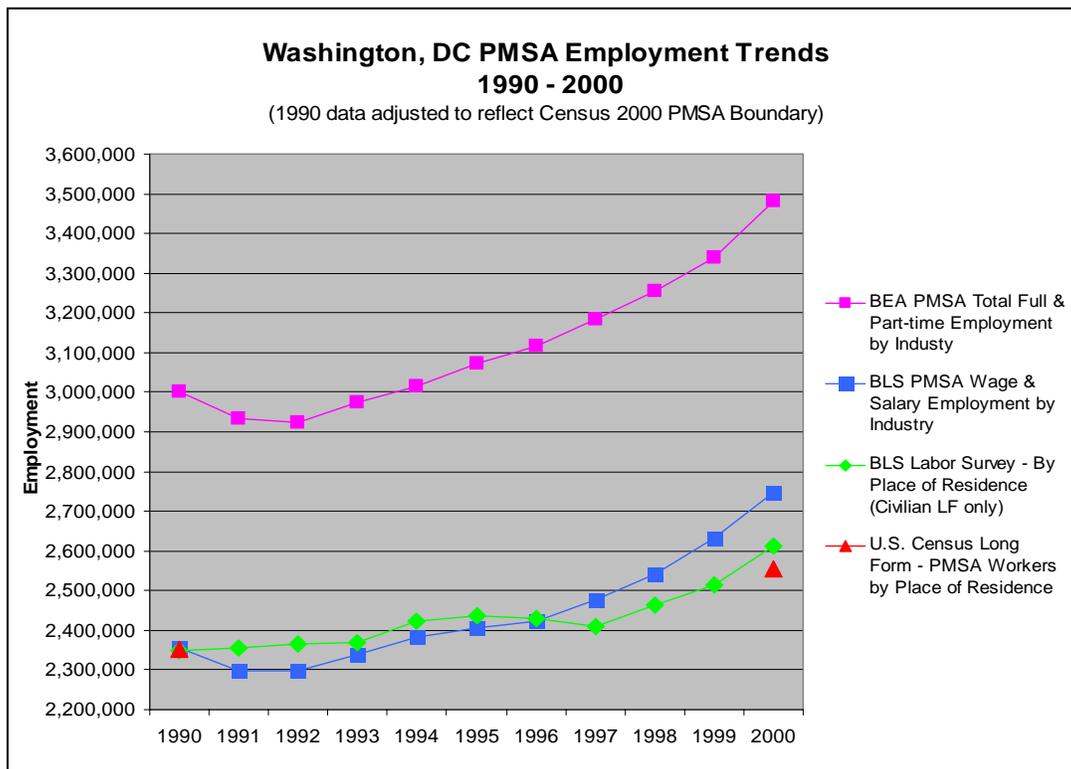
3. Economic, Demographic and Transportation Survey Limitations

All surveys have limitations and need to be put in an appropriate context. In the area of employment and worker survey data, there are multiple information sources including monthly resident employment surveys, monthly employer surveys and the decennial US Census, among the more prominent sources. For this assessment, state labor and employer data, Bureau of Labor Statistics data, Bureau of Economic Analysis data, and census data were all reviewed, as indicated in the survey notes at the end of this summary.



In all regions evaluated, there was an increasing deviation between Census-defined workers and other data sources between 1990 and 2000, which may suggest that some workers were not counted in the census. This is relevant to transportation because Census-defined workers are the basis for the journey to work statistics. In the case of Los Angeles County, the gap between the state labor survey and the Census was over 550,000 in 2000. In the District of Columbia, the 1990 Census records for number of resident workers tracked closely with District statistics in that year; the census counting 304,428, less than 1.5 percent below the District Labor Survey estimate. In Census 2000, the gap had widened. The District labor survey for May 2000 counted 290,000 civilian employed residents, while the Census 2000 counted 260,844. The spread between these two counts had widened to over 10 percent in 2000. These differences are highly relevant to transportation because District resident workers are much more likely to use transit or other non-auto modes of travel.

The US Census Bureau's own analysis shows that the gap between regional labor surveys and the 2000 census data was statistically significant and warranted further study. If there was a significant undercount of workers in some large metropolitan areas and urban jurisdictions in the Census 2000,



it would be informative to know who they were and how they traveled. Given the comparability of the profile of the transit rider to the non-respondent and to undercounted populations, counts of transit commuters are likely to have been affected.

4. Transportation and Infrastructure Investments

The scope and timing of major transit and street/highway improvement can have a major impact on both short and long term transportation system use and survey results. If a region is investing primarily in facilitating private vehicle travel, it will have an impact on the viability of other modes (transit, walking and cycling). Expansions in the street and highway system capacity can be

quickly consumed by users since the investments in the fleet (mostly private) have been made and the development patterns are already in place to support the use of that extra capacity.

In the case of major fixed transit infrastructure investments (rail or busways), many supporting steps are required to foster an appropriate level of use and public benefit. Travel patterns need to change more substantively, supporting infrastructure is required, and land use/development patterns need to change in many instances. As a result, the ridership benefit may be five, ten or more years beyond the completion of the investment.

In all three regions studied, substantial fixed transit infrastructure investments were made during the 1990's. In the case of Denver, the starter light rail service did not open until 1994. The potential benefits of these investments on regional transportation patterns will likely emerge during the current decade. It should be noted that the District's rail investments are more mature than Denver or Los Angeles and have fostered land use changes in some parts of the region that have increased transit use, such as the Rosslyn-Ballston Corridor in Arlington County, VA.

5. Transportation Service Characteristics

Unlike street and highway infrastructure investments, which are all but impossible to remove once these are opened for public use (by a vast, existing private vehicle fleet), transit service characteristics can be changed quite dramatically in the short term by transit operators and local jurisdictions. In both the District of Columbia and Los Angeles County, there were dramatic reductions in bus service by the regional transit provider in the early to mid 1990's due to recessionary conditions and budget pressures. In the case of the Los Angeles, the expansion of rail transit also had an effect on bus service. These cuts were partially offset by expansions by other local transit providers.

Service characteristics can also change with fixed rail systems. Rail frequency can be reduced. Reliability can be reduced by deferring needed maintenance. As such, any evaluation of the utility of these different transportation investments needs to be put in the appropriate context.

Notes on Surveys to Describe the Labor Force and At-Place Employment:

- 1. US Department of Commerce - Census Bureau - Decennial Census Long Form Survey:** A decennial survey of approximately one in eight households nationally last conducted in April 2000. This survey utilized mail-in forms with follow-up data collection and estimation/imputation steps by Census Bureau workers. This long form survey collects a broad range of detailed household data that is not captured in the national summary form. In the area of employment and travel patterns, all information tracks back to the definition of "workers." This definition ties to question 21 on the Long Form Survey, and assumes that each person 16 years or older in the household filled in this question: "Last week, did this person do any work for either pay or profit? (Mark the yes box even if the person worked only 1 hour, or helped without pay in a family business or farm for 15 hours or more, or was on active duty in the military). With this question, the Census is tracking household members 16 years and older that are eligible to be in the workforce. Workers that are on vacation, leave of absence, unemployed in the prior week are not counted in the subsequent journey-to-work statistics. Unlike at-place employment statistics and the income statistics, the Census Long Form is a household self-reported survey instrument.
- 2. U.S Department of Labor - Bureau of Labor Statistics (BLS)/State Labor Department At-Place Employment Survey:** A monthly national survey of payroll records covering over 390,000 businesses, which provides detailed industry data on non-farm filled payroll positions for all 50 states and 270 metro areas. This is a state/federal government cooperative endeavor. Persons with more than one payroll position in the month will be counted for each payroll position. Several categories of workers are excluded from this survey: sole proprietors/self-employed workers, unpaid family or volunteer workers, farm workers, and employees of foreign governments and some international organizations. This survey is based on place of work vs. place of residence.
- 3. BLS/State Labor Department Labor Force Survey:** A monthly national survey of 60,000 households called the Current Population Survey. This data is collected by personal and telephone interviews. This survey covers the civilian non-institutional population 16 years and older. The purpose of the survey is to determine who is and is not in the labor force, and the level of civilian employment and unemployment. Employed persons are all those who did any work for pay or profit during the survey reference week; all persons who did at least 15 hours of unpaid work in a family-operated enterprise; and all persons who were temporarily absent from their regular jobs because of illness, vacation, and other reasons. If a person is employed in more than one job, they are still only counted once as employed. This survey is organized by place of residence as opposed to place of work.
- 4. US Department of Commerce - Bureau of Economic Analysis (BEA) Estimate of Total Full-time and Part-time Employment by Industry:** This is an annual estimate of employment by industry for counties as a supplement to the estimates of earnings-wages and salaries, other labor income, and proprietors' income, in the personal income series. Employment, as reflected in the BEA sub-national estimates, consists of the number of wage and salary jobs plus the number of sole proprietorships and the members of partnerships except for limited partners. This count also includes some full and part-time positions held by US residents with foreign embassies/ consulates and international organizations where the jobs are based in the US. Active-duty military employment is also counted in this measure. As such, this measure of employment is more inclusive than the BLS at-place employment survey. This BEA annual employment estimate is derived from tabulations by the State employment security agencies (ESAs) from their State employment security reports (form ES-202). Each quarter, the State ESAs submit the ES-202 tabulations to the Bureau of Labor Statistics, which provides the data to BEA. BEA adds several million administrative records received from the States and the District of Columbia to its database annually. The BEA runs a series of programs to check for errors and anomalies before producing the estimate.

Section 5: Making Transit Count

Conclusions and Recommendations

Totaling it all up, there are plenty of reasons to seek new and better data sources to support transportation planning and decision-making. The counts of employed persons from the 2000 long-form deserve much more attention and raise legitimate concerns with the journey to work data, as do changes in processing the 2000 data. The NHTS needs greatly increased support, as well as evaluation to bring it to the point where it can fill in the information gap.

What the current short-comings illustrate most is the more important, longer term issue: the lack of comprehensive information on travel that is of high quality and timely. This should not have been expected from the decennial census, which is primarily designed and conducted for enumeration – after all only every 10 years. Nor are we likely to get the detail needed from the new American Community Survey, where data will be more timely, but the “real estate” still will be expensive. The reality is that, despite the importance of travel data to transportation planning and investment, there is a dearth of good information on most aspects of local and intercity travel. We have relied heavily on the census because there is not much else out there for the transportation industry. The demographic and transportation data from census are extremely valuable, but inadequate to meet all the primary information requirements on transportation today. The purpose of the NHTS is laudable, but the delivery is too variable. Significant improvement is needed to bring it up to standard with other federal household surveys.

Metropolitan travel and transit surveys can do much to fill the gap at the local level. There is not yet, however, sufficient agreement on standard questions to be able to aggregate these efforts to national results. Moreover, very few regions have been able to afford regular surveys that provide timely data.

There is much at stake for the transit community in making sure that transit gets properly counted in travel surveys, both nationally and locally. Some issues of survey design are important technical questions that should always reside with the statisticians, but there are policy decisions embedded in the census and other transportation surveys like the NHTS that deserve to be debated outside of narrow technical disciplines. For these reasons, transit leaders should join forces with other transportation interests to support and ensure the quality of survey efforts. Recent US DOT discussions with Census have included the question of allowing multimodal answers as part of the limited journey to work data. This discussion gives transit interests an opportunity to weigh in to improve the amount of information from the new ACS and to support continued efforts to ensure quality data.

Results from the survey tests for the ACS are promising. And, not just because the picture they offer of transit is a closer fit to the industry’s experience. By key measures of accuracy, the quality of the ACS data is improved over recent decennial results. What is needed most is to show continuing support for the quality of the ACS product.

Given the limited scope of transportation information provided by the ACS, however, it is important to support steps to substantially improve the quality of the NHTS or similar broader surveys to ensure more detailed, and frequent, information on which to make sound transportation policy decisions. Investment in the quality of the information also must be assured if it is to provide reliable information about transit.

With funding always a concern, however, achieving this goal across all parts of the country may be unrealistic. As a budget-constrained option, the survey could focus on the top 50 congested metropolitan areas every two years and conduct a nationwide survey regularly every six years – the current average. This would focus on the greatest areas of concern, but continue to provide a national travel picture. Make no mistake, it would still mean a greater statistical budget at US DOT and possibly Census.

These policy decisions do influence how transit is counted – in transportation investment analysis, in local development plans, in project development, as well as politically.

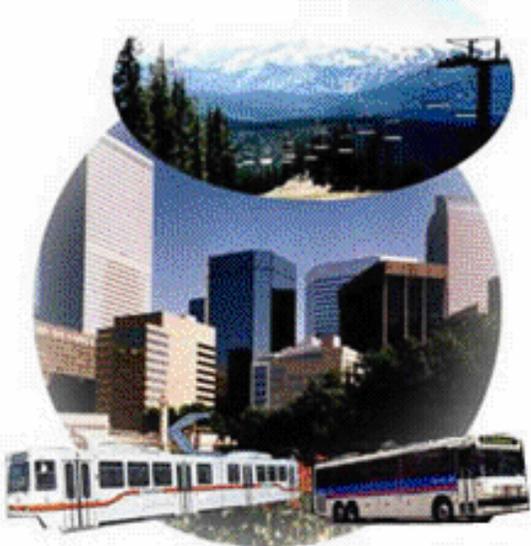
Appendix

Contents

1. Denver, Colorado Region 1990 - 2000
2. Los Angeles, California Region 1990 - 2000
3. Washington, DC Region 1990 - 2000
4. Metropolitan Transportation Surveys
5. Bibliography

Denver, Colorado Region 1990 - 2000

Geographic Definitions of the Region

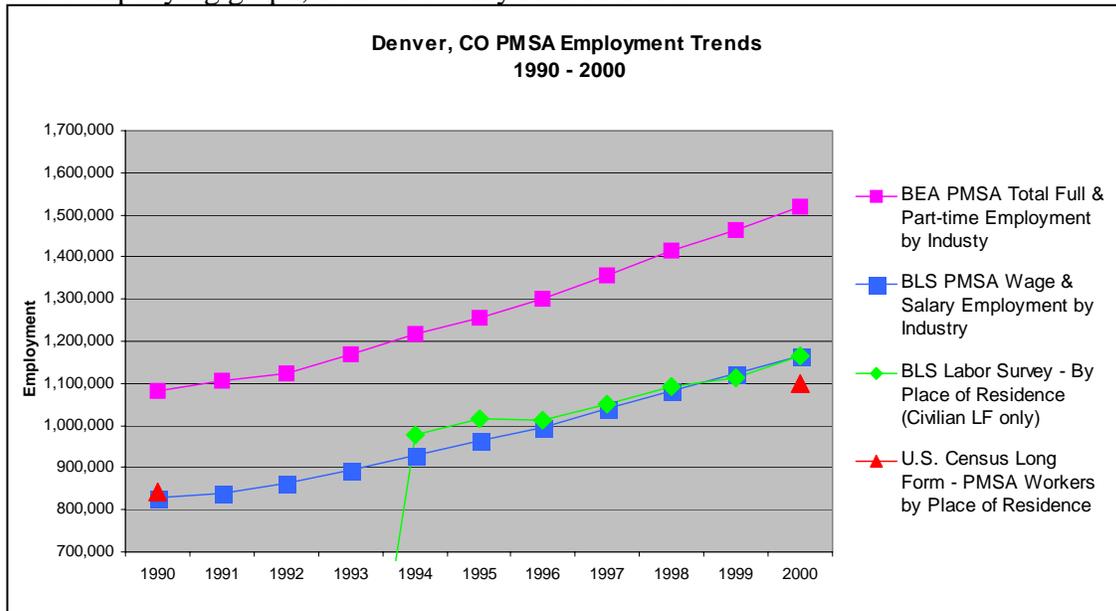
- The Denver-Boulder-Greeley Consolidated Metropolitan Area covers 8,046 square miles (much of this is in agricultural and natural protection districts). This CMSA is divided into three PMSAs: The Denver PMSA at 3,246 square miles (consisting of Denver City and Adams, Arapahoe, Douglas, and Jefferson Counties), the Boulder-Longmont PMSA at 779 square miles (consisting of Boulder City, Longmont and Boulder County) and the Greeley PMSA at 4,021 square miles (consisting of the City of Greeley and Weld County).
- 
- The CMSA boundaries were changed between 1990 and 2000. In 1990, the CMSA was comprised of the Denver PMSA and the Boulder-Longmont PMSA. The City of Greeley and Weld County, at 4,021 square miles, was not part of the 1990 CMSA definition.
 - The Census 2000 definition of the urbanized area for the Denver, Colorado PMSA was 498.8 square miles, 15.4% of the PMSA region. The defined urbanized area for the 1990 Census was 459 square miles, 14.1% of the PMSA region.
 - The Denver Regional Council of Governments (DRCOG), is the designated metropolitan planning organization for the Greater Denver Region. Its planning boundary for transportation includes the Denver PMSA, the Boulder PMSA, and two rural counties to the west of Denver, Gilpin County (4,800 persons and 151 square miles) and Clear Creek County (8,625 persons and 395.5 square miles). The DRCOG planning area covers 4,372 square miles of territory ranging from areas that are highly urbanized to rural and wilderness areas. For the purposes of transportation planning, DRCOG divides the region into an MPO Transportation Management Area consisting of the Denver PMSA less the eastern half of Adams and Arapahoe Counties (which are rural), and the Boulder PMSA. The eastern half of Adams and Arapahoe Counties along with Gilpin and Clear Creek Counties are in the Mountain and Plains Planning Area.

- These geographic definitions are important because transit use mostly occurs in the urbanized area (areas outside the boundary generally are rural or feature very low-density development and have little or no transit service). For the purposes of this review, the Denver PMSA, and the Denver-Aurora Urbanized Area will be used. In both the 1990 and the 2000 Census, over 98% of workers identified as using transit were in the urbanized area.

Economic & Demographic Information:

Employment

- According to the Census, the number of resident workers in the City of Denver increased from 231,503 in 1990 to 278,715 in 2000 (a 20.4% increase). Looking at the urbanized area, resident employment expanded from 789,327 in 1990 to 1,034,518 in 2000 (a 31.1% increase). In the PMSA, the number of Census reported resident workers increased from 843,738 in 1990 to 1,100,029 in 2000 (a 30.5% increase).
- According to the US Bureau of Labor Statistics (BLS), at-place wage and salary employment in the Denver PMSA grew at a faster rate than Census documented workers between 1990 and 2000. At-place wage and salary employment expanded from 828,040 in 1990 to 1,165,374 in 2000, a 40.7% increase. A comparison between BLS Labor Survey data and the Census could not be made for the period because labor survey data was no longer readily available for the years 1990 through 1993. See the accompanying graph, Denver County PMSA trends.



- As in the case of other metropolitan regions, the U.S Bureau of Economic Analysis (BEA) has estimated a much larger pool of jobs in the PMSA and an increasing

divergence from the Census between 1990 and 2000. BEA documented 1,082,867 full and part-time positions in the Denver PMSA in 1990. In 2000, BEA documented 1,519,288 full and part-time positions (for a growth rate of 40.3%). For each Census documented worker in 1990, there were 1.28 full and part-time BEA documented positions. In 2000, this ratio increased to 1.38.

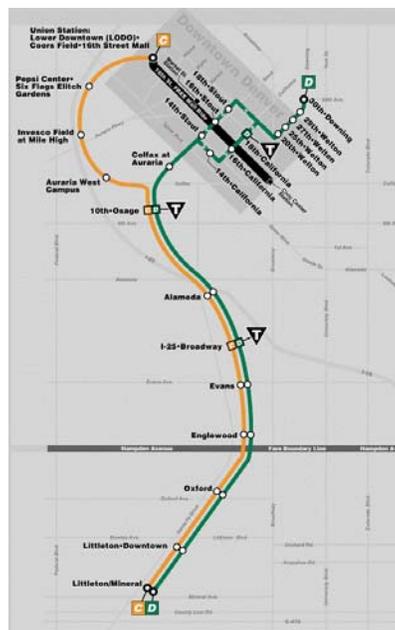
- The divergence between US Census identified resident workers in 1990 and 2000 and the BLS and BEA statistics is statistically significant and may suggest that there are problems with the journey-to-work data. If there was an undercount in the number of workers, who wasn't counted and what form of transportation did these workers take?

Population & Households

- According to the Census, the population of the Denver PMSA increased from 1,622,980 in 1990 to 2,109,282 in 2000 (+30%). In the defined Denver-Aurora Urbanized area, the population expanded from 1,517,803 to 1,984,585 (+30.8%). In 2000, 94% of the population resided in the urbanized area. The City of Denver also experienced population growth during the period, with its population increasing from 476,610 to 554,636 (+18.6%).
- Households increased at a similar rate from 1990 to 2000. Households in the PMSA increased from 649,404 to 825,291 (+27.1%). In the urbanized area, households increased from 614,006 to 781,774 (+27.3%). In the City of Denver, households increased from 211,137 to 239,235 (+13.3%).

Transportation:

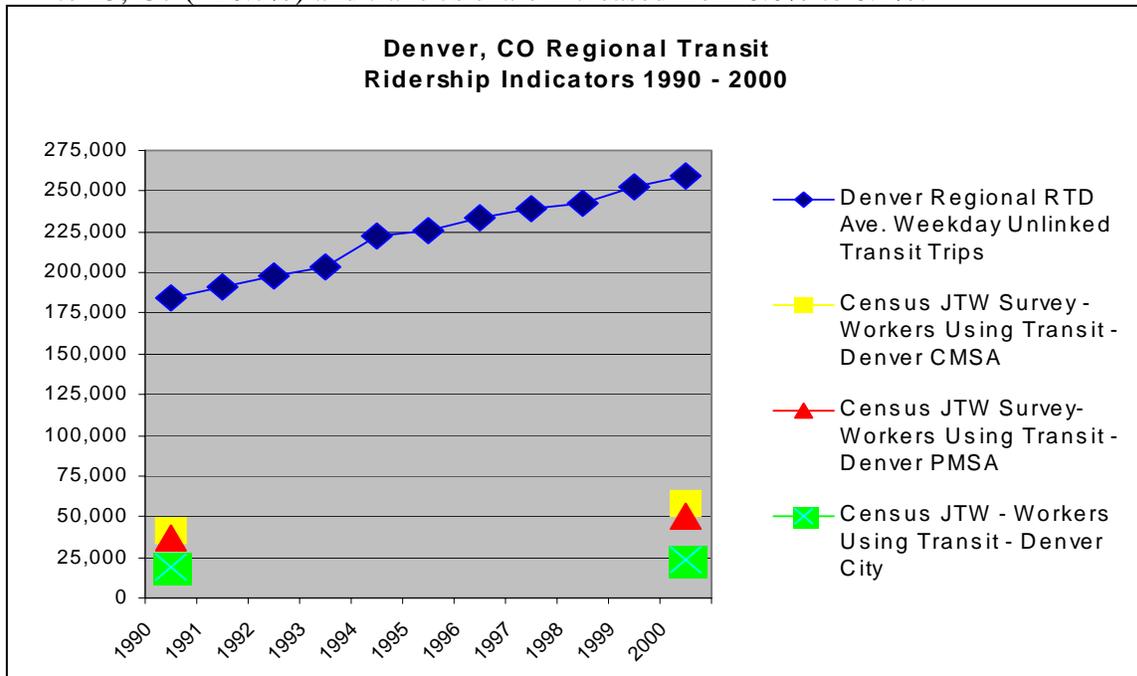
- The Regional Transportation District (RTD) is the transit service provider for the Denver Region. RTD, which supplies bus, light rail and paratransit service, provided 183,984 average weekday unlinked trips in 1990. This number grew to 259,703 in 2000, an increase of 41.2%. Average weekday light rail ridership grew from 12,743 in 1994, the first year of the 5.3-mile starter line, to 22,467 in 2000 (some of this increase is due the opening of a 9-mile extension in the summer of 2000). Average weekday bus ridership increased during the period, even with the opening of light rail. Ridership grew from 183,984 in 1990 to 237,236 (a 29% increase). See graph on following page.



- According to the Census, at the Denver PMSA

level, workers using transit as their primary mode of travel to work increased from 36,738 in 1990 to 50,399 in 2000 (+37.2%), and transit's share increased from 4.4% to 4.6%.

- Looking at the urbanized area, according to the Census, workers using transit increased from 36,173 in 1990 to 49,595 in 2000 (+37.1%) and transit's share increased from 4.4% to 4.8%.
- In the City of Denver, the share of resident workers using transit increased from 18,500 to 23,437 (+26.7%) and transit's share increased from 8.0% to 8.4%.



Transit System & Service Changes:

- RTD initiated service on a 5.3-mile light rail starter line in 1994. Prior to that date, the region had no local rail passenger service. System extensions were not open for service until after the 2000 Census. A nine-mile southwest extension opened in the summer of 2000, and a 1.8-mile extension east to the Platte Valley and Denver's Union Station with four stations, opened in the summer of 2001. Another 19-mile extension to the southeast with 12 stations is currently under construction as part of the T-REX multimodal project.
- Most of the ridership increase from the first 16.2 miles of light rail service is likely to occur in this decade, not in the 1990 to 2000 period.
- RTD also undertook a large-scale expansion of bus service in the region between 1990 and 2000. Bus revenue hours of service and revenue miles both increased by 44% during the period.

Los Angeles Riverside-Orange County, California Region

Geographic Definitions of the Region

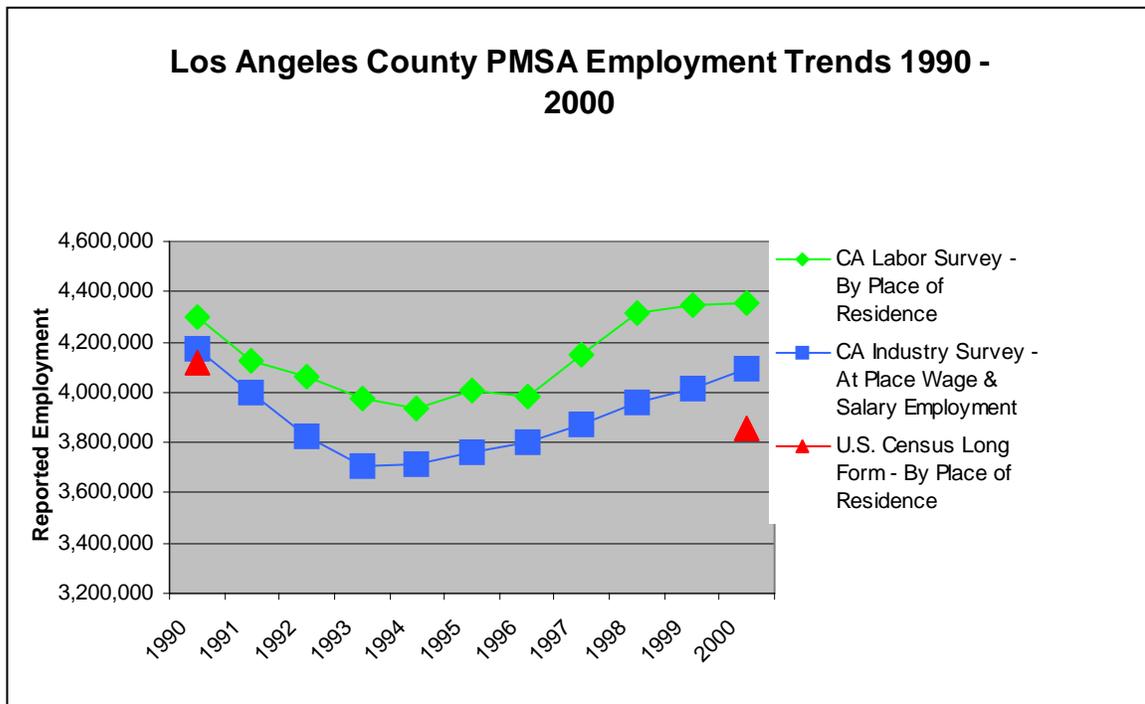
- The statistical definition for the Los Angeles-Riverside-Orange County Region Consolidated Metropolitan Statistical Area (CMSA) consists of Los Angeles County, Orange County, Ventura County, Riverside and San Bernardino Counties. The first three counties listed are stand-alone Primary Metropolitan Statistical Areas (PMSAs). Riverside and San Bernardino Counties are combined to make up the region's fourth PMSA.
- The geographic definition of the PMSAs and the CMSA did not change between 1990 and 2000.
- The CMSA is geographically vast, encompassing 33,966 square miles extending from the Pacific Coast to state border with Nevada and Arizona. The center of the region, Los Angeles County, is 4,060 square miles. In both the 1990 and 2000 Census, less than 10% of the total CMSA area was designated as urbanized. In 2000, approximately 3,000 square miles was designated as urbanized.
- The CMSA includes multiple urbanized areas given the region's topography and dispersed development pattern. In 2000, the largest of these are Los Angeles-Long Beach-Santa Anna (LA & Orange Counties) -1,668 square miles, Riverside-San Bernadino - 439 square miles.
- In 2000, 72% of the region's population lived in the Los Angeles-Long Beach-Santa Anna Urbanized Area. Over 95% of the region's population lived in one of eleven designated urbanized areas.
- The urbanized area designations are important because transit service coverage generally falls within these boundaries.

Economic & Demographic Information

Employment

- The Greater Los Angeles Region experienced a major recession and regional economic restructuring during the period between 1990 and 2000.

- During the first three years of the 1990's, the region lost nearly 1/2 million jobs due to the significant job loss in defense-related industries.
- Wage and salary employment declined from 1991 to 1993, and grew from 1993 to 2000.
- In 2000, the region's unemployment rate dropped to below 5% after peaking at over 9% in 1993.
- Different measures of employment and workers describe differing patterns of what happened in the region during the decade.
- At the Los Angeles County PMSA level, the monthly State of California Labor Survey shows resident employment at just over 4.3 million in 1990, declining to less than 4 million in 1994, before recovering to almost 4.4 million in 2000. The State of California At-Place Wage and Salary Employment Survey shows employment at just under 4.2 million in 1990, dropping to just over 3.7 million in 1993, before expanding to 4.1 million in 2000. The 1990 US Census identified just over 4.1 million workers in Los Angeles County. In 2000, the Census identified just over 3.8 million. The three measures of employment and workers showed an increased deviation between 1990 and 2000 with the 2000 Census recording a substantially lower level of employment than the other two measures. The 1990 Census was 187,000 below the Labor Survey in that year. The 2000 Census was over 494,000 below the Labor Survey in 2000.



- This same pattern holds true at the CMSA level, with the 2000 Census recording over 865,000 fewer workers than the State of California Labor Survey in that year.
- This pattern of deviation is statistically significant and is relevant to the measure of work-related transit use. The US Census journey to work data ties directly back to the number of workers captured by the Census long-form. If the Census 2000 long-form has undercounted workers in the Los Angeles PMSA and CMSA, it raises questions about who wasn't counted and how they traveled.

Population and Households

- Due to the severe recession, the region faced net out-migration in the 1990's (about 1.5 million) which originated almost exclusively from Los Angeles County
- Net foreign in-migration and natural increase (births - deaths) more than offset the domestic out-migration in the 1990s with the Los Angeles CMSA gaining 446,387 households and 1,842,116 people according to the Census. Even in the Los Angeles County PMSA, which bore the brunt of domestic out-migration, experienced an increase of 119,431 households and 656,174 people according to the 2000 Census.
- In 2000, 5 million or 31% of Los Angeles CMSA residents were foreign born, up from 3.94 million or 27% in 1990.
- In 2000, 3.5 million residents or 36.8% of Los Angeles County PMSA residents were foreign born, up from 2.9 million or 32.7% in 1990.

Transportation

- Between 1990 and 2000, VMT increased at the same rate as population (13%) according to the state transportation department, CALTRANS.
- Contrary to the national trend, the percentage of households without a car in the region actually increased from 1990 to 2000 according to the US Census. In the Los Angeles CMSA, the percentage of car less households grew from 8.9% to 10.1% of total households. In the Los Angeles County PMSA the percentage of car less households grew from 11.1% to 12.6% of total households.
- According to the Southern California Association of Governments, work trips account for approximately half of all transit trips in the region.
- In 2000, total annual unlinked transit trips in the region reached 630 million. This is an increase of 20% from



the 1990 level, where 525 million unlinked transit trips were recorded.

- Annual transit trips per capita increased in the Los Angeles CMSA from 36 transit trips in 1990 to 38 transit trips in 2000. In Los Angeles County, where most of the transit service is concentrated, annual transit trips increased from 50 to 55 from 1990 to 2000.
- The US Census reported the number of workers using transit in the Los Angeles CMSA was essentially the same between 1990 and 2000, increasing slightly from 310,563 in 1990 to 315,544 in 2000. At the Los Angeles County PMSA level, the Census reported a decline in workers using transit over the decade, from 267,210 workers in 1990 to 254,091 in 2000.
- LACMTA continues to be the primary transit provider in the region, accounting for 70% of the total unlinked trips in the region. However, there are now 30+ transit systems/providers in the Los Angeles CMSA
- Based on the FTA Year 2000 reports, over 1.9 million unlinked passenger trips were taken on the average weekday in the Los Angeles CMSA, 6.6% of total national transit trips.



Transit System and Service Changes

- The Los Angeles Region experienced dramatic changes in transit facilities and services between 1990 and 2000.
- The Los Angeles County Metropolitan Transportation Authority, the largest transit provider in the region, completed a series of light and heavy rail transit projects during the decade. The 22-mile Metro Blue Line light rail extending from Downtown Los Angeles to Long Beach, opened in 1990. The Metro Green Line light rail extending from Norwalk to El Segundo near LAX, opened in 1995. The Metro Red Line subway was opened in segments extending from Union Station to Wilshire/Western in 1996, to Hollywood in 1999, and to North Hollywood in 2000. As of 2000, the Metro Gold Line light rail from Union Station to Pasadena was under construction but not open. In 2000, average daily weekday heavy rail and light rail system ridership was over 174,000.
- The Southern California Regional Rail Authority (SCRRA), developed and opened an extensive commuter rail system during the decade. Service was initiated in 1993 and expanded periodically during the remaining part of the decade, operating over 770 directional route miles. In 2000, average weekday ridership was over 26,000.
- The bus network, operated by LACMTA and 28 other providers supplies the most of the transit service in the Los Angeles CMSA and Los Angeles County and accounts for 89.5% of the ridership in 2000.

- During the economic downturn in the early 1990's, bus service and ridership declined in the region, particularly for the dominant transit provider LACMTA. Between 1989 and 2000, annual bus unlinked passenger trips declined by 12.9%. This decline was offset by the growth of local transit service providers, and the growth in rail transit service.

Washington, DC Region 1990 - 2000

Geographic Definitions of the Region

- The statistical definition for the Washington, DC Region was changed by the federal Office of Management and Budget (OMB) between the 1990 and 2000 Census. In 1990, the Washington, DC MSA consisted of the District of Columbia, five counties in Maryland (Frederick, Montgomery, Prince George's, Calvert and Charles), and 10 counties and cities in Northern Virginia (Arlington, Alexandria, Falls Church, Fairfax, Fairfax City, Loudoun, Prince William, Manassas, Manassas Park, and Stafford) encompassing a land area of 3,966 square miles.
- For the 2000 Census, the definitions have been changed to create the Washington, DC CMSA that included Baltimore and its suburbs for the first time. The Washington, DC PMSA, which is more comparable to the 1990 MSA definition, was greatly expanded to include more jurisdictions in Virginia and West Virginia. Six additional Virginia counties and two West Virginia counties were added to the region, which resulted in the addition of 2,534 square miles of mostly rural territory, or sparsely developed, a 65% increase in area from the 1990 MSA definition. The Census 2000 PMSA definition includes 6,500 square miles of territory.
- These rural counties were added by OMB because of a growing economic relationship between these rural counties and the existing Washington, DC region.
- The Census 2000 definition of the urbanized area for the Washington, DC PMSA included 1,156 square miles, 18% of the PMSA region. The defined urbanized area for the 1990 Census was 944.6 square miles, 24% of the MSA region.
- The Metropolitan Washington Council of Governments (COG) operates with several different planning boundaries. Its member jurisdictions include all local governments within the 1990 boundary of the Washington DC MSA with the exception of Charles and Calvert Counties in Maryland, and Stafford County in Virginia. COG also serves as staff to the Transportation Planning Board (TPB), the federal designated Metropolitan Planning Organization for the greater Washington Region. For the purpose of transportation surveys and air quality conformity analysis, the TPB includes Calvert, Charles and Stafford Counties.



- These geographic definitions are important because transit use mostly occurs in the urbanized area (areas outside the boundary generally are rural or feature very low density development and have little or no transit service). Of the 285,398 workers that were identified as using transit in the 2000 Census for Washington, DC PMSA, 275,053 persons resided in the urbanized portion of the region (96.4%).
-

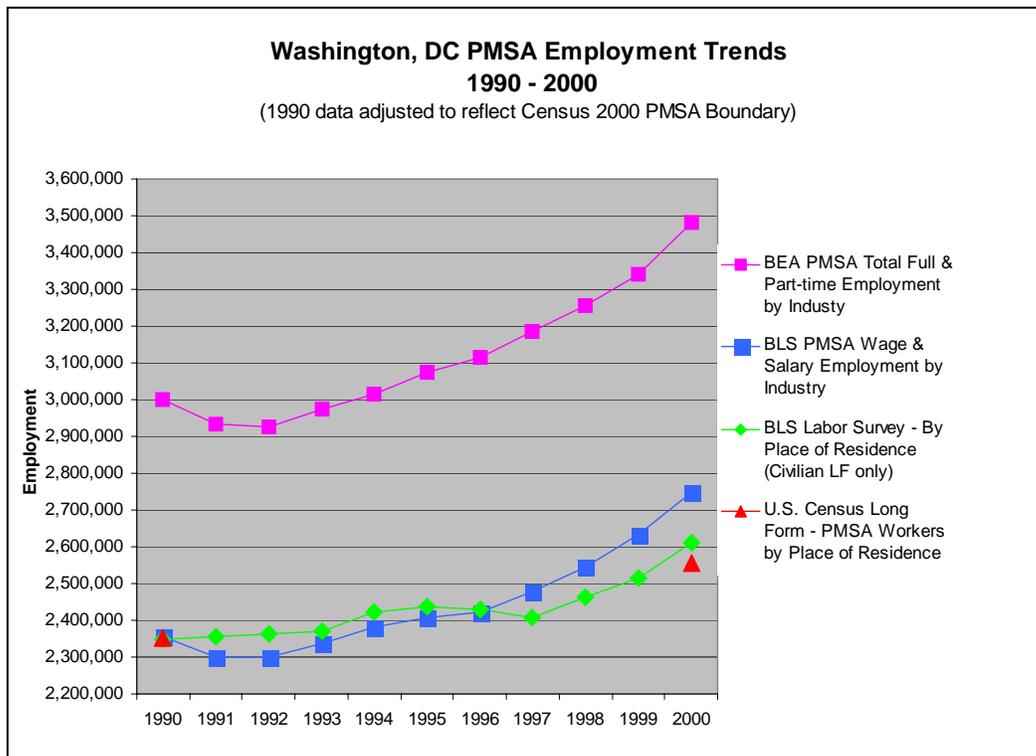
Economic & Demographic Information

Employment

- Economic cycles have a major impact on transportation system use, and have a pronounced impact on work trips, particularly those made by transit.
- The District of Columbia experienced severe economic and financial stress in the middle of the 1990's with recorded civilian wage and salary employment dropping from over 308,500 in 1990 to a low of under 235,000 in 1997 according to statistics maintained by the District's Department of Employment Services. However, the District's statistics also show a tremendous recovery that started in 1997 and continued through 2000, where reported resident employment increased to 290,000 by May 2000.
- The 1990 Census records for number of resident workers tracked closely with District statistics in that year. The Census counting 304,428, less than 1.5% below the District Labor Survey estimate. In the 2000 Census, the gap had widened. The District labor survey for May 2000 counted 290,000 civilian employed residents. The 2000 Census counted 260,844. The spread between these two counts had widened to over 10% in 2000. These differences are highly relevant to transportation because District resident workers are much more likely to use transit or other non- auto modes of travel.
- Looking at industry employment survey data, the District of Columbia also experienced a drop in at-place employment reported by industry. Wage and salary employment, tracked by BLS and the District's Department of Employment Services, dropped from 680,000 in 1990 to a low of 613,500 in 1998, before increasing to 650,000 in 2000. Over 90% of this reduction was caused by a substantial decrease in federal and local government employment in the District. The District ended the decade with 29,800 or 4.4% fewer covered employment jobs then it had in 1990. Looking at the more comprehensive measure of employment provided by the Bureau of Economic Analysis (BEA), which includes sole proprietors, part time employment, and employees of international organizations, employment declined from 788,700 in 1990 to a low of 718,200 in 1997, and then increased to 766,000 in 2000. By this measure, the District's employment base declined by 2.9% over the decade.
- The Washington, DC PMSA as a whole experienced growth of slightly over 11% in civilian resident employment according BLS resident labor survey, expanding from 2.35 million in 1990 to 2.61 million in 2000. The Census in 1990 counted 2.35 million

total workers in 1990 and 2.55 million workers in 2000, an 8.5% increase (refer to end note for adjustments to 1990 MSA data). See graph on next page.

- Looking at industry employment survey data, wage and salary employment in the PMSA expanded from 2.36 million in 1990 to 2.75 million in 2000, a 16.7% increase. Looking at the more comprehensive measure of employment provided by BEA, total full and part-time employment in the PMSA increased from 3 million in 1990 to 3.48 million in 2000, a 16.1% increase.
- At the PMSA level, comparing the BEA survey of employment to the US Census documentation of workers, an increasing diversion is apparent. In 1990, there were an estimated 1.27 filled jobs from the BEA survey for every worker identified by the Census long-form. In 2000, there were 1.36 filled jobs for every worker identified by the Census.



Other Regional Sub-area Employment and Development Trends

- The Census 2000 Transportation Package permits an aggregation of data to show workers by place of work. According to this measure, Arlington County, Virginia was shown to have experienced a slight decline in employment from 163,900 in 1990 to 163,600 in 2000. The City of Alexandria showed a bigger decline, from 83,700 in 1990 to 81,400 in 2000 (a 3% decline). Looking at BEA data for this period, it documents that the total number of full and part-time jobs in Arlington County rose from 196,579

in 1990 to 202,018 in 2000 (a 2.8% increase). Alexandria City's own employment records show an increase from 92,209 in 1990 to 98,552 in 2000 (a 6.9% increase). As such the spread between the estimated full and part-time employment for these jurisdictions and the Census estimate of workers increased between 1990 and 2000. In Arlington County, there were 1.24 jobs for every Census recorded worker in 2000, up from 1.199 in 1990. In Alexandria City, there were 1.21 jobs for every Census recorded work in 2000, up from 1.10 in 1990.

- Development that occurred in both jurisdictions during the period also supports the finding of expanding employment during this time period. In Arlington County, 4.4 million square feet of office space, 1.62 million square feet of retail space, and 1,200 hotel rooms were added to the County's commercial inventory (enough development to support 19,000 jobs at full occupancy). In Alexandria City, 1.2 million square feet of office and 676,000 square feet of retail were added to the commercial inventory (enough development to support over 5,600 jobs at full occupancy)
- The growing gap between the number of workers reported on the Census long-form and the BLS and BEA employment estimates is statistically significant and could signal that the Census Journey to Work data may not be yielding an entirely accurate picture for these more transit-oriented jurisdictions.

Notes: For the purposes of analyzing trends for Washington, DC PMSA employment, population and households, the 1990 MSA data has been adjusted to include the 1990 data from the additional jurisdictions that were added to create the PMSA in 2000. This provides a consistent basis for comparison.

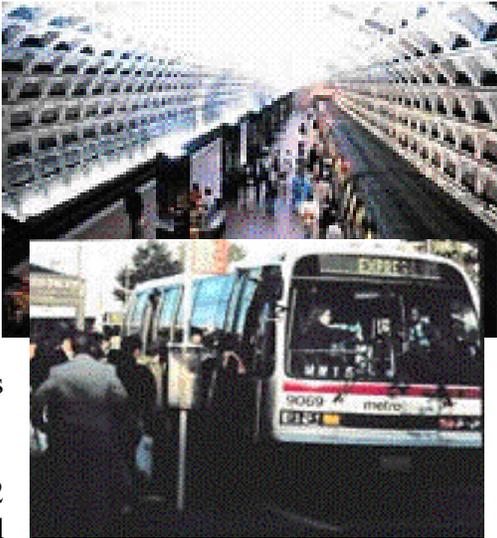
The US Census Bureau has acknowledged that there may be problems with the estimates of employed workers in some jurisdictions, which may stem from confusion over the revised worker question on the Census 2000 long-form, from increased non-response, and/or coverage errors. In a recent report, Comparing Employment, Income, and Poverty: Census 2000 and the Current Population Survey, Census analysts from the Housing and Household Economics Unit concluded that "lower counts of employed persons, and the civilian labor force have been produced from the Censuses than the Population Survey dating back to 1950, but in 2000, the difference between the Census and the Current Population Survey was greater than in the past." This analysis was done by state. The District of Columbia had the largest spread between the two data sources; the 2000 Census recorded 10.2% fewer workers than the Population Survey.

Population & Households

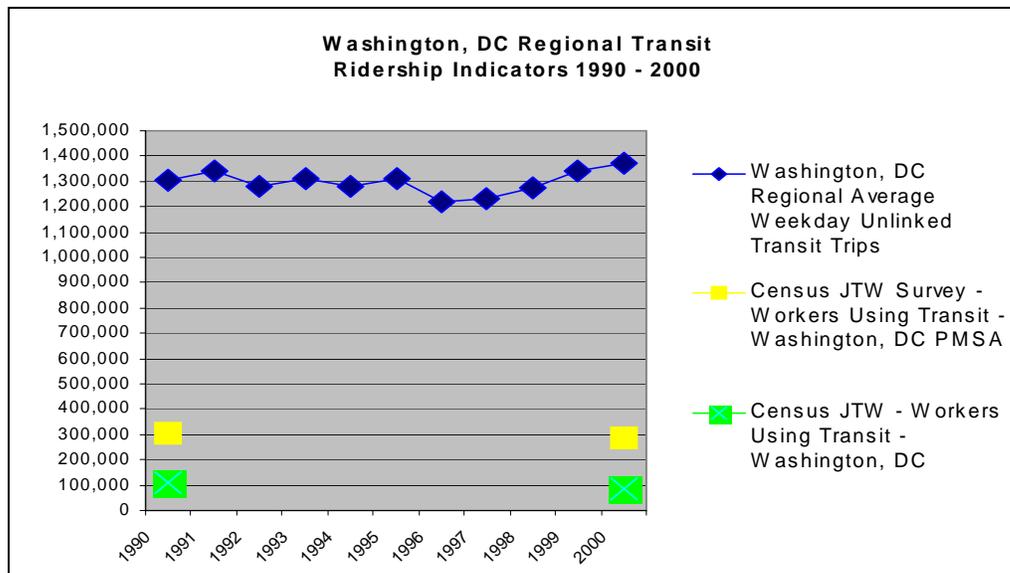
- The Census documented a 5.7% decline in the District of Columbia's population between 1990 and 2000, from 606,900 to 572,059. It also documented relative stability in the number of the District households, which only declined from 249,034 to 248,338.

- The Census documented the addition of 718,695 residents (a 17.1% increase) and 312,089 households (a 20.3% increase) in the Washington, DC PMSA. The statistics for 1990, describing the Washington, DC MSA were adjusted to include the counties that were added to create the Washington, DC PMSA in 2000. Thus, the population, households and workers that were recorded in the 1990 Census for these outer counties were added to the 1990 MSA totals to provide a consistent basis for comparison (refer to the end notes in the prior section).

Transportation

- The Washington Region entered the 1990's with three transit systems: WMATA, which provided 1.24 million average weekday unlinked trips in 1990 (95% of the region's total transit trips), Montgomery County, MD's Ride-On service with 51,500 average weekday trips, and MARC Commuter Rail with 15,000 average weekday trips. The total average weekday unlinked transit trips recorded in the Washington Region in 1990 using transit agency ridership statistics, was 1.306 million.
 
- By 2000, the Washington Region had 12 reporting bus and rail systems that carried approximately 1.37 million people on an average weekday, a 5% increase from 1990. This only covers systems that report ridership to FTA, APTA or local transportation planning organizations. Numerous business, institutional and government shuttle services were established or expanded in the decade that are not in these estimates.
- According to the Census, at the PMSA level, workers using transit as their primary mode of travel to work declined from 304,351 to 285,398, or 6.3%. This doesn't appear to track with the overall ridership trends in the region. This may be explained by a potential undercount of workers in the region as discussed in the section above.
- Looking at the urbanized area, according to the Census, workers using transit declined from 297,342 in 1990 (15.55% share) to 275,053 (13.43% share). This represents a 2.12% drop in transit share over the decade. Also according to the Census, commuting by bus dropped from 143,470 in 1990 to 98,343 in 2000, a 31.5% drop in this mode. Average weekday bus ridership in the region dropped 7.3% over the period according to agency statistics.
- According to the most recent Metropolitan Washington Council of Government's State of the Commute Survey (2001), 18% of survey respondents reported commuting by transit on a regular basis. An additional 1.6% reported occasionally using bus or rail

transit to get to work. These transit use percentages are higher than those reported by the Journey to Work data from the 2000 Census. This survey included all jurisdictions in the 1990 MSA definition of the Washington region, extending over 3,966 square miles.



Transit System & Service Changes:

- Between 1990 and 2000, the Metrorail System was expanded by 22.36 miles, and 17 stations were opened. This expansion took place in Maryland, the District and Northern Virginia. There was also a major expansion in the parking supply at suburban Metrorail Stations. Average weekday ridership (complete trips which does not count internal transfers) grew from 518,405 in May 1990 to 576,945 in May 2000 (an 11.3% increase). Based on a comprehensive ridership survey conducted by WMATA of all Metrorail stations in May 2002 (over 30% of the daily riders surveyed), 73.2% of all weekday Metrorail trips were for commuting to and from work. With this percentage applied to 2000, assuming each surveyed worker took two complete trips per day, 211,000 workers would use Metrorail to get to work. Census 2000 recorded 164,867 workers that cite this as their primary mode for work travel, a difference of over 46,000. Some of this difference can be accounted for in that the Metrorail passenger survey and gate data includes multi-modal transit trips (commuter rail or bus to Metrorail). The Census does not account for multi-modal work trips, or workers with two or more jobs.
- The Virginia Railway Express (VRE) commuter rail system was created in the mid-1990's with service on two lines covering 87 miles, connecting Manassas and Fredericksburg, Virginia to Union Station in the District (average weekday ridership on this service was 8,000 in 2000). The MARC commuter rail system expanded service on its three lines in Maryland, and average weekday ridership grew from 15,000 in 1990 to over 20,000 in 2000. These commuter rail trips are almost exclusively oriented

to work commutes. Thus, in 2000, over 14,000 workers would be commuting by commuter rail, with some fraction of them commuting from outside the PMSA. The 2000 Census reported 10,470 workers using this mode,

- Numerous local jurisdictions (cities and counties) either established or expanded bus service during the period.
- The only area of decline in transit service was in WMATA-operated bus service. Some bus service was eliminated or scaled back with the opening of new Metrorail stations. There was also a major cutback in bus service in the District of Columbia in the mid-1990's due to the government's fiscal crisis, and major losses in federal and local government jobs. WMATA decreased annual bus revenue hours of service by 14.3% over the decade and decreased annual bus revenue miles of service by 15% over the same period. Over 7% of this decline was offset by increases in locally operated bus service by cities and counties in the region.

Bibliography

- Cohn, D’Vera. “Census Bureau Praises Data.” *The Washington Post* 25 Nov. 2003: A27.
- Cox, Wendell. “DART's billion-dollar boondoggle.” *Knight-Ridder/Tribune* 17 June 2002, Business News.
- Eno Transportation Foundation. John Pucher and John Renne. "Socioeconomics of Urban Travel: Evidence from the 2001 NHTS." *Transportation Quarterly* 57.3 (2003): 49-77.
- Henry, Lyndon. “Light Rail and Urban Mobility: Is Light Rail Transit Justifying Its Investment?” *Transportation Research Circular E-C058: 9th National Light Rail Transit Conference*: 371-385.
- Layton, Lyndsey. “Metro Says Census Missed Some Riders; Reported Drop in Mass Transit Doesn't Account for Service Cuts, Non-Work Trips.” *The Washington Post* 17 June 2002, final ed.: A10.
- Layton, Lyndsey. “Transit Ridership Outstrips U.S. Pace; Area's Increased Use of Trains and Buses Attributed to New Stations, Fare Subsidies, Immigrants.” *The Washington Post* 18 Apr. 2002, final ed.: B1.
- National Research Council. “Measuring Personal Travel and Goods Movement: A Review of the Bureau of Transportation Statistics’ Surveys.” *Transportation Research Board Special Report 277* (2003).
- Neff, John. “Accuracy of Estimates of the Number of Persons Who Ride Transit.” Preliminary draft. 19 Mar. 2004.
- Neff, John. “Examining Perceived Conflicts with Transit Usage Data: Is There an Industry Perspective?” Background Notes for Attendees at a Panel Presentation. Transportation Research Board. 14 Jan. 2003.
- Pisarski, Alan. “Some Thoughts on the Census – Transit Statistical Matchup.” *Transportation Quarterly*, Eno Transportation Foundation, 57.3 (2003): 12.
- Purvis, Charles L. “Transit Ridership and Transit Commuting Trends: Are They Different?” Presentation. Transportation Research Board Session 578: Examining Perceived Conflicts with Transit Usage Data. 12-16 Jan. 2003.
- Spar, Edward J. *The American Community Survey: Where it Currently Stands*. Council of Professional Associations on Federal Statistics.
<<http://members.aol.com/copafs/acs.htm>>.
- Texas Public Policy Foundation. Wendell Cox. “The Illusion Of Transit Choice.” *Veritas*. Mar. 2002: 34-42.

United States. Census Bureau. *American Community Survey Profile 2002: Los Angeles County CA*, Table 3.

---. ---. "Journey to Work." *Census 1980*.

---. ---. "Notes and Errata." *Census 2000*, ch. 8.

---. ---. *Census 2000*. Supplementary Survey Data Release: Subject Matter Expert Comments. 20 Nov. 2001 <<http://www.census.gov/Press-Release/www/2001/C2SS/expert.html>>.

---. ---. *Corrected Census 2000 Total Population, Group Quarters Population, Total Housing Unit, and Vacant Housing Unit Counts for the United States and Puerto Rico*. 28 Nov. 2003.

---. ---. "D. Transportation: Places of Work and Journeys to Work, Vehicles Available." *United States Census 2000*. 23 Mar. 2000 <http://www.census.gov/dmd/www/pdf/05d_tr.pdf>.

---. ---. *Local Employer-Household Dynamics Reports*. Maryland Metro (2001) and Colorado County (2000) <<http://www.lehd.com>>.

---. ---. *Meeting 21st Century Demographic Data Needs – Implementing the American Community Survey*. May 2002.

---. ---. Decennial Statistical Studies Division. Darlene A. Moul. "Nonresponse Followup for Census 2000: Final Report." *Census 2000 Evaluation* H.5. 25 July 2003.

---. ---. ---. Herbert F. Stackhouse and Sarah Brady. "Census 2000 Mail Response Rates: Final Report." *Census 2000 Evaluation* A.7.a. 30 Jan. 2003.

---. ---. ---. Kevin J. Zajac. "Analysis of Imputation Rates for the 100 Percent Person and Housing Unit Data Items from Census 2000: Final Report." *Census 2000 Evaluation* B.1.a. 25 Sep. 2003.

---. ---. Paula Schneider. "Content and Data Quality in Census 2000." *Census 2000 Testing, Experimentation, and Evaluation Program, Topic Report Series* 12. 29 Sep. 2003.

---. ---. Planning, Research, and Evaluation Division. Sherri Norris. "Analysis of Item Nonresponse Rates for the 100 Percent Housing and Population Items from Census 2000: Final Report." *Census 2000 Evaluation* B.1.b. 23 Sep. 2003.

- . ---. ---. James B. Treat. "Response Rates and Behavior Analysis." *Census 2000 Testing, Experimentation, and Evaluation Program, Topic Report Series 11*. 30 Sep. 2003.
- . ---. Population Division. Edward W. Fernandez. "Using Analytic Techniques to Evaluate the 1990 Census Coverage of Young Hispanics." *Technical Working Paper*. 11. May 1995.
- . ---. Sandra Luckett Clark, John Iceland, Thomas Palumbo, Kirby Posey, and Mai Weismantle. "Comparing Employment, Income, and Poverty: Census 2000 and the Current Population Survey." Sep. 2003.
- . ---. Sandra Luckett Clark and Mai Weismantle. "Employment Status: 2000." *Census 2000 Brief*. Aug. 2003.
- United States. Census Bureau and Bureau of Labor Statistics. "Current Population Survey: Design and Methodology." Technical Paper 63, Mar. 2000.
- United States. Census Bureau and Interagency Household Survey Nonresponse Group. Sameena Salvucci, Stephen Wenck, Susan Hamsher, and Nancy Bates. "Summary Report." *Response Rate Summit: National Health Interview and Consumer Expenditure Quarterly Surveys*. 21-22 Feb. 2002.
- United States. Department of Transportation. Bureau of Transportation Statistics. *NHTS 2001 Highlights Report*. BTS03-05.
- . ---. ---. "Targeted Survey," "National Transportation Availability and Use Survey (Mail Survey)." *Omnibus Surveys*. 2002
<http://www.bts.gov/omnibus/targeted_survey/2002_nation_transportation_availability_and_use_survey/public_use_data_files/>.
- . ---. Charles Purvis. "Journey to Work Trends: 1960-2000." *CTPP 2000 Status Report*. 2002.
- . ---. Federal Highway Administration. *Census Transportation Planning Package 2000*. 9 Apr. 2004 <<http://www.fhwa.dot.gov/ctpp/>>.
- . ---. ---. *National Household Travel Survey*. 1977, 1983, 1990
<<http://www.fhwa.dot.gov/policy/ohpi/nhts/index.htm>>.
- United States. Office of Management and Budget. Statistical Policy Office. Federal Committee on Statistical Methodology. "Statistical Policy Working Paper 28: Seminar on Interagency Coordination and Cooperation, Part 1 of 2." Apr. 1999.
- Utt, Ronald and Wendell Cox. "Census Shows Commuters are Rejecting Transit," *Executive Memorandum #832*. Heritage Foundation. 5 Sep. 2002.

Washington Post, The. "Masses in Transit." *The Washington Post* 25 Apr. 2002. final ed.:
A28.

Bibliography for Regional Case Studies

Geographic Definitions

United States. Census Bureau. County & City Data Book 1994, 12 Edition (used for 1990 MSA, PMSA and CMSA geographic definitions). US Government Printing Office, Aug. 1994.

---. ---. Land Area, Population and Density for Metropolitan Areas: 1990. US Census Bureau, Mar. 14, 1996.

---. ---. Metropolitan Statistical Areas and Components: 1981, 1983, 1990, 1993, 1999 (Metropolitan Areas defined by the Office of Management and Budget).

---. ---. United States Urbanized Areas & Population: 1990 and 2000.

---. ---. Differences Between the 1990 Census and Census 2000 Urbanized Area Criteria.

---. ---. Census 2000 Urban and Rural Classification.

---. ---. Significant Change to Counties and County Equivalent Entities: 1970-Present.

Denver, Colorado Region

American Public Transit Association. Quarterly Transit Ridership Reports: 1996 - 2001. APTA.

Denver Regional Council of Governments. 2025 Interim Regional Transportation Plan - Denver, CO., DRCOG, Apr. 2002.

---. About DRCOG: Regional Transportation Planning Boundaries. Nov. 2003
<<http://www.drcog.com>>.

---. *Travel in the Denver Region: Results from the 1997 Household Travel Survey and the 1998 Roadside Survey*. Denver, CO, May 2000.

Denver Regional Council of Governments and the Parsons Transportation Group. *Denver Regional Travel Behavior Inventory*. Denver Regional Council of Governments, Denver, CO, April 14, 2000.

---. *Regional Travel Behavior Survey*. Denver Regional Council of Governments, Denver, CO, June 19, 2000.

Denver Regional Transit District. Transit Expansion Program. Nov. 2003
<<http://www.RTD-Denver.com/Fastracks>>.

---. Transit Planning History. Nov. 2003 <<http://www.RTD-Denver.com>>.

Federal Transit Administration and the Denver Regional Transportation District. *Section 15 Report: ID Number 8006*. Federal Transit Administration, 1990 - 2000.

National Research Center, Inc. *Southwest Light Rail Passenger Survey: Report of Results*. Regional Transportation District, Denver, CO, Dec. 2002.

United States. Bureau of Economic Analysis. CA25 Total Full-time and Part-time Employment by Industry - Denver, CO (PMSA), 1990 - 2000.

United States. Bureau of Labor Statistics. Denver, CO PMSA Wage and Salary Employment by Industry, 1990 - 2000.

United States. Bureau of Labor Statistics & the Colorado Department of Labor. Denver, CO PMSA Labor Survey by Place of Residence, 1994 - 2000.

United States. Census Bureau. Census 1990, Denver CMSA, PMSA and Denver City, Colorado: Data from the Short Form and the Long Form Survey.

---. ---. Census 2000, Denver CMSA, PMSA and Denver City, Colorado: Data from the Short Form and the Long Form Survey.

Los Angeles, California Region

American Public Transit Association. Quarterly Transit Ridership Reports: 1996 - 2001. APTA.

Federal Transit Administration and Transit Providers Serving the Los Angeles CMSA. *Section 15 Report for LACMTA and Other Transit Service Providers: ID Number - multiple*. Federal Transit Administration, 1990 - 2000.

Los Angeles County Metropolitan Transportation Authority (LACMTA). *1998 Metro Red Line, Blue Line, and Green Line Passenger Surveys*. LACMTA, Los Angeles, CA, Feb. 1999.

Kemp, Brad: California Employment Department Labor Consultant for Los Angeles County. Phone Interview by Dennis Leach, TransManagement, Inc. Sep. 19, 2003.

Martelle, Scott and Dan Weikel. "Commuter Are Shifting Away From L.A. County." *The Los Angeles Times*, 6 Mar. 2003.

---. "Census Data on Traffic Questioned." *The Los Angeles Times*, 9 Mar. 2003.

NuStats International. FY96-97. *FY96-97 MTA Bus On-Board Passenger Survey: Final Report*. LACMTA, Mar. 1998 (revised Dec. 1998).

---. *Los Angeles County Metropolitan Transportation Authority (LACMTA) Service Planning Market Research Program: Phase I Summary Report*. LACMTA, Mar. 1999.

Southern California Rapid Transit District: Transit Research Unit. *Metro Blue Line Ridership Patterns Following the Opening of Metro Center in Downtown Los Angeles*. Oct. 1992.

Southern California Association of Governments (SCAG). *1998 State of the Commute Report*. SCAG, Los Angeles, CA, July 2000.

---. *1999 State of the Commute Report*. SCAG, Los Angeles, CA, July 2000.

---. *The State of the Region 2002: Measuring Progress in the 21st Century*. SCAG, Los Angeles, CA, Dec. 2002.

State of California. Employment Development Department: Labor Market Information Division. *Civilian Labor Force, Employment, and Unemployment for Counties in Southern California, 1990 - 2003*. Sep. 2003 <<http://www.calmis.ca.gov>>.

---. ---. Labor Market Information Division. *Industry Employment & Labor Force - by Month, for Counties in Southern California, 1990 - 2003*. Sep. 2003 <<http://www.calmis.ca.gov>>.

---. ---. County Snapshots: Los Angeles 2002, Sep. 2003 <<http://www.calmis.ca.gov>>.

United States. Census Bureau. Census 1990, Los Angeles City. PMSA and CMSA, California: Data from the Short Form and the Long Form Survey.

---. ---. Census 2000, Los Angeles City, PMSA and CMSA, California: Data from the Short Form and the Long Form Survey.

Washington, DC Region

American Public Transit Association. Quarterly Transit Ridership Reports: 1996 - 2001. APTA.

District of Columbia Department of Employment Services: Office of Labor Market Research and Information. *Employment Projections by Industry and Occupation 2000 - 2010 in the Washington Metropolitan Area and the District of Columbia*. District of Columbia, June 2003.

Federal Transit Administration and Transit Providers Serving the Washington, DC PMSA. *Section 15 Report for WMATA and Other Transit Service Providers: ID Number - multiple*. Federal Transit Administration, 1990 - 2000.

Griffiths, Robert. *Commuting to Work in the Metropolitan Washington Region: Some Preliminary Results from the 2000 Census*. Metropolitan Washington Council of Governments, Washington, DC, Mar. 2003.

Layton, Lyndsey. "Metro Says Census Missed Some Riders: Reported Drop in Mass Transit Doesn't Account for Service Cuts, Non-Work Trips." *The Washington Post* 17 June 2002: A10.

Metropolitan Washington Council of Governments & Commuter Connections. *State of the Commute 2001: Survey Results from the Washington Metropolitan Region*. Commuter Connections, Washington, DC, 2002.

Silva, John - DC Department of Employment Services. Contacted by Dennis Leach, TransManagement. 15 Oct. 2003.

United States. Bureau of Economic Analysis. CA25 Total Full-time and Part-time Employment by Industry - District of Columbia and the Washington, DC PMSA, 1990 - 2000.

United States. Bureau of Labor Statistics & District of Columbia Department of Employment Services. District of Columbia and the Washington, DC PMSA Wage and Salary Employment by Industry, 1990 - 2000.

---. ---. District of Columbia and the Washington, DC PMSA Labor Survey by Place of Residence, 1990 - 2000.

United States. Census Bureau. Census 2000, District of Columbia and Washington, DC PMSA: Data from the Short Form and the Long Form Survey.

---. ---. Census 1990, District of Columbia, Washington, DC MSA and Outlying Counties to be Added to Create the PMSA: Data from the Short Form and the Long Form Survey.

Washington Metropolitan Area Transit Authority (WMATA). Capsule History of WMATA. Oct. 2003 <<http://www.wmata.com>>.

---. *Metrorail Boarding Survey Data: 1977 - 2003*. WMATA, Sep. 2003.

---. *Metrorail Comprehensive Patron Survey - May 2002*. WMATA, Fall 2003.

Whitman, Raymond - Job Trend Associates (DC Employment Services - Labor Force Projections Contractor). Interviewed by Dennis Leach, TransManagement. Oct. 2003.