

CHAPTER ONE: CHANGES IN PERSON MILES OF TRAVEL

Key Findings

- Growth in person miles of travel of about 19 percent between 1983 and 1990 has been the product of three factors in roughly equal proportions: population growth, increases in per capita tripmaking, and increases in average trip length.
- The geographic distribution of population is far more crucial than population growth in creating dramatic changes in travel in individual locations.
- Women led the growth in tripmaking with a major share of their increase in personal business trip purposes, while men led the growth in trip length. Changes in the proportion of the population with driver's licenses were a major factor in differences in tripmaking rates and average trip lengths.



Changes in person miles of travel (PMT) are a product of change in the size of the population, change in the number of trips made per capita, and change in average trip length. Between 1983 and 1990, total national PMT increased by 19 percent according to the NPTS. This is a very substantial increase for such a short period of time. This review will examine the three components of change to determine their relative contributions to PMT growth in the last decade.

Figure 1 shows the growth rates of the components of PMT in the 1983-1990 period. The figure, in effect, depicts a formula for PMT—population multiplied by trips per capita equals total trips; multiplied by average trip length equals total PMT. As indicated in the figure, population increase of those over 5 years of age was the least important factor at 4.3 percent; trips per capita increased 7.0 percent; and trip length shows a similar increase at

6.9 percent. This effect is further emphasized in Figure 2, which displays the relative contribution of each of the factors on total PMT. As can be seen from the figure, each contributed to the 19 percent growth in PMT in the period.

One point that this emphasizes is that population increase by itself is just one factor to consider. Had there been no population increase in the period, there still would have been an increase in PMT on the order of 14 to 15 percent. Thus, efforts to limit growth or penalize its arrival are dealing with only a segment of the travel growth picture. What, then, are the underlying factors that cause change in trips per capita and in trip length?

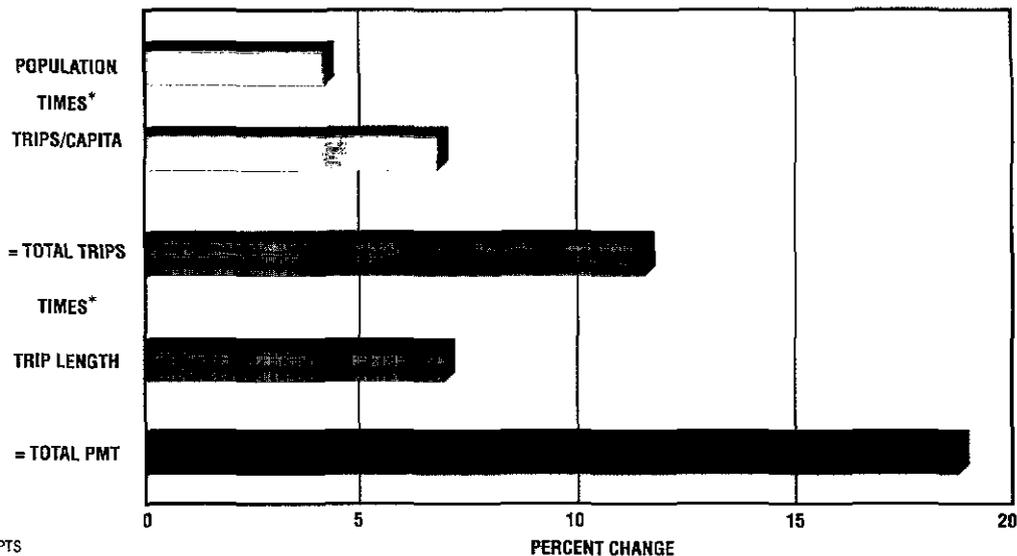
Population

Population change contributed less than 5 percent growth to PMT from 1983 to 1990. Excluding internal migration swings, overall population

Population increase by itself is just one factor to consider. Had there been no population increase in the period, there still would have been an increase in PMT on the order of 14 to 15 percent. Thus, efforts to limit growth or penalize its arrival are dealing with only a segment of the travel growth picture.

FIGURE 1

**Factors Affecting Person Travel
Percent Change
1983 - 1990**



*The formula shown at the left is correct when the actual values for population, trips per capita, etc. are being used. However, percent change is used in this chart in order to display the data graphically. When percent change is substituted for the actual values, the percent changes are added together instead of multiplied.

increase should be a relatively minor factor in PMT growth in the future, with annual growth rates, including immigration, estimated at less than 1 percent per annum through the decade.

Obviously, that growth varied dramatically from place to place in America. Some places, most particularly the metropolitan areas of the South and West, incurred prodigious growth in the eighties. Of the 50 fastest growing metropolitan areas in the decade, 37 were in Florida, Texas, and California. The area among the 50 with the lowest growth for the decade was above 25 percent. Areas such as Dallas,

Atlanta, and San Diego, all around 2.5 million in population in 1990, had growth rates in the 30 to 35 percent range for the decade. Phoenix, Arizona, an area of over 2 million in population, grew 40 percent in the decade and has doubled since 1970. Despite signs that the strength of these shifts is ebbing, internal migration will be an important PMT factor.

Trips per Capita

Of the three factors of interest affecting PMT, trips per capita grew 6.96 percent in the 1983-1990 period. Many factors can contribute to an increase in

tripmaking behavior in the population. Increased tripmaking per capita can be called a true mobility increase. Historically, increased tripmaking has been associated with variations over time in demographic structure, such as age variations, geographic location, and stage in the life cycle; it is also associated with long-term improvements in the society's condition, such as rising incomes and improvements in minority well being. Sex differences can also be a factor. In modal terms, all person trip increases were the product of vehicle trip increases.

In 1983, males and females over age 5 had the same rate of tripmaking per day, but with significant differences in both mode and purpose. In 1990, male trip rates had grown to 3.04 daily trips per person, while female trip rates had grown to 3.13 trips per person—a 3 percent higher trip rate for women contrasted to that for men. Because weekend trip rates for men and women are the same, the differences between them are all a product of weekday travel

patterns. This subject is treated more extensively in the section on women's travel trends.

In this decade, there have been significant shifts in age in the population, with substantial percentage decreases in the young adult age groups, and corresponding increases in those in their middle working years and in the elderly. This is a likely source of tripmaking change because the age-specific variations in tripmaking rates are well known. However, age cohort analyses indicate that the age shift from 1983 to 1990 actually contributed to a slight

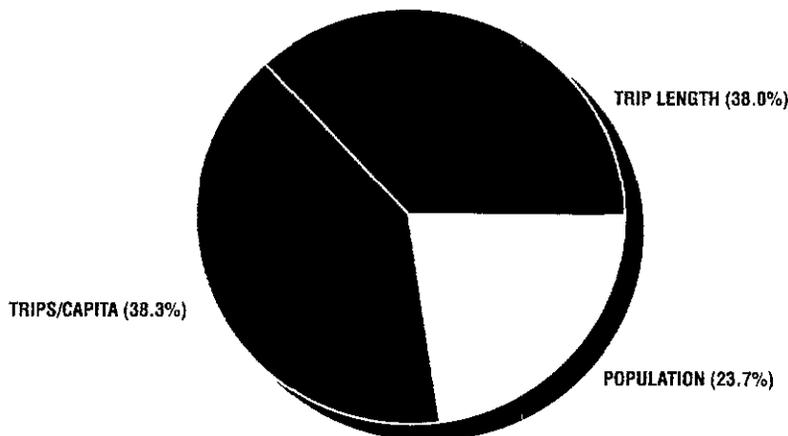
decrease in tripmaking per capita in that the population was shifting into higher age groups with lower typical trip rates.

One factor to consider is that the change in tripmaking from 1983 to 1990 is an effect of longer-term economic trends. There is some basis for this. The decline in overall tripmaking rates and trip lengths between 1977 and 1983 as measured in NPTS surveys in those years could have been a

***In modal terms,
all person trip
increases were the
product of vehicle
trip increases.***

FIGURE 2

**Person Miles of Travel
Factors of Increase
1983 - 1990**

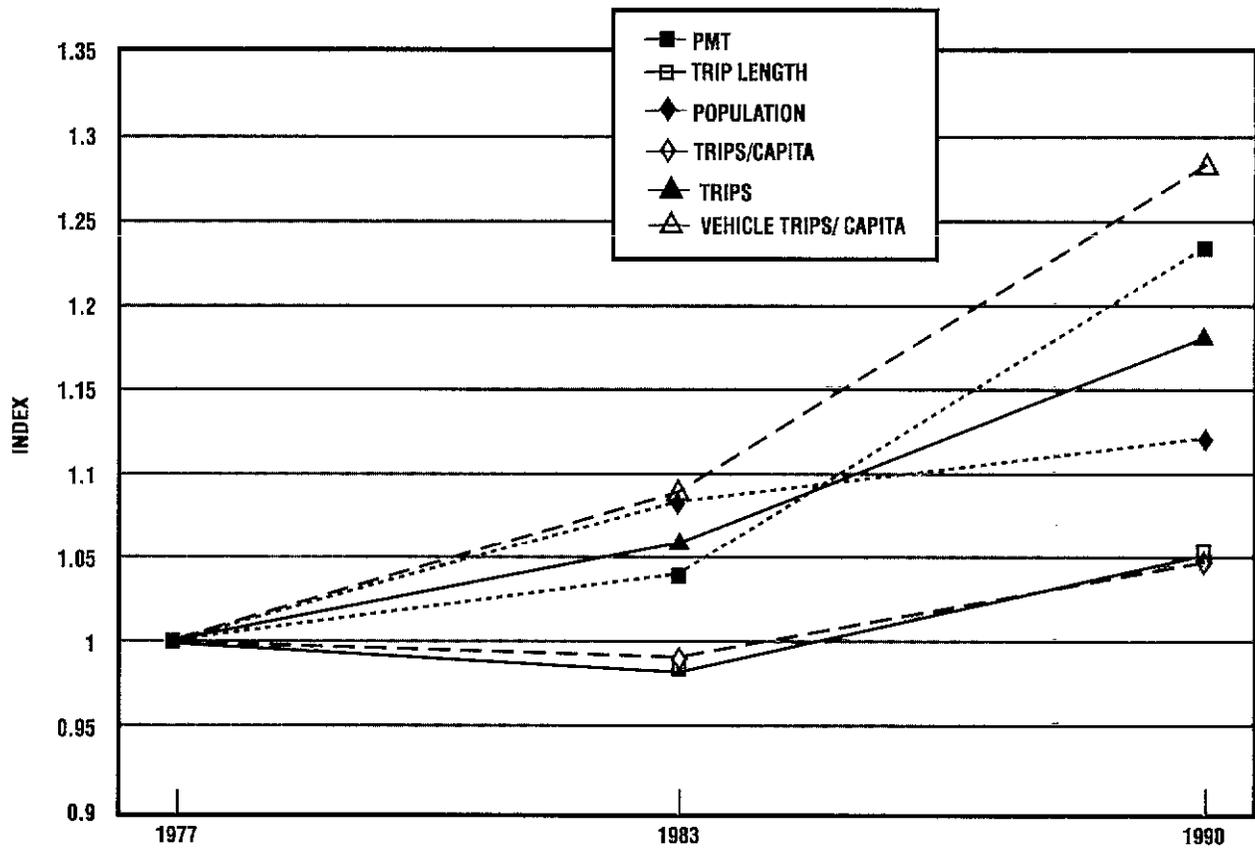


Source: NPTS

Stage in the life cycle can be an important factor in tripmaking because so many trips are determined by serving younger members of the household, or caring for the household itself. Thus, how the population of 243 million persons distributes itself in various groupings can have tremendous effect on trip rates.

FIGURE 3

**Indexed Trends
of PMT Factors
1977 - 1990**



Source: NPTS

product of the recession in the 1981-1983 period. These factors are depicted in Figure 3.

Other factors that affect trip rates per capita are household size and availability of driver's licenses. Related to these factors, stage in the life cycle can be an important factor in tripmaking because so many trips are determined by serving younger members of the household, or caring for the household itself. Thus, how the population of 243 million persons distributes itself in various groupings can have tremendous effect on trip rates. The NPTS data for 1983 show person trip rates can double between a single adult with child under age 6 and a household with two adults and no children. Average household size is a major factor to consider. The average household size has declined steadily over the last several decades, from 3.16 in 1969, to 2.83 in 1977, 2.69 in 1983, down to 2.56 in 1990. Thus the population of today forms into 4 million more households than that same population would have with 1983 average persons per household rates. To the extent that tripmaking is household-based rather than person-based, this would have had a differential effect on average trip rates.

Trip Length

Increases in average trip length contributed 6.9 percent to PMT growth between 1983 and 1990. The detailed factors affecting trip length changes are treated in a separate section specific to that factor, but can be briefly summarized here.

The two most significant factors in trip length growth are population shifts to very large metropolitan areas, and to the suburbs of those areas, and the increases in driver's licenses, particularly among women. For example, work trips by women with driver's licenses are 50 percent longer than work trips by women without driver's licenses. Driver's licenses do not cause longer trips, but the license is a component of a life style structure that signals

certain kinds of needs and behaviors, of which longer trips are a part. It may signal a greater tendency for women to seek more substantial job opportunities from a broader geographic environment for which a longer trip is required in trade for higher incomes and professional rewards, and which a driver's license makes feasible.

The greater availability of personal vehicles, linked to licenses, has supported the tendency to greater trip lengths. The central question for review will be to examine the expanded opportunities available to those incurring the longer trip lengths.

With respect to the first point, it is known that work trip lengths increase in distance with metropolitan area size, as do some other trip purposes, and tend to be significantly longer for suburban residents than central city residents. Suburban work trip lengths were unchanged from 1985 to 1989, but a person with a central city job and a central city residence shifting to a suburban residence could add almost 50 per-

cent to his work trip length. Thus, as the population had shifted to the suburbs of the Nation's large metropolitan areas, work trip lengths to the center increased. The effect of job locations shifting to the suburbs may have tended to bring jobs closer to suburban workers. The potential for persons with suburban jobs to shift their residences well beyond the suburban fringe, starting a new wave of suburban development, will be a factor to watch. The NPTS data also indicate that large increases in trip length occurred for central city residents, suggesting that work destinations are shifting to suburban locations or to adjacent metropolitan areas.

A third factor that needs further research is that some trip purposes have been growing in trip length, e.g., work and personal business, while others, like shopping, have been more stable. If the trips that are growing in length are also the trips that are growing relative to other trip purposes, the trip length average

The two most significant factors in trip length growth are population shifts to very large metropolitan areas, and to the suburbs of those areas, and the increase in driver's licenses, particularly among women.

would be affected. Preliminary data review suggests that this is the case. Personal business trips, which increased their share of total vehicle travel from 16 percent in 1983 to 20 percent in 1990, also grew 7 percent in vehicle trip length. School/church trips grew 36 percent in length and work trips grew by almost 30 percent in the period from 1983 to 1990, as measured by vehicle trip lengths.

Overall growth in trip lengths has occurred differentially between men and women. Men's average trip lengths were considerably longer than women's in 1983, roughly 20 percent longer. Men's trip lengths have grown faster as well, about a 10 percent increase from 1983 to 1990 contrasted to about a 6 percent increase for women's trip lengths, so that by 1990, men's average trip length exceeded women's by 25 percent. Analyses indicate that this is typical across almost all age groups with the exception

of the childhood years and post-65 age group.

Further Work

The three components of *personal miles of travel* growth need to be carefully monitored in the future. Population growth is the least significant and perhaps the easiest to measure. The important aspects of the population question for subnational analyses are: interregional migration, size of metropolitan area, metropolitan area physical distributions and density variations in population, jobs, and commercial activities. Understanding tripmaking and trip length trends and patterns and, particularly, their links to household structure and women's changing roles, will be critical to evaluating the values and costs of changes in these elements of travel behavior.

FACTORS IN GROWTH OF PERSONAL TRAVEL

