

# Bureau of Transportation Statistics Special Report

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## Trends in Personal Income and Passenger Vehicle Miles

by Jeffery Memmott, Ph.D.

For years, increasing income has been a principal factor contributing to the rapid growth of highway passenger travel. As incomes increased, the demand for additional transportation services manifested itself in a variety of ways:

- more individuals and households acquired personal vehicles;
- the proportion of multiple vehicle households grew;
- families moved to larger and more comfortable housing in the suburbs, thereby increasing commuting trip distances; and
- the number and length of discretionary trips increased.

As a result, passenger highway travel, as reflected in vehicle miles of travel (VMT), increased rapidly.

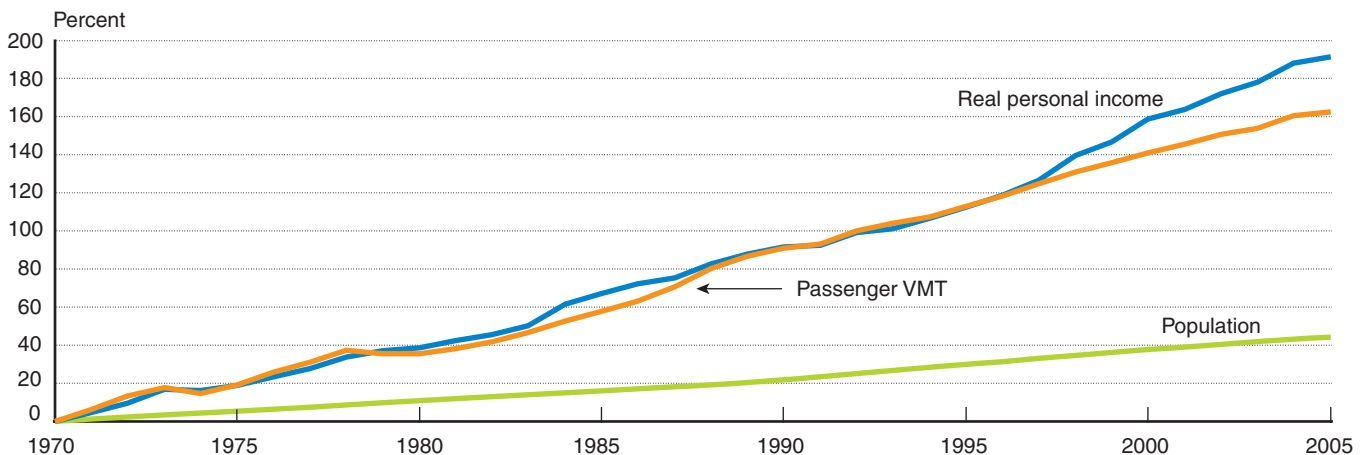
But there have been discussions since at least the early 1990s about whether the effects of rising incomes on travel demand would start to diminish.<sup>1</sup> That speculation now appears to be a reality as recent data suggest the relationship *has* weakened—vehicle travel growth has started to slow in comparison to growth in real personal income.

<sup>1</sup> C. Lave, 1991. *Things Won't Get a Lot Worse: The Future of U.S. Traffic Congestion*. Working Paper No. 33, The University of California Transportation Center, University of California, Berkeley, CA.

Historically, passenger vehicle miles traveled<sup>2</sup> and real personal income have grown at about the same rate, and at a much higher rate than population. Both also exhibit very similar patterns during periods of economic recession and expansion. However, since 1997, a widening gap has emerged between the trends in real personal income and passenger VMT (figure 1). The growth in passenger VMT is slowing down even though personal income continues to increase

<sup>2</sup> Vehicle categories represented by Passenger Vehicle Miles Traveled include passenger cars, other 2-axle 4-tire vehicles (some of which may be used primarily for commercial purposes not involving passenger transportation), motorcycles, and buses.

**Figure 1: Growth in U.S. Highway Passenger Vehicle Miles Traveled, Real Personal Income, and Population (percent change since 1970)**



**Source:** Calculated from U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, Table VM-1, Passenger Cars and Other 2-axle 4-tire Vehicles, various years. U.S. Department of Commerce, Bureau of Economic Analysis, Table 2.1 Personal Income and Its Disposition. U.S. Census Bureau, Annual Population Estimates for the United States, as of July 1 of each year.

at about its historical trend. From 1970 to 1997, passenger VMT grew at 3.0 percent per year, and real personal disposable income grew at 3.2 percent per year. From 1997 to 2005, passenger VMT grew at a much lower 2.0 percent per year, compared to 3.2 percent annual growth for real personal disposable income.

## Household Income, Number of Vehicles, and Vehicle Use

In the past, one of the most important factors influencing the rapid increase in passenger VMT has been vehicle availability. Not surprisingly, income is a major determinant of the number of vehicles in a household. The 2001 National Household Travel Survey found that, overall, 93 percent of households have at least one vehicle.<sup>3</sup> In the lowest household income bracket (less than \$25,000), 80 percent have at least one vehicle, and over 10 percent have three or more.<sup>4</sup> Among households with no vehicles, the vast majority (78 percent) are in the lowest income category.

<sup>3</sup> The data were collected from March 2001 to May 2002.

<sup>4</sup> Household income is used in analyzing data from the 2001 National Household Travel Survey because it is the income category collected in the survey and available in the dataset.

An important observation from table 1 is the relatively similar distributions of vehicles for higher income categories. The lowest income category is different from the other income categories. The income categories from \$25,000 to less than \$75,000 transition from the predominantly zero or one vehicle households of the lower income category to multiple vehicle households. The two highest income categories (\$75,000 to \$99,999 and \$100,000 or more) have very similar distributions. For household with incomes of \$50,000 and above, the number of household vehicles increase by only modest increments. This would imply that increased incomes would potentially have the greatest impact on lower income households. Increased incomes for higher income categories would likely have a much smaller impact.

Auto availability, in turn, has a dramatic effect on the mode used to make trips. Figure 2 shows the distribution of trips by mode and number of household vehicles. Not surprisingly, zero-vehicle households make a much larger proportion of their trips using transit or walking than do households with one or more vehicles. Households with a vehicle use that vehicle for most travel. Households with one or more vehicles have similar modal use patterns, with some variation. For example, households having three or more

**Table 1: Distribution of Households by Number of Household Vehicles, for Each Income Category**

Household income	Numer of household vehicles								
	0 vehicles		1 vehicle		2 vehicles		3 or more vehicles		Total
	Percent	SE	Percent	SE	Percent	SE	Percent	SE	Percent
0-24,999	19.5	0.61	47.9	0.73	22.2	0.53	10.4	0.41	100.0
25,000-49,999	3.3	0.29	33.7	0.61	40.6	0.54	22.5	0.51	100.0
50,000-74,999	1.4	0.23	20.6	0.69	45.7	0.85	32.4	0.65	100.0
75,000-99,999	0.8	0.24	11.8	0.89	47.9	1.22	39.5	1.02	100.0
100,000 +	1.3	0.26	9.6	0.66	48.2	1.10	40.9	0.98	100.0
<b>Overall</b>	<b>7.2</b>	<b>0.20</b>	<b>30.8</b>	<b>0.31</b>	<b>37.7</b>	<b>0.26</b>	<b>24.3</b>	<b>0.24</b>	<b>100.0</b>

**Note:** Sample covers about 26 thousand households, SE = standard error. Numbers may not add to 100 percent due to rounding.

**Source:** Calculated from the 2001 National Household Travel Survey, Household File, U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration.

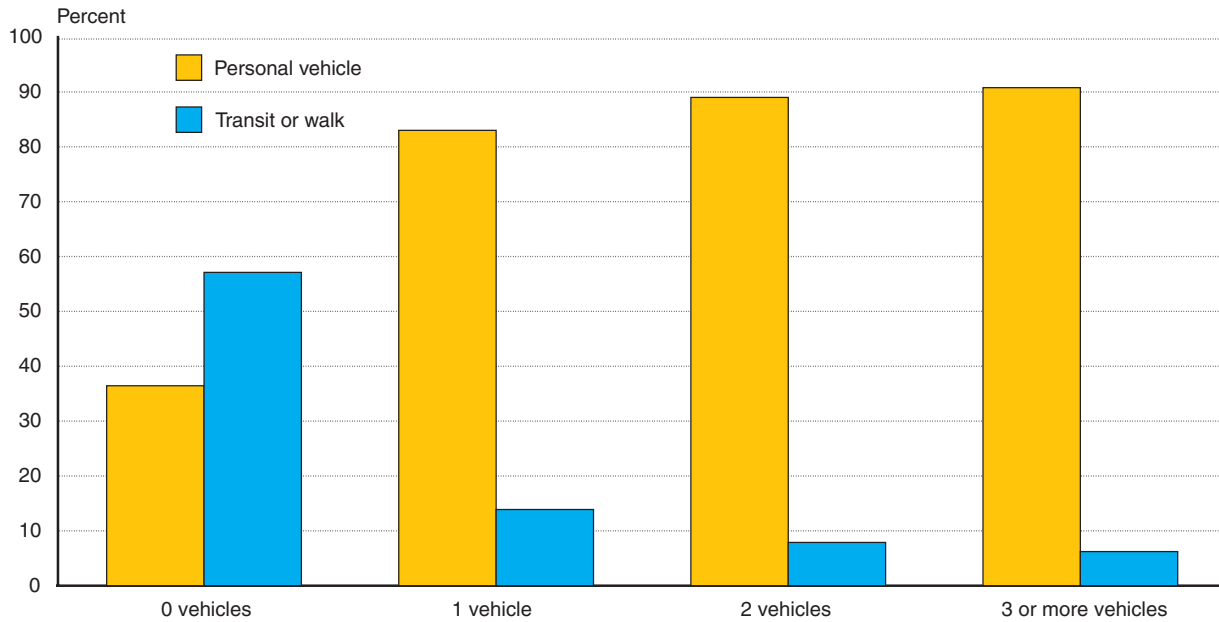
**Table 2: Number of Trips and Average Trip Length, for Each Income Category**

Household income	Number of daily trips		Trip length (miles)	
	Mean	SE	Mean	SE
0-24,999	3.5	0.04	8.2	0.16
25,000-49,999	4.1	0.03	9.5	0.19
50,000-74,999	4.3	0.04	10.4	0.39
75,000-99,999	4.4	0.05	11.1	0.49
100,000 +	4.6	0.05	11.8	0.64
<b>Overall</b>	<b>4.1</b>	<b>0.02</b>	<b>10.0</b>	<b>0.16</b>

**Note:** Sample contains about 250 thousand daily trips, SE = standard error.

**Source:** Calculated from the 2001 National Household Travel Survey, Person and Day Trip Files, U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration.

**Figure 2: Distribution of Trips by Mode and Number of Household Vehicles**



**Note:** Zero-vehicle households have some drive-alone trips because the vehicle used in making a trip does not have to belong to the household.

**Source:** Calculated from the 2001 National Household Travel Survey, Day Trip File, U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration.

vehicles make a higher proportion of their trips driving alone than households with one or two vehicles. In addition, the proportion of walking trips goes down as the number of vehicles in the household increases. Households with one or more vehicles make very few transit trips, and transit trips fall to less than 1 percent of all trips among households with two or more vehicles.

Income also affects the number of trips individuals take, as well as the distance traveled in each trip. Table 2 shows the average number of trips per day and the average length of those trips by income class. Higher income households make more trips and travel more miles than lower income households. The differences are substantial. Households in the highest income class make about 30 percent more trips, and the average length of those trips is more than 40 percent longer than trips by those in the lowest income class.

## Income Related Factors Affecting Future Highway Travel

Many factors, including household vehicle ownership, number and length of trips, and the number of new immigrants, will influence income's effect on future highway travel. A widely cited report by Polzin, making the case for moderate future growth in VMT, points out that vehicle availability may be reaching a saturation point.<sup>5</sup> The number of zero-vehicle households is already low, and

<sup>5</sup> S.E. Polzin, 2006. *The Case for Moderate Growth in Vehicle Miles of Travel: A Critical Juncture in U.S. Travel Behavior Trends*. Center for Urban Transportation Research, University of South Florida, Tampa, FL, April.

while economic growth may continue to lower that number somewhat, some part of the population will have limited means and other limitations of a legal, mental, or physical nature that will preclude driving a vehicle. Also others may choose not to own a vehicle or not to own as many vehicles as their income could support. Polzin estimates that only about 25 percent of the households in the United States have more adults in the household than vehicles. This means that because the vast majority of households already have one or more vehicles per adult, the impacts of vehicle availability on passenger VMT growth may not be as strong as in the past.

Other income-related factors, such as increases in the number and length of trips, are affected by the cost of travel. Polzin found that real costs per vehicle mile have already started to rise slightly, and average speeds have started to drop, reversing the historical trend of lower costs and higher speeds. There may also be constraints on additional time available to devote to travel, though Polzin found no evidence that the trend of increasing time devoted to travel has begun to slow down.<sup>6</sup>

Litman also looks at some of the moderating demographic and behavioral trends related to travel demand.<sup>7</sup> He concludes that per capita vehicle ownership and vehicle mile-

<sup>6</sup> Polzin predicts that the number of trips and trip length will increase only at about a third as fast in the future as they have historically. As a result of these moderating influences, he predicts overall VMT will grow at about 2 percent per year through the year 2025. Historically VMT has grown, on average, by about 3 percent annually since 1970.

<sup>7</sup> T. Litman, 2006. *The Future Isn't What it Used to Be, Changing Trends and Their Implications for Transport Planning*. Victoria Transport Policy Institute, Victoria, BC.

age have peaked and will not increase in the future. He bases this conclusion on the saturation of vehicle ownership and anticipated improved travel and location options.

A frequently overlooked factor on highway vehicle travel is the impact of new immigrant households. New immigrants are typically just starting the process of growth in household income and vehicle acquisition. In addition, a large proportion of new immigrants immediately become part of the workforce, with corresponding needs for transportation to and from work. A study by Sum, Fogg, Harrington, et al. found that new foreign immigrants accounted for 47 percent of the increase in the civilian labor force from 1990 to 2000.<sup>8</sup> The additional vehicle demand by new immigrants may not be fully anticipated in VMT growth projections.

While it is difficult to predict how individuals will use increases in their real income in the future, it is clear that historically some of that increase has been used to acquire a household vehicle or increase the number of household vehicles. Higher incomes, along with increased vehicle availability, have enabled individuals to travel more and for longer distances. However, some indicators suggest

<sup>8</sup> A. Sum, N. Fogg, P. Harrington, et al. 2002. *Immigrant Workers and the Great American Job Machine: The Contributions of New Foreign Immigration to National and Regional Labor Force Growth in the 1990's*. Center for Labor Market Studies, Northeastern University, Boston, MA., August.

these effects have begun to diminish. Whether income effects will have smaller impacts in the future depends on many factors, such as vehicle availability and responses to changing travel costs and speeds.

One important question is how many individuals will be willing to pay for higher quality and more reliable transportation services in the future as their incomes rise in lieu of increasing the number and length of trips? If demand increases for more costly, but faster and more reliable transportation services, this would likely have a moderating effect on future passenger VMT growth.

Another factor that may affect future VMT growth is the possibility of rising costs of transportation, both in terms of time (lower average speeds due to increased congestion and longer trip distances) and vehicle operating costs (higher real prices of fuel). Increased transportation costs would tend to have some dampening effect on passenger VMT growth over time.

However, these potentially moderating factors on VMT growth could be partially offset by the additional work trips by new immigrants entering the labor force, along with increased vehicle availability for those new immigrant households and corresponding increases in trip frequency and distances for those households. 🌐

## About this Report

This report was prepared by Jeffery L. Memmott, Transportation Specialist, of the Bureau of Transportation Statistics (BTS). BTS is a component of DOT's Research and Innovative Technology Administration.

The estimates in this report were developed from a variety of data sources. The principal data sources are:

- U.S. Department of Transportation, Bureau of Transportation Statistics and Federal Highway Administration, 2001 National Household Travel Survey.
- U.S. Department of Transportation, Federal Highway Administration, Highway Statistics, various years.
- U.S. Department of Commerce, Bureau of Economic Analysis, Personal Income and Its Disposition.
- U.S. Census Bureau, Annual Population Estimates.

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### Data —

- **National Household Travel Survey** – survey of daily and long-distance passenger travel in the United States, 2001.
- **Commodity Flow Survey** – survey reporting value, weight, and ton-miles by commodity, mode, origin, and destination.

### Publications —

- *Highlights of the 2001 National Household Travel Survey*
- *Transportation Statistics Annual Report 2006*
- *Estimated Impacts of September 11th on U.S. Travel*