

# Relationship of Passenger-Car Age and Other Factors to Miles Driven

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This report presents empirical data on the effects of passenger-car age, multicar ownership, and other factors on miles traveled by automobiles. Odometer readings and estimated annual miles traveled by year model were analyzed. The data analyzed came from three home-interview surveys. Two of these surveys were motor-vehicle-use studies conducted in Illinois and Montana and the third survey was conducted by the Bureau of the Census.

•THIS report presents data from several studies which show certain factors affecting passenger-car mileage. The data include average yearly mileages driven in single and multicar households, average odometer readings according to age of car, cars bought new or used and major body type. By analyzing such empirical data on the characteristics of passenger-car ownership and use, basic relationships will be developed which should be useful in predicting future levels of motor-vehicle ownership and travel demands.

## BACKGROUND

Three principal sets of data are used in this paper. The first set was obtained from the National Automobile Use Study conducted by the Bureau of the Census for the Bureau of Public Roads in April 1961, and supplemented by additional data obtained in June 1962. The sample used by Census for this study was a Current Population Survey panel of approximately 4,000 households. The households selected in the sample were asked, among other items, the number of automobiles owned and their year models, the odometer reading of each vehicle, and the estimated miles traveled by each car in the preceding 12 months. In June 1962, the Census Bureau wrote to the head of each sampled household asking if the vehicle included in the original sample was still being operated from that household, and, if so, what was its current odometer reading. About 1,500 usable records were obtained from this resurvey. For purposes of this report, the records for 15 months were adjusted to represent estimates of one year of travel.

The other two sets of data were some unpublished findings developed from the Illinois and Montana motor-vehicle-use studies, the former conducted from September 1957 through August 1958 and the latter from July 1963 through June 1964. Both of these studies were conducted as highway planning projects by the respective state highway departments in cooperation with the Bureau of Public Roads. Standard statistical sampling techniques were used in which selections are made on a probability basis. The data for each household were obtained by personal interview. The sample design reflected both rural and urban characteristics of each of the states. The studies provided for a full-year coverage, with the interview samples in each population group divided into four equal segments and a sampling taken in each season.

TABLE 1  
PERCENTAGE DISTRIBUTION OF PASSENGER CARS BY AGE, FOUR STUDIES

| Age of Passenger Car (years) <sup>1</sup> | R. L. Polk and Co. July 1, 1961 <sup>2</sup> |            | National Automobile Use Study, April 1961 <sup>3</sup> |            | R. L. Polk and Co. July 1, 1964 <sup>2</sup> |            | Montana Motor-Vehicle-Use Study, 1963-1964 |            |
|---|--|------------|--|------------|--|------------|--|------------|
|   | Actual                                       | Cumulative | Actual   | Cumulative | Actual                                       | Cumulative | Actual                                     | Cumulative |
| Under 1                                   | 6.5  | 6.5        | 6.9  | 6.9        | 8.9  | 8.9        | 5.0  | 5.0        |
| 1-2                                       | 10.5   | 17.0       | 16.4   | 23.3       | 11.1   | 20.0       | 11.7                                       | 16.7       |
| 2-3                                       | 9.9  | 26.9       | 12.2   | 35.5       | 10.0   | 30.0       | 9.6  | 26.3       |
| 3-4                                       | 7.4  | 34.3       | 9.0  | 44.5       | 8.3  | 38.3       | 9.5  | 35.8       |
| 4-5                                       | 10.1   | 44.4       | 11.4   | 55.9       | 9.3  | 47.6       | 9.3  | 45.1       |
| 5-6                                       | 9.8  | 54.2       | 10.5   | 66.4       | 8.5  | 56.1       | 9.3  | 54.4       |
| 6-7                                       | 10.9   | 65.1       | 10.7   | 77.1       | 6.0  | 62.1       | 6.8  | 61.2       |
| 7-8                                       | 7.0  | 72.1       | 6.1  | 83.2       | 7.7  | 69.8       | 8.2  | 69.4       |
| 8-9                                       | 7.8  | 79.9       | 6.8  | 90.0       | 7.1  | 76.9       | 6.1  | 75.5       |
| 9-10                                      | 4.2  | 84.1       | 1.9  | 91.9       | 7.1  | 84.0       | 7.3  | 82.8       |
| 10-11                                     | 4.9  | 89.0       | 2.1  | 94.0       | 4.0  | 88.0       | 3.8  | 86.6       |
| 11-12                                     | 4.8  | 93.8       | 3.1  | 97.1       | 3.7  | 91.7       | 3.6  | 90.2       |
| 12 and over                               | 6.2  | 100.0      | 2.9  | 100.0      | 8.3  | 100.0      | 9.8  | 100.0      |
| Total                                     | 100.0  | —          | 100.0  | —          | 100.0  | —          | 100.0                                      | —          |
| Year not given, number                    | 181(000)                                     |            |  |            | 52(000)                                      |            |  |            |

<sup>1</sup>Each class interval includes lower, but not higher age than that shown.  
<sup>2</sup>From (1) and (2). Data used here by permission of R. L. Polk and Co.  
<sup>3</sup>Includes only those vehicles for which 1962 data were collected.

Reliability of Data

To evaluate the reliability of the distribution of vehicles by age, the percentage distributions of vehicles found in two of the surveys were compared with a similar distribution of passenger cars by age reported by R. L. Polk and Company as of July 1, 1961 (1), and July 1, 1964 (2). Although the tables prepared by Polk represent an adjusted registration count to July 1 of each year, these registrations are considered representative of the distribution for the entire year. From data in Table 1, a comparison can be made of the Polk (1) data and the national study data for 1961. A similar comparison can be made of the 1964 (2) Polk data and the Montana data collected from July 1, 1963, to June 30, 1964. The cumulative frequency distributions from these studies are shown in Figure 1.

Results from the national study in 1961 compared fairly well with those from the 1961 Polk (1) survey for some years. But the percentages shown for the national studies are generally larger than the Polk figures for cars less than 6 years old, and

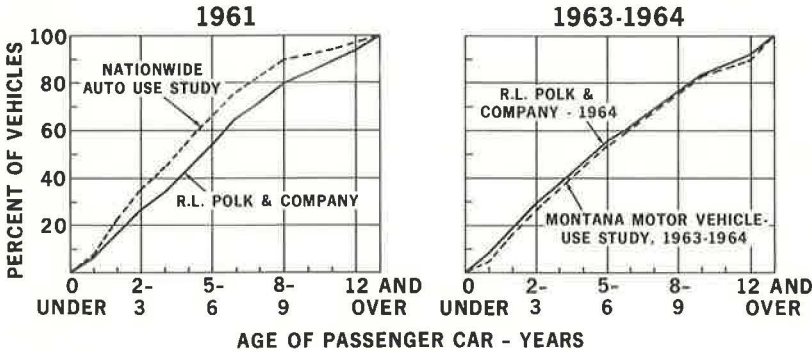


Figure 1. Cumulative frequency distributions of vehicles by age.

TABLE 2  
AVERAGE ANNUAL MILES TRAVELED BY PASSENGER CARS  
BETWEEN 1961 AND 1962

| Year Model <sup>1</sup> | Age of Car (years) | Average Annual Travel | Number of Vehicles in Sample |
|-------------------------|--------------------|-----------------------|------------------------------|
| 1961                    | Less than 1½       | 13,200                | 99                           |
| 1960                    | 1½-2½              | 12,000                | 235                          |
| 1959                    | 2½-3½              | 11,000                | 175                          |
| 1958                    | 3½-4½              | 9,600                 | 129                          |
| 1957                    | 4½-5½              | 9,400                 | 164                          |
| 1956                    | 5½-6½              | 8,700                 | 153                          |
| 1955                    | 6½-7½              | 8,600                 | 153                          |
| 1954                    | 7½-8½              | 8,100                 | 88                           |
| 1953                    | 8½-9½              | 7,000                 | 99                           |
| 1952                    | 9½-10½             | 7,300                 | 28                           |
| 1951                    | 10½-11½            | 4,900                 | 37                           |
| 1950                    | 11½-12½            | 5,700                 | 47                           |
| 1949 and older          | 12½ and older      | 4,300                 | 46                           |
| All years               |                    | 9,400                 | 1,453                        |

<sup>1</sup>National Automobile Use Study conducted for Public Roads by the Bureau of the Census, 1961-1962. Summary data obtained from two odometer readings, one in April 1961 and another on identical vehicle in June 1962. Data were adjusted to represent estimates of 12 months of travel.

smaller for cars more than 6 years old. The largest difference was for cars 9 years and older. For the Polk study, 20.1 percent of the cars sampled were 9 years old and older, for the national study, 10.0 percent.

The percentage distribution of cars by age for the Montana study and the 1964 Polk study (2) were in close agreement for all age groups of cars except those less than one year old. The difference for cars less than one year old may have been caused by

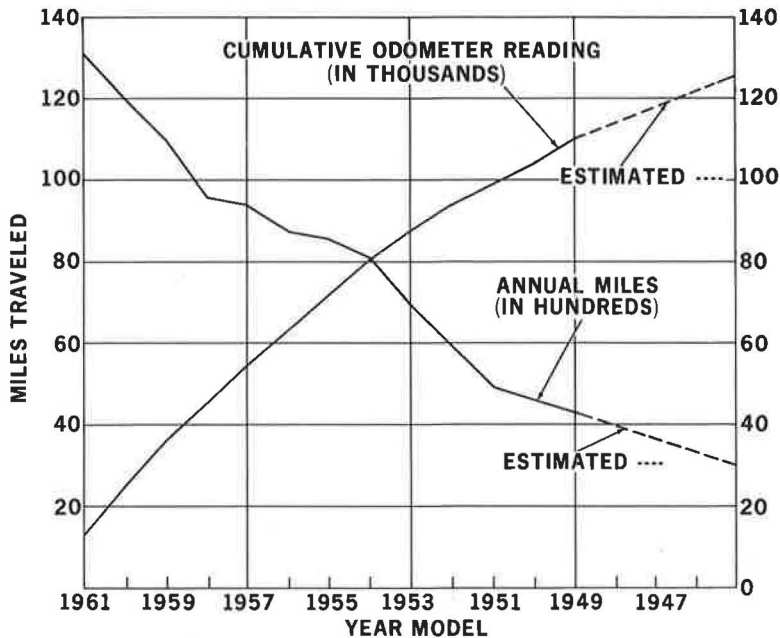


Figure 2. Average annual miles traveled between 1961 and 1962 and cumulative odometer readings by year model.

TABLE 3  
AVERAGE ODOMETER READING BY AGE AND YEAR MODEL OF PASSENGER CARS  
REPORTED IN TWO STUDIES

| Age<br>(years) <sup>1</sup> | National Automobile<br>Use Study, April 1961 <sup>2</sup> |                                    |  | Montana Motor-Vehicle-<br>Use Study, 1963-1964 <sup>3</sup> |                                    |  |
|-----------------------------|---|------------------------------------|--|---|------------------------------------|--|
|                             | Year<br>Model   | Number of<br>Vehicles in<br>Sample | Average<br>Odometer<br>Reading<br>(mi) | Year<br>Model   | Number of<br>Vehicles in<br>Sample | Average<br>Odometer<br>Reading<br>(mi) |
| Under 1                     | 1961  | 99                                 | 3,100                                  | 1964  | 114                                | 5,200                                  |
| 1-2                         | 1960  | 235                                | 11,700                                 | 1963  | 267                                | 12,400                                 |
| 2-3                         | 1959  | 175                                | 21,900                                 | 1962  | 219                                | 21,900                                 |
| 3-4                         | 1958  | 129                                | 30,200                                 | 1961  | 217                                | 31,700                                 |
| 4-5                         | 1957  | 164                                | 40,700                                 | 1960  | 212                                | 39,800                                 |
| 5-6                         | 1956  | 153                                | 46,500                                 | 1959  | 212                                | 45,300                                 |
| 6-7                         | 1955  | 153                                | 51,400                                 | 1958  | 155                                | 52,200                                 |
| 7-8                         | 1954  | 88                                 | 54,700                                 | 1957  | 187                                | 56,900                                 |
| 8-9                         | 1953  | 99                                 | 61,500                                 | 1956  | 138                                | 64,700                                 |
| 9-10                        | 1952  | 28                                 | 67,100                                 | 1955  | 167                                | 72,700                                 |
| 10-11                       | 1951  | 37                                 | 66,400                                 | 1954  | 87                                 | 78,300                                 |
| 11-12                       | 1950  | 47                                 | 66,900                                 | 1953  | 81                                 | 76,000                                 |
| 12 and over                 | 1949 and earlier  | 46                                 | 70,000                                 | 1952 and earlier  | 222                                | 87,500                                 |
|                             | All years   | 1,453                              | 36,800                                 | All years   | 2,278                              | 46,400                                 |
| Average age                 |   |                                    | 4.9 years                              |   |                                    | 6.1 years                              |

<sup>1</sup> Each class interval includes lower, but not higher age than that shown.

<sup>2</sup> Includes only those vehicles for which 1962 data were obtained.

<sup>3</sup> Includes only those vehicles for which odometer readings were available; thus, average age shown differs from average age shown in text table in section on multicar households.

the fact that the Montana data represent a study conducted over 12 months while the Polk data represent an adjusted registration count to July 1 of each year. Further, the Polk data are national while the Montana data are for one state.

TABLE 4  
AVERAGE ODOMETER READINGS BY YEAR MODEL FOR CARS BOUGHT NEW AND THOSE BOUGHT  
USED BY REPORTING OWNERS<sup>1</sup>

| Year<br>Model    | Passenger Cars Bought New |         |                                  | Passenger Cars Bought Used |         |                                  |
|------------------|---------------------------|---------|----------------------------------|----------------------------|---------|----------------------------------|
|                  | Number                    | Percent | Average Odometer<br>Reading (mi) | Number                     | Percent | Average Odometer<br>Reading (mi) |
| 1964             | 112                       | 9.9     | 5,200                            | 2                          | 0.2     | 3,600                            |
| 1963             | 243                       | 21.4    | 11,900                           | 24                         | 2.1     | 17,100                           |
| 1962             | 176                       | 15.5    | 20,000                           | 43                         | 3.8     | 29,900                           |
| 1961             | 136                       | 12.0    | 30,400                           | 81                         | 7.1     | 33,900                           |
| 1960             | 108                       | 9.5     | 38,300                           | 104                        | 9.1     | 41,300                           |
| 1959             | 106                       | 9.4     | 40,000                           | 106                        | 9.3     | 50,700                           |
| 1958             | 46                        | 4.1     | 47,600                           | 109                        | 9.5     | 54,200                           |
| 1957             | 57                        | 5.0     | 53,900                           | 130                        | 11.4    | 58,300                           |
| 1956             | 30                        | 2.6     | 56,200                           | 108                        | 9.4     | 67,100                           |
| 1955             | 36                        | 3.2     | 70,700                           | 131                        | 11.4    | 73,200                           |
| 1954             | 18                        | 1.6     | 64,900                           | 69                         | 6.0     | 81,900                           |
| 1953             | 15                        | 1.3     | 74,000                           | 66                         | 5.8     | 76,400                           |
| 1952             | 9                         | 0.8     | 63,900                           | 45                         | 3.9     | 78,300                           |
| 1951             | 14                        | 1.2     | 71,100                           | 40                         | 3.5     | 87,100                           |
| 1950             | 13                        | 1.2     | 79,300                           | 34                         | 3.0     | 88,000                           |
| 1949 and earlier | 15                        | 1.3     | 90,900                           | 52                         | 4.5     | 104,900                          |
| All years        | 1,134                     | 100.0   | —                                | 1,144                      | 100.0   | —                                |

<sup>1</sup> Montana motor-vehicle-use study, 1963-1964.

## ANNUAL TRAVEL BY CAR AGE

The average miles that passenger cars travel in a year are related to their age. For example, when an automobile is new, its owner is likely to take more frequent trips. Table 2 gives, by year, model and age of car, the average miles traveled by passenger cars between 1961 and 1962 as reported in the National Automobile Use Study. This information is shown in Figure 2 along with the cumulative mileage by age of car.

The information shown in Table 2 and Figure 2 is based on about 1,500 records of travel derived from two odometer readings on the same vehicle, one in April 1961 and the other in June 1962. The data were adjusted to represent estimates for 12 months. From the 4,000 households surveyed in April 1961, it was possible to obtain about 1,500 responses in June 1962. Some vehicles were sold or traded between April 1961 and June 1962. To the extent that the driving experience of those responding to the June 1962 inquiry may not be typical of the total sample, bias may be present in the tabulation.

Data show that as car age increases, annual miles of travel decrease. A yearly average of 9,400 miles was traveled by all year models in the study, a figure that agrees closely with Bureau of Public Roads published averages of 9,465 miles in 1961 (3) and 9,435 miles in 1962 (4).

Another related area investigated was odometer readings by age and year model of passenger cars. Table 3 gives this information which was developed from the National Automobile Use Study and the Montana motor-vehicle-use study. The average odometer readings from the two surveys compare favorably, except for cars less than one year old and for cars 9 years or older. For cars less than one year old, the differences in odometer readings from the two surveys may have occurred because the national survey consisted of data collected during only one week in April 1961 and the Montana survey data were collected between July 1963 and June 1964. Also, one-tenth of the vehicles reported in the national study were in the older car group (9 years or older) as compared with one-fourth of the vehicles reported in the Montana study. With proportionately more older vehicles found in the Montana study, the average odometer reading was 46,400 miles as compared with 36,800 miles in the national study. The average age of all cars sampled was 4.9 years in the national study and 6.1 years in the Montana study.

## NEW AND USED CARS

The average odometer readings by year model for cars bought new or bought used by the reporting owner were also considered. This information, based on the Montana study, is given in Table 4. The difference in the odometer mileage on 1964 cars purchased new or used by the reporting owner was not significant because there were too few used cars purchased. However, when the vehicles were 2 and 3 years old—the 1962 and 1963 year models—the difference in odometer readings between cars reported by the owner as purchased new or purchased used was large. A possible reason for the large difference in readings might be that many of the second-owner vehicles having large mileages were originally operated by salesmen, utility companies, and rental agencies, and were kept for only a year or two before being traded. For the 1961 and 1960 models, the average odometer readings for cars purchased used were about 3,000 miles more than for cars purchased new. Vehicles 5 years old or older that were purchased used—1959 year model and older—had much higher average odometer readings than cars purchased new. Possibly, many of the drivers who purchase a new car and keep it more than 5 years are low mileage drivers.

The number and percentage distribution by year model for cars bought new or used are also given in Table 4. A large percentage of the passenger cars purchased new by the reporting owner were late model cars—almost 60 percent were 1961 through 1964 year models. Conversely, a large percentage of the cars purchased used by the reporting owner were older vehicles—almost 60 percent were 1957 models or older.

The proportion of cars purchased new or used for each year model was also considered in this analysis. Table 5 gives this information, which is based on the Montana



TABLE 5  
PROPORTION OF PASSENGER CARS OF EACH  
YEAR MODEL BOUGHT NEW AND  
PROPORTION BOUGHT USED  
BY REPORTING OWNER<sup>1</sup>

| Year Model       | New  | Used |
|------------------|------|------|
| 1964             | 98.2 | 1.8  |
| 1963             | 91.0 | 9.0  |
| 1962             | 80.4 | 19.6 |
| 1961             | 62.7 | 37.3 |
| 1960             | 50.9 | 49.1 |
| 1959             | 50.0 | 50.0 |
| 1958             | 29.7 | 70.3 |
| 1957             | 30.5 | 69.5 |
| 1956             | 21.7 | 78.3 |
| 1955             | 21.6 | 78.4 |
| 1954             | 20.7 | 79.3 |
| 1953             | 18.5 | 81.5 |
| 1952             | 16.7 | 83.3 |
| 1951             | 25.9 | 74.1 |
| 1950             | 27.7 | 72.3 |
| 1949 and earlier | 22.4 | 77.6 |
| All years        | 49.8 | 50.2 |

<sup>1</sup>Montana motor-vehicle-use study, 1963-1964.

study. In this study it was found that more than 90 percent of the 1963 and 1964 model vehicles were purchased new. The percentage of cars purchased new becomes less as year models get older. Only half of the cars bought as new were still operated by their original owner for more than 5 years. For all year models combined, half of the cars were purchased as new cars and half as used cars. The Illinois study also showed that about half of all passenger cars operated by residents of that state during 1957 and 1958 were purchased as new cars.

#### CLASS AND BODY TYPE

The cars in the sample from the Montana study were assigned by makes of cars to classes roughly indicative of weight (Table 6). Although a wide range of weights may exist in a given make, the authors believe that the classification was appropriate for the study purposes. Only a few vehicles were found in the sample for the class labeled "Other American" but it did not seem appropriate to put them into any other category.

Average odometer readings by class of car and major body type within each class are given in Table 7. The number of vehicles included in the sample and average age of the cars in each class are also given. The average age of the cars was included because the data have shown that age influences the miles traveled.

The data given in Table 7 show that the American compact class, representing more than 10 percent of all the sampled cars, had the lowest average odometer reading,

TABLE 6  
PASSENGER CARS GROUPED IN CLASSES, ROUGHLY INDICATIVE OF WEIGHT<sup>1</sup>

| American Compact <sup>a</sup> | American Light | American Light Medium | American Heavy Medium | American Heavy | Other American | Foreign       |
|-------------------------------|----------------|-----------------------|-----------------------|----------------|----------------|---------------|
| Comet                         | Chevrolet      | Dodge                 | Buick                 | Cadillac       | Corvette       | Anglia        |
| Corvair                       | Ford           | Hudson                | Chrysler              | Continental    | Thunderbird    | Austin-Healey |
| Dart                          | Plymouth       | Kaiser                | De Soto               | Imperial       |                | Fiat          |
| Falcon                        | Studebaker     | Nash                  | Edsel                 | Lincoln        |                | Hillman       |
| Federal                       |                | Pontiac               | Mercury               |                |                | Jaguar        |
| International                 |                |                       | Oldsmobile            |                |                | Mercedes Benz |
| Harvester                     |                |                       | Packard               |                |                | Metro         |
| Lark                          |                |                       |                       |                |                | Opel          |
| Rambler                       |                |                       |                       |                |                | Renault       |
| Tempest                       |                |                       |                       |                |                | Triumph       |
| Valiant                       |                |                       |                       |                |                | Vauxhall      |
| Willys                        |                |                       |                       |                |                | Volkswagen    |
|                               |                |                       |                       |                |                | Volvo         |

<sup>1</sup>Many vehicle makes not shown because none were found in sample.

<sup>2</sup>Some vehicles shown in this class may not be strictly compacts, but special purpose vehicles.

TABLE 7  
AVERAGE ODOMETER READINGS BY CLASS OF CAR AND  
MAJOR BODY TYPE<sup>1</sup>

| Class                 | Vehicles<br>in<br>Sample<br>(No.) | Average<br>Age<br>(years) | Average Odometer Readings by<br>Major Body Type (mi) |                  |                   |        |
|-----------------------|-----------------------------------|---------------------------|--|------------------|-------------------|--------|
|                       |                                   |                           | 2-Door<br>Sedans                                     | 4-Door<br>Sedans | Station<br>Wagons | All    |
| American compacts     | 234                               | 4.7                       | 27,700   | 28,700           | 37,800            | 30,900 |
| American light        | 1,174                             | 7.3                       | 56,500   | 47,100           | 49,700            | 50,300 |
| American light medium | 254                               | 6.7                       | 49,800   | 44,000           | 42,000            | 45,600 |
| American heavy medium | 469                               | 6.7                       | 48,100   | 46,000           | 46,800            | 46,600 |
| American heavy        | 63                                | 6.3                       | 52,300   | 44,700           | —                 | 46,600 |
| Other American        | 10                                | 3.8                       | 31,200   | —                | —                 | 31,200 |
| Foreign               | 74                                | 4.9                       | 31,500   | 67,400           | 48,500            | 37,900 |
| All                   | 2,278                             | 6.7                       | 49,200   | 45,000           | 46,200            | 46,400 |

<sup>1</sup>Montana motor-vehicle-use study, 1963-1964.

30,900 miles. The average is comparatively small primarily because of the relatively short history of the compact car as an advertised type so that there are few or no compact cars in the high-age groups. The American light class had the highest average odometer reading, 50,300 miles. In terms of body type for all classes of cars, the 4-door sedans had the lowest average odometer readings and 2-door sedans had the highest.

Another factor of interest in the usage of automobiles is the number of vehicles reporting average odometer readings of over 100,000 miles. In the Montana study it was found that about 5 percent of all the passenger cars surveyed had odometer readings of more than 100,000 miles. Table 8 gives the percentage distribution by broad year-model groupings and the average odometer reading in miles for each group. For vehicles showing a year model before 1950, the average odometer reading was 141,000 miles, representing 34 percent of these high odometer vehicles. Vehicles showing a year model between 1951 and 1955, representing 61 percent of all the high odometer vehicles, reported an average odometer reading of 115,000 miles. For all vehicles which had an odometer reading of over 100,000 miles, the average was 123,400 miles.

## MULTICAR HOUSEHOLDS

The number of multicar households is increasing. In 1965, it was estimated that 20.6 percent of all households had more than one automobile as compared with 13.4 percent reported in 1960 (5). Multicar ownership is typically characteristic of suburban and rural dwellers rather than persons living in the closely built-up parts of cities where the ownership of even one car is a considerable burden. Tabulations of data reported in results of several studies indicate that the estimated total average annual mileage of travel for each of the cars in a multicar household is more than the average estimated for cars in the one-car households.

TABLE 8  
PERCENTAGE DISTRIBUTION BY YEAR MODEL  
AND AVERAGE ODOMETER READINGS OF  
PASSENGER CARS REPORTING  
AVERAGE ODOMETER  
READINGS OF OVER  
100,000 MILES<sup>1</sup>

| Year Model <sup>1</sup> | Percentage<br>Distribution | Average Odometer<br>Readings (mi) |
|-------------------------|----------------------------|-----------------------------------|
| 1945 and earlier        | 9.2                        | 141,000                           |
| 1946-1950               | 24.5                       | 141,600                           |
| 1951-1955               | 61.2                       | 114,600                           |
| 1956 and over           | 5.1                        | 110,800                           |
| All years               | 100.0                      | 123,400                           |

<sup>1</sup>Montana motor-vehicle-use study, 1963-1964. The vehicles reported here represent about 5 percent of all vehicles reported on.

TABLE 9  
ESTIMATED ANNUAL MILES TRAVELED PER PASSENGER CAR BY  
AGE OF VEHICLE CLASSIFIED BY ONE-CAR  
AND MULTICAR HOUSEHOLDS<sup>1</sup>

| Age of<br>Vehicles<br>(years) <sup>2</sup> | Illinois Motor-Vehicle-<br>Use Study |                        | National Automobile<br>Use Study |                        |
|--|--------------------------------------|------------------------|----------------------------------|------------------------|
|  | One-Car<br>Households                | Multicar<br>Households | One-Car<br>Households            | Multicar<br>Households |
| Under 1                                    | 12,300                               | 14,300                 | 12,400                           | 13,600                 |
| 1-2  | 12,800                               | 13,900                 | 11,600                           | 13,400                 |
| 2-3  | 11,200                               | 13,600                 | 10,400                           | 10,800                 |
| 3-4  | 11,500                               | 11,000                 | 10,100                           | 10,500                 |
| 4-5  | 9,600                                | 8,900                  | 9,000                            | 10,400                 |
| 5-6  | 9,100                                | 8,800                  | 8,700                            | 9,400                  |
| 6-7  | 8,400                                | 6,800                  | 8,600                            | 8,800                  |
| 7-8  | 8,400                                | 7,500                  | 8,400                            | 7,100                  |
| 8-9  | 7,100                                | 7,500                  | 7,800                            | 7,500                  |
| 9-10                                       | 6,600                                | 7,200                  | 6,100                            | 6,600                  |
| 10-11                                      | 6,000                                | 4,000                  | 5,100                            | 6,400                  |
| 11 and over                                | 4,400                                | 4,800                  | 5,400                            | 4,800                  |
| All years                                  | 9,900                                | 10,000                 | 8,900                            | 9,300                  |

<sup>1</sup>Estimated mileage for preceding 12 months.

<sup>2</sup>Each class interval includes lower, but not higher age than that shown.

### Annual Miles of Travel

The estimated annual miles of travel by passenger cars classified by age and whether owned by a one-car or multicar household are given in Table 9. These figures are based on the National Automobile Use Study—the complete sample of 4,000 households was used—and the Illinois study. The Illinois study reported an estimated annual mileage of 9,900 miles for each car in the one-car households as compared with an average of 10,000 miles for each car in the multicar households. The national study reported an estimated annual average of 8,900 miles for each car in one-car households and 9,300 miles for each car in the multicar households.

Data published in the Chicago Area Transportation Study (CATS) in 1956 (6), tend to confirm the finding that drivers in multicar households drive more miles per car than those in single-car households. According to the CATS, it was estimated that internal trips for purely local purposes of cars of one-car households located within the study area aggregated 11.60 miles on an average weekday, whereas cars of multicar households were driven 12.38 miles on similar trips.

However, preliminary results from the 1963 to 1964 Montana study do not agree with previous findings. In the Montana study it was found that cars operated from multicar households averaged about 12 percent fewer annual miles per car than cars operated from single-car households. The single-car households estimated 9,100 annual miles of travel per car, two-car households estimated 8,000 annual miles of travel per car, and three-or-more-car households estimated 7,900 annual miles of travel per car. Although the Montana study findings seem to contradict the results of the other studies, several factors that might have influenced the findings should be considered. The fact that multicar households in Montana reported fewer average annual miles of travel per car than single-car households may reflect a different situation in multicar ownership in that state. It is possible that in Montana the second or older car on a farm or ranch is used primarily for utility purposes. In city or suburban areas of more densely populated states such as Illinois, the second car may be used for relatively more driving by the wife or one of the children. Data show that the average age of all cars in single-car households is 6.6 years in Montana, and 5.4 years in Illinois; in multicar households, 7.6 years in Montana, and 5.6 years in Illinois.

It is also possible that the results reported in the Montana study reflect a difference in the time the study was conducted; the Montana study was made in 1963 and 1964, the



TABLE 10  
PERCENTAGE DISTRIBUTION OF PASSENGER CARS BY AGE OF CARS IN ONE-CAR  
HOUSEHOLDS AND BY AGE OF NEWER AND OTHER CAR(S)  
IN MULTICAR HOUSEHOLDS<sup>1</sup>

| Age of<br>Vehicles<br>(years) <sup>2</sup> | One-Car Households |            | Multicar Households |            |                           |            |
|--|--------------------|------------|---------------------|------------|---------------------------|------------|
|  | Actual             | Cumulative | Newer Car           |            | Other Car(s) <sup>3</sup> |            |
|  |                    |            | Actual              | Cumulative | Actual                    | Cumulative |
| Under 1                                    | 4.4                | 4.4        | 10.0                | 10.0       | 0.5                       | 0.5        |
| 1-2  | 14.2               | 18.6       | 22.6                | 32.6       | 4.0                       | 4.5        |
| 2-3  | 14.5               | 33.1       | 17.3                | 49.9       | 4.7                       | 9.2        |
| 3-4  | 14.1               | 47.2       | 17.2                | 67.1       | 8.3                       | 17.5       |
| 4-5  | 9.9                | 57.1       | 9.4                 | 76.5       | 8.5                       | 26.0       |
| 5-6  | 10.5               | 67.6       | 9.0                 | 85.5       | 12.4                      | 38.4       |
| 6-7  | 7.1                | 74.7       | 5.0                 | 90.5       | 7.4                       | 45.8       |
| 7-8  | 7.8                | 82.5       | 4.9                 | 95.4       | 12.9                      | 58.7       |
| 8-9  | 7.1                | 89.6       | 2.5                 | 97.9       | 14.6                      | 73.3       |
| 9-10                                       | 5.0                | 94.6       | 1.3                 | 99.2       | 11.7                      | 85.0       |
| 10-11                                      | 2.4                | 97.0       | 0.2                 | 99.4       | 6.4                       | 91.4       |
| 11-12                                      | 1.4                | 98.4       | 0.1                 | 99.5       | 3.1                       | 94.5       |
| 12 and over                                | 1.6                | 100.0      | 0.5                 | 100.0      | 5.5                       | 100.0      |
| Total                                      | 100.0              | —          | 100.0               | —          | 100.0                     | —          |
| Average age of all<br>vehicles             | 5.4 years          |            | 5.6 years           |            |                           |            |

<sup>1</sup>Illinois motor-vehicle-use study, 1957-1958.

<sup>2</sup>Each class interval includes lower, but not higher age than that shown.

<sup>3</sup>Includes those vehicles in households with more than two cars.

national study in 1961, and the Illinois study in 1957 and 1958. The Montana data might possibly reflect a future situation. Other considerations that might have influenced the average number of miles driven by residents of single-car and multicar households include household composition, i.e., the number of persons of driving age, as well as income and availability of public transportation.

Another factor possibly associated with estimated annual travel by cars in single-car and multicar households is the distribution of cars by age. Table 10, which is based on the Illinois study, shows these distributions.

By comparing the age of cars in one-car households with the age of the newer cars in multicar households, it was noted that a higher percentage of newer vehicles were reported in the multicar households. Thirty-three percent of all cars owned by one-car households were less than 3 years old and 50 percent of the newer cars owned by

TABLE 11  
RELATIVE DIFFERENCE OF AGES OF FIRST AND SECOND CARS OWNED  
IN TWO-CAR HOUSEHOLDS<sup>1</sup>

| Year Model    | Percentage Difference in Age in Years for Second Car |              |              |              |                       |              |
|---------------|--|--------------|--------------|--------------|-----------------------|--------------|
|               | 0-1<br>Years   | 2-3<br>Years | 4-5<br>Years | 6-7<br>Years | 8 or<br>More<br>Years | All<br>Years |
| 1958          | 19   | 26           | 19           | 16           | 20                    | 100          |
| 1957          | 22   | 25           | 21           | 20           | 12                    | 100          |
| 1956          | 22   | 28           | 22           | 18           | 10                    | 100          |
| 1955          | 23   | 24           | 31           | 14           | 8                     | 100          |
| 1954          | 22   | 20           | 30           | 19           | 9                     | 100          |
| 1953 and over | 33   | 34           | 18           | 5            | 10                    | 100          |
| All years     | 24   | 27           | 23           | 15           | 11                    | 100          |

<sup>1</sup>Illinois motor-vehicle-use study, 1957-1958.

multicar households were less than 3 years old. It appears that a high proportion of other cars in the multicar households were older vehicles. Almost 75 percent of the other or older car(s) in multicar households were 5 years old or older. One possible reason for this is that when a one-car household decides to buy a new car, often the trade-in dollar value is low and, logically or illogically, the family becomes a multicar household. Typically, one car is still used for work trips and shopping trips while the other car is used for trips generated by other family members during the entire day because a car is available. The new car is often used for the longer trips made on weekends and vacations. The average age of all vehicles found in one-car households was 5.4 years as compared with 5.6 years for all vehicles found in multicar households.

A further analysis was made of the data from the Illinois study to find out more about the characteristics of two-car households. Table 11 shows the relative ages of first and second cars owned in multicar households. Generally, this table shows that for the two-car households, the older car was less than one year older than the new car in one quartile of the households, 2 to 3 years older in the second quartile, and 4 to 5 years older in the third quartile.

### SUMMARY

Some of the major findings covered in this paper that may be helpful in forecasting automobile travel are:

1. Based on actual odometer readings taken in April 1961 and June 1962, and estimated for 12 months, the annual travel per vehicle averaged over 11,000 miles for vehicles less than 3 years old, 9,500 miles for vehicles 4 and 5 years old, and decreasing year by year at an accelerated rate to 4,500 miles for vehicles over 12 years old.
2. The average odometer reading by age of car was 12,000 miles for vehicles one to 2 years old, 22,000 miles for vehicles 2 to 3 years old, 52,000 miles for cars 6 to 7 years old, and over 70,000 miles for cars 9 to 10 years old.
3. The average odometer reading by year model for passenger cars bought as new cars was less than the average odometer reading for the same year model for cars bought as used cars. Further, only 50 percent of the cars over 5 years old were being operated by their original owner.
4. The average odometer reading for American compact cars was 30,900 miles, the lowest of any class of car because of their lower average age. Foreign cars showed averaged odometer readings of 37,000 miles. All other classes of cars reported average odometer readings of over 45,600 miles with the American light cars reporting the highest average odometer reading of 50,300 miles.
5. Of over 2,300 vehicles found in households sampled in Montana during 1963-1964, 5 percent reported odometer readings in excess of 100,000 miles.
6. Two separate investigations disclosed that the estimated average annual miles per passenger car in single-car households was somewhat less than the estimated average annual miles per car in multicar households. The first investigation indicated that cars of single-car households averaged 9,900 miles a year, whereas cars of multicar households averaged 10,000 miles per car a year. Although these differences are not great, the results were confirmed by a second investigation which indicated that cars of single-car households averaged 8,900 miles a year, whereas cars located in multicar households averaged 9,300 miles per year. Preliminary results from a more recent study conducted in Montana indicate that vehicles driven from multicar households average fewer annual miles per vehicle than vehicles operated from single-car households.

### REFERENCES

1. Automobile Facts and Figures (R. L. Polk and Company data). Automobile Manufacturers Association, p. 22, 1963.
2. Automobile Facts and Figures (R. L. Polk and Company data). Automobile Manufacturers Association, p. 20, 1965.

3. Highway Statistics, 1961. U. S. Bureau of Public Roads, Table VM-1, p. 25.
4. Highway Statistics, 1962. U. S. Bureau of Public Roads, Table VM-1, p. 54.
5. Automobile Facts and Figures. Automobile Manufacturers Association, p. 45, 1966.
6. Chicago Area Transportation Study. Final Report, Volume 2, Data Projections.  
State of Illinois Dept. of Public Works and Buildings, Table 22, p. 76, July 1960.