

COST OF OWNING AND OPERATING AUTOMOBILES AND VANS 1979

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SUBURBAN-BASED OPERATION

SIZE	TOTAL COSTS: CENTS PER MILE
STANDARD	24.6
COMPACT	21.7
SUBCOMPACT	18.5
PASSENGER VAN	36.2











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1979



U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

Office of Highway Planning
Highway Statistics Division

COST OF OWNING AND OPERATING AUTOMOBILES AND VANS 1979

SUBURBAN-BASED OPERATION							
TOTAL COSTS: CENTS PER MILE							
SIZE	 ORIGINAL VEHICLE COST DEPRECIATED	 MAINTENANCE, ACCESSORIES, PARTS & TIRES	 GAS & OIL (EXCLUDING TAXES)	 GARAGE, PARKING & TOLLS	 INSURANCE	 STATE & FEDERAL TAXES	TOTAL COST
STANDARD WITH STANDARD EQUIP- MENT, WEIGH LESS THAN 4,000 LBS. EMPTY. 	6.3	5.5	5.5	3.2	2.5	1.6	24.6
COMPACT WEIGH LESS THAN 3,000 LBS. EMPTY. 	5.2	4.8	4.9	3.2	2.3	1.3	21.7
SUB COMPACT WEIGH LESS THAN 2,500 LBS. EMPTY. 	3.8	4.1	4.1	3.2	2.2	1.1	18.5
PASSENGER VAN WEIGH LESS THAN 5,000 LBS. EMPTY. 	10.2	6.1	7.4	3.2	7.2	2.1	36.2



U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

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Highway Statistics Division

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COST OF OWNING AND OPERATING AUTOMOBILES AND VANS

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Introduction

The cost of owning and operating a motor vehicle is of major significance, as Americans experience increasing demands on their incomes. It costs more than \$6,000 to purchase a standard-size American car. Typically, it will be driven 100,000 miles over a 10-year period, and the total cost to its owner will be nearly \$25,000. During that period it will cost about \$5,437, excluding tax, for some 6,250 gallons of gasoline, about \$4,804 to keep the vehicle maintained and in repair, \$2,445 to insure it, \$3,198 for garaging, parking, and tolls, and \$1,597 in automotive taxes. This last item goes mainly for the roads on which the vehicle is driven, and accounts for only 6.5 percent of total costs.

Here, we shall examine the factors influencing the costs of car ownership and operation, and suggest ways the motorist can get the best value for the money spent.

This report updates "The Cost of Owning and Operating an Automobile—1976," and it has been expanded to include a passenger van. The figures shown in this study are for mid-1979. The format and methods used to arrive at the costs figures are similar to those used in previous reports. As with the earlier reports, the costs are based on operations of typical vehicles in the Baltimore, Maryland suburbs.

The study traces the selected vehicles and their costs through a 10-year lifetime of 100,000 miles. These figures are considered reasonable from a study of odometer readings and the average age of passenger vehicles in use up to and including early 1979. Usually an automobile or van passes through three or more owners during its life, but these costs are not included in this report.

Vehicles Used in the Study

Description: The vehicles, repairs, repetitive maintenance operations, replacement items, insurance, and other costs included in the study and the values of factors used to compute these costs are given in Table 1,

"Vehicle Operating Costs—Bases for Estimates." As in the previous studies, three cars have been chosen to compare the costs incurred and to show the various costs in relation to the highway-user taxes paid. Because of the increased use of vans, a van is included in this study for the first time. Though the current study is for vehicles based in the Baltimore, Maryland area in order to retain comparability with data for the automobiles from prior reports, an analysis for vehicles in other locations can follow procedures as described later.

Four American-made vehicles were chosen for study: a standard-size four-door sedan (Table 2), a compact (Table 3), a subcompact (Table 4) and a passenger van (Table 5). Although historical data on passenger vans is limited, we have made certain assumptions, based on our experience with automobile operating costs and available information on nonpassenger vans, to arrive at the figures shown in Table 5. The costs for vans used in this report will not correlate with those to be found in another Federal Highway Administration publication, "Rideshare and Save—a Cost Comparison," which assumes that the van was purchased for the specific purpose of vanpooling and would be used for only 4 years. The costs presented here are intended to be applicable to any passenger van, and assume that it will be used for a total of 10 years, 100,000 miles, the same as automobiles. We have no evidence to indicate that the lifetime use of vans differs from automobiles.

The current purchase price of the vehicle was considered to be the "sticker" price of the vehicle less an assumed dealer discount. The discounts are affected by many factors—the size of the dealership, the dealer's inventory situation, the time of year, and the ability of the buyer to negotiate a good deal. The dealer discount used is based on interviews with dealers in the study area.

Vehicle Life: Many things, such as individual driving habits, climate, garage facilities, type of road, purpose for which the vehicle is used, and sometimes luck, can affect the service life and costs of operating a vehicle.

However, since compacts appear to be surviving at about the same rate as standard-size cars, all of the study vehicles are assumed to have a 10-year, 100,000-mile life. A normal travel pattern has been set at 14,500 miles in the first year and a decreasing number of miles each year thereafter until the vehicle is driven only 5,700 miles in its 10th year. These assumptions are reasonably consistent with available travel data. In normal circumstances, an individual's need for transportation is relatively stable from year to year, so it is unlikely that an only car or van would be driven successively fewer miles each year. However, studies show that, as a general rule, vehicles are operated fewer miles each year. The older vehicle usually becomes the second or third family vehicle or, for other reasons, it is driven less.

The average automobile or van is sold or traded three or more times during its life, usually through new or used car dealers, because either the need for or anticipation of repairs, usually prompts owners to trade-in their vehicles. Dealers serve as quality control judges of the used vehicle trade. They wholesale those that require very expensive or time-consuming work and make the repairs on the remainder prior to resale. But whether the vehicle needing repairs is owned by an individual or by a dealer, the money spent on repairs and upkeep becomes a part of the cost of owning and operating the vehicle. Battery and tire replacements, brake linings, radiator repairs, body work, and numerous other replacements and repairs are included in the used car or van reconditioning programs of many dealers. The additional work done under dealer warranties does not impose direct out-of-pocket expenditures on the vehicle owner, but these costs are submerged in each vehicle's purchase price. For the purposes of this report, no effort has been made to separate them.

Types of Costs

Although many owners think of costs in terms of outlays for gasoline, oil, tires and tolls, a careful examination shows that some costs occur whether or not the vehicle is driven, and other costs are directly related to the amount of travel. The first group of costs is generally referred to as ownership costs and the latter group as operating costs. Analysts may differ on the costs that should be included in each category. In the past, all repairs and maintenance costs, as well as garaging, parking and tolls, were included under operating costs. Because of their fixed nature, the tables now show as ownership costs the portion of repairs and maintenance costs included in scheduled maintenance (i.e., the costs of maintenance items generally shown in the owner's manual), garaging costs and the corresponding sales tax. Nonscheduled repairs and maintenance, parking, tolls, and the corresponding sales tax are included under operating (running) costs. Sufficient detail is shown in the tables for users to arrive at their own definition of ownership or operating costs.

Ownership Costs: Ownership costs include depreciation, insurance, finance charges, registration and titling fees, scheduled maintenance, accessory costs and garaging. Even if the vehicle is permanently garaged a portion of each of these costs occurs. Although all repairs and maintenance may be properly included in operating costs, as they are related to a greater or lesser extent to usage, we have placed scheduled maintenance under ownership costs.

1. *Depreciation* is the loss in value of the vehicle during the time it is owned due to (1) passage of time, (2) its mechanical and physical condition, and (3) the number of miles it is driven.

Vehicle values are determined by a canvass of selling prices of vehicles by make and model year in each geographic area. These values are based on normal travel, so odometer readings higher or lower than the normal range will be reflected in lower or higher remaining vehicle values. Of course, the vehicle's appearance is very important in determining the remaining value. With this information, national vehicle dealer groups issue vehicle value books for different sections of the country, usually on a quarterly basis. These have been used in arriving at the vehicle depreciation figures.

Depreciation is the greatest single cost of owning and operating most passenger vehicles during a 10-year life span. The cost of gasoline, however, is fast overtaking depreciation costs and has already exceeded the depreciation costs for the subcompact automobile. In the majority of cases, the age of a vehicle is more important than its mileage in determining resale or trade-in value. Such factors as brand popularity, body style, size, and color, are also considered in determining value. For the standard-size car, by far the greatest dollar depreciation occurs in its first few years, while for the smaller cars, the depreciation is more evenly distributed over all their years of use. Van depreciation seems to parallel that of the standard-size automobile. Since newer vehicles are driven more miles than older vehicles, the depreciation on a per-mile basis is held down the first few years. For example, consider depreciation for the standard-size car in this report (see Table 2). If the car were bought new for \$6,303 and sold or traded at the end of the first year when it had been driven 14,500 miles, depreciation would be \$1,760. This depreciation cost divided by the 14,500 miles driven the first year amounts to 12.1 cents per mile. By the end of the second year, when the car had been driven 27,500 miles, depreciation would total \$2,681, which divided by the 27,500 miles would compute to 9.7 cents per mile. As the vehicle gets older, the depreciation rate decreases, but the outlay for maintenance and repairs rises. As time passes it becomes increasingly difficult and expensive to keep a car in satisfactory operating condition.

2. *Insurance Costs* are determined by the amount of coverage, the purpose for which the car is used, and the location in which it is operated.

Automobiles are continuously exposed to the possibility of damage, whether on the highway or parked. The large numbers of vehicles on the roads and streets and in parking lots make vehicles highly susceptible to accident involvement. Controlled crash tests on cars produced through 1973 showed that they were not able to escape unmarked from any sort of collision. Beginning with 1974 models, most cars were manufactured with energy absorbing bumpers that were designed to protect against impacts up to 5 miles per hour without damage to the vehicles. Even so, the cost of repairing even minor damage has increased considerably and is reflected in the insurance rates.

The uninsured deductible portion of accident costs is included in the maintenance and repair costs. A spokesman for the insurance industry ventured the opinion that the average motorist will be involved in an accident twice during an 8-year period, and one of these probably will be his fault. If the owner carries collision insurance for the first 5 years of the vehicle's life, his out-of-pocket cost during this period will be the deductible amount (usually \$100). That amount can be considered the minimum he will pay for accidents during the life of the vehicle if he continues this coverage. After his collision insurance is discontinued, he will have to pay the entire cost of any accidents for which he is responsible.

The insurance coverage in this study for automobiles includes \$20,000/\$40,000 bodily injury, \$10,000 property damage, \$2,500 personal injury protection, \$20,000/\$40,000/\$5,000 uninsured motorist and \$50 deductible comprehensive coverage for the 10-year life of the automobile. For the van, the insurance coverage includes \$300,000 single limit liability, \$2,500 personal injury protection, \$50,000 uninsured motorist and \$50 deductible comprehensive coverage for the 10-year life of the van. Both vehicle types include \$100 deductible collision coverage for the first 5 years. Accidents during the sixth through tenth years could, therefore, increase the cost of owning and operating a vehicle more than the amounts shown in the accompanying tables. An industry representative said that the trend is toward a deductible comprehensive coverage rather than full comprehensive. There is a considerable saving to the insurance company when a large number of small claims do not have to be processed. The saving is passed on to the insured in lower rates.

It should be noted that the insurance costs shown in Table 5 for a van reflect the assumption that the van would be used in daily commuting to work with passengers who share the expense with the driver.

3. *Finance Charges* are not included in the costs shown in the tables in this report since a number of options are available, but they may be approximated with relative ease. Most vehicle buyers either pay interest on money they borrow to buy their vehicles or they forego interest they would have earned if they had elected to use savings or other investments to pay for the vehicles outright.

Lending institutions and vehicle dealerships have various vehicle financing plans available. They may differ regarding the portion of the vehicle cost they are willing to finance, the interest charged, and length of the loan term. Interest charged should be considered in the cost of owning a vehicle. The lender will provide the total interest charges, which may be divided by the accumulated miles of travel for the length of the loan. For a 3-year loan, total interest charges would be divided by 39,000 miles (14,500 plus 13,000 plus 11,500 miles). The computation will give the cost-per-mile figure that should be added to each of the 3-year totals shown on the tables.

The computation of interest lost on savings is more difficult. The cash payment for the purchase of a vehicle, the type of savings plan, the current rate of interest, and the period of time for monthly deposits to equal the cash payment, will vary greatly among purchasers. Savings institutions will provide the amount of interest that could be earned by the deposit of an amount equal to the cash payment for the selected period of time and the amount of interest that can be earned if equal monthly amounts are paid into the savings account for the same period. The difference between these two interest amounts is the interest lost by paying cash for the purchase of a vehicle.

If \$4,500 cash was needed to purchase a vehicle and 3 years (36 months) was selected as the period of time needed to save this amount, the monthly payment into savings would be \$125 ($\$4,500 \div 36$). The difference in interest earned by these payments and the interest earned on \$4,500 on deposit for 3 years is the interest lost by paying cash.

Alternative methods of financing a new vehicle purchase can make important cost differences; and merits of different plans should be weighed carefully before a particular one is selected.

4. *Registration and Titling or Sales Taxes* are payments to the State in which the vehicle is registered. The registration fee customarily is due each year, and the titling or sales tax is due only once—when the vehicle is purchased. However, in Maryland, which is the base State for this study, a titling tax applied as a percentage of the vehicle's value is invoked each time the vehicle changes hands. The same is true in some other states. Also, some States or their local subdivisions (but not Maryland) levy an annual tangible or personal property tax which is figured as a percentage of the value of certain personal possessions, including automobiles. In this study, the cost of the registration fee is applied to the year in which it is charged, and the titling tax is applied in the first year of ownership.

5. *Scheduled Maintenance* includes the items shown in the owner's manual. Generally, the suggested maintenance intervals are expressed in miles driven or period of time owned. These include the recommended maintenance of pollution control equipment presently installed in new vehicles. We assume that the manufac-

turer's maintenance schedule will be followed for each of the four vehicles. Nonscheduled repairs and maintenance are included with the operating costs. The user may wish to include scheduled maintenance under operating costs along with nonscheduled maintenance.

6. *Accessory Costs* cover the value of any add-on features for a car and have no effect on its mechanical operation. These items customarily include cover mats for the floors, radio, extra side mirrors, seat covers, etc. The costs of these items are usually assigned in equal amounts to the year purchased and any following years in which the items are still serviceable. Accessories, as defined in this analysis, do not include optional equipment such as power steering, automatic transmission, or air conditioning, which are included in the purchase price.

7. *Garage Costs* are computed as the value of any arrangements made by the car owner for off-street storage of the vehicle at the owner's residence. It may be an attached or detached garage, a carport, or it may be a paved parking apron or gravel surfaced space beside his house.

Operating Costs: Operating costs include nonscheduled repairs and maintenance, gasoline, oil, tires, parking and tolls, and taxes on gasoline and oil. The more a car is used the higher these costs become.

1. *Nonscheduled Repairs and Maintenance* shown in this report are not taken from records of specific vehicles nor are the amounts of usage, fuel consumption rates, or any other factors presented as "average." However, the vehicle and operating cost factors are considered to be typical for cars of these sizes in the study area. The factors used here were selected on the basis of available statistics, discussions with automobile industry personnel, assistance from service managers of major automobile dealers, and a computer printout from the Department of Transportation, Transportation Systems Center.

To estimate operating costs, it was necessary to make a series of assumptions concerning tire and battery replacements, wheel alignments, light bulbs, fan belts, brake linings and parts, and other repair and maintenance items. The need for repairs was estimated from data gathered during discussions of repair experience with car service personnel. These were adjusted using data provided by the Transportation Systems Center. They include such items as starter repair, carburetor overhaul, replacement of fuel pump, radiator hoses, muffler, tail pipes, and shock absorbers, etc., for what must seem to the owner to be a long list of repairs. Several of these repairs and replacements must be made more than once during the life of the vehicle. No costs were included for repairs or replacements that would be covered by warranties.

The mechanical features on the vehicles in this study are similar to those in the prior study, so changes in costs result primarily from increases in charges for parts and

labor. Assumptions were made as to where the repairs and maintenance would most likely be made, and labor costs at dealer garages, at independent garages and at service stations were applied. These costs averaged \$18.66 per hour in the study area.

Replacement of spark plugs, windshield wiper blades, fan belts, radiator hoses, etc., on cars of all sizes are simple, and savings can be realized if you can do the work yourself. Although there are increasing numbers of "at home" mechanics, repair garage experience shows that the public generally is not ready to assume this responsibility, so vehicle owners must pay professional wages.

2. *Gasoline* is a major cost item for vehicles of all sizes. The difference in gasoline costs alone between the 1979 model standard-size car and the subcompact over 100,000 miles of travel can amount to as much as \$1,483. As shown in Tables 2 and 4, respectively, over the first 3 years, gasoline will cost \$578 more for the standard-size car than for the subcompact. The difference in gasoline costs between the standard-size (Table 2) and the compact (Table 3) is not quite as great, but still noteworthy, when one considers that compacts feature most of the advantages of both the larger cars and the smaller subcompacts. Until gasoline shortages occurred in 1973, the price of gasoline, including taxes, had changed little for more than 20 years. However, the price of gasoline rose more than 14 cents per gallon in the study area in late 1973 and early 1974. Since then, gasoline prices have increased regularly. In past studies, we used a gasoline price that was an average for the study area. Gasoline costs for this study were computed at \$1 per gallon, including State and Federal taxes.

The gasoline costs shown on the tables can be adjusted to reflect increased costs. For each 1-cent increase in the cost of a gallon of gasoline for a standard-size automobile the total cost-per-mile would increase 0.0625 cent, computed by dividing the total cost-per-mile of gasoline (5.44 cents) plus State and Federal taxes (0.56 cent and 0.25 cent) by \$1 (100 cents), the cost-per-gallon used in this study. Therefore, a 30-cent increase in the cost of a gallon of gasoline, to \$1.30 a gallon, would increase the cost of operating a standard-size automobile by 1.875 cents (30 cents, amount of increase, x 0.0625 cent, above) per mile. For other vehicles, for each 1-cent increase per gallon, the total operating cost-per-mile would increase by 0.0555 cent for a compact automobile, 0.0455 cent for a subcompact automobile and 0.0833 cent for a passenger van.

3. *Oil* costs for a new or relatively new vehicle are mainly dependent on the car manufacturer's instructions for oil changes, because little, if any, oil is burned by these cars. Currently, many manufacturers recommend a change every 7,500 miles, and the capacities listed for the study cars are 5 quarts for each vehicle.

4. *Tires* receive 400,000 miles of wear when an automobile is driven 100,000 miles. It was assumed that

steel-belted radials would be used on the standard-size automobiles and fiberglass-belted radials on the compact-size automobiles. Bias-ply tires would be used on the subcompact-size automobile and the van.

5. *Parking and Tolls* include metered curb parking and fees charged in parking lots, and toll charges for using private or public highways and bridges.

6. *Taxes on Gasoline and Oil* are paid to the government in most States on a per-gallon basis. For the study area, the State gasoline tax is 9 cents per gallon, the Federal gasoline tax is 4 cents per gallon, and the Federal oil tax is 6 cents per gallon.

Adjustment of Costs to Other Localities

Using this study as a guide, the costs and rates for suburban Baltimore, shown in Tables 2, 3, 4 and 5, can be compared with costs and rates for other localities. For example, the price of gasoline used in this study was \$1 per gallon. If the price of gasoline in another locality is \$1.05 per gallon, persons living there can estimate their own automobile operating costs by adjusting the gasoline cost figure to reflect the higher price, using the procedure shown in "gasoline and oil" above. Similar adjustments can also be made for other cost items. This is particularly important with respect to repair labor rates and insurance.

Not all cost items are listed in detail in the tables, but sufficient information is included to assist those who wish to make computations to fit other geographic areas or other types of operation. If the suburban costs had been computed for Boston, New York or San Francisco, they probably would have been higher, and if they had been computed for Jacksonville, Montgomery or Fort Worth, they would have been lower. Operating costs in most rural areas of the United States probably would not differ greatly, but there are substantial differences in vehicle registration fees and gasoline tax rates among States. The operating costs (gasoline, tires, oil, repairs, maintenance, etc.) for the vehicles in rural operation tend to be lower than for comparable vehicles in suburban use because there are fewer traffic control devices and less congestion. Because of the lower accident rates in rural areas, insurance costs are usually much less than in urban areas.

The costs that are most likely to change in the short range, and to need adjustments from one geographic location to another, are gasoline price and tax, registration fee, repair labor rate, insurance premium, and toll and parking charges. Furthermore, the market value of vehicles can differ substantially from region to region, and any estimates of interim costs should allow for differences in rates of depreciation.

In some areas of the United States, tolls and garaging would cost less than in the study area, but an automobile owner traveling in the Baltimore area customarily would encounter major toll routes, while another in Montgomery, Alabama would not. Also, garaging and parking

would be more than for residents of small towns or rural areas.

The worksheet included in this report has been prepared as a guide so that you may produce costs for the first year of your vehicle's life in your locality. If annual and per mile costs for an older car are desired, the odometer mileage for that vehicle should be compared with a cumulation of the annual mileages shown at the top of the "year" columns on Tables 2, 3, 4 and 5. When sufficient mileages are added together to match the vehicle's odometer mileage, the proper column of Table 2, 3, 4 or 5 can be used to identify cost factors for everything except depreciation. Since depreciation is dependent on both car age and mileage, local used car prices and "blue book" values (if available) should be used.

Other Applications for Study Data

Choosing a Car: A person's choice of an automobile—standard size, compact, or subcompact—is dependent on several considerations. For the motorist who needs the space provided in the standard-size car because of a large family, carpool needs, or equipment that must be carried, the economics and size advantages of the compact and subcompact must be forgone. If he finds that space needs are not compelling, the smaller cars offer several advantages, including the great advantage of better fuel economy. Parking in curb space is easier, some parking lots have lower rates for small cars, repair costs may be less, registration fees in some States are lower, tires cost less, and savings in the gasoline cost over the life of the car will be enough to pay a substantial amount toward the cost of a new car. As was previously mentioned, the gasoline cost savings between a standard-size car and a subcompact over 100,000 miles can be substantial.

When To Trade In: "When should I trade in my car?" There is no answer that fits everyone because monetary consideration is only a part of the problem. Vehicle style, size, interior decor, mechanical features, availability of money, and many other considerations may be important to the car owner in making a decision on which vehicle to buy and when to buy again.

However, most people probably are concerned mainly with the money difference when they ask the question. The "annual trader" drives a current model car all the time, but depreciation for the standard-size automobile will cost him about \$17,600 over a 10-year period. The "2-year trader" pays about \$13,405 in depreciation. This is a saving of \$4,195 from the "annual trader's" costs, and even more can be saved by becoming a "3-year trader." However, after the first year, a series of outlays for tire replacement, repairs, and incidentals begin to offset the savings in depreciation.

The obvious flaw in trying to use these tables to determine when to trade a car is that a family's annual auto usage tends to be relatively constant from year to year

and does not follow the pattern shown in this study, which traces the life of a typical car. If the family customarily drives 14,500 miles per year it is unlikely that they will drive fewer miles the second year and still fewer the third year. Therefore, by the end of the third year, they will have driven 43,500 miles (3 x 14,500 miles) instead of the 39,000 miles obtained by accumulating the mileage shown for the first 3 years on Table 2. By the end of the fourth year, they will have traveled 58,000 miles while Table 2 shows this to be the mileage on a 5-year old car. Therefore, it appears that the mileage traveled can be as important to a car's condition and remaining value as the car's chronological age. But, using total miles traveled as the only determinant of a car's condition can be misleading. Some long trips can put a lot of "easy" mileage on a car, while many short trips to the store and around the neighborhood, with a lot of stop-and-go driving, can put fewer, but very wearing miles, on a car.

The total vehicle cost per mile is lower for the high-mileage drivers because depreciation in the early years of a car's life is determined more by age than by miles and because some of the annual charges, such as insurance and garaging at the owner's residence do not increase in proportion to mileage. A low-mileage driver sustains about the same depreciation, insurance, and garaging costs, but they are distributed over fewer miles and result in a higher cost per mile. On the other hand, most insurance companies charge lower rates for private and recreational uses of vehicles and higher rates for vehicles used directly for work or in relation to business. In addition, many companies apply a surcharge for high-mileage drivers in both categories.

To some degree, the purpose for which a car is used and the circumstances of its use will dictate the vehicle-cost pattern. Once the vehicle-use pattern is determined, the owner may be able to relate costs to those shown in this report and decide when it will be most advantageous to trade cars. The high-mileage driver may find some repairs and tire replacements moved to earlier years than those shown in this study. Of course, comfort, dependability and appearance are important to most car owners, and these weigh heavily in the automobile purchasing decision.

Business Use of Car: Employers commonly reimburse the costs for the use of an employee's personal car for business purposes. The question uppermost in the mind of each of the parties is, "How much should the reimbursement be?" If a personal automobile is used only occasionally and incidentally for business purposes, an amount necessary to cover out-of-pocket costs, tire wear, and general wear on the vehicle may be sufficient. If the extent or type of use affects the insurance rate, or if it subjects the automobile to unusual loads or operating conditions, the reimbursement should be adjusted upward accordingly. Tolls and parking or storage costs incurred in the course of such use should be paid separately and in full, regardless of per-mile reimbursement.

If an employee's job is dependent on obtaining and using a personal vehicle in the employer's behalf, reimbursement on the basis of the employee's overall costs per mile seems fair. If, in addition, the employee's frequency of car purchases, the type of automobile bought, or other factors of ownership or upkeep are substantially affected by the employer's requirements, the reimbursement should be sufficient to cover all outlays that exceed what the employee would normally spend for personal nonbusiness automobile transportation. Information concerning reimbursement for private automobile use can be obtained from business travel advisory services that have made studies of costs for specific vehicles and groups of vehicles under various conditions of use. The tables may also be used as a guide for determining reimbursement rates for occasional use of a vehicle.

Carpooling and Vanpooling: Many of the automobiles used for commuting in the United States carry only one person—the driver. While circumstances can justify some driver-only cars, there are many that could be removed from the rush hour traffic crunch, and their drivers would enjoy advantages and savings available through carpooling and vanpooling.

Out-of-pocket cost is the major saving. Specific cost comparisons between driving alone and carpooling are presented in the Federal Highway Administration publication "Rideshare and Save—A Cost Comparison," second edition, 1979. This can be obtained from the Office of Public Affairs, Federal Highway Administration, Washington, D.C. 20590.

In addition to the direct monetary advantages of carpooling and vanpooling, there are added benefits in the form of less air pollution, fewer cars on the streets during rush hours so traffic can flow more freely, a lower accident exposure, substantial energy savings, a guaranteed comfortable seat (usually with pickup and delivery to your door), and less driving for each vehicle owner. The potential fuel savings are enormous: Increasing the average automobile occupancy for commuting trips to only two persons per car would save the Nation 300,000 barrels of gasoline a day.

Summary of Costs: Savings Opportunities

During the first year of operation the four study vehicles would have daily owning and operating costs of \$10.79 (standard size), \$7.61 (compact), \$5.82 (subcompact), and \$17.67 (van). The portion attributable to gasoline costs, including taxes, would amount to \$2.48 for the standard size, \$2.21 for the compact, \$1.81 for the subcompact and \$3.31 for the van.

Throughout the 10-year life of these vehicles, gasoline and oil costs, including taxes, would account for about 26 percent of the total cost for the automobiles and about 23 percent of the total cost of a passenger van. These figures indicate that substantial savings can be achieved by conserving fuel.

Opportunities to Save on Costs: For car owners who wish to reduce their owning and operating costs, a number of possibilities are suggested. Here are four steps that can help you save.

If you take all of the steps in this column:

It's the same as saving about this much on each gallon of gasoline (Gas @ \$1 per gal.)

DRIVE MORE EFFICIENTLY

Warm engine correctly		
Drive at a moderate speed		
Accelerate briskly and steadily		
Anticipate what's ahead—allow space between vehicles in traffic		
Flow smoothly through traffic—avoid sudden starts and stops	altogether	\$0.05

PLAN YOUR TRIPS

Rideshare to work with a friend		\$0.09
Plan family errands		
—combine trips		
—use the telephone and mail		
—ride with others	altogether	\$0.03
Plan social and recreational trips		
—combine trips		
—rideshare	altogether	\$0.03

CARE FOR YOUR CAR

Inflate tires to highest recommended pressure		\$0.03
Select high-mileage oil		\$0.02
Get tune-up and adjustments when needed		\$0.04
	Immediate Savings—Subtotal	\$0.29

CHOOSE YOUR NEXT CAR AND TIRES

Buy radial tires		\$0.02
Replace your present car with another that gets 10 mpg more than your present one		
	Future Savings—Subtotal	\$0.18
		\$0.20
	You can save: Total	\$0.49

SOURCE: Transportation Programs, Conservation and Solar Applications, U.S. Department of Energy, Washington, D.C. 20545.

Additional savings can be achieved by following the manufacturer's and dealer's recommendations. The preventive maintenance procedures have been recognized as essential by fleet owners in holding down costs.

The Environmental Protection Agency publication, "Gas Mileage Guide," can be used as a guide in selecting a vehicle. Copies are available from the Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830.

Keeping records on automobile expenses, particularly fuel consumption miles-per-gallon figures is recommended. Any significant decrease in these figures could signify a need for a tune-up.

Driving habits are an important factor in cost savings, not only on fuel consumption but also on repairs, maintenance costs and replacement tires.

The basis for estimating the operating costs for each of the four study vehicles follows in modified tabular

form to emphasize factors that differ and those that are the same for the four vehicles. The annual costs and per-mile costs shown in Tables 2, 3, 4 and 5, are self explanatory.

Worksheet to Convert Costs to Any Locality

This worksheet has been included to assist the owner in arriving at owning and operating costs for a personal vehicle. Sales tax, if applicable, should be included with the individual items on the table except for an automobile sales tax that should be shown on line 9 on the worksheet. It should be noted that total maintenance and repair costs are included on line 23 to simplify the preparation of the worksheet. If the owner requires a breakdown of ownership costs and operating costs, then scheduled maintenance, as explained in the text, should be separated from this total and shown separately under the ownership costs section.

TABLE 1—VEHICLE OPERATING COSTS—BASES FOR ESTIMATES

ITEM	VEHICLE AND ESTIMATING BASES
Vehicle Description	<p>Standard-size automobile— 1979 model 4-door sedan equipped with: V-8 engine, automatic transmission, power steering and brakes, air conditioning, tinted glass, radio, clock, white-wall radial tires, wheel covers, remote control left-hand mirror. Purchase Price—\$6,303</p> <p>Compact-size automobile— 1979 model 2-door sedan equipped with: 6 cylinder engine, automatic transmission, power steering and brakes, air conditioning, tinted glass, radio, white-wall radial tires, remote control left-hand mirror. Purchase Price—\$5,215</p> <p>Subcompact-size automobile— 1979 model 3-door (hatchback) equipped with: 4 cylinder engine, standard equipment plus tinted glass. Purchase Price—\$3,854</p> <p>Passenger van— 1979 model extended wheelbase 12-passenger van equipped with: 8 cylinder engine, automatic transmission, power steering and brakes, dual air conditioning, extra heater, tinted glass, insulation, radio, carpeting, spare tire cover, wheel covers, dual exterior mirrors, interior and exterior trim packages. Purchase Price—\$10,248</p>
Repairs and Maintenance	<p>All Vehicles— Includes routine maintenance such as lubrications, repacking wheel bearings, flushing cooling system, and aiming headlamps; replacement of minor parts such as spark plugs, fan belts, radiator hoses, fuel filter, and pollution control equipment; minor repairs such as brake jobs, water pump, carburetor overhaul, and universal joints; and major repairs such as a complete "valve job." Costs were calculated using updated 1978 parts prices and a per hour labor rate of \$16.00 for service station, \$17.00 for independent garage and \$23.00 for dealer garage.</p>
Replacement Tires	<p>Standard-size automobile— 3 new regular and 4 new snow tires would be purchased during the life of the vehicle.</p> <p>Compact-size automobile— 7 new regular and 4 new snow tires would be purchased during the life of the vehicle.</p> <p>Subcompact-size automobile— 11 new regular and 6 new snow tires would be purchased during the life of the vehicle.</p> <p>Passenger van— 7 new regular and 4 new snow tires would be purchased during the life of the vehicle.</p>
Accessories	<p>All vehicles— Extra wheels and floor mats would be purchased the first year, seat covers the sixth year, miscellaneous items totaling \$3.35 each year.</p>
Gasoline	<p>Standard-size automobile— Consumption rate of 16 miles per gallon and a gasoline price of \$1.00 per gallon including taxes were used.</p> <p>Compact-size automobile— Consumption rate of 18 miles per gallon and a gasoline price of \$1.00 per gallon including taxes were used.</p> <p>Subcompact-size automobile— Consumption rate of 22 miles per gallon and a gasoline price of \$1.00 per gallon including taxes were used.</p> <p>Passenger van— Consumption rate of 12 miles per gallon and a gasoline price of \$1.00 per gallon including taxes were used.</p>
Oil	<p>All vehicles— Consumption is based on manufacturers recommended oil change intervals. Extra oil consumption is 1 quart every 2,500 miles between 50,000 and 75,000 miles driven and 1 quart every 2,000 miles between 75,000 and 100,000 miles driven.</p>
Insurance	<p>All vehicles— Coverage for the automobiles includes \$20,000/\$40,000 bodily injury, \$10,000 property damage, \$2,500 personal injury protection, \$20,000/\$40,000/\$5,000 uninsured motorist and \$50 deductible comprehensive coverage for the 10-year period. \$100 deductible collision for the first 5 years is also included.</p> <p>Coverage for the passenger van includes \$300,000 single limit liability, \$2,500 personal injury protection, \$50,000 uninsured motorist and \$50 deductible comprehensive coverage for the 10-year period. \$100 deductible collision for the first 5 years is also included.</p>
Garaging, Parking, and Tolls	<p>All vehicles— Includes monthly charge of \$20 for garage, rental or indirect cost of the owners garaging facility, and a toll average of \$7.80 per year; plus parking fee averages of \$72 per year for standard-size automobile and passenger van and \$69 per year for compact and subcompact automobiles.</p>
Taxes	<p>All vehicles— Includes Federal excise taxes on tires (10 cents per pound), lubricating oil (6 cents per gallon), and gasoline (4 cents per gallon); plus the Maryland tax on gasoline (9 cents per gallon), titling tax (5 percent of retail price), sales tax (5 percent of retail items), and registration fee (\$20.00 for 3,700 pounds or less shipping weight, or \$30.00 for vehicles over 3,700 pounds).</p>

TABLE 2—ESTIMATED COST OF OWNING AND OPERATING A STANDARD-SIZE 1979 MODEL AUTOMOBILE ¹

(Total costs in dollars, costs per mile in cents)

Office of Highway Planning
Highway Statistics Division

ITEM	FIRST YEAR (14,500 Miles)		SECOND YEAR (13,000 Miles)		THIRD YEAR (11,500 Miles)		FOURTH YEAR (10,000 Miles)		FIFTH YEAR (9,900 Miles)	
	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE
Cost Excluding Taxes:										
Depreciation	1,760.00	12.14	921.00	7.08	701.00	6.10	626.00	6.26	532.00	5.37
Scheduled Maintenance.....	(147.97)	(1.02)	(167.98)	(1.29)	(260.14)	(2.26)	(107.93)	(1.08)	(129.57)	(1.31)
Nonscheduled Repairs and Maintenance.....	(42.50)	(.29)	(154.34)	(1.19)	(363.57)	(3.16)	(133.23)	(1.33)	(664.68)	(6.71)
Total Repairs and Maintenance.....	190.47	1.31	322.32	2.48	623.71	5.42	241.16	2.41	794.25	8.02
Replacement Tires.....	39.98	.27	35.81	.28	31.70	.27	31.70	.32	74.98	.76
Accessories.....	12.51	.09	11.55	.09	10.61	.09	9.66	.09	9.61	.10
Gasoline	788.44	5.44	706.88	5.44	625.31	5.44	543.75	5.44	538.31	5.44
Oil	8.65	.06	15.57	.12	15.57	.13	6.92	.07	12.11	.12
Insurance.....	313.00	2.16	300.00	2.31	300.00	2.61	281.00	2.81	281.00	2.84
Parking and Tolls.....	115.71	.80	103.74	.80	91.77	.80	79.80	.80	79.00	.80
Garaging, etc.....	240.00	1.65	240.00	1.84	240.00	2.09	240.00	2.40	240.00	2.42
Total	3,468.76	23.92	2,656.87	20.44	2,639.67	22.95	2,059.99	20.60	2,561.26	25.87
Taxes and Fees:										
State:										
Gasoline	81.56	.56	73.13	.56	64.69	.56	56.25	.56	55.69	.56
Registration.....	30.00	.21	30.00	.23	30.00	.26	30.00	.30	30.00	.30
Titling.....	315.14	2.17	-	-	-	-	-	-	-	-
Operating Cost Sales Tax.....	(2.51)	(.02)	(5.09)	(.04)	(13.28)	(.12)	(5.58)	(.06)	(21.67)	(.22)
Nonoperating Cost Sales Tax.....	(2.52)	(.02)	(2.62)	(.02)	(3.85)	(.03)	(2.16)	(.02)	(2.38)	(.03)
Total Sales Tax.....	5.03	.04	7.71	.06	17.13	.15	7.74	.08	24.05	.25
Subtotal	431.73	2.98	110.84	.85	111.82	.97	93.99	.94	109.74	1.11
Federal:										
Gasoline	36.25	.25	32.50	.25	28.75	.25	25.00	.25	24.75	.25
Oil ².....	.08	-	.14	-	.14	-	.06	-	.10	-
Tires	1.23	.01	1.11	.01	.98	.01	.98	.01	2.31	.02
Subtotal	37.56	.26	33.75	.26	29.87	.26	26.04	.26	27.16	.27
Total Taxes.....	469.29	3.24	144.59	1.11	141.69	1.23	120.03	1.20	136.90	1.38
Operating Costs.....	1,116.91	7.70	1,128.31	8.68	1,235.76	10.74	883.27	8.83	1,473.60	14.88
Ownership Costs.....	2,821.14	19.46	1,673.15	12.87	1,545.60	13.44	1,296.75	12.97	1,224.56	12.37
Total of All Costs.....	3,938.05	27.16	2,801.46	21.55	2,781.36	24.18	2,180.02	21.80	2,698.16	27.25

TABLE 2—(Continued)

ITEM	SIXTH YEAR (9,900 Miles)		SEVENTH YEAR (9,500 Miles)		EIGHTH YEAR (8,500 Miles)		NINTH YEAR (7,500 Miles)		TENTH YEAR (5,700 Miles)		TOTALS AND AVERAGES FOR TEN YEARS (100,000 Miles)	
	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE
Cost Excluding Taxes:												
Depreciation	438.00	4.42	395.00	4.16	326.00	3.83	313.00	4.17	251.00	4.40	6,263.00	6.26
Scheduled Maintenance	(167.62)	(1.69)	(164.53)	(1.73)	(73.85)	(.87)	(186.29)	(2.48)	(73.85)	(1.30)	(1,479.73)	(1.48)
Nonscheduled Repairs and Maintenance	(453.45)	(4.58)	(944.13)	(9.94)	(222.50)	(2.62)	(309.58)	(4.13)	(36.50)	(.64)	(3,324.48)	(3.32)
Total Repairs and Maintenance	621.07	6.27	1,108.66	11.67	296.35	3.49	495.87	6.61	110.35	1.94	4,804.21	4.80
Replacement Tires	81.81	.83	71.91	.75	70.24	.83	69.72	.93	70.70	1.24	578.55	.58
Accessories	17.37	.18	16.81	.18	15.39	.18	13.97	.19	11.43	.20	128.91	.13
Gasoline	538.31	5.44	516.56	5.44	462.19	5.44	407.81	5.44	309.94	5.44	5,437.50	5.44
Oil	19.03	.19	12.11	.13	15.57	.18	12.11	.16	12.11	.21	129.75	.13
Insurance	194.00	1.96	194.00	2.04	194.00	2.28	194.00	2.59	194.00	3.40	2,445.00	2.44
Parking and Tolls	79.00	.80	75.81	.80	67.83	.80	59.85	.80	45.49	.80	798.00	.80
Garaging, etc.	240.00	2.42	240.00	2.53	240.00	2.82	240.00	3.20	240.00	4.21	2,400.00	2.40
Total	2,228.59	22.51	2,630.86	27.70	1,687.57	19.85	1,806.33	24.09	1,245.02	21.84	22,984.92	22.98
Taxes and Fees:												
State:												
Gasoline	55.69	.56	53.44	.56	47.81	.56	42.19	.56	32.06	.56	562.51	.56
Registration	30.00	.30	30.00	.32	30.00	.35	30.00	.40	30.00	.53	300.00	.30
Titling	-	-	-	-	-	-	-	-	-	-	315.14	.32
Operating Cost Sales Tax	(17.06)	(.17)	(30.93)	(.32)	(12.08)	(.14)	(13.79)	(.18)	(4.22)	(.07)	(126.21)	(.13)
Nonoperating Cost Sales Tax	(2.64)	(.03)	(2.52)	(.03)	(1.13)	(.02)	(3.64)	(.05)	(.93)	(.02)	(24.39)	(.02)
Total Sales Tax	19.70	.20	33.45	.35	13.21	.16	17.43	.23	5.15	.09	150.60	.15
Subtotal	105.39	1.06	116.89	1.23	91.02	1.07	89.62	1.19	67.21	1.18	1,328.25	1.33
Federal:												
Gasoline	24.75	.25	23.75	.25	21.25	.25	18.75	.25	14.25	.25	250.00	.25
Oil ² . . . . .	.16	-	.10	-	.14	-	.10	-	.10	-	1.12	-
Tires	2.52	.03	2.22	.02	2.17	.03	2.15	.03	2.18	.04	17.85	.02
Subtotal	27.43	.28	26.07	.27	23.56	.28	21.00	.28	16.53	.29	268.97	.27
Total Taxes	132.82	1.34	142.96	1.50	114.58	1.35	110.62	1.47	83.74	1.47	1,597.22	1.60
Operating Costs	1,271.78	12.85	1,730.96	18.22	921.78	10.84	936.05	12.48	527.55	9.25	11,225.97	11.22
Ownership Costs	1,089.63	11.00	1,042.86	10.98	880.37	10.36	980.90	13.08	801.21	14.06	13,356.17	13.36
Total of All Costs	2,361.41	23.85	2,773.82	29.20	1,802.15	21.20	1,916.95	25.56	1,328.76	23.31	24,582.14	24.58

¹ This estimate covers the total costs of a medium priced, standard size, 4-door sedan, purchased for \$6,303, operated 100,000 miles over a 10-year period, then scrapped for \$40. See table 1 for a list of items included in the purchase price. Baltimore area prices, considered to be in the middle range, were used.

² Where costs per mile are less than .005 cent, a dash (-) appears in the column.

TABLE 3—ESTIMATED COST OF OWNING AND OPERATING A COMPACT-SIZE 1979 MODEL AUTOMOBILE ¹

Office of Highway Planning
Highway Statistics Division

(Total costs in dollars, costs per mile in cents)

ITEM	FIRST YEAR (14,500 Miles)		SECOND YEAR (13,000 Miles)		THIRD YEAR (11,500 Miles)		FOURTH YEAR (10,000 Miles)		FIFTH YEAR (9,900 Miles)	
	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE
Cost Excluding Taxes:										
Depreciation	869.00	5.99	657.00	5.05	554.00	4.82	518.00	5.18	497.00	5.02
Scheduled Maintenance	(88.40)	(.61)	(180.15)	(1.39)	(192.83)	(1.68)	(176.92)	(1.77)	(110.80)	(1.12)
Nonscheduled Repairs and Maintenance	(42.50)	(.29)	(118.52)	(.91)	(238.48)	(2.07)	(289.05)	(2.89)	(349.27)	(3.53)
Total Repairs and Maintenance	130.90	.90	298.67	2.30	431.31	3.75	465.97	4.66	460.07	4.65
Replacement Tires	27.07	.19	24.33	.19	40.92	.36	64.31	.64	58.09	.59
Accessories	11.60	.08	10.74	.08	9.89	.09	9.04	.09	8.98	.09
Gasoline	700.84	4.83	628.33	4.83	555.83	4.83	483.34	4.83	478.50	4.83
Oil	8.65	.06	15.57	.12	15.57	.13	6.92	.07	12.11	.12
Insurance	289.00	1.99	273.00	2.10	273.00	2.37	259.00	2.59	259.00	2.62
Parking and Tolls	111.36	.77	99.84	.77	88.32	.77	76.80	.77	76.03	.77
Garaging, etc.	240.00	1.66	240.00	1.85	240.00	2.09	240.00	2.40	240.00	2.42
Total	2,388.42	16.47	2,247.48	17.29	2,208.84	19.21	2,123.38	21.23	2,089.78	21.11
Taxes and Fees:										
State:										
Gasoline	72.50	.50	65.00	.50	57.50	.50	50.00	.50	49.50	.50
Registration	20.00	.14	20.00	.15	20.00	.17	20.00	.20	20.00	.20
Titling	260.76	1.80	-	-	-	-	-	-	-	-
Operating Cost Sales Tax	(1.86)	(.01)	(3.59)	(.03)	(7.22)	(.06)	(12.40)	(.12)	(12.09)	(.12)
Nonoperating Cost Sales Tax	(1.61)	(.01)	(1.79)	(.02)	(2.83)	(.03)	(1.78)	(.02)	(1.49)	(.02)
Total Sales Tax	3.47	.02	5.38	.05	10.05	.09	14.18	.14	13.58	.14
Subtotal	356.73	2.46	90.38	.70	87.55	.76	84.18	.84	83.08	.84
Federal:										
Gasoline	32.22	.22	28.89	.22	25.56	.22	22.22	.22	22.00	.22
Oil ² .....	.08	-	.14	-	.14	-	.06	-	.10	-
Tires	1.23	.01	1.11	.01	1.87	.02	2.93	.03	2.65	.03
Subtotal	33.53	.23	30.14	.23	27.57	.24	25.21	.25	24.75	.25
Total Taxes	390.26	2.69	120.52	.93	115.12	1.00	109.39	1.09	107.83	1.09
Operating Costs	998.31	6.88	985.32	7.58	1,031.41	8.97	1,008.03	10.08	1,060.34	10.71
Ownership Costs	1,780.37	12.28	1,382.68	10.64	1,292.55	11.24	1,224.74	12.24	1,137.27	11.49
Total of All Costs	2,778.68	19.16	2,368.00	18.22	2,323.96	20.21	2,232.77	22.32	2,197.61	22.20

TABLE 3—(Continued)

ITEM	SIXTH YEAR (9,900 Miles)		SEVENTH YEAR (9,500 Miles)		EIGHTH YEAR (8,500 Miles)		NINTH YEAR (7,500 Miles)		TENTH YEAR (5,700 Miles)		TOTALS AND AVERAGES FOR TEN YEARS (100,000 Miles)	
	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE
Cost Excluding Taxes:												
Depreciation	476.00	4.81	450.00	4.74	424.00	4.99	399.00	5.32	331.00	5.81	5,175.00	5.18
Scheduled Maintenance	(185.78)	(1.88)	(146.17)	(1.54)	(51.70)	(.61)	(194.88)	(2.60)	(36.80)	(.65)	(1,364.43)	(1.36)
Nonscheduled Repairs and Maintenance	(561.83)	(5.67)	(720.15)	(7.58)	(195.77)	(2.30)	(244.45)	(3.26)	(36.50)	(.64)	(2,796.52)	(2.80)
Total Repairs and Maintenance	747.61	7.55	866.32	9.12	247.47	2.91	439.33	5.86	73.30	1.29	4,160.95	4.16
Replacement Tires	66.85	.68	71.94	.75	64.42	.76	56.84	.76	43.88	.77	518.65	.52
Accessories	16.75	.17	16.21	.17	14.86	.18	13.50	.18	11.07	.19	122.64	.12
Gasoline	478.50	4.83	459.17	4.83	410.83	4.83	362.50	4.83	275.50	4.83	4,833.34	4.83
Oil	19.03	.19	12.11	.13	15.57	.18	12.11	.16	12.11	.21	129.75	.13
Insurance	186.00	1.88	186.00	1.96	186.00	2.19	186.00	2.48	186.00	3.26	2,283.00	2.28
Parking and Tolls	76.03	.77	72.96	.77	65.28	.77	57.60	.77	43.78	.77	768.00	.77
Garaging, etc.	240.00	2.42	240.00	2.53	240.00	2.82	240.00	3.20	240.00	4.21	2,400.00	2.40
Total	2,306.77	23.30	2,374.71	25.00	1,668.43	19.63	1,766.88	23.56	1,216.64	21.34	20,391.33	20.39
Taxes and Fees:												
State:												
Gasoline	49.50	.50	47.50	.50	42.50	.50	37.50	.50	28.50	.50	500.00	.50
Registration	20.00	.20	20.00	.21	20.00	.23	20.00	.27	20.00	.35	200.00	.20
Titling	-	-	-	-	-	-	-	-	-	-	260.76	.26
Operating Cost Sales Tax	(19.64)	(.20)	(19.45)	(.21)	(9.63)	(.12)	(10.13)	(.13)	(2.88)	(.05)	(98.89)	(.10)
Nonoperating Cost Sales Tax	(2.70)	(.03)	(1.91)	(.02)	(1.09)	(.01)	(2.88)	(.04)	(.89)	(.02)	(18.97)	(.02)
Total Sales Tax	22.34	.23	21.36	.23	10.72	.13	13.01	.17	3.77	.07	117.86	.12
Subtotal	91.84	.93	88.86	.94	73.22	.86	70.51	.94	52.27	.92	1,078.62	1.08
Federal:												
Gasoline	22.00	.22	21.11	.22	18.89	.22	16.67	.22	12.67	.22	222.23	.22
Oil ² . . . . .	.16	-	.10	-	.14	-	.10	-	.10	-	1.12	-
Tires	3.05	.03	3.28	.03	2.94	.04	2.59	.04	2.00	.04	23.65	.03
Subtotal	25.21	.25	24.49	.25	21.97	.26	19.36	.26	14.77	.26	247.00	.25
Total Taxes	117.05	1.18	113.35	1.19	95.19	1.12	89.87	1.20	67.04	1.18	1,325.62	1.33
Operating Costs	1,296.59	13.10	1,427.77	15.03	825.97	9.72	800.49	10.67	457.92	8.03	9,892.15	9.89
Ownership Costs	1,127.23	11.38	1,060.29	11.16	937.65	11.03	1,056.26	14.09	825.76	14.49	11,824.80	11.83
Total of All Costs	2,423.82	24.48	2,488.06	26.19	1,763.62	20.75	1,856.75	24.76	1,283.68	22.52	21,716.95	21.72

¹ This estimate covers the total costs of a medium priced, compact size, 2-door sedan, purchased for \$5,215, operated 100,000 miles over a 10-year period, then scrapped for \$40. See table 1 for a list of items included in the purchase price. Baltimore area prices, considered to be in the middle range, were used.

² Where costs per mile are less than .005 cent, a dash (-) appears in the column.

**TABLE 4—ESTIMATED COST OF OWNING AND OPERATING A SUBCOMPACT-SIZE 1979 MODEL
AUTOMOBILE ¹**

Office of Highway Planning
Highway Statistics Division

ITEM	(Total costs in dollars, costs per mile in cents)									
	FIRST YEAR (14,500 Miles)		SECOND YEAR (13,000 Miles)		THIRD YEAR (11,500 Miles)		FOURTH YEAR (10,000 Miles)		FIFTH YEAR (9,900 Miles)	
	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE
Cost Excluding Taxes:										
Depreciation	473.00	3.26	442.00	3.40	438.00	3.81	412.00	4.12	408.00	4.12
Scheduled Maintenance	(61.77)	(.43)	(87.22)	(.67)	(158.04)	(1.38)	(87.22)	(.87)	(109.86)	(1.11)
Nonscheduled Repairs and Maintenance	(42.50)	(.29)	(99.23)	(.76)	(216.42)	(1.88)	(160.16)	(1.60)	(424.55)	(4.29)
Total Repairs and Maintenance	104.27	.72	186.45	1.43	374.46	3.26	247.38	2.47	534.41	5.40
Replacement Tires	21.87	.15	29.90	.23	56.80	.49	54.81	.55	63.47	.64
Accessories	11.05	.07	10.25	.08	9.46	.08	8.66	.09	8.61	.09
Gasoline	573.41	3.95	514.09	3.95	454.78	3.95	395.46	3.95	391.50	3.96
Oil	8.65	.06	8.65	.07	17.30	.15	8.65	.09	12.11	.12
Insurance	278.00	1.92	262.00	2.01	262.00	2.28	246.00	2.46	246.00	2.48
Parking and Tolls	111.36	.77	99.84	.77	88.32	.77	76.80	.77	76.03	.77
Garaging, etc.	240.00	1.66	240.00	1.85	240.00	2.09	240.00	2.40	240.00	2.42
Total	1,821.61	12.56	1,793.18	13.79	1,941.12	16.88	1,689.76	16.90	1,980.13	20.00
Taxes and Fees:										
State:										
Gasoline	59.32	.41	53.18	.41	47.05	.41	40.91	.41	40.50	.41
Registration	20.00	.14	20.00	.15	20.00	.17	20.00	.20	20.00	.20
Titling	192.70	1.33	-	-	-	-	-	-	-	-
Operating Cost Sales Tax	(1.60)	(.01)	(3.22)	(.03)	(7.52)	(.07)	(6.96)	(.07)	(17.93)	(.18)
Nonoperating Cost Sales Tax	(1.80)	(.01)	(1.89)	(.01)	(2.73)	(.02)	(1.80)	(.02)	(1.99)	(.02)
Total Sales Tax	3.40	.02	5.11	.04	10.25	.09	8.76	.09	19.92	.20
Subtotal	275.42	1.90	78.29	.60	77.30	.67	69.67	.70	80.42	.81
Federal:										
Gasoline	26.36	.18	23.64	.18	20.91	.18	18.18	.18	18.00	.18
Oil ² .....	.08	-	.08	-	.15	-	.08	-	.10	-
Tires	1.26	.01	1.73	.02	3.28	.03	3.16	.03	3.66	.04
Subtotal	27.70	.19	25.45	.20	24.34	.21	21.42	.21	21.76	.22
Total Taxes	303.12	2.09	103.74	.80	101.64	.88	91.09	.91	102.18	1.03
Operating Costs	846.41	5.84	833.56	6.41	912.53	7.93	765.17	7.65	1,047.85	10.58
Ownership Costs	1,278.32	8.81	1,063.36	8.18	1,130.23	9.83	1,015.68	10.16	1,034.46	10.45
Total of All Costs	2,124.73	14.65	1,896.92	14.59	2,042.76	17.76	1,780.85	17.81	2,082.31	21.03

TABLE 4—(Continued)

ITEM	SIXTH YEAR (9,900 Miles)		SEVENTH YEAR (9,500 Miles)		EIGHTH YEAR (8,500 Miles)		NINTH YEAR (7,500 Miles)		TENTH YEAR (5,700 Miles)		TOTALS AND AVERAGES FOR TEN YEARS (100,000 Miles)	
	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE
Cost Excluding Taxes:												
Depreciation	374.00	3.78	351.00	3.69	336.00	3.95	305.00	4.07	275.00	4.83	3,814.00	3.81
Scheduled Maintenance	(129.72)	(1.31)	(105.22)	(1.11)	(32.45)	(.38)	(144.04)	(1.92)	(7.00)	(.12)	(922.54)	(.92)
Nonscheduled Repairs and Maintenance	(438.84)	(4.43)	(630.27)	(6.63)	(270.76)	(3.19)	(190.18)	(2.54)	(36.50)	(.64)	(2,509.41)	(2.51)
Total Repairs and												
Maintenance	568.56	5.74	735.49	7.74	303.21	3.57	334.22	4.46	43.50	.76	3,431.95	3.43
Replacement Tires	63.46	.64	60.90	.64	59.48	.70	53.55	.71	48.31	.85	512.55	.51
Accessories	16.38	.17	15.85	.17	14.53	.17	13.22	.18	10.86	.19	118.87	.12
Gasoline	391.50	3.95	375.68	3.95	336.13	3.96	296.59	3.95	225.41	3.95	3,954.55	3.96
Oil	13.84	.14	15.57	.16	13.84	.16	6.92	.09	12.11	.21	117.64	.12
Insurance	183.00	1.85	183.00	1.93	183.00	2.15	183.00	2.44	183.00	3.21	2,209.00	2.21
Parking and Tolls	76.03	.77	72.96	.77	65.28	.77	57.60	.77	43.78	.77	768.00	.77
Garaging, etc.	240.00	2.42	240.00	2.53	240.00	2.82	240.00	3.20	240.00	4.21	2,400.00	2.40
Total	1,926.77	19.46	2,050.45	21.58	1,551.47	18.25	1,490.10	19.87	1,081.97	18.98	17,326.56	17.33
Taxes and Fees:												
State:												
Gasoline	40.50	.41	38.86	.41	34.77	.41	30.68	.41	23.32	.41	409.09	.41
Registration	20.00	.20	20.00	.21	20.00	.24	20.00	.27	20.00	.35	200.00	.20
Titling	-	-	-	-	-	-	-	-	-	-	192.70	.19
Operating Cost Sales Tax	(15.21)	(.15)	(16.86)	(.18)	(10.54)	(.12)	(8.39)	(.11)	(3.10)	(.05)	(91.33)	(.09)
Nonoperating Cost Sales Tax	(1.95)	(.02)	(2.04)	(.02)	(1.20)	(.02)	(2.21)	(.03)	(.89)	(.02)	(18.50)	(.02)
Total Sales Tax	17.16	.17	18.90	.20	11.74	.14	10.60	.14	3.99	.07	109.83	.11
Subtotal	77.66	.78	77.76	.82	66.51	.79	61.28	.82	47.31	.83	911.62	.91
Federal:												
Gasoline	18.00	.18	17.27	.18	15.45	.18	13.64	.18	10.36	.18	181.81	.18
Oil ² . . . . .	.10	-	.12	-	.13	-	.12	-	.06	-	1.02	-
Tires	3.66	.04	3.52	.04	3.43	.04	3.09	.04	2.79	.05	29.58	.03
Subtotal	21.76	.22	20.91	.22	19.01	.22	16.85	.22	13.21	.23	212.41	.21
Total Taxes	99.42	1.00	98.67	1.04	85.52	1.01	78.13	1.04	60.52	1.06	1,124.03	1.12
Operating Costs	1,061.14	10.72	1,232.01	12.97	809.81	9.53	660.76	8.81	405.74	7.12	8,574.98	8.57
Ownership Costs	965.05	9.74	917.11	9.65	827.18	9.73	907.47	12.10	736.75	12.92	9,875.61	9.88
Total of All Costs	2,026.19	20.46	2,149.12	22.62	1,636.99	19.26	1,568.23	20.91	1,142.49	20.04	18,450.59	18.45

¹ This estimate covers the total costs of a low priced, subcompact size, 3-door (hatchback), purchased for \$3,854, operated 100,000 miles over a 10-year period, then scrapped for \$40. See table 1 for a list of items included in the purchase price. Baltimore area prices, considered to be in the middle range, were used.

² Where costs per mile are less than .005 cent, a dash (-) appears in the column.

TABLE 5—ESTIMATED COST OF OWNING AND OPERATING A 1979 MODEL PASSENGER VAN ¹

Office of Highway Planning
Highway Statistics Division

(Total costs in dollars, costs per mile in cents)

ITEM	FIRST YEAR (14,500 Miles)		SECOND YEAR (13,000 Miles)		THIRD YEAR (11,500 Miles)		FOURTH YEAR (10,000 Miles)		FIFTH YEAR (9,900 Miles)	
	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE
Cost Excluding Taxes:										
Depreciation	3,164.00	21.82	1,225.00	9.42	1,123.00	9.77	1,021.00	10.21	916.00	9.25
Scheduled Maintenance	(126.50)	(.87)	(244.77)	(1.89)	(192.51)	(1.67)	(187.06)	(1.87)	(173.45)	(1.75)
Nonscheduled Repairs and Maintenance	(45.00)	(.31)	(158.88)	(1.22)	(398.26)	(3.46)	(122.60)	(1.23)	(758.78)	(7.67)
Total Repairs and Maintenance	171.50	1.18	403.65	3.11	590.77	5.13	309.66	3.10	932.23	9.42
Replacement Tires	31.51	.22	28.31	.22	47.62	.41	74.84	.75	67.60	.68
Accessories	16.18	.11	14.84	.11	13.52	.12	12.20	.12	12.12	.12
Gasoline	1,051.25	7.25	942.49	7.25	833.75	7.25	725.00	7.25	717.75	7.25
Oil	15.57	.11	15.57	.12	15.57	.13	15.57	.15	13.84	.14
Insurance	938.00	6.47	891.00	6.85	891.00	7.75	845.00	8.45	845.00	8.54
Parking and Tolls	115.71	.80	103.74	.80	91.77	.80	79.80	.80	79.00	.80
Garaging, etc.	240.00	1.65	240.00	1.85	240.00	2.09	240.00	2.40	240.00	2.42
Total	5,743.72	39.61	3,864.60	29.73	3,847.00	33.45	3,323.07	33.23	3,823.54	38.62
Taxes and Fees:										
State:										
Gasoline	108.75	.75	97.50	.75	86.25	.75	74.99	.75	74.25	.75
Registration	30.00	.21	30.00	.23	30.00	.26	30.00	.30	30.00	.30
Titling	512.40	3.53	-	-	-	-	-	-	-	-
Operating Cost Sales Tax	(2.45)	(.02)	(4.75)	(.03)	(15.37)	(.13)	(6.71)	(.07)	(22.19)	(.23)
Nonoperating Cost Sales Tax	(1.76)	(.01)	(3.58)	(.03)	(2.80)	(.03)	(2.27)	(.02)	(3.25)	(.03)
Total Sales Tax	4.21	.03	8.33	.06	18.17	.16	8.98	.09	25.44	.26
Subtotal	655.36	4.52	135.83	1.04	134.42	1.17	113.97	1.14	129.69	1.31
Federal:										
Gasoline	48.33	.33	43.33	.33	38.33	.33	33.33	.33	33.01	.33
Oil ² .....	.14	-	.14	-	.14	-	.14	-	.12	-
Tires	2.01	.02	1.81	.02	3.04	.03	4.77	.05	4.31	.05
Subtotal	50.48	.35	45.28	.35	41.51	.36	38.24	.38	37.44	.38
Total Taxes	705.84	4.87	181.11	1.39	175.93	1.53	152.21	1.52	167.13	1.69
Operating Costs	1,420.72	9.80	1,396.52	10.74	1,530.10	13.30	1,137.75	11.38	1,770.85	17.89
Ownership Costs	5,028.84	34.68	2,649.19	20.38	2,492.83	21.68	2,337.53	23.37	2,219.82	22.42
Total of All Costs	6,449.56	44.48	4,045.71	31.12	4,022.93	34.98	3,475.28	34.75	3,990.67	40.31

TABLE 5—(Continued)

ITEM	SIXTH YEAR (9,900 Miles)		SEVENTH YEAR (9,500 Miles)		EIGHTH YEAR (8,500 Miles)		NINTH YEAR (7,500 Miles)		TENTH YEAR (5,700 Miles)		TOTALS AND AVERAGES FOR TEN YEARS (100,000 Miles)	
	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE	TOTAL COST	COST PER MILE
Cost Excluding Taxes:												
Depreciation	819.00	8.27	613.00	6.45	510.00	6.00	460.00	6.13	357.00	6.26	10,208.00	10.21
Scheduled Maintenance	(88.90)	(.90)	(272.27)	(2.87)	(54.20)	(.64)	(148.71)	(1.98)	(88.36)	(1.55)	(1,576.73)	(1.58)
Nonscheduled Repairs and Maintenance	(544.58)	(5.50)	(875.24)	(9.21)	(411.29)	(4.84)	(323.40)	(4.31)	(66.56)	(1.17)	(3,704.59)	(3.70)
Total Repairs and Maintenance	633.48	6.40	1,147.51	12.08	465.49	5.48	472.11	6.29	154.92	2.72	5,281.32	5.28
Replacement Tires	77.80	.78	83.72	.88	74.96	.88	66.15	.89	51.06	.90	603.57	.60
Accessories	35.50	.36	34.20	.36	30.95	.37	27.70	.37	21.86	.38	219.07	.22
Gasoline	717.75	7.25	688.75	7.25	616.25	7.25	543.75	7.25	413.25	7.25	7,249.99	7.25
Oil	20.76	.21	22.48	.24	13.84	.16	15.57	.21	10.38	.18	159.15	.16
Insurance	552.00	5.58	552.00	5.81	552.00	6.49	552.00	7.36	552.00	9.69	7,170.00	7.17
Parking and Tolls	79.00	.80	75.81	.80	67.83	.80	59.85	.80	45.49	.80	798.00	.80
Garaging, etc.	240.00	2.42	240.00	2.52	240.00	2.82	240.00	3.20	240.00	4.21	2,400.00	2.40
Total	3,175.29	32.07	3,457.47	36.39	2,571.32	30.25	2,437.13	32.50	1,845.96	32.39	34,089.10	34.09
Taxes and Fees:												
State:												
Gasoline	74.25	.75	71.25	.75	63.75	.75	56.25	.75	42.75	.75	749.99	.75
Registration	30.00	.30	30.00	.32	30.00	.35	30.00	.40	30.00	.53	300.00	.30
Titling	-	-	-	-	-	-	-	-	-	-	512.40	.52
Operating Cost Sales Tax	(21.38)	(.22)	(28.49)	(.30)	(15.44)	(.18)	(13.41)	(.18)	(4.04)	(.07)	(134.23)	(.13)
Nonoperating Cost Sales Tax	(2.12)	(.02)	(4.54)	(.05)	(1.55)	(.02)	(3.51)	(.04)	(1.81)	(.03)	(27.19)	(.03)
Total Sales Tax	23.50	.24	33.03	.35	16.99	.20	16.92	.22	5.85	.10	161.42	.16
Subtotal	127.75	1.29	134.28	1.42	110.74	1.30	103.17	1.37	78.60	1.38	1,723.81	1.73
Federal:												
Gasoline	33.01	.33	31.66	.33	28.33	.33	25.00	.33	19.00	.33	333.33	.33
Oil ² . . . . .	.18	-	.20	-	.12	-	.14	-	.09	-	1.41	-
Tires	4.96	.06	5.34	.06	4.78	.06	4.22	.06	3.26	.06	38.50	.04
Subtotal	38.15	.39	37.20	.39	33.23	.39	29.36	.39	22.35	.39	373.24	.37
Total Taxes	165.90	1.68	171.48	1.81	143.97	1.69	132.53	1.76	100.95	1.77	2,097.05	2.10
Operating Costs	1,573.67	15.90	1,882.94	19.82	1,296.59	15.25	1,107.74	14.77	655.88	11.51	13,772.76	13.77
Ownership Costs	1,767.52	17.85	1,746.01	18.38	1,418.70	16.69	1,461.92	19.49	1,291.03	22.65	22,413.39	22.42
Total of All Costs	3,341.19	33.75	3,628.95	38.20	2,715.29	31.94	2,569.66	34.26	1,946.91	34.16	36,186.15	36.19

¹ This estimate covers the total costs of a passenger van, purchased for \$10,248, operated 100,000 miles over a 10-year period, then scrapped for \$40. See table 1 for a list of items included in the purchase price. Baltimore area prices, considered to be in the middle range, were used.

² Where costs per mile are less than .005 cent, a dash (-) appears in the column.

