

COST OF OWING & OPERATING - Automobiles, Vans, and Trucks

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COST OF OWNING & OPERATING

AUTOMOBILES, VANS & LIGHT TRUCKS -- 1991

Introduction

The cost of owning and operating a motor vehicle is of major significance, as Americans experience increasing demands on their incomes. It costs about \$14,000 to purchase a 1991 intermediate-sized model year car. If it is driven 128,500 miles by one owner over a period of 12 years, the total cost to the owner will be about \$42,700. During that time it will cost

about \$16,300 for depreciation and finance charges, \$9,050 to insure the vehicle, \$7,800 (including taxes) for some 6,500 gallons of gasoline, \$200 for oil, \$5,350 for maintenance and repair work, \$1,250 for fires, \$1,650 for parking and tolls, and, for Maryland drivers, \$1,100 for license, registration, and vehicle excise tax. The pie chart below illustrates a breakdown of total costs over twelve years for the 1991 intermediate-sized model year car. Tax revenues for gasoline and oil are used primarily for improvements to roads on which the vehicle is driven and account for less than five percent of the total costs. The average annual cost of \$3,560 represents about 12.3 percent of a household's 1991 disposable income.

This report updates *The Cost of Owning and Operating Automobiles and Vans -- 1984*. It traces selected vehicles in personal use and their costs through a 12-year lifetime of 128,500 miles using 1991 data. The user is cautioned against making direct comparisons between the costs reported in this and previous issues. The study methodology has been modified (details below). As with earlier reports, costs are based on operation to typical vehicles in the Baltimore, Maryland, suburbs. A worksheet for developing costs for the first year of a vehicle's life in other localities is provided at the back of this report. Although a vehicle will usually pass through three or more owners during its life, the cost resulting from transfer of ownership are not included in this report.

The average annual cost of \$3,560 represent about 12.3 percent of a household's 1991 disposable income.

Methodology For the Study: The basic methodology for this study was modified somewhat from the used in the 1984 study. For the 1991 study, vehicle lifetime mileage was increased from 120,000 to 128,500. The five vehicle classes used for the 1984 study have been retained, and three additional classes have been added: compact pickup trucks, full-sized pickup trucks, and minivans. The average age of an automobile (7.8 years) is higher now than it has been at any time in the post-World War II period. The average annual mileage per vehicle is approximately 10,700, with travel decreasing as the age of the vehicle increases. As in the 1984 study, the cost of the home garage or a parking facility was omitted. In a suburban setting, parking facilities range from curb parking to paved drive ways to carports to fully-enclosed garages, with an equally wide range in costs. In suburban areas, garage costs are not usually a factor in automobile purchase or use decisions. Only costs to the vehicle owner are addressed. The costs of vehicle emissions and other external costs of vehicle use are not considered.

Vehicles Used in this Study

Description: The vehicle classes, repair and maintenance operations, replacement items, insurance, fuel and oil consumption, taxes, and other costs included in the study and the values of the factors used to compute these costs are given in Table 1, Vehicle and Estimating Bases. In the current study, between two and seven vehicles were selected to represent each vehicle class.

For this study, 29 domestic and imported vehicles were chosen to represent eight vehicle classes: subcompacts, compacts, intermediates, and full-sized automobiles; compact and full-sized pickups; and minivans and full-sized vans. The selected vehicles represent the most popular nameplates in their class. For each class, the selected nameplates account for at least 47 percent of 1990 sales (using the Automotive News assignment of vehicles to classes). The vehicles selected are intended to be typical of new vehicles in each size category, but, because of changing technology, they are probably not representative of older vehicles in their respective size classes.

The average age of an automobile (7.8 years) is higher now than it has been at any time in the post-World War II period.

The vehicles were equipped as described in Table 1. All have gasoline engines. The optional equipment selected is that which the automotive industry reports to be typical for each vehicle size group. For example, data show that about 92 percent of intermediates have air conditioning. The purchase price of each vehicle was calculated using dealer cost plus freight plus an estimate of dealer markup. The markup depends on many factors--the size of the dealership, the dealer's inventory situation, the time of year, and the ability of the buyer to negotiate. For most vehicles, the markup is roughly half the difference between sticker price and dealer cost.

Vehicle Life: Many things, such as individual driving habits, climate, garage facilities, type and condition of road, type of use, and sometimes luck, can affect the service life and operating costs of a vehicle. Most private passenger vehicles are now staying on the road for at least 12 years; and the average vehicle accumulates 128,500 miles in these 12 years. The same distribution of these miles over time--12,900

miles the first year, decreasing to 8,200 miles traveled in the 12th year--has been used for all eight vehicle classes. (Annual mileage actually does vary somewhat by vehicle class, but the data on how it varies is weak and using different annual mileages would reduce the comparability of results across vehicle classes.) The complete mileage distribution is shown in Tables 2 through 9.

The decreasing mileage distribution is consistent with the average annual miles driven by age of vehicles; but, in normal circumstances, an individual's need for transportation is relatively stable from year to year. It is unlikely that an only car would be driven successively fewer miles each year. What is more likely is that, as a vehicle ages, it becomes a second or third family vehicle or its ownership is transferred to a household that uses it less.

The average vehicle is sold or traded two or more times during its life, often through new or used car dealers. This is often prompted by the need for or anticipation of repairs. Dealers serve as quality control judges of the used vehicle trade. They wholesale those vehicles that require very expensive or time-consuming work and make the repairs on the remainder prior to resale. Battery and tire replacements, brake linings, radiator repairs, body work, and numerous other replacements and repairs are included in the used vehicle reconditioning programs of many dealers. The additional work done under dealer warranty 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 purpose of this report, no effort has been made to separate them.

Types of Costs

Some owners may think of costs only in terms of outlays for fuel, oil, tires and tolls. A more careful examination shows that some costs occur whether or not the vehicle is driven, while others are directly related to the amount of travel. The travel-related group is generally referred to as operating costs, and the other group as ownership costs. Analysts often differ on the costs that should be included in each category. The following defines the terms as they relate to this study.

Ownership Costs: Ownership costs include depreciation, finance charges, insurance, registration and titling fees, and any taxes applied to these items. No matter how little a

vehicle is driven, the majority of the cost of each of these items is incurred.

1. Depreciation is the loss of value of the vehicle during its lifetime due to passage of time, its mechanical and physical condition, and the number of miles it is driven.

National vehicle dealer groups issue vehicle value books for different regions of the country, usually on a quarterly basis. These values are determined by a survey of vehicle selling prices by make and model year in each geographic area. The values are based on normal travel, so lower or higher odometer readings will be reflected as higher or lower remaining vehicle values, respectively. The depreciation costs in this report represent the projected decline in real value over time, obtained from such reports and adjusted to exclude the effect of inflation and the difference between prices charged by dealers and those obtainable by individuals when they sell their vehicle.

Depreciation is the single greatest cost of owning and operating most passenger vehicles; however, the cost of insurance, gas and maintenance are also significant. In the majority of cases, the age of the vehicle is the most important factor in determining resale or trade-in value. Other influences are mileage, brand popularity, body style, size, color, and the state of the used-vehicle market.

Typically, between 25 and 45 percent of all depreciation occurs in the first year of ownership. Much of this occurs as soon as the vehicle is purchased (an individual cannot get as much for a car as a dealer can), and there is additional depreciation when the next year's models become available. Purchasers of used vehicles also will encounter significant depreciation during their first year of ownership. The tables represent the case in which a vehicle is owned by the same family for all twelve years, so the extra depreciation that occurs in the first year of ownership of a used vehicle is not shown. For new cars, the percentage of depreciation occurring in the first year is highest for compact pickups and subcompact automobiles and lowest for minivans.

Depreciation rates drop sharply in the second year (to 7-10 percent of the purchase price) and much more gradually after that. Since vehicles generally are driven less as they age, depreciation cost declines more slowly when it is expressed on a per-mile basis than as an annual cost. For a \$13,715 intermediate-sized car, depreciation in the first year is about \$4,350, or 33.7 cents per mile; while in the second

year it is about \$1,270, or 10.1 cents per mile, and in the 12th year it is \$430, or 5.3 cents per mile. If the car is kept for 12 years, overall depreciation averages 10.7 cents per mile.

2. Finance Charges are based on a typical interest rate of 10.5 percent, a 4-year financing term and a 25 percent down payment. However, since a number of options are available, methods are provided so that readers can approximate their own costs 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 elect to use savings or other investments to pay for the vehicles outright.

Lending institutions and vehicle dealerships have various financing plans available. Institutions may differ as to the portion of the vehicle cost they are willing to finance, the rate of interest charged, the length of the loan term. These conditions may depend upon whether the vehicle is new or old. Dealers are sometimes willing to provide financing at below market interest rates, but recipients of such subsidized loans actually pay for them by foregoing a cash payment from the dealer or otherwise paying a higher purchase price for their vehicle.

A more careful examination shows that some costs occur whether or not the vehicle is driven (ownership costs), while others are directly related to the amount of travel (operating costs).

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 4-year loan, total interest charges would be divided by 49,700 miles. The computation will give the cost-per-mile figure that should be added to each of the 4-year totals shown in 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.

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

If \$12,000 is needed to purchase a vehicle and four years (48 months) is selected as the period of time needed to save this amount, the monthly payment into savings would be \$250 (\$12,000 divided by 48). The difference in interest earned by these payments and the interest earned on \$12,000 on deposit for four years is the interest lost by paying cash. At five percent interest compounded quarterly, \$12,000 on deposit for four years would earn \$2,638 in interest. This would be lost if the money were withdrawn from savings to pay cash for a car. To replace the \$12,000 in savings over four years, the purchaser would have to deposit \$250 at the end of each month. These deposits would earn \$1,248 in interest. The difference between these two interest amounts ($\$2,638 - \$1,248 = \$1,390$) would be the interest cost of paying for the automobile purchase from savings.

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 plan is selected. Table 10 shows the cost per thousand dollars for financing a vehicle purchase through a loan and financing through a savings withdrawal at various interest rates.

3. Insurance Costs are determined by vehicle type, the amount and type of coverage selected, the purpose for which the vehicle is used, the operator's driving record, and the location in which it is garaged. Insurance rates may also be affected by unusually high or low annual mileage driven.

Automobiles are continuously exposed to the possibility of damage, whether on the highway or parked. The large number of vehicles on the roads and streets and in parking lots make each vehicle susceptible to accident involvement. The cost of repairing even minor damage has continued to increase and is reflected in the insurance rates. For comparable coverages, the insurance rates used for automobiles in this study average about 50 percent more than they did in 1984 (though the rates for full-sized vans are almost unchanged).

The insurance coverage in this study for all vehicles except full-sized vans includes \$20,000/\$40,000 bodily injury,

\$10,000 property damage, \$2,500 personal injury protection, and \$20,000/\$40,000/\$10,000 uninsured motorist coverage. This coverage is the minimum required by law in the State of Maryland and according to State officials is the most common coverage purchased. For full-sized vans, the insurance coverage includes \$300,000 single limit liability, \$2,500 personal injury protection, and \$50,000 uninsured motorist coverage. The higher coverage for full-sized vans reflects an assumption that they will be used primarily for van-pool commuting. Coverage reflects the cost for a policy where the driver has no moving violations or accidents in the last 3 years, no youthful drivers are covered and there is no multi-vehicle discount. Coverage for all vehicles also includes \$100 deductible comprehensive coverage and \$250 deductible collision coverage. Collision coverage is assumed to be dropped after the first 5 years. The deductibles are higher than those used in 1984, reflecting the effects of inflation and a trend to controlling premiums by increasing deductibles. 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.

All coverages with the exception of collision are assumed to remain in effect for the full 12-year period covered. Some owners of older vehicles do not obtain comprehensive or collision coverage, either because they choose to self-insure or because their insurance company does not offer these coverages on older vehicles.

4. Registration, Title and Inspection Fees are fees collected by the State and some local subdivisions in which the vehicle is registered. All States charge a fee for registration, and some charge an additional fee for obtaining title to a vehicle when it is first purchased (whether new or old). Also, some States charge fees for emissions or safety inspections performed by a State agency or a State contractor. The fees shown in Tables 2 through 9 consist of an annual registration fee varying with vehicle weight, a biennial \$8.50 emissions inspection fee, and a \$12 titling fee applied when the vehicle changes ownership (assumed to occur only in Year 1).

5. Vehicle Taxes consist of sales taxes and personal property taxes levied on the value of the vehicle by some States and local subdivisions as well as the Federal "gasguzzler" tax and the Federal luxury tax levied on the portion of a new-car sales price that exceeds \$30,000. Tables 2 through 9 show the effect of a five percent "excise titling tax" applied when the vehicle changes ownership (assumed to

occur only in Year 1). None of the vehicles selected for this study are subject to either of the Federal taxes.

Operating Costs: Operating costs include scheduled maintenance and unscheduled repairs and maintenance, fuel, oil, tires, parking, tolls, and the taxes applied to these items. The majority of each of these costs are a function of vehicle usage.

1. Scheduled Maintenance includes the services shown in the owner's manual. Generally, the suggested maintenance intervals are expressed in miles driven or period of time owned. The services include maintenance of the cooling system, oil changes, safety checks, tuneups, and lubrication. When the owner's manual recommends that an item (e.g., brakes) be checked for wear, the cost of the labor to make such an inspection is considered scheduled maintenance. If a repair is found to be necessary, the cost of the replacement parts and the labor to install them are included in nonscheduled repairs.

2. Unscheduled Repairs and Maintenance shown in this report were estimated by taking data on total costs for repairs and maintenance (from the 1989 Consumer Expenditure Survey), adjusting for differences across vehicle classes, and subtracting the cost of scheduled repairs and maintenance. The estimated costs exclude the cost of any repairs that are done by a dealer when a vehicle is traded but that would have to be performed by the owner if the vehicle is kept for the full 12 years.

About 65 percent of repair and maintenance costs are for labor and 35 percent are for parts. A Baltimore, Maryland labor rate of \$48.67 per hour was used. Both the labor rate and the prices for parts include markups that cover the cost of buildings, equipment, supervision and other costs of doing business. Actual labor costs for maintenance and repairs vary widely. This factor should be taken into account in using the results of the study.

Many dealers offer an optional extended warranty, usually 5 years/50,000 miles, which, if chosen by the vehicle purchaser, would have a bearing on costs for major unscheduled repairs. The optional extended warranty is not included in this study.

Some owners of older vehicles do not obtain comprehensive or collision coverage, either because they choose to self-insure or because their insurance company does not offer these coverages on older vehicles.

Some maintenance jobs, such as replacement of radiator hoses or fan belts, are relatively easy and present the vehicle owner an opportunity to save by performing them himself/herself. Many vehicle owners, however, opt to pay professional mechanics for these services.

3. Fuel is a major cost item for vehicles of all sizes. For the gasoline-engine vehicles used in this study, the difference in fuel costs between the 1991 full-sized car and the subcompact over the lives of the vehicles is \$2,690 (including taxes). As shown in Tables 2 and 5 respectively, over the first 3 years, gasoline will cost \$791 more for the full-sized car than for the subcompact. This comparison is more meaningful when considering the full-sized car provides only about 35 percent more interior space for the nearly 50 percent higher fuel cost.

A cost of \$1.196 per gallon, including State and Federal taxes, for unleaded regular gasoline was used for this study. This represents an 80/20 mix of self-service and full-service prices for the study area (in line with the average mix of self-service and full-service purchases). Full-service costs in the Baltimore area are about 28 cents per gallon higher than the price used in this study and self-service costs are about 7 cents per gallon lower (though the difference averages only about 22 cents per gallon nationally).

Fuel is a major cost item for vehicle of all sizes. For the gasoline-engine vehicle used in this study, the difference in fuel costs between the 1991 full-sized car and the subcompact over the lives of the vehicles is \$2,690 (including taxes).

The gasoline costs shown in Tables 2 through 9 can be adjusted to reflect changes in the price of gasoline. For each one cent increase in the cost of a gallon of gasoline, the total cost per mile for the full-sized car would increase 0.0558 cents. This is computed by dividing the total cost per mile of gasoline (4.85 cents) plus State and Federal taxes (1.03 cents and 0.79 cents) by \$1.196, the cost per gallon used in this study. Table 11 show the gasoline cost per mile for each class of vehicles for a selected range of gasoline prices.

4. 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 vehicles. The oil change interval is 7,500 miles for all five study vehicles. The subcompact cars and compact pickups have an average 4.7 quart capacity, the full-sized pickups and

full-sized vans have an average 5.5 quart capacity, and all other vehicles have a 5-quart capacity.

5. Tires receive 514,000 miles of wear when an automobile is driven 128,500 miles. All vehicles have radial tires and all replacement tires are assumed to be radial. The number of replacement tires is based on a life expectancy of 40,000 miles for radial tires. Tables 2 through 9 presume that tires are replaced in Years 4, 7 and 12 (i.e., at odometer readings of 40,000, 80,000 and 120,000) causing small spikes in the operating cost figures for those three years. In practice, the timing of these three spikes will depend upon the tire-replacement schedule actually followed, rather than the one assumed in this study.

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

7. Taxes on fuel and oil are the primary component of operating cost taxes. These taxes are paid on a per-gallon basis. The Federal gasoline tax is 14.1 cents per gallon. The Maryland gasoline tax is 18.5 cents.

Adjustment of Costs to Other Vehicles and Localities

In this study, all vehicles use regular unleaded gasoline at a cost, in suburban Baltimore, of \$1.196 per gallon, including taxes. If the cost in another area is \$1.10, persons living there can estimate their own operating costs by adjusting the gasoline cost figure to reflect the lower price. Procedures for accomplishing this are described in the section titled Fuel. Similar adjustments can be made for other cost items.

The costs most likely to change in the short run and to need adjustment for specific geographic locations are fuel prices, insurance premiums, taxes and fees, repair labor rate, tolls, and parking charges. Also, the market value of vehicles can differ somewhat among regions.

In general, rural costs are lower than suburban or urban costs. This is evident in insurance premiums, primarily because vehicles in rural areas are exposed to less traffic and fewer opportunities for accidents. Retail costs and labor rates are also usually lower in rural areas. Operating costs (fuel, oil, tires, repairs, etc.) per mile for vehicles in rural operation

also tend to be lower than for comparable vehicles in suburban use because there are fewer traffic control devices and less congestion on rural roads.

The worksheet included at the back of this report has been prepared as a guide so that costs for the first year of a vehicle's life can be developed for specific vehicles and for other localities.

If current per mile costs for an older vehicle are desired, the appropriate column of Tables 2 through 9 to use is the first one that shows a cumulative mileage that is at least equal to the mileage currently on the vehicle's odometer. (If costs over the next year are desired, an additional allowance should be made for miles expected to be driven over the next six months.) This column 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 or "book" values can be used. The figures shown for fuel and scheduled maintenance may also be slightly low for a vehicle built several years ago, since these figures are for vehicles with 1991 technology.

It should be noted that a family's annual auto usage does not usually match the mileage distribution in the tables. As mentioned before, a family would drive approximately the same number of miles each year, while the tables show a decreasing annual mileage pattern. This is because the mileages used in constructing Tables 2 through 9 represent averages for annual miles of all new vehicles, all one-year-old vehicles, all two-year-old vehicles, etc. Each of these averages represents a mix of vehicles that may have been purchased new and used and may serve as first vehicles, second vehicles, third vehicles, etc. If the family customarily drives 12,900 miles per year, at the end of three years its total mileage would be 38,700. Tables 2 through 9 show the accumulated mileage for Years 1-3 as 37,800. The total miles a car has been driven may not always be a good measure of its wear or condition. A long highway trip produces less wear than the same number of miles driven around town in stop-and-go traffic.

The total vehicle cost per mile is lower for the high-mileage driver because depreciation in the early years of a vehicle's life is determined more by age than by miles and because some of the annual charges, such as insurance, do not increase in direct proportion to mileage. However, most insurance companies charge lower rates for pleasure and recreational uses of vehicles and higher rates for vehicles used directly for work or in relation to business, and many

companies apply a surcharge for high-mileage drivers in both categories.

To some degree, the purpose for which a vehicle is used and the circumstances of its use will dictate the vehicle-cost pattern. For example, the high-mileage driver will find that tire replacements should be moved to earlier years than those shown in this study.

Applications for Study Data

Choosing Your Next Vehicle: Choice of an automobile--full-sized, intermediate, compact, or subcompact--is based on more than the consideration of cost. For the motorist who needs the space provided by the full-sized car because of a large family, car-pool needs, or equipment to be carried, the economic and size advantages of smaller cars must be foregone. If space needs are not compelling, cost considerations may lead the motorist to choose a smaller car. Dollar depreciation, financing and fuel costs are substantially lower for subcompacts and compacts. Also, repair costs generally are lower for smaller cars, tires cost less, and, in some States, registration fees are lower. Non-cost advantages are maneuverability in city traffic and ease of curb parking. The advantages of larger cars in capacity, comfort, safety and possibly status can be compared to the dollar costs incurred to obtain these benefits.

To some degree, the purpose for which a vehicle is used and the circumstances of its use will dictate the vehicle-cost pattern.

When To Trade In: There is no set answer to the question of when to trade in or to sell a vehicle. Monetary considerations are only part of the answer. Vehicle style, size, mechanical features, dependability, as well as the availability of money, are also factors in the decisions regarding when and which vehicle to purchase. A vehicle owner can minimize the depreciation costs by keeping the vehicle longer. The "annual trader" drives a current model vehicle all the time, but depreciation for the intermediate-sized car will cost about \$52,000 over a 12-year period (12 times the first year depreciation). A "two year trader" pays about \$34,000 in depreciation. This is a saving of \$18,000 from the "annual trader's" costs, and even more can be saved by becoming a "three-year trader." Of course, consideration must be given to the outlays for necessary repairs and replacement tires when

the vehicle is kept longer.

Once the vehicle-use pattern is determined, the owner may be able to relate costs to those shown in this report and to decide when it will be most advantageous to trade vehicles. Of course, comfort, dependability, and appearance are important to most vehicle owners, and these weigh heavily in the purchasing decision.

Ridesharing is another effective way to reduce automobile expenses . . . The cost for an intermediate car operator by a single driver is 33.25 cents per passenger mile compared to a cost of 8.31 cents per passenger mile for the same car with 4 occupants.

Business Use Of Vehicles: This study is not intended to establish the basis for determining an appropriate reimbursement for costs associated with use of an employee's personal vehicle for business purposes. The results of the study may be useful as a general guide for determining reimbursement rates; however, many factors, such as higher annual mileage and special requirements pertaining to purchase or upkeep of the vehicle related to use for business purposes should also be taken into account. Information concerning reimbursement for private vehicle 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.

Opportunities for Cost Savings

Vehicle costs can be minimized by selecting the smallest, most economical and fuel-efficient vehicle consistent with a family's needs and by avoiding unnecessary use.

During the first year of operation, intermediate-sized cars have daily owning and operating costs of \$21.35. The portion attributable gasoline costs, including taxes, amounts to \$2.14.

Throughout the 12-year life of these vehicles, fuel and oil costs, including taxes, would account for about 16 percent of the total cost for subcompact cars, about 18 to 20 percent of total costs for other cars, compact pickups, and minivans, and 24 or 25 percent for full-sized pickups and full-sized vans. These figures indicate that substantial savings can be achieved by conserving fuel. This can be accomplished through more efficient driving habits, careful planning to eliminate or

combine trips, proper vehicle maintenance, and ridesharing. Fuel efficiency should also be considered when selecting a new vehicle both in determining the size of vehicle and the particular model within a size class.

The U.S. Department of Energy has published the "1992 Gasoline Mileage Guide" containing the Environmental Protection Agency's fuel economy estimates. Consumer Reports also publishes fuel-efficiency estimates for individual vehicles as well as a qualitative information on relative costs for depreciation and for repair and maintenance.

Ridesharing is another effective way to reduce automobile expenses. Most people find that work trips are the most convenient for ridesharing. For example, if an auto is principally used for the work trip, and the individual rideshares with another and uses that auto 50 percent of the time, mileage and depreciation will likewise be reduced. According to the data generated for this study, the cost for an intermediate car operated by a single driver is 33.25 cents per passenger mile compared to a cost of 8.31 cents per passenger mile for the same car with 4 occupants. For a 9 person van-pool the cost drops even further to 4.95 cents per passenger mile. In addition, use of "High Occupancy Vehicle" lanes not only speed the work trip but reduce depreciation on an automobile, by avoiding daily "stop and go" travel on congested highways. Data from the Federal Highway Administration's 1990 Nationwide Personal Transportation Survey show that travel to work and back comprises 32.8 percent of all personal driving, providing the opportunity for substantial cost savings by ridesharing.

Table 1

Vehicle and Estimating Bases

Vehicles and Equipment All vehicles are 1991 models with gasoline engines, automatic transmission, power disc brakes, airconditioning, tinted glass, FM stereo, speed control, rear window defogger, tilt steering wheel.

Additional equipment: Subcompact automobiles (6 nameplates) - power steering
Compact automobiles (4 nameplates) - power steering
Intermediate automobiles (6 nameplates) -

power steering
Full-size automobiles (3 nameplates) - power steering, cassette deck, pulse windshield wipers, power windows, power door locks, left remote mirror, and white sidewalls
Compact pickups (3 nameplates) - none
Full-size pickups (2 nameplates) - power steering, overdrive, cassette deck, pulse windshield wipers, power door locks, left remote mirror, and white sidewalls
Minivans (3 nameplates) - power steering and overdrive
Full-size vans (2 nameplates) - same as full-size pickups plus power windows

Finance Charges are based on an interest rate of 10.5 percent, a 4-year loan term and a 25 percent down payment.

Repairs and Scheduled - as specified in owner's manuals.
Maintenance Assumed to be performed by professional mechanics. Unscheduled - derived as a ratio of unscheduled to scheduled maintenance using data from the 1989 Consumer Expenditure Survey. Excludes cost of repairs performed under normal or extended warranty, repairs performed by dealers when traded, and repairs of collision damage.

Replacement Twelve new radial tires purchased during the
Tires life of the vehicle.

Fuel Price: \$1.196 per gallon of gasoline, including taxes.

Average gasoline mileage:

Subcompacts: 26.23 mpg
Compacts: 22.86
Intermediates: 19.87
Full-size cars: 17.99
Compact pickups: 21.69 mpg
Full-size pickups: 14.48
Minivans: 17.54

Full-size vans: 11.23

Oil One oil change every 7,500 miles. One extra quart of oil assumed between changes.

Average capacity: 4.7 quarts for subcompacts cars and compact pickups; 5.5 quarts for full-size pickups and full-size vans; 5.0 quarts for all other vehicles.

Insurance Full-size van: \$300,000 single limit liability, \$2,500 personal injury protection, \$50,000 uninsured motorist, \$100 deductible comprehensive, and \$250 deductible collision coverage for the first 5 years of the life of the vehicle.

All other vehicles: \$20,000/\$40,000 bodily injury, \$10,000 property damage, \$2,500 personal injury protection, \$20,000/\$40,000/\$10,000 uninsured motorist, \$100 deductible comprehensive, and \$250 deductible collision coverage for the first 5 years of the life of the vehicle. Coverage is the minimum required by law in the State of Maryland and according to State officials is the most common coverage purchased.

Parking and Tolls Includes average of 1.19 cents per mile for parking and 0.09 cents for tolls (\$138 per year for a vehicle driven 10,700 miles per year).

Taxes and Fees Includes taxes at 1991 rates: Federal excise tax on gasoline (14.1 cents per gallon) effective December 1, 1990; Maryland tax on gasoline (18.5 cents per gallon) effective June 1, 1987; Maryland excise titling tax (5 percent on retail value of vehicle); Maryland sales tax (5 percent on other retail items); Maryland title fee (\$12) if vehicle is financed, registration fee (\$27-\$40.50, depending on weight), and emissions inspection fee (\$8.50 in alternate years).

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Worksheet to Convert Costs to a Specific Vehicle and Locality

Your Costs

1. Amount paid for your car \$_____
2. Cost of a tire to fit your car \$_____
3. Price of gasoline per gallon (including tax) \$_____
4. Price of oil per quart (including tax) \$_____
5. Annual cost of your insurance \$_____
6. Estimated cost of your daily parking \$_____
7. Estimated annual tolls \$_____
8. State registration fee for your car \$_____
9. Sales/titling/gas-guzzler and/or personal
property tax \$_____
10. Mechanics labor charge per hour \$_____

11. Monthly interest cost ((Monthly payment
x Number of months for loan) less (Amount
of loan + Number of months for loan)) \$ _____

12. Term of your auto loan \$ _____

13. Your mileage for the year \$ _____

Estimated First Year Cost

Ownership Costs (First Year)

	Total	Cost per (Total Column + line 13)
14. Depreciation (37%2 of line 1)	\$ _____	_____
15. Insurance (line 5)	\$ _____	_____
16. Registration fee (line 8)	\$ _____	_____
17. Financing (12 x monthly interest cost)	\$ _____	_____
18. Sales/titling, and/or property tax (line 9)	\$ _____	_____
19. Inspection fee (include only for years in which inspection is required)	\$ _____	_____

Operating Costs³ (First Year)

20. Gasoline (Annual gallons
used x line 3) \$ _____

21. Oil (line 13 + oil change interval
x oil capacity x line 4) \$ _____

22. Maintenance and Repair ((0.35 + 0.65
x line 10 + \$48.67) x first year
scheduled and unscheduled repair and
maintenance costs from appropriate
table (2-9) for your vehicle class) \$ _____

23. Parking (240 x line 6) or actual
days parked x daily cost \$ _____

24. Tolls (line 7) \$ _____

25. TOTAL COST (Add lines 14-25) \$_____

1 If you wish to compute your costs for other than the first year, note additional instructions in section titled "Adjustment of Costs to Other Localities."

2 Use 37% for subcompact, 35% for compact, 30% for intermediate, 29% for full-size car, 37% for compact pickup, 28% for full-size pickup, 26% for minivan, and 34% for full-size van.

3 All maintenance and repair, both scheduled and nonscheduled, are included in operating costs.

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