achieving energy conservation and beneficial effects for the promotion of coordinated transport policies. However, the implementation of such a policy is complex, given motorist perceptions and the wide range of existing vehicle license systems and national car stocks.

In the United Kingdom and Ireland, the abolition of the flat-rate annual license and a return to a progressive system, be it related to engine size or a fuel tax, would certainly be beneficial, but for other countries the choice between a fuel tax and a graduated vehicle license is less clear and very much depends on a motorist's perception of costs and the way in which improved consumer information may supplement it.

The Dutch are currently considering the abolition of their annual vehicle license and its replacement by an increased fuel tax. If it proceeds, this should provide important evidence as to the role and potency of transport taxation in transport and energy policies. The value of consumer information innovations in conjunction with this taxation issue merits further investigation.

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Subsidies in Oregon Highway Transportation

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Subsidies have been identified in Oregon highway transportation since the first cost-responsibility study was done in 1937. The 1980 Oregon Motor Vehicle Cost-Responsibility Study identified similar equity problems. The lack of adequate highway funds makes it imperative that they be spent optimally and that all road users pay for their responsibility. In times of scarcity, favored groups can no longer be subsidized at the expense of others. The purpose of this paper is to examine the extent of subsidies inherent in Oregon's existing road user tax schedules. These subsidies are calculated on the basis of the tax schedules and recommendations developed from the 1980 Oregon Motor Vehicle Cost-Responsibility Study. The existing subsidies are compared with those found in the 1963 and 1974 Oregon cost-responsibility studies.

Subsidies have been identified in Oregon highway transportation since the first cost-responsibility study was done in 1937 (1). The 1980 Oregon Motor Vehicle Cost-Responsibility Study (2) has identified similar equity problems. The lack of adequate highway funds makes it imperative that they be spent optimally and that all road users pay for their responsibility. In times of scarcity, favored groups can no longer be subsidized at the expense of others.

The purpose of this paper is to examine the extent of subsidies inherent in Oregon's existing road user tax schedules. These subsidies are calculated on the basis of the tax schedules and recommendations developed from the 1980 Oregon Motor Vehicle Cost-Responsibility Study. The existing subsidies are compared with those found in the 1963 and 1974 Oregon cost-responsibility studies (3,4).

OREGON COST-RESPONSIBILITY STUDIES

Background

The State of Oregon has long been a leader in applying cost responsibility to road user taxation. The 1980 study is in the tradition of previous Oregon studies that date back to 1937 (1-5). The use of the modern incremental approach in Oregon for allocating certain construction and maintenance costs started with the 1963 study (3) after the completion of the American Association of State Highway Officials (AASHO) Road Test.

Since 1905, three principles have guided the development of Oregon's road user tax system. These are that (a) those who use the public roads should pay for them, (b) road users should pay in proportion to the road user costs for which they are responsible, and (c) road user taxes should be used for constructing, improving, and maintaining the highways. Oregon has followed a pay-as-you-go philosophy in paying for its highways (6).

Each of the Oregon studies has addressed the following questions:

1. Is there equity among road user classes and especially among the truck classes?
2. If there is inequity, how should the current highway tax structure be modified to rectify it?
3. What level of taxation is necessary to preserve the state's investment in highways and how should this tax burden be distributed among road users?

Expenditures Versus Costs Approach

Should cost-allocation studies allocate costs or expenditures to the various user classes? Cost responsibility should be based on the true costs imposed on the highway system by road users. Finances may be so limited that maintenance funds are insufficient to prevent the highway system from deteriorating faster than it is being repaired. The unrepaired mileage represents costs that are borne by society in one form or another. They must in fact be borne by current and future road users, either in the form of higher road user taxes to address the deferred maintenance or in the form of increased private costs for vehicle repairs and related operating costs.

Even though a particular budget may fall far short of meeting a true cost-responsibility funding level, the expenditures within that budget should be allocated on a fair and equitable basis.

The 1980 study uses three expenditure levels, which range from a level based on existing road user tax rates to one that approximates the true costs of maintaining the existing system. This third expenditure level is defined as "the budget that includes sufficient road user taxes to: (1) adequately maintain the existing highway system at 'status quo' condition levels, (2) keep road capacity at an acceptable but slowly declining level of service, and (3) provide some highway improvements."

The preservation program assumes that system deficiencies will remain at present levels throughout the next 10 years. The costs of postponed construction and deferred maintenance are not included. This budget level is based on costs identified in the 1981 State Highway Preservation Study (7).

Results from Cost-Responsibility Studies

Distribution of Shares

Comparing cost-responsibility studies for different time periods is difficult since the expenditures, conditions, and parameters are different. However, such comparisons do indicate changing trends that may be useful for future studies.

Table 1 shows the expenditure responsibility distributions between basic and heavy vehicles in the 1963, 1974, and 1980 studies. As shown, the unadjusted heavy-vehicle responsibility shares for the current-expenditure-level budget are 38.5, 36.2, and 47.1 percent for the 1963, 1974, and 1980 studies, respectively. After adjustments have been made for subsidies, these shares are reduced to 35.2, 35.4, and 44.5 percent, respectively. For the preservation-level budget (budget 3), the unadjusted and adjusted responsibility shares for heavy vehicles are 49.1 percent and 46.0 percent, respectively.

The principal explanation for this shift in responsibility toward heavier vehicles is that most of the additional funds in the preservation-level budget are going into overlays and pavement maintenance projects that are weight-related and hence involve a greater heavy-vehicle responsibility.

Net Responsibility and User Charges

1974 Study

This study found that basic vehicles (i.e., all vehicles weighing 6000 lb or less) were essentially meeting their responsibility under the current-expenditure-level budget. Adjustments were recommended in truck weight-mile rates to meet inequities as shown in Table 2 and Figure 1. The 1974 study recommended an increase in weight-mile tax rates for vehicles weighing between 6001 and 34 000 lb and a decrease in the rates applying to those vehicles registered between 34 001 and 76 000 lb. This recommendation was not adopted and the existing schedule remained in effect until 1977 when it was increased proportionally to match an increase of 2 cents in the state fuel tax.

1980 Study

Budget 1, the current expenditure level, totals $187.3 million. Expenditures for construction and maintenance are $155.5 million and maintenance accounts for more than one-third. Priority is given to preserving rather than expanding the existing highway system.

Table 3 shows the net responsibility and the recommended and existing weight-mile schedules in mills per mile. Net responsibility is obtained after adjusting for payment of registration fees and the reallocation of subsidies given to farm and exempt vehicles. The net responsibility for the lightest vehicle class, the 0-6000-lb gross weight group (the basic vehicle), is 4.312 mills/mile, whereas the net responsibility of the gross weight group of 78 001 to 80 000 lb is 69.984 mills/mile.

The net responsibility together with the existing and recommended weight-mile schedules are plotted in Figure 2. The net responsibility increases gradually but irregularly from 52 000 to 74 000 lb and then increases rapidly from 74 000 lb up to approximately 88 000 lb. This occurs because axle weight is a more important factor in cost responsibility than gross weight for heavy trucks. Truck combinations from 74 000 lb up to approximately 88 000 lb tend to use the heaviest allowable axle weights. The decline in responsibility for vehicles that weigh more than 88 000 lb gross weight reflects the fact that most of the vehicles operating in this weight range are double- and triple-trailer combinations that have more than five axles.

Budget 3, the preservation-level budget, represents the true costs of preserving Oregon's highway system. It represents the level of expenditures needed to do the necessary construction and maintenance projects to maintain the system at its present level. The 1981 preservation study (7) results show that in the next 10 years, based on 1980 dollars, it will be necessary to spend a total of $890 million, $170 million, and $204 million on pavement overlays, bridge replacement, and traffic operations, respectively, on state highways. This excludes the cost of maintaining city streets and county roads.

Total expenditures under this budget are $408.7 million. Expenditures for construction and maintenance total $361.8 million, which is 133 percent larger than those under budget 1. Although maintenance expenditures have been increased by $43.1 million over those in budget 1, the level of expenditures for surface maintenance has not increased. The increase has been allocated to other maintenance items. Expenditures for construction under this budget are $163.2 million higher than those under budget 1. Approximately 43.7 percent of all construction expenditures are for pavement overlays.

Table 4 shows the recommended weight-mile schedules in mills per mile. The net responsibility of the lightest vehicle class, the 0-6000-lb gross weight group (the basic vehicle), is 10.728 mills/mile, whereas the net responsibility of the 78 001- to 80 000-lb gross weight group is 171.069 mills/mile.

Implications from 1980 Study

Budget 1: Current Expenditure Level

The distribution of cost responsibility between basic and heavy vehicles is approximately the same as the projected 1983 distribution of road user revenue from these vehicles. This implies that the basic vehicle is meeting its fair share for the level of expenditures in budget 1. However, as automobiles become increasingly more fuel efficient, their payment will fail to meet their cost responsibility.

The results imply that projected 1983 revenue from existing weight-mile tax rates will be suffi-

Table 1. Comparison of cost-responsibility distributions between basic and heavy vehicles.

		Cost-Responsibility Distribution			
		Unadjusted		Adjusted[b]	
Study	Budget[a]	Basic Vehicles	Heavy Vehicles	Basic Vehicles	Heavy Vehicles
1963	1	61.5	38.5	64.8	35.2
1974	1	63.8	36.2	64.6	35.4
1980	1	52.9	47.1	55.5	44.5
	3	50.9	49.1	54.0	46.0

[a]Budgets: 1 denotes current expenditure-level budget and 3 denotes preservation-level budget.
[b]Adjusted for redistribution of subsidies.

Table 2. Comparison of existing and adjusted rates for Schedule B, Budget 1.

Declared Combined Weight Group (lb)	Existing Rate per Mile (mills)	Recommended Rate per Mile (mills)
0 to 6 000	5.5	5.5
6 001 to 8 000	7.0	8.0
8 001 to 10 000	8.5	10.0
10 001 to 12 000	10.5	12.5
12 001 to 14 000	12.0	15.0
14 001 to 16 000	14.0	17.5
16 001 to 18 000	15.5	20.0
18 001 to 20 000	17.5	22.0
20 001 to 22 000	19.0	23.5
22 001 to 24 000	21.0	25.0
24 001 to 26 000	22.5	26.5
26 001 to 28 000	24.0	27.5
28 001 to 30 000	25.5	28.0
30 001 to 32 000	27.5	28.5
32 001 to 34 000	29.0	29.0
34 001 to 36 000	30.5	29.5
36 001 to 38 000	32.0	30.0
38 001 to 40 000	33.5	30.5
40 001 to 42 000	35.0	31.0
42 000 to 44 000	36.5	31.5
44 001 to 46 000	38.0	32.0
46 001 to 48 000	40.0	32.5
48 001 to 50 000	41.5	33.0
50 001 to 52 000	43.0	33.5
52 001 to 54 000	45.0	34.0
54 001 to 56 000	46.5	34.5
56 001 to 58 000	48.0	35.5
58 001 to 60 000	49.0	36.5
60 001 to 62 000	50.0	38.0
62 001 to 64 000	51.0	40.0
64 001 to 66 000	52.0	42.0
66 001 to 68 000	53.0	44.5
68 001 to 70 000	54.0	47.0
70 001 to 72 000	55.0	50.5
72 001 to 74 000	55.5	54.0
74 000 to 76 000	56.5	58.0
76 000 to 78 000	Add 1.0 mill/ ton or fraction of ton over 76 000	62.5
78 001 and over		Add 4.0 mills/ ton or fraction of ton

Figure 1. Comparison of existing schedule B and adjusted schedule B under austere budget.

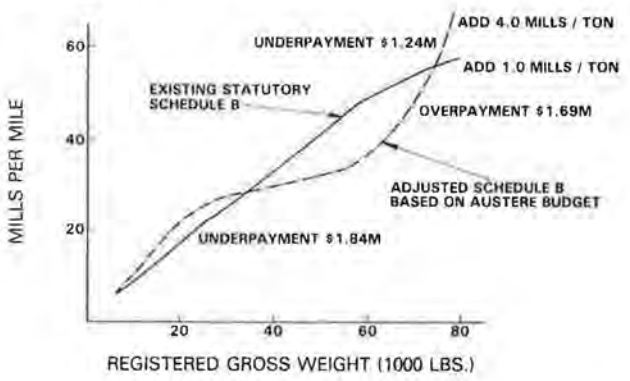


Table 3. Recommended and existing weight-mile tax schedules for diesel-powered vehicles, Budget 1.

	Mills/Mile		
Gross Vehicle Weight Group (lb)	Net Responsibility	Recommended Schedule	Existing Statutory Schedule
Cars	4.312	–	
0- 6 000	–	7.0	6.0
6 001- 8 000	12.368	10.0	8.0
8 001-10 000	11.546	12.0	9.5
10 001-12 000	11.884	13.0	11.5
12 001-14 000	12.212	14.0	13.5
14 001-16 000	12.266	15.0	15.5
16 001-18 000	13.908	16.0	17.5
18 001-20 000	12.520	17.0	19.5
20 001-22 000	13.004	18.0	21.0
22 001-24 000	13.333	19.0	23.5
24 001-26 000	13.850	20.0	25.0
26 001-28 000	16.405	21.0	26.5
28 001-30 000	18.222	22.0	28.5
30 001-32 000	19.447	23.5	30.5
32 001-34 000	21.527	25.0	32.5
34 001-36 000	23.073	26.5	34.0
36 001-38 000	23.557	28.0	35.5
38 001-40 000	23.031	30.0	37.5
40 001-42 000	20.946	32.0	39.0
42 001-44 000	31.993	34.0	40.5
44 001-46 000	32.533	35.0	42.5
46 001-48 000	31.198	36.0	44.5
48 001-50 000	35.525	37.0	46.0
50 001-52 000	34.292	38.0	48.0
52 001-54 000	27.561	39.0	50.0
54 001-56 000	32.781	40.0	52.0
56 001-58 000	28.028	41.0	53.5
58 001-60 000	30.498	42.0	54.5
60 001-62 000	33.280	44.0	55.5
62 001-64 000	33.381	46.0	57.0
64 001-66 000	37.739	48.0	58.0
66 001-68 000	42.891	50.5	59.0
68 001-70 000	47.811	53.5	60.0
70 001-72 000	43.763	56.5	61.5
72 001-74 000	43.384	59.5	62.0
74 001-76 000	55.673	63.0	63.0
76 001-78 000	71.455	66.5	64.0
78 001-80 000	69.984	70.5	65.0
80 001 and over		Add 4.0 mills/ton above 80 000 lb	Add 1.0 mill/ ton above 80 000 lb

cient to meet the fair share of heavy vehicles as a whole. However, it is strongly recommended that the weight-mile tax schedule be changed to conform more closely to the fair share of individual weight classes. Specifically, it is recommended that tax rates be reduced for the medium-weight trucks and increased for the heaviest-weight classes. The latter are the classes that are increasing at the greatest rate in numbers and miles driven and are also the ones that cause most of the weight-related road damage.

Budget 3: Preservation Level

For this expenditure level, the total responsibility of basic vehicles is 11.14 mills/mile. This represents a 110 percent increase from the corresponding responsibility under budget 1. The net responsibility of basic vehicles is 10.73 mills/mile. This implies that the gasoline tax should be increased by 11.0 cents to a total of 18.0 cents/gal.

Overall, heavy-vehicle weight-mile tax rates should be increased to bring in 128 percent more revenue than under budget 1. Any tax schedule adopted should conform closely to the net responsibility of individual weight classes.

Figure 2. Comparison of existing and recommended weight-mile tax schedules with net responsibility.

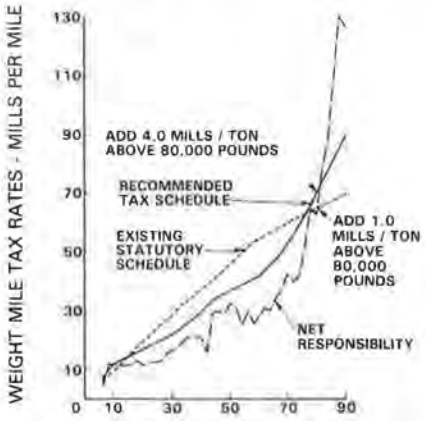


Table 4. Recommended weight-mile tax schedule, Budget 3.

Gross Vehicle Weight Group (lb)	Recommended Schedule (mills/mile)	Gross Vehicle Weight Group (lb)	Recommended Schedule (mills/mile)
0- 6 000	14.0	40 001-42 000	78.0
6 001- 8 000	19.0	42 001-44 000	83.0
8 001-10 000	22.5	44 001-46 000	88.0
10 001-12 000	25.0	46 001-48 000	92.0
12 001-14 000	28.0	48 001-50 000	95.0
14 001-16 000	31.0	50 001-52 000	97.0
16 001-18 000	34.0	52 001-54 000	99.0
18 001-20 000	37.0	54 001-56 000	101.0
20 001-22 000	40.0	56 001-58 000	103.0
22 001-24 000	43.5	58 001-60 000	106.0
24 001-26 000	47.0	60 001-62 000	110.0
26 001-28 000	50.5	62 001-64 000	114.0
28 001-30 000	54.0	64 001-66 000	119.0
30 001-32 000	57.5	66 001-68 000	125.0
32 001-34 000	61.0	68 001-70 000	131.0
34 001-36 000	65.0	70 001-72 000	138.0
36 001-38 000	69.0	72 001-74 000	146.0
38 001-40 000	73.0	74 001-76 000	155.0
		76 001-78 000	165.5
		78 001-80 000	177.0
		80 000+	Add 10.0 mills/ton above 80 000 lb

SUBSIDY ISSUES

Theory of Subsidies

Governments have traditionally used subsidies to help meet certain political and economic goals. Subsidies have been used to unite the country, to develop certain areas, to protect certain economic interests and groups, and to correct inequities due to external economies and diseconomies (8). If subsidies are necessary, they should be used to minimize economic disruption and maximize economic efficiency.

External economies may justify the use of subsidies to promote the social benefit. External diseconomies may justify the use of taxes to curb them. An economic case for subsidies (or taxes) may exist wherever an external economy or diseconomy creates a divergence between private pecuniary marginal cost as seen by a firm and social marginal cost.

Direct subsidies to transportation modes and groups have been justified on the basis of external economies. Subsidies have been given (a) to railroads to unify and develop areas; (b) to certain areas for highways for economic development to reduce poverty, e.g., the Appalachia highway program; (c) to develop new transport modes, e.g., the airlines; and (d) to revive existing transport modes, e.g., passenger train service and public transit.

Indirect subsidies are more difficult to justify. Frequently, the group benefiting does so at the expense of other existing competitive modes. Two examples that are very evident are the lack of adequate charges on inland waterway users (9) and inadequate charges for certain users of highways (10). The fact that there is very little vertical integration between the road owner and road user compared with the railways means that the road user is not paying full road charges. The result has been to put the railroads at an existing disadvantage with barge lines and trucking firms. External diseconomies due to environmental pollution by automobiles are indirect subsidies to road users.

Cross-subsidies have always existed. Certain groups have always financed others. Populated areas have financed roads in the less-populated areas. The rationale has always been that it would reduce the cost of transportation and hence lower the prices of goods and services. Fees from heavily traveled routes have been used to finance less-traveled routes. An example in the public sector is the cross-subsidization of certain ferry routes by the heavily traveled routes in the Washington State Ferry System (11). Here certain income groups have benefited at the expense of others.

Roads are not a pure public good; they have many of the economic characteristics of a natural monopoly and as such should be regulated by the state but not financed out of general taxation, nor should the road user be subsidized. The road marginal cost of a vehicle journey is not an insignificant portion of the overall road cost unless a superstrong road is built that would result in high capital costs and low marginal costs.

Subsidy Issue

Throughout the history of road user taxation in Oregon, the existence of subsidies has created some distortions in cost responsibility. A subsidy

exists when consumers pay less than the full cost of the goods and services they use or when a firm or a public agency does not recover the full cost of operation from users or consumers. To the extent that any class of vehicles is not paying its share of road user responsibility, that class is receiving a subsidy that must be borne by other vehicle classes. Three types of subsidies are currently present in the Oregon road user tax structure. These are direct subsidies, cross-subsidies, and indirect subsidies.

Direct Subsidies

These subsidies take the form of exemptions from certain road user taxes granted to some types of vehicles. Currently there are two main classes of vehicles that receive direct subsidies--farm vehicles and publicly owned vehicles. As shown below, under the current-expenditure-level budget in the 1980 study, farm and publicly owned vehicles are underpaying by $3 855 400. This amounts to 2.1 percent of the total responsibility of all vehicles.

Item	Amount
Total responsibility of farm and publicly owned vehicles ($)	9 854 629
Payment by farm and publicly owned vehicles ($)	5 999 149
Payment to be redistributed to all other (nonexempt) vehicles ($)	3 855 480
Underpayment by farm and publicly owned vehicles (%)	39.1
Underpayment with respect to total responsibility of all vehicles (%)	2.1

The 1963 study found that these payments amounted to $2.79 million or 0.3 mill/vehicle mile. This amounted to 3.9 percent of total responsibility. The 1974 study showed that these underpayments amounted to $5.74 million, which represented 3.7 percent of the total responsibility. Direct subsidies have been reduced since the 1974 study by (a) an increase in farm vehicle registration fees, (b) a required payment of weight-mile taxes by farm vehicles hauling for hire, and (c) a required payment of the gasoline tax by publicly owned vehicles.

If society deems that it is in the public interest to subsidize these groups, then it is necessary to point out that such subsidies violate cost responsibility and result in larger burdens on other vehicle classes. Since agriculture benefits the entire state, it would be more appropriate to subsidize farm vehicles out of general funds rather than out of the highway trust fund.

Cross-Subsidies

Cross-subsidization in existing tax rates may occur between basic and heavy vehicles or among heavy-vehicle weight groups. The latter situation may occur when statutory weight-mile rates are out of phase with the actual cost responsibility of most weight groups.

Basic Vehicles Versus Heavy Vehicles

Are basic vehicles subsidizing heavy vehicles or vice versa? Table 5 shows that for the total adjusted and net responsibilities in the 1980 study both classes as a whole are paying virtually what they should be under current tax rates. Therefore, very little cross-subsidization exists between basic vehicles and heavy vehicles as a whole.

Heavy-Vehicle Weight Groups

Cross-subsidization of certain heavy-vehicle weight groups does exist because the current statutory tax rates do not conform well to the actual cost responsibility of these groups. This is shown in Figure 2 for budget 1 and diesel-powered vehicles.

Under the existing weight-mile tax rates, heavy vehicles less than 16 000 lb and more than 76 000 lb are underpaying relative to their responsibility, whereas vehicles between 16 000 and 76 000 lb are overpaying. In other words, heavy vehicles between 16 000 and 76 000 lb gross weight are cross-subsidizing the other two groups. This is also shown in Table 5. Combination trucks do not appear to be paying their full responsibility, as shown by the ratios of payments to responsibility shown below:

Registered Weight Class (lb)	Ratio of Registration Fees and Weight-Mile Taxes Paid to Total Adjusted Responsibility	Ratio of Weight-Mile Taxes Paid to Net Responsibility
50 001-60 000	1.48	1.68
60 001-70 000	1.39	1.50
70 001-80 000	0.95	0.94
80 001-90 000	0.65	0.62
90 001-100 000	0.58	0.55
Total (all vehicles between 50 001 and 90 000 lb)	0.93	0.92

As can be seen, the heaviest-weight classes are substantially underpaying relative to their responsibility. Under the recommended tax rates shown in Table 3, these cross-subsidies are substantially reduced, as shown in Table 6.

The 1974 study found that heavy vehicles that weighed less than 34 000 lb and more than 74 000 lb were underpaying by $1.842 and $1.237 million, respectively, relative to their responsibility, whereas vehicles between 34 000 and 74 000 lb were overpaying by $1.691 million. This is shown in Figure 3. The 1980 study found larger cross-subsidies along with different crossover points. This was due to the increasing emphasis on preservation-type projects and the increase in heavy-vehicle traffic.

The result of this cross-subsidization has been to encourage growth in the number of heavier vehicles and thus to accelerate the deterioration of Oregon's highways, since it is these weight groups that are responsible for most of the weight-related damage. It is recognized that economies of scale have also encouraged their rapid growth and use.

Indirect Subsidies

State Police Funding

The removal of State Police funding from the Highway Fund has resulted in an indirect subsidy to all Oregon road users. State Police traffic patrols are road user related and thus are the responsibility of road users. The voters of Oregon, however, specified through the passage of Ballot Measure 1 in May 1980 that this item should be paid out of general tax revenues. This amounts to some $24 million annually and represents a windfall to the Oregon road user, mainly to the basic-vehicle group.

Table 5. Cross-subsidies in existing tax rates between basic vehicles and heavy vehicles and within heavy-vehicle weight group.

Vehicle Group	Net Responsibility ($)	Actual Payment ($)	Difference		Total Adjusted Responsibility ($)	Actual Payment ($)	Difference	
			Dollars	Percent			Dollars	Percent
Basic vehicles	78 701 240	77 435 680[a]	1 265 560	1.61	100 554 077	99 288 517[a]	1 265 560	1.26
Heavy vehicles	70 669 127	69 722 991	946 136	1.34	80 724 006	79 777 870	946 136	1.17
Weight group (lb 000s)								
0-16	1 645 013	1 602 919	42 094	2.56	2 026 869	1 984 775	42 094[b]	2.08[b]
16-76	15 504 412	21 312 408	-5 807 996	-37.46	19 546 727	25 354 723	-5 807 996	-29.71
76+	53 519 702	46 807 664	6 712 038	12.54	59 150 410	52 438 372	6 712 038	11.35

[a]Assumes 16.5 mpg average for basic vehicles.
[b]Positive difference indicates underpayment relative to responsibility and negative difference indicates overpayment relative to responsibility.

Table 6. Cross-subsidies in recommended tax rates within heavy-vehicle weight group.

Vehicle Weight Group (lb 000s)	Net Responsibility ($)	Actual Payments Based on Recommended Tax Rate ($)	Difference[a] ($)	Percent Difference
0-16	1 645 013	1 793 337	148 324	9.02
16-76	15 504 412	18 190 015	-2 685 603	-17.32
76+	53 519 702	50 695 338	2 824 364	5.28

[a]Positive difference indicates underpayment relative to responsibility and negative difference indicates overpayment relative to responsibility.

Figure 3. Comparison of recommended tax schedule B with present schedule B.

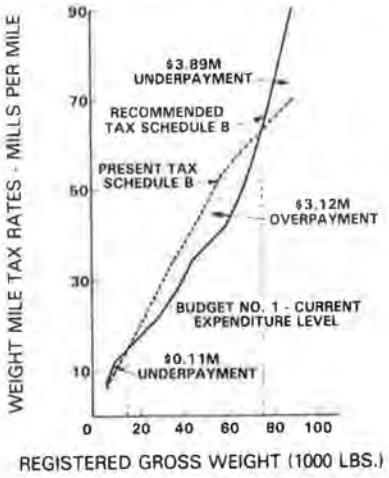
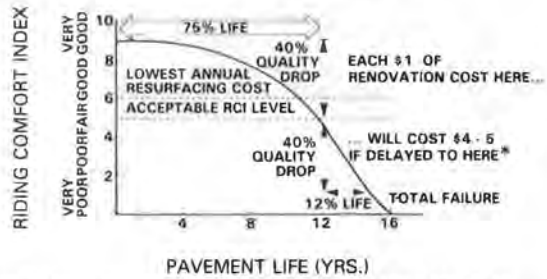


Table 7. Preservation-study results of 10-year costs.

Component	Status Quo	
	Quantity	Cost ($000 000s)
Pavement (miles)	3524	890
Bridges	49	170
Operations[a]		204
Total		1.264

Note: "Status quo" presumes holding the line at the present condition levels by addressing the most severe problems. This program accepts that system deficiencies will remain at present levels throughout the 10-year study period because elements now in good or fair condition will become deficient by the end of the period.
[a]"Operations" include a mix of needs ranging from traffic signals to passing lanes.

Figure 4. Road deterioration versus pavement life.



*(THE LATEST INFORMATION SUGGESTS THAT THE COST MAY IN FACT INCREASE 10 TIMES)

Lack of Adequate Expenditure Level

The failure of the state to adopt a budget that fully addresses the true cost of preserving the highway system indirectly subsidizes the present road user. To the extent that budgets 1 and 2 (not shown here) do not have adequate revenues to pay for preserving the system, these costs will be paid by future road users.

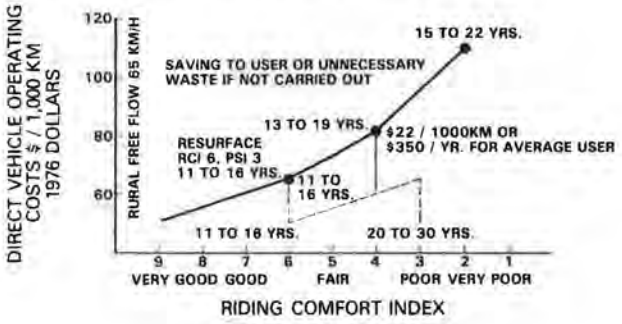
Table 7 (7) shows that to maintain the system in its present condition, Oregon would have to invest $1.264 million in 1980 dollars over the next 10 years. To achieve this, fuel-tax rates would have to be increased by 11.0-18.0 cents/gal and overall heavy-vehicle rates increased by 148 percent.

If this budget level is not adopted, there will be higher pavement repair costs in the future, as shown in Figure 4 (12). The basic pavement performance curve shows clearly that pavement deterioration starts slowly, and for about 75 percent of pavement life an acceptable level of service can be maintained. At the three-quarter point, however, the curve falls sharply and the roadway quickly deteriorates beyond the limits of inexpensive repair. If relatively low-cost rejuvenation and resurfacing are carried out before this rapid deterioration begins, pavement life can be extended for a fraction of the cost of waiting "just a couple of years more."

It costs more to drive on bad roads than on good roads (13-15). This is illustrated in Figure 5 (12), which displays how direct user costs increase with deteriorating road conditions. Dashed lines show what effect resurfacing would have on direct operating costs versus doing nothing. Without resurfacing, the average vehicle user would pay an additional $350/year in operating costs. This amount would be much higher for commercial vehicles.

It is estimated that badly worn roads add an estimated $437.1 million a year to drivers' costs in Oregon due to wasted fuel, excessive tire wear, and extra vehicle repairs. This total amounts to an average annual expense of $233/driver (16).

Figure 5. Rehabilitation effect on vehicle operating costs.



In other words, future road users will end up paying more, either in higher tax rates or in higher motor vehicle repairs and operating costs. In some cases, economic development may be slowed or indefinitely postponed, since good transportation is a necessary condition for development.

Recommendation

The goal should be to minimize subsidies as much as possible. Farm vehicles and publicly owned vehicles should pay their cost responsibility. To the extent that subsidies, as a matter of public policy, are considered to be beneficial to the people or the economy of the state, they should be paid from general tax revenues rather than from road user funds. Cross-subsidization should be minimized by adopting a weight-mile tax schedule based on the responsibility of each vehicle weight class. Indirect subsidies should be reexamined carefully to study the full implication to the Oregon taxpayer and future road users. This would mean adopting a preservation-level program with its required financing.

CONCLUSIONS

Subsidies continue to exist in Oregon highway transportation despite the best efforts to try to minimize them. As soon as one is eliminated, another appears. Cross-subsidization occurs because of the failure to adopt a weight-mile schedule that closely conforms to the net responsibility of individual weight classes. Direct subsidies, previously justified, should be looked into more closely by the State Legislature. Oregon is moving in the right direction, albeit at a slow pace.

ACKNOWLEDGMENT

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