Highway Cost Allocation and User Tax Revision in Indiana

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ABSTRACT

A discussion is presented of the use of the findings of a highway cost-allocation study in revising the highway financing scheme in Indiana. The cost-allocation study indicated that passenger cars and single-unit trucks as a group would continue to overpay their cost responsibilities whereas heavy combination trucks would continue to underpay if the 1983 highway user taxation structure were to remain unchanged. Several proposed taxation revision schemes were evaluated in terms of equity of revenue contribution and cost responsibilities of various user groups. These schemes involved the revision of fuel taxes and registration fees as well as the imposition of a new weight-distance tax. The adopted tax package included an increase in gasoline tax, a diesel fuel surcharge, an increase in registration fees, and a new user fee of $50 per year for commercial vehicles. Revenue/cost analyses conducted for each of the options considered indicated that no significant improvement in equity could be achieved without the imposition of a weight-distance tax. The adopted taxation scheme, although able to guarantee a funding goal, would not establish a desirable balance in equity among highway user groups. The possible reasons that the legislature did not include a third-tier tax are examined.

As in many other states, most of the expenditures in Indiana to construct, maintain, and rehabilitate highways are supported by highway user charges. In an effort to improve and reform the highway user tax structure in Indiana, a highway cost-allocation study (1), the first of its kind in Indiana, was mandated by a House Enrolled Act (Indiana General Assembly, No. 1006) in April 1983. The recommendations of this study served as important input for the highway user tax revisions enacted by the Indiana General Assembly in April 1985.

The major findings of the Indiana highway cost-allocation study are discussed and a description is given of how these findings were considered for revision of highway user charges in Indiana. The outcome of the user tax revision provides an excellent illustration of the fact that the determination of highway user charges involves not merely an engineering analysis of the cost responsibilities of individual user groups but also consideration of many economic and political issues.

INDIANA COST-ALLOCATION STUDY

Features

The main objective of the Indiana study was to fulfill the requirement of the legislative directive by determining the responsibilities of individual vehicle classes in occasioning highway costs. In addition, the revenue contribution of each vehicle class for the same analysis period was also computed. A comparison was then made between the cost responsibilities and revenue contributions of vehicle classes to determine whether the tax payment of each user class matched its cost responsibility for total highway costs. The complete analysis was performed for the study year 1983 and then repeated for the biennial budgetary period of 1985-1986. A flowchart is presented in Figure 1 to show the steps involved in the cost-allocation and revenue-attribution analyses.

The Indiana cost-allocation study team carried out an elaborate data collection effort on traffic volume and traffic stream composition. A vehicle classification survey was conducted at 60 randomly selected sites throughout Indiana in 1983. The traffic data for 1985 and 1986 were estimated on the basis of projected growth rates by vehicle class derived from the 1982 FHWA cost-allocation study (2).

The vehicle classification system adopted is shown in Tables 1 and 2. In Table 1, 14 vehicle classes based primarily on vehicle axle configuration are defined. In Table 2 the further subdivision of truck classes into subgroups on the basis of gross operating weights is shown.

The various cost-allocation procedures developed for individual items may be classified into two major groups, namely, roadway related and structure related. In the first group, the main concern was to develop a rational unified approach for allocating highway construction, routine maintenance, and rehabilitation costs in a consistent manner. An important feature of the unified approach developed (3,pp.3.59-3.70) is that the cost responsibilities of load and nonload factors are determined analytically on the basis of measured pavement performance data and there is no reliance on subjective judgment. In the structure-related group, an incremental approach similar to that used in the FHWA study (2) was followed.

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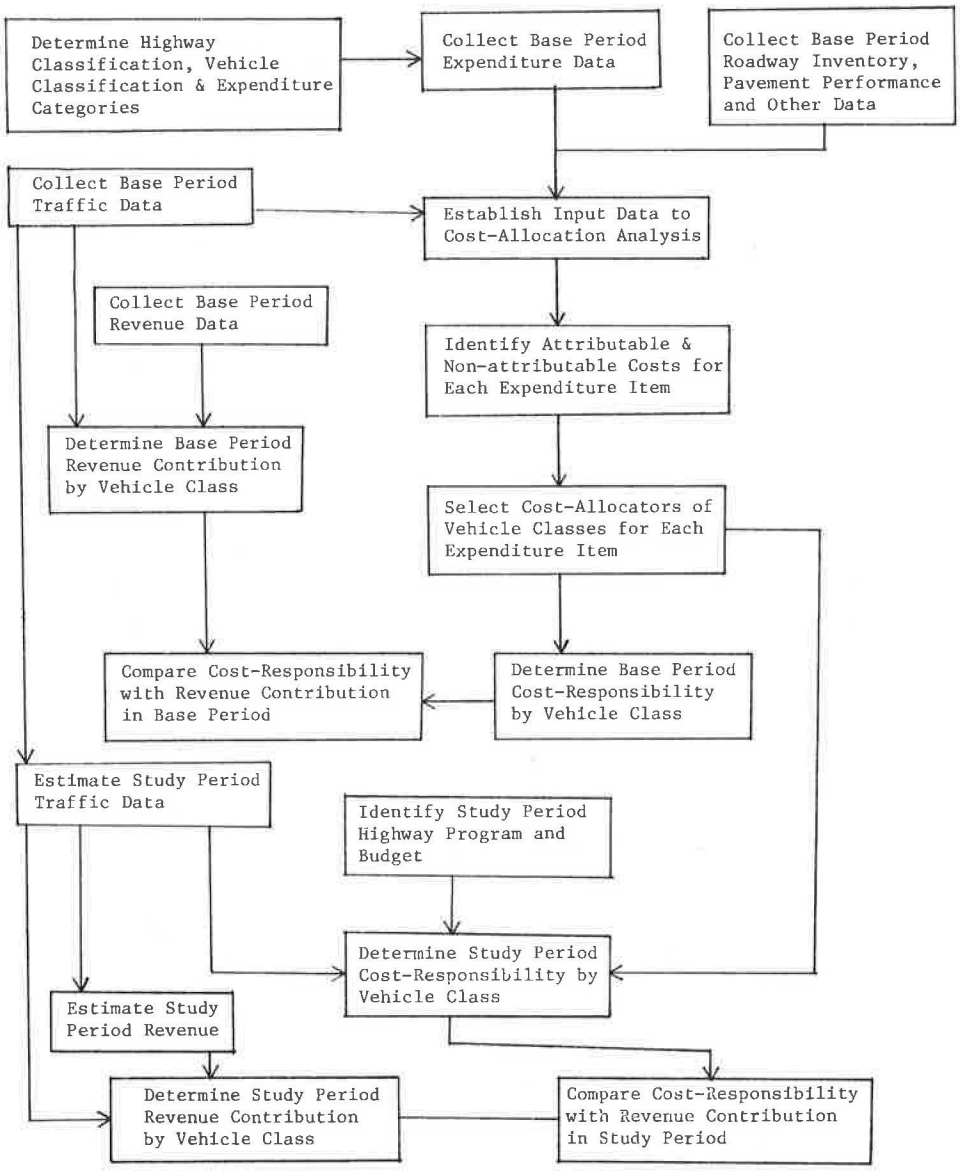

FIGURE 1 Flow chart for Indiana highway cost-allocation study.

Findings

The results of the cost-allocation analysis were expressed as percentage of cost responsibility for each vehicle class. Likewise, the results of the revenue attribution analysis provided percentage of revenues contributed by individual vehicle classes. Tables 3 and 4 present the overall statewide vehicle class cost responsibilities for FY 1983 and the biennial period 1985-1986, respectively. Tables 5 and 6 give the revenue contribution by vehicle class for the same two periods, respectively.

TABLE 1 Vehicle Classification

Class	Description
1	Small passenger car
2	Standard and compact passenger car, panel, and pickup
3	Two-axle truck (2S and 2D)
4	Bus
5	Car with one-axle trailer
6	Three-axle single-unit truck
7	2S1 tractor-trailer
8	Car with two-axle trailer
9	Four-axle single-unit truck
10	3S1 tractor-trailer
11	2S2 tractor-trailer
12	3S2 tractor-trailer
13	Other five-axle tractor-trailer
14	Six-or-more-axle tractor-trailer

The cost responsibilities and revenue contribution of vehicle classes were combined to provide a revenue/cost ratio for each vehicle class. Such a comparison provides an indication of equity in revenue contribution. The revenue/cost ratios for FY 1983 and the biennial period 1985-1986 are summarized for each vehicle class in Table 7. A revenue/cost ratio of unity indicates perfect equity. A revenue/cost ratio with a value less than 1 indicates that the vehicle class underpays its fair share of cost responsibility, whereas a value greater than 1 implies overpayment.

The conclusions that can be derived from the findings in Table 7 are as follows:

1. Passenger cars as a group overpaid their cost responsibility in 1983. There was, however, a significant imbalance between costs and revenues within the group. In particular, small cars underpaid their

TABLE 2 Vehicle Class Weight Group Classification

Vehicle Class	Vehicle Subgroup	Gross Operating Weight (lb)
1	1	All weights
2	1	All weights
3	1	<7,500
3	2	7,500-10,000
3	3	10,000-12,500
3	4	12,500-15,000
3	5	15,000-17,500
3	6	17,500-20,000
3	7	20,000-22,500
3	8	22,500-25,000
3	9	>25,000
4	1	All weights
5	1	All weights
6	1	<17,500
6	2	17,500-20,000
6	3	20,000-22,500
6	4	22,500-25,000
6	5	25,000-27,500
6	6	27,500-30,000
6	7	30,000-32,500
6	8	32,500-35,000
6	9	>35,000
7	1	<20,000
7	2	20,000-22,500
7	3	22,500-25,000
7	4	25,000-27,500
7	5	27,500-30,000
7	6	30,000-32,500
7	7	32,500-35,000
7	8	35,000-37,500
7	9	37,500-40,000
8	1	All weights
9	1	<22,500
9	2	>22,500
10	1	<27,500
10	2	27,500-30,000
10	3	30,000-32,500
10	4	>32,500
11	1	<22,500
11	2	22,500-25,000
11	3	25,000-27,500
11	4	27,500-30,000
11	5	30,000-32,500
11	6	32,500-35,000
11	7	35,000-37,500
11	8	37,500-40,000
11	9	40,000-42,500
11	10	42,500-45,000
11	11	45,000-47,500
11	12	47,500-50,000
11	13	>50,000
12	1	<22,500
12	2	22,500-25,000
12	3	25,000-27,500
12	4	27,500-30,000
12	5	30,000-32,500
12	6	32,500-35,000
12	7	35,000-37,500
12	8	37,500-40,000
12	9	40,000-42,500
12	10	42,500-45,000
12	11	45,000-47,500
12	12	47,500-50,000
12	13	50,000-52,500
12	14	52,500-55,000
12	15	55,000-57,500
12	16	57,500-60,000
12	17	60,000-62,500
12	18	62,500-65,000
12	19	65,000-67,500
12	20	67,500-70,000
12	21	70,000-72,500
12	22	72,500-75,000
12	23	75,000-77,500
12	24	77,500-80,000
12	25	80,000-82,500
12	26	82,500-85,000
13	1	<42,500
13	2	42,500-45,000
13	3	45,000-47,500
13	4	47,500-50,000
13	5	50,000-52,500
13	6	52,500-55,000
13	7	55,000-57,500
13	8	57,500-60,000
13	9	60,000-62,500
13	10	62,500-65,000
13	11	65,000-67,500
13	12	67,500-70,000
13	13	70,000-72,500
14	1	<40,000
14	2	40,000-60,000
14	3	>60,000

cost responsibility, whereas large cars considerably overpaid.

2. Single-unit trucks as a group also overpaid their cost responsibility in 1983. Although two-axle and four-axle single-unit trucks overpaid, three-axle single-unit trucks underpaid.

3. Combination trucks significantly underpaid their cost responsibility in 1983. The underpayment was consistent among all combination trucks. However, the extent of this underpayment varied within the group.

4. The same general pattern of overpayments as that in 1983 is present for the biennial period 1985-1986. In fact, the underpayment by heavy combination trucks is more pronounced in 1985-1986 than in 1983. This implies that the subsidization of heavy vehicles by passenger cars and single-unit trucks would continue to exist if the tax structure were to remain unchanged.

Implications

The 1983 Indiana highway user taxation scheme was primarily a two-tier system that consisted of first-structure vehicle registration fees and second-structure fuel taxes. Because the net result of the cost-allocation analysis was that passenger cars and single-unit trucks subsidized heavy combination trucks, the following revision options were considered in Indiana:

1. Increase heavy vehicle registration fees,
2. Increase special fuel (diesel) tax, and
3. Impose a third-tier weight-distance tax on heavy trucks.

The first two options involved revisions of tax rates while retaining the existing two-tier system. The third option required additional administrative organization and personnel. A switch from the existing two-tier system to a weight-distance taxation scheme was considered too drastic a change and was not included in the revision schemes seriously considered by the legislature.

Raising registration fees of heavy combination trucks is a simple method of increasing revenue contribution of these trucks. It, however, has the drawback of creating inequity between vehicles with

high annual mileage and those with low annual mileage. Increasing the special fuel tax, on the other hand, tends to reduce the inequity between these vehicles. Unfortunately, as both single-unit and combination trucks are affected by a special fuel tax increase, it is not effective in eliminating the inequity between these two categories of trucks. A third-tier weight-distance tax with a properly designed rate schedule can help bring equity among passenger cars, single-unit trucks, and combination trucks. A major disadvantage of this option is the comparatively high administration and enforcement costs. In theory, it is possible to achieve equity for the major vehicle classes in Table 7 by means of an appropriate combination of Options 1, 2, and 3, identified earlier.

Both Indiana highway officials and legislators recognized that there was an unmet need for additional highway funding at both the state and local levels in order to ensure adequate highway maintenance and rehabilitation. Initially, there were proposals that some general revenue funds be allocated to highways. However, the findings of the cost-allocation study clearly established that some users were not paying their fair share and that additional funds could be raised from these users. Consequently, it was generally agreed by the legislators that highway funding should continue to be derived from highway user fees and taxes. At the same time some legislators expressed interest in improving the equity of the state highway user taxation system.

The trucking industry in Indiana was strongly in favor of retaining the existing two-tier taxation system without imposition of any additional forms or types of taxes applicable to highway users (statement by G.G. Cline, Indiana Motor Truck Association, Inc., December 6, 1984). It also suggested that the benefits of a good highway system enjoyed by nonusers of the highways should be recognized by assigning some highway cost responsibility to the general public. Noting the recent increase of federal tax on diesel fuel from 4 cents a gallon to 15 cents a gallon, the trucking industry expressed its concern over the possible adverse effect on the economy of the state

TABLE 3 Overall Vehicle Cost Responsibilities, 1983

		Percentage of Responsibility				Percentage of Responsibility	
Vehicle Class	Vehicle Subgroup	Vehicle Class	Vehicle Subgroup	Vehicle Class	Vehicle Subgroup	Vehicle Class	Vehicle Subgroup
1	1	10.869	10.869	11	6		0.410
				11	7		0.142
2	1	41.510	41.510	11	8		0.183
				11	9		0.133
3	1	6.766	0.440	11	10		0.161
3	2		0.403	11	11		0.197
3	3		0.866	11	12		0.213
3	4		0.873	11	13		0.463
3	5		0.450				
3	6		1.587	12	1	30.253	0.020
3	7		1.179	12	2		0.072
3	8		0.388	12	3		0.263
3	9		0.580	12	4		0.994
				12	5		0.455
4	1	0.448	0.448	12	6		0.526
				12	7		0.187
5	1	0.387	0.387	12	8		0.308
				12	9		0.581
6	1	2.605	0.362	12	10		0.612
6	2		0.266	12	11		0.286
6	3		0.174	12	12		0.388
6	4		0.234	12	13		0.551
6	5		0.092	12	14		0.544
6	6		0.117	12	15		0.629
6	7		0.144	12	16		0.675
6	8		0.220	12	17		0.955
6	9		0.995	12	18		3.051
				12	19		1.817
7	1	0.974	0.029	12	20		3.499
7	2		0.035	12	21		5.320
7	3		0.049	12	22		3.808
7	4		0.072	12	23		3.737
7	5		0.077	12	24		0.672
7	6		0.137	12	25		0.136
7	7		0.156	12	26		0.171
7	8		0.191				
7	9		0.228	13	1	1.285	0.259
				13	2		0.317
8	1	0.081	0.081	13	3		0.249
				13	4		0.158
9	1	1.087	0.018	13	5		0.182
9	2		1.069	13	6		0.008
				13	7		0.017
10	1	0.107	0.021	13	8		0.009
10	2		0.025	13	9		0.009
10	3		0.027	13	10		0.016
10	4		0.033	13	11		0.009
				13	12		0.025
11	1	2.525	0.060	13	13		0.028
11	2		0.106				
11	3		0.224	14	1	1.110	0.095
11	4		0.128	14	2		0.249
11	5		0.105	14	3		0.765

TABLE 4 Overall Vehicle Cost Responsibilities, 1985-1986

Vehicle Class	Vehicle Subgroup	Percentage of Responsibility: Vehicle Class	Percentage of Responsibility: Vehicle Subgroup
1	1	11.707	11.707
2	1	43.610	43.610
3	1	5.746	0.409
3	2		0.240
3	3		0.783
3	4		0.793
3	5		0.435
3	6		1.302
3	7		0.960
3	8		0.342
3	9		0.484
4	1	0.344	0.344
5	1	0.427	0.427
6	1	2.224	0.325
6	2		0.238
6	3		0.164
6	4		0.206
6	5		0.083
6	6		0.101
6	7		0.124
6	8		0.186
6	9		0.799
7	1	0.804	0.031
7	2		0.032
7	3		0.044
7	4		0.062
7	5		0.066
7	6		0.109
7	7		0.132
7	8		0.152
7	9		0.176
8	1	0.090	0.090
9	1	1.146	0.020
9	2		1.126
10	1	0.093	0.018
10	2		0.021
10	3		0.025
10	4	0.029	13
11	1	2.287	0.059
11	2		0.104
11	3		0.218
11	4		0.124
11	5		0.111
11	6		0.340
11	7		0.122
11	8		0.153
11	9		0.123
11	10		0.147
11	11		0.174
11	12		0.201
11	13		0.413
12	1	29.281	0.021
12	2		0.084
12	3		0.323
12	4		1.042
12	5		0.544
12	6		0.536
12	7		0.241
12	8		0.337
12	9		0.539
12	10		0.571
12	11		0.324
12	12		0.401
12	13		0.519
12	14		0.569
12	15		0.620
12	16		0.799
12	17		0.999
12	18		2.670
12	19		1.718
12	20		3.155
12	21		4.910
12	22		3.851
12	23		3.453
12	24		0.736
12	25		0.130
12	26		0.190
13	1	1.218	0.222
13	2		0.274
13	3		0.226
13	4		0.148
13	5		0.161
13	6		0.016
13	7		0.027
13	8		0.012
13	9		0.013
13	10		0.024
11		0.015	
13	12		0.037
12	13		0.044
14	1	1.030	0.089
14	2		0.217
14	3		0.724

if an additional drastic hike in diesel fuel tax or truck registration fee were imposed in Indiana.

The railroad industry believes that as highway costs increase, the burden of fuel taxes should not be shifted further to the midweight trucks and away from the heavy long-haul vehicles, which had been found to underpay by the greatest amount. Because the railroad industry competes with heavy long-haul trucks for as much as 70 percent of its revenue nationally (4), it strongly advocates the adoption of a weight-distance tax, which, it claims, could create a more equitable user charge structure, add to highway revenue, and help simplify procedures for taxing interstate motor carriers.

There was no known organized position of passenger-car owners and single-unit truck operators in Indiana. One suspects, however, that such owners and operators would not oppose the imposition of a third-tier weight-distance tax on heavy combination trucks. Passenger-car owners and single-unit truck operators likely would not be favorable to increases in gasoline fuel tax, claiming that it would further widen the inequity gap already existing between light and heavy vehicles.

TAX STRUCTURE REVISION SCHEMES

Several tax structure revision schemes were proposed for discussion in the Indiana legislature during early 1985. The results of the cost-allocation study were used to provide direction to these revisions. The direction was, in general, to raise additional revenues from heavy combination trucks. The revision schemes included fuel tax, registration fees, axle tax, and axle-mile tax as well as a weight-distance tax. Revenue/cost ratios were computed to evaluate the equity aspect of each of the proposed schemes. Discussed in this section, in chronological order, are some of the major revision schemes proposed.

Transportation Coordinating Board Recommendation (5)

The first draft of the Indiana cost-allocation study final report was issued on October 31, 1984. In December 1984 the official transportation policy group in Indiana, the Transportation Coordinating Board (TCB), recommended the following changes in highway user tax structure:

Scheme A

1. Increase of state gasoline tax by 4 cents, from 11.1 cents/gal to 15.1 cents/gal;
2. Increase of state diesel fuel tax by 6 cents, from 11.1 cents/gal to 17.1 cents/gal;
3. Increase in passenger-car registration fees from $12/year to $15/year; and
4. Increase in truck registration fees by 35 percent.

Scheme B

1. All changes in Scheme A, and
2. Imposition of an appropriate weight-distance tax for combination trucks. The study team that performed the cost-allocation study designed the following weight-distance tax scheme:

Registered Weight (lb)	Cents/Mile
48,000-54,000	1.00
54,000-60,000	1.50
60,000-66,000	2.00
66,000-72,000	2.75
72,000-74,000	3.75
74,000-76,000	5.00
76,000-78,000	6.50
78,000 and above	8.50

TABLE 5 Revenue Contribution by Vehicle Class, 1983

Vehicle Class	Vehicle Subgroup	Percentage of Contribution: Vehicle Class	Percentage of Contribution: Vehicle Subgroup
1	1	8.080	8.080
2	1	56.670	56.670
3	1	8.020	3.240
3	2		0.450
3	3		0.900
3	4		0.940
3	5		0.710
3	6		0.580
3	7		0.330
3	8		0.400
3	9		0.460
4	1	0.372	0.372
5	1	0.453	0.453
6	1	2.210	0.390
6	2		0.240
6	3		0.160
6	4		0.250
6	5		0.160
6	6		0.210
6	7		0.210
6	8		0.160
6	9		0.450
7	1	0.540	0.037
7	2		0.046
7	3		0.036
7	4		0.090
7	5		0.038
7	6		0.031
7	7		0.180
7	8		0.040
7	9		0.039
8	1	0.078	0.078
9	1	1.620	0.630
9	2		0.990
10	1	0.069	0.017
10	2		0.016
10	3		0.020
10	4		0.016
11	1	1.211	0.074
11	2		0.110
11	3		0.200
11	4		0.106
11	5		0.110
11	6		0.150
11	7		0.070
11	8		0.073
11	9		0.073
11	10		0.063
11	11		0.062
11	12		0.058
11	13		0.066
12	1	18.900	0.043
12	2		0.166
12	3		0.563
12	4		1.370
12	5		0.847
12	6		0.631
12	7		0.400
12	8		0.419
12	9		0.457
12	10		0.416
12	11		1.120
12	12		0.329
12	13		0.397
12	14		0.468
12	15		0.487
12	16		0.718
12	17		0.606
12	18		0.730
12	19		0.614
12	20		0.782
12	21		1.442
12	22		1.799
12	23		0.952
12	24		0.454
12	25		1.337
12	26		1.355
13	1	1.260	0.461
13	2		0.128
13	3		0.080
13	4		0.073
13	5		0.056
13	6		0.032
13	7		0.046
13	8		0.037
13	9		0.037
13	10		0.049
13	11		0.038
13	12		0.057
13	13		0.163
14	1	0.520	0.189
14	2		0.068
14	3		0.264

TABLE 6 Revenue Contribution by Vehicle Class, 1985-1986

Vehicle Class	Vehicle Subgroup	Percentage of Contribution: Vehicle Class	Percentage of Contribution: Vehicle Subgroup
1	1	8.946	8.946
2	1	60.250	60.250
3	1	8.306	3.563
3	2		0.450
3	3		0.833
3	4		0.897
3	5		0.977
3	6		0.556
3	7		0.306
3	8		0.350
3	9		0.375
4	1	0.336	0.336
5	1	0.459	0.459
6	1	1.824	0.369
6	2		0.204
6	3		0.138
6	4		0.212
6	5		0.130
6	6		0.173
6	7		0.170
6	8		0.129
6	9		0.300
7	1	0.420	0.034
7	2		0.064
7	3		0.032
7	4		0.058
7	5		0.035
7	6		0.028
7	7		0.097
7	8		0.036
7	9		0.035
8	1	0.079	0.079
9	1	1.179	0.515
9	2		0.664
10	1	0.062	0.016
10	2		0.015
10	3		0.018
10	4		0.014
11	1	1.087	0.066
11	2		0.113
11	3		0.175
11	4		0.094
11	5		0.098
11	6		0.131
11	7		0.062
11	8		0.065
11	9		0.064
11	10		0.055
11	11		0.055
11	12		0.051
11	13		0.058
12	1	15.029	0.038
12	2		0.148
12	3		0.490
12	4		1.195
12	5		0.733
12	6		0.547
12	7		0.344
12	8		0.362
12	9		0.391
12	10		0.358
12	11		0.490
12	12		0.279
12	13		0.307
12	14		0.353
12	15		0.357
12	16		0.546
12	17		0.476
12	18		0.573
12	19		0.467
12	20		0.612
12	21		1.159
12	22		1.427
12	23		0.814
12	24		0.383
12	25		1.083
12	26		1.099
13	1	1.457	0.813
13	2		0.108
13	3		0.067
13	4		0.061
13	5		0.041
13	6		0.027
13	7		0.036
13	8		0.029
13	9		0.029
13	10		0.038
13	11		0.030
13	12		0.045
13	13		0.134
14	1	0.566	0.304
14	2		0.051
14	3		0.212

Scheme C

1. All changes in Scheme A, and
2. As an appropriate weight-distance tax for combination trucks, the study team also designed the following alternative scheme:

Registered Weight (lb)	Cents/Mile
48,000-54,000	0.25
54,000-60,000	0.38
60,000-66,000	0.50
66,000-72,000	0.70
72,000-74,000	0.95
74,000-76,000	1.25
76,000-78,000	1.63
78,000 and above	2.13

Scheme A involved only rate changes of the existing tax structure, whereas both Schemes B and C introduced a weight-distance tax in addition to the changes in the existing tax rates. The rate schedule of the weight-distance tax in Scheme B was designed to bring to unity the revenue/cost ratio of combination trucks as a whole. The rate schedule in Scheme C was set such that the weight-distance tax would raise $50 million in 1986. The estimated additional highway user revenues that could be collected in 1986 with the foregoing revisions was $147 million, $349 million, and $197 million for Schemes A, B, and C, respectively.

A revenue/cost analysis for the three revision schemes yielded the results presented in Table 8. Scheme A would produce only slight improvements in equity among the different vehicle classes, and combination trucks would continue to underpay under this scheme. By including a weight-distance tax, Scheme C would produce further improvements for all vehicle classes in terms of equity, but the situation would, however, still be far from perfect. With Scheme B, the overall revenue/cost ratio for the combination trucks as a group could become 1.00, and the corresponding group revenue/cost ratios for passenger cars and single-unit trucks would be close to unity.

TABLE 7 Cost-Allocation and Revenue Contribution Summary

Vehicle Class	Vehicle Subgroup	FY 1983 VMT (%)	FY 1983 Cost Responsibility (%)	FY 1983 Revenue (%)	FY 1983 Revenue/Cost Ratio	1985-1986 VMT (%)	1985-1986 Cost Responsibility (%)	1985-1986 Revenue (%)	1985-1986 Revenue/Cost Ratio
Passenger car	1	19.124	10.869	8.080	0.743	19.176	11.707	8.946	0.764
	2	68.921	41.510	56.670	1.365	68.001	43.610	60.250	1.382
	5	0.623	0.387	0.453	1.171	0.641	0.427	0.459	1.075
	8	0.107	0.081	0.078	0.963	0.127	0.090	0.079	0.878
		88.775	52.847	65.281	(1.235)	87.945	55.834	69.734	(1.249)
Bus	4	0.164	0.448	0.372	0.830	0.162	0.344	0.336	0.977
Single-unit truck	3	2.666	6.766	8.020	1.185	2.604	5.746	8.306	1.446
	6	0.692	2.605	2.210	0.848	0.646	2.224	1.824	0.820
	9	0.091	1.087	1.620	1.490	0.092	1.146	1.179	1.029
		3.449	10.458	11.850	(1.133)	3.342	9.116	11.309	(1.241)
Combination truck	7	0.196	0.974	0.540	0.554	0.219	0.804	0.420	0.522
	10	0.040	0.107	0.069	0.645	0.043	0.093	0.062	0.667
	11	0.688	2.525	1.211	0.480	0.752	2.287	1.087	0.475
	12	6.385	30.253	18.900	0.625	7.211	29.281	15.029	0.513
	13	0.224	1.285	1.260	0.981	0.245	1.218	1.457	1.196
	14	0.078	1.110	0.520	0.468	0.081	1.030	0.566	0.550
		7.611	36.254	22.500	(0.621)	8.551	34.713	18.621	(0.536)

Note: Values in parentheses refer to revenue/cost ratio of vehicle class.

House Bill 1462 Proposal

Indiana House Bill (H.B.) 1462, distributed in March 1985, contained the following proposal, which is designated Scheme D. In addition, another scheme was devised combining the fuel tax and registration fee increases with a weight-distance tax for the purpose of legislative deliberation. This scheme is designated Scheme E.

Scheme D

1. Increase of gasoline tax by 3.9 cents, from the existing 11.1 cents/gal to 15.0 cents/gal;
2. Increase of diesel fuel tax by 7.9 cents, from the existing 11.1 cents/gal to 18.0 cents/gal; and
3. Increase of truck registration fees by 35 percent according to the H.B. 1462 schedule to yield $17.5 million in 1986 for trucks with more than 7,000 lb registered weight.

Scheme E

1. Increase of gasoline tax by 1.9 cents, from the existing 11.1 cents/gal to 13.0 cents/gal;
2. Increase of diesel fuel tax by 3.9 cents, from the existing 11.1 cents/gal to 15.0 cents/gal;
3. Increase in truck registration fees by 35 percent according to the H.B. 1462 schedule to yield $17.5 million in 1986 for trucks with more than 7,000 lb registered weight; and
4. Imposition of a third-tier weight-distance tax on combination trucks to yield $50 million in 1986 (see Scheme C).

The pattern of revision of Schemes D and E was similar to that of Schemes A and C, respectively. In 1986 Scheme D was expected to yield a total revenue of $153 million, and Scheme E, $134 million. The impacts of these two schemes in terms of revenue/cost ratios are presented in Table 9. The results showed that the improvement in the equity of the tax struc-

TABLE 8 1986 Revenue/Cost Ratios for Schemes A, B, and C

Vehicle Class	Vehicle Subgroup	Existing Tax Structure	Scheme A	Scheme B	Scheme C
Passenger car	1	0.764	0.742	0.601	0.701
	2	1.382	1.355	1.097	1.281
	5	1.075	1.068	0.865	1.009
	8	0.878	0.433	0.351	0.409
		(1.249)	(1.223)	(0.990)	(1.156)
Bus	4	0.977	1.064	1.006	1.047
Single-unit truck	3	1.446	1.468	1.189	1.387
	6	0.820	0.866	0.701	0.818
	9	1.029	1.086	0.879	1.026
		(1.241)	(1.273)	(1.031)	(1.203)
Combination	7	0.522	0.524	0.911	0.671
	10	0.667	0.710	1.259	1.984
	11	0.475	0.511	0.862	0.675
	12	0.513	0.550	0.892	0.677
	13	1.196	1.148	1.388	1.217
	14	0.550	0.540	0.660	0.565
		(0.536)	(0.565)	(1.001)	(0.695)

Note: Values in parentheses refer to revenue/cost ratio of vehicle class.

TABLE 9 1986 Revenue/Cost Ratios for Schemes D and E

Vehicle Class	Vehicle Subgroup	Existing Tax Structure	Scheme D	Scheme E
Passenger car	1	0.764	0.737	0.697
	2	1.382	1.337	1.262
	5	1.075	1.070	0.998
	8	0.878	0.878	0.822
		(1.249)	(1.209)	(1.141)
Bus	4	0.977	1.102	0.980
Single-unit truck	3	1.446	1.384	1.358
	6	0.820	0.880	0.823
	9	1.029	0.915	0.908
		(1.241)	(1.202)	(1.171)
Combination truck	7	0.522	0.598	0.738
	10	0.667	0.882	1.108
	11	0.475	0.615	0.775
	12	0.513	0.594	0.709
	13	1.196	0.134	1.242
	14	0.550	0.475	0.541
		(0.536)	(0.611)	(0.611)

Note: Values in parentheses refer to revenue/cost ratio of vehicle class.

ture would be marginal with the Scheme D revision. Better results could be obtained with Scheme E, which incorporated a third-tier weight-distance tax into the existing structure.

The Adopted Tax Revision

A review of Tables 8 and 9 suggests that schemes with a third-tier weight-distance tax are more effective in improving the equity of combination trucks. The final tax revision adopted by the Indiana legislature did not, however, include a third-tier tax. One of the reasons cited for excluding a weight-distance tax was that it would be costly to put into operation.

The new highway user tax structure as described by the Indian House Enrolled Act 1462 includes the following major revisions:

1. Increase of gasoline tax by 2.9 cents to 14.0 cents/gal,
2. Increase of diesel fuel tax by 3.9 cents to 15.0 cents/gal,
3. Imposition of a diesel fuel surcharge tax of 8.0 cents/gal on commercial vehicles,
4. Imposition of a $50 annual supplemental highway user fee per commercial vehicle, and
5. Increase in truck registration fees of 35 percent according to the H.B. 1462 schedule for trucks with more than 7,000 lb registered weight.

The revenue/cost ratios of vehicle classes for the new Indiana highway user tax structure were computed and are shown in Table 10. The results indicate that although the funding goal would be met under this structure, there is little improvement in the overall equity among user groups. The combination trucks as a group would still underpay by a significant margin, and the position of single-unit trucks would become even more inequitable.

TABLE 10 1986 Revenue/Cost Ratios for New Tax Structure

Vehicle Class	Vehicle Subgroup	Existing Tax Structure	Existing Tax Structure
Passenger car	1	0.764	0.700
	2	1.382	1.270
	5	1.075	1.007
	8	0.878	0.949
		(1.249)	(1.148)
Bus	4	0.977	0.930
Single-unit truck	3	1.446	1.528
	6	0.820	1.079
	9	1.029	1.082
		(1.241)	(1.362)
Combination truck	7	0.522	0.622
	10	0.667	0.968
	11	0.475	0.660
	12	0.513	0.651
	13	1.196	1.207
	14	0.550	0.524
		(0.536)	(0.667)

Note: Values in parentheses refer to revenue/cost ratio of vehicle class.

CONCLUSIONS

A discussion has been presented of how the findings of a highway cost-allocation study have been used in revising the highway financing scheme in Indiana. The cost-allocation study indicated that passenger cars and single-unit trucks as a group would continue to overpay, and heavy combination trucks would continue to underpay their cost responsibilities if the 1983 highway user taxation structure were to remain unchanged. In fact, the underpayment by heavy combination trucks would be more pronounced in 1985-1986 than in 1983. It was apparent that funds for unmet highway needs did not have to come from general revenue funds, as proposed by some, but that additional funds could be reasonably generated by taxing heavy combination trucks. The study also indicated the need to balance the tax burden among user groups if equity in terms of revenue/cost ratios was to be achieved.

Several taxation-increase schemes included increases in fuel taxes and registration fees as well as the imposition of new taxes such as the axle tax, the axle-mile tax, and the weight-distance tax. Ultimately, the legislature adopted a tax package that included an increase in the gasoline tax, a diesel fuel surcharge, an increase in registration fees, and a new user fee of $50/unit per year for commercial vehicles. Revenue/cost analyses conducted for each of the options indicated that no significant improvement in equity could be achieved without the imposition of a weight-distance tax. The taxation scheme adopted, although able to provide the funding goals, did not provide the desirable balance in equity among highway user groups. There were several possible reasons for the legislature not to include a third-tier tax, even though many legislators recognized the desirability to achieve equity. These reasons are as follows:

1. The legislature did not have sufficient time to evaluate thoroughly the alternative taxation schemes in regard to equity and other factors before adjourning in April 1985.
2. The implementation and enforcement costs of a third-tier tax could not be clearly or reliably identified and there was concern that much of the revenue raised would be offset by the added costs.
3. The advantage of piggybacking on the existing taxes by simply increasing the rates would eliminate the uncertainty of a new taxation scheme.
4. There was considerable uncertainty about truck volume and weight data, and the reliability of estimates of expected revenues from a weight-distance tax was questioned.
5. Although many members of the legislature were interested in creating a better balance in equity among highway user groups, the greater concern was the raising of a funding goal for the highway program with minimal political resistance.
6. Indiana is the ninth major trucking state in the nation (6). Any revision in the highway user tax structure that might create an adverse effect on the trucking industry might not be in the overall economic interest of the state. It was widely perceived that a weight-distance tax would impose a great burden on the Indiana trucking industry, both in higher taxes in Indiana and in possible new regulations imposed on Indiana trucks in other states.

In summary, there are a great many factors that are associated with decisions regarding any tax revision scheme, including economic and political consequences. Thus, although it was clear that the current imbalance in equity could be greatly reduced by imposing a weight-distance tax, the Indiana legislature decided not to impose such a tax at present.

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Transportation Impact Fees: The Florida Experience

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ABSTRACT

Transportation impact fees are now being considered in communities throughout Florida and have recently been enacted in four Florida counties. In view of its obvious appeal, this new tax is expected to be the subject of experiment by communities throughout the country. The purpose of this paper was to explore this new source of transportation revenue by using the Florida experience as a point of departure. Judicial standards on which impact fees are based are discussed, and a fee system that has become a model in Florida, having survived judicial challenge, is examined in some detail. A means to estimate the economic incidence of an impact fee is demonstrated and the use of the impact fee as a growth management tool is examined.

Government at all levels faces financial uncertainties. During the 1970s, the rising cost of government was attributed to a combination of general inflation and rapid increases in the cost of energy. Although the pressure of these factors has abated in recent years, it remains, particularly in urban areas experiencing rapid growth. The Reagan administration shift to federalism has reduced revenue pass through for state and local governments. At the same time, pressure to further relieve the property tax has intensified as controls like Proposition 13 abound throughout the country. This has resulted in a search by local government for alternative revenue sources.

In response to this search, local governments have begun experimenting with a variety of revenue-raising devices that are capable of both achieving political support and withstanding legal challenges. Several of these devices, including dedications, fees in lieu of dedications, and impact fees, have met with moderate success over the last decade. An increasing number of local communities in Florida now believe that new residents or developers, or both, should bear a fair share of the infrastructure cost required to provide additional services demanded. This interest is not exclusive to Florida. The states of California, Washington, and Arizona have had a history of legislative enablement and judicial support for impact fees and mandatory dedications (1).

The fiscal impact fee, in particular, has generated a great deal of excitement recently in Florida and throughout the country. Impact fees are a one-time charge collected by local government from new development in order to generate revenue for capital

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