Who Pays for the Roads—Highway Finance and Taxation

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In the preparation of this paper, the implications of the assigned subject—"Who pays for the roads?"—have been taken literally. The intent, therefore, is to inform the hearer or the reader as to how matters stand at present rather than to argue about who should pay for the highways. Within the scope thus defined, it is hoped that the treatment will succeed in illuminating the subject to some degree as well as being informative about it.

In trying to answer the question posed, the authors have of necessity drawn heavily upon the work of others. They have been particularly dependent on the great body of highway statistics acquired chiefly through the cooperative efforts of the state highway departments and published each year by the Bureau of Public Roads. The treatment is divided into three parts. First, there is a presentation of the facts of the matter—the kinds and magnitudes of highway revenues, the nature of motor-vehicle taxes and what becomes of them, and a side glance at highway expenditures. This is followed by a discussion of the tax payments made on vehicles of different types and sizes and the relation of these payments to the total cost of owning and operating them. The paper closes with some general observations about highway finance flowing out of the data presented.

THE STRUCTURE OF HIGHWAY REVENUES

Although the sources of highway revenue are numerous and varied, we tend to think of them as of two classes, those derived from taxes, fees, and tolls imposed on motor vehicles or their use, and those derived from other, sometimes called nonuser, sources. The term "user taxes," applied at the state level to those imposts that are commonly but not exclusively used for highway purposes, is employed with great restraint in this paper. The reason for this reticence is the emergence of what might be called a semantic approach to highway finance. Under the

Highway Revenue Act of 1956 the proceeds of certain excise taxes on motor vehicles and automotive products were directed into the highway trust fund, while other, not dissimilar, automotive tax proceeds were retained in the general fund of the Treasury. Thus inconsistencies of terminology arise when the term "user taxes" is applied indiscriminately to federal automotive excise taxes. But motor-vehicle taxes they all are, and such they are called in this discussion.

Table 1 gives a classification of the estimated highway revenues of the calendar year 1960 by kind of income and by the level of government at which the revenue originated. Federal funds for highways are given in greater detail than is customary, being divided into (1) highway trust fund revenues, which support the regular federal-aid program, (2) funds for forest, park, parkway, and public lands highways, (3) funds for highway construction on which the Bureau of Public Roads acts for other federal agencies, and (4) funds not connected with the Bureau of Public Roads, including (a) direct construction by other federal agencies and (b) earnings of royalties on the extraction of forest and mineral products from public lands, part of which go to the state and local governments within whose boundaries the extraction occurred, to be used for highway purposes.

It will be observed in Table 1 that the federal government supplied 29.9 per cent of highway revenues in 1960; the states 51.3 per cent; the counties and other local units 7.8 per cent, and urban places 11.0 per cent. The estimate of 1960 revenues for all roads and streets is $10,315 million, a sum whose magnitude reflects the increase of the federal gasoline tax from three to four cents per gallon in October 1959, as well as the general rise in all classes of highway revenue.

MOTOR-VEHICLE REVENUES

Highway revenues derived from motor vehicles are divided into three classes: motor-vehicle taxes, road and crossing (bridge, tunnel, and ferry) tolls, and parking fees. In spite of the importance of the great toll roads, bridges, and tunnels, their contribution to highway revenues is very modest, being only 4.8 per cent of the total. Parking-meter and other public parking fees that found their way into the tills of highway agencies are nearly negligible, amounting to $49 million or one-half of one per cent of the total. Motor-vehicle taxes contributed 73.3 per cent of all highway revenues in 1960; all motor-vehicle revenues amounted to 78.6 per cent.

Although state imposts on highway users remain the dominant source of highway income, it is plain that the very high percentage of

motor-vehicle revenues to the total is the result, in large part, of the shift of federal highway tax support from a general-fund base to a motor-vehicle tax base under the terms of the Highway Revenue Act of 1956. The federal gasoline tax and other automotive excises (plus a small item of interest) account for 98.0 per cent of the $2,856 million received by the Federal Highway Trust Fund in 1960. The remaining 2.0 per cent consists of excise-tax payments that cannot be ascribed to highway vehicles, chiefly those on aviation, industrial, and marine gasoline and on aviation, farm-machinery, and other off-highway tires.

Table 1.—ESTIMATED REVENUES FOR ALL ROADS AND STREETS IN CALENDER YEAR 1960, CLASSIFIED BY GOVERNMENTAL SOURCE AND BY KIND OF INCOME[1]

Governmental source	Revenues derived from motor vehicles				Revenues derived from other than motor-vehicle sources						Total revenues	
					Levies on property							
	Motor-vehicle taxes	Road and crossing tolls	Parking fees	All motor-vehicle revenues	Ad valorem taxes	Special benefit assessments	Miscellaneous tax revenues	Revenues from general funds	Miscellaneous non-tax revenues	All revenues from non-motor-vehicle sources	Amount or (horizontal)	Percentage by governmental source (vertical)
Amounts in million dollars: [2]												
Federal Government:												
Major federal-aid funds, Bureau of Public Roads[3]	2,800	....	....	2,800	....	....	....	56	....	56	2,856	27.7
Forest, park, and public-lands funds	....	....	....	....	....	....	....	42	....	42	42	.4
Other Public Roads funds[4]	....	....	....	....	....	....	....	39	....	39	39	.4
Other federal funds[5]	....	....	....	....	....	....	....	145	....	145	145	1.4
All federal funds	2,800			2,800				282		282	3,082	29.9
State governments	4,690	415	1	5,106	....	....	37	61	90	188	5,294	51.3
County and local rural governments	5	20	....	25	557	13	....	141	72	783	808	7.8
Urban places	64	59	48	171	291	154	....	451	64	960	1,131	11.0
All governmental sources	7,559	494	49	8,102	848	167	37	935	226	2,213	10,315	100.0
Percentage distribution by revenue source (horizontal):												
Federal Government:												
Major federal-aid funds	98.0	....	....	98.0	....	....	....	2.0	....	2.0	100.0	....
Forest, park, and public-lands funds	....	....	....	....	....	....	....	100.0	....	100.0	100.0	....
Other Public Roads funds	....	....	....	....	....	....	....	100.0	....	100.0	100.0	....
Other federal funds	....	....	....	....	....	....	....	100.0	....	100.0	100.0	....
All federal funds	90.8	....	....	90.8	....	....	....	9.2	....	9.2	100.0	....
State governments	88.6	7.8	[6]	96.4	....	....	.7	1.2	1.7	3.6	100.0	....
County and local rural governments	0.6	2.5	....	3.1	68.9	1.6	....	17.5	8.9	96.9	100.0	....
Urban places	5.7	5.2	4.2	15.1	25.7	13.6	....	39.9	5.7	84.9	100.0	....
All governmental sources	73.3	4.8	.5	78.6	8.2	1.6	.4	9.0	2.2	21.4	100.0	....

[1] Adapted from Public Roads Table HF-1, release of January 6, 1961. Excludes receipts from borrowings and collection expenses.

[2] In this table the amounts of highway revenue of different kinds are traced to the governmental levels at which they originate, rather than being associated with the governments that, through the processes of federal and state aid, finally receive them for expenditure.

[3] Receipts of the federal highway trust fund. The estimated receipts from other than motor-vehicle (highway) sources include taxes paid on motor fuel used for aircraft, industrial, marine, and other nonhighway purposes, taxes paid on tires and innertubes used for industrial, farm, and aircraft purposes, and excise taxes paid on "offhighway" vehicles of the Department of Defense.

[4] Consists of funds transferred to Public Roads by other agencies of the federal government for road construction.

[5] Includes direct highway construction expenditures by civilian and military federal agencies, and payments by federal agencies to state and local governments of earnngs on forest, mineral, or other products taken from public lands in those jurisdictions.

[6] Less than 0.05 percent.

Federal expenditures for highways other than those of regular federal aid are financed from the general fund of the Treasury. Figure 1 shows the amounts of motor-vehicle and non-motor-vehicle

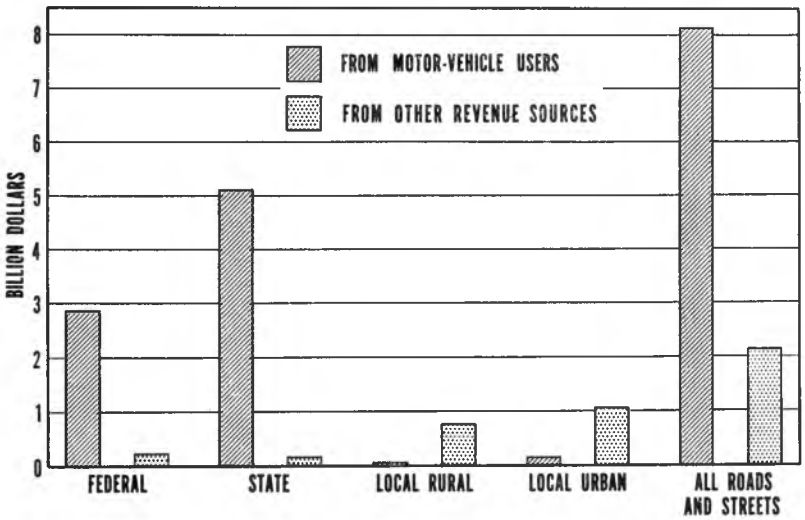


Fig. 1. Highway revenues for 1960 from motor-vehicle taxes and from other sources.

contributions to highway revenues at the federal, state, and local (rural and urban) levels. In percentage terms the relationships portrayed in Figure 1 are as follows:

	Motor-vehicle revenues	Non-motor-vehicle revenues
	Per cent	Per cent
Federal	90.8	9.2
State	96.4	3.6
County and local rural	3.1	96.9
Urban places	15.1	84.9
Total	78.6	21.4

NON-MOTOR-VEHICLE REVENUES

As is shown in the above tabulation, most of the support of highways from other than motor-vehicle sources is derived from the revenues of counties and municipalities, and most of that money is spent on county and local roads and local city streets. The principal sources are levies on property and revenues from general funds. The traditional and characteristic tax of the local rural units is the ad valorem property

tax levy, which produced $557 million of highway funds for these units in 1960, as against $141 million received from general funds. In contrast, general funds provide the largest source of non-motor-vehicle revenues for cities, the estimated total for 1960 being $451 million. Revenues from property levies were nearly equal to this total, but were divided between $291 million in ad valorem taxes and $154 million in special assessments. Although much more prominent in the earlier days of highway financing, the special benefit assessments persist as a convenient and successful means of financing city streets. They are most commonly used in new residential developments, but, as H. R. Briggs has pointed out in a recent report (1),* they are often used by American cities in the financing of arterial street improvements.

Non-motor-vehicle support of highways by the federal government is little more than a vestigial remainder from the pre-1956 days when the entire federal-aid program was supported out of the general fund of the Treasury. It should be mentioned, however, that certain of these expenditures, including funds for forest development roads and trails, roads in Indian lands, and direct highway expenditures by federal civilian and military agencies, are incidental to federal welfare and defense programs and form no part of a general program of highway improvement.

The trend over the years

Figure 2, based on the data listed in Table 2, portrays the historical trend in the relative amounts of highway revenue derived from motor-vehicle and non-motor-vehicle sources. By 1925 motor-vehicle taxes had got off to a good start, reaching a total of $384 million; but they comprised only 24.4 per cent of the total revenues for all roads and streets. By 1940 the percentage had climbed to 44.0 per cent and by 1955 to 64.1 per cent. This trend was the combined result of the phenomenal growth of motor-vehicle ownership and use during this 30-year period. The jump to the 1960 percentage of 78.6 reflects the previously cited shift of federal highway aid from a general-fund to a motor-vehicle-tax base, under the terms of the Federal-Aid Highway Act of 1956.

To remind the reader that the power of dollars to purchase highways varies from year to year, the totals in Table 2 have been converted approximately into constant dollars by the application of the price index of federal-aid highway construction with the year 1946

* Numbers refer to list of references.

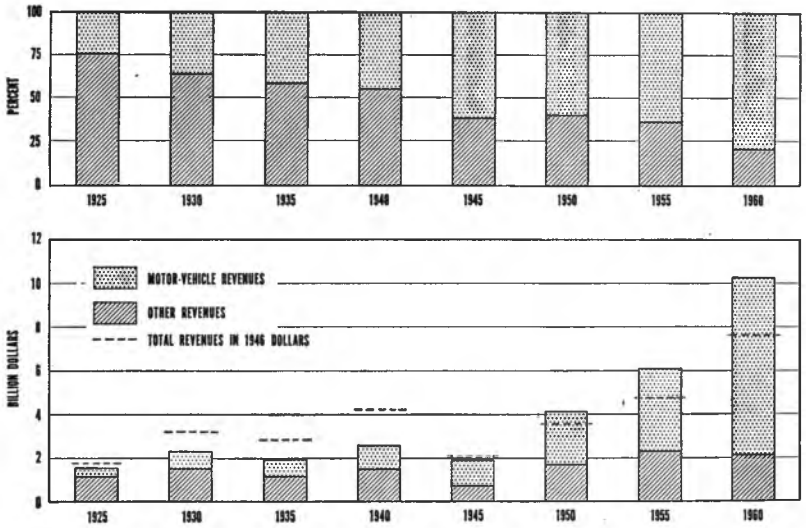


Fig. 2. Highway revenues by 5-year intervals, from motor-vehicle charges and from other sources.

as a base. This conversion in no way alters the percentages of motor-vehicle and non-motor-vehicle revenue supply; but it does show, for example, that the $10.3 billion of highway revenues in 1960 scale down, in terms of 1946 dollars, to $7.6 billion.

MOTOR-VEHICLE TAXATION

State motor-vehicle taxes

Of the estimated $4,690 million in highway revenues derived from state motor-vehicle taxes in 1960, $3,247 million came from taxes on gasoline and other motor fuels and $1,443 million came from motor-vehicle registration or weight taxes and allied fees. This is not, however, the whole story of state motor-vehicle taxes. To obtain a more searching view we must go back to 1959 and prior years, for which the data are in and analyzed. In the calendar year 1959 the receipts of the 50 states and the District of Columbia from state motor-vehicle taxes, net of refunds were as follows:

	Million dollars
Motor-fuel taxes	3,265
Motor-vehicle registration and allied fees	1,714
Motor-carrier taxes	113
Total	5,092

Table 2.—Non-motor-vehicle and motor-vehicle contributions for highways 1925 to 1960, at 5-year intervals
(In millions of dollars)

Year	Non-motor-vehicle contributions		Motor-vehicle contributions		Total contributions for highways		Price index, federal-aid highway construction 1946=100	Adjusted revenues in constant dollars
	Amount	Per cent	Amount	Per cent	Amount	Per cent		
1925	1,189	75.6	384	24.4	1,573	100.0	90.2	1,744
1930	1,484	64.4	822	35.6	2,306	100.0	72.0	3,203
1935	1,135	59.3	779	40.7	1,914	100.0	67.7	2,827
1940	1,415	56.0	1,110	44.0	2,525	100.0	60.2	4,194
1945	701	37.5	1,168	62.5	1,869	100.0	91.6	2,040
1950	1,630	40.2	2,429	59.8	4,059	100.0	115.8	3,505
1955	2,206	35.9	3,931	64.1	6,137	100.0	128.4	4,780
1960	2,213	21.4	8,102	78.6	10,315	100.0	134.9	7,646

Under the heading of motor-carrier taxes are grouped certain taxes and fees levied on passenger and freight carriers (among the latter both public and private carriers). The imposts—the so-called third structure group—include, in different states, gross receipts taxes, mileage, passenger-mile, and weight distance taxes, special weight and franchise taxes, and certificate of permit fees. The motor-carrier taxes produce substantial revenues in a number of states, but do not loom large in the whole body of state motor-vehicle taxes.

Table 3 gives, by 5-year intervals from 1925 to 1955, and for 1959, the receipts from state motor-vehicle taxes (highway-user imposts), expressed in terms of the amounts made available in each calendar year for distribution to various specified uses. It will be noted in the 1959 figures that there is a slight difference, due to funds in transit and other bookkeeping adjustments, between the reported receipts of $5,092 million and the amount available for distribution, $5,076 million. In the lower part of Table 3 is shown the distribution of funds by purpose of expenditure. The pie chart of Figure 3 gives the percentage distribution of 1959 funds.

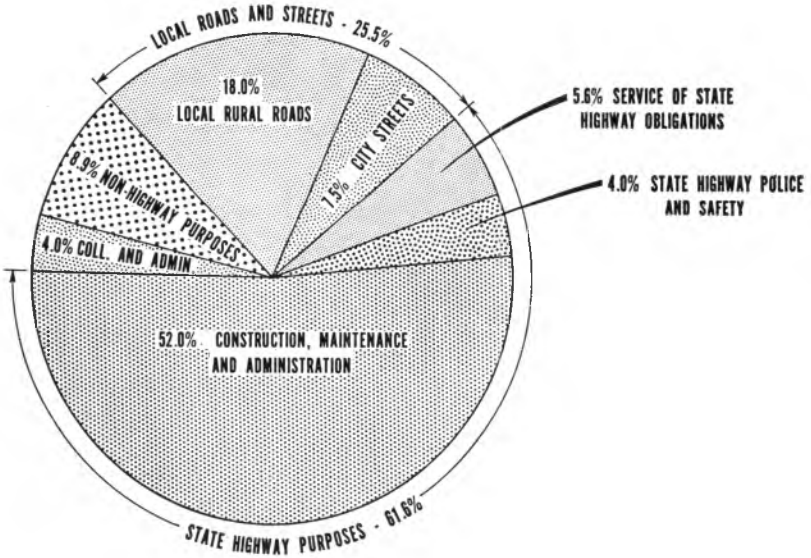


Fig. 3. Disposition of state road-user tax receipts, 1959.

The trend in motor-vehicle revenues

State motor-vehicle tax receipts have increased more than 12-fold since 1925. In that earlier year the proceeds of registration and allied fees exceeded those of the gasoline taxes, which by that time were barely

Table 3.—Disposition of receipts from state imposts on motor vehicles[1], by 5-year intervals, 1925-55 and in 1959
(Amounts in million dollars)

Item	Amounts by 5-year intervals (calendar year)							1959	
	1925	1930	1935	1940	1945	1950	1955	Amount	Percentage distribution
Receipt available for distribution:									
Motor-fuel taxes[2]	146	495	615	866	774	1,652	2,533	3,257	64.2
Motor-vehicle registration fees, etc.[3]	260	355	325	455	462	935	1,481	1,819	35.8
Total	406	850	940	1,321	1,236	2,587	4,014	5,076	100.0
Distribution of funds:									
Expenses of collection and administration	12	20	32	47	49	100	155	202	4.0
For state highway purposes:									
Construction, maintenance and administration:									
On state highway systems	277	562	376	576	609	1,374	2,234	2,606	51.3
On park, forest, and other state roads	...	...	1	3	4	24	25	34	.7
Subtotal	277	562	377	579	613	1,398	2,259	2,640	52.0
State highway police and safety	1	3	12	26	30	72	127	202	4.0
Service of obligations for state highways	23	63	134	149	128	128	179	285	5.6
Total, state highway purposes	301	628	523	754	771	1,598	2,565	3,127	61.6
For local roads and streets:									
County and other local roads	80	165	207	264	265	497	722	890	17.5
City streets	4	12	23	51	47	154	271	368	7.2
Service of obligations for local roads	2	5	8	8	4	21	19	[4] 37	.8
Total, local roads and streets	86	182	238	323	316	672	1,012	1,295	25.5
For nonhighway purposes	7	20	147	197	100	217	282	452	8.9

[1] Source, Highway Statistics, Summary to 1955, Bureau of Public Roads, Washington, 1957, Table DF-201, pp. 45, 46.
[2] Includes use taxes on diesel and other special fuels, as well as gasoline taxes.
[3] Includes motor-vehicle registration fees and allied receipts of the motor-vehicle departments, and special taxes on motor carriers.
[4] In 1959 $22 million, were allotted for local rural road obligations and $15 million for city street obligations making the total for county and local rural roads $912 million, and for city streets $383 million. See Figure 3.

off to a good start. By 1930, when gasoline taxes were in effect in all states, their receipts had pulled ahead of those of the registration-fee group. Recent history has left its mark in the trend in motor-vehicle revenues. The depression years are reflected in the slow growth of receipts between 1930 and 1935, and the actual decline in registration-fee receipts. A sharp drop in total revenues between 1940 and 1945 reminds us of gasoline rationing and the cessation of automobile production during the wartime years. In the late forties began the tremendous upward surge of receipts from motor-vehicle imposts, which rose from a 1943 low of $1.1 billion to $5.1 billion in 1959, a more than fourfold increase in 16 years.

This phenomenal increase in motor-vehicle revenues was caused in part by increases in tax rates. The weighted average motor-fuel tax rate, for example, rose 43 per cent, from 4.10 cents per gallon in 1945 to 5.86 cents per gallon in 1959. The dominant cause, however, was the remarkable growth of motor-vehicle ownership and use. Motor-vehicle registrations in the 48 contiguous states and the District of Columbia rose from 31.0 million in 1945 to 71.2 million in 1959; and motor-fuel consumption for highway use increased from 19,149 million to 56,157 million gallons in the same period. It is an ironical truth that the increase in revenues, great as it was, has been insufficient to provide the highway service demanded by the traffic of the burgeoning motor-vehicle population.

Disposition of State motor vehicle imposts

Figure 3 shows how the motor-vehicle-revenue pie is sliced. Slightly short of 62 per cent of the proceeds were used for state highways in 1959. State highway construction, maintenance, and administration claim the great bulk of these funds, accounting for 52 per cent of the total. Relatively small but significant amounts are devoted to state highway police and safety and to the service of state highway obligations. The percentage used for state highway purposes has fluctuated over the years. Before the Depression nearly three-fourths of the receipts were devoted to state highways. In 1935 the percentage dropped to less than 56 and remained near that level during the war years; but since 1945 it has hovered near 62 per cent.

Throughout the 30-year period the amounts of state motor-vehicle tax revenues allocated to or used on county and local roads and streets has remained between 20 and 25 per cent of the total. The tradition of state aid to counties and other local units began very early in the modern highway era; and indeed was one of the principal devices by

which roads which later became state highways received their initial improvement. This practice has been continued as a means of aiding in the improvement of the rural roads under county or local jurisdiction, with the result that in recent years motor-vehicle tax-revenues received as transfers from the states are greater in total than the revenues provided by the counties and local rural units themselves. Those who are watchful of the needs of the state highway systems tend to oppose the growth of state grants to local units; for there is never enough revenue. It has to be recognized, however, that much of the motor-vehicle tax money received from the states is spent on county primaries and highways of similar characteristics, which have grown in traffic importance, particularly in the more populous states.

The growth in the use of state motor-vehicle tax receipts for local city streets is significant. Only 1.0 per cent of the revenues were applied for this purpose in 1925; whereas the percentage was 7.2 in 1959, or 7.5 if the $15 million for city street obligations is included. More striking, perhaps, is the comparison of the totals allocated for local roads and streets—$4 million out of $86 million, or 4.7 per cent, in 1925 and $383 million out of $1,295 million, or 29.6 per cent, in 1959. In the earlier years the emphasis in road improvement programs was on rural highways; and the improvement of city streets, even those connecting main state routes, was commonly thought a matter of local concern. As the problems of urban congestion developed and city streets were recognized as a part of the highway transportation network, state legislatures became more responsive to the pleas of the cities for aid. The allocations made directly to them are now substantial, and federal and state funds are spent on freeways and other urban arterial connections of principal routes.

The so-called diversion to nonhighway purposes of state motor-vehicle taxes otherwise regarded as road-user taxes has plagued those concerned with the financing of highways for many years. The earmarking of taxes for specific purposes is regarded with disfavor by many tax experts. It has proved, however, a very successful device for providing highway revenues; and groups representing the highway users have vigorously defended the motor-vehicle revenues against efforts of those who would direct a part of them to other uses. So-called "anti-diversion" amendments have been added to state constitutions in 27 states, and these form a fairly sturdy safeguard against the escape of user-tax proceeds from the highway fold.

Since funds for the essential functions of state government are always in short supply, and motor-vehicle imposts, particularly gasoline taxes, are lucrative and reliable revenue producers, it is only natural for those interested in other worthy programs to look to the highway funds as a possible source of revenue. During the 1930s considerable amounts were diverted for relief of unemployment and destitution. This trend reached its peak in 1938, when $41 million of highway funds were so used. The allocation of highway revenues to state and local general funds during these years amounted to the same thing, since they were used to augment funds made deficient by depressed conditions. Diversions for relief purposes fell off rapidly after 1938, and they are of small consequence today.

The use of motor-vehicle tax proceeds for the public schools and other educational purposes has long been one of the principal nonhighway uses to which motor-vehicle tax revenues are devoted. In some states this practice is deeply entrenched in state law and tradition. In Texas, for example, the state constitution requires that 25 per cent of all state tax receipts shall be used for public education, thus making the nonhighway allocation automatic. The national total of diversions for educational purposes reached a peak of $38 million in 1938. After declining for several years they began to rise with the postwar rise in motor-vehicle tax receipts and reached a total of $94 million in 1959.

The highest percentages of total motor-vehicle revenues diverted to nonhighway purposes were recorded during the depression and recovery years, reaching nearly 16 per cent in 1935. During the war and postwar years the percentages declined, although the amounts rose with the postwar increase in revenues. An upward trend in percentages of nonhighway use has begun in the last few years, as is shown by the increase from 7.0 per cent in 1955 to 8.9 per cent in 1959.

The Federal automotive excise taxes

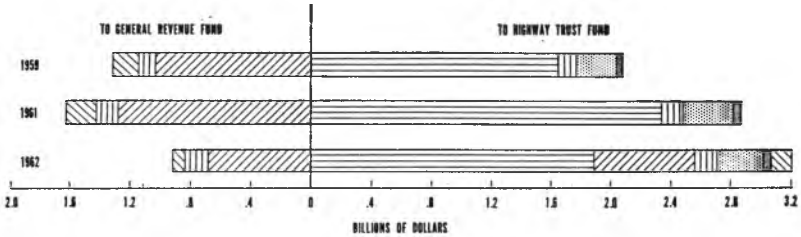
Prior to the revision and expansion of the federal highway program in 1956 federal aid for highways was supported out of the general fund of the Treasury. There was, however, a list of federal excise taxes on motor vehicles and automotive products which, although having no legal connection with federal aid, became associated with federal aid in the minds of many people among the motor-vehicle users, in the state highway departments, and in Congress. The automotive excise taxes and their rates immediately prior to 1956 were as follows:

Commodity taxed	*Basis and rate of tax*
Gasoline, diesel, and other special fuels	2 cents per gal.
Automobiles	10 per cent of mfgr's. price
Buses, trucks, and trailers	8 per cent of mfgr's. price
Tires	5 cents per lb.
Tubes	9 cents per lb.
Parts and accessories	8 per cent of mfgr's. price

There was, and is, a federal excise tax on lubricating oil, a large portion of which (estimated at 60 to 70 per cent) is paid by motor-vehicle users. Because of the considerable fraction paid by other users of lubricating oil, this tax is not treated as one of the automotive excise taxes in this paper.

Following in part the lead of the Clay Committee (2) recommendations, the Highway Revenue Act of 1956 created the highway trust fund and directed into it the proceeds of the following taxes: (1) The motor-fuel taxes, after an increase to three cents per gallon; (2) one-half of the tax on buses, trucks, and trailers, after an increase of the total tax to ten per cent of the manufacturer's price; (3) the tax on tires, after an increase to eight cents per pound; (4) the tax on inner-tubes; (5) a new tax of three cents per pound on tread rubber; and (6) a new tax of $1.50 per 1,000 pounds of gross weight on motor vehicles having gross weights of 26,000 pounds or over. The proceeds of the automobile excise tax, one-half the tax on buses, trucks, and trailers, and the tax on parts and accessories were retained in the general fund.

The estimate of the cost of completing the Interstate Highway System, prepared in 1957 and published in 1958 (3), demonstrated the need for approximately $9 billion more in federal revenues, over the period July 1, 1957 to June 30, 1972, than were provided in the $24.8 billion of interstate authorizations in the Federal-Aid Highway Act of 1956. In the Federal-Aid Highway Act of 1959, in order to relieve the revenue stringencies of the highway trust fund during the next few years, the Congress provided for certain changes in the funds to be directed into it. The effects of these changes are recorded in Table 4 and depicted in Figure 4, both of which show the amounts of motor-vehicle-tax revenue flowing to the highway trust fund, and to the general fund of the Treasury, in the fiscal years ending June 30, 1959, 1961, and 1962.



COMMODITY TAXED	RATE BASIS	RATE AND DISPOSITION					
		TO GENERAL FUND			TO TRUST FUND		
		1959	1961	1962	1959	1961	1962
MOTOR FUELS	GALLON				3¢	4¢	3¢
AUTOMOBILES	MFGRS. PRICE	10%	10%	5%			5%
TRUCKS, BUSES, TRAILERS	MFGRS. PRICE	5%	5%	5%	5%	5%	5%
TIRES, TUBES & TREAD	POUND				8.9.3¢	8.9.3¢	8.9.3¢
VEHICLE USE	PER 1000 LBS. OVER 26000				$1.50	$1.50	$1.50
PARTS & ACCESSORIES	MFGRS. PRICE	8%	8%	3%			5%

Fig. 4. Estimated federal automotive excise tax receipts in 1959, 1961, and 1962.

The figures for the fiscal year 1959 are representative of the provisions of the 1956 act, which left in the general fund the proceeds of the automobile excise tax, the tax on parts and accessories, and one-half the tax on buses, trucks, and trailers. Of the $3,387 million total receipts from the entire list of automotive taxes, $2,074 million, or 61.2 per cent, were receipts of the highway trust fund.

The 1959 act provided that, from October 1, 1959 to June 30, 1961 the federal taxes on gasoline and on diesel and other special fuels should be raised from three to four cents per gallon, with all of the proceeds to go into the highway trust fund. This action had the effect of raising very materially the revenues of the fund without disturbing those going into the general fund. Predicted revenues from all the federal automotive taxes in the fiscal year ending June 30, 1961 are $4,546 million, of which $2,859 million, or 62.9 percent, will be receipts of the highway trust fund.

A further provision of the 1959 act is that, during the period from July 1, 1961 to June 30, 1964, the proceeds of one-half of the automobile excise tax and five-eighths of the tax on parts and accessories shall be directed into the highway trust fund, the federal motor-fuels taxes reverting to three cents per gallon on July 1, 1961. This provision, if it is not rescinded, will reduce substantially the general-fund share of the federal automotive taxes in the three-year period during which it will be in operation. For the fiscal year ending June 30, 1962, $3,214 million, or 78.1 per cent, of the total predicted revenues of $4,115 million will be received by the highway trust fund.

Table 4.—Estimated revenues from federal excise taxes on motor vehicles and automotive products in fiscal years ending June 30, 1959, 1961 and 1962.
(Amounts in millions of dollars)

Tax items	Fiscal year 1959			Fiscal year 1961			Fiscal year 1962		
	To general fund	To trust fund	Total	To general fund	To trust fund	Total	To general fund	To trust fund	Total
Motor fuels[1]	....	1,657	1,657	....	2,362	2,362	....	1,894	1,894
Truck, bus and trailer excise[2]	108	107	215	142	142	284	143	143	286
Automobile excise[2]	1,039	....	1,039	1,345	....	1,345	679	679	1,358
Tires[3]	....	247	247	....	279	279	....	286	286
Tubes[3]	....	15	15	....	16	16	....	16	16
Tread rubber[3]	....	14	14	....	15	15	....	15	15
Vehicle use tax[4]	....	34	34	....	45	45	....	50	50
Parts and accessories[5]	166	....	166	200	....	200	79	131	210
Totals	1,313	2,074	3,387	1,687	2,859	4,546	901	3,214	4,115

[1] Three cents per gallon 7/1/56 to 9/30/59; 4 cents per gallon 10/1/59 to 6/30/61; three cents per gallon thereafter.
[2] Ten per cent on manufacturer's price. Truck tax, five per cent to each fund. Automobile tax, five per cent to highway trust fund 7/1/61—6/30/64.
[3] Tires eight cents, tubes nine cents, and tread rubber three cents per pound.
[4] $1.50 per 1,000 lbs. gross weight on vehicles having a gross vehicle weight of 26,000 lbs. or more.
[5] Eight per cent on manufacturer's price; five per cent to highway trust fund 7/1/61—6/30/64.

In view of these transfers from one fund to the other, and the breaking up of specific taxes into a general-fund segment and a trust-fund segment, it can be seen that a certain reticence in speaking of these funds is the part of prudence. In contrasts to the situation in the states, where motor-vehicle imposts, in effect, originated as highway funds the federal automotive excise tax receipts now going into the general fund cannot be called diversions of road-user taxes, for the general fund was the original home of all of them except the gross-weight tax. Conversely, the three-year direction of part of the proceeds of the excise taxes on automobiles and on parts and accessories into the highway trust fund is often spoken of by federal officials as "diversion" of general-fund revenues.

At the time of preparation of this paper, Congress is considering proposals whereby funds sufficient to complete the program for improvement of the Interstate Highway System by June 30, 1972, may be raised by equitable changes in the taxes supporting the federal-aid highway program. The study required by Section 210 of the Highway Revenue Act of 1956, and known as the Highway Cost Allocation Study, was designed to provide Congress with information that will aid it in making an equitable distribution of the tax burden among the beneficiaries of the federal-aid highway improvement program. The report of this study was submitted to Congress in January of this year (4) and has recently been published. The section of the report dealing with the allocation of the tax responsibility among vehicles of different dimensions and weights was deficient in that it did not include an allocation by the incremental method, which depends in part on the forthcoming analysis of the data of the AASHO Road Test at Ottawa, Illinois. A preliminary incremental solution, subject to adjustment when final results are received from the Road Test, was recently submitted to Congress and is available in offset form.

A GLANCE AT HIGHWAY EXPENDITURES

Disbursements for all roads and streets

In Table 5 are given the disbursements for all roads and streets during the calendar year 1960, classified by the expending governments, by the highway systems on which the expenditures were made, and by object of expenditure. Expenditures by governments and by objects are charted in Figure 5. The total of all disbursements was $10,731 million, but $598 million was spent on debt retirement, leaving genuine expenditures of $10,133 million. The table includes the amount of $6 million spent in federal highway aid to Puerto Rico, in order to embrace all federal expenditures for highways.

Table 5.—Total disbursements for highways by all units of government[1] in calendar year 1960.
(In million dollars)

Disbursement item and highway system	Expending governments					Percentage distribution	
	Federal government	50 states and District of Columbia	Counties and other local rural units	Municipalities and other urban places	All governments	Of major expenditure item	Of total expenditures
Capital outlay (right-of-way and construction):							
On state-administered highways:							
Rural	.....	3,206	24	.....	3,230	50.9	31.9
Municipal extensions	.....	1,345	.....	5	1,350	21.3	13.3
Total	.....	4,551	24	5	4,580	72.2	45.2
On county and local rural roads	.....	276	535	.....	811	12.8	8.0
On local urban streets	.....	55	23	750	828	13.1	8.1
On Puerto Rico roads	6	.....	.....	.....	6	.1	.1
On federal roads (unclassified)	113	.....	.....	.....	113	1.8	1.1
Total capital outlay	119	4,882	582	755	6,338	100.0	62.5
Maintenance:							
On state-administered highways:							
Rural	.....	895	2	.....	897	34.4	8.8
Municipal extension	.....	96	.....	1	97	3.7	1.0
Total	.....	991	2	1	994	38.1	9.8

On county and local rural roads	.....	12	895	.....	907	34.8	8.9
On local urban streets	.....	6	4	670	680	26.1	6.7
On federal roads (unclassified)	27	.....	.....	.....	27	1.0	.3
Total maintenance expenditures	27	1,009	901	671	2,608	100.0	25.7
Administration and research	28	305	90	70	493	.....	4.9
Highway police and safety	.....	230	.....	83	313	.....	3.1
Interest on debt	4	275	35	67	381	.....	3.8
Grand total expenditures	178	6,701	1,608	1,646	10,133	.....	100.0
Debt retirement	.....	290	103	205	598	.....	.....
Grand total disbursements	178	6,991	1,711	1,851	10,731	.....	.....
Capital outlay for toll facilities (included above):							
On rural state-administered highways	.....	(48)	.....	.....	.....	.....	.....
On municipal extensions of state systems	.....	(70)	.....	.....	.....	.....	.....
Total	.....	(118)	(4)	(77)	(199)	.....	.....

[1] Source: Public Roads annual table HF-2, release of January 6, 1961.

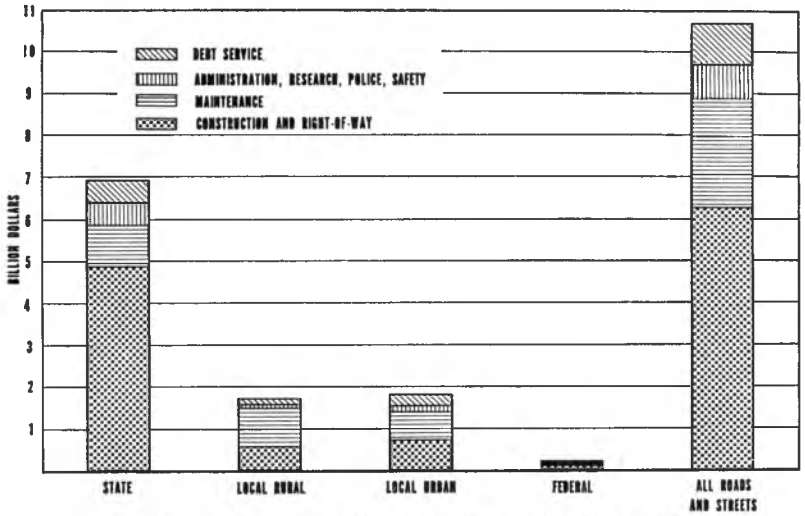


Fig. 5. Disbursements for all roads and streets in 1960.

Construction and maintenance expenditures in Table 5 are fully classified by system on which expended. The items of administration and research, highway police and safety, interest on debt, and debt retirement, are listed only in terms of the expending agency. The totals for expending agencies are, however, not far from those relating to the corresponding systems. It is of interest to examine the percentages in the two right-hand columns of Table 5. There it is shown that capital outlay accounted for 62.5 per cent of all highway expenditures in 1960. Construction and right-of-way expenditures on state highways and their urban connections comprised 72.2 per cent of all capital outlays and 45.2 per cent of all road and street expenditures. It is to be remembered that this category includes all expenditures of federal-aid funds except those on federal-aid secondary highways that are on the county and local systems.

The relation between capital outlays and maintenance expenditures on the different highway systems shows some striking comparisons. On state highways the capital expenditures were $4.6 billion in 1960, the maintenance expenditures less than a billion. In contrast, the capital outlays on county and local roads were $811 million and the maintenance expenditures were $907 million. On local city streets a total of $828 million was spent for construction, $680 million for maintenance. The effects of the program for improvement of the Interstate Highway System and other federal-aid work are reflected in these very high expenditures for state highway construction. It is generally

found, however, that the road systems of greater traffic importance, which require investment in high-type surfaces, heavy grading, and other long-lived facilities, have a much higher ratio of capital to maintenance expenditures than do the lower systems of roads and streets.

Capital outlays

Further insight into the subject of capital outlays for highways is afforded by Table 6 and the series of bar diagrams in Figure 6. Here again there is a three-way breakdown—by highway systems, including the three federal-aid systems, by rural and urban segments of the

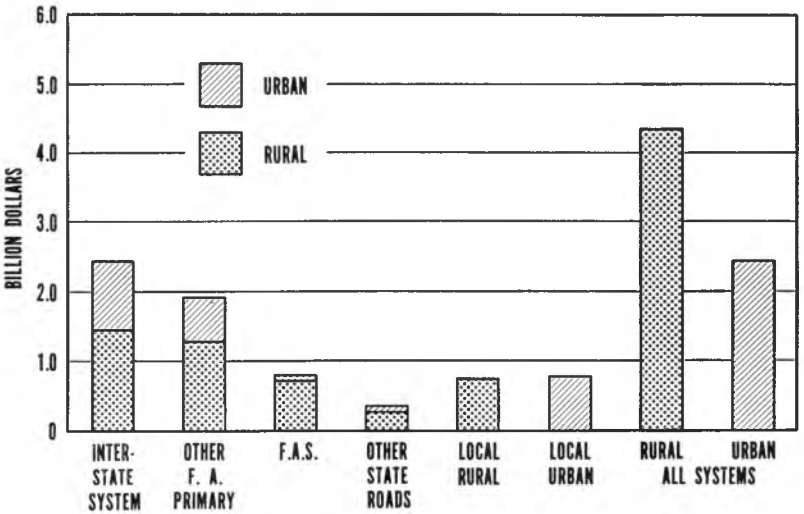


Fig. 6. Capital expenditures for highways in 1959.

several highway systems, and by expending government. Since all federal aid is channeled through the state highway departments, the states are shown as the expending governments for all outlays on federal-aid highways. The data are for 1959, as the estimates for 1960 do not provide the necessary subclassifications.

For the federal-aid systems, as explained in the second footnote of Table 6, the rural-urban classification is that established in federal legislation for delimiting areas eligible for the expenditure of federal-aid urban funds. For other than federal-aid roads and streets the reporting practices of the states most generally adhere to corporate limits, although exceptions are made in New England, where numerous unincorporated towns have urban characteristics.

In 1959 capital outlay for right-of-way, roads, and bridges on the 41,000-mile Interstate Highway System were $2,446 million, account-

Table 6.—Estimated capital expenditures for highways by all units of government in calendar year 1959, classified by federal-aid and other systems and by expending governments[1]
(In million dollars)

Highway system[2]	Expending governments					Percentage distribution	
	Federal Government	50 States and District of Columbia	Counties and other local rural units	Municipalities and other urban places	All governments	Of rural and urban segments	Of all capital expenditures
Interstate system:							
Rural	....	1,418	.....	.....	1,418	58.0	20.9
Urban	....	958	.....	70	1,028	42.0	15.2
Total	....	2,376	.....	70	2,446	100.0	36.1
Other federal-aid primary highways:							
Rural	....	1,265	9	.....	1,274	66.0	18.8
Urban	....	637	.....	19	656	34.0	9.7
Total	....	1,902	9	19	1,930	100.0	28.5
Federal-aid secondary highways:							
Rural	....	694	40	.....	734	93.0	10.9
Urban	....	55	.....	.....	55	7.0	.8
Total	....	749	40	.....	789	100.0	11.7

Other state highways:							
Rural	....	250	.....	.....	250	80.1	3.7
Urban	....	62	.....	.....	62	19.9	.9
Total	....	312	.....	.....	312	100.0	4.6
County and local rural roads	393	54	494	.....	641	.....	9.5
Local city streets	....	9	23	617	649	.....	9.6
Grand total, all roads and streets	93	5,402	566	706	6,767	.....	100.0

[1] Source: Public Roads annual table HF-21, release of January 6, 1961.

[2] The federal-aid systems rural-urban classification is in accordance with federal-aid legislation. The term "urban area" means an area including and adjacent to a municipality or other urban place having a population of 5,000 or more, as determined by the latest available federal census with boundaries to be fixed by a state highway department subject to the approval of the secretary. State and local systems "urban" classification, on the other hand consists principally of the area within the corporate boundaries of the municipalities.

[3] Unclassified.

ing for 36.1 per cent of all capital expenditures. The remainder of the federal-aid primary system, comprising approximately 224,000 miles of main highways second in importance only to the interstate system, received capital outlays of $1,930 million, or 28 per cent of the total. The federal-aid secondary system absorbed $789 million. In all, 1959 expenditures on the federal-aid systems, totaling $5,165 million, were 76.3 per cent of all capital outlays for highways in that year. County and local rural roads and local city streets accounted for a little less than 10 per cent each; and the remainder, 4.6 per cent, was spent on state highways not on the federal-aid systems.

Of greatest interest in Figure 6 is the comparison of capital expenditures on the rural and urban segments of the several highway systems. It is evident that the long-neglected urban areas are coming into their own. This has come about, not by way of local city revenues or through state aid for local streets, but by the expenditure of federal and state funds on urban portions of interstate, other federal-aid, and state highways. Of the $2,450 million in capital outlay on urban highways, only $617 million were contributed by the municipalities and only $649 million were spent on local city streets. On the Interstate Highway System 42.0 per cent of the capital expenditures were applied to urban routes. Urban connections accounted for over a third of the construction expenditures on other federal-aid primary highways. In all, 36.2 per cent of the $6,767 million of capital outlays for highways in 1959, were made on urban highways and streets.

VARIATION OF MOTOR-VEHICLE-TAX PAYMENTS WITH VEHICLE SIZES AND WEIGHTS

The most controversial question in highway taxation and finance is that of "Who should pay how much?" It is not the purpose of this paper to attempt answers to that question. Some light can, however, be thrown on the question of what vehicles of different dimensions and weights do pay in special motor-vehicle taxes. The recent Bureau of Public Roads bulletin, *Road User and Property Taxes on Selected Vehicles, 1960* (5) gives, for a list of 13 reasonably typical (but not necessarily "average") vehicles, the amounts of motor-fuel taxes, registration fees and allied taxes (including motor-carrier taxes), and property taxes that would be paid in 1960 on behalf of each vehicle in each of the 50 states and the District of Columbia. In making the calculations it was necessary to employ the assumption that all of the travel of a given vehicle was in its state of registration, in order that its motor-fuel tax (and perhaps weight-distance tax) payments might

be credited to the particular state. In order to provide an approximation of the total motor-vehicle taxes paid by vehicles of different sizes, median values of user-tax payments taken from this bulletin, the effective date of which is the 1960 registration year, are combined with calculations of the federal automotive excise taxes (including the gross-weight tax) that would be paid by the same group of vehicles. The schedule of taxes used was that which was in effect during the calendar year 1960 and will remain in effect until June 30, 1961.

In the first four columns of Table 7 the selected vehicles are described and their fuel type, registered gross weight, and annual travel are given. Only ten of the 13 vehicles for which data are listed in the Cope-Liston report (5, p. 6) were chosen, in order that their tax payments might be more readily portrayed, as they are in Figure 7.

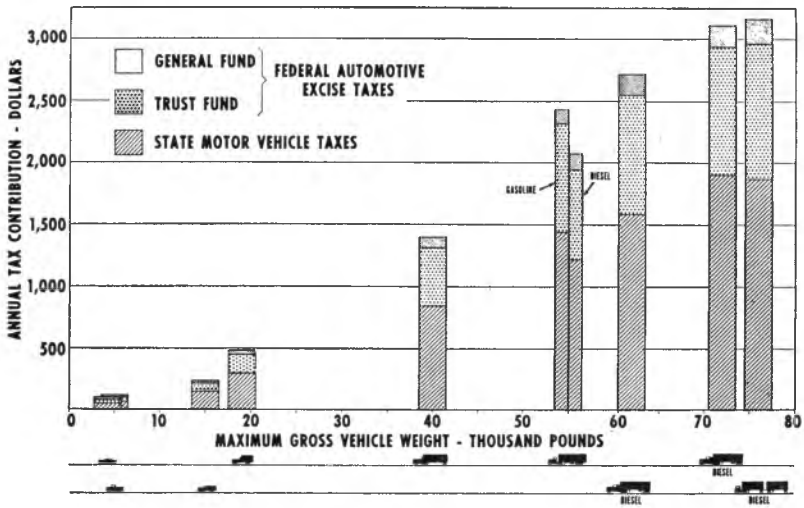


Fig. 7. Estimated state and federal tax contribution by typical vehicles in calendar year 1960 at existing rates.

Various other specifications are needed for the precise calculation of both state and federal taxes, but they need not be detailed here. It seems desirable, however, to list one of the omitted items, the miles per gallon of motor fuel consumed, which are as follows:

Vehicle	*Miles per gallon*
No. 2. Medium passenger	15.0
No. 4. 2-axle 4-tire pickup truck	12.0
No. 5. 2-axle 6-tire stake truck	8.5
No. 6. 2-axle 6-tire van truck	7.5
No. 8. 3-axle tractor-semitrailer, gasoline	5.0

Vehicle	*Miles per gallon*
No. 9. 4-axle tractor-semitrailer, gasoline	4.0
No. 10. 4-axle tractor-semitrailer, diesel	5.5
No. 11. 5-axle tractor-semitrailer, diesel, 62,000 lbs.	4.7
No. 12. 5-axle tractor-semitrailer, diesel, 72,000 lbs.	4.3
No. 13. 5-axle tractor-semitrailer with full trailer, diesel	4.2

Again it is emphasized that the above are not average values but values thought reasonably typical of the particular vehicle and kind of operation described. So also with the values of annual travel, which, in the case of the tractor-semitrailer combinations, were selected as being characteristic of an active business operation rather than as being averages for all vehicles of the type.

State and federal tax payments

In Figure 7 the median values of state motor-vehicle tax payments (excluding property taxes) are shown in the lower segments of each bar diagram. The payments of federal automotive taxes to the highway trust fund are given in the middle bar, and the generally much smaller payments to the general fund of the U. S. Treasury appear at the top of each bar.

State taxes.—The median values of state tax payments give a panoramic view of the taxes imposed on vehicles of different sizes, but they do not tell the story of the wide range among the states in the amounts of taxes paid. For example, the median passenger-car payment of state registration fees and motor-fuel tax payments is shown in Table 7 as $52; but among the 50 states these payments varied from $36 to $86. The range in state tax payments for the van truck, No. 6, was from $140 to $395, with a median value of $227. For the 72,000-lb. 5-axle tractor-semitrailer (No. 12), with a median payment of $1,900, the range in state road-user tax payments was from $964 to $4,163. For the double-bottom combination, No. 13, the range was even wider, from $983 to $4,955 (5, p. 7).

Two of the vehicles, the 4-axle tractor-semitrailer combinations, Nos. 9 and 10, are identical in gross weight, annual mileage, and other characteristics; but No. 9 is gasoline-powered and No. 10 is diesel-powered. With a fuel consumption rate of 4.0 miles per gallon, vehicle No. 9 is charged a median state tax payment of $1,438. Its diesel-powered brother, No. 10, is charged a somewhat lower rate, the median being $1,220. Within their effective range of operation, diesel vehicles enjoy the commercial advantage of both lower fuel costs per gallon (ex-tax) and lower rates of fuel consumption.

Table 7.—State road-user txaes and estimated federal excise taxes on motor vehicles and automotive products, for selected motor vehicles in private operation.

Type of vehicle	Type of fuel	Registered gross weight	Annual travel	State taxes (median values)[1]	Federal excise taxes[2]		Combined state anl federal payments	
					To highway trust fund	To general fund	Per year	Per mile of travel
		Pounds	Miles	Dollars	Dollars	Dollars	Dollars	Cents
No. 2, Passenger car (Medium)	Gasoline	4,413	9,500	52	29	25	106	1.116
No. 4, 2-axle, 4-tire, pickup truck	Gasoline	5,000	9,000	64	39	8	111	1.233
No. 5, 2-axle, 6-tire, stake truck	Gasoline	15,000	12,000	149	80	17	246	2.050
No. 6, 2-axle, 6-tire, van truck	Gasoline	19,000	15,000	227	111	28	366	2.440
No. 8, 3-axle tractor-semitrailer, 2-S1	Gasoline	40,000	40,000	839	476	77	1,392	3.480
No. 9, 4-axle tractor-semitrailer, 2-S2	Gasoline	55,000	60,000	1,438	850	129	2,417	4.028
No. 10, 4-axle tractor-semitailer, 2-S2	Diesel	55,000	60,000	1,220	700	136	2,056	3.427
No. 11, 5-axle tractor-semitrailer, 3-S2	Diesel	62,000	70,000	1,582	947	174	2,703	3.861
No. 12, 5-axle tractor-semitrailer, 3-S2	Diesel	72,000	70,000	1,900	1,040	178	3,118	4.454
No. 13, 5-axle tractor-semitrailer and full trailer, 2-S1-2	Diesel	76,000	70,000	1,879	1,041	209	3,129	4.470

[1] Source, **Road-user and Property Taxes on Selected Motor Vehicles, 1960.** Bureau of Public Roads, September 1960. Median value of the 48 states and the District of Columbia, or for all states in which vehicle is permitted.

[2] Federal excise taxes in effect during fiscal year 1961.

Federal tax payments.—In federal automotive taxes the medium passenger car pays $29 to the highway trust fund and $25 to the general fund. This relatively high general-fund payment results from the fact that the entire proceeds of the ten per cent automobile tax are retained in the general fund, whereas only half of the ten per cent tax on buses, trucks, and trailers is so retained. Vehicles other than automobiles are subject to federal charges considerably below the medians of state-imposed taxes. Total payments on behalf of the pickup truck are $47, of the stake truck $97, and of the van truck $139. The 4-axle, gasoline-powered vehicle sustains a payment of $979, of which $129 are held in the general fund. For the corresponding diesel-powered vehicle the total payments are $836, $136 going to the general fund. On the largest combination, the 76,000 lb. tractor-semitrailer with full trailer, the required payment to the trust fund is $1,041 and that to the general fund is $209, for a total of $1,250.

Combined state and federal payments.—The last two columns give the combined totals of the median state payments and the federal payments, in annual total and in cents per mile of travel. The totals range from $106 for the passenger car to $3,129 for the double-bottom combination. The rates per mile of travel vary from 1.116 to 4.470 cents. It is evident from these figures that required payments rise steadily with size of vehicle, and that heavy vehicles pay substantial sums into both state and federal treasuries. Most, but not all, of this money is spent for highway purposes.

MOTOR-VEHICLE TAXES AS A COMPONENT OF MOTOR-VEHICLE OPERATING COSTS

The special motor-vehicle taxes paid to the state and federal governments are, for the most part, spent on the construction, maintenance, and operation of roads and streets. They are that portion of a motor vehicle's ownership and operating costs that is used to build and maintain the fixed plant, or roadbed, over which the vehicle is operated. It is pertinent to inquire how this cost compares to the costs associated with the vehicle alone. Table 8 gives in some detail examples of the ownership and operating costs of three vehicles, (1) a medium-weight passenger car, (2) a 2-axle 6-tire truck, and (3) a 4-axle diesel-powered tractor-semitrailer. In effect these are three of the ten typical vehicles whose tax payments are compared in Table 7 and Figure 7. Because some special work was done in the calculation of such items as maintenance and repair (involving the purchase of parts and accessories), some variation from the figures in Table 7 occurs in the amounts

of federal excise taxes paid. The three pie charts of Figures 8, 9, and 10 give graphic comparisons of these costs with the motor-vehicle tax payments that form part of them.

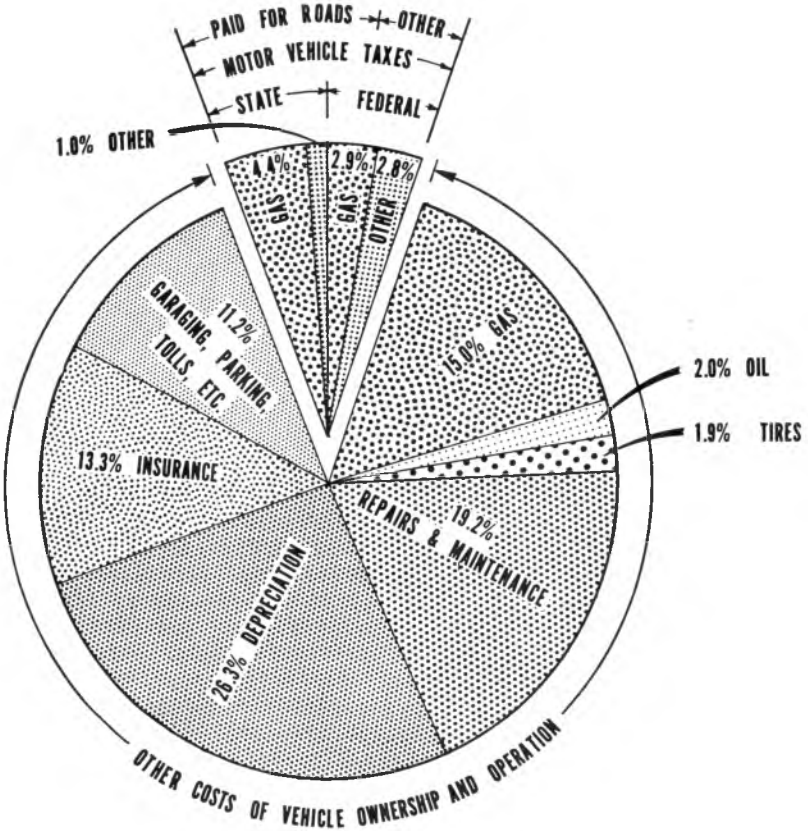


Fig. 8. Distribution of the vehicle operating cost dollar for a passenger car.

Passenger car costs

For the automobile, the data on ownership and operating costs are taken, with minor adaptations, from the recent Highway Research Board paper by Cope and Liston, "A Discussion of Gasoline Tax Rates and Gasoline Consumption." (6) The vehicle is taken as being a medium-priced 1960-model personal or family-operated car. Payments of personal property taxes are not included. No item is included for driver's wages. To have set up such an item would have made the data for the automobile more closely comparable with the two commercial vehicles but would have given a false impression of costs as the private owner sees them.

Table 8.—Estimated direct motor-vehicle ownership and operating costs for three selected vehicles in private operation[1]

Item	Passenger car			2-axle, 6-tire gasoline-powered truck			4-axle tractor-semitrailer diesel-powered combination		
	Amount			Amount			Amount		
	Per year	Per vehicle mile	Per cent	Per year	Per vehicle mile	Per cent	Per year	Per vehicle mile	Per cent
		Cents			Cents			Cents	
Assumed characteristics:									
Registered gross vehicle weight lbs.	4,413	...	.....	15,000	.....	.....	55,000	.....	.....
Annual travel miles	10,000	...	.....	12,000	.....	.....	60,000	.....	.....
Fuel consumption rate m.p.g.	14.4	...	.....	8.5	.....	.....	5.5	.....	.....
Vehicle costs excluding taxes:									
Motor fuel	$145	1.45	15.0	$298	2.48	8.8	$1,604	2.68	8.9
Lubricating oil	19	.19	2.0	23	.19	.7	107	.18	.6
Repairs, maintenance, accessories[2]	186	1.86	19.2	694	5.78	20.7	3,710	6.18	20.6
Tires, tubes	18	.18	1.9	103	.86	3.1	1,494	2.49	8.3
Depreciation	254	2.54	26.3	276	2.30	8.2	2,198	3.66	12.1
Insurance	129	1.29	13.3	144	1.20	4.3	1,560	2.60	8.6
Garaging, parking tolls	108	1.08	11.2	[2]	.....	.....	[2]	.....	.....
Driver's wages[3]	...	.....	.....	1,574	13.12	46.8	5,238	8.73	29.0
Total costs excluding taxes	859	8.59	88.9	3,112	25.93	92.6	15,911	26.52	88.1
State and federal taxes on motor vehicles and automotive products:									
State taxes:									
Motor fuel	42	.42	4.4	83	.69	2.5	644	1.07	3.6
Other[4]	10	.10	1.0	66	.55	1.9	576	.96	3.2
Total	52	.52	5.4	149	1.24	4.4	1,220	2.03	6.8
Federal taxes:									
Motor fuel	28	.28	2.9	56	.47	1.7	436	.73	2.4
Other[5]	27	.27	2.8	41	.34	1.3	481	.80	2.7
Total	55	.55	5.7	97	.81	3.0	917	1.53	5.1

Total taxes	107	1.07	11.1	246	2.05	7.4	2,137	3.56	11.9
Total direct vehicle operating costs	966	9.66	100.0	3,358	27.98	100.0	18,048	30.08	100.0
Estimate ol taxes paid for (1) highway and (2) other purposes:									
For highways:									
State	47	.47	4.9	136	1.13	4.0	1,111	1.85	6.2
Federal	29	.29	3.0	80	.67	2.4	700	1.17	3.9
Total	76	.76	7.9	216	1.80	6.4	1,811	3.02	10.1
For other purposes:	31	.31	3.2	30	.25	1.0	326	.54	1.8
Total taxes	107	1.07	11.1	246	2.05	7.4	2,137	3.56	11.9

[1] Passenger car operating costs adapted from "A Discussion of Gasoline Tax Rates and Gasoline Consumption," E. M. Cope and L. L. Liston, 40th annual meeting. Highway Research Board, 1961. Truck operating per-mile costs for maintenance, tires, and insurance from **Washington Motor Vehicle Operating Cost Survey,** Washington State Highway Commission, 1953. Charges for motor fuel, lubricating oil, driver's wages, depreciation and state and federal taxes are based on current prices and tax rates for stated mileages.

[2] Garaging costs of trucks are included with maintenance charges.

[3] Driver's wages were not assigned to the passenger car operating costs. For the 2-axle, 6-tire truck, driver's wages were assigned only on a "while driving" basis, and for the 2-S2 combination on a full-time driving basis.

[4] Other state taxes and fees include motor-vehicle registration and allied fees and motor-carrier taxes, if any.

[5] Other federal tax charges include vehicle excise, parts and accessories, tire, tube, tread rubber, and truck weight taxes.

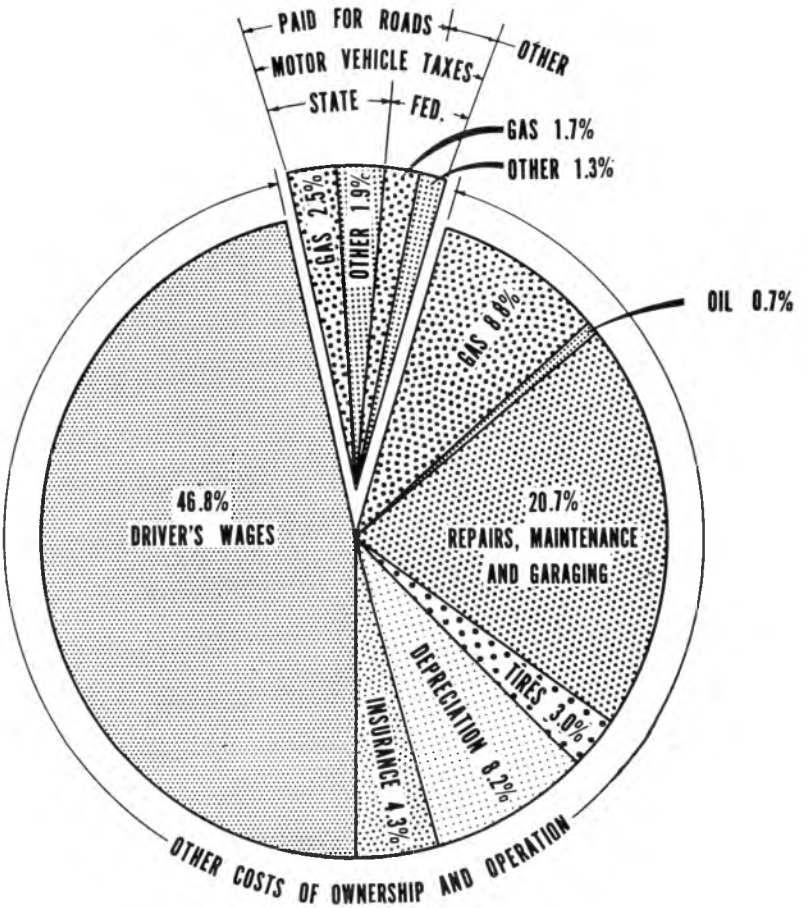


Fig. 9. Distribution of the vehicle operating cost dollar for a 2-axle, 6-tire truck.

Out of total ownership and operating costs of $966, the state and federal taxes paid by this automobile total $107, or 11.1 per cent of the total. Of the total tax payments, it is estimated that $76, or 7.9 per cent, are used for highway purposes. The principal nonhighway item is the payment of the 10 per cent federal excise tax (prorated over the life of the car), which goes into the general fund of the United States Treasury as a contribution to the expenses of the federal government. The remainder includes the federal parts and accessories tax and an allowance for the 8.9 per cent component of nonhighway use of state motor-vehicle revenues.

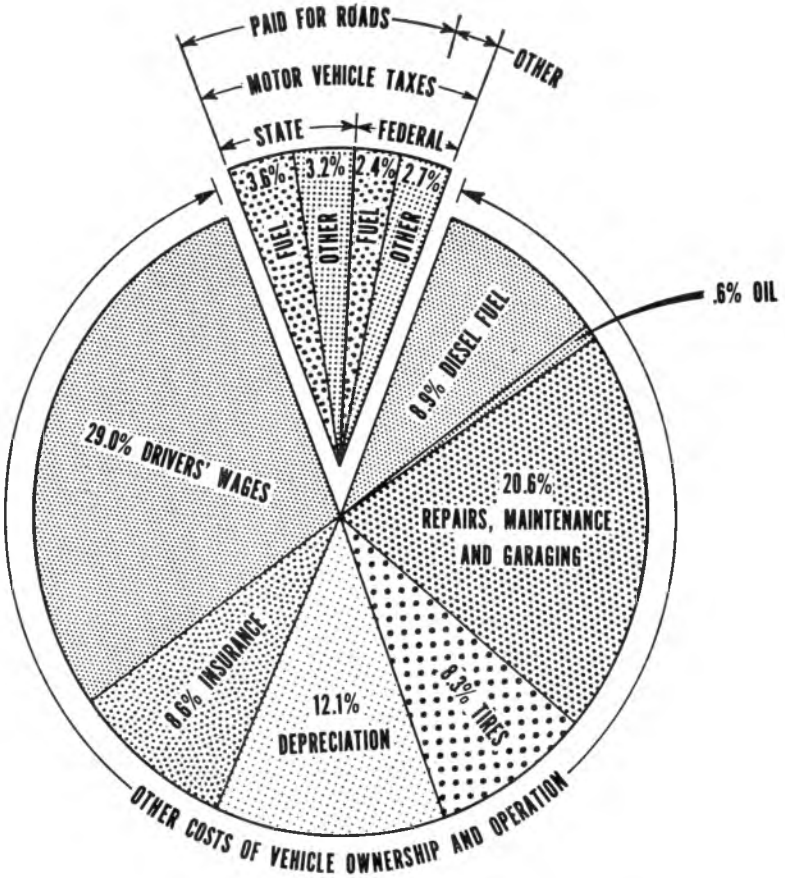


Fig. 10. Distribution of the vehicle operating cost dollar for a 2-S2 diesel combination.

Since the automobile is assumed to travel 10,000 miles a year, the costs per mile are obtained by merely moving the decimal point. Thus it is shown that the motor-vehicle taxes paid by this vehicle amount to slightly more than a cent per mile of operation. The taxes devoted to building and maintaining highways total less than 0.8 cent per mile of operation.

Costs of a 2-axle 6-tire truck

As stated in the first footnote of Table 8, certain of the estimated operating costs of the two commercial vehicles were obtained from the report, *Washington Motor Vehicle Operating Cost Survey* (7). The Washington estimates were updated by using more recent figures for costs of fuel, oil, driver's wages, depreciation and taxes.

Since trucks and combinations are used almost entirely in gainful pursuits, it was thought that the most meaningful comparisons would be obtained by including a charge for driver's wages. This introduces a complication, in that a truck driven only 12,000 miles per year (a mileage fairly typical of a 2-axle, 6-tire truck) is obviously not driven on a full-time basis, even at the low average speeds realized by trucks of this type in urban service. Driver's wages, at $1.97 per hour, were therefore assigned to this vehicle on a "while driving" basis.

The total operating costs of the 2-axle 6-tire truck were estimated at $3,358, or 27.98 cents per mile. Of this amount nearly half is accounted for by driver's wages. Motor-vehicle taxes amount to $246, of which $149 is in state taxes and $97 in federal taxes. The total comprises 7.4 per cent of the total ownership and operating costs. Reduced by the amounts destined for other than highway purposes the amount is $216 and the percentage 6.4.

Costs of a 4-axle tractor-semitrailer

For the diesel-powered tractor-semitrailer, driver's wages are estimated on a full-time basis, for one man, at $3.09 per hour. The total of this item is $5,238, 29.0 per cent of the total ownership and operating costs of $18,048. The cost per mile is 30.08 cents. State and federal taxes amount to $2,137, 3.56 cents per mile and 11.9 per cent of total costs. The estimated amount going for highways, $1,811, is 10.1 per cent of the total. Thus, even though the heavy combination pays taxes at high rates, the percentage which these taxes bear to total ownership and operating cost is commensurate with the corresponding percentages for the smaller vehicles.

MOTOR-VEHICLE TAX PAYMENTS IN PERSPECTIVE

Cope and Liston, in their Highway Research Board paper, (6) state, "The total of state and federal gasoline taxes, the principal source of revenue for highways, costs the average automobile user a little less than 20 cents a day—less than the cost of a loaf of bread." There are other ways of showing that the motorist gets a good bargain for the money he pays to build and maintain highways—for example, toll roads that cost him the equivalent of a gasoline tax of 16 to 34 cents per gallon. A recent tabulation prepared at the Bureau of Public Roads (8) shows that the depreciation on a typical automobile over its first three years, amounting to $1,615 out of a total purchase price of $2,540, when divided by the gallons of gasoline used during the three-year period, amounts to an equivalent gasoline tax of 65 cents per

gallon. Over the period of full depreciation of the car, taken as ten years, the equivalent gasoline tax is 36.3 cents per gallon.[1] Maintenance and repairs amount to an equivalent 24.6 cents per gallon during the ten-year period, and insurance to an equivalent of 18.5 cents.

Much the same relationships are found in the tax payments required of commercial vehicles. They do not take a much greater cut in percentage of total operating costs of the vehicle. Similar equivalents, running from 15 to 30 cents per gallon and even more, are found in the charges made to heavy trucks and combinations on toll roads (6, Figures 1 and 2). There are, however, commercial interests involved. A highway improvement program will tend to increase the opportunities for profitable commercial operation because of the benefits it provides in reduced operating, time, and accident costs. On the other hand, the program must be paid for, and the greater the taxes imposed on highway freight carriers the less the opportunities to profit from the benefits produced by the improvement program. At the margins of competition business may be won from, or lost to, competing forms of transportation, depending on the magnitudes and incidence of the user taxes supporting the program. This situation is complicated by the fact that the benefits accrue only gradually as the program develops, whereas the taxes must begin at once.

SOME FINAL REFLECTIONS

The tax-allocation problem

In this paper little has been said about the problem of finding means for equitably distributing the burden of tax support of a highway program. At the Bureau of Public Roads we have been struggling for more than four years with the tax-allocation problem. We have produced a so-called final report (4), but the job is not yet done. The incremental study, which will, we hope, produce the most reliable allocation of cost responsibility among vehicles of different dimensions and weights, cannot be completed in final form until the analysis of data from the Road Test at Ottawa, Illinois, produces equations that describe with high fidelity the performance of both rigid and flexible test sections under varying conditions of pavement design and the magnitude and frequency of axle loads. We do have a preliminary incremental solution, based on a preliminary model or equation for bituminous pavements and conventional methods of analyses for rigid pavements. It is felt that the results of the preliminary solution will

[1] The car is assumed to travel 35,500 in the first three years, 100,000 miles in ten years, at 14.29 miles per gallon.

not be very far from the final one, largely because the assignment of right-of-way, grading, and structure costs, accounting for a large portion of the costs, is not dependent on Road-Test results.

The problem of highway cost allocation is also acute in each state. Although many studies have been made, it can hardly be said that results fully satisfactory to every group or individual have been achieved in any of them or in the legislation that followed on their heels. Furthermore, the existing highway tax structure in most states basically antedates the Highway Revenue Act of 1956. The great increase in the federal program, the introduction of the 90-10 participation ratio on interstate projects, and the shift of federal aid to a motor-vehicle tax base—these measures profoundly altered the relationships, and the considerations of equity, between the federal government and the states in the provision of tax support for all roads and streets. The legislation that will result from pending proposals for revising and increasing the taxes supporting the federal-aid program are likely to complicate the situation still further. The structure of state highway taxation must be re-examined and re-thought-out in relation to the superstructure of federal motor-vehicle taxes.

Motor-vehicle and non-motor-vehicle tax support

Events of the last few years make it plain that the motor vehicle must be expected to provide by far the greater part of the revenues for the support of our road and street systems. Many economists regard motor-vehicle taxes as a pricing mechanism for the sale of highway services. Although taxes are not prices, there is much truth in the concept, and reasoning along this line is a valuable aid in the determination of equitable rates of motor-vehicle taxation. The question remains, must the motor-vehicle user be expected to provide all the revenues? Is there any survival value in non-motor-vehicle tax support of highways?

At the level of local roads and streets there appears to remain at least an incentive value in local tax support. So much is needed for main highways and principal secondary and feeder roads that the tertiaries are in danger of being neglected if funds for local support are not forthcoming. Zettel, in his Michigan report (9, p. 44), stated as follows:

> To take this argument a little further, it may be said that the requirement of participation by the local community in the cost of local low-traffic roads is one of the best tests of the justification of the expenditure and of the community's interest in it. It also

provides protection against extravagance. This practical result is one of the most persuasive arguments for requiring local participation in highway finance.

At the levels of federal and state financing the question becomes primarily one of public policy. There is no question of the widespread benefits accruing to the economy from the improvement of highways, or of the importance to national defense of the Interstate Highway System and other strategic highways. By reducing unit transportation costs and increasing the ease of movement of people and goods, modern highway improvements make possible advantageous reorganizations of land use in rural, urban, and metropolitan areas. These land-use changes, of which suburban shopping centers, industrial parks, consolidated schools, branch library systems, and medical and hospital centers are examples, bring about economies of scale and otherwise promote the more efficient operation of businesses, public services, and households. The question of policy is whether, in view of these widespread and pervasive benefits, to give partial support to highways out of nonuser tax sources, or to utilize the pricing mechanisms provided by the motor-vehicle tax system as the sole means of highway financing. The latter policy is justified on the ground that highway transportation is analogous in all important respects to other services and goods that are financed and marketed through the price system. Not all students of the subject agree with this viewpoint.

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