Chapter 9.—COST AND CAPITAL ISSUES, POLICIES, AND FINDINGS

Page

Summary 251
Introduction 251
Public Funding of Highways. 253
Highway Financing Policies. 256
Highway Maintenance. 261
Congestion Cost-Pricing. 267
Government-Industry Relations 273
Trends and implications 276
Policy Options 281
Consumer Costs. 283
Trends Affecting Personal Transportation Costs 283
Policy Options to Control Consumer Costs ...288

LIST OF TABLES

Table No. *Page*

114. Size and Distribution of Federal Appropriations forTransportation, 1955-75..258
115. Legislation Relating to Highway Financing .258
116. Advantages and Disadvantages of Transportation Financing Options 261
117. Historical and Projected Distribution of Highway Disbursements. 264
118. Legislation Affecting Automobile System Characteristics and Use 274
119. Contribution of the Motor Vehicle and Equipment industry to National Income in 1973 and 1975... 276
120. Automobile industry Employment, 1976....276
121. Change in the Distribution of **New Car Sales, 1976-85. . . . .277**
122. Projected Sales and Economic Data for the Auto Industry 277
123. Net Income and Net Income as a Percent of Sales in the U.S.Automobile Industry, 1969-76. 278
124. Market Shares ofU.S. PassengerCar Manufacturers unselected Years 280
125. Cost of Owning and Operating an Automobile-1950-76 284
126. Estimated Average New Car Costsof Ownership and Operation Based on Projected Shifts in Size Classes. 287
127. Costs Per Mile of Owning and Operating an Automobile in 1976, 1985,and2000. 288
128. State Regulation of Automobile Repair. 292

LIST OF FIGURES

Figure No. *Page*

47. Historical and Projected Distribution of Total Highway Disbursements 265
48. Total Urban Automobile Travel Under Congested Conditions for1975, 1985, and 2000 268
49. Projected Average Speed in Urban Areas. ...269
50 Scope of U.S. Automotive industry 275
51 Long-Term Debt as a Percent of Equity. 281
52 Comparative Trends in Selected Components of Auto Ownership and Operating Costs—Deflated by the Consumer Price Index 285
53 Forecasts for Components of Ownership and Operation Costs of a Standard-Size Auto 286

COST AND CAPITAL ISSUES, POLICIES, AND FINDINGS

CHAPTER 9

SUMMARY

The Federal Government provides about $7 billion of the $28 billion spent each year on the highway system, most of this through the Highway Trust Fund. Federal assistance for mass transit, which amounts to about $2 billion per year, is funded from general revenues.

If present trends continue, highway construction will decrease through the year 2000, and the new miles added to the system will fall far short of the demand created by growing automobile travel. In addition, meeting increased highway maintenance needs and providing moderate improvements in transit service will place a growing burden on State and local governments. A major increase in Federal assistance for transit operation and highway maintenance will be needed to retain the current level of mobility and protect the investment in the existing highway system.

The automobile industry faces a major challenge in meeting Federal Government mandates for improved fuel economy, lower emissions, and greater safety. As a more competitive and less differentiated market for automobiles is likely to evolve, the smaller domestic manufacturers will face severe financial difficulties, and their survival will be threatened.

The cost of automobile ownership and operation (in constant dollars) decreased steadily from 1960 to 1973. However, the trend has reversed since 1973 —due primarily to increased fuel prices, higher insurance costs, and increased cost of repairs and maintenance. The trends to 1985 and 2000 are uncertain, but Federal Government policies and regulations could be major determinants in future cost changes.

INTRODUCTION

The public and private costs of the automobile transportation system include the direct, private costs that individuals pay" to own, operate, and maintain a n automobile and the indirect costs that individuals pay in the form of taxes to support the system of streets and highways on which automoblies are operated. There are also social ccsts —borne by automobile users and nonusers alike —which include air pollutio)n, noise, highway death and injury disruption of communities, negative impacts on the quality of life, and many more.

As these costs rise, or are perceived to rise, and as i t becomes necessary to budget limited financial and material resources to attain an increasing number of social goals, three major issues could emerge:

1. The distribution of public funds for the automobile transportation system,
2. The appropriate role of the Federal Government with respect to the automobile and highway industry, and
3. The private costs of owning and operating an automobile.

Underlying these issues are fundamental questions about whether the Federal Government should intervene to affect future automobile

system characteristics and use and, if so, for what purposes, to what extent, and by what means.

Historically, the Federal Government's role in the automobile transportation system has been limited to providing financial support for developing and maintaining the highway system. Since 1956, Federal support has totaled approximately $109 billion. Recently, however, the economic and social costs of developing and maintaining the highway system have risen and the awareness of the social costs of the automobile transportation system has grown. Questions have been raised as to whether and how the Federal Government should extend its involvement and financial support to achieve other goals related to the personal transportation system. In this assessment, a general examination was made of the process and mechanisms used to finance the highway system and of the distribution of the Federal Government's financial support for highways and other personal transportation modes.

The automobile has a pervasive impact on the national economy. It accounts for about one-fourth of our petroleum use. Investment in the federally aided road system has added approximately $26 billion to the gross national product. About one out of every six to eight workers is employed in an industry related to the automobile. For every 250,000 new car sales lost, it is claimed that automobile manufacturers lay off an estimated 21,000 workers and that the automobile-related industries lay off another 41,000. Thus, policies affecting the automobile industry have profound consequences for the economy.

To change the characteristics of the automobile transportation system, the Federal Government has customarily relied on regulations and performance standards and has left to the auto industry the tasks of acquiring capital and developing the technology to comply with Government standards. Recently mandated fuel-economy standards will force manufacturers to produce a greater proportion of smaller, lightweight automobiles. This will curtail the wide variety of product sizes characteristic of the American automobile market and increase the competition between domestic and foreign manufacturers.

The smaller domestic manufacturers will have problems competing in this market and raising the capital necessary to finance the requirements for fuel-economy, emissions, and safety standards. Consequently, their economic viability and the present structure of the industry are seriously threatened. The interrelationship between the automobile industry and the national economy raises the issue of whether the Federal Government should seek to preserve or change the structure of the automobile industry,

Over 80 percent of all households own one or more vehicles, each of which is driven an average of 25 miles per day. The direct and indirect personal costs of owning and operating these vehicles include the costs of gasoline and oil, maintenance and repair, motor vehicle taxes, credit, property damage, lost wages and medical expenses due to accidents, and insurance premiums. The total cost of private transportation over the last 9 years has increased about 66 percent—5 percent less than the cumulative effect of inflation. However, some components of automobile cost—repairs, maintenance, and insurance—have increased almost 90 percent, which is greater than the rate of inflation,

Total automobile-related costs account for an increasing share of the household budget, since the number of households owning more than one car has increased and the number without cars has declined. In all but the lowest-income families, automobile-related expenditures rank as the second or third largest expenditure. Because of the public's dependence on the automobile transportation system for mobility and because of the size of the personal financial investment in the automobile, the question arises as to whether the Federal Government should intervene to influence the individual cost of ownership and use.

PUBLIC FUNDING OF HIGHWAYS

None of the many advances in transportation made during this century has transformed our lives as much as automobiles and highways. The United States is, in fact, a highway-dependent nation. Virtually everyone, drivers and nondrivers alike, is affected. Almost all intercity and intracity passenger travel is by automobile, and a major portion of our freight is delivered on highways, Highways are now a part of our physical landscape, There are in the United States today some **3.8** million miles of roads, approximately 1 mile of roadway for every square mile of land. The total area covered by roads and their rights-of-way is estimated to be about *24,000* square miles, an area equal to the size of West Virginia. [1]

The extent of the highway system is due, in part, to the emphasis placed on highways by public transportation funding policy. In 1977, for example, the Federal Government contributed about *$7* billion of the total **$28** billion spent on highways. The cost of the entire Federal-Aid Highway Program for the period beginning with the establishment of the Highway Trust Fund in **1956** until *1976* amounted to $109.2 billion. [2]

The Federal Government's investment in highways is reflected by the size and extent of the Federal-aid highway system, which constitutes 22 percent of the Nation's total highway mileage. The most heavily funded program, the Interstate System, comprises *42,500* miles of interconnected roads and receives almost half of all Federal-aid highway funds, approximately **$3.5** billion annually.[3] The Federal-Aid Primary System totals *260,000* miles and receives 18 percent of the Federal highway authorization. [4] The secondary system of rural collector routes totals 405,000 miles and receives about 5 percent of the total Federal highway aid. In **1970,** a separate urban system—formerly a part of the secondary system—was established. It consists of about 130,000 miles of arterials and collectors

[1] A.Q. Mowbray, *Road to Ruin* (New York: J.B. Lippincott Co., 1969), p. 12.

[2] Library of Congress, Congressional Research Service *The Highway Trust Fund Time for a Change?* by W. A. Lipford Issue Brief #77044, May 12, 1977 p. 4

[3] U.S. Department of Transportation, Federal Highway Administration, *America on the Move The Story of the Federal Highway Program and the Federal-State Relationship* 1977 p11.

[4] *U.S. Code* Vol. 23, sec. 103(e) IQ701

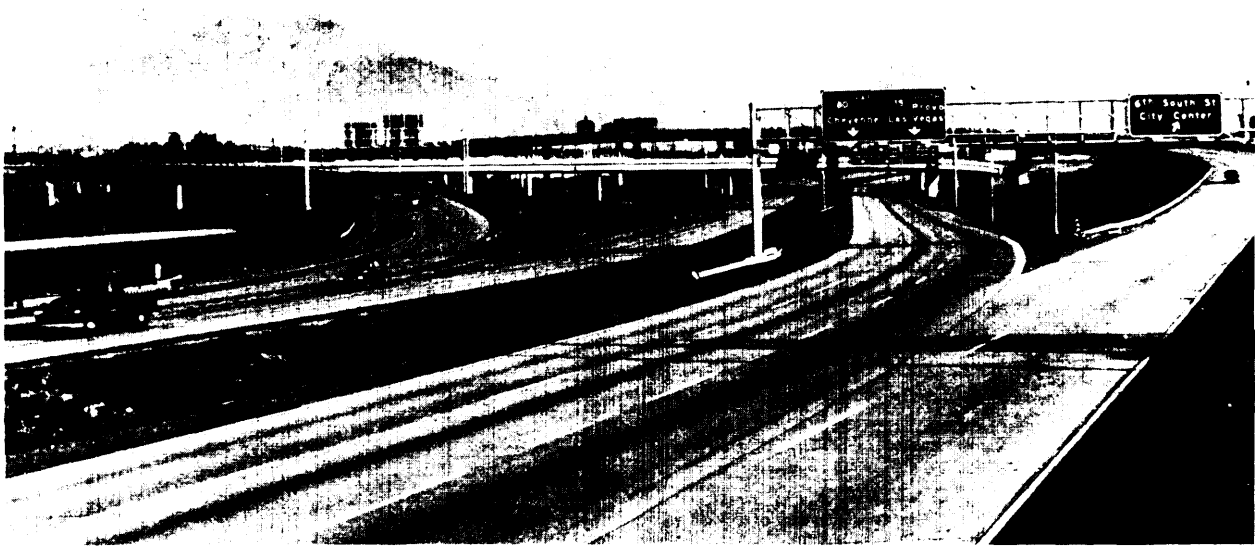

Photo Credit: U.S. Department of Transportation

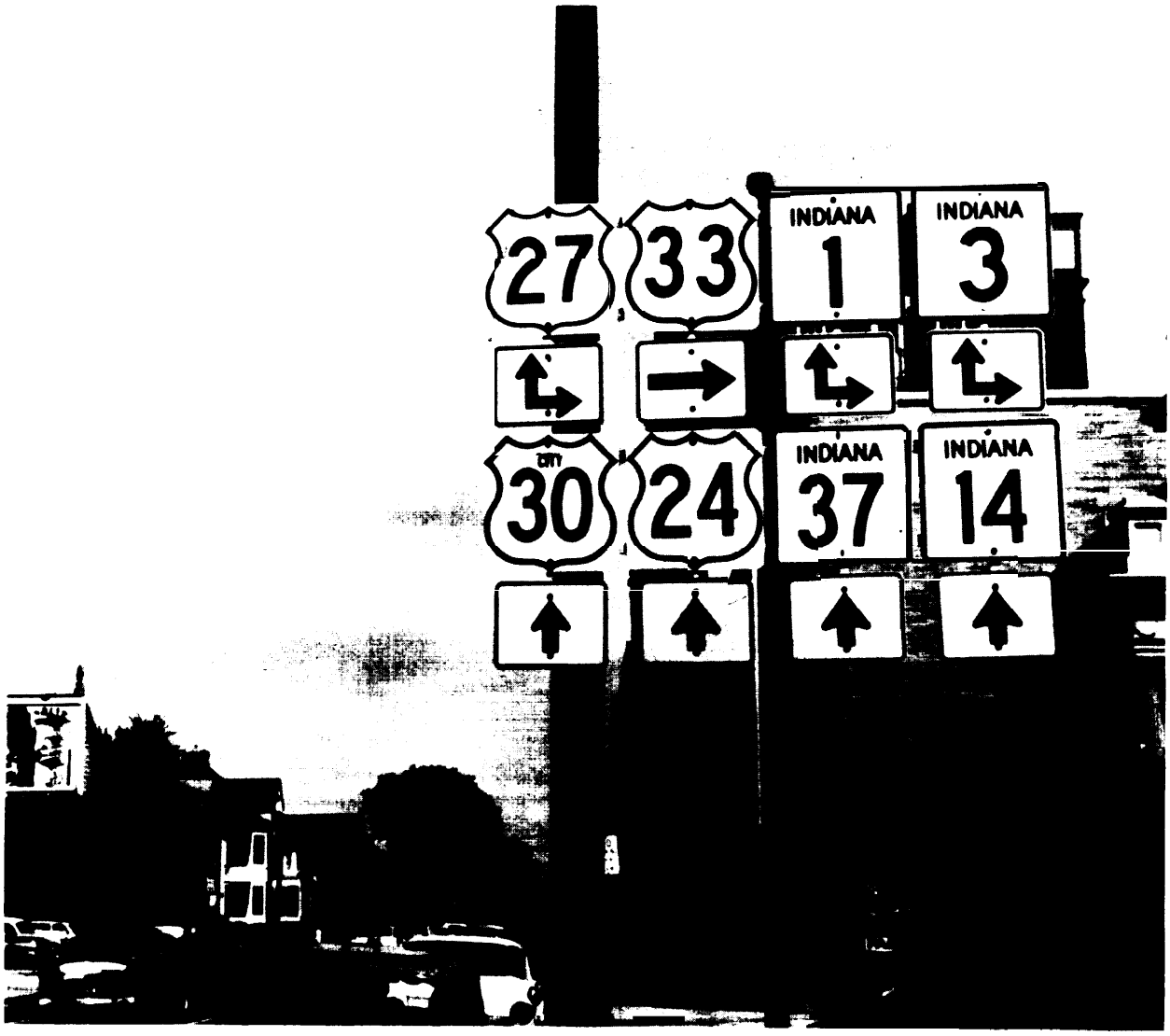

Photo Credit: U.S. Department of Transportation

and receives approximately 10 percent of Federal funding—$800 million in FY **1978.**[56]

The influence of the Federal Government on the Nation's transportation and highway system is greater than its financial contribution to the Federal-aid system alone might suggest. Under the Federal Highway Act of 1966, the Secretary of Transportation was authorized to develop standards and criteria for Fedinvestment in transportation facilities. By making Federal-aid contingent on State compliance with specified conditions and regulations, the Federal Government can influence the extent, design, quality, and use of the road system. Through the financing process and the fundin mechanisms used to channel investments into highways, the Federal Government can also influence the distribution of the costs of developing and maintaining the system. The Federal Government's influence over the highwa system has grown, and can be expected to continue to grow in the future, as the number of specific-purpose programs increases.[7]

[6]The remaining 17 percent of the Federal highway budget is devoted to programs designed to address national needs that are not specific to any one portion of the system. These include programs for highway safety, emergency relief, public lands, rural highway public transportation demonstrations, and planning and research.

[7]U.S. Department of Transportation, Federal Highway Administration, *America on the Move*, p. 11.

[7]U.S. Congress, Congressional Budget Office, *Highway Assistance Programs: A Historical Perspective*, Background Paper, by Porter Wheeler, February 1978, p. xiv.

In view of the extent of the highway system and the Federal Government's role in its development, it is easy to understand how Federal investment in highways has become a major policy issue. This was not always the case, however. In the earliest days of highway building, the major policy question was how to get the Federal Government involved in the development of highways. Although the Constitution provided the authority to establish national highways, the Federal Government used this authority only reluctantly in response to ad hoc needs and pressures, some of which were only tangentially related to transportation.

In the early years of the automobile, the Government was pressed to increase its financial commitment to roadbuilding to improve personal mobility, to overcome the economic and social isolation of rural areas, to alleviate the congested conditions of urban life, and to stimulate the economic development of major parts of the country. The benefits of highway construction appeared to outweigh the costs. Popular support for Federal aid to highway development culminated in 1956 with the passage of the Highway Act and the Highway Revenue Act.

The highway legislation of *1956* significantly increased the Federal Government's Financial contribution to the highway program, but the funding soon fell far short of requirements. The costs of constructing the Interstate System were severely underestimated, and the projected receipts from the highway user taxes were overestimated. Within 2 years after passage of the law, it was clear that additional measures were required to meet rising costs.

During the next two decades, the gap between tax receipts and highway expenditures was closed by increasing the rate of taxation and by extending the life of the program. Thus, in economic terms alone, the Interstate System developed into a very different program from the one Congress originally anticipated. What had been projected to be a highway system constructed over a period of 15 years at a cost of $27 billion became a $184 billion highway program spanning a period of 35 years.[8]

There was also a growing disillusionment with some of the purported benefits of highway construction. Highway building did not, for example, reduce congestion on city streets, as the sponsors had predicted. By the late 1960's, there was mounting evidence that the expansion of highway facilities had increased highway use without solving the problem of congestion.

New social and environmental concerns added to the dissatisfaction with the highway program. The automobile's contribution to air pollution was not fully understood in 1956.[9] Ten years later, however, as the connection between air quality and automobile use was established, environmentalists joined the growing ranks of those disenchanted with highways.

While recent economic, social, and environmental developments have contributed to a reconsideration of our national highway policy, nothing has dramatized the issues as much as the battle over the segments of the Interstate System in urban areas. Highway opponents, concerned about social and environmental impacts of highway building on urban life, began to protest new highway construction in the late 1960's. In their eyes, the extension of highways into urban areas has caused a series of social ills that threaten the viability of city life.

More and more people began to question the Federal Government's policy of what appeared to them to be unlimited support for highway construction. By 1970, it was almost impossible to get a major highway program approved in most large American cities.[10] Highway opponents gained the ears of policy makers during the 1973-74 oil embargo, when it suddenly *became* apparent that the world could be shifting from an era of relative abundance of energy to one of relative scarcity.

As the Interstate System nears completion, a reevaluation of the Federal-Aid Highway Program may be in order. While the legislators of 1956 were concerned with how to provide funds to stimulate highway construction, those of today are concerned with how to use the Federal Government's resources to devise a balanced transportation program reflecting all of society's needs. Several policies to make more efficient and equitable use of the Federal Government's

[8] Gary T. Schwartz, "Urban Freeways and the Interstate System," *Southern California Law Review* 49 (March 1976): p. 442.

[9] Ibid., p. 482.

[10] Ibid., p. 444

resources have been proposed. Three of these are examined in this assessment: highway financing, highway maintenance, and road pricing.

Highway Financing Policies

For the purpose of this analysis, the question of highway financing can be divided into four major policy options:

1. A policy to continue the Highway Trust Fund in its present form to serve as the primary mechanism by which highways are financed,
2. A policy to finance all Federal transportation expenditures from one general trust fund,
3. A policy to establish separate trust funds for each transportation mode, and
4. A policy to finance highways, as well as all transportation expenditures, from general revenues.

Legislative History

The debate over highway financing has been somewhat confused because, in the eyes of many people, the Highway Trust Fund is the symbol, if not the equivalent, of the Federal-Aid Highway Program. Highway supporters and opponents alike tend to view the Highway Trust Fund as the key factor determining the nature and the extent of the highway system. Therefore, it is not surprising that the highway debate is often focused on the Highway Trust Fund. The trends and developments that have given rise to a reconsideration of our highway construction program have also provoked criticism of the mechanism used to finance it.

Approximately **90** percent of all Federal highway-related expenditures are financed from the Highway Trust Fund which was established by the Highway Revenue Act of 1956, a companion to the Highway Act of 1956.11 The Highway Revenue Act was designed to encourage the construction of the highway system and, in particular, the Interstate System. The Highway Revenue Act increased the Federal Government's contribution to highway construction and established a funding mechanism for the Federal-Aid Highway Program. In addition to fixing the Federal share for interstate construction at 90 percent, the Revenue Act raised the number of Federal user taxes and created a Highway Trust Fund into which all these revenues were channeled to be made available for highway expenditures without additional authorization. [12]

The Highway Revenue Act of 1956 was less revolutionary than has often been assumed. The Federal Government had granted contract authority to the States since 1922. What the 1956 Act changed, however, was the source of the funds to meet these contract obligations. Before the establishment of the Fund, highway expenditures were appropriated from general treasury funds. With the exception of the Highway Trust Fund, the system of highway financing established in 1922 remains in effect today. '3

Although the Federal disbursements for highway construction increased substantially after 1956, there remained a large gap between the projected cost of the highway system and the funds available. In fact, the history of the Federal-Aid Highway Program in the years after 1956 has been characterized by a search for ways to close the gap between increasing costs and insufficient revenues. [14-15]

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[11] Although the Federal-Aid Highway Program and the Highway Trust Fund have come to be identified over the years, their separation was deliberately maintained in the legislation, The Act was divided into two distinct titles the first dealing with the Highway Program and the second with the financing mechanism. This division of the legislation means that, even if the Highway Trust Fund were to be eliminated, the' Federal-Aid Highway Program would not have to be restructured.

[12] U. S Congress, Congressional Budget Office, *Highway Assistance Programs* pp. 14-18.

[13] 'The Highway Trust Fund is financed from user taxes, two-thirds of which are derived from the 4 cents per gallon tax on gasoline. (The original 3 cents per gallon tax was increased in October 1969.) There are also taxes of 6 cents per gallon on motor oil, 10 cents per pound on highway vehicle tires and inner tubes, and 5 cents per pound on retread rubber. There is an annual use tax on heavy trucks and buses (over 26,000 pounds) of 3 cents per 1,000 pounds of gross vehicle weight, The 10-percent tax on the manufacturer's sale price of new trucks, buses, and trailers, and the 8-percent tax on truck and bus parts and accessories also go into the Highway Trust Fund.

"Only 2 years after the passage of the Highway Act, the Bureau of Public Roads reestimated the total cost of the Interstate Highway System of $44 billion, an increase of $14 billion over the original projection. To meet this deficit, Congress temporarily suspended the "pay as you go" provision in 1958 and increased the gasoline tax from 3 cents to 4 cents a gallon. Costs for the Interstate System continued to grow, forcing Congress to increase its authorizations in 1965, 1966, 1968, 1970, and 1973. In 1975, the official cost estimate was increased again, this time to $89 billion. The Comptroller General made an estimate in the same year and predicted that the total system might cost between $111 and $184 billion.

Photo Credit: U.S. Department of Transportation

The extent to which the Highway Revenuei Act generated funds for highway construction can be seen by looking at how Federal aid for transportation has been distributed among modes for the years 1955 to 1975. As can be seen from table 114, almost two-thirds of all Federal outlays for transportation were for highways. Highway programs accounted for **98** percent of all Federal aid for ground transportation. [16]

Before 1956, only 50 percent of all Federal aid for transportation went to highways. By 1960, the figure was almost 100 percent. Ten years after the passage of the 1956 highway legislation, Federal highway assistance had increased more than 5 times. [17] The readily available funding undoubtedly stimulated the construction of highways, which was the intent of the law.

Despite the skyrocketing costs of building the Federal-aid highway system, the Government did not begin to reevaluate its highway policy until the late 1960's. And, even then, this policy reevaluation was undertaken not so much in response to the increasing financial cost of the system as to the growing appreciation of some of the social costs involved in highway construction.

Ironically, while attributing many of our social problems to highway construction, some people have begun to view the Highway Trust Fund in an entirely new light. Once considered to be the inexhaustible source of funding responsible for an unbalanced national transportation policy, the Highway Trust Fund is now viewed by some as a potential resource for meeting the Nation's total transportation needs. Mass transit advocates, urban officials, and transportation planners are calling for increased flexibility in highway financing and are asking for a share of the Trust Fund to finance mass transportation programs.

The move towards greater flexibility in highway financing began in 1968 when Congress

[16] Schwartz, p. 439.

[17] James V. Cornehls and Delbert A. Taebel, *The Political Economy of Urban Transportation* (Port Washington, N.W.: Kennikate National University Publications, 1977), pp. 39-40.

[18] Ibid.

first provided Federal assistance for public transportation as a part of highway legislation. Greater flexibility in highway financing was also achieved by increasing the number of programs eligible for financial assistance from the Highway Trust Fund.[18] This trend is apparent in the summary of major highway legislation shown in table 115.

Despite the trend towards greater flexibility, Congress has been unable to agree on a method of highway financing. Although the 1976 Highway Act extended construction of the Interstate System to 1990, the Highway Trust Fund was extended only until 1979. By extending the Highway Trust Fund temporarily, Congress deferred the decision on its long-term future. In taking such an action, Congress had no intention of postponing a discussion of the issues involved in highway financing. The conferees explicitly stated that:

> The extension of the interstate program through **1990** does not address the question of the source of funds for construction during that program. The conferees expect that during the next Congress methods of financing highway construction will be considered.[19]

[18] In the late 1960's, Congress authorized a major set of highway beautification and safety programs to be financed from the Trust Fund. By 1974, these programs had proliferated to the point that Congress had to make 55 separate authorizations for highway-related programs. These new aut horizations included programs for economic developmen t growth centers, bridge safety, rail grade-crossings seen ic highways, hazardous locations, and removal of roadside obstacles. More recently, Congress instituted a program to resurface older segments of the Interstate System. In addition, several established programs (e, g, forest highways) have been transferred to the Highway Trust Fund.

[19] 'U.S. Congress, House, Federal Aid Highway Act, House Report 94-1017 to Accompany H.R. 8235, 94th Congress, 2d sess., Apr. 7, 1976, cited in U.S. Congress, Congressional Budget Office, Highway Assistance Programs, p. ***62,***

Table 114.—Size and Distribution of Federal Appropriations for Transportation, 1955-75 (millions of dollars)

Agency or program	1955	1960	1965	1970	1972	1975[a]
Department of Transportation						
Highway	$636	$2,978	$4,069	$4,507	$4,923	$5,020
Aviation	122	508	756	1,223	1,834	2,120
Railroad	2	3	3	17	57	267
Coast Guard	190	238	367	588	661	903
Urban mass transit	0	0	11	106	327	1,351
Other	0	0	23	-8	22	6
Offsetting receipts	0	0	-20	-16	-19	—
Subtotal	950	3,727	5,209	6,417	7,805	9,667
Other agencies	342	539	818	715	986	1,153
Total	$1,292	$4,266	$6,027	$7,168	$8,791	$10,820

[a] Already made or planned.
SOURCE: James V. Cornehls and Delbert A. Taebel, *The Political Economy of Urban Transportation*, 1977, p. 38

Table 115.— Legislation Relating to Highway Financing

Federal Aid Highway Act of 1968	Provided Federal assistance to local governments to help finance parking lots serving carpools and bus patrons.
Highway Act of 1970	Extended Federal aid for highway transit by permitting the use of urban highway funds for the development of exclusive bus lanes and other nonrail public transportation facilities.
Highway Act of 1973	Permitted local governments to substitute mass transportation projects for unwanted, withdrawn segments of urban interstates. (Such projects were, however, to be financed from general funds.)
Highway Act of 1976	Refined and liberalized the provisions of the 1973 Act, making $800 million of Trust Fund monies available for urban systems, to be used either in highway construction or for mass transit projects.

SOURCE: Library of Congress, Congressional Research Service, *The Highway Trust Fund: Time for a Change?*, by W.A. Lipford, May 12 1977, p. 4

Policy Options

Continuation of the Highway Trust Fund.—Supporters of the Highway Trust Fund argue that it provides an effective, equitable, and efficient mechanism for securing funds and allocating the costs of highway construction. Trust fund financing provides a continual source of funding for, and assurance of, a long-term Federal commitment to the national system of highways. [20-21] State and local governments require assurance of a long-term Federal commitment if they are to be induced to invest their own resources. Trust funds are one way to give this guarantee, both as to the magnitude of funding and the length of commitment.

Most supporters of the Highway Trust Fund resist proposals that would diminish the funds available for highways. They also oppose the growing practice of including new programs, regardless of their nature, among those financed by the Fund. Typical of this position is that of the Automobile Association of America:

> Since 1956 the Highway Trust Fund has been burdened with the expense of many transportation activities far beyond those envisioned when the Trust Fund was established. AAA believes that the Trust Fund should be used only for the construction and improvement of the Interstate System and the urban and rural primary arterial networks. [22]

The traditional defense of the Highway Trust Fund is that the dedication of the user taxes to highway expenditures makes them legitimate in the eyes of the public. It is argued that dedicated user taxes are the most equitable and efficient method for distributing the costs of highway construction and highway use. Many economists agree. For example, in testimony before the Senate Committee on Environment and Public Works, Alice Rivlin, Director of the Congressional Budget Office, noted:

> User charges represent a way of recapturing from the actual beneficiaries some of the costs to the general public. Levying *user* charges promotes economic efficiency because users pay, directly or indirectly, for the services they receive. Proper incentives are provided, since heavier use imposes greater costs on the users, and at the same time, generates revenues to expand facilities.[23]

Opponents of the Highway Trust Fund and the present system of highway financing have proposed alternative methods and mechanisms. Their criticisms of the Highway Trust Fund can best be seen by examining the alternatives they have advanced.

Financing Highway-Related Expenditures From General Funds.—Basic to all of the arguments calling for an elimination of the Highway Trust Fund, is the belief that all Federal programs should compete in the marketplace of political, economic, and social ideas. It is argued that, by providing earmarked funding, the Highway Trust Fund encourages the building of highways at the expense of other transportation modes. " If transportation facilities are to be made available to everyone at the lowest cost to society, the costs and benefits of using alternative modes in different situations must be weighed. This would require replacing the Highway Trust Fund with a more flexible funding mechanism. "

Trust fund financing also makes it difficult for Congress to make transportation decisions in the light of other societal values. Highway programs, for example, affect energy, environmental, and land development policies. Some groups feel that as long as highway financing decisions are made outside the normal budgetary process, they will not reflect total national needs. [26]

The Highway Trust Fund circumvents the normal congressional budgetary process. Since

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[20] It has been noted, however, that the ability of the present system to provide a continual source of funding may be due as much to the plenitude of dedicate funds—about $6 billion are devoted to the Highway Trust Fund annually—as to the Trust Fund device itself.

[21] U.S. Congress, House, Committee on the Budget, *Impact of Highway and Mass Transit Programs on the Federal Budget and Associated Federal Urban Investment*, hearings before the Task Force on Community and Physical Resources, 95th Cong., 1st sess., 1977, p. 55.

[22] U.S. Congress, Senate, Committee on Public Works, *Future of the Highway Program*, hearings before the Subcommittee on Transportation, 94th Cong., 1976, p. 1290.

[23] Statement of Alice M. Rivlin, Director, Congressional Budget Office, before U.S. Congress, Senate, Committee on Public Works, Feb. 7, 1978, p. 8.

[24] U.S. Congress, House, Committee on the Budget, *Impact of Highway and Mass Transit Programs*, p. 55.

[25] Ibid.

[26] Rivlin, pp. 1-2.

the Highway Trust Fund obtains its revenues from earmarked taxes, the budgetary authority for any year depends on the receipts deposited in the Fund and not on a congressional authorization. Congress, therefore, has almost no way to assert budgetary control over highway financing. One way of achieving such control would be to eliminate the Highway Trust Fund. The highway programs then would compete with other transportation programs—as well as with all other federally aided programs—for the revenues of the general treasury.

A Transportation Trust Fund.—The imbalance in the present transportation system is attributed by some, not to the existence of the Highway Trust Fund, but to the lack of similar trust funds for other modes.[27] They advocate conversion of the Highway Trust Fund into a user-financed, general transportation fund, in part because gasoline taxes are well-established and because their justification is greater than ever in view of the Nation's long-term energy needs. With the establishment of such a fund, transportation decisions would no longer be distorted in favor of highways. Modal decisions could be based on a comparative, cost-benefit analysis.

The concept of a transportation trust fund has some drawbacks, While it might facilitate development of a coordinated, multimodal transportation policy, it could not guarantee a specific Federal commitment to any particular mode. As a system of financing, a transportation trust fund is subject to the same criticism as the Highway Trust Fund—that is, a trust fund would be inflexible in the face of changing societal needs and would be exempt from the normal congressional process of budgetary control.[28] There is also a question of whether it would be politically feasible. Various institutions have been erected around every transportation mode at all levels of government—each with its own distinct organizational needs and priorities. Because of these institutional barriers, a policy providing for a common transportation fund might 'be difficult to implement.[29]

A Trust Fund for **Each** Mode.—An alternative popular among mass transit advocates is establishment of individual trust funds for each transportation mode. The advocates of multiple trust funds point to the success of the Highway Trust Fund as the rationale for extending this approach to other modes. The argument used to support this proposal is the same as that used to support the Highway Trust Fund: State and local governments need assurance of a long-term Federal commitment. Since all modes of transportation have long-term development and construction requirements, all should be financed through trust fund mechanisms.

Representative James Howard, Chairman of the House Public Works Committee and sponsor of legislation designed to bring highway and mass transit under one authorization but two separate funds, has argued thus:

> Mass transit has been a mess for years, not only because there has not been a sufficient amount of money available, but the money was available on a general revenue basis. We will never get a sensible, forward-looking mass transit program until we get a trust fund for mass transit.[30]

The advocates of a mass transit trust fund believe that the need for assured funding is greater than the need to make intermodal transportation decisions.

Opponents of individual trust funds believe that this approach could lead to an inflexible system of financing. Since each fund would be financed from earmarked revenues, investment decisions for one mode would be made without having compared the costs and benefits of investing in other transportation modes. Establishment of individual trust funds might also promote creation of new organizations and bureaucracies. In time, these organizations would develop their own institutional interests in maintaining the system and could resist change.

One major difference between the proposed mass transit fund and the Highway Trust Fund is the source of funding. Since most mass transit systems are presently operating at a deficit, it is unlikely that a mass transit fund could be sustained by user taxes.

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[27] U.S. Congress, House, Committee on the Budget, *Impact of Highway and Mass Transit Programs*, pp. 55-56.

[28] Rivlin, p. 7.

[29] Ibid., p. 10.

[30] Rochelle L. Stanfield, "A Truce May be on the Way in the Highway-Mass Transit Conflicts," *National Journal*, Nov. 19, 1977, p. 1815.

The arguments for and against each of the four policy options are summarized in table **116.**

In evaluating these policy options, it is important to remember that the Highway Trust Fund is not the equivalent of either the highway program or the highway financing process. Even if the Highway Trust Fund were dissolved, highway user taxes might be maintained, for example, and deposited in the general treasury fund. As the early history of the highway program demonstrates, it is not necessary to have a trust fund in order to link user taxes to highway expenditures. Similarly, long-term authorizations could be, and have been, made within the context of the congressional budgetary process.

Highway Maintenance

Another issue that could have a significant effect on the future of the highway transportation system is highway maintenance. Each year, Federal, State, and local governments spend approximately one-fourth of all highway funds to maintain the 3.3 million miles of national highways. Highway maintenance has traditionally been the responsibility of State and local governments—a quid pro quo for receiving Federal aid. As long as the federally aided highway systems were relatively small, the States were able to fulfill their obligations without undue hardship. In fact, the State governments consistently

Table 11 6.—Advantages and Disadvantages of Transportation Financing Options

Opt ions	'-Advantages	Disadvantages
Continuation of present policy . . .	Continual source of funds. Long-term commitment. System already in place. Relatively equitable distribution of costs.	Slow to respond to changing needs. Unsuitable as a framework for comparing costs and benefits. Exempt from budgetary control. Procedural discrimination against other modes.
Unified Transportation Trust Fund	Continual source of funds. Long-term commitment to transportation. Elimination of procedural discrimination among modes. Facilitates the development of a coordinated, multimodal transportation policy.	Unable to provide long-term financial commitment to a particular mode. Slow to respond to changing needs. Exempt from normal budgetary process. Present user taxes insufficient to finance general transportation fund. Institutional costs involved in dismantling present system.
Separate Trust Funds for each mode	Provide equal access to transportation funds for each mode. Provide assurance of long-term Federal commitment. Politically appealing because costs are least visible.	Least flexible system of financing. Exempt from normal budgetary process. Modal decisions would be independent of other transportation and societal decisions. Create institutional rigidities.
Financing for general funds.	Most responsive to changing needs. Eliminates procedural disc rim-i nation i n competition for funds. Suitable framework for comparing costs and benefits of investing in al l transportation modes. Subject to budgetary control.	Would entail transportation subsidies. Fails to provide guaranteed financial commitment. Politically cost l y.

rejected proposals that might reduce their responsibilities for, and authority over, highway maintenance activities.

With the growth of the highway system and the costs of maintaining it, the financial burden on State and local governments has taken on unforeseen proportions. The costs of maintenance are likely to increase further in the future, as the number of vehicle miles traveled rises and as many of the highways built in the last **20** years near the end of their service lives. If the present rate of deterioration continues, the investment in the national highway system will be significantly depreciated, and the costs of rehabilitation greatly increased. Steps must be taken to preserve the system if it is to continue providing the same level of service as today. Thus, the question is raised as to whether the Federal Government should—even in the face of State opposition—assume part of the burden of maintaining its investment in the Nation's highways.

Present Policy

The Federal-Aid Highway Program provides for building, improving, and maintaining highways. These tasks have been divided by law into the categories of construction and maintenance. Highway construction includes new construction, reconstruction, and highway betterment. Betterment, in turn, includes the tasks of resurfacing, restoration, and rehabilitation of roads or bridge decks as necessary for safe and efficient utilization. [31]

Maintenance is usually defined as "the preservation of the entire highway, including surface, shoulders, roadsides, structures, and any traffic control devices that are necessary for its safe and efficient utilization. "3[2] The ambiguity of the definition of maintenance has led to varied and controversial interpretations. In practice, the term maintenance has come to mean all those highway-related tasks that do not fit within any specific construction category .[33] While the Federal Government is primarily responsible for financing and setting standards for the construction of the highway system, the States bear sole responsibility for maintenance.

The States have been responsible for maintenance since the beginning of the Federal-Aid Highway Program. The Federal Aid Road Act of 1916 assigned to the States responsibility for maintaining all roads constructed under the provisions of that Act. The States' duty to maintain the federally aided roads was reiterated in 1921, the last time that the Federal-State division of labor for highway responsibility was contested.

In the Highway Act of 1921, the Secretary of Agriculture was authorized to place the highways "in proper condition of maintenance, " charging the costs against a State's allotment from Federal funds and prohibiting further projects until the Federal Government had been reimbursed for the maintenance expenses. This rarely invoked clause was amended by the Federal Highway Act of **1950,** which provided that the Federal Highway Administration could, after **90** days notification, withhold approval of further Federal-aid projects until the States had satisfactorily completed maintenance work.

The Federal Highway Administration has never used its authority to withhold funds. Nor has it prescribed standards for highway maintenance. [34] Although the Federal Government has been reluctant to interfere with State jurisdiction over highway maintenance, the existing institutional framework is flexible enough to allow the Federal Government to assume a more active role in this area.

Despite increased outlays for highways by all levels of government in recent years, highways have been deteriorating **50** percent faster than they are being restored .35 A review of the factors underlying this trend will help to illustrate the magnitude and urgency of the highway maintenance problem.

The accelerated rate of highway deterioration can be accounted for, in part, by the rate of inflation. Since 1967, State highway maintenance costs have increased at an annual rate of 7.3 per-

[31] U.S. General Accounting Office, *Improving and Maintaining Federal-Aid Roads - Department of Transportation Action Needed*, Feb. 2, 1977, p. 5.

[32] Ibid.

[33] When a road requires a significant improvement to increase capacity or to meet a design standard, or significant reconstruction or maintenance to restore it to normal use, expenditures are usually considered outlays for capital improvements. The Federal Highway Administration defines maintenance costs as those expenditures required to keep the highway in usable condition. They would include such activities as routine patching, bridge painting, and removal of snow and ice.

[34] Ibid, p. 6.

[35] Ibid.

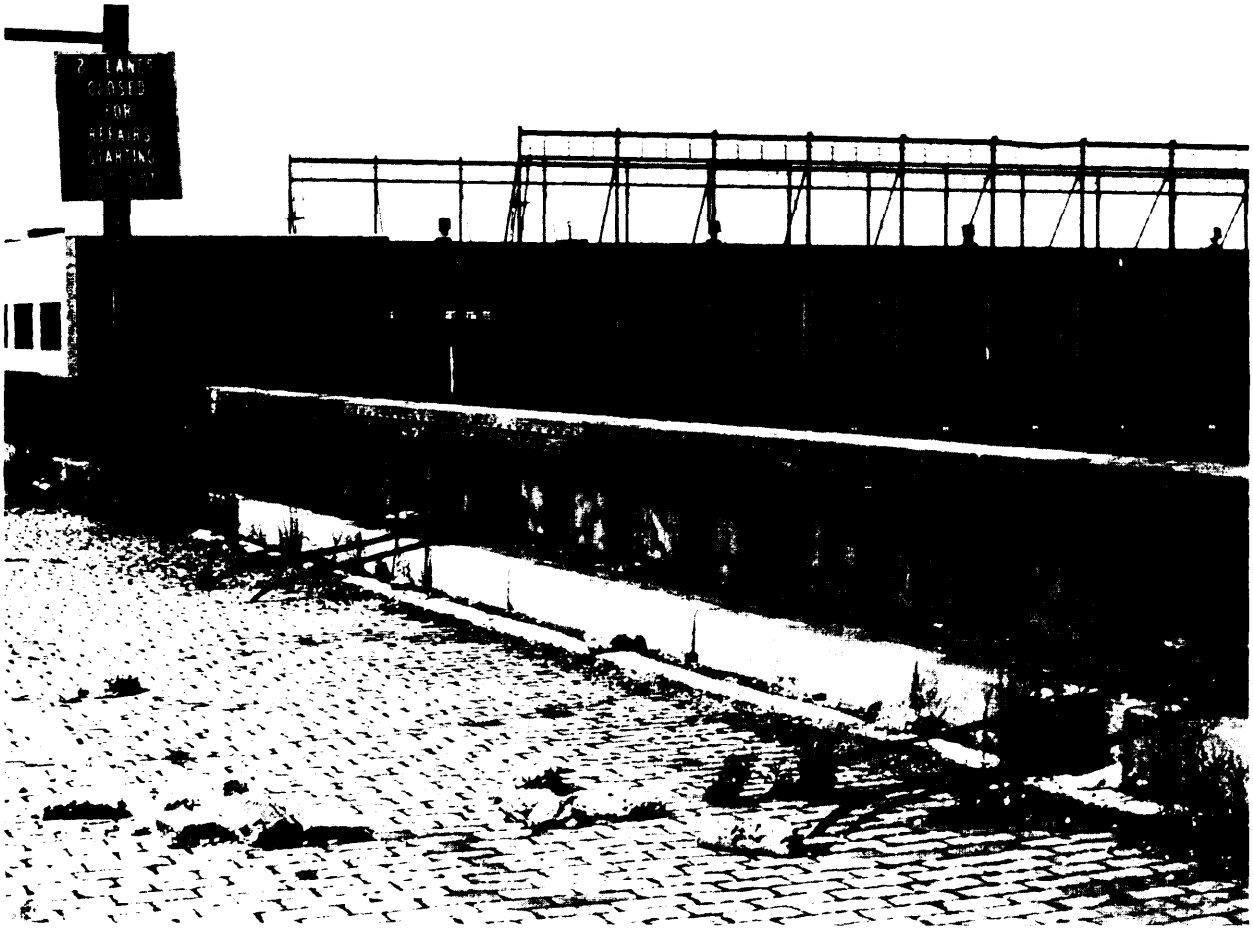


Photo Creditf Sydec

cent. The largest share of the increase is attributable to rising material and equipment costs.

Despite a twofold increase in annual expenditures for maintenance in the years between 1967 and 1976, the amount of real maintenance purchased—in terms of today's purchasing power—was only 7 percent.[36] This 7-percent increase in real maintenance expenditures contrasts sharply with the 41-percent increase in VMT, the 37-percent increase in the number of cars on the road, and the 88-percent increase in the number of trucks on the road.

The development of the Interstate System has also added to the States' highway maintenance burden. Interstate funds could not be used for reconstruction until 1976 and even then, only on a very limited basis. States responded to the favorable 90/10 matching ratio for new highway construction by building new roads instead of maintaining existing roads.[37] Acknowledging that the States' responsibility for maintaining the Interstate System has reached sizable and unanticipated proportions, the Department of Transportation, in the 1974 Transportation Report, noted that:

> As the Interstate System approaches completion, the costs of maintenance represent an increasingly larger share of State highway expenditures. This expense over the life of the System is expected to be more than double the States' initial capital investment in the System.[38]

Maintenance expenditures have also been increasing as a result of the Federal Government's decision to raise the permissible size and weight of trucks and large vehicles using the Interstate

[36] *Sydec EEA*, p. III-32

[37] U.S. General Accounting Office, *Improving and Maintaining Federal-Aid Roads*, p. 5.

[38] U.S. Department of Transportation, *1974 National Transportation Report, Current Performance and Future Prospects* (Washington, D.C.: Government Printing Office) July 1975, p. 514.

System. Under the 1956 Highway Act, no vehicle weighing more than 18,000 pounds on a single axle, 32,000 pounds on a tandem axle, or having a gross weight of over 73,000 pounds could use the Interstate System. When the Federal-Aid Amendment to the Highway Act raised the limits to 20,000 pounds on a single axle, 34,000 pounds on a tandem axle, and 80,000 pounds gross weight in an effort to save energy, an estimate was made of the potential maintenance and capital costs involved. Testifying before Congress, Federal Highway Administrator Tiemann pointed out that size and weight increases on the order of those proposed would increase highway maintenance costs by $40 million (adjusted to 1977 dollars) and would increase combined capital and maintenance costs by $200 million .39

The combined effects of rising inflation, expansion of the highway system, and the increase in the size of vehicles authorized to use the system have contributed to the steady rise of State expenditures for highway maintenance. In the years between 1967 and 1976, for example, State expenditures on highway maintenance and related operational expenditures tripled from $1.1 billion to $3.3 billion. Because of these increases in the size of maintenance and other noncapital highway expenditures, a smaller share of the total highway disbursements is being devoted to capital improvements. (See figure **47.**)

[39] U.S. Congress, Senate, Committee on Public Works, *Hearings on Truck Sizes and Weights*, 93d Cong., 2d sess., Feb. **20,** 1974, Part 2, p. 20.

The trend in the distribution of State highway disbursements is almost identical to that for total disbursements. State governments have traditionally provided about 80 percent of all capital expenditures for highways but, in recent years, they have been unable to sustain this proportion of investment. The share of State budgets available for capital expenditures has decreased from 71 percent in 1962 to 58 percent in 1974, as the costs of maintenance, administration, law enforcement, and debt service have increased. Continued decline in the level of capital improvement will, over time, increase the rate at which highways deteriorate and cause the long-range costs of highway maintenance to rise.

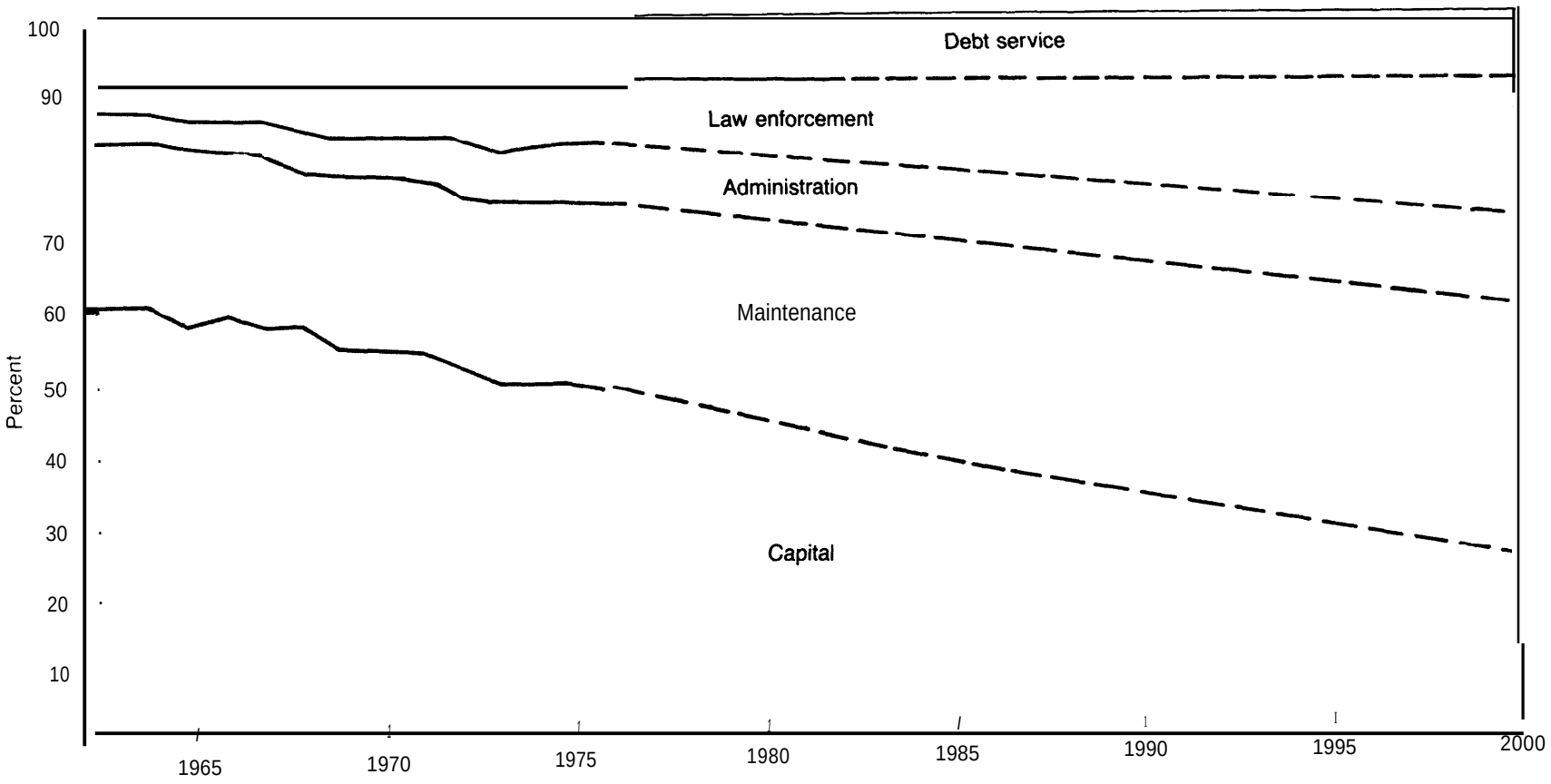
Projections under Base Case conditions suggest that these trends will continue. For example, it is assumed in the Base Case that a portion of the capital expenditures for highways will be used for the scheduled completion of the Interstate System by 1990. The cumulative capital expenditures from 1976 to 2000 are projected to total $257 billion in 1975 dollars. About **$38** billion of this amount would be required for completion of the Interstate System. The remainder is assumed to be expended on other highway systems in proportion to historic patterns. Increasingly more of the expenditures of the diminishing capital programs for all systems would be devoted to reconstruction of existing obsolete pavement and structures. The effect would be a decline in highway system performance.

Table 11 7.— Historical and Projected Distribution of Highway Disbursements

	Total highway disbursements (percent)				State highway disbursements (percent)			
	1965	1975	1985	2000	1965	1975	1985	" 2000
Capital	58	51	38	25	69	61	47	28
Maintenance	23	25	32	35	14	16	23	31
Administration	5	7	9	13	5	6	9	13
Law enforcement	4	7	11	17		7	11	17
Debt service	10	10	10	10	8	10	10	10

SOURCE *Highway Staff stics* through 1975, Sydec protections to 2000

Figure 47.—Historical and Projected Distribution of Total Highway Disbursements



SOURCE *Highway Statistics* through 1975 Sydec projections to 2000

In the Base Case, maintenance and other non-capital expenditures are assumed to increase 1 percent per year as a proportion of total expenditures. The increased mileage of interstate and other new highways over the last 20 years will also add to the costs of maintenance as these roads age. Vehicle miles of travel will increase more rapidly than the supply of highways, placing additional demands on the maintenance budget. Consequently, under Base Case conditions, maintenance expenditures per lane-mile are expected to increase from the 1975 levels of $2,627 to $3,180 in 1985 and to $3,936 in 2000 in 1975 dollars.

Policy Options

The following have been identified as policy options to deal with the problem of highway maintenance:

- Improve highway maintenance through management training, promotion and demonstrations of new ideas, and research and development.
- Establish Federal maintenance standards and a process of Federal inspection or State inspections to meet Federal standards.
- Divert revenues from an increased user tax on gasoline to State and local governments for capital and maintenance expenditures.
- Incorporate maintenance as well as capital programs in the highway planning process.
- Increase categorical funding and promote low-capital expenditures.
- Permit the transfer of funds from capital categories to maintenance activities.
- Provide block grants to States—with pass-through provisions for localities to be used on any reasonable mix of maintenance work or, alternatively, provide block grants directly to localities.

The arguments for and against a more active role for the Federal Government in highway maintenance have been summarized below to indicate the range of policy questions that will have to be addressed.

Arguments in Favor of an Increased Federal Role in Highway Maintenance.—

- Given the size of the social and economic investment in the highway system, the Federal Government should act to preserve that system.
- The highway dollar is under intense pressure from mass transit advocates, environmentalists, planners, and local governments. Matching funds for highway construction have become scarce, and States are reluctant to obligate the recently released impounded funds because of matching requirements. To free sufficient funds for a fully balanced highway program, States must be relieved of the entire maintenance burden.
- State and local governments need assistance to offset the effects of inflation and the inability of State user and property taxes to keep pace with needs.
- State legislatures have reduced maintenance expenditures in favor of capital expenditures to take advantage of Federal aid available for capital projects.
- The present, loosely managed highway maintenance program would be more effective if it were subjected to standards and inspection requirements in exchange for Federal aid.
- Federal aid for maintenance would provide State and local governments with greater flexibility in developing a proper mix between maintenance and capital investment.
- The 3R program provides evidence that maintenance projects can be adequately coordinated and promoted at all levels of government.
- Maintenance of Federal-aid highways is currently required by States, and the FHWA is authorized to review the adequacy of State maintenance programs. Thus, policies providing for an increased Federal role are compatible with the institutional division of responsibility.

Arguments Against an Increased Federal Role in Highway Maintenance. —

- Since State and local governments are close to the problems, only they can provide a flexible response to diversified local needs.
- There is historical precedent for State and local governments to maintain their own streets and roads.
- Federal aid for maintenance will unnecessarily increase red tape.
- Federal aid for highway maintenance will increase Federal control of accounting procedures, disbursements, and program mixes.
- There are no adequate work-performance measurements or standards for highway maintenance.
- Maintenance activities are carried out by a variety of work forces—State and local forces, private contractors, convict labor—making standardization almost impossible.
- Federal aid to maintenance would divert funds from the effort to complete the Interstate System.
- Unanticipated maintenance work such as the damage to highways created by storms or accidents cannot be planned or standardized.

Congestion Cost= Pricing

During the 1950's and 1960's, highway congestion was considered the major transportation problem, and highway construction was the preferred means of dealing with it. In the 1970's however, attitudes changed and highway construction came to be viewed by many as the cause of serious social problems. The highway building program was also criticized from the standpoint of equity. It was argued that the costs of building and maintaining additional lanes to deal with congestion are really commuter subsidies, since commuters are not taxed in proportion to their share of the costs.

As the economic costs of construction continue to escalate and as the social costs of highway building are reassessed, new strategies to cope with congestion are being sought. One such strategy, which aims to provide both increased capacity and a more equitable distribution of the cost of highway mobility, is the policy of congestion cost-pricing.

Factors and Trends Affecting Congestion

The problem of congestion is not an evenly distributed one geographically. Congestion has rarely been a problem in rural areas, except around major recreational sites. In urban areas, congestion is most severe during morning and afternoon hours on roads that serve high- density activity centers. Even within cities, the congested area is usually only a small part of the metropolitan region (typically less than 10 percent), and periods of congestion usually total only 4 to **6** hours per day. [40]

Given their present low levels of congestion, rural highways could accommodate future increases in the number of vehicle miles traveled—predicted to be in the range of 60 percent for all rural highways—without significant changes in average speeds. In urban areas, however, the picture is quite different. Increased growth in highway travel projected for the next **25** years will result in more congestion in urban areas. [41] As figure 48 indicates, this growth will occur on roads that already carry a large percentage of urban auto travel. Figure 49 indicates that there will be large speed decreases on these roads, and their current speed advantages over other highways will be considerably reduced.

The proportion of urban interstate highway travel occurring under congested conditions is projected to increase from about 10 percent in 1975 to about 34 percent in the year **2000.** Figure 48 also shows that for "other freeways and expressways" in urban areas, travel under congested conditions is projected to increase from about 11 percent of VMT per day to **30** percent. This means that the typical urban motorist in the year 2000 can expect to encounter stop-and-go traffic on freeways about 3 times as often as today.

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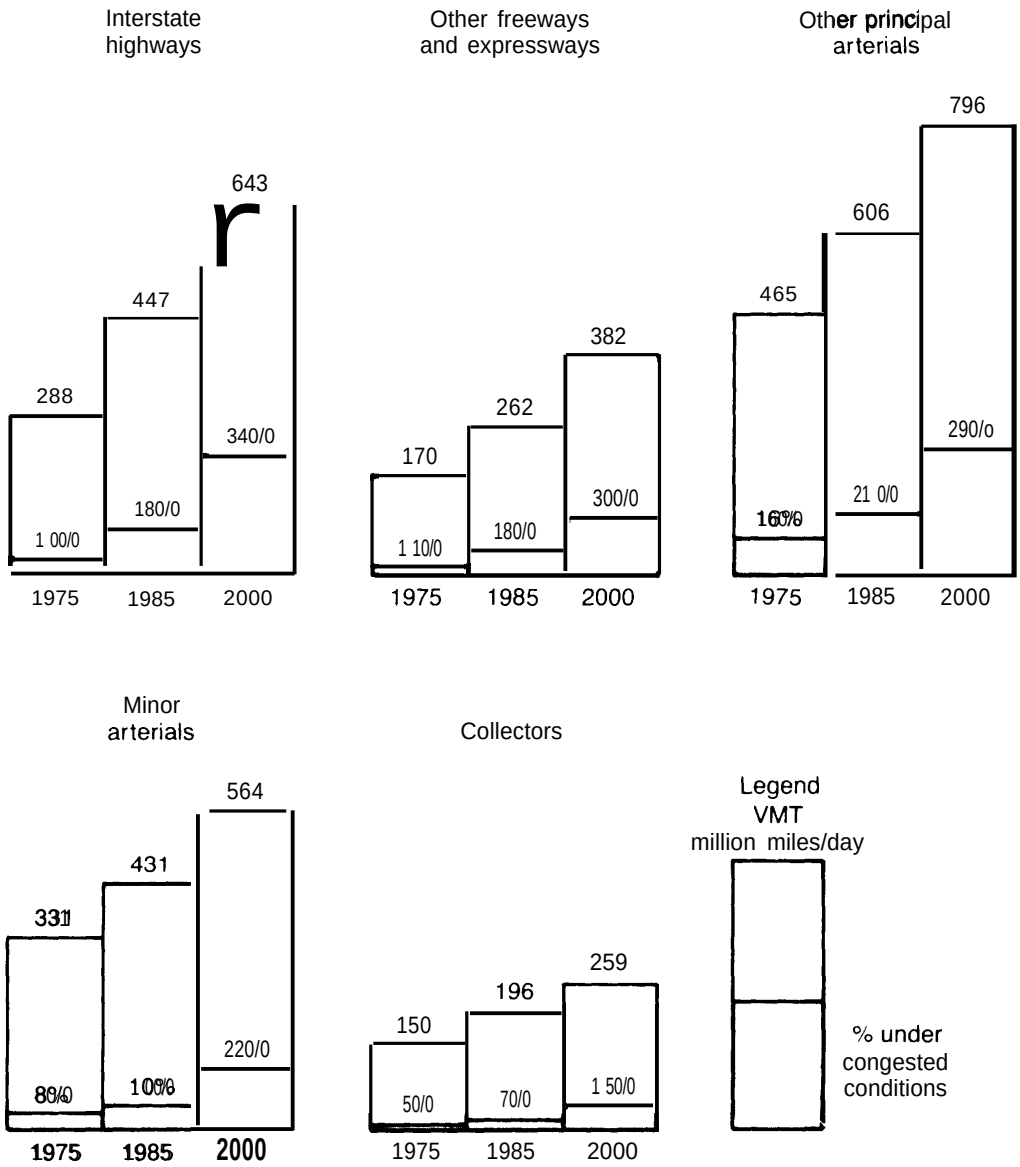
[40] Joel L. Horowitz, "Pricing the Use of the Automobile to Achieve Environmental and Energy Goals: A Comparison of Measures and Effects," *Urban Transportation Pricing Alternatives*, papers presented at a conference on May 14-17, 1976, Easton, Md., conducted by the Transportation Research Board, National Academy of Sciences, p. 3.

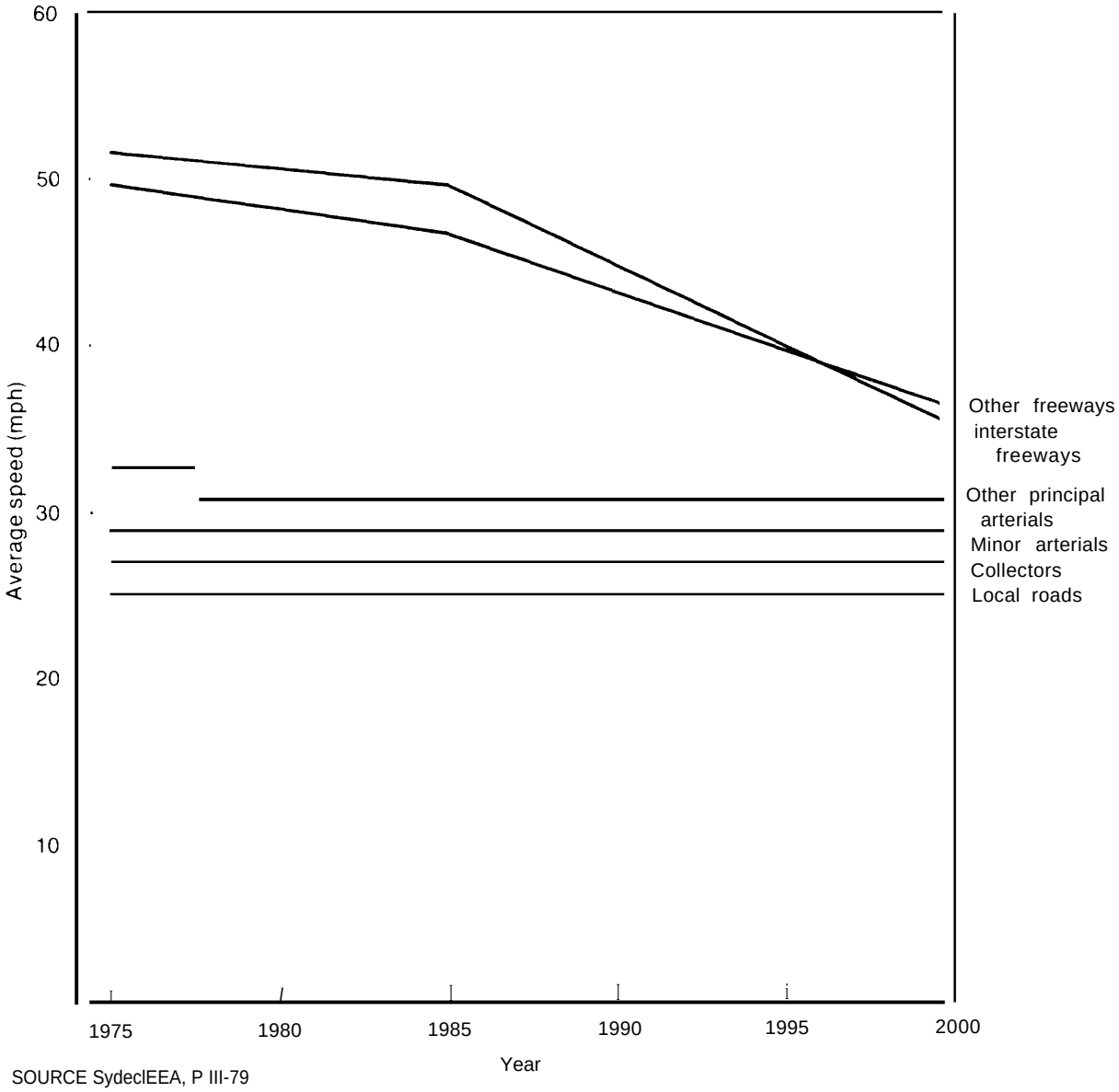
[41] *Sulec EFA*, p. 77.

Figure 48.—Total Urban Automobile Travel Under Congested Conditions for 1975, 1985, and 2000



SOURCE: Sydec EEA, p, 77

Figure 49.—Projected Average Speed in Urban Areas



SOURCE SydeclEEA, P III-79

Present Policies

Because urban congestion was not considered to be a major transportation problem until the 1950's, Federal highway policy was aimed not at relieving congestion in the cities, but at connecting isolated rural areas. Provisions for a continuing urban area highway program were first contained in the Federal Aid Highway Act of 1944.[42] The need to build urban highways was reaffirmed with the establishment of the Interstate Highway Program, which allocated 9,249 miles to the urban system.

From the beginning, however, there was disagreement as to whether the urban system should be designed primarily to extend intercity highways into urban areas or to serve the specific needs of metropolitan areas.[43] At the heart of the justification for the urban interstate was the argument that the construction

[42] U.S. Congress, House, Committee on Public Works, *Urban System Study*, Report of the Secretary of Transportation to the U.S. Congress, 94th Cong., 2d sess., December 1976, p. 13.

[43] Schwartz, pp. 470-477

of additional highways would reduce congestion by allowing a freer flow of traffic and reducing driving time. This claim was not borne out by events. Highway building could not keep pace with the growth in urban traffic, some of which was induced by the construction of additional highways .44

In the face of increased construction costs and public opposition to urban freeways, new major construction was slowed down in the 1970's. The Federal Government's approach to reducing congestion shifted from capital-intensive investment to strategies designed to make more efficient use of existing facilities and to allow greater local flexibility in choosing the means to reduce congestion. Evidence of the Federal Government's commitment to reducing traffic congestion can be found in the Federal Highway Code which states:

> The Congress hereby finds and declares it to be in the national interest that each State should have a continuing program within the designated boundaries of urban areas of the States designed to reduce traffic congestion and to facilitate the flow of traffic in the urban area. "

Federal planning regulations required that after October 1975, transportation plans should explicitly deal with short-term as well as long-term strategies and with operational as well **as** capital improvements. Subsequently, each metropolitan planning organization was required to submit a transportation system management (TSM) plan aimed at bringing about more effective usage of existing transportation capital stock. One of the options consistent with this mandate is congestion cost-pricing,

Policy Options

Economists often argue for congestion cost-pricing as a low-cost solution to the problem of congestion. In their view, such a policy not only would lead to optimal resource allocation and the efficient use of capacity, but also would cover the full social costs of the resources used.[46] Drivers would be charged for operating a vehicle—or, more effectively, for operating a low-occupancy vehicle—during the peak hours in highly congested sections of urban areas .47

Efficient use of streets would be achieved, since the price charged to drivers would link trip decisions to travel time. During peak hours, drivers would pay a fee proportionate to what they contribute to the total congestion on the highway. The price would be economically efficient if it equaled the social costs that the motorists imposed minus the actual payments in the form of other taxes, fees, and their own time expenditures. 48

One of the arguments in favor of road-pricing is that it is a flexible strategy whereby prices can be adjusted in accordance with the levels of improvement desired. Road-pricing also provides an element of choice. An individual can still choose to drive, but he does so at a price. Road-pricing is not only an inexpensive method of discouraging auto travel, but also a means of generating new revenue that can be used to develop alternative means of transportation. Pricing programs can also be combined with other programs designed to limit the use of energy, to reduce automobile emissions, or to encourage the use of alternate means of transportation.[49]

Although several methods and mechanisms have been proposed for administering road-pricing schemes, the most popular is some form of supplementary licensing. Licensing would be flexible, comprehensive in its application, relatively easy to enforce, and inexpensive to implement.

Several Federal Government agencies have been evaluating congestion cost-pricing. A National Science Foundation study recommended Federal support for a site-specific demonstration

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[44] Ibid., p. 490.

[45] "Transportation Improvement Program," *Federal Register* 40 (Sept. 17, 1975): p. 42978.

[46] *SRI*, p. E-5.

[47] C~~ngestlon represents a situation in which the sum of all costs (money, time, discomfort, etc.)of allvehicles using a road exceeds the sum of the cost it each vehicle were to use it separately. This sit uat ion occurs because the level of service decreases (or alternately, the level of congestion increases) as each additional vehicle enters the road. Thus, when a mot orist enters a road, he imposes a costono t her drivers that exceeds the extra time and discomfort that he will have topayto use the raod. It is for this additional cost that the motorists would be charged under apolicyof congestion cost-pricing.

[48] Kiran Bhatt, *What Can We Do About Traffic Congestion 7 A Pricing Approach* (Washington, D. C.: The Urban institute, April 19701, p. 15.

[49] Tom Higgins, *Compar ing Strategies for Reducing Traffic Related Problems The Case for Road Pricing* (Washington, D, C,: The Urban Institute, September 197tJ).

Photo Credit: U.S. Department of Transportation

planning project.'" The Office of Service and Methods Demonstration in the Urban Mass Transportation Administration (UMTA) has been actively involved in developing such a project since 1974. A panel representing several Government agencies and private concerns, all interested in mass transportation, energy, and the environment, has been established to provide advice.[51]

In the demonstration project, a congested area of the city will be designated an "area of experiment" during certain hours of heavy travel. Private automobile drivers, wishing to drive in this area during peak hours, will be required to purchase and display a license.[52] The Office of Service and Methods Demonstrations has adopted criteria for selection and has conducted a preliminary screening of candidate cities. Preliminary sketch designs will be made in approximately three to five cities, and actual implementation will be carried out in at least one.[53]

In conjunction with FHWA and EPA, UMTA is evaluating the congestion pricing scheme in use in Singapore. They are also conducting a study to determine the potential of parking policies for reducing the use of low-occupancy vehicles in congested areas.[54]

Effects and Impacts

If the arguments in support of congestion cost-pricing are valid, why has no local government sought to implement such a program in an effort to reduce automobile congestion? The reluctance of local officials to institute road- pric-

[51] Bert Arrillaga, "The UMTA Transportation Program," *Urban Transportation Pricing Alternatives*, p. 10.
[52] Ibid., pp. 11-12.
[53] Ibid.
[54] Ibid.

ing appears to be related to its potential repercussions. Although the economists' assertion that congestion cost-pricing will have net social benefits might be true, such a policy is likely to have impacts and costs that are not equally distributed.

Automobile users will be most affected. Those who continue to drive, in spite of the congestion charges imposed, will pay a fee that might or might not outweigh the value that they place on the time saved or the convenience gained.[55] Even if motorists value their time highly, they are likely to resent the imposition of congestion fees. Some drivers will be forced to forego trips in congested areas during peak hours.

Businessmen and the owners of parking facilities in downtown areas would also be directly affected by the imposition of congestion charges although the degree of impact would depend on other variables, such as the existence and convenience of alternate modes of transportation. Lacking empirical evidence, it is difficult to predict exactly how a road-pricing scheme would affect business in downtown areas. However, what is important to local politicians is the belief of local businessmen that their interests would be impaired.

[55] Damian Kulash, *Congestion Pricing: A Research Summary*, (Washington, D.C.: Urban Institute, July 1974), p. 3.

Current transit riders, who have to share facilities with additional riders, would also be affected by a policy of congestion cost-pricing. Some of the burden on public transportation might be eliminated if there were more room on highways for high-occupancy vehicles and if road-pricing revenues were channeled into the improvement and expansion of alternative modes of transportation.

Since congestion is not evenly distributed, the question of how much money the Federal Government should spend to reduce the problem is also likely to be an issue. If the funding available for all highway-related needs remains more or less the same, then any money spent on reducing congestion will beat the expense of other highway-related programs. In this sense, all those who are not the direct beneficiaries of congestion cost-pricing—rural dwellers and non-commuters, for example—would be negatively affected, although in a minor way, since the funding necessary to support such a scheme would be relatively small.

Any effort to predict the effects and impacts of a road-pricing policy would be speculative, since there have been no attempts to implement such a policy in the United States. To the extent that the conditions in Singapore are comparable to those in the United States, some useful

Photo Credit U S Department of Transportation

lessons can be drawn from that city's efforts to reduce traffic congestion. The World Bank has monitored the program and made an initial evaluation, from which the following observations are drawn. [50]

In an effort to reduce congested conditions and to prevent what, on the basis of growth trends, was predicted to be an extreme level of congestion, the City of Singapore instituted in 1975 a program of road-pricing designed to reduce peak-hour traffic by 25 to 30 percent. The traffic restraint scheme includes parking fees, area licenses, and a park-and-ride system to provide motorists with an alternative mode of transportation. To enter a designated area where congestion is to be reduced, a driver has to display a supplementary license that can be bought in the post office or in other public service areas. Public transportation and other high-occupancy vehicles, including carpools, are exempt from the licensing requirement. Within 6 months after implementing the program, the volume of traffic entering the restricted zone had been reduced by 40 percent.

The Singapore experience was also judged successful in terms of the ease with which it was implemented. Although the park-and-ride facilities proved to be unpopular and the price of licenses may have been set too high initially, the program was relatively easy to administer and acceptable to the general public. Enforcement proved not to be a serious problem. Apart from the expense of constructing fringe parking facilities and erecting new signs, the cost of the program was approximately $3 million. "

It is sometimes said that road-pricing schemes can kill three birds with one stone: reduce congestion, improve air quality, and reduce energy consumption. Preliminary analysis suggests, however, that the net effect on air quality and energy consumption would be insignificant. Since the characteristics of congestion, air pollution, and energy consumption vary, so must the measures that are applied to deal with them.[58] Since congestion pricing is aimed at changing the time and not the volume of automobile use, the net value in reducing pollution and energy consumption is likely to be negligible.[59]

GOVERNMENT= INDUSTRY RELATIONS

To achieve changes in the characteristics of the automobile transportation system, the Federal Government has traditionally relied on regulations and performance standards, leaving to the industry the tasks of acquiring capital and developing the technology to comply. Table 118 lists the major regulatory measures that have been enacted for automobiles by the Federal Government in the past 15 years.

With the growing awareness of the problems related to the automobile and with the increased cost and technology required to deal with these problems, the Federal Government has become more directly involved in financing and conducting research and development of new technologies to meet national goals. Although there is general agreement that the new development of technology requires substantial capital and technical resources, there is strong disagreement about whether the Federal Government should intervene in the free market either to stimulate technological innovation or to preserve or alter the present structure of the market.

An important factor in the relationship between the Federal Government and the automobile industry is the importance of the industry to the national economy. The automobile industry's role in the economy can be seen in figure 50 and table 119, which depict the contribution of the industry to personal consumption, investment, and the national income. Equally revealing are the employment statistics for the automobile industry and related services and business shown in table 120.

Given the scope of the automobile and auto-related industries, it is clear that policies affecting these industries will affect the national

[57] Edward P. Holland and Peter L. Watson, Ekistics, July 1976, pp. 14-18, reprinted from *Finance and Development* 13 (March 1976).

[58] Ibid., p. 16.

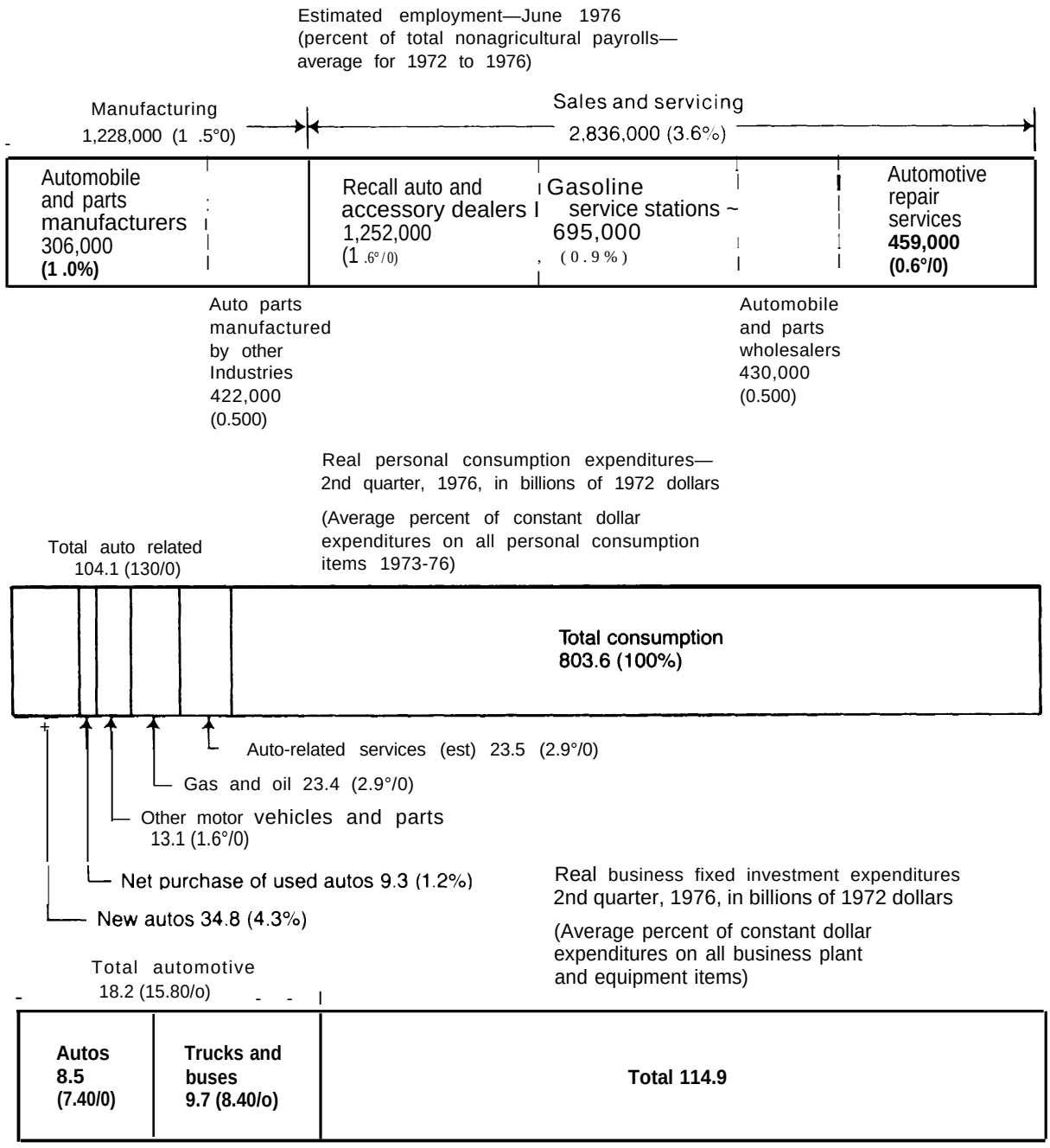
[59] Horowitz, p. 15.

[60] Ibid.

Table 118.—Legislation Affecting Automobile System Characteristics and Use

Safety	
1963	*The Roberts Bill, Public Law 88-515.* —Required that motor vehicles purchased by the Federal Government meet safety standards.
1968	*National Traffic and Motor Vehicle Safety Act and Amendments (1970, 1972, 7974), Public Law* 89-563,–Established safety standards, with mandatory inspections for motor vehicles i n interstate commerce.
1972	*Motor Vehicle /formation and Cost Savings Act and Amendments (1974, 1975), Public Law* 92-513.–Required manufacturers to disclose information indicating compliance with the standards set for bumpers and odometers. Required DOT to publish consumer information on new cars (not yet implemented).
cost	
1956	*Automobile Dealer Suits Against Manufacturers, Public Law 84-1026.* —Enabled franchise automobile dealers to bring suit against manufacturers for failure to comply with terms of franchises.
1958	*Automobile Information Disclosure Act and Amendment (1972), Public Law 85-506.* —Required full disclosure of information in the distribution of new automobiles.
1974	*Magnuson-Moss Warranty —Federal Trade Commission /improvement Act, Public Law 93-637.* — Provided disclosure standards for consumer product warranties i n regard to used motor vehicles.
Energy	
1974	*Energy Supply and Environmental Coordination Act, Public Law 93-319.* —Authorized a fuel-economy study to be undertaken by the Department of Transportation (120-day study) to establish a fuel-economy improvement standard.
1975	*Energy Policy and Conservation Act, Public Law 94-163.* —Established standards for motor vehicle fuel economy with a goal of *27.5* mpg for 1985.
1976	*Electric and Hybrid Vehicle Research, Development, and Demonstration Act, Public Law* 94-413.—Authorized a Federal program of research and development for electric vehicle technologies and demonstrate ion of their feasibility.
Environment	
1963	*Clean Air Act and Amendments (1965, 1966, 1967, 1970, 1971, 1973, 1977), Public Law 88-206.* —Encouraged greater efforts to develop devices and fuels that will reduce air pollution from motor vehicles.
1965	*Motor Vehicle Air Pollution Control Act, Public Law 89-272.* —Required standards for automotive emissions control on new motor vehicles.
1972	*Noise Control Act, Public Law 92-574.* —Established noise regulations for motor carriers engaged in interstate commerce.

Figure 50.—Scope of U.S. Automotive Industry



SOURCE Unpublished report of the A J Kearney, Inc Management Consultants, for the U S Environmental Protection Agency April 1977 pp II-5 and II-6

Table 119.—Contribution of the Motor Vehicle and Equipment Industry to National Income in 1973 and 1975[a] (billions of 1975 dollars)

	1973	1975
All industries (excluding government)		
Domestic income	$898	$1,025
Employee compensation	633	729
Corporate profits[b]	99	92
All manufacturing		
Income	**284**	**310**
Employee compensation	**230**	**251**
Corporate profits[b]	**44**	**46**
Motor vehicles and equipment manufacturing		
Income	$23.1	$18.5
Percent of all industries	2.5%	1.8%
Percent of manufacturing industries	8.2%	6.0%
Employee compensation	$16.4	$15.7
Percent of all industries	2.6%	2.2%
Percent of manufacturing industries	7.1%	6.2%
Corporate profits[b]	$5.8	$0.9
Percent of all industries	5.9%	1.0%
Percent of manufacturing industries	13.2%	1.9%

[a]Without capital consumption adjustment by industry.
[b]With inventory valuation adjustment.
SOURCE: Unpublished report of A. J. Kearney, Inc. Management Consultants, for the U.S. Environmental Protection Agency, April 1977 pp IL5andIL6

Table 120.—Automobile industry Employment,1976

Industrial sector	Employment
Motor vehicle and parts manufacturing	948,000
Auto and parts retail dealers	1,116,000
Auto and parts wholesale dealers	380,000
Service and garages	447,000
Gasoline service stations	627,000
Construction of highways and streets	299,000
Petroleum industries	397,000
State and local highway departments	582,000
Total	4,796,000

SOURCE Transportation Association of America, *Transportation Facts and Trends*

economy significantly. Projections of the future of the automobile industry, therefore, will have an important bearing on the kinds of policies that the Federal Government might consider.

Trends and Implications

The Base Case contains the following assumptions and projections about automobile technology and the industry's response to present policies:

- It is expected that the basic technology will be available to meet Government standards on fuel economy, emissions, and safety by 1985.
- Incorporating this technology will increase the average price of a new car by about $5oO (in 1975 dollars).
- In order to achieve fuel-economy standards, manufacturers will reduce the size and weight of automobiles, perhaps by an average 800 to 1,000 pounds between 1977 and 1981. Further size and weight reductions are expected during the period 1981 -2000.[60]
- The major impact of Government policies and changes in demand will become evident by 1985. After that, changes will occur more slowly but in the same direction.
- The impact of increased auto prices on sales will be more than offset by general economic trends and by reductions in the real cost of automobile ownership and operation. As a result, new car sales are expected to increase from 10 million in 1976 to 13 million in 1985 and 16.4 million by 2000.

[60]U.S. Department of Transportation, National Highway Traffic Safety Administration, *Data and Analysis for 1981-1984 Passenger Automobile Fuel Economy Standards*, Summary Report, Feb. 28, 1977.

New Car Sales and Prices

The implications of these trends for new car sales and prices are shown in tables 121 and 122. While new car sales are expected to increase 29 percent overall between 1976 and 1985, the bulk of this increase will occur in the subcompact, compact, and small luxury classes. Sales of intermediate and standard cars will fall dramatically, largely as a result of fuel-economy standards. New car prices by size class are predicted to increase between **$470 and $510 by 1985 (in** 1975 dollars).

Prices within size classes (excluding the impact of Government standards) are expected to remain about the same as today. However, if manufacturers downsize cars without reducing their price, the prices for the smaller size classes shown in table 122 might be somewhat understated.

The impact of Base Case projections of automobile sales on employment depends on productivity. If the rate of domestic new car sales per employee continues to increase by **2.7** percent annually, employment in 1985 will be 2.2 percent less than 1975, a loss of 18,000 jobs. Lower productivity gains in other motor vehicle manufacturing activities, a decline in the share

Table 121.– Change in the Distribution of New Car Sales, 1976-85

	Percentage		Volume (thousands)		
	1976	1985	1976	1985	Percent change
Subcompact.	22	30	2,225	3,940	+ 77.1
Compact.	19	30	1,921	3,940	+ 105.1
Small luxury	5	9	506	1,196	+ 136.4
Intermediate.	29	16	2,831	2,111	– 25.4
Standard	20	7	2,022	936	– 53.7
Large luxury	6	7	606	936	+ 54.4
Totals	100	100	10,110	13,058	+ 29.2

SOURCE Sydec/EEA, pp.III 165.

Table 122.—Projected Sales and Economic Data for the Auto Industry (1975 dollars)

New car price by size of class	1976	1985 Base Case	1985 All other cases
Subcompact	$3,600	**$4,080**	**$4,080**
Compact ., ...	4,200	4,710	4,710
Intermediate ... , ...	4,600	5,090	5,090
Standard	5,400	5,890	5,890
Small luxury.	5,650	6,130	6,130
Large luxury.	8,800	9,270	9,270
Gross revenue per domestic car sold	4,990	5,220	4,880
Annual domestic sales (thousands)	8,610	10,710	10,550
Annual domestic sales revenue ($ millions). . ... , . .	$42,950	$55,940	$51,460
Capital investment ($ millions).	$ 3,640		
New capital requirements for fuel-economy standards (millions, cumulative 1977-85).		$7.6	$7.6-$8.0'
Auto manufacturing employment (domestic)[b]. . . .	808,800	790,800	780,000

[a]The higher capital requirements are associated with higher diesel penetration rates in the Petroleum Conservation Case.
[b]Employment figures are for the four major domestic manufacturers and include only passenger car and auto parts manufacture.

SOURCE Sydec EEA pp. I I 163 to III 172 and Supplementary Report

Table 123.—Net income and Net Income as a Percent of Sales in the U.S. Automobile Industry, 1969-76

	Net Income ($ millions)					Net income as percent of sales				
	GMC	Ford	Chrysler	AMC	Total	GMC	Ford	Chrysler	AMC	Total
1969	$1,710.7	$546.5	$ 99.0	$ 4.9	$2,361.2	7.0	3.8	1.2	0.7	5.0
1970	609.1	515.7	(7.6)	(56.2)	1,132.4	3.2	3.4	(0.1)	(5.2)	2.8
1971	1,935.7	657.0	83.7	10.2	2,686.5	6.8	4.1	1.1	0.9	5.0
1972 ., ...	2,162.8	870.0	220.5	30.2	3,283.4	7.1	4.4	2.3	2.1	5.3
1973	2,398.0	906.5	225.4	86.0	3,645.9	6.7	4.0	2.2	2.6	5.0
1974	950.0	360.9	(52.1)	27.6	1,286.4	3.0	1.6	(0.5)	1.4	1.9
1975	1,253.0	322.7	(259.5)	(35.6)	1,280.7	3.5	1.4	(2.2)	(1.5)	1.7
1976	2,908.0	993.0	15.5	(34.4)	4,274.0	6.2	3.4	3.4	(1.5)	4.6

SOURCE: Wards Communications, Inc., *Ward's 1977 Automotive Yearbook*

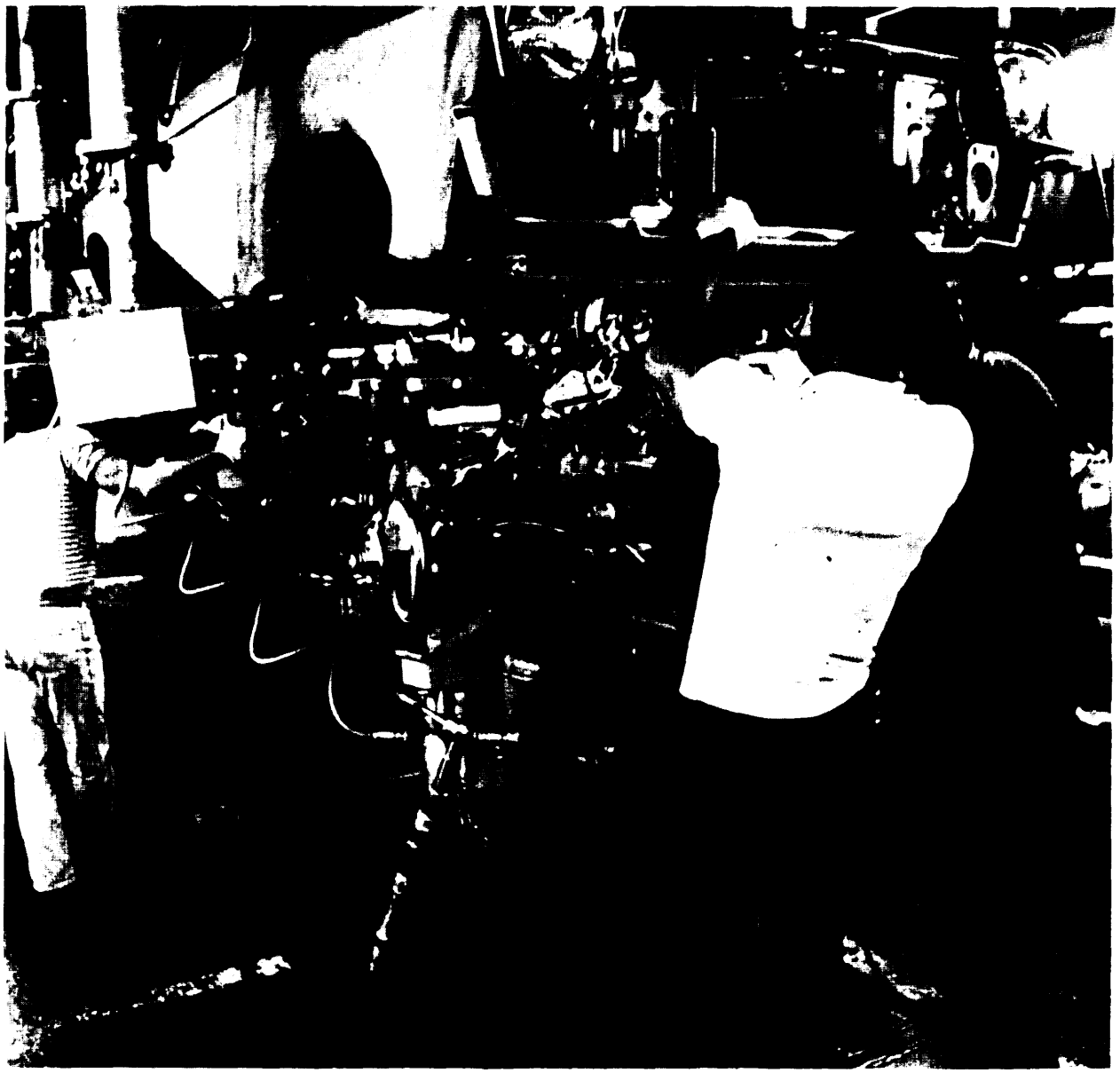


Photo Credit General Motors Corp

of imports, or the movement of foreign firms into the United States might act to offset some or all of this decline in employment.

The rate of profit in the automobile manufacturing industry varies considerably from year to year, depending on the company and the business cycle. Table 123 shows net income and net income as a percent of sales for the four major domestic manufacturers for the years 1969 to 1976. Although record gains in net income were experienced in 1976, net income as a percentage of sales was lower than it had been in several years. On the whole, however, the industry's return on equity and profit margins were comparable to those in other manufacturing industries. General Motor's profits were significantly higher than those of the other manufacturers, evidence of the relationship between profits and sales volume.

The significant increases in the rate of growth in sales improves the outlook for industry profitability. Because it is assumed that the increased costs of Government standards will be passed on to the consumer in the Form of higher prices, no reduction in profit levels is expected. The effect of Government standards and regulations on product mixes could, however, reduce industry profits.

Although precise data relating the rate of profit to car class and size are unavailable, all indications suggest that the smaller the car, the smaller the profit. A study, conducted in 1976 for the Department of Transportation, estimated that the variable profit margin—the revenue per car less variable costs—for two domestic manufacturers was 19 to 23 percent for compacts and subcompacts, 27 to 32 percent for

Photo Credit: General Motors Corp.

medium-sized cars, and 38 to 40 percent for large cars.[61]

The profit rate is highly sensitive to changes in volume of sales. Meeting Government standards and changing the mix of production will increase fixed costs, which are generally allocated to new car prices on the basis of anticipated volume of sales. Volume growth above expectations, therefore, will increase profits; whereas growth below expectations will cause a significant decline.

[61] D. J. Chupinsky and M. R. Harvey, *Development of a Motor Vehicle Materials Historical, High-Volume Industrial Processing Rates Costs Data Bank*, Volumes I and II (Warren, Mich.: Pioneer Engineering & Manufacturing Co., May 1976 and November 1976).

Industry Structure

The domestic auto-manufacturing industry consists of four major producers: General Motors, Ford, Chrysler, and American Motors. General Motors accounts for over 50 percent of domestic sales; GM and Ford account for over 80 percent. The market shares of manufacturers and their nameplates for the years 1947, 1957, and 1976 are shown in table 124.

Capital investments to meet Government standards and to accommodate changes in demand will increase the sales volume necessary for each firm to realize a profit. If a firm fails to make the required profit, it would have to rely on external sources of capital. While Ford and General Motors are conservatively financed and

Table 124.—Market Shares of U.S. Passenger Car Manufacturers in Selected Years (percent)

	1947	1957	1967	1976
Chevrolet	19.58	24.90	25.93	23.69
Pontiac	6.27	5.61	11.57	9.24
Oldsmobile	5.39	6.38	7.47	11.36
Buick	7.53	6.66	7.57	9.63
Cadillac	1.63	2.50	2.88	3.68
Total, GM	40.44	46.05	55.60	57.60
Plymouth	9.86	10.73	8.23	7.75
Dodge	6.52	4.78	6.72	6.45
DeSoto	2.29	1.92	—	—
Chrysler	3.04	1.94	3.25	1.50
Imperial	—	0.62	0.21	—
Total, Chrysler	21.71	19.99	18.41	15.70
Ford	16.93	24.89	18.60	17.59
Edsel	—	0.89	—	—
Mercury	3.51	4.50	3.84	5.12
Lincoln	0.82	0.61	0.46	0.76
Continental	—	0.01	—	0.71
Total, Ford	21.26	30.90	22.90	24.18
Total, Big Three	**83.41**	**96.94**	**96.91**	**97.48**
Hudson	2.82	**0.02**	—	—
Nash	**3.19**	**0.06**	—	—
Rambler	—	**1.78**	**3.09**	**2.52**
Total, American Motors		**1.86**	**3.09**	**2.52**
Crosley	0.54	—	—	.
Kaiser-Frazer	4.06	—	—	—
Packard	1.57	0.09	—	—
Studebaker	3.48	1.11	—	—
Willys	0.93	—	—	—

SOURCE Ward s Communications Inc *Ward s 1977 Automotive Yearbook* pp 116-117

would have many options open to them, American Motors and Chrysler, having had poor earnings records in recent years, would probably find it difficult to raise funds in the market.

The capital and cost requirements associated with meeting standards will probably deprive the smaller firms of the flexibility needed to invest in both regulation-induced activities and those related to product improvement and productivity. As figure 51 shows, Chrysler is the most highly leveraged of the four companies.[62] This disadvantage, together with the ability of larger firms to withstand cyclical demand conditions[63] and American Motors reliance on outside firms to provide improved engines and equipment to meet Government standards, will further decrease the competitiveness of the smaller firms.

[62] General Motors is one of the most conservatively structured corporations in the United States, with a debt-to-equity ratio of approximately 0.1, compared to a national average of about 0.5. Although Chrysler and American Motors are much more leveraged than General Motors, their debt-to-equity ratios are fairly common for U.S. corporations.

[63] The ability of the larger firms to respond to changing demands is greater than that of the smaller firms. Because of the differences in production volume, all new car changes occur more rapidly at Ford and General Motors than at Chrysler and AMC. Faced with changing demand or production requirements, the smaller firms either have to write off investments faster or face potential market erosion. It is not surprising, therefore, that General Motors is currently the only manufacturer planning to downsize its entire line by 1980.

Policy Options

In view of the relationship between the automobile industry and the national economy, the Federal Government might choose to adopt policies designed to have a direct effect on the structure or economic well-being of the industry. The following discussion suggests potential changes in Federal Government policy with respect to regulation, capital allocation, and research and development that merit further study.

Regulation

The Federal Government's policy of setting regulations and performance standards to deal with automobile-related problems has met with

Figure 51 .— Long-Term Debt as a Percent of Equity

SOURCE .*Sydec/EEA* p III-182

strong criticism and strong resistance by the industry. As late as July 1977, for example, the automobile manufacturers were preparing to turn out 1978 model cars while Congress was amending the emission standards that applied to that model year. Had Congress failed to pass the Clean Air Act Amendments in time, the 1978 cars would have been in violation of the law. The controversy over automobile regulatory policy is not surprising, considering the economic stakes and the fact that regulations must be set and implemented in the face of imperfect knowledge about the causal relationship between automobile improvements and safer travel, cleaner air, and reduced fuel consumption. [b4]

Supporters of the present regulatory system can be found among environmentalist groups, safety advocates, and automobile owners. Regulatory advocates argue that standards are necessary to force technological change within the industry. They prefer standards to market incentives as a means of achieving national goals, because standards, unlike taxes, address the problem directly and provide the public with symbolic assurance that some action is being taken. [bs]

Those who oppose the regulatory system on principle argue that intervention of the Government in industrial decisionmaking has led to an increasing maze of regulations which are inconsistent and generally unresponsive to changes in technology or consumer attitudes and preferences. In their view, the regulatory system has sheltered the industry against competitive pressures, led to higher prices, and has served the public poorly. They strongly advocate the use of market incentives, which they claim are more effective and economically efficient.

The automobile industry does not necessarily oppose standards on principle, but on the grounds that the technology for meeting them is unavailable and the costs cannot be fully recovered even by increasing the price to the consumer. Testifying before the Automobile Industry Task Force, Lee Iacocca, former President of the Ford Motor Company, stated that, between 1975 and 1980, $1.8 billion would have to be spent by the industry to meet Government standards for vehicle safety, damageability, and pollution control. [bb]

Capital Allocation

The costs of research and development of automobile technology to meet Federal environmental, safety, and energy standards have promoted a number of suggestions for Government programs to help companies that experience long-term difficulties raising capital. Manufacturers have traditionally raised capital through the sale of commercial paper in the marketplace, in competition for funds with bank certificate deposits and U.S. Treasury bills. In periods of restrictive monetary policy, the cost of raising funds in this way increases dramatically and aggravates the industry's problem of acquiring capital .[67]

Despite the problems of raising capital, the automobile industry has continually opposed proposals for the nonmarket allocation of funds. Testifying before Congress, the chief economist of the Ford Motor Company argued that the only way to improve the industry's capital position is for the Government to eliminate unnecessary and costly regulations and standards and to improve general economic conditions. "I see no way of maintaining a viable privately owned and operated automobile industry in the country if, (in addition to the Government's present involvement), the Government finances our capital expenditures. "[6g] A representative of American Motors was somewhat less emphatic in his opposition. Although opposed to the Federal allocation of capital, American Motors urged that the Government facilitate conventional borrowing by providing loan guarantees. [b9]

The United Auto Workers (UAW), on the other hand, favor credit allocation as a means of providing capital for the development of energy-related technology. Speaking to the Automobile Industry Task Force, Leonard

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[64] John B. Heywood and others, *Regulating the Automobile* Draft Paper, Report 77-007 (Boston: MIT Energy Laboratory, July 1977), p Iv.

[6] Ibid. p 4 16

[66] U. S. Congress, House, Committee on Banking, Currency, and Housing, *The Automobile industry and Its impact Upon the Nation Economy*, hearings before the Automobile Industry Task Force, 94th Cong., 2d sess., Vol. 1, June 1975, p. 286.

'-tIbid.

O* Ibid, p. 105.

[69] Ibid, p. IJQ,

Woodcock of the UAW urged the Government to create a National Production Energy Board empowered to make loans to the private sector, contract with the private sector, enter into joint ventures, and (when necessary) take a direct initiative in development technology. [70]

Government Research and Development

Some supporters of direct Government intervention argue that if the appropriate technology is to be made available, the Government will have to develop it. In their view, the auto industry will be unable to develop technology in response to federally mandated performance standards, because sufficient resources have not been invested in the right kinds of technology. This pattern will continue, since the private sector, operating under normal market incentives, will always tend to underinvest in research for which it is difficult to capture a full return. Federal involvement would be justified on the grounds that the benefits would accrue to both automobile users and nonusers alike. The United Auto Workers have advocated Government research and development in the areas where the private sector has failed to respond. [71]

Opponents of a more direct Government role in research and development argue that the industry can perform adequately on its own and that standards are too stringent in view of available technology, consumer prices, and product demand. The cost of research and development should not be borne by the general taxpayer, since it is the automobile owner who imposes the pollution costs of emissions and who will benefit most from fuel-efficient cars. Although the automobile industry has not opposed Government research and development in areas of general national interest, it has opposed Government efforts to develop specific technological devices .72

CONSUMER COSTS

Consumer costs of automobile travel represent a substantial portion of personal consumption expenditures in the United States. The Department of Commerce and the Department of Labor, the two most reliable sources of these data, estimate that user-operated transportation costs represented between 13 and *20* percent of consumer expenditures in 1973, the last year for which data from both sources are available. 73 The cost of owning and operating an automobile has not changed appreciably over the long term. However, the percentage of the household budget devoted to automobile transportation has risen as the number of households owning more than one car has increased and the number of those without cars has declined. In virtually all but the lowest income categories, expenditures on automobile transportation have replaced food as the second largest item in the household budget.

Trends Affecting Personal Transportation Costs

Figure 52 and table 125 trace the recent history of elements that comprise the cost of private automobile transportation. The total cost of owning and operating an automobile declined steadily in real terms rom *1962* to 1973.[74] After 1973, total automobile costs rose

[70] Ibid., p. 32.

[71] Ibid.

[72] Ibid., p. 239.

[73] Part of the reason for the different estimates is that the Department of Labor restricts the definition of consumer expenditures to those that are made for household items, while the Department of Commerce does not. The Department of Commerce includes in user-operated transportation insurance premiums, less claims paid, while the Department of Labor includes the entire cost of premiums. Department of Commerce data for the past 10 years show the costs of user-operated transportation to be increasing as a percentage of personal consumption expenditures, from 12.2 percent in 1966 to 13.0 percent in 1976.

[74] Total ownership and operating costs include the elements shown in figure 52, with appropriate weights, plus other items such as used car prices, tires, repairs and maintanance insurance, registration and license fees, and parking charges. The index is adjusted to remove cost escalation associated with improvements in the quantity or quality of the products to provide as pure a measure of price trends as possible For example, it some design feature or accessory is added to the list of items included in the base price of a new car the effect on price has been removed in calculating the index

slightly and, by 1976—due primarily to the sharp increase in gasoline and motor oil costs—they reached a level that erased some of the decline of the previous decade. The decline in the real cost of gasoline and motor oil after 1973 was offset by an increase in other cost components—notably new cars and insurance—during the recession of 1974-75.

Gasoline and motor oil costs were declining more rapidly than total costs until 1973-74, when the OPEC price increases raised these costs to a slightly higher level than 15 years earlier. Auto repairs and maintenance costs held constant through the mid-1960's but have gradually and steadily declined by about 10 percent in real dollars during the last decade. New car costs decreased steadily and at a greater rate than other components—more than a 30 percent decline over 15 years in real terms.

Figure 53 describes trends in the major components that make up total automobile-related costs, as they have been identified by FHWA.[75] Cost projections have been made for the years 1985 and 2000.

Although insurance costs have declined in real terms, it is unlikely, according to the FHWA, that such declines will continue. Recent data on insurance rates tend to support this view. Modest decreases might be realized from new safety standards, if they are not offset by the downsizing of cars.

Similarly, the costs of garage, parking, and tolls are not expected to change significantly. Slight decreases have occurred and might continue. As suburbanization continues, a relatively constant number (but smaller proportion) of cars pay garage and parking charges, which are common only in central cities. This might be

[5]Major cost components have been converted to cents per mile (in 1975 dollars). In contrast to the Consumer Price Index, the FHWA data provide a basis for estimating the overall ownership and operating cost of autos and the mutually exclusive components. The FHWA data must be treated with caution, since they are drawn from only one city, the Baltimore metropolitan area.

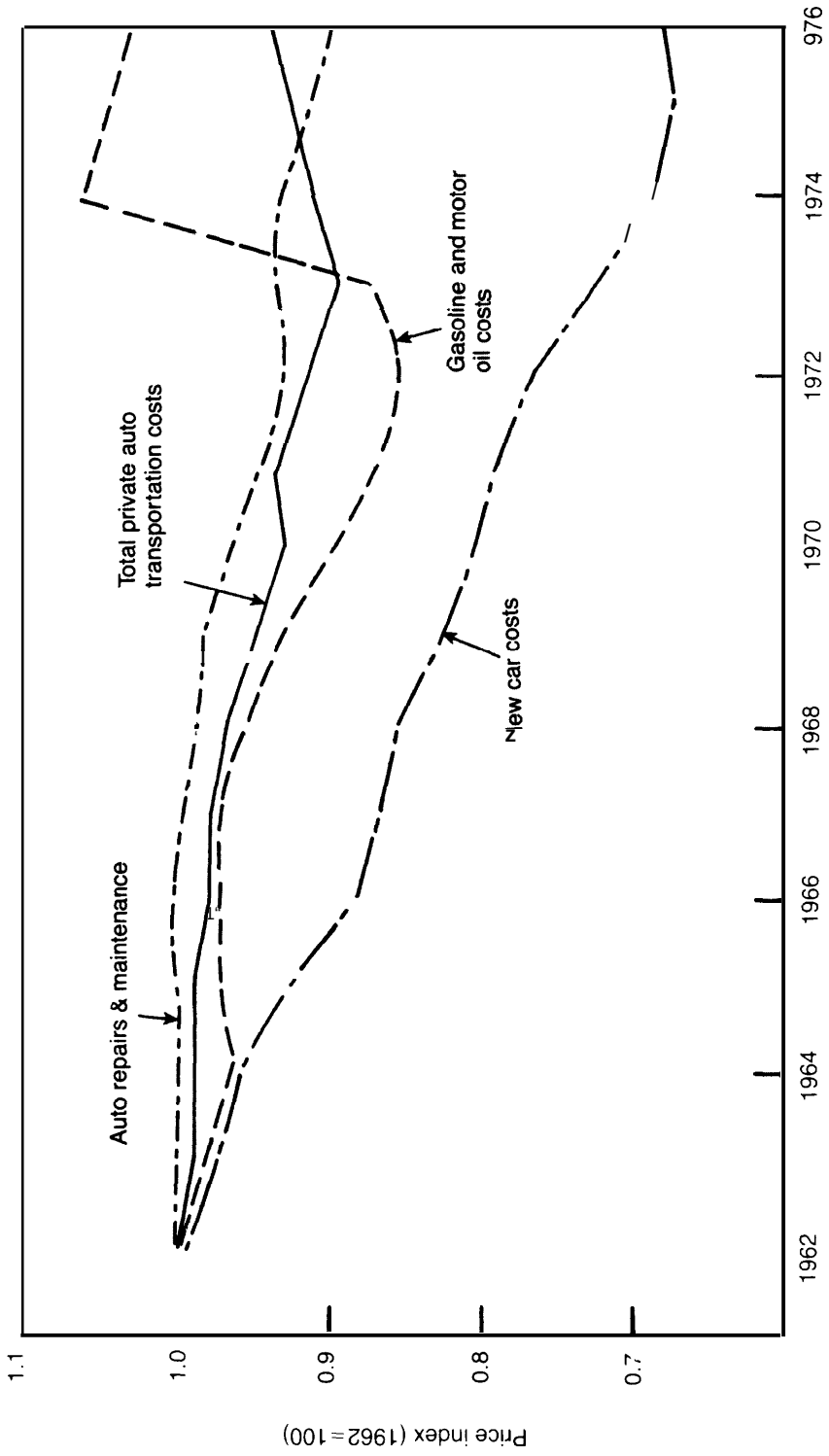
The FHWA studies, particularly the earlier ones, were ad hoc efforts rather than a time+ series analysis such as the Consumer Price Index. Also, the definition of the "standard" car used by FHWA has changed over successive years so that time-series trends in costs have little meaning,

Table 125.—Cost of Owning and Operating an Automobile—1 950 to 1976 (cents per mile, in 1975 dollars)

Type of automobile	Depreciation	Maintenance, accessories, parts, & tires	Gas & oil (excluding taxes)	Garage, parking & tolls	Insurance	State & Federal taxes	Total costs
1976 Standard . . .	4.7	4.0	3.1	2.1	1.6	1.5	17.0
976 Compact . . .	3.6	3.2	2.4	2.0	.5	1.1	13.9
976 Subcompact	3.0	3.0	1.7	2.0	.4	0.9	12.0
974 Standard . . .	4.6	3.7	3.5	2.2	.8	1.6	17.4
974 Compact . . .	3.2	3.0	2.8	2.2	.6	1.3	14.1
974 Subcompact	2.5	2.7	2.2	2.2	.6	1.0	12.2
1972 Standard . . .	5.7	3.3	2.7	2.3	1.8	1.7	17.5
1972 Compact . . .	3.5	2.8	2.3	2.3	1.7	1.3	13.9
1972 Subcompact	2.7	2.7	1.8	2.3	1.5	1.0	12,1
19704 dr. Sedan. .	4.4	2.6	2.6	2.5	2.4	1.9	16.5
19684 dr. Sedan .	4.3	3.3	2.6	2.8	2.2	1.9	17.0
19604 dr. Sedan	4.5	3.6	2.9	2.0	2.4	2.2	17.8
19504 dr. Sedan. .	3.1	2.9	3.1	2.0	2.0	1.6	14.8

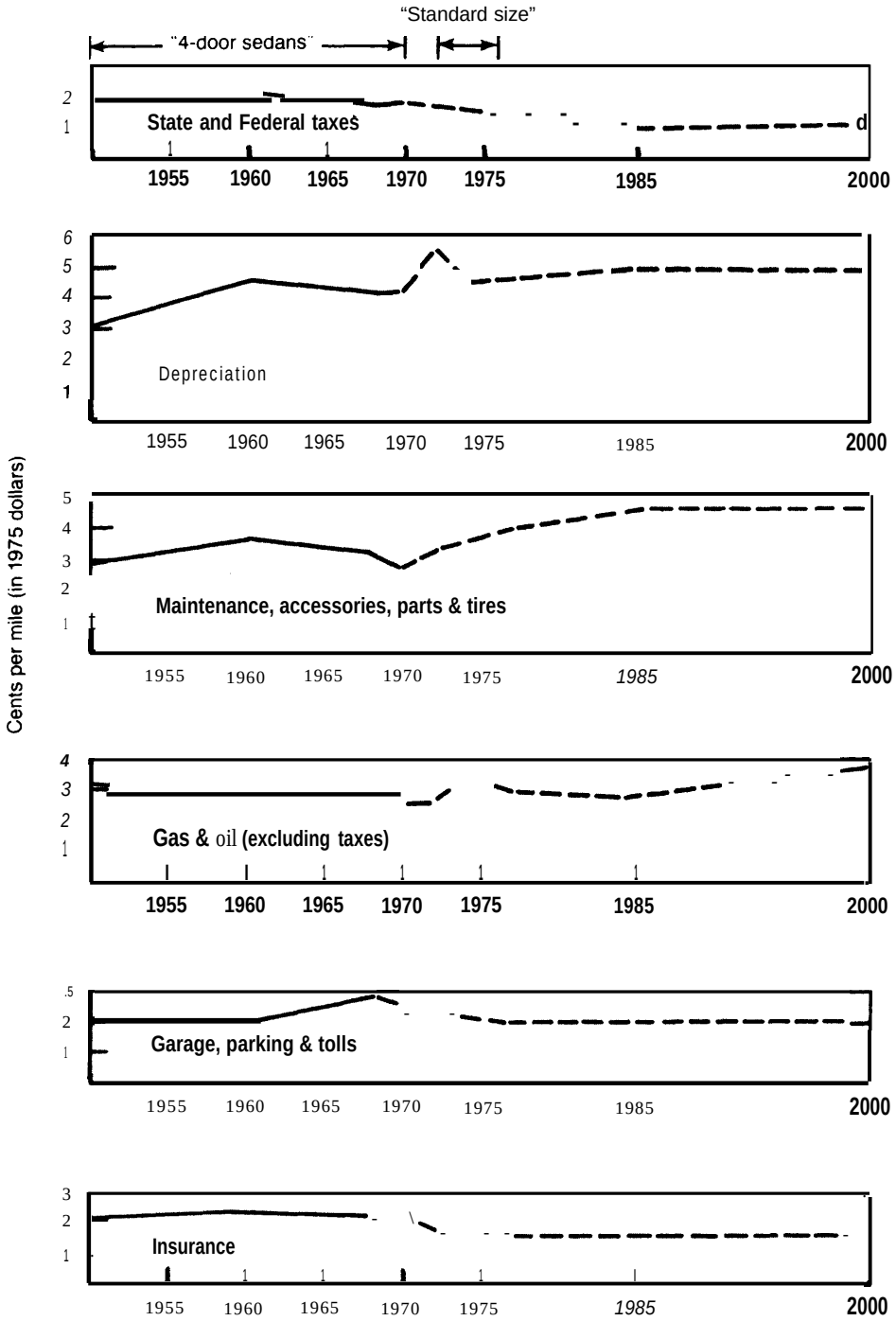
SOURCE U S Department of Transportation, Federal Hlghwa~ Admlmstratlon C;st 01 Owrrlrrg *arrd Operafing* an *Auforrrob//e* 1976

Figure 52.—Comparative Trends in Selected Components of Auto Owner ıip and Operating Costs—Deflated by the Consumer Price Index



SOURCE: U.S. Department of Labor data on components of Consumer Price Index. All values divided by CPI and adjusted to a 1962 base.

Figure 53.—Forecasts for Components of Ownership and Operation Costs of a Standard-Size Auto



SOURCE: *Sydec/EEA*, p. III-153

offset by rate increases in cities seeking to discourage auto commuting. Toll facilities will handle a declining proportion of VMT for similar reasons. Because fewer toll roads are being built, they represent a declining proportion of total highway mileage.

Base Case projections of future gas and oil costs, excluding taxes, are based primarily on fleet miles per gallon, vehicle miles of travel, and projected gasoline prices. Oil costs are projected to change in proportion to gasoline costs. The modest decline in real cost predicted for standard cars from 1976 to 1985 is a continuation of long-term trends. Weight reduction and improved fuel efficiency are expected to contribute to declining cost for the standard-size car through 1985.

Depreciation costs are projected to rise about **9** percent in real terms from 1976 to 1985. Based on new car price trends, a decline of about 2 percent per year, or about 18 percent total over the 9-year period, might be expected for a fixed auto design.[76]

The cost of maintenance, accessories, parts, and tires is projected to increase by about 16 percent in real terms between *1976* and 1985. This increase is slightly above the historical annual rate of increase for the four-door, standard-size car assumed in the FHWA studies, and is greatly above the Consumer Price Index trend, which shows a 10-percent decrease for the auto repair and maintenance cost index over the last 15 years. This upward projection allows for increased maintenance costs that might accompany new safety and emission control equipment.

Table 126 shows forecasts of total ownership and operating costs per mile for each class of new automobile and for the average new car fleet. The overall new car fleet average cost is expected to drop slightly from 15.3 cents to 14.9 cents per mile in 1975 dollars. Because of the projected shift to smaller size cars, this slight decrease in cost is expected to occur despite the price rise of **2** to *6* percent projected for each class.

Because the changing mix of new car sales for 1985 to 2000 cannot be predicted with accuracy, the same method cannot be used to forecast average new car costs per mile for the long term. Generally speaking, costs per mile for the three size classes of cars are expected to increase between **4** and *5* percent between *1985* and 2000. Because of this trend and because the shift to smaller classes will have been largely accomplished, the new car fleet average cost per mile is expected to increase slightly after 1985, reaching approximately the 1976 level of 15.3 cents (in 1975 dollars) by **2000.** Expressed as a proportion of real total personal disposable income, auto ownership and operating costs are projected to decline because real income is forecast to grow at a rate substantially higher than VMT.

[76] This projection allows for a total real increase, relative to price trends, of about 3 times the currently projected cost of $488 (or about 9 percent of the 1975 price of new standard-size cars) for all safety, emissions, and fuel-economy regulatory improvements defined for the Base Case. It makes an allowance for the possibility of having underestimated the costs of these regulatory requirements or of having failed to identify auto cost escalation factors. Similar provisions are made in the 1985 to 2000 forecast by holding the real cost of depreciation constant in spite of past sustained long-term cost decreases of about 2 percent per year.

Table 126.— Estimated Average New Car Costs of Ownership and Operation Based on Projected Shifts in Size Classes

	1976			1985		
Size class	Proportion of fleet in class	cost x per= mile	Contribution to average fleet cost/mile	Proportion of fleet in class	cost x per = mile	Contribution to average fleet cost/mile
Subcompact	0.22	11.9¢	2.6¢	0.30	12.6¢	3.8¢
Compact	0.19	13.8	2.6	0.30	14.3	4.3
Intermediate	0.29	15.4	4,5	0.16	15.8	2.5
Standard	0.20	17.0	3.4	0.07	17.3	1.2
Small Luxury	0.05	18.5	0.9	0.09	18,8	1.7
Large Luxury	0.06	20.1	1.2	0.07	20.2	1.4
Totals	1.00		15.3¢	1.00		14.911

SOURCE The new car fleet mix forecast is based on the EEA auto stock model Ownership and operating cost forecasts by Sydec are based on methods described in Sydec EEA pp III-150 to III 162

Table 127 shows the projections of ownership and operating costs for 1985 and 2000 by automobile size class. Within size classes, costs are expected to increase during both the 1975-85 and 1985-2000 periods. This increase is due primarily to rises in depreciation, maintenance and parts, and gasoline and oil. The Environmental Policy and Conservation Act (EPCA) fuel-economy standards are expected to cause a shift of new car sales among size classes that will be sufficient to offset these increases in each class by 1985, As a result, the weighted overall fleet average costs per mile are forecast to decline slightly from 15.3 cents per mile in *1976* to *14.9* cents in 1985 (in 1975 dollars). By the year 2000, however, the cost reduction due to shifts to smaller cars will be more than offset by continuing increases in the real price of petroleum, so that the average cost per mile for the fleet will return to about the *1976 level.*

Policy Options to Control Consumer Costs

Government policies to control the cost of automobile ownership and use might be directed toward any of the major costs of automobile transportation. Three that have been selected for consideration here are those that deal with the costs of insurance, repair, and maintenance—the three components of ownership and use cost that might rise more steeply than others between now and 2000. The specific policies considered are:

- A Federal law providing for no-fault insurance and other modifications in insurance practices,
- State regulation of repair practices, and
- Federal incentives or standards to increase automobile durability and maintainability.

Automobile Insurance

Projected increases in the number of automobiles and in vehicle miles traveled foreshadow an increase in the number of accidents. This trend, coupled with the rising costs of medical care and vehicle repairs, could lead to increased insurance premiums. Historically, insurance companies have used a system of risk assessment to minimize their losses. Under this system, the decision of whether or not to issue a policy is based on the applicant's driving record, age, sex, marital status, and drinking habits. Critics argue that risk assessment prevents some drivers from obtaining insurance at prices they can afford. Although insurance companies are required to participate in assigned risk pools that make insurance available to high-risk applicants, the rates are so high that many drivers do not buy coverage.

Table 127,—Costs Per Mile of Owning and Operating an Automobile in 1976, 1985, and 2000 (all values in 1975 dollars)

	Subcompact	Compact	Intermediate	Standard	Small luxury	Large luxury
1976. ....., ...	0119	0.138	0.154	0.170	0.185	0.201
Base Case						
1985. ....., ...	0.126	0.143	0.158	0.173	0.188	0.202
2000. . . . . 4°/0 to 5% increase over *1985* due to gasoline price increase.						
Petroleum Conservation						
1985. .., ... 3°/0 above 1985 Base Case due to gasoline price.						
2000. . . . . .4 % above 2000 Base Case due to gasoline price.						
Improved Environment						
1985. , ... 5% above 1985 Base Case due to gas price and air quality equipment.						
2000. . . . . 3°/0 above 2000 Base Case due to air quality equipment.						
Increased Mobility						
1985. . . . . 30/. above 1985 Base Case due to gasoline price.						
2000, ... 1% below 2000 Base Case due to insurance cost decrease.						
Improved Accessibility						
1985. ..., ... 3% above 1985 Base Case due to gasoline price.						
2000. . . . . 4% above 2000 Base Case due to gasoline price.						

SOURCE 1976 data are from FHWA.*Cost* 01 *Owning and Operating an Automobile* 7976, all values adjusted to 1975 dollars based on CPI Sydec forcasts are based upon detailed analysis of cost trends for all components of ownership and operating costs and the !nfluence of each policy case on these costs

It is also argued that the present system is inefficient and fails to provide complete coverage. The late Senator Phillip A. Hart stated that . . . of $5.1 billion of personal and family losses suffered by one-half million serious injury and fatality victims of automobile accidents in *1967,* the auto insurance fault system provided only $813 million. . . ." Averaging all degrees of economic loss, the ratio of recovery to loss ranges from 21 to 36 percent.

The present system has also been criticized for prolonged delays in payment of claims when the responsibility for payment must be determined by trial. In some States, there have been delays of 3 years and longer. Although relatively few suits for claims actually go to trial, settlements are often not negotiated until the trial date approaches.

Thus, consumers have a minimum of three basic complaints about automobile insurance: high cost, perceived inequities in the process of setting rates and making insurance available, and excessive time required to collect claims. An important issue is the role that the States and Federal Government should play in shaping an automobile insurance system that is responsive to these concerns.

Until 1970, the prevailing system in the United States was one that required drivers, judged to be at fault, to pay reparations to accident victims. Because most drivers carried liability insurance, these payments were typically made by insurance companies on behalf of negligent (accident-causing) drivers. Unless fault could be determined through negotiation of the parties and a monetary settlement agreed upon, the matter was decided in a court of law, with the plaintiff having the right to a trial by jury. If successful in obtaining a judgment, the plaintiff received reparations to the extent that the defendent's assets, including any insurance coverage, sufficed to pay the judgment. Often, the substantial delay between the time of the accident and the time of judgment meant that the plaintiff himself had to shoulder the expenses of medical care, loss of work, and substitute means of transportation. The negligent driver, under this system, received no financial assistance, unless he had purchased first-party insurance coverage.

In *1970,* Massachusetts became the first State to institute a "no-fault" reparation scheme whereby each driver in an accident is paid immediately, by his own insurance company, for medical expenses incurred up to $2,000. Since 1970, 23 other States have instituted some type of no-fault insurance plan. Insurance companies cannot independently adopt a no-fault insurance scheme since, under present regulations, they must follow the law of the State in which they operate.

Theoretically, a pure no-fault plan would avoid the need to go to court to determine liability and the amount of reparation to be made by the negligent driver. The question of fault would be irrelevant, and compensation for economic loss would be made to all injured parties on an established payment schedule. A pure no-fault system would also prohibit any suit in tort for damage recovery, making accident victims dependent on established schedules for recovery, However, no State has adopted a pure no-fault system. All **23** States have established thresholds such that, if a person suffers economic loss above a certain amount, he can sue for further recovery in the courts. Therefore, many drivers in no-fault States continue to carry liability insurance to guard against the possibility of a substantial court judgment against them.

The Federal Government could approach the problem of automobile insurance in three ways: continue to let the States regulate all automobile insurance, establish national insurance standards, or expand existing Federal social programs to deal with the problems faced by drivers involved in automobile accidents.

If the Federal Government were to establish a national plan to deal with the costs of automobile accidents, it might either set standards for States to meet or exceed, or it might impose specific requirements. A precedent for Federal involvement exists with the uniform safety standards established for the States.

The idea of setting Federal insurance standards is not new. Legislation to that effect was introduced in the 92d, 93d, 94th, and 95th Congresses. Two identical bills were introduced in April 1977, under which basic standards would

be established for no-fault benefit plans providing for rehabilitation of, and compensation for, motor vehicle accident victims. (S. 1381 and H.R. 66ol: The Standards for No-Fault Motor Vehicle Benefit Act.) These bills allowed each State to establish its own no-fault plan, as long as it met or exceeded Federal standards. The proposed standard benefits included:

- Emergency treatment and care and medical and rehabilitation expenses up to $100,000 (in some cases $250,000), with optional coverage of up to $1 million,
- Wage losses up to $12,000,
- Replacement services for up to 1 year to allow accident victims to hire someone to perform tasks that they could no longer perform **as a** result of their injury, and
- Funeral and death benefits of $1,000.

The power of insurance companies to refuse to renew or to cancel policies would be strictly limited under these bills. Access to the courts would be provided only in cases of death, serious disfigurement, or other serious or permanent injury. States would be required to develop a plan for making insurance available to everyone a t reasonable rates.

Since no-fault provisions for vehicle damage were not included in the proposed legislation, such claims would be dealt with in the traditional manner. States that have tried to incorporate compensation for vehicle damage in their no-fault plans have experienced serious problems. Massachusetts, for example, repealed the vehicle damage provisions of its no-fault plan in 1974. Michigan, while including such coverage, provides for a $100 deduction similar to the so-called "collision" insurance plans.

If federally imposed no-fault standards were adopted, accident victims would receive immediate financial assistance to pay for medical treatment, to make up for lost wages, and to secure substitute services. The time required to establish "fault" would be eliminated, except in cases of extreme hardship. All parties harmed in an accident would receive assistance— in most cases, more than they would receive under existing State programs.

Discrimination between policyholders **as a** result of ratesetting processes, policy cancellations, and nonrenewal of policies would be recognized as specific problems to be dealt with at the State level. While the cost savings would not be dramatic—since more people would be receiving benefits—there would probably be some savings due to reduction in the number of court cases. To the extent that the number of cases would be reduced by the Federal plan, courts would be freer to deal with other matters of concern.

One group that would stand to lose by the implementation of such a plan is the legal profession. Claimants would need legal representation only when necessary to prove fault. Historically, lawyers fees for handling **a** plaintiff's case have accounted for one-quarter of a settlement reached prior to trial and one-third of the plaintiff's recovery if the matter was resolved in the courts. Fees for defending a client are also significant. By removing the issue of fault from all but the most serious cases, and by having compensation awarded on the basis of established schedules, there would be little for lawyers to argue about in court.

Except in the most severe cases, injured parties would be unable to recover damages for "pain and suffering, " If the no-fault plan were to include a deductible amount, each claimant would suffer an equal loss regardless of "fault. " Without such a clause, minor claims would add significantly to insurance costs, as evidenced by present pricing practices for deductibles. Most no-fault programs that have been proposed require compulsory insurance coverage, an issue that is not necessarily tied to no-fault.

The cost impacts on consumers cannot be predicted with confidence since potential reductions of legal fees are offset by the prospect of having to compensate a greater number of accident victims.

Automobile Repair

Institutions that record consumer complaints identify automobile repairs as the leading cause of consumer dissatisfaction. Consumers complain that repair services are too costly, poorly performed, misguided, unnecessary, and sometimes fraudulent. Even new car owners, with recourse to warranty policies, complain of unsatisfactory repair services. The early breakdown of parts—in some cases on brand-new ve-

hicles—creates a considerable cost and inconvenience for the owner. In the coming years, consumer problems with automobile repairs are likely to increase as cars become more complicated and as the number of trained mechanics fails to meet increased demand.

Part of the cause of unsatisfactory repair service is that manufacturers make 90 percent of their profits on the sale of new cars, and only 10 percent on the subsequent sale of parts. The pressure on dealers is to sell. While manufacturers have canceled dealer franchises because of poor sales performance, they have seldom, if ever, done so because a dealer has failed to service cars adequately. Warranty repair work is not in the interest of either the automobile manufacturers or the automobile dealer. Manufacturers, in fact, have discouraged dealers from doing warranty repair work by requiring extensive paperwork and, at times, by refusing to reimburse all of their claims fully.

PhotoCredit U S Department of Transportation

With the exception of the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act (also known as the Consumer Product Warranty and Federal Trade Commission Improvement Act) that requires warranties to be stated clearly and that prohibits manufacturers from disclaiming or modifying implied warranties of the common law, the Federal Government has not intervened in the area of automobile repair. Rather, the responsibility for consumer protection has rested with the States. Three basic types of automobile repair laws have been developed: disclosure laws (truth-in-auto-repair laws), facility-licensing laws, and mechanics-licensing laws.

Disclosure laws typically require that a customer be given a written estimate of the repair costs, that a customer authorize repairs in writing before they are begun, that the customer be provided with a written invoice detailing the parts used and labor performed, and that the customer be allowed to inspect the parts.

Facility-licensing laws require auto repair facilities to obtain licenses for the purpose of doing business. Often, such facilities must pay a fee and post a bond. In the event of fraud or deceptive practices, the license can be suspended or revoked.

Mechanics-licensing laws require that repair work be either performed or supervised by a certified, licensed mechanic. Licensing typically requires that the applicant pass a competency examination.

To date, 15 States and 3 local governments have legislated one or more of these forms of regulation of automobile repair services. Table 128 shows the States that currently have automobile repair laws, according to the type of legislation in effect.

It is, perhaps, too early to evaluate the effectiveness of State actions to improve automobile repair services. If these policies are successful, the Federal Government might continue its present passive policy with respect to automobile repair. If the States are unsuccessful, the Federal Government might choose to take a more active role by passing national legislation designed to regulate or control the quality of repair service.

Table 128.—State Regulation of Automobile Repair

	Disclosure laws[a]	Facility licensing laws[b]	Mechanics licensing laws[c]
California	x	x	
Connecticut	x	x	
Florida	x		
Hawaii	x	x	x
Maryland	x		
Michigan	x	x	x
Montana	x		
Nevada	x		
New Hampshire	x		
New Jersey	x		
New York	x	x	
Ohio	x		
Rhode Island		x	
Utah	x		
Wisconsin	x		
District of Columbia	x	x	x
Montgomery County, Md.	x	x	
Prince Georges County, Md.	x	x	
Dallas, Tex.	x	x	

[a]Disclosure laws typically require that a customer be given a written estimate of the repair costs, that he authorize repairs in writing before they are begun, that he be provided with a written Invoice detailing the parts used and labor performed, and that he be allowed to Inspect parts.
[b]Facility licensing laws require auto repair facilities to obtain licenses for the purpose of doing business
[c]Mechanics licensing laws require that repair work be either performed or supervised by a certified, licensed mechanic
SOURCE *SRI*, pp F-27 to F-29

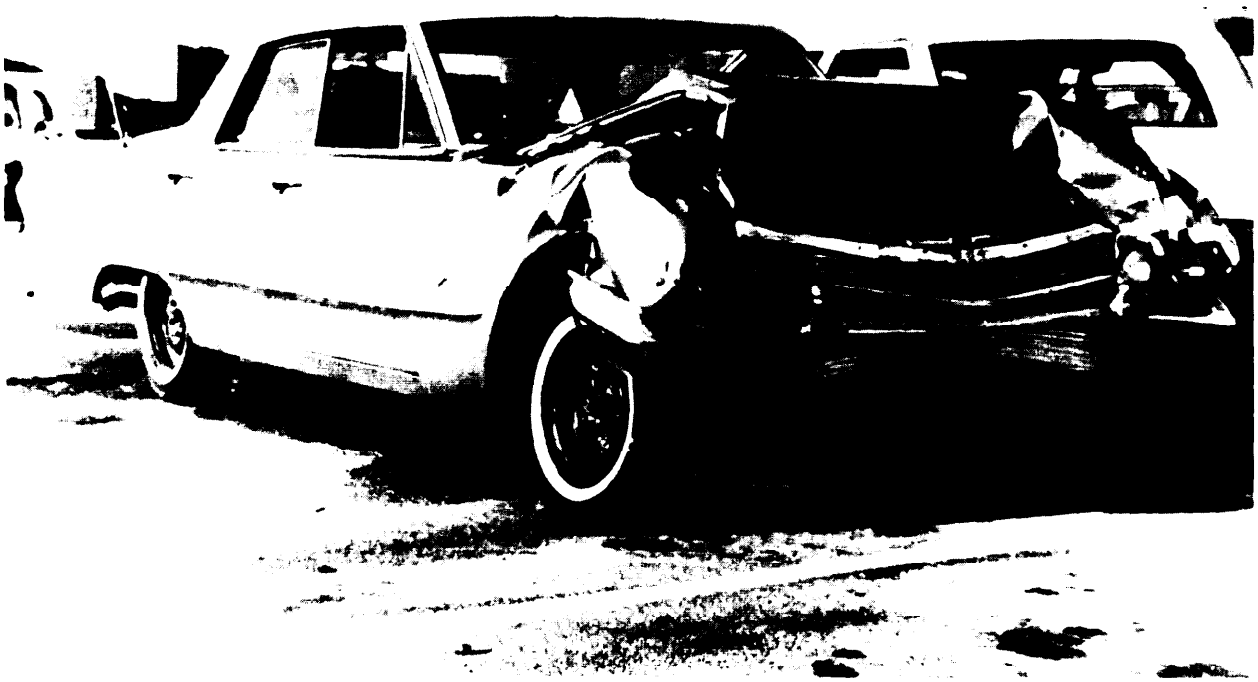


Photo Credit U S Department of Transportation

Automobile Durability

Automobile durability has a significant effect on consumer costs and is directly related to depreciation, which constitutes about one-quarter of the average cost per mile of operating an automobile. Durability of individual components is, moreover, a major element in repair and maintenance costs, which account for another 20 percent of the average cost per mile.[77]

The present economic system provides essentially no incentives for increasing automobile durability. Consumers have no channels through which to express a preference for more durable vehicles, nor do they have the know-how to assess the durability of the cars that they buy. The magnitude of the private investment required to own and operate an automobile gives rise to the question of whether the Federal Government should intervene in the market in an effort to increase the durability of the private automobile.

The average automobile engine produced in the United States lasts 100,000 miles before needing overhaul, and some engines have a life of 150,000 miles or more. At the point when overhaul is required, many vehicles are scrapped. Others are outfitted with a new engine and can be driven for an additional period. Other major components of the drive-train, body, and suspension system, might last longer than the engine.

The lifetime of accessories and components such as radiators, water pumps, distributors, alternators, and carburetors is often less than half that of the major power train parts. Optional accessories such as power steering, power brakes, and air-conditioning have similarly

[77] SRI, pp. F27-F29.

shorter life spans, as do seats, floor mats, door panels, and other appearance items. Degradation of such parts is a major factor leading to junking of the vehicle before the major components are worn out, The durability of all of these items could be greatly enhanced at relatively modest cost.

Corrosion of body parts caused by ice-dissolving chemicals also shortens the life of the automobile. Corrosion could be controlled rather inexpensively by using more galvanized sheet steel in the automobile body or by improved undercoating,

Although overall durability varies from car to car and from manufacturer to manufacturer, it is generally agreed that the smaller the car, the shorter its life span. Most likely, smaller cars are less durable then larger ones because they are operated at a greater proportion of their available power or capacity.

Durability is also a function of the manner in which a car is operated and maintained. While periodic motor vehicle inspections—first instituted in Pennsylvania in 1929—were designed to remove unsafe vehicles from the road, they had a secondary effect of promoting automobile maintenance and repairs, thereby increasing the life of the vehicle. The National Highway Traffic Safety Administration now requires every State to implement such a safety inspection program, although only 31 States and the District of Columbia have actually done so.

If the Federal Government were to seek to control automobile ownership costs, it might consider policies to improve durability. Among these are:

- Establish uniform warranties (or guaranteed life standards for all major automotive components, and enforce compliance,
- Require life testing and verification of all new cars as is now done in the case of emissions,
- Expand and fully implement a periodic maintenance and vehicle inspection program to cover safety, emissions, fuel economy, noise, and durability,
- Provide incentives such as rebates, taxes, or development subsidies individually, or in concert, to encourage durability,
- Establish an experimental durable car program analogous to the Research Safety Vehicle Program, and
- Provide the public, or require that the public be provided with, detailed information about the longevity, maintenance, and repair requirements of all makes and models of cars. 78

[78] The Motor Vehicle Information and Cost Savings Act (1972) requires that such information be provided, but this law has not yet been implemented by NHTSA.

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