HE
203
.A56
no.
83-30

.Department of
nsportation

Intergovernmental Responsibilities for Financing Public Transit Services

DEPARTMENT OF
MAY 18 1984
LIBRARY

August 1983

NOTE: This report is an analysis of key issues associated with transit financing. Part of its content includes policy and other recommendations based upon this contractor's perception of the issues involved. Recognizing that there may be many alternative approaches to resolving transportation problems, these positions may not necessarily reflect those of the U. S. Government. As such, no endorsement of these recommendations is either expressed or implied by the U. S. Department of Transportation.

HE
203
.A56
no.
83-30

Intergovernmental Responsibilities for Financing Public Transit Services

Final Report
August 1983

DEPARTMENT OF
TRANSPORTATION
MAY 18 1984
LIBRARY

Prepared by
Robert Cervero
Institute of Urban and Regional Development
University of California, Berkeley
Berkeley, California 94720

Prepared for
University Research and Training Program
Urban Mass Transportation Administration
U.S. Department of Transportation
Washington, D.C. 20590

In Cooperation With
Technology Sharing Program
Office of the Secretary of Transportation
Washington, D.C. 20590

DOT-I-83-30

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. DOT-I-83-30	2. Government Accession No. PB 83-147 520	3. Recipient's Catalog No.
4. Title and Subtitle Intergovernmental Responsibilities for Financing Public Transit Services		5. Report Date August 1983
		6. Performing Organization Code
7. Author(s) Robert Cervero		8. Performing Organization Report No.
9. Performing Organization Name and Address Institute of Urban and Regional Development University of California, Berkeley Berkeley, California 94720		10. Work Unit No.
		11. Contract or Grant No. DOT-CA-11-0023
12. Sponsoring Agency Name and Address University Research and Training Program Urban Mass Transportation Administration (URT-30) U.S. Department of Transportation Washington, D. C. 20590		13. Type of Report and Period Covered FINAL REPORT 7/1/81 - 6/30/82
		14. Sponsoring Agency Code OST/UMTA

15. Supplementary Notes

This is a slightly revised version of a report originally released to the National Technical Information Service dated November 1982.

16. Abstract

This report sorts through the myriad issues surrounding transit subsidy policy, and provides a rationale for sharing public transit costs. A range of factors that have some bearing on intergovernmental responsibilities for financing public transit are studied. An examination of the evolution of transit subsidy policy reveals that it has been shaped largely by ad hoc responses to ever-worsening industry wide fiscal crises. Although transit programs generally received broad-based support throughout the seventies, the formulation of any coherent, unified set of goals for transit became largely subordinate to simply keeping the buses rolling. A detailed analysis of the justifications for transit subsidies generally suggests that only social equity arguments are defensible, and even then it is far more prudent to subsidize users vis-a-vis transit service providers. An analysis of transit's benefits suggests that most are of only modest importance. Still, there's a general consensus that about one-half of the transit's social benefits accrue to constituents of local governments, with the remainder split evenly among state and federal government interests. It is also found that transit's current tax mix results in a fairly neutral redistribution of income as well as a diverse and reliable source of revenue. Moreover, governmental regulations, particularly those at the federal level, are partly responsible for transit's recent cost spiral. However, local subsidies are found to be far more perverse in terms of their cost and productivity impacts. Finally, an examination of alternative scenarios reveals that the elimination of public subsidies could cause severe declines in ridership and increases in fares, particularly in small urban areas.

17. Key Words Transit subsidies Cost-sharing Transit finance policy Benefits	18. Distribution Statement Special Edition available through U. S. Department of Transportation. Original version is for sale to the U.S. public through the National Technical Information Service, Springfield, Va. 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	193	A09

Form DOT F 1700.7 (8-69) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402

PREFACE

Many people contributed to the completion of this report, and their assistance is gratefully acknowledged. Gary Black, John Brunk, and John Dillon worked on the project as Research Assistants, contributing invaluably to the completion of the final report. John Brunk assisted with Chapters Three, Four, and Five, Gary Black with Chapters Four, Six, and Eight, and John Dillon with Chapter Seven. A number of people at the Institute of Urban and Regional Development in Berkeley also gave their time and energies unsparingly in helping organize both the draft and final report. Kathy Crum and Toni Brock provided helpful assistance in administering the entire project.

Special thanks are also due to the many interested transit managers and their staffs who assisted with the data collection phases of the research. Without their help and support, this research would not have been possible. Appreciation is also extended to Cynthia Burbank and Judy Meade, project monitors at the USDOT and UMTA, for their assistance throughout all phases of the project and their careful review and comments of the draft report. The views and conclusions expressed in this report are solely the author's and do not necessarily reflect those of the U.S. Department of Transportation, Urban Mass Transportation Administration.

TABLE OF CONTENTS

Page

PREFACE i
TABLE OF CONTENTS iii
LIST OF FIGURES vii
LIST OF TABLES ix

CHAPTER ONE: INTRODUCTION 1
1.1 Context of the Problem 1
1.2 Trends in Transit Costs, Pricing and Operating Deficits 4
1.3 Report Contents 7

CHAPTER TWO: ALTERNATIVE RATIONALES FOR FINANCING TRANSIT SERVICES 9
2.1 Evolutionary Changes in Transit Subsidy Policies 9
2.2 Competing Rationales for Transit Subsidies 20
2.2.1 Arguments for Transit Subsidies 21
2.2.2 Arguments Against Transit Subsidies 25
2.2.3 Weighing the Arguments 27
2.3 Transit Finance Review 27

CHAPTER THREE: GOALS OF TRANSIT SUBSIDY PROGRAMS 31
3.1 Federal Transit Goals 32
3.1.1 The Urban Mass Transportation Act 33
3.1.2 Section 3 and Section 5 Program Objectives 33
3.1.3 Current Federal Goals 36
3.2 Local/Operator Transit Goals 37
3.2.1 Structuring Local Transit Goals 37
3.2.2 Relative Importance of Local Transit Goals 41
3.2.3 Transit Performance and Goals 41
3.3 State Transit Goals 41
3.3.1 Structuring State Transit Goals 41
3.3.2 Relative Importance of State Transit Goals 44
3.4 Summary of Goals for Transit 44

CHAPTER FOUR: BENEFITS OF TRANSIT 47
4.1 Identifying and Classifying Transit's Social Benefits 47
4.1.1 Primary and Secondary Benefits 48
4.1.2 Real and Pecuniary Benefits 48
4.1.3 External and Internal Benefits 50
4.1.4 Tangible and Intangible Benefits 50

TABLE OF CONTENTS (CONTINUED)

Page

4.2 Assessing Transit's Benefits..... 50
4.2.1 Mobility for the Transportation-Disadvantaged.. 51
4.2.2 Congestion Relief..... 53
4.2.3 Land Use and Economic Development..... 55
4.2.4 Conservation of Land..... 56
4.2.5 Energy Conservation..... 58
4.2.6 Environmental Quality..... 60
4.2.7 Optional Mode of Travel..... 62
4.2.8 Safety..... 63
4.3 Summing Up the Benefits of Transit..... 64

CHAPTER FIVE: ALLOCATING TRANSIT'S BENEFITS..... 65
5.1 Benefits and Goal Attainment..... 65
5.2 Developing a Conceptual Framework for Distributing Transit Costs..... 67
5.3 Policy-Makers' Perceptions of Transit's Benefits..... 70
5.3.1 Importance of Benefits..... 70
5.3.2 Distribution of Benefits..... 70
5.4 Benefits and a Cost-Sharing Rationale..... 73

CHAPTER SIX: TAX EQUITY IN TRANSIT FINANCE..... 77
6.1 Introduction..... 77
6.2 Who Pays Taxes to Support Transit?..... 79
6.3 What Is the Most Equitable Tax Source for Transit?.... 80
6.3.1 Appropriate Taxes Based on Ability-to-Pay Principle..... 82
6.3.2 Appropriate Taxes Based on the Benefit Principle..... 84
6.4 Local and State Attitudes on the Most Appropriate Tax Sources for Transit..... 88
6.5 Conclusions..... 89

CHAPTER SEVEN: RESPONSIBILITIES OF GOVERNMENT INSTITUTIONS FOR TRANSIT COSTS AND PERFORMANCE..... 91
7.1 Introduction..... 91
7.2 Cost Impacts of Government Programs: Qualitative Assessment..... 91
7.2.1 Labor Protection Regulations..... 93
7.2.2 Social Service Regulations..... 97
7.2.3 Other Government Requirements..... 99
7.2.4 Closing Remarks on the Cost Impacts of Government Programs..... 99

TABLE OF CONTENTS (CONTINUED)

Page

7.3 Cost and Performance Impacts of Government Subsidy Programs: Quantitative Assessment..... 100
7.3.1 Measuring Transit Performance..... 100
7.3.2 Subsidy Impact Study: Data and Methodology.... 102
7.3.3 Study Results..... 104
7.3.4 Concluding Remarks on the Cost and Performance Impacts of Transit Subsidies..... 110

CHAPTER EIGHT: POSSIBLE FUTURES IN TRANSIT FINANCING..... 113
8.1 Introduction..... 113
8.2 Scenario I: Phasing-Out Federal Involvement..... 114
8.2.1 Past Research on the Impact of Federal Cuts.... 115
8.2.2 Methodology Used in Evaluating the Likely Impacts of Federal Cuts..... 116
8.2.3 Anticipated Fare, Service, and Ridership Impacts of Federal Cutbacks..... 120
8.2.4 Other Expected Impacts of Federal Cutbacks: Environmental and Energy Impacts..... 128
8.3 Scenario II: Sharing Costs Based on the Distribution of Transit's Benefits..... 131
8.4 Scenario III: The No Subsidy Option..... 133
8.5 Summary..... 134

CHAPTER NINE: SUMMARY AND CONCLUSIONS..... 137
9.1 Summary..... 137
9.2 Conclusions, Recommendations, and Suggestions for Future Research..... 140

APPENDIX A1: A REVIEW OF GOVERNMENT ASSISTANCE PROGRAMS FOR TRANSIT..... 143
A1.1 Federal Transit Assistance..... 143
A1.1.1 Capital Grants..... 144
A1.1.2 The Highway Trust Fund and Interstate Transfers..... 146
A1.1.3 Operating Assistance..... 147
A1.1.4 Fine-Tuning the Federal Transit Program..... 147
A1.1.5 Summing Up Federal Involvement..... 148
A1.2 State Transit Assistance..... 150
A1.2.1 Funding Levels..... 151
A1.2.2 Sources of State Funds..... 152
A1.2.3 Summing Up: State Transit Assistance..... 153
A1.3 Local Transit Involvement..... 153
A1.4 Recapping Operating Assistance..... 154

APPENDIX A2: A DESCRIPTION OF THE TRANSIT FINANCE SURVEY..... 157

REFERENCES..... 169

LIST OF FIGURES

FIGURE		Page
3.1	Operators' Goals	39
3.2	States' Goals	43
5.1	Goal Attainment Rating--Operators	66
5.2	Goal Attainment Rating--States	66
5.3	Hypothetical Demand Schedules for Transit Ridership Costs	69
5.4	Relative Importance of Benefits--Operators' Responses	71
5.5	Relative Importance of Benefits--States' Responses	71
5.6	Distribution of Benefits--Operators	72
5.7	Distribution of Benefits--States	72
6.1	Summary Incidence of Major Federal Taxes	81
6.2	Summary Incidence of Major State and Local Taxes	81
6.3	Distribution of Total Transit Tax Burden Among Income Classes, by Level of Government	83
6.4	Summary Incidence of Major Federal Taxes	86
6.5	Summary Incidence of Major State and Local Taxes	86
8.1	Percentage of Revenue Recovered by Various Operator Responses to Section 5 Elimination, by Urban Area Population	125
A1.1	Annual Transit Assistance Program Levels	150

LIST OF TABLES

TABLE		Page
2.1	Summary of Transit Financing Mechanisms	28
2.2	Nationwide Transit Revenue Sources	28
3.1	Goals Attributed to UMTA Transit Program	35
3.2	Local/Operator Goals	39
3.3	State Goals	43
4.1	Classifications of Transit's Social Benefits	49
4.2	Passenger Capacities Per Lane	54
4.3	Number of Trips Entering Selected CBDs by Mode	54
4.4	Proportion of CBD Devoted to Streets and Parking	57
4.5	Highway Lane Equivalents to Carry Transit Passengers in Private Automobiles into Central Business Districts	57
4.6	Potential Energy Efficiency of Different Transportation Modes	59
4.7	Actual Energy Efficiency of Different Transportation Modes	59
4.8	Emissions of Buses and Automobiles	61
4.9	Comparative Urban Fatality Rates by Mode	64
5.1	Distribution of Total Social Benefits	74
5.2	Comparison of Revenue Breakdowns	74
6.1	Taxes Used to Finance U.S. Transit Operators (1978)	78
6.2	Comparison of Ridership Patterns in New York and Chicago with Incidence Patterns of Various Taxes	87
6.3	Tax Sources Considered to Be Most Appropriate for Local and State Transit Officials	88
7.1	Nationwide Transit Operating Expenses for 1980 by Functional Categories	92
7.2	Nationwide Wage and Fringe Benefit Increases 1973-1980	96
8.1	Performance and Financial Data, Elasticity Estimates for U.S. Transit Operators	118
8.2	Actions to Offset Federal Cuts and the Percentage of Lost Revenue Recovered by Each, All Survey Respondents	121
8.3	Expected Fare, Service, and Ridership Responses to Federal Cuts, at the National Level	122

LIST OF TABLES (CONTINUED)

TABLE		Page
8.4	National Ridership Loss Under Different Revenue Recovery Schemes	123
8.5	Expected Fare, Service, and Ridership Responses to Federal Cuts, by Urban Area Population	127
8.6	Ridership Loss Under Different Revenue Recovery Schemes, by Urban Area Population	127
8.7	Summary of Expected Nationwide Fare and Ridership Impacts of the Three Scenarios, 1979 Figures	135
A1.1	Summary--Distribution of UMTA Program Funds	146
A1.2	Summary of UMTA Operating and Capital Grant Programs	149
A1.3	Level of State Transit Support	151
A1.4	Trend of Transit Revenues	155
A1.5	Sources of Public Operating Assistance: Twenty Largest Transit Operators	155
A2.1	State and Local Survey Respondents	158
A2.2	Survey Response Rate by Operator Size	160

Chapter One
Introduction--Defining the Issues

1.1. Context of the Problem

The American transit industry's financial health has deteriorated markedly over the past several decades. As recently as the mid-sixties, the industry was largely self-supporting, with most private bus companies recovering enough from the farebox to meet their operating expenses. But steadily declining patronage, coupled with precipitous cost increases, brought many private operators to the verge of bankruptcy during the sixties. By the early seventies virtually every local bus operation in the United States had been taken over by local authorities. Public ownership generally reflected a desire on the part of local elected officials to provide acceptable levels of mobility to carless and disadvantaged citizens, to attract commuters out of their cars, and to promote what many perceived to be the benefits of transit, namely cleaner air, stronger central business districts, and more compact urban development. The prevailing policy became one of keeping fares below operating costs and maintaining or expanding services regardless of how unprofitable they were.

This self-imposed financial responsibility quickly overwhelmed local treasuries. Public transit proved to have an insatiable appetite for financial aid, one that exceeded the revenue capacity of most municipal governments. With very little recourse, many big-city mayors and their congressional representatives turned to Washington for financial relief, actively lobbying for the creation of a federal operating subsidy program. These efforts won the eventual support of Congress, and in 1974 landmark legislation was passed providing a security blanket of long-term federal assistance to local transit operators. Many states were also quick to respond to local pleas for help. By 1975, 33 states had established operating assistance programs that collectively provided over $435 million in annual aid. The federal commitment to transit strengthened in 1978 when Congress authorized roughly $14 billion in both capital and operating assistance through the mid-eighties.

The changeover from private to public sponsorship and the subsequent creation of financial support programs were accompanied by several alarming trends. Between 1970 and 1980, the nationwide cost of transit services more than tripled, from just under $2 billion to over $6.5 billion.[1] During the same period, however, farebox revenues increased a mere 50%, from $1.64 billion to $2.46 billion--about one-half the rate of inflation. The net result has been a 1,370% increase in the industry's deficit, from $288 million in 1970 to just under $4 billion

---

[1] Unless indicated otherwise, statistics presented in this chapter are from the 1981 Transit Fact Book, American Public Transit Association. Figures are for all forms of urban transit, excluding automated guideways, commuter rail services, and urban ferry boats.

in 1980. Today, subsidies make up over 55% of the national transit budget, up from just 12% in 1970. Of the $3.61 billion collected from public treasuries in 1980, 47% came from local tax coffers, followed by 30% and 23% from federal and state treasuries respectively. Equally disturbing have been the declines in transit's overall performance. Despite growing subsidy support, we have been getting less and less out of transit over time. Labor productivity--as measured in vehicle miles of service per employee--dropped 16% during the seventies. The industry's "effectiveness" in serving passengers also declined sharply as reflected by the 21% decrease in passenger trips per employee.

Many observers attribute these trends, in large part, to the growth in operating assistance. Subsidies protect operators from escalating costs, it is argued, and consequently promote inefficiencies, mismanagement, and costly labor settlements. Subscribing to this view, the Reagan Administration, barely one month after the 1981 inaugural, included the gradual phase-out of federal transit subsidies in its first round of budget cuts. As part of the Administration's Program for Economic Recovery, federal operating assistance was slated for complete elimination by 1985. The recent passage of the Surface Transportation Act of 1982 has extended federal operating assistance through 1986. Even with the new dedicated gas tax funding for transit, however, the 1986 federal transit program will not regain the level of funding provided in 1981 prior to the Administration's cuts.

Though recent legislation suggests a renewed federal commitment to public transit, many still believe that the federal subsidy program will be pared down measurably over time and that the generosity of the late seventies will never be repeated. The past several years clearly represent a significant shift in federal philosophy toward transit. Can similar actions be expected at the state and local levels? Can public transportation realistically be expected to survive on farebox income alone?

The recent turn of events sharply calls into question what the role of the transit user--in contrast to that of the local, state, and federal governments--should be in supporting public transit. With growing pressures to hold down public spending and improve efficiency at all levels of government, transit subsidies will clearly become the target of closer public scrutiny during the eighties. Though many doubt that the public sector will ever completely withdraw its support, the issue remains as to what extent various spheres of government should be involved in financing operations. This very question was recently considered a priority policy issue for the eighties' agenda by the National Transportation Policy Study Commission (1979b, p. 174):

> With regard to cost allocation, controversy exists over the share which should be collected from users--through the farebox--as opposed to the share collected from other sources. The use of government funds is also at issue: how should costs be apportioned among local, state, and federal governments? . . . Some observers believe that the Federal government should increase its financial commitment to mass transit because improved service is believed to help solve energy, environmental and other problems. Others hold that extensive federal assistance is inappropriate because mass transit does

> not serve a large enough portion of the population to affect these problems significantly. Some believe that the funds are inefficiently directed in their present form. . . . Who should pay the cost of urban transportation, and what should be the basis of their payments?

More recently, the importance of this issue was reaffirmed by the Transportation Research Board in its 1981 update of the Ten Most Critical Issues in Transportation:

> To what extent should capital, maintenance, and operating costs be borne by users? What are the appropriate roles and funding responsibilities of federal, state, and local governments?

The intent of this report is to contribute toward the development of a stronger rationale for financing public transit by sorting out the various arguments and issues that have surfaced regarding how transit's cost burden should be distributed. The arguments are varied, and are often based as much on political rhetoric and gamesmanship as on economic principles and fact.

Ultimately, of course, any decision on how transit costs should be shared is a political one. There can be no right or wrong answers, nor can any precise allocation formula be derived for calculating appropriate levels of local, state, and federal involvement. Still, it is essential that competing rationales be well articulated and that empirical evidence regarding the effects of subsidies and the distribution of transit's benefits be brought to the forefront of the debate.

This research seeks to contribute to the current debate by examining competing arguments and presenting empirical evidence that merits consideration in the development of intergovernmental financial policies. A number of factors that should help shape transit fiscal policies are examined. For one, various goals and policies set for public transit at different institutional levels are examined. Goal statements provide some insight into how different spheres of government perceive themselves benefiting from transit. To the extent that transit's costs can be linked to the policy objective that benefited from their occurrence, some basis can be established for allocating costs among beneficiaries. The degree to which various institutional levels perceive themselves, relative to others, receiving transit's benefits is also evaluated in order to gauge the level of political consensus regarding the subsidy issue. In addition, the historical effects of subsidies on operating efficiency, productivity, and fiscal performance is investigated using empirical records from a number of California transit properties. Other factors addressed in this report that color the subsidy debate include a review of the incidence of various tax revenue sources used in financing transit and an examination of the cost effects of specific government-mandated programs, such as requirements on prevailing wage rates and full accessibility for buses. Several possible cost-sharing scenarios are then explored in terms of their likely fiscal, ridership, and equity consequences. It is hoped that the materials presented can serve as a useful framework from which a

politically feasible and economically sound program of transit cost-sharing can evolve.

1.2. Trends in Transit Costs, Pricing, and Operating Deficits

The fiscal posture of the American public transit industry has deteriorated considerably over the past 15 years. The evidence is unassailable. Whereas the nation's transit industry met operating costs through the farebox as recently as the mid-sixties, today passenger revenues cover less than half of operating costs. The nationwide deficit has swelled from less than $10 million in 1965, to $288 million in 1970, to $1,750 million in 1975, and to $3,946 million in 1980.

The twin blades of transit's soaring deficits have been runaway costs and, in real dollars, declining passenger fares. Over the past decade, costs have risen 203% compared with an increase in passenger revenues of only 48%. That is, costs grew over four times as fast as revenues.

Cost Trends

The nation's transit systems have been victimized by rampant inflation and skyrocketing operating costs. About half of the industry's cost increases since the mid-sixties have been attributed to inflation (*i.e.*, cost-of-living adjustments for employees) (Sale and Green, 1979).[2] Of the other half (*i.e.*, the constant-dollar increase), about 56% is due to increases in worker wages and benefits over and above the rate of inflation, and roughly 18% represents the cost of increasing the workforce to handle expanded administrative functions.[3] Only around 2% of the constant dollar cost increases is attributable to expanded

---

[2]Sale and Green's figures are based on an analysis of nationwide cost trends from 1967 through 1976. In the absence of more recent data, the breakdowns estimated by the authors are assumed to be applicable to the 1971-1980 period.

[3]Since 1960, while consumer prices have risen 235%, average transit wages have soared 404%. Over 80% of transit workers--compared with only 10% of other Americans--are today fully protected by cost-of-living clauses in union contracts (Peirce, 1981). In addition, one study found that in 1978 transit employees averaged 29 days of unscheduled absenteeism--nearly six full weeks--per year (Peak, Marwick, Mitchell and Company, 1980). The growth in labor costs has been particularly burdensome in that wages and fringe benefits account for 70-80% of transit operators' annual expenses. Saddled with the prospect of ever-increasing deficits, most transit operators are currently seeking major reform in the industry's labor practices, including the hiring of part-time help. The transit district in Los Angeles, for instance, recently reported a $2.5 million annual savings from employing part-time drivers (Peirce and Steinbach, 1981). Other major concessions, including wage freezes and the elimination of spreadtime bonuses, may also be in the offing.

services, and only 6% has been linked to rising fuel costs.[4] Since 1978, however, the cost of diesel fuel has risen 115%, suggesting that energy is becoming an increasingly important cost component. Still, the meteoric rise in labor costs--to expand the white-collar labor force and pay higher wages to other employees--amounts to 72% of the industry's real dollar cost increase (Lave, 1981).

Revenue Trends

The sluggish growth in passenger revenues during the seventies can be attributed to declining constant-dollar fares as well as to the changeover from graduated to flat price structures. Expressed in 1980 dollars, average fares have actually decreased 20% since 1980, from 46¢ to 38.4¢. Between 1949 and 1970, average fares increased at an annual rate 3% greater than the Consumer Price Index (U.S. Department of Transportation, 1974). Since 1970, however, fares lagged behind inflation by roughly 1.5% annually.

The switch from graduated pricing to flat fares during the seventies suppressed revenue income since trip lengths were increasing at the time. Sale and Green estimated that average transit journeys increased in length significantly over the past twenty years, ranging from a 52% increase in Philadelphia to a 124% increase in Atlanta. The authors provide some evidence that operators responded to suburbanization trends of the sixties and seventies by expanding routes and curtailing inner-city services. Nationally, they show, the average mileage covered by individual bus routes more than doubled between 1960 and 1974, while the total bus mileage actually declined during this period. In that nationwide ridership dropped 34% during this same period, the industry has witnessed fewer passengers traveling longer distances and paying low flat fares. Pricing policies of the past decade, then, have contributed directly toward the industry's deficit, particularly since uniform fares fail to capture the cost increases associated with expanded services.

The conversion to flat fare structures has been nearly universal. Of 25 urban areas with populations above one-half million in 1970, 17 had zone fares while 8 had flat ones (U.S. Department of Transportation, 1974). Today, except for some cases of graduated pricing of express services and time-of-day fare differentials, all but a few currently operate under uniform fares. The movement toward flat fares has also gained momentum in other countries. In a study of nearly 100 international cities, Gutknecht (1973) found that 55% employed graduated pricing in 1961; by 1972 the proportion had fallen to 25%.

Performance Trends

Most observers agree that government subsidies have had a direct hand in suppressing transit fares. But they have also encouraged systems to extend routes farther and farther into the suburbs, and to

---

[4]The remaining 21% has been attributed to miscellaneous and unaccounted causes, such as higher insurance premiums.

maintain many marginal and unprofitable services. Partly as a move to expand the political base of public transit, local authorities generally have carte blanche veto power over proposed route deletions and service changes. As a condition for subsidies, governments often insist that a mixed bag of services be offered, regardless of whether they recover even a fraction of their costs through the farebox. Consequently, transit managers have found themselves in the unenviable position of meeting their payroll and other expenses while also having to operate unproductive routes at unrealistically low fares.

Rising transit operating deficits would perhaps be somewhat palatable were it not for the fact that the industry's productivity has also declined appreciably over the past decade. Despite a massive infusion of government money, nationwide ridership increased only marginally over the past decade--from 5.93 billion in 1970 to 6.36 billion in 1980. The cost of carrying each passenger, in contrast, more than tripled during this period, from 34¢ to $1.03. By any measure chosen, the industry's "efficiency" at providing service also declined steadily.[5] For example, the amount of service provided per employee--measured in terms of revenue vehicle-miles per worker--declined 16% during the seventies. Whereas the number of transit employees climbed 37% between 1970 and 1980, vehicle miles of service increased barely over 10%. Moreover, the cost of operating a vehicle mile of service outpaced the Consumer Price Index--$2.13 in 1970 to $3.11 in 1980, measured in constant 1980 dollars.

Many critics cite these statistics as proof that transit subsidies provide very little in the way of tangible dividends. Whether these trends are the direct result of subsidies or are merely coincidental is conjectural. Still, an irrefutable public policy lesson of the 1960s and 1970s was that "government aid, whether in the form of capital or operating grants, failed to bring about a significant increase in urban mass transportation ridership" (Meyer and Gomez-Ibanez, 1981, p. 5).

Prospects

There is every reason to believe that the trends of the past fifteen years are beginning to catch up to the American transit industry. The evaporation of federal support portends drastic service cutbacks coupled with sizable fare increases. Increasingly, local transit agencies are finding it difficult to pay their bills. Boston's transit authority, to stay within a girdle-tight budget, was forced to lay off some 750 workers and to cut both bus and rail services by 25% in 1981. The Illinois State Legislature's refusal to bail out the Chicago Transit Authority with emergency financial relief has left many Chicagoans with the spectre of one-dollar fares as the system's annual deficit

---

[5]The "efficiency" of transit operations is measured as the amount of service output per unit of resource input. Efficiency, then, gauges how much service is being provided (typically in terms of either vehicle miles or hours) per unit of input (typically in terms of labor, capital, or dollar expenditures) (Fielding and Glauthier, 1976).

approaches the $100 million mark. Incidences of bus companies closing shop have even occurred. In early 1981, Birmingham, Alabama's financially riddled transit company had to shut down operations, leaving some 35,000 regular customers serviceless. Recognizing the gross inequities of flat fares of $1, riders are becoming increasingly outspoken in their opposition to continuing fare hikes. Recent court challenges in Pittsburgh, Memphis, Los Angeles, and Atlanta, charging violations of Title VI civil-rights requirements, could force many transit properties to adopt more equitable pricing practices.

Most transit managers concede that the total elimination of federal operating assistance would be a bitter pill to swallow. Federal aid has grown from approximately $300 million in 1975, to $700 million in 1978, to $1,100 million in 1980--a six-year increase of 265%. Aid from Washington, however, has not forestalled increases in state and local support. A number of states have established their own grant-in-aid programs, while at the same time local voters have increasingly granted transit authorities powers to levy regional sales, gasoline, and property taxes to finance transit services. Between 1975 and 1980, nationwide local assistance grew from around $700 million to $1,700 million (144%), while state aid increased from roughly $400 million to over $800 million (102%). Among individual operators, however, there is considerable variation of where revenues come from. In Los Angeles, for instance, the State of California covers 35% of the transit district's operating costs, with the federal government picking up 22% of the tab and the rest coming principally from the farebox. By contrast, the City of Houston pays 81% of the area's transit bill, while the federal government contributes 3% and the State of Texas kicks in less than one percent. Washington, D.C., obtains 10% of its operating revenues from federal treasuries, 33% from local sources, 3% from the State of Maryland, and 44% from the farebox. Transit systems in the greater New York metropolitan area and northeastern New Jersey have generally met over half their costs through the farebox.

It is apparent, then, that major changes in government contributions will have varying impacts on individual operators. The tripartite arrangement of federal, state, and local operating assistance now stands at the $4 billion mark, and the General Accounting Office estimates the total could exceed $6 billion in 1985 if today's labor and operating practices continue (Peirce, 1981). For some, the withdrawal of federal support will cut deeply, while for others the incision will be tolerable. State and local treasuries, however, are continually being trimmed, particularly in places like California where the pinch of Proposition 13 is now being felt, so that continued emergency bailouts appear doubtful. Changes in labor practices, fare structures, routing, and scheduling, along with the development of more innovative services such as paratransit and jitneys, appear to be in order if the industry is to weather massive cutbacks in subsidy support and reverse a decade of declining productivity and soaring deficits.

1.3. Report Contents

This report consists of nine chapters. Chapter 2 provides background material through a historical overview of transit subsidy

policies. Various arguments in favor of and against operating subsidies are closely examined, as are various principles for financing and pricing transit services. The third chapter analyzes the explicit goals of federal, local/operator, and state transit programs. Goals are ascertained primarily from public documents, interviews, and a nationwide survey of transit operators and state agencies. Chapter 4 documents the benefits of public transit. Constructed entirely from the available literature, the chapter classifies and examines transit's full range of social benefits.

A framework for allocating benefits (and, therefore, costs) of transit operations among levels of government is presented in Chapter 5. Although basic microeconomic theory is relied upon, the actual cost-sharing rationale presented is based partly upon the perceptions and attitudes of knowledgeable state and local transit policy-making officials.

The next two chapters provide additional insights for developing a cost-sharing rationale for transit. Chapter 6 examines the incidence of various tax sources used in financing the nation's transit services. Both ability-to-pay and beneficiary principles of equity are employed in investigating alternate revenue sources. The historical effects of government subsidy programs and regulations on transit's cost and productivity trends are explored in the seventh chapter. Both qualitative and statistical analyses are employed in this chapter.

The eighth chapter presents three plausible scenarios for financing the nation's transit services, and examines the likely fiscal, ridership, equity, environmental, and political ramifications of each. Comparisons are made among the three scenarios. Chapter 9 concludes the report with a summary and recommendations on transit cost-sharing. Suggestions for further research are also offered.

Chapter Two
Alternative Rationales for Financing Transit Services

Subsidization of public transit services has emerged as one of the more controversial policy issues in the transportation field. Some argue that transit should be viewed as an essential public service, like police or fire services, and thus should be supported principally by public treasuries. Others contend, however, that transit should operate according to sound business principles, meeting its costs through the farebox and seeking to maximize revenue income by eliminating unproductive services and expanding profitable ones. These views, poles apart, suggest that future transit finance policies will be strongly shaped by competing public influences and changing political priorities.

The debate, in simplest terms, focuses on the degree to which mass transit is a "private" versus a "public" good. To the extent that the benefits of transit services are confined solely to users, most economists would argue that transit is fundamentally a private good and should pay for itself through the farebox. However, to the extent that transit confers substantial external benefits, such as clean air and resource conservation, it takes on characteristics of a public good[1] and becomes largely the responsibility of all members of society. Most observers would agree that transit falls somewhere in between the extremes of a pure public and a pure private good--that is, it is a "mixed" good. The disagreement, however, centers around just how "mixed" it is--to what extent does it benefit users relative to nonusers, and with which group should the principal financial responsibility lie?

This chapter examines the various arguments and competing rationales that have surfaced over the past thirty years regarding how transit services should be financed. Both pro- and anti-subsidy viewpoints are presented. Particular attention is given to the evolution of federal subsidy policy in the midst of changing political agendas over the past several decades.

2.1. Evolutionary Changes in Transit Subsidy Policies

Early Experiences

From the days of horse-drawn trolley cars through the post-World-War-II era, America's mass transit services were virtually all privately owned and operated, and consequently received no direct public financial assistance. Though private operators had long fought for special tax

---

[1] Public goods have two key attributes: non-excludability and non-rival consumption. Non-excludability means that no person can be prevented from receiving these goods. Non-rival consumption means that one person's consumption does not diminish the amount available to others. The classic example of a public good is national defense. See Musgrave and Musgrave (1980, pp. 54-76) for further discussion.

exemptions and other public programs supportive of their businesses, it was only after the Second World War that the first clamorings for direct public assistance to transit were heard. The industry was beginning to experience dramatic ridership losses, brought on by secular increases in postwar family incomes, rising rates of auto ownership, and idyllic preferences for suburban living. While the transit industry carried 23 billion passengers in 1944, by 1953 the number had dropped to 14 billion and all signs pointed toward continual declines in patronage. Concern over a possible industrywide collapse brought strong cries for public support of transit, typified by the following excerpt from the 1955 American Society of Civil Engineers annual proceedings:

> The result of letting the dramatic decline in transit patronage continue unchecked could bring disaster to the transit industry. . . . If Mr. Average Taxpayer does not contribute to keep transit in operation in his city, he is likely to be assessed a much greater sum in order to provide highway capacity and parking places for those who would be forced to use their automobiles if there were no public transportation. . . . Public transit is in danger of disappearing from the American scene unless you who understand the problem explain it with force and clarity to the civic leaders in your respective cities.
>
> De Leuw, 1955, pp. 710-1 - 710-6.

By the mid- and late fifties, many localities opted to take over financially troubled bus companies and began assuming some of the responsibility for financing local services through their general-fund accounts. The prospect of a community's poor, elderly, and indigent residents falling prey to total immobility left most municipalities with very little recourse. By the early sixties, over half the nation's bus companies had fallen into public ownership.

This turn of events brought into question the role and responsibility of the federal government in supporting the nation's mass transportation services. After all, Washington had just embarked upon the largest public works project in modern history under the 1956 National Interstate and Defense Highway System Act. In the interest of parity, were not the nation's transit industry and fiscally constrained municipalities deserving of some federal assistance? In 1961, a special study group on Transportation Policies in the United States addressed such a question and found some grounds for federal concern over mass transit's economic plight:

> The Federal Government has a vital interest in the free flow of commerce in all parts of the United States, in the preservation and propagation of national wealth and tax production, in the provision of the best living and working conditions for the majority of its citizens, and in establishing the facilities and conditions necessary for the national security. To the extent that inadequate urban transportation facilities and the decline of public transport increase the total cost of daily economic activities, there is cause for immediate

Federal attention.

U.S. Senate, 1961, p. 594.

Referred to as the Doyle Report, this was one of the first official statements acknowledging a federal responsibility for the welfare of America's fledgling transit industry.

In April of the same year, a comprehensive report was released by the Advisory Commission on Intergovernmental Relations outlining local, state, and federal responsibilities for the nation's mass transportation services. The report, prepared under Public Law 86-380, suggested a number of reasons why the federal government should promote public transportation, including (1) the need to protect interstate commerce and defense traffic from urban congestion; (2) the need to offset some of the "pro-highway biases" of federal transportation policies; (3) the need to protect the federal investment in other fields, such as housing and air-pollution abatement; (4) the unique ability of the federal government, with its vast fiscal and managerial resources, to play a lead role in the construction and operation of transit facilities and services; and (5) the need to establish necessary agreements for interstate metropolitan transit services. The Commission, however, noting the highly localized nature of urban transit and expressing concern over the possible proliferation of administrative red tape, stopped short of recommending direct federal financial support of local transit, other than the financing of planning and special demonstration activities and the establishment of low-interest federal loans. The Commission also defined a minimal coordinating and regulatory responsibility for state governments. Its principal and most noteworthy conclusion, however, was that transit should principally fall under the purview of local authorities:

> Although the belief is not widely held that local government can and should "go it alone" with respect to the provision of mass transportation facilities and services, it is difficult to find responsible opinion, even among the most vigorous advocate of a strong Federal role in this field, which does not concede at the outset that local government must continue to carry <u>a large share</u> of responsibility for this function.
>
> U.S. Advisory Commission on Intergovernmental Relations, 1961.

Although these reports only defined a modest federal role, they nonetheless established an important precedent in recognizing some grounds for federal financial support of transit. Prior to their release, public transit had been openly rebuffed by the Eisenhower Administration. The reports gave new-found credibility to federal involvement in mass transportation and were the driving force behind Congressional approval of a small transit demonstration program under the Housing Act of 1961. Though modest, the Act provided $25 million for demonstrations and $50 million for a small program of loans and loan guarantees for capital improvements. The transit provisions of the 1961

legislation effectively gave Congress time to "test the political waters" to see if a large mass transportation program was something that it wished to undertake.[2]

The idea of Washington's helping the nation's transit systems gained legitimacy in 1962 when, in a message to Congress, President John F. Kennedy remarked:

> To conserve and enhance values in existing urban areas is essential, but at least as important are steps to promote economic efficiency and livability in areas of future development. Our national welfare requires the provision of good urban transportation with the properly balanced use of private vehicles and modern mass transport to help shape as well as to serve urban growth.

The era of urban renewal, model cities, and social welfare programs had arrived, and public transportation was being looked upon as a vital element of the upcoming Great Society program.

The Ensuing Debate

The pro-transit sentiment was by no means universally held. Dissenters argued that mass transit is strictly a local concern--since local residents are the primary beneficiaries, they should bear the full burden of cost. Critics also feared that federal intermingling would result in excessive red tape, compromise principles of separation of powers, and ultimately discourage efficient management practices. This concern was particularly prevalent among local business interests. In a 1963 survey of over 1,000 member offices of the U.S. Chamber of Commerce, for example, 73% felt that Washington should refrain from any financial grants-in-aid to local bus companies.[3]

It was perhaps the threat of federal meddling in local matters that

---

[2]The main purpose of the demonstration program was to determine if investment in transit would increase ridership and attract large numbers of commuters from their automobiles. Urban congestion had been worsening each year in spite of large public expenditures for roads. Improved mass transit was seen as a possible alternative for easing congestion, but the post-World-War-II performance of transit had been characterized by plummeting patronage, service cuts, aging capital, and a poor public image. The demonstration program sought to gauge the viability of federal investment in transit. Early demonstration results generally indicated that improved transit could increase ridership. See Smerk, 1964, pp. 39-47.

[3]Slightly over 24% of the 1,129 respondents recommended a role for the federal government in planning and research. Eleven percent supported federal loans, grants, and loan guarantees, while only 1% favored outright federal aid for operations and capital improvements (U.S. Chamber of Commerce, 1963).

disturbed critics the most. Washington's influence was becoming increasingly visible at the time, particularly with the federal government taking action in areas such as home financing and highway construction that had traditionally been the exclusive bailiwick of state and local governments. Federal officials maintained that the expanded role was meant not only to fill a vacuum left by local and state governments, but also to provide a degree of centralized leadership and promote fresh solutions to metropolitan problems. The absence of precise legal and constitutional boundaries defining areas of responsibility of the various levels of government left the debate lingering.[4]

Notwithstanding these concerns, the pro-transit campaign gained a steady foothold throughout the sixties. As the threat of an industry-wide collapse loomed ominously, public transit received a tremendous boost in 1964 with the passage of the Urban Mass Transportation Act. This was a landmark piece of legislation, establishing a program of federal matching grants "to assist in the preservation, improvement, and expansion of urban mass transit systems." The Act was legislated not only to promote new capital investments and expansion, but also to assist "state and local governments and their instrumentalities in financing urban mass transportation systems." Congressional passage of the 1964 Act signaled, de facto, a recognition of federal responsibility for protecting the welfare of the nation's urban mass transportation systems.

The original intention of restricting federal aid to capital

---

[4]Federal intervention has historically arisen out of practical concerns and judicial interpretations. The issue begs a philosophical question as to what types of programs come within the responsibility of the federal government, as opposed to that of the states and their subdivisions. The legal division of responsibility among different spheres of government is found in the Constitution and its court interpretation. The Constitution divides the powers of governments: those of the national government are specified (Article I, Section 8), while those of the states and their subdivisions are residual. Until the 1930s the courts were very reluctant to allow the national government to assume powers beyond those necessary to provide for national defense and to regulate interstate commerce, and Congress was generally reluctant to seek expanded responsibilities. Consequently, as of the late twenties the federal government contributed toward less than one-fifth of total government expenditures for civilian purposes. With the many problems brought on by the great economic depression of the thirties, however, there was an abrupt shift in social philosophy and judicial thinking. The thirties witnessed a judicial interpretation of the Constitution that placed no discernable legal limits on the amounts or purposes of federal spending. By the late thirties, the federal share of civilian expenditures rose to over 49%, and has since remained around that level. In sum, the powers of the federal government to tax and spend have come to be interpreted very broadly and now cover many areas of spending formerly reserved exclusively to the states and their subdivisions, such as public health and social welfare (see Ott and Ott, 1969).

expenses was to define the boundaries of federal fiscal responsibility and downplay any long-term federal commitment to transit. Most congressional representatives still viewed mass transportation as a local problem, best solved by local initiative. Meyer and Gomez-Ibanez (1981, p. 43) remark:

> By restricting Federal assistance to capital expenses, opponents of aid hoped to limit and distinguish the federal commitment from that of the state and local governments. Some believed that capital assistance was less likely to be wasted than operating assistance, since operating subsidies might reduce incentives to control operating costs and could encourage transportation unions to demand higher wages. . . . Capital assistance thus was seen as providing the one-time shot in the arm that would allow the industry to break its "vicious cycle" of decline.

Some of the more ardent opponents of the 1964 Act argued that capital grants would distort investment decision and result in the premature retirement of buses and other equipment, a concern that has been largely borne out over time. Several studies have provided compelling evidence indicting capital grants for inducing overcapitalization and the accelerated depreciation of rolling stock (Hilton, 1974; Tye, 1973). Noting the incentive to replace local dollars by federal capital outlays, Tye (1973, p. 798) concluded:

> Inefficiency occurs because the recipient has an incentive to incur subsidized capital costs rather than unsubsidized operating expenses, regardless of the unfavorable impact on overall efficiency . . . [resulting in] wasteful premature replacement, overcapitalized technology, and inadequate maintenance, which are likely to be extremely costly.

Others note that capital programs have also generated excessive demands for new rapid rail systems and extensions, and have encouraged the gold-plating of those systems already under construction. Altshuler (1981) observes:

> The federal government puts up 80 percent of the cost, while state and local governments typically bond the rest. Thus, state and local policy makers are able to take full credit for massive investments, involving large numbers of jobs, contracts, and real estate development opportunities, while bearing negligible tax consequences during the long design and construction period. The local tax liabilities are indeed large in the long run, especially as operating deficits are incurred, but these are borne by different generations of elected officials than those who seek and obtain federal capital grants.

Any concern over the possible misallocative effects of capital grants was quickly overshadowed, however, by a greater concern for safeguarding the nation's transit systems from economic collapse. By the late 1960s, nationwide ridership had fallen to 6 billion passengers

annually, and a massive infusion of public support was considered essential in reversing the downward spiral in ridership. Demands for increased public assistance were made on various grounds. Many extolled transit's ability to reduce congestion, conserve fuel, clean the air, and promote healthy urban growth, all areas of national concern. Others cited the inabilities of state governments to respond to urban problems, along with the tendency for transit's benefits to spill over jurisdictional boundaries:

> The multiple constituency pressures on the governor, the tradition of functional separation at the state level, financial limitations and the inherent complexity of such issues as mass transportation will restrict the interest and ability of state governments to metropolitan problems. . . . The growing importance of regional problems that cross state lines, coupled with the great difficulty of developing cooperative interstate programs, adds an additional incentive for federal action.
>
> Doig, 1966, pp. 347-348.

The Era of Expansion

By 1968, there was general agreement in the Administration that a substantially higher level and longer-term commitment of assured federal funding was needed. President Nixon's task force on transportation, in its January 1969 pre-inaugural report, agreed that "public transportation must be guaranteed a sustained source of funds and support for planning, research and development." Then Secretary of Transportation John A. Volpe, testifying before the Senate in October of that year, stepped up the rhetoric:

> The Administration's decision to fund the public transportation program from general revenues flows from the inevitable conclusion that public transportation is a public responsibility. This responsibility should be met by all of the taxpayers, not by a select group of them.
>
> U.S. Senate, 1969, p. 631.

Support for the Administration's policies came from all sides, with groups as diverse as the American Road Builder Association and the Institute for Rapid Transit backing the proposal. From the Senate hearings, for example, the highway lobbyist's testimony concluded, "We support a program of Federal assistance for urban public transportation, and recommend the enactment of legislation authorizing an urban public transportation program" (U.S. Senate, 1969, p. 631).

President Nixon, in his special message to Congress on public transportation, later laid out his Administration's policies toward public transit quite succinctly:

> Public transportation has suffered from years of neglect. In the last thirty years, urban transportation systems have

> experienced a cycle of increasing costs, decreasing funds for replacement, cutbacks in service, and decreases in passengers. . . . Local governments, faced with demands for pressing public services and with an inadequate financial base, have been unable to provide sufficient assistance. . . . About a quarter of our population lack access to a car. For these people--especially the poor, the aged, the very young and the handicapped--adequate public transportation is the answer. . . . We cannot meet future needs by concentrating development on just one means of transportation. We must have a truly balanced transportation system. Only when automobile transportation is complemented by adequate public transportation can we meet those needs.

The resulting legislation, the Urban Mass Transportation Assistance Act of 1970, not only provided a 12-year appropriation of $10 billion in federal aid, but also defined a greater role for state governments in the transit area and mandated the holding of public hearings on all federally sponsored projects. By all accounts, the 1970 Act signified an unprecedented commitment to transit, and to some transit had finally achieved parity with the automobile.

By 1970, however, the nationwide annual operating deficit had reached the $300 million mark, a sizable sum considering that the industry had been largely self-sufficient just four years earlier. Many local treasuries were beginning to feel the weight of this new financial burden, so for pro-transit interests, the creation of a federal transit operating assistance program was the next logical step. Amidst growing rhetoric tying the future of America's cities to a healthy transit industry, Congress commissioned a study in 1970 to look into the feasibility of such a program. The final report, released the following year, was unequivocal:

> Fundamentally, the revenue/expense squeeze in which transit is caught results from its lack of success in adapting to new patterns of urban development, responding to changes to public preferences and expectations, and competing effectively with the private automobile. . . . Available experience and analysis suggests that further extensions of federal support in the form of operating subsidies in and of itself would not contribute to the significant alleviation of the underlying difficulties of which the transit deficit is symptomatic.
>
> U.S. Department of Transportation, 1971, pp. 1-3.

By the time the report was circulated, the debate on federal operating subsidies had intensified. Many of the antisubsidy arguments were fueled by the transportation research community. Critics attacked subsidies primarily on economic grounds, contending that they would retard the emergence of more efficient, competitive forms of transit. Moreover, they argued, such federal effort would eventually become a bottomless pit and discourage cost-cutting measures and efforts to increase efficiency. Opponents also discounted the ability of subsidies

to turn the industry around financially, and argued that such purported external benefits of transit as energy conservation and pollution abatement were of only marginal significance (Peskin, 1973; Oi, 1973; Gomez-Ibanez, 1976). Others continued to rebuff subsidies using fiscal federalism arguments: "our federal system's integrity cannot be undermined with increasing involvement of the federal government in local problems" (DeBeer, 1974, p. 46). Still others challenged operating subsidies on geopolitical grounds:

> I find it difficult to believe that massive federal grants confined to the ten or twelve largest metropolitan areas with one-quarter of the country's population will strike the representatives of the other 75% of the country's population as a good deal for them. The fact is that the resident of Dubuque has nothing to gain, and perhaps something to lose, from heavy federal subsidy of New York's internal transport system.
>
> Netzer, 1974, p. 25.

Although the antisubsidy arguments were favorably received within academic circles, mounting political pressure for the creation of some kind of federal assistance program proved insuperable. New York City's chief transit official spoke forcefully for the pro-subsidy point of view:

> If some of our big cities have to cut service sharply or raise fares to prohibitive levels, the whole country will suffer. . . . It is high time that we face up to a basic fact: Mass transit, like public health and social security, is a national reponsibility.
>
> Ronan, 1974, pp. 71-73.

A confluence of events led to Washington's eventual capitulation and subsequent support of local transit operations. The Arab oil embargo of 1973-1974, the Watergate scandal, New York City's financial crisis, and growing signs of defeat in Vietnam provided the Nixon Administration with an incentive to develop new domestic programs that demonstrated its leadership in difficult times. One of these new proposals was the Unified Transportation Assistance Prgram (UTAP), providing six years of urban highway and transit aid. Prolonged debates over the allocation formula for disbursing transit operating aid, combined with Congress's preoccupation over impeachment proceedings against President Nixon in the summer of 1974, however, stonewalled the UTAP bill's passage (Markowitz, 1981).

Barely a week after President Nixon's resignation and Gerald Ford's confirmation, a delegation of fourteen big city mayors met with Ford and, after some tough negotiation and lobbying, won his support for a compromise on operating aid. Yielding to this groundswell of local demands for federal subsidy support, Congress quickly redrafted a compromise version of the UTAP bill which broadened the distribution of federal monies, and consequently passed both the Senate and the House.

On November 26, 1974, President Ford officially signed into law the National Mass Transportation Assistance Act, providing an $11.8 billion program of both capital and operating assistance through 1980. The 1974 Act, by all accounts, demonstrated federal acceptance of a major responsibility for the continuing welfare of the American transit industry. Whether this was the dawning of a new era for public transit or the opening of a Pandora's box could only be speculated.

Political pressure for operating assistance came primarily from two groups of cities--the ones that were too small to consider rail systems and found capital expenses to constitute a small share of their total transit costs; and larger, older cities whose rail systems predated federal transit aid and felt shortchanged for having had the foresight to build their rail systems early (Meyer and Gomez-Ibanez, 1981). Collectively, along with special-interest transit organizations, these groups formed a highly effective lobbying coalition with a broad political base.

It was clear from the language of the Act that federal aid was meant to rescue transit from a deepening financial crisis: "in recent years the maintenance of even minimal mass transportation service in urban areas has become so financially burdensome as to threaten the continuation of this essential public service. . . . Immediate federal assistance is needed to enable many mass transportation systems to continue to provide vital service" (Public Law 93-503, 88 Stat. 1565, Section 2). One observer remarked: "Key congressional supporters of federal assistance are motivated less by the possibility of using federal assistance to alleviate problems with current patterns of automobile and land use, [and] with the distribution of income and mobility . . . than by the possibility that federal transit assistance will provide some financial relief of hard-pressed urban governments" (Gomez-Ibanez, 1976, p. 10).

Throughout the remainder of the seventies, the transit industry found a receptive and supportive political climate in Washington, particularly after the Arab oil embargo. The federal commitment to transit blossomed in 1978 with the passage of the Surface Transportation Act, which upped the ante for capital and operating grants to over $16 billion through the mid-eighties. As one observer summarized it:

> . . . Transit proved to be a policy for all perspectives on the urban problem. Though its direct constituency was relatively small, its ideological appeal proved to be extremely broad. Whether one's concern was the economic vitality of cities, protecting the environment, stopping highways, energy conservation, assisting the elderly and handicapped and poor, or simply getting other people off the road so as to be able to drive faster, transit was a policy that could be embraced. This is not to say that transit was an effective way of serving all these objectives, simply that it was widely believed to be so.
>
> Altshuler, 1979, p. 36.

As the seventies came to a close, however, federal, state, and local dollars seemed to be providing very little in the way of tangible dividends. Though public operating assistance had almost doubled from $3.45 billion to $6.32 billion between 1975 and 1980, ridership was moving at a snail's pace, increasing just 12%--from 5.65 billion to 6.36 billion--during the same period. Most of the aid, researchers showed, was dissipated by inflation, rising wage levels, and diminishing productivity (Sale and Green, 1979; Barnum et al., 1979; Porter et al., 1979; Bly et al., 1980). Unfortunatey, the fears of transit subsidy critics appeared to be materializing--outside aid wasn't spurring ridership increases, but instead was insulating local operators from escalating costs and productivity declines.

The Eighties: A Watershed for Federal Transit Policies

The fiscal hardships facing the nation's transit industry were symptomatic of larger problems facing the American economy as a whole. Double-digit inflation, rising interest rates, and threats of a deep recession brought about a change in political leadership as well as an abrupt shift in federal economic policy. With a clear mandate to slash federal spending, balance the budget, and divest the federal government of involvement in local affairs, all domestic programs, including transit subsidies, have fallen under the axe of the Reagan Administration's budget cuts. Federal operating assistance to transit has been particularly hard hit, with the program slated for complete dismantlement by 1985.

The Reagan Administration's policies toward transit marked a sharp departure in federal philosophy from those of prior Administrations, and has rekindled the seemingly perennial debate over whose responsibility it is to finance the nation's transit services. In view of the gradual evolution of federal aid to transit over the past twenty years, this rather abrupt paradigmatic shift was remarkably bold and resolute.

The Reagan Administration's position on transit aid was indelibly shaped by several reports produced by several ad hoc pre-inaugural task forces. One, generated by the Heritage Foundation, unabashedly called for the conversion of aid programs to block grants and a moratorium on new rail projects, concluding, "the whole federal mass transit effort has gotten very expensive and it deserves a major reassessment of what the federal role should be in this area" (Heatherly, 1981, p. 7). Another, prepared by the transition team's transportation issues task force, whose members included the soon-to-be-appointed Secretary of Transportation and Federal Highway Administrator, proposed limiting federal assistance "to those few cases where there is a clear and widely accepted requirement for concerted action in an area of high national priority" and recommended the elimination of transit operating subsidies.[5]

---

[5]See "Transportation Issues Task Force Report," Reagan Transition Team, 1980. Though the actual report specified eliminating subsidies only for rail systems, cutbacks were presumably intended for all transit modes.

The official Reagan Administration position on transit was announced in February 1981 with the release of the President's Economic Recovery Program:

> Mass transit operating subsidies will be phased out by 1985. The Federal government does not, and should not, control the operation of local transit systems--including their costs, service levels and fares. Unfortunately, Federal subsidies for local operating costs can be counter-productive because Federal "strings" drive up these costs while holding fares unnecessarily low. Also, there is no reason for someone in Sioux Falls to pay Federal taxes so that someone in Los Angeles can get to work on time by public transportation.
>
> U.S. White House, p. 22.

This proposal was soon followed by a draft bill to Congress to initiate the operating assistance phaseout. The bill contended that federal spending had encroached on state and local prerogatives, intruded into areas of private-sector responsibility, retarded the emergence of more innovative and profitable transit alternatives, and encouraged operating inefficiencies, productivity declines, and lax management practices. Though a mixed bag of protests have been lodged against these proposed cuts, some contend that they will pass through Congress virtually unscathed. There appears to be a general consensus that such action, though viewed as Draconian by some, is necessary to bring about long-overdue reform in transit management and labor practices.

Prospects for the Future

Federal transit policy has vacillated considerably over the past three decades, reflecting changes in political priorities and ideological shifts. Early support was founded on a sincere belief that public transportation conferred major benefits on all members of society, and was thus deserving of substantial federal support. Accordingly, federal grant-in-aid programs flowered throughout the late sixties and seventies. As the evidence against transit subsidies began to accumulate, however, the federal role in the transit area came under close public scrutiny. The relatively small ridership increases during the seventies were a disappointment to many, and the runaway industrywide cost increases and major declines in productivity certainly did not endear federal subsidies to their critics. Though the issue remains splintered, most camps would agree that recent departures in subsidy policy have occurred with remarkable swiftness. What was once considered a well-entrenched, broadly supported federal program may soon be completely dismantled. Nevertheless, serious problems still plague America's transit industry, and the subsidy debate can be expected to liven through the eighties.

2.2. Competing Rationales for Transit Subsibies

Arguments in favor of and against public subsidies to transit are many and varied. Nonetheless, two basic types of arguments have emerged--those based on economic justifications, and those that appear

politically motivated and that rely principally on emotional appeal. This section summarizes the various arguments that have surfaced over time regarding public subsidization of transit. An attempt is made to sort out the competing lines of logic, and to isolate particular areas where there appears to be consensus as well as those aspects of the debate that remain largely unsettled.

2.2.1. Arguments for Transit Subsidies

Pro-transit-subsidy arguments, advanced by prominent scholars and lay citizens alike, derive from a belief that higher levels of transit usage will benefit society as a whole. The rationale is that subsidized fares encourage socially desired travel that would not otherwise occur, and that it is more efficient and economical to encourage trips by transit than by its chief competitor, the automobile. The pro-subsidy argument is well-represented by the following statement:

> Proponents of subsidy generally champion it as a means of effecting "desirable" income redistributions, inducing desirable economies or efficiencies in urban transportation, countervailing other and reputedly undesirable subsidies, creating superior aesthetic values, or providing a one-shot stimulant needed to place public transit on a sound economic or financial footing.
>
> Meyer *et al.*, 1964, p. 341.

Below, these points are examined more closely.

1. Arguments Based on the Effective Allocation of Services

The standard economic justification for operating subsidies is that the extra cost of a unit of transit output (*e.g.*, cost per vehicle mile) declines as scale increases, and that only by underwriting services can the public fully reap the benefits of these increasing returns. However, efficiency rules call for the setting of prices at marginal cost to reflect the value of foregone opportunities, which under conditions of scale economies means deficit spending--*i.e.*, total costs will exceed total revenue. Thus public subsidies become essential.

This argument seems compelling, although it depends entirely upon the existence of a steadily declining marginal cost curve for individual transit properties. To the extent that transit can be characterized as a natural monopoly, like electric and water utility services, declining unit costs could be expected. Evidence on this, however, remains inconclusive. Several early studies did suggest tendencies toward transit scale economies by demonstrating that larger transit systems exhibited lower unit costs than smaller ones (Wells *et al.*, 1972; Lee and Steedman, 1970). Others, however, have more recently cast some doubt on these findings. Wabe and Coles (1975), for example, found that the average cost per kilometer rose with fleet size for a number of British transit systems studied. Since larger bus systems tend to operate under conditions of greater surface street congestion and stronger union pressures on driver wages, some incidences of diseconomies of scale probably

exist within the transit industry. Moreover, the scale economies argument probably applies more to rapid rail than to conventional bus transportation systems, since rail operations are considerably more capital-intensive and rail capacity can be more readily expanded by adding cars. Since conventional bus transportation carried 76% of all transit passengers and comprised 84% of all transit vehicles in 1980, subsidy arguments based on maximizing economic efficiency do not seem highly applicable to the vast majority of operations in the United States.

2. Arguments Based on "Internalizing" Transit's External Benefits

This argument holds that governments can "internalize" transit's many external benefits, such as energy conservation and clean air, by underwriting the cost of services. Low fares, proponents argue, will encourage motorists to switch over to the transit mode, benefiting society as a whole.

As will be discussed in Chapter Four, there is growing skepticism over transit's ability to provide the many benefits that believers have attributed to it. Few transit projects of recent vintage have diverted substantial numbers of auto users to have any consequential effects on larger societal concerns. Cross-elasticities between transit and auto modes are known to be low, with some even suggesting that negative fares would be necessary to bring about any significant increase in transit usage (Moses and Williamson, 1963; Lago and Mayworm, 1981). Moreover, since transit accounts for only 3% of the nation's total vehicle miles of travel, recent empirical studies have shown transit's contribution to energy conservation, cleaner air, and reduced congestion to be either marginal or so ambiguous as to be indeterminate. Findings on the energy and land-use impacts of San Francisco's BART rail transit system, for example, suggest that in the absence of various development incentives and programs to restrict auto usage, few tangible energy savings and growth benefits can be expected (Webber, 1976). Some counter that the longer-range impact of such systems as BART might be more substantial; but the verdict on transit's city-shaping abilities is not yet in. Although at the turn of the century rail transit systems strongly influenced urban growth and land-use patterns, it is well recognized that today any rail investment will provide only a slight increase in regional accessibility, and therefore will affect urban environments only marginally. In sum, then, it would appear that arguments grounded in the belief that subsidies will enrich transit's many purported social benefits are largely unsupported.

3. Arguments Based on Offsetting the Historical Underpricing of Auto Usage

An oft-cited justification for transit subsidies is that some public assistance is needed to offset the distorting effects of undercharging motorists for the cost of their trips and to correct the "pro-highway bias" inherent in our nation's transportation programs (Sherman, 1971, 1972; Abe, 1973; Vickrey, 1973; Ponsonby, 1958). Referred to as the "countervailing subsidy" argument, advocates contend that the charging of transit customers the full cost of their trip while failing to do

so for motorist travel gives an unfair competitive edge to the auto mode, resulting in congestion and excessive pollution. A "second best" fare below the true cost of a trip, then, is needed to compensate for the de facto subsidy to the motorist. Second-best fares as low as one-half the level of marginal cost have been suggested to offset the implicit subsidy to auto motorists (Glaister and Lewis, 1978).

This argument has been criticized for attacking a symptom of the problem (i.e., low transit ridership) rather than the problem itself (i.e., underpricing of auto trips). Some note that transit subsidies simply exacerbate the resource misallocation already existing in the urban transportation sector, reinforcing the automobile's influence on low-density development (Meyer et al., 1965; Walters, 1967; Gordon and Theobald, 1980). Arguing that "two wrongs don't make a right," these critics contend that such direct measures as congestion tolls and vehicle entry restrictions are preferable to transit subsidies. Again, in that evidence suggests few motorists can be enticed to ride transit via subsidies, this argument remains somewhat shaky.

4. Arguments Based on "Infant Industry" Rationales

It has been argued that, as in the case of "infant industries" in developing nations, an infusion of temporary government aid is needed to get public transit systems started so that they will eventually become profitable and self-supporting (Peskin, 1973; Oi, 1973; Allen, 1976). This was the original justification for Federal capital subsidies to transit, the premise being that once on steady footing public transit would become competitive with the private automobile. A related argument is that transit, suffering from long-term secular declines in ridership, is caught in a "vicious cycle" of service cuts furthering patronage losses. Subsidies, then, are viewed as a temporary measure that will provide a new service-usage equilibrium so that any future service expansions will enhance the industry's financial health.

Although the "one-shot" stimulant idea has political appeal, critics counter that federal subsidies simply serve to delay the inevitable long-term collapse of the transit industry. As long as consumers prefer auto travel, it is argued, subsidies simply give transit officials a false sense of financial security. By creating a dependency on outside help, some maintain that subsidies provide a guarantee against risk, discouraging innovation and leading to overcapitalization (Tye, 1973; Hilton, 1974). Perhaps the fact that there is no case on record where a previously unprofitable service became solvent once subsidized is the strongest indictment against this argument. Clearly, the American transit industry has had ample time to turn itself around since the inception of federal assistance in 1964. Oi (1973, p. 5-4) concludes that "political gamesmanship offers the only plausible explanation . . . to advocate subsidy for temporary aid."

5. Arguments Based on Transit's "Option Value"

Proponents of this idea argue that transit benefits all members of society by providing an alternative backup transportation system in the event of an emergency or unforeseen need. Nearly everyone has at some

time relied upon public transportation when the car unexpectedly broke down or inclement weather restricted mobility. At a national scale, it can be argued that bus transportation provides a vital backup mobilization system, whether for civil-defense purposes, for mass evacuation from a natural disaster, or for the relief of inner-city congestion whenever the free mobility of certain protective services is essential. Some note that public subsidies are necessary to reflect the latent, or unexercised, demand people have for transit. Thus, a subsidy responds to the inability of the marketplace to reflect people's willingness to support public transportation, given assurances and the "psychic pleasure" that they will have mobility opportunities under any circumstance.

The question remains, however, just how much people are willing to pay for transit just to have the peace of mind of knowing it exists? This, of course, would be impossible to measure, particularly since people tend to realize the option value of transit only at times of emergency need. Some question whether this is even an area of public responsibility. Walters (1967, p. 31) remarks, "if availability is valued so highly, then surely it would be provided by the free market system itself." While most observers concede that transit's option value is often overlooked, few would argue for subsidizing transit largely on the basis of its backup role potential.

6. Arguments Based on Social Equity Objectives

The major political argument for operating subsidies is that high transit fares hurt the poor, the elderly, the socially disadvantaged, and other groups considered worthy of equal travel opportunities. Sometimes referred to as "merit groups," the belief is that significant numbers of these persons deserve travel subsidies so that they can more fully participate in society's social, economic, and cultural activities. The argument holds that public transit should serve as a redistributive tool, transferring income in kind from nonuser taxpayers to traditionally lower-income users. Clearly, this argument is fraught with social and ethical value judgments, and relies principally on humanitarian appeal.

Though meritorious, these arguments are not irreproachable. For one thing, the beneficiaries of unilateral transit subsidies are not always poor or needy. In fact, those netting the most benefit from subsidy programs are often the more affluent long-distance commuters and downtown land owners (Gomez-Ibañez, 1976; Cervero, 1981; Pucher, 1981). Moreover, significant numbers of financially secure elderly persons enjoy the subsidy benefit of the one-half fare requirement for off-peak periods mandated by the Federal government. Critics argue that although transit subsidies may help redress existing income disparities, there are far superior ways to redistribute wealth, such as through negative income taxes. Rather than forcing transit managers to function as welfare agents and directly interfering in the transit marketplace, it is argued that poor and needy persons should be given money directly and allowed the freedom to spend it as they choose. Such a redistributive program would have few misallocative effects and would foster greater competition among various transportation service providers.[6]

As an alternative to simple tax transfers or indiscriminate subsidies, some maintain that assistance should be targeted to specific groups of users. If the idea is to help certain populations of the needy, it is argued, then the subsidy should be user-side rather than provider-side--*i.e.*, provide targeted groups discounted tickets and vouchers rather than across-the-board subsidies to transit service providers. This arrangement would enable users to patronize the provider of their choice, encouraging greater competition as well as more efficient, less costly services. A number of recent user-side subsidy demonstration projects in the United States have been shown to be administratively feasible and cost-effective ways of targeting fare reductions and promoting competition among taxis, dial-a-buses, and fixed-route transit systems (Kirby, 1981).

In closing, today's provider-side subsidy programs do not necessarily transfer income to intended beneficiaries and have been implicated for misallocative effects. Critics maintain that either direct cash grants or user-side subsidies represent more efficient and equitable ways of targeting scarce subsidy dollars.

2.2.2. Arguments Against Transit Subsidies

Critics of transit operating and capital assistance rely principally upon economic arguments that hold that any subsidy distorts allocative investment decisions and gives rise to inefficient management practices. Both economic theory and empirical evidence are invoked in arguing this position. Many of these antisubsidy arguments and research findings are discussed further in Chapters Three and Seven. Common arguments against both operating and capital subsidies are enumerated below.

1. Operating subsidies remove the incentive for transit managers to be efficient. They induce lax management practices, costly wage concessions, and administrative waste. In particular, managers are less apt to drive hard bargains on wage levels, given assurances of outside support.

2. Subsidies require an administrative apparatus to implement, and result in government intrusion in local affairs and excessive red tape. Federal and State strings attached to subsidy dollars undermine local prerogatives and inhibit flexibility in decision making. Principles of fiscal federalism are compromised by locally targeted subsidy programs.

3. Subsidies restricted to specific service providers prevent other operators from entering the transit marketplace, such as private paratransit companies and taxi entrepreneurs, thus squelching free

---

[6] Others contend, however, that granting total consumer sovereignty over how income transfers are spent fails to promote certain social objectives directly and weakens the donors' control over these monies. Also, subsidy programs, unlike simple cash aids, have greater visibility, reach a broader constituency, and thus have greater political appeal.

competition and innovation.

4. Subsidies create a financial dependency on outside funding sources and a false sense of security that a sustained flow of funds is forthcoming. This can have a debilitating effect on the transit industry over the long run as shifts in administration policies alter the availability of funding. Outside dependencies perpetuate secular declines in the transit industry by creating an environment of fiscal irresponsibility.

5. Operating subsidies serve to depress transit fares, and over the long run dampen revenue income and service qualities. Together, low fares and subsidies form a vicious cycle, helping to perpetuate one another, leading the transit industry along a steady road of decline. Since transit users are far more sensitive to service qualities than price levels, subsidized fares, by suppressing revenue income, restrict service improvements, which further suppresses ridership.

6. Empirical evidence consistently reveals that subsidies fail to coerce substantial numbers of motorists to switch over to the transit mode. Accordingly, the impacts of subsidies on energy conservation, air quality abatement, land consolidation, and congestion relief have been minimal. Other purported benefits of subsidies, such as improvements in income distribution and stimulation of the transit industry through the infusion of funds, are equally specious and unsupported.

7. Whereas operating subsidies encourage mismanagement, the subsidization of capital acquisitions can distort investment decisions. Capital subsidies, in the absence of operating assistance, encourage the accelerated depreciation of equipment in order to save on ongoing maintenance expenses. Overcapitalization, induced by the availability of easy money, leads to higher operating costs, thus creating a greater dependency on outside operating assistance.

8. Over the long term, subsidies encourage suburbanization and wasteful land development by lowering the cost of travel to commuters. Although other factors, such as rising family incomes and postwar highway construction, have undoubtedly had a greater impact on the decentralization movement, subsidies and low transit fares nontheless reinforce this pattern.

9. Countervailing transit subsidies, intended to offset the implicit subsidies granted to automobile motorists, only serve to exacerbate the resource misallocation already existing within the transportation sector. A more prudent course of action would be to set prices for travel at their social marginal cost for all modes, thus eliminating all mispricing and ensuring the most efficient allocation of resources. Moreover, since subsidized fares have not diverted appreciable numbers of motorists to public transit, the countervailing subsidy argument is somewhat moot.

10. Transit subsidies are misdirected. The purpose of any subsidy is to encourage people to use more of a good or service than they would if they had to pay the full opportunity cost of the good or service. This is not applicable to transit, however, since travel itself is only an "intermediate" or "derived" good. Consumption of transit services is not an end in and of itself, but rather a means to an end, such as getting to work. Since people rarely travel for travel's own sake but rather for the purpose of accessing certain social, economic, and cultural activities, the subsidy should not be directed to transit *per se* but rather to people and the various societal activities they seek. As a welfare instrument, then, subsidies should take the form of cash aids to deserving persons rather than deficit offsets to transit agencies.

2.2.3. Weighing the Arguments

Many of the popular arguments in support of transit subsidies crumble upon closer scrutiny. The most compelling case to be made for public support of transit services is that certain needy groups are deserving of assistance, but even this position does not imply indiscriminate subsidies, but rather subsidies targeted to specific user groups. Traditional microeconomic theories are most frequently used in discrediting transit-subsidy rationales. The overriding criticism has been that subsidies breed inefficiencies and mismanagement. This view is prevalent among many scholars and political spokespeople, and generally finds support from empirical research. However, public transit policies cannot be framed around economic arguments alone; political ideology and public opinion must play a significant role as well. It follows that any reconciliation of the divergent views on whether public transit should be subsidized must occur within the political arena. Only through representative forums of governance can the voice of the populace be heard and the most prudent and equitable policies on public transportation be embarked upon. The purpose of the following chapters is not so much either to justify or to rebuff transit subsidies, but rather to help define the appropriate roles and responsibilities of various levels of government in supporting public transit services. Again, any ultimate policy on how transit's cost burden should be shared must be set by reponsible elected officials.

2.3. Transit Finance Review

As a brief prelude to later discussions, Table 2.1 summarizes information on alternative mechanisms for financing public transit services. There are two principal funding sources: fares and taxes. Fares are charges exacted against users, typically reflective of the benefits received by users. Taxes represent transfer payments from society at large to transit authorities and their direct beneficiaries. In theory, taxes should account for the social benefits of providing transit services, such as the conservation of energy and the intensification of land-use patterns. Other revenue sources are also frequently used to finance transit, including income from advertising and the rental of property; these, however, are more incidental to the overall transit operation and usually account for a very small proportion of total income. Table 2.2 identifies the dollar amounts collected nationwide

Table 2.1

Summary of Transit Financing Mechanisms

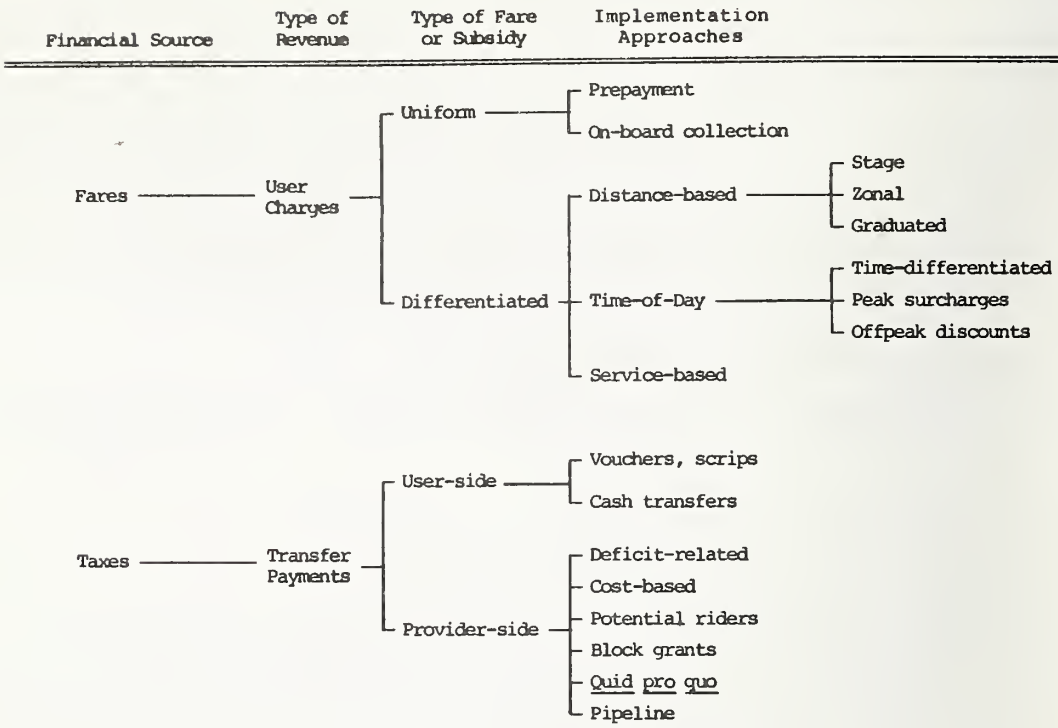


Table 2.2

Nationwide Transit Revenue Sources for 1980

Source of Revenue	Total Dollars (thousands)	Percent of Total
Passenger Revenue	2,462,296	39.0
Other Operating Revenue	105,888	1.7
Total Operating Revenue	2,568,184	40.7
Local Operating Assistance	1,703,862	27.0
State Operating Assistance	820,373	13.0
Federal Operating Assistance	1,093,870	17.3
Total Operating Assistance	3,618,105	57.3
Other Revenues	127,391	2.0
TOTAL	6,313,680	100.0

Source: APTA, 1981, p. 44.

from each of these revenue sources in 1980.

Two generic types of fare policies exist: uniform and differentiated pricing. Uniform fares involve charging a flat fare regardless of the distance or time of day of travel. Uniform fares can be assessed either through the issuance of monthly prepaid passes or through on-board collection. Differentiated fares, on the other hand, usually attempt to approximate the incremental cost of serving a trip, and often involve distinguishing fares according to trip length, time period of travel, or type of service (e.g., express vs. inner-city). Popular forms of distance-based pricing include stage fares (where prices increase with irregular distance steps), zonal fares (where prices change every time a fairly arbitrarily demarcated geographic zone is traversed), and graduated fares (where prices are exacted as a pure function of distance, typically on a per-kilometer basis). Time-of-day fares often involve surcharges during the peak, discounts for off-peak usage, or combinations thereof (e.g., upward adjustments in fare for rush-hour periods and downward adjustments for nonpeak periods). Service-based fares typically seek to reflect variations in service quality among different routes, often involving a graduated rate structure for express and paratransit operations and more of a fixed rate for inner-city, surface street operations. Thus, a host of alternative fare strategies are available for reflecting users' responsibilities for financing services.[7]

Two basic types of subsidy programs are available for financing services from tax revenue: user-side and provider-side subsidies. The user-side scheme attempts to target subsidy payments directly to intended beneficiaries through various voucher mechanisms (e.g., scrips, coupons, tickets) or direct cash aid (e.g., negative income taxes, human-service program monies). User-side subsidies are inherently advantageous because they efficiently channel funds to desired recipients and encourage competition among service providers. They fail, however, to disperse the benefits of a transit program widely among a transit district's constituents and therefore have limited political appeal. Provider-side subsidies are by far the most prevalent form of government assistance to transit. Here, financial aid is issued directly to public transit operators, usually on the basis of some disbursement criteria.

Six general approaches are available for dispersing subsidy dollars: deficit-based, cost-based, quid pro quo, potential ridership, pipeline, and block-grant approaches. Deficit-based subsidies cover the cost of a transit system's shortfall without stipulating any changes in management practices, service provisions, or fare policies. Essentially a response to the fiscal trends within the transit industry, this is how the federal government has historically chosen to distribute operating assistance. Cost-based, or input-related, subsidies cover some specific items of cost, such as equipment acquisitions. This has historically

---

[7]See Dygert et al., 1976, for a more complete discussion on alternative transit fare policies.

been the norm for distributing federal capital assistance. The quid pro quo approach ties subsidy dollars directly to some measure of production or output of services. Output can be either an efficiency measure of labor or vehicle productivity (e.g., vehicle hours of service per employee) or an effectiveness measure of service utilization (e.g., passengers per mile of service). Typically, some output standard is set as a precondition to the receipt of subsidy dollars, thus encouraging managerial efficiency. As a means of targeting subsidy dollars to places that hold the greatest promise for generating future patronage, another approach is to disperse monies on the basis of potential riders in a market area. The distribution of aid according to a region's population or the percent of population within one-half mile of a transit line could result in appreciable gains in industrywide ridership. Finally, subsidy dollars could be pipelined directly to local authorities based on no criteria whatsoever, other than the amount required; alternately, assistance could filter down to local levels as part of a revenue-sharing block-grant scheme.[8]

In closing, there are a variety of approaches for financing the nation's transit services. Ideally, fares should reflect users' direct responsibilities for the cost burden of transit services, while tax payments should encapsulate benefits accruing to society at large. The best approach toward getting farebox and tax revenues into local transit authorities' coffers, however, remains at issue. Although not within the purview of this research, these alternative financial schemes are addressed throughout the remainder of this report in investigating alternative cost-sharing schemes for transit. For the interested reader, past and current programs that evolved at the Federal, State, and local levels for financing transit services are discussed in detail in Appendix 1.

---

[8] See Institute of Public Administration, 1979, for a more complete discussion on alternative transit financing approaches.

Chapter Three
Goals of Transit Subsidy Programs

Goals are the foundation of public programs. In order to evaluate transit subsidy programs, goals must be clearly stated. This is no easy task, however subsidy programs cannot be rationally examined without some inkling of what achievements are desired. The determination of goals is particularly difficult in dealing with legislative bodies since public bureaucracies frequently have uncertain and conflicting goals (Blau, 1971). Consequently, goals must often be inferred from the actions of such bodies.

Once goals have been ascertained, program results can be analyzed. "Results" are benefits that represent progress toward desired objectives, or take the form of costs (dis-benefits) which produce retrogression from program goals (Quade, 1975). The very important relationship between goals and benefits is clear; goals are "anticipated-benefits," and the success or failure of the program depends on how well actual benefits match up with anticipated benefits. Recognizing the intimate link between goals and benefits, this report takes the position that an examination of the goals of transit programs and an assessment of transit's benefits can shed some light on an appropriate role for government in financing mass transportation. In particular, goals help define the stake, or vested interests, governments see themselves having in public transit, and thus provide some insight into how transit's cost burden might be shared. Accordingly, this chapter charts the goals that have been established by various levels of government for public transit. Chapters 4 and 5 merge the goal statements presented in this chapter with our current knowledge about transit's benefits in examining intergovernmental financial responsibilities for transit. The matching of goals with benefits, it is believed, provides the strongest foundation for establishing a rational cost-sharing program for public transit.

The problem of examining goals is compounded by the proliferation of terms associated with the task--goals, objectives, policies, etc. These terms are not universally defined and are often used interchangeably. A meaningful framework is essential in structuring any discussion of transit goals.

The term "goal" can be generically defined as "an end to which a planned course of action is directed" (Hill, 1968). Goals are then categorized from general to specific as ideals, objectives, and policies. An "ideal" is a broad statement of purpose which articulates the values to be adhered to in addressing the problem, and ultimately, the intended results. An "objective" denotes an attainable goal which may not have intrinsic value, but leads to the attainment of an ideal goal. Objectives should be defined operationally in either quantitative or qualitative terms.[1] A "policy" specifies actions which lead to the

---

[1] A qualitatively-defined objective is either attained or not by intui-

attainment of objectives. In this context, policies and programs are nearly synonymous, and are used interchangeably.

An example of this goal hierarchy might be as follows: an ideal is stated to create a healthy environment; one supporting objective would be to reduce air pollution 20% by 1985; and, a policy is implemented to obtain the objective which requires all new automobiles to meet certain emission standards.

Admittedly, goals are seldom structured so explicitly, but this still provides a useful framework for discussing the transit goals of each level of government. The focus of the following sections is on the stated objectives of transit agencies. Implicit goals, while they may be important reasons why a program exists, are simply too intractible for any type of detailed analysis. Regardless, a program must be held accountable to its stated goals. The following sections examine federal, local, and state goals.

3.1. Federal Transit Goals

Comprehensive transportation goals set by the federal government are noticeably lacking. Federal transportation policies, instead, are fairly loosely defined and generally fragmented. The National Transportation Policy Study Commission (1979a), for instance, found that sixty-four federal agencies have jurisdictions which impact transportation outcomes through approximately one thousand policies and programs. The Commission concluded:

> The U.S. has no unified 'national transportation policy.' Instead there are an assortment of policies and programs which have been developed in an ad hoc fashion to achieve sundry goals or resolve various issues [p. 35]. . . . The Federal government does not have a clear picture of how other levels of government aid transportation. In addition, the Federal government has limited data on the physical performance of the U.S. transportation system, so that it is impossible to determine whether Federal policies and programs are effective, or if more or less Federal spending is required to achieve Federal goals [p. 37].

Although these comments are part of a comprehensive appraisal of federal transportation programs, they speak to the transit program as well. Over time, rapid growth in the UMTA budget, changing administrative philosophies, and the absence of periodic, critical reviews of program goals have given rise to a large number of goals being associated with the federal transit program. This, in turn, hinders program evaluation and accountability over expenditures.

---

tive observation. A quantitatively-defined objective can be attained in varying degree--*i.e.*, the extent of attainment is measurable.

3.1.1. The Urban Mass Transportation Act

The roots of the federal transit program lie in the Urban Mass Transportation Act of 1964. This Act, passed in response to a widespread fiscal crisis in the transit industry, provides the basic statutory authority and funding for a mass transportation assistance program. Specifically, the stated purposes of the Act, which may at best be considered UMTA's ideal goals, were:

1. to assist in the development of improved mass transportation facilities, equipment, techniques, and methods, with the cooperation of mass transportation companies, both public and private;

2. to encourage the planning and establishment of areawide urban mass transportation systems needed for economical and desirable urban development, with the cooperation of mass transportation companies both public and private; and

3. to provide assistance to state and local governments and their instrumentalities in financing such systems, to be operated by public or private mass transportation companies as determined by local needs.

These purposes reflect the convictions Senator Harrison Williams expressed during a Senate hearing in 1961. He maintained that federal involvement in transit would accomplish four things: maintain services, encourage state and local officials to come to grips with the transit problem (financial and otherwise), help solve the problem by supporting research, planning, and demonstrations and by stimulating private investment, and promote coordinated regional planning.

3.1.2. Section 3 and Section 5 Program Objectives

In the early years of the Section 3 program, funds were distributed on more or less a first-come, first-served basis with little concern over whether requests were justified. However, by 1971, the number of requests for capital grants far exceeded the available funds. UMTA responded in the following year with a set of criteria for making investment decisions. Published in the report entitled, Capital Grants for Urban Mass Transportation: Information for Applicants (UMTA, 1972), the nonstatutory guidelines for evaluating applications define UMTA objectives for the Section 3 program. These provide some insight into how UMTA, as a federal agency, views its responsibilities.

The guidelines offer three objectives for the administration of capital grants. One objective calls for a program which can "reinvigorate public transportation," in the sense of making it competitive with the automobile. A second objective calls for the program to provide greater mobility for transit-dependent persons--the young, elderly, poor, and handicapped. The guidelines note that the transportation needs of these subgroups are diverse. Finally, the capital grant program should promote desirable development patterns in urban areas. Essentially, this objective seeks to encourage concentrated land use which, in turn, minimizes the need for investment in transportation

infrastructure. Transit is touted as a potential force in developing an "enhanced quality of the urban environment."

This rather expansive set of goals suggests, de facto, that transit yields a variety of urban benefits. Evaluation of these benefits is largely subjective since UMTA does not require capital grant applicants to assess the attainment of these benefits through benefit-cost analysis or other evaluation methodologies. Altshuler (1979) suggests, however, that this array of goals gave the program broad ideological appeal even though its direct constituency was relatively small. Because almost anyone with a concern for the urban environment--conservationists, environmentalists, businessmen, the poor, the commuter, etc.--could embrace the objectives of transit policy, it became the centerpiece for federal urban policy in the 1970s.

The addition of Section 5 formula grants in 1974 marked a significant programmatic change from the original UMT Act. Operating subsidies had heretofore been considered taboo and were specifically rejected as an acceptable use of Section 3 funds. In an evaluation of the Section 5 program, UMTA's Office of Policy and Program Development (1979) identified its objectives to be:

1. Improve or continue mass transportation services;

2. Maintain the financial support provided by state, local governments, and local public bodies;

3. Improve the efficiency, effectiveness, and productivity of transit operations and of the transportation system; and

4. Maintain low cost to users (especially transit-dependents).

These are consistent with earlier goals statements, with the notable exception that emphasis on the "efficiency, effectiveness, and productivity of transit operations" has been added. These measures were previously used only as criteria to gauge the success or failure of a project, if considered at all. More than just test criteria, "efficiency, effectiveness, and productivity" were made program objectives. It is clear, however, that the Section 5 objectives have cross-purposes. Specifically, the improvement of transportation services (Goal #1) and maintenance of low fares (Goal #4) entail some compromise in effecting improvement in efficiency and productivity (Goal #3). This is exactly what UMTA found in its evaluation; evidence indicated that goals #1, #2, and #4 had been largely achieved while results were mixed for goal #3.

In summary, the overall program goals set forth in the original UMT Act have remained essentially unchanged. Programmatic objectives have grown incrementally in response to the perceived needs of urban areas and the transit industry. A summary of goals attributed to the UMTA program, prior to the Reagan administration, was compiled in an UMTA issue paper (Burbank, 1979) and are presented in Table 3.1. Each goal was categorized as either an economic/efficiency, equity/distributional, "abstract," or performance goal.

TABLE 3.1. GOALS ATTRIBUTED TO THE UMTA TRANSIT PROGRAM

I. ECONOMIC/EFFICIENCY GOALS

1. Energy conservation
2. Reduced air and noise pollution
3. More efficient urban land use and development
4. Reduced traffic congestion
5. Enhanced mobility for urban residents

II. EQUITY/DISTRIBUTIONAL GOALS

1. Improved mobility for the elderly and handicapped and others without access to the automobiles
2. Revitalization of those metropolitan areas and segments of metropolitan areas (i.e., central cities) which are faced with severe financial constraints

III. ABSTRACT GOALS

1. "Balanced transportation," and others

IV. TRANSPORTATION AND TRANSIT PERFORMANCE GOALS

1. Improved reliability, shorter headways, and others

Source: Burbank, 1979

To date, there has been no on-going effort to ensure that specific transit assistance projects contribute to program goals. Although UMTA's program goals have been well-intended, and have amassed significant support, they are sometimes conflicting, and generally defy detailed evaluation.

3.1.3 CURRENT FEDERAL GOALS

The planned elimination of federal operating subsidies reflects, in part, the current Administration's belief that many of the goals set for transit cannot be accomplished at an acceptable cost. Whether this represents a retreat from goals set forth in the 1964 Act remains unclear. A policy shift does not necessarily signify a reformulation of federal goals. For example, the administration might simply have judged operating subsidies to be an ineffective tool for achieving current goals, and thus should be eliminated; federal goals might, for all intensive purposes, remain unchanged. However, goals are often inferred from general policy, thus many would contend that the current phase-out plan represents an unequivocal retrenchment in the federal commitment to transit.

Interviews with eight UMTA Regional Administrators indicated there are somewhat varying interpretations of the Reagan administration's goals for public transit.[2] Generally, there was a stronger recognition of internal policies rather than explicit goals and objectives. Most Regional Administrators interpreted two federal policies as indirect expressions of goals: fiscal restraint and the New Federalism. Administrators generally felt that an overriding federal objective would become one of encouraging major efficiency and productivity improvements in local transit operations. Consistent with the New Federalism, interviewees believed that this could best be accomplished by transferring the major responsibility for transit to the state and local levels.

There was general agreement among Regional Administrators that the federal government should not subsidize transit operations, though several maintained that some operating support might be appropriate at somewhat lower levels than the current Section 5 program. By contrast, all felt that federal capital assistance is justifiable. There was some acknowledgment that the federal government's role should be one of an exemplar, establishing rational policies which would aid local efficiency efforts. Ironically, the only transit program where efficiency was cited by Administrators as an objective was Section 5. But operating subsidies are generally perceived as one of the major causes of inefficient transit operations because they often represent a "blank check" for making up revenue shortfalls.

The UMTA program may seek to divest itself of a number of functions no longer considered within the federal purview. Regional

---

[2]Telephone interviews were conducted with eight UMTA Regional Administrators during December 7-9, 1981. Interviews were carried out with the proviso that anonymity would be guaranteed.

Administrators were in general agreement that ensuring equal mobility for citizens, strengthening economic vitality of cities, and environmental protection were primarily local or state/local concerns. Notably, improved mobility for the nation's poor, elderly, and disabled was considered the major benefit of public transportation. Although three interviewees acknowledged some federal responsibility in this area, only one emphasized that it is principally a national responsibility. With regard to economic development concerns, responses varied widely; three Administrators indicated that the federal government has a vested interest in the vitality of urban centers, however, the majority of interviewees felt that this was almost exclusively a local concern. There was less consensus on environmental protection as a national goal for transit; most Administrators stated that they felt transit provided very few tangible dividends in this area.

There was a unilateral consensus among administrators that energy conservation is a concern of national scope, and therefore, primarily a federal responsibility. Several mentioned that the states should join in a partnership with Washington in implementing and encouraging energy conservation strategies. Finally, transit's role as an alternative travel mode during gas shortages or civil emergencies had not been seriously considered by interviewees. Several did emphasize, however, that transit might play a vital role under conditions of federally-mandated gas rationing.

In sum, Administrators expressed mixed opinions regarding federal responsibility for transit. This divergence perhaps reflects the historical absence of a unitary transit policy at the federal level, owing to changing administration philosophies. The new Surface Transportation, however, has undoubtedly given rise to a more focused set of federal goals since these interviews were conducted.

3.2. Local/Operator Transit Goals

Transit operations are usually concentrated in the local areas, and thus transit goals should closely reflect the interests of local governments. This is a reasonable assumption; even though only 55% of all U.S. transit systems were publicly owned in 1980, they accounted for 94% of all transit passenger trips that year (APTA, 1981). Local goals, like the state goals described in Section 3.3, were compiled from responses to a nationwide "Transit Finance Survey" of transit policymakers at those levels of government. The survey instrument, a listing of the respondents, and a description of the sampling technique employed can be found in Appendix A2. In all, information on goals was received from 99 local transit operators, including seventeen of the nation's largest transit properties.

3.2.1. Structuring Local Transit Goals

Operators were asked to list the most recent goals established by their agency's policy-making body. Each goal was then rated as to its importance using a five-point scale which ranged from (1) least important to (5) most important. Eighty-eight operators listed and rated goals--59% representing explicit agency goals, and 41% being the

respondent's perceptions of agency goals. The other eleven operators indicated that their agency had no adopted goals. Most respondents were close to the policy-making process for their agency--82% were either an administrator, manager, planning director, or financial officer.

Goals statements took many forms and indicated various levels of sophistication. Some respondents listed very specific projects as goals, e.g., "finish the new maintenance facility," or "purchase fifteen new buses;" others specified goals which were closer to ideals, and may have consisted of only one statement, such as, "provide for the timely movement of people within the city at a reasonable cost." The typical response could be best characterized as an objective, although not well-defined in operational terms.

Synthesizing this information into a representative set of local goals for transit was largely a subjective task. A series of goals was redefined several times to provide a good match with operators' responses. Finally, goals were grouped into four categories: service, management, relational, and community goals. Summaries of local goals and operators' responses are presented in Table 3.2 and Figure 3.1, respectively. These summaries do not imply that operators incorporate all these elements into their goal structures; rather, an effort has been made to tap all the dimensions expressed by operators in the sample.

Service Goals. This category encompasses four objectives pertaining to the direct delivery of transportation services by the operator. All respondents cited at least one of these objectives in their goal statements.

The first objective simply refers to the provision of effective transit service which enhances mobility of the urban population in general. Service effectiveness was the most frequently cited goal, with over 65% of the respondents listing it in some form. A corollary objective, which often appeared in tandem with effectiveness, is to provide high quality service. Some aspects of quality service include good route coverage, short headways, dependable scheduling, well-maintained buses, courteous drivers, and various passenger amenities.

Another objective gives special emphasis to the transportation needs of the poor, young, elderly, and handicapped. This goal reflects a growing concern over the mobility problems of these groups relative to the general population. Specific policies include targeting routes, equipping conventional buses with wheelchair lifts, and development of demand-responsive services, such as dial-a-ride.

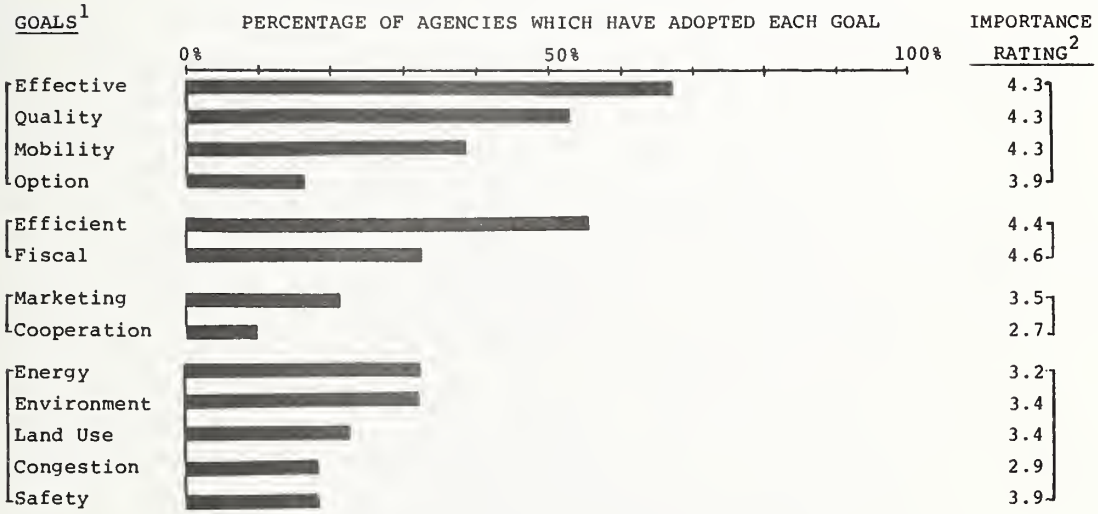
Finally, the least cited of the service goals specifies that public transit serves as an optional mode of travel in the event of a personal need, or a regional or national emergency. With reference to personal need, the option mode objective is a subset of the more general effectiveness objective. Otherwise, it refers to the particular need to move large numbers of people in times of natural disaster or civil emergency.

Management Goals. A pair of objectives frequently listed by local

TABLE 3.2 LOCAL/OPERATOR GOALS

KEY WORD*	DESCRIPTION
	I. SERVICE GOALS
Effective	Maintain and increase service effectiveness; enhance urban mobility through balanced service to employment centers, recreational and shopping areas, and educational and religious activities.
Quality	Provide high quality service including frequent, dependable, convenient service; well-maintained, clean buses; safe courteous drivers; and various passenger amenities.
Mobility	Improve the mobility of the transportation disadvantaged--the poor, young, elderly, and handicapped.
Option	Provide an alternative transportation mode for automobile drivers; provide service during energy shortages, natural disasters, and national crises.
	II. MANAGEMENT GOALS
Efficient	Improve the cost-efficiency of transit operations through the use of positive management and cost control programs, better union contracts, cost-effective substitutes for fixed route service, etc.
Fiscal	Maintain fiscal integrity; develop a stable transit financing program by identifying permanent, predictable funding sources.
	III. "RELATIONAL" GOALS
Market	Encourage broad public and private support for transit; market the transit product effectively.
Cooperation	Promote interagency cooperation; coordinate and support area goals in the development of transit plans and programs.
	IV. COMMUNITY GOALS
Energy	Conserve limited energy resources.
Environment	Improve air quality; reduce noise pollution.
Land Use	Stimulate economic development and encourage desirable land use patterns.
Congestion	Reduce traffic and parking congestion.
Safety	Ensure passenger safety.

*Key Words relate goals to Figure 3.1.



[1]Key words are listed--each goal is described in Table 3.2.
[2]Respondents rated each goal's importance on a scale from (1) least important to (5) most important.

FIGURE 3.1. OPERATORS' GOALS
The percentage of respondents citing each goal

agencies are concerned with the effective management of a transit operation: controlling costs and stabilizing revenues. Seven out of every ten respondents cited one or both of these objectives.

The first goal calls for a transit agency to operate in a cost-efficient manner. This is typically pursued by seeking productivity improvements through better management practices, prudent labor contract negotiations, elimination of costly and low-performance fixed-route services, or the implementation of more cost-effective forms of mass transportation. The second objective calls upon the operator to maintain fiscal integrity, primarily through the development of an array of funding sources that are adequate, dependable, equitable, and predictable.

Some tension exists between an operator's goal to balance the budget and its service-related goals. If ubiquitous service is desirable, then transit will be delivered outside its natural markets, and the fiscal condition of the system suffers. Some trade-off among goals, therefore, becomes necessary.

Relational Goals. "Relational" goals refer to how a transit agency relates to others who have an interest in its operation--the public, who are served by transit, and other agencies, with whom transit cooperates (or competes) in the development of unified public programs. Only about one operator in four included one of these objectives in their goal structure.

Marketing public transit, as an objective, serves two purposes. First, if transit is promoted in a positive light, it will attract more riders. And second, since transit's clientele is a relatively small proportion or an urban population, operators seek to establish goodwill among non-users and business interests so that during times of fiscal crisis, the agency can elicit more broad-based support.

Community Goals. These objectives represent a perception that transit provides a group of benefits which accrue to the residents of a community (and possibly the nation), regardless of whether one patronizes transit or not. In this sense, the term "community" may be somewhat of a misnomer, though it does suggest that a larger constituency is involved. These objectives, from the most frequently cited (32%) to the least (17%), were to conserve energy, improve air quality, encourage economic development and concentrated land use patterns, reduce traffic and parking congestion, and ensure passenger safety. About one-half of the operators cited at least one of them. Although policy-makers seem to be taking a more critical view toward these goals, it has been generally believed that the simple provision of transit services leads to their attainment. Interagency cooperation may be a complementary objective to this group, but it was seldom listed in conjunction with them.

In sum, community goals reflect common urban concerns which help to build a consensual base of support for transit services. Whether or not they are legitimate is addressed in the fourth chapter.

3.2.2. Relative Importance of Local Transit Goals

As mentioned earlier, the importance of each goal was rated relative to other goals of the operator. The average importance rating of each goal is also shown in Figure 3.1. This weighting system resulted in most respondents rating all their goals from "moderately important" to "most important," yielding somewhat inflated ratings. However, a pattern does emerge which matches one's intuitive expectations. Objectives related to the financing, operation, and delivery of transportation are perceived to be more important than peripheral objectives. Service and fiscal goals were rated 4.3 or higher, except for the option objective which was rated 3.9. The importance of relational and community goals ranged from 2.7 to 3.9.

3.2.3. Transit Performance and Goals

An effort was made to link goals statistically with transit agencies according to their operating characteristics--*e.g.*, number of revenue vehicles, percent of operating revenue from fares, operating expense per revenue mile, and passengers per revenue mile.[3] No significant relationships emerged which would allow an operators' objectives to be associated with its performance. Thus, there appears to be no underlying pattern as to why some operators choose certain goals while other operators choose other goals. For example, more efficiently run transit properties do not seem to align themselves with the management goals any more than less efficiently run properties.

3.3. State Transit Goals

Levels of responsibility differ markedly among state transit agencies. Some play a very minor role, perhaps existing only to distribute federal transit aid to eligible recipients. Other states have become involved to such an extent that they have become transit operators. Consequently, goals adopted by state agencies vary considerably from one to another.

3.3.1. Structuring State Transit Goals

In the Transit Finance Survey, state agencies were asked to list and rate their most recent goals. Thirty-one states responded and only one indicated that no goals had yet been established. Among the other thirty, nineteen listed explicit agency goals and eleven listed the respondent's perceptions of agency goals. Most respondents were close to the policy-making process for their agency--twenty-one were a state

---

[3]UMTA Section 15 operating and financial data were merged with the survey data in order to perform the statistical tests. Each goal was coded as (0) not listed by respondent, or (1) listed by respondent. A series of simple bivariate regressions were run with goals as dependent variables and performance measures as independent variables. There were no significant relationships suggesting that the presence or absence of a goal cannot be reliably predicted from an operator's performance record.

administrative or financial officer.

A structure of goals emerged from these responses similar to those of local transit properties. Overall, however, a decisively administrative tone was evident from the state level. State objectives were grouped into four categories: support, funding/cost-efficiency, service/effectiveness, and community goals. These are summarized in Table 3.3 and Figure 3.2.

Support Goals. As an ideal, most state agencies exist to support private, local, and regional efforts to maintain transit services. Consequently, their objectives tend to focus on the support of local transit systems and their instrumentalities. When the state is also an operator, of course, its goals reflect this direct participation.

In this structure, two objectives were identified specifically as support goals. One involves the states' role in identifying critical transit issues and seeking solutions with federal, other state, regional, and local agencies; states act as intermediaries, promoting working relationships between agencies. As a second objective, states provide planning assistance to operators in which they may function as an information clearinghouse, aid in the preparation of project applications and establishment of monitoring and evaluation programs, or participate in service and financial planning. Over 53% of the state respondents cited one of these support objectives.

Funding/Cost-Efficiency Goals. This category encompasses three objectives governing the states' role in funding local operations. These could be construed as support objectives, but they have a decidedly financial emphasis. More than half of the respondents listed at least one of the funding goals.

One objective, the most often listed in this category (33%), was to improve the ability of transit operators to use funds efficiently. The state programs want to provide assistance in managing revenue sources and in developing cost-efficient operations. As a corollary to this objective, a number of states specify that the distribution of state and federal aid should be carried out in a manner which encourages efficient and effective transit. Specifically, states are seeking to maintain the user's share in generating total revenue. This objective includes identifying transit needs of rural and small urban areas and equitably distributing funds.

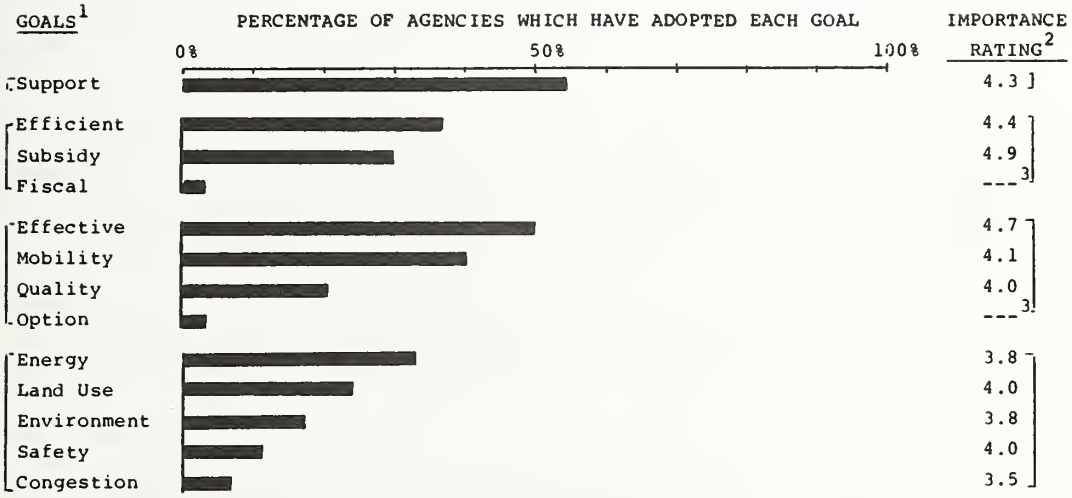
Only one state indicated, as an objective, that it should maintain the fiscal integrity of transit through its program. Certainly, however, this is implied in each of the two funding objectives already described.

Service/Effectiveness Goals. Objectives in this category are essentially a reiteration of service oriented goals expressed by operators except for a few twists peculiar to a state's perspective. Only four states failed to cite at least one of these service/effectiveness goals.

TABLE 3.3. STATE GOALS

KEY WORD*	DESCRIPTION
	I. SUPPORT GOALS
Support	Identify critical transit issues; seek solutions through interagency cooperation; Provide technical planning assistance; aid in the preparation of project applications and establishment of monitoring and evaluation programs; encourage multimodal planning and public participation; act as an information clearinghouse.
	II. FUNDING/COST-EFFICIENCY GOALS
Efficient	Increase the ability of local transit operators to use funds efficiently.
Subsidy	Distribute State and Federal aid in a manner which encourages effective and efficient transit; Promote a balance between user and non-user revenue sources.
Fiscal	Maintain the fiscal integrity of local transit.
	III. SERVICE/EFFECTIVENESS GOALS
Effective	Maintain and increase service effectiveness; develop an integrated (balanced) statewide transportation network; enhance mobility.
Mobility	Improve the mobility of the transportation disadvantaged--the poor, young, elderly, and handicapped; improve access to public transit in rural areas.
Quality	Provide high quality service--clean, dependable, safe equipment and service.
Option	Provide service during energy shortages, natural disasters, and national crises.
	IV. COMMUNITY GOALS
Energy	Conserve limited energy resources.
Land Use	Stimulate economic development and encourage desirable land use patterns.
Environment	Improve air quality; reduce noise pollution.
Safety	Ensure passenger safety.
Congestion	Reduce traffic and parking congestion.

*Key Words relate goals to Figure 3.2.



[1]Key words are listed--each goal is described in Table 3.4.
[2]Respondents rated each goal's importance on a scale from (1) least important to (5) most important.
[3]Only one respondent listed this goal--no importance rating was computed.

FIGURE 3.2. STATES' GOALS
The percentage of respondents citing each goal

States expressed an objective of service effectiveness on two levels: (1) to improve statewide mobility through the development of an integrated transportation system including improvement of interregional public transportation, and (2) encourage local operators to provide effective service which enhances urban mobility generally. Half of the respondents cited this objective.

Other service objectives included improving mobility for the transit-dependent (with special emphasis on the provision of public transit in rural areas), providing high quality service, and providing transit as an optional mode of travel.

Community Goals. As in the case of local operators, states adopted goals reflective of the potential externalities of transit. These objectives, listed from the most often cited (33%) to the least (7%), were energy conservation, economic development, improved air quality, passenger safety, and reduced traffic and parking congestion. About half of the respondents cited one or more of the community goals.

3.3.2. Relative Importance of State Transit Goals

State agencies also rated the importance of their goals from (1) least important to (5) most important; the average importance rating is included in Figure 3.2. Only a slight pattern is evident in these ratings. Among respondents citing the distribution of subsidies as an objective, the importance rating was 4.9; the overall rating for the category of funding/cost-efficiency goals was 4.7. Otherwise, all the support, funding, and service objectives received importance ratings of 4.0 or higher. No community objective received a rating above 4.0. As with operators, goals which are peripheral to the delivery of transit service are rated as secondary goals.

3.4. Summary of Goals for Transit

Public agencies involved in the provision of transit services are faced with a dilemma. They must balance objectives to operate transit in a business-like fashion against a variety of service and community goals. This problem is evident in the goal structures at every level of government. It is especially troublesome for local policy-makers who must make increasingly tough decisions as trading off service cutbacks against fare hikes in order to keep their systems solvent.

One of the major obstacles to the development of rational service and fare policies for public transit has been the lack of a coherent and sustained set of goals held in common by public bodies. To date, there has been very little agreement over what transit's major goals, purposes, and intended benefits are. Even though transit programs generally received broad-based financial support throughout the seventies, the formulation of any comprehensive, well-defined goals became largely subordinate to simply keeping the buses rolling. The obfuscation of goals has, in turn, hindered any serious evaluation of how successful the nation's public transit services have been.

This chapter has sought to catalogue goal statements at each level

of government. At the federal level, comprehensive transit goals are sorely lacking. Although specific federal programs usually contain fairly broadly-worded objectives, there remains no unified set of goals that adequately define what Washington hopes to get out of public transit. Interviews with eight UMTA Regional Administrators further indicated the confusion over transit goals. Most Regional Administrators felt that President Reagan's New Federalism framed all national policies on transit. Administrators expressed mixed opinions regarding federal responsibility for transit, perhaps reflecting the absence of a unitary federal policy on transit.

The survey of local transit operators and state agencies clearly revealed the tensions existing between service and social objectives on the one hand, and the desire to operate transit in a cost-efficient manner on the other. In general, local/operator goals aim primarily to provide effective, high-quality services, with concerns over meeting the travel needs of socially disadvantaged group and enhancing the urban environment of mostly secondary importance. State goals were found to generally parallel those at the local level, however most states placed primary emphasis on providing the necessary administrative framework for supporting efficient local transit services.

The lack of a unified set of well-articulated, priority-ranked goals at each level of government has clearly hampered efforts to develop a rational nationwide policy of support for public transit. Without explicit statements indicating the vested interest each sphere of government has in transit, defining relative roles of financial responsibility becomes extremely problematic. Many would argue that political processes inherently discourage detailed goal statements and specific public commitments. Perhaps it is the case that any public entity which commits itself to specific goals runs the risk of eventually being criticized for noncompliance. Still, the crucial financial problems facing the nation's transit industry today demand that governments clearly define their program objectives and evaluate how well they accomplish them. Articulation of what we as a nation want out of public transit is needed more now than ever.

In closing, it would appear, based upon the fragments of goal statements that exist, that service and community goals represent the fundamental objectives of government transit programs. Objectives related to management, funding, and support are subordinate goals which represent the means for maintaining transit's superstructure. Thus, major goals which have been articulated by the federal, state, and local level transit programs, and which are of revalence to this research, can be summarized as:

<u>Service Goals</u>

- enhance mobility for urban residents
- improve mobility for the transportation disadvantaged

<u>Social Goals</u>

- reduce traffic congestion
- conserve energy
- reduce air and noise pollution
- promote efficient land use and economic development
- ensure safety

The following two chapters juxtapose these goals with the range of benefits attributed to transit as a basis for identifying financial responsibilities for shouldering transit's tax burden.

Chapter Four
Benefits of Transit

Benefits can be defined as "the extent to which a program produces desirable results" (Haveman and Weisbrod, 1977). Since goals are the end to which a planned course of action is directed, what is or is not "desirable" depends on the goals of the program. The identification and measurement of benefits poses the most difficult problem in evaluating public programs. This chapter seeks first to identify and classify transit's purported benefits, and then to assess the degree to which each benefit has actually materialized due to the operation of transit services. Combined with the insights from Chapter Three, the materials from this chapter serve as input into exploring cost-sharing rationales in Chapter Five and the remainder of this report.

4.1. Identifying and Classifying Transit's Social Benefits

A fairly large number of benefits have come to be associated with the provision of transit services. The most obvious benefit, of course, accrues to users in the form of mobility, appropriately referred to as a "user benefit." However, there are many transit benefits which are enjoyed by specific groups, or by all urban residents, often referred to as "social benefits." For the purposes of this study, eight major social benefits were identified. Public transit is often purported to:

- increase the mobility of the poor, young, elderly, and handicapped--the transportation disadvantaged;
- reduce highway and inner-city congestion;
- increase business activity and central city vitality;
- conserve land that would otherwise be used for streets or highways;
- conserve energy;
- improve environmental quality--reduce air, noise, and visual pollution;
- provide an optional mode of travel in the event of personal or national need--energy shortage, natural disaster, or civil emergency; and
- improve safety.

These "social" benefits have historically proven difficult to assess. Nevertheless, it is helpful to begin by classifying transit's effects according to various benefit concepts.[1] The following discussion

[1] These benefit concepts are drawn from Haveman and Weisbrod (1977).

is summarized in Table 4.1.

4.1.1. Primary and Secondary Benefits

Primary benefits are the direct outputs of a program. Secondary benefits, alternatively, are indirect effects which are produced through the stimulative effects of direct outputs or the demand-inducing effects of program expenditures. For example, the mobility provided by a bus is a direct consequence of the consumption of transit service. Reduced congestion, however, is not obtained by the mere presence of bus transit; rather, it results from a shift of drivers from their automobiles to transit so that vehicle volumes are reduced. This is an indirect, stimulative effect of transit.[2]

Transportation is a "derived" or an "intermediate" good that is not consumed for its own sake, but rather for the goods and services which it allows people to obtain. In this context, only two of transit's social benefits should be considered primary: mobility for the transportation disadvantaged and transit as an optional mode. These result directly from the provision of transit service. All other benefits are secondary because they are obtained, not through the transportation service itself, but by the reduction in automobile travel brought about by transit.

4.1.2. Real and Pecuniary Benefits

Real benefits may take two forms: (1) an increase in consumer satisfaction, or (2) a decrease in the cost of resources used to produce goods and services. The first is best illustrated by the willingness of transit patrons to pay for services. An example of the second might be the cost savings in not expanding highway capacity due to the diversion of some auto trips to the transit mode.

Pecuniary benefits represent a redistribution of income--some are made better off at the expense of others.[3] Strictly pecuniary effects produce no net welfare gains and would not be included in an estimate of net benefits.

The promotion of business activity and central-city vitality would

---

[2] In a full employment economy, or when unemployment is equal and constant across activities, secondary effects do not contribute to aggregate welfare. It is assumed, under these conditions, that secondary effects are cancelled by the reduction in benefits from other displaced activities. Even primary benefits may be achieved at the cost of displacing other benefit-producing activities. This is an "opportunity cost" that must be included in the calculation of net benefits.

[3] For instance, when transit encourages economic development along its route, increased land values and retail sales may accrue to businessmen in the transit corridor at the expense of others in the region (assuming a full-employment economy).

TABLE 4.1. CLASSIFICATIONS OF TRANSIT'S SOCIAL BENEFITS

	PRIMARY	SECONDARY	REAL	PECUNIARY	EXTERNAL	INTERNAL	TANGIBLE	INTANGIBLE
MOBILITY FOR THE DISADVANTAGED	●		●			●	●	
REDUCE CONGESTION		●	●			●		●
ECONOMIC VITALITY		●	●			●	●	
LAND CONSERVATION		●	●			●	●	
ENVIRONMENTAL QUALITY		●	●			●		●
ENERGY CONSERVATION		●	●		●		●	
OPTION MODE	●		●			●		●
SAFETY		●	●			●		●

appear to be transit's only pecuniary effect. However, if otherwise idle resources are utilized in stimulating CBD activities, then the benefit is real. Each of transit's other benefits does not produce strictly pecuniary effects. Although many of them are not bought and sold in the marketplace--i.e., enhanced mobility, an improved environment, less congestion, and the others--they still represent an increase in aggregate welfare and can be reasonably classified as real benefits.

4.1.3. External and Internal Benefits

When benefits accrue to individuals within the system under consideration, they are called internal benefits; benefits accruing outside the system, on the other hand, are external benefits. The identification of internal and external benefits is dependent on how the system is defined. Normally, a boundary should be drawn so that all significant effects of a program are contained within it.[4] An argument could be made that energy conservation is a global issue, and thus, reasonably classified as an external benefit.

4.1.4. Tangible and Intangible Benefits

The distinction between tangible and intangible benefits involves the problem of measurement. If a benefit can be measured, then it is tangible and may be included explicitly in an aggregation of net benefits. An intangible benefit, on the other hand, is one which defies precise measurement. For example, the "psychic value" of knowing that a bus is available in the event of a personal emergency is an intangible benefit attributed to public transit.

Overall, the measurement of transit's benefits is somewhat problematic. In particular, it is difficult to factor out the effects of transit relative to all the other forces at work in the urban environment. Nevertheless, several of transit's benefits can be monetized including mobility for the transportation disadvantaged, the stimulation of business sales, land conservation, and energy savings. Other effects must be designated as intangible benefits given our current measurement capabilities.

4.2. Assessing Transit's Benefits

A substantial amount of empirical research has been directed toward identifying and assessing the impacts of transit. The remainder of this chapter reviews this body of literature for each of transit's purported

---

[4]This concept has particular relevance for transit. If the system is defined as the transit service itself, then its internal benefits are limited to direct mobility improvements; a host of secondary benefits would be classified as external and excluded from consideration. The split between internal and external benefits would be equivalent to the division between primary and secondary benefits. But if a broader system is specified, say on a national scale, then all benefits become essentially internal.

benefits, with an eye toward how benefits accrue to the constitutents of various levels of government.

4.2.1. Mobility for the Transportation-Disadvantaged

The majority of U.S. urban residents are able to take advantage of an unparalleled level of mobility made possible by the automobile. From 1950 to 1970, the proportion of households owning one or more cars increased from 52% to 83% and the percentage of adults licensed to drive rose from 43% to 83% (Altshuler, 1979).

There is, however, a significant portion of the population who do not own or cannot operate an automobile, thus severely restricting their mobility in today's auto-dominant society. Collectively termed the "transportation-disadvantaged" or "transit-dependent," these groups includes the poor, the young, the elderly, and the handicapped. Of all the benefits attributed to public transit, its ability to provide all persons with adequate (if not equal) access to employment, educational, health, cultural, and recreational opportunities may be the most often cited (Sheldon and Brandwein, 1973).[5]

The mobility constraints of the poor have received considerable attention since the McCone Commission, in its study of the 1965 Watts riot, identified transportation deficiency as one of the factors contributing to poverty. The poor tend to be concentrated in the old parts of central cities where housing is cheap, however blue collar, semi-skilled, and unskilled jobs have often relocated in suburban low-density areas. Since low income households have lower rates of car ownership, they are more dependent on public transportation than those households with higher incomes. Individuals from households with incomes below $5,000 used transit for 14% of their trips in 1970; households with incomes over $7,500 used it for only 4% (Altshuler, 1979). Although low income households are relatively well served by transit, by virtue of their central city location,[6] available transit services do not necessarily provide access to suburban employment centers.[7]

---

[5]Falcocchio (1974, p.4) notes that "the poor, the young, the aged, and the handicapped may constitute anywhere from 25 to 50 percent of the population of the United States," depending on how each group is defined or identified. Even if each category was exactly identified, information on the travel patterns of the carless is limited at best (Koutsopoulos, 1976). The fact that a group makes fewer trips per capita than the national average is not necessarily indicative of mobility deprivation. Nevertheless, available evidence indicates that there are large numbers of carless individuals and households who suffer from limited mobility (Altshuler, 1979).

[6]In 1970, 82% of all SMSA households with incomes under $5,000 lived within six blocks of public transportation (Altshuler, 1979).

[7]An excellent review of transit demonstration projects can be found in the Regional Plan Association's report, Transportation and Economic Opportunity (1973, pp. 57-65). Although some of these projects have been

The transportation needs of the elderly and handicapped captured the public's attention in the 1970s. The elderly make fewer than half as many trips per capita as all persons sixteen and over,[8] probably because they have lower rates of work force participation and generally lead relatively sedentary lives. Nationwide, the elderly rely slightly more on public transportation than the general population. The physically handicapped, also, are particularly dependent upon public transportation, especially highly personalized forms, such as the taxicab.[9]

Compared to the elderly and handicapped persons, the mobility problems of the young have received little attention. Their trip making is related primarily to school and summer jobs, though they also require reasonable access to other educational, cultural, and recreational events. Considering the cost of transit and inadequacy of fixed route bus service, there is a significant number of trips among youth which are suppressed.

In summary, the poor, elderly, handicapped, and young have benefited materially from transit. Since each group utilizes public transportation more intensively than the general population, many argue that public support of transit services is essential.

---

considered successful, notably the Century Boulevard Line in Los Angeles, most have suffered from a variety of problems. The programs have been criticized for (1) a lack of coordination between bus schedules and plant shift times (i.e., inflexible schedules preclude overtime work, and night shifts are often unserved); (2) excessively long bus rides; and (3) ridership levels which were too low to justify the program's cost. Workers had trouble holding jobs even with the transit service, and those who did keep their jobs often shifted to an automobile as their incomes rose.

[8] Persons sixty-five and over make 375 trips per capita while all persons sixteen and over make 849 trips per capita in 1970 (Altshuler, 1979).

[9] In 1970, the U.S. DOT estimated that there were 13.4 million individuals, or 7% of the U.S. population, who were handicapped in ways that impaired or prevented the use of bus transit (Altshuler, 1979). A study of physically handicapped people in Boston during 1968 indicated that they depended on public transportation, including taxicabs, for 38% of their trips (Abt Associates, 1969). More than any other group, the handicapped, who are also very often elderly, require some form of personalized public transportation.

4.2.2. Congestion Relief

Congestion has traditionally been considered transportation's Achilles heel, a daily ritual for rush hour motorists travelling a city's downtown streets and adjoining arterials.[10] The earliest arguments for improved transit extolled its potential to relieve congestion (Smerk, 1974). Transit has the inherent advantage of using less space than automobiles in transporting passengers, and thus increases the effective capacity of existing streets and highways. Table 4.2 shows that the capacities of city streets and freeways, accommodating the private automobile, range from 800 to 4000 passengers per lane per hour, depending on vehicle occupancy levels. By comparison, the bus passenger capacities of these facilities are significantly higher, ranging from 2,250 on streets to 15,000 on freeways. Capacity estimates for rail rapid transit per track are even more impressive. The bottom line, however, is whether the increased capacity offered by transit is utilized so that overall congestion is reduced.

Transportation and land use patterns have historically developed interdependently. Transit is an integral part of the transportation systems of the nation's largest cities. Table 4.3 reveals that transit has in the past played a significant role in transporting persons to the CBDs of large American cities. Cities with rapid transit and commuter rail services, in particular, carry an exceptionally high number of persons via mass transportation. Although these statistics are over twenty years old, the role of transit in these cities remains essentially the same today.

Studies of transit strikes in New York City (Barrington, 1966), Washington D.C. (USDOT, FHWA, 1971), and Los Angeles (Crain and Flynn, 1974) highlight the importance of transit in relieving congestion. When services were halted, these studies found that vehicle occupancy rates went up and commute times increased, while the peak period lengthened in time. The effects of a strike were most evident in New York City where the median length of a work trip increased from thirty to sixty-six minutes. However, even in Los Angeles, congestion worsened on some freeways and arterials feeding into the downtown area.

On the other hand, the ability of expanded transit services to reduce existing congestion is not encouraging. New services often draw a majority of their riders from current transit users, auto passengers, and new travellers. Though some drivers are lured from their automobiles, the overall traffic impact is usually inconsequential over the long run. A noteworthy exception is the Shirley Highway busway in Washington D.C., where roughly half of its riders were previously automobile

---

[10] The degree to which congestion is a problem is not clearly definable; technically congestion exists if the average speed of traffic is less than it would be under freeflow conditions. Altshuler (1979, p. 317), however, notes that "the degree to which any particular level of congestion is perceived as a problem . . . is largely a function of public expectations. . . ."

TABLE 4.2. PASSENGER CAPACITIES PER LANE

	FACILITY	VEHICLES PER LANE PER HOUR	EFFECTIVE CAPACITY AT VARIOUS PASSENGERS PER VEHICLE 1.50	1.75	2.00
PRIVATE AUTOMOBILE	City Street, Design Flow Rate	600	900	1050	1200
	City Street, Capacity	800	1200	1400	1600
	Freeway, Design Flow Rate	1500	2250	2625	3000
	Freeway, Capacity	2000	3000	3500	4000
	FACILITY	**VEHICLES PER LANE PER HOUR**	**EFFECTIVE PASSENGER CAPACITY FOR VARIOUS LOADING RATIOS 75%**	**100%**	**125%**
BUS TRANSIT (50 seats)	City Street	60	2250	3000	3750
	City Street	90	3375	4500	5625
	City Street or Freeway	120	4500	6000	7500
	Freeway	180	6750	9000	11250
	Freeway	240	9000	12000	15000

Source: Institute of Traffic Engineers, 1965, p.20

TABLE 4.3. NUMBER OF TRIPS ENTERING SELECTED CBD'S BY MODE

	YEAR OF CORDON COUNT	Number of trips entering CBD daily: TOTAL	BY AUTO NUMBER	BY AUTO PERCENT	BY TRANSIT NUMBER	BY TRANSIT PERCENT
CITIES WITH RAPID TRANSIT AND RAIL COMMUTER SERVICE						
BOSTON	1954	839,738	407,216	48.5	380,272	45.3
CHICAGO	1961	863,771	354,392	41.0	509,379	59.0
NEW YORK	1960	3,349,000	954,000	28.5	2,395,000	71.5
PHILADELPHIA	1955	900,389	425,935	47.3	474,454	52.7
CITIES W/O RAPID TRANSIT AND RAIL COMMUTER SERVICE						
BALTIMORE	1955	385,431	266,684	69.2	118,747	30.8
DALLAS	1958	354,190	281,746	79.6	72,444	20.4
LOS ANGELES	1960	678,977	506,798	74.6	172,179	25.4
LOUISVILLE	1953	283,369	205,690	72.6	59,445	21.0
ST. LOUIS	1957	347,574	255,519	73.5	92,055	26.5

Source: Wilbur Smith and Assoc., 1966.

drivers (McQueen, 1975). Less successful at diverting motorists to transit have been Chicago's Dan Ryan transit line (Hilton, 1974) and San Francisco's BART system (Webber, 1976).

In summary, public transit is essential toward maintaining adequate access to large downtown centers, or perhaps more accurately, for maintaining "acceptable" levels of peak period congestion. Cities such as New York, Chicago, Boston, or Philadelphia, given current land use intensities, would experience intolerable peak period congestion without transit services. However, in spite of their importance to currently built-up areas, transit improvements have proven ineffective at reducing congestion where it already exists.

4.2.3. Land Use and Economic Development

In recent years, advocates have placed increasing emphasis on transit's potential to shape urban growth, encourage economic development, and revitalize central cities. There is no doubt that transportation has played a significant role, historically, in the evolution of urban form. In particular, transportation has been well-established as a force for residential dispersion. Secular growth in real family income and Federal tax incentives for home ownership have also contributed to urban sprawl.

Whether or not transit can be a significant force in shaping future urban growth is debatable. Altshuler (1979, p. 394) notes that "the transportation changes that have most affected land use to date have all entailed technological improvements that offered consumers and businesses greater locational flexibility that they had previously enjoyed." Given the vast amount of street and highway capacity available and the unparalleled personal mobility afforded by the automobile, improved mass transportation is not likely to dramatically alter travel patterns. Thus, transit cannot be counted on to reshape the overall structure and density of cities as it once did. There is evidence, however, that certain types of transit investments, in conjunction with appropriate land use controls and incentives, can play a catalytic role in influencing urban growth.

The land use impacts of rail rapid transit facilities have been closely studied. Toronto built the first post-WWII rapid transit system; it is a compact, twenty-six mile conventional heavy rail network. The system has often been cited for its dramatic land use effects (Heenan, 1968). Toronto's growth has been attributed to an array of factors other than rail transit alone, including a favorable geographic location, a stable political setting, employment opportunities, pro-development land use policies, and a hospitable social environment (Knight and Trygg, 1977). Further, Toronto has actively encouraged concentrated development through its use of liberal zoning regulations (Lovely, 1979). The experience in Toronto illustrates that a modern-day city can be built at high densities around a sound transit system, given supportive social and political climate.

By contrast, San Francisco's BART system, which began operations in 1972, has had only a marginal impact on land use patterns to date.

Designed primarily to accommodate regional commuting needs, the seventy-one mile system was intensively studied during its first years of service (MTC, 1979). Regionally, BART has not had a measurable impact on population or employment levels, but activities are generally considered to be slightly more concentrated in BART corridors than would have occurred without BART.[11]

Finally, there is some disagreement as to whether high-density urban settings are even desirable. Historically, most commentators on urban issues viewed high densities as a source of urban pathology and associated progress with the decentralization of inner-city areas (Altshuler, 1979). Today, there remains no strong consensus on the ideal urban form. Indeed, some have gone so far as to argue that the social, environmental, and energy effects of compact cities are more harmful than more sprawled ones (Real Estate Research Corporation, 1974). Given the unmistakable consumer preferences for low-density, large-lot living environments over the past half-century, the question remains as to whether transit's city-shaping potential should be considered, de jure, a true social benefit.

4.2.4. Conservation of Land

Proponents of mass transit often herald its ability to conserve scarce urban land that would otherwise be needed for streets and parking facilities. This argument is often made on the grounds that transit has a greater passenger capacity per lane (or track) relative to the automobile (Smerk, 1974).

The concern for land conservation is greatest in central business districts where land values are high and space is at a premium. Streets and parking facilities which cater primarily to the private automobile consume a large amount of downtown land. Table 4.4 shows the amount of land devoted to streets and parking in the downtown areas of fifteen cities during the fifties and sixties, ranging from a low of 35% in Chattanooga to a high of sixty percent in Los Angeles. The average amount of land utilized for streets was about 33%. For parking, the average share was around 12%. Given the growth in auto usage over the past twenty years, these figures likely reflect today's situation as well. Excessive space tied up in the transport and storage of vehicles

---

[11] The system has had some effect on residential and commercial location decisions. Retailers, however, have been largely indifferent to their proximity to BART stations. One disheartening failure has been the lack of high density development in station areas outside CBDs. Various reasons have been suggested: prohibitive zoning regulations, an unfirm market demand, a lack of development space, and difficulty in assembling land parcels (Dyett, et. al., 1979). The BART system can be characterized by poor coordination of transportation and land use considerations. However, it can be argued that land use changes occur slowly in response to transportation improvements, especially given the region's current auto-dominance; BART may in the long-run significantly shape development patterns in the Bay Area (Webber, 1976).

TABLE 4.4. PROPORTION OF CBD LAND DEVOTED TO STREETS AND PARKING

CITY-CBD	YEAR	SQUARE MILES	Percentage devoted to: STREETS	PARKING	STREETS & PARKING
Los Angeles	1960	0.63	35.0	24.0	59.0
Chicago	1956	1.06[1]	31.0	9.7	40.7
Detroit	1953	1.08	38.5	11.0	49.5
Pittsburgh	1958	0.50	38.2	--	--
Minneapolis	1958	0.91	34.6	13.7	48.3
St. Paul	1958	0.75	33.2	11.4	44.6
Cincinnati	1955	0.52	--	--	40.0
Dallas	1961	0.54	34.5	18.1	52.6
Sacramento	1960	0.55	34.9	6.6	41.5
Columbus	1955	0.79	40.0	7.9	47.5
Nashville	1959	0.58	30.8	8.2	39.0
Tucson	1960	0.20	35.2	--	--
Charlotte	1958	0.74	28.7	9.7	38.4
Chattanooga	1960	0.38	21.8	13.2	35.0
Winston-Salem	1961	0.52	25.1	15.0	40.1

[1]Excludes undevelopable land.

Sources: Wilbur Smith and Associates, Transportation and Parking for Tomorrow's Cities, 1966, p. 314.

TABLE 4.5. HIGHWAY LANE EQUIVALENTS TO CARRY TRANSIT PASSENGERS IN PRIVATE AUTOMOBILES INTO CENTRAL BUSINESS DISTRICTS

	CITY	PEAK HOUR INBOUND TRANSIT RIDERS	NUMBER OF AUTOS NEEDED TO CARRY TRANSIT RIDERS[1]	EXTRA LANES OF CITY STREET NEEDED AT: DESIGN FLOW RATE	CAPACITY	EXTRA LANES OF FREEWAY NEEDED AT: DESIGN FLOW RATE	CAPACITY
CITIES W/O RAPID TRANSIT	Baltimore	26,663	17,775	20	15	8	6
	Dallas	17,161	11,440	13	10	5	4
	Los Angeles	28,496	18,997	21	16	8	6
	Louisville	10,678	7,119	8	6	3	2
	St. Louis	21,339	14,226	16	12	6	5
CITIES W/ RAPID TRANSIT	Boston	99,362	66,241	74	56	29	23
	Chicago	165,069	110,046	123	92	49	37
	New York	762,000	508,000	565	424	226	170
	Philadelphia	113,639	75,759	85	64	34	26

[1]Assuming average occupancy of 1.5 persons per car.

Source: Smerk 1974, pp. 100 and 105.

keeps valuable land from its most profitable use and yields little or no tax revenue for cities.

The space saving characteristics of transit are depicted in Table 4.5 where the number of lane equivalents necessary to carry peak hour transit riders by automobile has been computed. (These figures assume that all transit trips revert to the automobile mode at an average occupancy of 1.5 persons per car.) The table reveals that without transit, a non-rapid transit city, such as Baltimore, would have to accommodate fifteen to twenty more lanes of city streets, or six to eight lanes of freeway. Cities with rapid transit would need anywhere between 74 and 565 additional lanes of street or 29 to 226 extra lanes of freeway.

Freeways are prodigious consumers of urban real estate. Sheldon and Brandwein (1973) estimate that each mile of urban freeway consumes between eleven and thirty-four acres of urban land, ignoring the additional space required for new feeder lanes or additional downtown parking. Transit clearly provides passenger capacity in a given space more efficiently than the automobile. Large cities could not support the highly intensive land development in their CBDs without some form of mass transportation.

Transit improvements, however, are not likely to significantly reduce traffic volumes, or the amount of space needed for streets and parking. But, if land use activities intensify and inner-city congestion levels worsen, transit does become a cost-effective way of increasing capacity without acquiring more land for transportation purposes. With regard to land outside central business districts, it has been noted that transit service improvements have historically been forces for urban dispersal (Altshuler, 1979). Thus, conservation of land would only seem to be a benefit of transit in high density areas.

4.2.5. Energy Conservation

Over the past decade, public transit has been highly touted as an energy saver. However, recent research casts some doubt on this claim. A 1977 U.S. Congressional Budget Office report concluded that transit can potentially conserve the nation's energy resources, but does not necessarily do so in practice. The study found that buses use less energy per seat mile than any other mode (see Table 4.6). Expressing energy usage on a per seat mile basis, however, overstates energy savings because few vehicles operate at capacity. When the average load factor of each mode is taken into account, Table 4.7 shows that vanpools are actually the most energy efficient mode, using 2420 BTUs per passenger mile. Nevertheless, buses, at 3070 BTUs per passenger mile, are still almost twice as efficient as even high-mileage autos.

Despite the inherent fuel-efficiency of buses, their contribution to nationwide energy savings is small. Bus transit accounts for only about 2.8% of the total passenger miles travelled in U.S. cities (Altshuler, 1979). Even if bus service were totally eliminated and all travel was by the private automobile, total transportation energy consumption would increase only about 0.3%.[12] Moreover, doubling transit's

TABLE 4.6. POTENTIAL ENERGY EFFICIENCY OF DIFFERENT TRANSPORTATION MODES (energy consumption expressed in BTUs)

MODE	ENERGY CONSUMPTION[1] PER VEHICLE MILE	AVERAGE NUMBER OF SEATS	ENERGY CONSUMPTION PER SEAT MILE
Average Auto	14,225	5	2,845
Hi-mileage Auto	8,225	4	2,056
Carpool	14,225	5	2,845
Vanpool	18,200	12	1,517
Bus	32,470	50	649
Light Rail	85,700	63	1,360
Rapid Transit:			
New	95,500	72	1,326
Old	74,500	72	1,035
Commuter Rail	115,700	100	1,157

[1]Includes propulsion energy, station and maintenance energy, guideway construction energy, and vehicle manufacture energy.

[2]Distinction is made between modern systems, such as BART, and older systems such as New York City subways.

Source: U.S. Congressional Budget Office, 1977.

TABLE 4.7. ACTUAL ENERGY EFFICIENCY OF DIFFERENT TRANSPORTATION MODES (energy consumption expressed in BTUs)

MODE	ENERGY CONSUMPTION PER SEAT MILE	AVERAGE LOAD	ENERGY CONSUMPTION[1] PER PASSENGER MILE
Average Auto	2,845	28%	10,160
Hi-mileage Auto	2,056	35%	5,875
Carpool	2,845	60%	5,450
Vanpool	1,517	75%	2,420
Bus	649	23%	3,070
Light Rail	1,360	32%	5,060
Rapid Transit:			
New	1,326	29%	6,580
Old	1,035	33%	3,990
Commuter Rail	1,157	40%	5,020

[1]Adjusted for route circuity.

Source: U.S. Congressional Budget Office, 1977.

share of urban passenger mileage to 5.6% would result in a savings of only about 25,000 barrels of oil per day,[13] at a cost of $600-$4900 per barrel saved (in 1979 dollars). In general, any energy savings from motorists switching over to mass transit would be largely offset by the additional fuel expenditures incurred in substantially expanding service levels.

Empirical evidence on transit's actual energy impact is scant. In a study of the energy impact of Atlanta's transit improvements, Curry (1976) found that only 42% of the new riders were previously auto drivers. The net energy savings was estimated to be only 9,300 gallons of fuel per day, less than 0.5% of the city's daily transportation fuel consumption. In the case of Washington D.C., Curry estimated that bus service expansion resulted in a consumption increase of about 250 gallons per day. By contrast, along Los Angeles' eleven-mile San Bernadino busway, substantial numbers of auto drivers were attracted to express bus service. Total fuel consumption along the corridor fell by 44% within a year after the buslane's opening, due to increases in transit usage as well as carpooling. In this particular case, travel time savings were substantial, with commuters measurably changing their travel behavior as a consequence.

In sum, transit's ability to conserve national energy supplies would appear to be modest at best. Only along several high-density corridors and over the long run, when transit might effectively shape urban growth and travel patterns, can public transportation be expected to have any appreciable energy-saving impact.

4.2.6. Environmental Quality

There is a general consensus that public transit materially benefits an area's physical environment. By reducing automotive traffic, transit is often praised for reducing air pollution as well as ambient noise levels. One study found that buses pollute far less than autos (Environmental Research and Technology, 1976). Table 4.8, reproduced from the study, shows that buses emit only about 1.15 grams of pollutants per seat mile compared to 9.96 grams per seat mile for autos. Moreover, the table suggests that buses will pollute less than the improved auto of the future.[14] Since transit accounts for such a small share of the nation's total trips, its impact on air quality to date has

[12] Multiplying 12.8 billion passenger miles (APTA, 1980) times an increase of 3590 BTUs per passenger mile if transit passengers switch to automobiles (CBO, 1977) yields an increase of 45.9 trillion BTUs per year, which is 0.3% of total U.S. transportation energy as reported by Stuntz and Hurst (1975).

[13] Compared to total U.S. transportation fuel consumption of 7.3 million barrels per day (Altshuler, 1979), the reduction would be only 0.3%.

[14] Part of the difference is because buses use diesel fuel. More widespread use of diesel cars in the future will close this gap somewhat.

TABLE 4.8. EMISSIONS OF BUSES AND AUTOMOBILES
(expressed in grams per seat mile)

POLLUTANT	DIESEL BUS[1]	1976 GASOLINE AUTO[2]	1982 GASOLINE AUTO[3]
Carbon monoxide	0.54	8.00	3.00
Hydrocarbons	0.08	1.20	0.54
Oxides of Nitrogen	0.44	0.76	0.36
Sulphur dioxide	0.06	0.00	0.00
Particulates	0.03	0.00	0.00
TOTAL	1.15	9.96	3.90

[1]Buses are not expected to improve by 1982.

[2]Average auto, five seats.

[3]These standards have recently been relaxed. They may never be achieved.

Sources: Environmental Research and Technology, 1976.
U.S. Environmental Protection Agency, 1977.

probably been rather minimal. Nevertheless, bus transit can significantly reduce pollution in densely-travelled corridors. Curry (1976), for example, found that express bus service on the San Bernadino busway reduced emissions by 3.75 tons per day. Similar reductions were measured along Washington's Shirley Busway corridor.

Surprisingly, even in areas where transit service improvements attract only modest numbers of motorists, significant pollution reductions have been found. Studying the effects of service improvements and fare reductions in Atlanta, Washington D.C., San Diego, and Orange County, Curry found that bus service reduced pollution in every area, with carbon monoxide reductions ranging from one to thirteen tons per day.

While the air pollution effects of bus service have been extensively studied, transit's effect on noise has received comparatively little attention. The popular view is that transit reduces traffic noise by diverting motorists to buses (Sheldon and Brandwein, 1973). Others contend, however, that total road noise depends not on the number of vehicles but rather on the noise level of the loudest individual vehicle (Altshuler, 1979).[15] To those living along a route where diesel buses operate frequently, transit can be a real nuisance. It is probably a safe conclusion that transit has little overall effect on the ambient noise levels of most cities--it reduces traffic volumes, but at the expense of carrying former motorists on noisier vehicles (Stanford Research Institute, 1968).

---

[15]As an example, if there are ten cars on the road, each emitting 78 dBA of noise, the listener will hear about 79 dBA. However, if five cars are replaced by one bus, emitting 85 dBA, the listener will hear about 85 dBA.

4.2.7. Optional Mode of Travel

Public transit is often viewed as having "option" value--all persons in a community have it at their disposal should they ever need it. Many people rely on transit when foul weather makes driving impossible, when the family car is in disrepair, or when there is limited parking at their destination.

Transit also has option value from a national perspective. During World War II, scarce gasoline supplies were rationed and the materials and manpower of the automobile industry were substantially diverted to military purposes. This made automobile travel difficult, but the nation's basic travel needs were fulfilled as transit was able to absorb an additional nine billion annual passengers. One early study, commissioned by the Defense Department, concluded that the transit industry should be strengthened for reasons of national security (Yoshpe, 1961, p. 76-77):

> World War II provided a clear demonstration of the critical problems attendant upon reliance by metropolitan areas on automotive transportation in a national emergency. . . . An enlarged mass transit capacity, even if not fully utilized immediately, would provide a reserve for absorbing passengers who might be displaced from the private automobile in an emergency.

Transit could also prove useful for mass evacuation in the event of civil emergency. Several evacuation plans have been formulated which rely heavily on public transportation for mobilizing large populations. For example, a civil defense plan for New York City calls for total evacuation of its population in 3.3 days, with 3.3 million people, or about 29% of the population, being ferried by public transit. The plan found that the total evacuation time could be shortened significantly by relying on transit (Henderson, 1978).

4.2.8. Safety

Mass transit, like any other transportation mode, must maintain an acceptable safety record for the public to patronize it. Safety refers to freedom from both accidents and crime. Programs aimed at reducing accidents have traditionally exhorted patrons and employees to avoid known hazards of transit operations (Highway Research Board, 1974). The common response to crimes, such as pickpocketing, vandalism and muggings, has been the addition of more police to patrol the systems (Wallace, 1977). In recent years, both concerns have received more systematic analysis with an eye toward incorporating preventive measures into equipment designs and operational practices, particularly in the case of rail transit systems.

For transit to enhance urban transportation safety, it must have some comparative safety advantages over the automobile. No intermodal comparisons on the incidence of crime were found in the literature. Moreover, there is very little substantive information on the extent and

types of crimes that are being committed on transit systems. Still, crime is perceived to be a serious problem. Wachs (1977), for instance, found that safety from crime was identified by consumers as the most important factor in determining whether they ride public transit or not, more important than either travel time considerations or monetary cost of a trip. A recent National Conference on Mass Transit Crime and Vandalism (1980) identified crime on transit systems as a growing problem which will warrant closer scrutiny throughout the eighties.

The comparative safety of mass transit and the automobile has been examined by Cheaney et al. (1976) and Altshuler (1979).[16] Data on fatality rates per hundred million passenger miles travelled (hmpmt) indicate that transit passengers are measurably safer than occupants of private motor vehicles--0.07 fatalities per hmpmt for buses and 0.06 per hmpmt for rapid transit versus 0.53 per hmpmt for automobiles and trucks (Table 4.9).[17] Most noteworthy have been the significant strides in reducing catastrophic accidents.

Fatality rates provide only a partial picture of the relative safety of different transportation modes. The incidence of nonfatal accidents, for example, is a significant problem area for bus, rapid transit, and private motor vehicles. Although data is sparse and fails to disaggregate by injury severity, indications are that the rate of nonfatal accidents is not significantly different between these modes.

In sum, evidence suggests that transit has only a marginal positive impact on overall urban transportation safety. Only by significantly increasing load factors and attracting appreciable numbers of patrons from the auto can transit have a significant safety impact.

---

[16] Safety performance is generally expressed as accident frequencies; the numerator defines the unsafe condition being compared, such as, "all fatalities that have occurred," or "fatalities occurring among vehicle occupants," etc.; the denominator indicates the type of risk exposure being compared and normalizes the incidence of accidents for comparison, e.g., "distance," "time," or "number of passengers."

[17] Byun (1978) stresses that caution must be exercised in evaluating the relative safety of transit and the automobile. Analyses based on accident exposure rates are subject to a wide range of interpretations and complications which can lead to different results. With respect to nonoccupants, fatality rates per hmpmt are only slightly different between modes. However, this understates the risk exposure of transit relative to private motor vehicles. The nonoccupant fatality rate is 6.68 and 10.87 per hundred million vehicle miles traveled (hmvmt) for bus and rapid transit, respectively, and only 0.92 per hmvmt for autos and trucks. Because of the massive weight of most transit vehicles, then, nonoccupant hazards are significantly greater than nontransit modes.

TABLE 4.9. COMPARATIVE URBAN FATALITY RATES BY MODE -- 1975

	AUTO AND TRUCK	BUS	RAIL RAPID TRANSIT
RATE PER 100,000,000 PASSENGER MILES (hmpmt)			
Passengers[1]	0.53	0.07	0.06
Nonoccupants[2]	0.42	0.51	0.42
Overall	0.94	0.58	0.48
RATE PER 100,000,000 VEHICLE MILES (hmvmt)			
Passengers	1.15	0.91	1.65
Nonoccupants	0.92	6.68	10.87
Overall	2.07	7.59	12.52

[1]Excludes drivers and other operating employees for transit.
[2]Excludes motorcycle fatality totals.

Source: Altshuller, 1979, p. 224.

4.3. Summing Up the Benefits of Transit

The evidence indicates that all of the benefits discussed in this chapter result in part from the provision of transit services. It is noteworthy, however, that most of transit's documented benefits have arisen from the maintenance of current service levels. Benefits such as land conservation, congestion relief, and higher densities accrue because transit has become an integral part of the urban structure, although the time frame of such benefits has been long-term. The benefits of new services, by comparison, have been fairly minor and largely short-term in endurance.

In general, transit's benefits have been largely concentrated in populous and relatively dense urban areas. Benefits to small cities have been largely imperceptible. Perhaps the primary benefit has been transit's provision of essential travel opportunities to America's carless and low-income populations. In that the vast majority of benefits have accrued principally to big-city residents, it follows that a major reponsibility for financing services should be borne by residents of these areas and their local governments. The question of how transit's benefits are distributed among constituents of various levels of government is examined more closely in the next chapter.

Chapter Five
Allocating Transit's Benefits

The previous two chapters have detailed the goals for transit programs of the Federal, State, and local governments, and summarized the benefits which have been attributed to transit. Recognizing that the goals and benefits of public programs should reflect one another, this chapter ties these concepts together with respect to the financing of transit. Following the conceptualization of a framework for allocating the costs of transit among levels of government and users, the perceptions of policy-makers toward cost-sharing are examined.

5.1. Benefits and Goal Attainment

All transit programs specify goals which are indicative of their expectations about the direct and indirect benefits of transit. Service-related goals, which were the most often cited objectives among both state and local agencies, may be linked with the direct, or primary, benefits of transit. These include statements promoting the availability of transit as an optional mode of travel and improved mobility for the transportation disadvantaged. In addition, many agencies articulated a series of "community" goals reflecting the indirect (or social) benefits of transit: energy conservation, improved environmental quality, economic vitality, reduced congestion, and safety. These were of secondary importance to service-related goals, but they indicated a strong perception by all levels of government that transit can produce far reaching effects. Finally, as mentioned previously, many agencies expressed goals which cannot be related to the benefits of transit. Primarily, these pertained to operational and fiscal management, and interagency relationships.

State and local transit officials were asked in the Transit Finance Survey to indicate the extent to which each of transit's benefits helps to achieve their agencies' goals. Each benefit was rated as

(1) Definitely leading to the attainment of goals,
(2) Partially leading to the attainment of goals, or
(3) Not contributing at all to the attainment of goals.

The distribution of responses among these categories is presented in Figures 5.1 and 5.2, for operators and states, respectively.[1]

The pattern of responses was similar between state agencies and local operators. Each benefit was cited by a majority of respondents as making at least a partial contribution to the attainment of their agencies' goals.

---

[1]Respondents were not asked to explicitly link these benefits with their goals; these responses simply relate benefits to goal attainment in a generic sense.

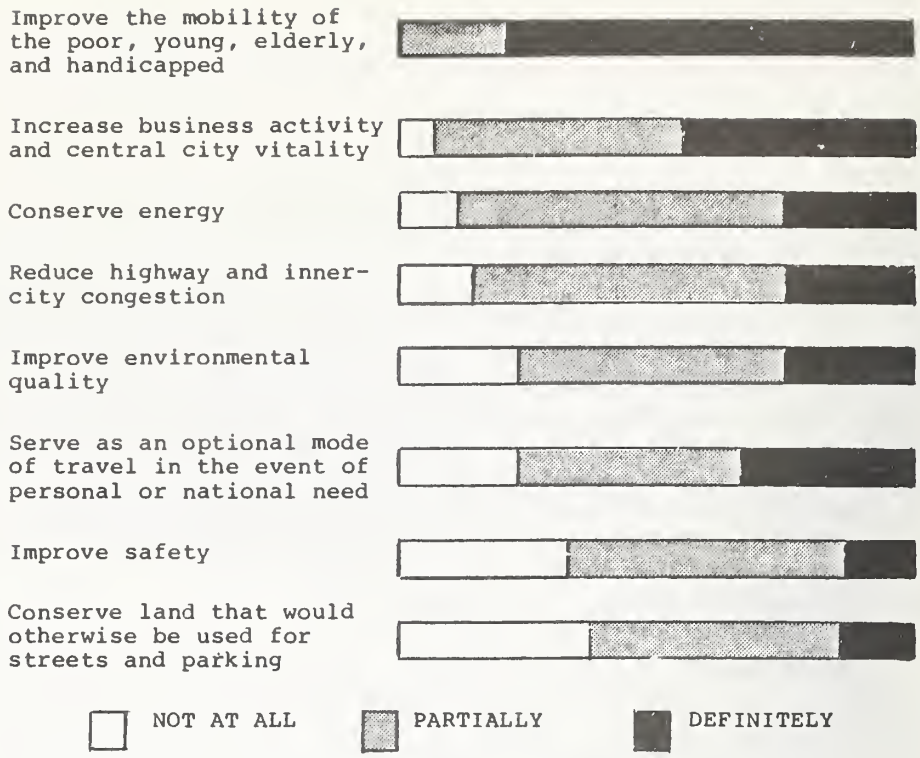


FIGURE 5.1. GOAL ATTAINMENT RATING -- OPERATORS
Respondents' perceptions of the extent to which each benefit leads to the attainment of their agency's goals

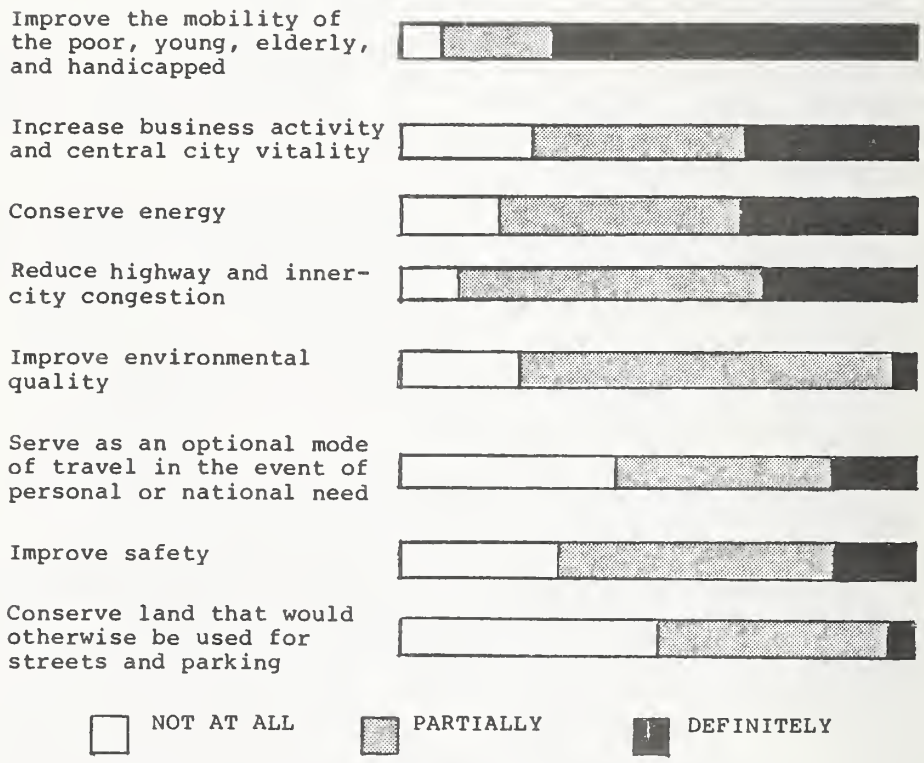


FIGURE 5.2. GOAL ATTAINMENT RATING -- STATES
Respondents' perceptions of the extent to which each benefit leads to the attainment of their agency's goals

Specifically, all operators and more than 90% of the states indicated that improved mobility for the transportation disadvantaged leads, to some extent, to the attainment of their agencies' goals. It received the most "definite" ratings by far: 79% of the operators and 71% of the states. Other benefits receiving very high goal attainment ratings were increased business activity, energy conservation, and reduced congestion. Conservation of land was the lowest rated benefit, but even it was cited by more that half of all respondents for a contribution to agency goals. Overall, except for improved mobility, "definite" ratings tended to be small, while "partial" ratings dominated the distribution of responses.

Surprisingly, even though only about half of all agencies cite one, or more, of the goals reflecting social benefits, these findings imply that the benefits are highly valued by state and local transit programs. As such, perceptions of goal attainment suggest that a cost-sharing scheme based on transit's benefits might be politically acceptable. The next section lays out the theoretical underpinnings for allocating transit costs utilizing benefit principles.

5.2. Developing a Conceptual Framework for Distributing Transit Costs

The allocation of transit costs among users and government levels should ideally be based on the benefit principle. At minimum, each beneficiary, *i.e.*, user and government institution, should pay toward the finance of service in proportion to benefits received. In this respect there are two major types of benefits: (1) direct user (or private) benefits and (2) social (or public) benefits. The first reflects the fact that transit has private good characteristics in that members of society do not consume it equally (i.e., consumers can be excluded via a pricing mechanism). However, transit also has elements of a public good in that all members of society benefit whether or not they choose to patronize it. Transit is properly classified as a "mixed" good since it possesses characteristics of both a public and private good.

Collectively, user and social benefits can be referred to as the "total" benefit of transit. Logically, then, the ratio of user benefits to total benefits should represent the share of total costs which users bear. The ratio of social benefits to total benefits, on the other hand, should represent the share of total costs collected from non-farebox sources. In terms of assigning the responsibility of meeting the total cost of public transit, user and public responsibility can be simply defined as:

$$\text{User Cost Responsibility} = \frac{\text{User Benefits}}{\text{Total Benefits}} \times \text{Total Cost}$$

$$\text{Public Cost Responsibility} = \frac{\text{Social Benefits}}{\text{Total Benefits}} \times \text{Total Cost}$$

This simply reflects the apportionment of costs occasioned in providing transit services to respective beneficiaries.

Benefits have traditionally been measured by the monetary amount certain groups are willing to pay to receive a particular service. If beneficiaries were broken down into four groups--users, local government constituents, state government constituents, and federal government constituents--the task would be to measure benefits from the demand schedule associated with each group.

Theoretically, the construction of a collective demand schedule for the nation's transit users would require initially the measurement of personal utility functions for different ridership groups. For example, the marginal utility of riding transit is less for higher income persons than lower income persons, reflecting the inferior good features of public transportation. If utility functions could be expressed and then aggregated to form a total demand schedule, then total user benefits could be measured as the shaded area in Figure 5.3.

In this example, the individual demand schedules of three distinct transit ridership groups A, B, and C are aggregated to form total user demand. Total benefit equals the trapezoid VWXY. Given an average fare level, Z, the total revenue paid by the nation's riders would be WXYZ, leaving a net benefit, or consumer surplus, of VWZ.

A similar exercise could be undertaken in measuring benefits to the other three groups--local, state, and federal governments. This would require monetizing all of transit's social benefits, i.e., translating energy conserved into a dollar figure, measuring the value of total time savings from reduced traffic congestion, etc. If all social benefits could be summed to yield a total dollar figure, then each government level would be responsible for paying its appropriate share of transit costs based on benefits received. For example, if total monetized social benefits reached one billion dollars per year for the nation as a whole, then this one billion dollars in benefits would have to be apportioned among the beneficiaries of the three levels of government. Disaggregating benefits to these three levels would clearly be an impossible, or at least a purely academic, task.

Alternatively, demand schedules for each of the governmental levels could be constructed by discerning what the elected officials, representing their constituents' interests, would be willing to pay for transit services. Then, the monetized benefit of all four demand schedules could be aggregated to measure total benefits, with cost responsibilities apportioned accordingly.

This discussion, of course, presents only a theoretical basis for assigning the costs of transit. Realistically, it is impossible to operationalize such a conceptual model since most of transit's benefits cannot be measured with any degree of precision. Even if benefits were commensurate and could be monetized, the difficult task of disaggregating them among institutional levels would have to be faced. It is because of these obstacles that transit finance policies are usually a product of political processes rather than the rigorous application of microeconomic theory. The perceptions and informed judgments of elected officials and industry leaders must instead be relied upon in examining transit benefits and formulating financial programs.

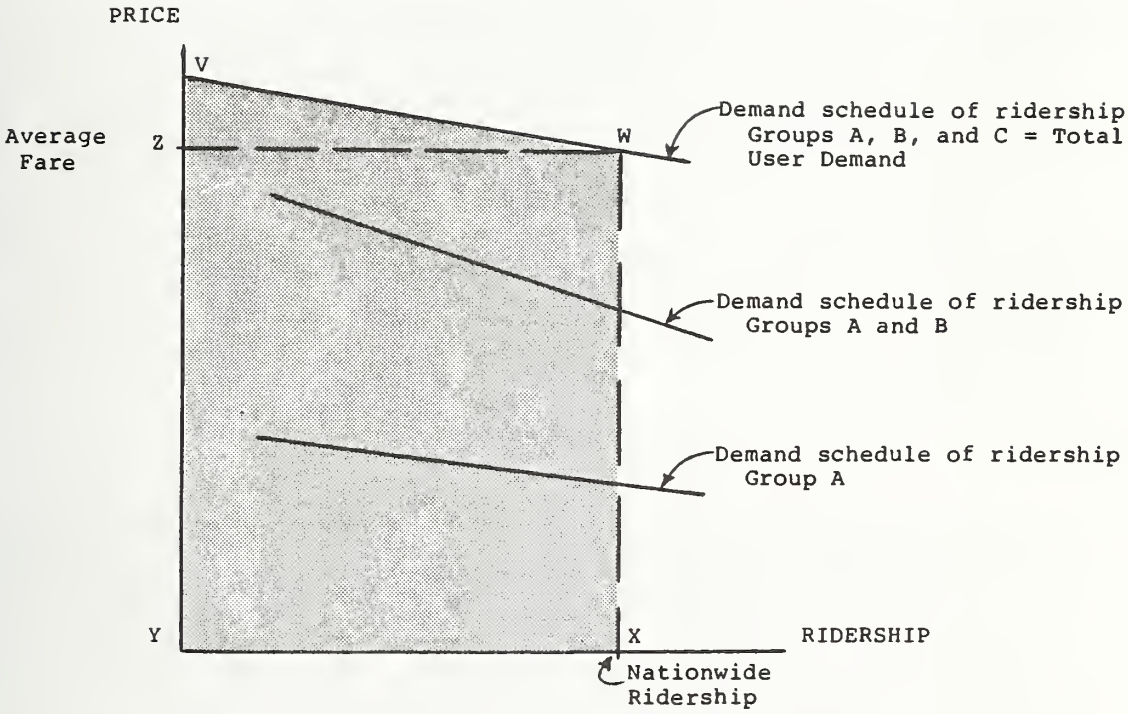


FIGURE 5.3. HYPOTHETICAL DEMAND SCHEDULES FOR TRANSIT RIDERSHIP GROUPS

5.3. Policy-Makers' Perceptions of Transit's Benefits

State and local transit officials were asked to record their perceptions of the relative "importance" of transit benefits. Moreover, information was gathered on how these officials perceive the benefits of transit being distributed among various groups--local, state, and federal government constituents. Together, their responses provide a useful benchmark for the development of a cost-sharing scheme for transit.

5.3.1. Importance of Benefits

On average, local and state respondents rated the relative importance of benefits in roughly an equivalent manner. Figures 5.4 and 5.5 reveal that improving the mobility of the transportation disadvantaged was considered, by far, to be transit's most important benefit, accounting for almost one-quarter of total social benefits. Transit's effects on increasing business activity, conserving energy, and reducing congestion were considered of more secondary importance, each receiving about the same rating. The other four benefits--option value, improved environmental quality, conservation of land, and improved safety--were generally considered less important and somewhat incidental. Local operators tended to rate increased business activity as slightly more important, and improved safety as slightly less important, than did state respondents.

5.3.2. Distribution of Benefits

From the survey, benefits were also distributed among the three spheres of government by respondents. Figures 5.6 and 5.7 summarize how local and state officials perceive benefits to be distributed. The figures indicate that perceptions were nearly identical from both institutional levels. Local government's constituents were considered the primary beneficiaries of transit's impacts on business activity, land conservation, mobility, congestion, and environmental quality. The federal sphere of interest was judged to receive most of transit's energy conservation and option value benefits. Improved safety was perceived to accrue almost evenly to all levels of government. In no case were states considered the major recipient of transit's benefits.

In general, state respondents assigned a greater share of transit's benefits to the state level than did local operators. Overall, this gave state responses a more even distribution, but did not mute the pattern described above. The proportion of benefits assigned to the federal level, however, was reasonably consistent across both groups of respondents.

An effort was made to statistically relate operator's perceptions of the benefit distributions with some of their operating characteristics--total number of revenue vehicles, percent of operating revenue from fares, total operating expenditures per revenue mile, and passengers per revenue mile.[2] Again, no significant relationships were

---

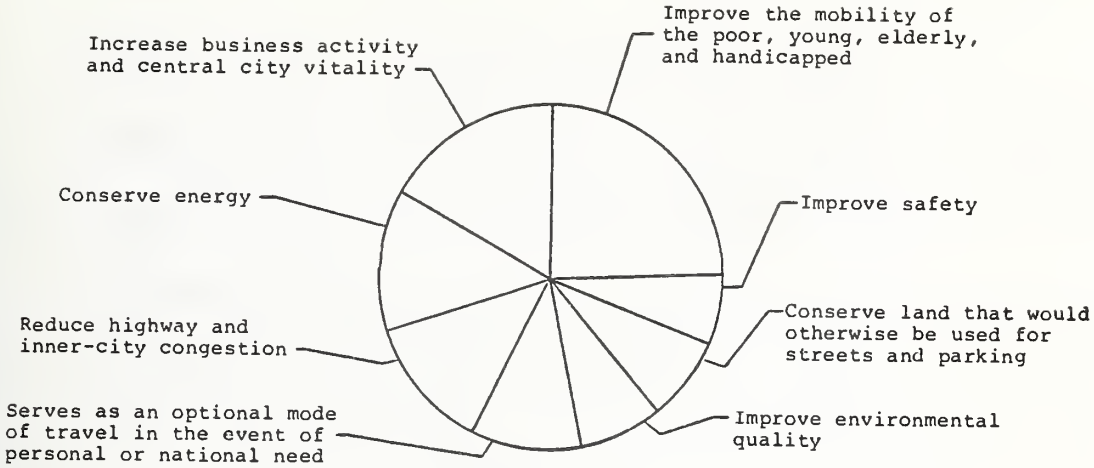


FIGURE 5.4. RELATIVE IMPORTANCE OF BENEFITS -- OPERATORS' RESPONSES

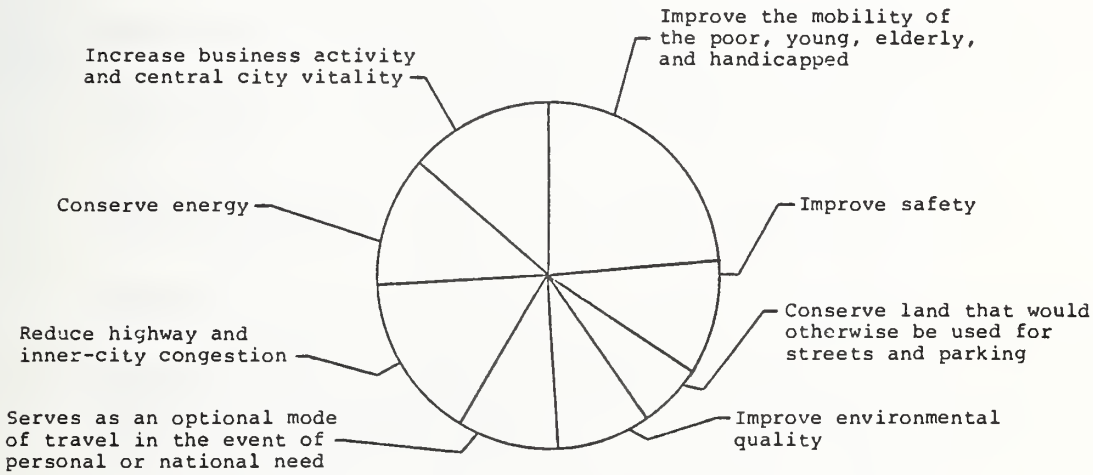


FIGURE 5.5. RELATIVE IMPORTANCE OF BENEFITS -- STATES' RESPONSES

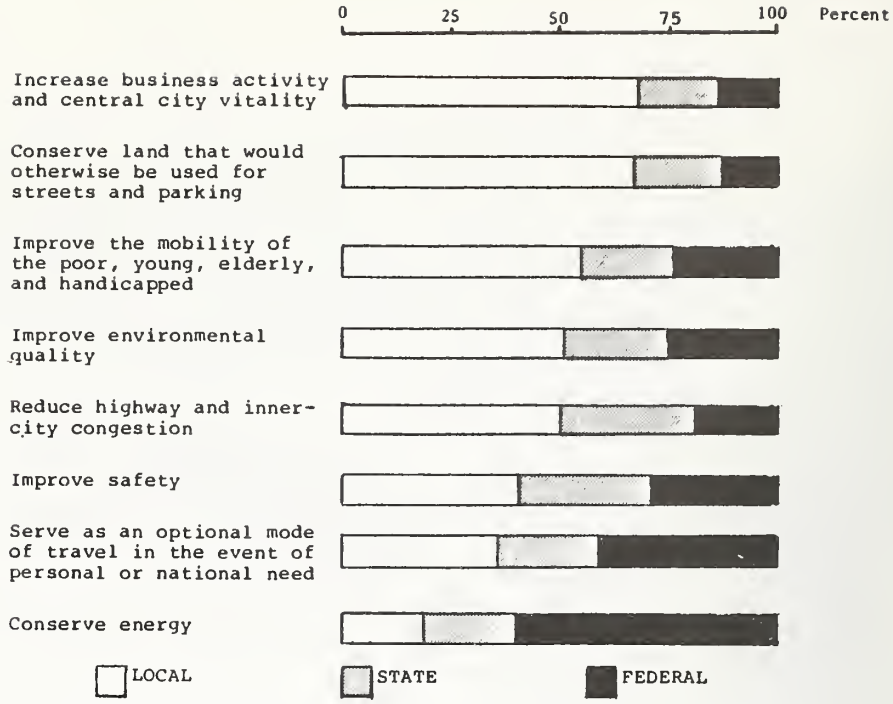


FIGURE 5.6. DISTRIBUTION OF BENEFITS -- OPERATORS
Respondents' perceptions of the extent to which benefits accrue to the constituents of each level of government

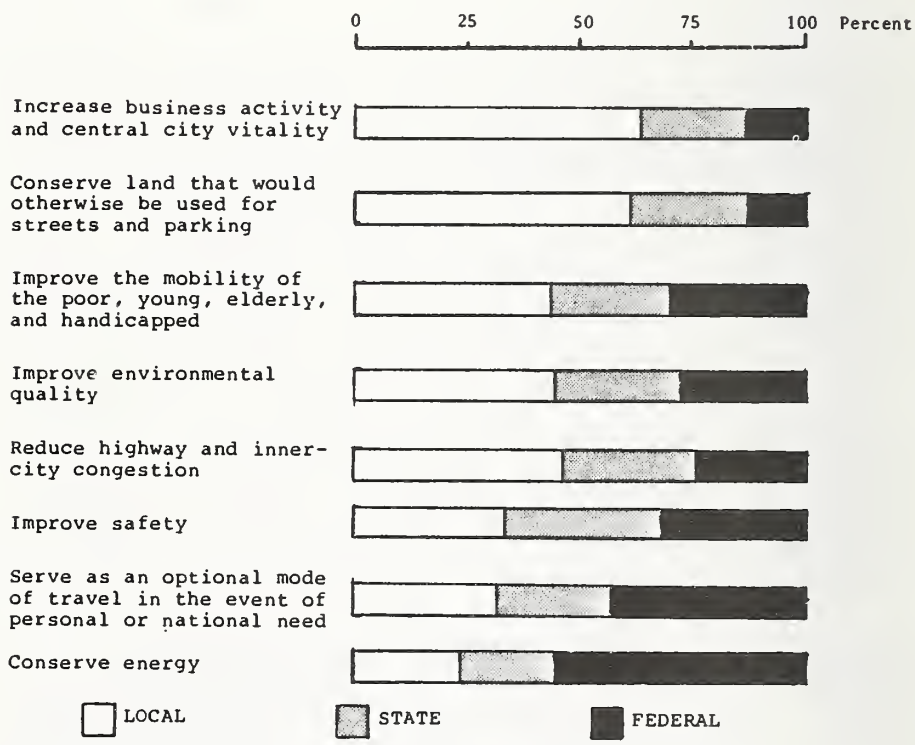


FIGURE 5.7. DISTRIBUTION OF BENEFITS -- STATES
Respondents' perceptions of the extent to which benefits accrue to the constituents of each level of government

found. This suggests that local respondents were not systematically influenced, in how they perceived transit's benefits being distributed, by the financial and operating environment of their transit systems.

5.4. Benefits and a Cost-Sharing Rationale

Respondents' perceptions of the distribution of transit benefits were be weighted by their relative importance, and summed, to determine the overall breakdown of the transit "social benefit pie." This pooled weighted average is presented in Table 5.1 for operators, states, and all respondents, combined.

The table reveals that operators, as a group, feel that over half of transit's social benefits accrue to the constituents of local government, while federal and state constituents receive about 27% and 23% respectively. State agencies, on the other hand, assign only about 43% of total benefits to the local level, with the remainder split evenly between the federal and state levels. Consistent with empirical findings, then, the bulk of social benefits is believed to accrue to the local level, but a sizable percentage is also perceived to favorably affect the constituents of other governmental levels.

Officials were also asked what percentage of transit's total benefits accrue directly to users. Respondents from both levels of government consistently indicated that about one-half of benefits accrue to users, with very little variation among responses.[3] The other half, then, represents social benefits redounding to all members of society. Of the social benefits, rounding for survey error, there seems to be a general concensus that benefits accrue to local, state, and federal governments on a 50%-25%-25% basis, respectively. Taken together, this suggests that state and local transit officials would tend to favor an intergovernmental cost-sharing program with the following breakdown:

50%	User
25%	Local
12%	State
13%	Federal

Although it must be cautioned, this pro-rata only represents the perceptions of knowledgeable observers, it is perhaps not too ironic that current funding levels generally follow this breakdown. Table 5.2, which compares respondents' perceptions with actual 1980 intergovernmental transit expenditures, suggests that the cost responsibilities of

[2] As in Chapter Three, Section 15 operating and financial data were merged with the survey data in order to perform the statistical tests. For each benefit, a Pearson correlation coefficient was computed between respondents' perceptions of the distribution of the benefit and each performance measure. None of the coefficients were significant.

[3] Overall, respondents felt that users should pay 46% of transit's operating costs (operators indicated 45.7%, states, 48.4%).

TABLE 5.1. DISTRIBUTION OF TOTAL SOCIAL BENEFITS
Pooled weighted average of respondents' perceptions of benefits.

RESPONDENTS	Percentage of total social benefits accruing to: LOCAL	STATE	FEDERAL
All	48.7	24.2	27.1
Operators	50.4	23.0	26.6
States	43.3	28.1	28.6

TABLE 5.2. COMPARISON OF REVENUE BREAKDOWNS

	Percentage share of transit's costs borne by: USERS	LOCAL	STATE	FEDERAL
Based on Perceptions of Benefit Distribution	50.0	25.0	12.0	13.0
Actual* (1980)	42.7	27.0	13.0	17.3

*Source: American Public Transit Association, 1981.

users should be expanded while the role of governments should shrink somewhat. It is noteworthy that this is consistent with current fiscal policies calling for a reduction in government spending and an increased reliance on user charges.

This breakdown is also consistent with one of the better arguments for federal support of transit. Most transit service in the United States is concentrated in the major metropolitan areas, where transit promotes high-density CBDs. Businesses in these CBDs--e.g., the banks, insurance companies, etc.--serve the whole nation. Since the cost of relocating downtown development, if transit service were eliminated, would be prohibitive, it is clearly in the best interests of the nation to maintain service. Local government should contribute the most, since it receives the greatest benefit from a viable CBD; the state and federal governments should pay somewhat less, but still should contribute significant amounts in absolute terms.

In sum, it is clear from the responses of state and local policymakers that a significant share of transit's benefits are perceived to flow to the constituents of local, state, and federal governments. Given the nature of transit's benefits, current public transit programs, which specify a range of service and social goals, imply that each level of government should contribute to operating costs. This conclusion flows directly from the relationship between goals and benefits; that is, the benefits of transit fulfill the goals of transit programs. Additionally, even though goals have generally not been well defined, these perceptions of the distribution of benefits are likely to persist regardless of what the goal-setters say at any particular level of government. Despite the federal government's threats to withdraw operating support, there is an overwhelming consensus that Washington benefits from transit service, and is therefore obligated to help foot the bill. Otherwise, the common perception may shift to one in which the federal government is viewed as a free-rider--materially benefitting from public transit, but failing to carry its fair share of the overall financial burden.

Perceptions of who receives transit benefits cannot be the sole basis for devising a rational cost-sharing program. Other factors that also deserve some consideration are the incidence of various tax sources collected by different levels of government, the responsibilities of governmental policies for recent deficit levels, and the historical effects of past subsidy programs on fiscal performance and productivity. These additional factors are addressed in the next several chapters.

Chapter Six
Tax Equity in Transit Finance

6.1. Introduction

A multitude of revenue sources are today being tapped to subsidize transit services. The incidence of these revenue sources (i.e., who pays) has some bearing on how costs might be allocated among government levels. Optimally, subsidy programs should have high target efficiencies, in the aggregate, collecting revenues from various socioeconomic groups in line with the benefits they receive. To the extent that transit's social benefits can be assigned to particular segments of society, the incidence of various tax sources could provide some insight into how transit's cost burden might be distributed. If, for instance, higher-income groups are major recipients of transit's social benefits, arguments could be made for funneling more progressive forms of tax dollars into transit coffers. Moreover, whenever subsidy dollars are used in lieu of passenger fares to finance transit, the tax revenues used to cover deficits should ideally come from those groups patronizing transit. This chapter examines the incidence of various transit tax sources as possible input into the development of a cost-sharing program for transit.

Currently, about 60% of the nation's transit revenues come from local, state, and federal sources (U.S. Department of Transportation, 1981). Table 6.1 reveals that government assistance came primarily from state sales taxes, local property taxes, and the federal income tax in 1978. Together these three sources accounted for almost 70% of all government assistance to transit.

The appropriateness of these and other taxes for financing American transit operations depends upon the criterion employed. One measure of appropriateness often used is tax equity, which relates to the "fairness" of a tax.[1] A tax can be considered fair if its burden falls most heavily on those with higher incomes. Based on this criterion, this chapter finds that the federal income tax is most equitable. This, then, suggests that the federal government should be a major financial contributor to transit from an equity standpoint. On the other hand, a tax can be considered fair if its burden falls on those who receive the benefits of transit services. However, it is very difficult to accurately measure just how much the general public benefits from transit. Thus, benefit principles often have more theoretical than operational merit. To the extent that benefits are essentially confined to users,

---

[1] There are two other measures of tax appropriateness -- efficiency and adequacy. The efficiency of a tax is a measure of how much it distorts economic behavior. The adequacy of a tax is a measure of how much revenue it generates (also accounting for collection and compliance costs). For a further discussion of taxation principles, see Musgrave and Musgrave, 1980, pp. 229-326.

Table 6.1

Taxes Used to Finance U.S. Transit Operations (1978)

TAX		TAX EXPENDITURES IN MILLIONS OF DOLLARS	TAX EXPENDITURES AS A PERCENT OF TOTAL
Federal:	Personal Income Tax	$ 493	18.5 %
	Corporate Income Tax	163	6.1
	Customs and Excise Taxes	68	2.6
	Estate and Gift Taxes	15	0.6
Total Federal		$ 739	27.8
State and Local:	Sales Tax	$ 782	29.4
	Property Tax	538	20.2
	Income Tax	247	9.3
	Bridge and Tunnel Tolls	190	7.1
	Gas and Motor Vehicle Taxes	140	5.3
	Payroll Tax	23	0.9
Total State and Local		$ 1,920	72.2
TOTAL ALL SOURCES		$ 2,659	100.0

Source: Pucher, 1981.

the most equitable arrangement is user charges, i.e., fares. In large cities, notably New York City and Chicago, where the majority of residents are transit users, excise taxes are found to be equitable supplements to fares. Specifically, the burden of excise taxes are found to fall largely on the very income groups patronizing public transit in these two cities. This chapter concludes, then, that the federal government should be a significant funding participant on equity grounds, and that state and local excise taxes are probably the best substitutes for fares on beneficiary principles.

6.2. Who Pays Taxes to Support Public Transit?

All taxes burden individuals in some way. To determine the true burden of a tax, i.e., its incidence, it is necessary to determine whether or not the tax is shifted from its intended target. A tax falling on a business, for instance, is usually ultimately borne by its customers. Quite often, the ultimate burden differs significantly from that intended by tax statutes. Determining who ultimately bears a tax's burden is problematic, however past studies have reduced the amount of guesswork.[2] Below, current opinions on the incidence of various tax sources used to finance public transit are briefly summarized.

Personal Income Tax. There is little controversy regarding the incidence of the personal income tax. Most economists agree that the tax is borne by individual taxpayers--i.e., the burden is not shifted.

Corporate Income Tax. The incidence of the corporate income tax is more controversial. One view holds that the tax causes a shift of capital out of the corporate sector, and thus lowers the rate of return on all investments. Another view is that capital will not leave the corporate sector, and, therefore, the tax acts to lower wages. Still others feel that market imperfections allow the tax to be shifted to consumers in the form of higher prices.

Sales and Excise Taxes. There are two opposing positions regarding the incidence of these taxes. One holds that sales and excise taxes result in higher prices on taxed commodities and are thus shifted to consumers. The other position is that higher relative prices cannot actually be charged for taxed items, and the burden is therefore borne by producers in the form of lower wages and lower returns to capital. Most empirical studies adopt one or the other of these positions, with the majority assuming that sales and excise taxes are borne by consumers.

Property Tax. There is also no strong consensus on the incidence of the property tax. Again, two viewpoints prevail. The so-called "old

---

[2] Further discussions of the incidence of various taxes can be found in Aaron (1974) (property tax); Harberger (1962) (corporate income tax); McClure (1977) (property tax); Mieszkowski (1972) (property tax); Musgrave and Musgrave (1980) (general); and Rolph (1951) (sales and excise tax).

view" maintains that the tax on homes is borne by homeowners, the tax on rental property is borne by renters, and the tax on businesses is borne by consumers. The "new view" argues that the tax actually acts to reduce the rate of return to all capital. These opposing views are often reconciled as follows: the burden of the national average property tax falls on owners of capital in accordance with the "new view," and the burden of local differentials around the average falls on homeowners, renters, and consumers in accordance with the "old view."

Empirical Evidence. A number of past studies have sought to gauge the incidence of the most commonly used taxes by measuring the share of different groups' incomes paid to these taxes.[3] Figures 6.1 and 6.2 combine findings from these studies to reveal the general incidence of the most common federal, state, and local taxes.[4] Both figures show that federal and state income taxes take an increasing percentage of income as income rises. The federal income tax, however, is more progressive than state income taxes since the percentage increases faster. Corporate income taxes take roughly the same percentage of income from everyone and are, therefore, proportional in incidence. Sales, excise, and property taxes are generally regressive since their percentage declines as income rises. In sum, then, personal income taxes provide, by far, the most progressive revenue sources available to transit.

6.3. What are the Most Equitable Tax Sources for Financing Public Transit?

Once it is known who pays a tax, the question remains whether the tax is fair. As mentioned previously, there are two different ways to judge the fairness of a tax: the benefit principle and the ability-to-pay principle. According to the benefit principle, a tax is fair if those who pay are the ones who benefit. For example, the gasoline tax

---

[3]The four major empirical studies on tax incidence to date are: Musgrave, Case, and Leonard (1974); Pechman and Okner (1974); Browning and Johnson (1979); and Phares (1980). Each study makes underlying assumptions regarding the degree of tax shifting that occurs. All the studies assume that income taxes are borne by the actual taxpayer. Studies by Musgrave et al., Pechman and Okner, and Phares assume that sales and excise taxes are borne principally by consumers. Browning and Johnson, on the other hand, assume that these taxes are borne by owners of capital. For the corporate income taxes and property taxes, the four studies use a variety of assumptions. These taxes are variously assumed to fall on owners of capital, on consumers, or on both.

[4]Tax burden, defined as the percentage of a person's income paid to taxes, is expressed in these figures using "average" or "baseline" assumptions on tax shifting, from the four studies identified in footnote 3. Despite the fact that the studies were conducted at different times, they yield remarkably similar results under similar assumptions. It should be noted, however, that the use of varying assumptions clouds the incidence of the corporate income and property tax. In these cases, the most moderate and middle-ground assumptions must be invoked.

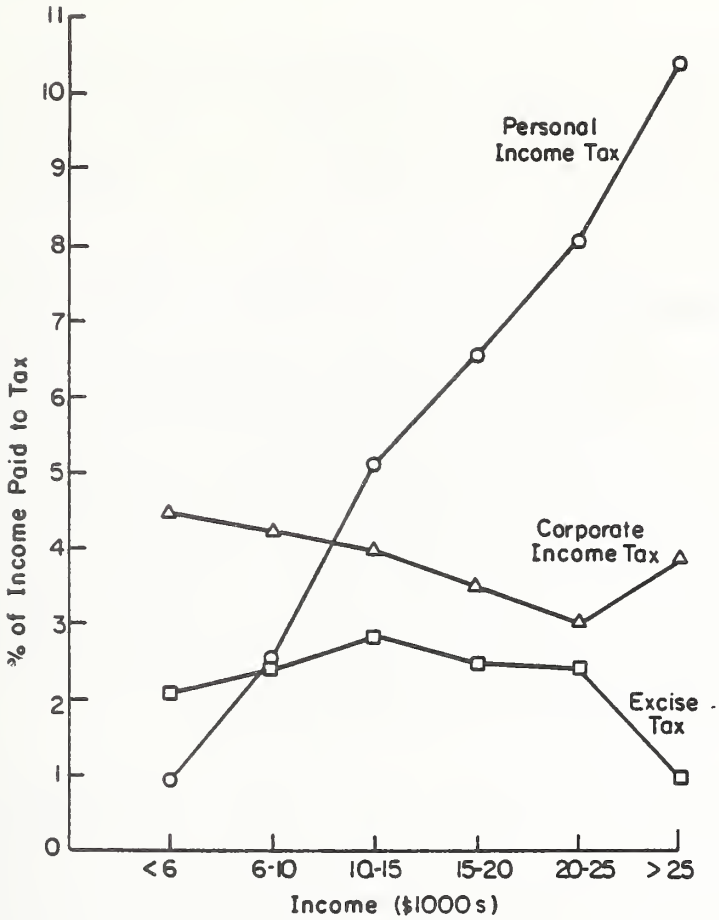


FIGURE 6.1. SUMMARY INCIDENCE OF MAJOR FEDERAL TAXES
Percent of Income Paid to Tax

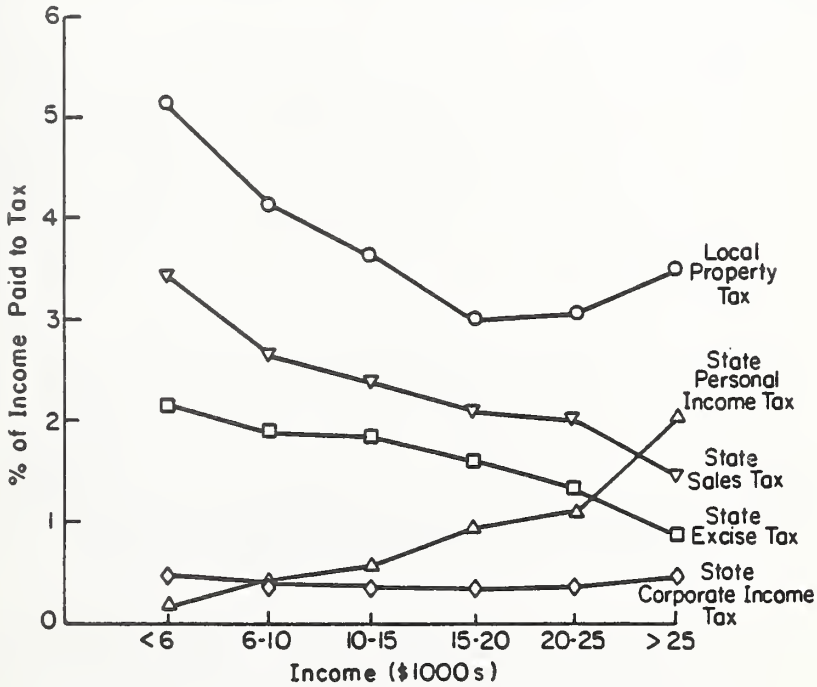


FIGURE 6.2. SUMMARY INCIDENCE OF MAJOR STATE AND LOCAL TAXES
Percent of Income Paid to Tax

is judged fair because it is paid by highway users. By contrast, the ability-to-pay principle considers a tax fair if those most able to pay are assessed relatively high taxes while those least able to pay are assessed relatively low taxes. Thus, depending on the principle adopted, different taxes appear appropriate for financing transit services.

6.3.1. Appropriate Taxes Based on Ability-to-Pay Principle

The previous figures showed that Americans with the lowest incomes often pay the greatest percentage of their income to taxes. The notable exception is the federal income tax, which is by far the most progressive and therefore the most consistent with the ability-to-pay principle.[5] Americans earning under $6,000 per year pay only about 1% of their earnings to the federal income tax, while those earning over $25,000 per year pay roughly 10%. State income taxes are also progressive, but less so than the federal income tax. All other taxes, however, generally seem to be proportional or regressive in their incidence. Based solely on the ability-to-pay principle, then, one would conclude that major public services, including transit, should receive a significant share of their funding from federal income taxes.

Pucher (1981a), in his investigation of taxes used to finance transit operations, recently found that the federal income tax, which accounts for 18.5% of the total subsidy to transit, makes the national tax mix progressive overall (Figure 6.3). Federal taxes were found to be sufficiently progressive to overcome the regressivity of the state and local taxes. By themselves, then, state and local taxes would render the overall incidence of transit's financial program regressive. Clearly, the Reagan Administration's proposed elimination of federal operating subsidies to transit can be expected to hurt the poor more than the rich.

Although public transit, in the aggregate, appears to be financed progressively,[6] such is not necessarily the case for individual operators. Most large operators receive only a small percentage of their revenues from federal subsidies. For example, in the San Francisco Bay Area, BART receives only about 4% of its operating revenue from Washington. Due to the heavy reliance on sales and property taxes, the financing of BART's construction, as well as much of its operating assistance,

---

[5] It should be noted that this position is not universally held. Some studies (for example, Browning and Johnson, 1979), because of the unique incidence assumptions they adopt, show other taxes to be more progressive than the income tax. Also, Rock (1981) examines the incidence of several less-common taxes and finds that a stock-transfer tax would be more progressive. However, of the common taxes, the income tax is generally accepted as the most progressive.

[6] While transit subsidies are financed progressively, Rock (1981) has shown fare income to be regressive. Thus, transit's total financing might be regressive despite the high percentage of federal aid.

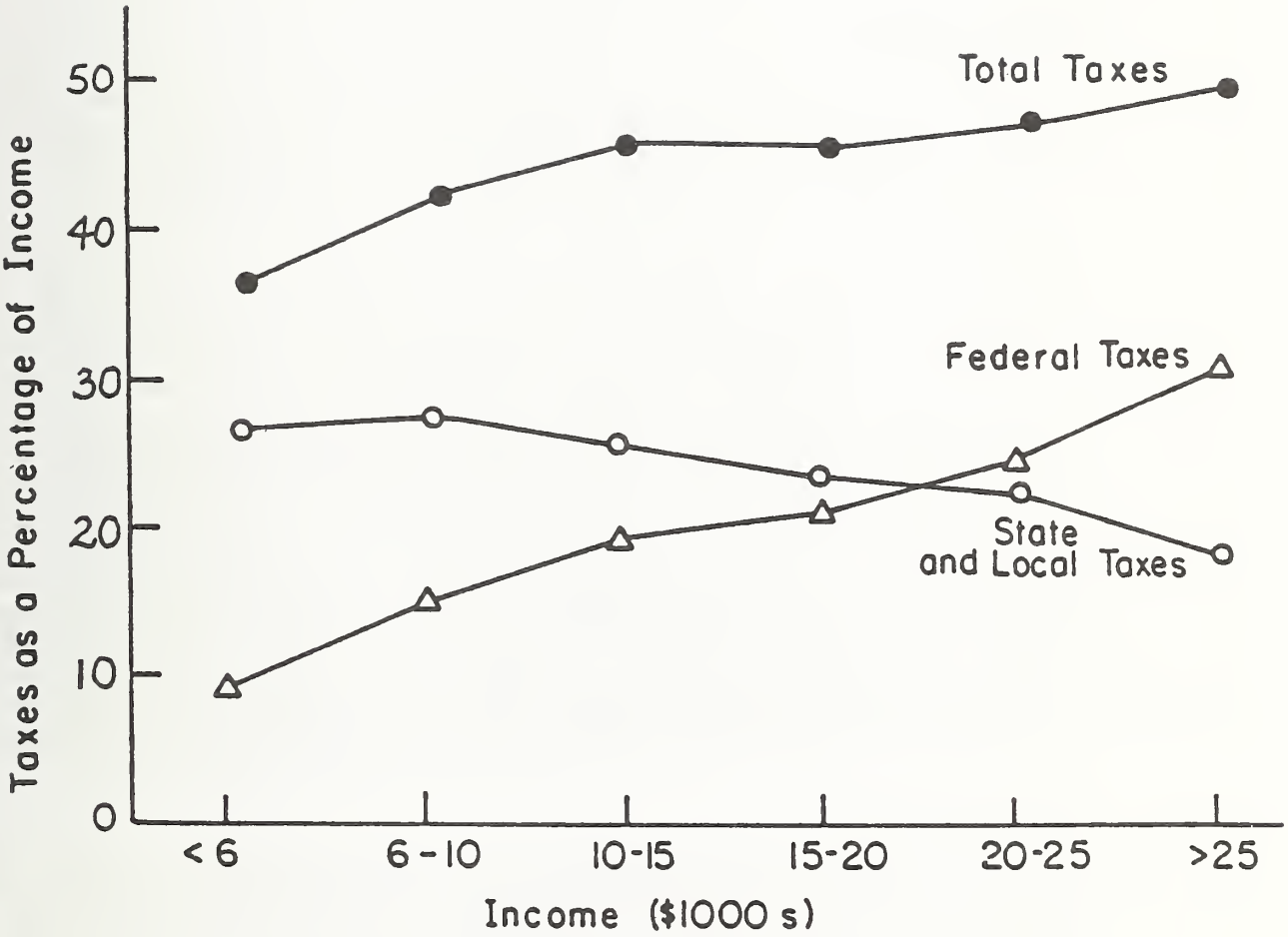


FIGURE 6.3. DISTRIBUTION OF THE TOTAL TRANSIT TAX BURDEN AMONG INCOME CLASSES, BY LEVEL OF GOVERNMENT, U.S. METROPOLITAN AREAS, 1978.

Source: Pucher, 1981.

has been decisively regressive (Hoachlander, 1976, 1979). Thus, some of the larger transit operators in the U.S. probably have a net tax incidence that is regressive.

6.3.2. Appropriate Taxes Based on the Benefit Principle

Under the benefit principle, the income capacities of individuals should have nothing to do with who finances transit. Rather, those reaping the rewards of transit should pay accordingly. As discussed in Chapter Five, all members of society should help finance transit based on the share of total benefits that are social, or external, in nature. Users should pick up the rest of the tab through fares. This section finds the benefit principle to be largely inoperable, though it may be useful in determining the most appropriate tax substitute for user fares.

Social Benefits

Levying taxes based upon who benefits from transit services has considerable theoretical merit, but is nearly impossible to operationalize in practice. For example, although everyone is better off because of the energy savings and land conservation afforded by public transit, measuring exactly how much better off we are, and which population groups receive the most benefit, would be a futile, or at least purely academic, exercise. Many of transit's benefits, such as its option value and contributions to cleaner air, simply cannot be monetized and are generally considered to be noncommensurable. Moreover, determining the relative degree to which various population groups benefit from transit would necessitate the derivation of some expressions of interpersonal utilities, which would have to be aggregated to form a social welfare function of sorts. Theoretically, it would be possible to determine the value of transit's benefits to certain groups by asking their members how much they would be willing to pay to keep transit available. Such an undertaking, however, would be prohibitively expensive and practically impossible to carry out objectively. It can be safely concluded, then, that the benefit principle cannot be applied in a strict sense in distributing transit's cost burden and identifying an appropriate tax source. Rather, political judgment must substitute for precise mathematical measurement in applying the benefit principle.

User Benefits

As discussed in Chapter Five, most economists maintain that transit users should pay for the cost of their services in line with the benefits they receive. However, operators often face stiff political opposition to any fare hikes. Resistance to fare hikes will likely continue to grow, particularly in such places as New York and Chicago, where residents have recently become militant in their opposition to proposed base fares of a dollar or more. Tax revenue, then, might be used increasingly as a substitute for fares in these places. A tax would be an equitable substitute for fares if it were paid only by transit riders. In most areas, however, taxes are paid principally by nonusers since only about 3% of trips in most U.S. urban areas are made on public transit, and only around 6% of all commuters are frequent transit

patrons (Altschuler, 1979). Taxes used in lieu of fares, then, would appear to be grossly inequitable based on beneficiary principles.

Taxes might prove an equitable substitute to fares in several settings, however. A few large U.S. cities, particularly New York City and Chicago, are highly dependent on transit. Together, New York and Chicago account for 44.5% of the nation's transit ridership.[7] In both cities, over 60% of all trips to and from the CBD are made via transit. Thus, it's probably a safe assumption that the majority of New York and Chicago taxpayers are also transit users. Both cities, then, might be good candidates for financing some of users' costs through taxes.

Theoretically, if those persons riding transit match those who pay a particular tax, then that tax could be considered an equitable supplement to fares. To investigate this, Figures 6.4 and 6.5 break down the percentage of tax revenues collected from each income category to reveal which groups are paying the most in absolute terms.[8] The figures show that, in absolute terms, all taxes fall principally on the wealthy; regardless if a tax is progressive or regressive, higher-income persons pay substantially greater absolute amounts. Those earning $25,000 or more annually (1968 dollars), for example, contributed toward about 34% of state excise tax income and nearly 75% of federal personal income tax revenue.

Comparing these tax incidence patterns (Figures 6.4 and 6.5) to ridership patterns in New York and Chicago (Figure 6.6) reveals generally close matches.[9] Those income groups paying state excise taxes seemed to most closely match those income groups patronizing transit in the nation's two largest cities. This is best measured by the chi-squared statistic, which found an extremely good fit between the distribution of New York City and Chicago ridership by income class and the distribution of state excise tax broken down by income class (see Table 6.2). State excise taxes, therefore, emerge as good candidates for supplementing fares in New York and Chicago. It's important to add that state excise taxes usually include taxes on gasoline, cigarettes, and alcohol. Since those paying gasoline taxes probably ride transit the least, gasoline taxes might be exempted from excise taxes earmarked for transit funding.[10] State sales taxes would be a second best substitute for fares in New York City and Chicago. By contrast, federal income taxes are poor fare substitutes.

---

[7]This figure is expressed in passenger miles and was calculated from data in Tri-State Regional Planning Commission (1978) and U.S. DOT (1981).

[8]See note 3 for the sources used in preparing Figures 6.4 and 6.5.

[9]Figure 6.6 was derived from 1970 ridership data. Income categories were inflated to 1978 dollars using the Consumer Price Index.

[10]This, however, might be a means of redressing the current competitive distortions between auto and transit.

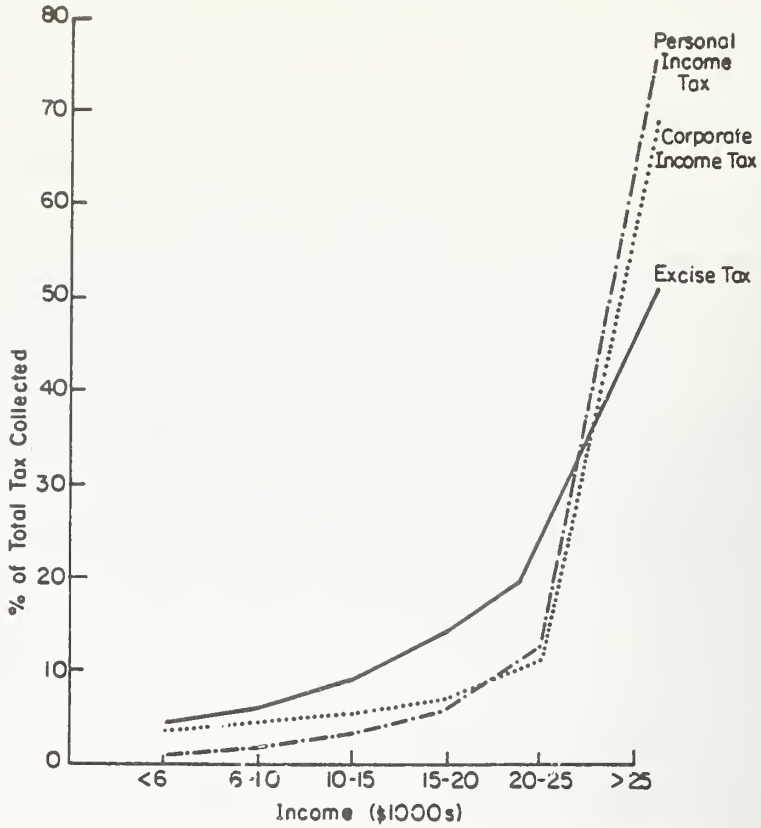


FIGURE 6.4. SUMMARY INCIDENCE OF MAJOR FEDERAL TAXES.
Percent of Total Tax Collected by Income Category

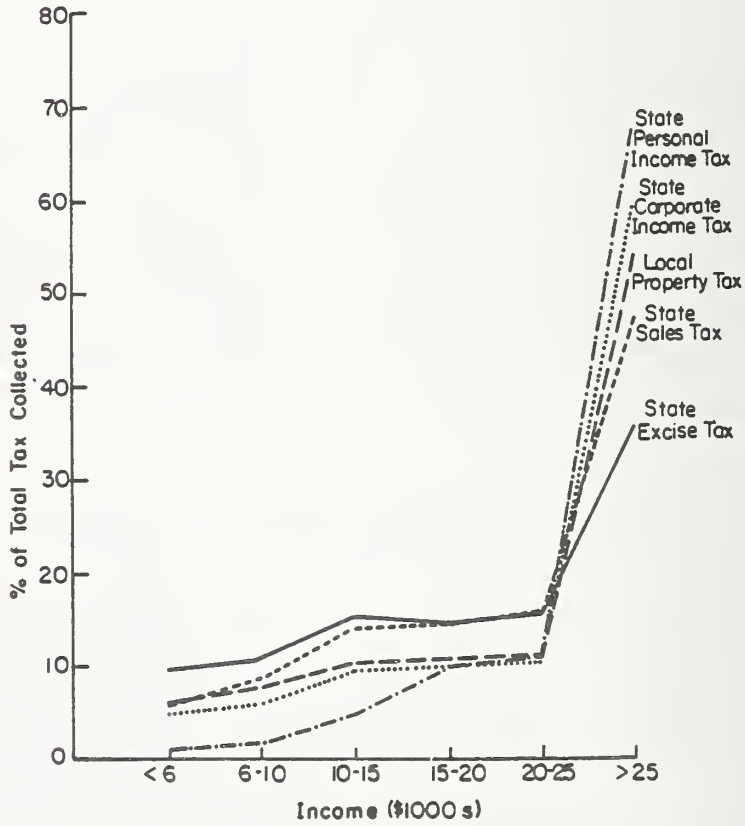


FIGURE 6.5. SUMMARY INCIDENCE OF MAJOR STATE AND LOCAL TAXES
Percent of Total Tax Collected by Income Category

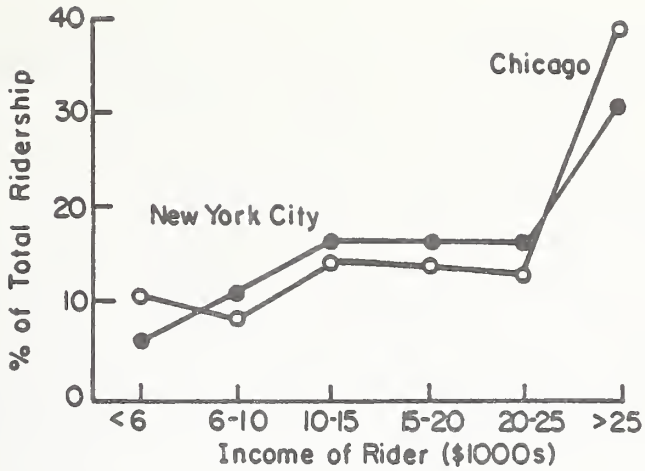


FIGURE 6.6. BREAKDOWN OF NEW YORK CITY AND CHICAGO TRANSIT RIDERSHIP BY INCOME CATEGORY

Sources: Pucher et al., 1981 and U.S. Department of Commerce, Bureau of the Census, 1973.

Table 6.2
Comparison of Ridership Patterns in New York and Chicago with Incidence Patterns of Various Taxes*

TAX	CHI-SQUARE STATISTIC NEW YORK CITY	CHICAGO
Federal Personal Income	103**	67**
Federal Corporate Income	60**	34**
Federal Excise	21**	14**
State Personal Income	58**	32**
State Corporate Income	32**	16**
State Sales	11**	6
State Excise	1	2
Property	29**	13**

*Calculated from Figures 6.4 through 6.6 using the following formula:

$$\chi^2 = \sum_{\substack{\text{all income}\\ \text{categories}}} \left[\frac{\left(\begin{array}{l}\text{\% of total tax revenue that}\\ \text{is collected from persons in}\\ \text{income category}\end{array} - \begin{array}{l}\text{\% of total ridership}\\ \text{accounted for by persons}\\ \text{in income category}\end{array} \right)^2}{\begin{array}{l}\text{\% of total ridership accounted for by}\\ \text{persons in income category}\end{array}} \right]$$

where a low Chi-Square indicates a good fit. See Blalock (1979, pp. 279-290) for a complete discussion of this statistical technique.

**Indicates that the distribution of tax payments varies significantly from the distribution of ridership, broken down by income categories, at the .05 level. Taxes that are not significant, then, indicate the best fits.

Several caveats appear to be in order at this point. Rock (1981) casts doubt on the adequacy of cigarette and liquor taxes to raise sufficient revenue for transit, since they represent a very small share of an area's tax income. Also, other taxes not considered in this section might prove more appropriate for financing transit. For example, some believe that a payroll tax on downtown employers would be most effective in generating funds from transit users (Puryear and McHugh, 1979). Finally, even in New York and Chicago not everyone rides transit, and of those who do, not all buy cigarettes and alcohol. Regardless of which tax were used, some degree of inequity would likely persist.

6.4. Local and State Attitudes on the Most Appropriate Tax Sources for Transit

The Transit Finance Survey elicited responses from local operators and state transit officials on which tax sources they considered to be the most appropriate for financing public transit.[11] Table 6.3 summarizes the survey findings. In general, a mix of tax sources were considered apropros for transit. Only a few patterns emerge from the table, however. In particular, the nation's largest operators tend to favor federal tax sources. Except for federal excise taxes on gasoline, most of the small and middle-sized properties prefer state and local tax sources.

Table 6.3

Tax Sources Considered to be Most Appropriate by Local and State Transit Officials

Tax Source		Seen as Appropriate by: States	Small Operators	Medium Operators	Large Operators	Largest Operators
Federal:	Personal Income					●
	Corporate Income					●
	Gasoline	●	●	●		●
State:	Sales			●	●	●
	Gasoline	●	●	●	●	●
	Vehicle Registration	●	●	●	●	
Local:	Income		●			
	Sales	●	●	●		●
	Gasoline			●		
	Payroll and Profits	●			●	

Key: Small = under 100 vehicles
Medium = 100-500 vehicles
Large = 500-1000 vehicles
Largest = over 1000 vehicles

[11] See Appendix A2 for a complete description of the survey.

Responses generally reflected a greater concern over the adequacy and efficiency of a tax than its equity consequences. That is, transit officials appear most interested in whether a tax can be counted on to produce a sustained flow of revenue over time, and whether the tax will enhance rather than undermine the local and national economy. Since large transit properties have such enormous budgets and their services are so vital to their communities, it is understandable that they would opt for more dependable federal taxes than for traditionally more volatile state and local revenue sources.

Table 6.3 also indicates that gasoline and motor vehicle registration taxes were overwhelming favorites among transit officials. The popularity of these revenue sources again probably stems from the fact that they are dedicated and can therefore be counted on with some degree of confidence. It also seems that many officials feel that transit should be financed from revenues generated within the transportation sector, and that motorists have an obligation to pick up some of the transit tab. (See Chapter 2 for the discussion of the "countervailing subsidy" argument.)

The sales tax also emerged as a popular revenue source, with larger transit properties generally preferring that it be administered at the state level and smaller ones preferring that be administered locally. The sales tax generates substantial amounts of revenue today, and is generally considered to be a fairly established source of transit income. Although an ad valorem sales tax is not resistant to economic recession, most believed that it still provides a fairly stable revenue stream. By contrast, the property tax, which has historically been the major contributor to the local general fund, was viewed as too unreliable, and therefore received little support among respondents.

A fairly uncommon tax which was considered appropriate by five states and a number of large transit properties is the payroll and profits tax. Since the payroll and profits tax is regressive (Rock, 1981), does not confine subsidies to the transportation sector, generates only small amounts of revenue, and is a dedicated tax only in the State of Oregon, its popularity is probably best explained in terms of the benefit principle of equity. Because downtown landowners, merchants, and office workers are often major beneficiaries of transit services, the payroll and profits tax is perhaps seen as the best way to assess these groups. However, Rock (1981) has shown that the tax is more likely to fall on workers and customers than on business owners and landowners.

In sum, several distinct tax sources, in particular those which provide large and reliable revenue streams, were considered most appropriate for financing transit services by survey respondents. The overwhelming favorites were gasoline and vehicle registration taxes, ostensibly because most feel that highway users bear some responsibility for supporting transit. The few large operators in this country expressed a preference for federal income tax support while smaller properties generally preferred local tax sources. Payroll and profits taxes were also deemed appropriate by a number of state and large operator respondents. In general, few respondents seemed interested in whether the incidence of a tax was progressive or regressive.

6.5. Conclusions

Determining the best tax source for financing public transit depends on which of the two principles of equity is considered.

Analysts have traditionally concentrated on the ability-to-pay principle, though the current political mood would suggest that the benefit principle will gain increasing favor. However, since transit's social benefits accrue to everyone, it's very difficult to apportion them among population groups for the purpose of levying a tax. Thus, no tax can match taxpayers to beneficiaries, and no governmental entity emerges as the "best" for administering a subsidy program (at least on benefit grounds). Still, to the extent that the social benefits of transit actually exist, government subsidies are in order. Ultimately, the hard decision as to which, if any, tax sources should be used to finance public transit is a political one, ideally considerate of equity principles but reflective of political priorities and public mandates as well.

Though no tax emerges as the best candidate for financing transit from a benefit standpoint, a local excise tax on cigarettes and alcohol could be an equitable way to substitute tax dollars for fares in a few of the nation's largest cities. This implies that if public funds are to be increasingly used to assuage the impacts of fare hikes, then the role of local governments in financing transit should expand. This arrangement would amount to a smokescreen, however, since user benefits should be directly paid for by passenger fares.

From an ability-to-pay standpoint, one particular tax is clearly superior--the federal income tax. While it is not practical to suggest that all government services be financed by the federal income tax, studies have documented that it serves to offset the regressivity of other taxes. Because of federal involvement, then, the overall tax mix used to finance transit in the U.S. is slightly progressive. While usually not as progressive as the federal income tax, state income taxes could also render the overall tax mix more progressive if they were expanded. Thus, a case might be made for increased federal and state support of transit invoking ability-to-pay arguments.

Setting all theoretical and empirical arguments aside, it was found that most state and local transit officials considered gasoline and vehicle registration taxes to be the best revenue sources for transit. Federal income taxes were generally favored by large transit properties, whereas smaller ones tended to prefer local sales taxes. Nearly all respondents frowned on property taxes to finance transit, primarily because they are unreliable. Thus, transit officials considered a mixed bag of tax sources appropriate for financing American public transit, perhaps with a slight preference expressed for local and state revenue sources.

In closing, the analysis of the incidence and equity of various taxes failed to identify any one level of government as the most appropriate for administering and shouldering the major burden of transit's subsidy program. Depending upon the criteria adopted, different governmental entities appear best suited for taking the lead role in administering transit subsidies. It would seem that the current tax mix used to finance transit serves to balance the pros and cons of any one tax source, and that the richness of transit's current funding composition results in a fairly neutral, efficient, and adequate financial situation. Thus, the current level of financial participation of each level of government seems desirable from a tax equity standpoint.

Chapter Seven
Governmental Responsibilities for Transit Costs and Performance

7.1. Introduction

The nationwide cost of providing public transit services has skyrocketed over the past decade, rising from less than $2 billion in 1970 to over $6.5 billion in 1980. This cost increase has been attributed to a host of factors, including rising wage rates, higher fuel expenses, and expanded services. Many observers believe that governments have also had a direct hand in transit's cost spiral, through various policies that effectively place costly requirements on local operators as preconditions to receiving public assistance--in particular, mandates involving labor protection and full accessibility provisions. Moreover, some argue that subsidies have induced costly wage settlements, negligent management, and low productivity, and consequently government institutions bear some responsibility for the current financial mess. Accordingly, any investigation of a transit cost-sharing scheme should take these factors into account, attempting to gauge the responsibilities of various governmental entities for recent cost escalation and the effects of their subsidy programs on industry-wide productivity and performance.

This chapter examines the various arguments and research findings that have surfaced regarding the responsibilities of governmental bodies for recent cost and performance trends as possible input into the development of a cost-sharing rationale. Initially, various labor protection and social policy mandates are examined with regards to their cost impacts. It is generally found that public institutions, and in particular the federal government, do bear some responsibility for recent cost increases, though no actual dollar figure can be attributed to the effects of their programs. Next, the historical effects of subsidies on cost and service performance are studied using longitudinal data gathered for seventeen individual California transit properties. In general, local subsidies are found to exert a negative influence on cost and performance, while the impacts of federal and state operating assistance are found to be comparatively modest.

7.2. Cost Impacts of Government Programs: Qualitative Assessment

Labor is by far the most costly component of running a transit system, accounting for over 73% of the total nationwide transit expenses in 1980 (Table 7.1). Relative to salaries and fringes, other cost components seem almost insignificant. Fuel, for example, accounts for only about 6.6% of today's total costs. Consequently, any evaluation of the cost impacts of government programs must focus on the labor component of costs, *i.e.*, how policies affect wage levels and labor contracts.

Two groups of government programs, in particular, have been cited as major contributors to transit's cost spiral: (1) Section 13(c) of the amended 1964 Urban Mass Transit Act, which defines labor protection

Table 7.1

Nationwide Transit Operating Expenses for 1980
by Functional Categories

Functional Category	Total Dollars (Thousands)	Percent of Total
Salaries and Wages	3,141,758	51.93
Fringe Benefits	1,295,878	21.42
Services	276,066	4.56
Fuel and lubricants	400,414	6.62
Tires and Tubes	39,155	0.65
Other Supplies	319,438	5.28
Utilities	193,122	3.19
Casualty and Liability	238,124	3.93
Other	146,156	2.42
Total	6,050,111	100.00

Source: APTA, 1981, pp. 48-49.

provisions for transit agency employees; and (2) an assortment of social service programs aimed at improving the mobility of the nation's elderly and handicapped populations, codified under the "504 Regulations" of the 1973 Rehabilitation Act and Sections 5(m) and 16(a) of the 1964 UMT Act. In addition, a number of state regulations supplement these federal programs.[1] Other government requirements, such as for planning and record-keeping, have also served to increase transit operating expenses, but their impacts are generally considered to be minor by comparison.

[1] For example, some forty states have enacted legislation enabling the creation of public transit authorities. Of these forty, twenty-eight have some labor-protection provisions: Alabama, California, Colorado, Connecticut, Delaware, District of Columbia, Illinois, Indiana, Kentucky, Louisiana, Maine, Maryland, Michigan, Massachusetts, Minnesota, Nebraska, New Jersey, New Mexico, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Utah, Virginia, Washington, West Virginia, and Wisconsin. The twelve other states that have passed enabling acts free of labor-protection provisions are Arizona, Florida, Georgia, Iowa, Kansas, Mississippi, Missouri, Nevada, New Hampshire, New York, South Carolina, and Texas (Stern et al., 1976).

Recognizing that government responsibilities for financing transit depend in part on the costs they impose on operators, this section examines the cost effects of various social service policies and regulations.

7.2.1. Labor Protection Regulations

Section 13(c) of the amended Urban Mass Transportation Act of 1964 guarantees that transit employees will not be adversely affected by any program involving federal transit grants. This provision was a response to concerns over the possible labor impacts of changing over from private to public transit ownership. Under private industry, employees were largely unionized. Understandably, they became concerned over protecting the labor rights that had been won from private owners. Section 13(c) provided this protection.

While the language sounds harmless, 13(c) has been blamed for placing management at a disadvantage in contract negotiation. Many of today's highly restrictive work rules (e.g., prohibitions of part-time employment, guaranteed pay clauses) have frequently been linked to Section 13(c). The growth in transit wages, which has been among the highest in both private and public sector employment, has likewise been attributed to 13(c). These points are examined more closely below.

Constraints on Negotiation

Two positions characterize the debate over federal labor protection provisions. The harsher view holds that 13(c) has been a decisive factor in constraining management's ability to negotiate cost-effective contract packages. Alan Altshuler, testifying before the Congressional Subcommittee on Public Works and Transportation in June 1981, summarizes this position:

> Federal policy has tipped the balance in labor-management relations sharply to the advantage of labor. It has done so in two ways: by adding to the resource base available for generous settlements, and by giving virtual carte blanche to utilize federal grants as bargaining instruments. Peculiarly, national policy since 1964 has been premised on the idea that federal aid is a threat to organized labor. In fact, with rare exceptions, precisely the reverse is true . . . [The Department of Labor] has required local operators and transit labor unions to agree on the facts and nature of any protection or compensation to be provided. The result has been to give organized labor a virtual veto over federal transit grants and to permit the use of 13(c) in quite surprising ways.

Some have argued that the mere threat of actions by labor unions under this provision have been sufficient to win concessions by management fearful of prolonged strikes (Ortner and Wachs, 1979).

The more moderate view contends that the effects of 13(c) have been exaggerated, noting that few cases of federal intervention in local contract negotiation can be documented. Rather, it is argued that cost increases attributed to Section 13(c) are usually the result of local political events. Gomez Ibañez (1976, p. 14) comments:

> Management efforts to negotiate productivity improvement have also been discouraged, probably unnecessarily, by Section 13(c) . . . Their concern appears exaggerated, however, because few grants affect working conditions and compensation adversely, and Section 13(c) prohibits only changes imposed unilaterally by management and not those negotiated through the normal collective bargaining process. More importantly, Section 13(c) is only one of many factors, including the internal tensions of the unions or the local political climate, that determine the relative bargaining strength of labor and management.

From his analysis of some thirty transit properties, Perry (1979, p. 46) adds:

> Any significant adverse impacts of Section 13(c) appear to be more of a potential, rather than a real problem. No instances were encountered in our sample in which protections guaranteed by a 13(c) agreement were granted an employee because of an adverse impact of federal funding.

Restrictive Work Rules

The "restrictive work rules" most affecting public transit operating costs are those defining shift lengths, guaranteed time, spread time penalties, overtime compensation, and hiring of part-time employees to serve peak-period demand. Restrictions are also typically placed on duty-substitution, i.e., prohibiting drivers from performing other tasks such as maintenance during off-peak periods.

Empirical evidence suggests that the cost impacts of work rules have been substantial. The effects of penalizing labor provisions are particularly important because transit is a highly labor-intensive industry. San Diego Transit's 1967 reduction in maximum split shift period from 13 to 11.5 hours was estimated to have increased operating costs by 15%. Similarly, total labor cost increased an estimated 21.5% from a reduction of maximum spread time from 12.5 to 11 hours in Toronto (Meyer and Gomez-Ibañez, 1977). In that the marginal cost of providing peak-only service has been found to be as much as 2.5 times that of all-day service, work rules that effectively prolong the peak period can be extremely costly (Oram, 1979). One recent study, for example, found the average cost of peak-period services to be upwards of 50% as great as the cost for off-peak services for three California transit operators, largely because of the impacts of restrictive work rules (Cervero, 1981).

Although the precise cost impact of Section 13(c) and comparable state legislation is indeterminable, most would concede that it has materially undermined management's bargaining powers. In that labor accounts for roughly three-quarters of transit's total costs and 60% of its cost increase since 1970 (Lave, 1981), clearly 13(c) has had a significant, though immeasurable, fiscal impact. Recent events may offer some relief to crippled transit budgets. In Seattle, "tripper" drivers operating primarily during peak hours are now permitted. Seattle has estimated that part-time help could save about 9% of its transit labor costs (Public Technology, Inc., 1978). Other areas, including Bal-

timore, Washington D.C., Miami, Minneapolis, Portland, and Orange County, California, have recently followed Seattle's lead. Moreover, some states have passed legislation mandating that part-time labor be contractually available to transit operators as a precondition to financial assistance. California's Senate Bill 620, for example, requires all operators receiving state assistance to have part-time labor provisions.

Changes in Transit Employees' Wage Levels

Public transit employees have historically enjoyed wage increases as high or higher than most other private and public employees. From 1950 to 1977, transit wages increased 70% in constant dollars. During the same period, by comparison, wages for city employees increased 68%, while private-sector manufacturing wages rose 56% (USDOT-UMTA, 1979, p. 32). Some have attributed at least part of these increases to the negotiating advantages granted transit unions under Section 13(c).

More recently, transit workers' wages have generally increased in line with those of other blue-collar workers. Between 1973 to 1977, transit employee wages were found to increase at an average annual rate of 5.8%. This increase appears reasonable when compared to that received by teachers (5.2%), firemen (7.7%), policemen (6.5%), and electrical power workers (7.1%) (OMB-UMTA, 1979). Over the past seven years or so, transit wages have increased at a fairly constant and slow rate (Table 7.2). Given the current economic climate, then, it is quite possible that even greater concessions on the part of labor might be in store and that Section 13(c)'s future influences will be fairly inconsequential.

Summary: Effects of Labor Protection Regulations

Federal and state protection of transit labor has unquestionably driven up the cost of doing transit business. By how much can only be speculated. In general, there is little consensus on the actual magnitude of Section 13(c)'s impact.

The influences of 13(c) and its state-level counterparts are indirect, affecting the relative strengths of labor and management in contract negotiations. In addition to straight-time wage increases, overtime and premium pay provisions are also usually protected by 13(c). Still, wage increases for transit workers as a group have generally not exceeded increases in other sectors of the economy by significant amounts, particularly over the past eight or so years. Nevertheless, transit workers remain among the highest-paid public employees, and have been able to negotiate cost-of-living adjustments to wages and attractive pension packages in spite of declining industry productivity.

The inability to actually measure the impact of labor protection regulations limits the usefulness of this cost responsibility argument to a cost-sharing program. Moreover, it would be impossible to decipher the effects of 13(c) vis-à-vis comparable state programs, though the federal program is generally conceded to be more influential and probably the catalyst behind companion state legislation. It might be noted that Section 13(c) is not the only federal labor protection regulation affecting transit labor costs. The Davis-Bacon Act, which requires that the highest prevailing union wage levels be paid on all federally funded construction projects, has also been cited as a cost escalator. In particular, the wage bill for some of the new Section-3-funded rapid-rail projects, such as in Atlanta and Washington, D.C., was unquestionably

Table 7.2

Nationwide Wage and Fringe Benefit Increases
1973-1980

Year	Total Transit Employees	Avg. Annual Wages and Fringe Benefits Current $	Avg. Annual Wages and Fringe Benefits Constant 1972 $*	Percent Increase From Previous Year (Constant $)
1973	140,700	13,729	12,976	
1974	153,100	16,116	13,891	7.05
1975	159,800	17,831	14,023	0.95
1976	162,950	18,934	14,160	0.98
1977	162,510	20,678	14,593	3.05
1978	165,400	22,398	14,731	0.95
1979	178,750	23,023	15,285	3.76
1980	189,300	23,442	15,639	2.31

Source: APTA, 1981.

*Wages adjusted by yearly consumer price index, from U.S. Department of Commerce, 1981, p. 478.

inflated because of the Davis-Bacon provision. But the influence of this act has been largely confined to a handful of rail cities, and thus has unlikely had as pervasive an impact as 13(c).

Arguments are currently being made to relax the federal position on labor protection to allow management greater latitude in negotiating cost-savings and efficiency innovations. Recent concessions on the part of labor, and state legislation allowing for the hiring of part-time drivers, are particularly promising signs of the future.

It is instructive to draw parallels between the transit industry's fiscal problems and the current dilemma facing the American automobile industry and the United Auto Workers. Declining productivity and a reluctance to innovate have placed American automakers at a competitive disadvantage with respect to their foreign competitors. Detroit is now finding it necessary to economize and eliminate inefficiencies throughout the production process. Even two years ago, suggestions that auto workers might have to choose between giving up already-won wage gains or losing their jobs altogether would have been skeptically received. Today, that is the choice many are facing. If public transit employees are to avoid a similar fate, they must begin to act in concert with transit management to bring about the kind of innovative work rule and efficiency reforms that can help place the industry on sound financial footing.

7.2.2. Social Service Regulations

Federal legislation mandating barrier-free accessibility and off-peak fare discounts for elderly and handicapped persons have been similarly cited for their adverse fiscal effects. Equal accessibility requirements place substantial capital cost burdens on local operators, while special pricing mandates suppress farebox income.

The statutory framework for the nation's program on elderly and handicapped transportation can be found in five legislative authorities:

1. Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination against handicapped persons in any program receiving federal funds;

2. Section 16(a) of the Urban Mass Transportation Act of 1964, which establishes a national policy holding that elderly and handicapped persons have the same right as others to utilize mass transit facilities and services and mandates special efforts to bring t is policy about;

3. Section 16(b) of the amended Urban Mass Transportation Act of 1964, which requires that public transit vehicles, including buses, be accessible to all passengers, including senior citizens and those with physical disabilities.

4. Section 5(m) of the amended 1964 Act, which prevents transit fares charged to elderly and handicapped passengers during off-peak periods from exceeding one-half the general peak-period fare; and

5. Section 165(b) of the Federal Aid Highway Act of 1973, which directs the Secretary of Transportation to require full accessibility as a condition of approval for other transportation projects or programs.

There are few states or localities that have a set of laws comparable to those above, but almost all jurisdictions have transportation provisions within their human-services programs which support the spirit of these federal requirements.

Empirical evidence on the fiscal impacts of these requirements is unequivocal. A study by the Congressional Budget Office (1979, p. 46) estimated that implementation of the Department of Transportation's "full accessibility" regulation for buses would cost $4.8 billion through the remainder of this century. A recent study of the St. Louis and San Diego experience with wheelchair lifts concluded that maintenance plus operation costs of their services increased by $.053 per mile, or about $1,800 per bus annually (Booz, Allen, and Hamilton, 1978).[2] For rapid rail systems, the estimated costs of modifying

---

[2]This estimate excludes costs for training bus drivers in special handicapped services, for additional liability insurance, and for possible fleet expansion to replace lost capacity in lift-equipped buses.

stations and vehicles to accommodate wheelchair passengers has been placed at $1.5-1.7 billion in 1978 dollars, most of which would go for installing elevators in subway stations (U.S. DOT, 1978). CBO projected the ultimate cost of providing full accessibility to handicapped passengers to be as high as $38 per trip. In comparison, demand-responsive taxis would serve about 3.5 times the number of severely disabled persons, at a cost of $7.62 per trip.

Although the Section 5(m) requirement effects revenue receipts rather than costs, it has still materially hurt the industry's financial health. In 1980, approximately one-half billion, or roughly 10%, of total transit riders were elderly (Pucher et al., 1981). Assuming that 75% of elderly people take advantage of reduced fare during off-peak periods, the half-fare requirements could cost local operators some $50 million annually.[3] Others have put the cost of the Section 5(m) program as high as $200 million per annum (Meyer and Gomez-Ibañez, 1981). One recent study (OMB-UMTA, 1979) concludes that 7.4% of operators' Section 5 funds were used to provide special services and half-fares to elderly and handicapped passengers. This represents $81.4 million of the 1980 Section 5 allocation.

In sum, special elderly and handicapped requirements have had an appreciable impact on the transit industry's fiscal health, though probably less so than labor protection mandates. The federal government, by virtue of the regulations it has promulgated for the benefit of the elderly and handicapped, is largely responsible for at least $80 million of the transit industry's annual deficits, and probably significantly more. Washington has taken it upon itself to promote improved transportation for the elderly and handicapped as a national goal, and must bear some responsibility for the attendant cost. Though the current Administration has sought to loosen these requirements (e.g. by softening the Section 16(b) provisions and eliminating the "Transbus" program[4]), the cost effects of past policies still linger.

---

[3]This estimate is based on the following: Assuming 75% of the 513.5 million elderly passengers travel during the off peak, approximately 385 million passengers paid half-fares in 1980. This reduced total revenue paid by elderly passengers by $72 million below what they would otherwise have paid. Assuming a fare elasticity of -.35 for elderly passengers (Mayworm et al., 1980, p. 45), removal of the half-fare provision would reduce elderly patronage by 135 million. The net foregone revenues in 1980 can be placed at approximately $47 million annually. This represents about 0.8% of the transit industry's 1980 total income.

[4]The Transbus program attempted to replace the American transit fleet with buses characterized by low floors and wide doors for easier access by wheelchair users. It has been estimated that the program would have increased the capital cost for buses by $600 million annually (Meyer and Gomez-Ibañez, 1981).

7.2.3. Other Government Requirements

In the name of efficiency, a number of administrative requirements have been placed upon local transit operators over the past several decades. Most aim to promote better day-to-day management of operations, capital investment programming, the citizen involvement process, and both short- and long-range planning.

At the federal level, Section 4(a) of the amended 1964 UMT Act and the 1975 joint FHWA/UMTA regulations require local operators to participate cooperatively in a comprehensive planning process and to prepare specific planning and implementation documents as a precondition to the receipt of federal aid. Other federal requirements, such as the national reporting of transit financial and operating data under the Section 15 program, have likewise served to increase administrative expenses. Comparable programs also exist in many states, such as California's Transportation Development Act (TDA), which requires operators to submit a yearly performance audit assessing the efficiency of their systems. These programs, however, generally aim to increase productivity and reduce costs, at least over the long run, and in theory should offset the expenses related to their implementation.

Still, the cost impacts of these requirements have not been inconsequential. Recipients of UMTA's Section 5 grants report that approximately 7.5% of the monies are used for implementing management, marketing, and administrative training programs (OMB-UMTA, 1979). In 1980, general administration accounted for about 18% of nationwide transit expenses (APTA, 1981). Since the late sixties, administrative employees have accounted for roughly 10% of the industry's inflation-adjusted cost increase (Sale and Green, 1979). The growing cost burden of administrative overhead is also quite evident at the operator level, where in the case of AC Transit serving the Oakland, California, area administrative costs rose from 6% to 16% of total expenses between 1974 and 1980.

While administrative requirements have undeniably had a hand in transit's cost spiral, their intent is to enhance rather than degrade the industry's fiscal condition. This doesn't diminish the fact, however, that federal and state governments have been lead players in assembling a fairly expensive transit administrative apparatus.

7.2.4 Closing Remarks on the Cost Impacts of Transit Programs

All governments must shoulder some of the responsibility for public transit's recent cost increases--efforts to protect transit labor and ensure equal mobility opportunities for all, while well-intended, have imposed significant financial burdens on local operators. Clearly, these actions carry with them some accountability for the industry's current fiscal problems.

It should be mentioned in closing that government cost responsibilities are not solely limited to formal regulations and legislation. Local political bodies, for example, have more indirectly contributed to current fiscal problems by steadfastly resisting fare increases while at the same time expanding often highly unprofitable services in order to

spread transit's political base. Elected officials are usually far more concerned with the delivery of service improvements to their constituents than with the ultimate financial stability of their transit districts (Ortner and Wachs, 1979; Altshuler, 1979). The fiscal effects of irresponsible fare and service policies are probably far more severe than the formal regulations discussed in this chapter, but again there is no clear cut way to measure by exactly how much.

Many of the labor protection and social service policies which currently exist have come under close scrutiny recently as government priorities shift toward fiscal austerity. Handicapped access regulations have already been relaxed somewhat, and most assuredly we'll see an increase in the hiring of part-time employees and the usage of ongoing route-by-route performance evaluations in the very near future. Such changes are essential if the American transit industry is to be placed on steady financial footing and reverse a decade of productivity declines.

In terms of possible input into a cost-sharing program for transit, this analysis of government cost responsibilities does not yield any readily operable dividends. This should not be surprising in that the complexity of the problem precludes precise measurement of who is responsible for what. Perhaps it's less instructive to attempt to assign specific levels of cost responsibility to each level of government than to conclude that all three collectively have had a hand in transit's current fiscal woes and should take appropriate corrective actions accordingly.

7.3 Cost and Performance Impacts of Government Subsidy Programs: Quantitative Assessment

This section attempts to statistically evaluate the historical effects of transit subsidies on the fiscal and operating performance of a number of transit properties in the state of California. This quantitative analysis is intended to complement the more qualitative one presented in the previous section, and to provide some new insights into how operating subsidies have historically influenced cost trends, management practices, and productivity. It is found that, on the whole, operating subsidies exert a negative influence on performance, primarily due to local rather than federal or state aid, and that they seem to more directly impact costs than productivity. It is argued that knowledge of subsidies' impacts on transit performance should play a role in shaping any future cost-sharing program.

7.3.1 Measuring Transit Performance

The impacts of transit subsidies have historically been gauged using what are called "performance indicators." In general, they measure how efficiently services are being provided, and how well agency goals, such as ridership maximization, are being met. Fielding *et al.* (1978) have divided transit performance indicators into three categories. Efficiency indicators measure how well resource inputs, e.g. labor and capital, are used in producing service outputs. Such measures include Vehicle Hours per Employee and Cost per Vehicle Hour. Effectiveness

indicators reflect system success in attaining service objectives--e.g., Passengers per Service Area Population or Passengers per Vehicle Hour. Finally, overall indicators measure expense per consumed output unit, for example Operating Cost per Passenger.

In general, most studies which have used these indicators to statistically gauge the effects of transit subsidies on performance have produced somewhat conflicting results. One study, by Barnum and Gleason (1979), found that government subsidies increased operating expenses by only 9% for 29 U.S. transit agencies over the 1975-76 period. Their regression analysis also revealed that subsidies increased ridership by 93% over what it would have been without them. The lack of a substantial time-series data base and truly random sample for tracing subsidy impacts, however, casts some doubt on the numerical accuracy of this research.[4]

Another recent study used international data in exploring the performance impacts of transit subsidies. In analyzing 18 countries including the United States, Bly et al. (1980) found that a 10% increase in subsidy resulted in a 4-6% increase in cost, a 5-7% reduction in fares, and a 2-3% rise in ridership, holding other factors constant.[5] The authors attributed part of the cost increase to a reduction in output per employee, which was found to decrease 1.5-3%. They conclude that "most of any extra subsidy finds its way into lower fares and an improved level of service, but with some leakage into higher manning levels and higher unit cost" (p. 326). Because of the grossly aggregate level of analysis, however, these figures should again not be considered reflective of the precise impacts of subsidies.

More recently, LaMare (1981) more recently used a proxy performance indicator, "Per Passenger Operating Subsidy", to examine the effects of the local-fund matching requirements of California's Transportation Development Act. Her study of 42 transit properties revealed a significant relationship between system efficiency and levels of local support. Per passenger subsidy was found to be significantly less for those properties receiving over one-third of their costs from local sources than those properties receiving less than a one-third share. Again, some caution must be exercised in interpreting these findings due to the use of cross-sectional data as well as non-parametric statistics.

Other evidence on the impacts of transit subsidies has been largely anecdotal. Many U.S. researchers have cited national statistics showing

---

[4]The authors caution that because a truly random sample of operators was not gathered, the 93% ridership figure should be considered tentative and certainly not indicative of the U.S. transit industry as a whole. In addition, they did not claim to establish a causal link between subsidies and increased patronage--they merely conclude that the two are associated with one another.

[5]Changes in cost were measured on a per-vehicle-kilometer and per-passenger-trip basis.

that operating expenses increased 73% between 1975 and 1980, while government assistance rose 157% during the same period in implicating subsidies (APTA, 1981). Ortner and Wachs (1979, p. 20), in tabulating revenue and cost data for four American transit systems, concluded that subsidies and regulations "in combination may be among the most important causes of growing inefficiency and rising costs." Jones (1979) has further speculated that the federal operating aid formula, based on population rather than need or transit market potential, induces inefficient transit services.

In sum, our insights into the impacts of transit subsidies remains partial. Although American transit ridership has increased only at a glacial pace over the past decade while deficits have quadrupled, there has, surprisingly, been very little hard empirical evidence that links government subsidies to the industry's decline.

7.3.2 Subsidy Impact Study: Data and Methodology

In recognition of some of the shortcomings of previous studies and in attempt to augment what we currently know about the effects of subsidies, a longitudinal analysis was undertaken to evaluate the impacts of California's transit assistance program. The analysis was limited to California transit properties partly to control for the effects of varying state-level subsidy programs and also because the most uniform and extensive time series data base was available from the state of California.

Financial and operating data compiled for seventeen California transit properties spanning the years 1971 to 1981 comprised the key inputs to the analysis.[6] These seventeen properties represent the California transit industry well in that they served over 98% of the State's public transit trips in 1980. In total, 155 data observations were gathered for the analysis. Annual reports from the properties and the California Transportation Development Act (TDA), as well as UMTA's Section 15 reports, provided the primary data inputs.

Because of the lack of comprehensive time-series for any one transit property or the industry as a whole, it was necessary to pool together historical data from all seventeen operators. This approach

---

[6]The seventeen California transit properties were: AC Transit (Oakland); Golden Gate Bridge and Transit District (Marin County); Long Beach Public Transit; Omnitrans (San Bernadino); Orange County Transit District; SamTrans (San Mateo County); Sacramento Regional Transit District; San Diego Transit Corporation; San Francisco Municipal Railway; Santa Clara County Transit; Santa Cruz Metropolitan Transit District; Santa Monica Municipal Transit; Santa Rosa Transit; Southern California Rapid Transit District (Los Angeles); South Coast Area Transit; Stockton Metropolitan Transit District; and Vallejo Transit Lines. These seventeen operators effectively represent the universe of California transit operators (at least in terms of total ridership), so random representation was not a concern.

generated a pooled time-series/cross-sectional data base for tracking statistical trends. This approach was considered an improvement over past studies which, due to the paucity of data, have generally opted for a static analysis--restricting the study time frame to one, or at most, two years. Since the influence of subsidies on performance is inherently a longitudinal phenomenon, it was felt that a pooled time-series/cross-sectional analysis could better capture cause-effect relationships. Still, pooling can sometimes present possible model specification problems. In general, cross-section parameters must remain relatively stable over time if pooling is to provide consistent, unbiased parameter estimates. Accordingly, it is important to choose non-fluctuating time-series explanatory variables in the model--i.e., independent variables which do not oscillate significantly as a function of time (see Pindyck and Rubinfeld, 1981, pp. 252-253). Generally, explanatory variables within each cross-section were found to be sufficiently stable to justify the pooling operation.

The following performance indicators, which served as the dependent variables of the analysis, were gathered from each property for the eleven-year time series:

Efficiency Indicators-

- Operating Cost/Vehicle Mile;
- Operating Cost/Vehicle Hour;
- Vehicle Miles/Employee;
- Vehicle Hours/Employee;
- Revenue Miles/Vehicle;
- Revenue Hours/Vehicle;
- Passengers/Employee.

Effectiveness Indicators-

- Passengers/Vehicle Mile;
- Passengers/Vehicle Hour;
- Passengers/Vehicle.

Overall Indicators-

- Operating Cost/Passenger.

Multiple regression analysis was relied upon to test the effects of operating assistance on performance. Because the dependent variables represent ratio expressions (e.g., Operating Cost/Hour), independent variables were also expressed as ratios (e.g, Operating Assistance/Operating Cost). This indicates how performance indices vary

as a function of relative subsidy levels. Additionally, the performance indicators were regressed on the total values of the subsidy variables, to measure the response of system performance to unit changes in operating assistance. In the analysis presented below, the former type of models are referred to as Ratio Models while the latter ones are called Absolute Models. Below, the best-fitting and most intuitively reasonable models for each performance indicator are presented.

7.3.3 Study Results

Results of the regression analysis generally support the view that public operating assistance significantly impacts performance and productivity, at least in the State of California. The indicators which were found to be most highly correlated with the degree of subsidization were Cost/Mile, Cost/Hour, Miles/Employee and Cost/Passenger. By comparison, other indicators appeared to be only marginally affected by the level or ratio of subsidy. In general, subidies seem to have affected cost trends more than productivity or ridership levels. Moreover, the effects of local aid seemed generally to be about twice as great as federal aid, while state subsidies were largely inconsequential.

The results are detailed in the following equations where subsidy is measured in both absolute and relative terms. Under each model, the correlations coefficient (R^2) reflects the amount of variation in the dependent variable explained by the independent variables. Standardized Beta Weights (SBW) reflect the relative explanatory power of the independent variables, removing the effects of different measurement units, thus indicating from which levels of government subsidies have been most influential. In some of the models, the variable "Year" is also used to partial out the effects of secular trends, e.g., inflation and growth rates. In parentheses below the parameter coefficients are the prob-values of the coefficients, indicating the statistical significance level of the parameter estimates.

In some of the models, variables were transformed non-linearly to better fit the data. Also, lagged versions of some independent variables, denoted by the subscript (t-1), were used to improve the fit and correct for serial correlation problems. Finally, the variables included in the analysis, and their mnemonics, are defined below:

- Op. Cost = Total annual system operating cost, excluding capital costs, in dollars.

- Local Assist. = Annual local operating assistance, in dollars.

- State Assist. = Annual state operating assistance, in dollars; in California, this is primarily from SB325 Transportation Funds.

- Fed. Assist. = Annual Federal Operating Assistance (Section 5 of the 1964 UMT Act, as amended), in dollars.

- Total Assist. = (Local Assist + State Assist. + Fed. Assist.), in dollars.

- Yr. = Year of the observation.

Equations

FISCAL EFFICIENCY INDICATORS

1. Operating Cost/Vehicle Mile

Ratio Model: Cost/Mile = -14.77+.22Yr -1.62 Fed. Assist./Op. Cost
(.0001) (.0001) (.0062)

R^2 = .42

SBW: Yr = .79, Fed. Assist./Op. Cost = -.31

Absolute Model: Cost/Mile = -10.78+0.13Yr+0.50(log(Total Assist)$_{t-1}$
(.0001)(.0001)(.0001)

R^2 = .65

SBW: Yr = .51, (log(Total Assist.)$_{t-1}$) = .50

Cost/Mile has tended to increase with time and also with the level of total operating assistance during the prior year. This suggests that removing secular effects, increases in total subsidies result in higher-unit costs. Interestingly, however, cost per mile does not seem to rise with the relative level of federal assistance, suggesting that for most of these seventeen properties, federal support has not led to inefficiencies (when measured in cost/mile).

2. Operating Cost/Vehicle Hour

Ratio Model: Cost/Hour = -186.58+2.70Yr+5.56Total Assist./Pass.
(.0001) (.0001)(.0034)

R^2 = .43

SBW: Yr = .50, Total Assist./Passenger = .30

Absolute Model: Cost/Hour = -179.74+2.26Yr+6.50(log(Total Assist)$_{t-1}$
(.0001)(.0001)(.0001)

R^2 = .51

SBW: Yr = .48, (log(Total Assist)$_{t-1}$) = .40

Cost/Hour has increased both as a linear function of time, and as a logarithmic function of total assistance (lagged by one year) in the absolute model. The significance of the lagged variable suggests there is a delayed reponse in higher unit costs to total subsidies. In the ratio model, assistance per passenger also exerts a positive influence on Cost/Hour. The coefficient suggests that a dollar increase in the average amount of assistance per passenger increases the costs of

transit operations per hour by over $5.50, again controlling for secular influences. However, most of the variation in Cost/Hour can be explained by the simple passage of time as opposed to changes in subsidy level.

LABOR UTILIZATION EFFICIENCY INDICATORS

3. Vehicle Miles/Employee

Ratio Model: Miles/Employee = $\underset{(.0001)}{5.07} \exp\left[\underset{(.0001)}{-.39}\,\frac{\text{Local Assist.}}{\text{Op. Cost}} + \underset{(.0027)}{.61}\,\frac{\text{Fed. Assist.}}{\text{Op. Cost}}\right]$

$R^2 = .37$

SBW: Local Assist./Op. Cost = -.52, Fed. Assist./Op.Cost = .34

Absolute Model: Miles/Employee = $\underset{(.0001)}{11.28} \exp(\underset{(.08)}{2.09}\text{Yr} + \underset{(.0001)}{.00016}\text{Fed Assist.} - \underset{(.0001)}{.00018}\text{Local Assist.})$

$R^2 = .70$

SBW: YR = .15, Fed. Assist. = .72, Local Assist. = -1.29

These equations reveal that vehicle miles/employee have generally declined in response to increases in local assistance, while increasing as a function of federal assistance. The relationships appear to follow an exponential function-- miles/employee grow at an increasing rate with federal assistance and decline at a decreasing rate with local assistance. The sign on the federal assistance variable in both models, however, seems counterintuitive to our *a priori* expectations. Beta Weights in both models indicate that the negative influence of local assistance is much stronger than the positive effect of federal assistance, though. This suggests that labor productivity is more responsive to local than to federal subsidies, and that local support has a dampening influence, while the impact of federal support seems the exact opposite. It can be surmised that labor policies are more sensitive to local level fiscal decisions, and that federal assistance has more of a residual influence.

4. Vehicle Hours/Employee

Ratio Model: Hours/Employee = $\underset{(.0687)}{282.68} - \underset{(.1098)}{3.24}\text{Yr} - \underset{(.15)}{21.67}\,\frac{\text{Total Assist.}}{\text{Op. Cost}}$

$R^2 = .20$

SBW: Yr. = -.23, $\frac{\text{Total Assist.}}{\text{Op. Cost}}$ = -.21

Absolute Model: Hours/Employee = $\underset{(.02)}{394.79} - \underset{(.03)}{4.84}\text{Yr} -$

$\underset{(.24)}{.000069}\text{Fed.Assist.} - \underset{(.16)}{.00046}\text{Local Assist.}$

$R^2 = .16$

SBW: Yr = -.35, Fed. Assist. = .32, Local Assist. = -.35

Hours per employee, as a labor productivity index, does not appear to be strongly influenced by subsidy levels. In the ratio model, the higher the subsidy ratio (i.e., Total Assist./Op. Cost), the fewer hours transit vehicles are in service per employee. In general, a totally subsidized service could be expected to average about 22 fewer hours of transit service per employee per year than a nonsubsidized service. In the absolute model, local assistance again has a negative effect on performance, mirroring the effect revealed in the equations for miles per employee.

VEHICLE UTILIZATION EFFICIENCY INDICATORS

5. Miles/Vehicle

Ratio Model: Miles/Vehicle = $\underset{(.0001)}{295.86} + \underset{(.009)}{66.68}\left[\left(\frac{\text{Total Assist.}}{\text{Op.Cost}}\right)_{t-1}\right]$

$R^2 = .14$

Absolute Model: Miles/Vehicle = $\underset{(.26)}{273.24} + \underset{(.003)}{38.53}\left[\log(\text{Total Assist})_{t-1}\right] +$

$\underset{(.014)}{.00026}$ Fed.Assist. $-\underset{(.0001)}{.00032}$ Local Assist.

$R^2 = .31$

SBW: Yr = -.05, $(\log(\text{Total Assist.})_{t-1})$ = .46, Fed. Assist. = .48, Local Assist. = -.97

The subsidy ratio (in the previous year) seems to increase the revenue miles of service per vehicle for the absolute model. Vehicle utilization, like labor productivity, appears to be positively influenced by federal subsidies, and negatively influenced by local assistance. The negative effects of local subsidy dollars on vehicle utilization, however, have been about twice as great as the positive effects of federal assistance.

6. Hours/Vehicle

Ratio Model: Hours/Vehicle = $\underset{(.09)}{476.5} - \underset{(.18)}{5.11}\text{Yr} - \underset{(.07)}{68.04}\,\frac{\text{Total Assist.}}{\text{Op.Cost}}$

$R^2 = .12$

SBW: Yr. = -.18, $\frac{\text{Total Assist.}}{\text{Op.Cost}}$ = -.24

Hours per vehicle do not seem to be strongly related to the levels of operating assistance. This equation suggests that hours of service per vehicle have generally declined with subsidy ratios over time, though the association has been weak. A totally subsidized service could be expected to average nearly 500 fewer hours of revenue service per vehicle, *ceteris paribus*, than a comparable nonsubsidized service.

7. Passengers/Vehicle Mile

Ratio Model: Pass./Mile = 2.38 − 0.48 $\frac{\text{Total Assist}}{\text{Passenger}}$
(.0001)(.0179)

$r^2 = .11$

Absolute Model: Pass./Mile = 1.868 + .0000016 (Local Assist)$_{t-1}$
(.0001) (.0001)

$r^2 = .18$

Passengers per mile exhibits a statistically significant relationship with the amount of subsidy per passenger and the level of local assistance (lagged by one year). Every million dollars of local assistance in California generally increased the number of passengers carried per revenue mile of service by 1.6 riders over the period of analysis.

8. Passengers/Vehicle Hour

Ratio Model: Passengers/Hour = 34.13−9.60 $\frac{\text{Total Assist.}}{\text{Op.Cost}}$
(.0001)(.06)

$r^2 = .06$

Absolute Model: Passengers/Hour = 14.52 + .000025 Total Assist.
(.71) (.0001)

$r^2 = .39$

Total assistance has exerted a positive influence on passengers per hour in the absolute model, but a negative influence as a proportion of systems cost--i.e., service usage has grown with total subsidy levels, but declined as a function of relative subsidization. The fit of the ratio model, it should be cautioned, is quite poor. In general, the absolute model suggests that every $40,000 in operating subsidies increased the average number of systemwide passengers carried per hour by one.

9. Passengers/Vehicle

Ratio Model: Pass./Vehicle = −1403.88+29.24Yr−217.07 $\frac{\text{Total Assist.}}{\text{Op.Cost}}$
(.127) (.0185)(.0008)

$R^2 = .16$

SBW: Yr = .30, $\frac{\text{Total Assist.}}{\text{Op.Cost}}$ = .43

Absolute Model: Pass./Vehicle = −99.54+163.59(log(Total Assist)$_{t-1}$)
(.55) (.0001)

$R^2 = .25$

Passengers per vehicle generally mirrors the relationships found for passengers per hour, though the response to subsidies appears to be lagged. According to the Ratio Model, a totally subsidized operation

could be expected to average over 200 fewer passengers per vehicle annually than a comparable nonsubsidized one. Thus, for most California transit properties, relative passenger levels have dropped with increases in the subsidy rate, controlling for secular trends.

10. Passengers/Employee

Ratio Model: Pass./Emp. $= \underset{(.0001)}{334.92} - \underset{(.23)}{105.82}\,\frac{\text{Fed.Assist.}}{\text{Op.Cost}} + \underset{(.19)}{80.72}\,\frac{\text{State Assist.}}{\text{Op.Cost}}$

$R^2 = .09$

SBW: $\frac{\text{Fed.Assist.}}{\text{Op.Cost}} = -.16$, State $\frac{\text{Assist.}}{\text{Op.Cost}} = .17$

Absolute Model: Pass/Emp. $= \underset{(.0001)}{308.49} + \underset{(.04)}{.00018}\,\text{Fed.Assist.} + \underset{(.05)}{.0006}\,\text{State Assist.}$

$R^2 = .18$

SBW: Fed.Assist. = .27, State Assist. = .25

Passengers per Employee does not appear to be strongly related either to the subsidy ratio or to the absolute level of subsidy. The contradictory signs on the federal assistance variable and low R^2 values suggest that some random error is being measured. State assistance does seem to have a significant though modest positive impact on ridership under the Absolute Model. A very general inference would be that every million dollars in California operating assistance has increased the annual number of passengers per employee by about 600.

OVERALL INDICATOR

11. Operating Cost/Passenger

Ratio Model: Cost/Pass. $= \underset{(.001)}{-4.50} + \underset{(.001)}{5.11}\,Yr + \underset{(.001)}{3.99}\,\frac{\text{Local Assist.}}{\text{Op.Cost}}$

$R^2 = .30$

SBW: Yr = .45, $\frac{\text{Local Assist.}}{\text{Op.Cost}} = .35$

Absolute Model: Cost/Pass. $= \underset{(.081)}{-4.79} + \underset{(.005)}{.07}\,Yr + \underset{(.013)}{.11}\,(\log(\text{Total Assist.})_{t-1})$

$R^2 = .23$

SBW: Yr = .41, $(\log(\text{Total Assist.})_{t-1}) = .17$

Cost per passenger has increased over the period of analysis, and in response to increases in total assistance and the local assistance ratio. Removing secular effects, operating subsidies clearly seem to increase the relative costs of consumed transit services.

7.3.4. Concluding Remarks on the Cost and Performance Impacts of Transit Subsidies

Current plans to eliminate federal transit operating assistance are based on the belief that subsidies encourage inefficiencies, cost increases, and lax management. Surprisingly, however, there has been very little statistical analysis to date that clearly demonstrates the effects of subsidies on performance. Most studies to date have been cross-sectional and suffer from aggregation problems. Even with a decade of time series data, the analysis in this chapter was unable to demonstrate unequivocally that subsidies have induced major cost increases and performance declines. Indeed, when the effects of trends were removed from the analysis, subsidies generally seemed to have only a modest impact on both fiscal and operating performance of California transit properties.

This empirical analysis did yield several interesting findings, however. First, operating assistance seems to have had the greatest impact on fiscal performance measures, i.e., cost/mile, cost/hour, and cost/passenger. The nature of the relationship has not been linear, and in certain instances performance indicators appear to follow a lagged response to changes in subsidy policy. By comparison, indicators of service efficiency and productivity (e.g., miles/vehicle) do not appear strongly related to operating assistance levels, although generally negative statistically significant relationships were captured.

Secondly, the source of government financing seems to have been an important determinant of performance impacts. Local operating assistance seemed to consistently exert a negative influence on measures of system performance. By comparison, federal aid seemed to be related to efficiency and effectiveness indices in a positive fashion. Also, the effect of local aid seemed generally to be twice as great as federal aid. It can only be speculated why this might be the case, and the possibility of some statistical aberration certainly cannot be summarily dismissed. One possible explanation is that transit managers and boards are more sensitive to local budgetary policy, and generally design their service programs and operating practices around them. It is also plausible that the availability of fairly routine levels of annual local support through the general funds and dedicated sources has had a depressing effect on performance in that there is less incentive for managers to drive hard bargains at the labor negotiation table. Federal assistance, on the other hand, may have been perceived as less of a "sure thing" (due to federal maintenance of effort stipulations, etc.), and that the incremental effect of this non-local support was to strengthen performance and perhaps partly compensate for some of the locally-induced productivity losses.

It bears repeating that the above is only conjectural. Perhaps all that can be safely said from this analysis is that there remains some uncertainty regarding the influence of operating assistance, but on the whole, the impacts seem to be modestly negative. In general, local subsidies were found to be most onerous, with the effects of federal and state aid fairly modest by comparison. Though these relationships are clealy more associative than causal, they still highlight the unintended

but harmful effects of subsidizing transit services.

From a cost-sharing policy perspective, it might be added, the results of this chapter suggest that the role of governments in financing transit services should probably be scaled down, in particular the role of local government assistance. In contrast, there appears to be less empirical justification, at least based upon this analysis, to reduce federal and state operating assistance from a subsidy-impact perspective. As better data become available, the challenge rests with the transportation reseach community to closely monitor the influences of operating subsidies on transit performance and marshall the evidence so as to help shape future policies on cost-sharing.

Chapter Eight
Possible Futures In Transit Financing

8.1 Introduction

This chapter looks at several possible futures for financing the nation's public transportation services. Three plausible scenarios are presented. One involves the elimination of all federal operating assistance, replaced by users' fares and state and local subsidies. This scenario receives, by far, the most attention, mainly because it's the most likely future funding picture for transit. The other two scenarios involve sharing costs based on the perceived distribution of transit's benefits (as presented in Chapter Five) and relying solely on users' fares. For all three scenarios, the probable range of fiscal, ridership and equity impacts are examined.

Before presenting these three scenarios, let's take stock of what has been discussed so far. The discussions on the evolution of transit subsidy policies revealed that government aid to transit gained steady political support over the past twenty years. Transit emerged as an ideal showpiece for grappling wth urban problems as most political leaders and their constituents believed, whether rightly or wrongly, that it afforded urban America tremendous benefits. Still, a coherent and sustained policy of support for public transit has been sorely lacking as different Administrations have shifted the emphasis of national urban policy. A close examination generally reveals there are few good reasons, and perhaps several bad ones, for subsidizing the providers of public transit services. In general, social equity objectives can best be accomplished by subsidizing users rather than service providers.

Still, many believe public transit should be financed, in part, through government treasuries. This is evident from the goal statements of various public institutions as well as the attitudes and perceptions of many high-ranking transit officials. All levels of government have adopted explicit goals for supporting transit operations. Local goal statements generally focus on improving service qualities cost-effectively and meeting the travel needs of socially disadvantaged groups. Federal and state goals, on the other hand, are couched principally in a support capacity, as both levels of government aim to promote transit as part of a larger program for enhancing urban environments. Such policies acknowledge, de facto, some responsibility for the fiscal well-being of the nation's transit services. The specific levels of responsibility can perhaps be best gauged by examining transit's purported benefits. Much of the empirical evidence to date suggests that transit's social benefits have been relatively modest, primarily because it has been unable to win over significant numbers of auto motorists. In particular, its impact on energy and land conservation, air quality, traffic congestion, and safety has been minimal, save for a few of the nation's larger cities. However, it has played an important role in providing essential travel opportunities to America's carless and low income populations. Though its impossible to measure the degree to which these benefits have accrued to the constituents of each level of

government, there seems to be a strong concensus that roughly one half of these benefits redound to local residents with the other half split about evenly among state and federal constituents. This, it must be cautioned, only represents the perceptions of knowledgeable observers, although it's perhaps not too ironic that current funding levels generally follow this pro-rata.

Two other factors which should have some bearing on a cost-sharing program for transit have also been discussed. It was shown that the net tax incidence of current transit funding is roughly neutral, however this delicate balance could be disturbed by the elimination of federal operating assistance. Local and state excise taxes were also singled out as preferred revenue sources by transit managers, largely because of their reliability, and also as reasonable substitutes for fare revenues in the nation's largest cities. This analysis suggests that the funding involvement of all spheres of government helps provide a rich and generally equitable source of income for the nation's transit industry. The other factor involved analyzing the responsibilities of governments for recent cost and productivity trends. Various labor protection regulations and social service provisions of federal and state legislation were implicated as contributors to recent cost rises, holding these institutions partly accountable for the industry's current financial plight. In addition, an empirical analysis revealed that subsidies indeed seem to conduce cost escalation, though their impact on productivity appears less certain. Moreover, the time series analysis found local subsidies to be particularly onerous, with the effects of federal and state aid fairly modest by comparison. Though these relationships are clearly more associative than causal, they still underscore the unintended but deleterious effects of underwriting transit services.

By themselves, these findings might appear somewhat fragmented. Fusing them together into a workable cost-sharing program for transit remains problematic. Certainly, no easy cost allocation formula lies in waiting. Stewardship of these ideas into a workable cost-sharing program lies in the hands of responsible transit officials and political spokespersons. To help marshall this evidence and promote the concept of cost-sharing, the likely consequences of several scenarios are presented next.

8.2 Scenario I: Phasing-Out Federal Involvement

The first scenario involves phasing-out federal operating subsidies, relying instead on user fares along with state and local assistance. This scenario reflects the will of the current Administration which was elected on a platform calling for reductions in federal spending. Though the new Surface Transportation Act extends federal support through 1986, there remains the possibility that federal operating grants may eventually be eliminated. Federal cuts have been suggested in the name of efficiency, as the current Administration strives to make transit agencies manage themselves more like private businesses. The likely fare, service and ridership consequences of possible federal cuts are explored below.

8.2.1 Past Research on the Impact of Federal Cuts

Several studies to date have attempted to gauge the effects of eliminating federal operating subsidies. One study, conducted by the Regional Plan Association of New York (RPA)[1], assumed that all lost revenue would be recovered through higher fares. RPA estimated that, nationwide, fares would increase 37%, from an average of 38.4¢ to 56.2¢, and ridership would fall by 900 million annual trips. From these figures, RPA further estimated that auto usage would increase by 2.4 billion miles (.06%) and fuel consumption would rise by 167 million gallons (.29%) per annum.[2] The study concludes that federal cuts will have very little effect on auto usage or gasoline consumption since transit carries only some 3% of urban trips nationwide.

One major shortcoming of the RPA study is that it ignores how individual transit agencies will weather the cuts. Another study, conducted by the UMTA Office of Policy and Research (1982) did investigate the likely effects of eliminating federal aid on operators of different sizes. This study found that most operators could not possibly make up revenue losses through fare increases alone. Only in the case of a few very large operators did the farebox emerge as a reasonable alternative revenue source. The study concluded that:

> When Federal assistance is more than half as large as a system's farebox revenues, lost Federal revenues could not be recovered from the farebox, because too many riders would be lost as fares increased.

It is important to note that neither the UMTA nor the RPA study considered options other than fare increases for recovering lost federal revenues--e.g., service reductions, or increased local and state aid. In an attempt to gain a more complete picture, APTA surveyed its membership in 1981. The survey results indicated that 90% of the nation's operators will raise fares, 80% will seek increased local and state aid, and 67% will reduce service (APTA, 1981). A significant number of operators actually indicated they may be forced to close shop, particularly in urban areas with populations of 500,000 or less.

APTA translated these survey results into predictions of a nationwide fare increase of 88% by 1985, to an average fare of 94¢, and a ridership loss of 2.1 billion trips, or 26%. Although the study's methodology is not disclosed, in view of the RPA findings and expected increases in state and local aid, APTA's figures seem rather inflated.

---

[1] Reported in APTA Transit Fact Book, 1981.

[2] It was assumed that 80% of all foregone transit trips would be replaced by automobile trips, with average auto occupancy levels of 1.2 persons and average trip lengths of 4 miles. Since these figures are fairly imprecise, RPA's estimates should be considered suggestive rather than predictive.

As a political lobbying organization, it is in APTA's and its member operators' interest to portray the worst possible consequences of federal cuts. Thus, some bias may have crept into its survey or the subsequent calculations. In light of the shortcomings of these studies, more accurate predictions of the effects of federal transit cuts appear in order. The following sections attempt to respond to this need.

8.2.2 Methodology Used in Evaluating the Likely Impacts of Federal Cuts

To gather indications about how U.S. transit operators may respond to federal cuts, a survey was administered. As shown in Appendix A2, each operator was asked to identify the actions its policy board plans to take in response to the Section 5 phase-out, including raising fares, reducing services, increasing local and state aid, obtaining federal block grants, increasing productivity (e.g., better scheduling), and implementing cost-saving programs (e.g., securing labor concessions). It should be noted that the questionnaire did not elicit when these actions might take place. Since federal subsidies are to be phased out between 1983 and 1985, it can be presumed that the actions will occur sometime during that period. Nevertheless, the survey results cannot be used to predict the actual fares or service levels that will exist at a particular time. Rather, this section generally gauges the direction and magnitude of future changes in transit operations.

One potential problem, common to all attitudinal surveys, is that respondents may have deliberately distorted their responses for political purposes. If such biases occurred, operators would probably have attempted to portray as gloomy a prediction as possible--fare increases and service cutbacks. That is, it would not be in an operator's best interest to indicate that federal funds could be easily replaced by increases in efficiency or increases in local aid. However, comparison of this study's survey results with those of the APTA survey shows a much milder prediction of consequences. Thus, if the results are biased, they are at least less so. Nevertheless, it is possible that this study, as would any which directly elicits information from transit agencies, overstates the impact of federal cuts.[3]

Elasticity Measures

The analysis, allowing the transformation of survey responses into predictions of fare, service, and ridership changes, hinges on demand-elasticity estimates. Simply put, a fare elasticity is the percentage change in ridership resulting from a 1% change in service level. The typical formulas used to estimate fare, or service, elasticity are:[4]

---

[3]Another possible problem with any survey of this sort is that respondents may not be in a position to accurately predict their future actions. It is believed that this problem was reduced by directing the questionnaires to transit managers, who generally have the greatest knowledge about their agencies. Also, the survey's transmittal letter asked managers not to express personal opinions, but to represent the official position of their agency's policy board.

$$\eta_f = \frac{Q_2-Q_1}{Q_1} \Big/ \frac{F_2-F_1}{F_1} \qquad \eta_s = \frac{Q_2-Q_1}{Q_1} \Big/ \frac{S_2-S_1}{S_1} \tag{8.1}$$

where: η_f = Fare elasticity
η_s = Service elasticity
Q_2 = Ridership after
Q_1 = Ridership before
F_2 = Fare after
F_1 = Fare before
S_2 = Service after
S_1 = Service before

The seminal work on fare elasticities was done by Curtin (1968). In a study of 77 fare increases spanning a 20-year period, he found that, on average, a 10% increase in fares will produce a 3% decrease in ridership--i.e., a fare elasticity of -0.3. Though the Curtin rule-of-thumb has proven remarkably reliable at a national level, elasticities can vary significantly among operators, user groups, and types of service. For example, commute-hour transit riders are known to be less sensitive to fare changes than midday or weekend patrons.

Mayworm et al. (1980) have recently summarized fare and service elasticity estimates from around the world. The estimates used in this chapter, shown in Table 8.1, are based largely on the above-cited compendium.[5] These estimates reflect the fact that operators in smaller

---

[4]The elasticity estimates obtained from these formulas are termed line elasticities, or shrinkage ratios, because the demand curves are assumed to be simple linear functions of either price or service. That is, for any fare change the ridership response is assumed to be proportionately the same. Thus, a 10% fare increase from 50¢ to 55¢ would decrease ridership equally as much as would a 10% increase from $1 to $1.10. While, in reality, the transit demand curve is probably not a straight line--i.e., elasticities vary at different price levels--line elasticity estimates are considered adequate for the level of analysis in this chapter.

[5]The fare elasticities for cities with populations greater than 1 million, and less than 250,000, are taken directly from the Ecosometrics report (p.22). For cities with populations between 250,000 and 1 million, the -0.32 elasticity estimate is a slight upward adjustment of Ecosometrics' 500,000 to 1 million estimate of -0.30. The service elasticities in Table 8 are based on an average vehicle miles elasticity of +0.61 as well as the fact that elasticities vary among different levels of service. A given service change has more impact where existing service is poor than where it is very good. It is assumed that low levels of service improve as a direct function of population size. The Ecosometric study shows that, assuming a normal distribution, service elasticities can vary, plus or minus, by 50% depending on the existing level of service. Given the average vehicle miles elasticity of +0.61, this would establish a range of about +0.31 to +0.92. To be conservative, and because operators in cities with populations less than 250,000

TABLE 8.1. Performance and Financial Data, Elasticity Estimates for U.S. Transit Operators*

	Metropolitan Area Population				
	under 100,000	100,000-250,000	250,000-1 million	Over 1 million	U.S. Total
Total Operating Expenses (millions)	$39.5	$153.4	$443.8	$4,225.3	$4,862.0
Fare Revenues (millions)	$11.5	$45.9	$159.2	$1,777.3	$1,993.9
Linked Passenger Trips (millions)	43.0	126.9	447.6	5,451.4	6,068.9
Revenue Vehicle Hours (millions)	2.1	6.9	17.6	78.7	105.3
Fare Elasticity	-.35	-.35	-.32	-.24	
Service Elasticity	.80	.72	.58	.40	
Federal Share of Total Revenue	33%	33%	31%	18%	
Number of Operators	57	91	71	105	324

*figures are totals for all operators in the category

Sources: APTA, 1981; Mayworm et al., 1980.

urban areas experience greater ridership losses for a given increase in fares or decrease in service. This is the case because smaller cities tend to be less dense, thus making driving a viable alternative to transit. Because of congestion and parking constraints, transit riders in large cities are often unable to switch to the automobile.

Calculations of Fare, Service, and Ridership Changes

Merging the operating, financial, and elasticity information summarized in Table 8.1 with survey responses, it was possible to estimate fare, service, and ridership changes resulting from federal cuts.[6] The estimation procedure basically relied on the line elasticity measure shown in Equation 8.1. On the questionnaire, each operator indicated how much of that revenue would be recovered by fare increases. This amount was added to the existing fare revenue to derive a target amount of fare revenue that the operator will need to generate.[7] From this, the average fare necessary to achieve the target and the resulting ridership level was calculated using fare elasticity estimates.

---

probably achieve headways better than 50 minutes, this study adopts an elasticity range of +0.40 to +0.80.

[6]Only fare increases and service cuts are used to calculate ridership loss. Thus, it is assumed that the other possible operator actions--increased state and local aid, federal block grants, increased efficiency, cost savings-- will not affect ridership levels.

[7]It is necessary at this stage of the analysis to hold total costs, and therefore total revenues, constant. Later in the analysis the impact of service cuts on total costs will be accounted for.

Next, the ridership loss due to service cuts was subtracted. Survey responses and information on current federal funding levels disclosed the necessary amount of cost reductions that can be expected from service cuts. Knowing the average cost per vehicle hour of service,[8] the service cuts necessary to achieve those cost reductions were calculated.[9] Using the service elasticity estimates, service cuts are translated into ridership losses. These were then subtracted from the ridership left over after fare increases to yield a total ridership loss.[10]

Ridership Impact of Fare Increases

$$R_2 = (C \cdot J \cdot P_f) \tag{8.2}$$

where: C = total operating cost, assumed equal to total operating revenue,

J = proportion of revenue received from the federal government,

P_f = proportion of federal cuts recovered by fare increases,

R_1 = existing fare revenue,

R_2 = target fare revenue, after fare increase; thus

$(C \cdot J \cdot P_f)$ = additional fare revenue that must be generated to make up revenue lost from federal cuts.

$$(Q_2 - Q_1) = \frac{(F_2 - F_1)}{F_1} \cdot \eta_f \cdot Q_1 \tag{8.3}$$

where: Q_1 = ridership before fare change,

Q_2 = ridership after fare change,

F_1 = average fare before fare change,

F_2 = average fare after fare change, and

η_f = fare elasticity.

Both Q_2 and F_2 are unknown. But the identity $R_2 = F_2 \cdot Q_2$ allows Equation 8.3 to be solved, substituting R_2/F_2 for Q_2.

---

[8] Vehicle hours are considered the best measure of level of service (Fielding, 1977). It is assumed that the service elasticities presented in Table 8.1, which are actually based on vehicle miles, are equally applicable to percentage changes in vehicle hours.

[9] An assumption must be made that cost per vehicle hour of service will remain constant with federal cuts. In truth, costs may be reduced. It is impossible, however, to accurately predict what they will be.

[10] It should be noted that the simple recursive methodology used in this study ignores possible feedbacks between fare increases and service cuts--*i.e.*, fare increases result in ridership losses, which cause operators to cut back service, which results in further ridership losses, and so on. Given the roughness of the data, the simpler, recursive model is considered adequate for this study.

Ridership Impact of Service Cuts

$$S_2 = \frac{C - (C \cdot J \cdot P_s)}{C/S_1} \tag{8.4}$$

where: P_s = proportion of federal cuts recovered by service reductions,

S_1 = service level before service cutbacks,

S_2 = reduced service level necessary to cut costs to make up lost federal assistance,

C/S_1 = cost per vehicle hour of service; thus,

$(C \cdot J \cdot P_s)$ = absolute reduction in costs necessary as as result of federal cuts.*

$$(Q_3 - Q_2) = \frac{(S_2 - S_1)}{S_1} \cdot \eta_s \cdot R_1 \tag{8.5}$$

where: η_s = service elasticity,

Q_3 = final absolute ridership after fare increases and service cuts; thus,

$(Q_3 - Q_2)$ = absolute change in ridership due to service cuts.

8.2.3 Anticipated Fare, Service, and Ridership Impacts of Federal Cutbacks

An Aggregate Picture

The 99 transit operators responding to the survey collectively indicated that lost federal revenue will be recovered predominantly through fare increases and service cuts (see Table 8.2). By comparison, operators estimate that only a small amount of revenue can be recovered through efficiency gains, costs savings, or federal block grants.

---

*It is assumed that increases in efficiency, which may increase service levels, will partially offset the impact of service cuts. In the absence of any empirical data indicating otherwise, it is assumed that one-half the percentage of revenue recovered by efficiency measures will offset service cuts:

$$P_s = P_s^* - 1/2\ (P_e)$$

where: P_s = adjusted percentage of revenue recovered by service cuts

P_s^* = reported percentage of revenue recovered by service cuts

P_e = percentage of revenue recovered by increased efficiency

TABLE 8.2. Actions to Offset Federal Cuts and The Percentage of Lost Revenue Recovered by Each, All Survey Respondents

Action	Percentage of Revenue Loss Recovered
Increase fares	22%
Decrease service	18%
Increase local support	17%
Increase state support	17%
Federal block grants	11%
Increase efficiency/ productivity	8%
Cost saving measures	7%

Table 8.3 shows that these actions can be expected to result in a 17% fare increase nationwide, from an average fare of 38.4¢ to 44.9¢.[11] Service can be expected to decrease 3% from 105 to 102 million vehicle hours. While these impacts seem minor, especially when spread over the three year span of the Section 5 phase-out, they could reduce nationwide ridership by 6%, or about 370 million trips annually, holding all other factors (e.g., extreme gas shortages) constant.

Patronage losses resulting from federal cuts could be much larger if local and state governments fail to increase their aid. Table 8.4 indicates that if operators are forced to rely solely on fare increases, ridership losses could total 935 million trips annually, a reduction of 15%.[12] It was estimated that service reductions will make up for federal cuts with the least impact on ridership. If operators receive the increases in state and local aid they expect, compensation for the remainder of withdrawn federal revenues through service cuts will result in only a 3% ridership loss. Even without the increased state and local aid, ridership losses could be held to 7%.

These findings suggest that the failure of states and localities to increase support could cause ridership to decline significantly. However, these impacts may be exaggerated somewhat. In particular, all fare increases and service reductions need not be across-the-board. Cervero et al. (1980) have shown that selective distance-based and time-of-day pricing could increase revenue by as much as 70% with only about a 4% drop in ridership. There now appears to be a movement away from flat fares, and to the extent that federal cuts encourage this trend, ridership losses might be less than those indicated in Table 8.3 (Hemily and Meyer, 1982).

[11] All figures in this section are expressed in 1979 dollars.

[12] Some operators could not rely solely on fare increases because too many riders would be priced off the system. Thus, the worst case presented in Table 8.4 represents the maximum possible fare increases, with service reductions making up for some of the federal funds.

TABLE 8.3. Expected Fare, Service, and Ridership Responses to Federal Cuts, at the National Level

	Average Fare	Service Level (million veh.hrs.)	Ridership (billion trips)
Existing	38.4	105.3	6.37
Future	44.9	102.1	5.99
Percent Change	+17%	-3%	-6%

While it is uncertain what form fare increases will take, it is highly unlikely that service reductions will occur unilaterally (e.g., a simple increase in average headways). Hemily and Meyer suggest that most operators will reduce service in such a way that ridership loss is minimized. They argue that operators will first eliminate night-owl service (midnight-6am), followed by Sunday service, evening service, Saturday service, and so on. An even more prudent way to reduce costs might be to systematically examine routes, eliminating the most unprofitable ones. In any event, by assuming across-the-board service cuts, the service-induced ridership losses shown in Table 8.3 might be exaggerated somewhat.

A Disaggregate Picture

Considering only the nationwide impacts of federal transit cuts masks the hardships that will be experienced by certain groups of operators. For example, an operator receiving 50% of its revenue from the federal government will probably be severely hurt by the cuts, no matter which actions it takes.

Central to a more disaggregate analysis is the issue of how to best group operators that will be similarly affected by the cuts. Operators are typically categorized by size, e.g., number of vehicles. The amount of federal dollars received, as well as the actions contemplated, however, were not found to vary significantly among different-sized operators.[13] However, the percentage of operating revenue contributed by the federal government was found to vary significantly among different types of operators. Regression equation 8.6 indicates that those operators

[13] Various methods were attempted--including regression analysis and factor analysis--to classify operators according to their anticipated actions, but none produced statistically significant results. This classification analysis relied on data acquired principally from UMTA's National Urban Mass Transportation Statistics (1981).

TABLE 8.4. National Ridership Loss Under Different Revenue Recovery Schemes

Revenue Recovery Scheme	Ridership Loss (millions of trips)	Percentage Ridership Loss
fare increases/ service cuts/ state & local aid	290	-6%
worst case: fare increases only	935	-15%
service cuts only	431	-7%
best case: service cuts/ state & local aid	204	-3%

least reliant on federal aid are concentrated in the nation's large, dense cities.[14]

$$\text{FEASSIST} = 42.5 - .00120\ \text{METROPOP}^{**} - .320\ \text{OUTPUT}^{**} - 2.07\ \text{DENSITY}^{**} - .338\ \text{LAPRO}^{*} \quad R^2 = .51 \quad n = 65 \qquad (8.6)$$

where:

FEASSIST	=	Federal share of operating revenue (expressed as a percentage)
METROPOP	=	Metropolitan area population (in thousands)
OUTPUT	=	Operating expense per vehicle hour (in dollars)
DENSITY	=	Metropolitan area population density (coded 1 through 5, low to high)
LAPRO	=	Revenue vehicle hours per employee

**significant at the .01 level

*significant at the .05 level

R^2 = Coefficient of Determination

n = number of cases

By far, the most important explanatory variable in equation 8.6 is metropolitan area population.[15] This variable alone explains over 30% of the variance in FEASSIST, suggesting that operators can be best grouped by the size of their metropolitan areas. Four groups of transit opera-

---

[14] It may seem that such operators also tend to have many vehicles, and hence, operator size should enter the equation. In truth, however, there are many small operators located in large metropolitan areas, particularly in New York City, and many get little federal aid.

The other two significant variables, OUTPUT and LAPRO, suggest that operators with high labor productivity and high operating expenses per vehicle hour receive proportionately little federal aid. The fact that high expenses equate with low federal aid is perhaps explained by the fact that operating expenses are generally higher in large urban areas. That is, because of the high cost of living in large cities, transit workers receive relatively high wages, which drives up operating costs. Thus, expenses per vehicle hour may be somewhat of a proxy variable for the size of an agency's operating environment. Still, no problems of multicollinearity were evident.

[15] The most important explanatory variable is that which has the highest standardized regression coefficient, e.g., beta weight. Beta weights for Equation 8.6 are: -.39 for METROPOP, -.32 for OUTPUT, -.26 for DENSITY, and -.16 for LAPRO.

tors are, therefore, utilized: those located in metropolitan areas with populations over 1 million; 250,000-1 million; 100,000-250,000; and under 100,000. The specific categories were chosen so that roughly equal numbers of transit operators were in each group.

Figure 8.1 summarizes how operators from different-sized metropolitan areas are planning to respond to federal cuts, as well as the percentage of total revenue they will lose. While the anticipated actions do not vary significantly by metropolitan area size, a rough pattern does emerge. Operators in small metropolitan areas will likely rely more on increases in state and local aid, while those in large cities can be expected to opt more for fare increases and service cuts. These results are not surprising since operators in small areas usually receive a relatively large share of their revenue from the federal

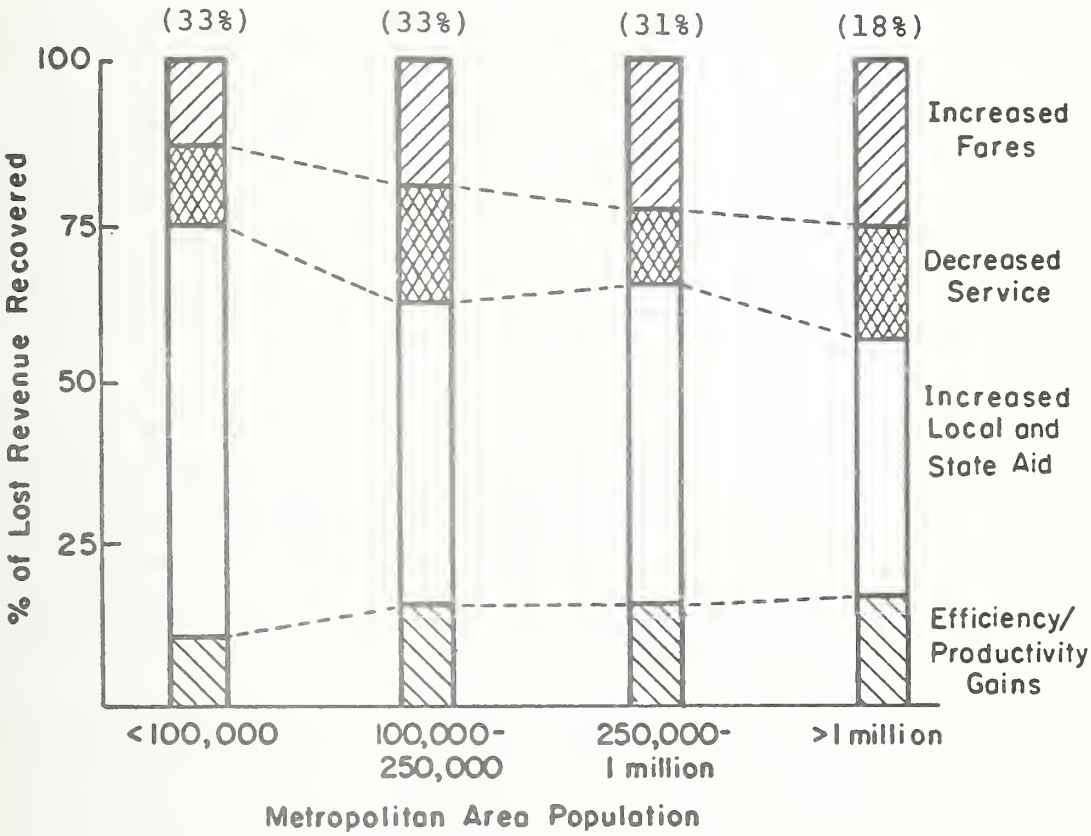


FIGURE 8.1. PERCENTAGE OF REVENUE RECOVERED BY VARIOUS OPERATOR RESPONSES TO SECTION 5 ELIMINATION, By Urban Area Population

(%) = Percentage of operating revenue received from federal sources

---

Equation 8.6 should not be confused with the Section 5 allocation formula, which also incorporates population and density measures. Based on the allocation formula, one would expect that large, dense cities would receive the greatest assistance. The equation shows, however, that when assistance is expressed as a percentage of total revenue, exactly the opposite is true.

government. They would be hard-pressed to recover lost revenue solely through fare and service changes, even though the total amount nationwide is fairly small. In contrast, operators in large areas stand to lose only 18% of their total revenue to federal cuts, but the absolute amount is substantial.[16] Thus, these properties could more easily recover lost revenue with fare increases or service cuts than by seeking large increases in state and local aid.

Effects in Large Urban Areas

For the most part, whatever happens to operators in large urban areas happens to the U.S. transit industry as a whole. This is because America's transit services and ridership are very much concentrated in large areas. While there are more transit operators in smaller areas, 85% of the nation's ridership is in areas with populations greater than 1 million.

Transit agencies in large cities generally receive a relatively small proportion of their total income from federal grants. Of the nation's ten largest operators, all located in large urban areas, all but two (those located in Los Angeles and Detroit) receive less than 20% of their operating revenue from federal sources. Operators in New York City, alone accounting for 40% of U.S. ridership, receive only 6% of their revenue from Washington.

Because the large operators, especially those in New York City, stand to lose a relatively small proportion of their revenue, the impact of federal cuts on large urban areas should be minimal. Table 8.5 shows that fares are expected to increase about 15%, from an average of 32.6¢ to 37.5¢, and service levels can be expected to fall by only about 3%. The result will be an estimated 5% decline in ridership, a loss of 250 million annual riders. Again, with few other travel options, big-city residents will likely continue to patronize transit even when fares rise sharply.

While large urban areas will be the least affected by federal cuts, in relative terms the ridership losses could nonetheless be significant. Importantly, these operators are also counting on a $280 million increase in state and local aid. If this aid is not forthcoming, the ridership loss could run as high as 14% (see Table 8.6).

Effects in Smaller Urban Areas [17]

---

[16] All operators in areas with populations less than 100,000 received a total of only $14.6 million in federal grants in 1979, about 1.5% of total federal operating assistance. Operators in areas with populations over 1 million, by comparison, received a total of $760 million in federal operating aid in 1979.

[17] Smaller urban areas are defined as those with populations under 1 million. While these areas would certainly not be considered small by most standards, they only account for 15% of U.S. transit ridership.

TABLE 8.5. Expected Fare, Service, and Ridership Responses to Federal Cuts, by Urban Area Population

	Urban Area Population			
	under 100,000	100,000-250,000	250,000-1 million	over 1 million
Percentage of total U.S. transit ridership	1%	2%	7%	90%
Percentage fare increase	+31%	+48%	+35%	+15%
Percentage service decrease	-3%	-6%	-3%	-3%
Existing ridership (millions of trips)	43	127	448	5,450
Ridership loss (millions of trips)	6	27	60	252
Percentage ridership loss	-13%	-21%	-13%	-5%

TABLE 8.6. Ridership Loss Under Different Revenue Recovery Schemes, by Urban Area Population

	Percentage Ridership Loss by Urban Area Population			
Revenue Recovery Scheme	under 100,000	100,000-250,000	250,000-1 million	over 1 million
fare increase/ service cuts/ local & state aid	-13%	-21%	-13%	-5%
worst case: fare increase only*	-48%	-39%	-28%	-14%
service cuts only	-24%	-20%	-15%	-6%
best case: service cuts/ local & state aid	-6%	-9%	-6%	-3%

*Ridership loss resulting from maximum possible fare increase. Some service cuts would still be necessary since withdrawn federal funds could not be recovered with fare increases alone.

Although operators in small areas serve a small proportion of nationwide ridership, they are nonetheless important to their individual localities. In particular, many serve an important social function by providing mobility to those without cars. Most of these operators rely as heavily on federal subsidies as the farebox, with some receiving fully one-half of their revenue from Washington. Thus, with Section 5 elimination, they stand to lose a substantial revenue source and may no longer be able to serve the needs of the transit-dependent. Figure 8.1 shows that operators in small urban areas are largely planning to replace federal grants with increased state and local aid. Nonetheless, some fare increases and service cuts will occur. Table 8.5 shows that fares can be expected to increase 31-48%, while service cuts of 3-6% may be in the offing. The total ridership loss is expected to reach 92 million annual passengers, with the largest impact expected to be in areas with populations 100,000 to 250,000.

Unlike operators in large areas, smaller-city agencies must receive increased state and local aid in order to continue operations. Table 8.6 shows that, without the increased aid, operators will suffer substantial ridership losses as a result of drastic fare increases and service cuts. Many would be forced to cease operations. One UMTA Regional Administrator, during an interview, confirmed this scenario by predicting that several, predominantly rural, states in his region would be left with no transit service after 1985. Services in many small-city areas can be expected to fall below the threshold necessary to maintain political support. Consequently, operators that can afford to run buses only a few hours a day, or only on hour-and-a-half headways, may eventually be forced to close shop as policy-makers find other ways to meet the travel needs of their constituents.

Summary of Fare, Service, and Ridership Impacts

These results indicate that federal cuts will likely have only a minor impact in large metropolitan areas but could be devastating in many smaller cities. Large cities will be relatively unaffected because they receive only a small share of their revenue from Washington, and their riders are generally less sensitive to changes in fares or service levels. Agencies in small cities, by comparison, are highly dependent on federal assistance. Also because they have low existing service levels and relatively low-income patrons, there are fewer opportunities for raising fares and reducing service. Thus, if supplemental state and local aid is not forthcoming, the elimination of Section 5 subsidies could bankrupt many agencies in small metropolitan areas.

8.2.4 Other Expected Impacts of Federal Cutbacks: Environmental and Energy Impacts

Because transit carries only 3% of urban passenger trips, the environmental and energy impacts of ridership losses resulting from federal cuts will be imperceptible at the national scale. Assuming a net reduction of 343 million transit trips annually, the Section 5 phase-out could increase automobile travel by 1.3 billion miles and fuel consumption by 93 million gallons.[18] In absolute terms these increases

seem substantial; however, in relative terms they represent only a 0.001% increase in automobile usage and a 0.01% increase in fuel consumption nationwide.

Still, impacts could be significant in some localities. In cities such as New York City, Chicago, or San Francisco, and along high-density and congested travel corridors in many other cities, transit carries a large percentage of trips. To the extent that patrons are forced into automobiles by fare increases and service reductions, federal cuts could result in noticeable increases in congestion, pollution, and energy consumption in those areas.

Equity Impacts

Federal cuts will impact some income groups more than others. Clearly, fare increases induced by federal cuts will strain a poor person's income more so than a richer person's. The impact on the poor could prove pervasive since they are much more reliant on transit than the wealthy. In 1970, for example, Americans with incomes below $5,000 used transit for 13.7% of their trips, while those with incomes over $15,000 used transit for only 5.8% of their trips (Pucher, 1981).

Service cuts will probably also hurt the poor the most. As a group they own fewer cars so will be more likely to forego travel because of federal cuts. In 1974, for instance, roughly one-third of families below the poverty line of $7,500 did not own cars, whereas only 3% of families with incomes above $15,000 were carless (Altshuler, 1979). The loss of travel opportunities to the poor will be even more burdensome if service reductions focus on night-owl, Sunday, and other off-peak services. Nationally, a high percentage of off-peak patronage is made up of lower income persons while wealthier riders tend to dominate peak period usage (Pucher, 1978).

Poor residents of smaller urban areas may be particularly hard hit by federal cuts. For one, operators in these areas will be forced into the most radical fare increases and service reductions. Also, transit patrons in smaller cities tend to be even less well-off than those in large areas (Pucher, 1981). Thus, without some travel alternatives, poor residents of small areas may become immobilized by subsidy cuts.

While it is clear that the poor will bear the brunt of fare increases and service cuts, the question of which income class will suffer the most from a changeover to state and local aid will depend on the tax sources used. As discussed in Chapter 6, the replacement of the more progressive federal income taxes by the more regressive state and local sales and property taxes could place an increasing tax burden on the poor. If some localities opt for more progressive taxes, such as a stock transfer tax, to help foot their transit bill, more wealthy residents of those areas may be making up the difference in withdrawn federal funds.

---

[18] This subsection employs assumptions used by RPA as discussed in subsection 8.2.1.

In sum, federal cuts will likely place a double burden on the poor. They will suffer the most from higher fares and reduced service, and will likely also bear the brunt of tax increases to support transit. User-side subsidies should be considered for lessening the impacts of federal cuts on the poor. Ultimately, however, the impacts of federal cuts on any population group will depend on the specific approaches individual transit properties take in dealing with them.

Political Impacts

Federal transit cuts are apt to spark some major political confrontations. Battles will surely be fought between managers seeking selective service cutbacks and fare increases on the one hand, and boards trying to maintain their political support via low fares and extensive routing, on the other.

Fare increases have never been won easily. Elderly, low income, and minority patrons have become particularly outspoken in their opposition to across-the-board rate hikes, particularly since these groups generally cross-subsidize the travels of others (Cervero, 1982). Consequently, legal suits have recently been filed in many American cities to end what are considered discriminatory fare practices. Yet, there is stiff opposition to graduated and other differential fare policies which charge long haul, rush hour commuters more, many of whom are wealthy and wield more political clout. Labor also usually opposes such pricing because it complicates driving duties. Any future fare increases can certainly be expected to intensify the debate.

Similarly, confrontations will heighten over service cuts that must necessarily follow the Section 5 phase-out. Many local taxpayers protest bitterly when services to their neighborhoods are reduced, and transit boards have historically been sympathetic to such concerns. The search for untapped revenue sources will also pose problems for transit managers and boards. At the very least, they will be forced to lobby state and local representatives for increased appropriations. If these efforts fail, agencies will have little recourse than to appeal to the public for new taxes. Already, many operators have been forced to bring new tax measures before their local electorate. For example, Youngstown, Ohio recently voted to raise its property tax levy in order to keep its city buses running. Special sales tax initiatives have recently passed in Santa Cruz and Santa Clara counties in California, as well. Of course, whenever a transit agency seeks a bail-out, it subjects itself to close scrutiny, as well as the possibility of a major organizational shake-up.

An even more pernicious outcome of federal cuts might be their bandwagon effect. Should state and local governments follow the federal lead and cut their own subsidy programs, many transit systems, especially those in smaller areas, would suffer immensely. In areas where systems close shop, local officials could find themselves in the tenuous position of searching for suitable travel alternatives for the poor.

Labor Impacts

Federal cuts may also hurt transit labor. Most fundamentally, as services are scaled down, some transit workers may be furloughed. In areas where unemployment is already high, such as the industrial northeast, this could impose significant hardships. Second, the scarcity of funds will make it harder for unions to negotiate wage and fringe benefit increases. Third, transit labor may be forced to end restrictive work practices and accept split shift duties and part-time assignments. Reductions in late night, evening, and special holiday services could materially cut into drivers' take home pay. Such actions should save transit agencies considerable dollars, but at the expense of some tough contract battles.

8.3 Scenario II: Sharing Costs Based on the Distribution of Transit's Benefits

The second scenario involves distributing transit's cost burden among users and different levels of government based upon the benefits each receives. As noted previously, transit's benefits are not easily quantifiable and clearly cannot be allocated among the nation's constituents with any degree of precision. The survey responses of informed state and local officials, however, suggest that on average, users should cover about one-half of transit's costs, with local, state, and federal treasuries picking up 25%, 12%, and 13% of the tab respectively. This pro-rata closely matches how many knowledgable observers perceive transit's benefits being distributed, and is surprisingly close to how costs are allocated today. Compared to the 1980 distribution of transit costs, this scenario would increase user involvement by about 8%, while lowering the share of costs met by local, state, and federal governments by about 2%, 1%, and 4% respectively. Effectively, then, this scenario would expand the role of customers in financing transit, while scaling down that of public institutions, in particular the role of the federal government.

The impact of this scenario would be modest compared to the first one since it represents only a slight change in the status quo. Based on 1979 national figures, federal support for transit would drop from about $855 million to $670 million while passenger revenues would rise from roughly $2.5 billion to over $2.7 billion under this scenario. Employing the methodology discussed in Section 8.2.2, the average fare would climb to 42.3¢ nationwide and total transit ridership would fall to about 6.18 billion. This represents a 10% increase in average fare (from 38.4¢) and a 3% drop in patronage (from 6.36 billion annual trips).

Of course, the above script is based upon an aggregate response to the funding proposal and does not necessarily reflect how individual operators would react. Currently, operators are dependent upon government aid to varying degrees, some relying on public treasuries for as much as 90% of their income while a few others are largely self-supporting. Were all areas to adopt this scenario's formula for allocating costs, then those cities currently heavily dependent upon public subsidies would have to either raise fares drastically, slash services,

or both. This cost allocation scheme would require substantial fare hikes and shifts in funding policies in places such as Boston, Cleveland, St. Louis, San Francisco, Atlanta, Seattle, Denver, Salt Lake City, and Orange County. In other areas, such as New York, Newark, Chicago, Baltimore and Dallas, few fare or funding changes would be necessary since these cities currently allocate transit costs comparably to this scenario.

Of course, it would be most improbable and perhaps undesirable for all transit agencies to adopt this pro-rata, so attempting to gauge impacts to individual operators might be considered fruitless.[19] Still, a widespread changeover to this benefit-based schema would generally impact different sized areas differently. Since small area operators tend to be more reliant on outside aid, while those in large areas are less so, this scenario would involve transferring more federal dollars to large cities and greater fare and service reforms in smaller ones. This outcome would likely be warmly embraced by the current Administration, but perhaps less so than the expected outcome of the first scenario.

Since this scenario would not drastically alter transit's existing financial composition, its environmental, distributional, and political impacts would be largely inconsequential. But again, those operators facing major fare increases and service cuts might experience more serious secondary impacts. This would particularly be so along dense and congested corridors in several large cities where increased vehicular traffic could aggravate air quality, and in smaller areas where service reductions could severely immobilize transit-dependent residents. This scenario could also give rise to political dissension in that appreciable numbers of elected officials might resent such a multilateral cost allocation program and vehemently oppose any public funding of transit. Moreover, the fact that transit's benefits cannot be measured and distributed with any degree of precision might discredit this scheme in the eyes of some observers.

In sum, this scenario proposes a simple yet intuitively appealing way to share transit's cost burden. Users would pay for half the cost of nationwide services, and of the remaining portion, localities would collectively pick up one half, and state and federal governments would evenly split the other half. This scenario would not radically alter transit's current funding composition, but would seem to represent a

---

[19] The advantage of a financing system in which every agency receives the same share of revenues from the farebox, state, local, and federal sources, is that it would afford some stability. Operators could plan ahead with some assurances of where their revenues would be coming from. The disadvantage is that such a formula ignores differences in operating environments. A small, low-density city, for example, would have a very difficult time recovering the same share of costs through the farebox as a dense, transit-dependent city. Also, gaining the cooperation of state and local agencies to inaugurate such a cost-sharing program would be next to impossible.

step in the right direction, without some of the hardships imposed by a wholesale withdrawal of federal support. In a sense, this scenario offers a reasonable compromise between current funding policies and eliminating all federal aid. An expanded role for the user coupled with a slightly reduced role for the three levels of government would impact ridership only marginally while probably also bringing about the types of productivity and efficiency improvements many observers hope for.

8.4 Scenario III: The No Subsidy Option

The final scenario examined involves no subsidy--*i.e.*, paying for everything through users' fares. This scenario is not as heretical as it may sound--the transit industry as a whole only began running deficits in 1963. Thus, transit subsidies only have a 20 year history, compared to a 60-70 year legacy of profitable operations.

As discussed in the second chapter, government aid to transit sought to stem post-war losses in ridership and ensure some level of mobility to society's disadvantaged citizens. Evidence suggests it has been somewhat successful on both planes. However, eliminating all transit subsidies would almost certainly place debilitating hardships on society's poor and plunge the industry into another period of steady ridership declines. Again using 1979 baseline figures, passenger revenues would rise 120%, from $2.4 billion to over $5.3 billion under this scenario, with average fares climbing to about $1.05. Nationwide ridership would decline by about 1.1 billion patrons per year as a consequence, plummetting to about 5.2 billion annual users. These aggregate figures, of course, disguise impacts at the individual operator level. For many smaller properties, the elimination of all government subsidies would wreak havoc. A significant number would be forced to close shop, while most marginally productive services in all areas would likely be drastically curtailed. At minimum, noticeable service reductions in tandem with the tripling of average fares would be required in all urban areas.

As discussed under the first scenario, the poor would suffer the most from these sequence of events, particularly carless and indigent residents of small cities. User-side subsidies, special travel voucher programs, and expanded transportation provisions within human services programs would be essential toward mitigating the impact of this scenario on society's poor. The energy and air quality consequences of eliminating all government subsidies would be about three times that estimated under the first scenario. Violations of air quality standards would surely increase, particularly in cities such as Denver, Salt Lake City, and Los Angeles where ambient photochemical smog levels would worsen due to substantial increases in automobile usage, but less so in larger east coast cities where rush hour transit usage would probably be unaffected. Nationwide, liquid petroleum consumption could be expected to rise by less than 0.05%, again because of transit's comparatively small number of vehicle miles covered annually.

If average transit fares, in 1979 dollars, were to exceed one dollar, many operators would likely begin differentiating their fare structures more finely, switching over to distance and time-of-day pricing.

In general, the degree of cross-subsidization from short, off-peak trips to long, peak hour ones would prove intolerable as flat fares reached the dollar mark. Protests lodged by lower income, inner-city minorities, who tend to travel short distances during lower cost off-peak periods, would force managers to introduce graduated pricing. Because rush hour and long haul commuters are less sensitive to fare hikes, the overall effect of more graduated fares would be to reduce ridership less and increase passenger revenues more than previously suggested for this scenario. Conceivably, some of these revenue gains could be funneled into premium service improvements so as to increase ridership even more. Through a combination of selective service changes and more efficient, cost-based pricing, many observers argue that the elimination of all subsidies would radically improve the overall health of the nation's transit industry over the long run.

There remains the possibility that the private sector would assume some financial responsibility for transit should all government subsidies disappear. In particular, commercial businesses suffering retail losses by the curtailment of transit services might choose to form special assessment districts to keep buses operating. Merchants might be particularly inclined to support midday and weekend transit services which are vital to customer access. Likewise, aid for maintaining rush hour services might come from large employers who depend on transit to get their employees to work. Increased ride-sharing, vanpooling, subscription bus operations, and other para-private forms of transit might also be desirable offshoots of eliminating subsidies. To many, increased private sector involvement would be an openly welcomed change.

Finally, discontinuing all subsidies might also serve to "depoliticize" transit. Fairsharemanship, whereby transit services are indiscriminately spread over a wide geographic area, would no longer be a problem were politicians removed from the service policy decision-making process. This might be at the risk, however, of failing to provide vital transportation services to the truly needy. Clearly, some political compromise would be necessary under this scenario to ensure that special transportation needs were met while also allowing managers to run their systems on a fully liquidating basis.

8.5 Summary

Three plausible futures for financing the nation's transit services were presented in this chapter. Table 8.7 summarizes the likely nationwide fare and ridership impacts of implementing each of the scenarios (using 1979 baseline figures). Clearly, the benefit-based cost-sharing approach would result in the least ridership loss, however it would keep average fares the lowest as well. Phasing out federal subsidies would likely result in about 200 million fewer riders annually than the benefit based scenario, though average fares would only be about 3¢ more per trip (due to the expected service reforms and cost saving measures in response to federal cuts which would enable fares to remain relatively low). By contrast, the elimination of all government subsidies could have a severe impact on the American transit industry, with nationwide ridership plummeting by well over one billion annual users and fares skyrocketing to over one dollar per trip.

TABLE 8.7. Summary of the Expected Nationwide Fare and Ridership Impacts of the Three Scenarios, 1979 Figures

	Scenario		
	I. Federal Subsidy Phase-Out	II. Benefit-Based Cost-Sharing	III. No Subsidy
Average Fare	45c	42c	$1.05
% Change in Fare	+17%	+10%	+170%
Ridership (billions of annual trips)	5.99	6.18	5.18
% Change in Ridership	-6%	-3%	-19%

Sharing transit's cost burden based upon benefit principles represents a rational and equitable funding approach. Having users pay for half the costs of services, with local governments picking up one-quarter the cost and state and federal governments splitting the remainder seems intuitively reasonable and generally finds support among many knowledgeable observers. This cost-sharing arrangement would impact ridership only marginally while also encouraging more efficient pricing and management practices. Though such a reassignment of financial responsibility would not be as radical a departure from the status quo as totally eliminating federal subsidies, the benefit-based scenario represents, in the opinion of the author, a satisfactory and reasonable compromise.

Chapter Nine
Summary and Conclusions

9.1 Summary

This report has sought to sift through the issues surrounding transit subsidy policy, and provide a rationale from which a politically feasible and economically sound program of transit cost-sharing could evolve. A range of factors which have some bearing on intergovernmental and user responsibilities for financing public transit were studied. For one, the evolution of transit subsidy policy was closely examined, as were various economic and political justifications for underwriting transit services. Goal statements from each level of government and evidence on the distribution of transit benefits were also investigated as possible input into a cost-sharing program. Other factors which bear on the subsidy debate addressed in the report included the incidence of various tax sources used in financing transit and the cost impacts of various government mandates involving labor protection and social service delivery. Moreover, the historical impacts of government subsidies on transit performance were empirically assessed. Several possible cost-sharing scenarios were then explored in terms of their likely financial, ridership, and political repercussions. It was concluded that a cost-sharing program whereby users covered one-half of transit expenses, localities covered one-quarter, and state and federal governments split the remainder would be most appropriate for transit.

The second and third chapters of this report traced the growth of transit subsidy policies, and addressed governments' expectations of transit, as evidenced by their goals. Few other transportation policy issues have been as poignantly debated and experienced such a fluctuation in public sentiment as the subsidization of mass transit services. National transit policy has evolved largely in an ad hoc fashion. Government programs have, for the most part, been driven by an ever worsening fiscal crisis in the transit industry. Federal support mushroomed after the early 1960s in response to intense pressure from big city interests to "salvage" the industry. The federal commitment witnessed many properties falling under local government ownership, and most states establishing their own transit programs to help cover the costs of municipal transit operations. Transit programs generally received broad-based support throughout the seventies, but the formulation of any coherent, well-defined goals became largely subordinate to simply keeping the buses rolling.

The goals for transit at each level of government suffer from a tension between service and social objectives on the one hand, and the desire to operate transit in a cost-efficient manner on the other. This dialectic is reflected by the fact that most view transit as both a social good which benefits everyone, and a private good which confers benefits primarily to patrons. To date, there has been little reconciliation over what transit's major goals, purposes, and intended benefits are. Tension also arises from the more fundamental debate over whether subsidies are even justified in the first place. Upon close scrutiny,

most economic arguments for subsidizing transit are either unsupported or spurious. Most falter because few motorists have been willing to switch to the transit mode, and subsidies have proven incapable of stemming the industry's overall secular decline. Political arguments are more defensible, however it probably makes more sense to directly pay the intended beneficiaries of subsidies through travel vouchers and travel allowances. Stewardship of the evidence on the benefits of transit to society offers the best hope for resolving the debate.

The fourth chapter reviewed what we currently know about transit's benefits. The intent was to determine whether governments' expectations of transit are realistic, i.e., do their goals reflect legitimate benefits of transit. Over the past two decades, government expectations have been far too high. Advocates have gone so far as to claim that transit will radically reshape the urban landscape. Still, transit has materially benefitted society at large to some degree. The most tangible benefits include increased mobility for the transportation disadvantaged, reduced congestion, and concentrated development patterns. More modest benefits have been the conservation of energy, improved environmental quality, and the provision of back-up transportation in the event of a personal or national emergency.

These benefits are most prevalent in large, densely developed areas. Only the benefit of improved mobility for the needy has been substantially realized in small cities. New transit services usually have only marginal effects in the near-term. The greatest dividends can be reaped by expanding existing services in heavily-used corridors. Still, transit generally provides benefits which are consistent with local, state, and federal objectives. Though benefits are most evident at the community level, they nevertheless have statewide and national relevance.

The survey of local and state transit policy-makers disclosed that these benefits are perceived to redound predominantly to users, followed by local governments, then state and federal governments. Specifically, respondents felt that about one-half of transit's benefits are enjoyed by users, with the remainder accruing to the constituents of local, state, and federal governments on a 50%-25%-25% basis, respectively. Increased mobility for the disadvantaged and improved land development were generally regarded as the most important benefits, and thus, the benefits which best help transit programs achieve their goals.

The question remains as to whether these perceptions can be translated into an acceptable rationale for sharing the costs of transit among governments and users. Since transit's full range of benefits are impossible to monetize and distribute among users and governments with any degree of precision, this approach to cost-sharing seems to have more conceptual than operational merit. Overall, these collective survey preferences appear to have considerable intuitive appeal and generally find support through current policies. That users should assume primary responsibility for covering transit's costs is indisputable. The allocation of one-half of the remainder to localities and the other half to states and the federal government is conceptually straightforward and ostensibly in conformance with the views of many knowledgeable

observers. Additionally, this cost apportionment closely matches how transit's expense burden is currently distributed. Perhaps more importantly, however, this cost-sharing scheme would increase the financial responsibility of users while at the same time lowering that of public entities, in particular the federal government. This is particularly noteworthy in that it represents a step in the direction of current Administration policy.

Several other factors which might help shape a cost-sharing program for transit were examined in the sixth and seventh chapters. The analysis of the incidence of various transit tax sources suggested that the federal government should be a significant funding participant on equity grounds. State and local excise taxes emerged as suitable substitutes for fares on beneficiary principles. Excise taxes, along with gasoline and vehicle registration taxes, were also viewed by transit managers as dependable and therefore preferable revenue sources. Most officials seemed inclined toward a mixed bag of transit revenue sources, however, perhaps with a slight preference for local and state taxes. Collectively, these findings suggest that the funding involvement of all spheres of government provides a robust and generally equitable source of income for transit. Any abrupt shifts in funding policy, however, could disturb this balance and render the net incidence of transit taxes regressive.

In the seventh chapter, the impacts of various government regulations and assistance programs on recent cost and productivity trends were assessed. It was found that all levels of government bear some responsibility for public transit's fiscal problems--efforts to protect transit labor and guarantee equal mobility opportunities for all, while meritorious, have imposed significant financial hardships on local operators. No precise dollar figure, however, can be attributed to the effects of government programs. This does not negate the fact, however, that all government levels have had a hand in transit's current fiscal woes and are therefore obligated to take some constructive action, short of withdrawing all support, to make amends.

The statistical analysis of how subsidies effect the performance of California transit properties provided several useful insights. It was found that, on the whole, operating subsidies exert a negative influence on performance, primarily due to local rather than federal or state aid, and that they seem to more directly impact costs than productivity or ridership levels. In fact, the effect of local aid seemed generally to be about twice as great as federal aid, while state subsidies were largely inconsequential. From a cost-sharing policy perspective, this suggests that the role of governments in financing transit services should probably be scaled down given the deleterious effects of subsidies, in particular the role of localities. In sum, these findings seem to reinforce the perception that user responsibilities should expand somewhat while government involvement should be contracted.

The eighth chapter investigated various options for revising transit's funding composition, all involving an expansion of users' responsibilities and a contraction of the government role, though to varying degrees. Much of the chapter focussed on the effects of phasing

out federal operating subsidies, primarily because this scenario seems to be a very real possibility. Withdrawal of federal assistance can be expected to cause nationwide fares to increase on the order of 17%, service to decrease roughly 3%, and ridership to decline by about 6%. The nationwide picture, however, obscures what will happen among operators of different-sized cities. In large urban areas, impacts will be minimal because operators there depend on federal aid only to a small extent. Since these operators account for 85% of nationwide patronage, most U.S. transit riders will be unaffected by federal cuts. Impacts will be more severe in small urban areas (i.e., those with populations less than one million), because of their relatively heavy reliance on federal aid. Ridership losses will likely average around 15-20% in these areas, and a number of properties may be forced to actually cease operations. Though the majority of U.S. transit agencies are located in smaller cities, they collectively serve only 15% of the nation's riders.

Should massive federal cuts actually come about, ridership losses can be minimized through service reductions rather than fare increases. The selective elimination of unproductive routes and the introduction of distance and time-of-day pricing offer the best opportunities for meeting costs while also minimizing ridership losses. Most operators are also counting upon substantial increases in local and state aid to cushion the federal blow. Should this assistance fail to materialize, nationwide ridership could decline as much as 15%. In general, the poor will bear the brunt of future fare hikes, service cuts, and state/local tax increases spurred by federal cuts.

The other scenarios presented in Chapter Eight involved apportioning costs based upon the perceived distribution of transit benefits and eliminating government subsidies altogether. The benefit-based scenario would result in only a 3% nationwide ridership loss combined with a 10% increase in average fare. By contrast, the elimination of all public subsidies would be devastating, causing nationwide ridership to plummet by well over one billion annual users and average fares to catapult to well over one dollar per trip. All factors consider, the benefit-based cost-sharing approach would have the least inflammatory effects on the nation's transit industry, while also moving in the direction of encouraging improved management practices.

The ultimate challenge, of course, is to translate these findings and those of other researchers into a workable program of cost-sharing for transit. Again, there can be no grand allocation formula for identifying who should finance transit and how much they should pay. In the final analysis, we must rely upon our representative form of governance to marshall what evidence does exist on the pros and cons of subsidies and the financial responsibility of various beneficiaries to fashion a sound and equitable program of cost-sharing for transit.

9.2 Conclusions, Recommendations, and Suggestions for Future Research

The findings of this report suggest that the overall composition of transit funding which has evolved over the past twenty years should not be fundamentally altered. What little evidence there is available would indicate that the current funding composition seems to closely match how

many perceive transit's benefits to be distributed. Based on the explicit goals the three tiers of government have set for transit as well as the policy mandates each has promulgated, there is a strong public acknowledgment of responsibility for the well-being of America's mass transit industry. Empirical evidence seems to suggest that operating subsidies serve to redistribute income to the nation's transportation-disadvantaged, though not necessarily efficiently. However, transit subsidies have also contributed to the industrywide fiscal crisis and productivity declines of the past decade.

The bottom line seems to be how can we best promote mass transit usage, which almost all observers would agree is desirable, without encouraging the kinds of inefficiencies and poor management practices associated with heavy subsidization. This report argues that a balanced financial program consisting of major user involvement and a tripartite arrangement of government participation represents the most prudent course of action. Specifically, a national cost-sharing program whereby users paid for one-half of all expenses, localities covered one-quarter, and states and the federal government evenly split the balance is called for. This recommendation, it should be emphasized, represents the researcher's opinions and not necessarily those of UMTA. Washington is taking appropriate action, however, in paring down federal involvement in the transit area, though any elimination of total public support would need to be seriously questioned. It is doubtful that even the nation's largest transit systems could survive on passenger fares alone. The evaporation of all government subsidies could easily plunge transit into a period of gradual attrition similar to that which brought the industry to the brink of financial collapse prior to the seventies.

This recommendation, it is realized, might not sit well with critics of transit subsidies. Perhaps, however, the bone of contention is less over <u>whether</u> the nation's mass transit services should be subsidized but rather <u>how</u>. Two suggestions are offered in this regard. For one, all governments should rely increasingly on user-sider subsidies which target aid specifically to the intended beneficiaries of much of the public aid, namely the poor. A well-designed subsidy program providing travel vouchers to the nation's poor, elderly, and handicapped could also stimulate greater competition among various service-providers and encourage more innovative para-transit modes to emerge. Second, efficiency objectives can probably be better achieved through subsidy allocation strategies rather than the complete withdrawal of all public support. Governments can encourage the types of efficiency improvements desired and bring escalating costs under control through various incentive programs and the adoption of performance standards. Tying subsidies to improvements in cost recovery or labor productivity offers greater hope for strengthening the industry than simply eliminating operating assistance. In closing, of the one-half share of transit costs shouldered by local, state, and federal governments, it is recommended that an ambitious program of user-side and incentive-based provider-side subsidies be employed.

Several directions for future research are recommended. More effort needs to be devoted toward objectively measuring how transit's benefits are distributed, and more importantly, incorporating relevant

findings into an explicit and focussed framework for financing public transit. More in-depth research is also needed into the specific effects of operating subsidies on transit's fiscal performance and productivity trends. Likewise, a surveillance program should be established to closely monitor productivity changes in response to changes in funding programs, in particular the proposed phase-out of federal operating assistance. The availability of longitudinal data from UMTA's Section 15 reporting system should assist these efforts.

It seems increasingly evident that the coming decade will greatly challenge transit managers' ingenuity. Most will face the unenviable task of keeping their systems operating under tough financial constraints. A large part of future research efforts should be directed toward identifying better transit management techniques and operating practices. Particularly important will be research into ways to increase fare revenue through innovative pricing and ways to increase ridership through the improved provision of specialized services. The success of these research efforts will be measured by transit's continued contribution to the well-being of the nation's cities. The challenge should be met by all fronts of the transportation research community.

Appendix A1
A Review of Government Assistance Programs for Transit

This appendix describes federal, state, and local transit programs that have evolved to date. Primary emphasis is given to the structure of the transit subsidy programs--*i.e.*, the sources and level of program funds, how grants are distributed among eligible operators, and what these monies may be used for.

A1.1. Federal Transit Assistance

The Transportation Act of 1958 was the catalyst for the eventual involvement of the federal government in funding mass transit. This Act vested the Interstate Commerce Commission with power over the abandonment of passenger trains, leading some to fear that money-losing commuter rail services would be discontinued without approval by state railroad commissions. Some municipalities took steps to protect threatened service--*e.g.*, Philadelphia began to subsidize the Pennsylvania and Reading commutation trains. However, cities were often financially strapped and state governments were generally unresponsive to requests for assistance. Consequently, the mayors of New York, Philadelphia, and Chicago, with the support of the American Municipal Association (now the National League of Cities) and the U.S. Conference of Mayors, sought assistance from the federal government.

The transit lobby was initially rebuffed by the Eisenhower administration. However, the release of two major federal reports on transportation issues in 1960 gave credibility to their efforts (Lieb, 1978). Both reports called for increased federal involvement in solving the cities' commutation problems. The breakthrough came when Congress incorporated a modest transit program in the Housing Act of 1961. Transit-related provisions of the Act provided $25 million for a program of transit demonstration projects and $50 million for a small program of loans and loan guarantees for capital improvements (Hilton, 1974). Both programs were administered by the Housing and Home Finance Agency, which later merged into the Department of Housing and Urban Development.

The transit provisions of the 1961 legislation were significant for several reasons. First, the main purpose of the demonstration program was to determine if investment in transit would increase ridership and attract large numbers of commuters from their automobiles. Urban congestion had been worsening each year in spite of large public expenditures for roads. Improving mass transit was seen as a possible alternative for easing congestion, but the post-WWII performance of transit had been characterized by plummeting patronage, service cuts, aging capital, and a poor public image. The demonstration program was to establish (or discourage) the viability of federal investment in transit. Early demonstration results generally indicated that improved transit could encourage increased ridership (Smerk, 1964).

The programs were also important because they revealed

Congressional interest in urban transportation problems. This small beginning gave Congress time to "test the political waters" to see if a large mass transportation program was something that it wished to undertake (Altshuler, 1979).

Finally, transit's early association with housing programs has resulted in a program structure which deals primarily with municipalities and local transit agencies. The federal highway program, by comparison, has worked through the states. As a result, public transit's early growth was shaped by a large number of clients and gave rise to major managerial problems in dealing with multiple public interests.

Transit advocates were encouraged by their successes and sought expanded federal funding. The Highway Act of 1962 brought them one step closer to that goal. This Act required that cities with populations over 50,000 engage in comprehensive, continuing, and cooperative transportation planning in order to qualify for federal highway funds. In effect, it demanded a broad examination of transportation options and their relationship to the urban environment. The federal government had recognized the need for a balanced transportation system and was beginning to encourage the integration of highway and transit systems. The Highway Act's major shortcoming was that it did not provide funds supporting options other that highways. By this time, it was apparent that the transit program would be ineffective because neither public nor private transit agencies could see any prospect for loan repayment.

A1.1.1. Capital Grants

President Kennedy emerged as a strong ally of transit and recommended that Congress establish a capital grant program for public mass transportation. However, in the political transition that took place after his assassination, transit moved down the priority list (Lieb, 1978). In late 1963, urban-metropolitan interests, organized labor, and the mass transportation industry formed the Urban Passenger Transportation Association (UPTA) to advocate federal aid for mass transit and, specifically, to support a transit bill which had been delayed in a Congressional committee for over a year. Although prospects appeared slim, with effective lobbying by the UPTA and strong support from the Johnson administration, the Urban Mass Transportation Act of 1964 (Public Law 88-365) was passed and signed into law on July 9th.

The UMT Act provided the outright federal grants which the transit industry had sought. It initiated a program of capital grants (Section 3) allocated to public agencies on a discretionary basis. No state could receive more than 12-1/2% of the total program funds. This limitation was a political tool designed to generate geographically widespread support (Hilton, 1974). In practice, it led to an inefficient disbursement of funds, since the bulk of transit demand was, and continues to be, concentrated in a relatively few states with highly urbanized areas.

The Section 3 grant program would provide two-thirds of the net cost of any capital improvements. "Net" cost was defined as that part of the total project cost which would not be financed from revenues.

The remaining one-third of the net cost would be covered by state and local governments or special districts with taxing power. The two-thirds/one-third split was dependent on the completion of local long-range transportation plans, a requirement that dovetailed nicely with the Highway Act of 1962. The planning requirement was to ensure that highway and mass transit projects complemented, rather than competed, with each other. If local plans were not finished within three years of the bill's enactment, the federal share was lowered to one-half.

The final terms of the Act provided authorization for appropriations totaling $375 million. The initial appropriation was for $78 million. Table A1.1 documents Section 3 spending (as well as other programs) through 1980. Many of the first grants were used to replace obsolete rolling stock and for public takeover of private transit companies.

The next several years brought a number of significant developments in the transit program. Congress made several amendments to the UMT Act in 1966. Capital grants provided under Section 3 of the Act were extended at a rate of $150 million per year for the next three years. A technical studies program (Section 9) was also added on the same shared responsibility basis as the capital grant program (2/3 federal, 1/3 local). This program was developed in response to the claims of many cities that they were unable to finance the planning studies required for maximum federal funding (Lieb, 1978). Lastly, the 1966 legislation established a new program of research, development, and demonstrations, and a program of management training for persons already involved in transit administration.

The transit program underwent a major administrative change in 1968, when it was shifted from HUD to the new Department of Transportation (DOT). The Urban Mass Transportation Administration (UMTA) was established within DOT to administer the transit program.

Pressure continued to mount in the late 1960s for increased federal support. More and more cities were seeking to replace their aging bus fleets and old maintenance facilities, and several costly rail projects had reached the stage of capital funding eligibility. Transit advocates maintained that federal funding commitments were too short term, thus preventing strategic planning and hampering efforts to raise local transit funds. Proposals to alleviate this problem included the creation of a transit trust fund, similar to the Highway Trust Fund, or yearly appropriations from the Highway Trust Fund for transit projects. Both met with strong opposition.

The 1970 UMT Act responded to these pressures by providing contract authority for $3.1 million dollars over five years--an average of $600 million per year--but left Congress with authority to make appropriations on an annual basis. The Act also provided a non-binding commitment for federal expenditures of $10 billion over a twelve year period, "to permit confident and continuing local planning and greater flexibility in program administration" (Public Law 91-453). Prior to 1970, annual federal transit assistance had never exceeded $200 million. The fact that the federal transit program had begun under Kennedy and

TABLE A1.1 SUMMARY -- DISTRIBUTION OF UMTA PROGRAM FUNDS
(in thousands)

	Section 3	Section 5	Section 18	Technical Studies	Research, Development, & Demonstrations	Managerial Training	University Research
1965	$50,680	---	---	---	$8,977	---	---
1970	132,834	---	---	$7,778	17,269	$19	$3
1975	1,150,763	$151,591	---	36,947	47,257	463	2
1980	1,650,000	1,550,000	$56,000	*	*	*	*

*Unavailable

Source: USDOT, UMTA, 1977; USDOT, UMTA, 1980.

Johnson administrations and had now received its principle funding under the Nixon administration reflected the essentially bipartisan support that the program enjoyed during this period (Hilton, 1974). UMTA distributed program funds of $399 million in 1971, $602 million in 1972, and $971 million in 1973.

A1.1.2. The Highway Trust Fund and Interstate Transfers

By 1973, the nation's transit industry faced an operating deficit of $738 million (APTA, 1981). Many transit officials advocated dropping the Section 3 grant program and initiating a program of federal operating subsidies (Hilton, 1974). Another priority on the transit lobby's agenda was the diversion of Highway Trust Fund monies to major transit projects (U.S. DOT, 1974). The Congress addressed these issues extensively in 1973 debates. The administration opposed operating subsidies because it feared they would encourage inefficiencies, but favored opening up the Highway Trust Fund to transit. The debate culminated in the Highway Act of 1973.

The Act contained several provisions regarding transit funding. Congress appropriated $3.0 billion more toward its $10 billion "commitment" from 1970. Also, the federal share for capital and technical studies grants was increased from two-thirds to 80%.

Two new programs were established by the Act. Local jurisdictions were allowed to use the Federal Aid for Urban Systems (FAUS) money, which comes from the Highway Trust Fund, for transit capital improvements and planning assistance projects. It marked a departure from the sole use of general funds for federal transit assistance and constituted a cross subsidy from auto users to transit. The law also established the Interstate Transfer program which permits state and local officials

to withdraw segments of the Interstate and to substitute mass transit or non-Interstate highway projects. The approval of an Interstate withdrawal creates an authorization of funding for use only by the affected area. Also, funds come from the General Treasury, not the Highway Trust Fund. The current federal share for substitute projects is 85%, compared to 80% for other transit programs.

A1.1.3. Operating Assistance

Only one year after the Highway Act of 1973, the transit industry began experiencing a serious financial crisis. The nationwide transit deficit had risen to $1.3 billion by 1974, in part because of rapidly soaring operating costs and declining constant-dollar fares. Operating costs were rising primarily because of major increases in the cost of labor and the rapid expansion of rush hour services to suburban areas. Congress responded with the National Transportation Assistance Act of 1974 (Public Law 93-503).

The Act significantly increased funding for the federal transit program by authorizing $11.8 billion over a six year period. It also established a new grant program (Section 5) which would provide funds for either capital improvements or operating costs. Funds were distributed in accordance with a national formula to all urbanized areas (population over 50,000) based on population and population density. If the funds were used for capital purposes, the federal share was 80%; if for operating aid, the federal share was 50%. To date, the vast majority of Section 5 funds have been used for operating assistance.

A1.1.4. Fine-Tuning the Federal Transit Program

The 1974 Act was landmark legislation for the American public transportation industry. Transit activists now had a full array of federal programs for transit: capital, operating, planning, demonstration, research, and management grants. Following 1974, there was relatively little new legislation for transit. The transit industry and the UMTA wanted to evaluate the new program and its impact (Smerk, 1979). It was expected that by 1977, sufficient evidence would be available to enact new legislation to correct deficiencies in the transit program. Although escalating costs and lagging revenues continued to undermine transit's fiscal health--the industry deficit reached $2.0 billion in 1977 (APTA, 1981)--the political climate stymied efforts to push through new transit legislation.

It was not until October of the next year that a joint highway-transit bill was signed into law: the Surface Transportation Act of 1978. The Act increased funding levels and made some major revisions in the mass transit program. The transit portion of the bill authorized $15.2 billion to be distributed over five years: $3.2 billion in 1979, $3.3 billion in 1980, $3.5 billion in 1981, $3.7 billion in 1982, and $1.6 billion in 1983.

The Section 5 program received some major restructuring. The 1978 Act called for funds to be funneled through four levels or tiers (UMTA, 1980):

TIER I continues the original grant program, which provides funds to urbanized areas based on population and population density for either capital or operating assistance purposes.

TIER II is a supplemental program aimed at the largest urbanized areas; 85% of the funds go to urbanized areas with populations over 750,000. Again, funds are apportioned on the basis of population and population density and can be used for either operating or capital assistance.

TIER III is for capital and operating assistance projects involving commuter rail and/or other fixed guideway systems. Funds are apportioned on the basis of commuter rail and fixed guideway route miles and commuter rail train miles operated within each urbanized area.

TIER IV is for the purchase of buses and bus related items including support equipment and the construction of bus facilities. These funds may not be used for operating assistance and are apportioned on the basis of population and population density.

Each tier receives annual appropriations; in 1979, the formula grant program was appropriated $1.52 billion, split between tiers as follows: Tier I, $850 million; Tier II, $250 million; Tier III, $300 million; Tier IV, $115 million.

Section 3, the regular capital grant program, was to be used primarily for large-scale projects. Each year at least $350 million must be spent on rail modernization and $200 million is available for intermodal terminals and transit-related urban development projects. The discretionary funds cannot be used until Section 5 or Section 18 (the new small urban and rural assistance program) allocations have been exhausted (Smerk, 1979).

Finally, the 1978 Act initiated a new program (Section 18) of capital and operating grants for use by cities of under 50,000 population. In a departure from other federal transit programs, the funds are apportioned to states based on their share of the total nonurban population of the United States. The states must ensure the fair and equitable distribution of the funds, presumably through some mechanism similar to the federal formula. Public bodies, nonprofit agencies, and private operators are eligible for Section 18 money, the latter through purchase of service agreements with local public bodies. The federal share, as with the Section 5 program, is 50% for operating assistance and 80% for capital improvements.

A1.1.5. Summing Up Federal Involvement

A narrow, small-scale federal transit program originally formulated in response to a specific crisis has developed rapidly into a large, broad-based financial assistance program. Transit programs and policy have emerged from Congress primarily as a result of the lobbying efforts of urban interest groups. Since the late 1960s, the transit industry

has taken the lead in proposing new legislative programs, specifying priorities, and setting funding targets. The rest of the transit lobby then works with Congress for the best transit package it can achieve (Altshuler, 1979).

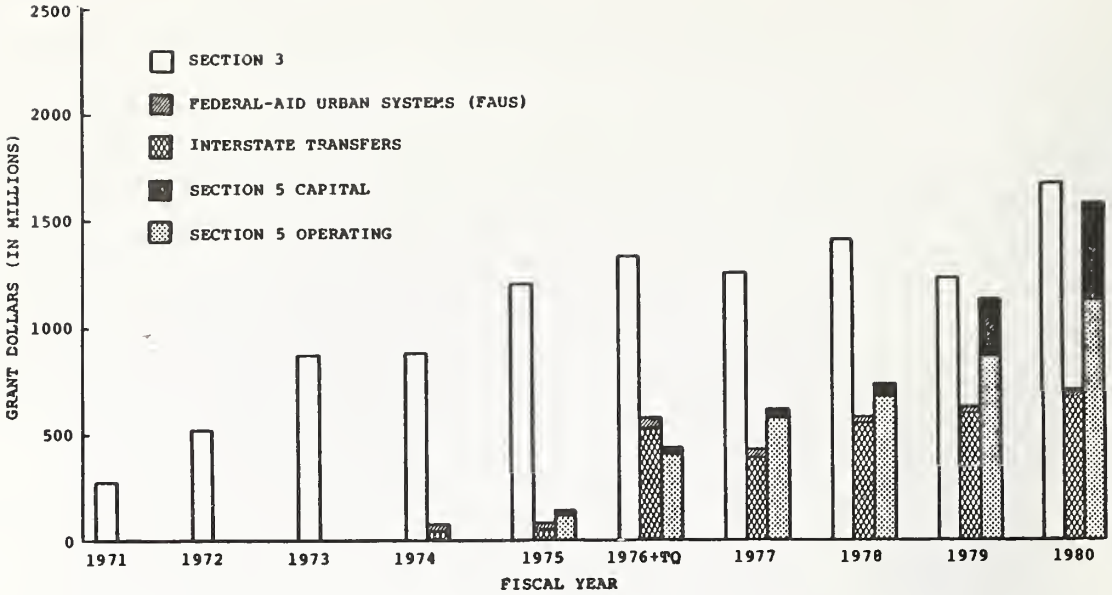
UMTA's current capital and operating grant programs are summarized in Table A1.2. These are the Section 3, 5, and 18 programs established by the UMT Act of 1964, as amended, and the Interstate Transfer and FAUS programs established by the Highway Act of 1973. Figure A1.1 shows the relative funding levels of these programs from 1971 through 1980.[1] Section 3 capital grants continue to be the most highly funded program, but Section 5 grants have been steadily growing since their initiation in 1975. Most of these grants have been used for operating assistance. Federal Aid Urban Systems monies have not been substantially utilized for transit projects.

TABLE A1.2 SUMMARY OF UMTA OPERATING AND CAPITAL GRANT PROGRAMS

PROGRAM	DESCRIPTION	INITIATED BY	FEDERAL/LOCAL SHARE	1980 FUNDING LEVEL
Section 3	A program of discretionary capital and planning assistance grants to transit agencies and public bodies.	UMT Act of 1964	80%/20%	$1.65 billion
Section 5	A program of formula grants to designated recipients for both operating and capital assistance. Allocation formulae determine funding distribution for various purposes under four tiers on the basis of population, population density, commuter rail train and route miles, and fixed guideway route miles.	National Transportation Assistance Act of 1974	80%/20% (capital) 50%/50% (operating)	$1.55 billion
Section 18	A program administered jointly by UMTA and the Federal Highway Administration providing formula grants to states for capital and operating assistance projects in small urban and rural areas.	Surface Transportation Act of 1978	80%/20% (capital) 50%/50% (operating)	$56 million
Interstate Transfer	A program which allows local Jurisdictions, with proper approval, to substitute transit or highway related capital and planning assistance projects for non-essential segments of the Interstate Highway System.	Highway Act of 1973	85%/15%	$679 million (transit)
Federal-Aid Urban	A program which permits the funding of transit projects with urban system Highway Trust Funds.	Highway Act of 1973	80%/20%	----

Source: USDOT, UMTA, 1980.

[1] Section 18 funding levels are omitted from Figure A1.1; 1980 was the first year of funding.



Source: USDOT, UMTA, 1980.

FIGURE A1.1 ANNUAL TRANSIT ASSITANCE PROGRAM LEVELS

A1.2. State Transit Assistance

Financial assistance for local transit is well established in many states, particularly those with large urban areas.[2] The programs vary extensively from state to state in the amount of aid provided and the mechanisms used to provide it. Generally, state assistance comes through direct grants for capital improvements, operations, demonstration programs, and technical planning. In addition, states indirectly provide support by passing enabling legislation granting special taxing power (sometimes subject to local referendum) to local governments or transit districts. This indirect support simply provides the means for localities to subsidize their own transit services using revenue sources other than general funds.

States have progressively been drawn into the transit issue. In the late 1950s, when several commuter rail operations were threatened with abandonment, states refrained from providing direct subsidies. However, with a new federal urban transportation policy emerging in the Highway Act of 1962 and the UMT Act of 1964, states began to play a more active role. In response to the availability of federal capital grants for mass transit, many states provided a portion or all of the required local share. Also, the establishment of the U.S. Department of Transportation in 1967 prompted many states (39 by 1975) to organize their own DOTs, with primary responsibility for transit often falling within the purview of planning divisions. Once a federal role in transit funding had been formulated, localities were able to elicit state support.

[2] This discussion is drawn primarily from two sources: R. L. Carstens, *et al.*, 1976; and Fitch, 1979.

A1.2.1. Funding Levels

By 1975, thirty-two states had allotted funds for transit, although over 90% of the total was accounted for by six states with large cities and rail transit systems either in existence or under construction. Table A1.3 shows the funding breakdown for the seventeen states which allotted one million dollars or more. Of the fifteen other states, only North Carolina and Kentucky allotted more than $100,000 and most limited their support to technical studies grants. As expected, it was the more rural states that confined their transit programs to planning grants and special programs for the elderly and handicapped. States provided a total of about $810 million (California omitted) in transit assistance in 1974-75.

TABLE A1.3 LEVEL OF STATE TRANSIT SUPPORT -- 1975

	EXPENDITURE CATEGORY (millions of dollars)			
STATE	CAPITAL	OPERATING	PLANNING	TOTAL
Maryland	129.3	50.3	1.9	181.5
Illinois	40.0	113.0	0.7	153.7
New York	100.0	45.9	0.4	146.4
New Jersey	32.0	72.0	0.8	104.8
California	---	---	---	95.0[1]
Pennsylvania	15.0	74.0[2]	1.0	90.0
Massachusetts	17.0	48.0	---	65.0
Michigan	13.0	11.0	0.5	24.5
Virginia	3.6	---	0.2	3.8
Connecticut	0.8	15.1	0.2	16.1
Florida	7.0	---	0.7	7.7
Washington	6.0	---	---	6.0
Rhode Island	---	2.4	---	2.4
Wisconsin	---	1.0	0.4	1.4[3]
Tennessee	1.0	---	0.6	1.6
Delaware	0.4	0.8	0.1	1.2
Nebraska	---	1.0	---	1.0
15 others	1.6	0.6	0.8	3.0
TOTAL	366.7	435.1	8.3	905.1

[1]Total figure for 1973-74; breakdown not available.

[2]Excludes reimbursement for senior citizen fare reduction from state lottery proceeds.

[3]Budget figures include federal grants; state grants estimated at 20% of total

Source: USDOT, UMTA, 1979, p.85.

Although most financial support for transit capital improvements comes from the federal UMTA program, eighteen states provided capital grants in 1975. These states have sought primarily to generate federal funds by limiting their aid to projects which are eligible for federal grants. The portion of the local share provided from state funds varies among states.[3] Only three states had capital grant programs for projects that cannot be federally funded. Capital grants made up about 45% of the transit funds allocated by states.

Operating assistance made up the largest portion, 55%, of state support for transit in 1975, the first year federal operating subsidies were available. Fourteen states provided operating assistance to local transit agencies in that year. Many of these states have sought to link operating subsidies with incentives for improved service and management. Only two states, Connecticut and Rhode Island, covered all operating losses--not covered by federal subsidies. Eight other states covered half, or more, of operating losses, provided that certain conditions were met, usually that operating revenues cover a specified percentage of costs.

State level planning grants are relatively small in comparison with capital and operating support. Almost all states that actively support transit provide assistance either with state personnel or through direct grants.

A1.2.2. Sources of State Funds

There are three mechanisms most often used by states as funding sources for capital and operating grants:[4]

(1) Apportionment from state bond funds--for capital outlays.

(2) Apportions from state general funds--for capital and/or operating outlays.

(3) Earmarking for transit, part or all, of the proceeds of specific taxes, either transportation related or general taxes--for capital and/or operating outlays.

---

[3] Four states provided all of the local share (Connecticut, Delaware, New Jersey, Rhode Island); another ten states provided half or more of the local share (Florida, Georgia, Illinois, Maryland, Massachusetts, Michigan, New York, Pennsylvania, Tennessee, Virginia); and a number of states vary their contributions to the local share.

[4] General and bond funds are apportioned through formulas based on demographic or transit performance data, or *ad hoc* arrangements used to ward off specific crises. Earmarked taxes are often apportioned on the basis of taxing levels in the transit district. This last type of apportionment has two advantages over other methods: competition between communities for favorable allocations is dampened, and expected annual funds can be more accurately estimated. It does, however, preclude disbursement on the basis of need.

Although general funds have been the dominant source of money for state transit allocations, a number of other sources are commonly used. These include the gasoline tax, sales tax, motor vehicle registration fees, and lottery receipts. Several states also make use of a state transportation fund to support their transit programs. Transportation funds are either dedicated funds used by all modes of transportation or highway trust funds--derived from road use taxes--which have been opened for transit use.

A1.2.3. Summing Up: State Transit Assistance

It is difficult to draw a comprehensive, up-to-date picture of state transit funding because it varies widely over time. Still, state involvement is clearly increasing. State operating assistance has more than doubled since 1975, reaching $820 million in 1980 (APTA, 1981). Although no comparable figures are available for state capital and planning grants, the increasing availability of federal grants on an 80%/20% matching basis would suggest that state support will continue to expand for those purposes.

A1.3. Local Transit Involvement

Localities have played a significant role in transit since the industry's formative years. Initially, local government involvement was limited to granting franchises to private companies and regulating their service levels and fare structures. However, public takeover of private systems during the past several decades led to a vastly expanded local role.

As early as 1894, private transit promoters in Boston realized that public backing was essential to raise enough capital for construction of the subway. The Boston Transit Commission built and owned the city's system, but leased its operation to a private firm. The Boston "El" and private surface lines were eventually consolidated and began operating as a publicly-sponsored service in 1948 (Womack, 1979). Although 97% of U.S. transit systems were still privately owned in 1950, transit properties in several of the largest metropolitan areas--New York, Chicago, Boston, San Francisco--were already publicly owned and operated. Because these public systems were in large, transit-dependent cities, they collectively carried nearly as many passengers as the private transit systems (Meyer, 1977).

The introduction of federal capital subsidies in 1964 helped spawn public ownership of transit properties. This trend accelerated in the early 1970s so that by 1980, 55% of the nation's transit systems had made the transition to public ownership (APTA, 1981). These systems accounted for 94% of the total passenger trips made that year.

In addition to owning and operating transit systems, local governments have become extensively involved in subsidizing capital improvements and operating deficits. In 1961, twenty-one cities provided subsidies to transit, but by 1971, the number almost quadrupled to eighty-one (Hart, 1973). During that period, most of these cities were faced with the pressing problem of keeping their transit systems running. Localities have covered the largest share of operating deficits through the 1970s. In 1980, local operating assistance amounted to $1.7 billion, which was 107% and 56% larger than the state and federal contributions, respectively (APTA, 1981).

Funding sources utilized by local governments have been varied. In eighteen of the twenty-five largest cities, taxes earmarked specifically for transit made up all or a portion of operating deficits. Among these eighteen cities, two revenue sources predominated: ten earmarked the sales tax and five earmarked the property tax.[5] A number of cities (11 of 25) made substantial use of general funds, which are also the predominant source of transit support in small communities.

In addition to the sales and property taxes, localities rely on a variety of other revenue sources. These include mortgage taxes (New York, Buffalo), a payroll tax (Portland), an earnings tax (Cincinnati, Louisville), a gasoline tax (Baltimore, Chicago, Detroit), motor vehicle taxes (Baltimore, Detroit, Seattle), and tolls (New York, San Francisco). Cities in Pennsylvania utilize lottery proceeds for transit.

A1.4. Recapping Operating Assistance

Public operating subsidies play a crucial role in supporting the nation's transit services. Table A1.4 shows transit revenue trends from 1975, the first year that federal operating assistance was available, through 1980. During this period, operating revenues increased 28% while operating assistance from the local, state, and federal governments increased 143%, 101%, and 263%, respectively. In current dollars, annual operating revenues increased $566 million (from $2.00 to $2.57 billion), which was a substantially slower rate of growth than that of government subsidies. Annual subsidies increased $2.21 billion, from $1.41 to $3.62 billion, between 1975 and 1980. In each of the last two years, subsidies have exceeded operating revenues. Together, operating and non-operating revenue accounted for just 43% of the total industry-wide revenue income of $6.31 billion in 1980.

Table A1.5 summarizes the public operating assistance received by the nation's twenty largest transit operators. Each operator receives a portion of its aid from UMTA Section 5 funds. Levels of state and local support vary extensively. For example, Cleveland relied heavily on federal support, covering nearly 90% of its deficit through federal assistance. Boston, on the other hand, was dependent on state general funds and a local dedicated tax for about 87% of its public support.

---

[5] Among those cities earmarking the sales tax for transit were Los Angeles, San Diego, Denver, Atlanta, Chicago, Kansas City, St. Louis, and Seattle. Cities using the property tax were Boston, the Twin Cities, Milwaukee, San Francisco, and Denver.

TABLE A1.4 TREND OF TRANSIT REVENUES
(millions of dollars)

	TOTAL OPERATING REVENUE	NON-OPERATING AND AUXILIARY REVENUE	OPERATING ASSISTANCE				TOTAL REVENUE
			LOCAL	STATE	FEDERAL	TOTAL	
1975	$2002.4	$ 40.6	$ 699.4	$ 406.6	$ 301.8	$1407.8	$3450.8
1976	2161.1	75.0	857.4	367.1	422.9	1647.3	3883.4
1977	2280.0	73.6	841.1	478.4	584.5	1904.1	4257.7
1978	2381.1	68.8	977.8	564.3	689.5	2231.7	4681.5
1979	2524.2	123.6	1416.9	637.7	855.8	2910.4	5558.2
1980	2568.2	127.4	1703.9	820.4	1093.9	3618.1	6313.7

Note: Excludes automated guideway transit, commuter railroad, and urban ferry boat.

Source: APTA, 1981.

TABLE A1.5 SOURCES OF PUBLIC OPERATING ASSISTANCE: TWENTY LARGEST TRANSIT OPERATORS
(Note: fiscal year ending between 7/1/81 and 6/30/79)

		Percent of total public assistance:					
		FEDERAL		STATE		LOCAL	
	TOTAL PUBLIC ASST. $(000)	SECTION 5	OTHER	GENERAL REVENUE	DEDICATED	GENERAL REVENUE	DEDICATED
NYCTA/MABSTOA	333143.1	25.6	--	27.3	20.8	26.3	--
Chicago TA	163161.1	27.0	--	12.6	--	5.8	54.7
South Cal. RTD	130870.7	39.6	1.7	--	0.1	0.5	58.1
SEPTA - Phil.	139966.2	27.8	5.4	43.2	6.8	15.6	1.1
WMATA	102305.7	23.2	--	--	--	76.8	--
MBTA - Boston	201190.8	11.2	2.1	49.5	--	--	37.2
Transport of N.J.	36687.0	42.4	--	56.5	--	1.1	--
SEMTA - Detroit	77365.5	39.4	2.9	12.4	43.6	1.7	--
Cleveland RTA	12545.8	89.5	0.2	5.3	--	4.9	--
PAT - Pittsburgh	51502.3	30.5	--	45.9	9.2	14.3	--
Baltimore MTA	29798.4	51.2	--	--	48.8	--	--
Bi-State DA	47693.3	32.9	0.4	--	11.3	--	55.5
S.F. MUNI	58479.2	15.2	8.9	--	--	64.8	11.1
St. Paul MTC	43988.3	22.9	--	44.8	--	--	32.3
MARTA	40927.9	15.0	0.6	--	--	--	84.3
AC Transit	37781.0	31.3	--	10.1	--	--	58.6
Seattle Metro	23234.2	17.4	0.3	--	81.0	1.3	--
RTD Denver	3230.6	68.1	31.9	--	--	--	--
Metro Dade Co. TA	21860.7	38.7	0.8	--	--	60.5	--
Milwaukee Co. TS	12795.3	56.6	--	28.9	--	14.5	--

Source: USDOT, UMTA, 1981.

Appendix A2
A Description of the Transit Finance Survey

To support this research, a Transit Finance Survey was carried out. Questionnaires were mailed to 252 transit policymakers: all fifty state transit programs and 202 local transit operators throughout the country. All local agencies with 50 vehicles or more and one-half of the local agencies with less than 50 vehicles were surveyed.[1] Call-backs were made to increase the response rate.

The actual questionnaire and the cover letter used to transmit it can be found at the end of this appendix. Questions were wide-ranging; information requested included tax sources, program goals, and opinions on the importance and distribution (among levels of government) of transit's benefits. It is important to note that responses represented the official positions of each agency's policy board on the range of questions posed.

Table A2.1 lists the state transportation agencies and local transit agencies responding to the questionnaire. As shown in Table A2.2, the overall survey response rate was about 50%, considered adequate for statistical analysis (Babbie, 1973). Surveys were received from thirty states (57%) and ninety-nine operators (49.5%). Generally, the response rate was higher for the large operators than for the small ones, partly because call-backs focused primarily on large operators. The high response of large operators means that transit systems serving about 80% of the total U.S. transit ridership were represented in the survey.

A problem with any survey of this sort is that respondents may not be in a position to predict future actions accurately, such as the likely response to federal cuts in operating assistance. To minimize this problem, the questionnaires were directed to transit managers, who have the greatest knowledge about their agencies. Table A2.3 shows that 28% of the respondents were either transit mananagers or heads of major departments. The average respondent had nine years of experience in the administration of transit services and five years in his present position.

---

[1] Information on the number of vehicles operated by each agency was obtained from UMTA Urban Mass Transportation Statistics, 1981. There are 123 operators listed with 50 vehicles or more, and questionnaires were sent to each. There are 184 listed operators with 49 vehicles or less, and questionnaires were sent to 77, or 42%, of them. Operators receiving questionnaires were chosen at random, using a random-number table.

Table A2.1

State and Local Survey Respondents

State Respondents

Alabama	Maryland
Arizona	Michigan
Arkansas	Minnesota
California (CTC)	New Hampshire
California (CALTRANS)	New Jersey
Colorado	New York
Delaware	North Carolina
Dist. of Columbia	North Dakota
Georgia	Oregon
Hawaii	Pennsylvania
Idaho	South Dakota
Illinois	Utah
Iowa	Vermont
Kentucky	Virginia
Maine	Wyoming

Local Respondents

Chicago TA	Northern Kentucky TA
Southern Calif. RTD	Fort Worth CITRA
SEPTA Philadelphia	Gary PTC
WMATA Washington	Suburban Safeway
MBTA Boston	Western Reserve Transit
Transport of New Jersey	Grand Rapids Transit
Cleveland RTA	St. Petersburg MTS
Pittsburgh PAT	Kanawha Valley RTA
Baltimore MTA	Oklahoma City MASSTRANS
Bi-State DA St. Louis	Erie MTA
San Francisco MUNI	Central Arkansas Transit
St. Paul MTC	Lane County MTD
MARTA Atlanta	Lehigh/Northhampton TA
Seattle Metro	Winston-Salem MTS
Denver RTD	Portland Transit
Milwaukee County TA	Santa Barbara MTD
Buffalo-Niagara TA	Raleigh TS
Detroit DOT	Brockton Area Transit
Tri-County Metro Portland	Lexington/Fayette UCG
New Orleans Public Service	Stockton MTD
Dallas Transit	Alachua County RTA
San Diego Transit	Corpus Christi Transit
Honolulu DOT	Peoria MTD
Utah TA Salt Lake	Springfield MTD
New York MSBA	South Coast Area Transit
Memphis Transit	Champaign-Urbana MTD
Norfolk-Tidewater TDC	Lubbock Transit

Table A2.1 (continued)

Local Respondents
(continued)

Golden Gate Transit	Springfield City Utilities
SEMTA Detroit	Red Rose Transit
Houston Transit	Syracuse and Oswego ML
Santa Clara County TD	Altoona Metro Transit
Albany Capital DTA	Sioux City Transit
Central Ohio Columbus	Norwalk Transit System
Rhode Island PTA	East Volusia TA
Sacramento RTD	Topeka MTA
San Mateo County TD	Beaumont Transit System
Richmond Transit	Westside Transit Lines
Phoenix Transit	Saginaw Transit Service
Indianapolis PTC	Culver City MBL
New Haven Transit	Monterey Transit
Omaha TA	Green Bay Transit
Toledo Area RTA	York Area TA
Jacksonville TA	Vallejo Transit
Central New York RTA	Richland County Transit
Broward County Comm.	Columbia Area Transit
Nashville MTA	Brevard TA
Miami Valley RTA	Billings MTA
Madison Metro	Lafayette PTC
North Suburban MTD	Rochester City Lines

Table A2.2

Survey Response Rate by Operator Size

Operator Size (number of vehicles)	Number of Questionnaires: Sent	Received	Response Rate
Over 1,000	13	10	77%
500-1,000	10	8	80%
250-499	18	11	61%
100-249	42	22	52%
50-99	40	16	40%
25-49	35	17	49%
Under 25	42	15	36%
Totals	200	99	50%

Table A2.3

Position of Survey Respondents

Position	Number of Respondents	Percent of Total
Transit Manager	57	58%
Planning Director	10	10%
Finance Director	14	14%
Planner/Engineer	18	18%
Total	99	100%

UNIVERSITY OF CALIFORNIA, BERKELEY

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO SANTA BARBARA • SANTA CRUZ

INSTITUTE OF URBAN AND REGIONAL DEVELOPMENT BERKELEY, CALIFORNIA 94720

Dear Transit Official: September 3, 1981

How should the nation's public transit services be financed? I'd like to request your assistance in probing this important policy question. As part of a Federally-sponsored research grant, I'm examining alternative rationales for financing transit services, each involving different levels of participation among users and various governmental entities. Should the Federal role in financing transit operations increase, decrease, remain the same? How about State, Local, and user participation?

The enclosed survey aims to elicit responses to such questions and to draw a composite picture of attitudes regarding the finance of public transit. To the extent possible, responses should represent official positions by your agency's policy board on these particular issues. Accordingly, the questionnaire should be completed by those management level personnel most accountable to your agency's policy-making body on transit affairs. For the sake of consistency, it's requested that the questionnaire be completed by each agency's Manager/Executive Director (or his or her deputy on transit matters).

All survey responses will be aggregated and examined on a nationwide level. Thus, individual responses will remain strictly confidential and be treated anonymously.

Your prompt return of the questionnaire is appreciated. A self-addressed, stamped envelope has been enclosed for your convenience. Should you have any questions or need clarifications, please contact me or my assistants at (415)-642-1629. Also, I'd be glad to provide you with a copy of the study results should you be interested. Your time and interest in this project are greatly appreciated.

Sincerely,

Robert Cervero

Robert Cervero,
Assistant Professor

TRANSIT FINANCE SURVEY

Please respond to each question to the best of your abilities. Questions are self-explanatory.

I. AGENCY INFORMATION

A. Agency name _____

B. Type of organization *(circle one)*

1. municipal transit agency
2. county transit agency
3. state administered transit agency
4. special transit district *(identify type)* _____
5. other *(explain)* _____

C. List state and local tax sources currently used to finance your agency's transit operations:

_____ _____ _____

_____ _____ _____

II. RESPONDENT INFORMATION

A. Your title or position _____

B. Number of years in current position _____

C. Number of years employed in either the operation, management, or administration of transit programs _____

D. Age _____

E. Sex _____

F. Number of years of post-high school education _____

Last degree received and major subject area _____

III. AGENCY GOAL IDENTIFICATION

A. Enumerate the most recent goals which have been established by your agency's policy-making body concerning the operation and provision of public transit services. If these goals have been prioritized, list and number them in the space below beginning with the highest priority goal and ending with the lowest priority goal. *If goals have not been prioritized, list, but do not number them.* Using the five-point scale shown below, also rate each goal as to your perceptions of its importance. *(Use additional paper if more space is required.)*

Least Important	Somewhat Important	Moderately Important	Very Important	Most Important
1	2	3	4	5

List goals here -- circle appropriate number to rate goal's importance.

( ) _____ 1 2 3 4 5

_____

( ) _____ 1 2 3 4 5

_____

( ) _____ 1 2 3 4 5

_____

( ) _____ 1 2 3 4 5

_____

( ) _____ 1 2 3 4 5

_____

Note: If your agency's transit goals have been published in a recent report or newsletter endorsed by its policy board, please attach a copy of the relevant excerpts in addition to the list and ratings.

B. Does the list of goals represent *(check one)*:

--explicit goals of your agency _____

--your perceptions of agency goals _____

IV. INSTITUTIONAL-LEVEL ANALYSIS OF TRANSIT BENEFITS

How would you distribute 100 percent of the following social benefits of public transit services among the three spheres of government shown (i.e., to what extent do you feel each benefit listed accrues to the constituents of the Federal versus State versus Local governments)?

BENEFITS / GOVERNMENT SPHERE:	LOCAL* CONCERNS		STATE CONCERNS		FEDERAL (NATIONAL) CONCERNS	
Conserve energy		+		+		=100%
Improve the mobility of the poor, young, elderly, and handicapped		+		+		=100%
Increase business activity and central city vitality		+		+		=100%
Conserve land that would otherwise be used for streets and parking		+		+		=100%
Reduce highway and inner-city congestion		+		+		=100%
Improve environmental quality (i.e., reduce noise, air, and visual pollution)		+		+		=100%
Improve safety (i.e., reduce highway related casualties and property damage)		+		+		=100%
Serves as an optional mode of travel in the event of personal or national need (e.g., as an auto substitute, for mass evacuation, for defense readiness)		+		+		=100%
Other *(specify)*: _____ _____ _____		+		+		=100%

**Local refers to municipal, county, special district, and regional concerns*

V. EVALUATION OF TRANSIT BENEFITS

This section consists of two sub-parts concerning the importance of transit benefits to your agency.

(A) RELATIVE IMPORTANCE OF BENEFITS
Assign percentages to each benefit in terms of its importance relative to the other social benefits listed, such that the summed total equals 100 percent.

(B) GOAL ATTAINMENT RATING
Using the three-point scale on the right side of the table, assess the extent to which each benefit has led to the attainment of your agency's goals.

BENEFITS	(A) RELATIVE IMPORTANCE OF BENEFITS	(B) GOAL ATTAINMENT RATING		
		Not at all	Partially	Definitely
Conserve energy	☐ +	1	2	3
Improve the mobility of the poor, young, elderly, and handicapped	☐ +	1	2	3
Increase business activity and central city vitality	☐ +	1	2	3
Conserve land that would otherwise be used for streets and parking	☐ +	1	2	3
Reduce highway and inner-city congestion	☐ +	1	2	3
Improve environmental quality (i.e., reduce noise, air, and visual pollution)	☐ +	1	2	3
Improve safety (i.e., reduce highway related casualties and property damage)	☐ +	1	2	3
Serves as an optional mode of travel in the event of personal or national need (e.g., as an auto substitute, for mass evacuation, for defense readiness)	☐ +	1	2	3
Other *(specify)*: _____ _____ _____	☐	1	2	3
	= 100 %			

VI. ATTITUDES CONCERNING TRANSIT FINANCE

A. What percentage of transit's operating costs should users pay? _____%

B. Among the non-user's share of costs, what percentage should be borne by the:

Federal government		_____%
State government	+	_____%
Local government	+	_____%
		100 %

C. Evaluate the appropriateness of each listed revenue source for financing your agency's transit services. Use the following four point scale:

Don't know	Inappropriate	Somewhat Appropriate	Appropriate
1	2	3	4

Revenue sources	*Circle one for each revenue source*			
Federal:				
Personal income tax	1	2	3	4
Corporate income tax	1	2	3	4
General excise tax (e.g., cirarettes, tires)	1	2	3	4
Other *(specify)* _____	1	2	3	4
_____				
State:				
Personal income tax	1	2	3	4
General sales tax	1	2	3	4
Gasoline consumption tax	1	2	3	4
Motor vehicle registration tax	1	2	3	4
General excise tax	1	2	3	4
Other *(specify)* _____	1	2	3	4
_____				
Local:				
Property tax	1	2	3	4
General sales tax	1	2	3	4
Other *(specify)* _____	1	2	3	4
_____				

D. In the event of a total withdrawal of Federal operating assistance, how does your agency plan to make up this lost revenue? *(Indicate whether each listed action will probably be taken by circling either yes or no. For yes responses, fill in percentages such that they add up to 100 percent of lost Federal dollars.)*

ACTION	AGENCY'S LIKELY RESPONSE	PERCENTAGE OF LOST FEDERAL REVENUE MADE UP BY ACTION
Increase fares	yes no	_____%
Decrease service levels	yes no	+ _____%
Increase local support	yes no	+ _____%
Seek increased State assistance	yes no	+ _____%
Increase efficiency and productivity (i.e., expand profitable operations, seek fuel savings, enforce performance standards, etc.)	yes no	+ _____%
Seek internal cost savings measures (i.e., change labor rules, staff reductions, etc.)	yes no	+ _____%
Seek Federal block grant support	yes no	+ _____%
Other *(specify)*: _____ _____ _____	yes no	+ _____%
		= 100 %

THANK YOU FOR YOUR TIME AND INTEREST IN THIS SURVEY

REFERENCES

Aaron, Henry J. (1974). "A New View of Property Tax Incidence." The Brookings Institution, General Series Reprint 291.

Abrams, Robert (1973). "No More Tokenism: The Case for Free Subways and Buses." New York, Fall: 24-29.

Abt Associates (1969). Transportation Needs of the Handicapped: Travel Barriers. Cambridge, Mass.: Prepared for the Urban Mass Transportation Administration, pp. 80-90.

Allen, Gary R. (1976). "An Analysis of Subsidy Issues in Public Transportation." Traffic Quarterly, 30: 595-614.

Altshuler, Alan (1979). The Urban Transportation System: Politics and Policy Innovation. Cambridge: M.I.T. Press.

Altshuler, Alan (1981). "Testimony before the Subcommittee on Investigation and Oversight, Committee on Public Works and Transportation." Washington, D.C.: U.S. House of Representatives, June 23, 1981, unpublished testimony.

American Enterprise Institute for Public Policy Research (1981). Legislative Analysis: Urban Mass Transportation Aid Bills. Washington: D.C.: Report No. 6.

American Public Transportation Association (1981). "Survey of Cutbacks in Federal Operating Assistance." Washington, D.C.: unpublished paper.

American Public Transportation Association (1981). Transit Fact Book. Washington, D.C.

Anderson, Shirley C., and Gordon J. Fielding (1982). Comparative Analysis of Transit Performance. Washington, D.C.: U.S. Department of Transportation, Urban Mass Transit Administration.

Babbie, Earl R. (1973). Survey Research Methods. Belmont, California: Wadsworth Publishing Company, Inc.

Barnum, Darold T., and John M. Gleason (1979). Executive Report: Measuring the Influence of Subsidies on Transit Efficiency and Effectiveness. Washington, D.C.: Department of Transportation, Urban Mass Transportation Administration.

Barrington and Co. (1966). The Effect of the 1966 New York City Transit Strike on the Travel Behavior of Regular Transit Users. New York: unpublished report.

Baum, Milton S. (1970). Cost and Benefit Evaluation of the Sacramento

Transit Authority. Sacramento Transit Authority.

Beshers, Eric W. (1976). "Federal Transit Operating Subsidy Options." Transportation Research Record, 573: 12-17.

Blalock, Hubert M., Jr. (1979). Social Statistics. New York: McGraw-Hill, Revised Second Edition.

Blau, Peter M., and Marshall W. Meyer (1971). Bureaucracy in Modern Society. New York: Random House, Second Edition.

Bly, P. H., F. V. Webster and Susan Pounds (1980). "Effects of Subsidies on Urban Public Transport." Transportation, 9: 311-331.

Booz, Allen and Hamilton Inc. (1978). "Preliminary Assessment of the Feasibility of Mandating Lifts for New Buses Procured Prior to Transbus." Washington, D.C.: Urban Mass Transportation Administration.

Browning, Edgar K., and William R. Johnson (1979). The Distribution of the Tax Burden. Washington, D.C.: American Enterprise Institute of Public Policy Research.

Burbank, Cynthia (1979). "Issue Paper on UMTA Goals and Objectives." Washington, D.C.: U.S. Department of Transportation, unpublished paper.

Byun, Joonho, et al. (1978). A Transportation Safety Index Applicable to All Modes. Brooklyn, New York: Polytechnic Institute of New York, Department of Transportation Planning and Engineering.

Cargill, Jack, and C. J. Fielding. (1980). "Mobility for the Handicapped: Case Study in Public Policy." Institute of Transportation Studies, University of California, Los Angeles.

Carstens, R. L., C. R. Mercier, and E. J. Kannel (1976). "Current Status of State Level Support for Transit," Transportation Research Record, 589: 14-19.

Cervero, Robert (1981). "Flat Versus Differential Transit Pricing: What's a Fair Fare?" Transportation, 10: 211-232.

Cervero, Robert (1982). "Transit Cross-Subsidies." Transportation Quarterly, 36: 377-389.

Cervero, Robert, Martin Wachs, Renee Berlin, and Rex J. Gephart (1980). Efficiency and Equity Implications of Alternative Transit Fare Policies. Washington, D.C.: U.S. Department of Transportation, Urban Mass Transportation Administration.

Cheaney, E. S., et al. (1976). Safety in Urban Mass Transportation: Research Report. Columbus, Ohio: Battelle Company, unpublished report.

Chicago Area Transportation Study (1977). "A Summary of Travel Characteristics." Chicago: unpublished report.

Crain, John L., and Sydwell D. Flynn (1975). Southern California Rapid Transit District 1974 Strike Impact Study. Sacramento: State of California, Business and Transportation Agency.

Curry, James P. (1976). Case Studies of Transit Energy and Air Pollution Impacts. Washington, D.C.: U.S. Environmental Protection Agency.

Curtin, John F. (1968). "Effects of Fares on Transit Riding." Highway Research Record, 213: 8-18.

DeBeer, Ann M. (1974). Financing Operating Subsidies for Urban Mass Transit Systems. An Analysis of State and Local Tax Options. Washington, D.C.: Urban Mass Transportation Administration.

DeLeuw, Charles E. (1955). "Is Subsidy Necessary for Adequate Mass Transit?" Proceedings, American Society of Civil Engineers, 81, 710-716.

Doig, Janeson W. (1966). Metropolitan Transportation Politics and the New York Region. New York: Columbia University Press.

Dyett, Michael, et al. (1979). Land Use and Urban Development Impacts of BART: Interpretive Summary of the Final Report. Washington, D.C.: U.S. Department of Transportation.

Dygert, Paul, James Holec, and Donald Hill (1976). Public Transit Fare Policy. Washington, D.C.: U.S. Department of Transportation.

Environmental Research and Technology (1976). "Emission Characteristics of Buses and Automobiles." in Pratt, R. H. Associates, Mass Transit Program, Technical Report No. 4, Washington, D.C.

Falcocchio, John C., and Edmund J. Cantilli (1974). Transportation and the Disadvantaged. Lexington, Mass.: Lexington Books, D. C. Heath and Co.

Fielding, Gordon J. (1977). Development of Performance Indicators for Transit: Final Report. Irvine: Institute of Transportation Studies, University of California.

Fielding, Gordon J., and Roy E. Glauthier (1976). "Distribution and Allocation of Transit Subsidies in California." Irvine: University of California, Institute of Transportation Studies, unpublished report.

Fielding, Gordon J., Roy E. Glauthier, and Charles A. Cave (1979). "Performance Indicators for Transit Management." Transportation, 7: 365-379.

Fitch, Lyle C., and Associates (1964). Urban Transportation and Public

Policy. San Francisco: Chandler Publishing Co.

Fitch, Lyle C., et al. (1979). Financing Transit: Alternatives for Local Government. Washington, D.C.: U.S. Department of Transportation, Urban Mass Transportation Administration.

Glaister, S., and D. L. Lewis (1978). "An Integrated Fares Policy for Transport in London." Journal of Public Economics, 9: 341-355.

Gomez-Ibanez, Jose A. (1976). "Assessing the Arguments for Urban Transit Operating Subsidies." Transportation Research Record, 573: 1-11.

Gomez-Ibanez, Jose A., and John R. Meyer (1976). "Productivity Growth and Labor Relations in Urban Mass Transit." Cambridge, Mass.: Department of City and Regional Planning, Harvard University, unpublished paper.

Gordon, Peter, and Peter M. Theobald (1980). "Urban Transit Subsidies and Vanpooling." Transportation Research A, 4: 229-234.

Gutknecht, R. (1973). "Alternative Approaches to Public Transport Fares with their Traffic and Revenue Implications." Paper presented to the UITP 40th International Congress, Brussels, Union International de Transports Publics.

Harberger, Arnold (1962). "The Incidence of the Corporation Income Tax." Journal of Political Economy, 70 (June): 215-240.

Hart, William (1973). Public Financial Support for Transit. Washington, D.C.: Highway Users Federation, Technical Study Memorandum, No. 7.

Hartman, Ronald J., and John M. Zakotnic (1980). "Land Use and Transportation Decisions: A Survey of Local Coordination." Transit Journal, 6 (Fall): 29-44.

Haveman, Rogert H., and Burton A. Weisbrod (1970). "Defining Benefits of Public Programs: Some Guidance for Policy Analysts," in Public Expenditure and Policy Analysis, R. H. Haveman and J. Margolis, eds. Chicago: Rand McNally College Publishing Co., pp. 135-166.

Heatherly, Charles L., ed. (1981). Mandate for Change. Washington, D.C.: The Heritage Foundation.

Heenan, Warren (1968). "The Economic Effect of Rapid Transit on Real Estate Development." The Appraisal Journal, 36: 212-224.

Hemily, Brendon, and Michael D. Meyer (1982). "Public Transportation in the 1980s: Responding to Pressures of Fiscal Austerity." Washington, D.C.: Paper presented at the 61st Annual Meeting of the Transportation Research Board, Washington, D.C., January.

Henderson, Clark (1978). Crisis Relocation of the Population at Risk in

the New York Metropolitan Area: Final Report. Palo Alto, California: Stanford Research Institute.

Highway Research Board Task Force on Urban Mass Transportation Safety Standards (1973). Safety in Urban Mass Transportation: The State of the Art. Washington, D.C.: National Research Council, Division of Engineering.

Hill, Morris (1968). "A Goal-Achievement Matrix for Evaluating Alternative Plans," Journal of the American Institute of Planners, 34: 19-29.

Hilton, George (1974). Federal Transit Subsidies. Washington, D.C.: American Enterprise Institute for Public Policy Research, Evaluative Studies No. 17.

Hilton, George (1975). "The Urban Mass Transportation Assistance Program," in Perspectives on Federal Transportation Policy, James C. Miller III, ed., Washington, D.C.: American Enterprise Institute for Public Policy Research, pp. 131-144.

Hoachlander, E. Gareth (1976). "Bay Area Rapid Transit: Who Pays and Who Benefits?" Institute of Urban and Regional Development, Working Paper 267.

Hoachlander, E. G. (1979). "Who Pays and Who Rides BART? A Reexamination." Berkeley, Calif.: Institute of Urban and Regional Development, Working Paper 309.

Institute of Public Administration (1979). Financing Transit: Alternatives for Local Government. Washington, D.C.: U.S. Department of Transportation, Urban Mass Transportation Administration.

Institute of Traffic Engineers (1965). Capacities and Limitations of Urban Transportation Modes. Washington, D.C.

Institute of Transportation Engineers. (1976). Transportation and Traffic Engineering Handbook. Englewood Cliffs, N.J.: Prentice-Hall.

Jones, David W., Jr. (1979). "Cost-Revenue Squeeze in Conventional Transit." Transportation Research Board Special Report 184: 58-63.

Kennedy, President John F. (1962). "The Transportation System of Our Nation." Washington, D.C.: Message to Congress, Doc. No. 87-384, April 5, 1962.

Kirby, R. F. (1981). "Targeting Money Effectively: User-Side Transportation Subsidies." The Journal of Contemporary Studies, 4: 45-52.

Koutsopoulos, K. C., and C. G. Schmidt (1976). "Mobility Constraints of the Carless." Traffic Quarterly, 10: 67-83.

Knight, Robert L., and Lisa L. Trygg (1977). Land Use Impacts of Rapid

Transit: Implications of Recent Experience. Washington, D.C.: U.S. Department of Transportation.

Lago, A. M., and P. D. Mayworm (1981). "Transit Fare Elasticities by Fare Structure Elements and Ridership Submarkets." Transit Journal, 7: 5-14.

Lamare, Judith L. (1981). "Intergovernmental Finance, Productivity and the Local Match Question: The Case of California's Transit Subsidy Policy." Public Administration Review, July/August: 463-470.

Lave, Charles (1981). "Dealing with the Transit Deficit." Journal of Contemporary Studies, 4, 2: 53-60.

Lee, Charles, and I. Steedman (1970). "Economies of Scale in Bus Transportation." Journal of Transport Economics and Policy, 4 (January): 15-28.

Litchfield, Nathaniel (1970). "Evaluation Methodology of Urban and Regional Plans: A Review." Regional Studies, 4: 151-165.

Lieb, Robert (1978). Transportation: The Domestic System. Reston, Virginia: Reston Publishing Co., Inc.

Lovely, Mary E. (1979). "Public Transit and Downtown Development," Urban Land, November: 14-22.

McClure, Charles (1977). "The New View of the Property Tax: A Caveat." National Tax Journal, 30 (March): 69-75.

McQueen, James T., et al. (1975). Evaluation of the Shirley Highway Express-Bus-on-Freeway Demonstration Project: Final Report, Washington, D.C.: Urban Mass Transportation Administration.

Markowitz, Joel (1981). "A Draft Obituary on the Impending Demise of the Federal Transit Operating Assistance Program." Berkeley: University of California, Department of City and Regional Planning, unpublished paper.

Mayworm, Patrick, Armando M. Lago, and J. Matthew McEnroe (1980). Patronage Impacts of Changes in Transit Fares and Services. Washington, D.C.: U.S. Department of Transportation, Urban Mass Transportation Administration.

Metropolitan Transportation Commission (1979). BART in the Bay Area: The Final Report on the BART Impact Program. Berkeley, California: MTC, unpublished report.

Meyer, John, and Jose Gomez-Ibanez (1977). Improving Urban Mass Transit Productivity. Washington, D.C.: Urban Mass Transportation Administration.

Meyer, John R., and Jose A. Gomez-Ibanez (1981). Autos, Transit, and Cities. Cambridge, Mass.: Harvard University Press.

Meyer, J. R., J. F. Kain, and M. Wohl (1965). The Urban Transportation Problem. Cambridge, Mass.: Harvard University Press.

Mieszkowski, Peter (1972). "The Property Tax: An Excise Tax or Profits Tax?" Journal of Public Economics, 1 (April): 73-96.

Moses, L. N., and J. F. Williamson (1963). "Value of Time, Mode Choice and the Subsidy Issue in Urban Transportation." Journal of Political Economy, 71 (June): 247-264.

Musgrave, Richard A., Karl E. Case, and Herman Leonard (1974). "The Distribution of Fiscal Burdens and Benefits." Public Finance Quarterly, 2 (July): 259-311.

Musgrave, Richard A., and Peggy B. Musgrave (1980). Public Finance in Theory and Practice. New York: McGraw-Hill, Second Edition.

National Transportation Policy Study Commission (1979a). A Compendium of Federal Transportation Policies and Programs. Washington, D.C.: U.S. Department of Commerce, Special Report No. 6.

National Transportation Policy Study Commission (1979b). National Transportation Policies Through the Year 2000. Washington, D.C.: U.S. Department of Commerce, Final Report.

National Transportation Policy Study Commission (1979c). Executive Summary: Current Transportation Issues in the U.S. Washington, D.C.: U.S. Department of Commerce.

National Transportation Policy Study Commission (1979d). State and Local Transportation Policies. Washington, D.C.: U.S. Department of Commerce, Special Report No. 4.

Netzer, Dick (1974). "The Case Against Low Subway Fares." New York Affairs, 1, 3: 14-25.

New York State Senate Committee on Transportation (1981). National Conference on Mass Transit Crime and Vandalism. Washington, D.C.: Urban Mass Transportation Administration.

Oi, Walter Y. (1973). "Alternative Formulas for a Federal Operating Subsidy Program for Transit." Arlington, Virginia: U.S. Department of Defense.

Oram, Richard L. (1979). "Peak-Period Supplements: The Contemporary Economics of Bus Transport in the U.K. and the U.S.A.," in Progress in Planning, D. Diamond and J. B. McLaughlin, eds., Oxford: Pergamon Press, pp. 83-154.

Ortner, James, and Martin Wachs (1979). "The Cost-Revenue Squeeze in American Public Transit." Journal of American Planning Association, 45: 10-21.

Ott: David J., and Attiat F. Ott (1969). Federal Budget Plans.

Washington, D.C.: The Brookings Institution.

Paaswell, R. E., and J. Berechman, et al. (1981). An Analysis of Rapid Transit Investments: The Buffalo Experience. Washington, D.C.: U.S. Department of Transportation.

Peat, Marwick, Mitchell, and Company (1975). Immediate Travel Impacts of Transbay BART. Washington, D.C.: unpublished report.

Peat, Marwick, Mitchell, and Company (1980). Study of Operator Absenteeism and Workers' Compensation Trends in the Urban Mass Transportation Industry. Washington, D.C.: Urban Mass Transportation Administration.

Pechman, Joseph, and Benjamin Okner (1974). Who Bears the Tax Burden? Washington, D.C.: The Brookings Institution.

Peirce, Neal R. (1981). "'Draconian' Transit Cuts May Force Needed Reforms." Nation's Cities Weekly, March 2, p. 5.

Perry, James L. (1979). The Impact of Labor-Management Relations on Productivity and Efficiency in Urban Mass Transit. Washington, D.C.: Urban Mass Transportation Administration.

Peskin, Henry (1973). An Analysis of Urban Mass Transit Subsidies. Arlington, Virginia: Institute for Defense.

Phares, Donald (1980). Who Pays State and Local Taxes? Cambridge, Mass.: Oelgeschlager, Gunn, and Hain.

Pindyck, Robert S., and Daniel L. Rubinfeld (1981). Econometric Models and Economic Forecasts. New York: McGraw-Hill Book Company, 2nd ed.

Ponsonby, G. J. (1958). "The Problem of the Peak, with Special Reference to Road Passenger Transport." The Economic Journal, 68: 74-88.

Porter, Alan L., et al. (1979). Effects of Federal Transportation Funding Policies and Structures, Overview. Washington, D.C.: U.S. Department of Transportation.

Porter, Alan L., et al. (1981). "Transportation Funding Structures and Policies." Transportation Research 15A: 139-153.

Public Technology, Inc. (1978). Transit System Productivity. Washington, D.C.: Urban Mass Transportation Administration.

Pucher, John R. (1978). "Equity in Transit Financing: The Distribution of the Costs and Benefits of Transit Subsidies among Income Classes." Cambridge, Mass.: M.I.T., unpublished paper.

Pucher, John R., Chris Hendrickson and Sue McNeil (1981). "Socioeconomic Characteristics of Transit Riders: Some Recent Evidence." Traffic Quarterly, 35: 461-483.

Pucher, John R. (1981). "Equity in Transit Finance." Journal of the American Planning Association, 47: 387-407.

Puryear, David, and Richard McHugh (1979). Regional Financing Alternatives for Mass Transit. Washington, D.C.: U.S. Department of Transportation.

Pushkarev, Boris, and Jeffrey Zupan (1980). Urban Rail in America: An Exploration of Criteria for Fixed Guideway Transit. Washington, D.C.: Urban Mass Transportation Administration.

Quade, E. S. (1975). Analysis for Public Decisions. New York: American Elsevier Publishing Co., Inc.

Regional Plan Association (1973). Transportation and Economic Opportunity. A report to the Transportation Administration of the City of New York, January, pp. 57-65.

Rock, Steven (1981). The Redistributive Impact of Transit Services Financing. Washington, D.C.: Urban Mass Transportation Administration.

Rolph, Earl (1951). "A Proposed Revision of Excise Tax Theory." Journal of Political Economy, 60: 102-117.

Real Estate Research Corporation (1974). The Cost of Sprawl: Detailed Cost Analysis. Washington, D.C.: U.S. Government Printing Office.

Ronan, William (1974). "We Must Subsidize Mass Transit." Readers' Digest, 104, 624: 69-73.

Rosenbloom, Sandra (1978). "Peak-Period Traffic Congestion: A State-of-the-Art Analysis and Evaluation of Effective Solutions." Transportation, 7: 167-191.

Sale, James E., and Bryan Green (1979). "Operating Costs and Performance of American Public Transit Systems." Journal of the American Planning Association, 4,3: 22-27.

Sheldon, Nancy W., and Robert Brandwein (1973). The Economic and Social Impact of Investments in Public Transit. Lexington, Mass.: Lexington Books, D.C. Heath and Co.

Sherman, Roger (1971). "Congestion Interdependence and Urban Transit Fares." Econometrica, 39 (May): 565-576.

Sherman, Roger (1972). "Subsidies to Relieve Urban Traffic Congestion." Journal of Transport Economics and Policy, 6 (January): 22-31.

Smerk, George M. (1964). "Three Experiments in Urban Transportation." Business Horizons, 7,2: 39-47.

Smerk, George M. (1965). "The Urban Mass Transportation Act of 1964: New Hope for American Cities." Transportation Journal, 5,3: 35-39.

Smerk, George M. (1974). Urban Mass Transportation: A Dozen Years of Federal Policy. Bloomington, Ind.: Indiana University Press.

Smerk, George M. (1975). "Federal Transit Policy: Speculations on the Future." Transit Journal, 1,3: 5-20.

Smerk, George M. (1979). "Update on Federal Mass Transportation Policy: The Surface Transportation Act of 1978." Transportation Journal, 18,3: 16-33.

Smerk, George M. (1979). "Federal Urban Mass Transportation Programs and Policy," in Alan Altshuler, ed., Current Issues in Transportation Policy. Lexington, Mass.: D.C. Heath and Co., pp. 83-93.

Southern California Association of Governments (1976). "Transit Safety and Security: A Design Framework." Los Angeles: unpublished report.

Stanford Research Institute (1968). Benefit/Cost Analysis of the Five Corridor Rapid Transit System for Los Angeles. Palo Alto, California.

Stern, James L., et al. (1976). The Legal Framework for Collective Bargaining in the Urban Transit Industry. Washington, D.C.: Urban Mass Transportation Administration.

Stevens, Amy, and John Zakotnic (1979). "A Survey of Local Mechanisms for Financing Transit Operating Costs." Washington, D.C.: American Public Transit Association, unpublished paper.

Stuntz, Mayo S., and Eric Hurst (1979). Energy Conservation Potential of Urban Mass Transit. Washington, D.C.: U.S. Federal Energy Conservation, Energy Conservation Paper No. 34.

Transportation Issues Task Force (1980). "Transportation Issues Task Force Report." Washington, D.C.: Reagan Transition Team, November.

Transportation Research Board (198[illegible]). "Ten Most Critical Issues in Transportation." Transportation Research News, 95: 2-5.

Tri-State Regional Planning Commission (1978). "Regional Public Transportation at a Glance." New York: pamphlet.

Tye, William B. (1973). "The Capital Grant as a Subsidy Device: The Case Study of Urban Mass Transportation," The Economics of Federal Subsidy Programs, in Transportation Subsidies, Part 6, Washington, D.C.: U.S. Government Printing Office, pp. 786-826.

Tye, William B. (1976). "Problems and Potentials of Federal Transit Operating Subsidies." Transportation Research Record, 573: 21-29.

U.S. Advisory Commission on Intergovernmental Relations (1961). "Intergovernmental Responsibilities for Mass Transportation Facilities and Services in Metropolitan Areas." Washington, D.C.: U.S. Senate.

U.S. Chamber of Commerce (1963). "Business Views on Local Transit: An Analysis of How 1,129 Chambers of Commerce View the Need for a Federal Subsidy Program." Transportation and Communications Department, unpublished paper.

U.S. Congress, House of Representatives (1973). "Hearings before a Subcommittee of the Committee on Appropriations, Second Session (Part 2), Department of Transportation and Related Agencies Appropriations for 1973." Washington, D.C.

U.S. Congressional Budget Office (1977). Urban Transportation and Energy: The Potential Savings of Different Modes. Washington, D.C.

U.S. Congressional Budget Office (1979). Urban Transportation for Handicapped Persons: Alternative Federal Approaches. Washington, D.C.

U.S. Department of Commerce (1981). U.S. Statistical Abstracts. Washington, D.C.

U.S. Department of Commerce, Bureau of the Census (1973). 1970 Census of Population: Characteristics of the Population. Washington, D.C.

U.S. Department of Transportation (1971). Feasibility of Federal Assistance for Urban Mass Transportation Operating Costs. Washington, D.C.

U.S. Department of Transportation (1974). A Study of Urban Mass Transportation Needs and Financing. Washington, D.C.

U.S. Department of Transportation (1978). "The Economic Impacts of U.S. Department of Transportation Regulations Implementing Section 504 of the Rehabilitation Act of 1973--The Costs and Benefits of the Handicapped in Federally Assisted Transportation Programs." Federal Register, 43, no. 111, June 8, p. 25,052.

U.S. Department of Transportation, Federal Highway Administration (1971). The Effect of a Suspension of Bus Service on Local Peak Hour Traffic Congestion. Washington, D.C.: Highway Planning Technical Report 25.

U.S. Department of Transportation, Urban Mass Transportation Administration (1964). Urban Mass Transportation Act of 1964 and Related Laws, as Amended. Washington, D.C.

U.S. Department of Transportation, Urban Mass Transportation Administration (1972). Capital Grants for Urban Transportation: Information for Applicants. Washington, D.C.

U.S. Department of Transportation, Urban Mass Transportation Administration (1977). Statistical Summary. Washington, D.C.

U.S. Department of Transportation, Urban Mass Transportation Administration (1979). Financing Transit: Alternatives for Local Government. Washington, D.C.

U.S. Department of Transportation, Urban Mass Transportation Administration (1980). FY1980 Summary of UMTA's Transit Assistance Program. Washington, D.C.

U.S. Department of Transportation, Urban Mass Transportation Administration (1981). National Urban Mass Transportation Statistics. Washington, D.C.: Section 15 Reporting System.

U.S. Department of Transportation, Urban Mass Transportation Administration (1982). "Fare Paper." Washington, D.C.: Office of Policy and Research.

U.S. Environmental Protection Agency (1977). Compilation of Air Pollution Emission Factors. Washington, D.C.

U.S. Office of Management and Budget, and Urban Mass Transit Administration (OMB-UMTA) (1979). Operating Assistance for Transit: An Evaluation of the Section 5 Program. Washington, D.C.

U.S. Senate (1969). "Mass Transportation--1969." Washington, D.C.: Hearings Before the Subcommittee on housing and Urban Affairs of the Committee on Banking and Currency, July-November.

U.S. Senate, Committee on Interstate and Foreign Commerce (1969). National Transportation Policy, Preliminary Draft of a Report. Washington, D.C.

U.S. White House (1981). "America's New Beginning: A Program for Economic Recovery." Washington, D.C.: unpublished report, February 18.

Vickrey, William (1973). "Current Issues in Transportation," in Neil W. Chamberlain, ed., Contemporary Economic Issues. Homewood: Richard D. Darwin, Inc., pp. 219-300.

Wachs, Martin (1976). "Consumer Attitudes Toward Transit Service: An Interpretative Review." Journal of the American Institute of Planners, 42: 96-104.

Wallace, Paul S. (1977). Urban Mass Transit: Crime and Related Problems--A Brief Historical Review (1853-1977). Washington, D.C.: Urban Mass Transportation Administration.

Walters, A. A. (1967). "Subsidies for Transport?" Lloyds Bank Review, 83: 22-33.

Webber, Melvin M. (1976). The BART Experience--What Have We Learned? Berkeley: Institute for Urban and Regional Development, Monograph No. 26.

Weiner, Edward (1976). "Mass Transportation Needs and Financing in the United States." Transportation (May), 93-110.

Wells, J. D., N. J. Asher, M. R. Flowers, and M. C. Camran (1972).

Economic Characteristics of the Urban Public Transportation Industry. Washington, D.C.: Institute of the Defense.

Wilbur Smith and Associates (1966). Transportation and Parking for Tomorrow's Cities. New Haven, Connecticut.

Witherspoon, Robert (1979). "Transit and Urban Economic Development: How Cities Could Use Transit as a Development Tool; Why They Don't; What to Do About It." Transit Journal, 5,2: 63-78.

Wohl, Martin (1970). "Users of Urban Transportation Services and Their Income Circumstances." Traffic Quarterly, 24,1: 21-43.

Womack, James P., and Alan Altshuler (1979). An Examination of the Transit Funding Process at the Local Level. Washington, D.C.: Urban Mass Transportation Administration.

Yoshpe, Harry B. (1961). Transportation: The Nation's Lifelines. Washington, D.C.: Industrial College of the Armed Forces.

U.S. GOVERNMENT PRINTING OFFICE: 1983-381-428/3327

NOTICE

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

This document is being distributed through the U.S. Department of Transportation's Technology Sharing Program.

DOT-I-83-30

HE 203 .A56 no.
Cervero, Robert.
Intergovernmenta
responsibilitie

Form DOT F 1720.2 (8-
FORMERLY FORM DOT F 1700.

DOT-I-83-30

DOT LIBRARY
00014738

TECHNOLOGY SHARING

A Program of the U.S. Department of Transportation