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The Numbers Game:

The Politics of the Federal Surface Transportation Program

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Urban Planning

by

Jeffrey Richard Brown

2003

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2003

The dissertation of Jeffrey Richard Brown is approved.

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2003

DEDICATION

This work is dedicated to all those who encouraged me along the way.

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ABSTRACT OF THE DISSERTATION

The Numbers Game:

The Politics of the Federal Surface Transportation Program

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In 2003, the federal government spent about $37 billion on the highway and transit networks that comprise the surface transportation system. With so much money at stake it is no surprise that expenditure decisions are subject to intense debate. Settling past conflicts has required the development of elaborate compromises, from the transit penny in 1982 to minimum-guaranteed-return rules in more recent years. Conflicts over expenditure decisions continue to resurface, particularly during the debates over program reauthorization.

This dissertation examines federal surface transportation expenditure policy. It includes both historical and quantitative analyses. The historical analysis seeks to understand how the current expenditure policy rules came into being and how they have

evolved from the 1890s to the present. The quantitative analysis focuses on the period from 1990 to the present. It examines the spatial pattern of highway and transit expenditures among the states, investigates geographic redistribution in the highway program (the donor state conflict), and determines whether these expenditure patterns can be explained by political, transportation, and socio-demographic variables. It also seeks to understand whether these patterns have changed in the years following passage of ISTEA and TEA-21.

The historical analysis shows that political and/or institutional inertia has limited the opportunity for significant policy change. Policies developed to address particular problems at very specific moments in time have been retained long after their original rationales have disappeared. The Senate has traditionally defended the policy status quo, and its institutional structure has been an important factor in the development of federal policy. The quantitative analysis shows that the relationships between highway expenditures and highway use and between transit expenditures and transit use are moving in opposite directions. The geographic redistribution of federal highway dollars is unrelated to either the use or extent of a state's highway system. The analysis also shows that a state's earmark dollars are more closely related to political representation variables than are its formula dollars. Notwithstanding the rhetoric of policy change, ISTEA and TEA-21 have produced only modest changes in any of these patterns.

CHAPTER ONE: THE INTRODUCTION

The very words "Big Dig" can strike fear and outrage into the hearts of many drivers, business owners, tourism authorities and public officials in Boston. The project has been plagued by several scandals, including last year's much-publicized imbroglio over cost overruns (the final price tag had ballooned from $10.5 billion to $15 billion) that resulted in the firing of former Big Dig chief James Kerisiotes. And to many people, the Big Dig means one thing: a major public pork barrel project for the state where pork barrel spending was made famous.

Panorama Magazine: Official Guide to Boston[1]

Transportation is important. The transportation system is an integral part of everyday life. We rely on transportation to link home, work, and recreation. Transportation makes goods and services provided from one location accessible to the larger world. Transportation links dispersed people and places to one another, and makes the movement of people and goods possible. A well structured, properly functioning transportation system is crucial to the economic and social well being of every nation, and a poorly designed and/or improperly functioning transportation system is a severe handicap to its prospects.

Transportation innovations played an important role in the past settlement and economic development of the United States. The wagon roads, canals, transcontinental railroads, and national highway network helped to open new land for settlement while also integrating the different sections of the country into one coherent whole. Transportation investments stimulated economic activity in new locations, and even gave

[1] Wallenberg, Christopher. (19??). "Panorama gives you the inside scoop behind (and underneath) Boston's Big Dig." See www.panoramamagazine.com

rise to new industries, the long-distance intercity trucking industry being one of the most recent examples.

Transportation was important in the past—and it remains important today. Transportation is a pillar of the US economy. Along with communications, it has a significant effect on all sectors of the economy, and its indirect contributions are significant. The federal government estimates that the demand for transportation goods and services totals $1.05 trillion a year, and thus accounts for nearly 10.5 percent of the nation's gross domestic product (BTS 2002, Table 3-02a). Millions of American workers rely directly or indirectly on the demand for transportation for their livelihoods.

Given its crucial role in everyday life and the nation's economic health, it is no surprise that we spend a lot of money on transportation. The average US household spends 20 percent of its household budget, approximately $7,000 per year, on transportation-related items (BTS 2000, Chapter 1). This expenditure ranks behind only the amount households spend on housing itself. Private households spend most of their transportation budgets owning and maintaining the nation's 227 million privately owned motor vehicles (*Highway Statistics* 2001, Table MV-1).

The public, in the guise of government, spends more than $150 billion a year to build, maintain, and operate the nation's vast transportation system (BTS 2002, Table 3-25a). This includes more than 3.9 million miles of public roads, 26,000 miles of waterway, 7,300 miles of rail transit lines, hundreds of airports and seaports, and countless vehicles, pipelines, and support infrastructure (BTS 2002, Table 1-01). Each of these plays a significant role in the nation's economy, but of particular importance to the

daily lives of most Americans are the public roads, rail lines, and transit vehicles that comprise the surface transportation system. These public facilities make everyday activity for the average American possible, are the backbones of passenger travel in the US, and receive the lion's share of public expenditures on transportation. Not surprisingly, they are also the subjects of significant attention by policymakers, interest groups, researchers and the public at large. This surface transportation system is the subject of this dissertation.

Surface transportation expenditures and the importance of federal aid

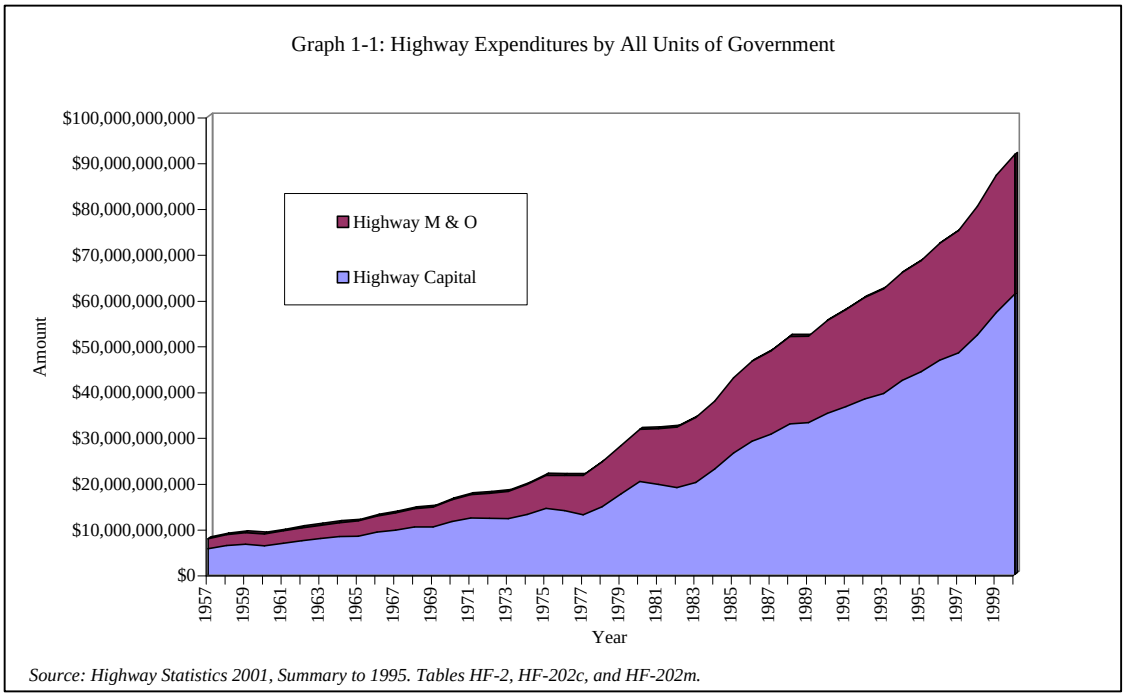
When the talk in Washington or Sacramento, Albany, Springfield, and other state capitals turns to transportation, the subject is generally the surface transportation system, the nation's roads (highways) and public transit networks. These are the facilities and/or programs with which most voters are familiar, and these are the policy areas where most of the public's transportation expenditures are made. Each year, all units of government (federal, state, and local) spend more than $150 billion a year for roads and public transit systems throughout the United States (*Highway Statistics* 2001, Tables MT-2a, MT-2b, and HF-2). This figure includes approximately $120 billion a year for road/highway and transit capital, maintenance, and operations expenses.[2] Three quarters of this money, $90 billion, is spent on roads and highways, while the remaining one quarter, $30 billion, is spent on public transit. Expenditures on surface transportation have risen steadily over the past two decades.

[2] Approximately $30 billion in annual highway expenditures on administration, safety, law enforcement, and bonded interest payments are deducted from the total reported here (*Highway Statistics* 2001, Table HF-2).

At the state and federal level, most surface transportation expenditures are supported by dedicated trust funds. Motor vehicle user tax revenues, including proceeds from gasoline, tire, and heavy vehicle taxes, are deposited in the trust fund account (or accounts), and the revenues are then distributed to finance road and transit systems or projects. The user-fee finance basis is an important feature of transportation, and a desire not to break faith with the users/taxpayers when policy decisions are made is an important factor in political debates.

The creation of the trust fund mechanism led to a dramatic surge in public expenditures on transportation. **Graph 1-1** shows the growth of highway capital, maintenance, and operation expenditures, in unadjusted dollars, by all units of government since the creation of the federal highway trust fund (HTF) in 1956. In the mid-1950s, highway expenditures were less than $10 billion a year, of which approximately $2.5 billion (a 25 percent share) was made by the federal government (*Highway Statistics* Summary to 1995, Tables HF-202c and HF-202m). Over the four decades since the creation of the HTF, highway expenditures have grown significantly, and the federal share has grown as well. In 2000, highway expenditures were more than $90 billion, of which approximately $30 billion were made by the federal government (a 33 percent share) (*Highway Statistics* 2001, Table HF-2).

Graph 1-1: Highway expenditures by all units of government, unadjusted dollars



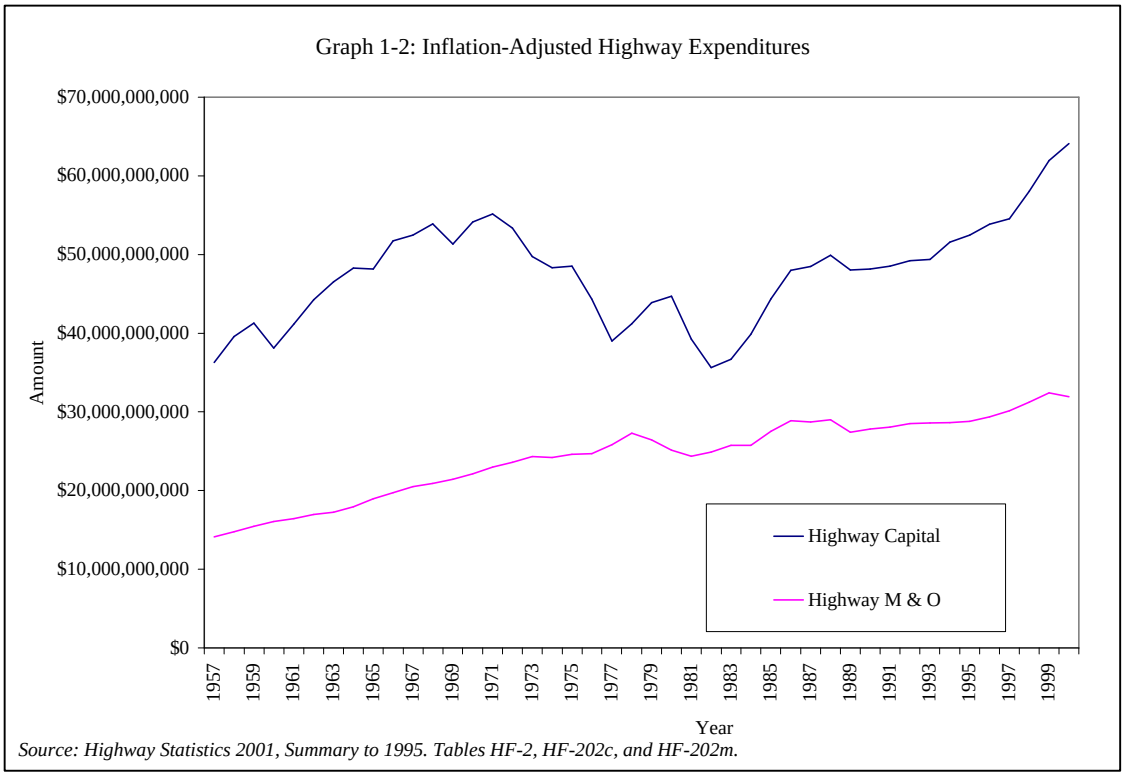
Some of the increase in overall expenditures is a function of inflation, but **Graph 1-2** shows that inflation-adjusted highway expenditures have grown as well.[3] The sudden upsurge of the late 1950s and early 1960s, decline (due to the ravages of inflation) of the early 1970s, and a significant increase in expenditures beginning in the 1980s emerge quite clearly.[4] Also striking from these two graphs is the increasing share of highway dollars spent on maintenance and operations, a reflection of the aging of the nation's

[3] The data were adjusted for inflation using the consumer price index, to allow for consistent treatment of different kinds of expenditures. Expenditures are shown in 2002 dollars.

[4] Inflation-adjusted expenditures on capital projects have surpassed those of the early 1960s "interstate construction boom," although vehicle miles traveled (VMT) has nearly quadrupled since 1960 (*Highway Statistics* 2001, Table VM-1). Expenditures per VMT have thus declined significantly.

basic highway infrastructure. By 2000, nearly one-third of highway expenditures was classified as maintenance and operations, and a significant share of capital expenditures was for reconstruction as opposed to new construction. These shares are likely to increase in the future.

Graph 1-2: Inflation-adjusted highway expenditures (2002 dollars)

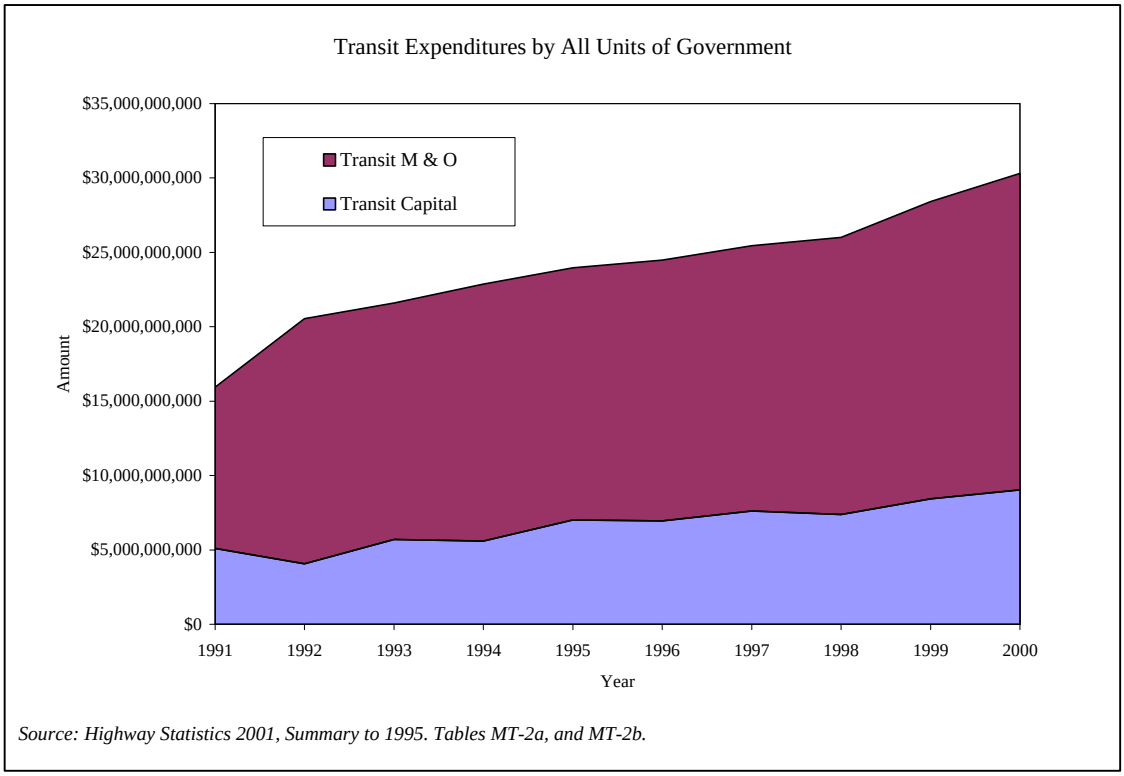


Source: Highway Statistics 2001, Summary to 1995. Tables HF-2, HF-202c, and HF-202m.

Public transit expenditures have also increased in recent years, particularly in the years immediately following the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991. **Graph 1-3** shows that overall expenditures on public transit jumped from $16 billion in 1991 to approximately $30 billion ten years later (*Highway Statistics* 2001, Tables MT-2a and MT-2b). **Graph 1-4** shows that inflation-adjusted expenditures rose 25 percent between 1991 and 1992, and have increased

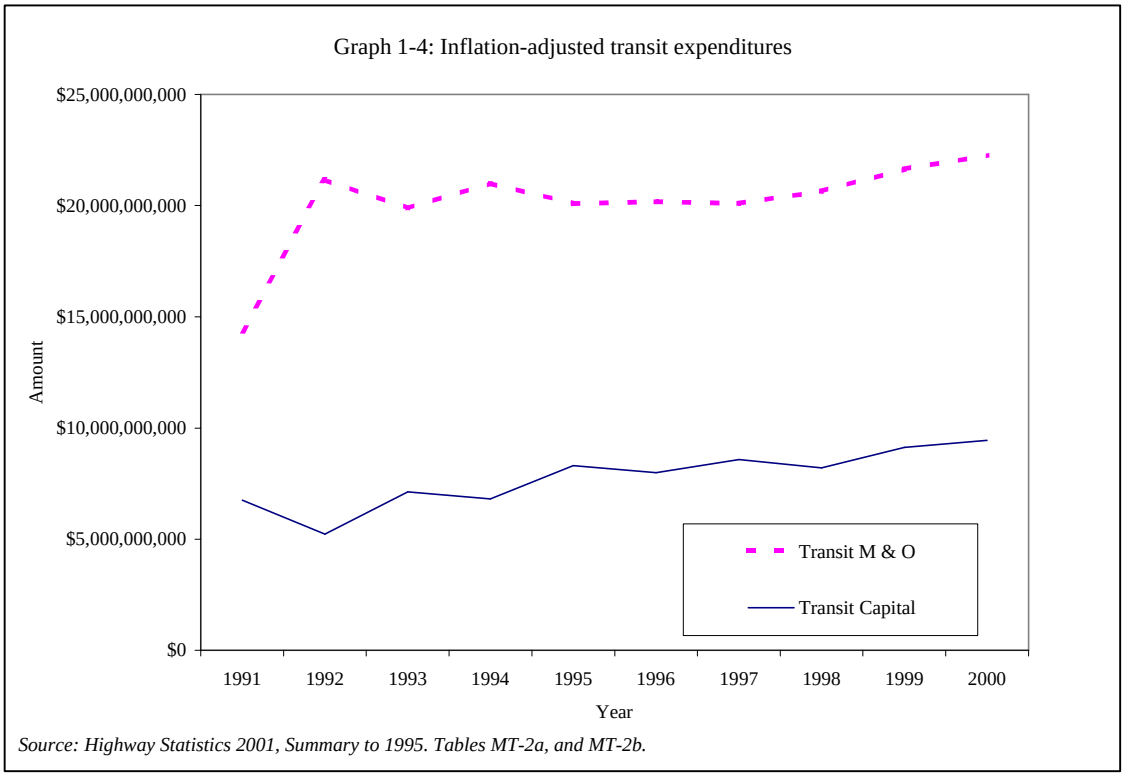
steadily, although at a much slower rate since that time. Passenger fare revenues and federal grants each account for about 23 percent of the revenues, while local and state governments supply the rest. Federal aid is directed primarily toward capital assistance while local and state aid is directed primarily, although not exclusively, to operations. More than two-thirds of all transit expenditures are made for maintenance and operations, which is not surprising given the labor-intensive nature of the transit industry (Jones 1985).

Graph 1-3: Transit expenditures by all units of government, unadjusted dollars



Source: Highway Statistics 2001, Summary to 1995. Tables MT-2a, and MT-2b.

Graph 1-4: Inflation-adjusted transit expenditures (2002 dollars)



Source: Highway Statistics 2001, Summary to 1995. Tables MT-2a, and MT-2b.

State and local government expenditures on surface transportation dwarf those of the federal government, but the federal government is the most important public "player." State and local governments have historically looked to the federal government for direct or indirect guidance. Federal programs have served as role models for equivalent state programs, and federal financial assistance has leveraged additional state and local aid. Because the nation's surface transportation program plays such an important role in the overall economy, and has a profound influence on the shape of the transportation system, the way we use it, and the cities and towns in which we live, researchers and others

interested in public policy have long sought to better understand how the program operates. And, because the federal program is the preeminent factor within surface transportation policy, we need to better understand the history, function, and long-term consequences of that program in particular. For these reasons, this dissertation focuses on the federal program, and specifically on the often-contentious issue of resource distribution. I am most concerned with (how and) why federal surface transportation dollars are expended on the projects and in the places in which they are.

The battle over federal surface transportation dollars

Surface transportation is an important policy area with significant effects on all aspects of the economy. There are billions of public dollars at stake each year. Thus, it's not surprising that there are conflicts over how and from whom the revenues are raised (who bears the burden) and where and on what projects or programs the resources are expended (who reaps the benefits). These conflicts date to the origins of the federal surface transportation program, and they've often been quite bitter.

On the revenue side, motorists complain about high motor fuels taxes, and legislators shy away from proposing tax increases except under very rare conditions (Brown 1998). The public wants its roads, highways, and public transit systems—but doesn't want to pay a lot of money to build, maintain, and operate them. And when gasoline prices increase, "high" gasoline taxes are often cited as a culprit. Politicians have often responded with calls to reduce the motor fuels tax. [5] Revenue conflicts have

[5] Serious proposals to repeal or suspend portions of the federal gasoline tax appeared during the price spikes of 1996 and 2000. It is interesting that many of the leading figures in these efforts

also pitted the auto club (AAA) and other motorist groups against the trucking industry. For more than fifty years, the automobile associations and allied groups have claimed that truckers do not bear their fair share of the tax burden. The trucking industry has vigorously disputed the assertion that heavy vehicles impose far more cost on the roads than their users pay in highway taxes, and often argues just the opposite.[6] And the conflict continues. All of these conflicts intensify when the time comes to raise taxes to generate more revenue. But nearly every transportation-related interest group agrees on one important thing when it comes to user taxes: the revenues raised should be earmarked for transportation projects and programs, and not used for non-transportation purposes. To do otherwise would be a breach of faith with the users who pay taxes into the system, or so the argument goes.[7]

Conflicts over how and from whom the revenue is raised are only part of the story. There are also serious conflicts over expenditures, or more precisely over how and where the money is spent, and that is the focus of this research. The transportation interest groups generally agree, for example, that more money should be spent on transportation. They often disagree on how the most critical needs are defined. Each interest group seeks more money for its constituents: auto interests want more highways,

are the same people complaining about the need for higher public expenditures on transportation. Of course, the gasoline tax is the primary source of these revenues.
See http://edition.cnn.com/2000/ALLPOLITICS/stories/07/13/gas.taxes/

[6] Small, et al (1989) provide a detailed discussion of the heavy vehicle cost estimation and taxation issues.

[7] See, for example, Oberstar (1997).

transit advocates want more rail projects and buses, and place-based interest groups want more funding for the "essential" transportation project in their community.

For more than two decades, for example, a vigorous modal dispute between highway and public transit advocates dominated surface transportation policy debates, and one still sees glimpses of this conflict to this day. Highway advocates viewed the use of highway user tax revenues for transit as a breach of faith with the motorists who paid the taxes—and saw transit as a competitor for scarce public resources. The modal dispute has subsided somewhat in recent years, after a series of compromises (temporary truces, perhaps) resulted in the creation of a mass transit account in the highway trust fund (1982) and the allowance for more flexibility in the use of federal transportation dollars for highways or transit (1991, 1998).

Every interest group seeks a "fair share" for its own needs, and collectively they argue frequently and vigorously over precisely what the term means. They have relied on a combination of economic development, equity, environmental, and even national defense arguments to aid them in their struggles.[8] The heated rhetoric typically subsides, only to intensify when it comes time to reauthorize the federal program. Reauthorization is the time when all the key revenue and expenditure decisions are made, decisions that guide the program for the next five to seven years—and often much longer than that.

[8] The national defense argument has frequently been used, especially when it comes to highways. Tales of Eisenhower's army convoy trip in 1919 are frequently mentioned as justification for the nation's interstate system. But it should also be noted when the then War Department (now the Department of Defense) was asked to contribute to the cost of these "defense" highways in 1944 and again in the late 1940s they balked.

These conflicts over expenditures are real, but so is a long history of compromise. In recent years, the availability of more money for transportation has created many winners in the funding sweepstakes and few true losers.[9]

Resource allocation and the war between the states

> What we have here is a debate about numbers. It has to do with the fact that a number of States have been shortchanged over a period of years, and there may very well have been a reason for that to have occurred, because some of the Western States did not have as much tax revenue, had longer highways, so that kind of arrangement was made… (but today) the basic issue has to do with the fairness and equity of some States getting 85 cents on the dollar and some States getting $2 and $3 and $7 on the dollar paid in.
>
> Senator Howard Metzenbaum (D) - Ohio[10]

> Any federal activity, by definition, is unequal in its impact. Is life fair?"
>
> Senator Daniel Patrick Moynihan (D) – New York[11]

One of the essential features of any public program is that it creates winners and losers. Certain areas or recipients benefit from any particular program more than do others. The very nature of a federal system of intergovernmental finance makes the redistribution of resources a reality (Break 1980). The residents of all states contribute tax dollars, but not everyone directly benefits from, say, the farm subsidy program. States

[9] This was certainly the case with passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991, when West Virginia Senator Byrd "found" approximately $8.2 billion in the highway trust fund to add to the bill (Congressional Record 1991, Weingroff 2001). The money was used for a handful of special projects and to fund the "hold harmless" agreement which protected states against losing money vis-à-vis their allocations under the prior law.

[10] Congressional Record (1991: 7401).

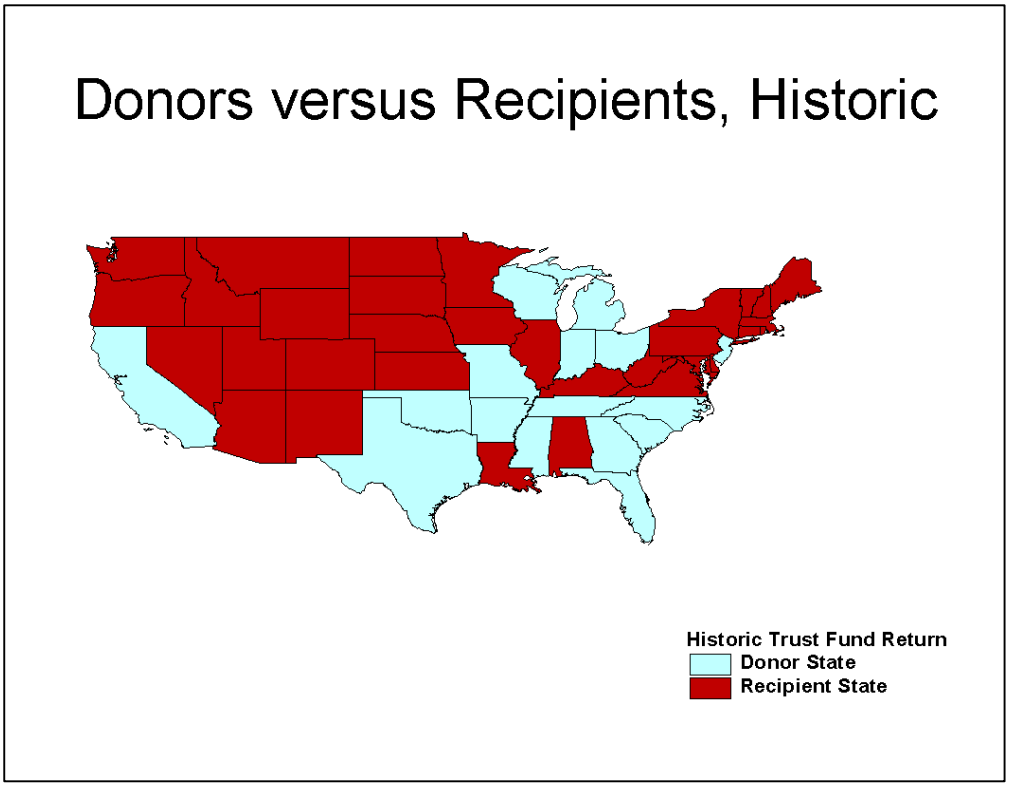
[11] Congressional Quarterly (1991), page 1368. Cited in Lem (1996).

have different distributions of resources and needs. Everyone, however, claims a tremendous need for transportation projects, and the spatial distribution of federal transportation dollars has thus become a significant political issue.

The federal transportation program creates winners and losers. There is no guarantee that all the money be returned to the state from whose taxpayers it is collected. Some states pay more in highway user taxes than they receive in federal aid while other states receive much more in federal aid than they pay in taxes. And this issue, particularly as it applies to the federal highway program, has been the focus of very visible and intense conflict for more than twenty years. The representatives from states that pay more into the highway account of the highway trust fund (HTF) than they receive in federal highway aid, the donor states, have long complained about the unfairness of their treatment (see **Map 1-1**).[12] They also question why states that would seem to be quite similar in terms of highway program needs, for example Mississippi and Alabama, are treated quite differently when it comes to the net balance of user tax payments and aid disbursements. Donor state representatives demand a fairer share of highway expenditures, and define their fair share as being directly related to the amount of money their taxpayers contribute to the highway account of the highway trust fund. They want more of the money their taxpayers pay into the account returned to them.

[12] The states are defined as donors or donees on the basis of ratio of their payments into and allocations from the highway account of the Highway Trust Fund. Mass transit account payments or allocations are not included in the calculations made by USDOT, and do not factor into any of the minimum guaranteed return rules that have arisen in recent years. Eighteen states have been historic net donors over the life of the trust fund. See *Highway Statistics* 2001, Table FE-221.

Map 1-1: Historic highway trust fund donor states



Source: Highway Statistics to 1995, Highway Statistics 1996-2001. Table FE-221.

Donor state representatives have used program reauthorization as the time to forge coalitions of similarly situated states, raise the banner of state equity, and demand a more equitable distribution of the resource pie (defined in terms of an increase in their ratio of aid disbursements to tax payments). They do so by changing the formulas that are used to allocate most highway dollars to the states. Donor states have sought a 95-percent return on their trust fund contributions in each of the last three reauthorization debates, and settled for less. Under the soon-to-expire Transportation Equity Act for the 21st Century (TEA-21), all states are guaranteed a minimum return of 90.5 percent of the

revenue they pay into the highway account of the HTF.[13] The donor states, now united under the umbrella of the States' Highway Alliance for Real Equity (SHARE), are looking for a 95 percent guaranteed return in the next reauthorization bill due in 2003.

Geographic redistribution and its purpose

The complaints of donor state representatives speak to issues of fairness, but they also raise questions as to why there is redistribution in the first place. And, one must also ask whether redistribution serves a positive purpose, or a negative one?

The redistribution of resources is often necessary, and can serve very important social purposes. Resources are redistributed among individuals to aid the poor, to limit the concentration of wealth, and to provide equality of opportunity for differently situated individuals (Rawls 1971). Resources are also redistributed among places, as in the case of the donor-donee conflict noted above. Resources can be redistributed among places to help poor states or localities, to maintain a national transportation system, to compensate states or localities for the benefits outsiders derive from their investments, and to provide for the needs of the national defense (Break 1980). These are all legitimate reasons for there to be donor and donee states, regardless of the donor states' complaints.

But there are other explanations for redistribution that are less easy to justify, and most of these boil down to politics. Some people argue that well-situated politicians and/or interest group representatives are shaping the transportation program to benefit themselves and their constituents, to the detriment of others and even of national needs as

[13] The minimum guaranteed returns apply only to the highway account of the Highway Trust Fund (HTF) (TEA-21 1998).

a whole (Stein and Bickers 1995). A different but somewhat related explanation posits that politicians, bureaucrats, and interest groups like to keep things as they are, and have used institutional inertia to maintain the status quo—because it benefits them or their constituents. One challenge of this work is to determine which, if any, of these explanations best fit the geographic pattern.

Modal conflicts and types of expenditures

The spatial conflict over donor and donee states drew me into this dissertation because it is a very visible conflict. But just as interesting, and perhaps more important, are what the money is actually expended upon. Surface transportation dollars can be spent on highway programs or transit programs. And within each of these modal categories we can spend money on new infrastructure or on system maintenance and operations (or in transit, on buses or rail projects). We can also create earmarks to give higher priority to particular kinds of projects in particular places. But how do we decide which mode to favor or which kind of project to favor? And how do we then determine where the expenditures are made?

Federal policy has tended to favor one mode over another and one kind of project over another. Historically, the federal program was very much a highway program, and tales of the highway lobby that protected it from competitors and/or opponents fill the transportation literature. Transit advocates battled the highway lobby for years before they breached the trust fund barrier in the 1970s; they were then given a dedicated mass transit account within the trust fund in the 1980s. As a result of these political compromises, the federal transit program is now about 20 percent the size of the highway

program. At the same time, transit serves only 2 percent of all trips while motor vehicles account for most of the remainder. Despite the claims of many transit advocates, the transit program would seem to enjoy a favorable position vis-à-vis the highway program today. But is this really the case? And how did these changes occur?

Simultaneously, there is the issue of expenditures within the modal categories, a topic that has not elicited anywhere near the passions of the modal debate itself. Historically, the federal highway program has emphasized capital expenditures over maintenance and operations (*Highway Statistics* Summary to 1995). The same has also been true of the transit program. Maintenance and operations expenditures have recently become a large share of federal highway expenditures, as the highway system has aged. At the same time the federal government has retreated from its earlier commitment to provide transit operating assistance. A historic tendency to favor capital investment has been apparent in both federal programs, but why?

One possible explanation is the philosophical belief that one-time capital investments are properly the purview of the federal government while ongoing maintenance and operating expenditures are more appropriately a matter for the states and localities. The federal government thus provides the basic national transportation infrastructure, and the other levels of government keep it in good running order. But, there are also political considerations. New capital projects provide opportunity for ribbon cutting and other credit-claiming endeavors, and maintenance or operations expenditures typically do not.[14] Different kinds of projects also generate different

[14] See, for example, King (1997).

numbers and kinds of jobs in different industries and geographic areas (Taylor and Samples 2002). Put simply, capital investments may have larger multiplier effects than operations investments. These are some potential explanations for this phenomenon, although there are undoubtedly many different combinations of factors at work.

Research questions

The dissertation seeks to understand why certain geographic areas and certain kinds of projects have been favored over others when decisions are made about the distribution of federal surface transportation resources. It does so by taking a close look at the mechanisms that guide resource distribution decisions, in particular the formula apportionment process that dominates both the federal highway and transit programs. It explores the origins and evolution of the resource distribution rules and procedures over the course of the surface transportation program's history, and examines how the reality of the program's expenditure outcomes relates to the rationales articulated by the public finance, public administration, political science, and transportation policy literature. The research will contribute toward a larger long-term project that assesses how transportation finance decisions on both the revenue and expenditure side have shaped the transportation system, the way we use it, and the built form of the surrounding urban and rural environment. But it is limited to a consideration of the expenditure dimension because of the resource, time, and space constraints of the dissertation.

Through this exercise, I answer three general research questions. The first two overarching questions relate to net geographic return and within-category (modal distribution, capital versus operations, etc) patterns of expenditure, and will be addressed

through the combined historical investigation and quantitative analysis. First, what factors explain the net geographic distribution of federal highway money among the states? In short, why are some states net donors to the federal highway program and others net recipients? To answer these questions, I look at the spatial patterns of the states' net return on contributions to the highway account of the HTF, and explore potential explanations for the particular patterns that emerge.

Second, what factors explain the distribution of the federal highway and transit expenditures themselves? Are they related to use of the transportation system? Or, does something else better explain the patterns we find? To address these questions, I examine federal expenditures by mode (highway, transit) and category (total, earmark, transit capital, transit operation, etc) among the states.

Third, how do the findings from the above analyses compare with the theoretical rationales for redistribution and/or expenditure decisionmaking discussed in the public finance literature and the functional explanations discussed in the political science literature? In short, do the patterns detected in questions one and two reflect economic need, system need, or political influence? To address these questions, I will include factors that measure some of these dimensions within the quantitative analysis. Once these questions are answered we can consider whether the observed outcomes contribute to our larger transportation policy goals, or whether changes should be made in the resource distribution process.

Finally, over the long term, I hope to examine how decisions about expenditure policy have affected the form and function of the transportation system. By favoring

particular kinds of projects with generous aid allotments or high matching ratios, the federal transportation program encourages states and localities to invest in certain types of transportation projects and not in others. These investment decisions have in turn affected people's travel choices and the way we build our cities.

These specific research questions were chosen because of the very important and highly visible role that decisions about transportation investments have on travel and urban form. These issues are thus very important to transportation researchers. The first question, focused on geographic redistribution, is generally thought of as a political issue and is thus the subject of investigations by political scientists as opposed to transportation researchers. But I argue that redistribution is an important issue for transportation researchers because it is emblematic of other problems in the transportation program. Redistribution is symptomatic of other distortions in transportation finance, and these distortions have negative effects on the design and use of the transportation system.

The geographic redistribution in surface transportation might have had an important purpose at one time but has outlived its usefulness. Like the 80- and 90-percent federal cost matching arrangements, it influences the selection of transportation projects, may thus create inequities among taxpayers in different states, counties, and localities, solely on the basis of where they live, and may also result in the waste of billions of precious transportation dollars. Redistribution shifts scarce resources from congestion-plagued, highly populated areas to less-congested areas with seemingly less critical transportation needs. Especially when considered in relation to other distortions in the transportation program (including unequal treatment of different modes or categories of

projects, too generous matching ratios, public land state matching bonuses), which have even more profound implications, its significance may be enormous.

Initial hypotheses

I hypothesize that a number of factors produce the patterns of revenue and expenditure that we find. First, I suspect there is an anti-urban bias in the distribution of transportation dollars, particularly in the federal highway program. I believe federal highway dollars are being redistributed from urban to rural states. I suspect this tendency is partly a legacy of the program's origins as a rural-only highway program, but is perpetuated by a formula allocation process negotiated in a political environment in which the benefiting areas are disproportionately influential.

Second, I believe the states and localities represented on the key policymaking and oversight committees in congress disproportionately benefit from the federal surface transportation program. The disproportionate representation of rural politicians and interest groups in the policymaking process, including membership on the congressional committees that oversee the program, is one possible explanation for the anti-urban bias noted above. I strongly suspect that those urban states that have been large beneficiaries of the Federal program have also been at the committee table.

Third, there has been a shift in the patterns of redistribution and influence over the past few decades, but only a slight one. I don't believe that the changes enacted in ISTEA and TEA-21 have had a large effect on the patterns of transportation expenditures. For all the changes over the course of their history, the surface transportation programs have

been remarkably consistent and stable—except in a very few moments of crisis and genuine policy change.

Fourth, political and interest group wrangling have caused a distortion in favor of capital expenditures, as opposed to maintenance and operations, and the same maneuvers have given certain kinds of mass transit capital initiatives, particularly rail projects in a handful of favored localities, a disproportionate share of transit resources.

I posit these four assertions as answers to the research questions discussed above. I will assess the validity of these claims by looking at overall surface transportation expenditures in general and, more particularly, at the spatial distribution of these expenditures among the fifty states. I employ a combination of quantitative and qualitative methods. The quantitative analysis will focus on three years: 1990, 1995, and 2000. This timeframe allows a statistical examination of the surface transportation program both before (1990) and after passage of ISTEA (1995), which has often been labeled a revolutionary moment in the program's history, and after TEA-21 (2000). One point of investigation will be to determine whether the rhetoric surrounding ISTEA and TEA-21 matches the reality. The specific statistical tests will include correlation, simple regression techniques, paired t-tests, and a preliminary use of multivariate regression in a small number of cases. The data sources include the annual *Highway Statistics* series produced by the Federal Highway Administration, the annual *Grant Summaries* produced by the Federal Transit Administration, and the budgetary data included in the transportation program's authorization and appropriations bills.

But the dissertation also explores the origins of the surface transportation program, with a particular focus on the origins of its apportionment formulas, matching share arrangements, and other expenditure rules. Therefore, I employ a qualitative methodology relying on examination of the political, legislative, and financial history of the surface transportation program from its origins to the present. Most of this analysis focuses on key moments of policy change. For those handful of epochs I use a combination of primary source documents (bills, legislative debates, and committee reports) and other sources (including the academic literature and a sprinkling of newspaper accounts) to get a sense of public and interest group sentiment toward what was being developed in Washington.

Preview of research results

At the outset, I will briefly preview a handful of key findings. First, the federal surface transportation program has been very stable, with few moments of large-scale policy change. This stability is particularly evident in the apportionment formulas used to distribute resources among the states. For example, within the highway program, formulas designed to distribute resources in a way that met a particular program goal, at a given moment in time, have often survived decades after the original rationale disappeared. This is most famously the case in the inclusion of a state's rural post road miles (included in 1916, when post roads were a focus of the federal highway program) as a factor in the apportionment of federal funds until 1998 (long after the goals had shifted to other purposes). This same phenomenon can be seen in the continued retention of minimum state apportionment provisions and public lands state matching share

bonuses in the highway apportionment formulas decades after the original rationales for their inclusion (minimum floor of ongoing aid, property tax-based highway finance system) have disappeared.

Second, historic expenditure patterns are a strong determinant of current expenditure patterns. In the case of the donor state issue, for example, the most powerful explanation for a state's donor/donee status is its past status in this regard. My analysis also shows that a state's urban population share, as opposed to its rural share, is positively associated with its net geographic return at least prior to passage of TEA-21. Both a state's rate of return and its net return (total dollars and per capita) are negatively correlated with population, highway system use, and highway system extent. In other words, the states that would seem to have less highway system need benefit from the current pattern of redistribution. By contrast, a state's political representation is a relatively unimportant factor. ISTEA changed almost none of these relationships while TEA-21 made only modest adjustments. The decision made in TEA-21 not to cut most states' total apportionment dollars below their ISTEA levels, so as to create few losers, meant that the highway formula changes made in 1998 have not had very significant results. The past drives the present.

As for the expenditures themselves, total highway program expenditures are strongly associated with population, vehicle travel, representation on the House committees with jurisdiction, and (increasingly since TEA-21) measures of highway system extent. But these relationships are reversed when we look at per capita expenditures. Highway earmarks (total dollars) are positively associated with House

political representation and, in terms of appropriation earmarks (total dollars), increasingly associated (positively) with measures of highway system extent.

In the transit program, the key change in recent years is the decreasing association between transit expenditures and use of the transit system, particularly in the years following ISTEA. Most of this is due to the decision in the 1990s to reduce and, after TEA-21 eliminate, operating assistance to urban areas with populations over 200,000—precisely the areas where most transit riders live. The increasing disconnect between transit expenditures and transit system use is particularly visible when we look at earmark expenditures, where the correlations have been only weakly positive for total expenditures and are weakly negative for per capita expenditures.

The analyses indicate that the biggest changes resulting from ISTEA and TEA-21 have been an influx of more dollars overall, rather than changes in the expenditure patterns themselves. But I contend that the biggest problem affecting the federal surface transportation program today is not a scarcity of resources but rather the way the resources are used. From both an economic efficiency and a social equity perspective, resources should be expended where the needs are greatest—where the systems are large, heavily used, and/or critical components of the basic national infrastructure. And this isn't always what happens.

I will close this preview of findings by raising some of the arguments discussed in the concluding chapter. I argue that the biggest problems in the federal surface transportation program today are not necessarily the donor state issues, the proliferation of earmarks, modal biases, or even the relative treatment of capital and

maintenance/operating expenditures. The biggest problems, to my mind, are the scope of the programs and the federal matching ratios. In terms of scope, the federal surface transportation program has taken responsibility for projects far beyond what would seem appropriate for it to take in a federal system such as ours. Many highways and transit projects that receive lots of federal dollars are more properly the concern of local, regional, or state governments. We need to rethink the mission of the federal programs, both in highways and transit.

At the same time, we must reconsider the wisdom of the very high matching ratios we use in our federal transportation programs. In many cases the federal government is willing to pick up more than 80 percent of the cost of a highway or transit project. This makes a lot of less essential (in transportation terms) projects more desirable from the standpoint of local or state officials. Many things appear quite desirable when you only have to cover 20 percent of the capital cost.

It was just this sort of matching ratio incentive that influenced urban freeway development to favor modern interstate-style highways rather than some of the smaller-scale, multi-modal concepts being planned by local engineers and planners. State and local governments took the interstate money, and accepted the interstate rules and design requirements, because the federal government was willing to pay 90 percent of the cost (Taylor 2000). It could expect no federal aid were it to decide to build an alternative. It's hardly surprising what the results of such a financial incentive can be. We merely have to look at our cities to see the results—and look at how different the situation is in other

nearby countries (for example Canada) which lacked a federal program with such large dollars and distorting matching share incentives.

The structure of the dissertation

The dissertation consists of 11 chapters. Chapter 1 is this introductory one. The remaining chapters, with the exception of the conclusion, are organized in three parts. The first part of the dissertation, consisting of chapters two and three, presents an overview of the topics explored in the research. Chapter 2 describes the federal surface transportation program, including the budget process for transportation and the operation of the Highway Trust Fund, and raises one of the key political issues in the current reauthorization debate, the issue of geographic redistribution and the donor-donee conflict in the federal highway program. The chapter contains descriptive data on the breakdown of current federal expenditures. The object is to provide a more detailed overview of the federal surface transportation program.

Chapter 3 reviews the planning, political science, public administration, and public finance literature for the theoretical rationales and functional explanations that have been posited for the expenditure patterns discussed in this introduction and Chapter 2. The discussion forms the basis for the quantitative examination undertaken in Chapters 7 through 10, but also helps to focus the historical investigation contained in Chapters 4 through 6.

The second part of the dissertation, consisting of Chapters 4 through 6, is a detailed examination of the history of the surface transportation program. Chapter 4 recounts the history of the surface transportation program from the 1890s to the years

immediately preceding passage of the 1956 highway legislation. It traces the origins and evolution of the programs, focusing specifically on their resource distribution mechanisms. It also explores the rationales offered for the particular structures that were selected, as a prelude for considering their appropriateness in today's changed environment.

Chapter 5 focuses on the period from roughly 1956 to the passage of the 1987 reauthorization law, the last law of the interstate highway construction era. It highlights the creation of the Highway Trust Fund, the emergence of the modal conflict between supporters of highways and transit, and the growth of the geographical conflict between representatives of donor and donee states. It also focuses on the elaborate geopolitical compromises that were negotiated to ease these conflicts.

Chapter 6 focuses on the period from ISTEA to the present, the post-interstate era. It focuses on the political negotiations that produced ISTEA and later TEA-21. The chapter closes with the question: did ISTEA and TEA-21 really change that much?

The third part of the dissertation is a quantitative analysis of surface transportation expenditures in 1990, 1995, and 2000, three years that bracket the passage of ISTEA and TEA-21. Chapter 7 describes the data used in the examination and discusses the statistical methods that are employed. Chapter 8 is the empirical analysis of the federal highway program in 1990, 1995, and 2000. Chapter 9 is the empirical analysis of the federal transit program in the same three years. Chapter 10 is an empirical analysis of geographic redistribution in the federal highway program, the donor state problem.

The latter three chapters examine changes in the spatial patterns of expenditures, among their respective expenditure categories, over those three years. The chapters also test both the literature's explanations for the spatial expenditure patterns and my own hypotheses on the subject, and the relevant conclusions are drawn.

The dissertation closes with Chapter 11. This chapter offers concluding thoughts on the research findings, develops broader arguments about federal policy, offers a few policy prescriptions, and identifies avenues for future research.

Concluding thoughts on the federal program and its effects

The US transportation system provides high levels of low-cost mobility, and this is a function of decades of federal, state, and local investment in transportation infrastructure. The federal program has helped pay for countless miles of streets and highways, fleets of buses and rail cars, and a host of transportation-related buildings and other facilities. It has linked the various regions of the country to one another, and in doing so stimulated the growth of industries such as inter-city trucking. The federal program encouraged the development of the nation's urban freeway and expressway network. It has had a profound influence on travel, the economy, and our cities.

The challenge of this research is to explore and better understand the resource distribution mechanisms of the federal program with an eye toward considering some of the effects on system design, system use, and the surrounding landscape. This research focuses specifically on apportionment formulas, special project earmarks, program rules, expenditure patterns, and other aspects of the federal program. However, I see it part of a long-term project to better understand the politics of transportation finance, from revenue

policy through expenditure policy and on to the consequences of these policies for system development and urban form.

Transportation economists have devised scores of recommendations to make transportation policy more economically efficient and less wasteful. But few of these policy prescriptions have found their way into practice. In their zeal to eliminate economic waste and inefficiency, many of the researchers have neglected the political factors involved in transportation policymaking. Political scientists, on the other hand, have analyzed the effects of different political variables on transportation policymaking. They have quantified the effects of senate representation and committee membership on the amount of money a state or congressional district receives in federal transportation aid. And, a few political scientists have included variables reflective of the demand for aid by lower units of government. But political scientists have typically shied away from assessing the economic efficiency of these policy choices or examining their long-term effects on the operation of the transportation system. The dissertation is part of a larger research project that attempts to bridge these two literatures.

PART ONE: OVERVIEW OF THE TRANSPORTATION PROGRAM

CHAPTER TWO. FEDERAL SURFACE TRANSPORTATION PROGRAM

Members of Congress who wanted funds for a project in their State had adopted the practice of inventing a concept it would "demonstrate" as if it were part of an important research initiative. Under this idea, for example, funding for two parking lots became a demonstration of "methods of facilitating the transfer of passengers between different modes of transportation." Federal Highway Administration[15]

The backbones of the nation's transportation infrastructure, particularly where the daily movement of persons is concerned, are the roads, highways, and transit networks that make up the surface transportation system. Each year, we spend more than $120 billion to build, maintain, and operate our surface transportation infrastructure (BTS 2002). The most important single player in this effort is the federal government.

Each year, the federal government spends more than $35 billion to help its intergovernmental partners build, maintain, and operate the highways and transit networks that encompass this system (BTS 2002). It does so under the umbrella of the surface transportation program, the wide array of highway and mass transit programs that provide financial assistance to state and local governments and the nation's public transit providers. These programs operate under a variety of complicated rules and funnel money to recipients through an array of resource distribution processes. The federal programs are funded largely, but not exclusively, from the federal highway trust fund, a dedicated finance mechanism whose creation reflected the longstanding belief in user-

[15] President Ronald Reagan and the Surface Transportation and Uniform Relocation Assistance Act of 1987. http://www.fhwa.dot.gov/infrastructure/rw01e.htm

based transportation finance (Brown 1998). The federal surface transportation programs, including their historic origins and modern-day function, are the subjects of this dissertation.

This chapter provides a descriptive overview of the federal surface transportation program. The chapter opens with a brief discussion of the magnitude of the program and the general trend of expenditures over the past several decades. In the second part of the chapter, I discuss some characteristics of the programs themselves, beginning with the highway program and moving to the transit program. The discussion briefly touches on the different program categories, their expenditure levels, resource distribution mechanisms, and general history. The discussion gives the reader a general sense of the programs and serves as a prelude to the analysis in later chapters.

The third part of the chapter discusses the legislative features and resource distribution processes in surface transportation. The section focuses on the importance of authorizing legislation in transportation, the operation of the highway trust fund, formula apportionment processes, and the phenomenon of earmarking. It also provides an introduction to some of the key political players in federal policymaking.

The final parts of the chapter discuss expenditure outcomes of the policymaking process. First, I describe the spatial patterns of federal expenditures as an introduction to the contentious donor state issue that has dominated recent policy debates. Then, I focus briefly on the modal conflict between highways and transit.

Federal surface transportation expenditures

The federal government spends more than $50 billion a year on all aspects of transportation, while state and local governments spend about twice that amount (*Highway Statistics* 2001, Table HF-2). Despite this fact, the federal transportation program dominates all others. It does so by virtue of its position as coordinating entity, role model for state and local programs, and provider of grants that come with a lot of requirements attached (Lem 1996, Mertz 19??).

The federal transportation program is administered by the US Department of Transportation (DOT), a multi-modal department whose constituent agencies encompass nearly all facets of surface, water, and air transportation. In fiscal year 2002, expenditures by the US DOT reached a record $56 billion, and the president's budget requests for fiscal years 2003 and 2004 call for expenditures of $53 billion and $54 billion, respectively (USDOT 2003). More than 90 percent of federal transportation expenditures are made by three agencies: Federal Highway Administration (FHWA, 55 percent), Federal Aviation Administration (FAA, 23 percent) and Federal Transit Administration (FTA, 14 percent) (USDOT 2003). Several rail, maritime, and transportation research programs account for the remaining 8 percent.

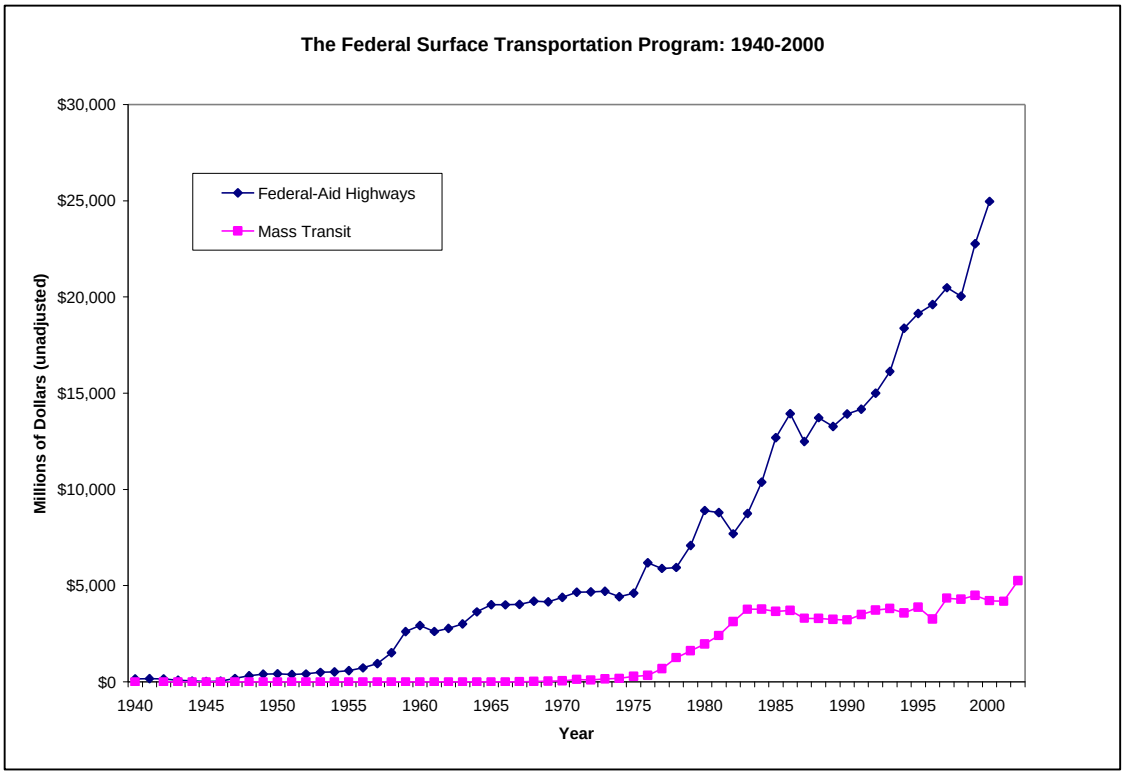
The federal surface transportation program includes both the highway and public transit programs administered by FHWA and FTA. These programs had total expenditures of $38 billion in fiscal year 2002, and accounted for 69 percent of the federal government's expenditures on the transportation (USDOT 2003). Most of the

money used to support the surface transportation program is derived from the federal highway trust fund (HTF).

In recent years, federal surface transportation expenditures have grown significantly. A large federal program is now taken for granted, despite occasional calls for more devolution from some quarters (Poole 1996). But the federal program was quite small, in relative terms, throughout most of its history, both in terms of funding and programmatic scope. Prior to the early 1950s, the federal role in transportation had been limited to providing assistance for the construction and maintenance of the federal-aid highway system, and federal expenditures, though increasing steadily, were relatively modest (Seely 1987).

Graph 2-1 shows that annual highway expenditures first topped the $1 billion mark in the early 1950s, when the decision to provide additional financial assistance for interstate highway construction was made (Rose 1990). Expenditures then grew significantly with the beginning of the golden age of interstate highway construction in the late 1950s. After a period of relative stagnation, highway expenditures have soared over the last two decades, from about $8 billion a year prior to enactment of 1982's Surface Transportation Assistance Act (STAA) to around $30 billion a year today. The near quadrupling of federal highway spending in the past two decades has far outpaced inflation, and overall public spending is near its historic high.

Graph 2-1: Federal surface transportation program, 1940-2000, unadjusted dollars

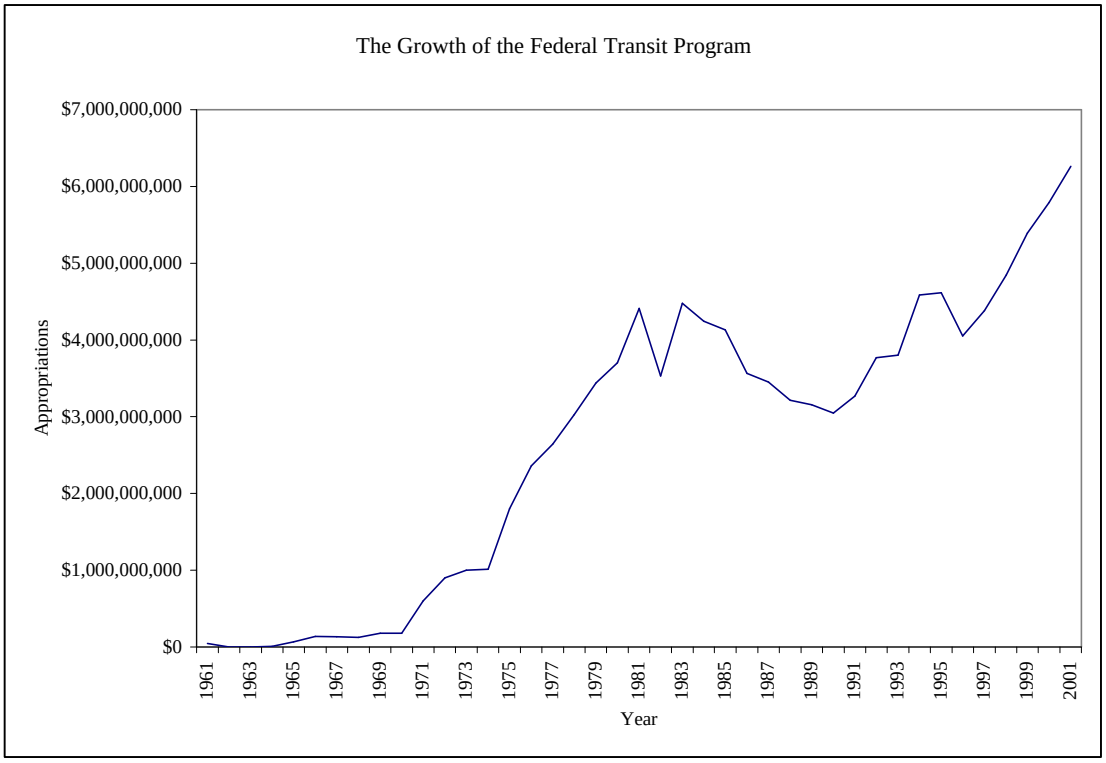


Source: Federal transportation legislation listed in references.

Federal involvement in public transit also began quite small, with the creation of a limited capital grants program in the 1960s (Hilton 1974). The federal role in transit became ongoing during the 1970s and extended to operating assistance; federal expenditures grew as a result (Jones 1985). In 1982, a dedicated transit finance mechanism was created when a portion of that year's motor fuels tax increase was dedicated to a new mass transit account within the highway trust fund (STAA 1982). This significant policy development paved the way for the more recent increase in federal transit expenditures.

Graph 2-2 shows that in the years immediately preceding passage of 1991's Intermodal Surface Transportation Efficiency Act (ISTEA) federal transit expenditures were around $3 billion per year, a slight reduction from their early 1980s peak. The federal government now spends $6 to $7 billion a year on transit (USDOT 2003).

Graph 2-2: The federal transit program, 1961-2001, unadjusted dollars



Source: Federal transportation legislation listed in references.

The dramatic increase in federal transportation spending reflects a change in policymakers' views of the federal government's appropriate role vis-à-vis state and local governments. In the early years of the federal program, fear of centralization and a loss of state power vis-à-vis the federal government kept the program small (Holt 1923, Burch 1962). In the middle years, a medium sized program reflected the widespread recognition

that the federal government had an important role to play in developing basic trunk networks to serve national needs in the realms of economic development and national defense (Brown 1998, Rose 1990). In the more recent period, the creation of the highway trust fund, with its billions of dedicated tax dollars, has led to a proliferation of programs and an increase of federal financial responsibility to include areas scarcely dreamed of by the program's creators (Weingroff 1996). In most of these program areas, the federal government is willing to pick up more than 80 percent of a project's cost.

The federal surface transportation programs

Federal expenditures on highways and roads totaled $30 billion in fiscal year 2000, and covered one-third of the nation's highway expenses (*Highway Statistics* 2001, Table HF-2). Federal expenditures on mass transit totaled more than $6 billion in fiscal year 2000, and covered 20 percent of the nation's transit expenses (*Highway Statistics*, Tables MT-2a and MT-2b). While the federal shares in both areas are relatively modest, the two federal programs affect the transportation system far out of proportion to their share of expenses. Both programs have served as models for state programs, and the grants they distribute have leveraged significant state and local investment in both policy areas (Brown 1998, Jones 1985, Seely 1987). On the highway side, federal expenditures are focused on the principal roads and highways of the country, the primary conveyors of persons and goods. On the transit side, federal expenditures are focused largely on capital expenses (subways, light rail systems, buses, and intermodal facilities), and this assistance has stimulated a flurry of new rail construction during the past quarter century.

The federal highway program

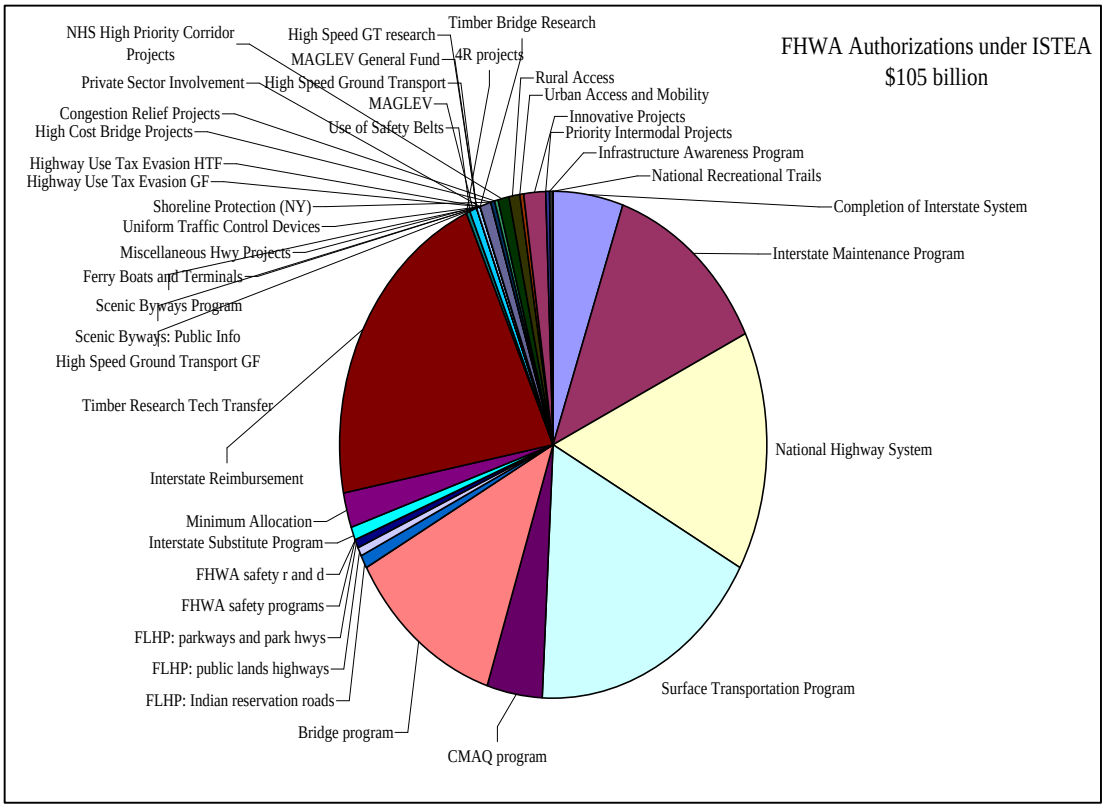
The Federal Highway Administration provides funds for road construction, rehabilitation, and maintenance for the National Highway System (NHS), forest roads, and a host of other highway-related programs, under the auspices of the Federal-Aid Highway Program (FAHP). In 1991, congress authorized $105 billion in highway spending over six years as part of the Intermodal Surface Transportation Efficiency Act (ISTEA) (ISTEA 1991). This amount was increased more than 25 percent to $136 billion over six years as part of ISTEA's successor, the Transportation Equity Act for the 21st Century (TEA-21), in 1998 (TEA-21 1998). The highway program accounted for 77 percent of surface transportation spending authorized by ISTEA ($105 billion out of $140 billion), and grew to 79 percent under TEA-21 ($136 billion out of $172 billion).

The highway program has been characterized by some critics as cumbersome and inflexible, and state and local governments have argued for a streamlining of programs, relaxation of rules, and devolution of program decisionmaking (although not financial responsibility) to lower levels of government (Poole 1996). In response, ISTEA permitted more flexibility in the shifting of resources across program categories, and several established programs were consolidated. The result of consolidation is that the overwhelming majority of highway expenditures are made within a small handful of programs.

Graph 2-3 shows the breakdown of ISTEA's highway expenditures among categories of highway programs. The core highway programs (Interstate Reimbursement, Surface Transportation, National Highway System, Interstate Maintenance, and Bridge

programs) accounted for about 78 percent of all authorized expenditures with the remainder spread among demonstration projects, research programs, and minor federal aid road programs (public lands roads, reservation roads, etc).

Graph 2-3: Federal highway administration authorizations under ISTEA



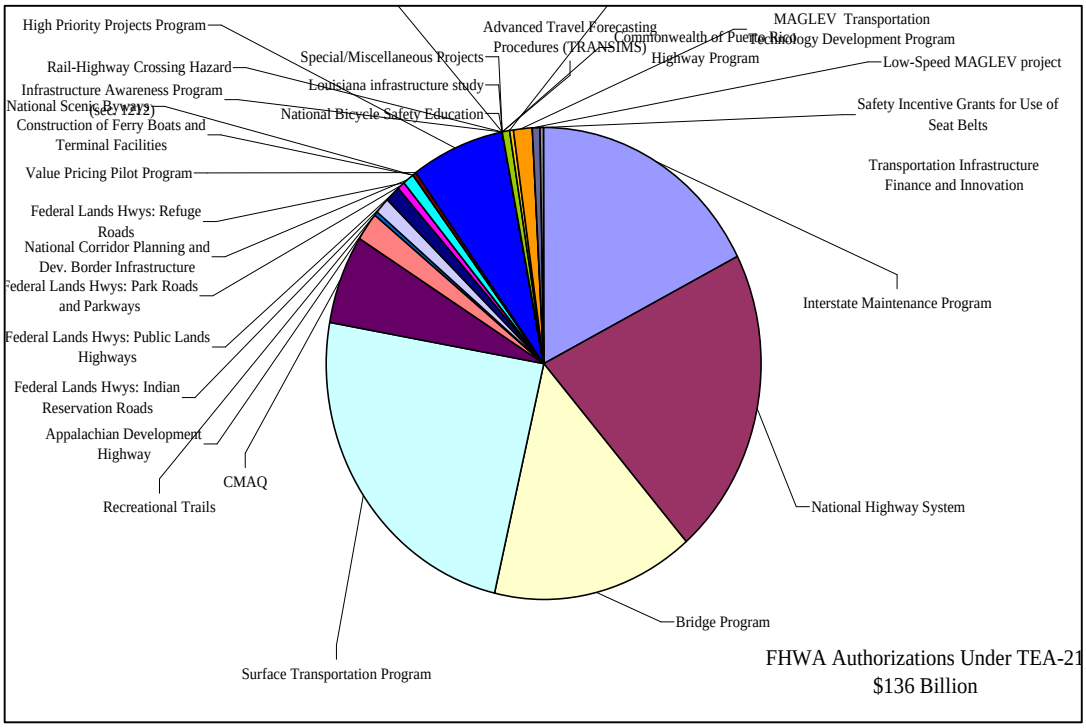
Graph 2-4 shows the breakdown of TEA-21 highway expenditures. The core programs accounted for nearly 80 percent of authorized expenditures, with the remainder spread among a number of smaller programs.

One important change between the two graphs is the growing share of expenditures for the High Priority Projects program. This program contains the specific highway project earmarks attached to transportation authorizing legislation by members

of congress. They are the so-called "pork barrel" projects upon which much negative media coverage has been focused (Stein and Bickers 1995). These projects were a minor feature in federal transportation policy prior to passage of the Surface Transportation and Uniform Relocation Assistance Act (STURAA) in 1987, but they ballooned under both ISTEA and TEA-21, each of which included more than 1,000 specific highway project earmarks. While highway earmarks are growing in number and in dollars, they are still a relatively small share of overall highway expenditures (between 5 and 7 percent). But their high visibility and the ease with which they can be linked to the actions of specific individuals or interest groups has made them a significant feature in policy debates.[16] The earmarking phenomenon is discussed in more detail later in this chapter.

[16] See for example Pianin and Babcock 1998.

Graph 2-4: Federal highway administration authorizations under TEA-21



The highway program is financed by taxes levied on highway users (FHWA 1999a). The proceeds from these taxes are deposited in the highway trust fund, and then allocated to the states and other government entities through statutory apportionment formulas, administrative action by USDOT, and congressionally directed project earmarks (FHWA 1999a). Both the revenue collection and expenditure distribution mechanisms are established by authorizing legislation (ex. ISTEA, and TEA-21).

The federal highway program began as a technical advisory program in 1893, but it was transformed into a modest grants program with passage of the 1912 Post Office Appropriations Act (Brown 1998). Congressional dissatisfaction with the way that the grants were allocated prompted the creation of a formula-driven apportionment process

when the highway program was expanded and made permanent in 1916 (Congressional Record 1916). Formula apportionment was widely heralded because it made a state's annual aid apportionment more predictable, and, so the argument went, less subject to the individual whims of the political appointees and agency bureaucrats who had allocated money under the grants program (Congressional Record 1916). Months of political negotiations produced what became known as the "one-thirds" formula that weighted a state's land area, population, and miles of rural postal routes equally in the determination of its share of federal highway aid (Federal Aid Road Act 1916). Federal funds were limited to rural areas, and the ostensible purpose of the program was building roads over which the mails would be carried (Holt 1923).

Political considerations limited the federal role to providing assistance for building individual rural post roads until the early 1920s at which time the program's focus shifted to completion of a national rural highway network (Seely 1987). The highway program finally acquired an urban component during the economic crisis of the Depression when highways and other public works funds were used to provide jobs (Gifford 1983). The urban component became a permanent, and central, feature of the federal highway program after 1944. But despite the growth in program size, the federal financial commitment remained relatively modest prior to 1956 and the creation of a dedicated finance mechanism, the highway trust fund (Brown 1998).

As the focus of the federal program expanded, new apportionment formulas were developed. But many of the original formula factors were retained (miles of post roads, land area). A state's miles of rural post roads remained a factor in the apportionment of

some federal highway funds until 1998, long after building rural post roads had ceased to be a primary goal of the program (Congressional Record 1998). Once politically negotiated and set in place, formulas tend to be difficult to change. And as such, decisions about which factors to include in a formula and how to weight them are enormously important, both in the short-term (because of the dollars involved) and the long-term (because it is hard to change them, and they affect even more dollars over time). Not surprisingly, arguments over formulas are often particularly intense, as evidenced during the debates preceding ISTEA and TEA-21 (discussed later). Today's highway formulas include factors related to population, system extent, and system use, but they also contain minimum state apportionment rules, public lands state bonus provisions, and "hold harmless" provisions that prevent most states from losing money vis-à-vis their apportionment under ISTEA (see **Table 2-1** for today's formula factors).

Table 2-1: FHWA apportionment formulas under TEA-21

Federal Highway Administration formulas under TEA-21

Program	Formula	Federal Share	Minimum Apportionment
Interstate Maintenance Formula	1/3 interstate system lane miles, 1/3 interstate system VMT, and 1/3 annual contribution of commercial vehicles to Highway Account in HTF	90%	.5% IM + NHS combined
Interstate Maintenance Discretionary	discretionary	90%	
National Highway System	1/4 lane miles on non-interstate principal arterials, 35% VMT on non-interstate principal arterials, 30% diesel used on hwys, 10% lane miles on principal arterials per state population	80%	.5% IM + NHS combined
Alaska Highway		100%	
Territorial Highways		100%	
Surface Transportation program	1/4 lane miles of federal aid hwys, 40% VMT on federal aid hwys, and 35% highway user payments into Highway Account in HTF	80%	0.50%
Safety Infrastructure		90%	
Transportation Enhancements		80%	
Bridge Replacement and Rehab	Relative share of total cost to repair or replace deficient bridges	80%	.25%, max of 10%
CMAQ	weighted nonattainment and maintenance area population	80%	0.50%
Federal lands Highways		100%	
Emergency Relief		80%+	
Motor Carrier Safety Grants		80%	
Appalachian Development Hwys		80%	
Recreational Trails	50% equal shares to each state, 50% non-highway recreational fuel use	80%	None
National Corridor and Border Infrastructure		80%	
Scenic Byways		80%	
Ferry Boats and terminals		80%	
Value Pricing Pilot		80%	
Highway Use Tax Evasion		100%	
Transp and Community and System Pres. Pilot		100%	
Woodrow Wilson Bridge		80%+	
High Priority Projects	earmarked	80%	
ITS- R and D		80%+	
ITS- Deployment		50% - 80%	
Surface Transportation Research		80%+	
Technology Deployment		80%+	
State Planning and Research		80%	
Metropolitan Planning	Urbanized area population	80%	0.50%
Minimum Guarantee	varies with program	80%	varies with program
State and Community Hwy Safety Grants	75% pop, 25% public road mileage	80%+	0.50%

As briefly alluded to above, formula apportionment is complicated by the presence of minimum apportionment rules. Many highway programs contain minimum apportionment provisions that guarantee each state 0.5 percent of the funding within that specific program category to each state (TEA-21 1998). Thus, 25 percent of the total funding within the affected category is distributed before any "need" which the program is meant to serve is even considered (0.5 percent per state times 50 states). The net result is that smaller population states receive a disproportionate share of the resources from any given program. The provision was inserted in 1921 to guarantee all states a minimum level of federal aid to support a viable long-term highway program, during a time when the federal program was quite small (Congressional Record 1921). It has survived primarily at the behest of small population state senators who have resisted occasional efforts by the House of Representatives and several Administrations to modify or remove the provision (Congressional Record 1991). Without it, their state's apportionment would be significantly reduced (Congressional Record 1991).

The federal highway program has always been seen as a partnership between the states and the federal government, and the partnership arrangement extends to the issue of cost sharing (Gifford 1983). Most components of the highway program operate on a matching grant basis, with the federal share defined by authorizing legislation such as ISTEA or TEA-21. The states are then required to match the federal contribution. When the program began, the federal share was set at 50 percent, reflecting the idea that the program represented an equal partnership between the federal government and the states (Congressional Record 1916). The federal share has grown over time. Under the

interstate program, the federal share was 90 percent of project cost, so as to expedite the system's completion, and the generosity of the share for interstate projects was undoubtedly a reason for their popularity with state and local officials (Taylor 2000). Today, the federal share on most highway projects ranges from 80 percent to 100 percent.

The federal share is increased in the so-called public land states, the dozen or so states where the federal government owns a large share of the land area. This provision also dates to 1921, a time when the property tax was the mainstay of the highway finance system. Because federally owned lands were exempt from state and local property taxes, federal ownership seriously reduced the highway revenue generating ability of some states (Congressional Record 1921). To make up for this handicap, these states were allowed a larger federal match on eligible projects, with the specific match increasing in proportion with the amount of their land area owned by the federal government (Federal Aid Highway Act of 1921). When this provision is applied to the interstate program, it means that the federal share can increase from 90 percent to as high as 95 percent (TEA-21 1998).

As in the case of minimum apportionment, the public land state bonus was an appropriate response to a particular problem at a specific moment in time. But the public land state bonus is still with us, despite the fact that the property tax ceased to be even a minor means of financing highways several decades ago (Brown 1998). There have been no serious attempts to eliminate or to scale back the public lands state bonus.

The federal transit program

The Federal Transit Administration (FTA) provides capital assistance to transit agencies throughout the United States and operating assistance to agencies in urban areas with populations under 200,000. The transit program includes both formula apportionment and discretionary grant programs, although congressional earmarks now consume most of the discretionary program resources (Congressional Record 2002). In 1991, ISTEA authorized $32 billion in transit expenditures, and in 1998 TEA-21 increased this amount to $36 billion. However, transit's share of surface transportation expenditures has decreased over this time. The FTA accounted for 23 percent of surface transportation expenditures under ISTEA ($32 billion out of $140 billion), but only 21 percent under TEA-21 ($36 billion out of $172 billion) (ISTEA 1992, TEA-21 1998).

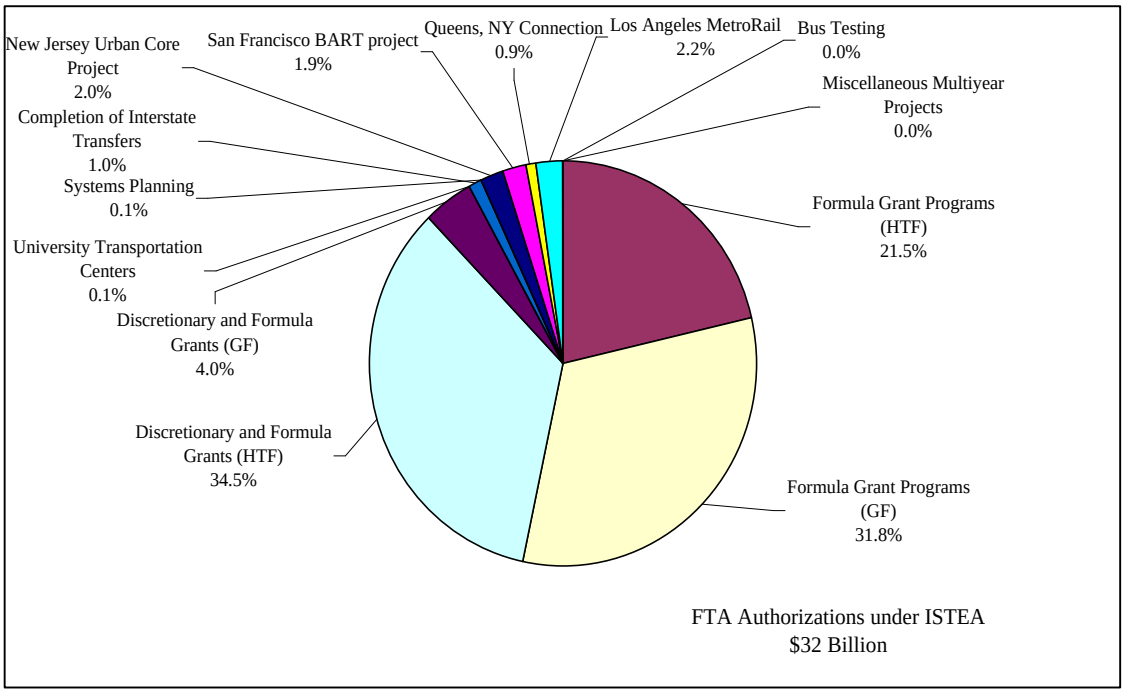
The FTA spent $7 billion in fiscal year 2002, up from a little over $6 billion in fiscal year 2000. The President's budgets for fiscal years 2003 and 2004 request a little over $7 billion each year for FTA's programs (USDOT 2003). Federal transit aid pays for approximately 23 percent of the nation's annual transit bill (*Highway Statistics* 2001).

Unlike the federal highway program, program proliferation has not been a major issue in the transit program in recent years. The number of expenditure categories has remained fairly stable. A handful of new programs have been created, for example the Job Access Reverse Commute Program (JARC) in the wake of welfare reform, but many freestanding project earmarks have been moved into the established discretionary grants programs in recent authorization periods (TEA-21 1998). In essence, the presence of the

discretionary grants programs acts as a break on the trend toward new program creation; new program supporters simply create earmarks within the once discretionary programs.

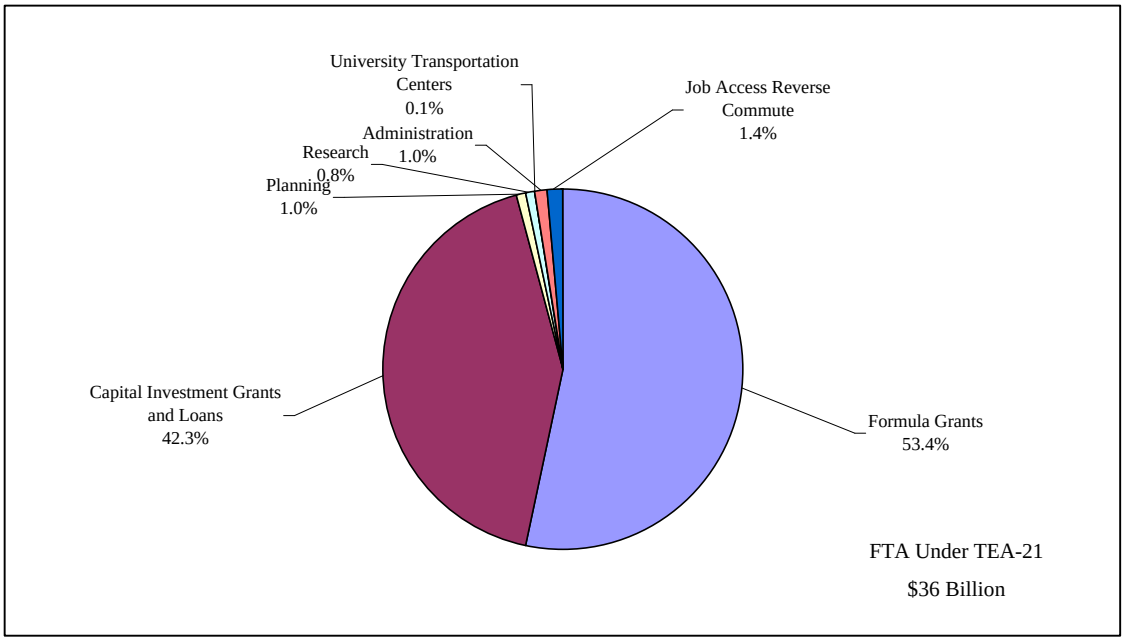
Graph 2-5 shows the breakdown of ISTEA authorizations among the primary transit program categories. The three discretionary and formula grants programs accounted for more than 85 percent of expenditures, with the remainder spread among a handful of research and stand-alone demonstration projects. **Graph 2-6** shows the consolidation of expenditures into a smaller number of categories as part of TEA-21, with the formula grants (including operations funding) and capital investment grants and loans programs accounting for more than 95 percent of all transit expenditures.

Graph 2-5: FTA authorizations under ISTEA



Source: ISTEA legislation.

Graph 2-6: FTA authorizations under TEA-21



Source: TEA-21 legislation.

The federal transit program dates to the passage of the Housing Act of 1961. The program was originally envisioned as a one-time grant and loan guarantee program to aid cash-strapped transit agencies in a time of serious fiscal distress in the transit industry (Jones 1985). At the time, many people believed that money was needed to upgrade rolling stock and equipment, and that once these upgrades were made the transit industry could remain viable without substantial federal assistance (Hilton 1974). But this did not turn out to be the case.

The federal transit program, like its railroad counterpart (AMTRAK), became a permanent part of the transportation policy landscape in the 1970s. The impetus was years of lobbying by big city mayors, urban members of congress, and community groups seeking to use transit as an alternative to the motor vehicle and transit assistance as a

substitute for increasingly unpopular (in many areas) interstate freeway projects (Hilton 1974, Jones 1985). The original grants program expanded during the energy crisis of the 1970s to include both capital and operating assistance, and a combination of apportionment formulas and competitive discretionary grants were chosen to distribute federal resources (discussed later) (Jones 1985).

The Surface Transportation Assistance Act of 1982 (STAA) marked a major milestone for the transit program by creating a mass transit account within the highway trust fund (HTF).[17] A portion of the federal motor fuels tax, was earmarked to transit, and this decision made the program more financially stable. It also made possible the dramatic increase in federal transit spending that occurred under ISTEA (ISTEA 1991). In recent years, the federal government has reduced its commitment to providing operating assistance, and has dedicated a larger share of its transit resources to providing capital grants for rail construction, rail and bus vehicles, and inter-modal facilities (discussed later) (TEA-21 1998).

The transit program is financed by a combination of (1) highway user tax revenues (including a portion of the federal motor fuels tax that is deposited in the mass transit account of the highway trust fund) and (2) general fund revenues. The trust fund-supported share of transit expenditures has increased in recent years and is now more than two-thirds (FTA Grant Summaries 1995-2000) The majority of transit funding is

[17] As in the case of the highway program, the parameters of the federal transit program are set in the surface transportation program's periodic authorizing legislation. Since passage of the STAA in 1982, both highways and transit have been covered within the same authorizing law. Prior to that time transit expenditures were considered under separate authorizing legislation.

distributed by formula apportionment, according to factors and weights defined in TEA-21 (FTA Grant Summaries 1995-2000). The formulas are based on factors such as population, population density, miles of transit service, and other measures that, correspond to extent of the transit system (see **Table 2-2**).

A more direct relationship between expenditures and transit ridership has been resisted for political reasons because the nation's transit ridership is concentrated in a handful of places, while the revenue used to support the program comes from the country as a whole (National Transit Database 2001, Highway Statistics 2001). In fact, there has been an historic tendency to limit the maximum share of resources any single state receives under any of the program categories—a provision meant to penalize New York that would otherwise dominate the transit program (NMTA 1974). The 1998 decision to end operating assistance for the large urban areas (over 200,000 people) where most of transit riders live has further weakened the relationship between expenditures and transit system use (as discussed in Chapters 6 and 9).

Transit advocates have waged a long campaign to bring more equal treatment of highway and transit projects, and their hard work paid off in the last decade. To cite one example, the federal cost share for most transit projects was increased to 80 percent under TEA-21, to bring transit in line with the highway program. Previously, the federal share for most transit programs was around 50 percent. And, transit now receives around 20 percent of federal surface transportation resources, while it accounts for less than 2 percent of all person trips (BTS 2001). The historic pro-highway bias frequently cited by

many transit advocates, including the American Public Transit Association (APTA) and the Surface Transportation Policy Project (STPP), appears to be a thing of the past.

Table 2-2: FTA formulas under TEA-21

Federal Transit Administration formulas under TEA-21

Program	*Formula*	*Federal Share*	*Statute*
Clean Fuels Program	Number of vehicles in bus fleet and number of bus passenger miles, weighted by severity of non-attainment	80%	49USC5308
Rural Transportation Accessibility Initiative	Competitive basis	90%	TEA 21 3038
Urbanized Area Formula Grants	50 to 199k: population and density; over 200k: bus rev veh miles, bus pass miles, guideway veh miles, guideway rte miles, pop, and density	80%	49USC5307
Nonurbanized Area Formula Grants	Population in areas under 50,000	80%	49USC5311
Elderly and Persons with Disabilities	Number of elderly and disabled individuals in state	80%	49USC5310
Job Access and Reverse Commute	Section 3037	50% DOT plus other fed	TEA 21 3037
Bus and Bus-related Capital Grants	earmarked (supposed to be discretionary)	80%	49USC5309
Fixed Guideway Modernization	seven-tiered formula, min. of one mile fixed guideway	80%	49USC5309
New Starts	earmarked (supposed to be discretionary)	80%	49USC5309
Metropolitan Planning	formula	80%	49USC5303
State Planning and Research	State's urbanized area, .5% minimum	80%	49USC5313(b)
National Planning and Research	earmarked (supposed to be discretionary)	varies	49USC various
Rural Transit Assistance Program	nonurbanized population	100%	49USC5311(b)

Authorizing legislation, the highway trust fund, and resource allocation

Surface transportation programs operate under a somewhat different set of financing rules and procedures than apply to most other federal programs (FHWA 1999a,

FHWA 1999b). For example, where most federal programs must compete with one another for scarce resources, transportation enjoys the relative financial security of a dedicated revenue stream, the highway trust fund.[18] The highway trust fund, which is administered by the US Department of the Treasury, contains both a highway account and a mass transit account. The receipts from federal highway user fees on motor fuels, tires, trucks, and heavy vehicles are collected from users and/or intermediaries, and a specified portion of the proceeds are earmarked to the each of these accounts (see **Table 2-3**) (FHWA 1999a). Money deposited within the Highway Trust Fund is then available to be expended through the federal surface transportation program, pending passage of appropriate authorizing legislation (FHWA 1999a).

[18] The trust fund has been the target of poaching by deficit hawks and supporters of other discretionary government programs, but transportation supporters have fared better when expenditure decisions are made, because of the trust fund, than have those in other policy sectors (Congressional Record 1998, Oberstar 1997).

Table 2-3: Disposition of highway user tax revenues, by fund

Disposition of federal highway user tax revenues

Tax/Fee (cents per gallon)	*Rate*	*Highway Trust Fund*		*Underground Storage fund*	*General fund*
		Highway account	*Transit account*		
Gasoline	18.4	15.44	2.86	0.1	-
Diesel and Kerosene fuel	24.4	21.44	2.86	0.1	-
Special fuels					
Liquefied Petroleum Gas	13.6	11.47	2.13	-	-
Liquefied Natural Gas	11.9	10.04	1.86	-	-
Other Special Fuels	18.4	15.44	2.86	0.1	-
Neat alcohol (85% alcohol)	9.25	7.72	1.43	0.1	-
Compressed natural gas	4.3	3.44	0.86	-	-
Gasohol					
10% gasohol made with ethanol	13.1	7.64	2.86	0.1	2.5
7.7% gasohol made with ethanol	14.319	8.859	2.86	0.1	2.5
5.7% gasohol made with ethanol	15.379	9.919	2.86	0.1	2.5

Other Taxes - All Proceeds to Highway Account	
Tires	0-40 pounds, no tax Over 40-70 pounds, 15 cents per pound in excess of 40 Over 70-90 pounds, $4.50 plus 30 cents per pound in excess of 70 Over 90 pounds, $10.50 plus 50 cents per pound in excess of 90
Truck and trailer sales	12 percent of retailer's sales price for tractors and trucks over 33,000 pounds gross vehicle weight (GVW) and trailers over 26,000 pounds GVW
Heavy vehicle use	Annual tax: Trucks 55,000-75,000 pounds GVW, $100 plus $22 for each 1,000 pounds (or fraction thereof) in excess of 55,000 pounds Trucks over 75,000 pounds GVW, $550

Source: Highway Statistics 2001, Table FE-21b

Contract authority and the importance of being authorized

Transportation is further insulated from the day to day give and take of most expenditure debates by a provision called contract authority. Contract authority dates to passage of the 1921 Federal-Aid Highway Act, and was developed to facilitate long-range highway planning (Gifford 1983). It permits federal transportation aid recipients to

enter into project contracts in advance of the passage of appropriations legislation (FHWA 1999b). Operationally contract authority means that multi-year authorizing legislation (ISTEA, TEA-21) has become much more important than annual appropriations legislation in determining year-to-year transportation expenditure policy (FHWA 1999a). Authorizing committees have become much more powerful than appropriations committees (Congressional Record 1998). This has been particularly the case since the creation of the highway trust fund, which provided the transportation program with a stable, long-term, dedicated revenue stream (Weingroff 1996c).

Authorizing legislation allows the agencies and aid recipients to enter into their contracts, safe in the knowledge that a specified amount of money will be available for actual expenditure over a given number of years. Authorizing legislation, such as ISTEA and TEA-21, establishes the basic structures of the surface transportation program for a period of five to seven years (see **Graph 2-7**). The legislation specifies nearly all aspects of surface transportation policy, from defining programs and their rules, setting authorized expenditure levels, and developing the procedures for raising revenue from taxpayers and distributing money to aid recipients (ISTEA 1991, TEA-21 1998). This explains why everyone in the transportation policy arena gets very excited when reauthorization time is at hand (and is much less interested about annual appropriations legislation).

Appropriations legislation is significantly less important in the transportation area than in other parts of the federal government, and the appropriations committees in congress have been cut out of much decisionmaking (Congressional Record 1998). They

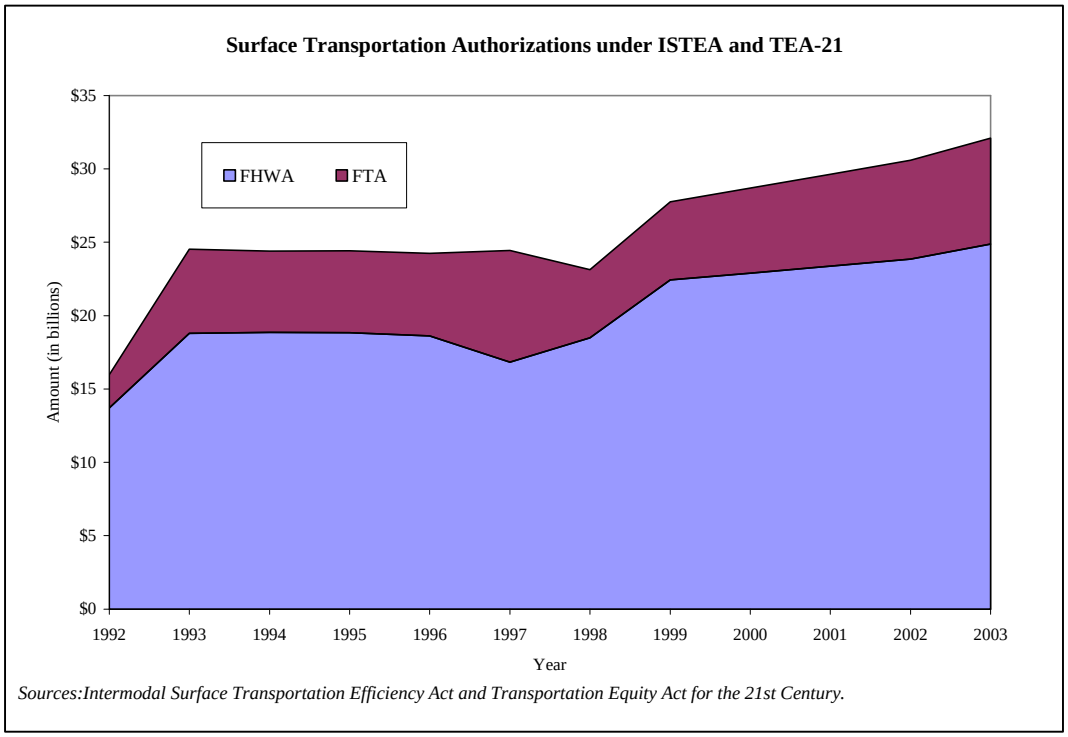
have been left to work within the framework established by the authorizing legislation (and the public works committees that write such laws). However, they have sought to exercise some power by consistently appropriating less money than is permitted under the authorizing legislation.[19] They have typically done so by setting annual obligation limits that function as expenditure ceilings, much to the dismay of their public works-minded colleagues and representatives of most transportation interest groups.[20]

The primary result of the appropriators' efforts is that actual transportation expenditures have generally been below authorized levels, and have usually fallen short of the amount of money raised each year by the highway user taxes that support the highway trust fund (Highway Statistics 2001). The result has been the accumulation of unspent balances in the highway trust fund. Many critics charge that these surpluses have been used to fund other programs and to mask the size of the federal budget deficit (Congressional Record 1998, Oberstar 1997).

[19] See the recent appropriations legislation (fiscal years 1999 to 2003) cited in the references, as examples of the practice.

[20] Appropriators have also tried to cut in on the authorizing action by adding their own new project earmarks to annual appropriations legislation. Many members of congress have decried this practice, including some members of the authorizing committees (Congressional Record 2002). The dull transportation appropriations environment of the past is beginning to get a little more interesting, particularly in more recent years.

Graph 2-7: Surface transportation authorizations under ISTEA and TEA-21



Sources:Intermodal Surface Transportation Efficiency Act and Transportation Equity Act for the 21st Century.

Proponents of increased transportation expenditures have long complained about the appropriators' and others' use of "budget trickery" involving the accumulated trust fund balances.[21] They argue that any attempt to use the trust fund revenue for non-transportation purposes represents a breach of faith with the taxpayer (Oberstar 1997). Their congressional allies inserted a special provision in 1998's TEA-21 that was meant to end these practices. The Revenue Aligned Budget Authority (RABA) process, enacted as part of TEA-21, was designed to limit the ability of appropriations committees to keep spending lower than authorized, and to stop surpluses from building up in the highway

[21] These complaints were voiced in testimony preceding passage of every appropriations bill over the last decade, and were aired in testimony (and speeches by members of congress) prior to passage of TEA-21 (Congressional Record 1998).

trust fund (Congressional Record 1998). RABA provisions call for transportation expenditures to be adjusted upward or downward in accordance with changes in the amount of highway user tax receipts. Any increases in user tax revenues would be matched by an increase in the federal aid apportionment. RABA was adopted as a compromise to other proposals to take the highway trust fund out of the annual budget process entirely.[22]

RABA supporters believed that the net result of its enactment would be a sudden surge in transportation expenditures (Pianin 1998b). Upward adjustments in transportation spending occurred in fiscal years 1999 and 2000, along with significant political fights over how the sudden financial windfall would be allocated (Congressional Record 1999). But a cut in federal expenditures seemed to be in the works for the current fiscal year (2003) because of the recession and lower than projected user tax revenues. Because no one wanted to see his or her highway or transit projects scaled back or taken away, several members of congress have proposed a suspension of RABA provisions for the current and next fiscal years, and the proposal enjoys significant bipartisan support (Congressional Record 2003).

Members of congress seem to prefer to drawing down the accumulated balance in the highway trust fund, or raiding the general fund, (and thus maintaining high transportation expenditure levels) to reducing transportation expenditures over the short-term, although this could have significant negative implications for the rest of the

discretionary budget (Pianin 1998b). In fact, concerns about the implications of increased transportation spending for other parts of the budget were raised prior to TEA-21's passage, but the law enjoyed very strong bipartisan support—as do most transportation expenditure bills (see Chapter 6 for discussion of TEA-21).

The resource allocation processes

Authorizing legislation permits highway trust fund money to be spent on highway and transit projects. Money is taken from the fund and distributed to recipients through one of three processes: formula apportionment, administrative discretion (allocation), and congressional earmarking (FHWA 1999a). Under the Transportation Equity Act for the 21st Century (TEA-21), the most recent authorizing law, transportation dollars were distributed 87 percent by statutory formula, 8 percent by administrative discretion, and 5 percent by congressional earmark (in the form of high priority projects) (TEA-21 1998).

The practice of earmarking has been scrutinized most closely by the media, through investigative reports on pork barrel demonstration projects, and the efforts of certain members of congress, including most notably Senator McCain of Arizona (Congressional Record 1998). The demonstration project phenomenon is a very visible case of the exercise of political influence over resource distribution decisions, and fits with certain skeptical or even cynical views about the behavior of politicians (Stein and Bickers 1995). But for all the media and political attention they receive, demonstration projects account for a very small (albeit growing) percentage of transportation

[22] House Committee on Transportation and Infrastructure Chair Shuster made getting such "protection" for the trust fund one of his priorities preceding passage of TEA-21 (Congressional Record 1997, Congressional Record 1998).

expenditures. And formula apportionment decisions, which are sometimes presumed to be apolitical, are just as much the product of political influence and negotiation as are demonstration projects. The choice of factors and the assignment of weight to the factors are the subjects of significant political maneuvering, although the links to specific politicians are not as easy to trace. Administrative discretion (allocation) is the third means of distributing federal transportation resources, and this process allows USDOT officials to distribute money on a competitive grant basis. It is shrinking as a share of overall transportation spending, as congress has begun to earmark money once set aside under discretionary categories—particularly in the transit program.

Earmarks and the demonstration project phenomenon

Congress frequently relies on earmarks to direct funding to specific projects, in specific geographic areas. Supporters of the practice point out that is reasonable for members of congress, who presumably know the needs of their constituents, to exercise their judgments over this small portion of overall transportation expenditures.[23] But some critics charge that many of these earmarks are for wasteful projects that would not otherwise be funded, and that the projects are sometimes opposed by the affected state's own transportation officials (Congressional Record 1998, Pianin 1998a).

Earmarking was a minor factor in federal surface transportation policy prior to passage of the Surface Transportation and Uniform Relocation Assistance Act (STURAA) in 1987. The presence of more than 100 congressional earmarks in the

[23] Senator Byrd, one of the leading earmarkers, frequently makes this argument, as is noted in Chapter 6.

STURAA bill prompted a presidential veto, the first veto in the history of the federal transportation program. But the generosity of the earmarks helped the bill to be passed over the veto.[24] Bill crafters and other interested members of congress paid close attention. With ISTEA and TEA-21, the number of earmarks and the dollars involved have grown significantly. Each law contained more than 1,000 project earmarks, and the total cost of these projects was more than $5 billion in ISTEA and $10 billion in TEA-21 (ISTEA 1991, TEA-21 1998).

Congressional earmarks first appeared in the highway program. A flurry of media exposes and an attendant outcry from critics of the practice resulted in a mid 1990s congressional agreement to cut back on the practice, particularly when it came to the relatively recent phenomenon of attaching earmarks to annual appropriations legislation (Congressional Record 1995, Congressional Record 1996). But, the practice of adding transit earmarks to these bills has taken off in recent years (see **Graph 2-8**).

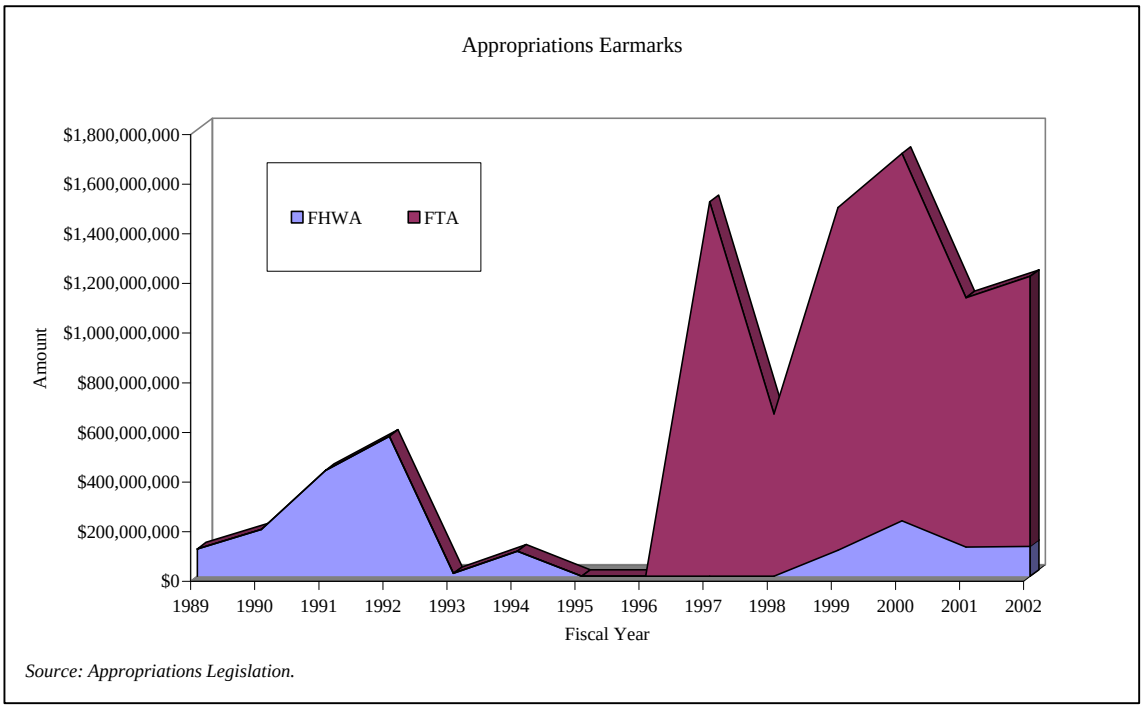
Today, earmarking is a significant factor in both programs when it comes to authorizing legislation, but is a much bigger phenomenon in the transit program than in the highway program when it comes to appropriations earmarks and the overall share of program money that is earmarked. Now, nearly a quarter of all federal transit dollars are delivered via earmarks of previously discretionary project funds.[25] Congressional

[24] The Senate override vote cleared by a single vote, which was cast by a North Carolina senator who had been told that his failure to override the veto would be followed by the introduction of anti-tobacco legislation. He lost his reelection bid (FHWA 2002).

[25] Data are obtained from numbers contained in the annual appropriations and multi-year authorizing laws cited in the references.

earmarking in the transit program has severely curtailed administrative discretion in both the capital grants and new starts programs, and both programs are now earmarked well beyond their authorized levels (FTA Grant Summaries 2002). Earmarking has caused discretion to be eliminated from the discretionary program.

Graph 2-8: Growth of appropriations earmarks, unadjusted dollars



Source: Appropriations Legislation.

Formula funding

Most federal surface transportation money is distributed by statutory apportionment formula, through which distribution decisions can be just as easily manipulated as in the case of earmarks. It's just easier for a politician or interest group to camouflage their role when they are interested in directing resources to particular programs or to a state as a whole (which formulas do) than when they want to fund a

particular project in a particular place (which earmarks do). Decisions have to be negotiated over which factors to use in the formula and how to weigh them, and the choice of factors has been the subject of great controversy. Computer printouts of the effects on state apportionment levels of modest changes in the formulas have been used as weapons in recent formula fights (Congressional Record 1997, Congressional Record 1998). And, formulas tend to last a very long time, so the results are even more significant than just differences in dollars over one particular authorization period.

The story of the formulas is recounted briefly below as prelude to the more detailed investigation of program history contained in Chapter 4. The details of the discussion come from analyzing the legislation cited in the references noted in Chapters 4 through 6 and listed in the bibliography.

The highway program

Formula apportionment first entered the transportation program in 1916 with the passage of the Federal Aid Road Act.[26] The purpose of formula apportionment was to make any given state's annual allotments more predictable and to remove bureaucratic influence from the decision-making process, two concerns cited by critics of the competitive grants process through which resources had been allocated under the 1912 Post Office Appropriations Act (Congressional Record 1916). The original apportionment formula weighted area, population, and rural postal mileage equally in the distribution of federal aid, and is sometimes called the one-thirds formula (Gifford 1983)

[26] The formulas and their evolution are discussed in more details in Chapters 4 through 6. The details of the formulas are taken from the federal legislation cited in the references.

The first formula modification occurred in 1921 when pressure from states that had received very small allotments under the original formula successfully lobbied for the inclusion of a 0.5 percent minimum apportionment for each state. They argued that there was a minimum level below which a permanent state highway program could not function (Congressional Record 1921). Their arguments carried great weight in congress, particularly in the Senate, which was then and remains dominated by representatives from small-population states.

The apportionment formula was unchanged over the next fifteen years, as construction began on the rural federal aid highway network designated in the early 1920s. Urban areas were then ineligible to receive federal aid, because the program was a rural one. During the 1930s, the federal aid highway program was bypassed in favor of public works highway projects funded through the Works Progress Administration (WPA) as part of emergency employment legislation in the Depression (Gifford 1983). But the traditional program weathered the storm, and slowly evolved to meet the changing times.

Change initially came in the guise of a temporary relaxation of established rules, such as the gradual end to the prohibition against urban aid in 1934 (Hayden-Cartwright Act 1934). And in 1938 a more significant change was made with the formal establishment of a federal-aid secondary system program subject to the same apportionment formula (and accompanying rules) as the original program (Gifford 1983). The development of the secondary system was itself a response to concerns from rural

interest groups that the sudden shift in federal attention to urban areas meant that their own needs were being neglected (Congressional Record 1937, 1938).

The apportionment formulas were revisited in 1944 when the first postwar highway legislation was considered and adopted. The 1944 legislation created an urban highway system, for which the money was apportioned on the basis of population, and changed the secondary system formula to substitute state rural population for total population because of the rural nature of the program (Federal Aid Highway Act 1944). The 1944 act also created a 45-30-25 distribution of federal aid dollars among the primary, secondary, and urban system programs. This negotiated settlement helped to prevent conflict among supporters of the programs over the next few decades, and prevented supporters of one program from raiding the others for more money (Congressional Record 1944, Congressional Record 1956).

The interstate system was also created in 1944, but was not given its own funding category until 1952 (Rose 1990). At that time it was assigned the same apportionment formula (1/3 weight each of population, land area, post road miles) that applied to the federal primary program (FAP), under which it had previously been subsumed (Federal Aid Highway Act 1944). The interstate formula was changed in 1954 when the weight assigned to population was increased (and the weighting for the other two factors decreased), and the federal cost share was increased from 50 percent to 60 percent in order to stimulate state spending on interstate projects (Federal Aid Highway Act 1954).

In 1956, the federal cost share on interstate projects was increased to 90 percent, and the interstate formula was changed entirely (Federal Aid Highway Act 1956).

Henceforth, states would be apportioned funds on the basis of their share of the cost to complete the system. The 90 percent federal match, and the sudden increase in federal highway money from the newly created highway trust fund, led to a sudden surge in interstate highway construction (*Highway Statistics* Summary to 1995). The formulas were unchanged over the next decade.

For fiscal year 1972 the federal cost share for the primary, secondary, and urban system projects were increased from 50 percent to 70 percent, while the interstate cost share remained 90 percent (Federal Aid Highway Act 1971). The increased federal cost share for interstate projects had been justified on the grounds that its early completion was a national priority (Congressional Record 1956). The increased cost share for the other programs simply reflected state desires to get the federal government, which possessed the fabulously productive (in terms of revenue generation) highway trust fund, to bear more of the financial burden (Congressional Record 1971). The cost shares were increased to 75 percent for fiscal year 1979. And as the federal share increased over time, the mileage of these national highway networks has also increased. There is a tremendous financial incentive, from a state's perspective, to enroll as many miles into the program as possible—to take advantage of federal aid dollars (Brown 1998).

The apportionment formulas were themselves changed for fiscal year 1977. These changes increased the weight accorded to population from 33 percent to approximately 54 percent, in each of the primary, secondary, and urban highway programs (Federal Aid Highway Act 1976). After passage of the Surface Transportation Assistance Act (STAA) in 1982, the primary system formula was changed to a pure population basis: ½ urban +

½ rural. Otherwise, the apportionment formulas, factor weights, and cost shares were unchanged until passage of ISTEA in 1991.

ISTEA consolidated the highway program into nine categories, including the National Highway System (NHS) and Surface Transportation Program (STP), which together include the bulk of the federal highway programs (ISTEA 1991). The federal cost share for highway projects was changed to 80 percent or higher, and the one-half percent minimum apportionment provisions were retained for most of the programs (ISTEA 1991). The small population states would not countenance a break in this tradition (Congressional Record 1991). Public land states successfully fought for retention of their own privileged treatment as well. The apportionment formulas themselves were revisited in TEA-21 when rural post route miles finally disappeared, after eighty years, as a formula factor (TEA-21 1998).

Most formulas now emphasize population, system extent, system use, and state highway tax payments—factors that are more closely related to system needs than were the previous factors (TEA-21 1998). But the original cost-sharing partnership has disappeared in favor of a program for which the federal government bears 80 percent or more of the cost (TEA-21 1998). The inclusion of ever more mileage of highways within the federal aid umbrella continues to this day (*Highway Statistics* various years). Federal resources are spread over mileage of truly national importance and undoubtedly over many miles of only local or regional importance, and the nation's taxpayers (through the highway trust fund) bear 80 percent or more of the cost for all these roads.

Federal transit program

The federal transit program initially began as a grant program that was envisioned as a temporary means to help struggling transit agencies upgrade their aging capital stock (Hilton 1974). The federal share of expenditures on grant projects was set at two thirds, a higher cost share than for every highway program excluding the interstates. But as with many other federal programs that began as temporary efforts, a vocal constituency of supporters quickly emerged to protect the program from abandonment. As the 1960s wore on, the temporary program became more permanent, and expenditures increased dramatically. But the program was not yet safe from sudden elimination (Hilton 1974).

It was not until passage of the National Mass Transit Act of 1974 that the transit program truly became a permanent fixture of the transportation policy landscape, and a formula apportionment process was created for the transit program at this time.[27] The formulas focused on urban population and population density, both of which were viewed as proxies for an area's transit need (Congressional Record 1974). But the decision was made to not include transit ridership in the formula—because the program would be even further oriented to a small number of urbanized states than it already was and it might lose its still-tenuous political support (Congressional Record 1974). New York, for example, would have received a very large share of federal aid under a ridership-based apportionment. And to prevent a state from receiving a large share of federal transit aid, and to spread the dollars over as wide a geopolitical area as possible, any one state was

[27] The formulas are discussed in more detail in Chapters 5 and 6. The details are taken from the text of legislation cited in the references.

allowed only up to a maximum of 12.5 percent of the dollars within any particular funding category (NMTA 1974). The net result was that New York received fewer dollars than it otherwise would have, and these "lost" dollars were distributed over many more states than would have otherwise been the case. A wider geographic distribution provided the program with more political support (Congressional Record 1974).

With passage of the Surface Transportation Assistance Act of 1982, a more elaborate structure of programs and formulas emerged (STAA 1982). Population and population density remained part of the formula, but variables measuring transit service provided and transit system extent were also included (STAA 1982). It is worth noting that these formula changes have the somewhat perverse effect of encouraging operators to add more miles of service, regardless of how much new ridership is gained (Garrett and Taylor 1999). They resulted in a further shift of dollars away from larger urban areas with highly utilized, but perhaps smaller (in mileage terms), systems to other areas with extensive service but not necessarily many riders (Garret and Taylor 1999). But the number of transit program beneficiaries (and political supporters) was increased as a result (Congressional Record 1982). It is also worth noting that a three-tiered formula structure began to emerge in the early 1980s, with different formulas for different sized urban areas (STAA 1982, STURAA 1987). Large urban areas, the original proponents of the federal program, were placed at a further disadvantage by these developments.

With the passage of ISTEA, the present formula structure and array of programs emerged. The federal share of capital project expenditures was set at 80 percent for most transit programs, to introduce an element of equity vis-à-vis the highway program

(ISTEA 1991). But the critical change made in the late 1990s was the elimination of operating assistance to large cities (urban areas with more than 200,000 persons)—the places where transit ridership was concentrated.[28] Supporters of the move claimed that large urban areas could draw on other resources to support their transit agencies, and that the federal operating assistance they would lose represented a small share of their overall operating budgets (Congressional Record 1998). They argued that smaller population areas were more dependent on federal operating assistance for a larger share of their transit budgets and lacked the resources needed to make up any decline in this assistance (Congressional Record 1998). But the link between federal transit expenditure and actual use of transit was further weakened, raising a serious question. Is the policy objective to aid riders? Transit agencies? Or states? The answer doesn't appear to be the former.

But at the same time as operating assistance was reduced as a share of federal transit dollars, capital aid was increased.[29] The result has been an explosion in new rail transit planning and construction, in many parts of the country (including places for which rail transit seems ill suited). The primary apportionment factors, population and system extent, were unchanged by TEA-21 (TEA-21 1998).

[28] Operating assistance to these large areas had been declining substantially for the preceding five years, so the loss of operating assistance was the culmination of a long-running trend rather than an abrupt change.

[29] As an interesting side issue during the TEA-21 authorization debate, a number of states made a push for a guaranteed return on their payments to the mass transit account of the Federal Highway Trust Fund, although these proposals (undertaken as a means of self defense by the states that were donees under the much larger highway program) were beaten back (Congressional Record 1998).

Before leaving transit, one other important development in the expenditure policy area should be noted. The discretionary grants program is a significant component of the federal transit program, but there has been a pronounced trend in recent authorization laws to earmark more money for special projects that are funded out of "discretionary" project funds than there is money authorized for the discretionary grant programs themselves (Congressional Record 2002, FTA *Grants Summaries* 2002). Thus, formula funding and earmarked funding dominate the transit program, squeezing discretion out of the picture entirely.

Apportionment formulas and other program rules are established through negotiation in a political environment. Before we consider some of the spatial expenditure patterns that result from the distribution mechanisms just discussed, we should introduce some of the important players in the political process, focusing specifically on the congressional committees that write surface transportation law.

Players in the policy process

It is not surprising that in a policy area as important and with as many resources as transportation there are a large number of actors engaged in the policymaking process. For example, ordinary citizens use the transportation system on a daily basis, and are quite willing to make their voices heard when a particular policy displeases them. But a much smaller number of actors play important ongoing roles when it comes to negotiating transportation revenue and expenditure policy. These actors include interest group representatives, administration officials, and members of congress, particularly members of the key congressional committees.

Interest groups representing both private and public sector entities develop policy proposals, respond to policy proposals, and lobby for and against particular policy recommendations, in accordance with the needs of their members. The administration develops the budget and policy proposals, subject to input from interest groups, the affected agencies, congressional allies, and the fiscal guardians at the Office of Management and Budget (OMB), and tries to get them enacted into law. The congressional committees, and especially the relevant subcommittees, examine the administration proposals, develop their own proposals, hear testimony from interested parties, and recommend legislation for passage by the congress and signature by the president. Congress and the administration negotiate a final bill, subject to a host of outside pressures. And finally, officials within the various parts of DOT and their state-level counterparts translate legislative text into specific tasks, projects, and facilities.

In this section and throughout the research presented here, I will focus on congressional actors in the policy process. A number of committees and subcommittees are charged with the development of transportation policy and oversight of the day-to-day operations of the Department of Transportation's operating agencies. Within the House of Representatives, three committees play significant roles (FHWA 1999a). The Ways and Means Committee shapes taxation and revenue policy, and serves as the congressional guardian of the highway trust fund. The members of the Ways and Means committee tend to take only periodic examinations of the revenue-side of the highway finance system, and their influence is thus of an indirect albeit very important nature. I do not focus on them in this analysis which focuses on expenditure policy.

The Appropriations Committee and its transportation subcommittee develop annual appropriations legislation for USDOT, and seek to enlarge their role within the strictures imposed by the transportation program's authorizing legislation and larger programmatic structures (FHWA 1999a). They have succeeded in reclaiming some authority from the authorizing committee in the age-old battle of authorizers versus appropriators.

Finally, the Committee on Transportation and Infrastructure (CTI), and its subcommittee on ground transportation, prepare surface transportation legislation and conduct oversight of FHWA, FTA, and a host of other agencies within the Department of Transportation (FHWA 1999a). It former chairman, Representative Shuster, was one of the driving forces behind TEA-21 (Congressional Record 1998). Formerly known as the Public Works Committee, CTI is one of the most popular committee assignments in congress and boasts the largest membership of any of the standing House committees (Congressional Directory 2001). The CTI has received a great deal of negative attention throughout its history as being a pork barrel committee (Mertz 19??). Its earlier efforts in the sphere of port legislation have achieved near mythic status and its present highway and transit project concerns have come under a great deal of scrutiny by the press and researchers. Many demonstration projects are added to surface transportation legislation at the behest of, if not directly on behalf of, CTI members (ISTEA 1991, TEA-21 1998).

On the Senate side, four committees have some jurisdiction over the surface transportation program (FHWA 1999a). The Senate Finance Committee, the counterpart to the House Ways and Means Committee, has a minor role related to taxation and

revenue issues. Its role is much weaker than the House committee, because taxation and revenue legislation is required by the Constitution to originate in the House. I do not focus on this committee in this research. The Senate Appropriations Committee and its transportation subcommittee develop annual appropriations legislation for USDOT, similar to the role of its House counterpart. This committee has often played a visible role, particularly when it comes to the issue of earmarking. Its former chairman, Senator Byrd, is frequently cited as one of the all-time earmark champions—both inside and outside of transportation (Congressional Record 1998).

Authorizing and oversight responsibilities lie in two Senate committees. The Committee on Banking, Housing, and Urban Affairs, and housing and transportation subcommittee, oversees the federal transit program. The Committee on Environment and Public Works, and its transportation and infrastructure subcommittee, are responsible for highway legislation. Throughout this research, I focus on the committees themselves rather than on their respective subcommittees.

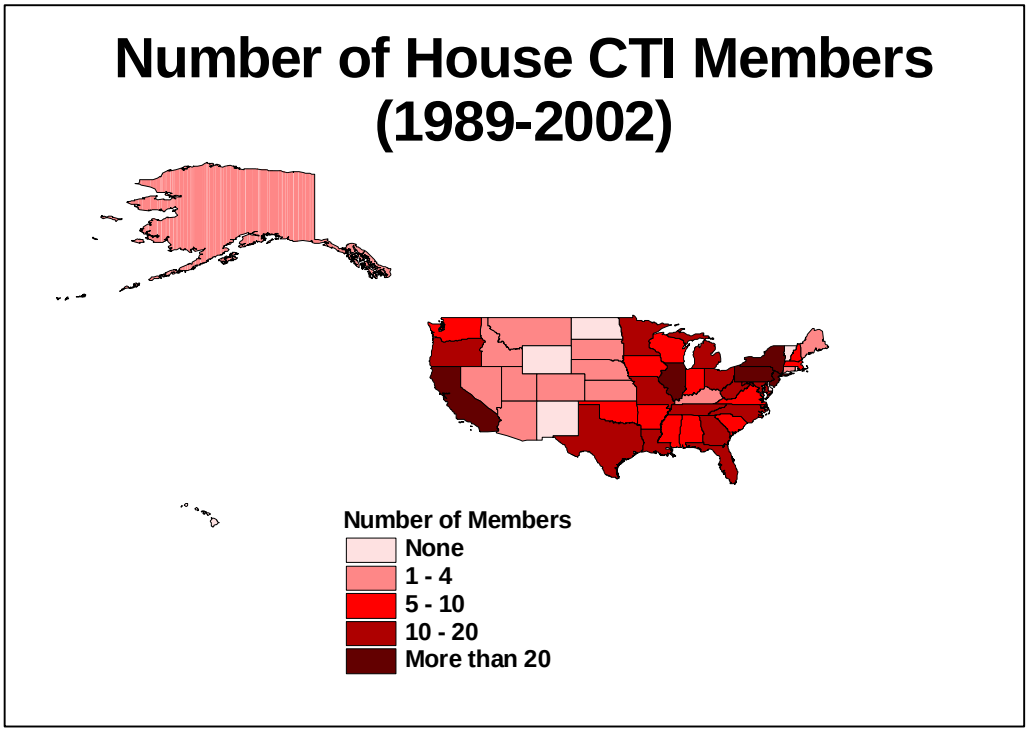
The involvement of so many players (and these are only the congressional actors) makes the crafting of surface transportation legislation a very complicated process. Because the key policy decisions are usually made at reauthorization time, it is particularly important to consider who is represented at these crucial moments.[30] So, which states were represented on these committees at the two most recent critical moments in transportation program history (ISTEA and TEA-21)?

[30] All information on committee representation is taken from the *Congressional Directory*, which is published biennially. I do not cite particular issues of the directory in this chapter.

House of Representatives

The Public Works Committee in the House of Representatives is particularly infamous for being, throughout its history, a pork barrel committee. It is currently known as the Committee on Transportation and Infrastructure (CTI). **Map 2-1** shows the representation of the different states on this committee throughout the period bracketing ISTEA and TEA-21. It is worth noting that this committee, typically the largest or second largest committee in the House, had representatives from all but three states (New Mexico, Wyoming, and North Dakota) seated on the committee between 1989 and 2002. Every state's representatives have an interest in highway and/or transit projects, and it is no surprise therefore that there would be such a widespread pattern of representation (Congressional Record 1998). The larger population states have been fairly well represented, which is not surprising given the House's population-based apportionment, but so have a number of smaller population states, including Louisiana, West Virginia, and New Hampshire. (The term "small" states used throughout the dissertation refers to states with small populations.) Turnover on this committee has been relatively low since the large number of retirements following the 1994 elections.

Map 2-1: House Committee on Transportation and Infrastructure, 1989-2002



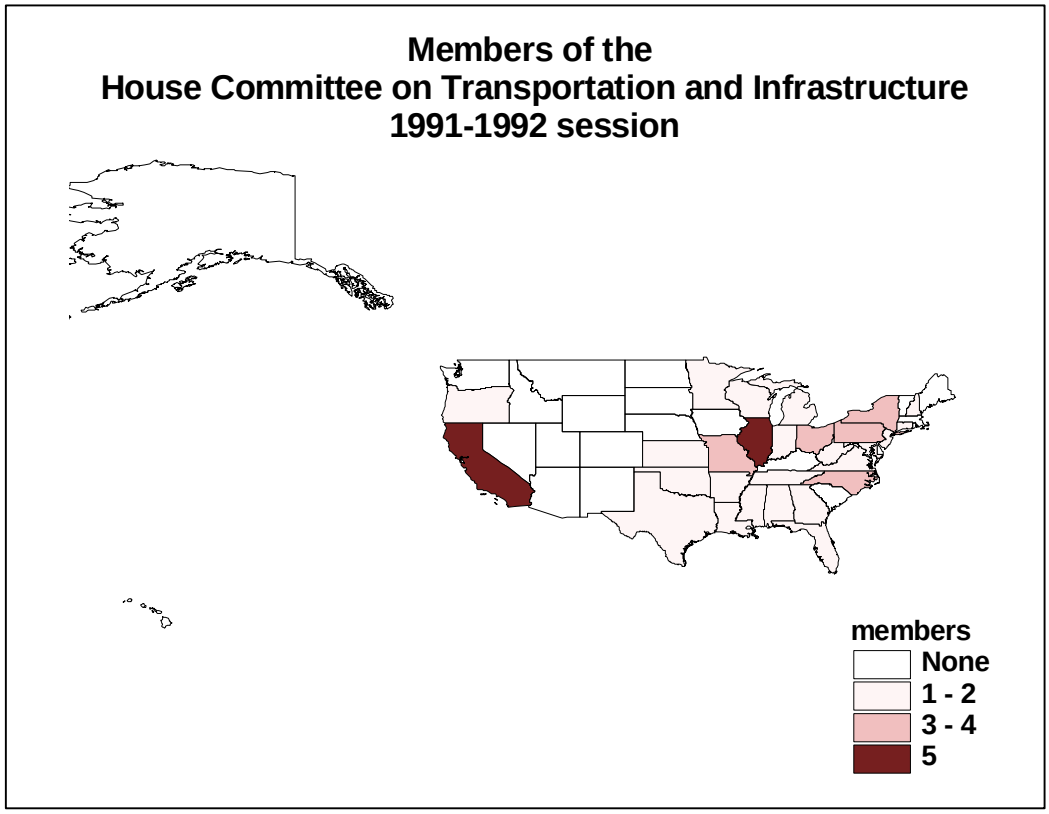
Source: Congressional Directory.

CTI members oversee both FHWA and FTA programs, but they play their most important role during the reauthorization periods. They write and then vote on the authorization bill itself (FHWA 1999a). The CTI chairman is a particularly important player, as evidenced by the very public role played by Pennsylvania's Bud Shuster during the TEA-21 reauthorization. The current chairman (during the 2003-4 session) is Don Young of Alaska.

Maps 2-2 and 2-3 look at the representation of the states on CTI during the ISTEA and TEA-21 reauthorization periods. **Map 2-2** focuses on the 1991-1992 congressional session, during which ISTEA was drafted and enacted. Twenty-eight states

had representatives on CTI during the ISTEA reauthorization, with California, Illinois, and Pennsylvania having the largest membership (5, 5, and 4 seats, respectively). Twenty-two states had no representation on CTI, with many small, medium, and large population states among the group. The Democratic Party controlled the committee during this time, but party affiliation is generally quite unimportant when it comes to transportation policy issues (Stein and Bickers 1995, Lee and Oppenheimer 1999).

Map 2-2: House Committee on Transportation and Infrastructure, 1991-1992



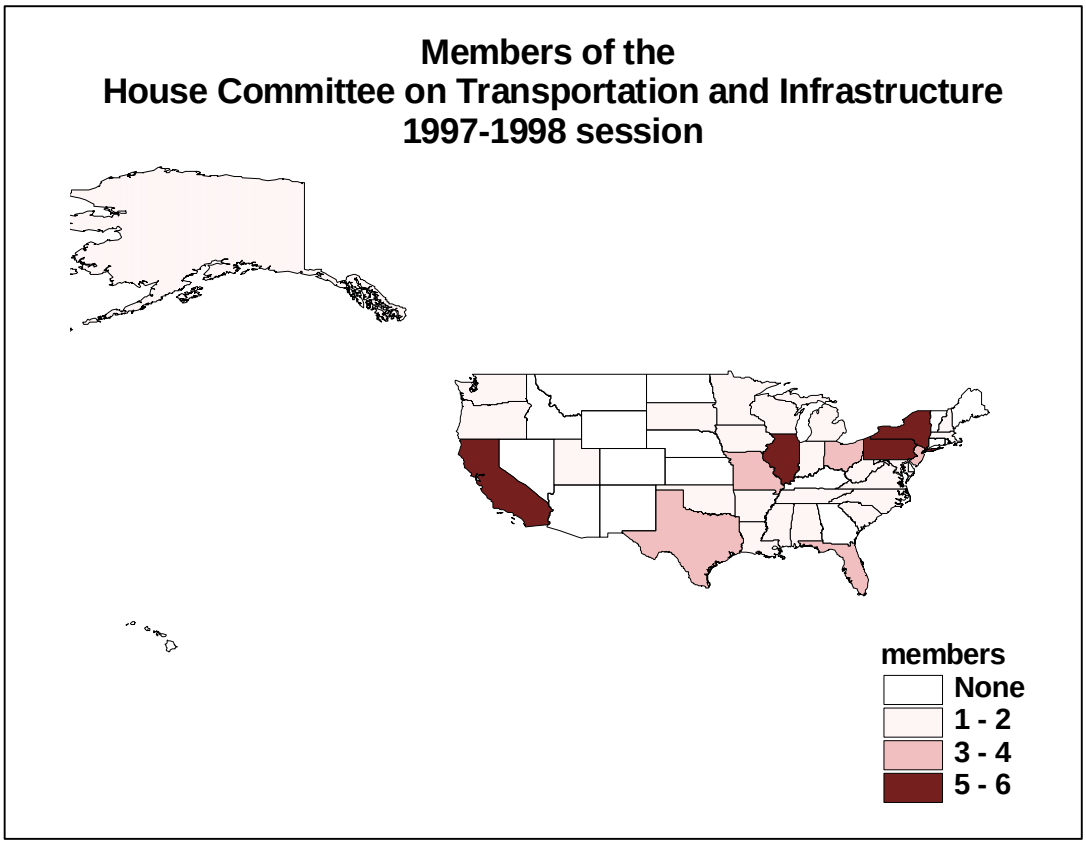
Source: Congressional Directory.

Map 2-3 focuses on the 1997-1998 congressional session, during which TEA-21 was passed (after a yearlong delay). Republican Bud Shuster ran the committee during

the TEA-21 negotiations, and he was a particularly vocal advocate for the inclusion of his members' demonstration projects in the final bill. Ranking Democrat James Oberstar (D-Minnesota) jokingly referred to the committee's preferred bill, which bore the acronym BESTEA (Building Efficient Surface Transportation and Equity Act), as the Bud E. Shuster Transportation for the Eternity Act (Oberstar 1997). Such was the chairman's very public effort to secure broad support for his very large bill (http://www.pumpkinvine.org/bestea.htm).[31] Thirty-two states were represented on CTI during the TEA-21 session, with California, Pennsylvania, Illinois, and New York having the largest delegations (6, 6, 5, and 5 members, respectively). Eighteen states were not represented, most of them small population states.

[31] Oberstar was a strong and highly visible supporter of Shuster's efforts during the TEA-21 debate (Oberstar 1997).

Map 2-3: House Committee on Transportation and Infrastructure, 1997-1998



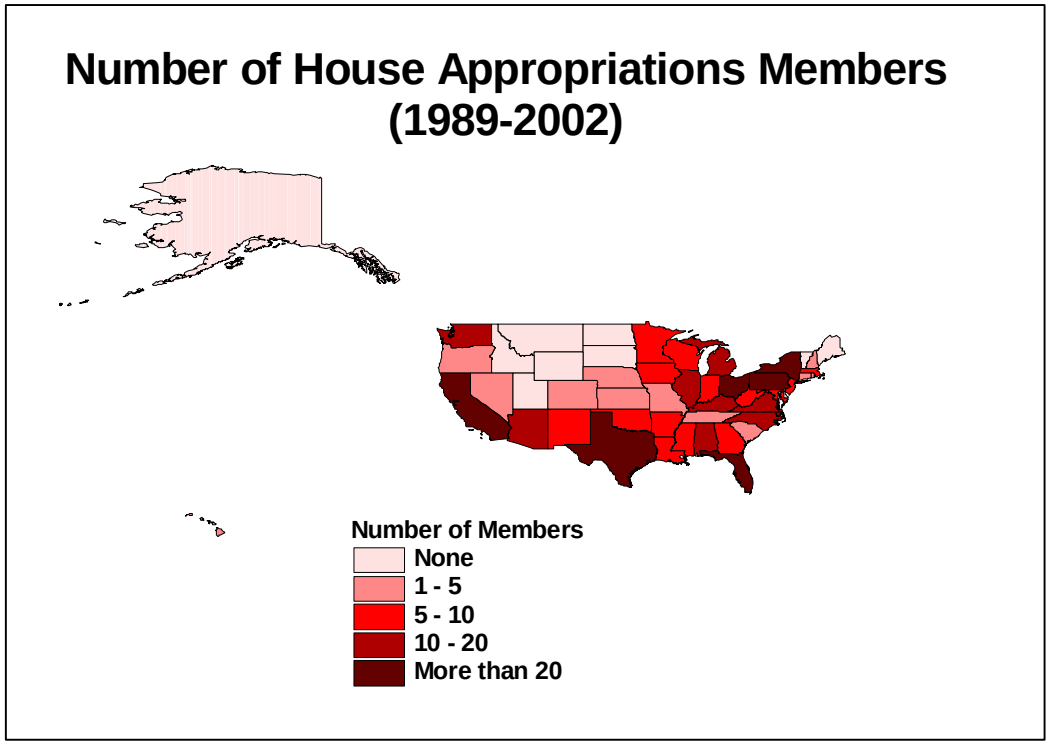
Source: Congressional Directory.

The other important committee in the House is the Appropriations Committee, although its powers pale in comparison with those enjoyed by CTI. The committee typically uses its powers to keep transportation expenditures below the levels contemplated in authorizing legislation such as ISTEA and TEA-21, so as to maintain financial support for other federal programs or to better manage the budget (Congressional Record 1999). This should be no surprise given that its responsibilities extend to all areas of the federal government, and not just transportation.

Recently, the members of the Appropriations Committee have taken advantage of their positions to insert their own favored demonstration projects as earmarks in the DOT's annual appropriations legislation. This behavior has often brought howls of outrage from members of the CTI (Congressional Record 1999).

Map 2-4 displays representation on the committee throughout the period from 1989 to 2002. As with CTI, the large population states have been well represented in terms of their seats on the committee. Nine states did not have any seats on the committee during this period; most of these states are in the upper plains and Rockies region.

Map 2-4: House Appropriations Committee, 1989-2002

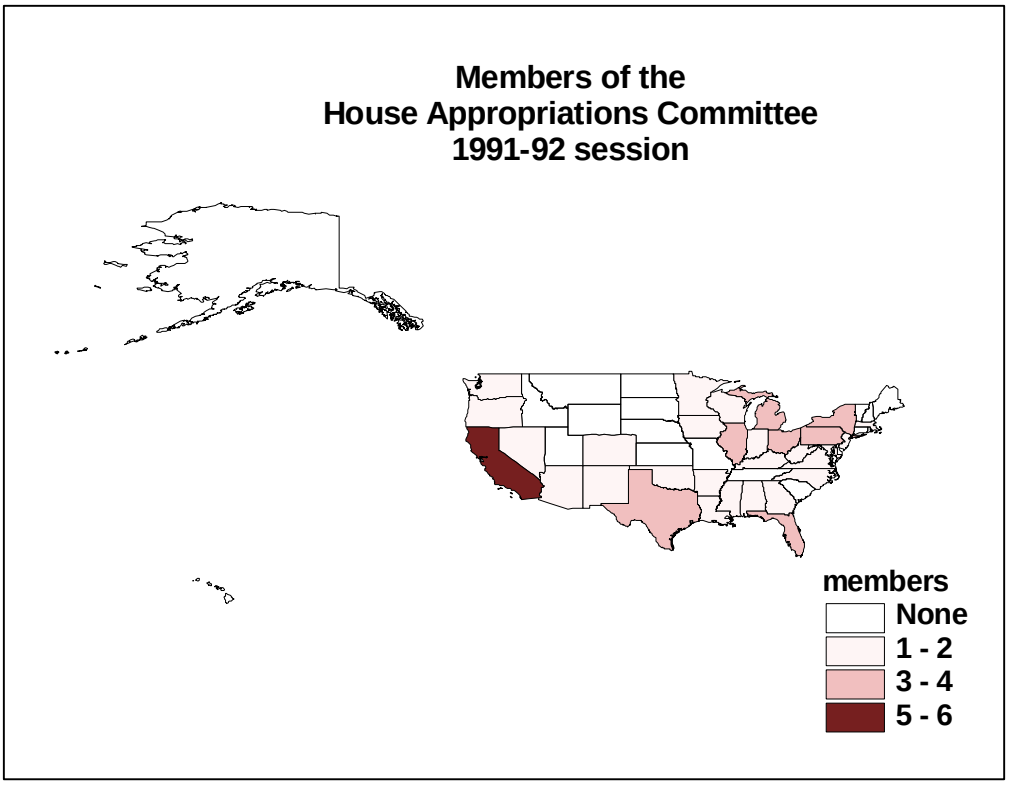


Source: Congressional Directory.

Maps 2-5 and 2-6 focus on the committee membership during the 1991-1992 and 1997-98 reauthorization sessions. The committee is not necessarily a key player during the reauthorization debate, but looking at its membership during these periods is still useful because the committee was writing appropriations legislation at these times, and making its concerns known to authorizing committee members.

Map 2-5 focuses on the 1991-1992 session, during the ISTEA debate. Large population states tended to have significant representation on the committee, while small population states were disproportionately among those with no representation. California had six members on the committee, while nineteen states were not represented.

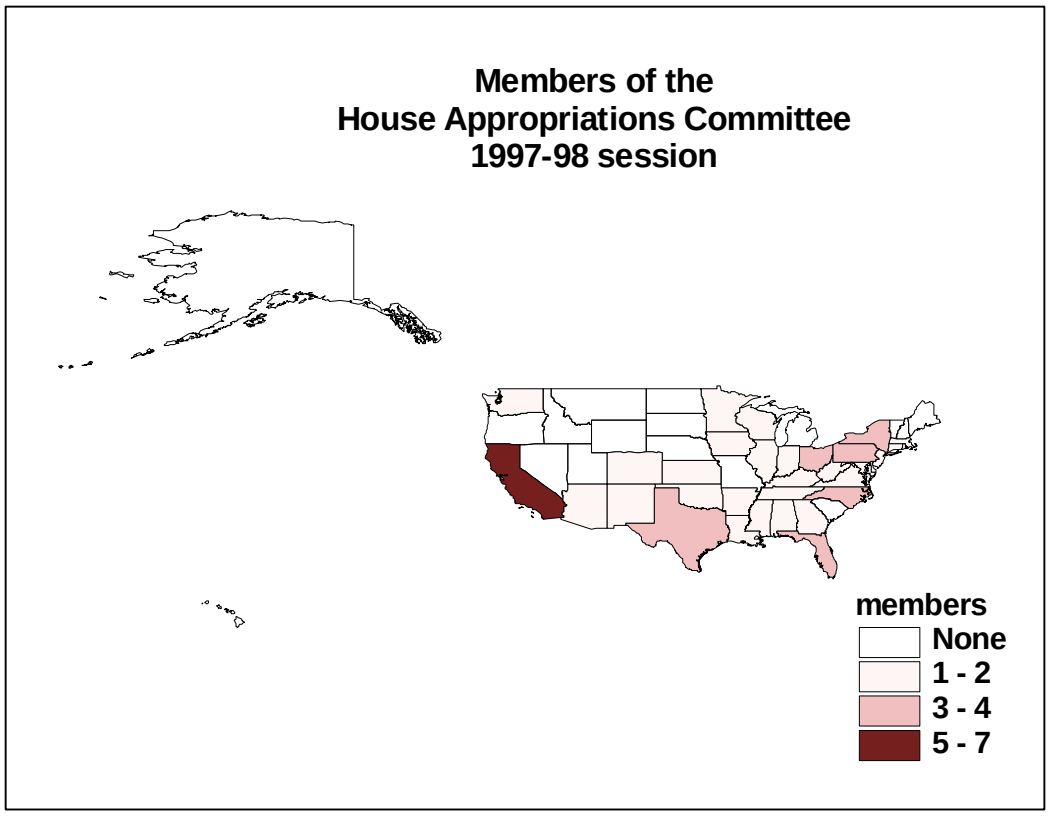
Map 2-5: House Appropriations Committee, 1991-1992



Source: Congressional Directory.

The same kinds of patterns are evident on **Map 2-6**, which shows committee membership during the 1997-1998 session. Nineteen states were not represented on the committee during this session, only one of which (Michigan) was a large or medium-sized population state. Large population states tended to be well represented, with California's seven members towering over second highest New York's four members.

Map 2-6: House Appropriations Committee, 1997-1998



Source: Congressional Directory.

On balance, representation on the two House committees during these two critical moments in the history of the surface transportation program appear consistent with the population-based membership structure of the House as a whole.

By and large, the most populous states had the largest numbers of representatives on the two committees. The leadership of CTI has tended to include representatives of urban, medium and large states like New Jersey and Pennsylvania (during the two periods of interest noted above), while Mississippi and Louisiana representatives held the chairmanships of the appropriations committee during the two periods discussed above. The switch from Democratic to Republican control of the House in January 1995 certainly affected the particular players involved, but the same sets of states tended to be included and excluded before and after the shift in power (*Congressional Directory*).

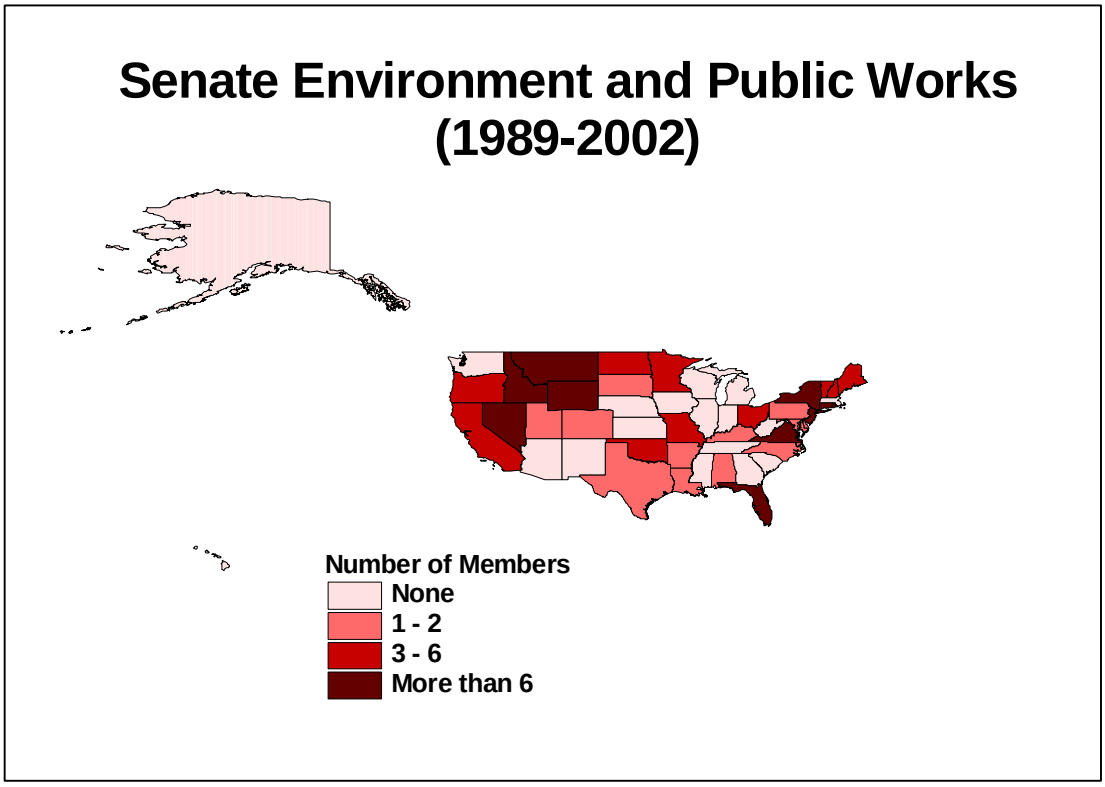
Senate

The Senate is a very different kind of institution than is the House. The Senate's two votes per state structure gives less populated states an advantage when it comes time for coalition building (Lee and Oppenheimer 1999). Each senator is treated as an equal, whether s/he represents 500,000 people in Wyoming or 35 million people in California. And, the Senate's rules mean that sixty votes are required for just about anything meaningful to be accomplished (Lee 2000). The Senate's rules do not grant committees and their members the same privileged position enjoyed by their House counterparts, although smart chairs and ranking members still exercise a great deal of power (Lee and Oppenheimer 1999). In the Senate, three committees have key roles to play when it comes to making decisions about the distribution of surface transportation resources.

The Senate's Environment and Public Works Committee (EPW) is the committee with oversight of the federal highway program, and is thus (roughly speaking) the counterpart of the House's CTI. **Map 2-7** displays committee membership over the

period from 1989 to 2002. Thirty-two states were represented on this committee during that time, with the upper plains, rocky mountain, and northeastern states enjoying the largest numbers of seats held. In general, the states represented on the committee during this time appear to represent a reasonable cross-section of states, and no obvious spatial or socio-demographic patterns are apparent.

Map 2-7: Senate Environment and Public Works, 1989 – 2002

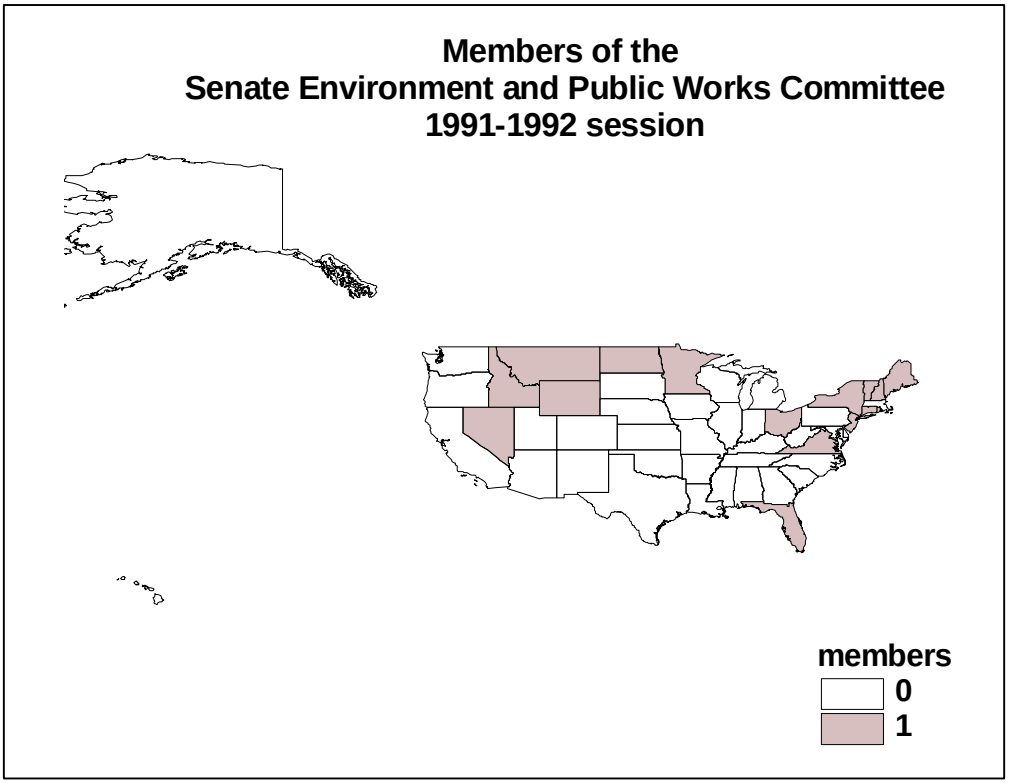


Source: Congressional Directory.

Map 2-8 and **Map 2-9** look at membership patterns during particular periods, namely the periods during ISTEA (1991-1992) and TEA-21 (1997-1998) reauthorization.

In 1991, the northeast and Rocky Mountain states dominated the committee, and New York's Daniel Patrick Moynihan, the father of ISTEA, was the dominant figure.

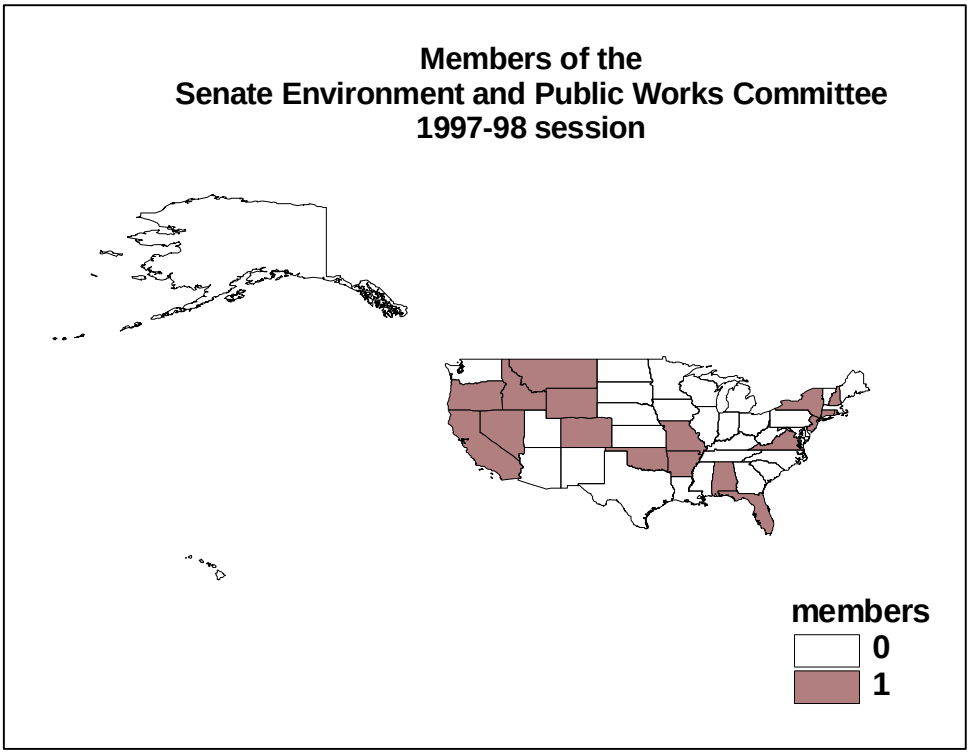
Map 2-8: Senate Environment and Public Works, 1991-1992



Source: Congressional Directory.

In 1997, California and Florida joined the same states. Membership, in terms of the states that are represented on the committee, has been very stable (*Congressional Directory*).

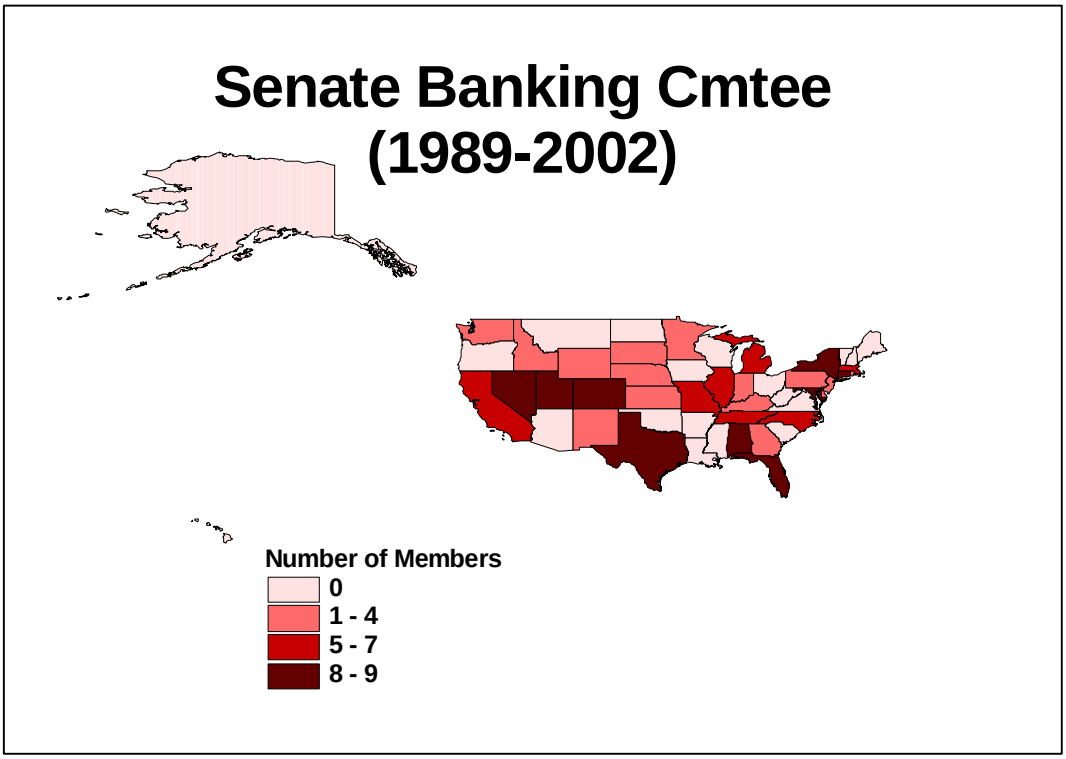
Map 2-9: Senate Environment and Public Works, 1997-1998



Source: Congressional Directory.

The Senate Banking, Housing, and Urban Affairs Committee has oversight responsibility for the federal transit program. Historically, states with larger populations have tended to be clustered among the members of this committee, which oversees the banking, housing, and urban programs of the federal government (*Congressional Directory* various years). Between 1989 and 2002, more than thirty states were represented on the committee. **Map 2-10** shows the widely spread geographic distribution of this membership. In 1991, 19 states were represented on the committee, with Florida represented by both its senators. In 1997, 18 states were represented on the committee.

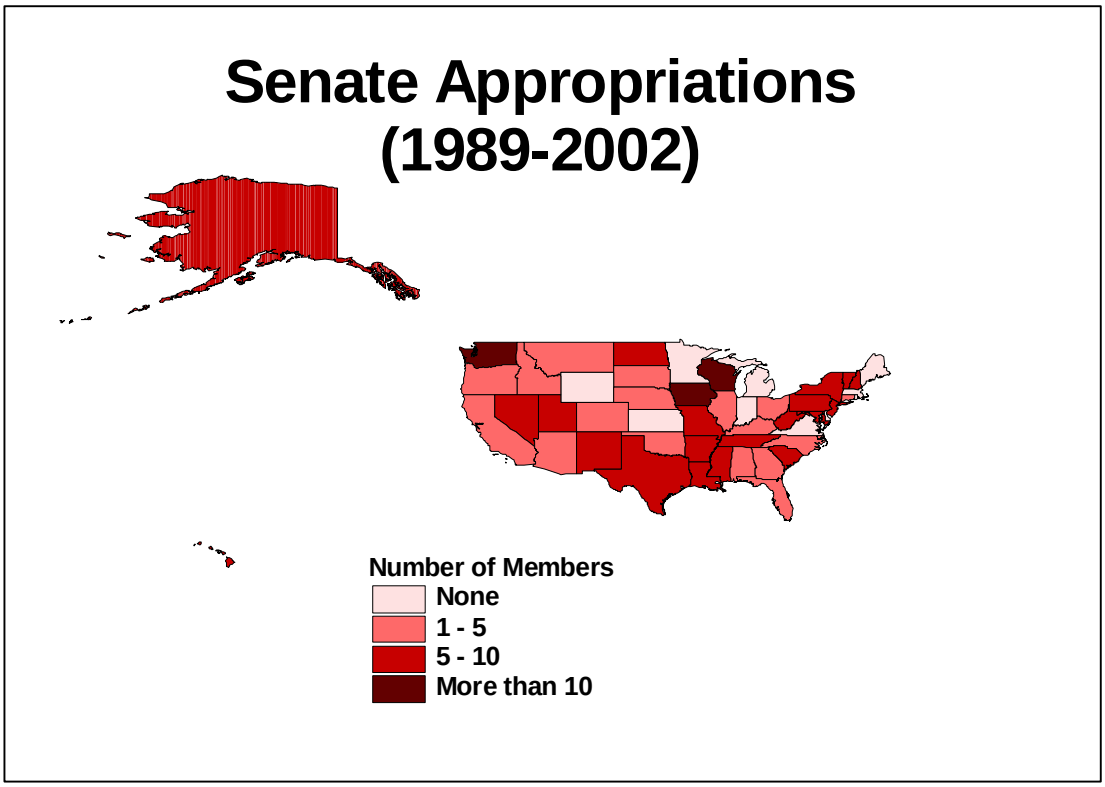
Map 2-10: Senate Banking Committee, 1989-2002



Source: Congressional Directory.

The Senate Appropriations Committee handles all appropriations issues. It has typically been a large committee with more than 25 members (*Congressional Directory* various years). Between 1989 and 2002, only eight states were not represented on the committee, whose dominant figure throughout this period was West Virginia Senator Robert Byrd. In 1991, 28 states were represented on the committee, and in 1998 27 were represented, including Washington's two senators. In general, the membership of the committee has been very geographically diverse, although the senate's apportionment bias toward low population states (of which there are many) and against larger population states (of which there are few) is visible on occasion.

Map 2-11: Senate Appropriations Committee, 1989-2002



Source: Congressional Directory.

Patterns of expenditures

Federal transportation dollars are spent on particular projects in particular places, and politicians and interest group representatives are concerned with one or both of these two issues (Stein and Bickers 1995). They want to know: where are the dollars being expended? And on what are they being spent? Researchers, in the meantime, want to know if there are spatial or non-spatial patterns to the distribution of expenditures. They

also want to know what kinds of factors explain these patterns? This research focuses on the spatial patterns of different kinds of transportation expenditures.[32]

Spatial patterns

So, what are the spatial patterns of federal transportation expenditures? First, consider highway expenditures. **Map 2-12** displays the pattern of total dollar expenditures made by the Federal Highway Administration between 1988 and 2000, or roughly the timeframe covered by the last three federal authorizing laws (STURAA 1987, ISTEA 1991, and TEA-21 1998). A link between the amount expended and the state's population is immediately apparent.

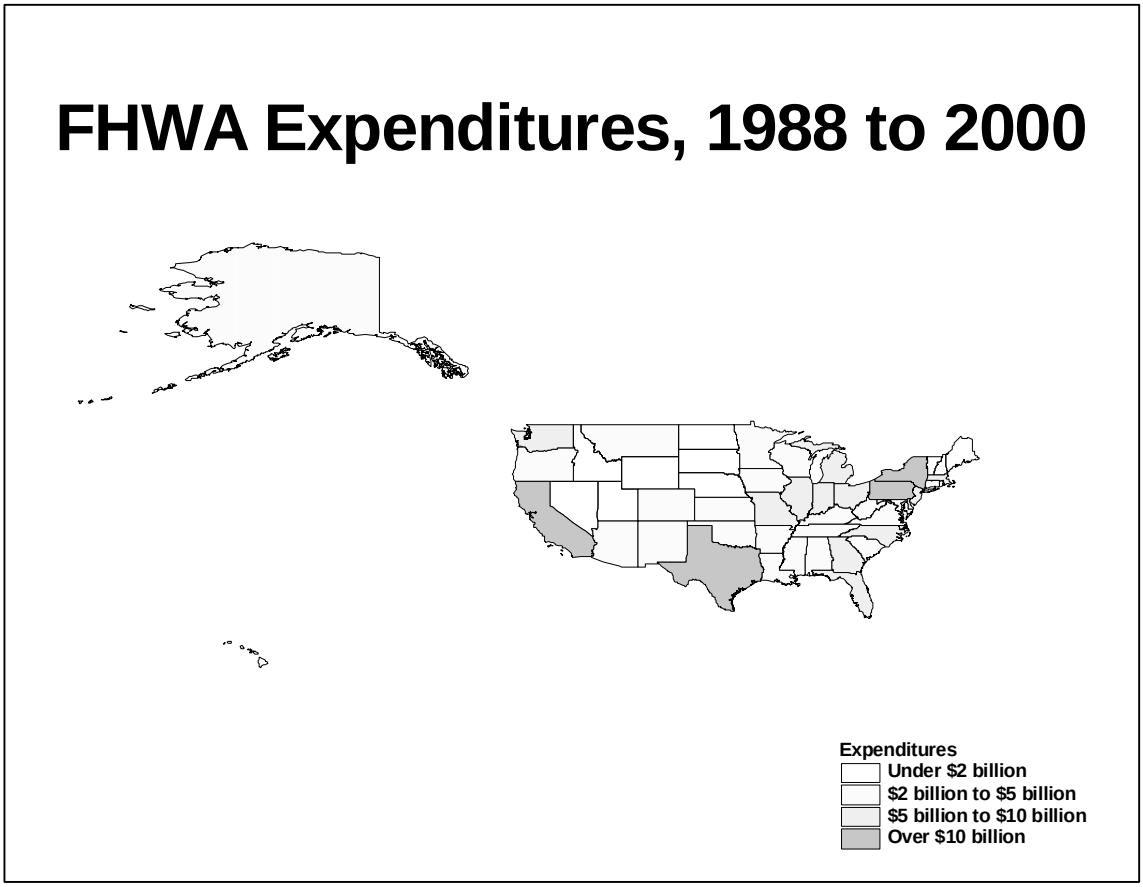
In 1988, the lowest expenditure was in Vermont with $43 million, and the highest expenditure, not surprisingly, was in California with just over $1 billion. The median expenditure was $207 million in Iowa. In 2000, the lowest expenditure was in Hawaii with $82 million, and the highest expenditure, again, was in California with over $1.9 billion. The median expenditure was $363 million in Alaska.

In general, the states with the largest populations were the places where FHWA expended the most money, but the states with the lowest populations were not necessarily the places where the lowest expenditures were made. Low population states with large land areas and/or extensive federal aid mileage tended to fall in the middle range of expenditures, such as Alaska which was the median state, because of the area and road mileage factors included in the apportionment formulas. Of course, one would expect

[32] The data in this chapter are descriptive. The data are analyzed and interpreted in Chapters 8 through 10.

states with larger populations to receive more total dollar expenditures simply as a function of the larger number of people and vehicles in the state. But more interesting patterns might emerge if we examine the same patterns through another prism: expenditures per person.

Map 2-12: Highway expenditures, 1988 to 2000

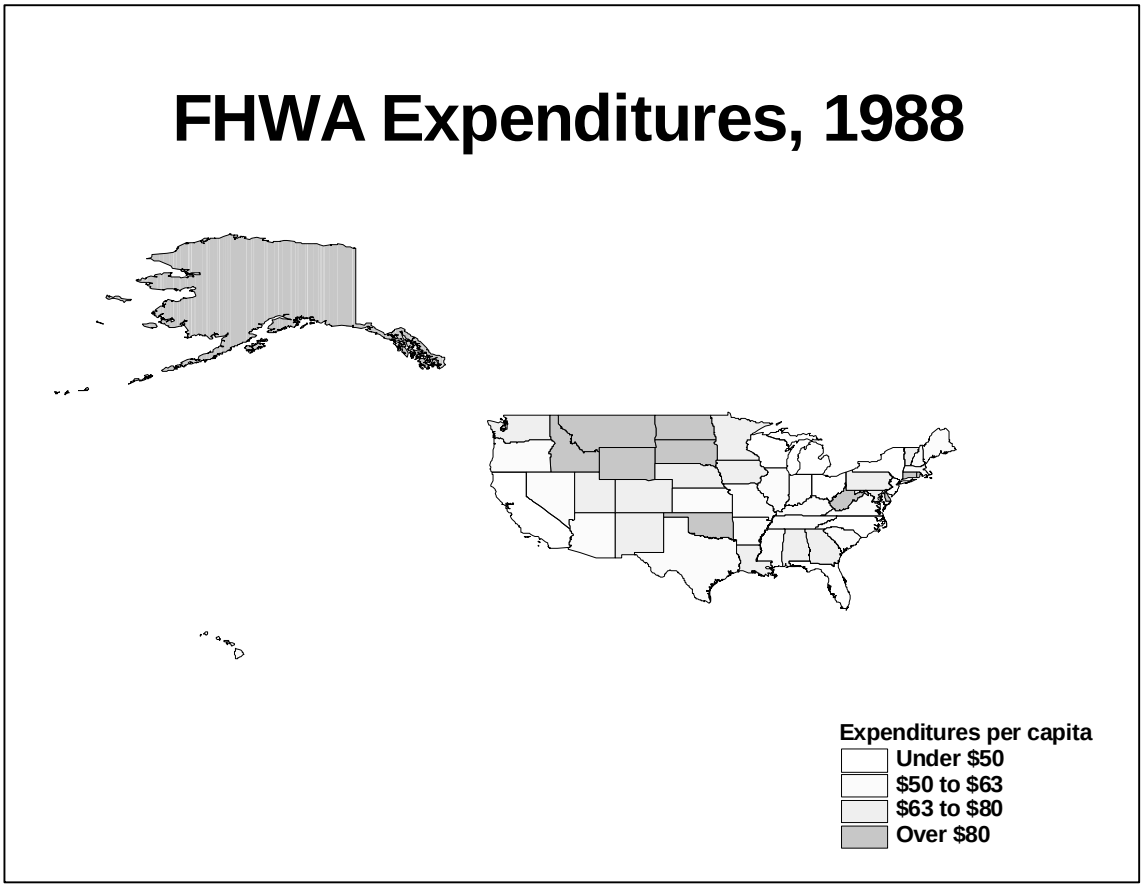


Source: Highway Statistics Summary to 1995, 1996 to 2001, Table FA-3.

When expressed on a per capita basis, we find highway expenditures to be highest in small population states and in the west—excluding the Pacific Coast. Historically, the lowest per capita expenditures have been in the highest population states. In 1988, the

lowest per capita expenditure ($34.26) was for New York, with California a very close second. The highest per capita expenditure ($256.57) was Alaska, and the median expenditure ($62.27) was for Nevada (see **Map 2-13**).

Map 2-13: Highway expenditures per capita 1988

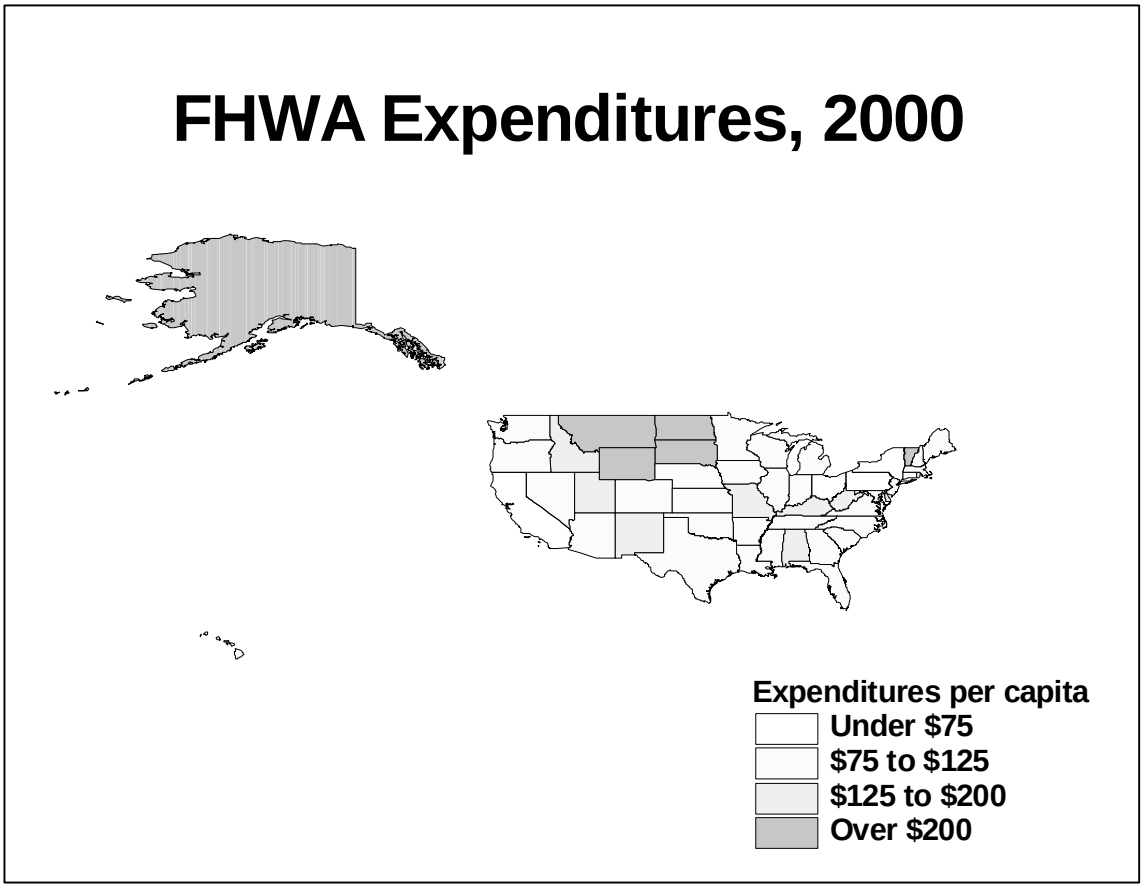


Source: Highway Statistics 1989, Table FA-3. Data adjusted using population data from the Census Bureau.

In 2000, the lowest per capita expenditure ($58.26) was in California, and the highest was in Alaska ($536.67) (see **Map 2-14**). Federal highway expenditures per capita have been highest in Alaska throughout most of the past fifty years, because of the

state's combination of large land area and extensive federal-aid mileage. The median expenditure for 2000 was North Carolina ($90.87).

Map 2-14: Highway expenditures per capita 2000



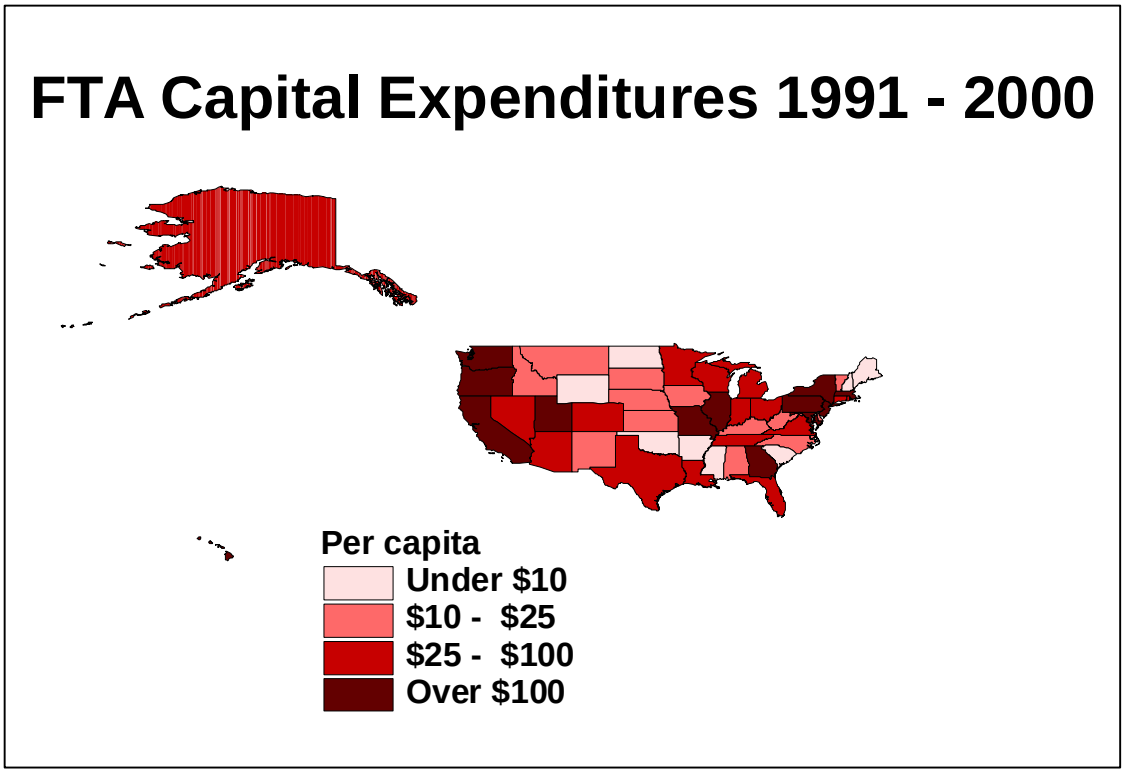
Source: Highway Statistics 2001, Table FA-3. Data adjusted using population data from the Census Bureau.

How about the spatial pattern of transit expenditures? There was an enormous range in transit expenditures among the states. Consider the case of capital expenditures from 1991 to 2000. In 1991, the smallest capital expenditure, a scant $15,000, was made in Idaho, while the largest, $575 million, was made in New York. In 2000, the smallest

expenditure, $45,000, was made in Wyoming, while the largest expenditure, $822 million, was made in California.

Maps 2-15 and 2-16 focus on the pattern of expenditures per capita for the Federal Transit Administration between 1991 and 2000, or the timeframe covered by the last two federal authorizing laws. Map **2-15** focuses on total per capita capital expenditures made between 1991 and 2000. The lowest total per capita expenditures have tended to be in the Rocky Mountain and Plains states and the highest in the heavily urbanized and higher population states. In 1991, the lowest per capita expenditure was just over $0.01 in Idaho, while the highest was $470 per capita in the District of Columbia. In 2000, the lowest was Wyoming with $0.09, and DC once again topped the list with per capita expenditures of $388. Subway and light rail construction projects dominate capital expenditures, and this helps explain the District of Columbia's position at the top of the distribution. Expenditures on the DC subway averaged $200 million per year throughout this period (ISTEA 1991, TEA-21 1998).

Map 2-15: FTA capital expenditures per capita, 1991 – 2000



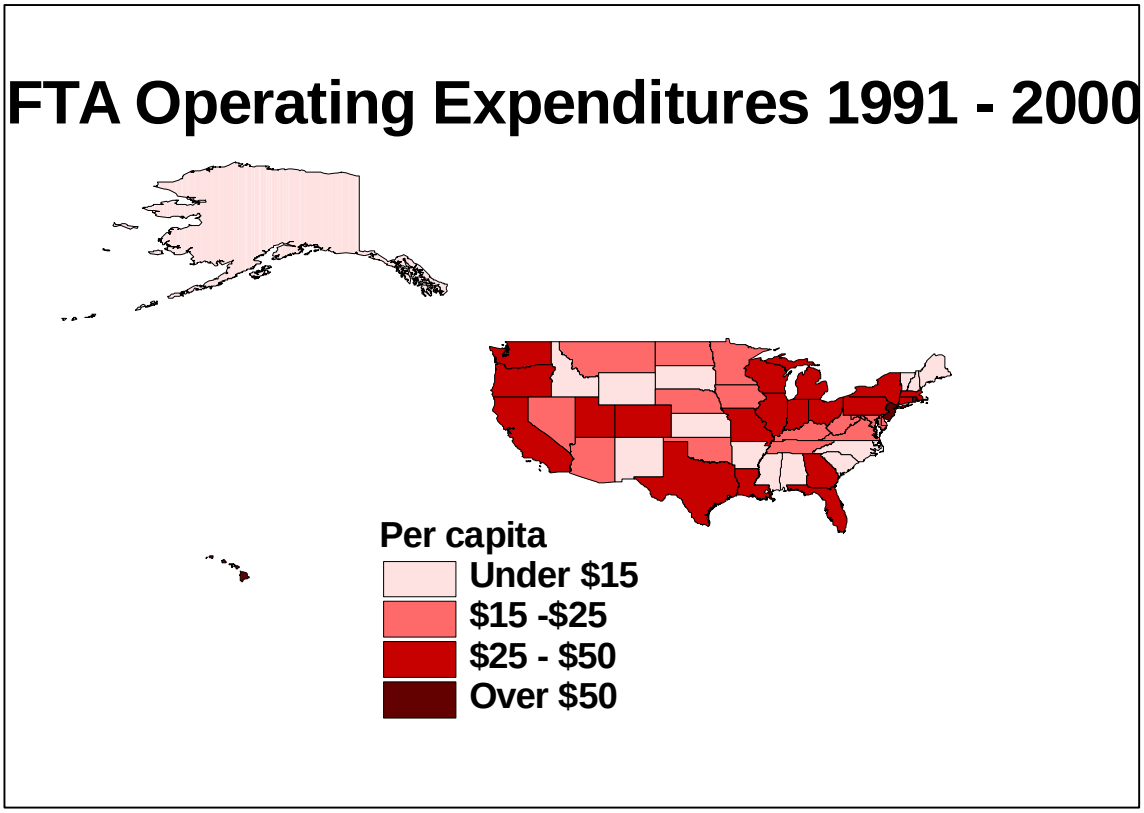
Source: Highway Statistics Summary to 1995, 1996 to 2001, Tables MT-2a and MT-2b, Federal Grants Summaries 1994 to 2001. Data adjusted using population figures from the Census Bureau.

On the operating expenditure side, the federal government reduced and then eliminated operating assistance for big city transit operators during this period, and this had a significant effect on the geographic distribution of operating dollars (TEA-21 1998). For example, New York received only 14 percent of the operating assistance in 2000 ($18 million) that it had received in 1991 ($129 million), although overall federal expenditures on operating assistance increased. In 1991, the lowest overall expenditure

was $261,000 in Wyoming, and the highest $129 million in New York. In 2000, the lowest overall expenditure was again Wyoming with $424,000, and the highest $219 million in California. In both years, the median expenditure was about $5 million. Rhode Island was the median state in 1991, and Kentucky in 2000.

Map 2-16 focuses on total per capita operating expenditures during this period. In general, the highest per capita expenditures have been in the urbanized states where much of the nation's transit riders live, although this changed somewhat after TEA-21 eliminated large city operating assistance. Expenditures tend to be lower in the interior states and in much of the south. Wyoming was at the bottom in 1991 ($0.57), and Maryland in 2000 ($0.44). The median per capita operating expenditure has been stable at around $1.90 per year.

Map 2-16: FTA operating expenditures per capita, 1991 – 2000



Source: Highway Statistics Summary to 1995, 1996 to 2001, Tables MT-2a and MT-2b, Federal Grants Summaries 1994 to 2001. Data adjusted using population figures from the Census Bureau.

Earmark patterns

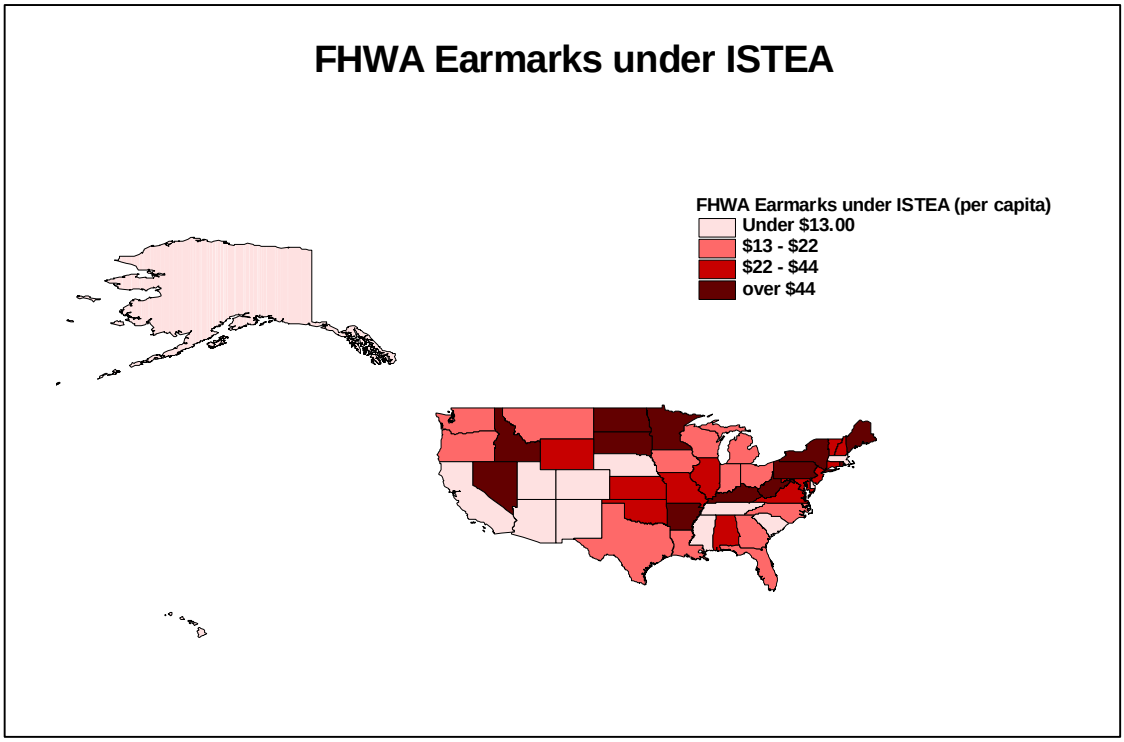
Overall expenditures are one part of the story; congressional earmarks are another.[33] Almost every member of congress tries to earmark, despite the protestations from a few very vocal earmarking opponents (Stein and Bickers 1995). So, who have been the most successful? Which districts and/or states are doing particularly well?

[33] The earmark data cited in this section are taken from the ISTEA, TEA-21, and annual approriations legislation themselves, as cited in the references.

We could use a combination of project descriptions in the legislation and expenditure databases such as the Federal Assistance Awards Data System (FAADS) to allocate expenditures to specific congressional districts (although it must be cautioned that FAADS' geographic treatment of some grants is problematic because it allocates too many dollars to state capitals). But an easier approach is simply to allocate to the state level, and that is what I have chosen to do throughout this research. We can then look at the states that have been the big winners (and the non-winners) in the earmark lottery, and ask whether or not there are some special characteristics that these states have in common.

For example, consider the geographic pattern of per-capita earmark expenditures contained in authorizing legislation like ISTEA. **Map 2-17** shows the geographic distribution of total highway earmarks in the ISTEA legislation, expressed on a per capita basis. (TEA-21 earmarks are discussed in later chapters.) In total dollar terms, the earmarks ranged from $0 for Alaska to $1.05 billion for New York, whose senior Senator (Daniel Patrick Moynihan) was a principal author of the ISTEA bill. When expressed on a per capita basis, overall ISTEA earmarks ranged from $0 in Alaska to more than $200 in West Virginia, whose senior Senator (Robert Byrd) is a legend for his ability to direct federal expenditures to his state. In general, the northeast and the Midwest fared quite well in receiving highway earmarks under ISTEA, while the southwest and the south did not fare very well at all.

Map 2-17: FHWA earmarks, per capita, under ISTEA

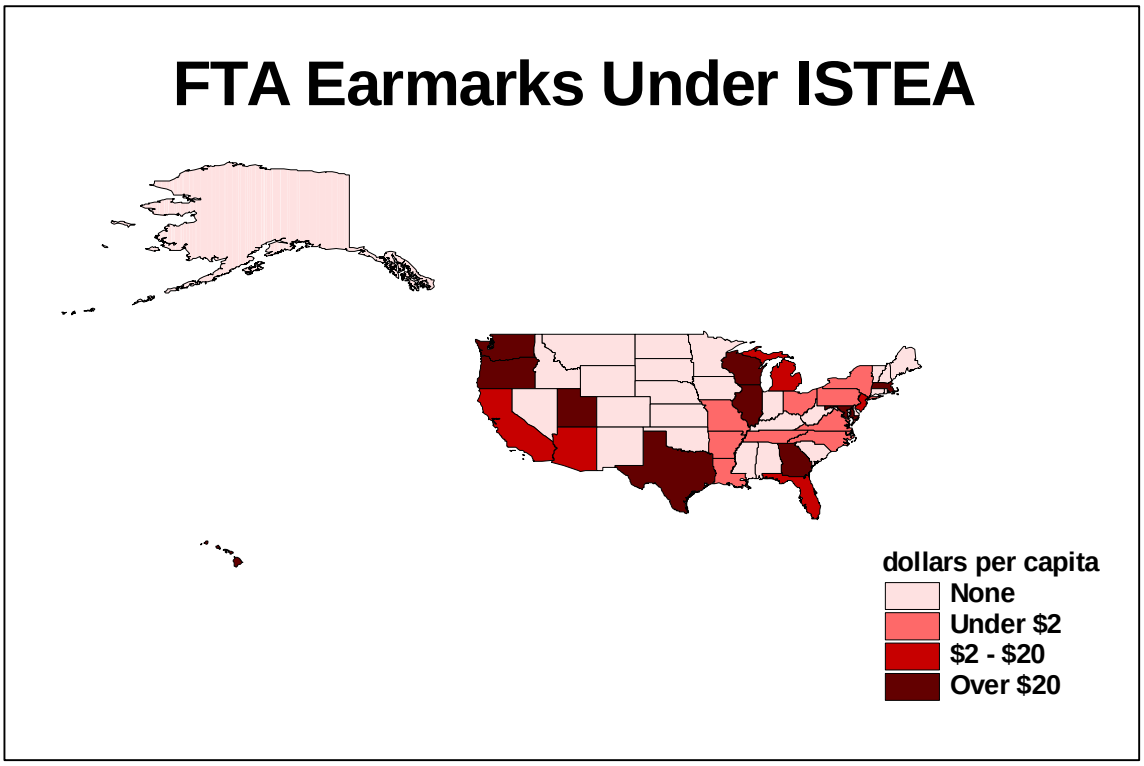


Source: ISTEA 1991. Data are adjusted using population data from the Census Bureau.

In addition to highway earmarks, there are transit project earmarks. **Map 2-18** shows the geographic distribution of transit earmarks in the ISTEA legislation, expressed on a per capita basis. In pure dollar terms, the earmarks ranged from $0 for 27 states up to $500 million in Virginia. Superficially, the money appears to be distributed to a handful of states where the nation's transit ridership is concentrated. But looking closer, we see that New York, the location of nearly one third of the nation's transit ridership, is in the middle of the distribution of earmarks. Virginia, with $73 per capita of FTA earmarks

over the course of ISTEA, fares the best. A number of Virginia politicians played key roles, in both House and Senate, during the ISTEA debate.

Map 2-18: FTA earmarks, per capita, under ISTEA



Source: ISTEA 1991. Data are adjusted using population data from the Census Bureau.

Congress has extended earmarking to include their insertion in appropriations legislation, as well as authorizing legislation. For a long time, authorizing committees successfully resisted the attempt to add project earmarks in transportation appropriations legislation but beginning at the end of the 1980s this barrier came crashing down. Generally, the earmarks have totaled less than $1 billion per year, but they have caused a serious resource allocation problem and set proponents of the projects contained in authorizing bills against those who are seeking the new earmark route in appropriations

bills (Congressional Record 1999). Appropriations committees have frequently tried to strip funding from demonstration projects listed in authorizing legislation, in order to fund their own earmarks—or so their opponents have charged (Congressional Record 1999).

Graph 2-8, seen earlier, showed the growth of appropriations earmarks from fiscal year 1989 to the present. Two things are most striking about the graphic. First, there was a lull followed by a sudden upsurge in appropriations earmarks toward the end of the 1990s. Second, all of the earmarked dollars in the earlier period from 1989 to 1993 were highway project earmarks while most of those in the period since 1996 have been transit earmarks. In fact, highway earmarks disappeared in the middle of this period, in the aftermath of a wave of negative press accounts about the practice. Somehow, transit supporters did not fall victim to the same pork barrel accusations as their highway-minded colleagues (as discussed in Chapter 6).

Between fiscal years 1989 and 2002, a total of $1.9 billion in highway project earmarks were successfully attached to annual appropriations legislation for the US Department of Transportation. In fiscal year 1989, $110 million was earmarked, and the earmarks skyrocketed to $560 million by fiscal year 1992. However, growing media attention made the earmarks controversial and there were no highway earmarks in fiscal years 1995 to 1998. Recently, the practice has resumed, and there were $121 million in highway earmarks in the fiscal year 2002 appropriations law, the most recently enacted DOT law. Wyoming was the only state that did not receive any highway appropriations earmarks during this time.

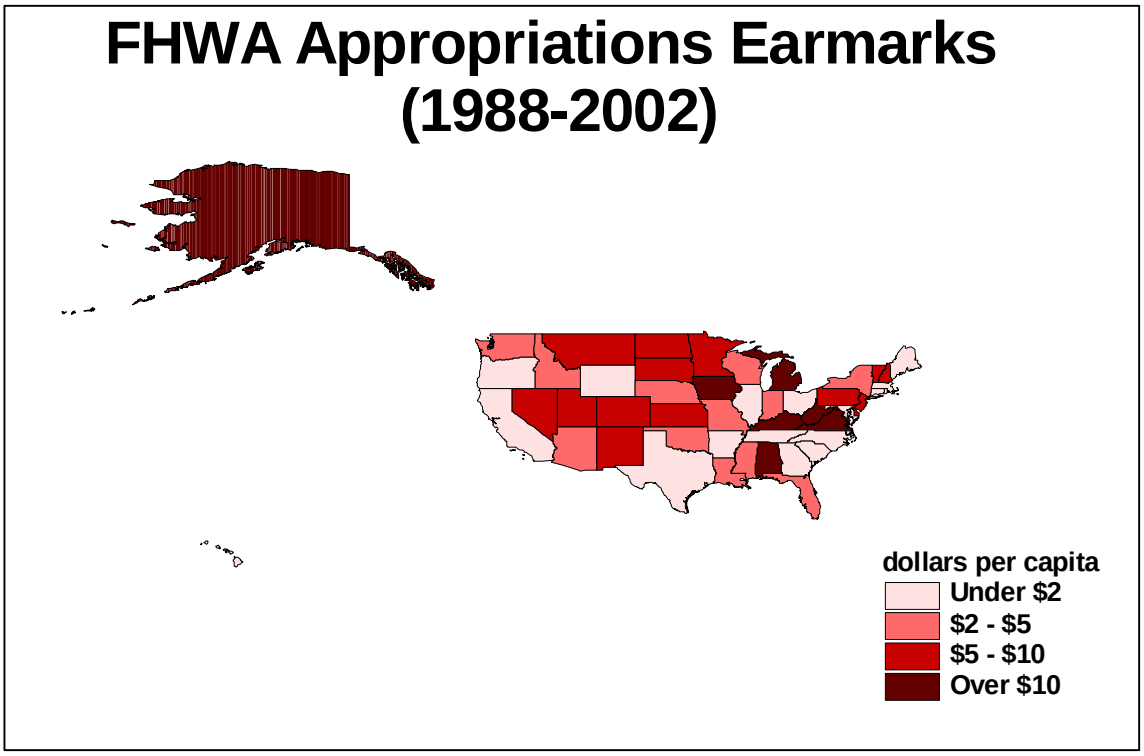
Transit appropriation earmarks are a relatively recent phenomenon, dating only to the fiscal year 1997 appropriations legislation. This bill included a staggering $1.5 billion in transit earmarks. The total amount of the earmarks fell to just over $1 billion in fiscal year 2002. Idaho and Wyoming are the only states that did not receive any transit appropriations earmarks during this period.

Maps 2-19 and 2-20 display the spatial distribution of highway and transit appropriations earmarks among the states, on a per capita basis. **Map 2-19** focuses on total highway project earmarks per capita. In 1989, a small minority (17) of states benefited from highway project earmarks, and New Jersey received the most money measured on a per capita basis ($3.62). In the early 1990s, nearly every state benefited from the earmarks, and the per capita dollars were relatively small. Then they disappeared altogether. In 2002, forty states plus DC benefited from highway appropriations earmarks, and small states appeared to be the biggest winners when the results were measured on a per capita basis. Alaska led all states with $3.98 in per capita highway earmarks. The spatial pattern seems to indicate a slight bias in favor of smaller population states, although the inclusion of Pennsylvania and Michigan within the ranks of the winners means that there is more behind this pattern than a state's population alone. This issue will be examined more carefully later.

Map 2-20 focuses on the spatial distribution of transit project appropriations earmarks among the states between 1988 and 2002. Between 1988 and 1992, there were no transit appropriations earmarks. In 1993, California led all states with $157 million, and led again in 2002 with $202 million. Between 1993 and 2002, every state received

some transit earmark dollars; New Hampshire received the least ($1.7 million) and California the most ($1.6 billion). When expressed on a per capita basis, large population states, which are presumably the ones with the most transit riders, fare reasonably well, although so do a few smaller population states, such as Vermont and Utah.

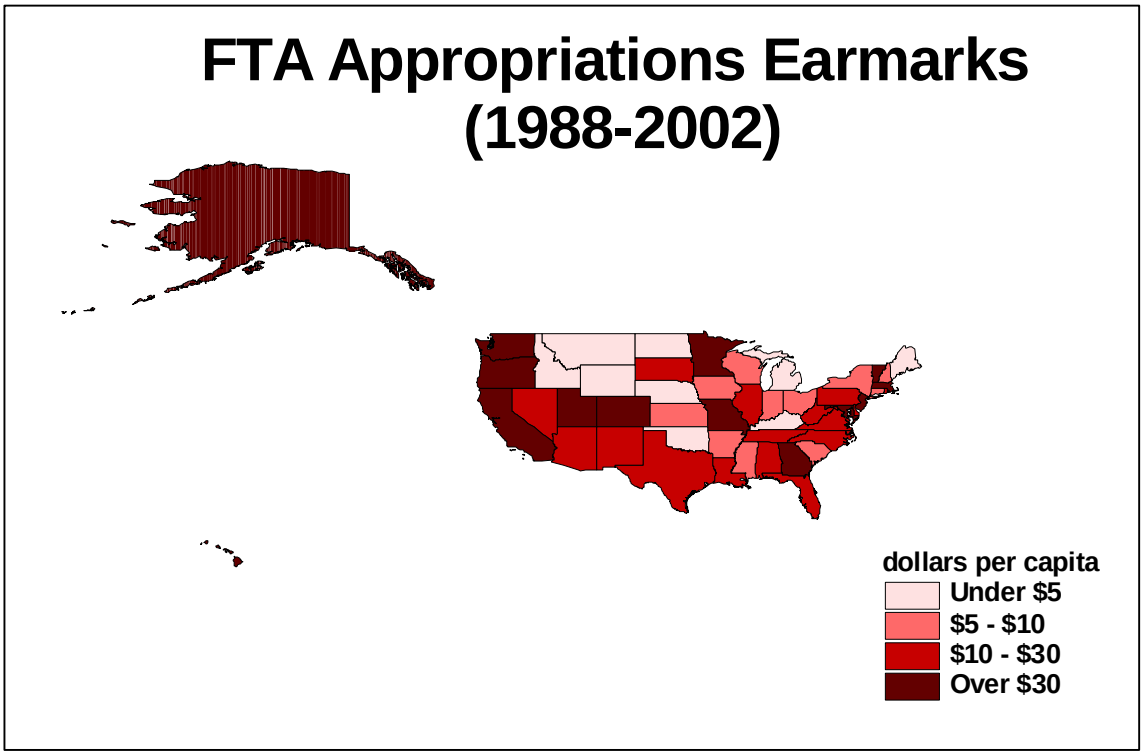
Map 2-19: FHWA appropriations earmarks, per capita



Source: Annual DOT Appropriations legislation. Data are adjusted using population data from the Census Bureau.

The proliferation of earmarks resembles an arms race in which states attempt to outflank each other lest they lose out in the battle for funds. Earmarking is a never-ending battle. Everyone feels the pressure to add more earmarks, or someone else will take the remaining dollars for their own earmarks.

Map 2-20: FTA appropriations earmarks, per capita



Source: Annual DOT Appropriations legislation. Data are adjusted using population data from the Census Bureau.

The political conflicts over policy outcomes

Given transportation's importance and the enormous amounts of money involved in the federal transportation program, it is not surprising that it is surrounded by conflict. There are conflicts over who pays the taxes used to finance the program and how much each group pays, conflicts over where the money is spent and on what kinds of projects, and conflicts over how facilities are located and their interaction with adjacent communities. All of these conflicts are ongoing, and the first two kinds of conflicts tend to become particularly intense when it is time to reauthorize the transportation program.

Automobile associations and trucking industry groups have long argued amongst themselves about their respective "fair shares" of the tax burden, and with everyone else about the use of these dollars. They demand special treatment of transportation tax revenues, and resist attempts to use the money for non-transportation purposes—sometimes successfully and others not so. The highway and mass transit lobbies have also waged a very long campaign over the use of highway trust fund dollars. Transit supporters demanded a piece of the trust fund action. In 1982, a truce of sorts was arranged, the transit penny and mass transit account inaugurated, and an era of relative calm took hold in the modal conflict. The modal conflict was reduced by giving each side more money than it had before, and by making expenditure categories more "flexible" (ISTEA 1991).

But among the wide array of transportation conflicts, one receives the lion's share of political and media attention. This is a conflict whose origins date back to the immediate postwar period but which became much more intense beginning in the late 1970s and early 1980s. This conflict is the geographic war between the donor and donee states in the highway program.

The formulas that distribute money from the highway trust fund to the states do not make returning the money to the places it was raised a priority. Money is redistributed among the states, in order to support a federal program that is supposed to meet national needs (FHWA 1999a). Those states that pay more in federal highway user taxes than they receive in federal highway aid are the donor states, while those states that receive more in federal aid than they pay in user taxes are called donee states. Sixteen

states have been historic net donors since the creation of the highway trust fund, with Texas and North Carolina (85 percent return each) faring the worst, and Alaska (750 percent) and Hawaii (350 percent) emerging as the biggest winners in the money game (see **Map 2-21**).

Donor state representatives and interest groups accepted the need for some redistribution while the basic national highway infrastructure, such as the interstate highway system, was put in place in the 1960s and 1970s (Congressional Record 1982). But they became less tolerant of redistribution once these facilities were opened for use. They fail to see any legitimate reason to continue redistributing their highway user tax revenues to benefit some other state, simply because that's the way things worked in the past—and while their own highway needs are not being met (SHARE 2003).

The donor states have raised the banner of "state equity" and called for a fairer return for their constituents. They want a larger share of their highway account tax payments returned to them in the form of federal highway aid (SHARE 2003). They demanded the creation of a minimum guaranteed return on their tax contributions, a floor below which no state could fall. In 1982, they achieved their first victory when the minimum guaranteed return was set at 85 percent, and this was subsequently increased to 90 percent under ISTEA. But loopholes in the application of the minimum guaranteed return rules meant some states still fell well below a 90 percent return on their tax payments into the highway account of the highway trust fund. They demanded a higher return rate, and more stringent rules about what it applied to, and they received both, after a vigorous fight, under TEA-21 (90.5 percent). But their complaints continue, and the

donor states have forged a coalition called the States' Highway Alliance for Real Equity (SHARE) to push for a 95 percent minimum guaranteed return during the 2003 reauthorization (SHARE 2003).

Donee states have argued that simply looking at the ratio of federal aid receipts to total user tax payments is too simplistic. Seaman and Cerreno (2003) note that many states that are currently donees when it comes to the ratio of aid to tax payments are less privileged when federal aid is examined on a per capita, per transit rider, or per VMT basis. Many states that are donees also receive a smaller proportion of their total transportation funding from the federal government. For example, New York, currently a donee state, receives only 15 percent of its total transportation funding from the federal government; the remainder comes from the state and local governments. States also face different environmental and traffic conditions that produce significant differences in terms of "wear and tear" on their transportation infrastructure (Seaman and Cerreno 2003). They also note that many states that are donees under the transportation program are donors when we consider the states' respective federal balance of payments. New York, a donee state in transportation, is a net donor to the federal treasury. But then again, so is California, which is a donor state in the transportation program (Seaman and Cerreno 2003).

All of these are valid assertions, and representatives from donee states have aired many of them, as we will see in Chapters 5 and 6. The issue of equity can be defined in many different ways, and a funding distribution that seems inequitable when the dollars are examined one way looks very different when the dollars are examined using a

different base. But transportation has long been envisioned as a user-financed program, and this user-based tradition (embraced in trust funds and other dedicated finance mechanisms at both federal and state levels throughout the country) provides significant support for the donor states' arguments.

While politicians have complained about geographic biases, and modal advocates have spoken of pro-highway biases, many academics have discussed the presence of a capital funding bias in the federal surface transportation program (Taylor 1992). Indeed even a cursory glance at the expenditure data shows an historic trend toward favoring capital as opposed to maintenance and operations expenditures (see earlier graphic). Presumably, this bias is a function of the need of politicians and interest group members to achieve the political or financial benefits that accrue from new facilities (ribbon cutting, etc) and that don't accrue when other less visible kinds of expenditures are made (Stein and Bickers 1995). But the federal highway program has shifted in recent years away from its original focus on construction and toward system maintenance, operations, and reconstruction, as the highway network ages (see earlier graphic) (FHWA 1999a). Yet, the federal transit program is weighted heavily toward capital expenditures while state and local assistance is primarily used for operations and maintenance (see earlier graphic).

The donor state issue

But I am asking why it is that the donor States--the States that send more than they receive--can't eventually hope to get some equity in this program. What we are doing here is locking in for 6 years a continued unfair program for the 18 or so States that contribute more than they receive. *Senator John Kyl (R) - Arizona*[34]

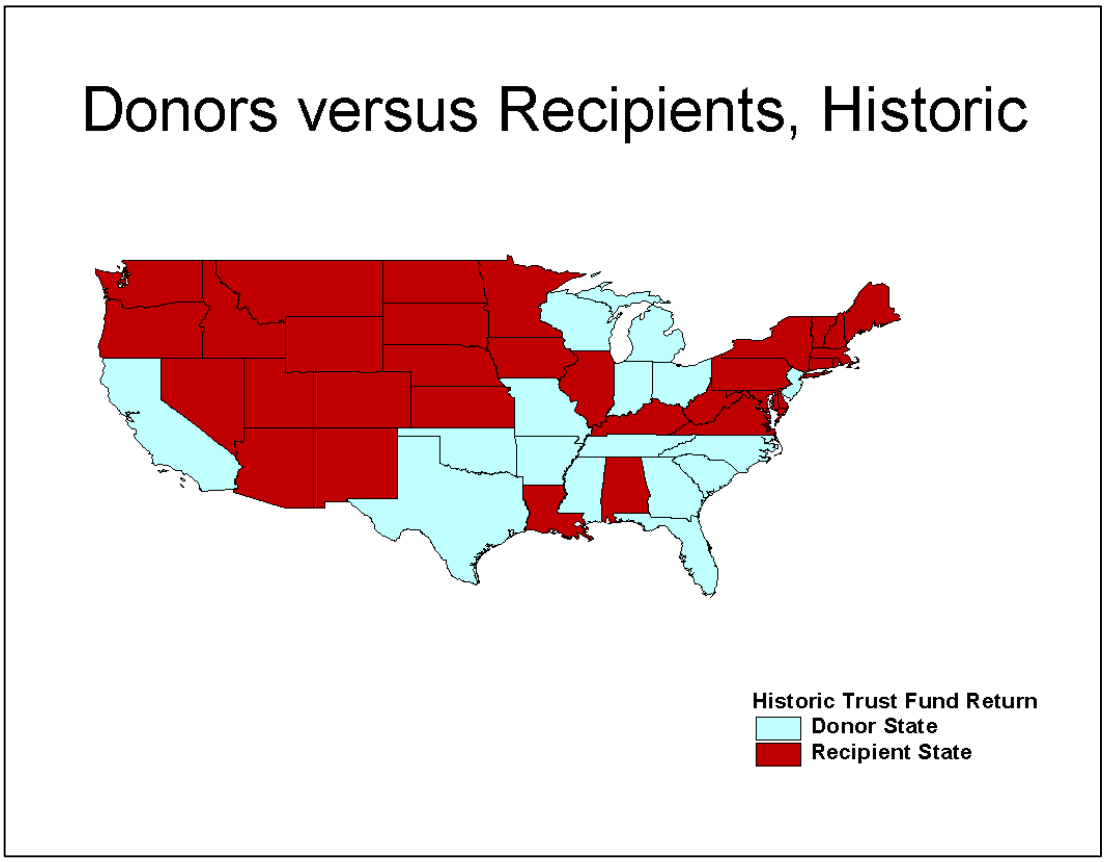
[34] Congressional Record (1998: 5391).

When the issue of state equity is raised, the states focus on their rates of return, the ratio between federal highway aid disbursements from and user tax payments into the highway account of the HTF. States whose ratio is larger than 1, i.e. whose aid disbursements exceed their tax payments, are the donee or recipient states and those whose ratio is less than one are the donor states. Over the period from 1957 to 2001, seventeen states have received less in highway aid disbursements than their residents paid in user taxes (Highway Statistics, Table FE-221). Six states had ratios less than 0.90: Texas, Oklahoma, North Carolina, Indiana, South Carolina, and Florida. Historically, the biggest loser has been Texas with a ratio of around .85. On the other hand, eight states have ratios greater than 2.0: North Dakota, South Dakota, Vermont, Rhode Island, Montana, Hawaii, DC, and Alaska. The biggest winner has been Alaska, whose ratio is 6.7. In general, western states and the northeast have been big winners while southern states have been big losers. But why is this so? And is it a good thing or a bad thing? Those are the key questions considered in this research.

During the early period of the trust fund's history (roughly 1957-1973), the primary focus of the highway program was the completion of the interstate highway system, and a significant amount of redistribution was expected and tolerated in order to facilitate construction of the system (Riddick 1973). During this period, 18 states were donor states, including many southern states, California, New York, New Jersey, and

Pennsylvania. The last four named states had extensive highway programs that predate the interstate program itself.

Map 2-21: Historic trust fund donors, 1957 to 2000



Source: Highway Statistics 2001, Table FE-221.

Donor state complaints led to the enactment of minimum guaranteed return provisions starting with passage of the Surface Transportation Assistance Act (STAA) in 1982 whose rates were increased in both ISTEA and TEA-21. One would expect to see changes in the different states' rates of return following each piece of authorizing legislation. I briefly discuss this issue below.

I examined the change in the states' rate of return ratios between 1982 and 1983 (before and after creation of the first minimum guaranteed return rule as part of STAA). Five states received a smaller rate of return in 1983 than they had in 1982, prior to enactment of the 85 percent minimum guaranteed return provision in STAA. These states included four states that then fell in the donee state category (Virginia, New Mexico, New York, and West Virginia) and one (Wisconsin) that had been an historic donor throughout much of the period but that had recently enjoyed a higher than normal rate of return. Between 1982 and 1983, most states enjoyed an increase in their rates of return, and this reflects the fact that there was both a draw-down of the built-up balance in the trust fund and an influx of new money with passage of the gas tax increases associated with STAA legislation.

Throughout the 1980s, donor state complaints continued to grow, despite the presence of the 85 percent minimum guaranteed return provision. The donor states banded together during the ISTEA debates to demand a 95 percent guaranteed return, but had to settle for a 90 percent return instead. Eleven donees states saw their return ratios fall after passage of ISTEA, but a number of the biggest winners also saw their return ratios increase, including Alaska and Hawaii. And the results for donor states were not as positive as they had hoped, as is clear from the data in Chapter 10.

Many donor state representatives complained that ISTEA's minimum guaranteed return rule did not cover a number of expenditure categories, including demonstration projects, and needed significant improvement (Congressional Record 1997). When it came time to reauthorize ISTEA, they launched an extensive campaign, and drew up their

own reauthorization bill that called for a 95-percent return and included all expenditure categories (Congressional Record 1998). The donee states made their own stand and devised a bill that would have exacerbated the redistribution problem (Congressional Record 1998). A stalemate ensued that helped delay passage of a bill for a year. When TEA-21 was finally passed in 1998, it contained a slightly higher minimum guaranteed return provision (90.5 percent return), but one that affected all categories of expenditure (TEA-21 1998). And, between 1998 and 1999 three states saw their return ratios decline (North Dakota, Alaska, and Wyoming), all of whom were historic donee states.

However, TEA-21 also contained a "hold harmless" provision that protected most states from a dramatic decline in their aid apportionment from their ISTEA levels (TEA-21 1998). Redistribution continued, and so have complaints. The donor states have again mobilized to demand a higher return, and they formed SHARE to help them achieve this result (SHARE 2003).

Typically, the House of Representatives has embraced the call for a higher guaranteed return, and the Senate has opposed it (Congressional Record 1998). This is not surprising given the different representational structures of the two chambers. The House is apportioned on a population basis, and the Senate's structure gives equal representation to each state. Large population states tend to be donor states, so it is not surprising that the House would embrace their cause. But the majority of states benefit from the current system, so it is equally unsurprising that the Senate backs the current system and resists most efforts to change it. Most states would lose money if a 95 percent guaranteed return were enacted, unless it was accompanied by substantial increases in

overall transportation spending. And, the reality of Senate representation, which gives the large number of small population states a disproportionate amount of political power, means that significant change is unlikely (Lee 2000).

But what if a 95 percent guaranteed return was enacted? Would this be the end of donor state complaints, or would calls for a 100 percent return be far behind? As the guaranteed return creeps closer to 100 percent, the very rationale for a federal program comes into question. We might as well abolish the federal program entirely, as a few advocates for devolution have been demanding (Poole 1996). If all the federal government does is collect money and then return it where it is collected what purpose does a federal transportation program serve? Perhaps it guarantees certain standards of system design, but these could also be handled cooperatively through organizations such as AASHTO. Or, perhaps it guarantees certain minimum standards of personal behavior (blood alcohol levels, minimum drinking ages, speed limits, seat belt laws, etc), but these are not quite the purposes it was originally intended to serve.

Conclusion

This chapter has provided a descriptive overview of the federal surface transportation program, focusing specifically on expenditure levels, apportionment formulas, political players, and other issues surrounding expenditure policy. Among the key issues discussed toward the end of the chapter are the donor-donee conflict, and the issue of geographic redistribution among the states. Redistribution is a factor in the highway program. No one denies that fact. But why does redistribution occur? And, more

generally, why are expenditures made in particular places and on particular projects? The next chapter tells us what the literature has to say about both of these issues.

CHAPTER THREE. LITERATURE REVIEW

The preceding chapter closed by focusing on the spatial patterns resulting from expenditure decisions, and in particular on the issue of geographic redistribution of federal highway funds among the states. These patterns are the products of the distribution mechanisms and program rules of the transportation program. But where did these mechanisms come from and how were they developed? Answering this question is a key focus of this research, and one step on the path is to review the relevant literature for guidance.

This chapter briefly reviews arguments presented in the literature on the intergovernmental grant system in general and transportation policymaking in particular. The literature is concerned with the geographic distribution and/or redistribution of resources, and presents two sets of arguments and/or explanations for its occurrence. These include both theoretical rationales that offer justifications for redistribution and functional explanations for its actual occurrence. These general insights about net spatial patterns are also applicable to a consideration of expenditure patterns more generally. The chapter closes with a discussion of the means I have chosen to assess the applicability of some of the literature arguments to transportation, and this section thus serves as an introduction to the main body of the research investigation in the subsequent seven chapters.

Geographic redistribution of resources

Geographic redistribution is a fact of life within the transportation program, and is a central fact of other federal programs as well. The existence of the highway trust fund finance mechanism makes it easy for all to see that geographic redistribution occurs. Some states are net contributors to the federal highway program (donors) while others are net recipients (donees). An obvious question arises: why are some places net recipients and others net contributors? Related to this is another question: is this fact something that should really concern transportation researchers? Both of these questions will be discussed in the pages that follow, by focusing first on the explanations offered by other scholars and then by my own ideas on the subject.

Geographic redistribution of highway dollars occurs under the auspices of the federal intergovernmental grants system, a system that has itself been the object of a great deal of scholarly study. Researchers in economics, public finance, public administration, and political science have dissected the grants system, focusing on its rationale, its function, and its net results, and the issue of resource redistribution lies at the core of their analysis. These scholars maintain that the spatial patterns are the result of conscious effort by policy actors, and not the result of an accident. Expenditure decisions are important policy exercises, and their outcomes are not left to chance.

Economists, public finance theorists, and public administration scholars have focused on illuminating the theoretical rationales for spatial redistribution. Political scientists, on the other hand, have focused on developing functional explanations, on the

behavior of specific policy actors and on the actual occurrence of redistribution and questions of resource allocation more generally.

Theoretical rationales for redistribution

The pooling and redistribution of resources to achieve a common goal is one of the primary roles of government, and there are number of important reasons to expect, and indeed to favor, redistribution as a specific object of government policy. Redistribution can occur among specific individuals or between collections of individuals residing in particular places, such as states or congressional districts. The former issue has tended to dominate most discussions of redistribution, although the theoretical arguments developed in this body of work have been applied to spatial concerns as well.

Along these lines, two types of theoretical justifications have been developed to encourage and to explain geographic redistribution. The first set of justifications is concerned with economics, and stresses the importance of the spatial redistribution of resources to guarantee economic efficiency. The second set of justifications is concerned with issues of equity, including socio-spatial justice and fiscal equity. Both justifications characterize the spatial redistribution of resources as a means of remedying the geographical imbalance of program costs and program benefits, and/or the income and other resources that are needed to support a program or project. The redistribution of resources from one geographic area to another helps to counter these imbalances, and may enable more equal treatment of people and places and/or more equal access to the benefits of particular policies for people in different places.

Economic efficiency arguments

The public finance and administration literatures on intergovernmental relations and fiscal federalism offer an array of theoretical explanations for the idea of redistributing public resources over space. Many writers in this area are public finance economists who maintain that a central objective of the grants system is to guarantee economic efficiency. They argue that the primary theoretical rationale for the geographic redistribution of public resources—indeed for any intergovernmental grants at all—is to correct for so-called benefit spillovers.[35]

A benefit spillover occurs when there is a mismatch between the geography of taxation and the geography of program benefits. The most frequently cited example is in the case of publicly funded education.[36] While the financial cost of providing education is extremely localized (to the town or city) the benefits of the program flow to a much wider geography—especially when one considers the high levels of residential mobility in the United States. There are significant social benefits associated with investing in education (educated workforce, informed citizenry) but many of these benefits accrue to jurisdictional units external to the local entity that might be required to pay the taxes to support the educational system. A rational, self-interested local government may therefore decide not to invest in a program or project with significant net social benefit to the state or nation as a whole, or may choose to invest far less than is socially optimal—

[35] Break (1967), Break (1980), Breton (1996), Gramlich (1997), May (1969), and Oates (1972) are just a few of the numerous books on this subject.

[36] Most of the books that are cited in the footnote above make this point.

because its own share of the program benefits may be less than the cost it must bear. Under such circumstances, serious economic inefficiencies arise.

> Whenever the benefits of a particular state or local program accrue both to insiders who pay for the program and to outsiders who, though able to pay for it, receive it free, inequities arise. Economic inefficiencies exist if those who pay for the program expand it only to the point where their own marginal benefits equal their marginal tax costs, rather than to the socially optimal point where total marginal benefits equal total marginal costs. Without counteracting forces, then, programs with benefit spillovers are likely to be given less support than they merit, as compared to programs without spillouts or to goods sold in the marketplace, thus producing an inefficient diversion of resources from superior to inferior uses.[37]

Because rearranging government structures to address these benefit spillovers is not generally feasible and different geographies may best fit each of a number of different programs, the use of intergovernmental grants is suggested as a second-best option for policymakers desiring to avoid the potential problem.

> The goal (of a government grant) would be to reduce the cost to insiders until they come into line with the benefits enjoyed by those groups. For a local government spillout program this could be done by a federal or state open-ended matching grant, with the grantor's share of total costs set equal to the outsider share of total benefits. In economic terms such a grant would reduce the price at which insider's could purchase the program's total benefits. If that price were set correctly, the local government would choose to operate the program at the socially-optimal level, and there would be no free-rider groups.[38]

[37] Quote is taken from Break (1980:77).

[38] Quote is taken from Break (1980:77).

Thus a higher level of government jumps in to provide additional financial support--collected, of course, from program beneficiaries residing outside the local taxing jurisdiction--to ensure that a socially beneficial program or project is built.

Education and transportation are cited as the two policy areas with enormous society-wide benefits and high localized costs.[39] The recouping of these external benefits through the system of intergovernmental fiscal relations may thus explain some (or all) geographic redistribution of transportation money. Perhaps, when we account for all program benefits and attribute them to their proper beneficiaries, geographic redistribution is actually justified—and the unaccounted for increment is quite small.

Some scholars argue further that fiscal equalization is only part of the story. May (1969) adds the corollary that intergovernmental grants are used both to support minimum standards of service in all states and to encourage state and local expenditure in certain policy areas. "A system of revenue allocation may seek to achieve a number of objectives: it may seek to achieve good government, to safeguard the autonomy of the unit governments, to promote political stability, to allocate resources efficiently, to facilitate rapid growth, to achieve financial equalization, to foster financial responsibility, or to do all of these at once" (May 1969: 167). The object of an intergovernmental grant program, then, is both to equalize resources and to use the grants to leverage additional local investment.

While most public finance scholars accept the fiscal equalization arguments used to justify the redistribution of resources within the intergovernmental grants system, a

[39] See, for example, Gramlich (1997) and Musgrave and Musgrave (1980).

few warn that the translation from theoretical ideal to policy practice has not been handled well. For example, Oates (1994) warns that while correcting for benefit spillovers may provide a rationale for redistribution within the intergovernmental grants system, he also argues that the design of the system does not mesh well with basic economic principles. He cites the example of the 90 percent federal cost share for interstate highway projects, and argues that external benefits of this magnitude are highly doubtful for this program. The transportation program is filled with very high federal cost shares, typically on the order of 80 percent or more, that seem to bear little relation to the real external benefits of the program. So something else must be at work.

Socio-spatial justice and fiscal equity concerns

While some scholars focus on economic efficiency arguments, others have extended their investigation to focus on the issue of equity. While there are, of course, many ways to define equity, and the literature is divided on this score, everyone accepts the initial premise that the geographic distribution of resources and needs is not coincident as a given.[40] There is fiscal imbalance. Some communities are wealthy and others are poor. Indeed one would be hard pressed to argue the opposing case. But there is a real debate as to whether the focus should be on places per se or more on the individuals living within the places.

One group of scholars, including a large group of public finance economists, focuses primarily on horizontal equity concerns while another group, including a more

[40] See, for example, Breton (1996), Musgrave and Musgrave (1980), and Oates (1972).

diverse group of scholars both inside and outside public finance, introduces vertical equity and notions of social justice into the picture.[41] In both cases, geographic redistribution is suggested as a strategy to redress fiscal imbalances by providing aid to resource-poor and/or high need localities.

The first body of work focuses on potential distortions of individual and firm location choices that might arise from fiscal imbalances.

> (I)f junior governments provide goods and services whose span is less than national—namely, goods and services that are private, contestable, or both—and if per capita residence-based public revenues are larger in some jurisdictions than in others because of, let us say, an uneven endowment of taxable, marketable resources, intergovernmental transfers should be used to eliminate inefficient mobility among jurisdictions. The central government should tax the jurisdictions that are rich in natural resources and transfer the proceeds to those that are poor, thus permitting both to adopt taxation and expenditure patterns that eliminate the interjurisdictional mobility of labor that would otherwise occur… fiscal capacities, needs, or both differ among jurisdictions and these differences call for some form of equalization payments from governments situated at one jurisdictional level to those at another level.[42]

This economic concern focuses on the concept of horizontal equity, namely that similarly situated individuals should be treated equally in public policy decisions, such as

[41] In the former group, for example, are Break (1980), Breton (1996), and Musgrave and Musgrave (1980). In the latter group, for example, are Oates (1972), Rawls (1971), and Shoup (1969).

[42] Quote is from Breton (1996:198).

taxation.[43] This group of scholars does not single out a particular subset of individuals—and think in terms of vertical equity—but rather focuses on the community as a whole.

> Why should wealthy communities be able to buy public goods of high quality at low tax rates while poor ones struggle to achieve minimum levels of service by taxing themselves at very high rates… as long as state and local tax systems retain their strong ability-to-pay orientation, and as long as real estate markets operate imperfectly, both vertical and horizontal imbalances can be expected to exist. One way to deal with these inequities and inefficiencies is by the use of federal, unrestricted redistributive grants…It is an inherent characteristic of these unrestricted grants, however, that their funds accrue to the benefit of the whole community rather than to specific families or groups within it. Their purpose is to moderate fiscal imbalances for all households and not just for those with low incomes.[44]

Another set of arguments focuses on vertical equity, and a general concern for social and spatial justice.[45] These scholars emphasize the use of redistribution to help assist poor individuals or poor localities.[46] In fact, many of these kinds of equity and fairness arguments have been used in Federal Highway Administration publications that

[43] Musgrave and Musgrave (1980) are two of many scholars who have written in this area. They write that the central fiscal entity (federal government) should neutralize the individual citizen of the federation against the fiscal operations of the particular state in which he resides, in order to address potential problems of horizontal equity, vertical equity, and general economic efficiency objectives.

[44] Quote is from Break (1980:86).

[45] Rawls (1971) presents a detailed theoretical discussion about the meaning and operating principles associated with a functional concept of justice.

[46] See, for example, Shoup (1969).

describe the federal surface transportation program.[47] Given this fact, one might therefore expect for transportation resources to be redistributed from relatively wealthy to relatively poor individuals or jurisdictions. But May (1969) argues that any equalizing effects of the intergovernmental grant system have been very slight. And Lem (1996) found that the federal highway program actually redistributes from "poor" fiscal capacity to "high" fiscal capacity states; the program actually serves to *increase* fiscal inequality. Lem's finding turns the fiscal equalization rationale on its head and raises a number of important questions. Namely, if not to promote fiscal equalization then why does redistribution occur at the federal level?

A third set of theoretical rationales for redistribution focuses on the need to promote national or state objectives other than those mentioned above. For example, geographic redistribution may be necessary to develop a national transportation system to maintain a strong national defense, promote interstate commerce, serve other national economic objectives (aside from simple efficiency concerns), or provide basic transportation service to all Americans. Proponents of the federal transportation program have made each of these justifications over the course of the program's history, as chapters 4 through 6 show.

[47] Lem (1996) quotes from a number of these FHWA and DOT publications and press releases in his study of the fiscal equalization rationale for geographic redistribution in the federal and state (California) transportation programs. The findings discussed in this paragraph and the next one are the results of Lem's investigation.

Functional explanation for geographic redistribution

In addition to presenting theoretical rationales for geographic redistribution, the literature offers functional explanations for its actual occurrence. Particularly relevant to this research are a set of explanations derived from the political science literature that focus on the behavior of political/legislative system actors and the effects of institutional structures on resource allocation, expenditure policy development, and policy change.

Political power dynamics

The political science literature provides a powerful functional explanation for the occurrence of geographic redistribution. Many scholars see redistribution as the result of the efforts of powerful legislators and/or interest groups to structure the resource distribution process so as to benefit their constituents. For example, they claim legislators employ grant programs for political advantage, and that they propose policies that benefit their districts—in order to further their chances of reelection.[48] In short, politicians trade votes for the assurance of future legislative or reelection-related support (including campaign contributions) from their colleagues, or from interest group representatives, even in cases where no direct constituent benefit is present. Some scholars have gone so far as to claim that members of congress have even altered program administration procedures in order to provide constituency service and credit claiming opportunities.[49] And there is some empirical evidence to validate these claims.

[48] See, for example, Fenno (1966) and Stein and Bickers (1995).

[49] Stein and Bickers (1995) and Weaver (1988) both discuss the credit-claiming strategies used by some elected officials to make themselves more visible to their aid-seeking constituents.

Much of the political science literature maintains that politicians stake out positions of power where they are able to get direct programmatic benefits for their constituents. Hence the literature has been dominated by studies of the roles of legislative committees and powerful members of committees in decisions on the allocation of federal dollars to states and congressional districts.[50] For example, members of congress (or the Legislature) seek positions on the committees where they can affect the structures of the funding formulas that determine where federal money is spent—in order to get as many benefits as possible for their district (see Figure 9).[51] Adler and Lapinski (1997) observe, for example, that the transportation committees are disproportionately made up of representatives from high demand districts. They define the high demand districts in the transportation arena as those with high percentage of employment in transportation and construction industries. This kind of behavior describes what has come to be known as the pork barrel hypothesis of legislator behavior. Indeed, the central premise of much of the political science literature is that elected representatives want to be reelected. Therefore, politicians are expected to engage in behavior that they believe will help them get reelected, such as funneling grants to their constituents.

[50] See, for example, Stein and Bickers (1995).

[51] See, for example, King (1997) and Smith and Deering (1990).

The pork barrel hypothesis is frequently cited in studies of resource allocation decisions in transportation and other major infrastructure programs.[52] And real-world experience provides some support for the hypothesis. Most empirical studies have focused on legislative behavior at higher levels of government, what we might call the supply side of the equation, as opposed to the behavior of grant seekers, the demand side of the equation. Lee (2000) is a recent example of the former case.

A smaller body of literature has examined the question of the behavior of lower level officials and interest groups, the demand side of the equation. For example, among a host of demand-related variables, Maddox (1997) found that taxable wealth, local political ideology, and the level of state bureaucratization were significant explanatory factors in the distribution of federal aid. And he emphasized that these actors do not look on all money as equally desirable.

Jerome (1997) found that a state's congressional representation correlates positively with DOT aid revenue received in one particular fiscal year. For every additional member on House Ways and Means, states received $3.16 more per capita in matching aid, $2.58 more per capita in formula aid, and $.78 per capita in project grant dollars. For every additional member on House Public Works, states received $2.94 more per capita in matching grants; for every additional member of the Senate Public Works committee states received an additional $4.65 per capita. The results were statistically significant in all of these cases. The same study also observed that the legislative

[52] See, for example, Lee (2000) and Maddox (1997).

committees' influence varied among the different categories of federal grants. "It should be noted that the influence of committee representation varies significantly in formula and matching grant programs versus project grant programs. In formula grants, there is the expected influence of representation of relevant committees over the distributive formulas instituted and the distribution of aid. For project grants, the effects are considerably smaller and Senate committees are actually negatively correlated with aid revenue. Project grants appear to be less politicized than formula grants…the results cast doubt on the hypothesis that members of oversight committees exercise considerable influence over program administrators who select programs" (Jerome 1997: 122).

Jerome (1997) also found that state population was negatively correlated with federal transportation aid. States lose $1 per capita for every million residents in formula and matching grant funds, and lose $.30 per capita in project grant funds (122). He also found that state land area was positively and significantly correlated with aid per capita. Neither of these findings was surprising given the structure of the apportionment formulas discussed in Chapter 2. Mostly rural states received more formula and matching grant funds and fewer projects grant funds, per capita, than did mostly urban states. As most of the project funds he examined were for transit projects, which are distributed to urban areas, neither of these findings was particularly surprising.

But Jerome (1997) also cautions us.

> There are some lingering questions about the causal direction of the linkage between formula grants and committee representation that should be the subject of further research. It is not clear whether members of Congress self-select onto particular committees in order to preserve distributive advantages or whether each cohort of legislators attempts to alter formulas to benefit their districts. Additional work examining the

> degree to which the periodic reauthorization of programs affects the distribution of aid consistent with changes in the geographic representation of oversight committees would be instructive. The causal mechanism may differ by type of expenditure. For developmental programs, high demand across all jurisdictions may lead members to seek membership on committees that allow them influence over the determination of formulas. For redistributive programs, demand is likely restricted by partisanship and state/district preferences, thus members may seek committee appointments that allow them to preserve existing distributive advantages as well as programs themselves (127).

Of course, the findings refer to a specific moment in time and do not attempt to determine whether these results have been consistent over the course of the program's history. Still, they provide solid empirical evidence that the pork barrel hypothesis is a relevant avenue of investigation in the transportation policy field.

Political scientists have proposed a number of models to account for the actions of politicians and other policy process actors. One of the most famous of these is the legislative self-interest model. In this model, legislators make policy decisions such that their chances of reelection are increased. They are looking out for themselves and their constituents when they make policy decisions. In one variant of this framework, legislators, bureaucrats, and their constituents with an interest in a particular policy area join together to form iron triangles or sub-governments in order to protect their programs. They negotiate settlements in an environment where consensus is the operational norm. The members of the triangle share broadly similar objectives, and are able to work in their own self-interest while also protecting the interests of the triangle as a whole. Indeed, their self-interests often coincide. In such a model, conflict originates from outside the triangle. These networks are presumed to be most influential in the less politically divisive distributive programs, such as transportation and infrastructure

development, and are less influential in the case of politically contentious redistributive programs, and in the regulatory arena, where presidential influence, political parties, and congressional leaders tend to dominate policy discussions (Johnson 1992).

Johnson (1992) is one of many scholars who have criticized the self-interest model as being too simplistic. He argues that legislators' policy views rather than reelection goals shape interactions between legislators, interest groups, and the bureaucracy. In his more complicated arrangement, legislators respond to the need to achieve reelection but also to an inner desire to become policy experts in a particular area or to protect the powers of the legislative institution as a whole. Similarly, agencies often have policy goals that do not mesh with those proposed by legislators. The result is a system where conflict is a normal feature. It is inevitable, is raised by insiders and outsiders, and often arises when an agency's bureaucrats do not support additional tasks and responsibilities being assigned to them by the congress. Johnson (1992) argues that such conflict is good—even between bureaucrats and legislators—because bureaucrats can make significant and meaningful contributions to the policy process, and conflict often stimulates policy changes.

Stein and Bickers (1995) develop a similar model of interaction structured around the notion of policy subsystems. Policy subsystems are populated by a combination of interest groups, legislators, agencies, program recipients, and journalists who are interested in particular policy areas, or programmatic portfolios.

> Policy subsystems are networks of relationships among different actors all of whom have a stake in the policy arena. At the heart of most policy subsystems is a set of government programs. Our argument is that these programs are bundled together in nonrandom ways that are intended to

> address the heterogeneous preferences of the diverse actors in the subsystem. These bundles of programs, which we call program portfolios, provide opportunities for subsystem actors to pursue their own interests but, at the same time, force them to engage in some degree of cooperative behavior with one another. Around each portfolio is a distinct set of actors who use the portfolio to promote their individual and organizational goals (4).

The portfolio approach is particularly important because portfolios can offer synergies, and by bundling programs into portfolios, actors are frequently able to win approval for narrowly tailored recurring programs. The network of relationships among these actors defines the subsystem. Each actor strives to achieve his/her goals, but the structure of the system and its interrelationships requires the different actors to cooperate with one another to achieve their goals.

In general, subsystem allies seek to maximize the number of congressional districts serviced by the subsystem's entire portfolio of programs in order to minimize potential opposition, but when they confront fiscal and/or political constraints they may have to make a tradeoff between district coverage and homogeneity of program recipients. Interest groups figure prominently in this model, and Bickers and Stein argue that campaign contributions by an interest group's PAC may, for certain purposes, operate in lieu of programmatic benefits to a district. This behavior may result in legislators voting for programs that none of their constituents want, in exchange for campaign support, and this distorts relationships between legislators and constituents.

Institutional considerations

A number of political scientists have stressed institutional issues in their examinations of federal grants. To cite one recent case, Lee and Oppenheimer (1998)

emphasize the peculiarities of the United States Senate and its representational structure. The Senate provides each state with two members, regardless of a state's population, and the Senate's institutional structure causes senators to regard each other as equals. Those from more populous states are not treated any differently than those from less populous states. This egalitarianism has enormous implications when it comes time to make resource distribution decisions, and shapes the Senate's concept of fairness. By and large, a "fair distribution" in the Senate is one that treats senators equitably—which means treating states equally. And given the wide variation in state populations, treating states equally leads to dramatic variations in the treatment of individuals in different states. An allocation of $10 million, for example, is transformed into a tiny bit of money per capita in California, with its 35 million people, but makes a huge financial impact in Wyoming, with its population of less than half a million.

Equal state representation, coupled with the fact that a little money goes a long way in lower population states, means that small-state senators are the most attractive targets for senators seeking to build coalitions. They can be included at much less cost than it would require to attract large state support, and Delaware's two votes count for just as much as New York's votes. Given that most states fall into the small population category, it is not surprising that the Senate tends to look out for the interest of small population states.

Lee and Oppenheimer (1998) have also noted the differences between the committee-seeking behavior of small population state representatives and those from larger states. They observe that smaller state representatives tend to cluster on

"constituency" committees (such as the environment and public works committee) while large state representatives tend to cluster on policy committees (Foreign Affairs). This further privileges small states when decisions are made about, for example, distributing transportation dollars. "The pattern of constituency size in the Senate means Senate coalitions are likely to prefer to distribute funds in ways that disproportionately benefit constituents in less populous states even in the absence of conflict between large and small states" (Lee and Oppenheimer 1998: 161). But that said, committees are less important in the Senate where the rules allow more floor action than is possible in the House. The Senate is a very different institution than is the population-apportioned House.

Indeed, Senate versus House differences are quite important in all aspects of federal aid policy, including transportation. Because of its institutional structure, the House favors distributions based on population because districts are roughly equal in population; the Senate favors treating states equally, for the reasons noted above. These are very different notions of equity. The Senate will also introduce floors into formulas to help out smaller states—such as the 0.5 percent minimum apportionment guarantees in the highway program—and over time these provisions have produced windfalls for small states over what a strict population based allocation would have given them. The Senate can do this because the individual program amounts are relatively small amounts of overall authorization budgets, and large population state representatives thus have little to gain from opposing them.

House members emphasize geographic earmarks to their districts so as to benefit their constituents, because they have no guarantees where a state's allocation will be spent. Senators worry over the formulas that distribute money to the states, because by doing so they are helping all of their constituents obtain more money. Historically, the Senate has proven more likely to prevail on formula disputes and the House has typically been able to prevail when it comes to fights over earmarks and special projects, as the historical analysis shows.

To this discussion I would add another explanation, also focused on the political-institutional system rather than on specific actors. Many scholars have observed that the political system has a number of built-in safeguards that force policy changes to be introduced incrementally and that these safeguards tend to promote policy stability and continuity except in periods of crisis.[53] Bearing this fact in mind, one might interpret the geographic redistribution of highway money as a legacy of the early rural orientation of the highway program. Perhaps, the magnitude of the redistribution has diminished as the national and state transportation policy mission has broadened to include urban areas. But, because of the system's preference for minor adjustments, change comes slowly. Perhaps rural interests also still demonstrate a slightly stronger interest in receiving transportation funds than their urban counterparts.

[53] Altshuler (1979), Wachs (1995), and Wildavsky (1986) are three scholars who have made these claims.

A complicated array of factors

The public finance and public administration literatures present theoretical rationales for geographic redistribution, including correcting for benefit spillovers, fiscal equalization, and providing minimum standards of service for all people. The political science literature presents functional arguments for its actual occurrence, including political power dynamics and institutional arrangements. I believe that a combination of factors explains the pattern of federal surface transportation expenditures, but that the functional explanations offered by the political science literature are more relevant than the theoretical rationales offered by the public finance literature. These factors include the importance of program history, institutional structures, and the actions of politicians and interest groups. The analyses contained in the dissertation will focus on each of these factors. I believe the history of the surface transportation is particularly important and will thus explore it in great detail in the next three chapters. The expenditure patterns are the result of a formula apportionment process that has evolved slowly over time. And I contend that to understand the present system, we must look into the past.

My overall investigation is a two-pronged approach that encompasses both a historical investigation of the political debates and legislation that have produced the rules governing the apportionment of federal surface transportation dollars and a quantitative analysis of the spatial patterns of these apportionment decisions in the 1990s and 2000. In Chapter 7 I present my own hypotheses, which are informed both by the literature and my own historical research, regarding the resource distribution patterns and will attempt to test them, quantitatively, in Chapters 8 through 10.

At this stage I will offer a few notes about the historical investigation that occurs in the next three chapters. First, I argue that key policy decisions were made early in the history of the program. Second, the formula apportionment process is itself structured to make change difficult. Third, the beneficiaries of the current (and past) system have long controlled the key (institutional and political) levers of policy change. The net result is that when political negotiation produces a settlement it tends to outlive the conditions that necessitated its occurrence. Political and institutional inertia cements earlier settlements into place, and makes their replacement quite difficult. That is the theme of the next three chapters of the dissertation.

PART TWO: HISTORY OF THE TRANSPORTATION PROGRAM

HISTORICAL OVERVIEW

The federal surface transportation program is more than eighty years old. The modern federal highway program dates to 1916 (or even earlier, depending on one's definition). The federal transit program dates to 1961. The programs have changed considerably over the years. The federal highway program has grown from a relatively small rural post road assistance program into one that provides substantial financial assistance to an array of rural and urban streets and highways. The federal transit program has grown from a relatively small-scale capital grants program that disbursed aid to a handful of cities into one that provides capital and operating assistance to transit operators throughout the country.

As the programs have grown, the resources devoted to them have also grown. And as the program's goals have shifted, the mechanisms used to distribute resources among states (or other entities in some cases) have also evolved. But for all the programmatic changes that have occurred, especially over the last several decades, many aspects of the resource distribution system have been left unchanged. This is because the formulas that distribute most transportation resources to the states have been fairly stable entities. For example, minimum state apportionment rules, public land state bonuses, and even a state's rural miles of post roads have remained central features of the highway apportionment formulas decades after the original rationale for their inclusion ceased to be relevant. And only recently have highway system usage factors been added to the mix of apportionment factors. In the transit program, on the other hand, usage (measured in

terms of trips) is not a factor in the apportionment formulas. In general, political and institutional inertia has maintained past negotiated settlements well into the future.

The next three chapters recount the history of the federal surface transportation program, with an eye toward better understanding how the modern highway and transit programs came into being and how they have evolved over time. A particular focus of the investigation is learning how (and why) the mechanisms used to distribute federal dollars to the states came into being and how (and why) they have evolved over the years since. The story that unfolds is one of conflict and compromise, but only at specific moments in time. The story is also one of relative stability. The decision to rely on formula apportionment to distribute resources is a central reason for this stability—better still inertia—because it has been very hard to change the formulas.

I begin with a brief discussion of the literature on the history of the highway and transit programs. This brief discussion is included to highlight the differences between this research and other works on a program (particularly highways) that has been well covered, at least in terms of the number of books and articles written on the subject. I then move on to the historical discussion, which is contained in the following three chapters. This discussion places a particular emphasis on the key policy development periods: (1) creation of the federal highway program (1912 Post Office Appropriations Act, 1916 Federal Aid Road Act); (2) changes in highway program mission (1921 and 1944 Federal Aid Highway Acts); (3) creation of the highway trust fund (1956); (4) the advent of federal aid to transit (1961); (5) the era of modal conflict between highway and transit (1970s – 1982); and (6) the era of programmatic change (ISTEA and TEA-21).

Lessons from the historical analysis

There are a number of lessons from this historical investigation, one of which was noted above. First, once resource distribution mechanisms are created and rules attached, interest groups become entrenched, and they become very hard to change. Second, conflicts over these mechanisms are nothing new. Conflicts over how resources are distributed, including arguments about the balance between tax payments and federal aid (the donor state issue), are many decades old. Third, the formulas and other resource distribution mechanisms and rules are negotiated products of political compromise. Political considerations explain the distribution of transportation (and other) federal dollars and these considerations do not necessarily equate with goals of economic efficiency or equity. And, fourth, the rhetoric of policy change has also been stronger than the reality—because many old political compromises about the distribution of resources are retained after "revolutionary" policy changes occurred. This has certainly been true in the case of the changes surrounding ISTEA and TEA-21, where the continuation of most resource distribution mechanisms and rules, and the inclusion of hold-harmless provisions, have served to protect the interests of past program beneficiaries.

The historical investigation ends with a discussion of ISTEA and TEA-21, which recounts the history of their development and passage and highlights some of their key features that pertain to expenditure policy. This discussion serves as an important transition to the quantitative analysis about expenditures that occurs in Chapters 8 through 10. This section closes with the question: how much has really changed in the

wake of these two recent laws' passage? The analysis in the later chapters will then help to answer this question.

A brief note on the historical literature

A number of books and articles have been written on the history of the federal transportation program, so why bother looking at it again? Haven't we learned everything there is to know about the subject? Actually, much remains to be explored. This is particularly the case concerning the resource distribution mechanism rules, formula apportionment factors, and the like. There has been relatively little written on where these rules and factors have come from and how they have evolved, despite their enormous importance.

Most of the transportation policy history literature focuses on the federal highway program, particularly the interstate program, and its effects on American cities, culture, and everyday life. One recent example of highway program history is by Lewis (1999). He takes a fairly evenhanded tone in what is a well-written, popular account of the federal highway program's effects on American life. Also in the more popular vein, many authors have written polemical accounts of the interstate program's effects on America's cities. These accounts, many of which date to the era of urban crises and freeway revolts, include books by Kelley (1971), Leavitt (1970), and Mowbray (1969). They attribute many of America's urban ills to the federal highway program.

A number of authors have written about the roles of different participant groups in the history of highway policy. In the scholarly literature, Seely (1987) has written about the role of the engineers of the Bureau of Public Roads in shaping many of the central

features of federal policy by virtue of their self-appointed status as apolitical experts. Authors have also written about key individuals or events and their importance for the evolution of highway policy. Davies (2002) presents a popular account of the incidental role of a 1919 transcontinental military convoy in the later development of the interstate program. This trip has achieved legendary status in the highway community because the so-called "father of the interstates," Dwight Eisenhower, took part.

The works cited above deal with highway policy (or its effects) more broadly. There are also a smaller number of scholarly works on highway finance, including two that are worthy of note in reference to this research. Rose (1990) focuses on the key events leading up to and surrounding the creation of the highway trust fund in 1956. Rose's focus is largely on who bore the cost of the program, a critical issue to be sure, rather than on how the aid dollars were subsequently distributed. Gifford (1983) discusses the history of the federal highway program leading up to, but not including, the 1956 legislation. His work focuses largely on the state-federal partnership and federal influence on highway design, but he also briefly discusses the formula apportionment processes enacted in 1916 and 1921. This discussion provides a useful secondary source interpretation for the primary source discussion contained in this chapter.

All of these works have been on highway policy. There is a relative scarcity of good works on public transit policy and finance, perhaps because writers find it less interesting. But one good book-length overview of the history of public transit in the US, including the formulation of early federal transit policy, is Jones (1985). There is clearly room for more research on transit policy history.

The historical investigation contained here complements, as opposed to duplicates, the work produced by other scholars in the field because its focus is different from those of the other works. It also covers both highways and transit, whereas most other works have considered the two modes in isolation. As noted above, the particular focus of the historical research is the emergence of resource distribution processes and rules within the larger policy debates of the time. Of course, given the time and space constraints involved with this exercise, the portrait that emerges below is only a sketch as opposed to a finely detailed painting. Nevertheless, I hope this work allows a more detailed picture of the federal program will emerge.

Throughout the historical investigation, I focus on the actions of key political figures and interest groups, the roles of institutional structures in the formulation of politically negotiated policy compromises, and the importance of past settlements in charting later policy developments. The key theme of the research is one of policy stability, or perhaps, political/institutional inertia. I return to these issues in the quantitative analysis contained in part three of the dissertation.

CHAPTER FOUR. EARLY HISTORY (1893 – 1955)

This chapter examines the origins of the federal surface transportation program, from the creation of the Office of Road Inquiry (forerunner to today's Federal Highway Administration) to the years immediately preceding passage of the 1956 highway legislation and creation of the Highway Trust Fund (HTF). A number of key policy decisions were made during this era, including the decision to rely on formula apportionment to distribute federal dollars to the states. Political conflicts and administrative concerns of this era produced a number of resource distribution compromises, including minimum state apportionment rules, federal cost match shares, and public land state bonuses. These mechanisms were developed in response to very specific problems of this era. They have since become pillars of the highway program, with significant policy consequences.

Program origins

Public involvement in transportation finance in the United States dates to colonial times (Burch 1962). Colonial governments provided modest financial support for the construction and maintenance of major highways such as the Old York Road between Philadelphia and New York. After the Revolution, states provided financial assistance for the construction of turnpikes. The federal government also provided modest financial assistance for major road projects, most famously in the case of the National Pike, or Cumberland Road, across the Appalachian Mountains (Agg and Brindley 1927).

Early federal involvement in transportation was modest, and it was very controversial. Proponents of federal involvement cited the economic benefits resulting

from building better roads, while opponents voiced their concerns about the unchecked powers of a growing central government (Agg and Brindley 1927, Holt 1923). The controversy reflected sectional tensions surrounding the issue of states' rights vis-à-vis the national governments. States' rights supporters stressed the absence of constitutional authority for federal involvement in internal improvements, and Presidents Monroe and Jackson vetoed a number of road improvement bills on constitutional grounds. One of the most famous of these vetoes is Jackson's veto of the Maysville Road Bill (Fuller 1955). By the 1830s, the federal government had retreated from its earlier involvement in road building, and so, ironically, had the states.

An interest in better roads gave way to interests in canals and then railroads. States took part in the construction of major canal facilities like the Erie Canal. State and local governments provided financial assistance for railroad development. By the middle of the century, a few members of congress (and many interest groups) began talking about federal assistance in the development of a transcontinental railroad. During the Civil War (after secession had removed the most vocal opponents of central power from congress), a railroad bill was passed and signed by President Lincoln (Bain 1999). The federal government provided loan guarantees, direct financial subsidies, and millions of acres of the public domain to the railroad companies. The nation's railroad system blossomed and soon became the envy of the world. By contrast, the roads connecting the hinterlands to the railheads were relatively neglected. These "ruts in the mud" were the subjects of frequent public complaint, and the envy of practically no one (Holt 1923).

The good roads movement

By the late 19th century, many of America's roads were in bad shape, especially those in rural areas, but transportation conditions had begun to improve in urban areas, particularly in the largest cities. Cities had implemented property taxes to fund the improvement of roads and streets, and their physical condition improved considerably (Paxson 1946, Public Roads Administration 1949). Some cities began to construct more durable brick and cobblestone roads as replacements for dirt or macadam roads. These public efforts on behalf of better urban transportation were echoed by the work of profit-minded transportation entrepreneurs. By the end of the century, most cities had extensive privately owned transportation systems, including horsecars, streetcars, and, in a few places, subways and elevated railroads (Bottles 1987). Urban transportation conditions were far from perfect, and there were frequent complaints about overcrowding and poor quality service, but conditions were better than they had been. Few observers believed urban conditions were bad enough that state or even national involvement was necessary to improve the situation. Urban transportation was seen to be a local issue, and the local governments (and entrepreneurs) were perceived to be dealing adequately with the problems they encountered (Agg and Brindley 1927).

But in rural America, the roads remained in a sorry state (Burch 1962, Fuller 1955). The farmers were often literally stuck in the mud. Road conditions were poor, and the money and expertise required to improve them were sorely lacking. Decades of neglect were coming home to roost, and many people began to complain that state financial assistance, and perhaps federal aid as well, was required to improve conditions.

Farmers were chief among those doing the complaining, but railroad interests and bicycling enthusiasts soon joined them. These diverse groups came together under the banner of the so-called good roads movement.

These diverse groups raised the banner of building better roads for very different reasons (Fuller 1955). The farmers wanted better roads to bring their products to market. Railroad interests wanted better roads to connect the farmers in the hinterlands with their railheads (Bramlett 1982). The largely urban bicyclists wanted better roads in the countryside on which to ride their bicycles.[54] These diverse groups formed an alliance through organizations like the National Good Roads Association and took their case to the public and to state legislators and other officials throughout the country (Public Roads Administration 1949). Members wrote articles for the popular press in which the economic and social benefits of building better roads were raised (Burnham 1961, Burch 1962, Fuller 1955).

Among these purported benefits was the ability to end rural isolation and put a stop to the population exodus from America's farms to its crowded cities (Public Roads Administration 1949). The need to end rural isolation was a central factor in the creation of rural free delivery (RFD) mail service in 1896, an event that would have tremendous importance in the development of the federal highway program (Fuller 1955). RFD service required better roads for the delivery of the mails. RFD letter and parcel carriers

[54] The 1880s and 1890s was the era of a tremendous recreational bicycling craze, and bicyclists and bicycle manufacturers were among the most vocal proponents of state and federal aid. The head of the League of American Wheelman, the bicycling association, later became the head of the agency forerunner of today's Federal Highway Administration.

became good road advocates, and so did the rural customers who were afraid of such service being canceled in their area because of poor roads. The creation of RFD service was to be an essential step on the path toward creation of the federal highway program.

In the meantime, state and even national good road conventions quickly appeared, and so did the first victories in the good roads campaign. In 1891, New Jersey began a program of state highway aid, and a number of other states soon followed (Public Roads Administration 1949). Shortly thereafter a number of states created state highway commissions or departments, although many of these early agencies functioned largely in an advisory capacity to the local and county governments that carried out the actual work.

While victories were achieved at the state level, the campaign for federal aid continued. And here the supporters of a federal effort proceeded very slowly so as not to upset states' rights supporters or anyone else fearful of increased federal government power. In 1893, good road advocates in congress persuaded their colleagues to provide $10,000 for the creation of an Office of Road Inquiry within the Department of Agriculture (Holt 1923). The office was placed within the Agriculture Department because its primary purpose was to provide information to states seeking to construct better rural and farm-to-market roads (Public Roads Administration 1949). Its first chief, General Roy Stone, was connected to the bicycle industry and had long been active in good roads circles. By 1896, the office had begun its object lesson roads program as a means of demonstrating the techniques of better road construction and preaching the economic and social benefits of better roads to local and state officials (Seely 1987). The popularity of these efforts led to larger agency budgets as the new century began.

The long campaign for federal aid

The advent of state financial assistance, creation of the Office of Road Inquiry, and debut of RFD mail service were key steps in the path to federal aid, and their enormous popularity with the public paved the way for more far-reaching aid proposals to emerge in congress. All of these proposals focused on rural highway aid, because the road problem was believed to be most severe in rural areas that lacked the resources to fix the roads—and because urban areas were believed to have the necessary resources to address their own needs (Brown 1998, Fuller 1955).

A number of very general proposals appeared right around the turn of the century, and they all died in committee. One of the earliest serious proposals for federal aid was Tennessee Representative Brownlow's 1902 proposal to create a permanent Bureau of Public Roads as a replacement for the Office of Road Inquiry (ORI). Apparently crafted with significant input by ORI officials (ORI was supposed to steer clear of any political involvement), the Brownlow plan called for a $20 million a year federal rural highway assistance program (Fuller 1955). The federal government would prepare road and highways plans, and provide half the cost of road construction, while states or counties would match the federal contribution, and administer and maintain the roads. These cost sharing and partnership arrangements would reappear in subsequent proposals as well.

Brownlow and his allies stressed the partnership aspect of the program as a means of dealing with the concerns of states' rights supporters—but the proposal still ran into intense opposition. States' rights supporters continued to cite constitutional concerns about federal involvement on such a large scale, while fiscal conservatives raised serious

questions about the proposed level of expenditure and the means to pay for the program (Fuller 1955, Public Roads Administration 1949). The proposal died because of the lack of public support that might have been able to overcome these arguments. Despite the increasing popularity of the ORI's efforts and of state highway aid, the time was not right for a federal program—at least not in 1902.

Constitutional concerns, and associated states' rights arguments, were cited by those most opposed to federal aid (Mertz 19??). Some proponents began to argue that federal aid might fall under the federal government's constitutional duties under the commerce clause, but this basis for federal policy intervention had not yet been adequately tested. The critical Supreme Court case about use of the commerce clause, Wilson v. Shaw, would not be heard until 1907. But other federal aid supporters began to think more strategically. Taking their cues from the RFD program, they began to develop smaller scale aid proposals meant to fit neatly under this established area of constitutional law, the federal government's responsibilities for delivery of the mails. This decision had enormous implications.

As the first decade of the new century wore on, and as the constitutional questions continued to be debated, federal aid proposals continued to surface intermittently. For example, in 1904, and again in the 1905-1906 session, the Senate Committee on Agriculture and Forestry, the committee that oversaw the Office of Road Inquiry in the Department of Agriculture, considered a number of modest federal aid proposals—although few of these cleared the committee (Burch 1962, Fuller 1955). Instead, it took

tremendous outside pressure to produce serious congressional action—and the arrival of the automobile provided that pressure.

The birth and infancy of federal aid

In the first decade of the new century, the automobile ceased to be the provenance of the wealthy few and became affordable to the masses. The masses responded by purchasing automobiles, first by the hundreds of thousands and then by the millions (Brown 1998). Millions of automobiles placed new demands on the roads—demands that states and local governments had a hard time meeting. Automobile owners grew frustrated because the bad conditions of roads, particularly outside of cities, prevented them from fully exploiting the transportation advantages (mainly speed) of their driving machines (Paxson 1946). They formed associations like the American Automobile Association (AAA) to lobby on their behalf. These groups quickly became leading members of the good roads coalition.

The pressure for action mounted, and prominent politicians entered the fray. One of these, New Jersey Governor Wilson, made good roads a part of his campaign for the presidency. In an address before the 1912 National Good Roads Conventions in Atlantic City, Governor Wilson endorsed direct federal involvement in highway finance and urged immediate congressional action to this effect (Paxson 1946). He was joined on the podium of this and other conventions by a host of other politician advocates.

Congress took note, and during the 1911-1912 session more than sixty bills proposing direct federal aid for rural highways were introduced (Holt 1923, Fuller

1955).[55] This session proved to be the time when federal highway aid, albeit on a very limited scale, finally became possible. Despite recent Supreme Court support for commerce clause arguments to justify federal programs, proponents of federal aid still chose to move cautiously so as not to antagonize the many powerful politicians and interest groups that were opposed to greater federal power. Thus, they crafted their aid proposals as efforts to provide modest federal financial assistance for the construction and maintenance of roads used to deliver the mail (Fuller 1955).

The Shackleford bill

One of the leading longtime advocates of federal aid was Missouri Representative Shackleford. He had developed a number of federal aid proposals in the past, and returned yet again in 1912. His bill prompted a serious discussion of federal aid, and eventually paved the way for passage of the first highway aid bill. Shackleford proposed a somewhat complicated plan whereby the federal government would pay states and counties for the rental of roads used for rural free delivery service (Mertz 19??). The local governments would use the rental payments to improve and maintain the roads. Shackleford proposed an annual federal rental expenditure of $25 million, apportioned on a strict mileage basis (Fuller 1955).

Shackleford's rental plan for post roads proposal appeared to address the concerns of both the constitutionally skeptical (mail delivery focus) and states' rights supporters (federal dollars but power still in the hands of states). It easily passed the House of

[55] As noted earlier, urban highways were seen as a local matter, and urban local governments then appeared to have the financial resources they needed to build and maintain roads.

Representatives by a lopsided, bipartisan 240 to 86 vote (Fuller 1955). But it ran into serious opposition in the Senate where, to garner the support of the predominantly rural membership, the measure's ability to aid in the development of farm to market roads, over which RFD service could then be carried, was emphasized.

Fiscal conservatives took exception to the magnitude of the proposed expenditure. The AAA were opposed to the "wasting" of the public's money on little traveled roads, because its members favored the development of a national trunk highway system (New York Times 1913a). States' rights advocates remained skeptical of the entire prospect, but knew that the public demanded that something had to be done soon about the roads. It just wouldn't be the Shackleford proposal. The Shackleford bill died in the Senate, as would a number of other House-endorsed federal aid proposals over the next few years.

The Post Office Appropriations Act of 1912

Federal aid supporters serving on the committees charged with overseeing the Post Office Department responded with a smaller proposal, and their plan was quickly endorsed by their colleagues on the committees that oversaw the Agriculture Department (in which was housed the former ORI that was soon to become the Bureau of Public Roads (BPR)). As part of the post office appropriations bill, congress provided $500,000 in federal aid for the construction of rural post roads. The states would designate the routes, and the Post Office and Agriculture Departments would jointly approve the route selections and disperse the funds (Holt 1923, Mertz 19??). And in this way the federal highway program was born.

Under the 1912 act, rural post roads were defined to include any public road over which the US mail was now or might in the future be transported, excluding roads in places with a population greater than 2,500 persons (1912 Post Office Appropriations Act). An exception was made for areas with larger populations where the houses were more than 200 feet apart, so as to make New England towns eligible for inclusion (Agg and Brindley 1927). The result was that roads of all sorts could become eligible for federal aid, as was intended by the bill's proponents. They settled for a small program, but wanted it to become a large one. But the financial commitment was quite small, and so was the federal government's relative role. Only $500,000 of grant funds would be distributed—on a first come, first-served basis. States were required to match $2 for every $1 in federal grants (Public Roads Administration 1949). Thus, the matching grant aspect of federal aid was present at its inception. The federal government would help the states but would not pay most (or even half) the cost of any particular project. These features were retained, and the federal shares increased, as the program grew in both size and scope in the subsequent decades.

The law marked a very tentative first step toward a possibly larger involvement in the future, and its supporters counted on this fact (Fuller 1955, US Congress 1913). The leading advocates of the bill had pressed for creation of a special congressional committee to chart the future of federal highway policy, and a ten-member joint committee was duly created under the leadership of Senator Bourne (US Congress 1913).

Senator Bourne's aid proposal

The joint committee, which became known as the Bourne committee in honor of its chair, was given one year to study federal highway aid and report back to congress with its recommendations. The members duly interviewed a host of local and state officials around the country, spoke with staff at the Bureau of Public Roads, and interviewed members of leading interest groups. It went back to congress with a final report that was far from the last word on these still-contentious issues.

The final committee report strongly endorsed the principle of federal aid for rural postal roads, but did not endorse any specific program (US Congress 1913). The committee members disagreed about the wisdom of expanding the federal program beyond the initial pilot effort. Some wanted to maintain the current program focus on rural post roads while others endorsed the trunk highway proposal favored by the AAA. And they also disagreed about the size of the federal program. As a group, committee members also seemed fearful of developing a proposal that would then come under serious attack from opponents on one side or the other of the policy debate.

But they did agree on some things. They wanted a federal program to be a partnership of equals between the states and the federal government; they were afraid of concentrating too much power in Washington (US Congress 1913). And, the committee agreed that a federal program was justified by the constitution, although their choice of language demonstrates that they were hedging their bets somewhat. "It is generally conceded that the Federal Government, under the post roads and commerce clauses of the

Constitution, unquestionably has the right to make appropriations for or otherwise aid in the construction and maintenance of good roads" (US Congress 1913: 3).

While the Bourne committee failed to develop a specific long-term proposal for federal aid, the idea of creating a permanent federal highway program did not go away. In the years immediately afterward, many members of congress developed their own federal aid plans, and some of them passed the House of Representatives—only to die in the somewhat chilly air of the US Senate (Public Roads Administration 1949). The Senate was quite skeptical about the notion of increased aid, and was particularly opposed to the population and road miles oriented formulas most of these House proposals used to distribute federal aid funds (Congressional Record 1916). The interest groups were also busy. The AAA developed a preliminary scheme for a national trunk highway program that was long on rhetoric about the benefits of highways but rather short on program specifics (New York Times 1915). Most of these proposals were inspired by public and policymaker dissatisfaction with the practical experience of federal aid under the 1912 Post Office act, as will be discussed below.

The Bourne committee had failed to develop a meaningful aid proposal, but Senator Bourne himself unveiled a rather elaborate one.[56] He publicized his plan to good road advocates and the public at large in newspapers like the *New York Times* in the late spring 1913 (New York Times 1913b). His newspaper articles began by enunciating what

[56] Bourne preached the gospel of good roads with great fervor. In the preface to his own committee's report, he had written that "Outside of a few great fundamentals of government, I deem Federal aid to good roads the greatest, and certainly the most important, economic question now before the American people" (US Congress 1913: 3).

he, and most members of his joint congressional committee, took to be the key principles of any successful federal highway aid program (New York Times 1913b).

First, the program must be a cooperative one between states and federal government, with each having an equal weight in program decisions. Second, the federal government should bear half the program cost, so as to encourage (rather than compel) state participation. Both principles were meant to reassure nervous opponents of increased federal power.

Third, the plan should focus on long-term planning as opposed to short-term needs. Fourth, the plan should provide for maintenance assistance as well as new construction. Fifth, there must be an "equitable" apportionment of funds among the states. Equity concerns were indeed appearing in the post road assistance program. And, sixth, the plan must be structured so as to encourage the most "intelligent and honest" expenditures of funds. Expenditure decisions should be based on genuine need, as opposed to purely political concerns. Many of these principles have become hallmarks of the current surface transportation program.

The actual Bourne plan called for the sale of $1 billion in federal highway bonds over a period of approximately 30 years (New York Times 1913b). The states would then match by putting up their own bonds, in a rather complicated scheme to take advantage of the federal government's better credit rating and stronger borrowing power. The aid money would be apportioned by formula. Formula apportionment would provide predictability and stability of funding levels over the long term and would remove everyday "political" influence from resource distribution decisions.

Bourne chose four equal weight factors for his formula: land area, population, assessed valuation, and the mileage of roads. He had discussed the reasons he believed these factors were important in the preamble to the joint committee's own report.

> To my mind, area should be a factor because of the greater necessity for more or better roads in the newer or larger States; population a factor because whatever direct contribution is made by the people through the Federal Government is a tax on all the people; assessed valuation of the property in each State a factor because of the utilization of the Federal credit through the Government becoming practically an endorser for the States under my suggested plan, and because the taxable property of the State must bear a large proportion of the State's expenditure for road improvement, hence the property of the States should receive recognition in accordance with the liability assumed; and mileage of roads already in use a factor as a recognition of industry and efficiency of those States that have already constructed roads at their own expense (US Congress 1913: 11).

A National Highway Commission would oversee the program, and states would administer it through their own professional, "non-political" state highway departments. In an early example of what later became known as "printout politics," Bourne developed a series of tables and graphs to illustrate how each state would benefit under his scheme (New York Times 1913b, US Congress 1913).

Bourne's proposal eventually foundered, and the cause of federal aid soon found new champions, but other proposal crafters adopted several of his plan's key features. Chief among these was its use of formulas to apportion funds and its requirements that the program administration be placed in the hands of highway professionals rather than at the "mercy" of politicians. Both ideas appeared in most of the aid proposals that emerged between 1914 and 1916 (Public Roads Administration 1949).

The Senate versus the House in the struggle to make federal aid more permanent

During the 1910s, many federal aid proposals appeared to be on the verge of passage—only to founder at the last minute in one house or the other.[57] The majority of aid proposals easily cleared the House of Representatives, only to be killed by the US Senate (Metzer 19??).[58] The House proposals often relied on road mileage and population as key factors in their apportionment schemes, and the small population state members of the Senate (the vast majority of senators) resisted inclusion of these factors because their states would not fare well under such proposals (Congressional Record 1916, Weingroff 1996a). These were the first of many occasions to come when institutional differences in terms of apportionment of members in the two houses were to have a significant effect on the development of the nation's transportation policy.

Many proposals that emerged between 1913 and 1916 were prompted by dissatisfaction with the post road program. Only sixteen states had taken advantage of the federal aid grants, and a total of 464 miles of post routes were constructed with program

[57] All of the proposals contemplated federal aid for rural roads. Urban roads were the problem of the cities, not state or federal governments, or so went the argument. Rural road supporters went to great lengths to insist that urbanites would benefit from better rural roads because of the reduced cost for getting agricultural products to urban markets (US Congress 1913). They interpreted the lack of protest from urban representatives, or their constituents, as implying their consent to the rural focus of the proposals. Many people went so far as to claim that urban dwellers favored rural road aid, although they did not cite specific survey data to support their claims (New York Times 1915). Some urban members of Congress were in fact concerned about plans to exclude urban road aid, as emerged in the debates leading to passage of the 1916 Federal Aid Road Act.

[58] The policy initiative appeared to lie in the House, as few serious proposals originated from the Senate during this time.

funds (Holt 1923, Public Roads Administration 1949). This result was far less than had been anticipated by the program's proponents.

Most states were not happy with the structure of the post road program, and part of this dissatisfaction was the result of the very different views that states, counties, and the federal government had in terms of the true (as opposed to written) purpose of the aid program. State officials hoped to use federal dollars to build state highway systems (networks of high quality roads throughout their states), county officials had their own narrower road-building interests, and federal bureaucrats were focused specifically on the stated mission, addressing the mail delivery problem (Fuller 1955, Holt 1923). Each group had a very different vision of the program, and thus few were happy with its rather limited results.

State officials were particularly angry over the Department of Agriculture's narrow definition of eligible post road routes, because the rigid definition severely limited the amount of eligible mileage (Holt 1923). They demanded the right to determine project locations and the type of construction themselves, rather than working under the direction of federal officials. They also criticized the fact that awards amounts were highly variable. There appeared to be little rhyme or reason to the outcome of the awards process. Many officials advocated a switch to more predictable formula-based apportionment schemes, whereby aid amounts would not be subject to the bureaucratic whims of officials in the Department of Agriculture.

Outside the bureaucracy and the halls of congress, a number of powerful interest groups were dissatisfied with the federal aid program. The AAA and other automobile

interests were upset that federal aid dollars were being "squandered" on low priority road projects that did not form the core of connected systems of major highways (New York Times 1915, New York Times 1916). During the 1910s, the AAA launched a multi-year campaign preaching the benefits of using federal aid to develop a national trunk highway network. It also made the voices of its members felt in congress where the group allied with key figures like Representative Shackleford, encountered earlier, who was now a leading figure on the committee that oversaw the federal aid program. By 1916, efforts were underway to overhaul the federal aid program, to expand it and to make the federal commitment a permanent one. But serious obstacles had to be overcome.

The early years of federal aid: 1916 to 1929

After a series of federal aid proposal failures, and because of serious dissatisfaction with the post road program, congress created the modern federal highway program in 1916. In doing so, proponents had to address the concerns of some skeptics about the program's scope, and had to reassure their small (population) state colleagues that their own highway needs would not be neglected. The resulting legislation thus reflected a number of compromises meant to address these very real concerns and to broaden the program's appeal to the broadest possible constituency. Many of these arrangements have since become central pillars of federal policy.

The Shackleford bill of 1916

During the 1910s federal aid proposals sailed through the House of Representatives only to die in the hostile atmosphere of the Senate. But the House refused to give up. Instead, House members began tinkering with their proposals to

address some of the senators' complaints. One of these men was Representative Shackleford, the man behind the failed 1912 bill. By 1916 Shackleford was a leading figure in the House, and an occasional ally of the AAA and other motoring groups.[59] He was also one of the most visible members of congress when it came to the highway issue. He was busy drafting legislation in the years since 1912, including in 1916.

The AAA and allied groups viewed the proposals that began to emerge in congress in 1916 with some skepticism, because it appeared that the enlarged federal effort would be directed to those same wasteful post road projects as before. But safe in the knowledge that state highway and Bureau of Public Roads officials were more interested in building highway systems than isolated post roads, and thus could be counted on to shift the construction focus to more important roads, AAA decided not oppose any of the aid bills that began to emerge (Mertz 19??, Weingroff 1996a).

One of those bills was Shackleford's proposal. His bill called for $25 million of federal highway aid, spread over a period of anywhere from three to five years (Congressional Record 1916). This marked a significant increase over the $500,000 post road program, but was actually quite conservative when compared with some competing, albeit less serious, proposals calling for about $100 million in federal aid over the same time period. The program itself would remain a rural highway program, and he explicitly stressed the many benefits of the bill for rural America (farm to market roads, an end to

[59] The AAA had spent the years since 1912 lobbying for its desired trunk road system, and, eyeing the alarming events in Europe, it hit upon a new argument to use in its efforts. It began claiming, certainly with some merit, that federal aid to trunk highways would serve defense needs (New York Times 1916). And thus the "highways for national defense" argument was born.

rural isolation), as opposed to emphasizing its purely post road components (Congressional Record 1916). Shackleford's bill stressed that the money be used to build post roads, but it loosened the definition of post roads so as to encourage states to spend their apportionment on their most important roads.

Federal aid money would be apportioned to the states using a formula that contained only two factors: total state population and rural post road miles. These factors were viewed, by policymakers of the time, as the best measures of highway need (Congressional Record 1916, Holt 1923). But Shackleford was better in tune with political realities than had some previous bill drafters. As a concession to small-state senators, and in hope of greasing the skid for the bill's passage in the Senate, he included a provision that each state would receive $65,000, prior to the apportionment using the other factors. This money would serve as a floor that would help small population states maintain viable state highway programs. As to the $65,000 figure itself, Shackleford admitted that it had been pulled out of thin air (Congressional Record 1916). And thus was the first serious minimum state apportionment proposal born. He also reduced the small town definition to 2,000 persons (from 2,500 under the 1912 act), but retained the housing density qualifications that guaranteed New England's towns (and its politically important Senators) would remain eligible for federal aid (Congressional Record 1916).

Despite Shackleford's best efforts, opponents materialized almost immediately—and from a wide array of positions. Rural members complained that if the program were really designed to help rural Americans the aid money should be allocated using rural population, as opposed to total population, as a formula factor (Congressional Record

1916). Other opponents complained that the bill left too much discretion to the politically appointed Secretary of Agriculture. In fact, the bill gave the Secretary the power to determine the federal cost share on aid projects because he would define a road as being low quality or high quality. The federal cost share would be 30 percent on low quality roads and 50 percent on high quality roads (Congressional Record 1916). No one trusted a political appointee, and particularly a presidential one, to make a judgment on the merits when serious dollars might be involved.

A few state delegations were also incensed that every state would be eligible for federal aid under the Shackleford bill (Congressional Record 1916). They wanted to include a maintenance of effort provision in the formulas, so as to reward states that were already building and maintaining their highways. To reward states that had neglected their highways was seen as being unfair to their consitutents (Congressional Record 1916). Rural versus urban tensions also emerged, albeit for a very short time. Urban members questioned the fairness of excluding their highways and streets from a program for which their consitutents would bear a large part of the cost. Rural members retorted that cities got federal aid in the form of federal buildings and post offices—and the Panama Canal! Now, it was rural America's time to benefit from federal largesse (Congressional Record 1916). Urban members backed off—and focused on other programs instead.

The Senate response and the Bankhead bill

Despite the controversies over particular components of the Shackleford bill, it appeared likely to pass the House of Representatives—only to die in the Senate as had so

many recent proposals. However, unlike the past, the Senate was prepared to accept a bill, provided the House compromised on certain key resource distribution items. The Senate even went so far as to craft a highway bill of its own, to provide cues about the need for compromises. The Senate had not previously developed a serious aid proposal.

Senator Bankhead of Alabama joined forces with the nascent American Association of State Highway Officials (AASHO), the lobbying face of the nation's state and federal highway officials, to produce the Senate's alternative to the House bill. The Bankhead bill called for $75 million over three years, a dramatic increase over Shackleford's proposal (Congressional Record 1916). The program would be an equal partnership between state and federal government, and each would share equally in its cost; there would be no sliding scale of matching shares.

The mechanism for distributing federal aid dollars was a key concern of the Senate, and Bankhead's formula took the needs of small population states into account. He dropped the $65,000 minimum apportionment provision that Shackleford endorsed, and instead developed a three-factor formula that included population, rural post miles, and state area, all of which were weighted equally (Congressional Record 1916).

When compared with the Shackleford alternative, the Bankhead formula pulled money from larger population states with intensively developed post road networks and gave the money to the less populated states with large land areas and less developed road networks. More states were winners under the Bankhead proposal than under the Shackleford proposal, and states were the important constituency in the Senate. The western states were the big winners under the Bankhead plan.

As the House and Senate prepared to face off, and with President Wilson eager to sign a federal aid bill of almost any sort, the forces allied to each side took their campaign to the public. Newspaper accounts of pork barrel waste began to appear, as did editorials raising the presumably settled constitutional concerns about federal highway aid (New York Times 1916). The AAA put its "highways for national defense" campaign into full gear. A long battle for the hearts and minds of the public appeared to be emerging, but suddenly the campaign was called off and a compromise arranged.

After years of failure because of Senate opposition, the House members were particularly eager to compromise. They were tired of having come so close before only to fail. Thus, they surrendered to the Senate's position on the apportionment formulas (Congressional Record 1916). They exchanged the $65,000 minimum apportionment for the inclusion of a state's land area as the third factor in a three-part formula, and thereby directed a larger share of the money to the states we now know as donee states.[60] Representative Sims of Tennessee duly drafted the compromise bill, although the resulting legislation bore the names of Bankhead and Shackleford rather than his own (Weingroff 1996a, Congressional Record 1916).

The Federal Aid Road Act of 1916

The compromise legislation was signed into law as the Federal Aid Road Act of 1916. As the supporters of federal aid had wanted, the new law substantially increased federal aid for highway construction and made that increased involvement permanent.

[60] Minimum apportionment would shortly reappear, at the behest of small population state senators (Congressional Record 1921).

The law provided $75 million over five years for the construction of rural post roads, a substantial increase over the $500,000 post road program (Federal Aid Road Act 1916). The emphasis on rural post roads was retained, so as not to run afoul of the constitutionally skeptical, but leading proponents saw the act leading to the creation of a highway system rather than a disconnected assortment of post roads. They encouraged the Secretary of Agriculture to keep this in mind should any project selection controversies emerge (Federal Aid Road Act 1916).

The cost of the projects would be shared equally between the federal government and the states, reflecting the idea that this program represented a partnership of equals. The money would be channeled through state highway departments, which were required to possess certain powers so as to insulate the program from the political problems that had long plagued most infrastructure and public works programs (Federal Aid Road Act 1916). And it would remain a rural program. The increased money and higher federal cost share helped to stimulate a flurry of new highway construction (including maintenance)—in rural areas. Urban areas were left to fend for themselves.

One of the most durable achievements of the 1916 act was the shift to formula apportionment. Formulas dominate the federal program to this day, and the specific formula adopted in 1916 proved to be an especially durable one. The 1916 formula weighed land area, population, and miles of rural post roads equally in the determination

of a state's apportionment.[61] Key elements of this compromise formula, crafted in 1916 to meet a particular set of political concerns, remained part of the highway program for more than 80 years. It endured long after the federal program lost its original purpose of improving post roads, and even as critics began to raise their voices about the need for change.[62] Yet the formula remained. The story of the federal program since then could be read as an ongoing effort to tinker with the formula negotiated in 1916.

The results of the 1916 act and the opinions of critics

The 1916 Federal Aid Road Act was expected to unleash a new wave of highway construction across the country. Its $75 million authorization represented a dramatic increase in federal aid. Its formula funding mechanisms meant that state highway officials knew how much money they could expect to receive each year. Its five-year duration meant that federal aid was ongoing, with every likelihood of renewal when the five years came up. The political conflicts (and states' rights concerns) that had delayed passage of the federal aid law began to recede. Federal aid became quite popular—and why not? States received tremendous benefit from highway projects for which the federal government was willing to pay half the construction cost.

But several events conspired to minimize its effect. First, the ink on the president's signature had barely dried before the US entered the conflict in Europe. The

[61] Population and miles of rural post road were viewed as proxies for current highway needs (system use and extent) while land area was viewed by some formula proponents as a fair measure of likely future needs (i.e. growth) which must be anticipated (Holt 1923).

[62] Criticism of the inclusion of rural post miles in the formula began in the 1920s, as the program focused more on constructing systems of highways for vehicle travel rather than miles of good roads over which to deliver RFD mail service (Agg and Brindley 1927).

wave of hoped-for road projects never materialized (Public Roads Administration 1949). Road projects were assigned a low priority when it came to materials rationing during hostilities, and very few projects were completed before the war ended. Because material and labor shortages remained a problem for the first year following the end of the war, it took time for the program to pick up steam (Public Roads Administration 1949).

Second, state and federal highway officials quickly realized that $75 million over five years would not come close to meeting the nation's highway needs, however they were defined. Much more money was needed to make real progress. Congress responded to these concerns by authorizing an additional $200 million in highway aid in 1919, to be expended through fiscal year 1921 (Post Office Appropriations Act of 1919).

Third, state officials complained about the federal aid limitation of $10,000 per mile, a figure that did not come close to covering half (the federal share) the costs of the modern durable road construction techniques required for high-speed automobile travel. Congress responded to these concerns by doubling the aid limit to $20,000 per mile (Post Office Appropriations Act of 1919).

And, finally, there was general dissatisfaction with the purported mission of the federal program. The 1912 and 1916 legislation had both called for aid for the improvement and construction of rural post roads, any road over which the US mail was carried. The 1916 act winked at the definition of post roads, so as to make more roads eligible, but the post road orientation remained. Not surprisingly, the result of this policy was piecemeal improvement of individual road segments. But a growing number of state and federal highway officials, interest group representatives, and politicians thought the

federal program should promote the development of an interconnected system of highways (Mertz 19??, Congressional Record 1921). This was an entirely different goal than had originally been intended, and implied a much larger federal role.

Congress met a few of these demands halfway when it further loosened the definition of post roads—so as to make many more miles of major highways eligible for federal aid (Post Office Appropriations Act of 1919). At the same time, it did not mandate that such road projects lead to the creation of a highway system as such, so the criticisms of the program were merely muted for a short time before they resurfaced with renewed vigor. Congress hesitated in making such a change, perhaps because of a combination of fiscal and constitutional concerns, although the exact reasons are not entirely clear from the congressional debates (Congressional Record 1919).

The Townshend highway commission plan and its critics

The changes enacted in 1919 brought a few changes to the federal aid program, but most critics remained dissatisfied. One of these critics was Senator Townshend, the man who had supplanted Senator Bankhead as the leading proponent of an expanded federal aid program.

Townshend and his allies were especially critical of the way the state highway agencies were conducting themselves. The 1916 act had required states to create professional highway departments as one of the prerequisites of receiving federal aid, as a way of guaranteeing that engineering and transportation concerns would rule the day over political ones when spending decisions were made (Congressional Record 1916, Federal Aid Road Act 1916). But many state agencies, particularly those in the southern states,

were regularly faulted with failing to meet the spirit of the law (Holt 1923). Critics claimed that they were just as badly run, and just as prone to making politically motivated project decisions, as had been the discredited county road agencies of the time. Townshend believed that the solution to this and many other problems was more direct federal control, which would be exercised by a newly created National Highway Commission (Congressional Record 1920, Weingroff 1996b).

Many people agreed with these criticisms of the program, and a number of politicians and interest group representatives, including AAA, rallied around Townshend's call for a National Highway Commission (Congressional Record 1920).[63] However, the state highway officials, as represented by the American Association of State Highway Officials (AASHO), and the officials in the Bureau of Public Roads (BPR), now under the leadership of Thomas Mac Donald, were opposed to the Townshend plan (Seely 1987).[64] They feared that it would take months of political negotiation to get such a proposal through a congress that was still skeptical about increasing federal power vis-à-vis the states. And even if it ultimately passed, they feared that it would then take years for the commission to get established so that it could start making federal aid decisions. In the meantime, regular federal aid payments to the states

[63] The AAA was led into the National Highway Commission plan camp because the Townshend forces were strongly behind the idea of concentrating federal aid on the nation's major highways, an idea that AAA had been pushing since the early 1910s (Congressional Record 1920).

[64] The commission was also a threat to the BPR's and state highway agencies' own roles as the overseers of the program, as Seely (1987) notes.

might be delayed or canceled altogether, and construction would suffer. This dreadful prospect won the plan's critics support in many state capitals.

The critics won wavering members to their banner by emphasizing the prospect for mischief by the appointed members of the commission (Holt 1923, Public Roads Administration 1949). Presidents would appoint their political cronies to the commission, or so the critics charged, and these political appointees would then dictate everything to the states. Federal dictatorship in the highway arena would replace the federal-state partnership. Southern members, whose state highway agencies had come under especially harsh criticism, were particularly fearful of this prospect (Congressional Record 1920).

A combination of states' rights pressures, fears about the loss or delay of federal aid dollars, ingrained biases against political appointees, and concerns over trading a known but flawed program for unknown circumstances helped to defeat the Townshend proposal (Congressional Record 1920, Congressional Record 1921, Weingroff 1996b).[65] Instead of pursuing his doomed commission proposal, Townshend joined other members of congress in negotiating an extension and modification of the 1916 act, and thereby to deal with many of the complaints raised by critics of the program.

The federal aid highway act of 1921

In contrast to the vigorous political debate over the 1916 legislation, passions were relatively cool when the time came to extend the federal aid program. Most people, it seems, had used the fight over the Townshend commission plan as the opportunity to

[65] The AASHO and BPR later claimed a great deal of credit for the proposal's ultimate defeat, and their roles were certainly important because it presented the highway community as a unified front on the issue—but they might be overreaching a little (Holt 1923).

air their grievances. And there were many points of agreement around which people could rally. Most policymakers and interest group representatives agreed that the goal of the federal aid program should be the creation of a system of highways rather than a collection of post roads. And the lure of additional federal aid dollars made even skeptics of federal power more generally fans of the federal highway program, provided states retained significant power of their own. Most people were also comfortable with the decision to rely on formula apportionment to distribute federal dollars.

But formula change, at least around the margins, was certainly in the air. Small state senators had heard the complaints of their state highway officials that their federal aid apportionment was not sufficient to enable them to maintain effective long-term programs (Congressional Record 1921). The amounts were below the sums that were required, and officials sought a guaranteed minimum level of funding to meet basic ongoing program needs. Senators from western states with large federal land holdings had also heard concerns that their states would not be able to raise the state revenues needed to match federal aid under an expanded program (Congressional Record 1921). States then financed their highway programs primarily from the property tax, and public lands were exempt from property taxation. Officials from these "public land" states wanted additional help meeting their state's share of program costs. The other senators and House members viewed these concerns as quite reasonable and sought to address them. The strategies they adopted to deal with these problems are still with us today.

The legislation that was signed into law by President Harding made a number of changes to the federal aid program, changes that are among the most significant features

of the program's modern-day structure (Federal Aid Highway Act of 1921).[66] First, the goal of the federal aid program was changed to reflect changing times. The old post road rationale was replaced by the objective of creating a federal aid highway system. This federal aid system would consist of more than 100,000 miles of the most important highway mileage in the country, and was not to exceed 7 percent of the total highway mileage in any given state. Three-sevenths of the federal aid mileage would be included in a primary highway system whose routes would be selected by the states and Bureau of Public Roads acting in consultation with the War Department.[67] The First World War had demonstrated the importance of a well-designed surface transportation system, consisting of railroads and highways, as a vital part of the national defense.[68]

The primary system would be the major interstate highway backbone of the nation, and was to receive 60 percent of all federal aid. The state-federal share on federal aid projects would continue to be 50:50, in reflection of the program's basis as a partnership of equals (Seely 1987). The federal aid system was officially designated by 1922 and found its graphic representation on the War Department's famed Pershing Map (Brown 1998, Riddick 1973).

[66] The act authorized and appropriated $75 million in federal highway aid for fiscal year 1922.

[67] The remaining routes would comprise a secondary highway system.

[68] The War Department, from the Secretary and General Pershing down, did not want a repeat of the problems encountered by those military convoys that had been forced to use the disconnected, poorly built highway system during the first world war when the next war came (Davies 2002). Among the officers traveling with one of the military convoys that made the rough trek in 1919 was Dwight Eisenhower, whose experiences on the adventure have prompted many to cite as an inspiration for the modern interstate system (Davies 2002).

But despite the significant shift in program mission and structure there was no change in the basic formula used to apportion federal aid. The old trio of land area, population, and miles of rural post road remained, despite the abandonment of the post road rationale for federal aid (Federal Aid Highway Act of 1921). There were no serious efforts to replace the formula in 1921, and the miles of post road factor would survive a number of half-hearted challenges over the next two decades (Bitterman 1938). Congress simply didn't want to revisit the earlier formula fight anytime soon.

But there were significant modifications enacted at the behest of the concerned small (population) state and public land state senators. Small-state senators lobbied for and won the creation of a minimum apportionment provision (Federal Aid Highway Act of 1921). Each state was guaranteed a minimum of one half of one percent of the total aid apportionment. Thus 24 percent of all dollars distributed under the 1921 act (at the time 48 states at 0.5 percent each) were distributed under the minimum apportionment provision and before the larger apportionment formula was applied. The actual dollars seemed small at the time, but the net effect of this provision was magnified as the program grew.

And, the provision is still part of the highway program. It has been extended into new program areas as they have come online. The provision provides a financial bonus to small states even as concerns about inadequate fund distributions (the problem the provision was designed to remedy) have faded into the distant past. Today, it distributes

25 percent of the money in an affected program area, without regard for the distribution of the needs the program is designed to address. It has become a significant issue.

The other provision enacted in 1921 that has had a significant effect on the operation of federal aid over the long term is the public land state bonus. As noted above, the property tax was the mainstay of the highway finance system in the 1910s, and western states with large acreage of federal lands were at a distinct disadvantage when it came to their ability to raise property tax revenues (Brown 1998, Burch 1962). Congress responded by reducing their required state match (by increasing the federal matching share) along a sliding scale in proportion to the percentage of their land that lay in the public domain (Federal Aid Highway Act of 1921). The decision was appropriate given the circumstances of the time, but it has also been retained even as times have changed.

By the mid and late 1920s, the property tax had been supplanted by the gasoline tax as the primary means of raising state highway finance revenues (Brown 1998). The public land states were thus no longer at a disadvantage under a gas tax-based finance system, as they had been under the property tax-based system—yet there was no move to modify the public lands bonus. Instead it was retained and extended as new federal programs were created. The public lands bonus is still part of the TEA-21 era federal program, long after the original rationale for its creation has faded (TEA-21 1998). Many states that today receive the public land bonus are also net recipients under the highway trust fund programs. Yet there have been no serious attempts to modify this provision of the law. Both the minimum allocation and public lands bonus features have become

central pillars of the federal program, and together have a significant effect on the distribution of federal highway dollars among the states.

A final provision of the 1921 act deserves some comment. Between 1912 and 1921, federal aid recipients were allowed to spend their federal aid dollars on new road construction and the maintenance of existing roads. But the 1921 act barred recipients from spending money on maintenance. It thus marked the emergence of a new-construction "emphasis" in the federal program (Federal Aid Highway Act of 1921, Riddick 1973). The provision was inserted because of a widespread belief that the federal role should be to provide support in the development of the basic system while the states should administer and maintain the facilities. There was also a widespread belief that states had sufficient resources to bear highway maintenance costs over the long term but required up-front assistance to build the facilities in the near term (Riddick 1973). The issue is of course still subject to a great deal of debate. The prohibition on using funds for maintenance was removed in 1944, but a perceived emphasis on new capital expenditures has been associated with the highway program throughout its history. One merely has to look at the formula factors, federal matching shares, and overall level of expenditures over the course of the past eighty years to see there is a great deal of support for the contention that a new construction emphasis exists in the federal program.

Contract authority provisions and the importance of program authorization

Federal highway aid dollars authorized by the 1916 and 1921 legislation were released to the states through the annual appropriations process. The 1921 act, for example, set the basic parameters of the program, and thus acted in a role similar to

modern-day authorizing legislation, but its disbursement component authorized and appropriated $75 million for fiscal year 1922 alone (Federal Aid Highway Act of 1921). A new appropriations bill was required the following year to authorize and appropriate more money, and legislation was duly enacted, as part of the Post Office Appropriations bill, in 1922. The Post Office Appropriations Act of 1922 authorized and appropriated $50 million for fiscal year 1923, $65 million for fiscal year 1924, and $75 million for fiscal year 1925. It also created a new program category for forest roads, which were provided a total of $13 million through fiscal year 1925 (Post Office Appropriations Act of 1922).[69]

The annual appropriations process is a fact of life that federal aid recipients have had to come to terms with, but it made things especially difficult for highway aid recipients. Highway projects require long-term planning, and the annual appropriations process has a great deal of uncertainty. Aid recipients are unable to know their approximate future aid apportionment more than a year in advance, and this tends to discourage long-term planning. The decision to move to multi-year appropriations for the highway program in 1922 was a significant change that enabled states to plan over a longer timeframe. But the 1922 legislation also included another provision to encourage long-term highway planning: contract authority.

Contract authority allows states to enter into highway construction contracts in advance of actual appropriations (Riddick 1973). It enables states to engage in more long-

[69] It is interesting to note that highway appropriations continued to be made under the Post Office Department law during the 1920s—after the post roads rationale had been eliminated.

term project planning and programming, safe in the knowledge that the federal share would be forthcoming. But, coupled with the later creation of the highway trust fund, it also resulted in a fundamental shift in power within the congress. Over time, it has reduced the importance of the annual appropriations process, and of the appropriations committees that are often viewed as the guardians of the budget, and increased the importance of the authorization process, and the public works committee whose members tended to be big supporters of infrastructure spending.[70]

The long-term impact of this shift in decisionmaking has been profound. For example, it has tended to insulate the federal transportation program from annual budgetary pressures, and thus encouraged relatively high transportation expenditures even in times of fiscal stress. And contract authority provisions that encourage a focus on multi-year authorizations as opposed to annual appropriations, coupled with the formula apportionment procedures, have by and large allowed the highway program to operate on virtual autopilot. States have been able to engage in long-term planning, which was the goal of the provision, but the absence of regular program financial oversight means that transportation often disappears from the policy agenda except in periods of crisis (Brown 1998).

[70] Over the years a number of leading appropriations committee chairmen (such as Hayden and Byrd) have played important roles, but the balance of committee power has shifted—especially following the creation of the highway trust fund. In recent years, as is discussed later, the appropriations committees have been reasserting themselves through the use of obligation ceilings and the use of appropriations earmarks.

Lessons from the 1910s and the 1920s

By the end of 1922, the key policy decisions that would drive the highway program for the next quarter century and beyond were largely in place—and highway issues took a much lower profile on the public policy radar. The big decisions had been made, the formulas appeared to be operating as intended, and there was very little for anyone to talk about. In 1925, 1926, and 1928, two-year appropriations legislation was enacted, and no policy changes were implemented. Annual federal aid expenditures reached the $75 million mark for the first time for fiscal year 1925, and expenditures continued at this level through the fiscal year 1930 appropriation passed in 1928. The program rules and formula apportionment processes were left unchanged, and the prohibitions on expenditures of federal aid dollars in urban areas or on maintenance also remained.

The federal aid program was a well-established rural construction program operating under established rules and subject to very little political or interest group infighting as the 1920s wore onward. The program appeared to run virtually on autopilot, which may have been what its supporters intended all along. The Bureau of Public Roads and its allies in the state highway departments were able to make significant progress translating the Pershing Map of the nation's highway system into reality. The adoption of state-level gasoline taxes throughout the 1920s provided a new revenue source that

generated millions of dollars for highways (Brown 1998).[71] The result was a veritable golden era of rural highway construction.

Policy change from the Depression to the advent of the interstate, 1930 to 1955

If the 1920s were a time of programmatic stability in the federal highway program, the 1930s and 1940s were times of significant policy change. A program that ended the 1920s as a rural highway construction entered the postwar period with a new focus on the construction not only of urban highways, but of a national superhighway network as well. But these significant changes in the program's mission were mirrored by much more modest changes in the program's resource distribution structure, as this part of the chapter shows.

The driving forces behind policy change were the fiscal crisis of the Depression and the urban traffic congestion problem of the postwar period. The onset of the Great Depression brought with it a massive unemployment crisis, serious fiscal crises at the state level, and a virtual collapse of local government's highway finance system, which was then centered on the property tax. The federal government stepped into the breach with massive public works projects, including highway projects, in America's rural areas and its cities. Thus did the federal highway program finally enter the city.

And, in the aftermath of the Second World War, Americans took to their automobiles in record numbers, congesting city streets as they never had before. Local governments were under intense pressure to do something about this congestion, and they turned to the express highway, or freeway, as the solution. But because they lacked the

[71] Up until 1956, the federal highway program was funded from general fund revenues.

money to build these facilities, they looked to state and federal government for help. A relatively modest federal grant program to build rural post roads was well down the path of becoming a massive long-term, formula-driven highway construction effort to build urban freeways and transcontinental superhighways by the middle of the 1950s. All of these changes have made this era the starting point for a number of important histories of the federal highway program (ex. Rose 1990).

The depression and the beginning of urban highway aid

The stock market crashed in October 1929, and by 1930 the Great Depression had descended upon America. Millions of Americans were thrown out of work. A financial crisis raged in both the private and public sectors of a contracting economy. There was enormous pressure to do something to stimulate economic activity, and the Hoover Administration was grasping for straws (Sautter 1986). Only slowly did the long-term belief that balanced federal budgets had to be maintained give way to the notion that deficit spending could be an appropriate public response in dire economic times.

But by late 1930 and early 1931 modest federal relief efforts were underway. The Hoover-era efforts focused primarily on the use of grants and low interest loans to stimulate jobs, and one of the most attractive job-creation mechanisms was the use of road and highway projects (Sautter 1986). To that end, congress passed the Emergency Construction Act of 1930 that provided $80 million in highway loans to the states. The money was to be expended within eight months or would be subject to forfeiture. The focus on creating jobs immediately was that acute.

At the same time, the federal aid program came up for renewal as part of the regular authorization and appropriations process, and the amount of federal aid money was increased to provide more highway jobs. The Federal-Aid Highway Act of 1930 provided $50 million in supplemental appropriations for fiscal year 1931, bringing annual expenditures to $125 million. An additional $125 million was appropriated for each of fiscal years 1932 and 1933. But all of this money would be apportioned under the apportionment rules created in 1916 and 1921, and not a penny of the money could be spent in America's cities (Federal Aid Highway Act of 1930).

The economic chaos of the Depression was widespread. But while the needs were great throughout the country, the largest numbers of affected persons were in America's cities (Kennedy 1999). If the federal aid program were to become an effective means of generating jobs for the unemployed, the prohibition against spending federal aid dollars in urban areas would have to be lifted, and many other program rules would also have to be relaxed. To cite one example, many states' fiscal conditions were such that they were having trouble generating matching funds to take advantage of the federal aid then available (Weingroff 1996b, Public Roads Administration 1949).

Congress responded with the Emergency Relief and Construction Act of 1932 that provided $120 million in low-interest, ten-year loans to help the states meet the 50 percent cost matching requirement on federal aid projects (Emergency Relief and Construction Act of 1932). And in order to encourage more highway spending (and more highway jobs), the law raised the federal aid cap to $25,000 per mile of highway, and permitted states to enroll additional highway miles into their federal aid systems. The

need to put Americans to work was so acute (and so was the local government fiscal crisis) that the same act provided a temporary waiver of the prohibition against using federal aid funds in urban areas. This was an event of lasting significance for the federal program and the history of urban America, because the temporary waiver granted in 1932 eventually became permanent. Long-established rules gave way in the crisis atmosphere of the times.

Both congress and the administration viewed these highway acts as jobs bills because of the labor-intensive nature of highway construction. The close link between highway construction and jobs meant that the highway program received a significant infusion of resources at a time when the Hoover Administration was cutting spending in other areas in its doomed efforts to balance the federal budget (Sautter 1986). While these programs created many new jobs, the numbers paled in comparison to the New Deal era programs that were soon to follow. As an interesting aside, it should be noted that a federal motor fuels tax was also created in 1932—explicitly as a general revenue producing measure (Brown 1998). Linkage of the gas tax to highway spending would come later.

The new deal and the highway program

Franklin Roosevelt assumed the presidency in March 1933, and immediately thereafter began the famed first 100 days of the New Deal. Roosevelt's twin concerns at the outset of his administration were to stabilize the rapidly collapsing banking system and provide jobs for millions of unemployed Americans (Kennedy 1999). To deal with the latter concern, an array of emergency relief bills was introduced, and one of these

bills was passed in June 1933 as the National Industrial Recovery Act (NIRA). NIRA was a billion-plus dollar package of relief programs, $400 million of which was earmarked for emergency highway construction projects (NIRA 1933). This sudden infusion of money was provided as an outright grant to the states, rather than as a loan as had been the earlier Hoover-era relief bills. It would also be available for expenditure on rural or urban projects. The funds would supplement the traditional federal aid program, whose annual appropriation was still $125 million (Federal-Aid Highway Act of 1933).

There was tremendous controversy over how the NIRA funds would be distributed to the states, and a careful compromise was reached between supporters of the traditional federal aid program and those more concerned with immediate job creation (NIRA 1933). Federal aid supporters wanted to make sure the money was used for projects that met both highway needs and job creation needs, while their opponents wanted to create as many jobs as possible as soon as possible (Congressional Record 1933, Sautter 1986).

The job creation side yielded on the apportionment formula while federal aid supporters gave ground on some of the program requirements (NIRA 1933). Seven-eighths of the emergency funds would be apportioned using the federal aid formula (1/3 weight each for population, land area, and rural post road miles), while one-eighth would be apportioned on a purely population basis. Priority would be given to the use of human labor in all aspects of highway construction, so considerable efficiency was given up in favor of increased jobs (NIRA 1933). The states eagerly accepted the money, and then clamored for more.

The Bureau of Public Roads and its congressional supporters congratulated themselves on keeping control of the massive new highway spending within the established federal aid structure (Seely 1987, Gifford 1983). There had been concern that short-term employment needs might lead to the destruction of the established federal aid program, and they had thus far successfully weathered the storm. But some changes were soon made to the federal highway program because of changed conditions.

In 1934, the Hayden-Cartwright Act was enacted to reauthorize the highway program and provide new appropriations (Hayden-Cartwright Act of 1934). This act continued regular federal aid appropriations at $125 million for each of fiscal years 1936 and 1937, but it made significant changes to the structure of the federal aid program. First, it made permanent an end to the prohibition against spending federal aid funds in urban areas. The urban program begun under the exigencies of the Depression was now an integral part of the permanent federal highway effort. Over time, the federal program became focused more on dealing with urban conditions, and issues of traffic congestion and urban development, which marked a dramatic shift from its purely inter-city rural orientation of the 1920s.

Second, the act permitted states to spend 1.5 percent of their annual aid apportionment to engage in long-term highway planning. And, third, the act prohibited states from diverting their own state motor fuels tax money to non-highway uses lest they be penalized by losing their federal aid apportionment (Hayden-Cartwright Act of 1934). This last feature was quite popular in the anti-diversion atmosphere of the time, but must rank as an extreme example of federal hypocrisy. The federal government was intruding

on the states' prerogatives (and the states' rights supporters were relatively silent) at a time when the federal government diverted its own motor fuel tax revenues to non-highway uses. Indeed the annual federal highway expenditure was only about 15 percent the size of its annual motor fuels tax receipts (Crawford 1939). The linkage of gas tax revenues to highway spending was a fact of life at the state level where anti-diversion laws were the norm, but it would come more slowly to the federal level.

Federal aid supporters successfully survived the potential challenges NIRA had posed to the established program, but NIRA was only the first of a series of emergency public works bills. The unemployment crisis continued, and so did the pressure to create more jobs of any kind anywhere. Many of these jobs would be public works highway jobs, and the administrators in charge of the Works Progress Administration (WPA) had little patience for the arguments of federal aid supporters that upsetting established highway program rules and going outside established funding channels was necessarily a bad thing (Gifford 1983). And that is precisely what happened.

Congress passed $800 million in emergency highway spending in 1935, and an additional $435 million in 1936. These expenditures dwarfed the $125 million appropriated each year for the federal aid program, and all the new money was distributed outside the federal aid channels. It was simply given to the states in the form of grants, with no matching requirements attached. Jobs were created with all of this public works spending, and New Deal officials were happy with the arrangements (Kennedy 1999). Federal aid supporters were not, and they felt threatened by what was happening. The established federal aid program with its state-federal partnership, formula

allocation rules, and highway construction orientation was being cut out of the loop by a public works program run by the political appointees of the Roosevelt Administration.

FDR and the threat to federal aid

Gifford (1983) argues that federal highway officials felt threatened by what was happening with the public works emergency highway program, and that they responded by shifting the emphasis of the federal aid program to an issue that had suddenly become popular with the public and members of congress: superhighways. The documentary record appears to support his claims.

President Roosevelt proposed eliminating the federal aid program as part of his budget balancing effort in the fall of 1937. Roosevelt was under pressure from some members of congress and key figures of his own administration to reduce expenditures, and he decided to place the federal aid program on the chopping block in order to save his emergency public works programs (Gifford 1983, Mertz 19??). He also proposed the cancellation of previously authorized federal aid spending. Roosevelt and his supporters emphasized the superior job creation record of the WPA highway projects vis-à-vis the BPR directed federal aid program as the reason for his decision, but he appears to have also had a number of other axes to grind.

Roosevelt had serious problems with the way the federal aid program operated but his biggest complaint was that the contract authority provisions enacted in 1922 (discussed above) removed the program from effective executive branch oversight. In a November 30, 1937 message he complained that "(t)his mandatory provision (contract authority) completely ties the hands of the Executive as to the amount of road funds to be

included in the Budget for any fiscal year" (Committee on Roads 1937). He wanted more direct control over federal highway policy, and he was prepared to fight for it.

Congress decided to stare him down. In the aftermath of the infamous court-packing scheme, the president's motives were not viewed in a good light, even by some members of his own party, and there was sensitivity to the balance of power between the executive and legislative branches (Congressional Record 1937). Arizona Senator Hayden spoke for many members when he stated that tying the hands of the executive branch was precisely what congress had intended to do when it enacted the contract authority provisions in the first place (Federal Highway Administration 1984). Roosevelt backed down in the face of widespread congressional opposition to his proposal. But he succeeded in reducing federal aid appropriations to $100 million for fiscal year 1940 and $115 million for fiscal year 1941, down from the $125 million annual approriations that had been the recent norm (Federal Aid Highway Act of 1938). The President savored this minor victory, but the supporters of the federal aid program, from members of congress to officials in the Bureau of Public Roads, had been put on notice about his true intentions (Gifford 1983).

The federal aid lobby girded for future battle. The president of the American Association of State Highway Officials (AASHO) warned his membership that:

> The states must strive to discourage any Federal legislation which would tend to transfer the administration, supervision, and construction of projects from the Bureau of Public Roads and the State highway departments to other Federal governmental agencies and political subdivisions of the States. The importance of administering these projects through the Bureau of Public Roads, keeping them under the direct control of the State highway departments, is paramount (Purcell 1939:2).

Congressmen who were closely allied with the Bureau of Public Roads responded to the presidential threat by seeking to broaden political support for the federal aid program. They did so by embracing a cause dear to the President's own heart, the idea of a national superhighway system (Gifford 1983). Previously the BPR had viewed national superhighways as a waste of money, but highway policymakers were fascinated by the superhighways recently built in Germany and Italy (Public Roads Administration 1949). A number of politicians had taken tours of these facilities and returned to the US to preach the need for a US system. Roosevelt himself was intrigued by the idea of building a sparse network of toll superhighways, and according to a number of accounts drew a map of a rudimentary system of three east-west and three north-south routes one evening at the White House (Public Roads Administration 1949, Rose 1990).

As part of the 1938 federal aid highway appropriation, congress directed the Bureau of Public Roads to investigate the financial feasibility of the superhighway system. The Bureau Chief was to "investigate and make a report of his findings and recommend to the Congress not later than February 1, 1939, with respect to the feasibility of building, and cost of, superhighways not to exceed three in number, running in a general direction from the eastern to the western portion of the United States, and not exceeding three in number, running in a general direction from the northern to the southern portion of the United States, including the feasibility of a toll system on such roads" (Federal Aid Highway Act of 1938). The report documenting the BPR's investigation became a landmark in the history of federal highway policy. It was called Toll Roads and Free Roads, and was presented to congress in early 1939.

Toll roads and free roads, interregional highways, and birth of the interstates

In the first part of the report, the Bureau of Public Roads (BPR) proclaimed that the 14,000-mile toll road system envisioned by the congress was not financially feasible; large segments of the system would not generate the traffic needed to justify the system.[72] But the most influential part of the report was the second part, which congress had not requested. In that second part, the BPR outlined its own vision for superhighway transportation: a 27,600-mile system of interregional highways to serve both urban and rural traffic. The BPR argued for a strong urban component because urban traffic congestion was among the biggest highway problems facing the nation, and it relied heavily on metropolitan traffic volumes to justify the interregional system (Toll Roads and Free Roads 1939). President Roosevelt's own revisions to the original report had served to strengthen the interregional component of the proposal and to downplay, although not to eliminate, the urban component (Gifford 1983, Rose 1990). This interregional system was the basic inspiration for the interstate system that has dominated the federal transportation program over the last five decades. And while congress failed to act on the recommendations of the report in 1939, it inspired the work of another group of investigators only a few years later. In the meantime, storm clouds over Europe and the Pacific focused attention on other much more serious matters.

[72] The BPR's analysis has been criticized by a number of authors, including Gifford (1983) who notes that the BPR seriously underestimated the traffic on a number of segments including one paralleled by the enormously successful Pennsylvania Turnpike. The BPR was hostile to the idea of toll roads before it studied the idea, undoubtedly because toll authorities posed a serious challenge to the federal aid program's status quo, and it may have let the anti-toll sentiment color its analysis. It also failed to realize that people were willing to pay for the better driving experience offered by the superhighways—even in places where parallel free roads existed.

As the 1940s began, and with war raging overseas, the focus of the federal aid program shifted to include strategic and military highways that connected the nation's highway network to military facilities and key defense industry sites. The 1940 Federal Aid Highway Act temporarily reduced highway spending to $100 million annually, but the 1941 Defense Highway Act restored an additional $25 million in funds for the regular program. The 1941 act also added a massive $150 million military access road construction program to be jointly overseen by the BPR and the War Department (Defense Highway Act of 1941). These acts also included recommendations that the Bureau of Public Roads investigate the possibility of developing emergency flight strips adjacent to federal highways (Federal Aid Highway Act 1940). With the start of hostilities, the regular federal aid program was suspended for the duration, as labor and materials were shifted to the war effort. The 1943 appropriations legislation contained a relatively paltry $50 million in federal aid spending, all of which was geared toward projects essential to the war effort (Federal Aid Highway Act of 1943).

The Bureau of Public Roads and a handful of officials in the Roosevelt Administration used the wartime interlude as an opportunity to rethink the mission of the federal aid program for the postwar period. The BPR was still concerned with protecting its program against competitors (Gifford 1984). The Administration and many members of congress were concerned that the country would slip into depression again once the war ended, and they wanted public works plans, including highways (Rose 1990, Schwartz 1976). The President appointed a committee of seven experts to develop the

future path for the federal highway program and to make appropriate recommendations to congress.[73] This was the Interregional Highways Committee, and it began its work by revisiting the vision contained in Toll Roads and Free Roads.

One cannot overemphasize the influence of the Interregional Highways Committee and its Interregional Highways report, delivered to congress in January 1944, on the future of the federal highway program. The committee report proposed the creation of a national superhighway network, and the committee's members even discussed the potential means of financing the network: the dedication of federal highway user taxes to transportation. This idea eventually found expression in 1956 with the creation of the highway trust fund. As Rose (1990) observes:

> During the afternoon of September 9, at an informal session of the committee, Bibb Graves suggested earmarking federal automotive taxes for highway purposes. Dedication was uncommon at the federal level, argued the others, and was "vigorously opposed by...powerful influences within the Federal Government." Why not just call attention to the fact that federal automotive excises were about equal to construction costs, suggested Bartholomew. His idea, according to the minutes of the meeting, "appeared to meet with general approval." (20)

Linkage did not mean earmarking, but it was a necessary first step on that path.

The Interregional Highways report proposed the creation of a 39,000-mile network of high-speed facilities (75 miles per hour in rural areas) that would be designed to anticipate future highway needs (Interregional Highways 1944). The committee

[73] The seven-member committee consisted of three renowned planners, Harland Bartholomew, Rexford Tugwell, and Frederic Delano, two state highway engineers, George Kennedy of Michigan and Charles Purcell of California, Thomas MacDonald of the BPR, and, in a purely political appointment, Bibb Graves who was a Democratic gubernatorial candidate in Alabama (Interregional Highways 1944).

recommended that the Bureau of Public Roads in cooperation with state highway departments designate the 30,000 miles of rural routes while local city officials take charge over the 9,000-plus miles of highways in urban areas.[74] The committee did not specifically address the apportionment mechanisms for such a highway program, or attempt to put a price tag on its cost. It seemed more interested in laying out a vision, and allowing congress to fill in the details. But the one thing it did emphasize was that the 50:50 partnership arrangement between the states and the federal government be retained for the new interregional program (Interregional Highways 1944).

Formula and spending fights preceding the federal aid highway act of 1944

The Interregional Highways report marked the opening of the most in-depth highway policy debate since the passage of the 1921 act. AASHO fired the opening shot when it unveiled its estimate that the nation's long-term highway needs required expenditures of more than $1 billion a year under the federal aid program. AASHO staff worked closely with the staff of Arizona Senator Hayden, who was the dean of the congressional highway establishment. Hayden's staff crafted a bill calling for a $1 billion per year, three-year federal aid program renewal, an eight-fold increase over pre-war highway spending levels (Congressional Record 1944). Hayden countered criticisms of the "extravagance" of his proposed spending levels by arguing that increased highway spending was key to economic prosperity. He claimed that "the American people cannot

[74] The planners on the committee believed that local officials would be best able to design and to locate facilities which would blend into the urban landscape, revitalize central business districts, discourage outward sprawl, and connect with and augment local land use planning. The engineers on the committee, and the engineering organizations they represented, were unfamiliar with planning urban highways and were quite prepared to focus exclusively on the design of rural highways with which they were very familiar and comfortable (Rose 1990, Taylor 2000).

enjoy prosperity without an adequate highway-transportation system" (Congressional Record 1944: 7677-78). Hayden went further by arguing that the federal share of project costs should be increased from 50 percent to 60 percent, because of the highway network's importance to the nation's economy and its defense (Congressional Record 1944).

The Hayden bill ran into a great deal of resistance, because the proposed spending changes were so large. Many members of the House believed the states would have a lot of trouble meeting their cost share of an increased highway program, and House proposals typically called for federal aid expenditures of $500 million annually as a more fiscally prudent alternative. Most of Hayden's Senate colleagues backed proposals for a $650 million annual program, although a number of Senators complained that even that amount was foolish given the size of federal budget deficits at the time (Congressional Record 1944).

Early Senate debate focused most intensely on the proposed increase in the federal matching share. The debate over the federal match reflected different ideological perceptions of the program: equal partnership (50:50 match), or potential means of federal interference (more than a 50 percent federal share). And a number of critics complained that the federal program was in serious danger of becoming a program where states could obtain generous federal support for projects that were more in their interest than the nation's interest, a charge that is leveled to this day. A handful of Senators even

proposed reducing the federal share to 40 percent to make the states bear a larger share of the cost (Congressional Record 1944).

Hayden removed the proposal to increase the federal share, and attention turned to a new idea that was filling the air: linking highway taxes to highway spending. Georgia's Senator Russell was concerned that some members were trying to implicitly link federal highway taxes to federal aid—a sort of informal earmarking arrangement that was inspired by the Interregional Highways report itself. He felt this was highly inappropriate given the tight budget situation of the time. And so the rather tentative informal earmarking talk subsided. Hayden's committee was forced to give way on both the level of proposed expenditures and the matching share arrangement. In conference, the Senate assented to most of the House's recommendations on the $500 million a year program size and the retention of the current 50 percent cost matching share, in exchange for House assent to retain the minimum apportionment rules that aided the small states (Federal Aid Highway Act of 1944).

But there were also significant debates over apportionment formulas that had to be resolved. Both House and Senate bills proposed creating a federal secondary system of rural roads, a federal urban highway system, and the interregional highway system—and each of these new systems required a negotiated apportionment formula.

The primary system formula (one-third weight each for land area, population, and miles of rural post roads) came under attack when the proponents of linkage between federal highway user tax revenues and federal highway expenditures began looking at how the states' federal motor fuels tax contributions compared to their aid apportionment

(AASHO 1944, Congressional Record 1944). A handful of states appeared to disproportionately benefit from the federal aid formula, and these largely western states had been disproportionately represented on the congressional committees charged with oversight of the program (Riddick 1973). Charges of unfairness filled the air.

The president of AASHO, an organization whose members represented both winners and losers in the funding sweepstakes, attempted to explain away the formula controversy by minimizing the validity of the opponents' complaints.

> From the beginning, this formula, though accepted as just by the great majority of States, has been opposed by a minority. A principal cause of the objection is not that the formula inaccurately expresses the relative expenditure needs in the several States, but that it results in a distribution of the Federal highway appropriation in different proportion from the collection of Federal revenue, to the disadvantage of the objecting States. Objection on this ground is alien to the theory and practice of our Federal form of government. It is denied by the practice in highway finance by every State, including those that object. In all States, monies collected in one proportion from various parts of the State are expended for improvement of the State highway system in several parts in another proportion. For these reasons, the objection of the minority, although long and continuously expressed, has not found acceptance by the majority, nor has it been effective in modification of the legally prescribed formula (AASHO 1944: 22).

He then went on to emphasize the wisdom of the original formula factors, and to assert that most people agreed with them.

> In all that has previously been said, there is reflected, I believe, the considered judgment of all State highway officials. What will now be added cannot, I regret, be asserted to represent the opinion held in all States, though certainly it will accord with the will of the majority.
>
> In its appropriation of funds for expenditure in highway construction the Federal government has sought to advance as rapidly, and as consistently as possible, the improvement of all parts of the Federal-aid highway system, a system interstate in character and of national as well as state and local significance. Wisely, it was decided at the outset to entrust the fair

> apportionment of the total sums to be appropriated to no individual or group of individuals. A methodical apportionment by reasonable objective means was preferred, and various formulas were proposed and considered.
>
> The formula prescribed by Section 21 of the Federal Highway Act was generally agreed to express most faithfully the relative expenditure needs for adequate improvement of the Federal-aid system in the several States (AASHO1944: 21).

He went even further and restated the case for the three factors (land area, population, and miles of post road) themselves.

> By this formula three conditions having a probable relation to the relative highway expenditure needs of the several States are taken into account in the apportionment of the Federal appropriation, each condition governing, on a ratio basis, the apportionment of one-third of the appropriation.
>
> One of the three conditions considered is the population of the several States. It is presumed that both system network and the average traffic it serves will be more dense in States of large, than in States of small, population, and that the relative need for road improving expenditure in the several States will depend in part on their populations. Hence one-third of the total Federal appropriation is apportioned in the ratio that each State's population bears to the total population of the United States.
>
> The second condition considered is the mileage of rural post roads in the several States. .. It was presumed that these mileages would exist in the several States in approximate relation to the total road mileage, modified in some degree by the population to be served by the mails, and since the mileage and the essential improvement of the Federal-aid system also bear an approximate relationship to these same circumstances of the States, it was inferred that expenditure need on the system would depend in part on post road mileage. Hence one-third of the total Federal appropriation is apportioned in the ratio that the mileage of rural post roads in each State bears to the total mileage of rural post roads in the United States.
>
> Finally, the third condition considered is the area of the several States. There is wide variation in the areas of the States. Many of the larger States are sparsely populated, their mileage of rural post roads comparatively small, yet in these States, there are long distances to be spanned by the Federal-aid system between the widely separated borders in order to build a connected system of national highways. Hence it was

> decided to apportion one-third of the total Federal appropriation in the ratio that the area of each State bears to the total area of the United States. (AASHO 1944: 21)

Case closed? Well, not so fast. AASHO was merely restating the obvious history of the formula itself, and this did little to quell the objections of formula opponents. After the rhetoric subsidied, and because no one appeared to want a full-scale formula fight, a political compromise emerged. The existing formula was retained for the primary program (of major highways) and the interstate program (which was placed under the primary program), but new formulas were created for the other systems (Federal Aid Highway Act of 1944). Rural population was inserted in lieu of total population in the three-part formula for the secondary program (whose focus was farm to market roads desired by rural members and interest groups). Urban system funds would be apportioned on the basis of a state's share of the total national population in cities with populations larger than 5,000 persons.[75] The same kinds of factors that had been in place since 1916 were selected for the new programs (population, post road miles, etc) rather than other factors that would have more closely reflected actual highway needs (miles on the actual systems themselves, vehicle travel, etc). These factors were established and thus easier to justify (and to defend) when confronted by opponents.

The possibility of future conflict between supporters of the primary, secondary, and urban systems was anticipated, and the 1944 law's drafters tried to avoid it through the creation of yet another formula. Henceforth, federal aid funds would be divided into

[75] The creation of the urban system was a major milestone as it meant the federal government would be a permanent player in urban transportation policy and planning.

three categories: 45 percent would go to the primary system, 30 percent to the secondary system, and 25 percent to the urban system (Federal Aid Highway Act of 1944). The precise division mirrored political power realities of the time, and thus represented political power rather than the relative importance of each of the different systems. But it survived for more than three decades (Riddick 1973). Small state concerns were addressed by the expansion of the minimum apportionment rule to the secondary system, but not the urban system. Public lands state concerns were addressed when the public land bonus to the federal matching share was extended to both new highway systems.

The need for predictability, stability, and peaceful coexistence were the bywords among the urban and rural highway groups present at the table in 1944, and compromise through changes or modifications to the formula apportionment process were achieved relatively quickly. This task was made much easier because the dramatic increase in overall federal aid made everyone a winner. There were few vocal complaints about the legislation that was eventually passed. The annual appropriation of $500 million a year was a lot of money, and the system allocations themselves made almost everyone happy—for a time.

The creation of the interstate system

The Federal Aid Highway Act of 1944 was signed into law on December 20, 1944. It appropriated $500 million annually for three years, with the appropriations to be released beginning thirty days following the official declaration of an end to the wartime emergency. President Truman made this declaration on October 2nd, 1945. The 1944

legislation dominated highway policy for the succeeding decade, and many of its features remained in place far longer than that. The legislation continued the established tradition of formula apportionment, for reasons of predictability and the desire to avoid continuous fights over the distribution of resources, and it retained all the established programmatic structures (minimum apportionment rules, public lands bonus, 50:50 federal-state share) save one. The 1944 act officially ended the requirement that federal aid dollars be used solely for new construction, although new construction projects tended to be the destination of most federal aid (Federal Aid Highway Act of 1944, Riddick 1973). The act also reiterated the Depression-era commitment to providing federal aid to urban areas by making the urban program a central part of the overall structure.

The act also created, but failed to provide special funding, for the new 40,000-mile interstate highway system, whose construction would dominate federal surface transportation policy for the next forty five-plus years. The interstate system, whose official name was then the National System of Interstate Highways, would include the most important highways in the country.[76] The routes would be selected by the Bureau of Public Roads and the state highway departments on the basis of four criteria that were assigned specific weighting in the selection process: national defense (30%), integration (30%), population (20%), and the needs of industry and agriculture (20%) (Burch 1962,

[76] Section 7 of the 1944 Federal Aid Highway Act called for the designation of "a National System of Interstate Highways not exceeding forty thousand miles in extent so located as to connect by routes, as direct as practicable, the principal metropolitan areas, cities, and industrial centers, to serve the national defense, and to connect at suitable border points with routes of continental importance in the Dominion of Canada and the Republic of Mexico." The system was subsequently renamed the National System of Interstate and Defense Highways as a way of playing up the contributions the system might make to national defense efforts, and as a way of playing on the public's and policymakers' cold war-era defense-related fears.

Federal Aid Highway Act of 1944). Congress certainly loved creating formula breakdowns. But the desire for geopolitical equity, and the goal of achieving widespread congressional support, appeared to trump all other factors when the actual routes were selected. Portions of the system crossed or entered just over 400 of the 435 congressional districts (Burch 1962).

The interstate highways themselves were to be limited access, high-speed roadways that were designed to meet the traffic needs of the nation twenty years after their construction. They were also to be of uniform design standards, with the designs to be developed jointly by AASHO and the BPR. The uniform design principle was selected out of safety concerns while the limited access idea was an outgrowth of concern that the new highways would suffer development encroachment as had the existing federal highway system, and would thus lose much of their traffic movement capability (Rose 1990). The proposed system was unique in several other respects as well: provision for advanced right-of-way purchase, limited access, uniform standards, physical restrictions on the size and weight of vehicles, and control of advertising along the right-of-way (Burch 1962, Gifford 1983, Rose 1990).

The national defense rationale for the interstate program would be emphasized repeatedly over the following several decades, and defense concerns certainly played a role in the motivation of some interstate system advocates. But it must also be pointed out that every time interstate system supporters went to the War (and then Defense) Department for a financial contribution to the system's construction, they were laughed

off by defense establishment officials (Riddick 1973, Rose 1990).[77] President Roosevelt and his advisors viewed the new highway programs, including the interstates, as a massive new jobs program—with their highway benefits an added bonus rather than the primary motivation. He and many other public officials were possessed by an almost obsessive fear that the end of hostilities and sudden demobilization of millions of troops would result in serious economic dislocations, including the possible return of the depression itself (Kennedy 1999).[78] Thankfully this did not prove to be the case.

Federal highway policy in the late 1940s and early 1950s

The feared economic dislocation did not materialize, and congress responded by reducing annual highway expenditures from $500 million to $450 million when it passed the 1948 Federal Aid Highway Act (Federal Aid Highway Act of 1948). The highway program was a much lower priority in the tight fiscal conditions of the immediate postwar years. Even vocal complaints about the severity of urban traffic congestion and the lack of progress building the interstate program did not move President Truman or members of congress to make the highway program a larger priority (Rose 1990). International tensions with the Soviet Union and the need to provide massive postwar assistance to

[77] The interstate system was far from the highest of the defense establishment's priorities, and defense officials viewed it as overwhelmingly a public works and civilian transportation effort. But playing the national defense card was too tempting an argument for program supporters to resist employing. A few members tried playing it throughout the late 1940s in the hopes of gaining dedicated funding for the interstate system, but their efforts did not bear fruit until a few years later (Congressional Record 1948, Congressional Record 1950).

[78] The President stated that such highway programs serve "...as a means of utilizing productively during the postwar readjustment period a substantial share of the manpower and industrial capacity then available" (Roosevelt 1944, as quoted in *Congress and the Nation* 1965:527).

rebuild Western Europe, under the soon to emerge Marshall Plan, dominated policy discussions (McCullough 1993).

Congress charged the Bureau of Public Roads with studying interstate program needs, as a prelude to enacting future legislation, but it failed to act on the report's recommendation for a dramatic increase in interstate highway funding. Instead, congress returned annual federal aid expenditures to the $500 million a year level in 1950 (Federal Aid Highway Act of 1950).

Gradually, the interstate program became the primary focus of federal highway policy, and this was due to the long, hard work of interstate advocates, state highway officials, and officials in the Bureau of Public Roads. The pro-interstate lobby first took shape with the emergence in 1950 of the Project Adequate Roads coalition of truckers, automobile clubs, and state highway officials (Rose 1990). These groups called for a dramatic increase in federal highway spending, especially on the interstate system, but they opposed an increase in motor vehicle taxes to pay for the expanded program. And the unrealistic expectations of the group, combined with internal conflicts, to end the short-lived coalition. The linkage of federal highway taxes to federal aid expenditures was becoming a more popular idea among many members of congress, and occasional proposals to make linkage official policy were made by individual members of congress throughout the late 1940s and early 1950s (Brown 1998).

The interstate program itself was the subject of intensive lobbying by AASHO in the months leading to passage of the 1952 highway program bill. AASHO's members were very concerned about the lack of progress on the "critical" interstate highways, and

they put the blame on insufficient federal aid money (Riddick 1973).[79] Many politicians accepted the AASHO argument, and a specific allocation for interstate projects was inserted in the 1952 Federal Aid Highway Act. But the $25 million apportionment that was provided over two years, a very small share of the $550 million annual federal aid program, was probably not what system supporters had in mind (Federal Aid Highway Act of 1952).

The $25 million interstate apportionment was but a drop in the large bucket of money needed to build the system, but it marked a definite break in federal aid tradition. For the first time, congress singled the interstate system out for special financing treatment. The new interstate funds were apportioned according to the primary system formula (land area, population, and miles of rural post roads), and the federal-state matching ratio was set at the same 50:50 split as existed for the regular federal aid programs. But for some reason the minimum state apportionment rules were not applied to the interstate system at the time (Federal Aid Highway Act of 1952).[80]

From 1952 onward, the interstate system slowly moved to the center of the nation's highway policy discussions. Members of congress gradually came to view

[79] Rose (1990) notes that fewer than 5,000 miles of the interstate routes officially selected by the Bureau of Public Roads in 1947 had been completed--and most of these were previously-constructed toll roads that would be placed into the system. The possibility of a sudden upsurge in interstate construction without increased federal aid was believed to be extremely unlikely.

[80] I have not been able to determine why the minimum apportionment rules were not applied. Perhaps small population state representatives were not looking? Congress remedied this apparent oversight in 1954 when a 0.75% minimum allocation rule was imposed on the interstate program while the 0.5% rule remained in place for the other aid programs.

completion of the system as a much higher priority than they had before, and there were serious efforts by the BPR to study interstate construction progress and interstate program needs in the wake of the 1952 act. In 1953, the Senate Public Works Committee, which had been the highway program's oversight committee since the late 1940s, examined the finance issue and recommended that tolls be permitted on interstate highways, as a means of encouraging more rapid interstate highway construction. This proposal failed to clear the Senate as a whole because members from outside the northeast, where toll highway were more common, opposed the idea of toll highways (Mertz 19??). They preferred the idea of direct linkage with highway user tax revenues, and from this perspective tolls might be seen as a case of double taxation. The Bureau of Public Roads was also adamantly opposed to toll finance, probably because independent toll authorities were a threat to the established federal aid program (Rose 1990).

Congress reexamined the highway program in 1954, when highway expenditures were increased to $700 million in each of fiscal years 1956 and 1957 (Federal Aid Highway Act of 1954). The interstate system was to receive $175 million a year in federal aid, a dramatic increase from the $25 million under the prior law. The interstate system had become a higher national priority, and as such the federal match on interstate projects was increased to a more generous 60 percent of project cost. Congress hoped the higher federal match would make interstate projects more attractive to state highway officials and state policymakers when project priority decisions were made, and this certainly came true as a result. But increasing the cost match for interstate projects represented a break with established tradition. At the same time, the interstate formula

was altered, largely at the insistence of members from traffic-plagued urban areas. The new formula that provided equal weights to population and the original apportionment formula (area, population, miles of post roads) (Federal Aid Highway Act of 1954).

Even $175 million was a mere drop in the bucket when compared with the amount of money that would be required to build the interstate system. The need to find much more money for interstate construction became something of an obsession within the highway policy community. AASHO, BPR, and the National Governors' Associations each developed significant finance and expenditure policy proposals, and their work prompted the Eisenhower Administration to join the fray. President Eisenhower appointed his old aide General Clay to lead an investigation of how to best provide more money to finance the interstate system. The Clay Committee report marked the beginning of the political negotiations that paved the way for enactment of the historic 1956 legislation that dominated federal policy for decades after its passage, and this is the subject of the next section.

Conclusion

Between 1930 and 1956, the federal highway program was transformed from a rural highway program to one with an increasingly urban focus. But despite this change, many of the political settlements about expenditure policy made in the vastly different circumstances of 1916 and 1921 survived intact. Slight formula modifications were made in 1944 and then in the early 1950s as new programs came online, but the theme was one of expenditure policy stability (see **Table 4-1**).

Table 4-1: Highway apportionment formulas, 1912-1954

Federal-Aid Highway Program

Historic Formulas and Federal Matches

Year	Program	Formula	Federal Share	Minimum Apportionment
1912	Post Roads	None	33%	None
1916	Federal Roads	1/3 area, 1/3 population, 1/3 post road mileage	**50%**	None
1921	Federal Aid Highway	1/3 area, 1/3 population, 1/3 post road mileage	50%	**0.50%**
1938	Federal Aid Primary	1/3 area, 1/3 population, 1/3 post road mileage	50%	0.50%
	Federal Aid Secondary	**1/3 area, 1/3 population, 1/3 post road mileage**	**50%**	**0.50%**
1944	Federal Aid Primary	1/3 area, 1/3 population, 1/3 post road mileage	50%	0.50%
	Federal Aid Secondary	**1/3 area, 1/3 rural pop, 1/3 rural delivery miles**	50%	0.50%
	Federal Aid Urban	**Urban population**	**50%**	**0.50%**
1952	Federal Aid Primary	1/3 area, 1/3 population, 1/3 post road mileage	50%	0.50%
	Federal Aid Secondary	1/3 area, 1/3 rural pop, 1/3 rural delivery miles	50%	0.50%
	Federal Aid Urban	Urban population	50%	0.50%
	Interstate System	**1/3 area, 1/3 population, 1/3 post road mileage**	**50%**	**None**
1954	Federal Aid Primary	1/3 area, 1/3 population, 1/3 post road mileage	50%	0.50%
	Federal Aid Secondary	1/3 area, 1/3 rural pop, 1/3 rural delivery miles	50%	0.50%
	Federal Aid Urban	Urban population	50%	0.50%
	Interstate System	**1/2 population, 1/2 FAP formula**	**60%**	**0.75%**

Sources: Highway legislation cited in references. Changes are denoted in bold.

Conflicts occasionally emerged as in 1944, but they were generally short-lived and the promise of more money for everyone minimized their intensity. The political atmosphere and institutional and programmatic structures themselves (formulas rather than competitive grants or non-competitive earmarking) worked to minimize open conflict in favor of modest compromise changes. The formula funding process itself continued to dominate a program that was allowed to operate without much interference from congressional oversight committees or administration officials outside the highway community. The changes made in 1956 allowed the program to operate with even less regular oversight than it had before.

CHAPTER FIVE. THE INTERSTATE ERA (1956 – 1990)

By the middle of the 1950s, highway policymakers were preoccupied with the twin goals of building the interstate highway system as quickly as possible, and finding a way to pay for it without breaking the budget. In 1956, they addressed the vexing finance issue by creating a dedicated trust fund to finance the highway program. And over the following years they stepped back to allow their state and federal agency colleagues to build the system. The decisions they made in 1956 set the course of federal transportation policy for the next several decades, and the interstate program itself left a profound impact on the American economic, social, and physical landscape.

The key lessons of program history during this period are twofold. First, despite the significant programmatic changes of this era, most of the negotiated settlements of the 1920s were retained and even expanded to new programs, without significant consideration of their potential effects. Second, the period saw the reemergence of open political conflict within the surface transportation program, a significant change from the past where conflict was kept to a minimum. Elaborate geopolitical compromises were crafted to settle conflicts between mode-based interests (highways versus transit) and place-based interests (donor versus donee states). These compromises have since come to dominate federal expenditure policy and policy debates.

The era of interstate construction followed by modal conflict: 1956 to 1982

While many new developments occurred in the highway field, the nation's transit industry continued down its long path of decline. By the early 1960s the transit industry

was in desperate financial condition, and urban politicians demanded something be done to help—lest cities lose their transit systems altogether. Thus was a federal transit program begun, one that quickly went from being a temporary grants program to becoming a permanent feature of the policy landscape. And once the transit program was created, transit supporters began casting their eyes on a highway trust fund filled with motor fuels tax dollars. A long battle between supporters of the highway and public transit programs over the appropriate use of trust fund dollars soon followed.

The 1956 legislation

A great deal has been written about 1956, the creation of the highway trust fund, and the subsequent unleashing of a wave of new interstate highway construction across the United States. Some of these accounts have been relatively evenhanded scholarly investigations (Rose 1990), while others have been paeans to the visionaries of 1956 (Weingroff 1996c) or vitriolic condemnations of its consequences for America's cities (Mowbray 1969). There is no denying the importance of the 1956 legislation and its consequences, and hence it is the most analyzed moment of federal highway program history. Because of this fact, the discussion of 1956 contained in this section will be limited to only a brief focus on the points of most significance to expenditure policy.

By the mid 1950s nearly everyone wanted an expanded interstate highway program.[81] City officials wanted highways to solve the traffic congestion problem.

[81] The testimony of a number of witnesses before the Clay Committee gives a flavor of some of the arguments made to make the points cited in the following paragraph (Clay Committee 1955). These same arguments were also used in hearings before the key congressional committees in 1955 and 1956 (Brown 1998).

People professing a concern for highway safety wanted the limited access facilities built as replacements to unsafe highways. Economic development interests wanted particular interstate projects built to stimulate development in outlying areas. Downtown business groups wanted them so as to provide better auto access to the CBD in order to revitalize downtown businesses. The defense establishment occasionally jumped in to argue for better roads to evacuate US cities in case of an atomic attack—and then disappeared whenever they were asked to help pay for the roads. Truckers wanted better roads to boost their intercity trucking business. Auto groups wanted better roads for many reasons. Administration officials were eager to use an expanded highway program as a public works program should the need arise.[82] Almost no one argued against an expanded interstate system, except perhaps for the railroads that were wary of any policy that would benefit their competitors.

But there were serious disagreements over how to pay for the expanded program. The Clay Committee appointed by President Eisenhower in 1954 advocated the sale of thirty-year highway bonds to finance interstate highway construction (Clay Committee 1955). Opponents of highway bonds condemned the loss of billions of highway dollars to interest payments (Rose 1990). Robert Moses, among many others, advocated a greater reliance on toll finance to pay for interstate projects, and emphasized his successful use of toll finance to build an expressway system in New York City

[82] Administration officials were worried about being seen as ineffectual should bad economic times arise, and especially about being labeled with the "Hoover albatross" that Democrats had been heaping around Republicans' necks, to some success, over the previous two decades (Kennedy 1999). This concern helps explain why a supposedly conservative administration was able to embark upon one of the biggest public works programs ever.

(Brown 1998). The Bureau of Public Roads countered that toll finance was not feasible for most of the interstate mileage; at most between 10 and 20 percent of the system's mileage could be so financed (Weingroff 1996c). The Clay committee considered the issue of toll finance but rejected it out of hand because of the BPR's beliefs.

The Eisenhower Administration supported any method of highway finance that did not increase the federal budget deficit (Congressional Record 1955, Congressional Record 1956). A handful of members of congress, led by Virginia Senator Byrd, supported any method that did not increase the deficit or lead to the "waste" of money on things like interest charges (Kurylo 1960). Interest groups, including truckers, the auto clubs, and the automobile industry, supported any method of finance that delivered lots of new projects while asking for very few tax increases in return (Rose 1990). The challenge facing policymakers was thus a large one.

The Clay committee report was unveiled, and a bill drafted in accordance with its recommendations was introduced in 1955. The bill ran into serious opposition focusing on three issues: the interest charges associated with bond finance, its call for a National Highway Commission to oversee the program, and its proposal that the federal share of interstate project costs be set at a generous 90 percent.[83] Senator Byrd was a leading opponent of the bill. He opposed the loss of so much money to interest charges, and he

[83] The Clay Committee urged that the federal government assume 90% of the cost of the development of the interstate system because it wished to keep the state contribution at current levels because of state budgetary constraints--and it wished to "pump prime the economy" in the case of a recession (Clay Committee 1955, Rose 1990:76). The 90 percent figure was then adopted in the congressional proposals in 1956.

opposed the loss of congressional oversight power to the proposed National Highway Commission (Senate Public Works Committee 1955). A few members of congress questioned the wisdom of a larger federal role vis-à-vis the states as evidenced by the new 90:10 federal-state matching ratio and believed this could lead to a loss of state power vis-à-vis the federal government (Senate Public Works Committee 1955). The interest groups opposed the highway user tax increases the Clay Committee had recommended to pay for the bonds. All of these concerns doomed the 1955 bill.

But in 1956 legislation was easily enacted. So what had happened in the interval? First, the Bureau of Public Roads released its maps of proposed urban interstate routes, and these maps found their way into the hands of local officials and urban members of congress.[84] Suddenly, people had a general sense of where the highways would go and what they might do for their communities. A sense of urgency descended upon many members to get something done. Second, the long contentious finance issue was settled with only modest highway user tax increases, and the earmarking of highway user taxes to highway spending through the mechanism of a highway trust fund (Weingroff 1996c). Interest groups accepted the modest increases and championed the creation of the trust fund and the highways it would help to construct.

[84] The General Location of National System of Interstate Highways, published in September 1955, established the general locations of urban interstate routes. The Bureau of Public Roads had published a report detailing the general location of rural routes back in 1947. Schwartz (1976) argues that the release of this publication was important because it changed the urban interstate system from being merely a theoretical idea to an actual map that eager legislators could show their constituents. Congress now had at least a general idea as to the location of the urban routes and this created a powerful constituency in favor of adopting a financing bill as soon as possible (Schwartz 1976).

The creation of the highway trust fund was a crucial moment in the history of the federal highway program, perhaps the most important event since the birth of the program itself. The dedication of highway user taxes to transportation provided a sudden influx of new money to the highway program, enabling the construction of thousands of miles of highways.[85] The trust fund arrangement also insulated the highway program from the annual funding debates affecting other federal programs. In tough budget times, highway spending would be relatively secure from poaching (at least until the 1970s) and spending levels would be remarkably stable.

All these facts meant that congressional oversight committees could take something of a hands-off approach and simply let the highway engineers do their jobs. In fact, the 1956 legislation authorized $25 billion in interstate expenditures over thirteen years, a record for both the amount and length of authorization for any highway bill (Highway Act of 1956). The formula funding process had long allowed the federal highway program to run on virtual autopilot; the trust fund let it run on autopilot and use rocket power—which it did. The federal highway mission had been defined as being to

[85] The Highway Trust Fund established under the 1956 legislation was made responsible for the support not only of the Interstate System but for the system of primary, secondary, and urban-extension highways. Only roads and highways on specified public lands (for example national parks and national forests) or on Indian reservations would henceforth be financed with general revenues. Among the taxes dedicated to the Trust Fund were the federal gasoline, diesel and special fuels taxes (each set at 3 cents per gallon), taxes on tires and inner tubes (8 and 9 cents per pound respectively), one-half of the 10% federal excise tax on trucks, trailers, and non-transit buses, and the annual heavy vehicle use tax of $1.50 per 1,000 lbs of gross vehicle weight over 26,000 pounds (Highway Act of 1956, PL 84-627). These taxes were scheduled to expire in 1969, once the interstate system was completed. As before, excise taxes on automobiles continued to accrue to the general fund.

complete the interstate system as soon as possible, and with as little interference as possible, and this financial structure certainly provided the means of doing so.

The trust fund mechanism linked overall user tax revenues to highway expenditures, but it did not link a specific state or congressional district's user tax contributions to its federal aid receipts (Highway Act of 1956). By and large, people accepted the idea that some areas would be net recipients and others net donors under the system, because some redistribution was required to build the national highway network (Congressional Record 1956).[86] Only after this highway network was largely in place did politicians and interest groups begin to question the spatial pattern of expenditures. And modal questions did not figure at all in the 1956 debates. The still largely privately-owned transit industry made its voice felt on questions of motor fuel taxation, but there was no effort to provide any financial assistance to this already-distressed industry (Senate Public Works Committee 1955, Congressional Record 1956).

There were few arguments over the resource distribution processes. The formulas, minimum apportionment arrangements, and matching shares for the primary, secondary, and urban systems were left unchanged in the 1956 legislation; for example, a state's miles of rural post roads continued to be a formula factor for both the primary and secondary systems. The interstate program formula was the matter of some minor disagreement, and a compromise was fashioned. Until fiscal year 1960, the

[86] Early on most interstate spending would be on system construction. The architects of the program hoped to finish it within thirteen years, and the system itself had been designed to meet traffic needs to the year 1975. It was only later that issues of system reconstruction and maintenance, and the federal government's responsibilities in these areas, became a major concern.

apportionment formula was left unchanged; interstate funds would be apportioned on the equal basis of population and the primary system formula (Highway Act of 1956). This decision was made to provide a short transitional period for states already engaged in interstate project planning and construction (Congressional Record 1956, Weingroff 1996c). After that time, funds would be apportioned to the states in accordance with the cost to complete the system (Highway Act of 1956).

The 1956 legislation established a 90 percent federal matching share for interstate projects, in order to prime the economy and encourage states to complete their interstate miles as soon as possible. The public lands states could receive up to a 95 percent federal match on interstate projects.[87] From a federal perspective this high match ratio helped guarantee completion of the system at the earliest possible date. But from a much broader perspective, it meant that states were encouraged to choose interstate projects (and pay only 10 percent of project cost) as opposed to other highway projects (for which they bore a higher cost share) that might have been more appropriate to local conditions. Some scholars have argued that the result of this distortion in the highway decisionmaking process has been to the serious detriment of America's cities (Taylor 1992). I am inclined to agree. The 90 percent federal match was probably the most important decision made in 1956, aside from the fundamental decision to spend billions of dollars on the project. There were few discussions of its potential long-term effects.

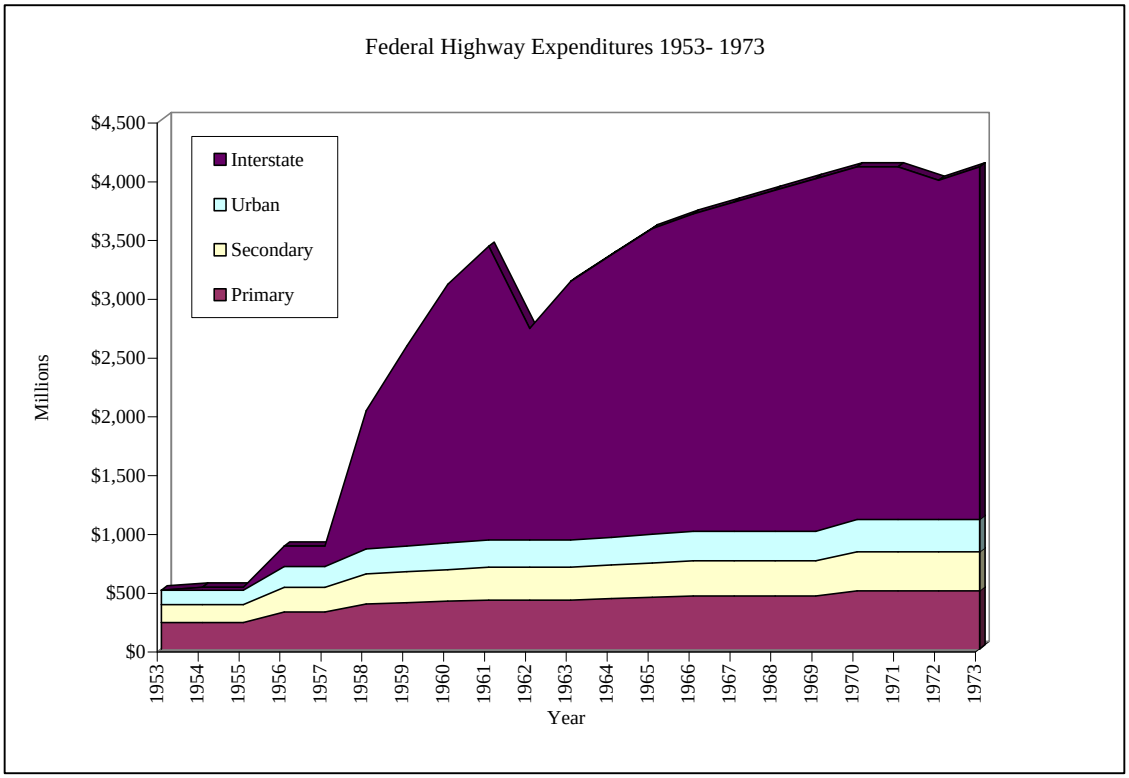
[87] The public lands state bonus and minimum state apportionment rules remained part of the traditional federal aid program and were applied to the interstate program as well. There was no discussion of whether it might be appropriate to eliminate or revise these mechanisms (after all their original rationales had long ceased to exist). There was also no discussion of whether it was appropriate to include them in the new interstate allocation process (which they were) (Public Works Committee 1955, Congressional Record 1956, Highway Act of 1956).

Besides authorizing $25 billion in interstate expenditures over 13 years, for an average of $2 billion per year, the 1956 law boosted spending on the primary, secondary, and urban highway systems to $850 million in fiscal year 1958 and $875 million in fiscal year 1959 (Highway Act of 1956).[88] The 45-30-25 percent split among the primary, secondary, and urban systems was retained, and the established apportionment formulas were left unchanged. But a new twist was added when the legislation's drafters decided to make Alaska eligible for the three highway programs. Only one-third of Alaska's huge land area would be counted for the formula—otherwise it would have received a huge share of total federal transportation dollars (Highway Act of 1956).

The passage of the 1956 legislation unleashed a wave of new interstate highway construction across the country, as its drafters had intended. Prior to 1956, less than 5,000 miles of the interstate highway system were opened to traffic. By 1960 nearly 10,000 miles were open, and the numbers of miles continued to grow throughout the decade (*Highway Statistics* Summary to 1995) The escalating appropriations on the traditional federal aid programs allowed states to build even more miles of streets and highways (see **Graph 5-1**). All of this was made possible by the dedication of highway user taxes through the highway trust fund. The trust fund made politicians' and motorists' dreams of new highways possible, and the engineers set to work translating these dreams into concrete and asphalt. The result of this effort was a rapid transformation of America's urban and rural landscape, for good and for ill (Lewis 1999).

[88] The 1958 act boosted overall spending to $900 million a year, while the 1960 act increased this level to $925 million a year.

Graph 5-1: Federal highway expenditures, fiscal years 1953 to 1973



Source: Highway legislation cited in references.

Throughout the early 1960s, the federal highway program operated in a very smooth, relatively uncontroversial manner. Highway projects were very popular with the public, and the occasional protests were on a small scale and focused on particular projects rather than the system as a whole (Altshuler 1965). Each year, $2 billion of federal aid was poured into the interstate system pipeline, and new miles were opened to traffic. It was true that there were occasionally bumps to be overcome. The cost and time-to-completion estimates prepared in 1956 had to be extended as the cost of the system escalated. Congress dutifully extended the system's completion date. And in 1961,

highway user taxes were increased modestly to help pay for the interstate and other highway projects (Brown 1998).

And while interstate expenditures grew, so did those on the primary, secondary, and urban systems. In 1962, annual appropriations for these three systems were increased to $975 million a year. In 1964, the annual appropriations were increased to a staggering $1 billion a year. In fiscal year 1965, the federal government spent more than $3 billion on highways, and the expenditure trend was ever upward. American motorists continued to drive and the trucking industry grew—and so did the money pouring into the trust fund. The politicians and interest groups were happy with the finance arrangements, formulas, expenditure decisions, and the results on the ground (see **Table 5-1**). Policy stability was the theme, and controversies were few. The 1964 Federal-Aid Highway Act was so non-controversial that its text was only two pages long; the 1966 act wasn't much longer at six pages (Federal-Aid Highway Act of 1964, Federal-Aid Highway Act of 1966). It appeared to be a golden age for highway construction. Such was not the case for America's public transit industry.

Table 5-1: Highway apportionment formulas, 1956 to 1970

Federal-Aid Highway Program
Historic Formulas and Federal Matches

Year	Program	Formula	Federal Share	Minimum Apportionment
1956	Federal Aid Primary	1/3 area, 1/3 population, 1/3 post road mileage	50%	0.50%
	Federal Aid Secondary	1/3 area, 1/3 rural pop, 1/3 rural delivery miles	50%	0.50%
	Federal Aid Urban	Urban population	50%	0.50%
	Interstate System	1/2 population, 1/2 FAP formula	**90%**	0.75%
FY 1960	Federal Aid Primary	1/3 area, 1/3 population, 1/3 post road mileage	50%	0.50%
	Federal Aid Secondary	1/3 area, 1/3 rural pop, 1/3 rural delivery miles	50%	0.50%
	Federal Aid Urban	Urban population	50%	0.50%
	Interstate System	**cost to complete**	90%	0.75%

Sources: Highway legislation cited in references. Changes denoted in bold.

The beginning of federal aid to public transit

While the highway program had billions of trust fund dollars, America's transit companies were in serious trouble, and urban politicians were very concerned. The largely privately owned transit industry had been in increasing financial trouble since the mid 1920s. Ridership had peaked in the early 1920s, only to fall throughout the remainder of that decade, rebound during wartime fuel and rubber rationing, and fall yet again after the war as people turned to the automobile in larger numbers (Jones 1985). Industry investment in physical stock, particularly on the rail side, had peaked even earlier than had ridership, and the physical stock had aged considerably. By the beginning of the 1960s, the troubled industry was but a shell of its former self—and conditions continued to deteriorate. Local officials frantically purchased the assets of the private companies lest they lose their local service, but they needed more money to complete the purchases and upgrade the stock.

America's railroads were in similarly bad shape, particularly when it came to their money-losing passenger operations. The railroads pleaded for permission to abandon this

line of business, and instead focus on their more profitable freight service (Hilton 1974). Congress granted this permission as part of the Transportation Act of 1958, and large-scale abandonment quickly followed. The abandonment of passenger railroad service posed a serious problem for big eastern cities that relied extensively on commuter railroads, and they began negotiating to purchase commuter railroad assets—but they needed more money (Jones 1985). Led by Philadelphia's Mayor Dilworth, a group of big city mayors turned to the federal government for financial help (Hilton 1974). Congress provided a modest amount of assistance in 1961.

As was the case with the highway program, federal aid to public transit began as a relatively small grant program. It was created in a mere handful of sentences toward the end of the 1961 Housing Act (Housing Act of 1961). New Jersey Senator Harrison Williams, whose state's residents were patrons of the commuter railroads serving both New York and Philadelphia, introduced a bill providing fianncial assistance for cities to purchase commuter railroad and other transit assets from their private owners. The bill provided $25 million in spending authority for "demonstration" projects, whose costs would be borne one-third by the state (or locality) and two-thirds by the federal government, and $50 million in low interest loans (Housing Act of 1961). This money could be used for the acquisition, coordination, and construction of transit facilities. Congress passed the Williams bill, but appropriated only $43 million, rather than the envisioned $75 million, for the task at hand (Hilton 1974,).

The authors of the 1961 act had viewed federal transit assistance as a temporary aid to cities and states hoping to acquire assets from private companies (Housing Act of

1961). The federal government would provide up-front capital assistance, in the form of a matching grant or loan, and then the transit provider, whether privately or publicly owned, would pay its own way. Thus, the 1961 act was not seen as marking the beginning of a long-term federal financial commitment to public transit. But it did not take long for the idea of a longer-term commitment to appear on the policy agenda.

The 1962 highway act required highway aid recipients to engage in comprehensive urban planning, including multi-modal transportation planning (Federal-Aid Highway Act of 1962). That same year, a widely circulated report published with the support of officials in the Kennedy Administration advocated a more direct federal role in the development of a "balanced" multi-modal transportation system that included both highways and transit services (Hilton 1974). This same report characterized public transit as an essential public service rather than a profit-making activity, and used this new definition as the rationale for a long-term federal aid commitment.

Senator Williams relied on this report when he drafted a bill to make federal transit aid permanent, and to significantly increase the $43 million in aid appropriated in 1961 (Hilton 1974). (By that time nearly everyone realized that the amount provided was not nearly enough to address local financial needs.) While the Williams bill died in committee, the idea of long-term federal aid did not die with it. It wasn't long before a series of transit aid proposals appeared, typically sponsored by members from the northeast in alliance with urban politicians and members of an incipient anti-highway movement (Congressional Record 1963, Congressional Record 1964). One of these bills eventually passed in 1964.

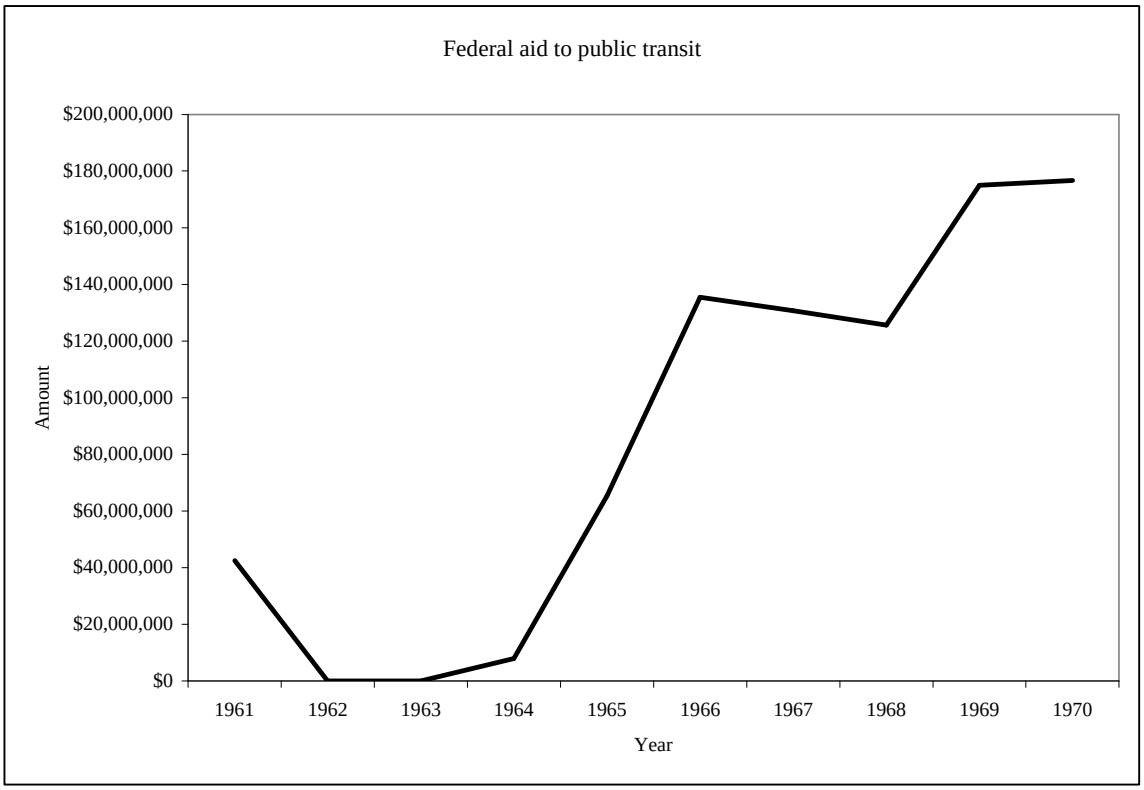
The passage of what eventually became the Urban Mass Transportation Act of 1964 took place against a backdrop of emerging opposition to urban freeway projects and a growing perception that a socio-economic crisis plagued urban America. As these developments grew throughout the middle and late 1960s, so did support for a larger and more permanent federal transit program as a partial palliative to these problems.

The Urban Mass Transportation Act was passed in 1964, and subsequently reauthorized in 1966. The act extended the original grants and loans programs, and the 2/3 federal matching share. Grants were to be awarded at the discretion of officials within the newly created Urban Mass Transit Administration on a "needs" basis, although the share of money available to any one state was capped at 12.5 percent (Urban Mass Transportation Act of 1964). This decision was made so that resources could be spread over a wider geographic range, and thus a wider base of political support was obtained for the new program. Without this cap, New York would have received a very large share of federal transit aid, because that's where a large share of the country's transit riders was concentrated. Given the presence of a spending cap, the link between federal transit aid and actual use of the transit system (ridership) was always a relatively weak one.

The amounts expended through the UMTA grants program grew steadily throughout the 1960s, as **Graph 5-2** shows below. Congress expended $8 million at the close of 1964, $65 million in 1965, and $135 million in 1966. While the appropriations were significantly larger than the under the initial Housing Act they were still quite small given the increasing evidence that even more money was required. As before, the grants were to be used to help local governments acquire and construct public transit facilities;

they were expressly prohibited from using any of the funds to subsidize operations (Urban Mass Transportation Act of 1964). Congress still viewed the program as a temporary federal intervention, although voices in favor of a permanent federal commitment to public transit aid grew in number as the urban crisis of the 1960s continued. By that end of the decade, the view that transit was a necessary social service (a view articulated in the report noted earlier) had gained much more support.

Graph 5-2: The growth of federal assistance to public transit in the 1960s



Source: FTA Grant Program Summaries.

The 1960s urban crisis and its effects on the federal transportation program

The social unrest of the 1960s and the attendant urban crisis provided the impetus for policy change in the federal transportation program. In the 1950s, the federal

government's urban transportation agenda focused on the construction of urban freeways. In the 1960s public pressures forced a shift to a multi-modal approach to urban transportation planning, and led to the revision of federal transportation policy. The creation and gradual enlargement of the federal transit program was one outgrowth of these changes. The retrenchment and refocusing of the federal highway program, particularly in urban areas, was another.

Congress created a new multi-modal Department of Transportation to oversee both the highway and transit programs in 1966, and the Bureau of Public Roads was renamed the Federal Highway Administration (FHWA). Despite this institutional change, the highway program was still focused primarily on the construction of the interstate system. Interstate expenditures continued to top the $2 billion a year mark as the 1960s ended, even as the mileage of new construction dropped and public opposition to controversial interstate highway projects heated up (Taylor 1992). The golden age of interstate highway construction was drawing to a close as public pressure made construction more difficult, and as inflation began to erode the purchasing power of highway trust fund dollars.

Congress responded to these pressures not by increasing fuel taxes to provide an influx of money for the highway trust fund but instead by increasing the federal financial commitment even further. In 1970, congress increased the federal cost share on primary, secondary, and urban system projects from 50 percent to 70 percent, while it retained the 90 percent interstate match (Federal Aid Highway Act of 1970).[89] The earlier cost-

[89] The formulas themselves were not changed at this time.

sharing arrangement between the federal government and states had now been replaced by a system wherein the federal government bore the majority of the cost. Such an arrangement might make sense for building projects of truly national importance, but many of the 600,000-plus miles contained in these three systems were roads of only local or regional, not national, importance. Federal highway dollars were being stretched thin.

Even as these events were unfolding, the federal program itself began to change. Congress increased urban system funding in 1968, and authorized the use of these funds to help make improvements in highway system operations (Federal-Aid Highway Act of 1968). The actual dollars involved were a small share of the federal highway program, but this was a significant shift from the construction-based approach to dealing with congestion issues. Change was coming to the highway program.

To complicate things further, congress soon passed both the National Environmental Policy Act (NEPA) and the Clean Air Act of 1970. Both of these laws mandated environmental review requirements for federal highway construction projects, and these requirements soon became tools used by environmentalists and local community groups to halt controversial freeway projects. And if all of these changes were not enough, the highway program soon found itself under assault from transit supporters. Transit supporters wanted to gain access to the highway trust fund so they could increase federal transit aid (Hilton 1974, Brown 1998). The modal war had begun.

Modal warfare part 1: targeting the trust fund, 1960 to 1973

During the late 1960s and early 1970s, many urban politicians began to argue for increased federal transit aid as an alternative to continued urban freeway construction.

Their congressional allies began a vigorous campaign to raid the trust fund and shift some of the money from highways to transit. Highlighting an apparent pro-highway bias in the treatment of the two modes of transportation, they demanded greater equality. And they took their fight to the very citadel of the so-called "road gang," the House Public Works Committee itself, during the debate over the 1970 highway act.

In his testimony before the committee, New York Representative Edward Koch, the future mayor, complained that:

> Today, 80% of our population lives in urban areas. And in the year 2000 this figure will reach 90% with an additional 80 to 100 million persons. I would submit that what urban dwellers, even now, say nothing of the future, need to get to work and back home again is mass transit. Yet, this year, the FY 1971 budget estimate for the mass transit program is $285 million, just 6% of the highway program's $4.5 billion budget.
> (Public Works Committee 1970:308)

Koch and other urban members of congress proposed the creation of a public transit trust fund, similar to the highway trust fund, to finance the transit program (Hilton 1974, Public Works Committee 1970). This fund would include the proceeds of the federal excise tax on automobiles, which were then deposited in the general fund. A trust fund would provide more stability in the transit program and, coupled with the use of apportionment formulas, would give state and local officials some assurance of their aid levels over the long term. Koch's proposal would have been a revolutionary development had it been adopted, but it was not. Part of the reason for its failure was a division within the public transit community over targets and tactics.

Most transit supporters had their eyes on a much larger target than the federal excise tax on automobiles. The American Transit Association (forerunner of the APTA)

had its eyes set on the highway trust fund itself. ATA officials felt that only the trust fund offered the financial resources that were required to provide the necessary funds for a stepped up federal capital *and operating* assistance program. They were thus reaching for the grand prize in the funding sweepstakes. Its representatives appeared before the House committee to argue vigorously, albeit unsuccessfully, for the use of highway trust fund revenues for public transit on the grounds that mass transit represented a national social responsibility (Public Works Committee 1970). The committee didn't accept their argument.

The pro-highway forces rallied their troops in defense of the trust fund and in support of an interstate program that was itself coming under constant attack. William Bresnahan, the managing director of the American Trucking Association, made the following statement before the Public Works Committee:

> I would guess that members of this committee, in common with many of us in the private sector who played a role in the formulation and realization of the highway program, have enjoyed occasional moments of silent and personal satisfaction in the thought that we may have contributed, at least in a small way, towards making the United States the great country it is.
>
> Apparently, we have been deluding ourselves. Now, all who have had anything to do with the highway program are being cast collectively as villains in one homogeneous and somehow infamous entity described by our detractors as the "highway lobby."
>
> The purpose of these attacks, needless to say, is (to) stop or curtail the highway program and to use the money for something else, notably urban rail transit.
>
> We happen to believe that the current Federal highway program should be completed as scheduled. We also believe that when it is completed there will be a continuing need for a substantial Federal road program and if

> Congress agrees with this view the trucking industry is entirely willing to continue paying the heavy special taxes it is being assessed.
>
> On the other hand, we feel very strongly--very strongly--that if the highway program is stopped, our special trust fund taxes should be stopped. Or, if the highway program is curtailed our special taxes should be curtailed accordingly.
>
> This position does not mean at all that we are oblivious to other needs and problems--needs and problems which probably deserve a higher priority than they have been getting. Nor does our position reflect a blind belief that highways and highway transportation are unadulterated blessings, but until the American people decide they want to make a radical change in their way of life, to discard the dream of a home with all the ground around it, and to forfeit their mobility, we can only work harder to accentuate the positives of highway transportation and to eliminate or minimize its negatives.
>
> But the existence of non-highway needs and problems, and the fact that highway transportation creates problems, are poor excuses for inflicting injustice upon the owners of motor trucks or any other group of Americans. (Public Works Committee 1970:918)

The highway lobby won the opening battle in 1970, but they girded themselves for a much longer war. The effort to open the trust fund to transit aid was defeated, but congress did allow states to use highway trust funds to build bus lanes on interstate highways (Federal-Aid Highway Act of 1970). This was at least a modest achievement for transit supporters.

Public transit advocates geared up for the next highway funding battle in 1973. But in the meantime, they had succeeded in increasing the general fund-supported transit grants program to $230 million for fiscal year 1971, $310 million for fiscal year 1972, and $700 million for fiscal year 1973 (Urban Mass Transit Act of 1970). This was a staggering increase over the sums provided only a few years earlier, and represented a

significant achievement for members of the transit lobby. But they still had their eyes set on the even bigger sums available in the highway trust fund.

Modal warfare part 2: the barriers begin to fall, 1973 to 1982

In 1973, the first barriers protecting the highway trust fund revenues from non-highway "poaching" were breached. Under the terms of the 1973 Federal-Aid Highway Act, urban areas were allowed to trade unwanted interstate highway routes for federal transit dollars. The breach could thus be explained as simply permitting local choice over matters involving a mere handful of highway projects; the gates of the trust fund hadn't been thrown wide open. Congress also reassured highway groups that the general fund would reimburse the highway trust fund for these transit expenditures, but the reimbursement fell farther and farther behind as the 1970s wore onward (Congressional Record 1973, 1976).

The federal government's own financial commitment to public transit increased with the passage of the 1974 National Mass Transit Act, which ended all pretense that federal transit aid would be a temporary effort (NMTA 1974). Federal expenditures on mass transit first passed the $1 billion a year mark in 1973 and NMTA boosted expenditures even further. The legislation authorized nearly $12 billion in federal transit capital and *operating* assistance over a period of six years. The federal share on capital grants was increased to 80 percent, which was higher than the federal share on all highway projects except the interstate program, and the federal share of operating assistance was set at 50 percent. These high cost shares certainly meant that transit was being treated more fairly vis-à-vis the highway program, but other than modal equity

there were no justifications offered for such high match shares. And as in the case of their highway counterparts they pose a serious question. Do national policy goals justify matching shares of this magnitude? Or, is something else going on here? I would argue that the high matching shares were not justified by national policy goals but instead reflect political concerns—of officials at various levels of governments.

The existing grants program was also paired with the use of apportionment formulas to distribute funds among states. Many funds would be distributed on a formula basis that weighted an area's urban population and population density equally; both factors were then viewed as appropriate measures of an area's transit needs (NMTA 1974). Ridership was purposefully not included as a factor for the political reasons discussed earlier. The federal transit program was structured to aid governments and agencies—and not direct resources to transit riders, just as the highway program helped states and did not direct resources to highway users. Thus, expenditure predictability was inserted into the transit program, reducing the influence of everyday politics and agency bureaucrats decisionmaking over expenditure decisions in certain program areas. The minimum state apportionment and public land state bonus provisions that were central elements of the highway program were not incorporated in the transit formulas.

The immediate impetus for the sudden increased federal commitment to public transit was the oil embargo of 1973, but environmental considerations also appear to have figured in the political calculus of some politicians (Congressional Budget Office 1978). The funds for the increased transit aid would be drawn largely from the general fund,

although interstate project substitutions (and the highway trust fund) would also come into play. Transit was ascending in the 1970s.

Meanwhile the federal highway program operated at the same expenditure levels as the late 1960s, and thus saw its purchasing power seriously eroded by inflation. Throughout the 1970s, the pressure on the highway program increased, as congress broadened the program's responsibilities even as it failed to provide more resources for the expanded mission. In 1976, congress created an interstate maintenance and reconstruction program, with a 50 percent matching share, whose funds would be apportioned on a mileage basis. This program addition changed the nature of the interstate program from a one-time federal construction program to provide the basic national infrastructure into a permanent federal commitment along the lines of the primary, secondary, and urban extension programs (Federal Aid Highway Act of 1976). The earlier limited conception of federal involvement had allowed congress to assume that the federal highway trust fund and its user taxes would expire once the construction program was over; their ongoing renewal was now a necessity. The earlier limited conception had also allowed the geographic redistribution of trust fund dollars to occur with only minimal controversy. Things were now about to change.

Further stress on the highway program was inflicted when congress decided that henceforth the highway trust fund and not the general fund would bear the cost of financing the substitute transit projects allowed under the 1973 highway act. There was every reason to believe that this might be a first step down the path to the transit

advocates' ideal of full trust fund support for transit aid. Indeed this belief was borne out when the 1978 Federal-Aid Highway Act was passed.

The new act authorized $39 billion in highway expenditures and $15 billion in transit capital and operating expenditures over the next four years. While not all of the spending would materialize, even the actual spending marked a more than 80 percent increase in both programs. The law marked the first time that highway and transit policy had been considered as part of the same piece of legislation, a definite preview of things to come. The highway and transit programs were now viewed under one surface transportation program umbrella; they were becoming linked to one another.

Both the 1976 and 1978 highway acts instituted modest changes in the highway formula apportionment process. The 1976 legislation increased the importance of population as one of the three weighted factors (population, area, and miles) in each of the primary, secondary, and urban system formulas, but it still did not include actual use of the system in the formulas. The 1978 legislation increased the federal share of highway project cost under the three systems from 70 percent to 75 percent.

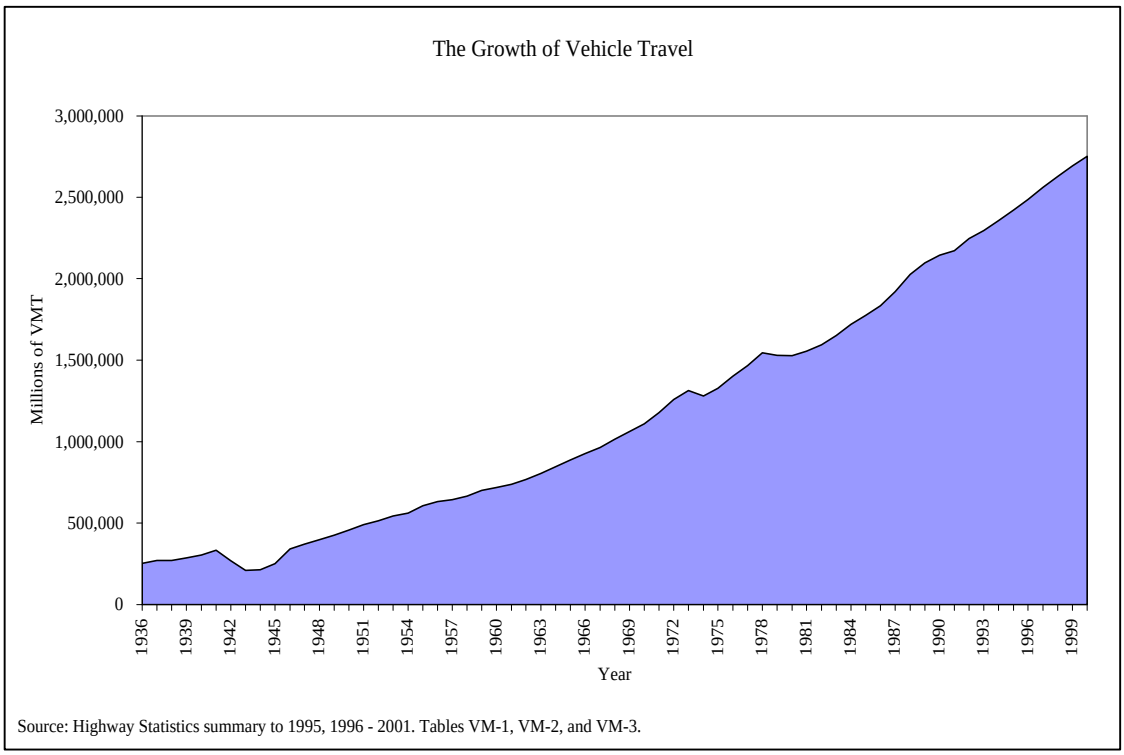
Revisiting Surface Transportation in the 1980s

As the 1980s began, the federal transportation program faced a number of significant challenges. The battle between highway and transit advocates over the highway trust fund's dollars had intensified, and proposals for a transit trust fund, similar to the ideas put forward in the early 1970s, began to be aired once again. Transit advocates were determined to get a stable finance source for their program. Within the highway field itself, interstate system construction, the program's *raison d'être* for more

than two decades, was beginning to wind down as the focus shifted to maintenance and reconstruction of aging highway segments. Years of neglect of highway and bridge maintenance were beginning to be felt, and dire warnings about the long-term economic implications of this neglect began to be heard from state and federal highway officials (Brown 1998).

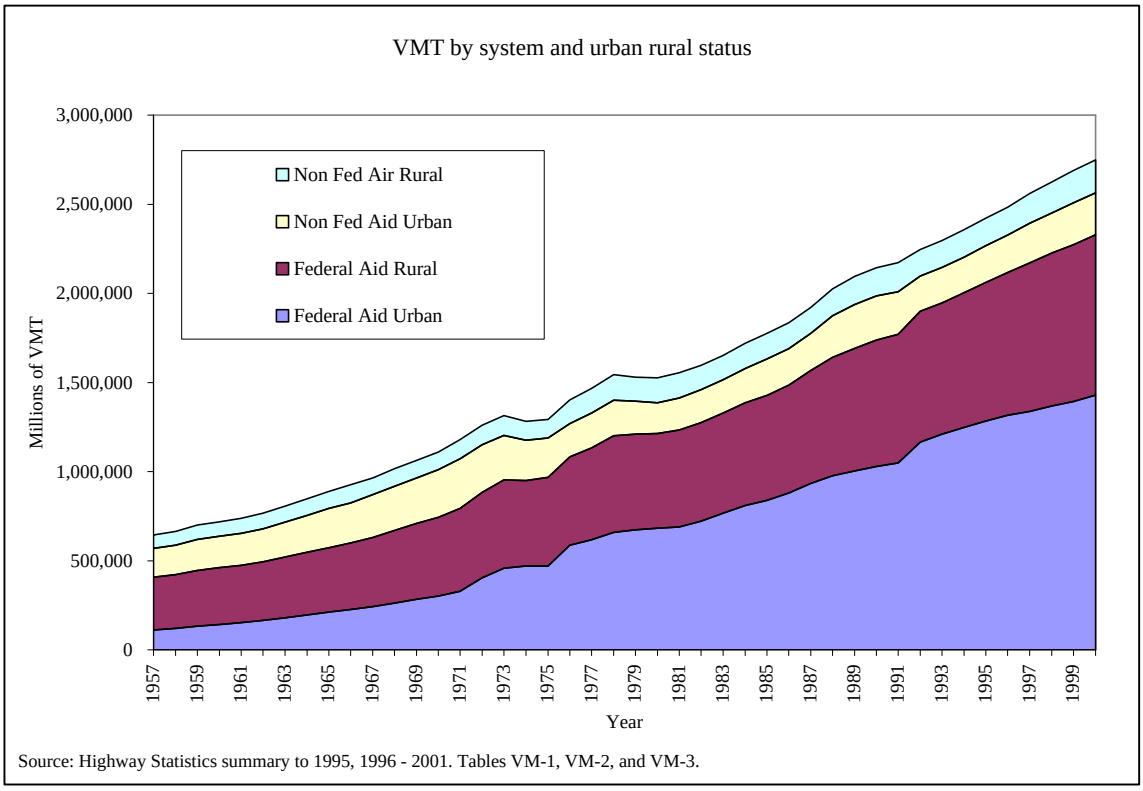
Americans were driving more than they ever had before, and despite the 1970s era gasoline crises, the trend was ever upward (see **Graph 5-3**). The increases were large in both rural and urban America. And because federal aid highways carried the bulk of the nation's motor vehicle travel, the pressures on these roads were especially significant (see **Graph 5-4**).

Graph 5-3: The growth of vehicle travel, 1957 to 2001.



Source: Highway Statistics summary to 1995, 1996 - 2001. Tables VM-1, VM-2, and VM-3.

Graph 5-4: The growth of vehicle travel, by functional system



Of course increases in vehicle travel were associated with increases in gasoline consumption, and hence in motor fuels tax revenues, but the purchasing power of these revenues was being seriously eroded by the combination of inflation and increased vehicle fuel efficiency. And, the highway user tax rates remained at the same levels they had been in the early 1960s. Cost inflation, the proliferation of new programmatic responsibilities, and increasing vehicle fuel efficiency, combined with the lack of regular oversight of the status of both the highway program's needs and available resources and a general anti-tax sentiment among the electorate, had conspired to create a serious

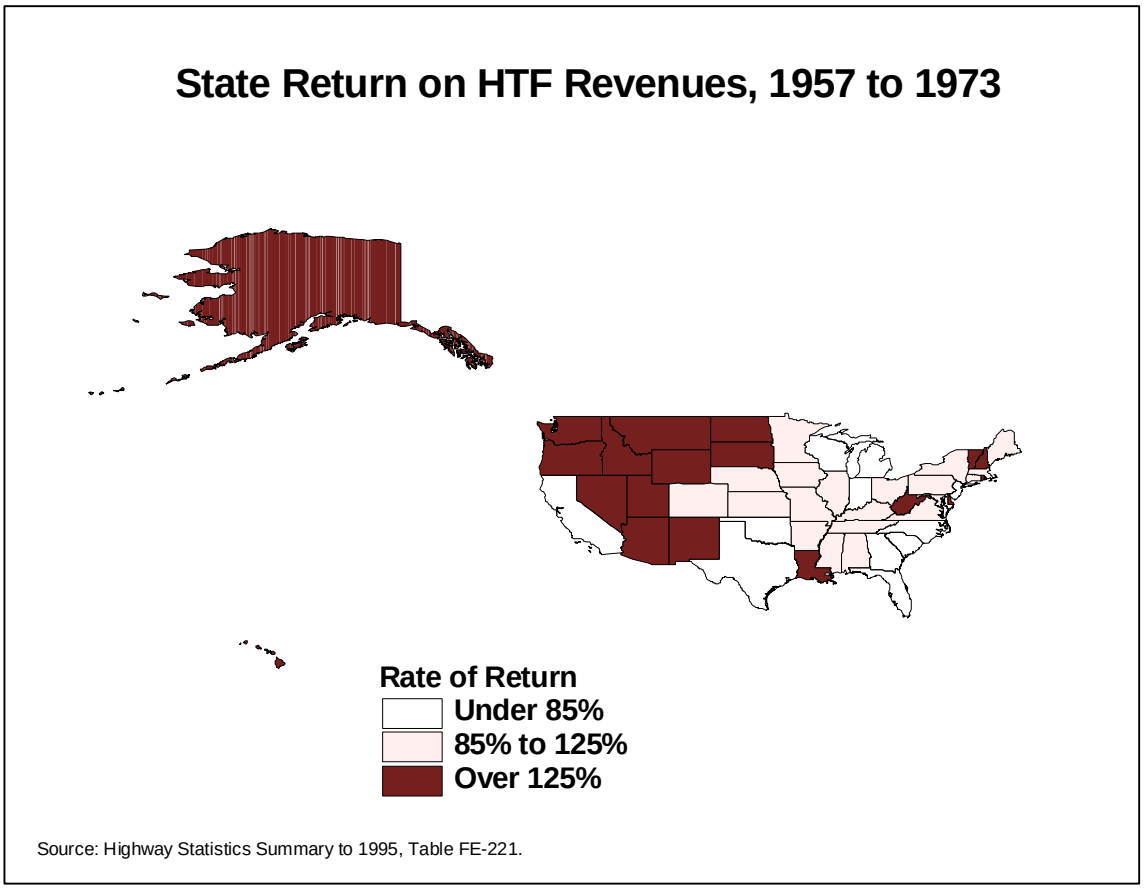
financial problem (Brown 1998). A crisis of highway finance was perceived to be in the air, at both the federal and the state level across the nation.

As if modal competition and the growing mismatch between programmatic responsibilities and the resources available to meet these needs were not bad enough for the transportation program and its supporters, another set of problems began to emerge as the 1980s began. The Reagan Administration unveiled its New Federalism scheme whereby responsibility for many federal programs, including transportation, would be devolved back to the states. Many conservatives began to question why the federal government was even in the transportation policy business, particularly as the interstate construction program began to wind down (Poole 1996). They felt states ran their transportation programs much more efficiently than the federal government and were much more open to policy innovation.

The gradual winding down of the interstate program brought the issue of highway trust fund winners and losers, what became known as the donor state problem, into the open. As discussed in detail earlier, the highway program redistributed money among the states, so as to allow the creation and maintenance of a national highway network. During the early years of trust fund operation, the years when interstate construction was in full swing, redistribution was accepted as a necessity for completing the system. Some states simply lacked the local financial resources to construct the federal highways without aid

from other states. Many of these needy states lay in the western portion of the country (see **Map 5-1**).[90]

Map 5-1: The donor state issue during the construction era, 1957 to 1973

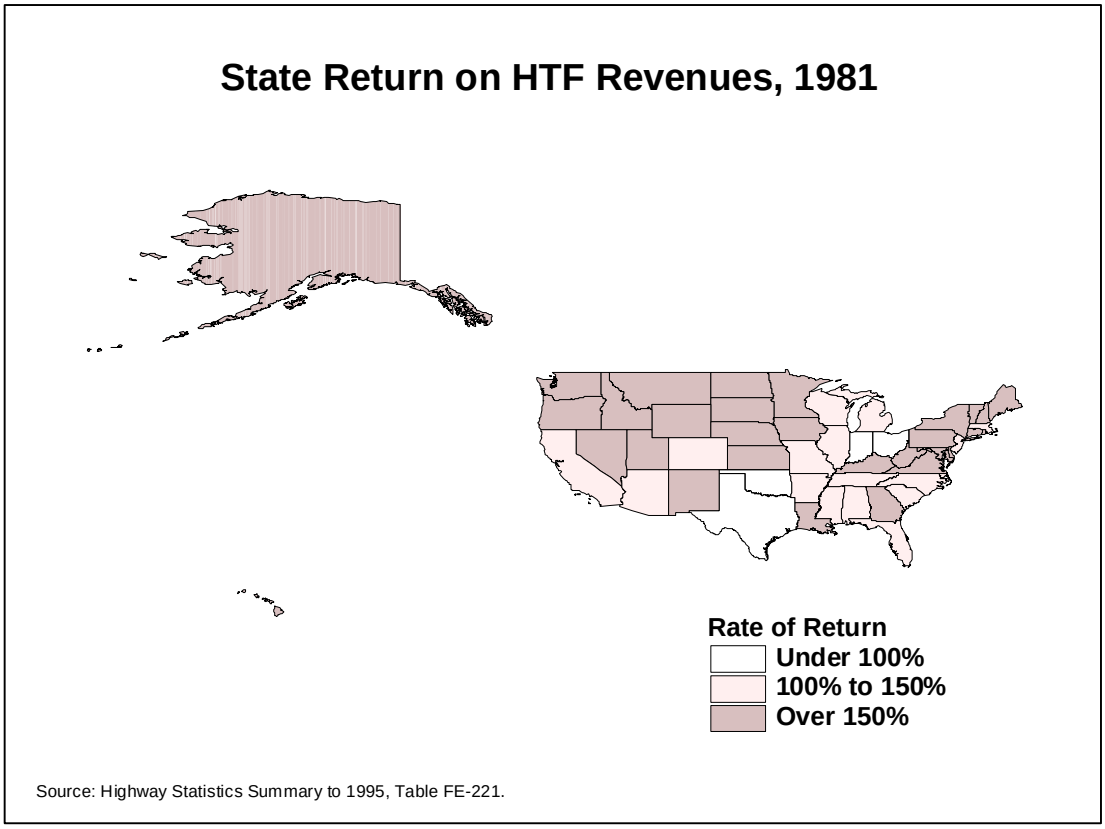


But by the early 1980s, the federal mission was increasingly becoming one of maintenance and reconstruction, rather than basic system construction. The representatives of the donor states (states that paid more in taxes than they received in aid) felt that their responsibilities to their "more needy" colleagues had thus drawn to an

[90] Two winners during this early period were New York and Pennsylvania, and these states were not among the poor and needy states in the country. They had historically been well represented on the oversight committees that designed the formula apportionment process (Riddick 1973).

end (see **Map 5-2**). At the very least they demanded more equity when decisions were made about the spatial distribution of federal aid dollars. They argued that it was not fair that some states lost money under the highway program, including many in the south, while other states, including many in the west and northeast, received a more than 150 percent return on their contributions. They wanted more of their residents' tax dollars returned to their states (Congressional Record 1982, Senate Vote Analysis 1982). It was against this conflicted backdrop, and in the midst of a recession, that the debate over reauthorization of the surface transportation program began.

Map 5-2: The donor issue in 1981, prior to the 1982 settlement



Modal truce and donor state compromise in 1982

Three issues touched on above (modal fights, donor fights, and the need for more HTF funds) dominated the 1982 reauthorization debate, and the recession provided an incentive for debate participants to come to some sort of early settlement. President Reagan and his aides quickly voiced their willingness to accept highway user tax increases (previously anathema to them, as were most tax increase proposals) if the funds could be used to provide lots of jobs for the growing numbers of unemployed (Congressional Record 1982). The highway community also lined up to support a large increase in the federal motor fuels tax—only to run into the opposition of a large body of donor state representatives and members of the public transit lobby. These groups had the votes to prevent passage of the motor fuels tax increase, and they voiced their intentions of doing so unless their own concerns were met. Highway program supporters raised charges of blackmail, but there was little they could do but listen to their opponents' complaints (Congressional Record 1982, Senate Vote Analysis 1982).

Public transit advocates demanded a large increase in federal aid to public transit and the creation of a dedicated funding mechanism like a trust fund (Congressional Record 1982, Jones 1985, Senate Vote Analysis 1982). A few were willing to settle for a share of the proposed five cents per gallon motor fuels tax increase then being discussed and the creation of a special transit account within the highway trust fund. Transit supporters sought certainty, stability, and more money for the transit program, and a dedicated funding source could provide all of these things.

The representatives of the donor states rallied in the House of Representatives, where population-based apportionment provided them with a platform from which to voice their grievances. The formula apportionment process was particularly unfair to states with large populations, with the notable exceptions of New York and Pennsylvania, two states that had historically been well represented on the key congressional committees, and the House rallied around the banner of adding fairness to the program. The House quickly settled on the demand that 85 percent of the money a state's taxpayers contributed to the highway account of the highway trust fund be returned to the state in the form of highway aid (Congressional Record 1982). They were willing to accept some continued geographic redistribution to support a national program, but they wanted a formal guarantee that a more equitable distribution would take place.

The 1982 reauthorization debate spilled into 1983, as competing bills were drafted and considered in prelude to the big compromise everyone knew would have to take place. Compromise legislation was finally enacted as the Surface Transportation Assistance Act of 1982 (STAA), and signed into law by President Reagan in June 1983. The STAA brought about significant changes in the way the federal transportation program operated, but researchers more interested in studying ISTEA and TEA-21 have generally neglected it. Even so, STAA's changes set federal policy directly on the path to the changes in later legislation.

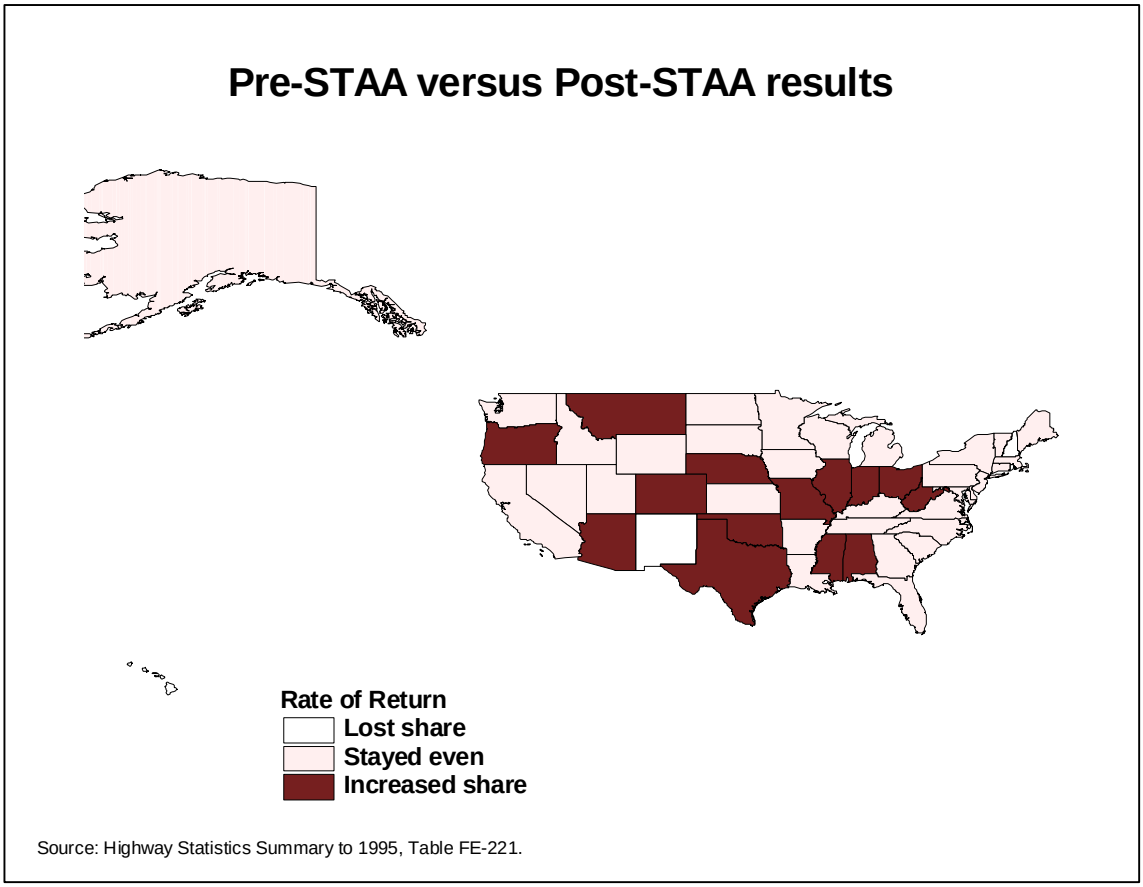
First, transit supporters won their desired dedicated funding source when one cent of the five-cent fuel tax increase was dedicated to public transit (Surface Transportation Assistance Act of 1982). The "transit penny" would be used to fund a newly created mass

transit account within the highway trust fund. This settlement enabled a significant expansion in federal transit expenditures over the next decade, and the idea that transit should receive around 20 percent of the federal aid expenditure (a legacy of this agreement) has been carried over into later surface transportation legislation (ISTEA, TEA-21). Thus, a truce had been arranged in the long-running modal war, although some conflict would reemerge in 1987 and 1991.

Second, donor state representatives succeeded in their effort to obtain some measure of state equity in the distribution of federal aid dollars. A provision mandating that a state receive in federal highway aid at least 85 percent of the money its residents paid in highway user taxes (to the highway account) was adopted. Unfortunately, there proved to be so many loopholes in the language of the law that it was applied to only certain programs within the federal aid umbrella and not to all of them. The results were thus far short of what supporters of the idea had hoped for. Indeed only a handful of net recipient states saw their rates of return go down (Hawaii, Vermont, New Mexico), and most donor states had their rates of return relatively unchanged over the next several years (see **Map 5-3**).

Dissatisfaction with the results of the 1982 settlement meant the donor state issue was not about to disappear, and donor state resentment underscored many proposals throughout the 1980s and 1990s to devolve the federal program to the states (Poole 1996, Roth 1991). The issue resurfaced every time reauthorization took place, and it dominated the political debates during the reauthorization in 1991 (ISTEA) and 1998 (TEA-21), and looks to figure prominently in this year's reauthorization as well (2003).

Map 5-3: The results of the STAA donor state settlement



Third, the overall federal financial commitment was increased dramatically. STAA authorized expenditures that were almost 50 percent higher than under the previous legislation. Over four years, a total of $71 billion in surface transportation spending was authorized, $54 billion for highways and $17 billion for public transit. Annual federal surface transportation spending was now more than $17 billion a year, a significant boost over the $5 to $6 billion levels of the 1970s. The highway user tax increases made the spending increases possible. In fact the higher taxes were so

successful in terms of revenue generation (because Americans were consuming so much gasoline and other petroleum products) that large balances began to accumulate in the highway trust fund. These unspent balances become the subject of great controversy, particularly in the 1990s, because they were used to help camouflage the size of the federal deficit and thus to support non-transportation spending (Congressional Record 1998).

In a preview of things to come, a few particularly creative, and it must be presumed well-placed, representatives and senators inserted provisions to fund 10 highway demonstration projects at a cost of $420 million (STAA 1982). The language did not require that states undertake these projects, they merely suggested them. But the insertion of project earmarks was the beginning of a new policy trend.

Otherwise, the formula apportionment process continued to dominate both the highway and transit programs. In the transit field, the 1982 act created a host of new program categories, by breaking up the existing programs into specific policy segments (capital grants, operations grants, etc), and unveiled an array of new formulas whose particular factors varied with an urban area's population size. There were suddenly different apportionment formulas for small cities (under 200,000), medium-size cities (200,000 to 1 million), and large cities (over 1 million). Most of the formulas retained a population and density component, but to these were added service factors such as vehicle miles of service. As before, a strict linkage with transit ridership was avoided because ridership was concentrated in such a small number of places. Political concerns

required that transit aid be spread over as wide an area as possible, and hence the state apportionment cap (12.5%) was also retained.

In the highway program, the interstate, secondary, and urban system formulas were left unchanged, but the primary system formula was changed to give a state's rural population and urban population equal weight in the distribution of funds (STAA 1982). Urban members had long advocated a switch to a strict population or a population plus VMT apportionment formula, but rural members still retained sufficient power to force a compromise that helped their constituents.

Federal transportation policy in the 1980s

During the 1980s, the transportation program got on with business as usual. The sudden influx of new funds led to significant new project activity, particularly in public transit where a proliferation of rail transit studies soon emerged. Highway activity focused on construction of the remaining interstate projects and on system maintenance and reconstruction. By and large things were relatively quiet, save for the occasional griping from donor states, the periodic floating by Reagan Administration officials of their latest block grant or turnback proposals, and the occasional attempt by supporters of other federal programs to raid the growing trust fund balances. Deficit hawks also began to cast their eyes on the trust fund, as a means of bringing some control to spiraling federal budget deficits.

Reagan Administration officials and their conservative interest group allies periodically advocated the devolution of highway finance and planning to the states (Congressional Record 1983, Roth 1991). There were frequent arguments that

transportation was primarily a local concern, that federal intervention and the often-cumbersome federal regulations were ill-advised intrusions with often-inefficient results, and that states could handle the task with better results (Roth 1991). The Administration achieved a minor success in its efforts with the passage of the Federalism Block Grant Highway Act in 1983, which provided for greater local control over transportation spending (Congressional Record 1983). But however popular it may have been with conservatives and libertarians, the idea has been a non-starter with most members of the highway community, including the nation's governors who have consistently voted down pro-devolution resolutions.

In 1986, congress began debates over the contents of what everyone knew would be the last program reauthorization of the interstate highway era. And very quickly the same conflicts that had arisen during STAA emerged. Transit supporters sought an even larger federal commitment to public transit, and donor state representatives wanted a better minimum guarantee arrangement than they had achieved under the 1982 bill. Remarkably, there were no formula fights on the horizon. But these efforts were complicated by two other factors, both related to the escalating federal budget deficit. First, the Reagan Administration wanted to reduce transportation expenditures as part of an overall reduction in domestic discretionary spending. Thus, officials warned that the President would veto any bill that increased federal transportation spending. Second, deficit hawks wanted to take a portion of the federal gasoline tax and redirect it to deficit reduction. Things would be very interesting indeed.

In fact, the bill that emerged, the Surface Transportation and Uniform Relocation Assistance Act (STURAA) is a very interesting piece of legislation. One reason is that it is the only modern highway bill to be vetoed. Citing its $90 billion authorization (which was $10 billion higher than the Administration would accept) and its 171 demonstration projects, Reagan wielded his veto pen, and a frantic effort to sustain or override the veto was soon underway (FHWA 2002).

The public charges that administration officials leveled against the bill were that it was "pure pork" and a "colossal waste of taxpayers' money." Especially galling to administration officials were the project earmarks. Earmarking began with the modest efforts under STAA in 1982, but had exploded during the 1980s as congress enacted a sequence of more than fifty highway project bills with a total cost of $2.5 billion during the annual appropriations process (Congress and the Nation 1988). Administration officials hated earmarks, and they publicly ridiculed congress' not-too-subtle attempts to justify them by making them look like pilot programs to test actual policy innovations. As one author noted of the congressional practice, "funding for two parking lots became a demonstration of 'methods of facilitating the transfer of passengers between different modes of transportation" (FHWA 2002). But the wide geographic spread of the earmarks among states and congressional districts allowed the House to easily override the veto and the Senate to override it by one vote (Senate Vote Analysis 1987). STURAA became law in early 1987 (STURAA 1987).

STURAA represented a holding pattern as far as most policy decisions were concerned. The big focus was wrapping up the interstate program, and using the time

leading to the next reauthorization to rethink the federal commitment to surface transportation in a post-interstate era. Highway expenditures grew under STURAA to around $17 billion a year while transit expenditures dropped slightly to just above $3 billion a year (Highway Statistics Summary to 1995, FTA Grant Summaries 1996). Formula funding decisions were postponed, and the ever-present complaints of donor states were also brushed aside. Both of these issues would return in 1991.

STURAA also marked a shift in budgetary treatment of highway user taxes, and precipitated a ten-year fight over the need to "protect" the highway trust fund dollars from non-transportation uses. In an effort to mollify the deficit hawks on Capitol Hill, STURAA provided that 2.5 cents per gallon of both the gasoline and diesel taxes be targeted to deficit reduction, a euphemism for transferring the money into the general fund. This was a major break with past experience and paved the way for additional deficit-reduction diversions in subsequent congresses, despite the vigorous opposition of the highway lobby. STURAA's diversion was made permanent as part of the 1990 budget agreement between Democrats and President Bush, and many people (of both political stripes) were not too happy with the idea.[91] The idea of using the gasoline tax as

[91] Fights involving the highway program and the use of trust fund revenues have cut across party lines. Consider the party affiliations (and rhetoric) of those who made arguments about the use of trust fund money for deficit reduction, a provision enacted under STURAA. Senator Richard Bryan (D-Nevada) argued that "It is fundamentally dishonest to the American people to dip into their pocketbooks for a stated purpose and then not spend money for that purpose" (Godfrey 1990:764). Senator Harry Reid (another Nevada Democrat) called the use of gas tax revenue in the general budget "immoral" (Congressional Record 1990, Godfrey 1990). Senators John Chafee (R-Rhode Island) argued that gas tax revenues should not even be earmarked at all and that the trust fund encouraged the expenditure of billions of dollars on already "overfunded" projects (Congressional Record 1990, Godfrey 1990). Senator Daniel Moynihan (D-New York) advocated drastic gas tax increases not only to help balance a budget whose annual deficits were

a deficit reducer caught on, and it was used again (despite the best efforts of opponents) as part of President Clinton's budget package in 1993. During the 1990s, opponents fought to repeal both deficit-reduction diversions of trust fund money. The long-term result of this fight was the creation of Revenue Aligned Budget Authority (RABA) as part of TEA-21.

The STURAA legislation was widely seen as representing the end of an era, the interstate construction era, as New York Senator Moynihan noted at the time (Congressional Record 1987). It didn't take much time after its passage for the Department of Transportation, congress, and a variety of interest groups across the transportation spectrum to begin their own attempts to define a new mission for the federal program. The story of the federal program in the post-interstate era is the subject of the next chapter.

soaring to $300 billion and higher, but also to "stem America's gluttonous appetite for cars" (Godfrey 1990:765).

CHAPTER SIX. THE POST-INTERSTATE ERA (1990 – PRESENT)

In 1991, congress passed ISTEA, the first transportation bill of the post-interstate era. The ISTEA debates marked the first extensive reconsideration of federal transportation policy since 1956, and as such there were significant disagreements among members of congress and interest groups within the transportation community. The long-running disagreements between supporters of highways and transit and donors and donees that had become significant features of the policy landscape in the 1970s and 1980s resurfaced, and elaborate compromises had to be negotiated before the bill was passed. The conflicts over resource distribution became even more intense during TEA-21 when donor state representatives stood their ground for a stronger financial guarantee for their constituents.

This chapter traces the story of the debates surrounding passage of ISTEA and TEA-21, and focuses particularly on the debates over resource distribution (including formula apportionment factors, minimum guaranteed return agreements, and high priority project earmarks) that dominated the discussion. Many of these same conflicts have resurfaced in the months preceding the current reauthorization debate. The chapter closes by posing the question: how much has ISTEA (and TEA-21) really changed? The quantitative analysis contained in the following chapters begins to answer this question.

The prelude to ISTEA: rethinking policy for the 1990s

The effort to rethink federal surface transportation policy in a post-interstate era began shortly after the ink had dried on the STURAA bill. In the immediate months after

the STURAA bill passed, an FHWA task force undertook a comprehensive reexamination of the federal highway program, which presented a number of different directions for the future but failed to recommend any particular scenario (FHWA 1988).[92] The different interest groups in the transportation arena were also active early. As far back as 1985, the American Association of State Highway and Transportation Officials (AASHTO, the successor to AASHO) had been thinking about the federal role in a post-interstate world, and had, perhaps not surprisingly, come to the conclusion that this role should focus on the development of a new system of the most important national highways. In other words, the federal effort had to be redoubled, and attempts to devolve or reduce the program resisted—although the idea of a block grant program as a supplement to the existing program won support among members of the organization's policy committee. AASHTO recommended an increase in the overall federal commitment to transportation, and called for annual highway expenditures of $25 billion or more and annual transit expenditures in the $5 to $6 billion range, approximately 20 percent the size of the highway expenditures (AASHTO 1988).[93] AASHTO also recommended the consolidation of many of the program categories. Shortly thereafter, AASHTO created a Transportation Alternatives Group (TAG) that included politicians from all levels of government as well as representatives from the highway and transit

[92] The FHWA report recommended that the federal government retain a central role, particularly in terms of maintaining a national system and in areas such as research and safety. It shied away from tackling the critical finance issues then swirling around the program (including donor state concerns and local/state desires for more programmatic flexibility) (FHWA 1988).

[93] AASHTO had to be somewhat sensitive to transit concerns, because it had expanded its focus into the transit field, but most of its members were still highway officials.

interest groups to develop a broad policy outline. TAG recommended emphasizing mobility, increasing federal aid, and introducing more flexibility in the use of federal aid dollars, but it avoided making more specific recommendations (Weingroff 2001).

While AASHTO began its efforts, so did the new Bush Administration. A task force was created by the Secretary of Transportation to make recommendations that could then become the basis for the Administration's favored reauthorization bill in congress. The task force produced a blueprint for a new National Transportation Policy (NTP). The key components of the NTP were: an increased federal focus on systems of national significance, more flexibility in the use of funds by state and local governments, increased authority for metropolitan planning organizations, an end to transit operating assistance, and a reduced federal share of the cost for most transportation projects (between 60 and 75 percent on most projects) (USDOT 1990). The NTP sought to reduce federal commitments overall, including cost shares, and shift them to systems of more national importance.

The blueprint's themes of flexibility and local choice won a great deal of praise, but calls for reduced federal cost shares and an end to transit operating assistance (which had been sought by the executive branch for more than a decade) stimulated a great deal of opposition, among interest groups and politicians. AASHTO, the American Public Transit Association (APTA), and the Highway Users Federation opposed the funding changes, and Representative Mineta of California was quoted as saying that NTP gave states "the shift and the shaft" (Weingroff 2001). Senator Burdick of North Dakota

complained that the proposed 60 percent federal shares for rural highway projects was both “unfair” and a “betrayal” of his constituents (Congressional Record 1990). The rhetoric was heating up—and the posturing had only just begun.

The highway lobby responded to the NTP and its calls for “flexibility,” which many thought meant less money for highways, with their own plans for a renewed federal commitment to highway construction and the creation of yet another national system of key highways. Many highway groups proposed funding this increased commitment by ending the diversion of highway trust fund revenues to deficit reduction (enacted as part of STURAA and the 1990 budget agreement) and public transit (enacted in 1982) (TRIP 1991). Transit advocates and allied interest groups formed the Surface Transportation Policy Project, and began working closely with Senator Moynihan of New York, to keep up the pressure for more transit aid and more finance flexibility.

The 1991 reauthorization battle and passage of ISTEA

The Bush Administration introduced its reauthorization bill in February 1991, the Surface Transportation Assistance Act (STAA) (Congressional Record 1991, Weingroff 2001). The bill called for total surface transportation spending of $105 billion over five years, including $89 billion for highways and $16 billion for public transit. The bill also called for a dramatic restructuring of the entire federal transportation program. On the highway side, the most important changes were: the creation of a National Highway System of 155,000 miles, consisting of the most important highways in the country; and the replacement of the traditional primary, secondary, and urban systems programs by a

new Urban/Rural program.[94] On the transit side, federal matching shares would be increased to 80 percent, and operating assistance would be eliminated in the largest US cities. The bill's flexibility provisions allowed a portion of the highway funds to be used for transit purposes.[95] By and large, politicians and interest groups gave the administration points for effort, and then bashed the finance elements of the package.

Every interest group attacked the proposed spending levels as being inadequate. Highway groups charged that it neglected critical infrastructure needs. Transit groups criticized the level of proposed transit expenditure and the elimination of operating assistance for large cities. The National Governors' Association condemned the plan for shifting so many of the program's costs to the states—by reducing the federal match (Weingroff 2001). The reactions from many parts of congress were hostile as well (Congressional Record 1991).

Representing its wide of array of transit and environmental groups, STPP responded to the administration proposal with its own transit-oriented one, which was focused on eliminating the pro-highway tilt that the transit community had long believed characterized federal policy (STPP 1991). For example, the proposal equalized the

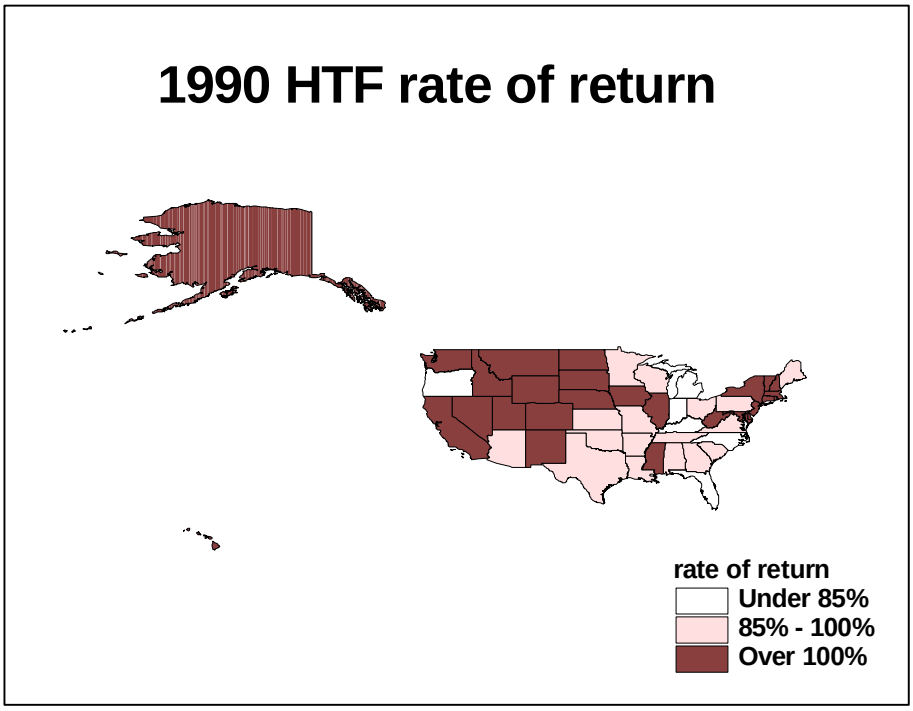
[94] The federal share of NHS project cost would be 75 percent, except in the case of interstate projects where the share would be 90 percent. The federal share for the Urban/Rural program would be 60 percent.

[95] The STAA bill also increased the powers of metropolitan planning organizations, added new environmental mitigation programs, permitted an array of new toll finance and congestion pricing demonstration projects, and allowed federal aid funds to be used on pedestrian and bicycle projects. Thus, while many could and did complain about the bill's lack of financial generosity, most were impressed by the boldness of its policy prescriptions.

federal match share at 75 percent for both the highway and transit modes. It would also retain transit operating assistance for large cities and boost overall transit spending to $26 billion over five years. The proposal also gave metropolitan planning organizations more control over planning and programming decisions.

The STPP bill was introduced as the Transportation for Livable Communities Act, but it was soon followed by a host of others. One of these, the Transportation Improvement Act, was introduced by representatives from donee states (the winners under the current highway apportionment system) to protect themselves against a negative change in the formulas. Senators Baucus of Montana and Reid of Nevada proposed altering the formulas to include factors such as weather adversity, per capita highway spending, and low population density, factors that would have provided a windfall to states that were already big winners under the current system (Congressional Record 1991). Senator Warner of Virginia countered with a proposal that relied on vehicle travel and highway system mileage to allocate funds and provided for a 90 percent minimum guaranteed return (the FAST proposal). His plan drew support primarily from members of the House of Representatives, a few of whom were holding out for a 95 percent return (Congressional Record 1991). These donor state representatives were angry about the 85 percent minimum return provision then in place, because it did not apply to all highway programs. Many states received much less than an 85% return, as **Map 6-1** (which shows the rate of return for 1990) indicates.

Map 6-1: The donor state question and the 85% minimum, 1990



Source: Highway Statistics 1991, Table FE-221.

Senator Bond of Missouri weighed in with a new formula scheme that emphasized gasoline consumption; he also trumpeted the additional $280 million a year this formula would produce for his state (Weingroff 2001). And so the battle was fully joined, and very soon this modal conflict was joined both by formula apportionment conflicts and battles between donor and donee states. Everyone was looking for more federal aid dollars and lots of programmatic change.

Senator Moynihan's proposal

The central political figure in the 1991 debate was Senator Moynihan of New York. Working closely with members of STPP, he unveiled a reauthorization plan that he called the Surface Transportation Efficiency Act of 1991 (STEA) (Congressional Record

1991). Moynihan's bill focused on streamlining program categories, increasing flexibility in the use of aid dollars, and leveling the playing field between highways and transit.[96] He sought to achieve the last point by declaring that all highway money authorized by the bill would be fungible, or available for use on non-highway projects. The bill proposed significant changes in the programmatic outlines of the federal program, and thus drew fire from highway groups and praise from transit groups (Weingroff 2001). But the bill did not go far enough in addressing all the finance disparities that existed in the current program. It addressed the modal side of the issue, but not the spatial and geopolitical issues that were raised by donor state representatives. For any proposal to pass congress, particularly the House of Representatives, some attention would have to be paid to their concerns as embodied in competing proposals like FAST.

The savior in the Senate battle turned out to be Senator Byrd of West Virginia who discovered $8 billion in budget authority in the highway trust fund (Congressional Record 1991). This found money was allocated to donor states through the minimum guaranteed return process and to states more generally on the basis of their level of tax

[96] The bill replaced the existing federal aid structure with a handful of programs: a surface transportation program of highway and public transit projects ($50 billion dollars, with an 80 percent match share); a scaled down interstate program focused on completion of the remaining projects ($7 billion); and interstate maintenance program ($14 billion dollars with an 80 percent match share); a bridge rehabilitation program ($13 billion with an 80 percent match share); and a Congestion Mitigation and Air Quality projects program designed for non-attainment areas ($1 billion annually). The bill also strengthened metropolitan planning organizations, mandated statewide transportation planning, provided for a magnetic levitation rail program (A Moynihan favorite), and called for the reimbursement of states whose toll roads had been incorporated in the interstate system in the 1950s. The bill neglected to create the national highway system that was the centerpiece of the Administration proposal. The bill incorporated many of the ideas STPP had put forward in its own proposal (Weingroff 2001).

effort. Every state received some money under one or both adjustments. And before the revised STEA bill left the Senate, the Environment and Public Works committee added a provision for the creation of the National Highway System favored by the Administration (Congressional Record 1991). Attention then turned to the House of Representatives.

Members of the House were, by and large, focused on three issues (Congressional Record 1991). First, they wanted more money spent on transportation. Some members were proposing a gas tax increase to make this possible, under the name "a nickel for America."[97] Second, they wanted a guaranteed minimum return of 90 percent for all states on their trust fund contributions, which was an increase over the current 85 percent. And, third, they wanted to include more than 400 demonstration project earmarks in the new reauthorization bill. These earmarks represented a total of $5 billion out of the $151 billion ($119 billion for highways, $32 billion for transit), five-year bill that ultimately emerged from the House. After a long delay, during which the ultimately doomed "nickel for America proposal" had consumed most of the House's attention, the House bill was passed by a lopsided vote in late October 1991 (Congressional Record 1991).

In conference, the basic programmatic form of the Senate bill was retained, but the 90 percent donor state guarantee and the 400-plus demonstration projects from the House bill were added (ISTEA 1991).[98] But donee states were protected through the

[97] The Administration warned members of Congress that any gas tax increase would be vetoed, regardless of how the revenues were to be spent. The President was suffering politically in the wake of the 1990 budget agreement and the breaking of his no new taxes pledge (Congressional Record 1991, Weingroff 2001).

[98] Senator Moynihan's prized maglev program survived the conference, but did not receive anywhere near the $500 million authorized under ISTEA (ISTEA 1991).

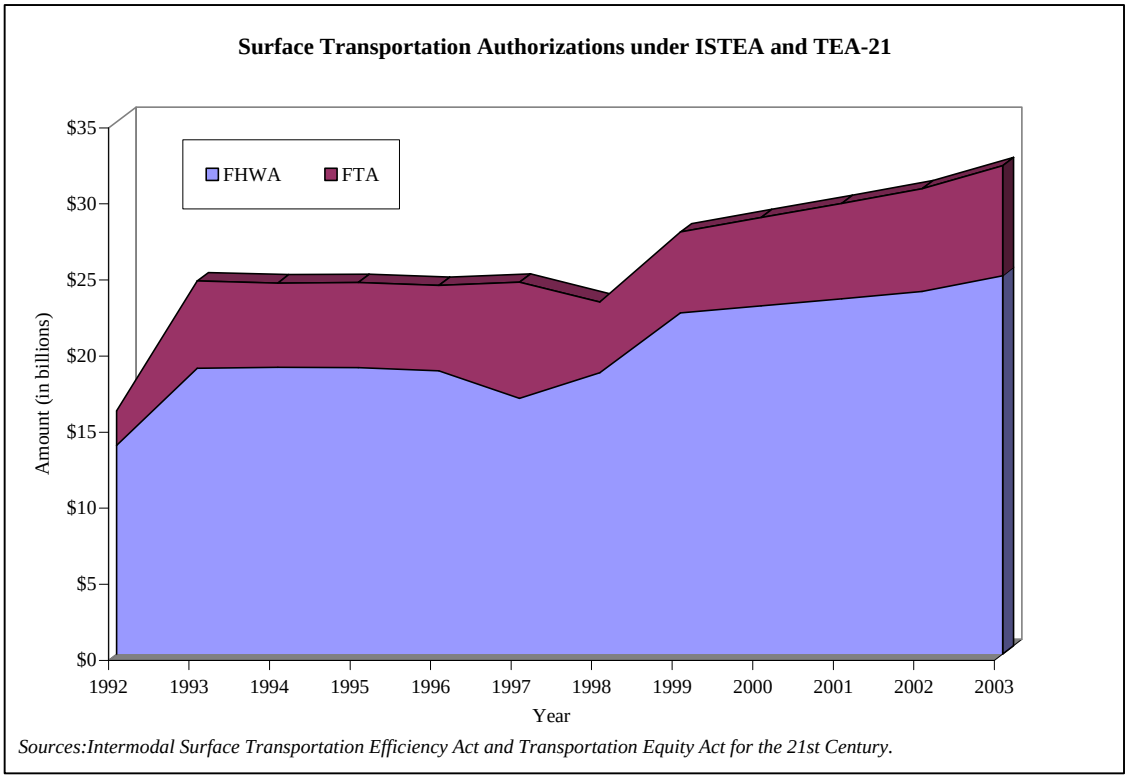
inclusion of hold harmless provisions that prevented total state apportionment amounts from falling below their levels under STURAA (ISTEA 1991). Thus, the opportunity for significant change in the net geographic distribution of highway funds was reduced considerably. The final compromise bill easily cleared both houses before being signed by President Bush at a Texas highway construction site in December 1991 (Weingroff 2001). The Intermodal Surface Transportation Efficiency Act (ISTEA) was by that time being sold to the public as a jobs bill to help alleviate a recession—just as its 1982 predecessor had been.

The ISTEA law

The Intermodal Surface Transportation Efficiency Act (or ISTEA as the law has since been called) provided $155 billion in transportation spending over six years, including $115 billion for highways and $32 billion for transit. Annual surface transportation expenditures approached $25 billion. ISTEA has been characterized as a major turning point in the history of federal transportation policy. One of these changes is presumed to be a shift away from a highway-centric to a multi-modal transportation policy. Another is said to be the empowerment of metropolitan planning organizations and local government vis-a-vis the once-dominant state highway departments. A third is the allowance for more flexibility in the use of federal aid dollars. While much has changed since passage of ISTEA, Chapters 8 through 10 show that the magnitudes of the changes, particularly when it comes to the pattern of expenditures, are not quite one would expect given the passionate rhetoric around the issue.

To be sure, transit expenditures increased, and transit's position in relation to the federal highway program was strengthened, as **Graph 6-1** shows. Transit expenditures were bumped into the $5-$6 billion a year range, a significant change from the 1970s and even early 1980s (ISTEA 1991). But highway expenditures grew as well as the same graph shows. And highway growth after ISTEA would exceed the rate of transit growth.

Graph 6-1. Surface transportation authorizations in the 1990s



Sources:Intermodal Surface Transportation Efficiency Act and Transportation Equity Act for the 21st Century.

The highway programs were restructured, and many new apportionment formulas were unveiled—including a couple that included use of the highways as an apportionment factor. But many old highway formulas were retained, as representatives of donor states complained at the time and in the years immediately afterward. **Table 6-1** shows the structure of the federal highway program, including categories and formulas, in

the aftermath of ISTEA. The federal share for most highway projects was changed to 80 percent, and a number of new programs were unveiled, but many old structures were retained. For example, the minimum state apportionment provisions and public lands state bonuses were both retained. And, deep within the National Highway System formula, a state's miles of rural post roads remained a factor affecting the apportionment of federal highway resources—seventy-five years after it first emerged.

Table 6-1. Federal highway program after ISTEA

Apportionment formulas under ISTEA

Federal Highway Administration

Program	*Formula*	*Federal Share*	*Minimum Apportionment*
Interstate Maintenance	55% interstate lane miles, 45% interstate VMT	90%	0.50%
National Highway System	based on percent shares of interstate 4r, primary, secondary, urban, bridge rehab and replacement, and interstate construction from FY 1987-1991	80%	
Bridge Replacement and Rehabilitation	relative share of cost of deficient bridges	80%	.25%, 10% max
Surface Transportation program	same as NHS, states to receive minimum of 70 percent of FY 1987-1991 allocations	80%	
CMAQ	weighted share of nonattainment area population	80%	.5%, 42% max
Metropolitan Planning	urbanized area population	80%	0.50%
Interstate Reimbursement	share of non-federal-aid funds used on interstate system routes	-	0.50%
Restoration Funds	specified percentages in PL 104-59	-	
Highway Safety Programs	3/4 total population, 1/4 public road mileage	80%+	0.50%

The federal transit program was also restructured by ISTEA, and given a new name. Henceforth, it would officially be the federal transit program (it was previously the urban mass transit program), and it would be overseen by a newly named Federal Transit Administration. **Table 6-2** shows the structure of the transit program, including categories and formulas, in the wake of ISTEA. The program was divided into a number of formula and discretionary grants categories, that include both capital and operating

assistance. This is almost the structure of the present program, missing is only the more recently added Job Access and Reverse Commute program enacted as part of welfare reform. It is worth noting that the threat to eliminate operating assistance was warded off during the ISTEA debates, but the law reduced the amount of money spent on transit operations. Operating assistance would continue to be a target for elimination by budget conscious administration officials of both parties during the 1990s, especially operating assistance to agencies in larger urban areas.

Table 6-2. Federal transit program after ISTEA

Apportionment formulas under ISTEA

Federal Transit Administration

Program	*Formula*	*Federal Share*
Clean Fuels Program	Number of vehicles in bus fleet and number of bus passenger miles, weighted by severity of non-attainment	80%
Rural Transportation Accessibility Initiative	Competitive basis	90%
Urbanized Area Formula Grants	50 to 199k: population and density; over 200k: bus rev veh miles, bus pass miles, guideway veh miles, guideway rte miles, pop, and density	80%
Nonurbanized Area Formula Grants	Population in areas under 50,000	80%
Elderly and Persons with Disabilities	Number of elderly and disabled individuals in state	80%
Bus and Bus-related Capital Grants	earmarked (supposed to be discretionary)	80%
Fixed Guideway Modernization	seven-tiered formula, min. of one mile fixed guideway	80%
New Starts	earmarked (supposed to be discretionary)	80%
Metropolitan Planning	formula	80%
State Planning and Research	State's urbanized area, .5% minimum	80%
National Planning and Research	earmarked (supposed to be discretionary)	varies
Rural Transit Assistance Program	nonurbanized population	100%

The transit apportionment formulas relied on a combination of service measures, density measures, and population features—but again not actual use of the transit system.

The federal matching shares were increased under ISTEA to 80 percent to introduce a measure of equality in the treatment of the highway and transit programs.

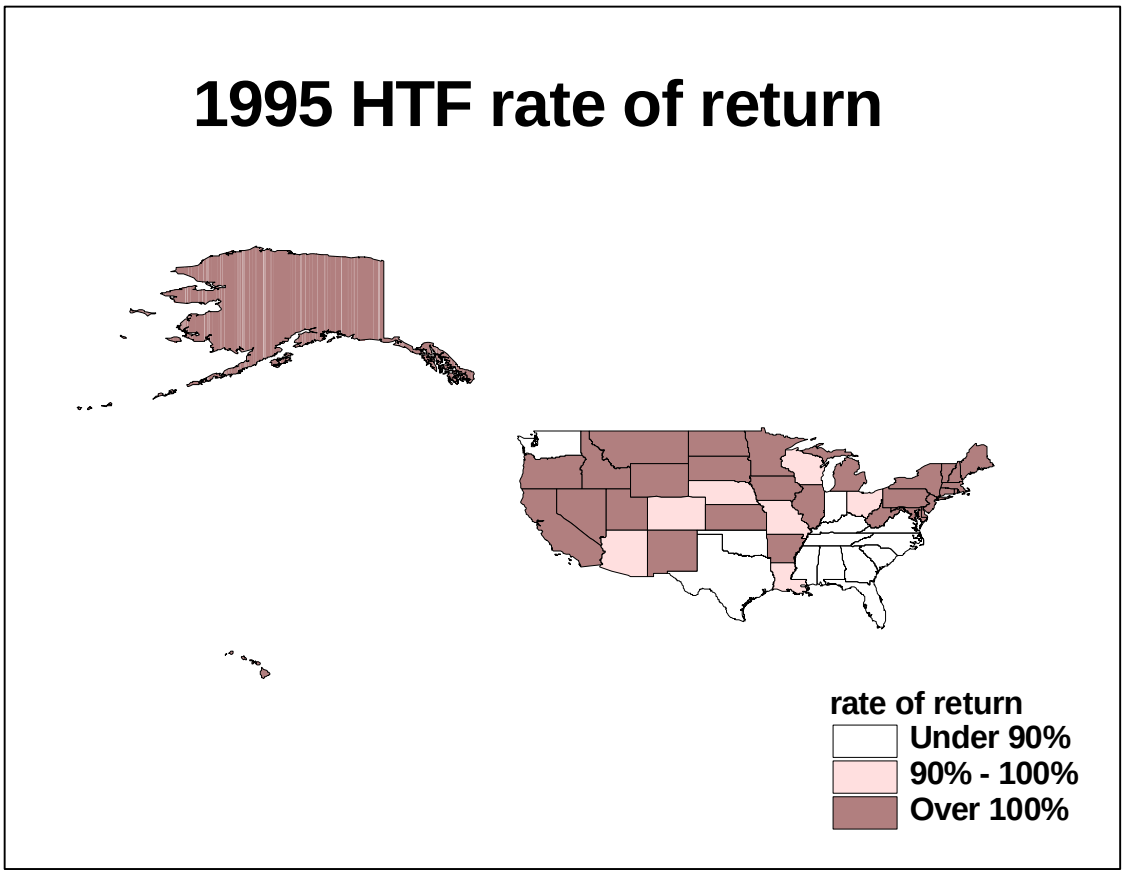
The wake of ISTEA: federal transportation policy in the 1990s

ISTEA increased transportation expenditures for all programs, consolidated spending categories, encouraged more flexibility in spending choices, and adjusted the formula apportionment process by changing a handful of formulas and guaranteeing a 90 percent minimum return (ISTEA 1991). But it did not eliminate the controversies that had surrounded the debate preceding its passage. During the 1990s, complaints about unfair treatment of public transit vis-à-vis highways, broken promises to donor states, unfair spending formulas, broken faith with the highway taxpayers, and complaints about the continued explosion of project earmarks filled the air.

Almost immediately after the law's passage, donor state representatives complained that the 90 percent minimum return provision was not functioning as they had been led to believe. In fact, many states still received substantially less than a 90 percent return, as **Map 6-2** shows for 1995. The chief problem was that ISTEA did not apply the minimum return to all spending categories, so there were enormous loopholes. A handful of state representatives in the House attempted to reopen the formula and minimum guarantee questions as part of the annual appropriations process, but their attempts were rebuffed by congressional leaders and authorizing committee chairs who were not eager for another fight so soon after ISTEA had passed (Congressional Record 1994, 1995). Donor state representatives decided to make a bigger stand at the next reauthorization, but a few were in no mood to wait so long. A few donor state

representatives, particularly members from Michigan, turned to other ways to get more money for their states, and one way was to join the rush to add new project earmarks to the annual appropriations bills that funded the USDOT (Congressional Record 1995).

Map 6-2. The donor states complain: rates of return for 1995

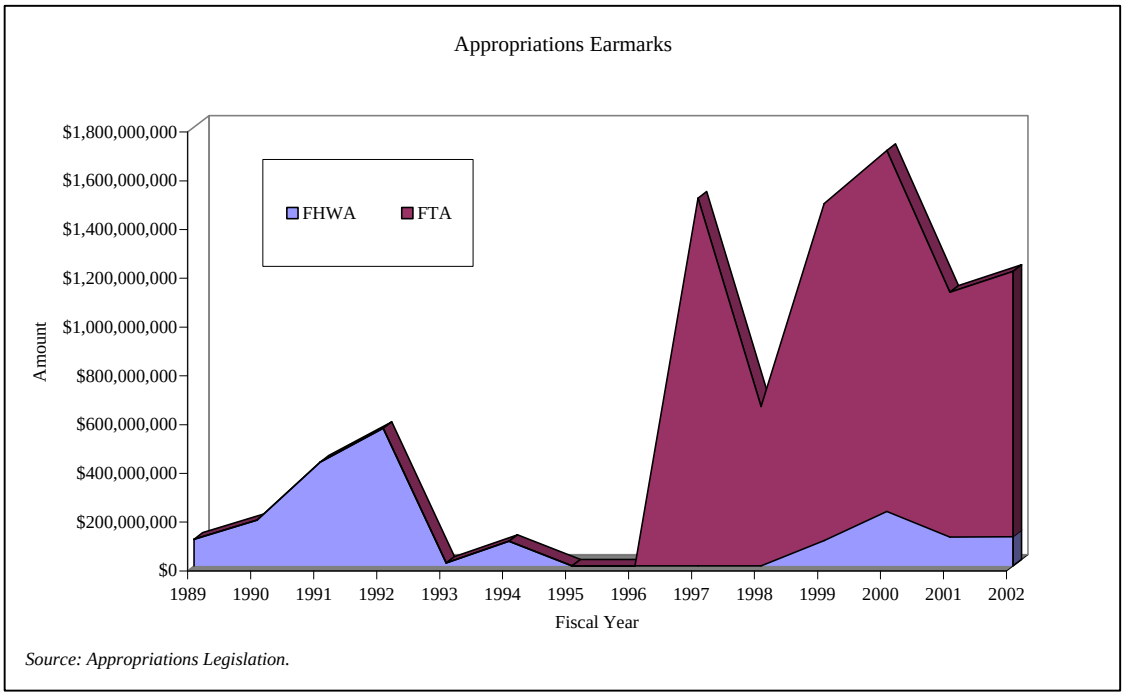


Source: Highway Statistics 1996, Table FE-221.

Indeed the annual appropriations process had recently become a favorite operating environment for members (and interest groups) that felt they had been neglected by the authorizations process. Ever since the mid 1980s, highway project supporters had targeted annual appropriations legislation, and the results were millions of dollars in "unauthorized" (yet funded) special highway projects (see **Graph 6-2**). By the 1990s, the

very term “special projects” had acquired a somewhat odious air, as the result of a series of media reports about pork barrel highway projects. Congress responded by briefly retreating from the practice, only to return to it in an even bigger way than they had before—and among the biggest participants were a few donor state representatives and many public transit supporters.

Graph 6-2: The proliferation of appropriations earmarks in the 1990s and beyond



Source: Appropriations Legislation.

Representative Carr of Michigan, the chair of the House Appropriations Committee, launched the first such effort; Michigan had historically been a donor state. Carr allied with other disgruntled members of his committee, many of whom represented historic donor states, to attach more than $305 million in earmarks to the fiscal year 1994 appropriations bill. One third of the earmarked money just so happened to go to his own

state (Congressional Record 1993: H4997). Public Works chairman Mineta of California, in alliance with ranking member Shuster of Pennsylvania, tried to eliminate the earmarks from the bill, on the basis that they were not authorized by existing law, and had been apportioned outside the formula process to a handful of members in particular states (Congressional Record 1993). Clinton Administration officials and the House leadership supported Mineta's position. Carr retorted that "these projects have been reviewed on their merits—not on the basis of in whose congressional district they happened to be located" (Congressional Record 1993: H6860). But when it looked like Mineta and his allies might succeed in eliminating all the spending, the appropriations committee tried to eliminate funding for a number of ISTEA-authorized projects, including two very expensive rail transit programs near Mineta's San Jose district (Congressional Record 1993). Mineta got the message. A compromise was reached, and only half the proposed appropriations earmark spending actually occurred. But earmarks continued to surface.

During the mid-1990s, congress buckled down and forbade the addition of new highway project earmarks in appropriations legislation—and patted its collective back for doing so (Congressional Record 1996). But it made no provision to forbid transit earmarks, and the result was an explosion in the practice, particularly in the case of rail transit earmarks. Transit supporters were in the ascendancy, and highway project supporters were on the defensive. There had, after all, been relatively few accounts of pork barrel transit projects, save a couple of subway programs, while tales of highway pork barreling were seemingly everywhere.

Many highway project supporters undoubtedly shared the sentiments of West Virginia Senator Byrd, a man many derided and others envied for his skills as one of the most successful practitioner of pork barrel politics in congress. The self-described infrastructure champion spoke extensively on the subject of project earmarks during debate over final passage of the fiscal year 1996 appropriations legislation, which contained a lot of transit earmarks and no highway earmarks. He did not necessarily oppose what the transit supporters were doing; he supported the idea of members of congress making such decisions for their constituents.

> I come not to bury mass transit projects but to praise them. I compliment Senators and Members of the other body who have successfully made the case for earmarking mass transit and bus moneys for cities and towns in their States and congressional districts. They are doing exactly what they should be doing. I do not find fault with that. I come not to bury justified earmarks but to praise them. I have always believed that the elected representatives of the people in Congress, both Houses, are in a better position to know the needs of their constituents in the States and congressional districts they serve than is some un-elected bureaucrat downtown who otherwise would make the arbitrary decisions as to how much and where transportation dollars will be spent.
>
> (Congressional Record 1995: S 16350-16354)

He (and other highway supporters) just wanted fairness and equity. Highway supporters had, after all, been hearing these words from their transit-minded colleagues for years.

> Yet, in this conference report on appropriations for transportation, highway projects are blatantly--blatantly--discriminated against. There is not one copper penny--not one--not one copper penny for highway projects. Members of the House of Representatives sought to have funding for highway projects included in the bill, but they were confronted with the policy that was to be the rule of thumb, the line in the sand--no highway projects; none!
>
> Mr. President, I come not to bury earmarks, but to praise them. In this particular bill I support every earmark. But as one who, while serving on

> the Appropriations Committee for 37 years, has never objected to the practice of earmarking, I ask, what justice--what justice--is there in a transportation policy that blatantly discriminates against highways? What wisdom, what reasonableness, what sweet reasonableness, what logic can there be in a transportation policy which says, ``Come one, come all'' to earmarks for mass transit, but which completely closes the door--closes the door--to highways. How sanctimonious can we get?
>
> (Congressional Record 1995: S16354, S 16356)

And he pointed out the hypocrisy of members claiming to have ended the practice of earmarking when that was not really the case.

> There have been news reports that earmarkings were being done away with in the Transportation bill; there would be no more such earmarkings. The so-called ``pork-busters'' breathed a sigh of relief--hallelujah! No earmarks! Henceforth, highway moneys should be distributed strictly by formula. Thus, a level playing field, it was claimed, was being created for the distribution of highway dollars. A new breed of legislator was in the saddle. Move over, John Wayne, a new breed of legislator was in the saddle. ``Down with earmarks'' was the battle cry!
>
> Yet, Mr. President, earmarking is not dead. It is very much alive and is more robust than ever. And the Transportation appropriations conference report is proof of it with $1,020,000,000--that is $1 for every minute since Jesus Christ was born--$1,020,000,000 for rail and other mass transit projects, all earmarked in this conference report, all earmarked. On the one hand we say we have done away with earmarks in the bill; on the other hand, the bill is full of earmarks. This is sheer hypocrisy, sheer hypocrisy.
>
> What is going on here is simple knee-jerk politics. It is a large fandango aimed at appearing to be ``pure'' on the subject of transportation pork, a large fandango aimed at appearing to be pure on the subject of transportation pork. Highway demos have, over the years, gotten a reputation which, in my view, is largely undeserved. Now that bad reputation is being exploited for political gain--for political reasons.
>
> Make no mistake about it, targeting moneys to a specific locality is earmarking. That is what has been done in the case of mass transit and bus moneys in this bill. That is earmarking. If it moos, gives milk, and has an udder, it is undoubtedly a cow--even if one insists on saddling it like a horse. It is still a cow. If it barks, wags its tail, and lifts its leg, it is a dog, no matter how loudly one claims that it thrives only on cat food. An

> earmark is an earmark is an earmark is an earmark and no amount of obfuscation can change that.
>
> (Congressional Record 1995: S16356)

Senator Byrd's pleas for a little equity, and charges of congressional hypocrisy fell on deaf ears.[99] The transit earmarks remained, and highway earmarks remained forbidden—until the fiscal year 1999 appropriations legislation when $100 million in highway earmarks that had been left out of TEA-21 were suddenly let in. Since that time, highway earmarks have grown modestly—but transit earmarks are on the order of more than $1 billion a year. Earmarking has resulted in the over-commitment of funds in the discretionary grants programs. Administrative discretion, particularly in the transit program, is now a thing of the past.

[99] The complaints about unfairness continued in later bills, as did claims that highway projects were unfairly labeled as pork when transit projects avoided the label. Representative Rahall of West Virginia spoke during the 1997 appropriations debate. "I would like to note that this bill does not contain any earmarking of funds for high-priority highway projects, often referred to as demonstration projects. The reason I make note of this particular fact is that whenever funds are earmarked for highway projects, some in the media, and some in this body, call it pork barrel. In fact, the distinguished chairman of the subcommittee, my good friend, advised Members earlier this year not to even bother testifying before his subcommittee on highway project requests. Yet, to be sure, as it turns out there are numerous earmarks for other types of transportation projects. For example, the bill earmarks over $724 million for 39 transit new start projects. The report accompanying this bill earmarks $333 million for 87 bus projects under what is supposed to be a discretionary program. In addition, the report directs $36.2 million to 16 specific intelligent transportation system projects. I could go on and on. My colleagues, those earmarks alone amount to almost $1.2 billion being directed by this bill toward specific projects. $1.2 billion. Ah, but not a one of them a so-called highway demonstration project. For some reason that I have been unable to understand, the pork barrel label is only applied by the media and some in this body to the earmarking of funds for highway projects. Meanwhile, the earmarking of funds for transit and ITS projects is met with mute silence. You can go to the Appropriations Committee to get an earmark of funds for a transit project, that serves a locality, but you cannot go to the Appropriations Committee for funding for a highway of an interstate nature that needs an extra boost to be completed. You can go to the Appropriations Committee to get an earmark of funds for a bus station in some small town, but not for a four-lane highway that crosses State lines. Mr. Chairman, this dual standard simply makes no sense. And, as we all know, dual standards are never fair" (Congressional Record 1996: H6964-6973).

While transit advocates may have been big winners in the battle over appropriations earmarks, they had to vigorously fight proposals to eliminate or at the least substantially reduce transit operating assistance. These proposals had been expected coming from the Reagan and Bush Administrations—but they continued under the Clinton Administration. Proposals to substantially reduce operating assistance, and shift a portion of the "savings" to capital programs, were parts of every administration bill during the 1990s. They were finally enacted in the fiscal year 1996 bill which nearly halved federal transit operating assistance—by substantially reducing operating assistance to operators in the big cities where most US transit riders lived (Congressional Record 1995). Proposal supporters claimed that big city operators could handle the large cuts because federal operating assistance represented a smaller portion of their budgets, while small city operators were more dependent on federal assistance and could not handle such significant cuts (Congressional Record 1995). This cut was the first step on the road to eliminating big city operating subsidies, which occurred in 1998's reauthorization, and marks an ever-increasing disconnect between transit expenditures and transit use.

The reauthorization debate begins

The ISTEA debate focused primarily on the mission of the federal surface transportation program in a post-interstate world, and much time was taken up with consideration of program categories and issues of flexibility and fungibility. Certainly financial issues and expenditure policy played key roles, but they were part of a much

broader policy debate. Financial and expenditure considerations would dominate the debate over the program's reauthorization in 1997 and 1998. Modal considerations took a backseat to geopolitical questions, and the donor state issue, and apportionment formulas, in the highway program were particularly significant.

The first reauthorization proposal was the Streamlined Transportation Efficiency Program for the 21st Century, or STEP 21, which was the preferred legislation of donor states. STEP 21 proposed a 95 percent guaranteed return on highway trust fund contributions (to the highway account), and proposed new apportionment formulas that emphasized measures of transportation system use while protecting small and low density states through the continued use of minimum apportionment factors (Congressional Record 1997). The plan thus tried to please both sides in the donor versus donee debate. The proposal, championed by Senator Warner, also increased local flexibility in spending decisions by consolidating the federal program into two categories, the national highway system and the surface transportation program (Congressional Record 1997).

The donee states responded with the Surface Transportation Authorization and Regulatory Streamlining Act (STARS 2000). STARS 2000 emphasized the use of formula factors such as land area, low population density, and highway mileage, and it was generally viewed as a western and rural state bill (Congressional Record 1997). STARS 2000 was most vigorously championed by Senator Baucus of Montana, whose state has been one of the most important net beneficiaries of the federal program. Both Senate bills called for total transportation spending of approximately $160-$170 billion, which were significant increases over the ISTEA levels. Senators Chafee and Moynihan

introduced a third bill, ISTEA works, which made only slight changes to the ISTEA structure and did not change the apportionment formulas. The donor states were not happy with this bill. [100]

The administration proposal was introduced as the National Economic Crossroads Transportation Efficiency Act in March 1997. The Administration bill called for $175 billion in spending over six years (Congressional Record 1997). The proposal increased flexibility in the spending categories and made passenger and freight rail projects eligible for federal assistance in the transit and highway programs respectively. The proposal called for modifications to the formula apportionment process to emphasize use and extent, and called for more funding for the donor states, but stopped short of the proposals made under STEP 21 and in the soon-to-emerge House bill BESTEA.

The reauthorization debate took place in the wake of a series of recent budget agreements between congress and the administration. These agreements set overall caps on discretionary spending that seemed to leave little room for the fanciful spending proposals that began to emerge from the House. As part of the agreement, a portion of the federal gasoline tax that had been earmarked for deficit reduction under the 1993 budget agreement was redirected to the trust fund, but the resulting revenues were not added to

[100] Speaking on the donor state issue, Moynihan said, "To distribute Federal transportation funds primarily upon the ability of each State to collect fuel taxes, as advocated by representatives of the donor States, would run counter to whole concept of federalism, which is based on collecting national resources to address national needs. When California has an earthquake, or Florida has a hurricane, or the Mississippi River floods its banks, the entire Nation addresses these needs, without considering whether the needed funds were raised in the affected States. Every other Federal program--from crop supports to water reclamation projects to airport improvement grants--distributes funds on the basis of need" (Congressional Record 1997: S3222).

the transportation budget. The accumulated trust fund balance would thus grow, and the revenue could be used to mask the size of the overall federal budget deficit.

These accumulating trust fund balances were a target of the bipartisan leadership of the House Committee on Transportation and Infrastructure (formerly the Public Works Committee), including chairman Shuster and ranking member Oberstar. Shuster and Oberstar sought to reclaim the trust fund for the transportation program and proposed taking it off budget—so the money would be out of reach of potential poachers. Representative Oberstar (1997) emphasized:

> The Highway Trust Fund was never intended to cover deficits in other programs or to act as a bank for the rest of the government. To allow an enormous surplus to accumulate in order to spend more money on non-transportation programs is a major breach of faith with users who pay the fuel taxes and expect these funds to be spent for transportation purposes.

By reclaiming the trust fund for its "intended purposes," they would be able to provide significantly higher transportation spending. In fact, the House Committee on Transportation and Infrastructure proposed annual spending of $34 billion over three years, or $218 billion over six years, when it unveiled its Building Efficient Surface Transportation Efficiency Act (BESTEA) (Oberstar 1997). The BESTEA bill proposed a 95 percent guaranteed return on state contributions to the highway trust fund, a revision of the apportionment formulas to include use and population as key factors, and hundreds of congressional project earmarks. Its spending levels also exceeded the budget caps for transportation—and potentially placed other discretionary programs at risk of having to endure significant budget cuts (Congressional Record 1997). The bill cleared the

authorizing committee but was not brought to the House floor for a vote, because it violated the budget agreement.

In the Senate, the institutional balance of power forced donor state senators to get what they could from their colleagues—which meant a pledge to strengthen the current minimum guarantee (Congressional Record 1997). But they still didn't like it, and continued to say so. The testimony of Senator Kyl of Arizona is typical of donor state comments:

> I represent a state, Arizona, which is still a donor state. Arizonans send a dollar to Washington in gas taxes and federal highway taxes and we get 89 cents back. Something happens to the other 11 cents.
>
> Here in Washington, DC, it's not so bad. The round trip actually earns them $2 on the $1 they send. Maybe that is because they do not send it so far. We have colleagues from other States, I will not mention them, but some colleagues are here representing constituents who send $1 and they get $2 back, or more than $2 back, and they ask us to be grateful for the fact that we get 90 cents instead of 89 cents, 'We gave you an increase.' Madam President, it is not fair. (Congressional Record 1998: S1749)

The Senate compromise, ISTEA II, called for $150 billion in spending over six years, a slight decrease from ISTEA but within the caps set by the budget agreement. It retained most of the existing apportionment formulas and program structures of the original ISTEA, but strengthened the donor state minimum guarantee to apply to a few more program categories.

But before the bill could pass the Senate, the Senate became preoccupied with campaign finance reform legislation—and it was withdrawn. Because the transportation program was about to expire, the House and Senate were forced to pass a six-month

ISTEA extension bill, which President Clinton signed. The pressure was on to produce something as 1998 began, and the House and Senate geared for battle over the final bill.

Transportation equity act for the 21st century (TEA-21)

As the new year began, Shuster and Oberstar worked with Senators Gramm and Byrd to increase the size of the Senate bill, while members of the respective chambers attacked one another over specifics and interest groups demanded something get done soon. Senators focused their complaints on the House's 1,000-plus demonstration projects while the House criticized the Senate for its apportionment formulas and for hypocrisy about earmarks. Many Senators were trying to get their own project earmarks considered. House budget guardians were frustrated when the House leadership decided to support Shuster's efforts to increase transportation spending regardless of the effect on budget agreements and other discretionary programs, and they complained publicly. Budget chairman Kasich called the bill an "abomination" and proof that the "era of big government was not over" (Pianin 1998a). Shuster retorted by charging his opponents with sour grapes (Pianin 1998b). Shuster won the public argument. Most of the political and interest group players voiced support for increased spending.

The Senate gave into the inevitable and passed a much larger $36 billion a year reauthorization bill, while the House passed a $37 billion a year. In conference, the House assented to most of the Senate's apportionment formula provisions, but won changes in a few formulas, while the Senate accepted the House's 1,400 demonstration projects and added more than 300 of its own. The donor state question was resolved—for

the time being—with a more stringent minimum guaranteed return arrangement that was set at 90.5 percent (TEA-21 1998).

Shuster achieved partial victory in his campaign to protect the trust fund from budget poaching. The conference bill included a provision called Revenue Aligned Budget Authority (RABA) that would adjust transportation expenditures in accordance with highway trust fund receipts. The trust fund was not taken off budget, as the House committee had hoped, but a new "firewall" was constructed around the fund.

The conference bill was entitled the Transportation Equity Act for the 21st Century (TEA-21), and was signed into law in June 1998. TEA-21 called for $217 billion of transportation spending over six years, including $172 billion for highways and $41 billion for public transit (TEA-21 1998). Every state with the exception of Massachusetts, whose ISTEA apportionment had been inflated by funding for the Central Artery project, would receive more money than it had under ISTEA. The legislation retained most of ISTEA's programmatic provisions, while it increased spending flexibility across both highway and transit programs. The minimum apportionment provisions and public land state bonuses that have been a part of the federal highway program since 1921 were retained by TEA-21.[101] The federal matching shares in most transit and highway program categories were left at their ISTEA levels.

The number of federal highway program categories were increased, as **Table 6-3** shows below, and highway program apportionment factors were more closely linked with

[101] The public lands bonus increases the federal share of project cost to a maximum of 95 percent on highway projects, and on certain categories of transit projects that are built with flexible highway funds (TEA-21 1998).

vehicle travel, system extent, state of repair, and population (factors that could presumably stand as proxies for highway needs) than they had before. A state's miles of rural post roads was finally eliminated from the formula, a move that was probably 80 years overdue. Coupled with the strengthened donor state program and RABA, the formula changes were the most important developments of TEA-21, and because they affect the actual distribution of program funds are probably the most important.

Table 6-3. Highway apportionment formulas under TEA-21

Apportionment formulas under TEA 21

Federal Highway Administration

Program	*Formula*	*Federal Share*	*Minimum Apportionment*
Interstate Maintenance Formula	1/3 interstate system lane miles, 1/3 interstate system VMT, and 1/3 annual contribution of commercial vehicles to Highway Account in HTF	90%	.5% IM + NHS combined
Interstate Maintenance Discretionary	discretionary	90%	
National Highway System	1/4 lane miles on non-interstate principal arterials, 35% VMT on non-interstate principal arterials, 30% diesel used on hwys, 10% lane miles on principal arterials per state population	80%	.5% IM + NHS combined
Alaska Highway		100%	
Territorial Highways		100%	
Surface Transportation program	1/4 lane miles of federal aid hwys, 40% VMT on federal aid hwys, and 35% highway user payments into Highway Account in HTF	80%	0.50%
Safety Infrastructure		90%	
Transportation Enhancements		80%	
Bridge Replacement and Rehab	Relative share of total cost to repair or replace deficient bridges	80%	.25%, max of 10%
CMAQ	weighted nonattainment and maintenance area population	80%	0.50%
Federal lands Highways		100%	
Emergency Relief		80%+	
Motor Carrier Safety Grants		80%	
Appalachian Development Hwys		80%	
Recreational Trails	50% equal shares to each state, 50% non-highway recreational fuel use	80%	None
National Corridor and Border Infrastructure		80%	
Scenic Byways		80%	
Ferry Boats and terminals		80%	
Value Pricing Pilot		80%	
Highway Use Tax Evasion		100%	
Transp and Community and System Pres. Pilot		100%	
Woodrow Wilson Bridge		80%+	
High Priority Projects	earmarked	80%	
ITS- R and D		80%+	
ITS- Deployment		50% - 80%	
Surface Transportation Research		80%+	
Technology Deployment		80%+	
State Planning and Research		80%	
Metropolitan Planning	Urbanized area population	80%	0.50%
Minimum Guarantee	varies with program	80%	varies with program
State and Community Hwy Safety Grants	75% pop, 25% public road mileage	80%+	0.50%

The transit formulas were unchanged from their ISTEA numbers, although large urban areas (over 200,000 persons) were now made ineligible for transit operating assistance. **Table 6-4** shows the programs and their respective formulas enacted under TEA-21.

Table 6-4: Transit apportionment formulas under TEA-21

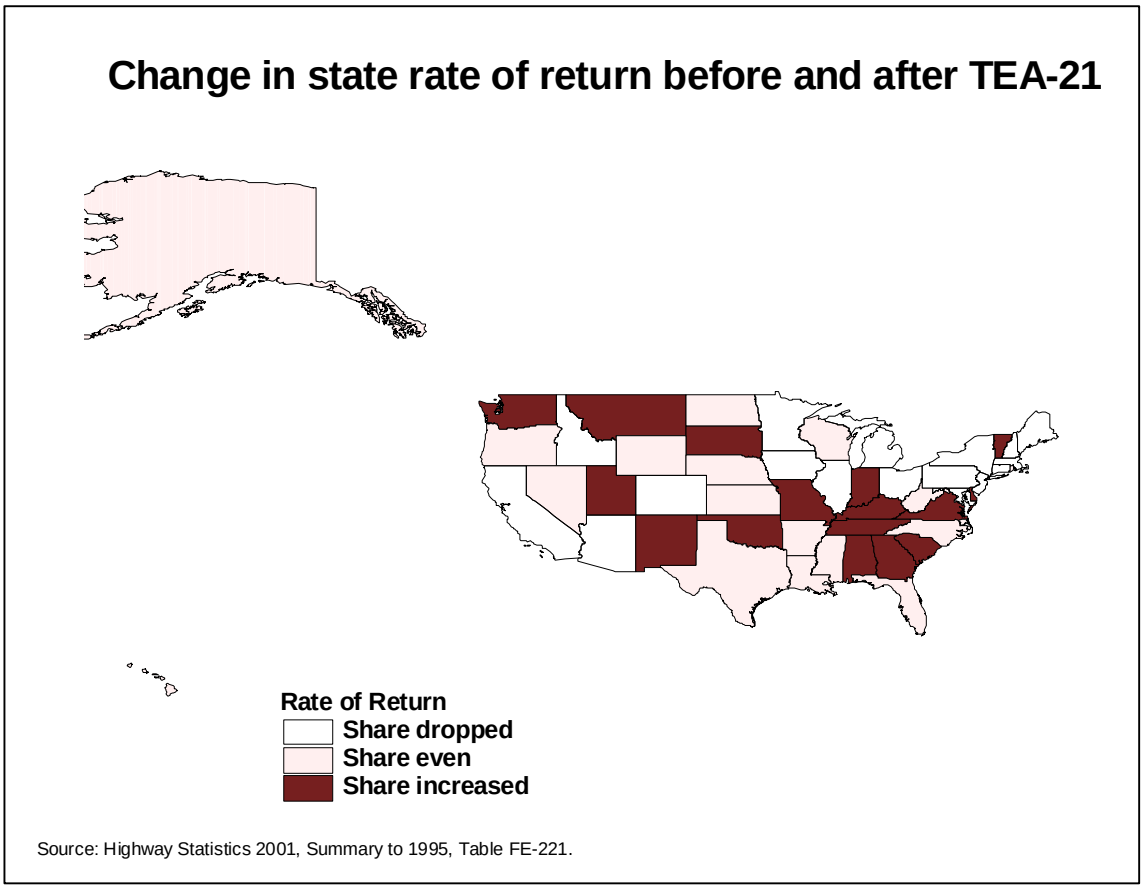
Apportionment Formulas under TEA-21

Federal Transit Administration

Program	*Formula*	*Federal Share*	*Statute*
Clean Fuels Program	Number of vehicles in bus fleet and number of bus passenger miles, weighted by severity of non-attainment	80%	49USC5308
Rural Transportation Accessibility Initiative	Competitive basis	90%	TEA 21 3038
Urbanized Area Formula Grants	50 to 199k: population and density; over 200k: bus rev veh miles, bus pass miles, guideway veh miles, guideway rte miles, pop, and density	80%	49USC5307
Nonurbanized Area Formula Grants	Population in areas under 50,000	80%	49USC5311
Elderly and Persons with Disabilities	Number of elderly and disabled individuals in state	80%	49USC5310
Job Access and Reverse Commute	Section 3037	50% DOT plus other fed	TEA 21 3037
Bus and Bus-related Capital Grants	earmarked (supposed to be discretionary)	80%	49USC5309
Fixed Guideway Modernization	seven-tiered formula, min. of one mile fixed guideway	80%	49USC5309
New Starts	earmarked (supposed to be discretionary)	80%	49USC5309
Metropolitan Planning	formula	80%	49USC5303
State Planning and Research	State's urbanized area, .5% minimum	80%	49USC5313(b)
National Planning and Research	earmarked (supposed to be discretionary)	varies	49USC various
Rural Transit Assistance Program	nonurbanized population	100%	49USC5311(b)

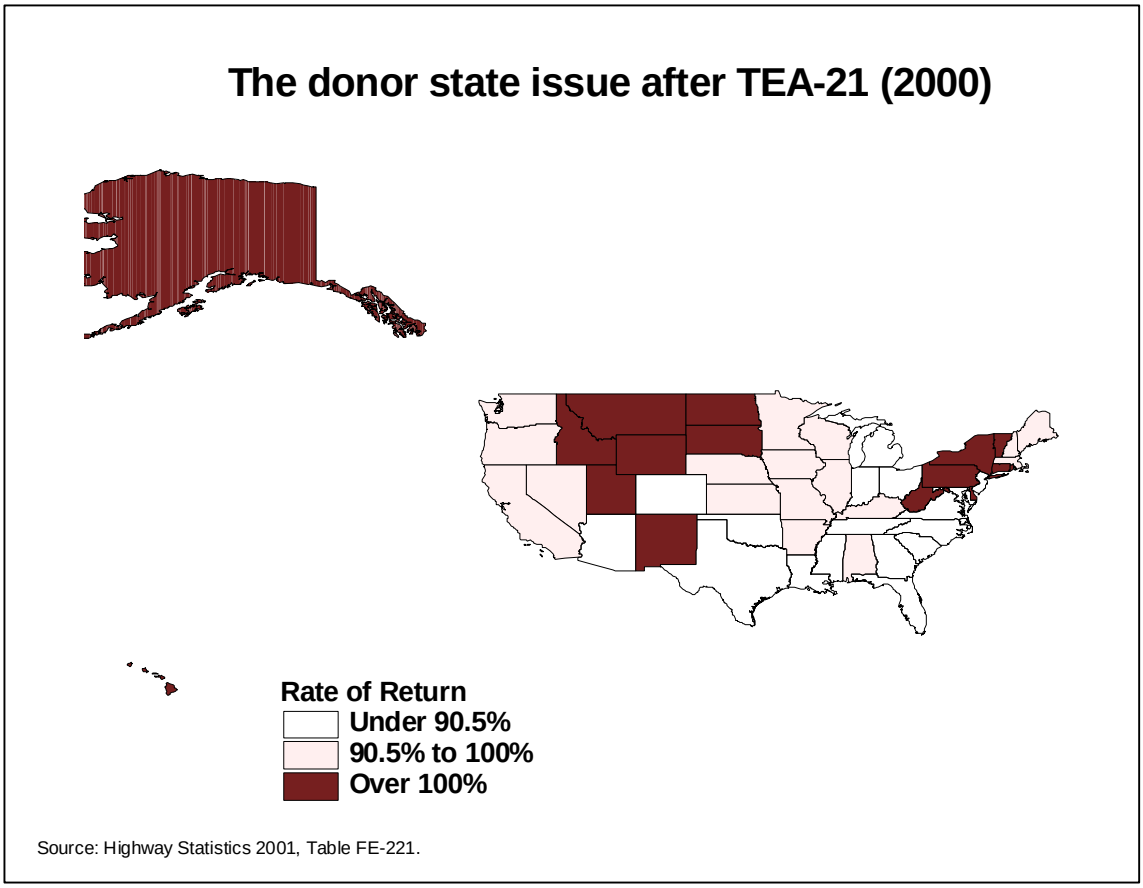
The central issue in the TEA-21 debate, the donor state question, was the subject of an elaborate compromise. ISTEA hadn't provided the requirement that the minimum return apply to all programs, but TEA-21 did. There was hope that significant changes would result, and there were changes in states' rates of return as **Map 6-3** shows. The map compares rates of return in 2000 with those in 1995. A number of long-time donor states saw their rates of return increase after TEA-21 passed, but others did not.

Map 6-3: Donor states' rates of return before and after TEA-21



And, as **Map 6-4** shows, a number of states' rates of return still lie beneath the 90.5 percent minimum that TEA-21 was supposed to provide. This means that the donor state issue has not gone away. In fact, it looks to dominate much of the discussion in the 2003 reauthorization debate. This time, donor states have joined forces in an organization called the States' Highway Alliance for Real Equity (SHARE), which will coordinate their efforts to achieve the long-sought promise of a 95 percent return on their residents' contributions to the highway trust fund (SHARE 2002).

Map 6-4: The donor state issue in 2000



In TEA-21's wake

The nearly five years since the passage of TEA-21 have been an interesting time filled with a number of controversies. The explosion of earmark expenditures has continued, and remains a controversial issue. Appropriations committees have sought to reclaim a measure of authority over federal transportation spending. The concern about trust fund poaching has continued, even after enactment of RABA provisions. And, the RABA process itself became the subject of a number of conflicts about the methods used to distribute the money to the states. In fiscal year 2002's appropriations legislation, the

Appropriations Committees decided to earmark RABA funds to new demonstration projects, and to cut funding to projects authorized under TEA-21. The long-running battle between the authorizers and appropriators will continue into the future.

The RABA procedure itself hasn't quite performed the way it was supposed to—mainly because the rosy fiscal projections of the late 1990s have not materialized in the current recession. RABA bonuses were distributed during the first two post-TEA 21 appropriations cycles, but recent cycles have brought the prospect of RABA-mandated cuts to transportation spending—because of a decline in highway user revenues. Congress has had to respond by passing emergency legislation to suspend RABA rules.

In public transit, one of the most important decisions enacted through TEA-21 was the end to big city operating assistance. The elimination of this aid to the areas where transit ridership is concentrated has undoubtedly had a negative effect on big city operators, particularly during the presently lean fiscal times. It will be interesting to see whether this marks the first step toward the long-sought (by succeeding Administrations) elimination of all transit operating assistance or whether transit supporters will be able to make a successful defensive stand.

A number of interest groups, in addition to SHARE mentioned earlier, have unveiled their reauthorization wish lists for 2003. AASHTO, the road builders (ARTBA), and the contractors (AGC) are calling for annual highway expenditures of between $45 and $60 billion, an increase of between 50 and 100 percent over current levels. The transit community (APTA) is seeking $14 billion a year for public transit, double current expenditure levels. The Administration seems to be looking at maintaining current

expenditure levels, $33 billion for highways and $7 billion for transit, because of fiscal pressures.

Also interesting to watch will be the donor state battle that everyone expects, and whether a more extensive battle over the formulas themselves will arise. If the fiscal situation is as tight, and authorization levels kept as low, as it appears, the traditional solution to resource fights, spreading more money to everyone, will be severely affected—and real arguments might ensue.

Conclusion

This chapter, and the preceding two chapters, provided an overview of the origins and evolution of the federal surface transportation program over the past 90-plus years. It recounted the development of the program structures and resource allocation mechanisms and noted the problems for which they were designed. The central theme of the overview has been one of remarkable stability, even with the periodic changes that were discussed. This stability is evident in the retention of formula factors and resource distribution rules long after the original rationales for their inclusion have disappeared.

The formula funding mechanisms have been remarkably stable; few significant changes were made to the basic structures of the highway program, for example, during the first 80 years of the transportation program. But in recent years, highway formulas have become more related to use and extent of the highway system. Somewhat perversely, transit formulas have become less related to use of public transit. Both of these developments pose questions about the purpose of federal aid. Does federal aid

exist to help states (or congressional districts)? Or mode-based interest groups? Or system users? For most of the program's history, the latter has not been the case.

Originally cast as apolitical, needs-driven solutions to the problem of determining how to distribute public resources, the apportionment formulas have become a subject of significant political and interest group attention and much greater conflict, especially in recent years. Yet the public and media interest still focuses largely on the more visible project earmarks that represent a small, albeit growing, portion of overall expenditures.

Chief among the other ongoing conflicts in transportation has been the modal struggle between highways and public transit and the geopolitical struggle involving donor and donee states. Both struggles are about the way the federal government treats different claimants in its expenditure policies. Over the past twenty years, a number of political compromises have emerged to provide truces in these conflicts, and the two most recent authorization laws (ISTEA and TEA-21) have been especially emphasized for the changes they have made in the way the federal transportation program operates. Yet, the conflicts remain, and this leads one to question whether the recent changes have really been significant as is sometimes asserted by observers of ISTEA and TEA-21.

The discussion in this chapter emphasized the rhetoric of policy change surrounding ISTEA and TEA-21. The next several chapters go much deeper into these issues by considering the expenditure patterns within the federal surface transportation over its recent history. It asks what factors help explain these expenditure patterns? And, have the patterns changed in recent years, particularly since the passage of ISTEA?

PART THREE: ANALYZING TRANSPORTATION EXPENDITURES

CHAPTER 7. EXAMINING TRANSPORTATION EXPENDITURES

The preceding three chapters examined the history of the surface transportation program. The central theme of this history is stability, or perhaps a better term would be inertia, particularly in terms of resource distribution mechanisms. The next several chapters are a quantitative analysis companion to the historical investigation. They pose a number of questions. These questions include the following. Why are some states net winners and others net losers in the struggle for federal highway dollars? What factors explain the spatial patterns of highway and transit expenditures? And have any of these relationships changed since passage of ISTEA and TEA-21?

As we learned in Chapter 3, the public finance and public administration literature suggest a number of theoretical rationales for the geographic redistribution of public resources, and for the spatial pattern of public expenditures more generally. These rationales include correcting for benefit spillovers, equalizing resources among states, and providing basic levels of service. The political science literature, on the other hand, presents a number of functional explanations for its actual occurrence, including political influences and institutional and/or programmatic structures, including program history. My own feeling is that these functional explanations offer a better understanding of the expenditure patterns we find than do any of the theoretical rationales, and hence I include political representation variables in the expenditure analysis that follows.

In Chapters 4 through 6 we learned the importance of program history, including stability in the resource distribution processes. In the case of the apportionment formulas

used to distribute resources among the states, stability is most evident in the fact that many of the formula apportionment factors and rules designed to address needs at a particular point in time have long outlived their original rationales. This fact means that formula stability might better be described as the result of political and/or institutional inertia. Stability is also evident in the hold-harmless provisions inserted in both ISTEA and TEA-21. I believe the preference for stability and the status quo, particularly on the part of entrenched interest groups seeking to protect their positions, means that the rhetoric of change in recent years has been much greater than the reality. I think this is particularly true when it comes to issues of distributing federal aid dollars over geopolitical space.

This series of chapters has three objectives. First, the chapters examine the patterns of expenditures within both the highway and transit programs. The analyses focus on the relationships between expenditure outcomes and variables that measure political representation, transportation system use and extent, and population.

Second, the analysis answers the question: why are some states donors and others donees in the struggle over the net geographic distribution of federal highway dollars? Earlier research by Lem (1996) found that actual redistribution runs counter to fiscal equalization objectives. I follow this earlier work and examine the relationships between redistribution and highway use, highway system extent, population, urban versus rural status, and political representation—in order to determine whether any of these factors, alone or in combination, explain the spatial patterns we find.

Third, I examine whether any of these relationships have significantly changed since the passage of ISTEA and TEA-21 by comparing patterns in three different years (1990, 1995, and 2000) that bracket these pieces of legislation. Chapter 6 emphasized the rhetoric of policy change surrounding ISTEA and TEA-21. These chapters attempt to test whether the rhetoric of policy change matches the reality, in terms of the pattern of expenditures. These are the three central challenges of this part of the dissertation. Along the way I also examine the well-publicized earmark phenomenon (in both highways and transit), focusing particularly on the importance (or lack thereof) of political influence (in addition to the other variables noted above).

This chapter begins with a brief discussion of the mechanics underlying the analysis, including a discussion of explanatory hypotheses, variables, data sources, the temporal frame of the analysis, and the analytical techniques themselves. As noted above, the quantitative analyses cover three different years: before ISTEA (1990), after ISTEA (1995), and after TEA-21 (2000).[102] The subsequent chapters focus on three issues, over each of these three years: expenditure patterns in the federal highway program (Chapter 8), expenditure patterns in the federal transit program (Chapter 9), and the donor state question in the highway program (Chapter 10).

Background information and mechanics

Chapter 2 described the spatial patterns of federal transportation expenditures, and Chapter 3 offered possible explanations for these patterns, particularly in relation to the contentious issue of geographic redistribution within the highway program.

[102] All expenditure amounts are reported for fiscal years, unless otherwise noted.

Redistribution has been explained as being associated with fiscal equalization strategies, benefit spillover correction, and political manipulation, among a host of other factors. But there are other potential factors behind both the general pattern of expenditures and the issue of geographic redistribution, including system use, system extent, and program history.

Hypotheses

I have my own hypotheses with respect to these issues. First, I will address the issue of geographic redistribution, or the donor-state question. I suspect federal highway dollars are redistributed from urban to rural states. I hypothesize that urban states that are net "winners" are those with representation on the key policy committees in congress. The states with the most highway need, defined in terms of system use and extent, are not the beneficiaries of redistribution. And, I suspect that the formula changes implemented in ISTEA and TEA-21 have not changed much. In short, politics, urban versus rural status, and the highway program's past account for the patterns of geographic redistribution. I test each of these hypotheses in chapter ten.

I believe these hypotheses about redistribution are also relevant to the expenditure patterns themselves. I'll start with the highway program. I suspect rural states are relative winners because of a combination of factors, including the program's early rural orientation. States with representation on the key congressional committees, and states with lower than average transportation needs, defined both in terms of highway system

extent and use, also receive higher per capita federal highway expenditures.[103] These hypotheses are examined in chapter eight.

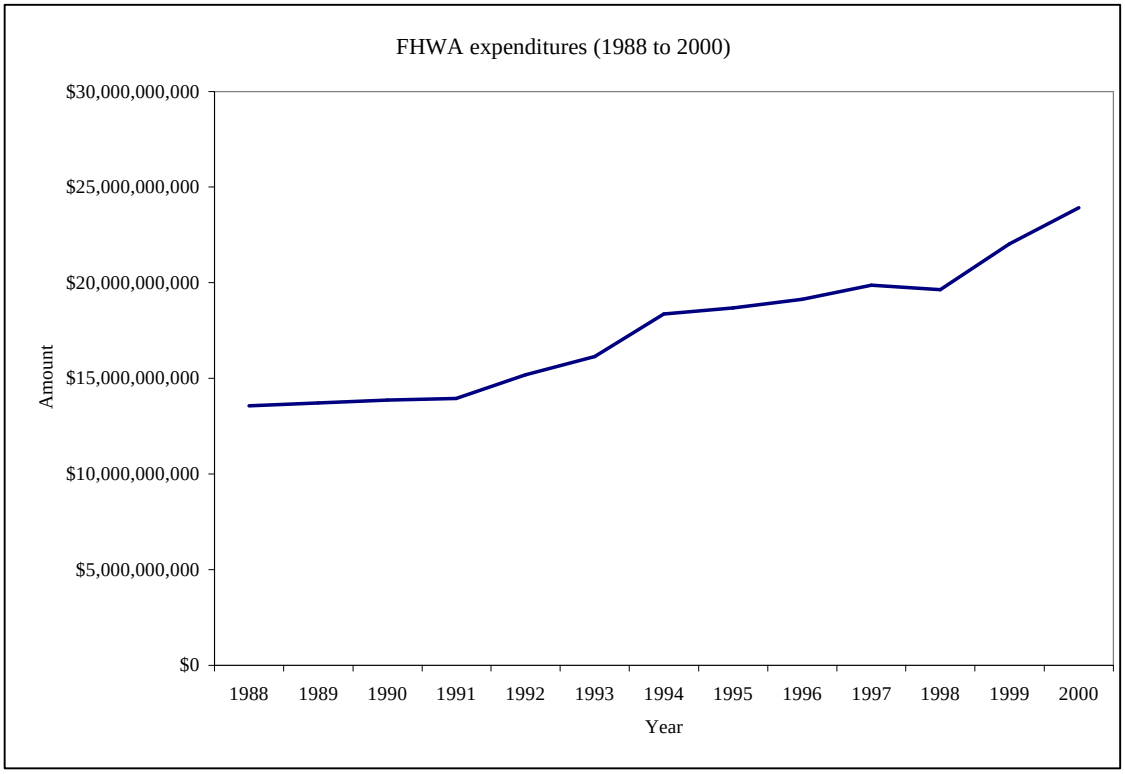
In the federal transit program, I hypothesize total expenditures are only weakly related to use (ridership). For example, I believe states with lower than average transit needs, defined in terms of use, receive higher per capita federal transit expenditures. And, I suspect that states with representation on the key policy committees fare better than those without. I also suspect urban states are relative winners in terms of per capita expenditures, partly because of the program's early big-city orientation. These hypotheses are examined in chapter nine.

Temporal frame

The analysis covers the period surrounding passage of the two most recent federal authorization laws, ISTEA in 1991 and TEA-21 in 1998. This was a period of rapid expenditure growth in both the highway and transit programs, as **Graphs 7-1** and **7-2** show.

[103] I include total expenditures in the correlation component of the analysis, but the regression analysis focuses on per capita expenditures—because of the wide variation in state population.

Graph 7-1: Federal highway expenditures, 1988 to 2000 (unadjusted dollars)

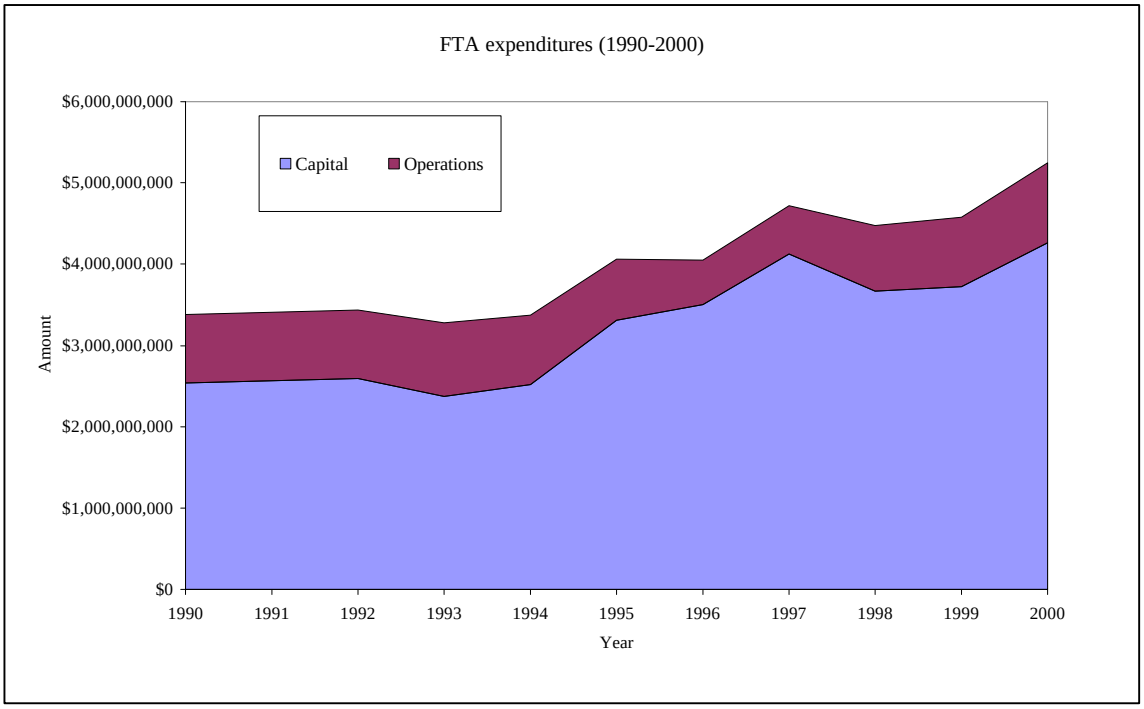


Source: Federal legislation listed in the references.

This period was also a time when the resource apportionment mechanisms of both the highway and transit program were changed, largely in response to long-standing political complaints (ISTEA 1991, TEA-21 1998). The complaints were loudest from donor state representatives in the context of the highway program (Congressional Record 1998). In ISTEA and especially in TEA-21, minimum guaranteed return rules were strengthened, and the rates of return increased. Thus, one would expect to see changes in highway trust fund return status before and after the two pieces of legislation. I doubted much change would be found because I believe the rhetoric of change was much larger

than the reality, particularly given the presence of the hold harmless provisions in TEA-21 that protect states from reductions in their level of apportionment(TEA-21 1998).

Graph 7-2: Federal transit expenditures, 1990 to 2000



Source: Federal legislation listed in the references.

I selected one year from the pre-ISTEA period, one year from the post-ISTEA/pre-TEA-21 period, and one year from the post-TEA-21 period for my analysis. I selected 1990 as the pre-ISTEA year, 1995 as the post-ISTEA year, and 2000 as the post-TEA-21 year. I analyzed the expenditure patterns within each of those years, and then looked at changes between the years, for a number of the variable relationships.

Variables and data sources

The analysis relies on an enormous amount of data, and the magnitude of the data requirements meant that many worthwhile avenues of investigation were left unexplored.

For example, I had hoped at one point to focus on congressional districts rather than states, but the size of the data and problems with a number of the expenditure data sets precluded this approach. I ran into similar data size and/or spatial allocation problems with a number of the sub-categories of highway and transit data, and thus the original scope of the analysis in these areas was curtailed.

For the federal highway program, I required data on expenditures, highway user tax revenues, highway system use, and highway system extent (see **Table 5-1** for variables and sources). The expenditure data came from two sources: the annual *Highway Statistics* series of publications and the text of authorizing and/or appropriations legislation. General expenditure data, by state, are available in a number of *Highway Statistics* tables, as the data source table indicates. Earmark expenditure data, on the other hand, were taken from the legislation itself, so as to separate earmarks into authorizing earmarks and appropriations earmarks. These earmark data were then geocoded to the appropriate state using geographic information systems software (ArcView). Highway user tax revenue, system use (vehicle miles traveled), and system extent (lane miles and centerline miles) were obtained from *Highway Statistics*. The purpose of including the earmark data was to see whether there were any differences in variable relationships between the overall patterns and the earmark patterns.

Aside from considering the general political relationships between earmark expenditures and political representation, I do not test the theories on earmarking discussed, for example, by Ellwood and Patashnik (1993). They argue that earmarks can be used to help sweeten otherwise politically unpalatable legislation, an issue that

emerged in the Chapter 3 literature review. Another theory posits that earmarking has grown precisely because transportation funding categories have been combined or eliminated (Luberoff 2001). These fascinating issues are worthy of future investigation but lie outside the scope of this research.

Table 7-1: Variables (and data sources) used for highway analyses

Variable	*Source*	*Note*
Federal highway expenditures (total dollars)	Highway Statistics, Table FA-3	
Federal highway user tax revenue (total dollars)	Highway Statistics, Table FE-9	
Federal aid highway lane miles	Highway Statistics, Table HM-48	
Federal aid highway centerline miles	Highway Statistics, Table HM-15	
Vehicle miles of travel (total)	Highway Statistics, Table VM-3	
Federal highway expenditures (per capita)	Highway Statistics, Table FA-3; US Census Bureau	
Federal highway user tax revenue (per capita)	Highway Statistics, Table FE-9; US Census Bureau	
Vehicle miles of travel (per capita)	Highway Statistics, Table VM-3; US Census Bureau	
Federal highway trustfund rate of return	Highway Statistics, Table FE-221	
Federal highway appropriations earmarks (total dollars)	Annual appropriations legislation (see references)	Geocoded to state in ArcView
Federal highway appropriations earmarks (per capita)	Annual appropriations legislation (see references); US Census Bureau	Geocoded to state in ArcView
Federal highway authorization earmarks (total dollars)	ISTEA (1991) and TEA-21 (1998)	Geocoded to state in ArcView
Federal highway authorization earmarks (per capita)	ISTEA (1991) and TEA-21 (1998); US Census Bureau	Geocoded to state in ArcView
Historic capital outlays for highways	Highway Statistics, Tables HF-2 and HF-202C	
Historic maintenance outlays for highways	Highway Statistics, Tables HF-2 and HF-202M	
Highway user tax rates and use	Highway Statistics, Tables FE-21B, FE-101A, and FE-101B	
Historic federal aid highway expenditures, by category	Highway Statistics, Table FA-205	
Federal highway apportionment formulas (current)	Highway Statistics, Table FA-4A	
Federal highway apportionment formulas (historic)	Legislation (see references)	
Disposition of highway revenues (all units of government)	Highway Statistics, Table HDF	
Revenues used for highways (all units of government)	Highway Statistics, Tables HF-1 and HF-10	

For the federal transit program, I used data on expenditures and transit system use (see **Table 7-2** for variables and sources). The expenditure data came from four sources: the annual *Highway Statistics* series of publications, the annual FTA *Statistical Summaries: Grant Assistance Programs* series, the annual *National Transit Database* series, and the text of authorizing and/or appropriations legislation. General expenditure data, by state, are available in two *Highway Statistics* tables, as the data source table indicates. It is also available in the *FTA Statistical Summaries* publications, although spread over a number of tables. This latter publication is, however, a very useful source for historic data. Earmark expenditure data, on the other hand, were taken from the legislation itself, so as to separate earmarks into authorizing earmarks and appropriations earmarks, and to separate bus project earmarks from fixed guideway (almost exclusively rail project) earmarks. These data were geocoded to the appropriate state within a geographic information systems software package (ArcView). The data on transit use (unlinked passenger trips) were obtained from the annual National Transit Database, and summed by state.

I also required data to represent the population and political representation dimensions of the analysis. Population data were obtained from the US Census Bureau website (www.census.gov). This website has historic total population data by state (on an annual basis) going back to 1900 and rural versus urban population data by state (on a 10-year basis) also going back to 1900. Political data, in terms of state representation on the five key committees in transportation (House Appropriations Committee, House Committee on Transportation and Infrastructure, Senate Appropriations Committee,

Senate Banking Committee, and Senate Environment and Public Works Committee) were obtained from the *Congressional Directory*.

Table 7-2: Variables (and data sources) used for transit analyses

Variable	*Source*	*Note*
Federal transit capital expenditures (total dollars)	Highway Statistics, Table MT-2A	
Federal transit operations expenditures (total dollars)	Highway Statistics, Table MT-2B	
Federal transit total expenditures (total dollars)	Highway Statistics, Tables MT-2A and 2B	
Federal transit authorization earmarks (total dollars)	ISTEA (1991) and TEA-21 (1998)	Geocoded to state in ArcView
Federal transit appropriations earmarks (total dollars)	Annual appropriations legislation (see references)	Geocoded to state in ArcView
Unlinked passenger trips	National transit database	Summed by state
Federal transit bus authorization earmarks (total dollars)	ISTEA (1991) and TEA-21 (1998)	Geocoded to state in ArcView
Federal transit fixed guideway authorization earmarks (total dollars)	ISTEA (1991) and TEA-21 (1998)	Geocoded to state in ArcView
Federal transit bus appropriations earmarks (total dollars)	Annual appropriations legislation (see references)	Geocoded to state in ArcView
Federal transit fixed guideway appropriations earmarks (total dollars)	Annual appropriations legislation (see references)	Geocoded to state in ArcView
Federal transit capital expenditures (per capita)	Highway Statistics, Table MT-2A; US Census Bureau	
Federal transit operations expenditures (per capita)	Highway Statistics, Table MT-2B; US Census Bureau	
Federal transit total expenditures (per capita)	Highway Statistics, Tables MT-2A and 2B; US Census Bureau	
Federal transit authorization earmarks (per capita)	ISTEA (1991) and TEA-21 (1998); US Census Bureau	
Federal transit appropriations earmarks (per capita)	Annual appropriations legislation (see references); US Census Bureau	
Historic federal transit expenditures	FTA Statistical Summaries (Grant Assistance Programs), Table 2	
Federal transit apportionment formula (current and historic)	ISTEA (1991), TEA-21 (1998), and other legislation (see references)	

Analytical methods

The analysis conducted in this chapter employs several standard statistical techniques. First, bivariate correlation analyses are conducted for each of the potential explanatory variables for the key expenditure variables. The resulting data show the correlation coefficient (r) between the dependent and independent variables (both in terms of magnitude and direction) and its significance level, or p-value. A correlation coefficient with an absolute value of 0.7 or above signifies a strong correlation, while a correlation coefficient with an absolute value of 0.3 or below signifies a weak correlation (Agresti and Finlay 1997). A p-value of less than .05 is statistically significant (Agresti and Finlay 1997).

Second, I employed simple linear regression analysis on a smaller number of key expenditure variables, particularly those measuring expenditures per capita. The analysis allows one to examine both the correlations between the two variables and the results of unit changes in the size of the independent variable on the size of the dependent variable. The r-square measures the goodness of fit for the equation. For this analysis, an r square of 0.49 or above is considered strong, and an r square below 0.09 is considered weak (the numbers selected are based on the discussion of correlation coefficients above). I include the correlation coefficient to show the direction of the relationship between the variables.

Finally, I employed a paired sample t-test to measure “before” and “after” changes in the spatial patterns for a small set of expenditure variables, as well as for highway trust fund rate of return. The resulting data provide correlation coefficients, correlation p-values, t-values, and t-test p-values. As in the case of other p-values, a t-test

p-value of less than 0.05 is considered a significant one (Agresti and Finlay 1997). More robust statistical methods are available to minimize the opportunity for error, but these are not included in this exercise. The results presented here are intended to highlight statistical relationships worthy of more in-depth investigation.

Analytical limitations: geographic concerns

At this stage, I would like to highlight areas of concern as regards the statistical analyses. Earlier I noted that I had initially planned to examine expenditures using congressional districts as the spatial unit of analysis, but had to instead use states because of data collection issues. However, selecting different spatial units for the analysis can have a significant effect on the results of the analysis because of what geographers have termed the *modifiable areal unit* problem. Hess (2002) discusses this problem in some detail.

The modifiable areal unit problem refers to the fact that geo-referenced data can be aggregated to any number of scales, and different aggregation scales. For example, the same set of data can be aggregated to form cities, counties, congressional districts, and states. The problem emerges because different data aggregations may in turn yield different analytical results. Statistical relationships may change based on differences in the geography of aggregation. In the case of this research, I examine statistical relationships involving states as my unit of analysis. These relationships may look quite different were congressional districts examined rather than states. For example, political representation variables, such as House committee representation, may emerge as much

important outcome predictors if congressional districts were the unit of analysis instead of states. This particular phenomenon is often called the *scale problem* (Hess 2002).

Related to the modifiable areal unit problem is the problem of *ecological fallacy*, which is when results based on aggregated group data are believed to apply to the subsidiary entities that make up the group (Hess 2002). Given the structure of the analysis presented here, it is less likely that an ecological fallacy problem would emerge than would a scale problem. I make no claims about the subsidiary entities (congressional districts, counties, cities, individuals, etc.) based on the state-level analysis.

I present both of these issues so as to caution all consumers of geo-referenced data analyses. The particular issues noted here are potential problems in all space-based analyses, and not merely a potential caution for this particular research.

Analytical limitations: statistical techniques

I rely on two primary statistical techniques in this quantitative analysis: simple linear regression and dependent t-tests. Both kinds of tests can be powerful analytical tools providing they are properly employed. Linear regression analysis rests on a number of assumptions (Agresti and Finlay 1997). First, the relationship between the dependent variable and all independent variables is linear. Second, the mean of the residuals of the regression equation is zero. Third, the residuals are distributed normally. And, fourth, the analysis assumes that all relevant variables are included in the model.

Regression analysis is a very robust analytical tool even when the basic assumptions are violated, except in two cases (Agresti and Finlay 1997). First, the analysis is subject to serious weakness in cases where there are errors in the measurement

of either the dependent variable or independent variable. Errors in measurement of the dependent variable can weaken tests of statistical significance, while errors in measurement of the independent variable can lead to erroneous estimates of the regression coefficient (Agresti and Finlay 1997). Second, the omission of relevant variables or inclusion of irrelevant variables, the error of model specification, weakens the regression analysis. Inclusion or exclusion of variables leads to significant changes in the regression coefficient and equation r square. This becomes a particularly important issue in the context of multivariate analyses (Agresti and Finlay 1997).

The regression analyses presented here are primarily simple regression analyses, and hence unlikely to be affected by any errors of model specification, or by problems of multi-collinearity that may affect multivariate regression analyses. Errors of measurement are possible and would be a function of errors in the government data used as the basis for this analysis. Far more likely in the case of this analysis are the emergence of errors arising from the presence of outlier observations, which can significantly affect the parameters of the regression equation. In a handful of cases, there are large ranges between the minimum and maximum observations, and hence the regression parameters may be susceptible to influence by observations that are significantly different from the mean. I do not believe that such concerns cast serious doubt on the validity of the analyses, but still believe that some caution should be taken when interpreting the results.

The second statistical technique used in this part of the dissertation is the dependent, or paired sample, t-test. These tests are frequently used in before and after analyses, hence I chose to employ a handful of them here. T-test analyses assume that the

same individuals are sampled twice and that the data are distributed according to the normal probability distribution (Agresti and Finlay 1997). Violation of either of these rules represents a serious threat to the validity of the test.

T-tests are extremely sensitive to skewed population distributions and the test statistics are significantly affected by the presence of outliers. In general, the tests are appropriate measures when the kurtosis has a value of between 1 and –1 (Agresti and Finlay 1997). In this analysis, there are outliers in several of the variable distributions, but I do not believe that the distributions are skewed to such an extent that the analysis is seriously compromised. The fact that the sample sizes are so large (n = 51) also provides some protection against errors arising from skewed distributions, as the central limit theorem applies in such cases (Agresti and Finlay 1997). Still, readers should be cautioned when they interpret the data.

The quantitative analysis in the next few chapters complements the historical analysis contained in Chapters 4 through 6. In the historical analysis, I rely a great deal on the actors' own statements to explain the reasons behind their actions. Such statements may be accurate or they may be constructed so as to obscure the actor's real intent (Howell and Prevenier 2001). That is one of the potential problems of historical analysis. But such analysis provides numerous benefits as well, including the ability to provide background information and contextual details within which to place other analyses (Howell and Prevenier 2001). The strengths and weaknesses of the historical and quantitative analyses do not overlap, and for that reason they are valuable analytical complements.

CHAPTER EIGHT. ANALYSIS OF HIGHWAY EXPENDITURES

The federal highway program is both the oldest and largest of the two surface transportation programs. Federal highway expenditures have grown significantly over the last two decades, and now exceed $30 billion a year (USDOT 2003). Since TEA-21, most of these expenditures are made according to formulas that emphasize population, highway system extent, and highway system use (TEA-21 1998). But most formulas also include minimum state apportionment rules that favor smaller population states.

I examine federal highway expenditures in 1990, 1995, and 2000. I focus both on total expenditures and earmark expenditures, as expressed both on a total and a per capita basis.[104] Through the analyses, I hope to test hypotheses about relationships between expenditure variables and each of the other variables that measure highway system use and extent, urban versus rural status, and political representation on key congressional committees. I hypothesize that total dollar expenditures are closely (and positively) related to factors such as population, vehicle miles of travel and system extent.

But I also suspect these relationships change when one examines the same expenditures expressed on a per capita basis. For example, I hypothesize that per capita highway expenditures are negatively associated with system and use and extent. I also suspect that per capita highway expenditures are positively associated with a state's rural population share and representation on the key political committees (House Committee on Transportation and Infrastructure, House Appropriations Committee, Senate

[104] I had hoped to separate capital and maintenance/operations expenditures from the totals, but this proved to be problematic for a number of the highway program categories. The data sources for this chapter are listed in the highway variables table in Chapter 7.

Appropriations Committee, and Senate Environment and Public Works Committee). I suspect that the political representation variables will be especially strong in the case of per capita highway earmark expenditures. I hypothesize that ISTEA and TEA-21 increased the dollars spent on highways, but had only minor effects on the spatial expenditure patterns themselves.

Federal highway program expenditures in 1990

The federal government spent approximately $14 billion on highways in 1990, less than half of what the federal government spends today (USDOT 2003). The states' dollar shares of this money ranged from a low of $47 million in Vermont to a high of nearly $1.5 billion in California (Highway Statistics 1991). **Table 8-1** shows that, as expected, the total expenditure by state was highly correlated with variables such as total population, total vehicle miles of travel, and total highway user tax revenue, all of which favor larger population states. Total expenditures by state are also strongly correlated with the House committee variables, which is also not surprising given the House's population-based apportionment, and with a state's urban population share. They are weakly correlated (and negatively so) with the Senate committee variables. But what happens when we adjust for differences in population, and instead look at expenditure patterns expressed on a per capita basis?

Table 8-1: 1990 FHWA expenditures (total dollars), correlation

Correlation: 1990 FHWA expenditures (total dollars)

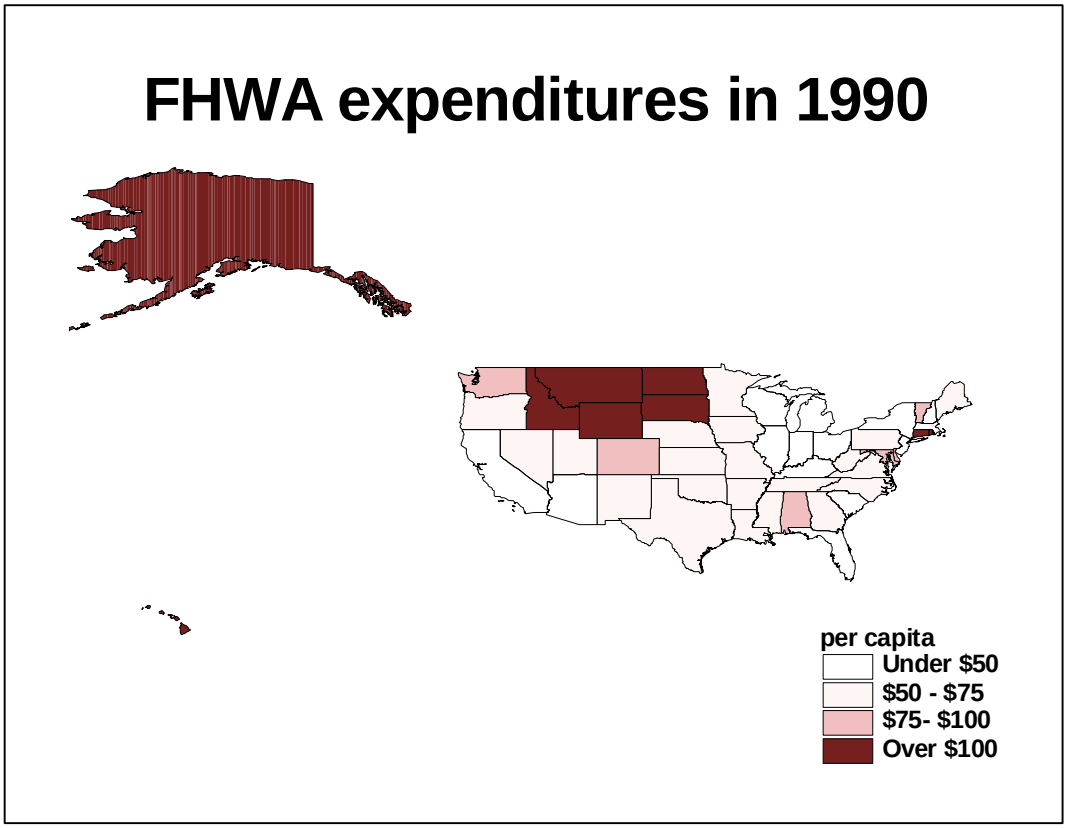
Variable	*Correlation*	*p-value*
1990 vehicle miles of travel (total)	0.949	0.000
1990 highway user tax revenue (total dollars)	0.949	0.000
1990 population	0.939	0.000
1989-90 House Appropriations	0.782	0.000
1989-90 House CTI	0.736	0.000
1990 federal aid highway centerline miles	0.694	0.000
1990 federal aid highway lane miles	0.680	0.000
1990 census percent urban	0.370	0.007
1990 census percent rural	-0.370	0.007
1990 FHWA expenditures (per capita)	-0.256	0.070
1990 highway user tax revenue (per capita)	-0.227	0.109
1990 highway trust fund rate of return	-0.211	0.137
1990 vehicle miles of travel (per capita)	-0.204	0.151
1990 FHWA appropriations earmarks (total dollars)	0.187	0.188
1989-90 Senate Appropriations	-0.103	0.470
1989-90 Senate Env. And Pub Works	-0.102	0.477
1990 FHWA appropriations earmarks (per capita)	-0.038	0.790

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Map 8-1 shows the distribution of per capita highway expenditures among the states. In general, the northern rocky mountain, northern plains, and the very far west (Alaska and Hawaii) enjoy high per capita expenditures, while the urbanized midwest, urbanized northeast, and California receive the least. The highest per capita expenditure was $262 in Wyoming, while the lowest was $32.60 in New York. The US average highway expenditure per capita for 1990 was $55.51. At first glance, it would appear that rural versus urban distinctions and state population size might be important factors. More urbanized (and larger population) states seem to lie at the low end of the distribution, and more rural states lie at the high end. But what do the numbers tell us?

Map 8-1: 1990 FHWA expenditures (per capita)



Source: Highway Statistics 1991, Table FA-3. Adjusted using population data from the US Census Bureau.

Table 8-2 looks at the rural versus urban dimension by examining correlations between a state's 1990 urban population share (percent urban, as defined by the Census Bureau) and a number of highway variables for both 1990 and 1995. The data show that 1990 FHWA expenditures (per capita) are very weakly, but negatively, correlated with a state's urban population share. The same is true for 1990 FHWA appropriations earmark expenditures (per capita), which are discussed a little later. The table also shows that urban population share is positively (but weakly) correlated with the House committee

variables for the 1989-90 session, and negatively (but weakly) correlated with the Senate committee variables.

Table 8-2. Urban population (1990) related to 1990 highway variables, correlation

Urban population (1990 percent urban) related to other variables

Variable	*Correlation*	*p-value*
1990 vehicle miles of travel (per capita)	-0.543	0.000
1990 highway user tax revenue (per capita)	-0.441	0.001
1990 population	0.386	0.005
1990 FHWA expenditures (total dollars)	0.370	0.007
1990 vehicle miles of travel (total)	0.351	0.012
1990 highway user tax revenue (total dollars)	0.329	0.019
1989-90 House Appropriations	0.324	0.020
1990 highway trust fund rate of return	0.286	0.042
1989-90 House CTI	0.204	0.151
1989-90 Senate Appropriations	-0.132	0.357
1990 FHWA appropriations earmarks (per capita)	-0.089	0.533
1990 federal aid highway lane miles	0.087	0.543
1990 federal aid highway centerline miles	0.056	0.696
1990 FHWA expenditures (per capita)	-0.056	0.698
1990 FHWA appropriations earmarks (total dollars)	0.056	0.699
1989-90 Senate Env. And Pub Works	-0.022	0.876

Notes: urban population data are from US Census Bureau and are based on Census definitions of
For rural population, p-values are identical, and correlation coefficients are identical but have the
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 8-3 takes us deeper into the 1990 FHWA expenditures (per capita), and presents a series of regression equations that include political representation, system use and extent, urban versus rural status, and a handful of other factors as the independent variables. In each of the regression tables, each row of independent variables is part of a separate regression equation. They are not parts of a single multivariate examination. A small number of multivariate analyses are reported at the end of the chapter.

The strongest relationship was between expenditures (per capita) and trust fund rate of return, which was not surprising (r square = 0.327). For every percentage point

increase in a state's 1990 HTF rate of return, per capita highway expenditures were higher by $0.20.

Most of the political variables were negatively correlated with per capita expenditures, which perhaps tells us that current political representation is not as important as past political representation. For example, for every additional member a state had on the House Appropriations Committee, its per capita expenditures were lower by $16.39 per capita (r square = 0.199). Only membership on the Senate Environment and Public Works Committee had a positive correlation, and it had a weak r square (0.050). Per capita expenditures were negatively correlated with the system extent variables, and with total VMT but not per capita VMT. For example, for every 1,000 additional centerline miles of highway a state has, its per capita expenditures were lower by $2 (r square = 0.160). And, finally, for every percentage point increase in a state's rural population share, per capita expenditures were higher by $0.17, but this last equation is very weak indeed (r square = 0.003). Thus, evidence existed to support most of my initial hypotheses, with the notable exceptions of the political representation variables.

Table 8-3: 1990 FHWA expenditures (per capita), regression

Dependent Variable: 1990 FHWA expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 highway trust fund rate of return	0.572	45.143	19.726	0.327
1989-90 House Appropriations	-0.446	94.462	-16.387	0.199
1990 highway user tax revenue (total dollars)	-0.418	95.396	-7.080	0.174
1990 vehicle miles of travel (total)	-0.410	93.894	-4.220	0.168
1990 population	-0.407	93.030	-3.450	0.166
1990 federal aid highway centerline miles	-0.400	102.606	-0.002	0.160
1990 highway user tax revenue (per capita)	0.393	7.941	1.127	0.155
1990 federal aid highway lane miles	-0.380	101.905	-0.001	0.144
1989-90 House CTI	-0.372	89.566	-13.967	0.138
1990 FHWA expenditures (total dollars)	-0.256	88.734	-4.630	0.065
1989-90 Senate Env. And Pub Works	0.223	69.540	22.463	0.050
1990 vehicle miles of travel (per capita)	0.116	37.957	0.004	0.014
1990 census percent rural	0.056	70.863	16.939	0.003
1990 census percent urban	-0.056	87.802	-16.939	0.003
1989-90 Senate Appropriations	-0.057	78.936	-4.905	0.003

Notes: each row refers to a separate simple linear regression equation.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)
Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

I also examined the pattern of highway appropriation earmark expenditures to determine whether they differed in any way from the more general expenditure pattern. I hypothesized that they would be more strongly correlated with the political variables than were total expenditures, because these projects are inserted in legislation at the behest of members of congress.[105]

In 1990, there were a total of $121 million in highway appropriation earmarks, of which $20 million were in the state of Michigan alone. **Table 8-4** shows the correlation

[105] As noted earlier, I merely look for the strength of the relationships between the political variables and earmarks. I do not discuss the larger issues raised in the literature on earmarks (Ellwood and Patashnik 1993, Luberoff 2001).

between total earmarks and the same variables discussed above. Two variables (appropriation earmarks per capita, 1989-90 House Appropriations) had moderate or strong correlations. Among the other variables, both Senate variables had changed signs when compared to their relationships with overall 1990 expenditures. The evidence in support of the political representation hypothesis was thus relatively weak given the coefficients involved, but the sign on the coefficients was in the hypothesized direction.

Table 8-4: 1990 FHWA appropriations earmarks (total dollars), correlation

Correlation: 1990 FHWA appropriations earmarks (total dollars)

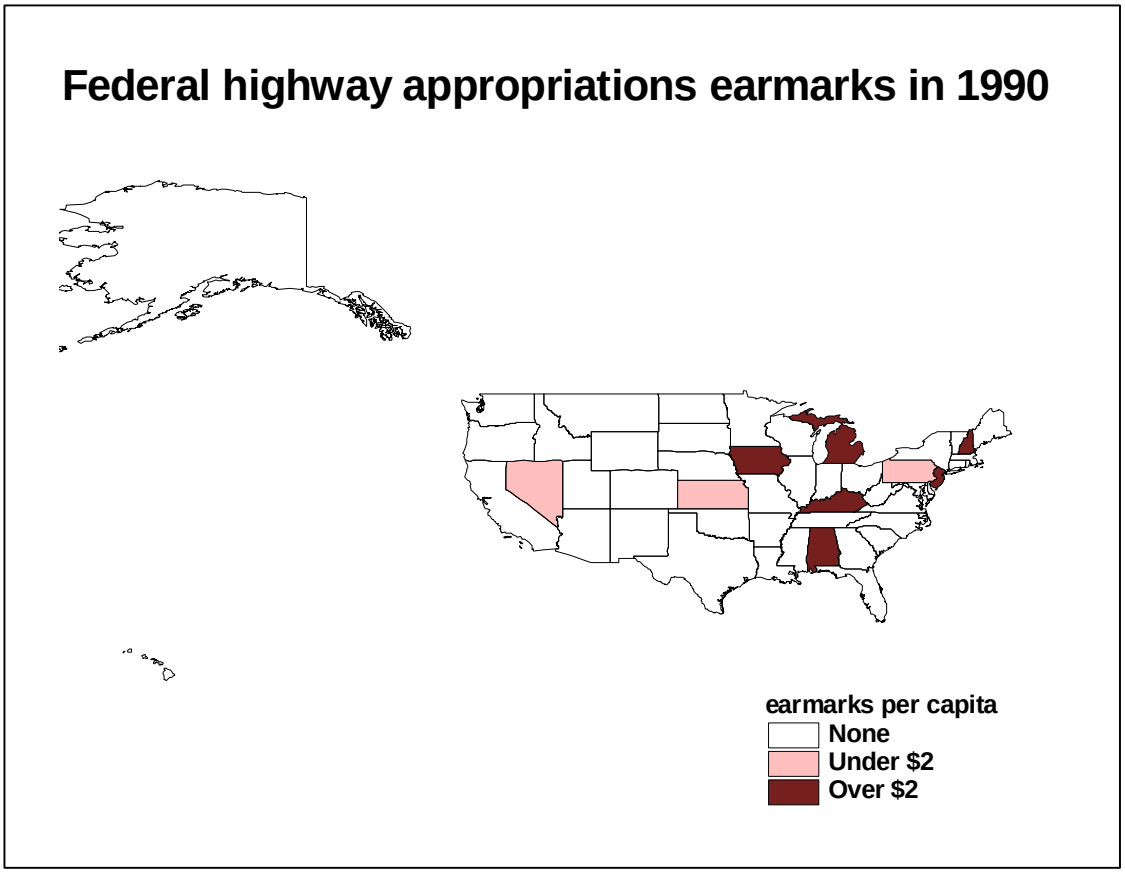
Variable	*Correlation*	*p-value*
1990 FHWA appropriations earmarks (per capita)	0.744	0.000
1989-90 House Appropriations	0.388	0.005
1989-90 House CTI	0.272	0.053
1990 population	0.250	0.077
1990 vehicle miles of travel (per capita)	-0.243	0.086
1990 FHWA expenditures (per capita)	-0.241	0.088
1990 highway user tax revenue (total dollars)	0.203	0.152
1990 vehicle miles of travel (total)	0.197	0.166
1990 federal aid highway centerline miles	0.193	0.175
1990 highway trust fund rate of return	-0.192	0.178
1990 FHWA expenditures (total dollars)	0.187	0.188
1990 highway user tax revenue (per capita)	-0.162	0.257
1990 federal aid highway lane miles	0.147	0.305
1989-90 Senate Appropriations	0.091	0.524
1990 census percent rural	-0.056	0.699
1990 census percent urban	0.056	0.699
1989-90 Senate Env. And Pub Works	0.018	0.903

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)
Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

I then examined per capita appropriations earmark expenditures, so as to account for differences in state populations. **Map 8-2** shows the resulting spatial pattern. The

highest per capita earmarks ($5.03) were in Iowa. The US average earmark was $0.48. Most states (37) received no earmarks in 1990.

Map 8-2: 1990 FHWA appropriations earmarks (per capita)



Source: Legislation. Adjusted using US Census Bureau data.

Table 8-5 presents the results of the regression analyses between 1990 FHWA appropriations earmarks (per capita) and the same variables included in the prior analyses. When we compare the regression results between per capita and overall earmark expenditures, we find that a number of the coefficients for the independent variables have changed signs (1989-90 Senate Appropriations, 1990 HTF rate of return, 1989-90 House Appropriations, 1989-90 Senate Environment and Public Works, and

both highway system extent variables). As noted above, I expected to find a positive relationship between the political representation variables (particularly the appropriations committee variables) and the outcome, and this was true for both Appropriations committees. For example, for every additional member of the Senate Appropriations Committee a state was higher by $0.42 in highway appropriations earmarks per capita (see **Map 8-3**). But the r square was a miniscule 0.045. Most of the variables of interest had very low r squares. To cite one other example, for every percentage point increase in a state's rural population share, a state's per capita earmarks were higher by $0.01. The per capita earmark expenditures were positively (and very weakly) correlated with system extent measures, and negatively correlated with vehicle travel. On balance, the evidence to support my initial hypotheses is very weak indeed.

Table 8-5: 1990 FHWA appropriations earmarks (per capita), regression

Dependent Variable: 1990 FHWA appropriations earmarks (per capita)

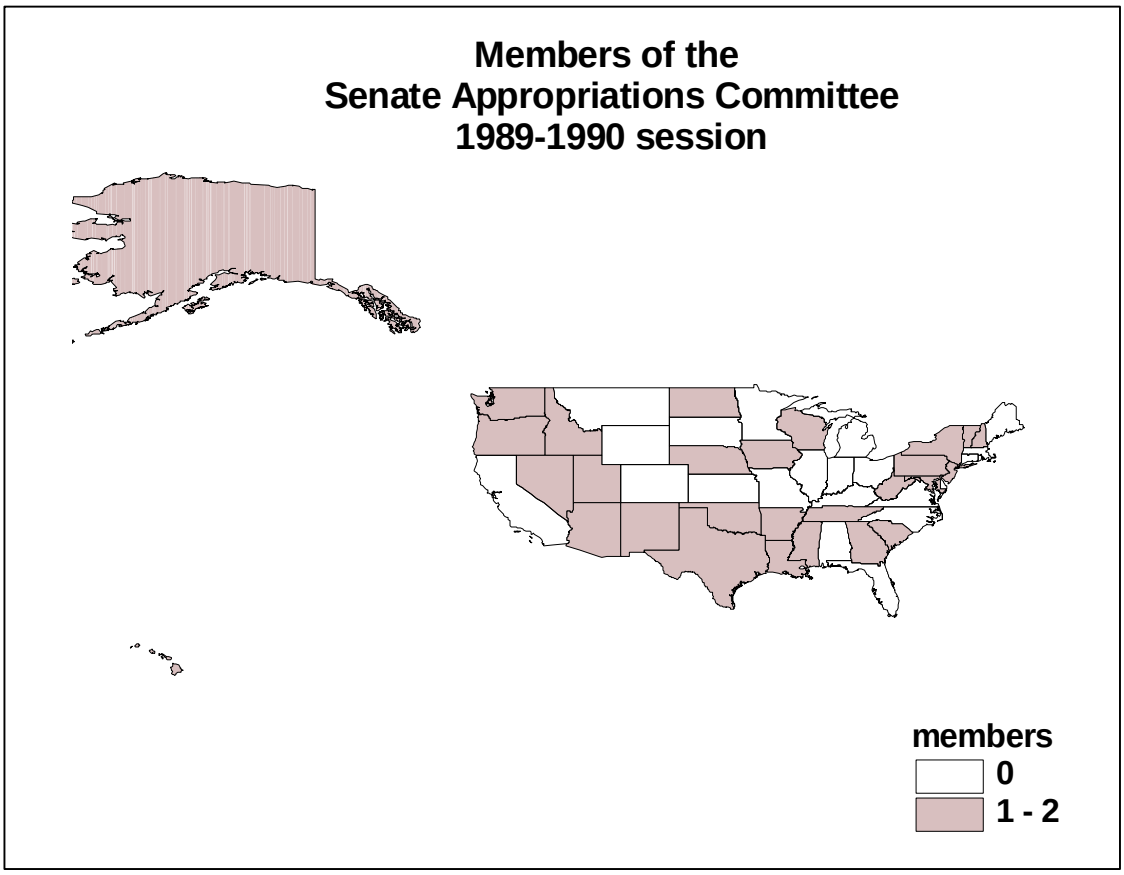
Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 FHWA appropriations earmarks (total dollars)	0.744	0.131	1.550	0.553
1989-90 Senate Appropriations	0.213	0.259	0.420	0.045
1990 FHWA expenditures (per capita)	-0.189	0.829	-0.004	0.036
1990 highway trust fund rate of return	-0.180	0.723	-0.143	0.032
1990 vehicle miles of travel (per capita)	-0.102	1.267	-8.591	0.010
1989-90 House Appropriations	0.093	0.410	0.078	0.009
1990 census percent rural	0.089	0.303	0.625	0.008
1990 census percent urban	-0.089	0.928	-0.625	0.008
1989-90 Senate Env. And Pub Works	-0.076	0.550	-0.176	0.006
1990 federal aid highway centerline miles	0.071	0.391	6.442	0.005
1990 federal aid highway lane miles	0.042	0.433	4.166	0.002
1990 highway user tax revenue (per capita)	-0.039	0.654	-0.003	0.002
1990 vehicle miles of travel (total)	-0.026	0.524	-6.160	0.001
1990 FHWA expenditures (total dollars)	-0.038	0.541	-1.591	0.001
1989-90 House CTI	-0.002	0.500	-0.002	0.000
1990 population	-0.011	0.509	-2.140	0.000
1990 highway user tax revenue (total dollars)	-0.017	0.516	-6.421	0.000

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Map 8-3: Members of the Senate Appropriations Committee, 1989-90 session



Source: Congressional Directory.

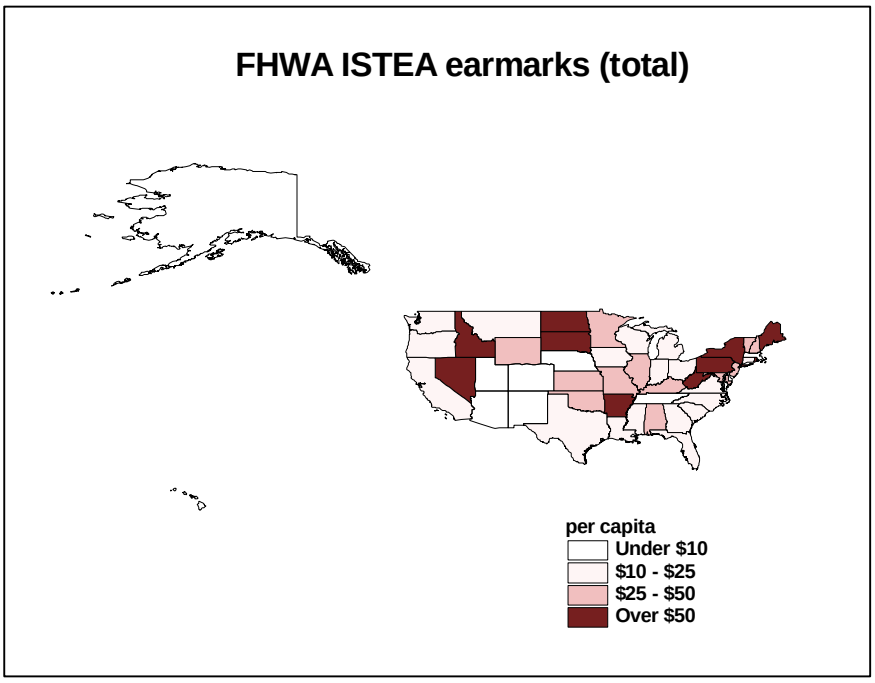
The highway program's ISTEA authorization earmarks

In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) was signed into law, and the federal transportation program was reauthorized until 1997. The ISTEA legislation boosted federal highway expenditures to $18.7 billion a year by 1995. ISTEA also brought a large increase in the phenomenon of congressional earmarking, as a total of $7 billion in highway authorization earmarks were included in the bill (ISTEA

1991). Among the states, Delaware and Alaska received no highway authorization earmarks, while New York, whose senior senator (Moynihan) was a driving force behind the bill, received more than $1 billion in highway authorization earmarks. Pennsylvania, with four representatives on the House authorizing committee (CTI), was a close second with $950 million. Total dollar ISTEA earmarks were highly (and positively) correlated with House CTI (.642), House Appropriations (.585), and total population (.595), and weakly correlated with urban population share (.098), Senate Appropriations (.08), and Senate EPW (.07). It paid to be from a large population state and one that was represented on the House committees. Most of these relationships were as expected.

On average, there were $26.86 in ISTEA highway authorization earmarks (over the life of the law) for every American. At the high end, West Virginia received $200 in per capita highway authorization earmarks. **Map 8-4** shows the spatial pattern of ISTEA highway earmarks (per capita). The northeast fared particularly well in the battle for per capita earmarks, as did the Dakotas, Idaho, Nevada, and Arkansas. My hypothesis has been that political representation is a significant factor when it comes to earmarking. So, is this the case with the ISTEA highway earmarks? And how important was the rural versus urban dimension?

Map 8-4: FHWA ISTEA total earmark expenditures (per capita)



Source: ISTEA 1991. Adjusted using data from US Census Bureau.

Table 8-6 shows the results of the regression analysis for the political representation and population share variables. The strongest correlations, and consequent highest r square measures, were for the population share variables. As expected, more rural states received more ISTEA highway earmarks (per capita), and this was by far the strongest relationship among those examined. For every percentage point increase in a state's rural population share, it received an additional $1.13 (r square = 0.188). It paid to be a more rural state under ISTEA.

Table 8-6: FHWA ISTEA total earmark expenditures (per capita), regression

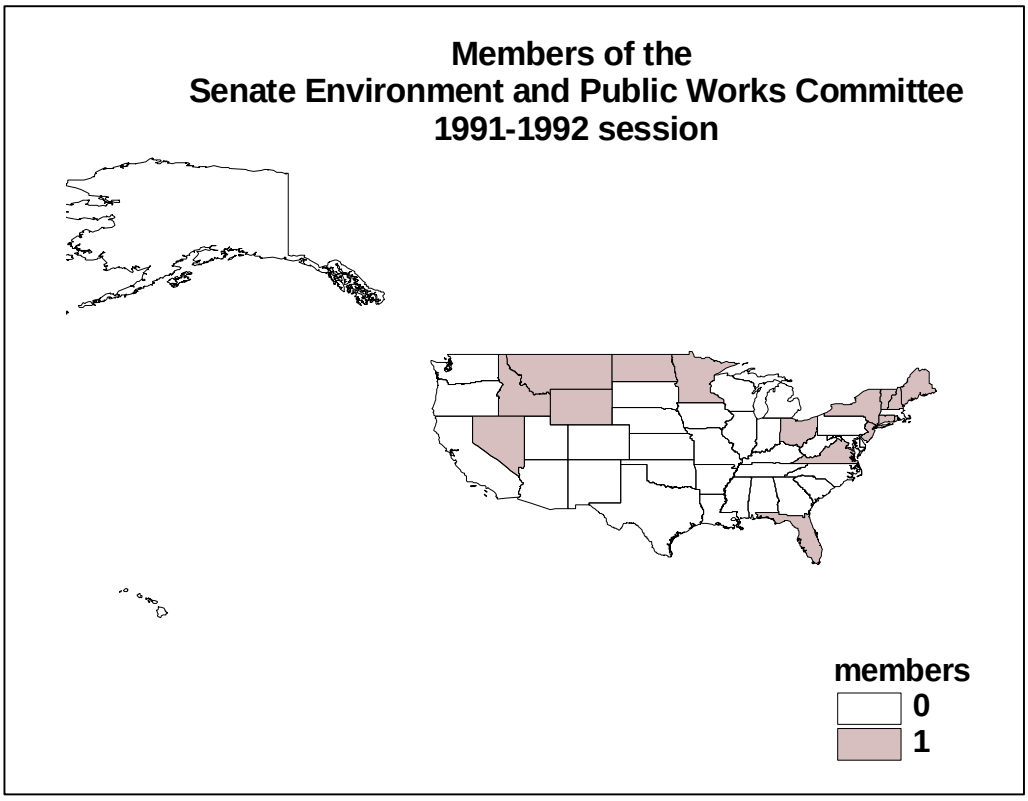
Dependent Variable: ISTEA highway earmarks (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 census percent rural	0.433	-1.773	112.858	0.188
1990 census percent urban	-0.433	111.085	-112.858	0.188
1991-92 Senate Env. Pub Works	0.224	27.509	18.877	0.050
1991 highway trust fund rate of return	-0.105	38.315	-3.107	0.011
1991-92 House Appropriations	-0.084	36.251	-2.438	0.007
1991-92 Senate Appropriations	0.016	32.751	1.197	0.000
1991-92 House CTI	0.003	33.346	0.079	0.000

Notes: each row refers to a separate simple linear regression equation.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)
Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

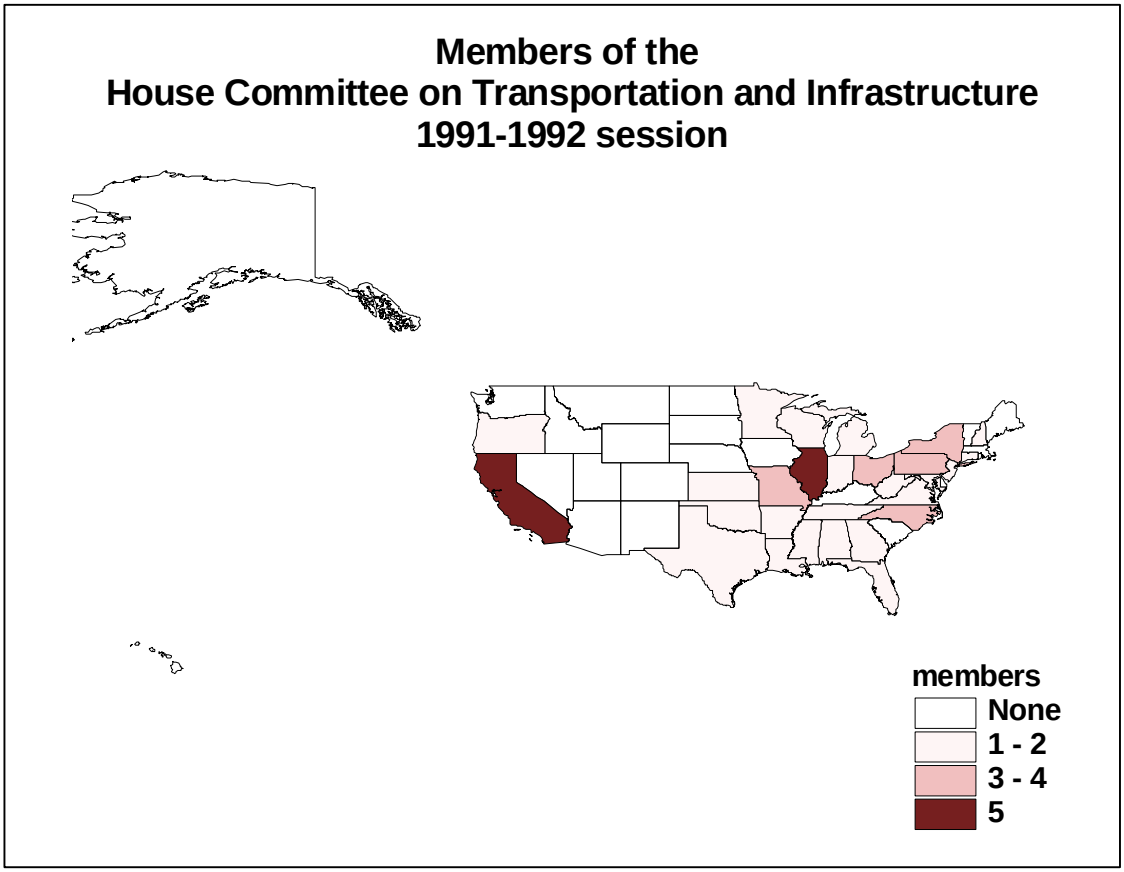
The relationships were in the expected direction, although weaker, for the political variables showing membership on the oversight committees that wrote the ISTEA legislation (Senate Environment and Public Works, House CTI). Thus, it appears that members were more interested in the total amount of the earmark than its per capita equivalent. For every member of the 1991-92 Senate Environment and Public Works Committee, a state was higher by $18.88 (per capita) in highway earmarks (r square = 0.05) (see **Map 8-5**). For every additional member of the House Committee on Transportation and Infrastructure, a state was higher by $0.08 (per capita) in highway earmarks (r square = 0.000) (see **Map 8-6**). It certainly paid to be a state represented on the Senate authorizing committee. It also paid to be from a state on the lower end of the donor versus donee spectrum. For every percentage point decrease in a state's trust fund rate of return, it was higher by $0.03 per capita in ISTEA highway earmarks (r square = 0.011).

Map 8-5: Members of the Senate EPW Committee, 1991-92 session



Source: Congressional Directory.

Map 8-6: Members of the House CTI, 1991-92 session

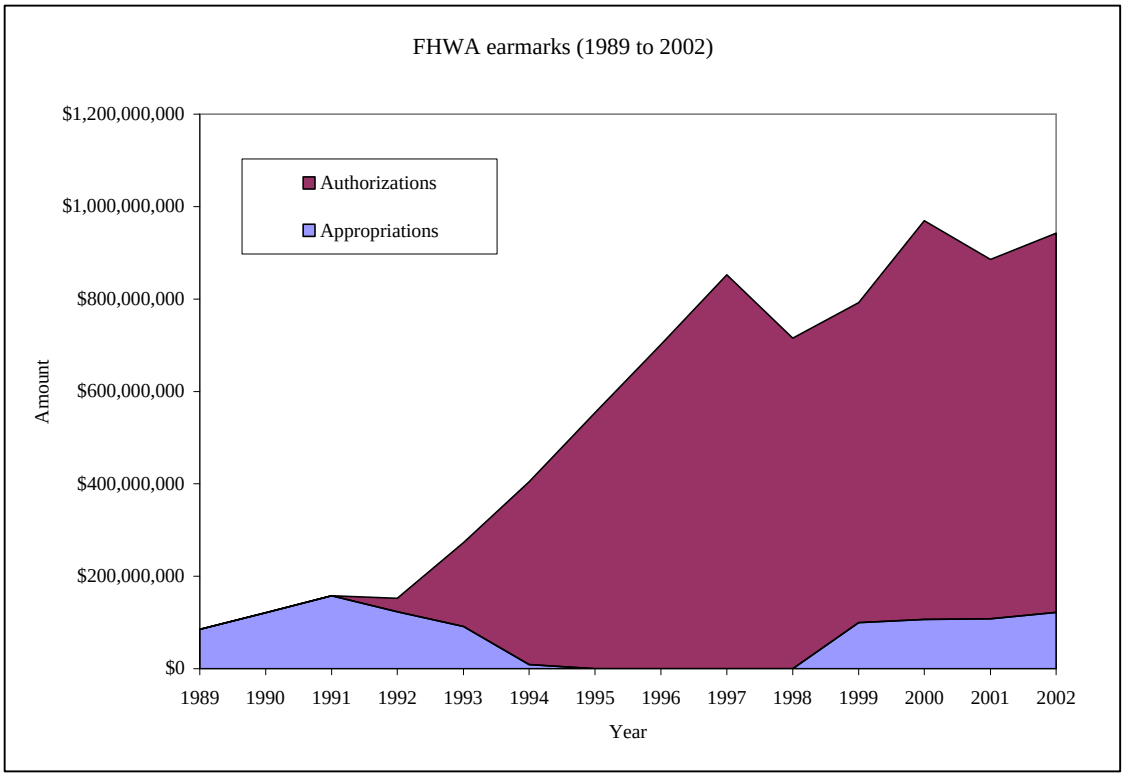


Source: Congressional Directory.

Federal highway program in 1995

The ISTEA earmarks noted above were distributed over the course of the legislation, including in 1995, so I do not examine the patterns for 1995 in particular. And, a series of media exposés on pork barrel highway projects prompted congress to voluntarily suspend the practice of adding highway (although not transit) earmarks to annual appropriations bills (see **Graph 8-1**). Therefore, the discussion of federal highway expenditures in 1995 will focus on the patterns of overall expenditures alone.

Graph 8-1: Federal highway earmarks, 1989 to 2002



Source: Legislation listed in the references.

But the first issue I examine briefly, is the relationship between urban population share and the other variables of interest for 1995. Unfortunately, the urban population share measures I had available were from the 1990 census. Thus, the results reported in **Table 8-7** should be read cautiously. In general, the relationships between the urban population share and the other variables were unchanged between 1990 and 1995. However, one notable exception was the Senate Environment and Public Works Committee. Membership on this committee in 1989-90 (and in 1991-92) had been negatively correlated with a state's urban population share, but membership in both the

1993-94 and 1995-96 sessions was positively (albeit very weakly) correlated with a state's urban population share.[106]

Table 8-7: Urban population share (1990) related to 1995 variables, correlation

Urban population (1990 percent urban) related to other variables

Variable	*Correlation*	*p-value*
1995 highway user tax revenue (per capita)	-0.536	0.000
1995 vehicle miles of travel (per capita)	-0.564	0.000
1995 FHWA expenditures (total dollars)	0.397	0.004
1995 population	0.389	0.005
1995 FHWA authorization earmarks (per capita)	-0.365	0.008
1995 vehicle miles of travel (total)	0.340	0.015
1995 highway user tax revenue (total)	0.311	0.026
1993-94 House Appropriations	0.296	0.035
1995-96 House CTI	0.295	0.035
1995-96 House Appropriations	0.274	0.052
1995-96 Senate Appropriations	-0.213	0.134
1993-94 House CTI	0.309	0.208
1995 highway trust fund rate of return	0.143	0.316
1995 FHWA expenditures (per capita)	-0.138	0.333
1995-96 Senate Env. Pub. Works	0.106	0.460
1995 federal aid highway lane miles	0.090	0.528
1995 federal aid highway centerline miles	0.089	0.535
1995 FHWA authorization earmarks (total dollars)	-0.065	0.651
1993-94 Senate Env. Pub Works	0.062	0.665
1993-94 Senate Appropriations	0.001	0.994

Notes: urban population data are from US Census Bureau and are based on Census definitions of
For rural population, p-values are identical, and correlation coefficients are identical but have the
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

In 1995, federal highway expenditures reached $18.7 billion, and the highway authorization earmarks included in ISTEA totaled $554 million for that year. States received substantially more money in 1995 than they had in 1990. Delaware, as was the

[106] I include the political membership variables for the 1993-94 session in all of the 1995 analyses because these individuals passed the appropriations legislation for fiscal year 1995. This is especially important to keep in mind when examining the issue of appropriations earmarks.

case in 1990, received the lowest amount of federal highway aid but saw its total jump to $67 million. California again received the largest amount ($1.76 billion). As was the case in 1990, population, total VMT, House Committee representation, and measures of highway system extent were highly (and positively) correlated with total highway expenditures, as **Table 8-8** indicates. These relationships were as expected.

Table 8-8: 1995 FHWA expenditures (total dollars), correlation

Correlation: 1995 FHWA expenditures (total dollars)

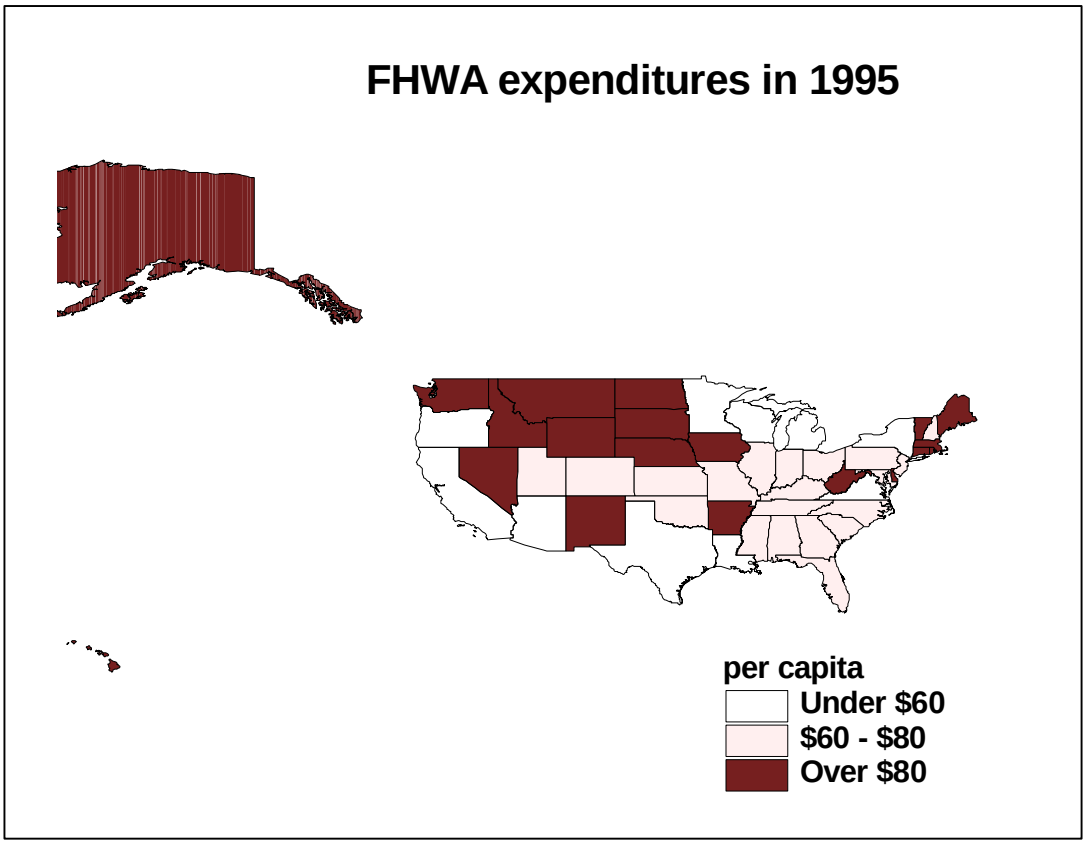
Variable	*Correlation*	*p-value*
1995 population	0.950	0.000
1995 vehicle miles of travel (total)	0.935	0.000
1995 highway user tax revenue (total)	0.919	0.000
1993-94 House CTI	0.838	0.000
1993-94 House Appropriations	0.834	0.000
1991-92 House Appropriations	0.829	0.000
1995-96 House Appropriations	0.820	0.000
1995-96 House CTI	0.792	0.000
1991-92 House CTI	0.711	0.000
1995 federal aid highway centerline miles	0.645	0.000
1995 federal aid highway lane miles	0.605	0.000
ISTEA highway earmarks (total dollars)	0.549	0.000
1990 census percent urban	0.397	0.004
1990 census percent rural	-0.397	0.004
1995 highway user tax revenue (per capita)	-0.320	0.022
1995 FHWA authorization earmarks (total dollars)	0.310	0.027
1995 FHWA expenditures (per capita)	-0.276	0.050
1995 vehicle miles of travel (per capita)	-0.276	0.050
1995 FHWA authorization earmarks (per capita)	-0.188	0.186
1993-94 Senate Env. Pub Works	0.176	0.217
1995 highway trust fund rate of return	-0.174	0.223
1995-96 Senate Env. Pub. Works	0.156	0.273
ISTEA highway earmarks (per capita)	-0.142	0.319
1995-96 Senate Appropriations	-0.138	0.335
1993-94 Senate Appropriations	0.137	0.337
1991-92 Senate Appropriations	-0.119	0.407
1991-92 Senate Env. Pub Works	-0.102	0.476

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

The federal government spent $70.14 per person on highways in 1995. The highest per capita expenditure was in Alaska ($408.06), while the lowest was in New York ($45.24). **Map 8-7** shows the spatial pattern of per capita federal highway expenditures in 1995. The highest per capita expenditures occurred in the upper plains and mountain states, while the lowest per capita expenditures occurred in the states with larger populations and those that might be thought of as being more heavily urban (and/or having large populations).

Map 8-7: 1995 FHWA expenditures (per capita)



Source: Highway Statistics 1996. Adjusted using US Census Bureau data.

I conducted a series of regression analyses involving the 1995 federal highway expenditures per capita variable. The same constellation of system use and extent, population, and political representation variables as were included in the 1990 analyses were examined in 1995. But I also included political representation variables for the intervening 1991-92 and 1993-94 sessions in this analysis. I included the 1991-92 political variables because these committees drafted ISTEA that serves as the authorizing legislation for the highway program. I included the 1993-94 political variables because the annual appropriations legislation for 1995 was passed during the 1993-94 session. The results of the regression analyses are reported in **Table 8-9**.

Table 8-9: 1995 FHWA expenditures (per capita), regression

Dependent Variable: 1995 FHWA expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1995 highway trust fund rate of return	0.820	22.713	53.556	0.673
1995 federal aid highway lane miles	-0.446	139.529	-0.001	0.199
1995 highway user tax revenue (total)	-0.436	126.346	-6.830	0.190
1995 vehicle miles of travel (total)	-0.428	124.446	-5.530	0.183
1995 federal aid highway centerline miles	-0.421	134.262	-0.019	0.177
1995 population	-0.405	121.419	-4.452	0.164
1993-94 House Appropriations	-0.402	119.976	-18.513	0.162
1991-92 House Appropriations	-0.396	119.593	-18.496	0.157
1991-92 House CTI	-0.392	118.729	-19.039	0.154
1995-96 House Appropriations	-0.393	117.525	-17.603	0.154
1993-94 House CTI	-0.370	116.580	-14.882	0.137
1995-96 House CTI	-0.282	111.730	-11.503	0.079
1995 FHWA expenditures (total dollars)	-0.276	118.463	-5.530	0.076
1995 highway user tax revenue (per capita)	0.236	44.982	0.611	0.056
1990 census percent rural	0.138	80.154	57.840	0.019
1990 census percent urban	-0.138	137.994	-57.840	0.019
1991-92 Senate Env. Pub Works	0.129	92.693	17.541	0.017
1993-94 Senate Appropriations	-0.075	103.244	-8.876	0.006
1995 vehicle miles of travel (per capita)	-0.039	112.953	-0.015	0.002
1991-92 Senate Appropriations	-0.042	101.000	-4.931	0.002
1995-96 Senate Appropriations	0.015	97.303	1.628	0.000
1995-96 Senate Env. Pub. Works	-0.007	98.515	-1.016	0.000
1993-94 Senate Env. Pub Works	-0.007	98.500	-0.966	0.000

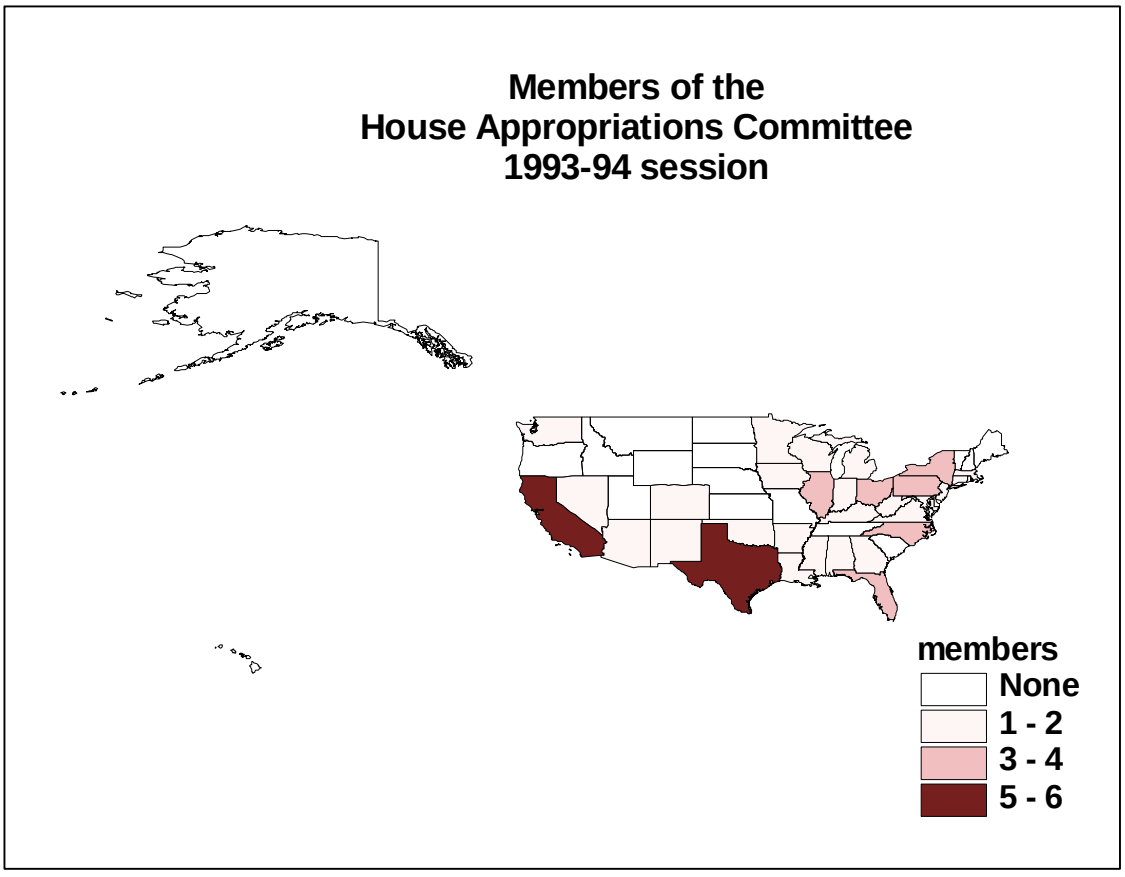
Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90%

There were changes in the size of the coefficients on three variables (percent rural, percent urban, and HTF rate of return) between 1990 and 1995. The highest r square was for 1995 HTF rate of return (0.673), and this relationship was stronger than it had been in 1990. Most of the House committee variables had r squares between 0.1 and 0.2, and the directions of the relationship were again negative. For example, for every additional member of the 1993-94 House Appropriations Committee a state was lower by $18.51 in 1995 per capita expenditures (r square = 0.162) (see **Map 8-8**).

Map 8-8: Members of the House Appropriations Committee, 1993-94 session



Source: Congressional Directory.

And as in 1990, more rural states enjoyed higher per capita expenditures. For every percentage point increase in a state's rural population share its per capita expenditures were higher by $0.58 (r square = 0.019). The rural versus urban dimension has a weak association with the makeup of the House committees, as Table 8-7 indicated. The use and extent variables continued to have negative correlations with the expenditure per capita variable, as did total population. When measured on a per capita basis, the most money was not being spent in the areas with the largest populations, most total vehicle travel, or largest highway systems. This was unchanged between 1990 and 1995.

The highway program's TEA-21 authorization earmarks

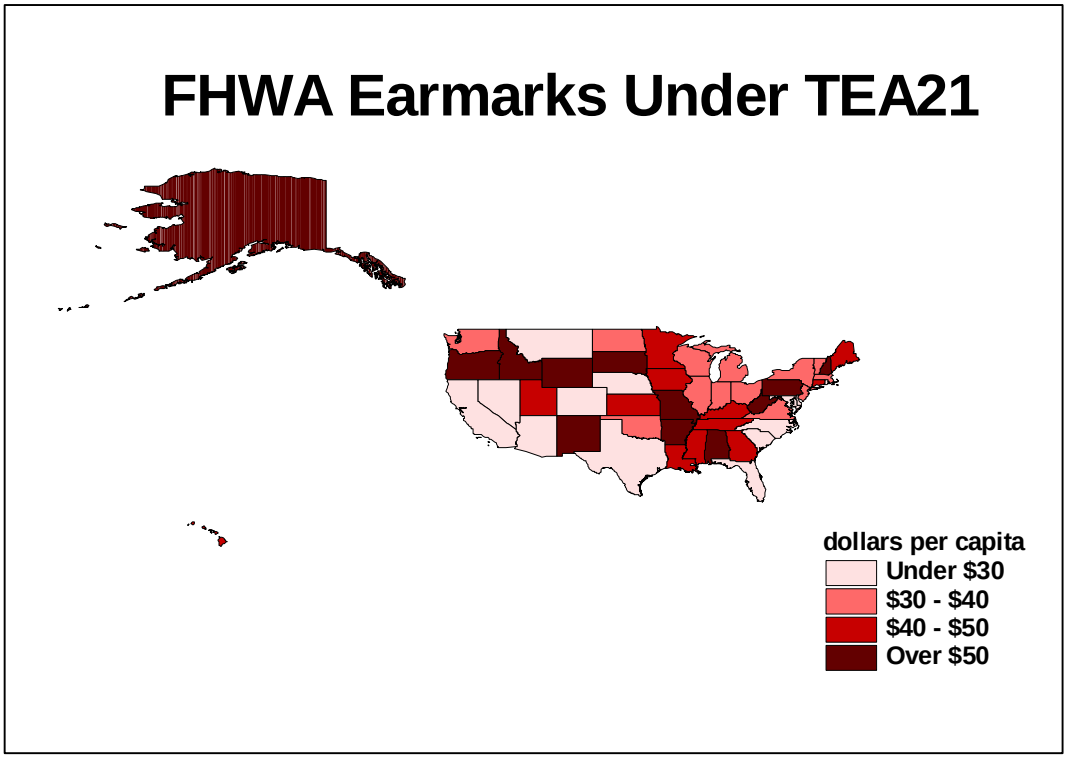
In 1998, congress again extended the surface transportation program when it enacted the Transportation Equity Act for the 21st Century (TEA-21). This legislation boosted overall transportation spending, and adjusted many of the formulas used to apportion funds to the states. The legislation also featured a dramatic increase in the practice of earmarking, as described in Chapter 6. The final legislation included about $9 billion in highway project earmarks (TEA-21 1998). California led all states with $875 million in highway authorization earmarks, while Delaware received the least, just under $9 million. Pennsylvania finished second in the earmark derby with just over $800 million. The fact that Representative Shuster of Pennsylvania was the key figure in the drafting of the TEA-21 legislation certainly appeared to help that state's cause.

In fact, total dollar TEA-21 earmarks were strongly correlated with House CTI membership (0.884), House Appropriations (0.805), and total population (0.998), and weakly correlated with urban population share (0.103). All the coefficients were larger

than for ISTEA. The House committees were clearly looking out for their constituents when it came to the chase for total dollar earmarks. By contrast, the Senate committees had weak correlations as with ISTEA (Appropriations 0.04, EPW 0.08). By and large, the same states that were earmark winners under ISTEA were also winners under TEA-21. In fact, the correlation between total ISTEA highway earmarks and total TEA-21 highway earmarks was 0.771.

TEA-21 provided $33 of highway earmarks (over the life of the law) for every American. South Dakota received $110 in TEA-21 highway earmarks per capita over the course of TEA-21, while Delaware received $11. **Map 8-9** shows the spatial pattern of TEA-21 highway earmarks (per capita). A wide array of states, including many in the south, fared well in the battle for earmarks. And so did Pennsylvania and West Virginia. So what helps to explain these per capita patterns? Was it political representation, as in the case of per capita earmarks?

Map 8-9: FHWA earmark expenditures under TEA-21 (per capita)



Source: TEA-21 legislation. Adjusted using US Census Bureau data.

I examined the same variables as in the case of the ISTEA earmarks per capita (political representation, rural versus urban status, and trust fund rate of return), and the results are reported in **Table 8-10** below. As in the case of the ISTEA earmarks, a state's rural population share had the strongest correlation (0.487) and highest r square (0.237) (see **Map 8-10** for the map of urban shares). For every percentage point increase in a state's rural population share, its TEA-21 highway earmarks per capita were higher by $0.93.

But a number of variables changed signs between ISTEA and TEA-21. For example, highway trust fund rate of return now had a positive sign, although the

correlation and resulting r square were both very low. The sign for the House CTI also changed, in this case from positive to negative, which was unexpected given the attention paid to the role of Representative Shuster and his colleagues. But the signs for Senate membership were positive, although the r squares were very weak. Again, the relationships between the expenditure outcomes and political variables were much stronger for total dollar than for per capita earmarks. The analysis suggests that politicians are more interested in the total amount of the earmark, and not so much in its per capita equivalent. A state's rural population share was even more important than it had been under ISTEA.

Table 8-10: FHWA earmark expenditures under TEA-21 (per capita), regression

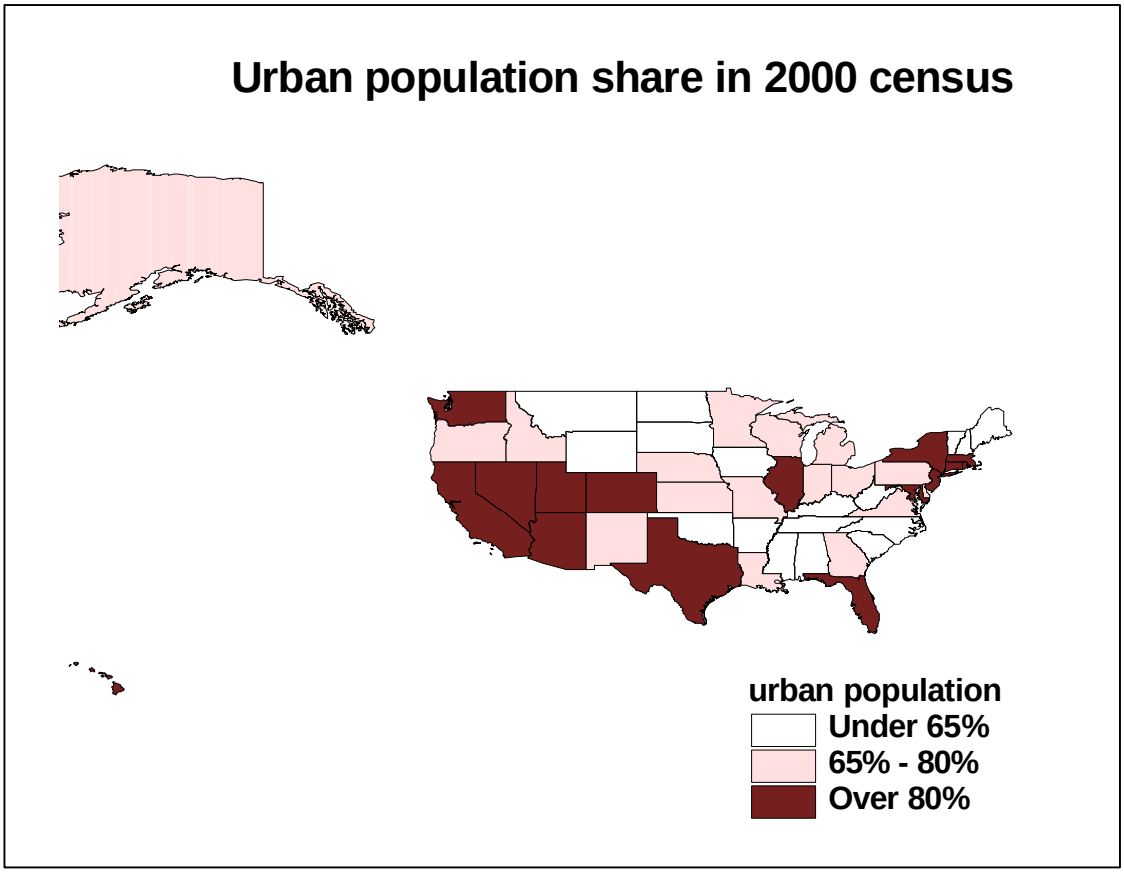
Dependent Variable: TEA-21 highway earmarks (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 census percent rural	0.487	-0.06	92.835	0.237
2000 census percent urban	-0.487	92.774	-92.835	0.237
1997-98 House Appropriations	-0.212	30.837	-4.436	0.045
1997-98 CTI	-0.139	29.3	-2.512	0.019
1997-98 Senate Appropriations	0.076	23.45	4.106	0.006
1997-98 Senate Env. Pub Works	0.06	24.416	3.65	0.004
1998 highway trust fund rate of return	0.016	24.994	0.555	0.000

Notes: each row refers to a separate simple linear regression equation.

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex.

Map 8-10: 2000 Urban population share



Source: US Census Bureau website.

Federal highway program in 2000

The passage of TEA-21 brought changes to the apportionment formulas used to distribute federal highway funds, an increase in overall highway expenditures, and the return of the once frowned-upon highway appropriations earmark. By 2000, federal highway appropriations earmarks exceeded the $100 million level, and they have continued to increase in subsequent years. In this section, I focus on both overall highway expenditures, and on the issue of highway appropriations earmarks.

By 2000, annual highway expenditures were approximately $24 billion (Highway Statistics 2001). Vermont was, as usual, the state that received the smallest amount of federal highway dollars ($116 million), although the amount was significantly higher than in 1995. And, again, California received the largest amount of federal highway money ($1.9 billion). Total highway expenditures were highly correlated with total VMT, population, and highway system extent, and the relationships were stronger than in 1995. This is not surprising as those are the factors now used in most of the post TEA-21 apportionment formulas (see **Table 8-11**). Expenditures were also again highly correlated with the House committee variables. (I include the 1997-98 session political variables in this analysis because these were the committees in place when TEA-21 was enacted.) These results were expected.

The federal highway program spent $85 for every American in 2000. The highest per capita expenditure ($537) was made in Alaska, and the lowest ($58) in California. The highest per capita expenditures occurred in Alaska, the northern mountain and plains states, and among a trio of states straddling the Mississippi and Ohio Rivers; the lowest occurred in a group of larger population states (see **Map 8-11**).

Because urban versus rural distinctions are an important component of this analysis, **Table 8-12** reports correlations between a state's urban population share in the 2000 census and a number of the other variables. None of the correlation coefficients were particularly surprising in terms either of their magnitude or sign, save those for appropriations earmarks. In these cases, the signs were positive, although the numbers

were quite low. These issues will be examined in the discussion of appropriation earmarks a little later.

Table 8-11: 2000 FHWA expenditures (total dollars), correlation

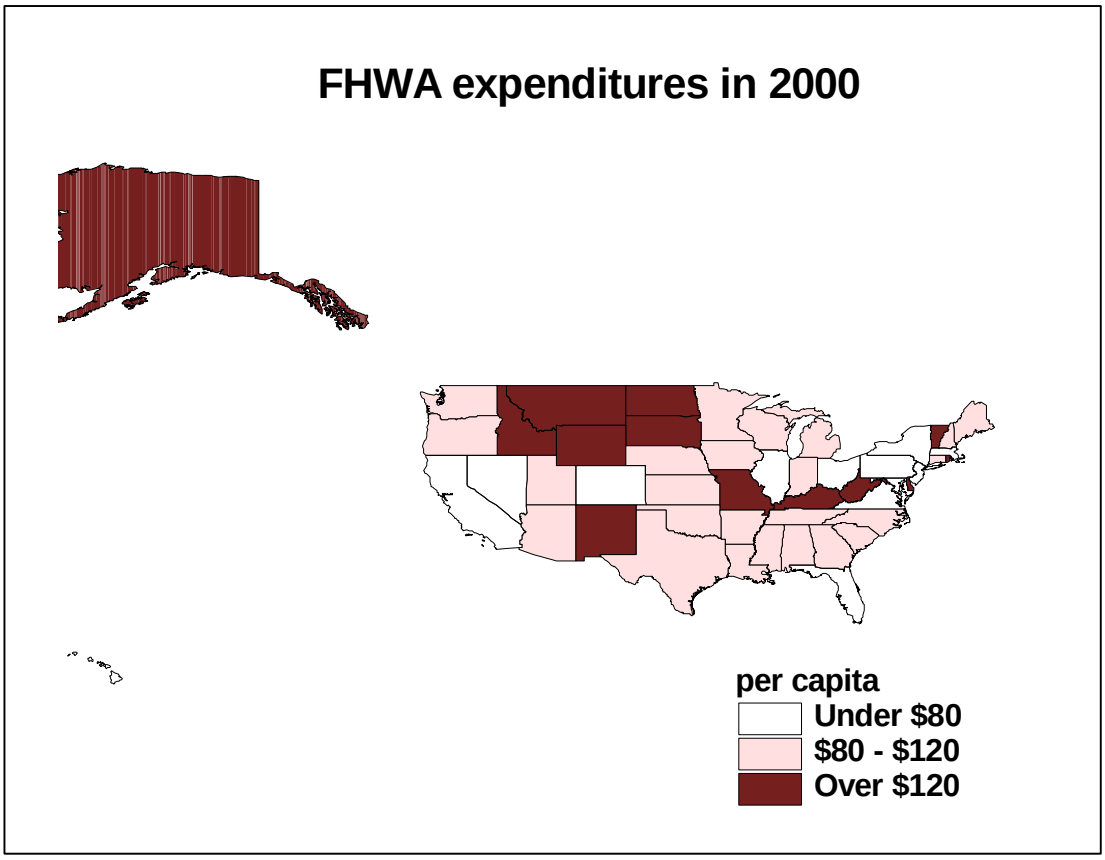
Correlation: 2000 FHWA expenditures (total dollars)

Variable	*Correlation*	*p-value*
2000 vehicle miles of travel (total)	0.999	0.000
TEA-21 highway earmarks (total)	0.998	0.000
2000 federal aid highway centerline miles	0.998	0.000
2000 population	0.998	0.000
2000 federal aid highway lane miles	0.997	0.000
2000 highway user tax revenue (total)	0.979	0.000
2000 FHWA appropriations earmarks (total dollars)	0.903	0.000
1997-98 House Appropriations	0.901	0.000
1999-00 House Appropriations	0.818	0.000
1997-98 CTI	0.771	0.000
1999-00 CTI	0.747	0.000
2000 highway trust fund rate of return	-0.281	0.045
1999-00 Senate Env. Pub Works	0.249	0.078
TEA-21 highway earmarks (per capita)	-0.244	0.084
2000 FHWA appropriations earmarks (per capita)	-0.240	0.090
2000 highway user tax revenue (per capita)	-0.202	0.155
2000 vehicle miles of travel (per capita)	-0.141	0.323
2000 FHWA expenditures (per capita)	-0.101	0.477
2000 census percent urban	0.099	0.486
2000 census percent rural	-0.099	0.486
1997-98 Senate Env. Pub Works	0.068	0.634
1999-00 Senate Appropriations	0.042	0.769
1997-98 Senate Appropriations	0.014	0.923

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Map 8-11: 2000 FHWA expenditures (per capita)



Source: Highway Statistics 2001, Table FA-3. Adjusted using US Census Bureau data.

Table 8-12: 2000 Urban population share, correlation

Urban population (2000 percent urban) related to other variables

Variable	*Correlation*	*p-value*
TEA-21 highway earmarks (per capita)	-0.487	0.000
2000 highway user tax revenue (per capita)	-0.535	0.000
2000 vehicle miles of travel (per capita)	-0.615	0.000
2000 FHWA expenditures (per capita)	-0.336	0.015
2000 highway user tax revenue (total)	0.331	0.018
1999-00 Senate Env. Pub Works	0.311	0.026
1999-00 CTI	0.305	0.030
1997-98 CTI	0.293	0.037
1997-98 House Appropriations	0.255	0.071
1999-00 House Appropriations	0.253	0.073
1997-98 Senate Appropriations	-0.185	0.195
1997-98 Senate Env. Pub Works	0.160	0.262
2000 population	0.125	0.379
2000 vehicle miles of travel (total)	0.112	0.429
TEA-21 highway earmarks (total)	0.103	0.469
2000 FHWA appropriations earmarks (per capita)	0.103	0.473
2000 FHWA appropriations earmarks (total dollars)	0.099	0.485
2000 FHWA expenditures (total dollars)	0.099	0.486
2000 federal aid highway centerline miles	0.068	0.633
2000 federal aid highway lane miles	0.067	0.639
1999-00 Senate Appropriations	-0.031	0.827
2000 highway trust fund rate of return	-0.013	0.929

Given the formula changes associated with TEA-21 (closer link to system use and extent, strengthened minimum guaranteed return), I also expected some changes in the relationships between the expenditure per capita variable and the other variables examined as part of the regression analysis. Some of the results were as expected, while others were not. **Table 8-13** shows the results.

Table 8-13: 2000 FHWA expenditures (per capita), regression

Dependent Variable: 2000 FHWA expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 highway trust fund rate of return	0.814	12.629	87.668	0.663
2000 highway user tax revenue (total)	-0.420	162.306	-5.464	0.176
2000 highway user tax revenue (per capita)	0.416	-0.299	0.916	0.173
1997-98 House Appropriations	-0.398	153.945	-25.159	0.158
1999-00 House Appropriations	-0.392	154.626	-24.903	0.154
1999-00 CTI	-0.360	156.429	-21.481	0.130
2000 census percent rural	0.336	70.564	193.716	0.113
2000 census percent urban	-0.336	242.280	-193.716	0.113
1997-98 CTI	-0.327	150.342	-17.816	0.107
2000 vehicle miles of travel (per capita)	0.160	44.534	0.008	0.026
2000 population	-0.127	127.181	-2.871	0.016
2000 vehicle miles of travel (total)	-0.124	127.104	-2.874	0.015
2000 FHWA expenditures (total dollars)	-0.101	126.548	-2.690	0.010
2000 federal aid highway centerline miles	-0.096	126.434	-6.412	0.009
2000 federal aid highway lane miles	-0.095	126.420	-7.418	0.009
1999-00 Senate Env. Pub Works	-0.069	129.294	-12.620	0.005
1997-98 Senate Appropriations	0.064	119.084	10.484	0.004
1997-98 Senate Env. Pub Works	-0.053	128.245	-9.649	0.003
1999-00 Senate Appropriations	0.047	120.601	7.721	0.002

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

One of the changes between 1995 and 2000 was that the correlation between expenditures per capita and a state's urban versus rural status increased. For every percentage point increase in a state's 2000 rural population share, its 2000 per capita federal highway expenditure was higher by $1.94 (r square = 0.113). By contrast, the correlation between expenditures per capita and the system extent measures (centerline miles, lane miles) decreased significantly between 1995 and 2000, but remained negative. The general trend was toward a closer (i.e. less negative) relationship with highway system use and extent.

The political variables, by contrast, were generally unchanged. For every additional member a state had on the 1997-98 House Appropriations committee, its 2000

highway expenditures per capita was lower by $25.16 (r square = 0.113). For every additional member a state had on the 1999-00 House Appropriations committee, its 2000 highway expenditures per capita was lower by $24.90 (r square = 0.154).

Congress also returned in the late 1990s to the once-discredited practice of including highway project earmarks in the annual DOT appropriations laws. **Map 8-12** shows the spatial pattern of 2000 FHWA appropriation earmarks (per capita). They range from a high of $4.79 in Alaska to a low of zero in fifteen states. I expected a strong positive connection between the appropriations earmarks (per capita) and the political representation variables. The regression results are presented in **Table 8-14**.

Map 8-12: 2000 FHWA appropriation earmark expenditures (per capita)

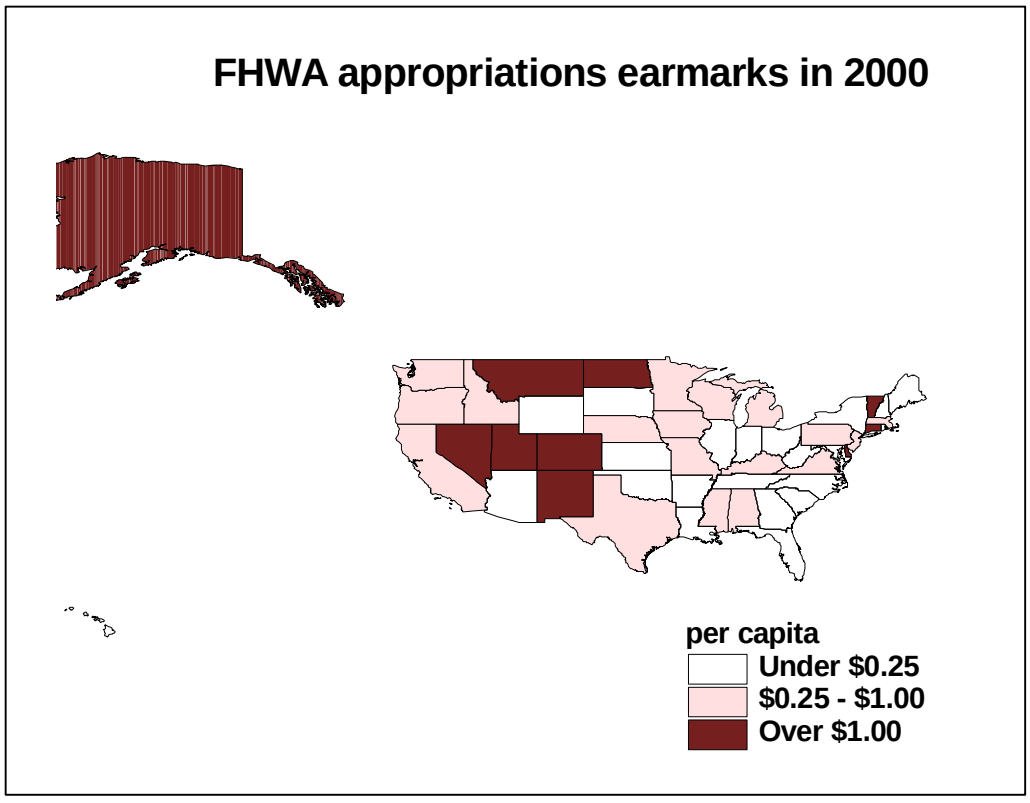


Table 8-14: 2000 FHWA appropriation earmarks (per capita), regression

Dependent Variable: 2000 FHWA appropriations earmarks (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 highway trust fund rate of return	0.690	-0.455	0.893	0.476
2000 federal aid highway lane miles	-0.346	1.216	-3.277	0.120
2000 federal aid highway centerline miles	-0.341	1.175	-2.604	0.116
1999-00 House Appropriations	-0.287	0.950	-0.219	0.082
1997-98 House Appropriations	-0.266	0.922	-0.202	0.071
2000 population	-0.266	0.940	-4.568	0.071
1999-00 CTI	-0.262	0.964	-0.188	0.069
1997-98 CTI	-0.229	0.902	-0.150	0.052
1999-00 Senate Appropriations	0.136	0.542	0.266	0.018
1997-98 Senate Env. Pub Works	-0.130	0.789	-0.285	0.017
1997-98 Senate Appropriations	0.129	0.549	0.253	0.017
1999-00 Senate Env. Pub Works	-0.116	0.778	-0.254	0.013
2000 census percent urban	0.103	0.174	0.712	0.011
2000 census percent rural	-0.103	0.886	-0.712	0.011

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

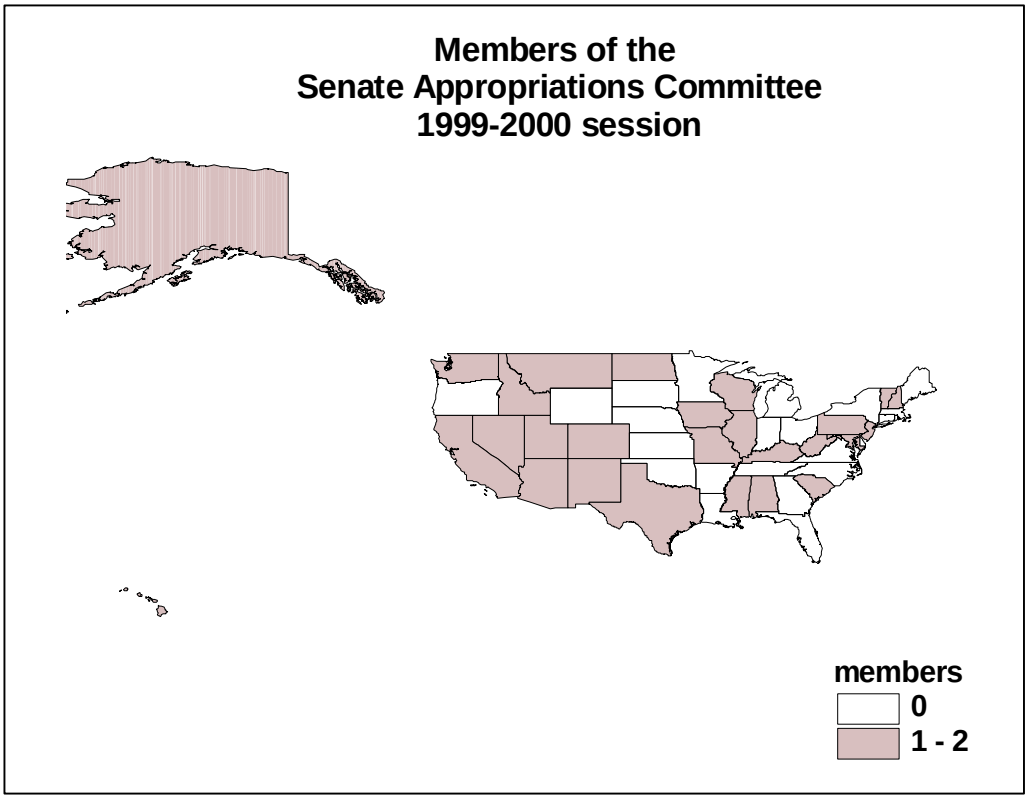
Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

The strongest correlation existed between 2000 highway appropriations earmarks per capita and a state's HTF rate of return, although the results of unit changes were quite small. For every percentage point increase in a state's rate of return, its per capita highway appropriations earmarks was higher by $0.009 (r square = 0.476). Among the political representation variables, the correlations were negative, except in the case of representation on the Senate Appropriations Committee. For each additional representative a state had on the 1999-2000 Senate Appropriations Committee, its earmark per capita was higher by $0.27 (r square = 0.018) (see **Map 5-27**).

And, for the first time in this analysis, there was a positive relationship between one of the expenditure (per capita) variables and a state's urban population share. For every percentage point increase in 2000 urban population share, a state's appropriations

earmarks per capita was higher by $0.007 (r square =0 .011). Most of the regression results are quite weak.

Map 8-13: Members of the Senate Appropriations Committee, 1999-2000 session



Source: Congressional Directory.

By and large the strongest relationships throughout this analysis were between the expenditure (per capita) variables and the HTF rate of return variables. This became abundantly clear when I made an attempt to build multivariate models for the 1990, 1995, and 2000 FHWA expenditures (per capita). After running through about thirty different model configurations in each case, the most striking tale was the increasing importance of two variables (HTF rate of return and highway user tax revenue per capita) in affecting the expenditure outcome (see **Table 8-15**). Indeed, substitution or inclusion of the other

variables listed in the expenditures per capita tables for each year of analysis had little effect on the resulting r square measures. The only more significant predictor of outcomes was the prior year in the sequence's expenditures (per capita) (as seen in **Table 8-15** below). The past was indeed a good predictor of the present, and stability seemed to be the norm.

Table 8-15. The increasing importance of two variables, regression

Dependent Variable: 1990 FHWA expenditures (per capita)

	Model summary	
Model components	Coefficient	p-value
Constant	-84.042	0.000
1990 highway trust fund rate of return	2.789	0.000
1990 highway user tax revenue (per capita)	0.231	0.000
Independent Variables	Correlation	p-value
1990 highway trust fund rate of return 1990 highway user tax revenue (per capita)	-0.347	0.013
R Squared	**0.724**	

Dependent Variable: 1995 FHWA expenditures (per capita)

	Model summary	
Model components	Coefficient	p-value
Constant	-95.486	0.000
1995 highway trust fund rate of return	61.437	0.000
1995 highway user tax revenue (per capita)	1.230	0.000
Independent Variables	Correlation	p-value
1995 highway trust fund rate of return 1995 highway user tax revenue (per capita)	-0.254	0.072
R Squared	**0.884**	

Dependent Variable: 2000 FHWA expenditures (per capita)

	Model summary	
Model components	Coefficient	p-value
Constant	-157.289	0.000
2000 highway trust fund rate of return	95.242	0.000
2000 highway user tax revenue (per capita)	1.172	0.000
Independent Variables	Correlation	p-value
2000 highway trust fund rate of return 2000 highway user tax revenue (per capita)	-0.132	0.356
R Squared	**0.942**	

Changes and summary of findings

Between 1990 and 2000, the federal highway program evolved (through the adoption of long overdue programmatic and apportionment formula changes), and its size (measured in terms of expenditures) grew significantly. But how much did the program's dollar outcomes really change? I conducted a series of "before" and "after" tests, identical to those encountered earlier in the context of the HTF rate of return rates, to answer this question. **Table 8-16** reports the results for the total dollar expenditure variables, and **Table 8-17** reports them for their per capita equivalents. The results show that there were statistically significant increases in the amounts expended in nearly all of the cases in both tables. There is more money in the federal highway program, even after one controls for inflation (as shown in Chapter 2), and it appears that this relative windfall is being enjoyed all over the country. And there are strong correlations between many of the expenditure variables and their prior year equivalents. Relative stability in terms of the spatial pattern appears to be the norm.

Table 8-16: Changes in highway expenditure variables (total dollars) (1990-2000)

Paired samples t-tests of FHWA expenditure variables (total dollars)

Variable 1	*Variable 2*	*Correlation*	*Correlation p-value*	*T-value*	*T-test p-value*
1990 FHWA expenditures	1995 FHWA expenditures	0.914	0.000	-5.058	0.000
1995 FHWA expenditures	2000 FHWA expenditures	0.918	0.000	-4.734	0.000
2000 FHWA expenditures	1990 FHWA expenditures	0.935	0.000	-8.312	0.000
1990 FHWA appropriations earmarks	1995 FHWA appropriations earmarks	n/a	n/a	3.325	0.002
1995 FHWA appropriations earmarks	2000 FHWA appropriations earmarks	n/a	n/a	-2.097	0.041
2000 FHWA appropriations earmarks	1990 FHWA appropriations earmarks	0.081	0.571	-0.935	0.354
1990 FHWA authorization earmarks	1995 FHWA authorization earmarks	n/a	n/a	-6.384	0.000
1995 FHWA authorization earmarks	2000 FHWA authorization earmarks	0.473	0.000	-5.573	0.000
2000 FHWA authorization earmarks	1990 FHWA authorization earmarks	n/a	n/a	-7.248	0.000
FHWA ISTEA special projects (totals)	FHWA TEA-21 special projects (totals)	0.771	0.000	-2.260	0.028

Table 8-17: Changes in highway expenditure variables (per capita) (1990-2000)

Paired samples t-tests of FHWA expenditure variables (per capita)

Variable 1	*Variable 2*	*Correlation*	*Correlation p-value*	*T-value*	*T-test p-value*
1990 FHWA expenditures	1995 FHWA expenditures	0.880	0.000	-4.972	0.000
1995 FHWA expenditures	2000 FHWA expenditures	0.914	0.000	-4.812	0.000
2000 FHWA expenditures	1990 FHWA expenditures	0.856	0.000	-6.436	0.000
1990 FHWA appropriations earmarks	1995 FHWA appropriations earmarks	n/a	n/a	3.350	0.002
1995 FHWA appropriations earmarks	2000 FHWA appropriations earmarks	n/a	n/a	-4.642	0.000
2000 FHWA appropriations earmarks	1990 FHWA appropriations earmarks	-0.089	0.535	-0.866	0.391
1990 FHWA authorization earmarks	1995 FHWA authorization earmarks	n/a	n/a	-4.810	0.000
1995 FHWA authorization earmarks	2000 FHWA authorization earmarks	0.344	0.013	-1.374	0.175
2000 FHWA authorization earmarks	1990 FHWA authorization earmarks	n/a	n/a	-8.378	0.000
FHWA ISTEA special projects (totals)	FHWA TEA-21 special projects (totals)	0.894	0.000	2.933	0.005

This analysis of the federal highway program has demonstrated many things, but four of them stand out. First, there have been only modest changes in the patterns of expenditure since the passage of ISTEA. The amount of money spent on highways has increased, but the relative positions of the states in the distribution of expenditures are virtually unchanged. Second, there is no evidence of a pro-rural bias in the distribution of federal highway funds, and in fact the reverse is usually the case. The urban versus rural dimension is not as strong as I had expected. Third, results for the hypotheses about political representation variables are quite mixed. Political variables are much more important when it comes to total dollar outcomes than per capita expenditures, and the House committee variables are generally more important than the Senate ones. Fourth, highway system extent and use variables are positively correlated with total expenditures, and are negatively correlated with the per capita expenditure variables. Thus, there is a mixed record when it comes to the performance of my initial hypotheses.

In the next chapter, I extend the analysis to a consideration of the other side of the federal surface transportation program, the transit program. I selected the same three years for the transit investigation (1990, 1995, and 2000).

CHAPTER NINE. ANALYSIS OF TRANSIT EXPENDITURES

The federal transit program is the younger and smaller of the two surface transportation programs. Federal transit expenditures have grown significantly since the early 1990s, and now exceed $6 billion a year. Many of these funds are now apportioned according to formulas emphasizing population, transit system use, and transit system extent variables, while others are distributed primarily by earmark.

In this section, I examine federal transit expenditures during the same three years examined in the earlier sections of the paper (1990, 1995, and 2000).[107] The wealth of available data allows me to examine both overall expenditures and their capital and operations components. I was curious to see whether there were differences in the distribution of capital expenditures and operations expenditures. I am also able to separate transit project appropriations earmarks into fixed guideway (mainly rail) and bus projects. Throughout the section I focus both on total and per capita expenditures, but pay particular attention to the per capita expenditure relationships. Because of time constraints, I chose not to examine expenditures on a per rider basis.

As was the case for the highway program, I hoped to understand the factors that help explain the spatial patterns of expenditures. I begin by restating the hypotheses discussed in Chapter 7. First, I suspect total expenditures are positively correlated with transit ridership (unlinked passenger trips) and total population, but that the correlations are declining with the recent changes to federal operating assistance policy. Second, I

[107] The sources for the transit data discussed in this chapter are listed in the transit variables table in Chapter 7.

suspect these relationships are actually reversed when we examine per capita expenditures. For example, I hypothesize that states with lower than average transit needs, defined here in terms of patronage, receive higher per capita federal transit expenditures.

Third, I hypothesize that states with representation on the key policy committees (House Committee on Transportation and Infrastructure, House Appropriations Committee, Senate Appropriations Committee, and Senate Banking Committee) fare better than states that do not have representation. I also suspect that the political representation variables will have even stronger relationships with the earmark expenditures than with general expenditures

And, fourth, I suspect urban states are relative winners both in terms of total and per capita expenditures, partly because of the program's early big-city orientation, but that the strength of this relationship is also weakening over time.

Federal transit program in 1990

In 1990, the federal government spent approximately $3.4 billion in what was then called the *urban* mass transportation program, about half the amount it currently spends (*Highway Statistics* 1991). Of this total, $2.5 billion was spent on capital projects and the remaining $841 million on operations. New York received the largest amount of federal transit expenditures, $576 million in capital aid and $129 million in operating assistance for a total of $705 million. Vermont and Wyoming each received around $440,000 in total assistance, and were the recipients of the fewest transit dollars.

A state's total dollar transit assistance was highly (and positively) correlated with the number of passenger trips, total population, and membership on the House committees (see **Table 9-1**). It was moderately (and positively) correlated with its 1990 urban population share and membership on the Senate Banking Committee (the Senate authorizing and oversight committee for the transit program) (see **Map 9-1**). The weakest correlation was with membership on the 1989-90 Senate Environment and Public Works, which was not surprising given that this committee oversees the highway program, and not the transit one (see **Map 9-2**). All of these relationships were as I had expected. The relationships held true when total expenditures were broken into their capital and operating components.

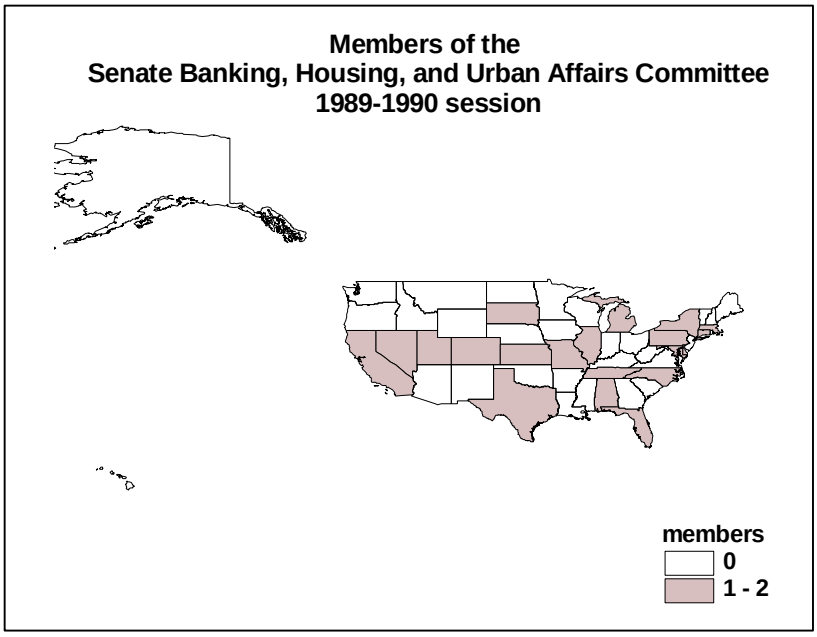
Table 9-1: 1990 FTA total expenditures (total dollars), correlation

Correlation: 1990 FTA total expenditures (total dollars)

Variable	*Correlation*	*p-value*
1990 unlinked passenger trips	0.932	0.000
1990 total population	0.708	0.000
1989-90 House CTI	0.684	0.000
1989-90 House Appropriations	0.554	0.000
1990 percent urban	0.484	0.000
1990 percent rural	-0.484	0.000
1989-90 Senate Banking	0.307	0.029
1989-90 Senate Appropriations	-0.079	0.583
1989-90 Senate Env. Pub Works	0.051	0.720

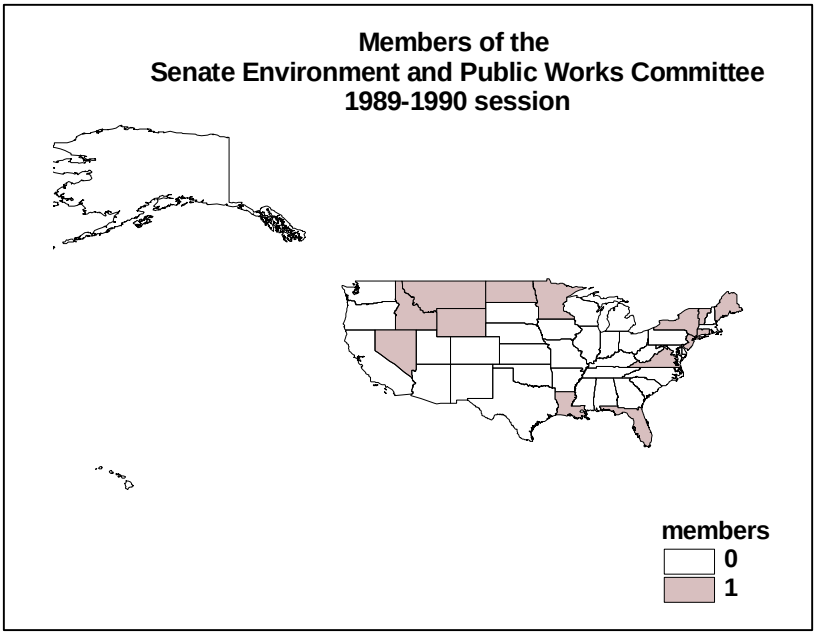
Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Map 9-1: Members of the Senate Banking Committee, 1989-90 session



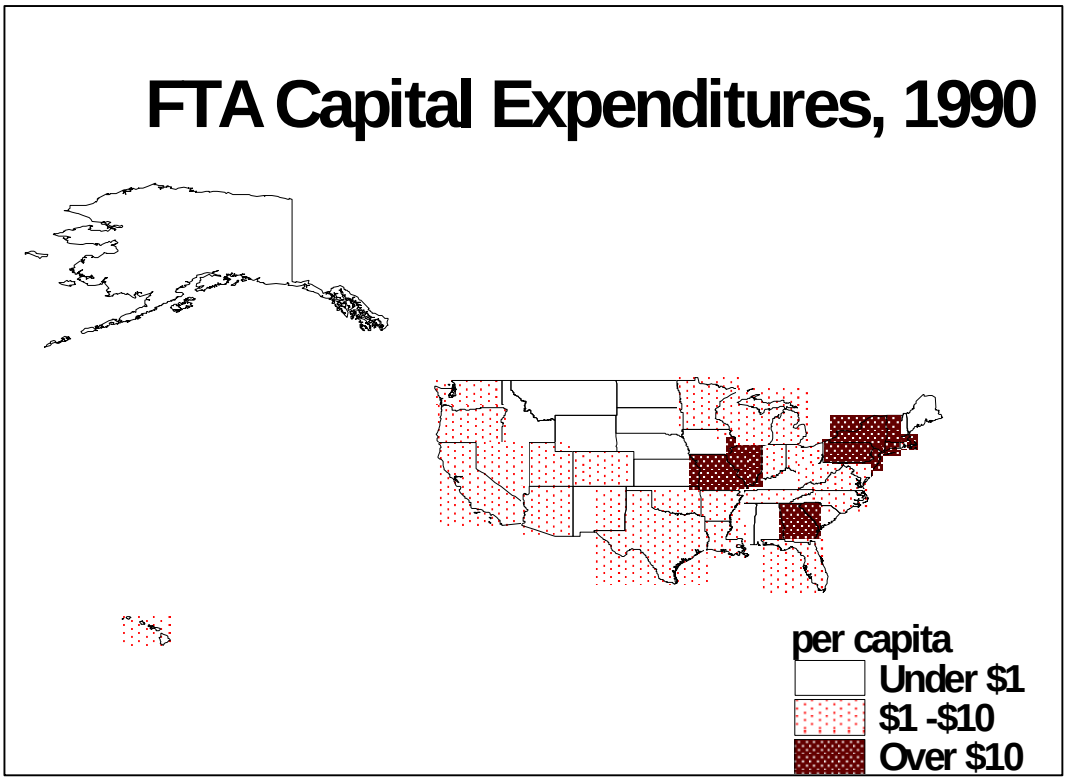
Source: Congressional Directory.

Map 9-2: Members of the Senate EPW Committee, 1989-90 session



In 1990, the federal government spent $13.53 on transit per American, approximately $10.16 for capital and $3.36 for operations. (The total per capita expenditure was a little less than one quarter of the amount spent on highways that year.) There was, however, significant variation in the spatial distribution of these dollars. First, consider capital expenditures. These ranged from a high of $470 in the District of Columbia (because of grants to DC Metro) down to a low of $0.01 in Idaho. As **Map 9-3** shows, the highest per capita capital expenditures occurred in the northeast and the lowest in the plains, mountain states, and the south.

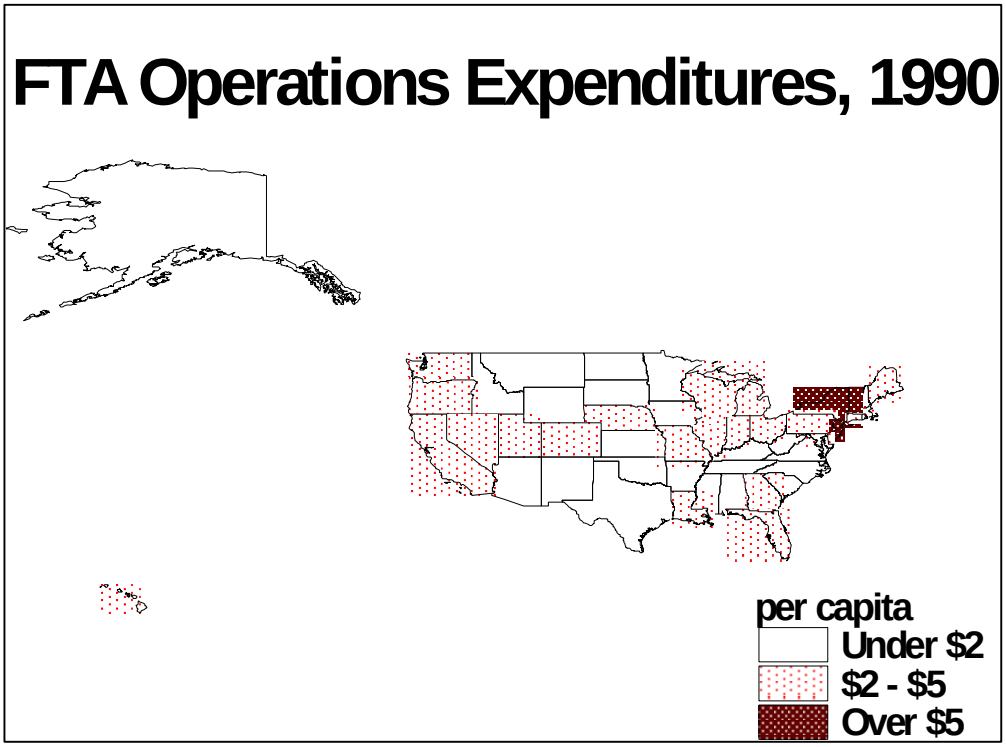
Map 9-3: 1990 FTA (UMTA) capital expenditures (per capita)



Map 9-4 shows the spatial pattern of 1990 federal transit operating expenditures (per capita). These ranged from a high of $88.95 in the District of Columbia down to a

low of $0.57 in Wyoming. The patterns were almost identical to that for capital expenditures (per capita), which is not surprising given that the correlation between these two variables was 0.998. The strength of this correlation means that little additional will be learned by breaking total expenditures per capita into these component parts than would be learned from merely examining the pattern of total expenditures (per capita).

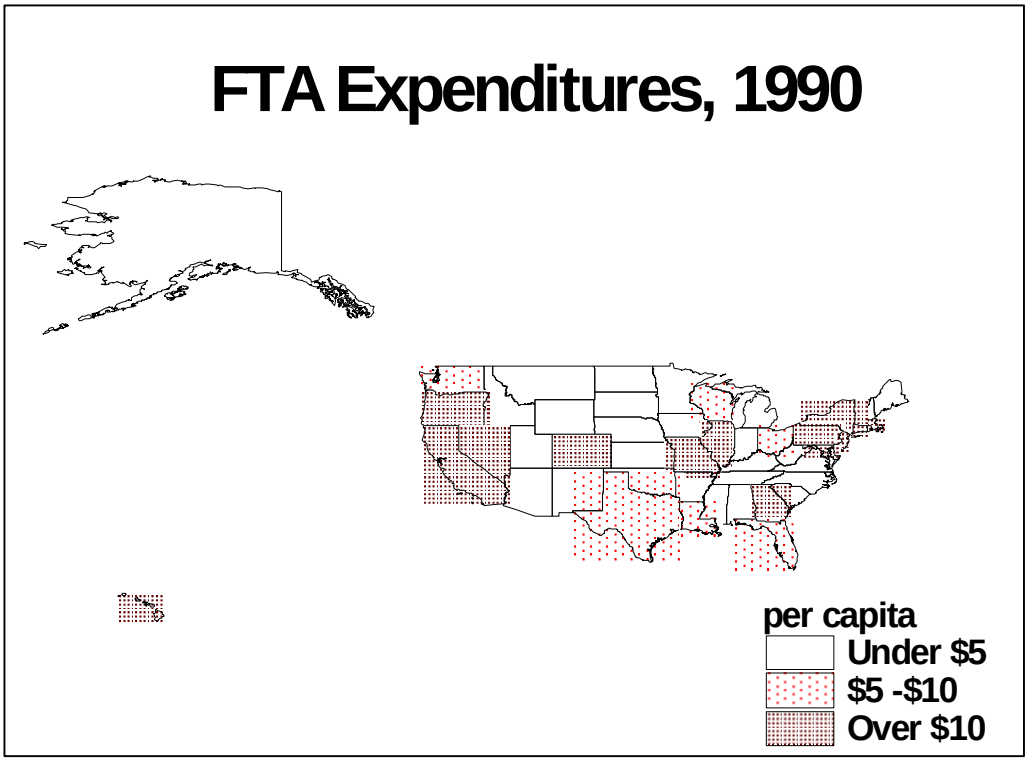
Map 9-4: 1990 FTA (UMTA) operating assistance (per capita)



Therefore, I will include the results of both the regressions for 1990 FTA capital expenditures (per capita) (**Table 9-2**) and 1990 FTA operating expenditures (per capita) (**Table 9-3**), but will confine my comments to the table for 1990 FTA total expenditures

(per capita) table (**Table 9-5**).[108] **Map 9-5** shows the pattern of total 1990 FTA expenditures (per capita). These ranged from a high of $559 in the District of Columbia down to a low of $0.67 in Mississippi.

Map 9-5: 1990 FTA (UMTA) expenditures (per capita)



[108] A quick comparison of the correlation coefficients for the variables in all of these tables shows they are almost identical, and so are the r squares. And, the summation of the coefficient for capital expenditures with that for the operating expenditures yields the coefficient for total expenditures.

Table 9-2: 1990 FTA (UMTA) capital expenditures (per capita), regression

Dependent Variable: 1990 FTA capital expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 FTA total expenditures (per capita)	1.000	-1.235	0.843	1.000
1990 FTA operation expenditures (per capita)	0.998	-7.779	5.350	0.995
1990 FTA capital expenditures	0.399	1.783	2.492	0.159
1990 FTA total expenditures	0.379	1.464	1.919	0.144
1990 percent urban	0.347	-88.688	149.492	0.120
1990 percent rural	-0.347	60.804	-149.492	0.120
1990 FTA operations expenditures	0.276	2.706	6.948	0.076
1989-90 Senate Appropriations	-0.153	24.711	-18.534	0.023
1990 unlinked passenger trips	0.139	10.655	2.391	0.019
1989-90 House Appropriations	-0.081	18.860	-4.194	0.007
1989-90 Senate Env. Pub Works	-0.084	17.686	-11.948	0.007
1989-90 Senate Banking	-0.075	17.953	-9.183	0.006
1990 total population	-0.057	17.530	-6.860	0.003
1989-90 House CTI	-0.050	16.719	-2.651	0.002

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 9-3: 1990 FTA (UMTA) operating expenditures (per capita), regression

Dependent Variable: 1990 FTA operations expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 FTA total expenditures (per capita)	0.998	1.235	0.157	0.997
1990 FTA capital expenditures (per capita)	0.998	1.467	0.186	0.995
1990 FTA capital expenditures	0.392	1.837	4.557	0.153
1990 FTA total expenditures	0.375	1.762	3.536	0.140
1990 percent urban	0.360	-15.822	28.958	0.130
1990 percent rural	-0.360	13.136	-28.958	0.130
1990 FTA operations expenditures	0.285	1.899	1.335	0.081
1989-90 Senate Appropriations	-0.169	6.286	-3.839	0.029
1990 unlinked passenger trips	0.137	3.461	4.374	0.019
1989-90 House Appropriations	-0.075	4.917	-0.728	0.006
1989-90 Senate Banking	-0.076	4.816	-1.731	0.006
1989-90 Senate Env. Pub Works	-0.070	4.647	-1.849	0.005
1989-90 House CTI	-0.055	4.624	-0.542	0.003
1990 total population	-0.057	4.730	-1.279	0.003

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

One of the many hypotheses I offered to account for the distribution of federal transit assistance was a state's urban population share. **Table 9-4** reports the correlation between this variable and a number of the other transit variables of relevance. The data show that only the Senate Appropriations and Senate EPW variables have negative correlations (and weak ones at that), while most of the other variables are moderately (positively) correlated with a state's urban population share. Urban population share was moderately (positively) correlated with 1990 the measures of transit expenditures (per capita).

Table 9-4: 1990 urban population share and transit expenditures, correlation

Urban population (1990 percent urban) related to 1990 transit variables

Variable	*Correlation*	*p-value*
1990 FTA operation expenditures	0.495	0.000
1990 FTA total expenditures	0.484	0.000
1990 FTA capital expenditures	0.474	0.000
1990 FTA operation expenditures (per capita)	0.360	0.009
1990 FTA total expenditures (per capita)	0.349	0.012
1990 FTA capital expenditures (per capita)	0.347	0.013
1989-90 Senate Banking	0.346	0.013
1989-90 House Appropriations	0.324	0.020
1989-90 House CTI	0.204	0.151
1989-90 Senate Appropriations	-0.132	0.357
1989-90 Senate Env. Pub Works	-0.022	0.876

For rural population, p-values are identical, and correlation coefficients have the opposite sign.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 9-5 presents the results of the regression analyses for total transit expenditures (per capita). The r squares for the expenditure equations were rather high, which was to be expected. The r squares for the political variables were rather low, and the correlations were uniformly negative, which was not expected. For example, consider

the Senate committee with oversight responsibilities for the transit program. For every additional member of the Senate Banking Committee in the 1989-90 session, a state was lower by $10.91 in 1990 total transit expenditures (per capita).

As expected, there was a positive relationship between urban population share and per capita expenditures. The table shows that for every percentage point increase in a state's urban population share, its 1990 total transit expenditures per capita was higher by $1.78 (r square = 0.122). And, as I expected the coefficient for a state's total population was negative, but the equation had a very small r square (0.003). But unexpectedly there was a positive relationship with transit ridership, although the equation had a small r square (0.019). Thus, the tests of my initial hypotheses led to quite mixed results. And, in most cases, the r square values were quite low.

Table 9-5: 1990 FTA (UMTA) total expenditures (per capita), regression

Dependent Variable: 1990 FTA total expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 FTA capital expenditures (per capita)	1.000	1.467	1.186	1.000
1990 FTA operation expenditures (per capita)	0.998	-7.779	6.350	0.997
1990 FTA capital expenditures	0.398	3.620	2.948	0.158
1990 FTA total expenditures	0.379	3.226	2.273	0.143
1990 percent urban	0.349	-104.510	178.450	0.122
1990 percent rural	-0.349	73.940	-178.450	0.122
1990 FTA operation expenditures	0.278	4.605	8.284	0.077
1989-90 Senate Appropriations	-0.155	30.997	-22.373	0.024
1990 unlinked passenger trips	0.139	14.115	2.828	0.019
1989-90 Senate Env. Pub Works	-0.082	22.333	-13.798	0.007
1989-90 Senate Banking	-0.075	22.769	-10.914	0.006
1989-90 House Appropriations	-0.080	23.776	-4.922	0.006
1989-90 House CTI	-0.051	21.344	-3.194	0.003
1990 total population	-0.057	22.260	-8.141	0.003

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Transit authorizing earmarks contained in ISTEA

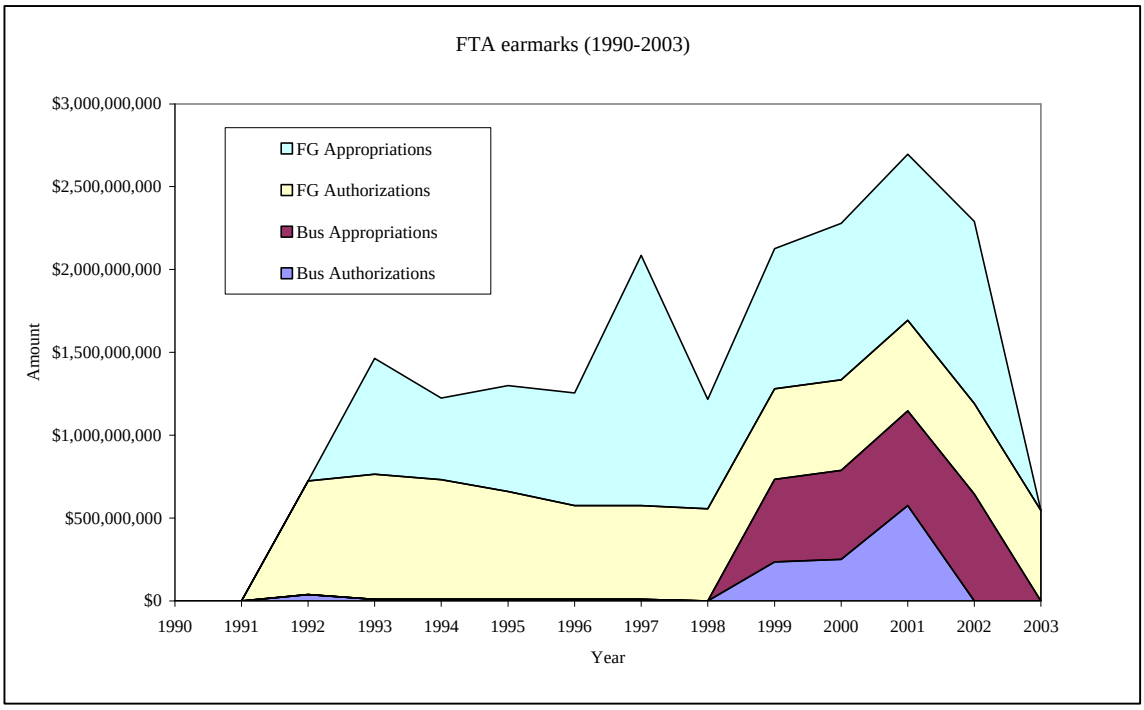
In 1991, ISTEA was passed, the federal transit program was given its current name, as was the FTA, and federal transit assistance was increased. In 1990, federal transit assistance had totaled around $3.4 billion. By 1997, the last year of ISTEA, transit assistance jumped to around $4.7 billion. The amount devoted to capital assistance soared from $2.5 billion in 1990 to $4.1 billion by 1997. But the amount spent on operating assistance actually declined, from $841 million in 1990 to $599 million in 1997. The federal commitment to providing operating assistance for large cities was reduced throughout this period, as we saw in Chapter 6.

As in the case of the federal highway program, transit earmarks were a large part of the ISTEA story. The total amount of transit earmarks contained in ISTEA totaled approximately $4 billion. The state receiving the largest amount of earmarked transit dollars was Texas with $660 million. The vast majority of these earmarks were for fixed guideway (largely rail) projects. **Graph 9-1** shows the growth of the transit earmarking phenomenon from 1990 to the present, separated by mechanism (authorizing legislation like ISTEA and TEA-21, annual appropriations legislation) and category (fixed guideway or bus).

Table 9-6 shows that the total dollar amount of ISTEA earmarks was positively, albeit weakly, correlated with a state's urban population share and total population. It was also positively but weakly correlated with membership on four of the five congressional committees. The strongest positive correlations were for membership on the Senate Appropriations (0.267) and House Appropriations (0.248) Committees. I had expected to

find a much stronger relationship between total dollar earmarks and the political representation variables, particularly in the case of the transit authorizing committees (House CTI, Senate Banking). Total dollar earmarks were positively correlated with the number of trips, which was unexpected, but the correlation was a weak one.

Graph 9-1: FTA earmarks, 1990-2003



Source: Legislation cited in references.

When expressed on a per capita basis, the earmarks totaled $16 for every American. **Map 9-6** shows the pattern of per capita transit earmarks authorized by ISTEA. The states receiving the largest earmarks per capita were Hawaii ($543) and Oregon ($175), while a number of states received no earmarks at all. The largest per capita earmarks did not go to states that have historically had large numbers of transit riders. My hypothesis is that there is in fact a negative relationship between per capita

expenditures and total ridership, but perhaps a positive one for the political variables. **Table 9-7** reports the results of the regression analysis.

Table 9-6: FTA ISTEA earmarks (total dollars), correlation

Correlation: FTA ISTEA earmarks (total dollars)

Variable	*Correlation*	*p-value*
1990 percent urban	0.341	0.014
1990 percent rural	-0.341	0.014
1991-92 Senate Env. Pub Works	-0.292	0.038
1991 total population	0.283	0.044
1991-92 Senate Appropriations	0.267	0.059
1991-92 House Appropriations	0.248	0.080
1990 FTA capital expenditures	0.149	0.296
1990 FTA total expenditures	0.139	0.329
1991-92 House CTI	0.117	0.414
1991-92 Senate Banking	0.101	0.480
1990 unlinked passenger trips	0.100	0.488
1990 FTA operations expenditures	0.092	0.523
1990 FTA operation expenditures (per capita)	-0.051	0.721
1990 FTA total expenditures (per capita)	-0.037	0.799
1990 FTA capital expenditures (per capita)	-0.034	0.814

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 9-7 shows that all of the equations had very low r square values, and thus none of the variables were particularly good explanatory factors. All but two of the variables had negative coefficients. For every percentage increase in a state's population share, its ISTEA transit earmarks (per capita) were higher by $1.32 (r square = 0.063). For every additional member of the 1991-92 Senate Appropriations Committee, its per capita earmarks were higher by $31.85 (r square = 0.046) (see **Map 9-7**). The amount of earmarks per capita were lower as population increased, as the prior year's transit expenditures increased, and with membership on the other congressional committees,

including the two oversight committees (see **Map 9-8** for the 1991-92 Senate Banking Committee). The connection to transit use (ridership) was weakly positive.

Map 9-6: FTA ISTEA earmarks (per capita)

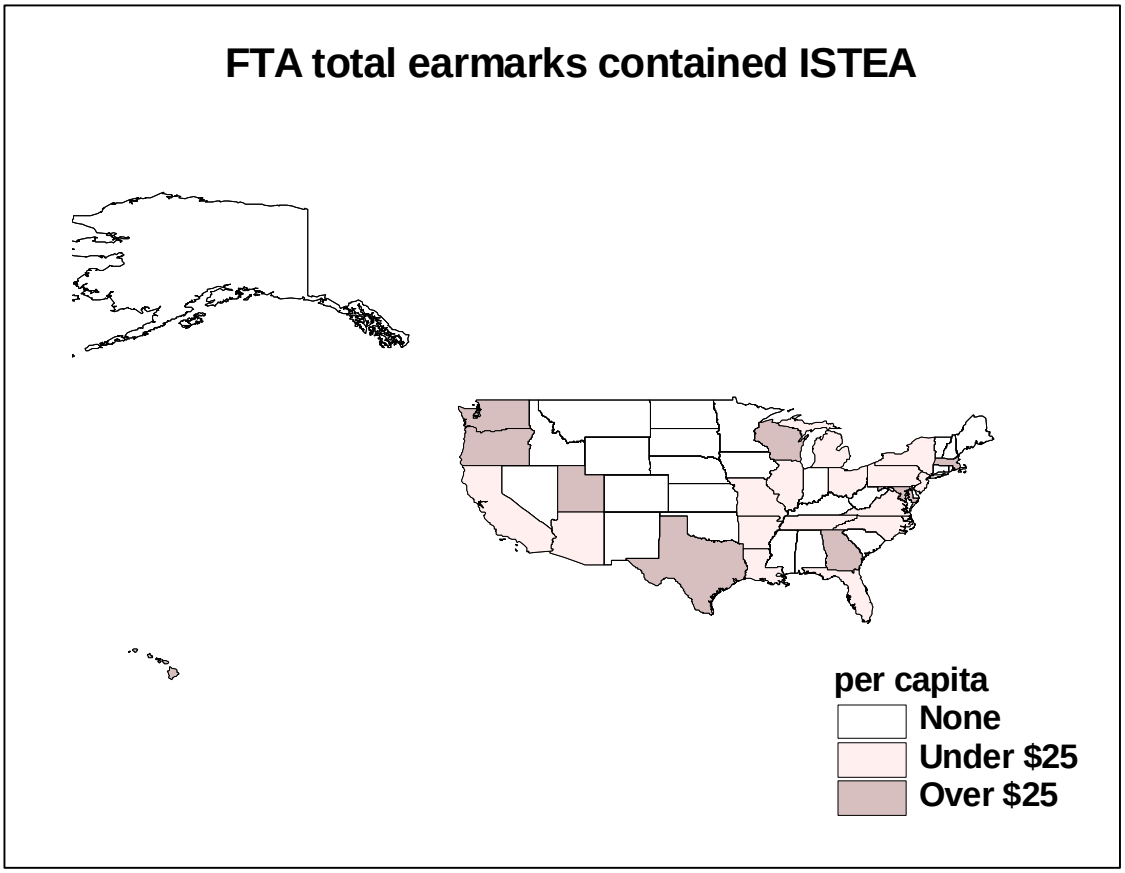


Table 9-7: FTA ISTEA earmarks (per capita), regression

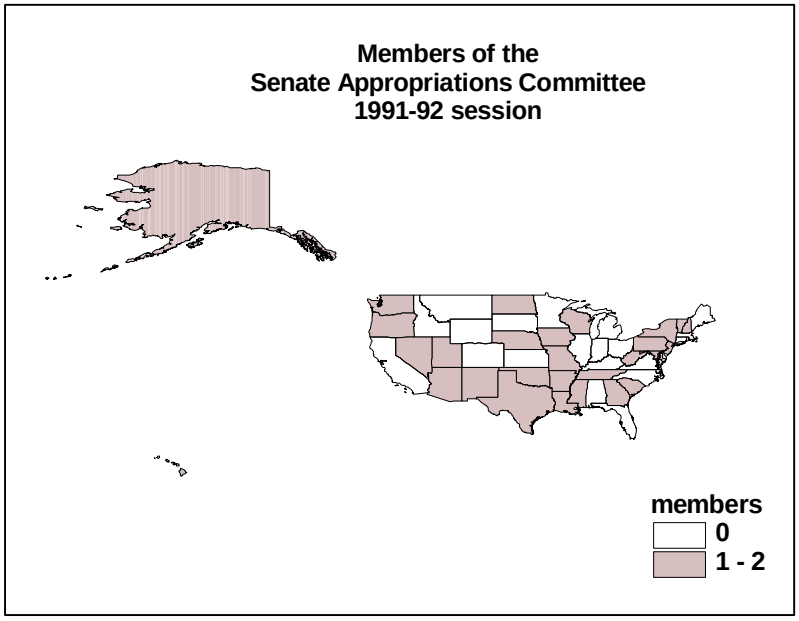
Dependent Variable: FTA ISTEA earmarks (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 percent urban	0.251	-68.706	132.411	0.063
1990 percent rural	-0.251	63.704	-132.410	0.063
1991-92 Senate Appropriations	0.214	4.293	31.845	0.046
1991-92 Senate Env. Pub Works	-0.183	32.204	-31.249	0.033
1991-92 House CTI	-0.114	29.928	-6.980	0.013
1991-92 House Appropriations	-0.095	28.842	-5.568	0.009
1991-92 Senate Banking	-0.088	27.595	-13.246	0.008
1991 total population	-0.074	27.693	-1.067	0.005
1990 FTA capital expenditures	-0.042	23.988	-3.192	0.002
1990 FTA total expenditures	-0.048	24.375	-2.981	0.002
1990 unlinked passenger trips	-0.023	23.111	-4.829	0.001
1990 FTA capital expenditures (per capita)	-0.026	22.845	-0.031	0.001
1990 FTA operation expenditures (per capita)	-0.026	23.094	-0.169	0.001
1990 FTA total expenditures (per capita)	-0.026	22.884	-0.026	0.001

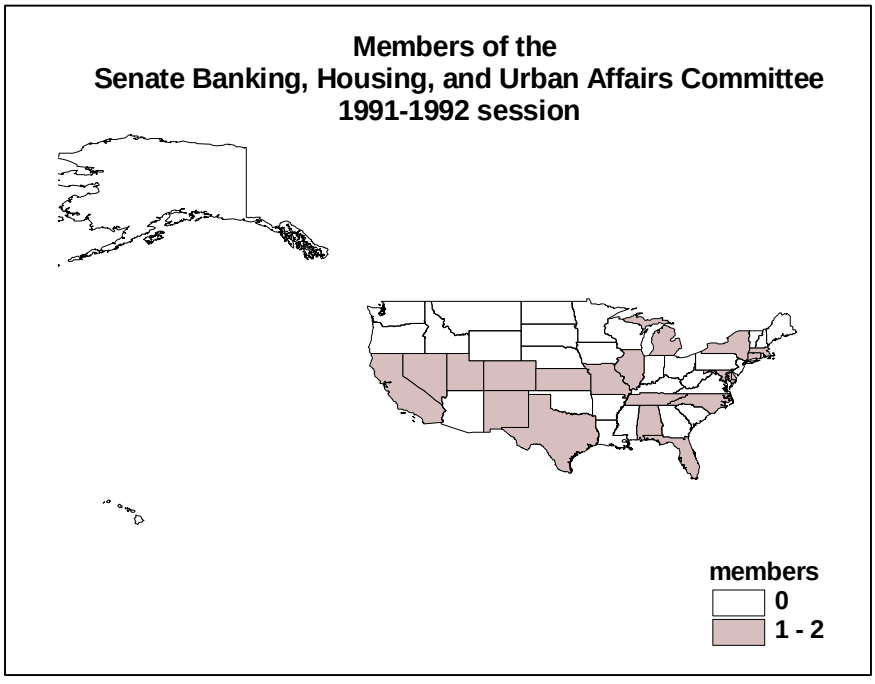
Notes: each row refers to a separate simple linear regression equation.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Time did not permit me to include a variable measuring transit system extent in any of the transit analyses, and I did not examine expenditures per rider for the same reason. I am curious as to whether including these variables and/or focusing on this other dimension would better explain the resulting per capita expenditure pattern—as nothing else does. Then again, as in the case of highways, politicians may more interested in the total dollars associated with an earmark than with their per capita (or even per rider) equivalents.

Map 9-7: Members of the Senate Appropriations Committee, 1991-92 session



Map 9-8: Members of the Senate Banking Committee, 1991-92 session



Federal transit program in 1995

In 1995, the federal government spent approximately $4.1 billion on transit, including $3.3 billion on capital projects and $748 million on operations. New York received the largest amount of federal transit assistance ($680 million in capital aid and $99 million in operating assistance, for a total of $779 million), while Wyoming received the smallest amount ($576,000 in total assistance). Every state received much more in total transit aid in 1995 than it had in 1990.

The amount of total dollar assistance a state received in 1995 was highly (and positively) correlated with the number of passenger trips, total population, membership on the House CTI committee, and its total amount of fixed guideway appropriations earmarks (see **Table 9-8**).[109] It was moderately (and positively) correlated with its 1990 urban population share (see **Table 9-9** for correlations between 1995 transit variables and 1990 urban population share). It was also moderately and positively correlated with membership on the Senate Banking Committee (the Senate authorizing and oversight committee for the transit program) (see **Map 9-9** and **Map 9-10**) and House Appropriations Committee (see earlier maps). It was weakly correlated with membership on the Senate Appropriations and Environment and Public Works Committees (see **Map 9-11** and **Map 9-12**).

These relationships were expected, and were quite similar to those reported for 1990. They also held true when total dollar expenditures were broken down into their

[109] There were no bus appropriation earmarks in 1995. As in the case of the 1995 federal highway program analysis, I include political variables for the 1993-94 and 1995-96 sessions. This is because annual appropriations legislation for fiscal year 1995 was passed in 1994

capital and operations components. Therefore, I do not include the correlation tables for these two sub-categories of total dollar expenditures.

Table 9-8: 1995 FTA total expenditures (total dollars), correlation

Correlation: 1995 FTA total expenditures (total dollars)

Variable	*Correlation*	*p-value*
1995 FTA capital expenditures	0.995	0.000
1995 unlinked passenger trips	0.918	0.000
1995 FTA operation expenditures	0.862	0.000
1995-96 House CTI	0.731	0.000
1993-94 House CTI	0.727	0.000
1995 total population	0.690	0.000
1995 fixed guideway appropriation earmarks	0.631	0.000
1995 bus appropriations earmarks	0.628	0.000
1995-96 House Appropriations	0.525	0.000
1990 percent urban	0.512	0.000
1993-94 House Appropriations	0.504	0.000
1990 percent rural	-0.512	0.000
1995 FTA operation expenditures (per capita)	0.452	0.001
1995 FTA total expenditures (per capita)	0.369	0.008
1995 FTA capital expenditures (per capita)	0.364	0.009
1995-96 Senate Banking	0.354	0.011
1995 fixed guideway appropriation earmarks (per capita)	0.333	0.017
1993-94 Senate Banking	0.285	0.042
FTA ISTEA earmarks	0.221	0.118
1993-94 Senate Env. Pub. Works	0.218	0.125
1995-96 Senate Appropriations	-0.194	0.172
1995-96 Senate Env. Pub Works	0.166	0.243
1993-94 Senate Appropriations	0.094	0.510
FTA ISTEA earmarks (per capita)	0.012	0.932

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

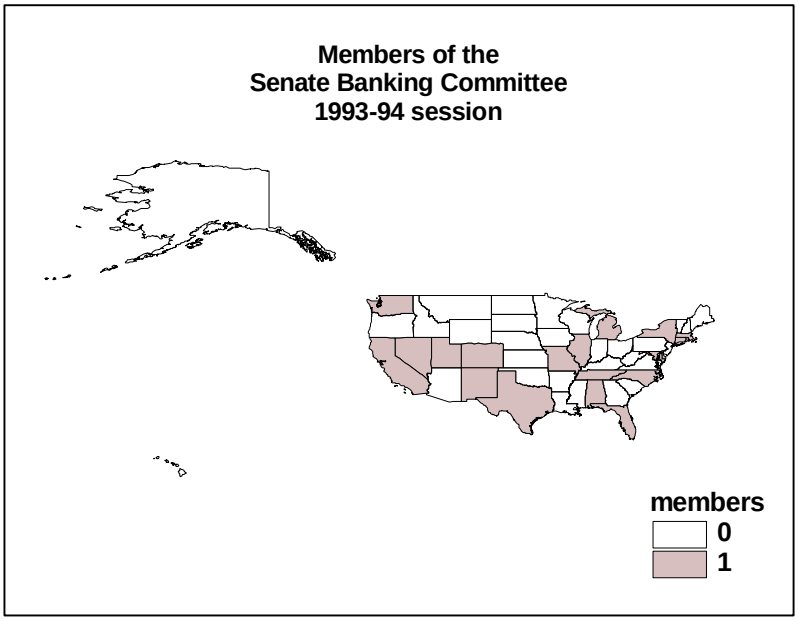
Table 9-9: Urban population share (1990) and 1995 transit variables, correlation

Urban population (1990 percent urban) related to 1995 transit variables

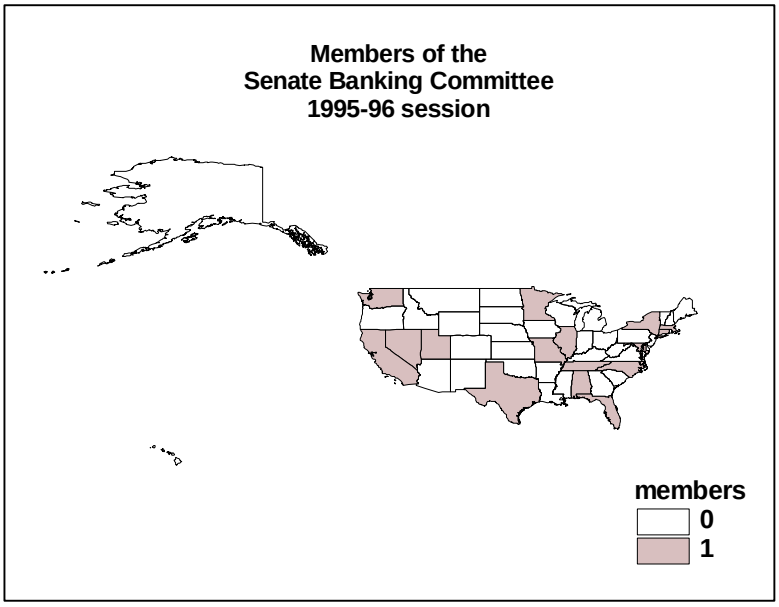
Variable	*Correlation*	*p-value*
1995 FTA total expenditures	0.512	0.000
1995 FTA capital expenditures	0.509	0.000
1995 FTA operation expenditures	0.447	0.001
1995 FTA operation expenditures (per capita)	0.426	0.002
1995 fixed guideway appropriation earmarks	0.378	0.006
1995-96 Senate Banking	0.372	0.007
1995 bus appropriations earmarks	0.366	0.008
1995 FTA total expenditures (per capita)	0.360	0.010
1995 FTA capital expenditures (per capita)	0.355	0.011
1995-96 House CTI	0.295	0.035
1995-96 House Appropriations	0.274	0.052
1995 fixed guideway authorization earmarks (per capita)	0.250	0.076
1995 fixed guideway appropriation earmarks (per capita)	0.213	0.134
1995-96 Senate Appropriations	-0.213	0.134
1995-96 Senate Env. Pub Works	0.106	0.460
1995 bus authorization earmarks	0.016	0.910
1995 bus authorization earmarks (per capita)	0.016	0.910

The "percent urban" variable is expressed in decimal form (ex. 1% is .01)

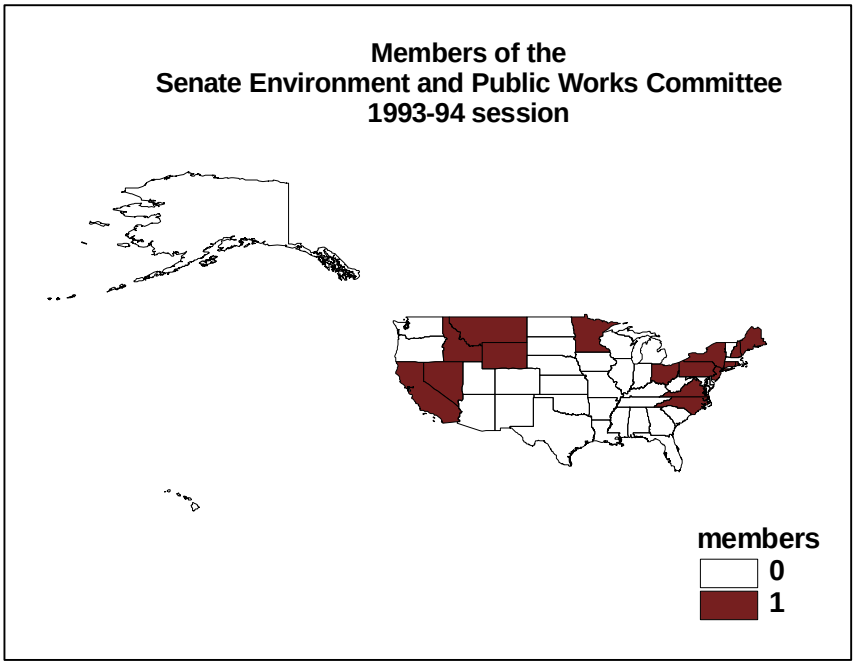
Map 9-9: Members of the Senate Banking Committee, 1993-94 session



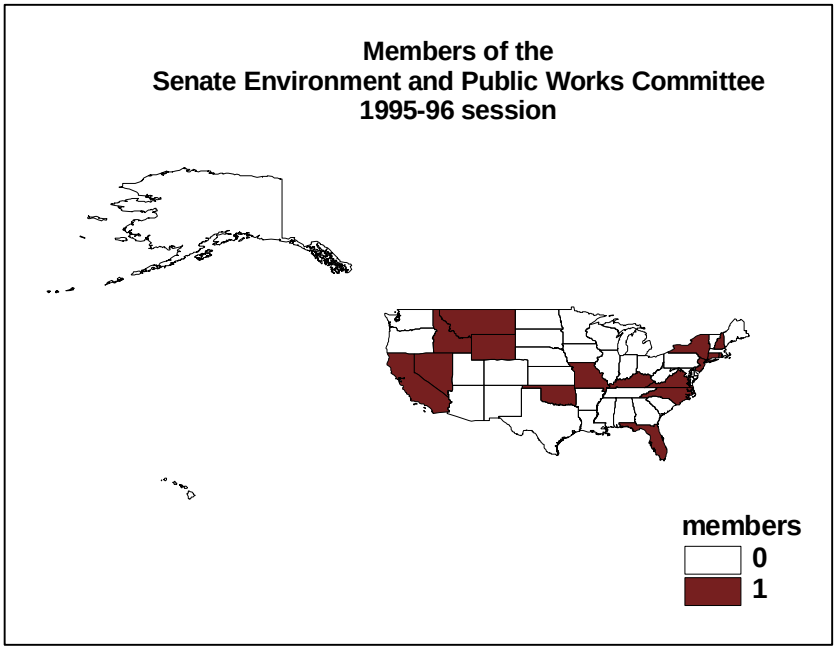
Map 9-10: Members of the Senate Banking Committee, 1995-96 session



Map 9-11: Members of the Senate EPW Committee, 1993-94 session

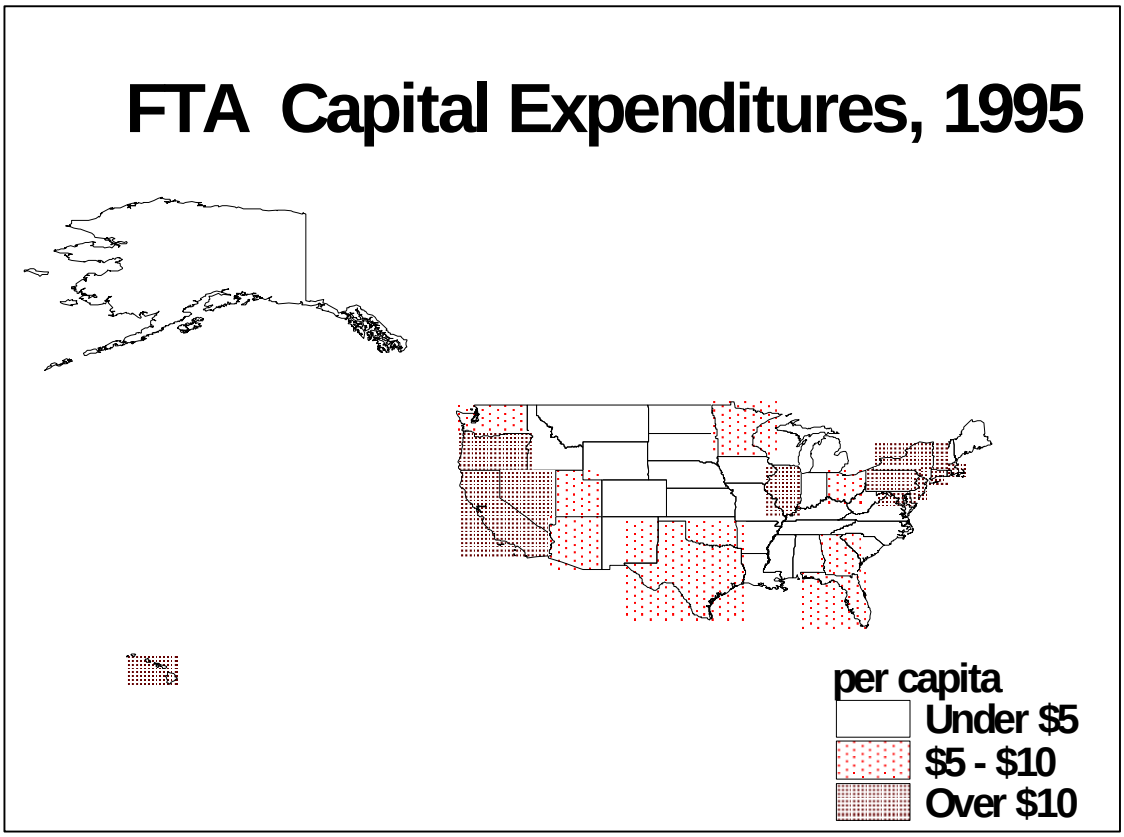


Map 9-12: Members of the Senate EPW Committee, 1995-96 session



In 1995, the federal government spent $15.25 per person on transit, including $12.44 for capital assistance and $2.81 for operating assistance. **Map 9-13** shows the spatial pattern of capital expenditures (per capita) in 1995. The District of Columbia had the highest ($599), while Wyoming had the lowest ($0.03). States with extensive rail transit systems ranked at the top, as had been the case in 1990. There was little change in the ranking of the states on this expenditure measure between 1990 and 1995.

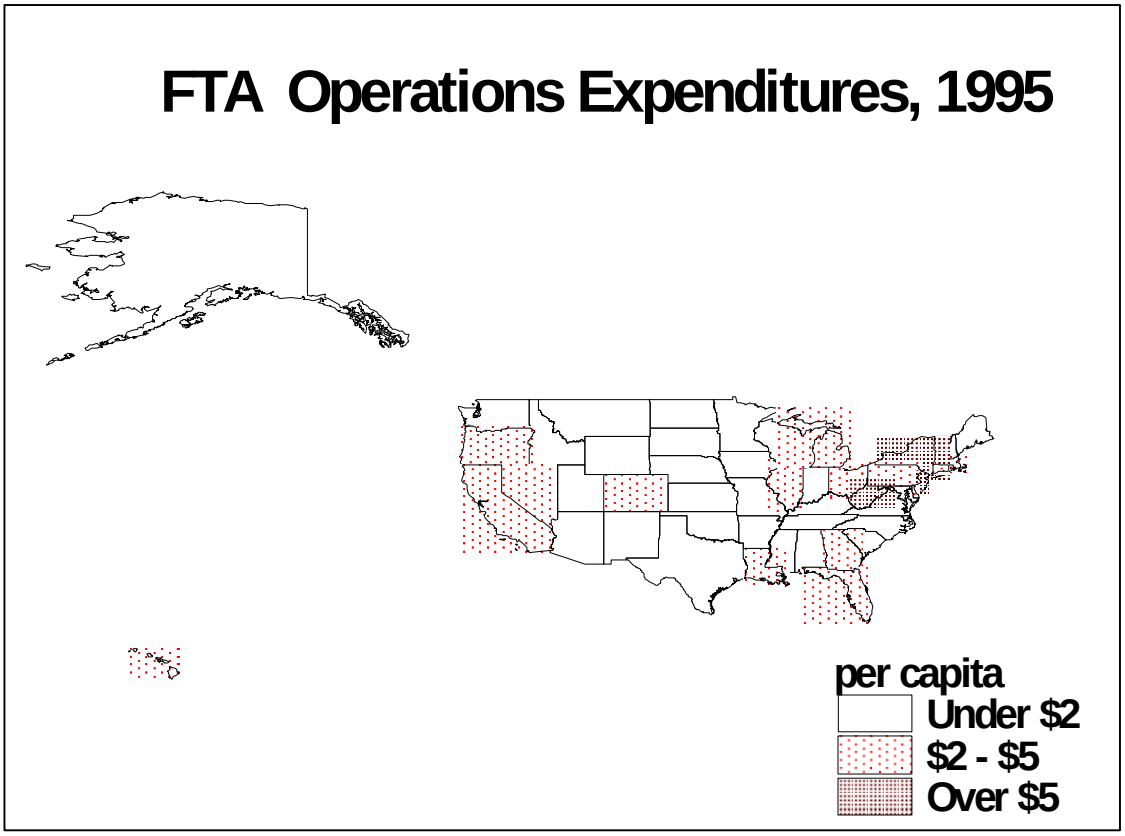
Map 9-13: 1995 FTA capital expenditures (per capita)



Map 9-14 shows the spatial pattern of 1995 operating expenditures (per capita). The District of Columbia had the highest federal aid expenditure ($26), while Wisconsin

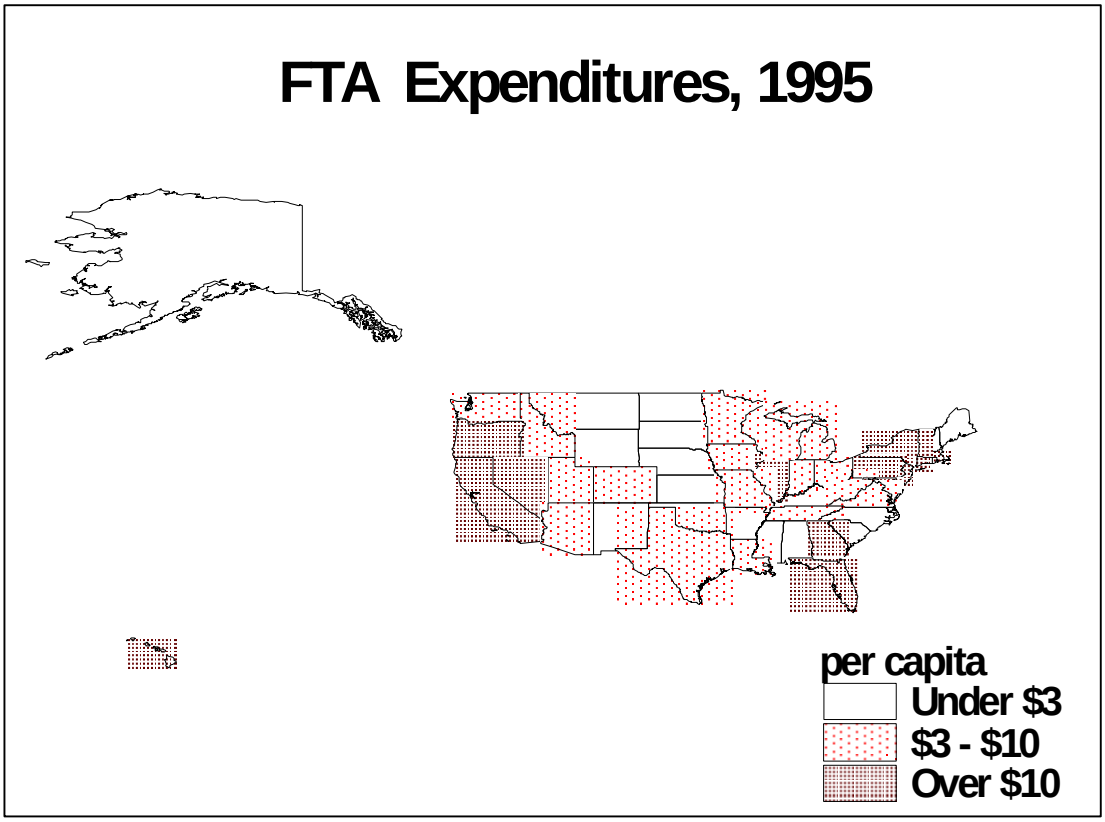
had the lowest ($0.39). One interesting observation is the presence of West Virginia, not known as a heavily transit oriented state, among the states receiving above the national average operating assistance (per capita).

Map 9-14: 1995 FTA operating expenditures (per capita)



Map 9-15 concludes this series of maps by focusing on 1995 total federal transit expenditures (per capita). The total expenditures (per capita) ranged from a high of $626 in the District of Columbia to a low of $1 in Vermont. In general, the states with the highest per capita total expenditures appear to be those with larger numbers of transit riders. Is this actually the case?

Map 9-15: 1995 FTA total expenditures (per capita)



As in the case of the 1990 expenditure data, I examined capital expenditures (per capita), operating expenditures (per capita), and total expenditures (per capita) separately. Tables reporting all of the regression results are included below, but I will again focus my comments on the table reporting the results for total expenditures (per capita). That said, when one compares the reported variable relationships for capital expenditures (per capita) (see **Table 9-10**) and operating expenditures (per capita) (see **Table 9-11**) one sees that in all but two cases the relationships are in the same direction, and in every case they are quite similar. There are, however, slightly stronger statistical relationships between almost all of the independent variables and 1995 operating expenditures (per capita). For example, a one-percentage point increase in a state's urban population share

capital expenditures (per capita) were higher by $1.95 (r square = 0.126) and operating expenditures (per capita) were higher by $0.10 (r square = 0.181).

In the case of the Senate EPW membership variables, the pattern changes. These variables are negatively correlated with capital expenditures (per capita) and positively correlated with operating expenditures (per capita). But in both situations the resulting r squares are quite low.

Table 9-10: 1995 FTA capital expenditures (per capita), regression

Dependent Variable: 1995 FTA capital expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1995 FTA total expenditures (per capita)	1.000	-1.860	0.961	1.000
1995 FTA operation expenditures (per capita)	0.885	-33.943	19.589	0.784
1995 FTA capital expenditures	0.410	1.335	2.738	0.168
1995 FTA total expenditures	0.364	2.450	2.093	0.132
1990 percent urban	0.355	-115.480	195.613	0.126
1990 percent rural	-0.355	80.133	-195.612	0.126
1995-96 Senate Appropriations	-0.137	30.020	-19.865	0.019
1993-94 Senate Appropriations	-0.133	30.875	-20.683	0.018
1995 unlinked passenger trips	0.130	14.911	2.857	0.017
1993-94 House Appropriations	-0.099	26.198	-6.022	0.010
1995-96 Senate Env. Pub Works	-0.092	24.264	-16.415	0.008
1993-94 Senate Banking	-0.083	24.437	-14.288	0.007
1993-94 Senate Env. Pub. Works	-0.084	23.847	-15.087	0.007
1995-96 House Appropriations	-0.086	24.717	-5.103	0.007
1995 total population	-0.073	24.640	-1.058	0.005
1995 FTA operation expenditures	0.060	16.020	2.109	0.004
1995 fixed guideway appropriation earmarks (per capita)	0.058	17.571	1.023	0.003
1995-96 Senate Banking	-0.058	22.352	-10.320	0.003
1995-96 House CTI	0.030	17.191	1.635	0.001
1993-94 House CTI	0.023	17.599	1.226	0.001
FTA ISTEA earmarks (per capita)	0.022	18.605	0.023	0.000
1995 fixed guideway appropriation earmarks	0.021	18.473	5.119	0.000
FTA ISTEA earmarks	0.008	18.787	4.136	0.000

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 9-11: 1995 FTA operating expenditures (per capita), regression

Dependent Variable: 1995 FTA operations expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1995 FTA total expenditures (per capita)	0.895	1.860	0.038	0.800
1995 FTA capital expenditures (per capita)	0.885	1.943	0.040	0.784
1995-96 Senate Appropriations	-0.211	3.470	-1.387	0.645
1995 FTA capital expenditures	0.478	1.771	1.443	0.229
1995 FTA total expenditures	0.452	1.772	1.176	0.204
1990 percent urban	0.426	-4.589	10.606	0.181
1990 percent rural	-0.426	6.017	-10.606	0.181
1995 FTA operation expenditures	0.241	2.150	3.808	0.058
1995 unlinked passenger trips	0.229	2.375	2.267	0.052
1995-96 House CTI	0.158	2.256	0.384	0.025
1993-94 Senate Appropriations	-0.159	3.344	-1.117	0.025
1993-94 House CTI	0.130	2.324	0.311	0.017
1995 fixed guideway appropriation earmarks	0.114	2.551	1.258	0.013
1995-96 Senate Banking	-0.080	2.910	-0.644	0.006
1993-94 Senate Banking	-0.071	2.914	-0.552	0.005
1995 fixed guideway appropriation earmarks (per capita)	0.050	2.649	0.039	0.002
1993-94 Senate Env. Pub. Works	0.036	2.616	0.294	0.001
1995 total population	0.025	2.624	1.616	0.001
1995-96 House Appropriations	-0.027	2.787	-0.071	0.001
1993-94 House Appropriations	-0.030	2.806	-0.083	0.001
FTA ISTEA earmarks	-0.032	2.769	-7.623	0.001
1995-96 Senate Env. Pub Works	0.019	2.661	0.152	0.000
FTA ISTEA earmarks (per capita)	-0.013	2.723	-0.001	0.000

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

The regression results for 1995 total expenditures (per capita) are reported in **Table 9-12**. As in 1990, total expenditures (per capita) were weakly (negatively) correlated to a state's total population and weakly (positively) correlated with the number of unlinked passenger trips, and the associated r squares were thus quite small. In general, the more urban a state, the higher its total expenditures (per capita). For every percentage point increase in urban population share, the total expenditures (per capita) were higher by $2.06 (r square = 0.l29). In terms of the political variables, the strongest relationships were with the Senate Appropriations variables (r squares of approximately 0.02) and the

weakest with the House CTI variables (r squares of less than 0.001). Most of the r squares were quite low.

Table 9-12: 1995 FTA total expenditures (per capita), regression

Dependent Variable: 1995 FTA total expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1995 FTA capital expenditures (per capita)	1.000	1.943	1.040	1.000
1995 FTA operation expenditures (per capita)	0.895	-33.943	20.589	0.800
1995 FTA capital expenditures	0.415	3.106	2.882	0.172
1990 percent urban	0.360	-120.070	206.219	0.129
1990 percent rural	-0.360	86.150	-206.219	0.129
1995-96 Senate Appropriations	-0.141	33.490	-21.252	0.020
1995 unlinked passenger trips	0.135	17.286	3.084	0.018
1993-94 Senate Appropriations	-0.135	34.218	-21.800	0.018
1993-94 House Appropriations	-0.097	29.004	-6.105	0.009
1995-96 Senate Env. Pub Works	-0.088	26.924	-16.263	0.008
1993-94 Senate Banking	-0.083	27.351	-14.840	0.007
1995-96 House Appropriations	-0.084	27.504	-5.174	0.007
1993-94 Senate Env. Pub. Works	-0.080	26.463	-14.793	0.006
1995 FTA operation expenditures	0.068	18.169	2.490	0.005
1995 total population	-0.069	27.264	-1.042	0.005
1995-96 Senate Banking	-0.059	25.262	-10.964	0.003
1995-96 House CTI	0.036	19.447	2.019	0.001
1993-94 House CTI	0.028	19.924	1.537	0.001
1995 fixed guideway appropriation earmarks	0.025	21.024	6.377	0.001
FTA ISTEA earmarks (per capita)	0.020	21.327	0.022	0.000
FTA ISTEA earmarks	0.006	21.556	3.373	0.000

Notes: each row refers to a separate simple linear regression equation.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Congress also included project earmarks for a number of fixed guideway projects, as part of the fiscal year 1995 USDOT appropriations bill. These earmarks totaled $639 million. California and New Jersey each had more than $100 million in fixed guideway appropriations earmarks, and Oregon was not too far behind with more than $95 million.

Sixteen states received no fixed guideway appropriations earmarks. Surely, politics played a role in the decisions that were made, or did it?

Table 9-13 shows the correlation between total dollar fixed guideway appropriations earmarks and a number of other variables. The total dollar earmark was highly correlated with total population, and was moderately correlated with total expenditures, the House committee variables, unlinked passenger trips, and a state's urban population share. In general, states with larger populations and more representatives on the House Committee on Transportation and Infrastructure received more money in total appropriations earmarks (see **Map 9-16** and **Map 9-17**). Thus, political representation was a significant explanatory factor.

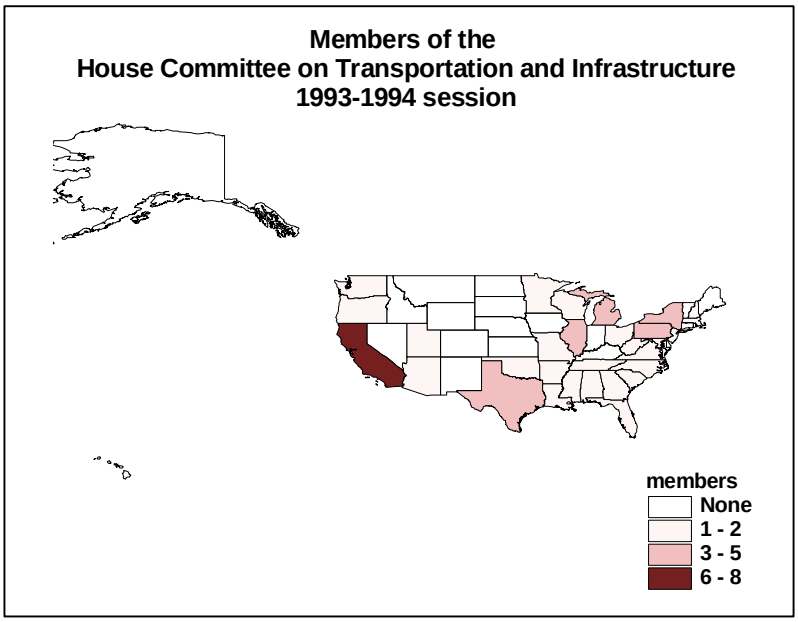
Table 9-13: 1995 fixed guideway appropriation earmarks (total dollars), correlation

Correlation: 1995 fixed guideway appropriations (total dollars)

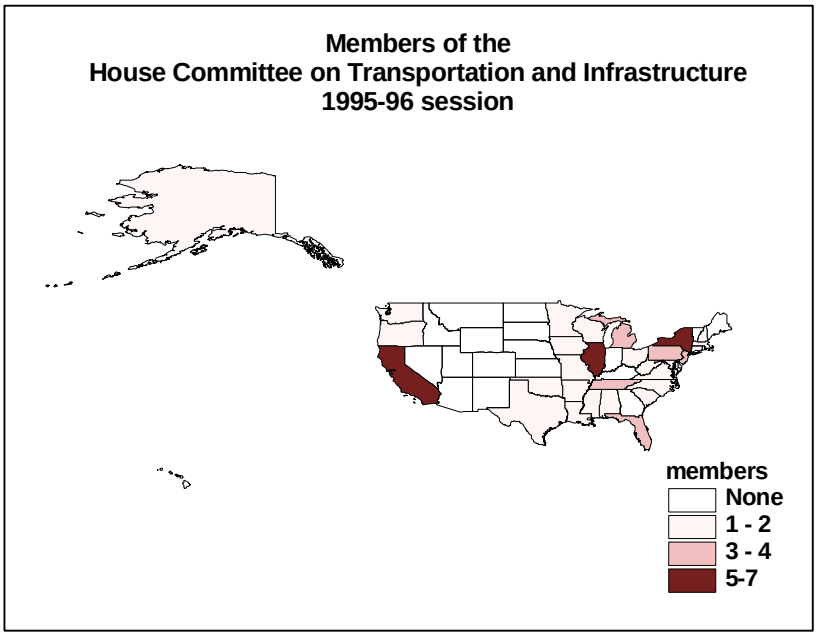
Variable	*Correlation*	*p-value*
1995 total population	0.704	0.000
1993-94 House CTI	0.658	0.000
1995-96 House CTI	0.641	0.000
1995 FTA total expenditures	0.631	0.000
1995-96 House Appropriations	0.595	0.000
1995 unlinked passenger trips	0.530	0.000
1993-94 House Appropriations	0.490	0.000
1990 percent urban	0.378	0.006
1990 percent rural	-0.378	0.006
FTA ISTEA earmarks	0.340	0.015
1995-96 Senate Banking	0.257	0.069
1993-94 Senate Appropriations	0.231	0.103
1995-96 Senate Env. Pub Works	0.228	0.107
1993-94 Senate Env. Pub. Works	0.219	0.122
1993-94 Senate Banking	0.196	0.168
FTA ISTEA earmarks (per capita)	0.074	0.604
1995 FTA total expenditures (per capita)	0.025	0.861
1995-96 Senate Appropriations	-0.017	0.904

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Map 9-16: Members of the House CTI, 1993-94 session

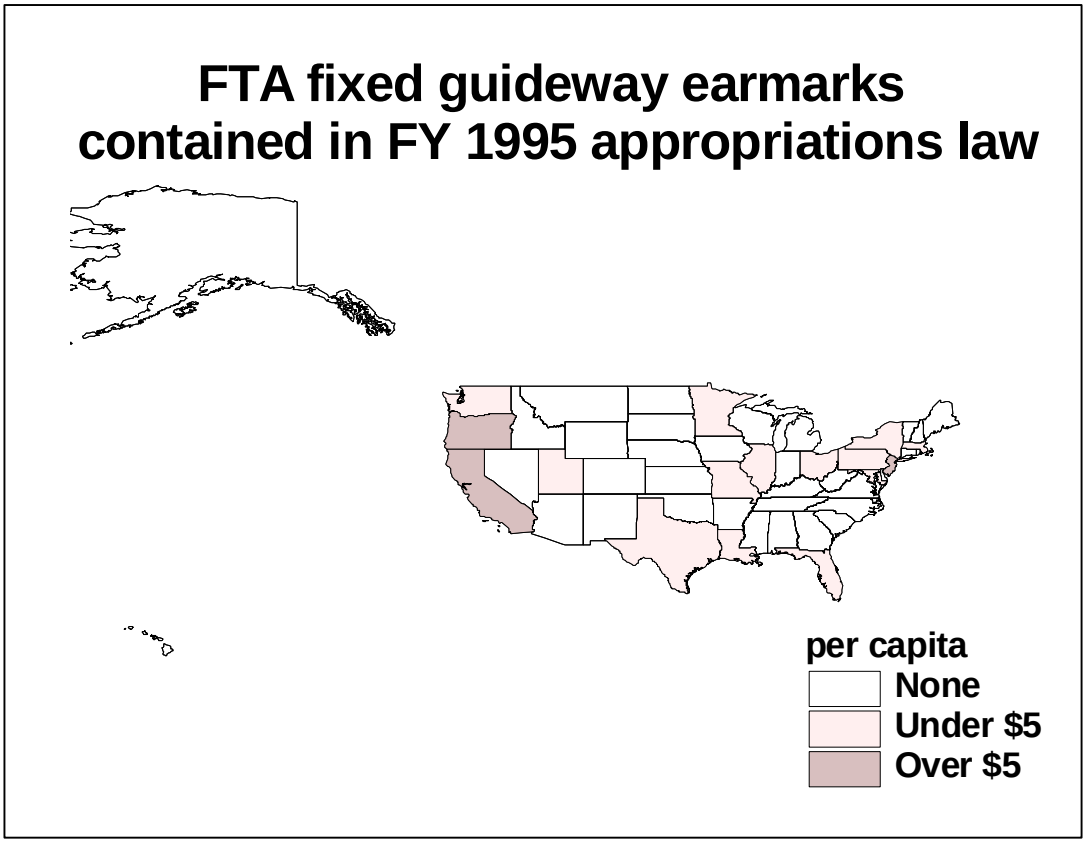


Map 9-17: Members of the House CTI, 1995-96 session



Map 9-18 shows the spatial distribution of 1995 fixed guideway appropriations earmarks on a per capita basis. Among the states receiving these earmarks, Oregon received the highest per capita amount ($31).

Map 9-18: 1995 fixed guideway appropriations earmarks (per capita)



The results of the regression equations are presented in **Table 9-14**. In general, the strongest predictors of a state's 1995 fixed guideway appropriations earmarks (per capita) were its total ISTEA transit dollar earmarks and its total dollar expenditures. For every $1 increase in ISTEA transit earmarks (per capita), a state's fixed guideway appropriations earmarks (per capita) was higher by $0.01 (r square = 0.058). States that received high total dollar aid received high per capita earmark aid.

Table 9-14: 1995 fixed guideway appropriations earmarks (per capita), regression

Dependent Variable: 1995 fixed guideway appropriations (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
FTA ISTEA earmarks	0.435	0.495	1.284	0.189
1995 FTA total expenditures	0.333	0.639	1.091	0.111
FTA ISTEA earmarks (per capita)	0.240	1.189	0.014	0.058
1990 percent urban	0.213	-3.076	6.664	0.045
1995-96 House CTI	0.213	0.744	0.650	0.045
1990 percent rural	-0.213	3.587	-6.664	0.045
1993-94 House CTI	0.186	0.816	0.560	0.035
1993-94 Senate Appropriations	0.181	0.598	1.601	0.033
1995 total population	0.172	0.772	1.411	0.029
1995 unlinked passenger trips	0.155	1.223	1.941	0.024
1995-96 Senate Appropriations	0.132	0.910	1.089	0.017
1995-96 House Appropriations	0.129	1.031	0.435	0.017
1995 FTA total expenditures (per capita)	0.058	1.439	0.003	0.003
1995-96 Senate Banking	0.044	1.369	0.446	0.002
1993-94 House Appropriations	0.028	1.395	0.097	0.001
1995-96 Senate Env. Pub Works	0.017	1.453	0.175	0.000
1993-94 Senate Env. Pub. Works	0.008	1.483	0.081	0.000
1993-94 Senate Banking	-0.006	1.531	-0.059	0.000

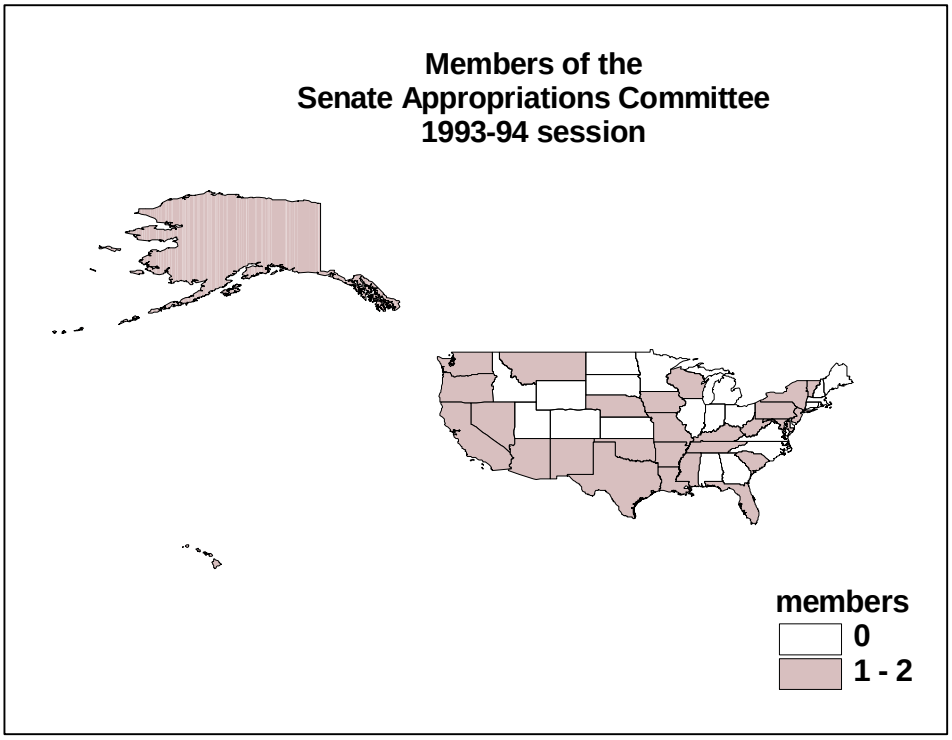
Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Among the remaining variables, the r squares were low, although the correlations were generally in the expected direction. For example, for every percentage increase in a state's urban population share its per capita earmark was higher by $0.07 (r square = 0.045). The relationships were also positive for total population (r square = 0.029) and unlinked passenger trips (r square = 0.024). The relationships involving the political variables were weaker when the dependent variable is per capita earmarks than when it was total earmarks, which is true throughout all of the analyses. For example, for every additional member of the 1993-94 Senate Appropriations Committee, a state's appropriations earmark (per capita) was higher by $1.60 (r square = 0.033) (see **Map 9-**

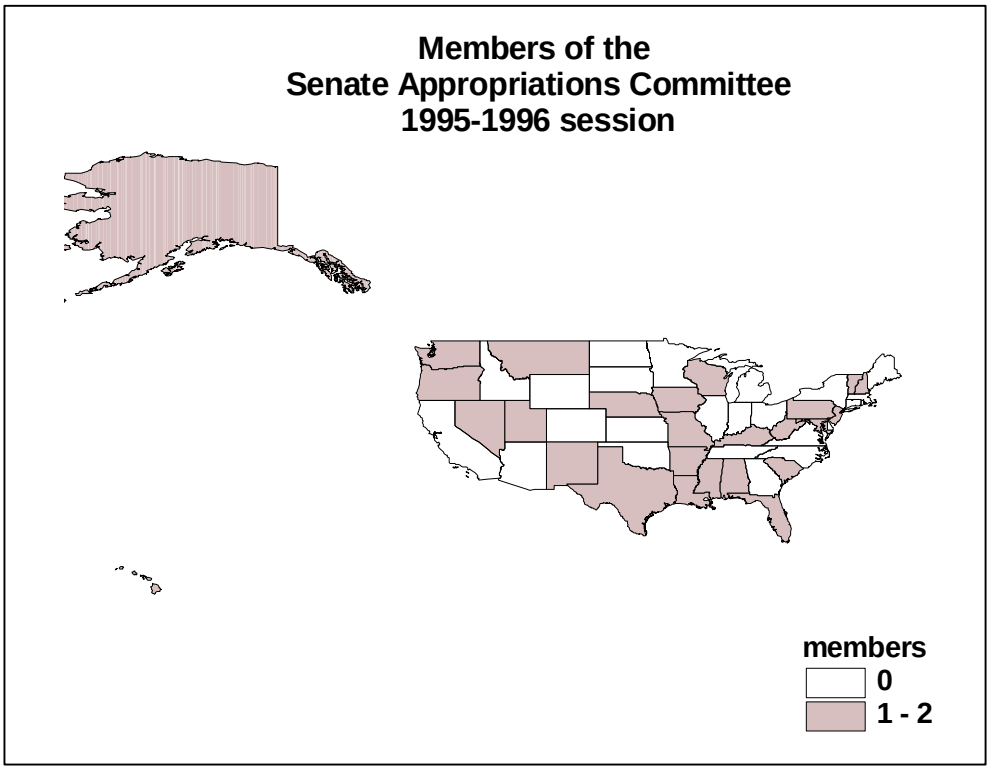
19). When the independent variable is membership on this same committee in the following (1995-96) session, the coefficient and r square both fall (see **Map 9-20**). The analysis suggests that politicians are more interested in total dollars than in per capita dollars. In all cases reported in the table the r squares are quite low. The spatial pattern of transit per capita earmarks is not explained (very well) by these particular variables.

Map 9-19: Members of the Senate Appropriations Committee, 1993-94 session



Source: Congressional Directory.

Map 9-20: Members of the Senate Appropriations Committee, 1995-96 session



Source: Congressional Directory.

The relationships between the expenditure outcomes and the other variables were relatively unchanged between 1990 and 1995. As in 1990, population and number of unlinked passenger trips were much stronger predictors of total dollar expenditures than per capita expenditures. The political variables were also the same way, particularly in the case of earmarks. As expected, states with larger urban population shares consistently ranked on the high end of the expenditure distributions.

Transit authorizing earmarks in TEA-21

After a one-year delay, the new reauthorization law, the Transportation Equity Act for the 21st Century (TEA-21), was enacted in 1998. Even more than its predecessor (ISTEA), TEA-21 achieved notoriety for the amount of special project earmarks it contained. More than $5.5 billion in transit authorization earmarks were contained in the bill, with the largest share ($956 million) given to California (TEA-21 1998).

As **Table 9-15** indicates, the total amount of earmarks a state received was very highly correlated with its total population (in this case for 2000) and its representation on the House Committee on Transportation and Infrastructure (whose members took the lead in drafting the bill) (see **Map 9-21**). The amount was also highly correlated with a state's transit ridership (in this case the 2000 ridership data). None of these results were surprising, but it was surprising how much stronger all of the relationships were than they had been in the case of ISTEA earmarks.

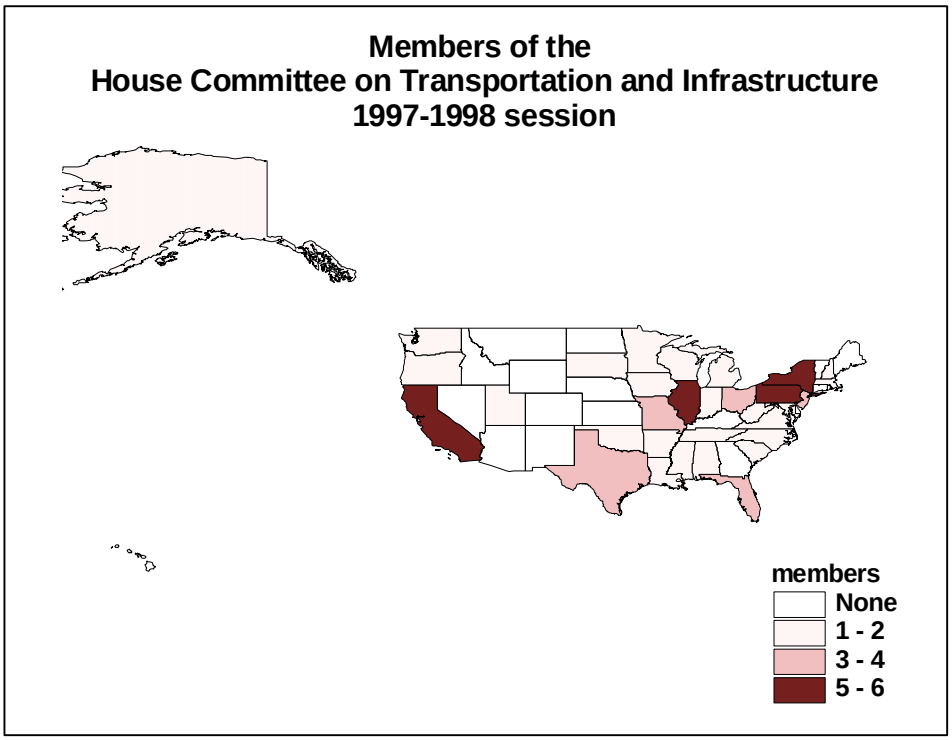
Table 9-15: FTA TEA-21 earmarks (total dollars), correlation

Correlation: TEA-21 FTA earmarks (total dollars)

Variable	*Correlation*	*p-value*
2000 total population	0.782	0.000
1997-98 House CTI	0.641	0.000
1997-98 House Appropriations	0.605	0.000
2000 percent urban	0.462	0.000
2000 unlinked passenger trips	0.338	0.015
1997-98 Senate Banking	0.278	0.049
1997-98 Senate Env. Pub. Works	0.207	0.145
1997-98 Senate Appropriations	0.165	0.246
2000 percent rural	-0.462	0.000

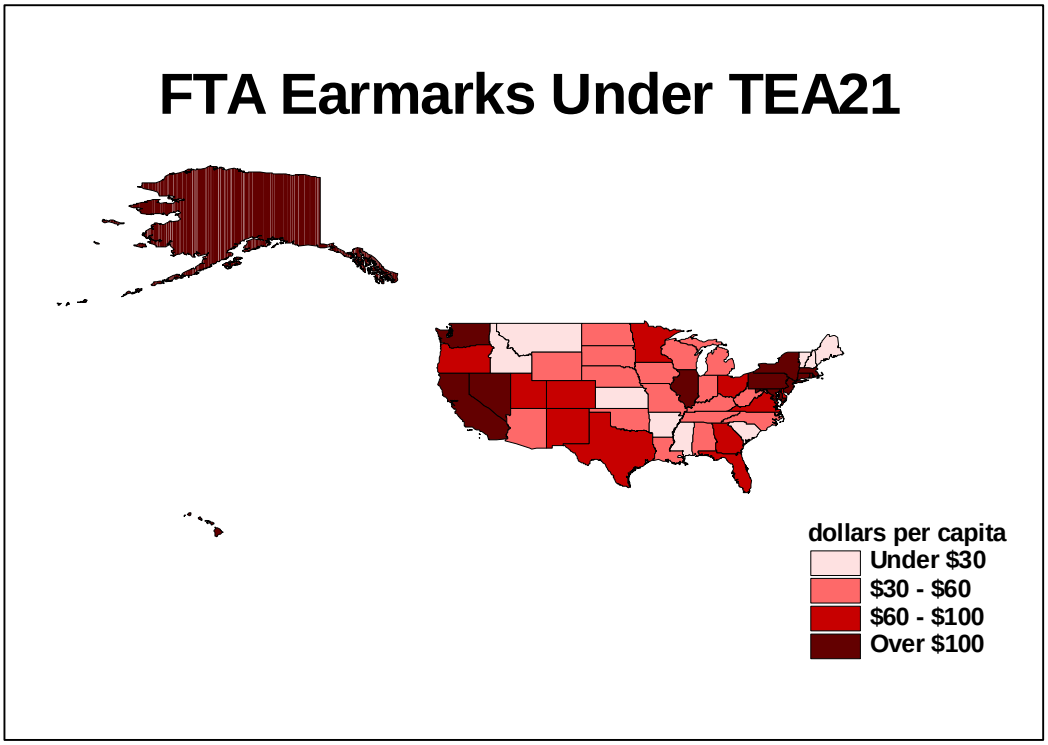
Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Map 9-21: Members of the House CTI, 1997-98 session



Map 9-22 shows the spatial patterns of these earmarks, expressed on a per capita basis. The average earmark for the US as a whole was $20. The highest per capita earmark was for Alaska ($111), while two states (Idaho and Wyoming) received no transit earmarks in TEA-21. I expected per capita earmarks to be positively correlated with the political variables and a state's urban population share, and negatively correlated with total population and transit ridership (unlinked passenger trips).

Map 9-22: FTA TEA-21 earmarks (per capita)



With few exceptions, the results in **Table 9-16** supported these hypotheses—although the correlations were very weak indeed. The strongest relationship existed between the per capita earmarks and a state's urban population share. For every percentage point increase in states' urban population share, they received an additional $0.46 in per capita transit earmarks (r square = 0.10). Among the political variables, three variables had positive coefficients and two had negative ones. The highest r square (0.054) was for the Senate Appropriations variable, while the lowest (0) was for the Senate Environment and Public Works variable (see **Map 9-23** and **Map 9-24**). The Senate Banking Committee fell in between (see **Map 9-25**). The r squares for both total

population and unlinked passenger trips were virtually zero. None of the variables were particularly good explanatory factors in this case.

Table 9-16: FTA TEA-21 earmarks (per capita), regression

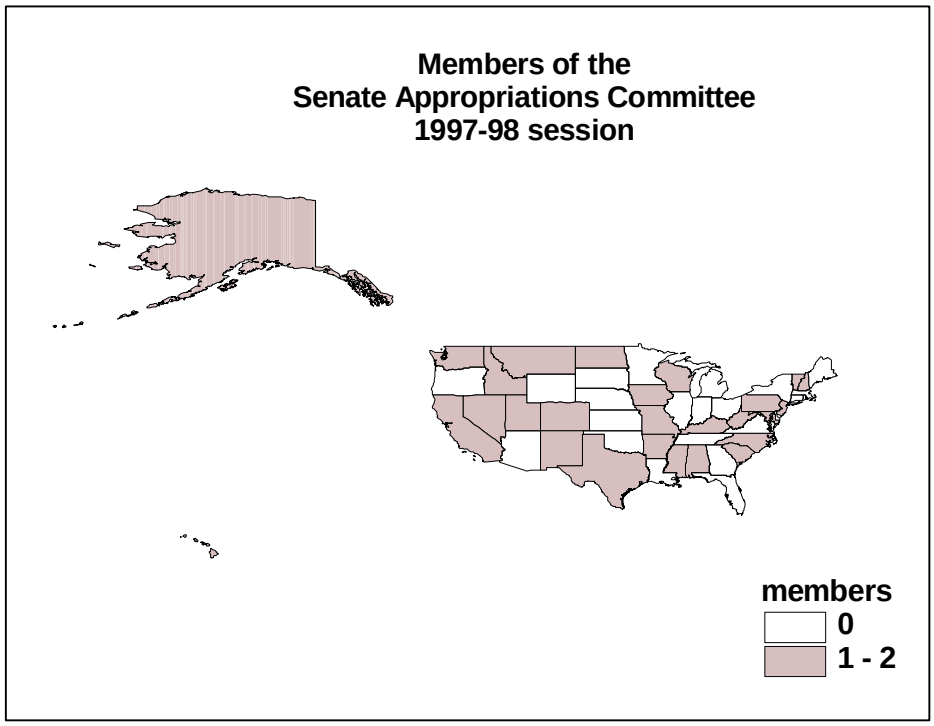
Dependent Variable: FTA TEA-21 earmarks (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 percent urban	0.317	-12.951	46.015	0.100
2000 percent rural	-0.317	33.063	-46.015	0.100
1997-98 Senate Appropriations	0.232	15.055	9.540	0.054
1997-98 House CTI	0.120	17.927	1.653	0.014
1997-98 House Appropriations	-0.112	22.361	-1.788	0.013
1997-98 Senate Banking	0.058	19.352	2.665	0.003
2000 total population	0.004	20.220	1.312	0.000
2000 unlinked passenger trips	-0.011	20.379	-5.310	0.000
1997-98 Senate Env. Pub. Works	-0.017	20.573	-0.795	0.000

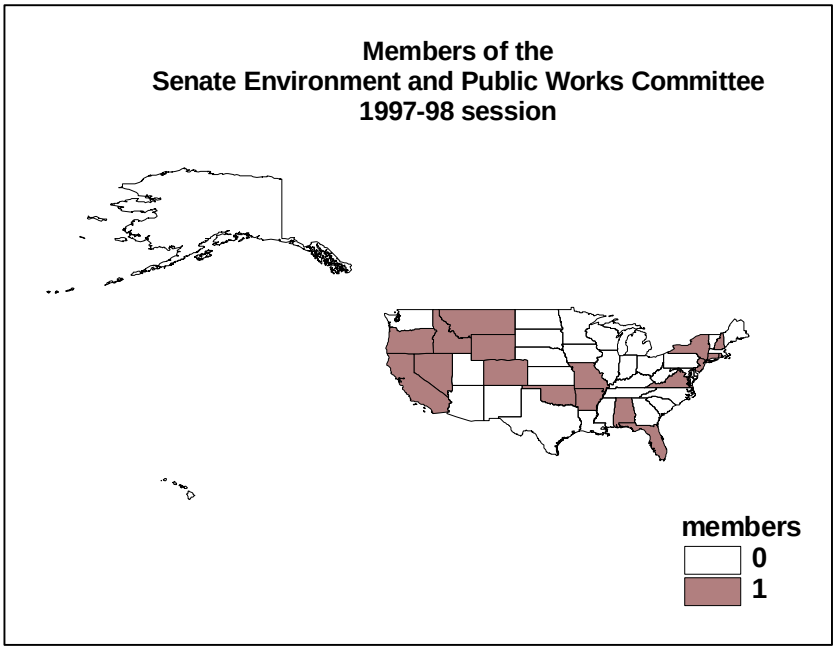
Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

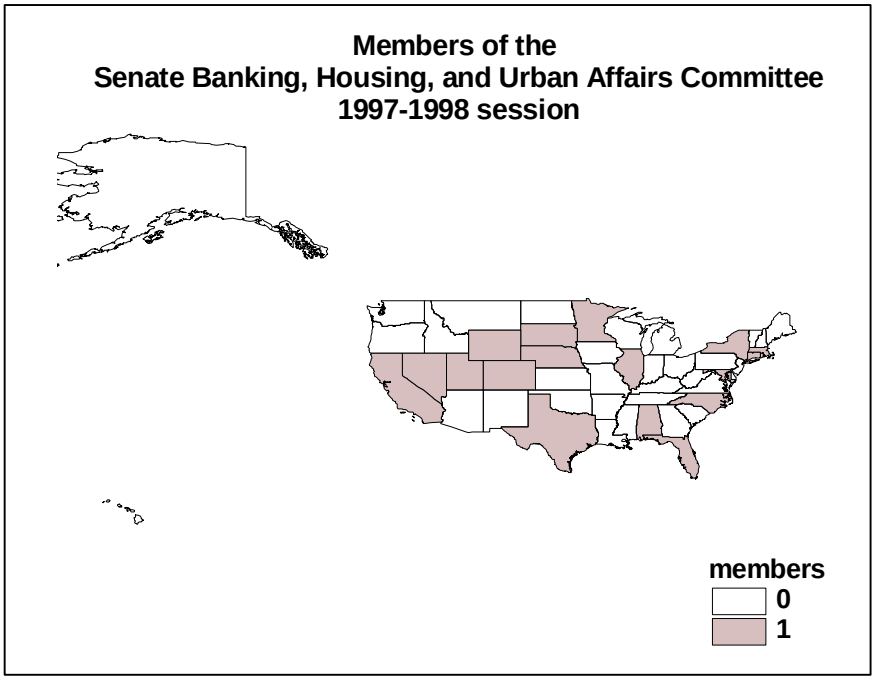
Map 9-23: Members of the Senate Appropriations Committee, 1997-98 session



Map 9-24: Members of the Senate EPW Committee, 1997-98 session



Map 9-25: Members of the Senate Banking Committee, 1997-98 session



Federal transit program in 2000

The passage of TEA-21 in 1998 brought an increase in transit aid, both on the capital and operating sides, and the end to operating assistance for areas with more than 200,000 people. This last development was the result of a long effort, by administrations of both parties, to end operating assistance to large cities. By 2000, federal transit expenditures exceeded $5.2 billion, including $4.3 billion for capital projects and just under $1 billion for operating assistance. Wyoming received the smallest amount of federal transit aid ($45,000 capital aid + $425,000 operating assistance = $470,000 total), while California received the largest ($821 million capital aid + $219 million operating assistance = $1.04 billion total).

Table 9-17 reports the correlation coefficients for 2000 capital expenditures (total dollars), while **Table 9-18** reports the same for 2000 operating expenditures. The changes in eligibility for federal operating assistance meant that the correlations between federal operating assistance and some of the other variables and federal capital aid and some of the other variables were further apart than before. For example, the correlation between passenger trips and capital expenditures was much higher (0.857) than between passenger trips and operating expenditures (0.311). This isn't surprising given that the areas where most transit trips are taken are the large urban areas that lost eligibility for federal operating assistance. The correlation between total capital aid and total operating assistance fell from 0.809 in 1995 to 0.685 in 2000.

Table 9-17: 2000 FTA capital expenditures (total dollars), correlation

Correlation: 2000 FTA capital expenditures (total dollars)

Variable	*Correlation*	*p-value*
2000 FTA total expenditures	0.992	0.000
2000 unlinked passenger trips	0.857	0.000
2000 total population	0.843	0.000
1999-00 House CTI	0.807	0.000
1997-98 House CTI	0.749	0.000
1999-00 House Appropriations	0.725	0.000
FTA TEA-21 earmarks	0.719	0.000
1997-98 House Appropriations	0.714	0.000
2000 FTA operations expenditures	0.685	0.000
2000 fixed guideway appropriations earmarks	0.660	0.000
2000 bus appropriations earmarks	0.605	0.000
2000 percent urban	0.473	0.000
2000 percent rural	-0.473	0.000
1997-98 Senate Banking	0.318	0.023
1999-00 Senate Env. Pub. Works	0.283	0.044
1997-98 Senate Env. Pub. Works	0.197	0.167
1999-00 Senate Banking	0.075	0.600
1999-00 Senate Appropriations	0.074	0.604
1997-98 Senate Appropriations	0.004	0.979

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 9-18: 2000 FTA operating expenditures (total dollars), correlation

Correlation: 2000 FTA operations expenditures (total dollars)

Variable	*Correlation*	*p-value*
2000 total population	0.836	0.000
FTA TEA-21 earmarks	0.812	0.000
2000 fixed guideway appropriations earmarks	0.773	0.000
2000 FTA total expenditures	0.770	0.000
1999-00 House Appropriations	0.738	0.000
1997-98 House Appropriations	0.724	0.000
1999-00 House CTI	0.687	0.000
2000 FTA capital expenditures	0.685	0.000
2000 bus appropriations earmarks	0.636	0.000
1997-98 House CTI	0.614	0.000
2000 percent urban	0.384	0.005
2000 percent rural	-0.384	0.005
2000 unlinked passenger trips	0.311	0.026
1999-00 Senate Env. Pub. Works	0.266	0.059
1997-98 Senate Env. Pub. Works	0.165	0.246
1997-98 Senate Banking	0.149	0.297
1999-00 Senate Appropriations	0.086	0.549
1997-98 Senate Appropriations	0.079	0.579
1999-00 Senate Banking	-0.062	0.667

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 9-19 reports the correlations between these same variables and 2000 total transit expenditures (total dollars). Changes had indeed occurred between 1995 and 2000. Compared to 1995, the correlation coefficients for House committee representation were larger, and the coefficient for trips was lower. The coefficient for population was higher, while the coefficient for urban population share was slightly lower (see **Table 9-20** for urban share coefficients), and coefficients for the Senate variables were generally lower. All of these relationships were positive. In general, larger population states and those

represented on the House committees were better off than before, while areas with large numbers of trips were slightly worse off, in a relative sense of course. Membership on the House Committee on Transportation and Infrastructure was among those variables most highly correlated with 2000 total transit aid (see **Map 9-26**).

Table 9-19: 2000 FTA total expenditures (total dollars), correlation

Correlation: 2000 FTA total expenditures (total dollars)

Variable	*Correlation*	*p-value*
2000 FTA capital expenditures	0.992	0.000
2000 total population	0.881	0.000
1999-00 House CTI	0.823	0.000
2000 unlinked passenger trips	0.804	0.000
2000 FTA operations expenditures	0.770	0.000
FTA TEA-21 earmarks	0.768	0.000
1997-98 House CTI	0.761	0.000
1999-00 House Appropriations	0.761	0.000
1997-98 House Appropriations	0.749	0.000
2000 fixed guideway appropriations earmarks	0.710	0.000
2000 bus appropriations earmarks	0.638	0.000
2000 percent urban	0.479	0.000
2000 percent rural	-0.479	0.000
1997-98 Senate Banking	0.304	0.030
1999-00 Senate Env. Pub. Works	0.293	0.037
1997-98 Senate Env. Pub. Works	0.200	0.159
1999-00 Senate Appropriations	0.080	0.578
1999-00 Senate Banking	0.055	0.700
1997-98 Senate Appropriations	0.017	0.906

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 9-20: Urban population share (2000) and 2000 transit variables, correlation

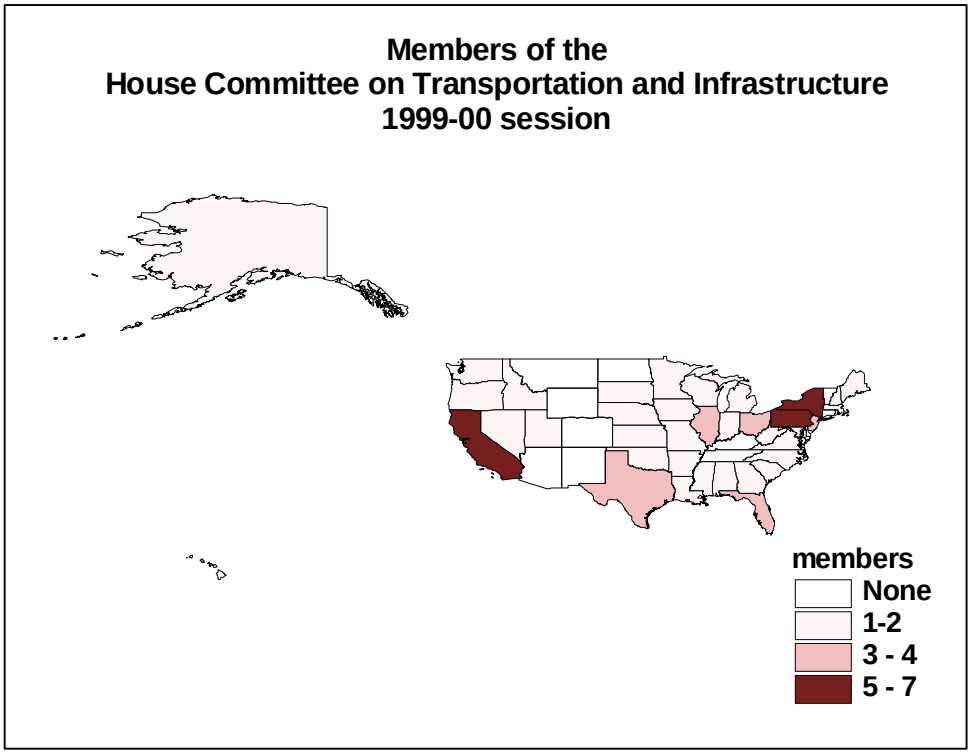
Urban population (2000 percent urban) related to 2000 transit variables

Variable	*Correlation*	*p-value*
2000 FTA total expenditures	0.479	0.000
2000 FTA capital expenditures	0.473	0.000
FTA TEA-21 earmarks	0.462	0.001
2000 FTA operation expenditures (per capita)	0.456	0.001
2000 fixed guideway appropriation earmarks	0.420	0.002
2000 FTA operations expenditures	0.384	0.005
2000 FTA total expenditures (per capita)	0.382	0.006
2000 FTA capital expenditures (per capita)	0.371	0.007
FTA TEA-21 earmarks (per capita)	-0.317	0.024
1999-00 Senate Env. Pub Works	0.311	0.026
1999-00 House CTI	0.305	0.030
2000 bus appropriations earmarks	0.281	0.046
1999-00 House Appropriations	0.255	0.071
2000 fixed guideway appropriation earmarks (per capita)	0.234	0.099
1999-00 Senate Banking	0.207	0.144
2000 bus appropriations earmarks (per capita)	-0.039	0.736
1999-00 Senate Appropriations	-0.031	0.827

Notes: urban population data are from US Census Bureau and are based on Census definitions of urban and rural places.

For rural population, p-values are identical, and correlation coefficients are identical but have the opposite sign.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Map 9-26: Members of the House CTI, 1999-2000 session

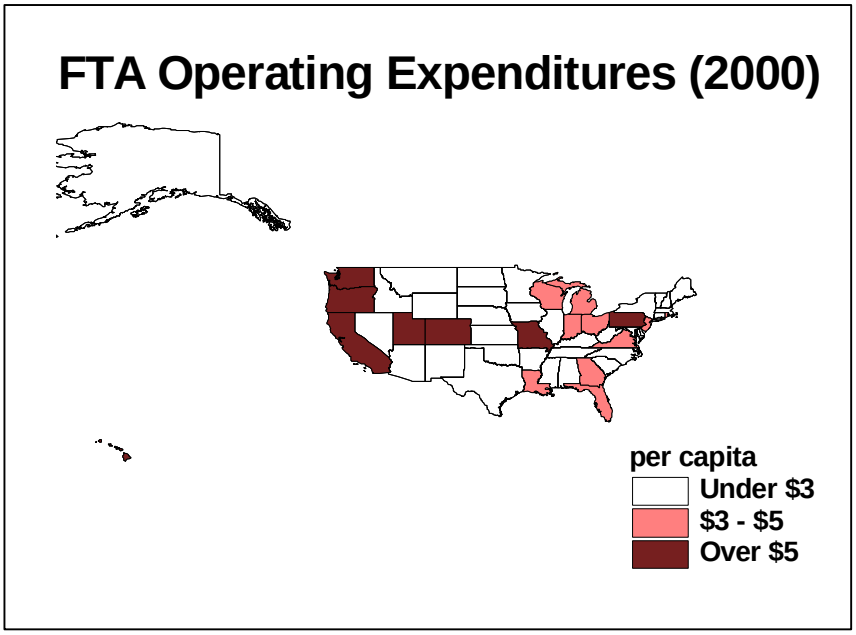


When expressed on a per capita basis, the federal government spent $18.65 on transit aid in 2000 ($15.15 for capital and $3.49 for operations). **Map 9-27** shows the spatial pattern of capital expenditures (per capita). The District of Columbia had the highest per capita expenditure ($388), while Wyoming had the lowest ($0.09). States with significant new rail project development were clustered on the high end, while the plains states tended to fall on the low end.

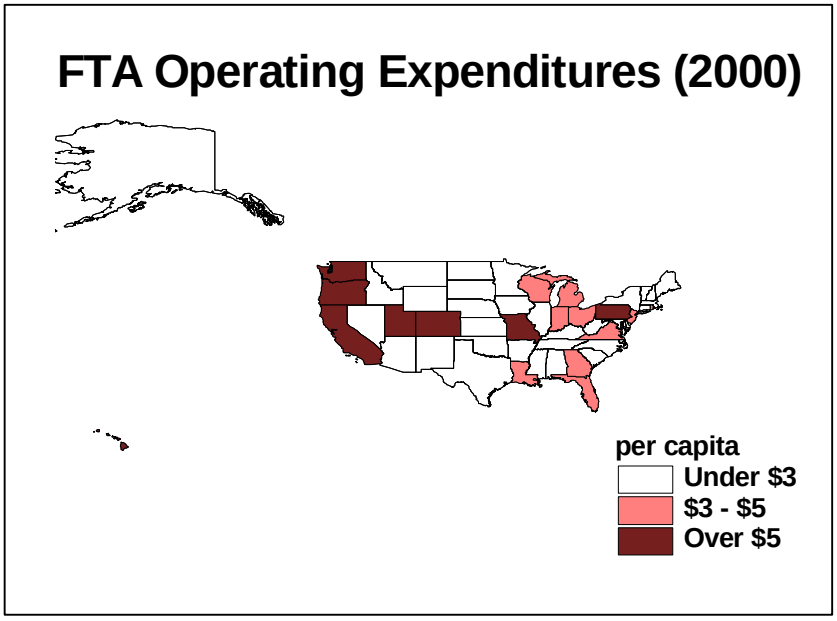
Map 9-28 shows the same pattern, but for operating assistance. Particularly noteworthy compared to prior years are New York and New Jersey's fall from the higher end of the range in 1995 to the low end in 2000—because of the end of large urban area

operating assistance. Hawaii ($15) and Utah ($9) were now at the highest end of the distribution.

Map 9-27: 2000 FTA capital expenditures (per capita)



Map 9-28: 2000 FTA operating assistance (per capita)



The results of the regression analyses for 2000 FTA capital expenditures (per capita) and 2000 FTA operating expenditures (per capita) are reported in **Table 9-21** and **Table 9-22** respectively. While I will save most of my comments for the discussion of total expenditures (per capita) that follows, I would like to note a few points about these two tables, focusing in particular on two variables where the correlation coefficients and associated r square values were different between them. The urban share variable was more strongly associated with operations than capital, while the trip variable was more strongly associated with capital than operations. In all cases, the signs of the coefficients were the same. Interpretation of the results in these tables is straightforward, and I will thus turn to discussion of the table that follows.

Table 9-21: 2000 FTA capital expenditures (per capita), regression

Dependent Variable: 2000 FTA capital expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 FTA total expenditures (per capita)	0.999	-2.129	0.932	0.998
2000 FTA operations expenditures (per capita)	0.824	-18.190	9.641	0.680
2000 percent urban	0.371	-78.761	131.022	0.137
2000 percent rural	-0.371	52.262	-131.022	0.137
2000 bus appropriations earmarks (per capita)	0.369	-0.492	5.534	0.136
2000 unlinked passenger trips	0.182	12.343	2.194	0.033
1997-98 Senate Appropriations	-0.127	22.885	-12.725	0.016
1999-00 Senate Appropriations	-0.107	21.781	-10.714	0.012
FTA TEA-21 earmarks (per capita)	0.105	10.734	0.255	0.011
1997-98 Senate Env. Pub. Works	-0.083	19.173	-9.278	0.007
1999-00 Senate Banking	-0.084	19.513	-9.216	0.007
1997-98 House CTI	0.070	12.560	2.333	0.005
1999-00 House CTI	0.061	12.596	2.246	0.004
1999-00 Senate Env. Pub. Works	-0.064	18.445	-7.215	0.004
1997-98 House Appropriations	-0.041	17.731	-1.583	0.002
1999-00 House Appropriations	-0.046	18.061	-1.808	0.002
1997-98 Senate Banking	-0.047	17.759	-5.269	0.002
2000 total population	-0.013	16.506	-1.100	0.000
2000 fixed guideway appropriations earmarks (per capita)	-0.018	16.408	-0.168	0.000

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Table 9-22: 2000 FTA operations expenditures (per capita), regression

Dependent Variable: 2000 FTA operations expenditures (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 FTA total expenditures (per capita)	0.849	2.219	0.068	0.721
2000 FTA capital expenditures (per capita)	0.824	2.415	-0.070	0.680
2000 percent urban	0.456	-6.419	13.780	0.208
2000 percent rural	-0.456	7.360	-13.780	0.208
2000 bus appropriations earmarks (per capita)	0.303	2.384	0.389	0.092
FTA TEA-21 earmarks (per capita)	0.252	2.474	0.052	0.063
1999-00 Senate Banking	-0.142	4.056	-1.327	0.020
1997-98 Senate Banking	-0.132	3.982	-1.265	0.017
1999-00 House Appropriations	-0.091	3.898	-0.302	0.008
1997-98 House Appropriations	-0.075	3.823	-0.248	0.006
1997-98 Senate Env. Pub. Works	-0.075	3.789	-0.716	0.006
2000 fixed guideway appropriations earmarks (per capita)	0.055	3.406	0.043	0.003
2000 unlinked passenger trips	0.039	3.471	3.995	0.001
1997-98 House CTI	0.028	3.420	0.081	0.001
1999-00 Senate Appropriations	-0.027	3.664	-0.234	0.001
1997-98 Senate Appropriations	-0.032	3.686	-0.274	0.001
1999-00 House CTI	0.004	3.518	0.012	0.000
2000 total population	-0.010	3.576	-7.281	0.000
1999-00 Senate Env. Pub. Works	-0.015	3.586	-0.143	0.000

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Total expenditures per capita ranged from a high of approximately $400 in the District of Columbia down to $0.95 in Wyoming. **Map 9-29** displays the spatial pattern of these expenditures, and the regression results are reported in **Table 9-23**. Compared to the 1995 regression results, the coefficients were slightly higher in a number of areas: urban population share (percent urban), transit trips (UPT), authorization earmarks per capita, and operation expenditures per capita. The coefficients were slightly lower for total population, and only slightly changed in the cases of the political representation variables. None of the signs on the coefficients changed between 1995 and 2000. The changes that were quite visible when the unit of analysis was total dollars were much less visible when the unit of analysis was dollars per capita.

Map 9-29: 2000 FTA total expenditures (per capita)

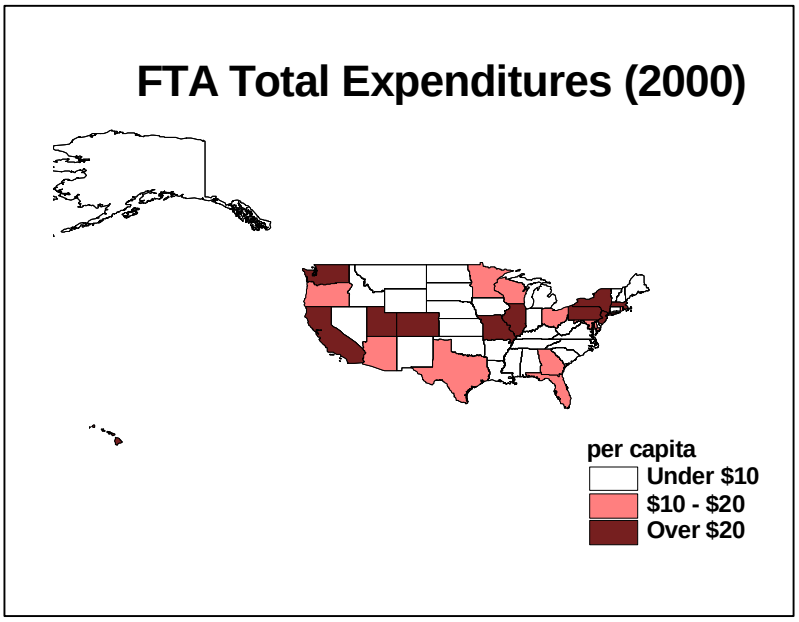


Table 9-23: 2000 FTA total operations expenditures (per capita), regression

Dependent Variable: 2000 FTA total expenditures (per capita)

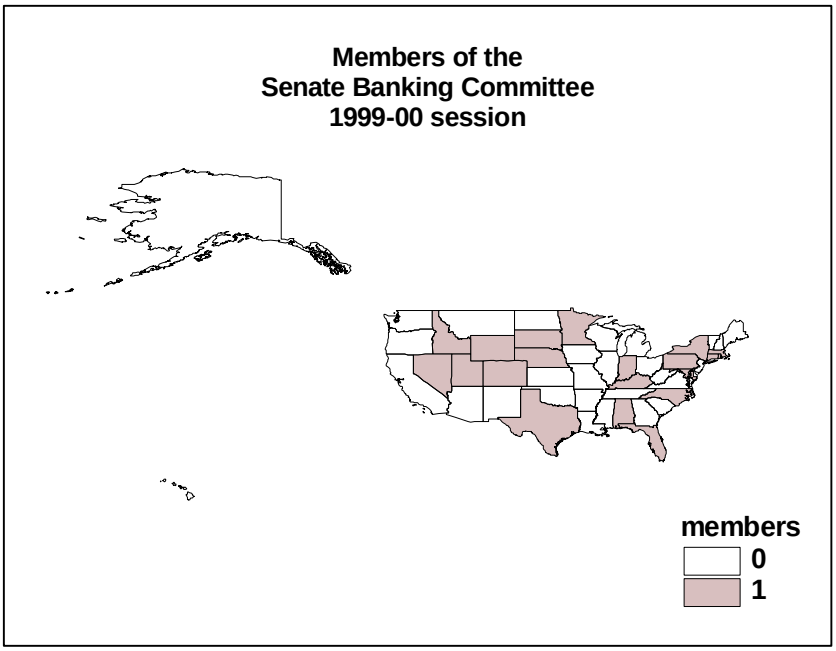
Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 FTA capital expenditures (per capita)	0.999	2.415	1.070	0.998
2000 FTA operations expenditures (per capita)	0.849	-18.190	10.641	0.721
2000 percent urban	0.382	-85.180	144.802	0.146
2000 percent rural	-0.382	59.622	-144.802	0.146
2000 bus appropriations earmarks (per capita)	0.369	1.893	5.922	0.136
2000 unlinked passenger trips	0.173	15.814	2.234	0.030
1997-98 Senate Appropriations	-0.121	26.571	-12.999	0.015
FTA TEA-21 earmarks (per capita)	0.118	13.208	0.307	0.014
1999-00 Senate Appropriations	-0.102	25.445	-10.948	0.010
1999-00 Senate Banking	-0.090	23.570	-10.544	0.008
1997-98 Senate Env. Pub. Works	-0.083	22.962	-9.994	0.007
1997-98 House CTI	0.067	15.980	2.414	0.005
1999-00 Senate Env. Pub. Works	-0.061	22.302	-7.358	0.004
1999-00 House CTI	0.058	16.113	2.259	0.003
1999-00 House Appropriations	-0.051	21.959	-2.110	0.003
1997-98 Senate Banking	-0.054	21.741	-6.534	0.003
1997-98 House Appropriations	-0.044	21.553	-1.831	0.002
2000 total population	-0.012	20.082	-1.170	0.000
2000 fixed guideway appropriations earmarks (per capita)	-0.013	19.815	-0.125	0.000

Notes: each row refers to a separate simple linear regression equation.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

The highest r squares were for the other expenditure variables. Among the remaining variables, only the percent urban (and percent rural) and bus appropriation earmarks (per capita) variables had moderate correlations. For every percentage point increase in state urban population share, its total transit expenditures (per capita) was higher by $1.45 (r square = 0.146). The trips, political representation, and total population variables had low r square values. For example, consider the case of the Senate Banking Committee (the Senate oversight committee for the transit program). For every additional representative a state had on this committee during the 1999-2000 session, its total expenditures (per capita) were lower by $10.54 (r square = 0.008) (see **Map 9-30**). I

expect to find stronger correlations between the political representation variables and the appropriations earmarks expenditures in the discussion that follows.

Map 9-30: Members of the Senate Banking Committee, 1999-2000 session



Congress inserted a number of transit appropriation earmarks into the fiscal year 2000 DOT appropriations bill, including $536 million in bus earmarks and $946 million in fixed guideway (mainly rail) earmarks. California led all states with $37 million in bus earmarks and $195 million in fixed guideway earmarks. My hypothesis is that the amount of earmark a state received, in both total dollar and per capita dollar terms, would be positively correlated with representation on the congressional committees, particularly the appropriations committees, and would be weakly correlated with the number of transit trips.

Table 9-24 shows the correlation coefficients between a state's 2000 bus appropriation total dollar earmarks and the population, use, expenditure, and political variables used throughout this section. The strongest correlations (all positive) were with total expenditure, total population, and House political representation variables. There were slightly weaker (still positive) correlations for the trip and percent urban variables, with the correlation for trips much stronger than I expected. In short, larger population states and those with political representation on the House committees tended to receive more bus appropriation earmark funds. But how do the relationships change when we look at per capita expenditures?

Map 9-31 shows the spatial pattern for per capita bus appropriation earmarks. The US average was $1.90. The highest per capita earmark ($12) went to the District of Columbia. Wyoming was the sole state to receive no bus appropriation earmarks.

Table 9-24: 2000 bus appropriation earmarks (total dollars), correlation

Correlation: 2000 bus appropriations earmarks (total dollars)

Variable	*Correlation*	*p-value*
1999-00 House Appropriations	0.687	0.000
2000 total population	0.681	0.000
2000 FTA total expenditures	0.638	0.000
2000 FTA operations expenditures	0.636	0.000
1999-00 House CTI	0.614	0.000
2000 FTA capital expenditures	0.605	0.000
FTA TEA-21 earmarks	0.582	0.000
2000 fixed guideway appropriations earmarks	0.524	0.000
2000 unlinked passenger trips	0.461	0.001
2000 percent urban	0.281	0.046
2000 percent rural	-0.281	0.046
1999-00 Senate Appropriations	0.187	0.189
1999-00 Senate Banking	0.037	0.795
1999-00 Senate Env. Pub. Works	0.014	0.921

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Map 9-31: 2000 bus appropriation earmarks (per capita)

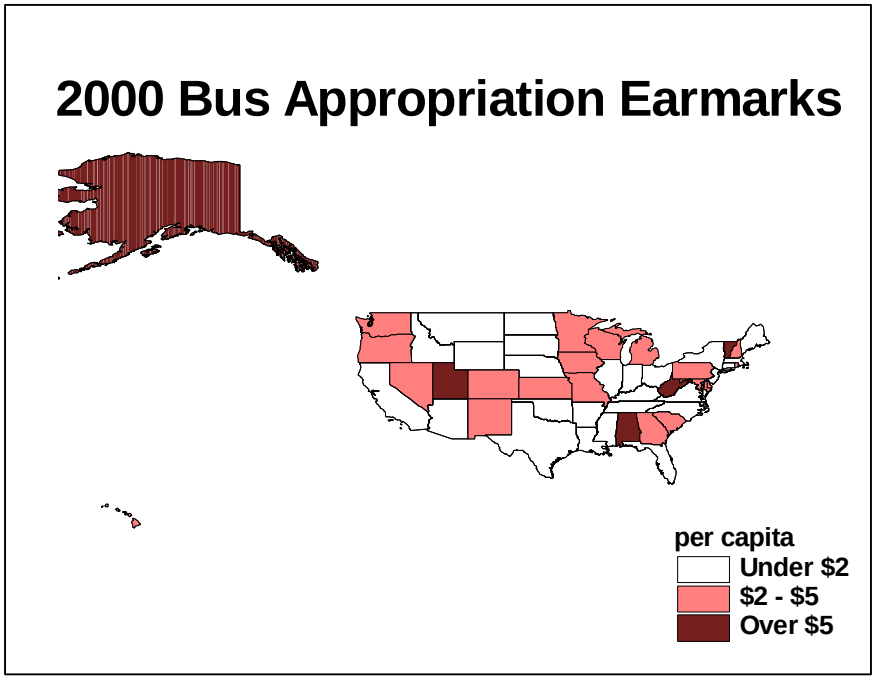


Table 9-25 shows the results of the regression analysis for bus appropriation earmarks (per capita). The strongest correlations were between this variable and the other expenditure variables. States that received higher per capita expenditures in general also did well when it came to earmarks. All the other correlations were weak, including the political variables, and most of them were negative. There was a very slight positive correlation between rural population share and bus appropriation earmarks (per capita), although the correlation was miniscule.

Table 9-25: 2000 FTA bus appropriation earmarks (per capita), regression

Dependent Variable: 2000 FTA bus appropriations earmarks (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 fixed guideway appropriations earmarks (per capita)	0.549	1.951	0.333	0.301
2000 FTA capital expenditures (per capita)	0.369	2.570	0.025	0.136
2000 FTA total expenditures (per capita)	0.369	2.516	0.023	0.136
2000 FTA operations expenditures (per capita)	0.303	2.125	0.237	0.092
2000 total population	-0.268	3.827	-1.570	0.072
1999-00 Senate Env. Pub. Works	-0.243	3.604	-1.819	0.059
1999-00 House Appropriations	-0.213	3.623	-0.553	0.045
1999-00 Senate Appropriations	0.199	2.234	1.326	0.040
1999-00 Senate Banking	-0.195	3.522	-1.428	0.038
1999-00 House CTI	-0.153	3.511	-0.374	0.023
2000 unlinked passenger trips	-0.090	3.079	-7.231	0.008
2000 percent rural	0.039	2.707	0.918	0.002
2000 percent urban	-0.039	3.625	-0.918	0.002

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

In addition to bus earmarks, there were also fixed guideway earmarks. **Table 9-26** shows the correlation coefficients between a state's 2000 fixed guideway appropriation earmarks and the population, use, expenditure, and political variables used throughout this section. The strongest correlations (all positive) were with total expenditure and total population variables. There were moderate (still positive) correlations for the House committee membership, bus appropriation earmark, and percent urban variables. The Senate committee and trip variables had weaker correlation coefficients but were positive. Larger population states, and those with more representatives on the House committees (which tend to be the larger population states), were quite successful in the drive to obtain fixed guideway appropriation earmarks. But what do the patterns look like when we consider per capita expenditures?

Table 9-26: 2000 fixed guideway earmarks (total dollars), correlation

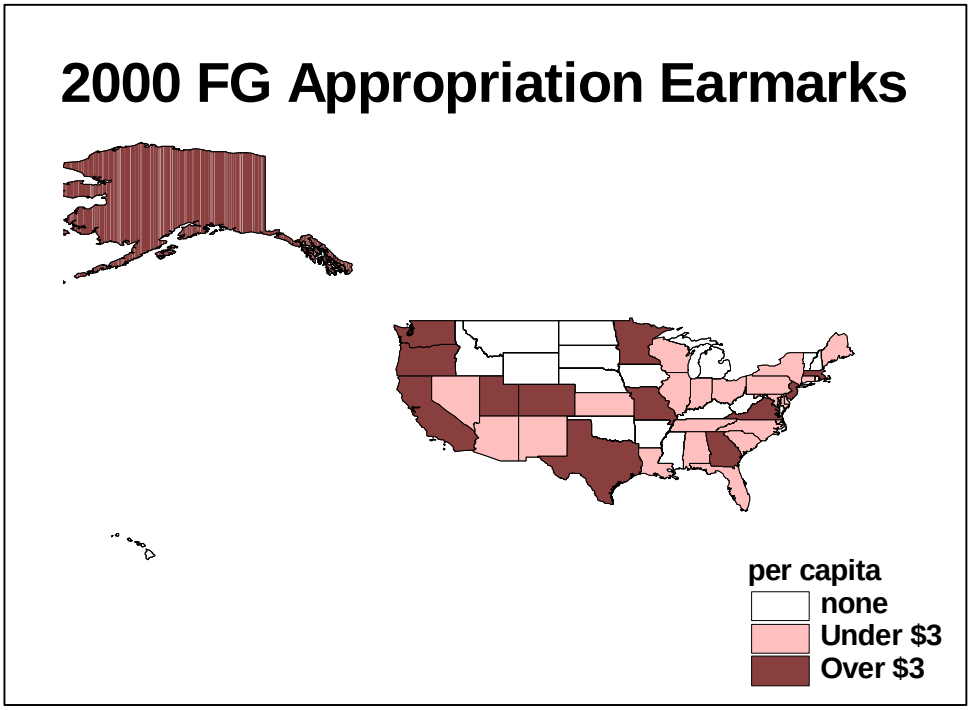
Correlation: 2000 fixed guideway earmarks (total dollars)

Variable	*Correlation*	*p-value*
2000 FTA operations expenditures	0.773	0.000
2000 total population	0.731	0.000
2000 FTA total expenditures	0.710	0.000
2000 FTA capital expenditures	0.660	0.000
1999-00 House CTI	0.594	0.000
1999-00 House Appropriations	0.590	0.000
2000 bus appropriations earmarks	0.524	0.000
2000 percent urban	0.420	0.002
2000 percent rural	-0.420	0.002
1999-00 Senate Env. Pub. Works	0.305	0.030
2000 unlinked passenger trips	0.262	0.064
1999-00 Senate Appropriations	0.217	0.127
1999-00 Senate Banking	0.017	0.908

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Map 9-32 shows the spatial pattern for per capita fixed guideway appropriation earmarks. The US average was $3.36. The highest per capita earmark ($32) went to Alaska. Eighteen states received no fixed guideway appropriation earmarks. These states were clustered in the plains and mountain region and south of the Ohio River and its extensions. The results of the regression analyses for this variable are presented **in Table 9-27** below.

Map 9-32: 2000 fixed guideway appropriation earmarks (per capita)



The regression results offer little real insight into understanding factors that might help to explain the per capita spatial distribution patterns—other than simply being a mathematical outcome of the search for total earmark dollars. This is a concern with all of the per capita expenditure analyses. That said, the strongest correlations were for percent urban (0.234), Senate Appropriations (0.225), and Senate EPW (0.088) variables. There were negative correlations with the other general (per capita) expenditure variables (albeit very weak ones), but a positive correlation (the largest) with the other earmark variable (0.549). More urban states and those that received more bus appropriation earmark dollars (per capita) tended to fare well when it came to the distribution of fixed guideway earmarks.

Table 9-27: 2000 FTA fixed guideway appropriation earmarks (p.c.), regression

Dependent Variable: 2000 FTA fixed guideway appropriations earmarks (per capita)

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 bus appropriations earmarks (per capita)	0.549	0.359	0.903	0.301
2000 percent urban	0.234	-3.520	9.070	0.055
2000 percent rural	-0.234	5.550	-9.070	0.055
1999-00 Senate Appropriations	0.225	1.675	2.474	0.051
1999-00 Senate Env. Pub. Works	0.088	2.649	1.088	0.008
1999-00 House CTI	0.075	2.591	0.300	0.006
2000 total population	0.050	2.766	4.844	0.003
2000 FTA operations expenditures (per capita)	-0.055	2.783	-0.071	0.003
1999-00 House Appropriations	-0.042	3.247	-0.179	0.002
1999-00 Senate Banking	0.028	2.894	0.343	0.001
2000 unlinked passenger trips	-0.007	3.047	-8.711	0.000
2000 FTA total expenditures (per capita)	-0.013	3.059	-0.001	0.000
2000 FTA capital expenditures (per capita)	-0.018	3.065	-0.002	0.000

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

The operating assistance eligibility rule change had a marginal effect on many of the individual coefficients, and reduced the link between total dollar expenditures and trips. But the general pattern of relationships remained the same in 2000 as it had been in 1995. There were just more dollars (particularly on the capital side and in the form of project earmarks) involved.

Changes and summary of findings

The primary trends in the federal transit program over the period examined here were an increase in overall federal assistance, particularly in terms of capital aid, and a weakening connection between total expenditures and transit ridership. This is because of the reduction and then elimination of operating assistance to urban areas with populations greater than 200,000, precisely the places where most of the nation's transit riders live. Throughout this period, political variables were highly correlated with total dollars, and

weakly (and often negatively) correlated with those same dollars expressed on a per capita basis. In terms of earmarks, the political variables, particularly House committee representation, had high correlations with the total dollar earmarks.

But how did the patterns of expenditures themselves change? **Table 9-28** presents the results of the paired sample t-test for the total dollar expenditure variables. The results of the tests largely reflect the overall increase in federal transit spending. The most significant changes were in terms of capital expenditures between 1990 and 1995. This was not surprising as ISTEA led to a dramatic increase in capital assistance for public transit—and all states benefited from increased federal spending.

Table 9-28: Changes in the federal transit program (total dollars)

Paired samples t-tests of FTA expenditure variables (total dollars)

Variable 1	*Variable 2*	*Correlation*	*Correlation p-value*	*T-value*	*T-test p-value*
1990 FTA capital expenditures	1995 FTA capital expenditures	0.967	0.000	-3.016	0.004
1995 FTA capital expenditures	2000 FTA capital expenditures	0.876	0.000	-1.564	0.124
2000 FTA capital expenditures	1990 FTA capital expenditures	0.904	0.000	-2.765	0.008
1990 FTA operation expenditures	1995 FTA operation expenditures	0.954	0.000	1.668	0.102
1995 FTA operation expenditures	2000 FTA operation expenditures	0.752	0.000	-1.493	0.142
2000 FTA operation expenditures	1990 FTA operation expenditures	0.649	0.000	0.764	0.449
1990 FTA total expenditures	1995 FTA total expenditures	0.975	0.000	-2.779	0.008
1995 FTA total expenditures	2000 FTA total expenditures	0.875	0.000	-1.708	0.094
2000 FTA total expenditures	1990 FTA total expenditures	0.887	0.000	-2.632	0.011
FTA ISTEA special projects (totals)	FTA TEA-21 special projects (totals)	0.382	0.006	-1.213	0.231
1995 fixed guideway app earmarks	2000 fixed guideway app earmarks	0.810	0.000	-1.977	0.054

Table 9-29 presents the same data, but for per capita expenditure variables. The changes in expenditure patterns were not statistically significant, although the change in capital expenditures (per capita) between 1990 and 1995 and operating expenditures (per capita) between 1995 and 2000 come the closest to being statistically significant. Again, the principal factor behind these results is the overall increase in federal transit aid, and this increase is reflected in the per capita expenditures as well.

Table 9-29: Changes in the federal transit program (per capita)

Paired samples t-tests of FTA expenditure variables (per capita)

Variable 1	*Variable 2*	*Correlation*	*Correlation p-value*	*T-value*	*T-test p-value*
1990 FTA capital expenditures	1995 FTA capital expenditures	0.995	0.000	-1.802	0.078
1995 FTA capital expenditures	2000 FTA capital expenditures	0.990	0.000	0.737	0.464
2000 FTA capital expenditures	1990 FTA capital expenditures	0.994	0.000	-0.944	0.350
1990 FTA operation expenditures	1995 FTA operation expenditures	0.904	0.000	1.115	0.270
1995 FTA operation expenditures	2000 FTA operation expenditures	0.733	0.000	-1.867	0.068
2000 FTA operation expenditures	1990 FTA operation expenditures	0.813	0.000	0.457	0.650
1990 FTA total expenditures	1995 FTA total expenditures	0.996	0.000	-2.103	0.041
1995 FTA total expenditures	2000 FTA total expenditures	0.990	0.000	0.553	0.583
2000 FTA total expenditures	1990 FTA total expenditures	0.992	0.000	-0.387	0.701
FTA ISTEA special projects	FTA TEA-21 special projects (totals)	0.256	0.069	0.194	0.847
1995 fixed guideway app earmarks	2000 fixed guideway app earmarks	0.183	0.118	-1.579	0.121

When it came to the per capita transit expenditures, the variables examined in this research were rather weak in terms of their predictive power. Per capita expenditures were unrelated to just about anything, and were instead merely a mathematical product of the arithmetic. Politicians, for example, seemed much more interested in total dollars than in per capita dollars, or so the data would appear to indicate. To illustrate this further, consider the following multivariate regressions for total (per capita) expenditures shown below for 1990 and 1995 (**Table 9-30**), and 2000 (**Table 9-31**). Substituting the various factors made little difference in terms of the power of the models, and including all the key variables, as I did below, didn't boost the r square above .34 in any of the three cases. The only consistently significant variable between the models was a state's urban population share, which is positively correlated (although only moderately so) with all of the expenditure variables examined in the dissertation.

Table 9-30: Total federal transit expenditures (per capita), multiple regression

Dependent Variable: 1990 FTA expenditures (per capita)

	Model summary	
Model components	Coefficient	p-value
Constant	-64.812	0.222
1990 percent urban	219.458	0.005
1989-90 Senate Appropriations	-38.305	0.064
1990 unlinked passenger trips	7.043	0.070
1989-90 Senate Banking	-41.225	0.082
1989-90 Senate Env. Pub Works	-36.899	0.115
1990 total population	-3.313	0.454
1989-90 House Appropriations	-11.136	0.478
1989-90 House CTI	-14.623	0.568
R Squared	**0.306**	

Dependent Variable: 1995 FTA expenditures (per capita)

	Model summary	
Model components	Coefficient	p-value
Constant	-124.47	0.037
1990 percent urban	296.727	0.001
1993-94 Senate Banking	-48.848	0.073
1995 total population	-1.217	0.079
1993-94 House CTI	24.644	0.137
1993-94 Senate Appropriations	-30.768	0.168
1993-94 Senate Env. Pub. Works	-35.564	0.182
1995 unlinked passenger trips	5.686	0.193
1993-94 House Appropriations	11.674	0.513
R Squared	**0.334**	

Table 9-31: Total federal transit expenditures (per capita), multiple regression

Dependent Variable: 2000 FTA expenditures (per capita)

	Model summary	
Model components	Coefficient	p-value
Constant	-100.933	0.020
2000 percent urban	207.671	0.001
2000 total population	-6.153	0.160
1999-00 Senate Banking	-20.507	0.211
1999-00 Senate Env. Pub. Works	-20.145	0.239
2000 unlinked passenger trips	2.480	0.273
1999-00 Senate Appropriations	-13.358	0.362
1999-00 House CTI	7.052	0.479
1999-00 House Appropriations	10.352	0.483
R Squared	**0.287**	

A brief cross-modal investigation

As an aside to the expenditure analysis, I briefly compared a handful of expenditures between highways and transit. One interesting issue to consider is whether there is any difference in the expenditure patterns among the states between the two modes. Perhaps some states benefit more from higher federal transit aid expenditures and others from higher federal highway aid expenditures? Perhaps some states receive higher transit earmarks and others higher highway earmarks?

The investigation is by no means a detailed one, but it does allow us to start thinking about expenditure relationships between the two modal programs. In this case, I focus on per capita total expenditures and both total dollar and per capita authorizing earmark expenditures. The investigation consists of two tables reporting a handful of correlation coefficients.

Table 9-32 reports correlation coefficients between total transit expenditures (per capita) and a couple of key highway-related variables for 1990, 1995, and 2000. The table shows a positive (but declining) correlation between total transit expenditures (per capita) and both trust fund rate of return and FHWA expenditures (per capita). There is a positive relationship between states' per capita federal aid expenditures in the two programs.

Table 9-32: Total expenditures, cross-modal correlation

Correlation: 1990 FTA total expenditures (per capita)

Variable	*Correlation*	*p-value*
1990 highway trust fund rate of return	0.414	0.003
1990 FHWA expenditures (per capita)	0.162	0.257
1990 FHWA appropriations earmarks (per capita)	-0.076	0.598

Correlation: 1995 FTA total expenditures (per capita)

Variable	*Correlation*	*p-value*
1995 highway trust fund rate of return	0.480	0.000
1995 FHWA expenditures (per capita)	0.099	0.490
ISTEA highway earmarks (per capita)	0.004	0.977

Correlation: 2000 FTA total expenditures (per capita)

Variable	*Correlation*	*p-value*
2000 highway trust fund rate of return	0.354	0.011
2000 FHWA appropriations earmarks (per capita)	0.347	0.013
TEA-21 highway earmarks (per capita)	-0.122	0.393
2000 FHWA expenditures (per capita)	0.091	0.526

Table 9-33 looks at the authorization earmarks contained in ISTEA and TEA-21. The cross-modal correlations are weak in every case but one. Total dollar TEA-21 highway and transit earmarks are highly and positively correlated. The states that received large amounts (in dollar terms) of highway earmarks in TEA-21 also received large amounts (in dollar terms) of transit earmarks. The same states were earmark winners in both programs.

Table 9-33: Authorization earmarks, cross modal correlations

Correlation: FHWA ISTEA earmarks (total dollars)

Variable	*Correlation*	*p-value*
FTA ISTEA earmarks (total dollars)	-0.006	0.966
FTA ISTEA earmarks (per capita)	-0.119	0.404

Correlation: FHWA ISTEA earmarks (per capita)

Variable	*Correlation*	*p-value*
FTA ISTEA earmarks (total dollars)	-0.238	0.092
FTA ISTEA earmarks (per capita)	-0.167	0.242

Correlation: FHWA TEA-21 earmarks (total dollars)

Variable	*Correlation*	*p-value*
FTA TEA-21 earmarks (total dollars)	0.693	0.000
FTA TEA-21 earmarks (per capita)	0.020	0.890

Correlation: FHWA TEA-21 earmarks (per capita)

Variable	*Correlation*	*p-value*
FTA TEA-21 earmarks (total dollars)	-0.226	0.111
FTA TEA-21 earmarks (per capita)	-0.226	0.111

CHAPTER TEN. ANALYSIS OF THE DONOR STATE ISSUE

One of the most contentious debates in all of surface transportation policy is the battle between donor and donee states. States that pay more user tax revenue into the highway account of the highway trust fund than they receive in federal highway aid (derived from the highway trust fund) are called donor states, and those that receive more aid than they pay into the fund are called donee or recipient states. The conflict between these two groups dates back a very long time, but became a central feature of the policy landscape in the 1970s. Political pressure led to passage of the first minimum guaranteed return provisions (85 percent minimum return) in 1982. The minimum guaranteed return was increased to 90 percent in ISTEA (1991), and to 90.5 percent in TEA-21 (1998). The conflict between donors and donees was particularly intense prior to passage of TEA-21, with many donor state representatives claiming that the promised minimum returns had not materialized. Many states received less than their minimum return, because many categories of funding had been excluded from the calculation. These issues were to have been remedied in TEA-21.

The donor state issue convinced me to undertake this exercise, and I developed a number of hypotheses about a state's donor/donee status, as noted above. For example, I suspect rural states and those that are represented on the key policy committees tend to be donees. I also suspect urban states, larger population states, and those with more highway system usage (vmt) tend to be donors. I hypothesize that ISTEA and TEA-21 changed

few, if any, of these relationships. I suspect past status is one of the strongest predictor of current status. I examine these relationships in the pages that follow.

The donor state issue in 1990

Prior to passage of ISTEA, states were supposed to receive roughly 85 percent of their highway user tax contributions to the highway account of the highway trust fund back in the form of federal highway aid. But many states received far less than the 85-percent minimum return, and many of these states were concentrated in the south and midwest (see **Map 10-1**).[110] The biggest net winners were in the northeast, mountain west, and the very far west (Alaska and Hawaii). The biggest loser in 1990 was Florida, whose trust fund return was a paltry 60 percent, and the biggest winner was Hawaii, whose trust fund return was a staggering 740 percent. The median state was Utah, whose return on trust fund contributions was 98 percent.

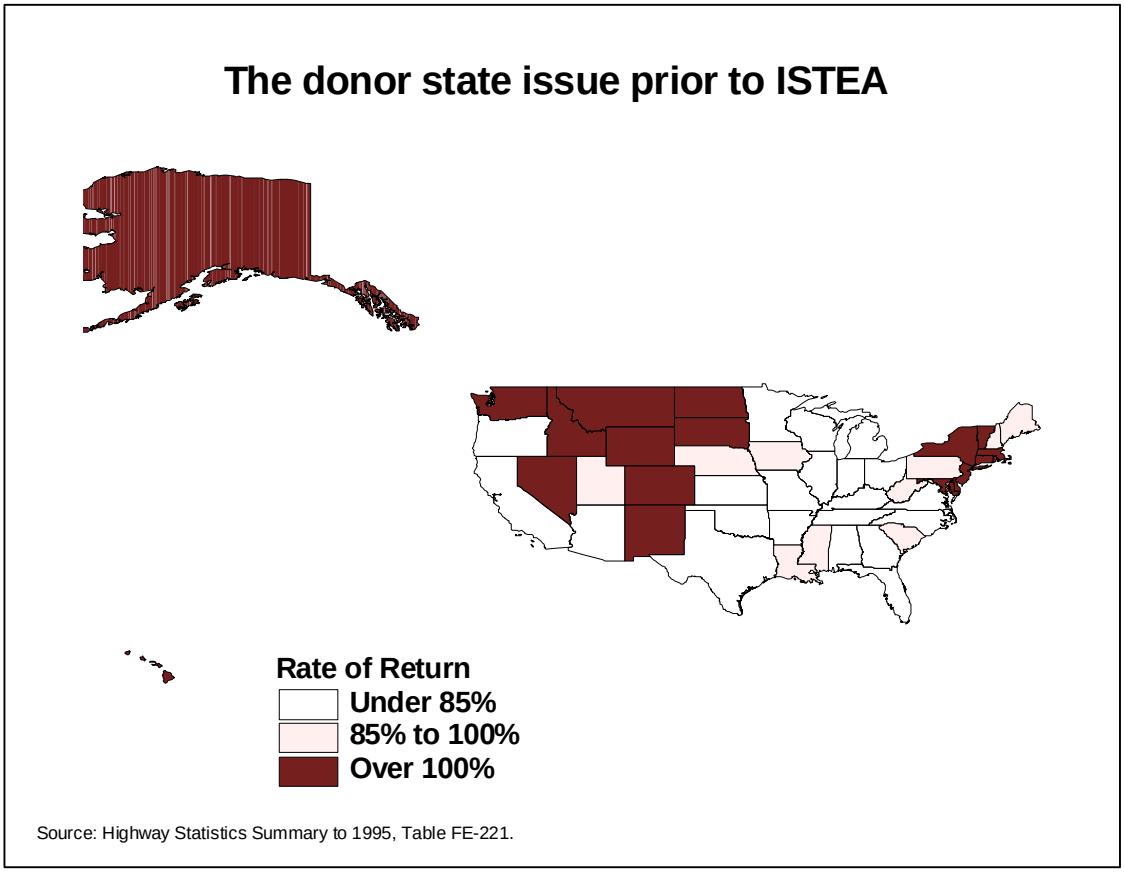
But what factors could have accounted for these patterns? I decided to examine the correlations between a state's 1990 highway trust fund (HTF) rate of return (the ratio between federal highway dollars and highway trust fund tax payments) and a number of political, population, transportation system, revenue, and expenditure variables. The results of the correlation analysis are presented in **Table 10-1**.[111] The variables are ordered from lowest p-value to highest, and then from highest (absolute value)

[110] It was possible for states to receive less than an 85-percent return because the minimum guaranteed return rules exempted many program categories. The data sources for this chapter are listed in the highway variables table in chapter seven.

[111] In the tables used in this chapter, the highway trust fund rate of return is expressed in decimal form (ex. 90 percent return is 0.90). The "percent urban" and "percent rural" variables are also expressed in decimal form.

correlation coefficient to lowest. Although no variables have a strong correlation (absolute value of r greater than 0.7) with a state's 1990 HTF rate of return, a number have moderate correlations.

Map 10-1: The donor state issue prior to ISTEA (1990)



As I expected, a state's 1990 HTF rate of return was negatively correlated with measures of transportation system use and extent. States with high per capita expenditures and those with low per capita user tax payments tended to have higher rates of return. Interestingly, 1990 HTF rate of return was positively (weakly) correlated with a

state's urban population share, as opposed to its rural share, but it was negatively correlated with total population. There were very weak correlations between the rate of return and the political variables, and the relationships were mainly negative.

Table 10-1: 1990 HTF rate of return, correlation

Correlation: 1990 HTF rate of return

Variable	*Correlation*	*p-value*
1990 FHWA expenditures (per capita)	0.572	0.000
FTA ISTEA earmarks (per capita)	0.557	0.000
1990 federal aid highway lane miles	-0.487	0.000
1990 federal aid highway centerline miles	-0.460	0.001
1990 vehicle miles of travel (per capita)	-0.468	0.001
1990 FTA operation expenditures (per capita)	0.419	0.002
1990 FTA total expenditures (per capita)	0.414	0.003
1990 FTA capital expenditures (per capita)	0.413	0.003
1990 highway user tax revenue (per capita)	-0.347	0.013
1990 highway user tax revenue (total dollars)	-0.331	0.018
1989-90 House CTI	-0.311	0.026
1990 vehicle miles of travel (total)	-0.301	0.032
1991-92 House Appropriations	-0.299	0.033
1991-92 House CTI	-0.289	0.039
1990 census percent urban	0.286	0.042
1990 census percent rural	-0.286	0.042
1990 population	-0.267	0.058
FTA ISTEA earmarks	0.242	0.087
1990 FHWA expenditures (total dollars)	-0.211	0.137
1989-90 House Appropriations	-0.204	0.151
1990 FHWA appropriations earmarks (total dollars)	-0.192	0.178
1990 FHWA appropriations earmarks (per capita)	-0.180	0.206
1991-92 Senate Banking	-0.167	0.242
1989-90 Senate Banking	-0.163	0.253
1990 FTA capital expenditures	0.065	0.651
1990 FTA total expenditures	0.047	0.744
1991-92 Senate Env. Pub Works	-0.036	0.804
1990 FTA operations expenditures	-0.028	0.844
1989-90 Senate Env. And Pub Works	-0.023	0.875
1991-92 Senate Appropriations	-0.017	0.906
1990 unlinked passenger trips	-0.012	0.931
1989-90 Senate Appropriations	0.001	0.997

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

I then conducted a series of simple linear regression analyses involving the rates of return, the results of which are reported in **Table 10-2**. It should be noted that the highest r-square values were obtained for the highway use, highway system extent, and per capita revenue and expenditure data, although none of the r squares exceeded 0.33. Each row in the table refers to a unique simple linear regression equation.

Table 10-2: 1990 HTF rate of return, regression

Dependent Variable: 1990 HTF Rate of Return

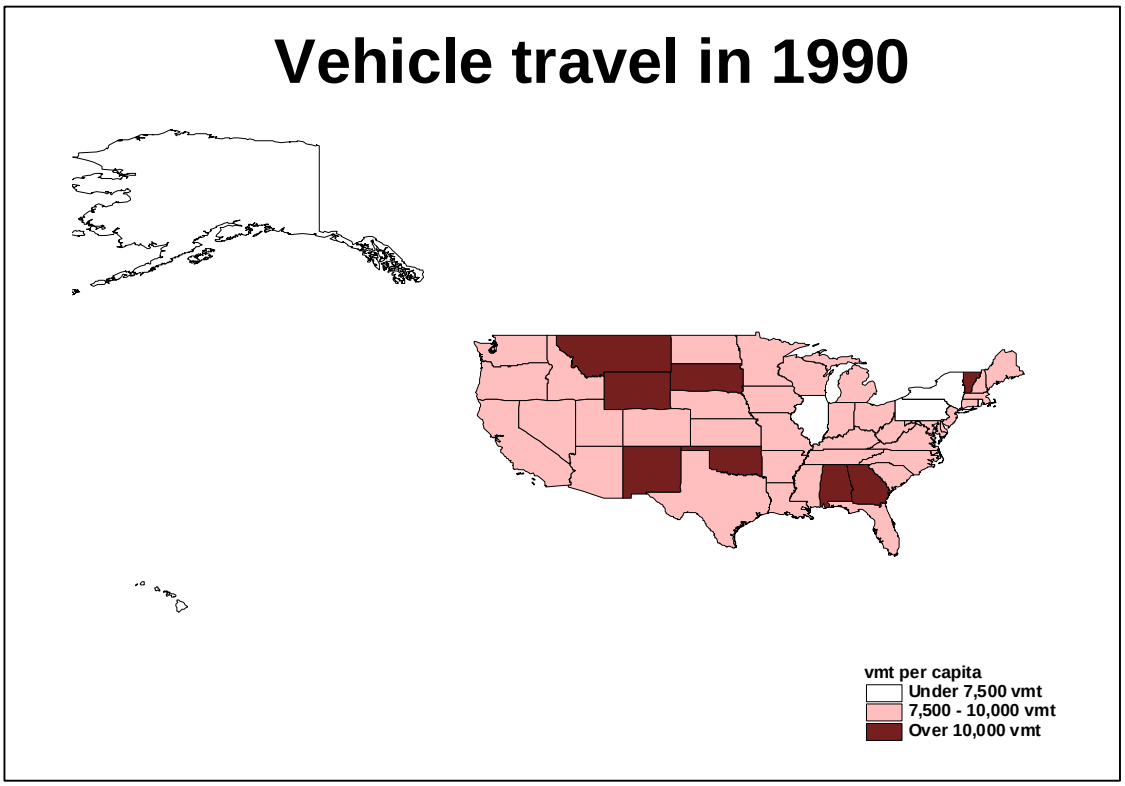
Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 FHWA expenditures (per capita)	0.572	0.311	0.017	0.327
1990 federal aid highway lane miles	-0.487	2.528	-6.061	0.237
1990 vehicle miles of travel (per capita)	-0.468	6.015	-0.001	0.219
1990 federal aid highway centerline miles	-0.460	2.453	-5.273	0.212
1990 FTA total expenditures (per capita)	0.414	1.441	0.007	0.171
1990 highway user tax revenue (per capita)	-0.347	3.313	-0.029	0.120
1990 highway user tax revenue (total dollars)	-0.331	2.014	-1.632	0.110
1989-90 House CTI	-0.311	1.897	-0.339	0.097
1990 vehicle miles of travel (total)	-0.301	1.949	-8.982	0.091
1990 census percent urban	0.286	-0.167	2.527	0.082
1990 census percent rural	-0.286	2.360	-2.527	0.082
1990 population	-0.267	1.893	-6.561	0.071
1990 FHWA expenditures (total dollars)	-0.211	1.873	-1.114	0.045
1989-90 House Appropriations	-0.204	1.815	-0.217	0.042
1989-90 Senate Banking	-0.163	1.740	-0.408	0.027
1990 FTA total expenditures	0.047	1.540	4.860	0.002
1989-90 Senate Env. And Pub Works	-0.023	1.591	-0.066	0.001
1990 unlinked passenger trips	-0.012	1.578	-4.391	0.000
1989-90 Senate Appropriations	0.001	1.571	0.001	0.000

Notes: each row refers to a separate simple linear regression equation.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)
Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

For every $1 increase in its 1990 FHWA expenditure (per capita), a state's 1990 HTF rate of return increases by 1.7 percentage points (r square = 0.327). For every 100 vehicle miles of travel (VMT) increase in 1990 vmt (per capita), the state's 1990 HTF

rate of return falls by 5 percentage points (r square = 0.219) (**see Map 10- 2**).[112] Neither the political nor population variables figure very strongly as factors (r squares under 0.10. For every additional member a state has on the 1989-90 House Committee on Transportation and Infrastructure, it falls 33.9 percentage points in its 1990 HTF rate of return (r square = 0.097) (see **Map 10-3**).

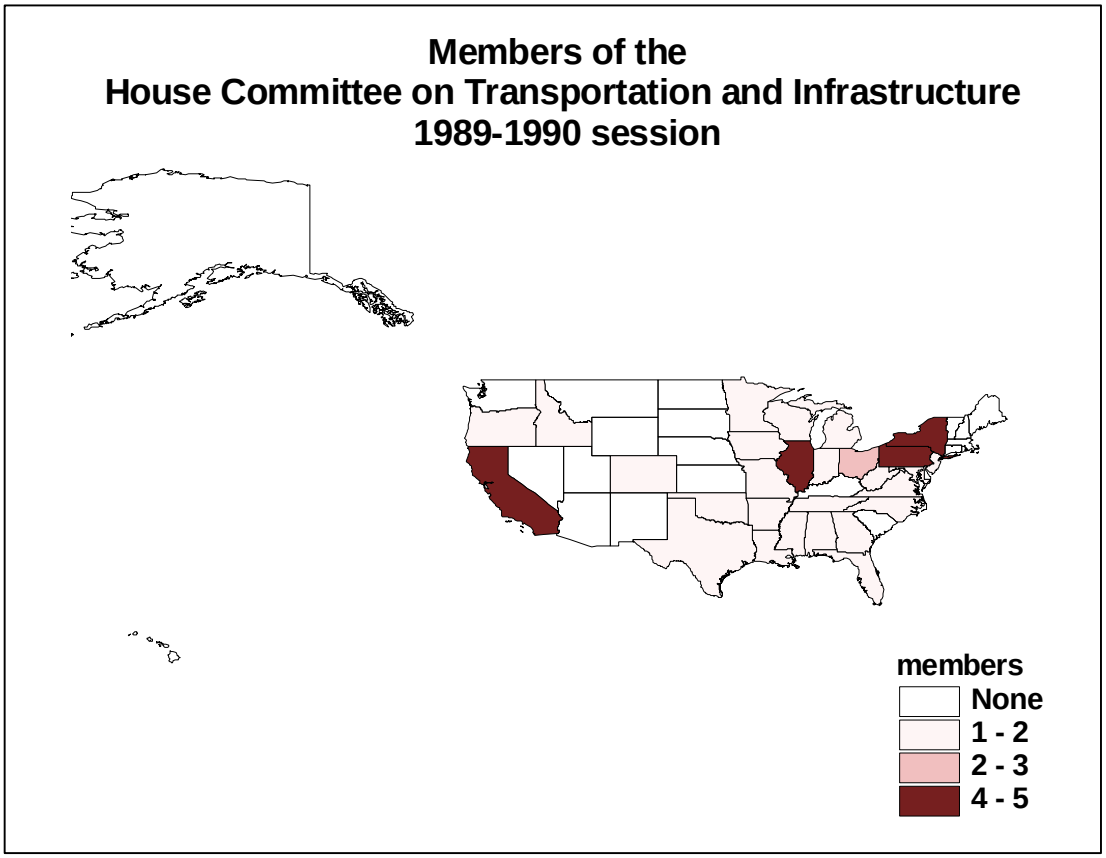
Map 10-2: 1990 vehicle miles of travel (per capita)



Source: Highway Statistics 1991, Table VM-3.

[112] The 1990 US average was 8,591 vmt per capita. The high was 12,857 vmt per capita in Wyoming, and the low was 5,628 vmt per capita in the District of Columbia (Highway Statistics 1991, Table VM-3).

Map 10-3: Members of the House CTI, 1989-90 session



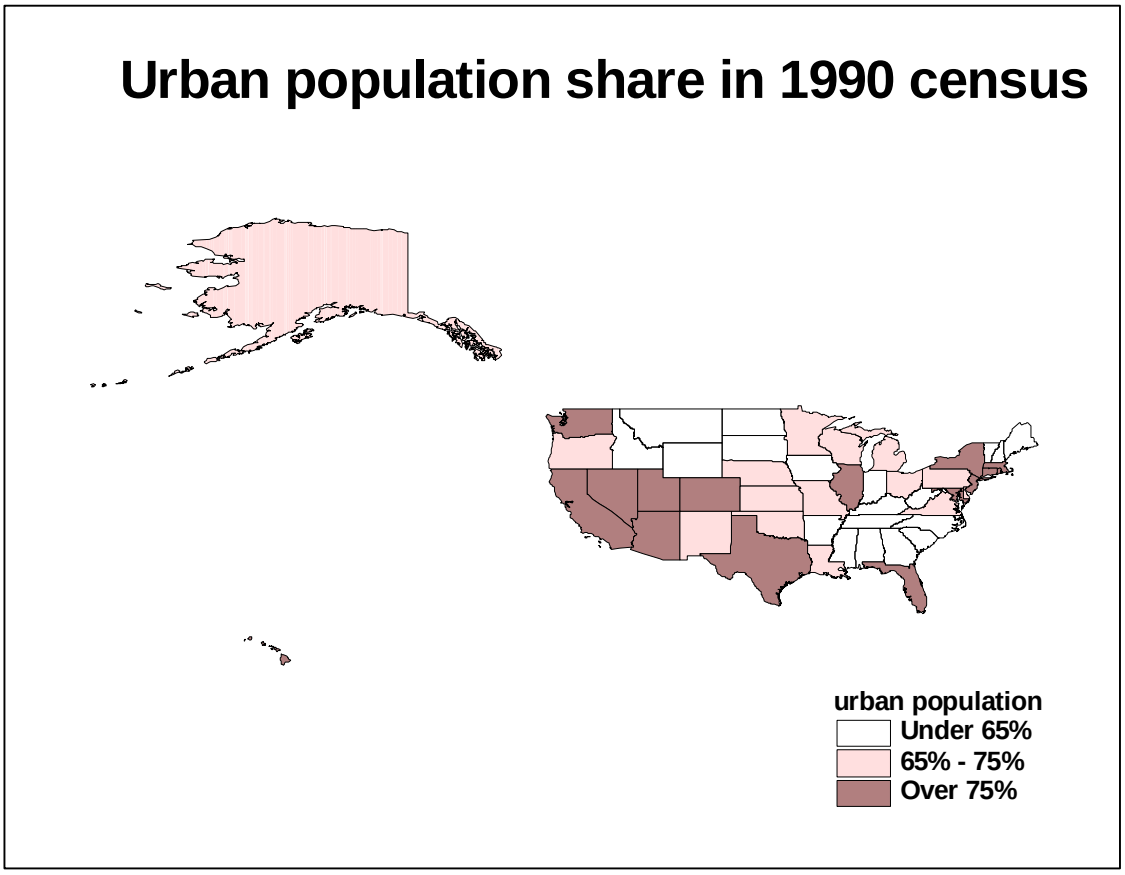
Source: Congressional Directory.

For every one- percentage point increase in a state's 1990 rural population share, its 1990 HTF rate of return actually falls 2.5 percentage points (r square = 0.082) (see **Map 10-4**).[113] Highway use and extent variables were much more strongly associated,

[113] The share of the US population classified as urban in 1990 was 75 percent. The highest urban population share was the District of Columbia (100%) and the lowest was Vermont (32%) (US Census Bureau).

albeit negatively, with a state's HTF rates of return than were the political variables or the urban versus rural status variables.

Map 10-4: 1990 urban population share



Source: US Census Bureau website.

But what happens when we shift the analysis from rates of return to net highway return dollars (both total and per capita)? In 1990, the states that received less than they contributed had a total net loss of about $901 million (7 percent of 1990 highway account payments), while the states that received more than they paid had a total net gain of $2.6

billion (20 percent of 1990 highway account payments).[114] The biggest loser was Florida, with a net loss of $246 million, while the biggest winner was Massachusetts, with a net gain of $660 million.

Table 10-3 shows that a state's net HTF return (total dollars) was negatively correlated with its highway system extent and use, total population, and three of the five political variables. It was also negatively correlated with a state's 1990 FTA total expenditures. Thus, money was leaving states with large populations, large amounts of vehicle travel, and extensive highway systems. In short, money was leaving states that might have larger highway needs and thus need more money. But a state's net HTF return (total dollars) was positively correlated with its urban population share, 1990 total FHWA expenditures (total dollars), and two of the political variables. In short, money was heading toward more urbanized states. But most of the correlation coefficients were rather weak.

[114] The total net loss and total net gain do not sum to zero in any of the years analyzed here, because payments out of the HTF often exceed payments into the fund in any give year. And there has been a tendency in recent years especially to spend more money in an effort to reduce the accumulated balance in the HTF (FHWA 1999b).

Table 10-3: 1990 net HTF return (total dollars), correlation

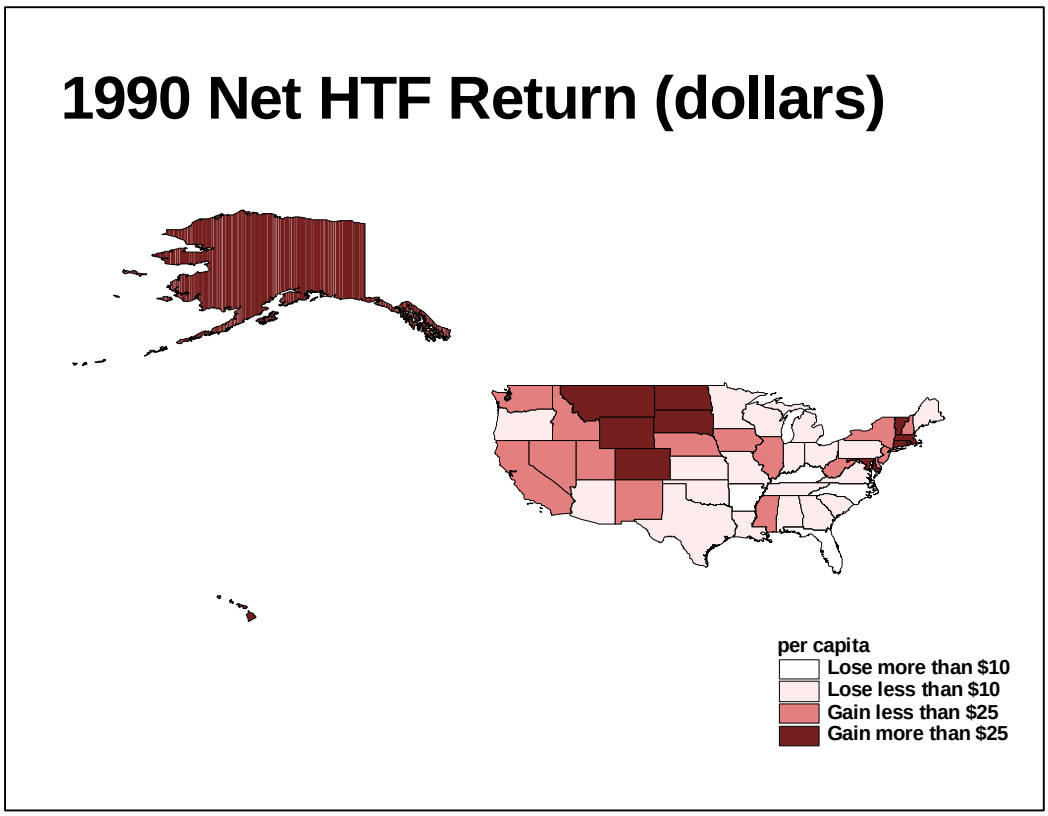
Correlation: 1990 net HTF return (total dollars)

Variable	*Correlation*	*p-value*
1990 federal aid highway lane miles	-0.335	0.016
1990 census percent urban	0.292	0.038
1990 census percent rural	-0.292	0.038
1990 federal aid highway centerline miles	-0.279	0.048
1989-90 Senate Banking	-0.196	0.169
1990 highway user tax revenue (total dollars)	-0.110	0.441
1990 FTA total expenditures (total dollars)	-0.109	0.445
1990 FHWA appropriations earmarks (total dollars)	-0.109	0.447
1989-90 House Appropriations	0.085	0.551
1989-90 House CTI	-0.083	0.565
1990 vehicle miles of travel (total)	-0.074	0.608
1990 FHWA expenditures (total dollars)	0.012	0.935
1990 population	-0.010	0.945
1989-90 Senate Appropriations	0.007	0.959
1989-90 Senate Env. And Pub Works	-0.003	0.981

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

As a group, the states with net losses saw $7.24 in highway money for each of their residents sent to other states. As a group, the states with net gains received $22.99 for each of their residents. The biggest per capita winner in the redistribution sweepstakes was Alaska (gained $248.05), while the biggest per capita loser was North Carolina (lost $19.01). **Map 10-5** shows the spatial pattern of net HTF return (dollars). Alaska, Hawaii, and the upper mountains and plains states were the biggest per capita net recipients, a couple of large population states (California, New York) were modest per capita net recipients, and many states in the south were among the net losers.



Map 10-5: 1990 Net HTF return (dollars per capita)

Despite the presence of New York and California among the net recipients in 1990, I hypothesized that money is being taken from larger population states and more needy states (defined in terms of system use and extent) and distributed to lower population states and less needy states. I also hypothesized that political representation is positively associated with a state's net HTF return per capita, especially representation on the highway program authorizing committees (House CTI and Senate EPW). **Table 10-4** presents the results of the regression analysis.

Table 10-4: 1990 Net HTF return (dollars per capita), regression

Dependent variable: 1990 net HTF return (dollars per capita)

Variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 FHWA expenditures (per capita)	0.738	-38.186	0.823	0.545
1990 federal aid highway lane miles	-0.502	62.533	0.000	0.252
1990 federal aid highway centerline miles	-0.480	59.980	-0.002	0.230
1989-90 House CTI	-0.356	38.855	-14.936	0.127
1990 vehicle miles of travel (per capita)	-0.342	149.818	-0.014	0.117
1990 population	-0.315	39.066	-2.975	0.099
1990 FTA total expenditures (per capita)	0.293	20.944	0.195	0.086
1989-90 House Appropriations	-0.269	36.828	-11.026	0.072
1989-90 Senate Banking	-0.198	-32.364	-19.087	0.039
1990 FHWA appropriations earmarks (per capita)	-0.198	29.294	-9.611	0.039
1990 census percent urban	0.176	-16.642	59.800	0.031
1990 census percent rural	-0.176	43.158	-59.800	0.031
1990 highway user tax revenue (per capita)	-0.166	56.546	-0.529	0.028
1989-90 Senate Env. And Pub Works	0.060	22.512	6.773	0.004
1989-90 Senate Appropriations	-0.004	24.715	-0.370	0.000

Notes: each row refers to a separate simple linear regression equation.
Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)
Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Most of the relationships had negative coefficients, with the exception of total FHWA expenditures (per capita) (the strongest correlation, 0.738), total FTA expenditures (per capita) (0.293), and Senate EPW representation (the Senate authorizing committee, 0.060). The equations show that states with larger populations, more extensive highway systems, and more vehicle travel—the places one might assume had the greatest “needs”—tended to be among the donor states. For every 10,000 lane mile increase in a state’s highway lane miles, its net HTF return (per capita) was lower by $2.40 (r square = 0.252). For each 1,000 mile increase in a state’s highway centerline miles, its net HTF return (per capita) was lower by $2.10 (r square = 0.230). And, for every 100 vmt increase in per capita vmt, its net HTF return (per capita) was lower by $1.40 (r square = 0.117).

The data also show that political representation on the key committees is usually associated with a decline in net HTF return dollars (per capita). For example, for every additional member of the House Committee on Transportation and Infrastructure, a state's net HTF return (per capita) was lower by $14.94 (r square = 0.127). The lone exception is membership on the Senate Environment and Public Works Committee, the Senate authorizing committee. For every additional member of that committee, a state's net HTF return (per capita) was higher by $6.77 (but the r square is a miniscule 0.004). The lesson from the table is that more urbanized states and those with lower values on the highway needs variables (use and extent) were winners in the redistribution game in 1990. Of course, ISTEA was adopted shortly thereafter. Did much change as a result of ISTEA?

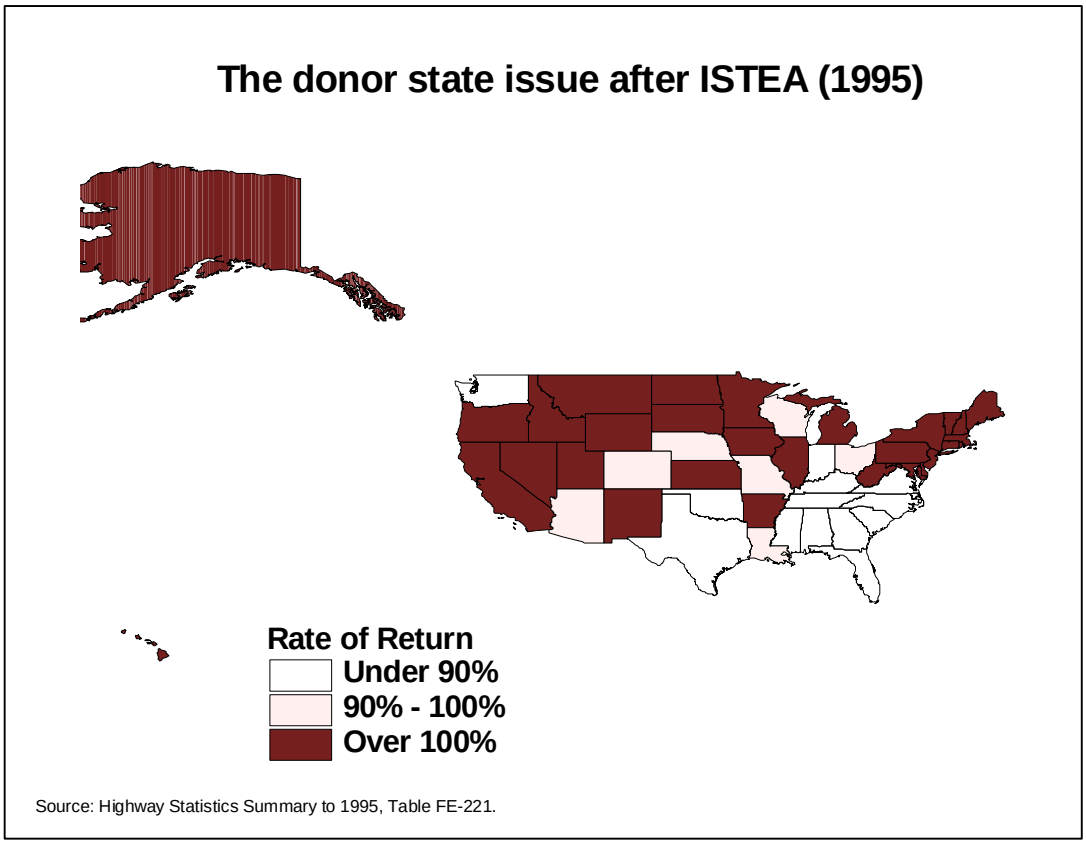
The donor state issue in 1995

The passage of ISTEA in 1991 brought many changes to the highway program. These changes included an increase in the minimum guaranteed return to 90 percent (although the donor states had sought 95 percent), revision of a handful of apportionment formulas (as noted in chapter 4), and a virtual explosion in the use of congressional project earmarks. Despite these changes, by 1995 many states still fell short of the minimum guaranteed return of 90 percent, because of loopholes in the guaranteed return rules.[115] These donor states were again concentrated in the southern and midwestern parts of the country (see **Map 10-6**). The 1995 HTF return rates ranged from a high of 640

[115] Many highway programs were still excluded from the minimum guarantee calculation. In one glaring example of a loophole, demonstration project earmarks were not included in the factors (ISTEA 1991).

percent in Alaska to a low of 56 percent in South Carolina. The median state was Nevada, with a 106 percent return rate.

As in the case of the 1990 HTF return rates, I examined the array of system use, extent, revenues, expenditure, political representation, and population variables for correlations with the 1995 HTF return rates (see **Table 10-5**). The strongest correlations were again with expenditures (positive), system use (negative), and system extent (negative). As in 1990, there was a very weak negative correlation with a state's rural population share. But population was again negatively correlated. The political variables had weak, generally negative correlations with a state's 1995 highway trust fund rate of return. But the strongest correlation of all, which is reported in a table at the close of the section, was between a state's 1995 HTF rate of return and its 1990 HTF rate of return (.832). Highway program net winners in 1990 were generally still net winners in 1995. The past was the best predictor of the present.



Map 10-6: The donor state issue after ISTEA (1995)

As with 1990, I conducted a series of simple linear regression analyses, the results of which are reported in **Table 10-6**. As noted before, the highest correlation, and consequently the highest r Square was obtained for a state's 1990 HTF rate of return. For every one-percentage point increase in the 1990 HTF rate of return, the 1995 HTF rate of return increased by 0.6 percentage points (r square = 0.692).

Table 10-5: 1995 HTF rate of return, correlation

Correlation: 1995 highway trust fund rate of return

Variable	*Correlation*	*p-value*
1995 FHWA expenditures (per capita)	0.820	0.000
1995 FTA total expenditures (per capita)	0.480	0.000
1995 FTA capital expenditures (per capita)	0.478	0.000
1995 FTA operation expenditures (per capita)	0.471	0.000
1995 federal aid highway lane miles	-0.443	0.001
1995 vehicle miles of travel (per capita)	-0.462	0.001
1995 federal aid highway centerline miles	-0.409	0.003
1995 highway user tax revenue (total)	-0.348	0.012
1995 vehicle miles of travel (total)	-0.325	0.020
1995-96 House Appropriations	-0.307	0.028
1993-94 House Appropriations	-0.304	0.030
1991-92 House Appropriations	-0.281	0.046
1995 population	-0.276	0.050
1995 FHWA authorization earmarks (total dollars)	-0.261	0.064
1995 highway user tax revenue (per capita)	-0.254	0.072
1991-92 House CTI	-0.230	0.104
1993-94 House CTI	-0.216	0.128
1993-94 Senate Banking	-0.190	0.183
1991-92 Senate Banking	-0.186	0.191
1995 FHWA expenditures (total dollars)	-0.174	0.223
1995-96 Senate Banking	-0.159	0.265
ISTEA highway earmarks (total dollars)	-0.150	0.294
1990 census percent urban	0.143	0.316
1990 census percent rural	-0.143	0.316
1995-96 House CTI	-0.132	0.357
1995 FTA capital expenditures	0.114	0.425
1995 fixed guideway authorization earmarks (per capita)	0.111	0.436
FTA ISTEA earmarks (per capita)	0.107	0.454
1993-94 Senate Appropriations	-0.106	0.459
1995 FTA operation expenditures	0.101	0.480
1995 fixed guideway appropriation earmarks	0.100	0.486
1991-92 Senate Appropriations	-0.093	0.517
1995 fixed guideway appropriation earmarks (per capita)	-0.084	0.559
1995 FTA total expenditures	0.082	0.568
1995-96 Senate Env. Pub. Works	-0.072	0.616
1995-96 Senate Appropriations	-0.058	0.687
1995 FHWA authorization earmarks (per capita)	-0.054	0.705
1991-92 Senate Env. Pub Works	0.045	0.753
FTA ISTEA earmarks	-0.045	0.755
1995 fixed guideway authorization earmarks	-0.034	0.813
ISTEA highway earmarks (per capita)	0.030	0.835
1993-94 Senate Env. Pub Works	-0.009	0.951
1995 unlinked passenger trips	-0.009	0.951

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Table 10-6: 1995 HTF rate of return, regression

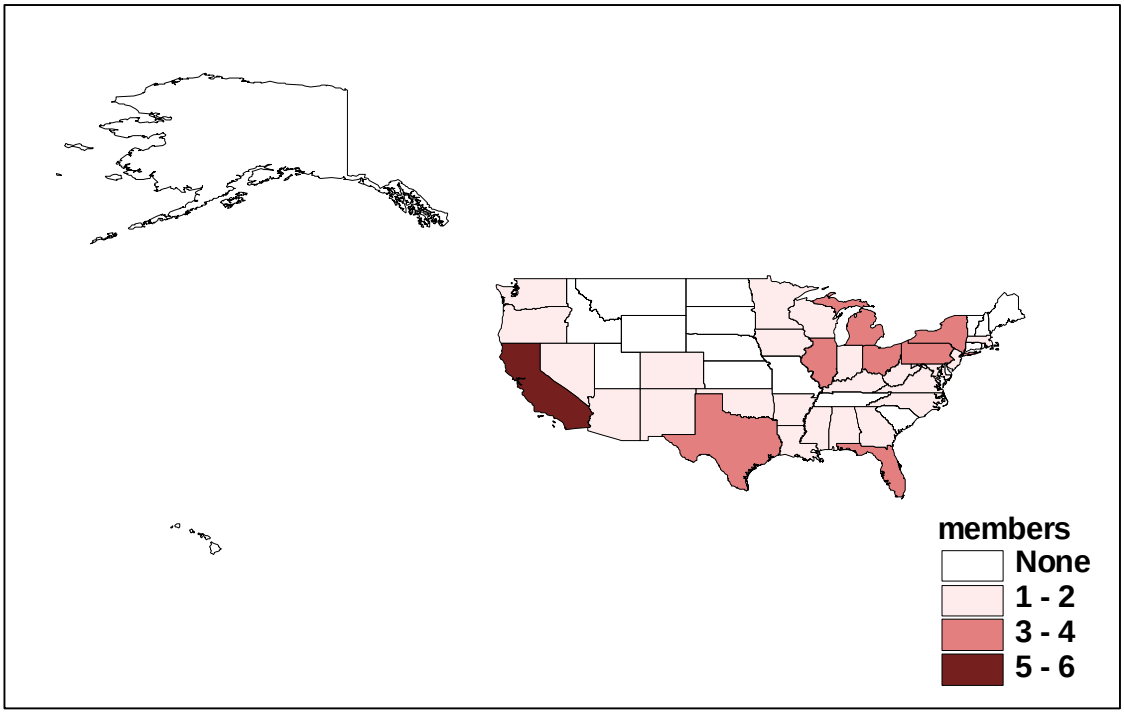
Dependent Variable: 1995 HTF Rate of Return

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1990 HTF rate of return	0.832	0.460	0.604	0.692
1995 FHWA expenditures (per capita)	0.820	0.175	0.013	0.673
1995 FTA total expenditures (per capita)	0.480	1.292	0.005	0.231
1995 vehicle miles of travel (per capita)	-0.462	4.073	-0.001	0.213
1995 federal aid highway lane miles	-0.443	2.039	-3.942	0.197
1995 federal aid highway centerline miles	-0.409	1.947	-2.883	0.167
1995 highway user tax revenue (total)	-0.348	1.754	-8.354	0.121
1995 vehicle miles of travel (total)	-0.325	1.715	-6.423	0.106
1995-96 House Appropriations	-0.307	1.641	-0.211	0.094
1993-94 House Appropriations	-0.304	1.662	-0.214	0.092
1991-92 House Appropriations	-0.281	1.642	-0.201	0.079
1995 population	-0.276	1.652	-4.643	0.076
1991-92 House CTI	-0.230	1.594	-0.171	0.053
1993-94 House CTI	-0.216	1.574	-0.133	0.047
1993-94 Senate Banking	-0.190	1.550	-0.378	0.036
1991-92 Senate Banking	-0.186	1.543	-0.341	0.035
1995 FHWA expenditures (total dollars)	-0.174	1.604	-5.322	0.030
1995-96 Senate Banking	-0.159	1.513	-0.331	0.025
1990 census percent urban	0.143	0.777	0.919	0.021
1990 census percent rural	-0.143	1.696	-0.919	0.021
1995-96 House CTI	-0.132	1.506	-0.082	0.017
1993-94 Senate Appropriations	-0.105	1.518	-0.192	0.011
1991-92 Senate Appropriations	-0.093	1.505	-0.168	0.009
1995 FTA total expenditures	0.082	1.366	5.475	0.007
1995-96 Senate Env. Pub. Works	-0.072	1.456	-0.149	0.005
1995-96 Senate Appropriations	-0.058	1.463	-0.098	0.003
1991-92 Senate Env. Pub Works	0.045	1.380	0.094	0.002
1995 unlinked passenger trips	-0.009	1.413	-2.272	0.000
1993-94 Senate Env. Pub Works	-0.009	1.415	-0.018	0.000

Notes: each row refers to a separate simple linear regression equation.
The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)
Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

The second highest correlation, and second highest r square, was for 1995 FHWA expenditures per capita, which was not surprising given that the HTF rate of return measures the ratio of expenditures to user tax payments. For every $1 increase in 1995 FHWA expenditures per capita, the 1995 HTF rate of return was higher by 1.3 percentage points (r square = 0.673). Further down the table, for every additional member of the 1991-92 House Appropriations Committee (in place during the passage of ISTEA), a state was lower by 20 percentage points in its 1995 HTF rate of return (r square = 0.079) (see **Map 10-7**).

Map 10-7: Members of the House Appropriations Committee, 1991-92 session

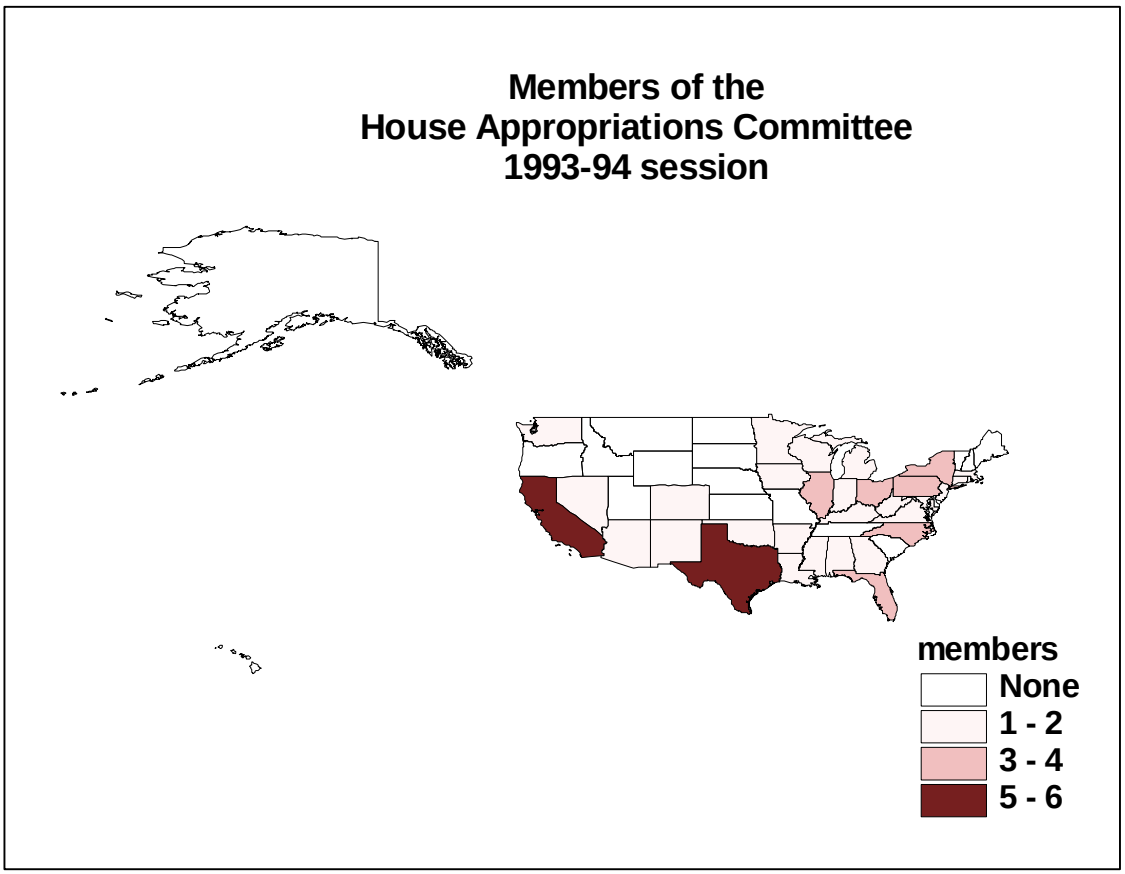


Source: Congressional Directory.

For every additional member of this same committee during the 1993-94 session (**see Map 10-8**) and during the 1995-96 session (see **Map 10-9**), it was lower by 21

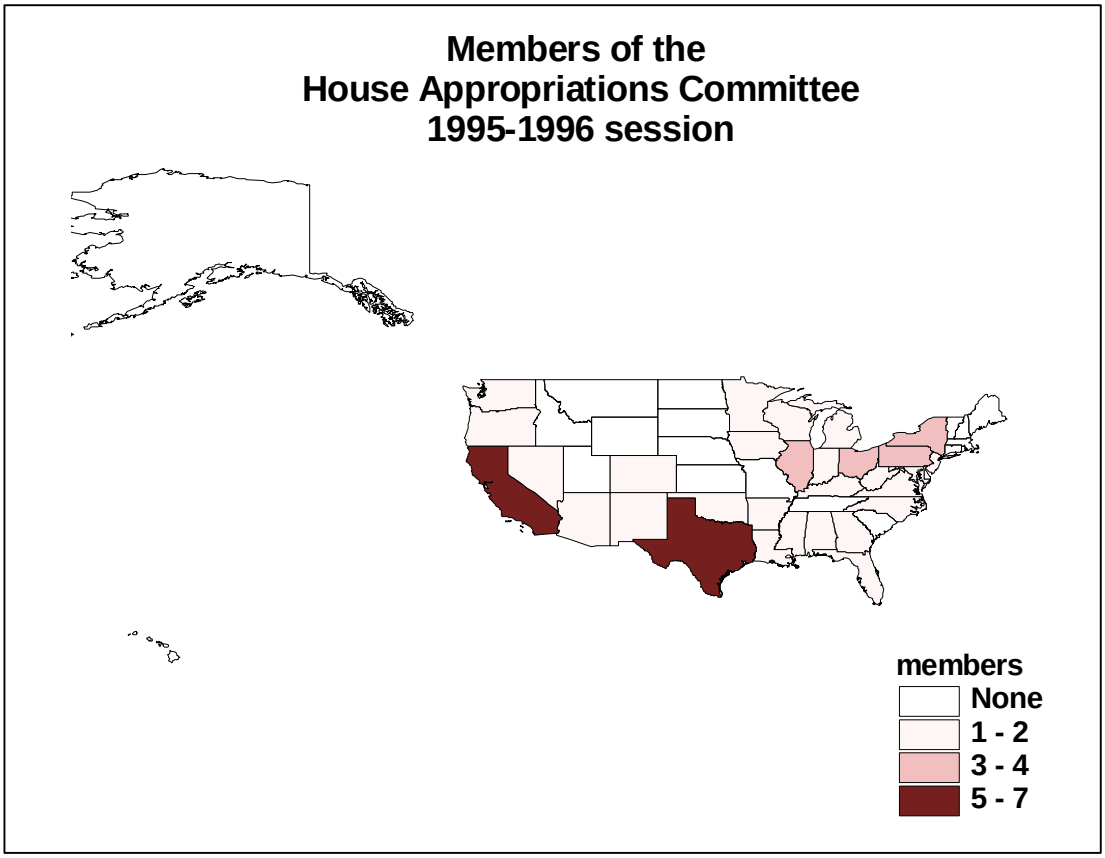
percentage points. And, much further down the table, for every percentage point increase in urban population share (measured by 1990 census breakdowns), a state gained .92 percentage points in its 1995 HTF rate of return (r square = 0.021). The equations using highway system extent, highway system use, and most expenditure variables had weak to moderate r squares. There were only modest changes in the variable relationships between 1990 and 1995. ISTEA didn't change very much in terms of this issue.

Map 10-8: Members of the House Appropriations Committee, 1993-94 session



Source: Congressional Directory.

Map 10-9: Members of the House Appropriations Committee, 1995-96 session



Source: Congressional Directory.

As in the case of 1990, I extended the investigation to focus on the dollars involved in redistribution. In 1995, the states that had net losses lost a total of $1.3 billion (6.8 percent of highway account payments), while the states that had net gains gained a total of $2.8 billion (14.9 percent). Although the dollar values involved were higher in 1995 than in 1990, the percentages were lower because highway trust fund receipts had increased. Among the states, Texas was the biggest net loser ($221 million), while Massachusetts, because of its massive Central Artery project apportionment, was the biggest net winner ($1.5 billion).

Table 10-7 presents the results of the correlation analysis for 1995. In general, relationships remained the same as in 1990 with a few notable exceptions. The signs for 1995 highway user tax revenue (total), total transit expenditure, total population, and Senate Environment and Public Works (EPW) had changed. In fact, the Senate EPW variable became more strongly correlated with net HTF return (total dollars). But, net HTF return (total dollars) remained negatively correlated with highway system use and extent measures.

Table 10-7: 1995 net HTF return (total dollars), correlation

Correlation: 1995 net HTF return (total dollars)

Variable	*Correlation*	*p-value*
1995 highway user tax revenue (total)	0.864	0.000
1995 FTA total expenditures	0.386	0.005
ISTEA highway earmarks (total dollars)	0.335	0.016
1995 federal aid highway lane miles	-0.335	0.016
1995 federal aid highway centerline miles	-0.304	0.030
1993-94 Senate Env. Pub Works	0.278	0.048
1990 census percent urban	0.213	0.133
1990 census percent rural	-0.213	0.133
1995 FHWA expenditures (total dollars)	0.211	0.136
1995-96 House CTI	0.196	0.169
1995-96 Senate Appropriations	-0.172	0.227
1993-94 House CTI	0.151	0.290
1991-92 Senate Env. Pub Works	0.144	0.314
1991-92 Senate Appropriations	-0.129	0.367
1991-92 House Appropriations	0.100	0.484
1993-94 Senate Appropriations	-0.092	0.519
1995 vehicle miles of travel (total)	-0.079	0.580
1991-92 House CTI	0.075	0.600
1995-96 House Appropriations	-0.070	0.627
1995 population	0.048	0.740
1993-94 House Appropriations	-0.041	0.774
1995-96 Senate Env. Pub. Works	0.040	0.779

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Map 10-10 shows the spatial pattern of net HTF return (per capita). On a per capita basis, the net losers lost $11.18 for each of their residents (up from 1990), while the net gainers gained $18.56 for each of their residents (down from 1990). The state with the largest net (per capita) loss was South Carolina ($41.20), while the state with the largest net (per capita) gain was Alaska ($332.71). The southern states tended to be among the biggest (per capita) donors.

Map 10-10: 1995 net HTF return (per capita)

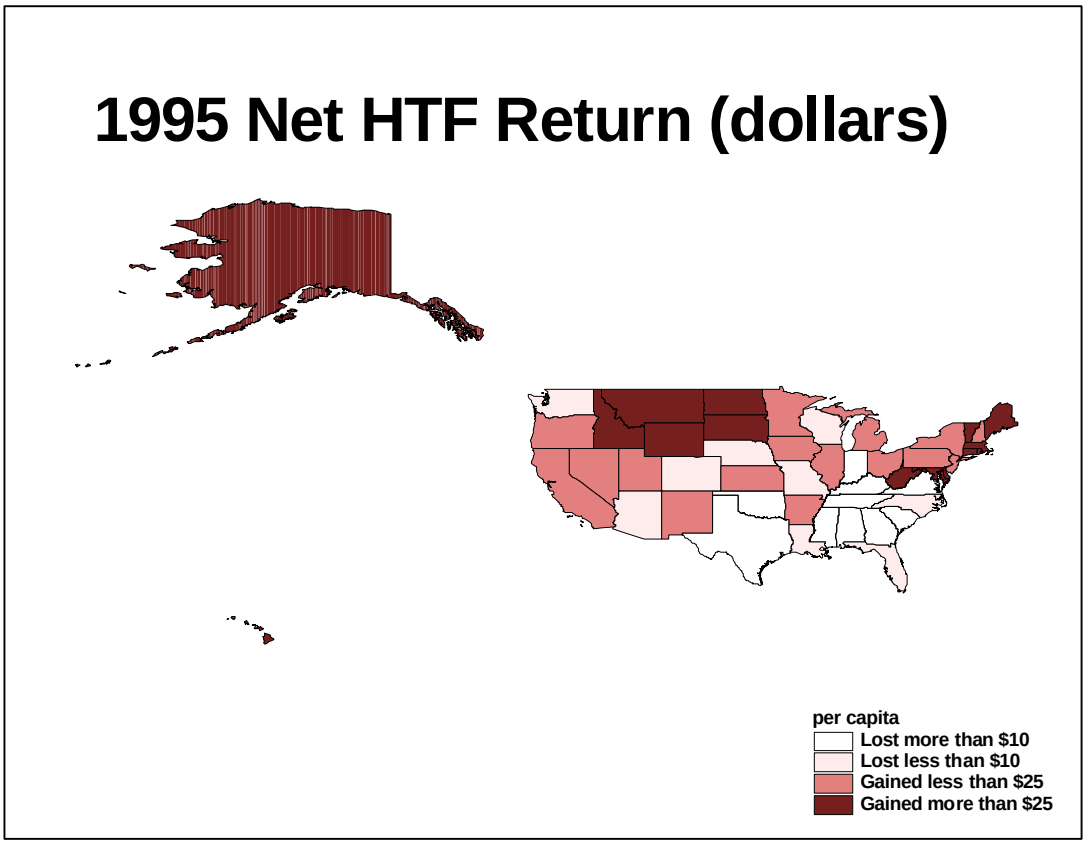


Table 10-8 reports the result of the regression analyses for 1995 net HTF return (dollars per capita). Compared with the 1990 correlation coefficients, the dependent variable and the FHWA expenditures per capita, vmt per capita, and House Appropriations variables were more highly correlated. The other variable coefficients had only modest changes. Again, there were negative relationships between 1995 net HTF return (dollars per capita) and the highway system use and extent variables. As before the net dollars (measured on a per capita basis) were negatively correlated with highway use, highway system extent, and population. But the lack of change was not that surprising, as the formulas themselves were not changed much by ISTEA. There were negative moderately strong relationships between HTF return dollars per capita and the House committee variables, which suggests that House committee representation is not as important an explanatory factor as I thought it was.

Table 10-8: 2000 net HTF return (dollars per capita)

Dependent variable: 1995 net HTF return (dollars per capita)

Variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1995 FHWA expenditures (per capita)	0.840	-42.501	0.682	0.706
1995 federal aid highway lane miles	-0.504	62.452	0.000	0.254
1995 federal aid highway centerline miles	-0.463	56.759	-0.002	0.214
1995 vehicle miles of travel (per capita)	-0.408	149.284	-0.013	0.166
1995-96 House Appropriations	-0.37	39.299	-13.473	0.137
1993-94 House Appropriations	-0.355	40.145	-13.295	0.126
1991-92 House CTI	-0.352	39.509	-13.914	0.124
1991-92 House Appropriations	-0.344	39.625	-13.070	0.118
1995 population	-0.321	39.462	-2.864	0.103
1995 FTA total expenditures (per capita)	0.306	20.543	0.182	0.094
1993-94 House CTI	-0.303	36.740	-9.904	0.092
1995-96 House CTI	-0.228	33.392	-7.555	0.052
1995 highway user tax revenue (per capita)	-0.197	60.534	-0.414	0.039
1990 census percent urban	0.176	-16.642	59.800	0.031
1990 census percent rural	-0.176	43.158	-59.800	0.031
1995-96 Senate Env. Pub. Works	-0.074	27.071	-8.182	0.005
1991-92 Senate Env. Pub Works	0.045	22.958	4.929	0.002
1993-94 Senate Env. Pub Works	-0.045	26.058	-4.953	0.002
1993-94 Senate Appropriations	-0.037	26.522	-3.547	0.001
1991-92 Senate Appropriations	-0.03	26.163	-2.917	0.001
1995-96 Senate Appropriations	0.023	23.368	2.017	0.001

Notes: each row refers to a separate simple linear regression equation.

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

The donor state issue in 2000

The passage of TEA-21 in 1998 was preceded by the most vigorous (to date) attempt by donor state representatives to get a "fairer" return on their highway user tax contributions. The enacted legislation called for a 90.5 percent guaranteed minimum, which doesn't sound like much of an improvement over ISTEA's 90 percent—until one realizes that it extends over almost the entire highway program. At the same time, many apportionment formulas were changed to include factors more closely related to population and transportation system use. These developments raised the possibility of real changes in the rates of return of the various states—although many (in the same parts of the country as before) continued to fall below the 90.5 percent level (see **Map 10-11**). The ranges, however, were smaller than in 1990. The highest rate of return was Alaska (574 percent), while the lowest was Arizona (85 percent).

The strongest correlations were between 2000 HTF rate of return and the per capita expenditure variables, which was not surprising as expenditures are part of the rate of return calculation (see **Table 10-9**). The highway system use variables tended to have moderate (negative) correlations, and most political variables had weak (negative) correlations. The 2000 percent rural and 2000 percent urban variables had very weak correlations (although the signs were reversed from prior years). There were very few changes in the general relationships between the HTF rate of return variable and the other variables, compared to the prior year relationships.

Map 10-11: The donor state issue after TEA-21 (2000)

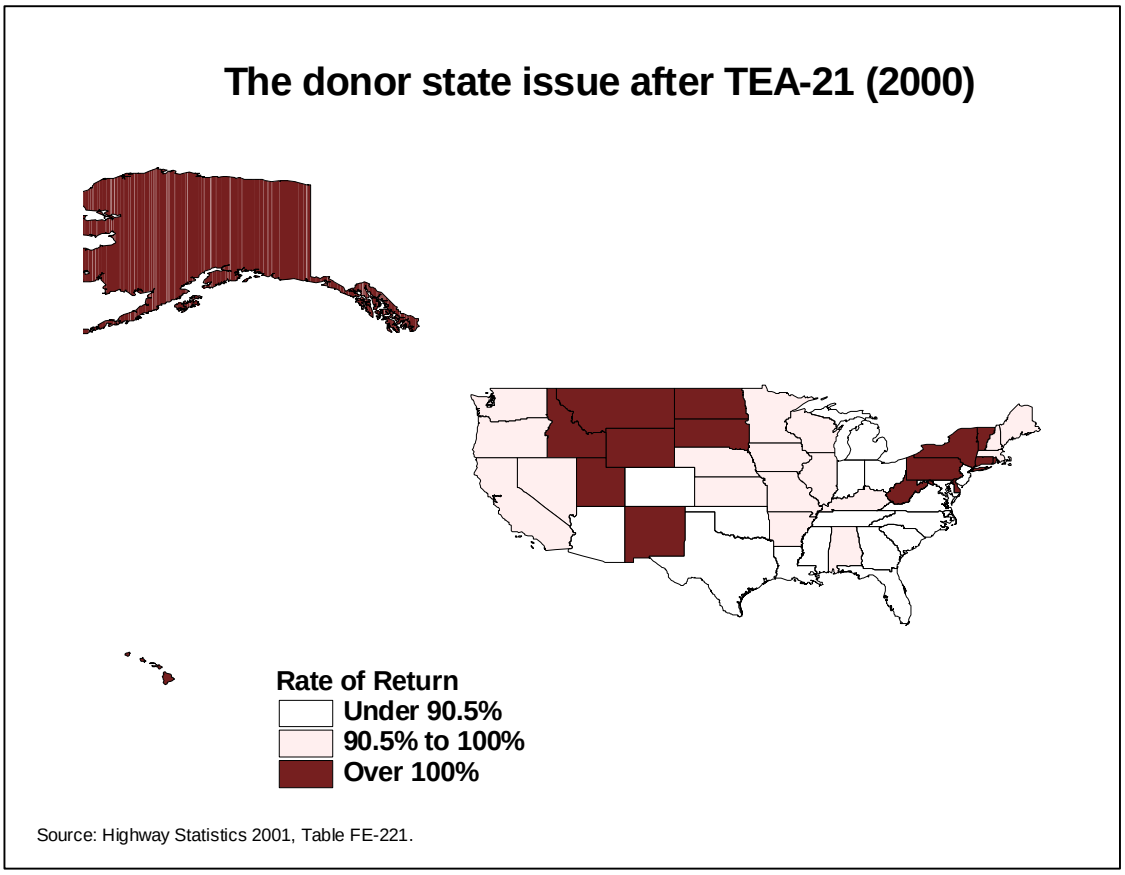


Table 10-10 reports the results of the regression analysis involving the 2000 HTF rate of return and the standard group of expenditure, system use, system extent, population, and political variables encountered earlier. As before the highest r squares were for the equations involving the previous, in this case 1995, HTF rate of return (r square = 0.916) and 2000 FHWA expenditures (per capita) (r square = 0.663).

Table 10-9: 2000 HTF rate of return, correlation

Correlation: 2000 highway trust fund rate of return

Variable	*Correlation*	*p-value*
2000 FHWA expenditures (per capita)	0.814	0.000
2000 bus appropriations earmarks (per capita)	0.781	0.000
2000 FHWA appropriations earmarks (per capita)	0.690	0.000
2000 FHWA authorization earmarks (per capita)	0.523	0.000
2000 vehicle miles of travel (per capita)	-0.344	0.000
2000 fixed guideway appropriations earmarks (per capita)	0.451	0.001
FTA TEA-21 earmarks (per capita)	0.446	0.001
2000 federal aid highway lane miles	-0.416	0.002
2000 federal aid highway centerline miles	-0.388	0.005
2000 highway user tax revenue (total)	-0.371	0.007
2000 FTA total expenditures (per capita)	0.354	0.011
2000 FTA capital expenditures (per capita)	0.354	0.011
2000 vehicle miles of travel (total)	-0.354	0.011
1997-98 House Appropriations	-0.344	0.013
1999-00 House Appropriations	-0.330	0.018
2000 fixed guideway authorization earmarks (per capita)	0.328	0.019
2000 population	-0.316	0.024
2000 bus authorization earmarks (per capita)	0.298	0.033
2000 FTA operations expenditures (per capita)	0.294	0.036
2000 FHWA authorization earmarks (total dollars)	-0.286	0.042
2000 FHWA expenditures (total dollars)	-0.281	0.045
TEA-21 highway earmarks (total)	-0.279	0.047
1999-00 CTI	-0.232	0.102
1997-98 CTI	-0.207	0.144
FTA TEA-21 earmarks	-0.201	0.158
2000 FTA operations expenditures	-0.184	0.196
2000 bus appropriations earmarks	-0.152	0.288
2000 fixed guideway appropriations earmarks	-0.151	0.290
2000 bus authorization earmarks	-0.135	0.344
2000 highway user tax revenue (per capita)	-0.132	0.356
1997-98 Senate Banking	-0.115	0.421
1999-00 Senate Banking	-0.114	0.427
2000 FTA total expenditures	-0.111	0.439
2000 fixed guideway authorization earmarks	-0.094	0.512
1997-98 Senate Env. Pub Works	-0.091	0.523
2000 FTA capital expenditures	-0.091	0.526
1999-00 Senate Env. Pub Works	-0.086	0.550
2000 FHWA appropriations earmarks (total dollars)	-0.074	0.605
2000 unlinked passenger trips	-0.054	0.707
1997-98 Senate Appropriations	0.053	0.711
1999-00 Senate Appropriations	0.050	0.727
TEA-21 highway earmarks (per capita)	0.016	0.914
2000 census percent rural	0.013	0.929
2000 census percent urban	-0.013	0.929

Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Table 10-10: 2000 HTF rate of return, regression

Dependent Variable: 2000 HTF Rate of Return

Independent variable	*Correlation*	*Constant*	*Coefficient*	*R2*
1995 HTF rate of return	0.957	0.148	0.803	0.916
2000 FHWA expenditures (per capita)	0.814	0.337	0.008	0.663
2000 federal aid highway lane miles	-0.416	1.770	-3.042	0.173
2000 federal aid highway centerline miles	-0.388	1.708	-2.282	0.151
2000 highway user tax revenue (total)	-0.371	1.587	-4.482	0.138
2000 FTA total expenditures (per capita)	0.354	1.183	0.005	0.125
2000 vehicle miles of travel (total)	-0.354	1.558	-5.163	0.125
2000 vehicle miles of travel (per capita)	-0.344	2.881	-0.001	0.118
1999-00 House Appropriations	-0.344	1.523	-0.203	0.118
1997-98 House Appropriations	-0.330	1.505	-0.194	0.109
2000 population	-0.316	1.511	-4.192	0.100
2000 FHWA expenditures (total dollars)	-0.281	1.562	-6.021	0.079
1999-00 CTI	-0.232	1.469	-0.128	0.054
1997-98 CTI	-0.207	1.430	-0.105	0.043
2000 highway user tax revenue (per capita)	-0.132	1.648	-0.003	0.017
1997-98 Senate Banking	-0.115	1.349	-0.195	0.013
1999-00 Senate Banking	-0.114	1.354	-0.188	0.013
2000 FTA total expenditures	-0.111	1.328	-4.662	0.012
1997-98 Senate Env. Pub Works	-0.091	1.335	-0.155	0.008
1999-00 Senate Env. Pub Works	-0.086	1.331	-0.145	0.007
2000 unlinked passenger trips	-0.054	1.296	-9.839	0.003
1997-98 Senate Appropriations	0.053	1.236	0.080	0.003
1999-00 Senate Appropriations	0.050	1.238	0.076	0.003
2000 census percent rural	0.013	1.261	0.068	0.000
2000 census percent urban	-0.013	1.329	-0.068	0.000

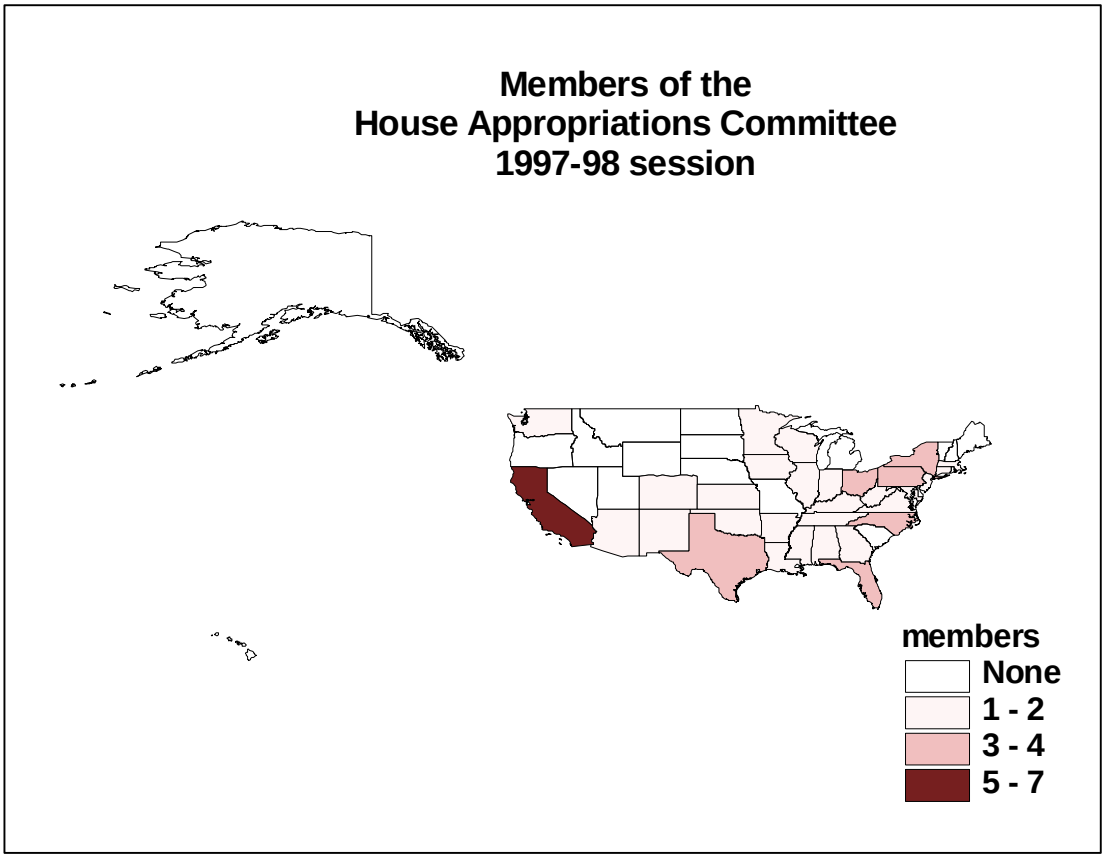
Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

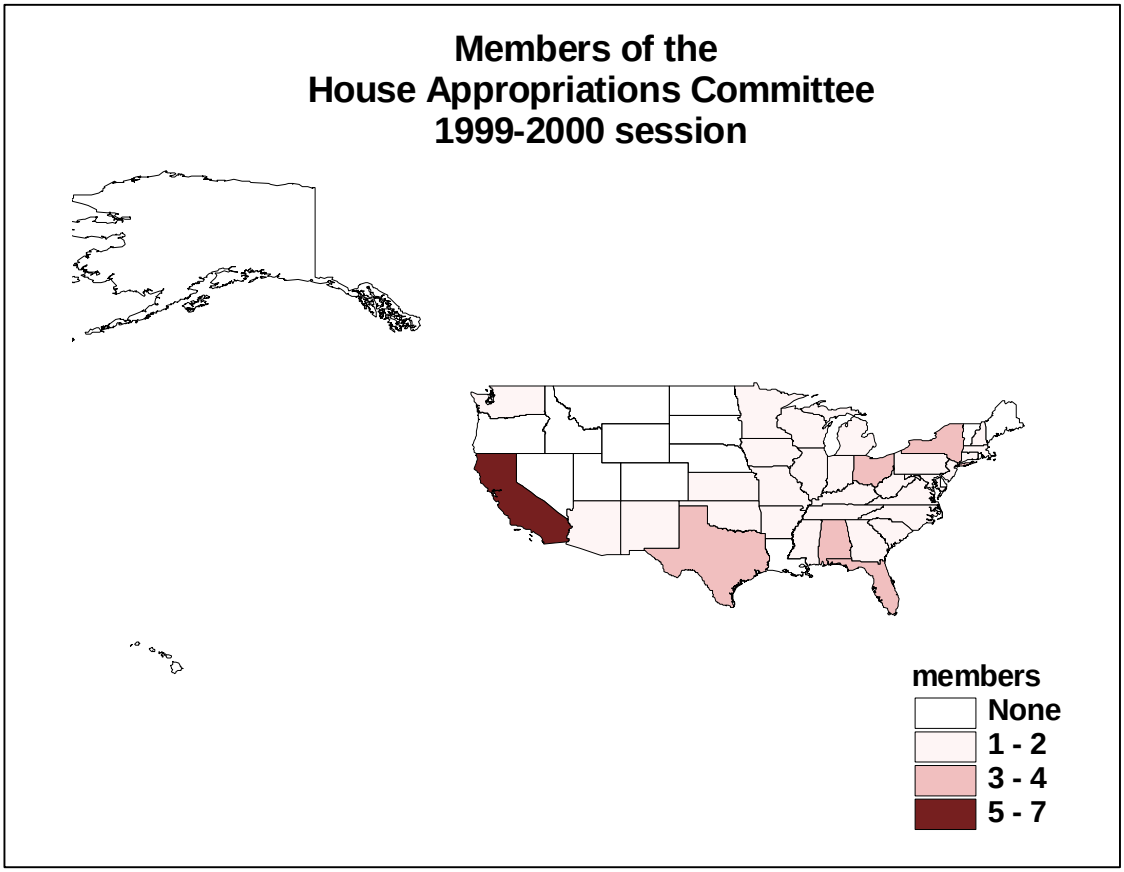
To highlight a few other findings, the r squares for the equations including population share variables were almost non-existent. The equations including the House Appropriations Committee membership had the highest r squares among the political variables (see **Map 10-12** and **Map 10-13**). This was consistent with the prior years' analysis.

Map 10-12: Members of the House Appropriations Committee, 1997-98 session



Source: Congressional Directory.

Map 10-13: Members of the House Appropriations Committee, 1999-00 session



Source: Congressional Directory.

Among the group of states that were net losers, the total net loss was $2.4 billion (8 percent of 2000 highway trust fund payments). Among the states that were net gainers under the highway program (aid exceeded payments), the total net gain was $2 billion (6.7 percent of 2000 highway trust fund payments). The state with the largest net loss was Texas ($374 million), while the state with the largest net gain was Alaska ($312 million). The correlation coefficients between 2000 net HTF return (total dollars) and the other variables are reported in **Table 10-11**.

Table 10-11: 2000 net HTF return (total dollars), correlation

Correlation: 2000 net HTF return (total dollars)

Variable	*Correlation*	*p-value*
2000 highway user tax revenue (total)	-0.647	0.000
2000 vehicle miles of travel (total)	-0.617	0.000
2000 federal aid highway centerline miles	-0.611	0.000
2000 federal aid highway lane miles	-0.598	0.000
2000 FHWA expenditures (total dollars)	-0.540	0.000
1999-00 House Appropriations	-0.507	0.000
2000 population	-0.507	0.000
1997-98 House Appropriations	-0.421	0.002
TEA-21 highway earmarks (total)	-0.279	0.047
1999-00 House CTI	-0.254	0.073
1997-98 HouseCTI	-0.238	0.092
2000 FTA total expenditures	-0.193	0.175
2000 census percent rural	0.149	0.297
2000 census percent urban	-0.149	0.297
1999-00 Senate Env. Pub Works	-0.074	0.608
1997-98 Senate Env. Pub Works	0.057	0.690
1997-98 Senate Appropriations	0.035	0.805
1999-00 Senate Appropriations	0.021	0.882

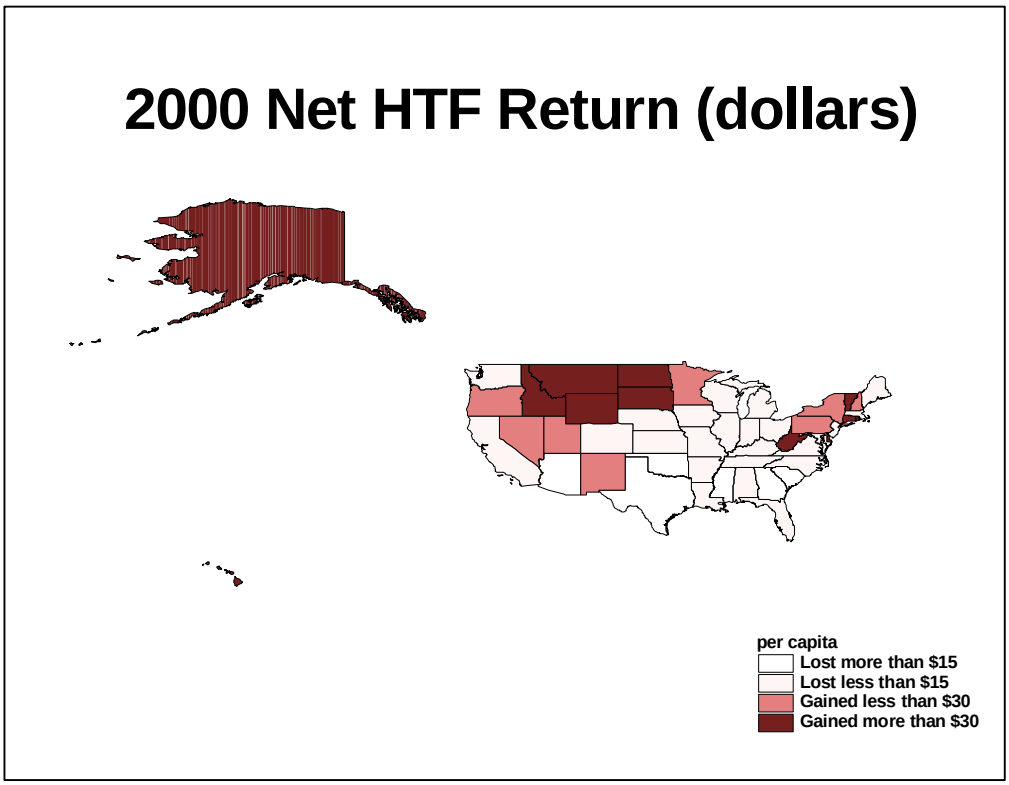
Note: the "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Interestingly, comparing the correlation coefficients between 1995 and 2000 one sees that most of the variables (with the exception of the highway system use and extent and House Appropriations variables) changed signs. The negative correlation between a state's (total dollars) net return and the system use and extent variables actually strengthened. For example, the more lane miles of highway in the state, the worse off a state is in its ratio of aid to user tax payments. One would doubt that this is what the people who wrote the formula changes in TEA-21 had in mind.

Among the group of states that were net losers, the net loss was $11.02 per resident. Among the states that were net gainers, the net gain was $33.20 per resident. The state with the largest per capita net loss was Mississippi ($22.12), while the state with the largest per capita net gain was Alaska ($499). The average net loss was smaller than in 1995, while the average net gain was larger. The states of the northeast, mountain region, very far west (Alaska and Hawaii), and plains region tended to be the largest net gainers (see **Map 10-14**).

Map 10-14: 2000 net HTF return (dollars per capita)



The results of the 2000 net HTF return (dollars per capita) regression analyses are presented in **Table 10-12**. Compared with their 1995 equivalents, the coefficients

dropped in the vast majority of cases. A state's net return (dollars per capita) continued to be negatively correlated with highway system use and extent—but less than in 1995. The system extent variable equations had the highest r squares, with the exception of overall expenditures (per capita). For example, for every additional 1,000 centerline highway miles, a state's net HTF return (per capita) was lower by $2 (r square = 0.131). For every additional 10,000 highway lane miles, a state's net return (per capita) was lower by $2 (r square = 0.147).

Table 10-12: 2000 net HTF return (dollars per capita), regression

Dependent variable: 2000 net HTF return (dollars per capita)

Variable	*Correlation*	*Constant*	*Coefficient*	*R2*
2000 FHWA expenditures (per capita)	0.928	-82.969	0.902	0.861
2000 federal aid highway lane miles	-0.384	77.095	0.000	0.147
2000 federal aid highway centerline miles	-0.362	71.494	-0.002	0.131
1999-00 House Appropriations	-0.361	56.338	-22.280	0.130
1997-98 House Appropriations	-0.346	54.321	-21.291	0.120
2000 population	-0.332	55.125	-4.609	0.110
1999-00 House CTI	-0.258	51.688	-14.959	0.067
1997-98 House CTI	-0.233	47.328	-12.322	0.054
2000 vehicle miles of travel (per capita)	-0.155	105.149	-0.007	0.024
2000 FTA total expenditures (per capita)	0.151	25.338	0.224	0.023
2000 census percent rural	0.141	7.725	79.143	0.020
2000 census percent urban	-0.141	86.868	-79.143	0.020
2000 highway user tax revenue (per capita)	0.099	1.231	0.208	0.010
TEA-21 highway earmarks (per capita)	0.079	23.701	0.233	0.006
1997-98 Senate Appropriations	0.078	22.892	12.382	0.006
1999-00 Senate Appropriations	0.076	23.052	12.089	0.006
1997-98 Senate Env. Pub Works	-0.036	31.930	-6.347	0.001
1999-00 Senate Env. Pub Works	-0.029	31.479	-5.069	0.001

Notes: each row refers to a separate simple linear regression equation.

The "percent urban" and "percent rural" variables are expressed in decimal form (ex. 1% is .01)

Highway trust fund rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

Among the political variables, the strongest r squares were on the equations for House committee membership, but the coefficients were negative. Only the Senate Environment and Public Works Committee variables had positive signs, and the coefficients were very weak. The signs for the rural and urban population share variables changed between 1995 and 2000. A state's net HTF return (dollars per capita) was now positively but weakly correlated with its rural population share.

In summary, the formula changes enacted under TEA-21 strengthened the connection between net HTF return (per capita) and overall expenditures, and slightly reduced the negative correlation between net HTF return and highway system use and extent. But net geographic redistribution remained—and dollars were being redistributed to states with fewer miles of highway and less vehicle travel.

Changes and summary of findings

ISTEA and TEA-21 promised some remedy for the ailments cited by representatives of the donor states, but did they deliver? To find out, I conducted paired sample t-tests (in essence a before and after test) of the HTF rates of return, and the results are shown in **Table 10-13** below. The changes enacted through ISTEA did not have a statistically significant effect on the HTF rates of return (t-test p-value = 0.132), but those enacted under TEA-21 have (t-test p-value = 0.004). The net result was a statistically significant change in the HTF rates of return between 1990 and 2000 (t-test p-value = 0.022). This is certainly progress in terms of dealing with this rate of return issue, but the political pressure for ever higher guaranteed returns continues—as evidenced by SHARE's call for a 95-percent return.

Table 10-13: Changes in the HTF rate of return (1990-2000)

Paired samples t-tests of HTF Rate of Return

Variable 1	*Variable 2*	*Correlation*	*Correlation p-value*	*T-value*	*T-test p-value*
1990 HTF rate of return	1995 HTF rate of return	0.832	0.000	1.531	0.132
1995 HTF rate of return	2000 HTF rate of return	0.957	0.000	3.044	0.004
2000 HTF rate of return	1990 HTF rate of return	0.772	0.000	2.367	0.022

HTF rate of return is a state's ratio of aid receipts to user payments, and is expressed in decimal form (ex. 90% is .90).

To summarize the findings of the results pertaining to the rates of return, there have been changes in the states' rates of return following TEA-21, which is contrary to my initial hypothesis, but the presence of the hold harmless provisions in ISTEA and TEA-21 have minimized the opportunities for change. Broadly defined system "need" variables (use and extent) were moderately, and negatively, associated with the HTF return rates, as expected, and remained so throughout this period. But there was little evidence to support assertions about the relationship between the specific political influence or urban versus rural status variables I selected and the HTF return rates. Larger population size is negatively correlated with states' HTF rates of return, although only moderately so.

When we consider changes in the total dollars involved in highway program redistribution, we see that the most significant change occurred after TEA-21 (see **Table 10-14**). But per capita apportionment dollars were relatively unchanged throughout this period (see **Table 10-15**).

Table 10-14: Changes in net HTF return (total dollars)

Paired samples t-tests of net HTF return (total dollars)

Variable 1	*Variable 2*	*Correlation*	*Correlation p-value*	*T-value*	*T-test p-value*
1990 net return	1995 net return	0.787	0.000	0.237	0.814
1995 net return	2000 net return	0.623	0.000	2.720	0.009
1990 net return	2000 net return	0.325	0.020	2.100	0.041

Table 10-15: Changes in net HTF return (dollars per capita)

Paired samples t-tests of net HTF return (dollars per capita)

Variable 1	*Variable 2*	*Correlation*	*Correlation p-value*	*T-value*	*T-test p-value*
1990 net return (per capita)	1995 net return (per capita)	0.877	0.000	-0.517	0.608
1995 net return (per capita)	2000 net return (per capita)	0.960	0.000	-0.676	0.502
1990 net return (per capita)	2000 net return (per capita)	0.817	0.000	-0.704	0.485

In short, the donor ratios of some states have changed over the course of this period, but redistribution remains. And this is not necessarily a normatively justifiable thing, as the regression results above, and earlier research by Lem (1996), indicate.

The results of the quantitative analyses presented in the preceding three chapters pose a number of questions for researchers and policymakers. In general, the total dollar expenditures were correlated with population and use and extent of the transportation system, as one would hope. But within this larger picture were other stories, particularly when one considers both the per capita expenditure patterns (which may or may not be a problem) and the geographic redistribution issue (whose patterns seem unrelated to any general policy objective). More investigation is required to make sure the results for these years were not aberrations, and a number of additional variables (including transit system extent) and expenditure dimensions (per vehicle mile traveled, per transit trip) should be included in future research. But the results indicated here do provide some fuel for

thought, particularly when it comes to negotiating future transportation policy arrangements.

It is to a consideration of the future that I turn in the final chapter of the dissertation. In that chapter, I briefly recap a few of the key findings from the rest of the dissertation. I then identify the issues I believe are the most important policy problems in the federal surface transportation program—and offer recommendations for how we might begin to solve them. I close with a brief discussion of areas within this field of study that require more research.

CHAPTER 11. CONCLUSION

In part two of the dissertation, I examined the history of the surface transportation program, focusing in particular on the evolution of the apportionment formulas. In part three, I examined the relationships between expenditure outcomes, including the contentious issue of geographic redistribution in the federal highway program, and population, system extent, system use, and political representation variables. In this chapter, I reflect on the key findings of these earlier chapters, tie these findings to the literature discussed in Chapter 3, and conclude with my recommendations to change federal surface transportation policy.

Lessons from this research

Both the historical and quantitative analyses offer important lessons for transportation researchers. The historical analysis showed that:

1. Policy stability has been the principal hallmark of the federal surface transportation program.
2. Policies developed to address particular problems at very specific moments in time have been retained long after their original rationales have disappeared.
3. Most proposals for policy change have come from the House of Representatives, administration officials, and/or interest groups. The Senate has historically been a defender of the status quo.
4. The Senate's institutional structure has been an important factor shaping federal transportation policy.

5. Political and/or institutional inertia has limited opportunities for significant policy change.

The quantitative analysis of recent program expenditures provided additional lessons.

1. Geographic redistribution of federal highway dollars is largely unrelated to the use or extent of the transportation system.
2. Federal highway expenditures in each of the states are becoming more closely related to a state's highway system use and extent in recent years.
3. Federal transit expenditures in each of the states are becoming less closely related to a state's transit system use (ridership) in recent years.
4. Political representation variables are more closely related to a state's project earmark dollars than to its formula apportionment dollars.
5. ISTEA and TEA-21 have produced only modest changes in the overall patterns of expenditures, notwithstanding the intense rhetoric around them.

These are some lessons from this research. I highlight three of them in more detail below.

The first of these lessons is the importance of history. This lesson is particularly important, for example, in the case of the highway program and the very contentious donor state issue. The most powerful explanation of a state's current status as a donor or donee is its past status, and while some changes have occurred in the wake of TEA-21 they are marginal. I suspect that the hold harmless provisions in TEA-21 are protecting previous donees and serve to minimize the opportunity for genuine change. The SHARE proposal to increase the minimum guaranteed return is thus not surprising. The states that

are now net losers have been net losers for a long time—and they're upset that the minimum guaranteed returns have yet to produce significant change.

The second lesson is that geographic redistribution is unrelated to the kinds of variables that transportation analysts use to measure current and/or future highway needs. This wouldn't be a serious problem (in a non-political sense, at least) if it contributed to other policy goals. But Lem (1996) showed that it hasn't contributed to fiscal equalization—it has actually run counter to this goal. The research presented here shows that the federal program redistributes highway money away from areas with more extensive highway systems, more vehicle travel, and larger populations. Because geographic redistribution runs counter to these factors, it is quite difficult to justify on the basis of transportation need, and appears to simply be a well-entrenched legacy of past finance arrangements.

The third lesson is that there is a weakening connection between transit expenditures and use of the transit system. This disconnect is a product of the recent federal decision to end operating assistance to the larger urban areas where most transit rides are taken. On the other hand, the connection between highway expenditures and use of the highway system is becoming stronger. This increased connection is the product of the series of apportionment formula changes enacted in TEA-21 to place more emphasis on variables like VMT when it comes time to distribute federal aid.

These last two findings raise questions about the purpose of federal assistance. What is the mission of the federal surface transportation program? Is it to support users? Is it to support transportation systems? Or is it to support states (units of geography)?

Many of the apportionment mechanisms are designed more to assist states than system users or the system itself, and we must ask ourselves whether this is the proper goal of a federal transportation program. My own belief is that the needs of the users should be paramount in a program that relies so extensively on user-based finance.

Links to the literature

The findings from this dissertation contribute to a better understanding of intergovernmental fiscal relations and federal expenditure policy. The findings provide support for certain assertions made in this literature and are at odds with others.

In Chapter 3, I introduced a number of arguments from the literature about federal expenditure policies, and in particular the issue of the geographic redistribution of public dollars in the federal highway program. These arguments fell into two categories: theoretical rationales that might justify geographic redistribution and functional explanations for its actual occurrence. The theoretical rationales, derived largely from the public finance literature, emphasized ideas such as correcting for benefit spillovers and fiscal equalization. The functional explanations, derived largely from the political science literature, emphasized the actions of key political figures and interest groups and the importance of institutional structures.

I did not attempt to verify the theoretical rationales in this dissertation for two reasons. First, attempting to quantify all the benefits of a project and then allocating them to their proper space-based beneficiaries is exceedingly difficult (Break 1980). It would thus be a mammoth task to try to prove or disprove the benefit spillover argument, and this explains why there have been few attempts to do so (May 1969, Oates 1972).

Second, Lem's research (1996) has demonstrated that the fiscal equalization rationale was not a relevant factor in the geographic redistribution of federal highway dollars. In fact, redistribution ran counter to this argument.

I did, however, conduct both the historical and quantitative analyses with the functional explanations of the political scientists firmly in mind. In the historical analysis, I paid particular attention to the roles of politicians and interest groups in the formulation of federal policy and the importance of institutional structures in the shaping and evolution of that policy. For example, consider the importance of institutional structures, in this case of the US Senate. Lee and Oppenheimer (1999) emphasized the importance of the Senate's representational structure (two members from each state) and its egalitarian atmosphere (senators regard each other as equals) in policy development. They also stressed the importance of differences in state populations when it comes to the development of policy and the formation of coalitions; it is less expensive to include small population states than large population states in any policy coalition. Thus, the Senate's institutional structures privilege small population states.

The findings of my historical research demonstrated the importance of the Senate's institutional structure in past policy development, and my quantitative analysis demonstrated that small population states continue to enjoy higher per capita transportation expenditures than large population states. The Senate continues to protect small state interests by defending minimum state apportionment rules and formula apportionment factors that favor small population states from attempts by the population-

apportioned House and the nationally-elected administration (of either party) to change things.

I also examined the importance of political representation in the spatial pattern of federal transportation expenditures, particularly through my quantitative analysis. Political scientists like Stein and Bickers (1995), Jerome (1997), and Fenno (1966) are among a large group of scholars who have written on the reelection-seeking strategies of politicians. These strategies fall under the rubric of the pork barrel hypothesis whereby representatives are assumed to stake out positions of power on congressional committees where they can direct federal dollars to their constituents. Jerome (1997) tested this hypothesis in the case of transportation expenditures in one year. He found a positive, statistically significant relationship between a state's representation on a handful of key congressional committees (House Ways and Means, House Public Works, and Senate Public Works) and its per capita federal transportation expenditures.

My own quantitative analysis found much weaker relationships between per capita transportation expenditures and a state's political representation. There were negative relationships between House representation and per capita expenditures and very weak mixed relationships involving the Senate variables. Political representation variables were more closely, and positively, related to total expenditures (as opposed to per capita expenditures) and to earmark expenditures than to per capita expenditures. These results were consistent over the three years I examined (1990, 1995, and 2000). Thus my findings thus do not support certain aspects of Jerome's work (1997), although his findings of a small population state bias in the pattern of per capita expenditures are

consistent with my own. My own suspicion is that his reliance on one year's worth of data, and his use of a categorical breakdown based on characteristics of the grants rather than the programs to which they apply may help explain our different results.

On balance, my findings support the political science research on the importance of institutional structures in policy development, but run counter to some of the work on the importance of political representation, particularly in the case of per capita expenditures. My work does, however, support the assertion that political representation is closely, positively, and significantly related to a state's total expenditures. My findings would also support the notion that politicians are more concerned about total dollars for their state than dollars per capita when it comes time to pursue federal grants. I have not seen a detailed discussion of this particular issue in the political science literature, but it is certainly a topic worthy of future investigation. My own thesis is that this may be a reflection of the Senate's historic influence and its historic role as defender of the policy status quo. After all, senators are elected by states and are interested in looking out for the interests of their states.

In the remainder of this chapter, I note some of the other important issues in federal transportation expenditure policy, offer my own short-term, medium-term, and long-term policy recommendations, and highlight areas of potentially fruitful future research. The historical analysis demonstrated the importance of political considerations, and the opportunities for implementing some of these policy changes are politically difficult. But that doesn't mean it isn't worth fighting for policy change. A great deal of energy has been spent fighting for modest changes in minimum guaranteed return rates; if

even a fraction of this effort were put to addressing policy issues of much greater importance, the results could be significant indeed.

The larger problems in the federal program

Most public attention focuses on expenditure patterns and how each state, congressional district, or mode is treated in pursuit of federal transportation dollars, and my own research followed this pattern. There are legitimate reasons for politicians and place-based or mode-based interest groups to be concerned about such issues, because large amounts of money are at stake. But there are also reasons for researchers to be concerned, particularly in cases where the expenditure patterns are largely disconnected from, or even run counter to, larger policy objectives, such as addressing social equity considerations or transportation need.

Very large efforts have been and will be needed to produce changes in formula apportionment factors, minimum state apportionment rules, and minimum guaranteed return rates that result in often marginal changes in the geographic distribution of expenditures. Such changes are quite desirable from the perspectives of social equity and economic efficiency, and the effort involved in achieving change can be worthwhile. But while the geographic patterns of the expenditures may be important, they are only part of the story. Even more important are the financial incentives built into the programs and the size and scope of the programs. These issues are admittedly somewhat tangential to the issues discussed in the preceding chapters but they are important nonetheless.

As the historical discussion showed, the federal transportation program has long been envisioned as a partnership between the federal government and the states (Holt

1923, Seely 1987). In the beginning, this idea was reflected in the equal cost-sharing arrangement between state and federal governments. But over time, the cost sharing arrangement has been altered considerably. The federal share was first increased to encourage states to build highways that would form part of a basic national highway network. The federal matching share was increased again, to 90 percent, to encourage states to devote their resources to building the interstate highway system. Today, the federal matching share for most transportation programs (both highway and transit) exceeds 80 percent, but no clear rationale has been articulated as to why this should be the case. This level of federal match has had a profound effect on state and local transportation policy choices.

The generosity of the 90-percent federal interstate match, for example, strongly encouraged states to build interstate highway projects, and the long-term results have been profound—particularly in America's cities. Local officials leapt at the opportunity to build interstate highways, and have someone else pay 90 percent of the cost. But in exchange for taking the federal dollars, they also had to accept federal design standards (70 miles per hour) and federal system mileage limitations (at first 41,000 miles total) (Gifford 1983, Seely 1987). Local officials ceded a significant amount of control over freeway routing and design to state highway departments and the federal Bureau of Public Roads. This was the price of federal aid. They had to accept the rules, or the money would go somewhere else. They didn't have the option of taking some of the money to build something else (Taylor 2000). Not surprisingly, interstate freeways sprouted all over urban America.

High matching shares continue to have a profound effect. They have helped transform the federal transportation program into a resource for state and local officials and interest groups to use to build projects they might not build were they to bear a higher share of the cost themselves. Consider the Central Artery Project in Boston, perhaps the most famous example of a so-called highway pork barrel project today. The total cost of this project now exceeds $15 billion (USDOT 2003). Federal highway taxpayers (and not just Massachusetts's highway taxpayers) are paying most of the project's cost. But in so doing, they are paying to remedy an earlier mistake of the interstate program: the original elevated expressway. Were it not for the generous federal matching ratio, it is unlikely that Massachusetts would have built either the original facility or the "Big Dig" on its own (Luberoff 2001).

Similar incentives affect the transit program. Recent years have seen an explosion of rail transit projects, particularly in the form of earmarks that have virtually eliminated administrative control over the use of discretionary grant funds. There are now far more requests for rail transit projects than there is federal money to build them (Congressional Record 2003). Many of these projects are located in sprawling, low-density, auto-oriented places that appear ill suited for fixed rail transit (Congressional Record 2003). Yet such projects continue to emerge, and are regularly cited as essential to the particular locality's economic, social, and transportation future (Taylor and Samples 2002). It is unlikely that these rail projects (or highway projects) would continue to be as popular with voters and their public representatives if local residents had to bear a higher share of the cost (Taylor and Samples 2002).

As federal matching shares have grown, so has the federal transportation program itself: both in terms of its size and its scope. As the historical analysis showed, the federal transportation program was once limited to providing financial assistance for the most important highways in the nation. Over time, the definition of what constituted a "highway of national importance" broadened considerably. Today, more than one quarter of all street and highway mileage in the US (about 1 million miles) is enrolled in one of the many federal aid highway programs (*Highway Statistics* 2001). The prospect of federal aid acts as an incentive for states to enroll as many miles as possible in the federal program. And because there are more miles of federal highways to cover, the size of the highway program has grown. But the backlog of "needs" on the ever-increasing miles of federal aid highways continues to exceed the available resources.

The need for policy change

Based on the findings of this research and the discussion just completed, I propose a series of short-term, medium-term, and long-term policy recommendations to address flaws in the federal surface transportation program.

Increase the rate of return

In the short-term, I recommend increasing the minimum guaranteed return above its current 90.5 percent level. As the quantitative analysis in Chapter 10 showed, geographic redistribution serves no easily justified purpose beyond simply benefiting long-term beneficiaries, and there is thus no reason to continue the practice. It does not aid states with more extensive highway systems or more vehicle travel, and actually directs money away from such states. A state's highway system extent and use would

undoubtedly factor in any definition of its highway needs. Any positive change in the current rates of return would thus bring the pattern of expenditures more into line with the distribution of highway needs (as measured on the basis of VMT and system extent) and, as Lem (1996) observed, would aid the less fiscally well off states. Achieving a higher rate of return is politically feasible, particularly given past experience and the increased pressure from donor states.

Modify the apportionment formulas and reduce the matching shares

In the medium-term, I recommend that changes be made to the apportionment formulas themselves. Making these changes will require a greater amount of effort than increasing the rate of return, because of the likely intensity of political and interest group opposition to changes of this magnitude. Among the specific policy recommendations I advocate are: (1) the elimination of the minimum state apportionment factor from the highway formulas and elimination of the maximum state apportionment factor from the transit formulas, and (2) the reduction of the federal matching share for most transportation programs. The first change would strengthen the connection between federal expenditures and transportation system use, a connection that, as Chapters 8 and 9 showed, is becoming stronger in the case of the highway program and weaker in the case of the transit program. Given the transportation mission of the federal surface transportation program, the users of the transportation system and their needs should be among the primary considerations when we make expenditure decisions.

My final medium-term recommendation is to reduce the federal matching share in most program categories. The high federal matching ratios were necessary to stimulate

state investment in the past, for example in the case of building and maintaining the basic transportation infrastructure as discussed in the historical analysis chapters. Today, the high matching ratios serve to distort state and local spending choices. The matching ratios have increased over the years even as the rationales for developing them have faded away. Reducing the matching shares will not be easy, but will have an enormous effect on the kinds of projects/programs that are proposed and eventually implemented in both areas. Because states and/or localities would bear a higher share of the cost, many projects that only looked attractive because of the high federal match will no longer be built. Other projects that appeared unattractive because they received a lower federal match, but that might make more sense given specific local conditions, would have a better chance of being undertaken. A reduction to 50 percent would restore the original state-federal partnership idea behind the transportation program, and thus may become politically acceptable in time. Restoring the original partnership aspect of the transportation program seems a reasonable medium-term policy goal, and is justified by past experience. An even further reduction might be justified on either economic efficiency or social equity grounds (Break 1980, Musgrave and Musgrave 1980). The current high matching shares cannot be justified on either efficiency grounds or equity grounds, and survive largely through political inertia (May 1969).

Rethink the federal role in surface transportation

In the long-term we need to rethink the federal role in surface transportation. Some transportation scholars argue that the federal government is involved in many areas of transportation policy that are more appropriately the concern of state and/or local

governments (Poole 1996, Roth 1991). I agree and argue the federal program should be much smaller than it is today.

Others disagree with this view, including a wide array of transportation interest groups encompassing everyone from the American Road Builders Association to the Surface Transportation Policy Project. Certainly the interest groups in transportation (highway and transit) want more federal involvement, at least in a financial sense. They have been winners under the current system. But the really important questions are: (1) have users benefited from federal involvement? And (2), is the country better off?

I argue that the federal government has had a significant role to play in the development of the basic national transportation networks, and its ongoing focus should be on improving the systems of highest national importance. The rest should be left for the other levels of government. This does not mean the federal programs should immediately be abandoned. Instead the programs should be gradually transformed, over time, into block grants. The federal government would take a portion of each state's highway user tax payments to support the programs and facilities of national importance while the remainder is returned to the states (Poole 1996). Alternatively, a large portion of the federal gasoline tax could be repealed and replaced by state gasoline tax increases. Either the money or the tax could be devolved.

Others would argue that true devolution is the answer (Roth 1991). I agree that some form of devolution is necessary. But in any event a rethinking of the appropriate mission of the federal transportation program is in order. The rethinking that occurred with ISTEA and then TEA-21 was tinkering at the margins, looking at issues of

flexibility in the use of federal dollars particularly between categories and modes. A discussion of more fundamental matters, including the program mission itself, is in order.

Future research

The research presented in this dissertation focuses on the history of the apportionment formulas in general and the patterns of expenditures since 1990. Several additional research questions have emerged from this work. For example, are these three years typical of overall patterns or merely aberrations? Much statistical investigation remains for the years examined here. There are other variables to examine, and other expenditure dimensions to consider, and multivariate models to build.

I mentioned throughout this chapter the effects of the high federal matching share on transportation decisionmaking and on the urban interstate program. One of the issues I hoped to explore in this research, but was unable to pursue, is how the federal interstate program's finance components have affected America's cities. One means of examining this issue would be to include a comparison with Canadian cities.

Canada lacks a federal transportation program comparable to the United States. There is no dedicated transportation trust fund at the national level. Canadian federal highway funds have long been focused on the Trans-Canada Highway, the country's primary inter-provincial highway system. The federal-provincial cost match for the system is also 50:50, far different from in the US. Canadian cities have fewer freeways than their US counterparts. Vancouver, for example, lacks a freeway within the city boundaries. But are the different ways the two countries have approached federal

transportation policy responsible for these different outcomes? The absence of easy-to-find Canadian data has thus far precluded my investigating this issue.

My own past research focused on the revenue side of state and federal transportation policy, and this research focused on the expenditure side of federal policy (Brown 1998). In the future I will expand this research and link it to more planning-oriented issues of transportation system design and the relationship between the transportation system and the built environment. Transportation is essential to so many things, and the public finance of transportation is an important factor in the development of the nation's transportation system.

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