SLANTED PAVEMENT:
HOW OHIO'S HIGHWAY SPENDING SHORTCHANGES CITIES AND SUBURBS

Edward (Ned) Hill
Billie Geyer
Kevin O'Brien
Claudette Robey
John Brennan
The Levin College of Urban Affairs at Cleveland State University

Robert Puentes
The Brookings Institution Center on Urban and Metropolitan Policy

A Discussion Paper Prepared for
The Brookings Institution Center on Urban and Metropolitan Policy

March 2003

THE BROOKINGS INSTITUTION CENTER ON URBAN AND METROPOLITAN POLICY
SUMMARY OF RECENT PUBLICATIONS *

DISCUSSION PAPERS/RESEARCH BRIEFS

2003

What the IT Revolution Means for Regional Economic Development

Is Home Rule the Answer? Clarifying the Influence of Dillon's Rule on Growth Management

2002

Growth in the Heartland: Challenges and Opportunities for Missouri

Seizing City Assets: Ten Steps to Urban Land Reform

Vacant-Property Policy and Practice: Baltimore and Philadelphia

Calling 211: Enhancing the Washington Region's Safety Net After 9/11

Holding the Line: Urban Containment in the United States

Beyond Merger: A Competitive Vision for the Regional City of Louisville

The Importance of Place in Welfare Reform: Common Challenges for Central Cities and Remote Rural Areas

Banking on Technology: Expanding Financial Markets and Economic Opportunity

Transportation Oriented Development: Moving from Rhetoric to Reality

Signs of Life: The Growth of the Biotechnology Centers in the U.S.

Transitional Jobs: A Next Step in Welfare to Work Policy

Valuing America's First Suburbs: A Policy Agenda for Older Suburbs in the Midwest

Open Space Protection: Conservation Meets Growth Management

Housing Strategies to Strengthen Welfare Policy and Support Working Families

Creating a Scorecard for the CRA Service Test: Strengthening Banking Services Under the Community Reinvestment Act

The Link Between Growth Management and Housing Affordability: The Academic Evidence

What Cities Need from Welfare Reform Reauthorization

Growth Without Growth: An Alternative Economic Development Goal for Metropolitan Areas

The Potential Impacts of Recession and Terrorism on U.S. Cities

TREND SURVEYS

2003

Boomers and Seniors in the Suburbs: Aging Patterns in Census 2000

Rewarding Work Through the Tax Code: The Power and Potential of the Earned Income Tax Credit in 27 Cities and Rural Areas

2002

Modest Progress: The Narrowing Spatial Mismatch Between Blacks and Jobs in the 1990s

Smart Growth: The Future of the American Metropolis

Living on the Edge: Decentralization Within Cities in the 1990s

Timing Out: Long-Term Welfare Caseloads in Large Cities and Counties

A Decade of Mixed Blessings: Urban and Suburban Poverty in Census 2000

Latino Growth in Metropolitan America: Changing Patterns, New Locations

Demographic Change in Medium-Sized Cities: Evidence from the 2000 Census

The Price of Paying Taxes: How Tax Preparation and Refund Loan Fees Erode the Benefits of the EITC

The Importance of Housing Benefits to Housing Success

Left Behind in the Labor Market: Recent Employment Trends Among Young Black Men

City Families and Suburban Singles: An Emerging Household Story from Census 2000

FORTHCOMING

The State Role in Urban Land Redevelopment

* Copies of these and previous Brookings urban center publications are available on the web site, www.brookings.edu/urban, or by calling the center at (202) 797-6270.

Acknowledgments

A grant from the Cleveland Foundation supported this research. The authors wish to thank the foundation and its staff for its support, as well as the Ohio Departments of Transportation and Taxation for access to data and other materials. Ryan Prince at Brookings provided review, research, and mapping assistance. Kimberly Gibson also provided review and support.

The Brookings Institution Center on Urban and Metropolitan Policy would like to thank the Ford, MacArthur and McKnight Foundations for their support of our work on metropolitan growth trends and transportation policy reform. Brookings would also like to thank the Fannie Mae Foundation for its founding support of the urban center and its work.

ABOUT THE AUTHORS

Edward W. (Ned) Hill is professor and distinguished scholar of economic development at the Maxine Goodman Levin College of Urban Affairs, Cleveland State University; non-resident senior fellow of the Brookings Institution Center on Urban and Metropolitan Policy; and an editor of *Economic Development Quarterly*.

Billie K. Geyer was formerly project manager with the Center for Public Management, Maxine Goodman Levin College of Urban Affairs, Cleveland State University. Currently, Geyer is the finance director of the Fine Arts Association in Willoughby, Ohio.

Robert Puentes is a senior research manager at the Brookings Institution Center on Urban and Metropolitan Policy.

Kevin O'Brien is director of the Center for Public Management and the Great Lakes Environmental Finance Center, Maxine Goodman Levin College of Urban Affairs, Cleveland State University.

Claudette Robey is a project manager in the Center for Public Management, Maxine Goodman Levin College of Urban Affairs, Cleveland State University.

John Brennan was formerly a researcher at the Center for Public Management, Maxine Goodman Levin College of Urban Affairs, Cleveland State University. Currently, Brennan is a research associate with the Cleveland Municipal School District's Office of Research, Evaluation, and Assessment and a doctoral candidate in the Levin College.

Comments on this paper may be directed to Ned Hill at ned@urban.csuohio.edu or Rob Puentes at rpuentes@brookings.edu.

ABOUT THE BROOKINGS INSTITUTION SERIES ON TRANSPORTATION REFORM

In order to inform the debate over reauthorization of the federal surface transportation law—the Transportation Equity Act for the 21st Century—the Brookings Institution has initiated a series of analyses designed to assess federal transportation reform. The essays seek to provide policymakers, the press, and the interested public with a comprehensive guide to the numerous issues that must be addressed as Congress considers the future of the nation's transportation policies.

IN THE SERIES:

TEA-21 Reauthorization: Getting Transportation Right for Metropolitan America

FORTHCOMING:

Fueling Transportation Finance: A Primer on the Gas Tax

Expectations: Transportation Policy and Patterns of Metropolitan Growth

Transportation Equity and Job Access: A Context of the Reauthorization Debate

EXECUTIVE SUMMARY

The geographical distribution of transportation funding revenues has become a hot issue at both the federal and state levels.

In the last reauthorization of the federal transportation bill, numerous states and constituencies called for a revised system of allocating states' shares of the Highway Trust Fund—more than 60 percent of which are generated by the federal gas tax. Some states argued that their shares of federal transportation dollars should be proportional to the amount of gas tax revenue they paid into the trust fund. Others wanted their shares determined by need. To a large extent both groups of states prevailed in obtaining greater equity.

In Ohio, and some other states, state transportation dollars flow to localities on the basis of neither of these standards for revenue distribution. The result in Ohio is a spatially skewed pattern of state transportation spending that is essentially anti-city and even anti-suburb. In effect, funds are diverted away from the very places that struggle with the greatest transportation needs and pay the most in gas taxes.

This paper examines the geographic pattern of state transportation spending in Ohio between 1980 and 1998. In particular, it examines the spatial patterns the location of state transportation finance and spending—including current highway contracts, gas tax collections, and vehicle registration tax revenues—and compares them to indicators of transportation demand and need.

In doing so, the paper seeks to decipher one state's confusing system of highway finance to determine whether state transportation dollars are being spent in ways that meet the myriad challenges—aging infrastructure, traffic congestion, and decentralizing economic development—faced by metropolitan areas. In addition the paper also seeks—since Ohio's system of transportation finance resembles that of many states—to throw light on spending patterns within numerous states.

To this end, this analysis of state trends and data on transportation spending from the Ohio Department of Transportation (ODOT) and other sources finds that:

- **Between 1980 and 1998, Ohio's highway dollars were spent disproportionately in rural counties, which received more funding relative to their transportation needs than urban and suburban counties.** One might assume that counties with high travel demands on its roads would receive more funding to deal with the resulting wear and tear, congestion, and other challenges to its road network. In Ohio, however, urban counties consistently took home a smaller share of state highway funds than suburban and rural counties relative to their amount of vehicle traffic (vehicle miles traveled), car ownership (vehicle registrations), and demand for driving (gasoline sales). On the flipside, rural counties received more dollars for each indicator of need than did urban or suburban counties.

- **At the same time, urban counties in Ohio contribute significantly more gas tax revenues to state transportation coffers than they get back in return, and essentially act as "donors" of transportation dollars to rural-county "donees."** Gas and vehicle registration levies, in this regard, generate approximately 60 percent of Ohio state highway funds. Of these revenues, a significant portion is redistributed to localities for building, improving, and maintaining roads. But once again, urban counties fared worse than rural and suburban counties by comparison to what they paid into the system. Highway spending in urban and suburban counties matched neither the volume of gas tax funds generated in those counties nor their levels of transportation need. At the federal level, the funding inequity between "donor" and "donee" states was debated and addressed. The Transportation Equity Act for the 21st Century (TEA-21), passed in 1998, guaranteed each state a return of at least 90.5 percent of the share its contribution to the highway trust fund. Despite the embrace of this funding logic at the federal level, similar rules exist neither in Ohio nor in most other states.

- **These anti-urban biases arise from three principal sources.** First, the formula for distributing revenues generated from the gas and vehicle registration taxes does not favor cities. To the contrary: Counties and townships receive these revenues in equal shares without regard to population size, numbers of vehicles, the amount of vehicle miles traveled, or which jurisdiction has responsibility for the roadway network. That means rural Harrison County, with a population of 15,000 receives the same level of funding from the county share as Cuyahoga County, home of 1.4 million urban residents. A second bias follows from the fact state highway funds are spent on interstate highways, state roads and highways only, which principally run through unincorporated areas, townships, and rural counties. This generally leaves municipalities responsible for maintaining their own roadways while rural counties benefit from greater state attention and state investment. Finally, Ohio restricts the use of gas tax revenues to highways only, which limits the ability of urban and suburban areas to invest in transit options or air quality improvements. That, too, tilts spending toward rural and suburban pavement.

- **Overall, these spatially uneven transportation policies place a disproportionate fiscal burden on urban jurisdictions while supporting the spread of development into exurban and rural areas.** Given the state's funding tilts, municipalities frequently must dip into their own funds, or impose taxes, to pay for the maintenance and improvement of their portion of their region's transportation network. This means local residents and businesses wind up assuming the burdens of maintaining roads that form vital economic links for the entire state. Compounding the problem is the fact that the state's current spending formulas (which favor new construction in rural areas) contribute to the spread of low-density development in the country. Such growth patterns undermine urban and inner-suburban jurisdictions by enabling people and businesses to locate miles from urban centers and still benefit from metropolitan life.

- **To end the fiscal drag on its urban areas Ohio should reduce the bias of its transportation funding system with a number of specific steps.** The state must first fix its tilted road classification system by including all major urban arterials in the "state highway system" that ODOT maintains. The state should also readjust funding distribution formulas that have clear spatial biases to better match where travel occurs, gasoline is purchased, and where vehicle registration fees are paid. On a more basic level, Ohio should remove the restriction that reserves gas tax revenues for highway projects only. This will require amending the state constitution, but that is not an insurmountable hurdle. In addition, Ohio needs to embrace transparency in its system of tax collections. Information on gas tax collections should be released annually by the state on where motor fuels tax revenues are generated. These data should be listed by local jurisdiction—city, township, or village—as well as by county. In sum, Ohio's system of highway finance should support a balanced transportation system in order to keep Ohio cities and businesses competitive for the future.

In the end, Ohio and other states need to take a comprehensive look at how they distribute federal and state gas taxes—the primary sources of state and local highway funding—across their landscapes. Rural highways remain important to state road networks. But the roads located in Ohio's seven major metropolitan areas are especially critical to the social and economic health of the state—and require attention. With that in mind, the emerging debate over the reauthorization of TEA-21 offers a prime opportunity for congressional leaders to move beyond the distribution of federal gas tax dollars across the 50 states to consider the very real donor-donee inequities *within* their own states.

TABLE OF CONTENTS

SLANTED PAVEMENT:
HOW OHIO'S HIGHWAY SPENDING SHORTCHANGES CITIES AND SUBURBS

I. INTRODUCTION

Roads and highways are physical and fiscal realities, joining waterlines, sewers, and telecommunications infrastructure in shaping America's metropolitan areas. Roads form the backbone of the regional transportation system, flowing seamlessly across municipal boundaries. They enable local housing and labor markets to function while connecting locally made goods and services to broader markets. Granted, infrastructure does not create development. But it permits and channels demand for land and buildings along specific corridors.

Transportation infrastructure has clear regional economic and social benefits, but its finance structure remains a patchwork, and creates huge financial liabilities for the unlucky unit of government that must foot the repair bills. How infrastructure construction and maintenance is financed affects the budgets of municipal, county, and state governments and represents large contingent liabilities, especially for municipal governments.

Do the rules governing who pays and how much make sense given today's metropolitan needs and realities? Municipal governments are generally required to pay for roads within their borders no matter where the traffic originates, no matter the role the road plays in the larger transportation system, no matter the fiscal condition and tax load borne by local taxpayers. They are required to pay no matter the bonding capacity of the jurisdiction and no matter who pays the fuel and use taxes that generate federal and state highway funds. Most state governments pay only for state and county routes under the pretext that traffic on all other roads is local and not part of the official state road and highway system. A few states maintain constitutional or statutory prohibitions on state funding of roads in large municipalities or on spending motor fuels taxes on any activity other than road and highway construction.[1] Such statutes reflect a bygone era when the cornstalk brigades ran state legislatures, and they persist in an era of suburban legislative dominance. Holes in roads are directly connected to holes in municipal purses.

Ohio typifies those parts of the nation that were industrialized before the mid-1960s, and struggle with outmoded transportation finance structures. Ohio is highly urbanized, with a mix of central cities, inner-ring "first" suburbs, and rapidly growing suburban and exurban areas. The state also contains a slice of Appalachia and a significant number of rural agricultural counties. Ohio has a fully developed interstate highway system that is being expanded at its margins through lane additions, while demand for maintenance continues apace. Although Ohio ranks 35th in geographic area, its highway system of federal and state-designated roads is the tenth largest in the country, with the second largest inventory of bridges. The state's interstate highway system is the fourth

[1] See the companion research report, Robert Puentes and Ryan Prince, "Fueling Transportation Finance: A Primer on the Gas Tax" (Washington: Brookings Institution, 2003).

largest in the country and carries the fourth largest amount of truck freight in the country.[2] Demands to use highway funds to attract and retain employers complicate highway allocation decisions, as do demands to redirect highway dollars toward alternative transportation uses, ranging from mass transit to recreational bikeways.

However, in Ohio, as in other states, an anti-urban bias distorts how transportation dollars are spent. Urban areas often act as "donors," contributing more transportation funds than they get in return. In this fashion, transportation funds continue to flow disproportionately to rural parts of the state, even though urban areas have the preponderance of people, vehicles, gas tax payments, and roadway expenses.

This report documents the long-standing fiscal mismatch between transportation revenues and responsibilities in Ohio. It offers a history of highway spending at the federal and state levels, a description of the responsibilities of, and revenues available to, different levels of government, and an analysis of spending patterns in Ohio from 1980 through 1998. In the end, the paper argues that Ohio must take steps to ameliorate the current mismatch between transportation funding and roadway responsibility.

[2] Ohio Department of Transportation, "Financial and Statistical Report" (2002). Available at www.dot.state.oh.us/finance/Annual/Annual2002.pdf.

II. HIGHWAY FUNDING IN OHIO

In Ohio, as in a number of other states, the system of transportation finance is a historical relic that was put in place initially to build the highway system. In 1904, the Ohio General Assembly created the State Highway Department to study the physical makeup of highways and their repair.[3] At the time, the state government faced two critical transportation challenges: to tie together major economic and population centers with a system of highways, and to end rural isolation by tying rural Ohio to the growth areas.

In the early 20th century, municipalities were constructing citywide arterials, connecting them to a few suburban municipalities.[4] Municipalities and urban counties had the ability to finance their own needs because they were home to most of the state's industrial and property wealth. They used a combination of local property taxes and municipal bonds to pay for road construction before gasoline taxes became available.[5] In fact, early annexations by central cities were often motivated by the desire of then-rural residents to gain municipal services, especially roads, municipal water, and sanitation services. Building these services required access to either the purse of the central city or to its bond floats. Rural townships and unincorporated places, by contrast, lacked the tax base to pay for these improvements and, frequently, so did their counties. Consequently, the state agreed to pick up the cost of county and state roads to connect isolated villages to regional economies. To pay for these projects, states such as Ohio instituted a tax on gasoline.

Today, transportation funding in Ohio is financed primarily through a variety of state and federal sources. The Ohio Department of Transportation's (ODOT) total biennium budget for the 2000–2001 state fiscal years was $4.37 billion, the sources of which are illustrated in Figure 1.[6]

---

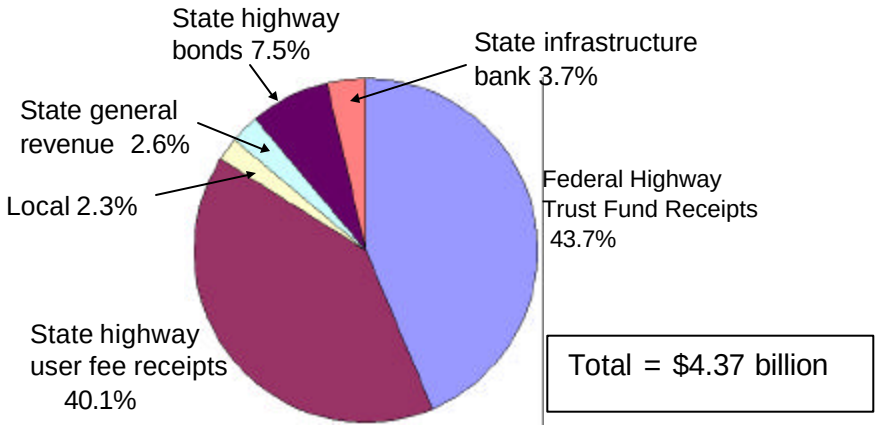
[3] In 1882, the Ohio General Assembly created the Ohio Highway Commission to determine whether the state needed better roads. It concluded that public highways would be better left to local governments rather than to the state.

[4] An arterial is generally a large road designed to handle a relatively large amount of traffic traveling at a relatively high speed.

[5] Jeffery Brown, "Reconsider the Gas Tax: Paying for What You Get." *Access* 19 (Fall) (2001): 10–15.

[6] Figure 1 reflects expenditures by the state DOT, but not distributions to local governments.

Figure 1. Ohio Department of Transportation, FY 2000– 2001 Appropriations Budget by Fund



Source: Ohio Department of Transportation, "FY 2000–2001 Appropriations Budget By Fund" (2002). Available at www.dot.state.oh.us/finance/Budget.htm (2001).

A. Gas Taxes

The federal revenues that flow to the state are derived from the federal gas tax, currently levied at 18.4 cents per gallon. These revenues flow directly into the Highway Trust Fund (HTF), which is administered by the Federal Highway Administration to support highway spending. HTF dollars are then redistributed to the states for transportation spending within the parameters, policies, and programs established at the federal level.[7] Other federal highway user taxes include taxes on diesel fuel, gasohol, special fuels, and various truck-related taxes, including the tire tax, truck and trailer sales tax, and heavy vehicle use tax.[8]

Ohio's state gas tax (or motor fuel tax, which along with the federal gas tax, is actually a motor fuel producers' or distributors' excise tax levied on dealers, wholesalers, and refiners) has remained at 22 cents per gallon since 1993 (Figure 2), and generates approximately $1.4 billion each year.[9] The motor fuel tax is also levied on diesel fuel and special fuels sold in Ohio. ODOT

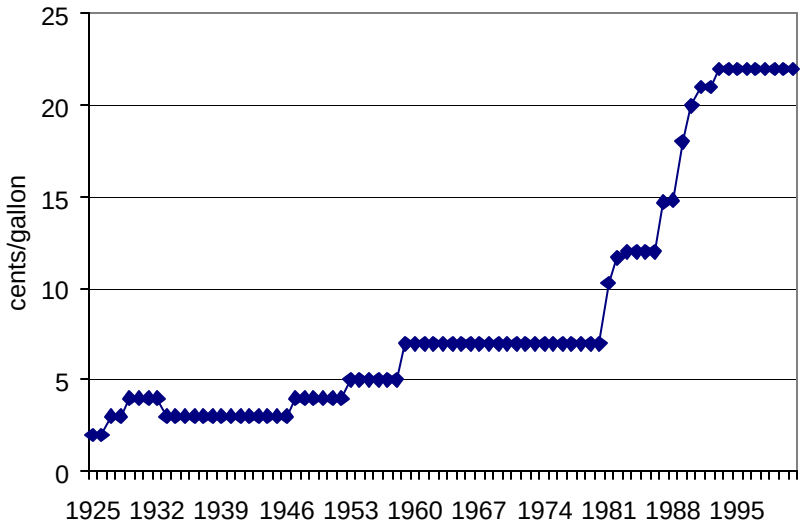
[7] The federal gas tax is divided as follows: Approximately 15.44 cents accumulates in the Highway Account, with the remainder distributed to the Mass Transit Account (2.86 cents) and the Leaky Underground Storage Tank trust fund (0.10 cents).

[8] Gasohol is a type of motor fuel that contains a mixture of gasoline and ethanol (about 10 percent alcohol) derived from cereal grains or grain by-products. Gasohol emissions contain less carbon monoxide than those from gasoline.

[9] Prior to 1993, increases in the state gas tax were directly tied to inflationary pressures. However, the use of this variable rate formula expired in the state fiscal year 1992–1993 budget bill.

administers state highway programs in accordance with federal and state laws, policies, and procedures.[10]

Figure 2. Ohio Gas Tax Rate in Cents per Gallon



In 2001, 41.1 percent of the transportation revenues employed by Ohio on its state-administered highways derived from state gas tax revenues.[11] In Fiscal Year (FY) 2000, the state directly spent 70.9 percent of the $1.4 billion in revenues generated by the state gas tax, with 63.9 percent going into the State Highway Operating Fund and 6.9 percent to the State Highway Bond Retirement Fund (Table 1). The remaining funds were distributed to local governments based on the following statutory formulas:

- The county share ($123.3 million, or 8.8 percent of total state gas tax collections) is divided equally between all 88 counties and is principally devoted to supporting county highway engineering staffs.
- The township share ($66.3 million, or 4.7 percent of collections) is divided equally between all state townships.
- The municipality share ($142.1 million, or 10.1 percent) is divided according to each municipality's share of statewide motor vehicle registration.

[10] In addition to the gas tax, two principal highway use taxes are charged to commercial vehicles operating within the state. The first is an annual license tax, based on the weight of the registered vehicle. The second is an additional 3 cents per gallon diesel surcharge. Commercial operators file a multi-state tax return and pay the amount owed to each state based on fuel purchases and relative miles traveled in each state. The highway use taxes, which are dedicated to bond retirement, generate about $190 million per year.

[11] Federal Highway Administration, "Highway Statistics Series, 2001," Table SF-1 (2002). Available at www.fhwa.dot.gov/policy/ohpi/hss

It is important to note that in Ohio, as well as 29 other states, gas tax receipts are restricted to spending on the highway system only. In other words, the funds not only cannot be spent on nontransportation items such as debt reduction, but they cannot be spent to finance congestion and air quality projects, mass transit, or other options unrelated to highways.

Table 1. Ohio Gas Tax Distributions, Fiscal Year 2000 (in $millions)

Distribution	Dollar Amount	Percent of Total
State	995.5	70.9
State Highway Operating Fund	898.3	63.9
State Highway Bond Retirement	97.2	6.9
Local	331.7	23.6
Distributions to Municipalities	142.1	10.1
Distributions to Counties	123.3	8.8
Distributions to Townships	66.3	4.7
Local Transportation Improvement Program	63.5	4.5
Other*	14.2	1.0
Total	$1,404.9	100%

*Includes Grade Crossing Fund, Waterway Safety Fund, and distributions to the Ohio Turnpike Commission.
Source: Ohio Department of Taxation, "2000 Annual Report."

One cent of the gas tax is dedicated to the Local Transportation Improvements Program, which was created by the legislature in 1989. These funds are available for local road, bridge, and culvert improvement projects and are administered in conjunction with the State Capital Improvement Program (SCIP). The SCIP (also known as the Issue 2 Program) allows the state to use its general revenues to support and issue up to $120 million in infrastructure bonds each year. These bonds offer financial assistance (loans, grants, and credit enhancement) to local governments to improve their basic infrastructure, including roads, bridges, and culverts. Projects are selected for funding assistance by 19 public works districts' integrating committees throughout the state.

B. The Motor Vehicle License Tax

The motor vehicle license tax (also known as vehicle registration fee) was first enacted in 1906 at $5 per vehicle. Subsequent changes instituted different fees for different types of vehicles and increased the rate.[12] During FY 2000, vehicle license taxes generated $451.9 million.[13] All the money is earmarked for highway purposes. After bond retirement obligations and administrative expenses are met, license tax revenues are distributed as follows:

[12] Counties may levy a $15 per vehicle tax. Municipalities within counties that have levied the full $15 tax may levy an additional $5. Municipalities in counties that have not levied any permissive taxes may levy a $20 tax. Townships can levy a $5 dollar tax regardless of the county's levy. Total local levies cannot exceed $20 per vehicle.

[13] Ohio Bureau of Motor Vehicles, "2002 Tax Distribution Summary Statement of Motor Vehicle Registrations" (2003). Available at www.state.oh.us/odps/division/bmv/03-3taxdst.html

- 34 percent to the municipal corporation or county of registration;
- 47 percent to county in which vehicle owner resides;
- 9 percent to counties based on their relative share of county roads within the state;
- 5 percent to townships based on the distribution formula discussed above; and
- 5 percent is divided equally among Ohio's counties.

C. Bonds and Other Revenue Sources

Ohio has used bond funds since 1954 to supplement the motor fuels tax, license fees, and other highway revenue sources. In November 1995, voters approved an amendment to increase the annual bond issuance limit to $220 million, with total outstanding debt limited to $1.2 billion. This increased bonding authority ended in 1997, and all related bonds will be retired by FY 2005. ODOT's annual bond issuances were limited to $220 million from FY 1996 through FY 2000, after which annual bond sales cannot exceed $100 million per year.

ODOT also sponsors a variety of other programs that allow local governments to access federal funds. These programs include an urban paving initiative, an enhancements program, and county, city, and high-cost bridge programs. In FY 2002, these programs totaled about $132 million, about one-tenth the amount generated from the state gas tax. Other local funding programs involves allocating federal funds to metropolitan planning organizations (MPOs) and to cities that are not large enough to have an MPO. These funds totaled $128.8 million in FY 2002, down from $139 million in ODOT's 2001 capital program.[14] The MPO is composed of local elected officials, transportation system operators, and appropriate state officials. The 16 MPOs in the state serve as regional forums for determining each region's transportation system needs, priorities, and financial resources. These planning processes are coordinated with the statewide planning process, the Transportation Plan and the Transportation Improvement Program (TIP). Local governments work with ODOT district offices as well as their MPO to plan and coordinate road and bridge projects within their jurisdiction.

D. Purposes of Finance Systems

There are three purposes for the current system of transportation finance in Ohio. The first is primarily economic—to facilitate trade and to connect places of work and places of residence. This argues for breaking away from county-based systems of highway decision making (including engineering) to one that serves functional regional economies. The second is to provide funds to maintain the highway system that has been built over the past century. This argues for distributing funds based on traffic volume and for emphasizing the centrality of a roadway to a region's transportation system. The third purpose, in terms of the gas tax, is to internalize the cost imposed

[14] Ohio Department of Transportation, "Central Ohio Transportation Workshop," available at www.dot.state.oh.us/finance/budget/tranfunding.pdf (2002).

on society by the various users of the system. This includes the direct costs of wear and tear by different types of highway users, and it argues for including the external costs on air quality and other environmental resources that are generated by highway traffic.

The remainder of this paper assesses how Ohio's system of transportation finance fulfills these purposes.

III. ROLES AND RESPONSIBILITIES FOR OHIO'S ROADS

Despite this array of funding sources, Ohio's roadway funding system creates a fundamental fiscal mismatch between jurisdictions with differing needs and responsibilities. In Ohio, local governments are generally responsible for maintaining, improving, and preserving the streets, highways, and bridges that are not the state's responsibility. The 2,345 local governments in Ohio are identified either as municipalities (there are 940 of these), townships (1,317), or counties (88). Municipalities are incorporated places with powers of local self-government, and municipalities with populations greater than 5,000 are considered cities. Townships are unincorporated areas of counties that provide a number of public services similar to municipalities. Some townships have larger populations than cities. Counties function as broad general-purpose governments in Ohio.[15]

Counties are responsible for county roads outside municipalities and for bridges on state and U.S. highways within municipalities that are over waterways. Incorporated municipalities or cities take care of roads in their jurisdictions (except the state roads and interstate highways). Townships are responsible for township roads; however, the major arterials within townships are frequently classified as county roads. Thus, unincorporated areas can rely the county to provide services such as engineering, maintenance, and inspection of roads, which are financed by the county directly through taxes or indirectly by other revenues, such as grants.[16] By contrast, incorporated municipalities cannot rely on counties for such funding.

Counties are responsible for more than 58,000 lane miles of roadways and 27,000 bridges. Municipalities are responsible for 74,000 lane miles and 2,000 bridges. Townships oversee about 88,000 roadway miles but no bridges. A recent report from the Ohio Public Works Commission found that, together, these local governments need about $12 billion for their roads and bridges: municipalities need $8.2 billion, counties need $2.8 billion, and townships need $922 million.[17]

ODOT is responsible for coordinating the entire state highway system, including the interstate system, but it is only responsible for developing projects that are outside urban areas. Generally, this leaves municipalities with primary responsibility for all streets and highways except interstates, the counties with responsibility for county routes outside municipalities, and townships with responsibility for township roads.

State highways, as defined by Section 4511.01 of the Ohio Revised Code, are "under the jurisdiction of the department of transportation, outside the limits of municipal corporations." The remaining streets and highways, including bridges, are the responsibility of the municipalities, counties, and townships. The state takes responsibility for state highways that run through municipalities as long as they "look" and function like interstate highways. That is, they must be

[15] Metropolitan Area Research Corporation, "Cincinnati Metropatterns" (2001).
[16] Hugh Hinton and Michael Beazley, "Analysis of the Fiscal Impact of Public Service Delivery Practices in Lucas County, Ohio" (University of Toledo Urban Affairs Center, 2002).
[17] Ohio Motor Fuels Task Force, "Study of the Adequacy and Distribution of the Motor Fuel Tax" (2002).

limited-access roads with entrance and exit ramps and with no impeding intersections. In practice, ODOT has accepted a much broader scope of work by helping municipalities with major highway and bridge projects.

Many of the roads ineligible for state support lie within the jurisdiction of municipalities, but part of much bigger networks. However, as this report demonstrates, cities receive a disproportionately small share of this revenue base, forcing them to use municipal income, property taxes, and local vehicle license tax revenues to pay for their portion of the region's transportation system. In addition, some wealthier inner-ring suburbs dedicate all of their estate, or inheritance, tax receipts to these capital accounts.

ODOT has made funding fairer by implementing policies and programs to help local governments meet their maintenance responsibilities and has improved the way funding is distributed to its district offices. Ohio's General Assembly has also recognized this fiscal mismatch to some extent, and initiated programs and revenue sources over the last 20 years to assist municipalities with their responsibilities. The Ohio Public Works Program, the Local Transportation Improvement Program, and local vehicle license tax options all provide greater funding opportunities to local governments for road improvements. These funding sources, however, remain small and piecemeal compared with the funding sources that cities cannot directly access or that send millions of dollars disproportionately to rural areas on the suburban fringe.

The problems with this intergovernmental fiscal arrangement range from potential fiscal distress to distortions of development patterns. As existing roads age, they require not only periodic resurfacing but eventual comprehensive rebuilding. Therefore, older cities face a dilemma. Do they undertake the repairs and rebuilding or endanger their budgets and bond ratings, or do they let the streets and roads deteriorate and endanger their economic and residential base? Another problem stems from the fact that the apportionments of gas tax revenues to local governments do not reflect the relative needs of different areas. For example, in Ohio the county portion of the distribution formula disburses funds equally to the state's 88 counties without regard to population, vehicle registrations, traffic volumes, gas tax payments, or miles of roadway. This ensures that counties with modest needs garner the same funding as counties with vast needs.

Current state laws fail, moreover, to recognize the fiscal burden that municipalities face in maintaining older roadways. Nor do state laws recognize important management differences between urban and rural areas. For example, county highway departments receive funding from the state to support their engineering staffs, while municipalities receive no such funding. This puts central cities and inner-ring suburbs (especially low-income suburbs) at a severe disadvantage in creating roadway funding proposals and bid documents and in supervising construction projects.

The next section examines the distribution of highway spending within Ohio to determine whether current laws and allocations create an anti-urban bias.

IV. AN ANALYSIS OF STATE HIGHWAY SPENDING

To determine how Ohio has been spending its highway dollars, we relied on several sources, outlined in the Appendix. Primarily, we analyzed a database maintained by ODOT identifying all highway contracts let by the state from 1980 to 1998. The database includes location, dollar amount, and type of activity. The activities are grouped into three categories: new construction, rehabilitation, and maintenance.

New construction includes contracts for new highway infrastructure—lanes, exits, and roads. Rehabilitation refers to major reconstruction efforts, such as bridge replacements and highway rebuilding (rather than resurfacing). Maintenance includes road resurfacing and other repair work.

To assess the fit between need and spending in Ohio, the analysis that follows considers a number of indicators that approximate demand for highway investment funds as well as the source of significant portions of those funds. This analysis indicates that Ohio's rural counties have fared significantly better than either urban or suburban counties on almost all indicators of state spending. The indicators employed in this assessment include:

- Highway spending per average daily vehicle miles traveled (VMT) on the entire road and highway system
- Highway spending per dollar volume of retail gasoline sales in each county
- Highway spending per total vehicle registrations in each county
- Highway spending per total lane miles in each county

These indicators are calculated for each county and then aggregated by county type (e.g., rural, urban, suburban). The federal government uses these indicators to allocate highway funds to the states.

Although it would seem that highway spending for expansion (new construction), maintenance, and rehabilitation would be higher in counties with greater roadway use, this is not the case. Road and highway spending in Ohio does not reflect the responsibilities that municipal governments have in maintaining and improving the roadway system.

What follows, then, examines each of the indicators. The annual data are first graphed for each indicator during the 19-year period, then aggregated and presented in a table of expenditures by the type of county.

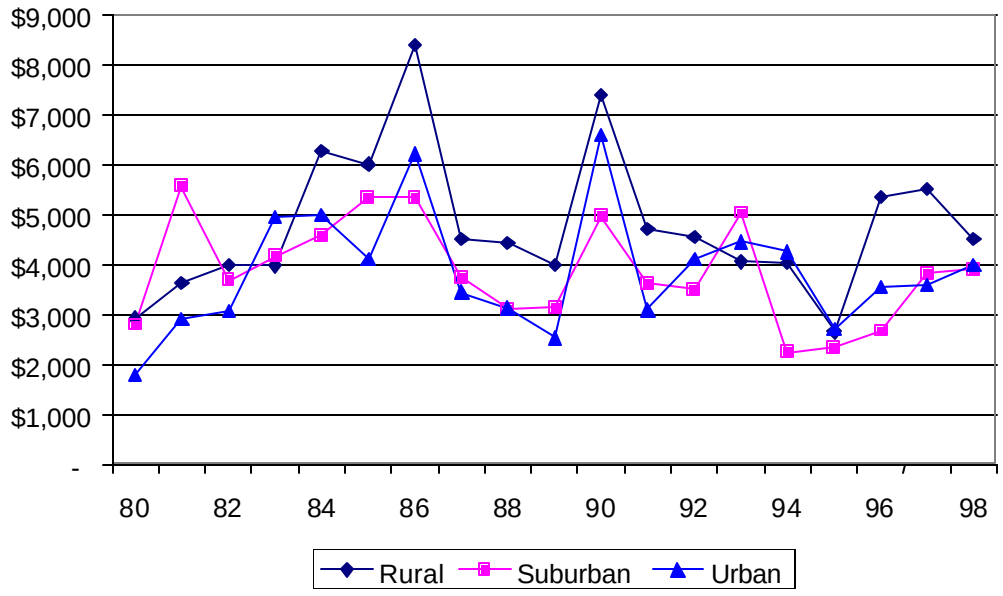
A. Highway Spending Compared to Average Daily Vehicle Miles Traveled

With wear and tear on roads comes demand for highway maintenance and improvement dollars. This demand is best suggested by average daily VMT on the state highway and municipal roadways in a given year. If the system of highway expenditures is indeed efficient, then

expenditures should closely parallel use. However, in Ohio it does not. In most years, rural counties spend more on state transportation relative to average daily VMT (combining travel on both the designated state system and municipal streets) than did suburban or urban counties. Rural counties received the highest relative amounts of spending, based on average daily VMT, for all but four years from 1980 to 1998.

Figure 3 shows annual highway construction expenditures for each 1,000 daily highway miles driven over the entire roadway system, by type of county in 1999 inflation-adjusted dollars.[18]

Figure 3. Highway Spending per Thousand Daily Vehicle Miles Traveled by County Type, 1980–1998



Totaling highway contracts over the 19-year period reveals the clear rural bias in funding (Table 2). Total highway spending is similar in suburban and urban counties, and both receive far less than even the state average. Table 2 shows that rural areas obtain more than urban and suburban counties in every category except new construction, for which the urban counties actually ranked highest.[19] Overall, highway spending between 1980 and 1998 in rural areas exceeded that in suburban counties by 25 percent and that in urban areas by 24 percent.

[18] Vehicle miles traveled are average daily figures estimated by ODOT. These figures were unavailable for each year, and therefore were estimated using the data available as described in the methodology section of the Appendix.

[19] This is likely because rural and, to some extent, suburban highway construction costs far less than urban highways, mainly because of infrastructure displacement. Costs depend, generally, on degree of urbanization, terrain, and complexity. Typical urban highways cost up to five times as much as a typical rural highway, and in many instances are far greater. See John M. Cobin, "Market Provisions of Highways: Lessons from Costanera Norte," *Planning and Markets* 2 (1) (1999). The higher amount of new construction

Table 2. Total State Spending Per Thousand Daily Vehicle Miles Traveled on the Total Roadway System, 1980–1998 (1999 dollars)

	Maintenance ($)	New Construction ($)	Rehabilitation ($)	Total ($)
Rural	13,481	11,591	66,305	91,377
Suburban	12,704	9,186	50,970	72,860
Urban	11,590	14,284	47,767	73,641
State Average	**12,366**	**12,076**	**52,944**	**77,386**

Source data is from the Ohio Department of Transportation with calculations by the authors.

Map 1 depicts total highway spending from 1980 to 1998 per average mile traveled. These are the same data as displayed Figure 3 and Table 2, but the data were converted into an index to simplify interpretation. The index represents the balance between the demand for highway spending (road use) and the amount spent, as represented by the percentage difference between each county and the median county in highway construction contracts let per average mile driven.[20] The median counties are Hancock and Muskingum. Light colors in Map 1 represent counties with index values below the median, and colors darken as the index value increases.

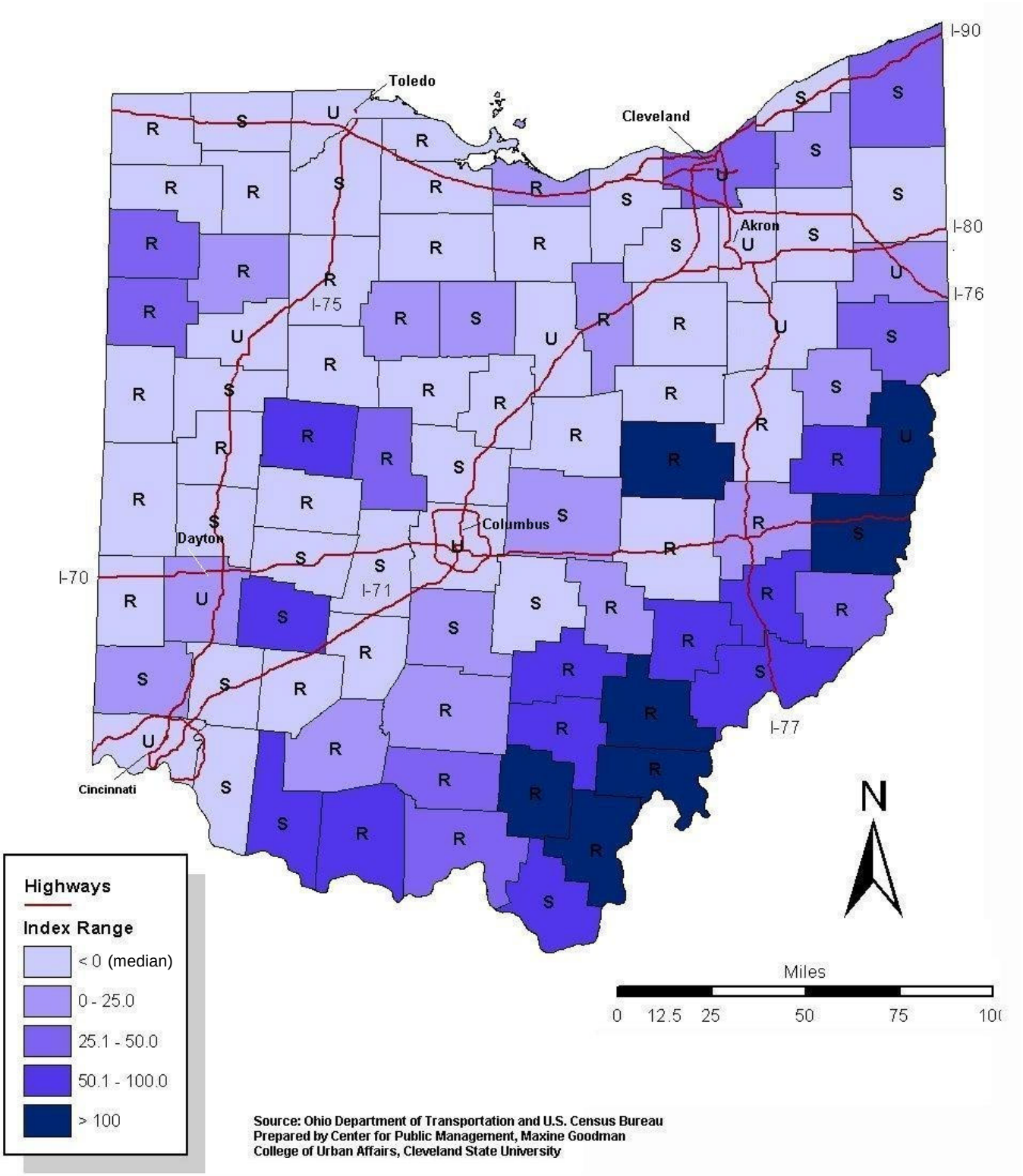
in urban areas owes almost entirely because to interstate highways, many of which contain many miles of bridges and overpasses.

[20] The index was formed by subtracting the median value (by county) of total highway contracts let per average total miles driven from the value of total highway miles driven per average total miles in each county, then dividing that number by the median and multiplying the total by 100. This allows the index to be interpreted as the percentage difference from the median amount. Spending data are the sum of spending over the entire time period, adjusted for inflation. Average daily vehicle miles traveled for each county is the average of use in 1982, 1987, 1992, and 1997.

The map shows that the Appalachian counties in the southeast corner of the state enjoyed the highest spending levels per vehicle mile traveled. The lowest relative spending is in the suburban and rural counties along Ohio's three major interstate highways: the north-south I-75 in the western portion of the state that carries traffic from southeast Michigan through Cincinnati, through the "auto alley;" I-71 from Cleveland to Columbus to Cincinnati (the "three C" corridor); and the east-west Ohio Turnpike (I-80).[21] Ohio's urban counties were grouped in the lowest three spending categories. The counties housing Akron, Canton, Cincinnati, Columbus, Lima, Mansfield, and Toledo all fell below the median (shown in the lightest colors on the map). The counties that are home to Dayton and Youngstown fell between the median and 25 percent above the median. Cuyahoga County, home to Cleveland, is 42 percent above the median, and Steubenville's county is in the highest spending bracket.

[21] "Auto alley" is so called because it links Detroit with auto plants and supply facilities in metropolitan Dayton with the new concentration of plants in Kentucky and Tennessee.

Map 1: Index of Capital Expenditures (1980-1988) per Average Vehicle Mile Traveled: Ohio Counties (1982, 1987, 1992, 1997)



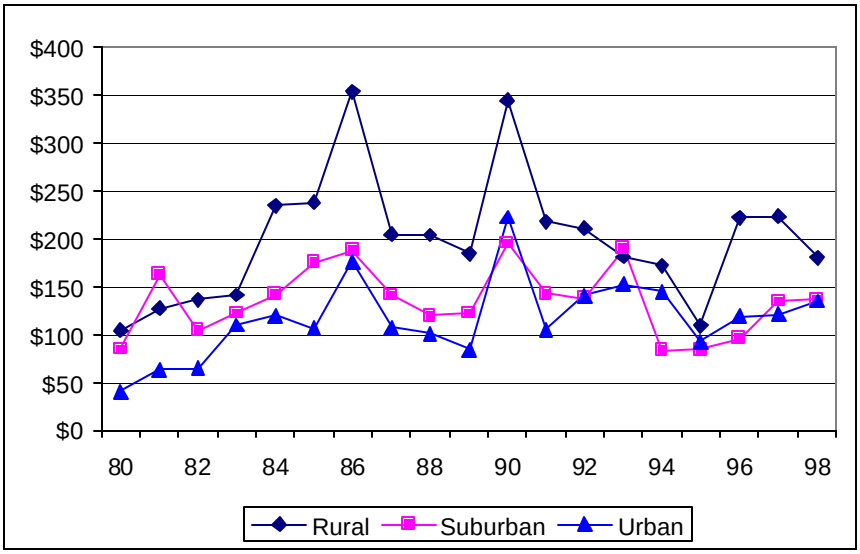
Source: Ohio Department of Transportation and U.S. Census Bureau
Prepared by Center for Public Management, Maxine Goodman
College of Urban Affairs, Cleveland State University

B. Highway Spending Compared to Gasoline Sales

Transportation funds are generated mainly from the tax on gasoline sales. Gasoline sales by county, therefore, provide a good indicator of the demand for vehicle use—and thus the roadway network—in a particular place. Data on gas taxes are approximated based on total retail sales at gasoline stations by county, using data from the U.S. Economic Census. To estimate sales values for the inter-census years, we calculate a moving average. Unfortunately, we could not use data on actual gasoline tax collections because the Ohio Department of Taxation neither tabulates the data nor makes them available to the public.[22] The economic census provides data on total sales by retail gasoline stations, but does not specify motor fuels sales; therefore, receipts from repairs and sales of groceries and sundries are also included in the data. Despite these problems, the census offers the best approximation of where motor fuels tax revenues are generated by county. Comparing these data to county data on highway contracts is an excellent, if admittedly rough, measure of spending equity.

Employing these measures, we find large discrepancies between types of counties where highway contracts are let and the types of counties where retail gasoline sales take place. Figure 4 shows that rural counties again had the highest spending levels in all but two years between 1980 and 1998 relative to sales at gasoline stations.

Figure 4. Highway Spending per Retail Sales in Gasoline Stations, 1980–1998



[22] Gasoline tank truck drivers record the data on fuel deliveries on their route sheets when they make deliveries. The retailer pays the tax to wholesalers based on the volume of gasoline delivered, which the wholesaler then forwards to the Department of Taxation. The department retains the route sheets but does not code the information or make it available to the public.

When these statistics are totaled for the 19-year period, highway spending in rural counties exceeded that in suburban and urban areas by 46 percent and 62 percent, respectively. Rural investments in road maintenance, new construction, and rehabilitation all exceeded those of all other counties (Table 3).

Table 3. Total Highway Spending per Retail Sales at Gasoline Stations, 1980–1998 (1999 dollars)

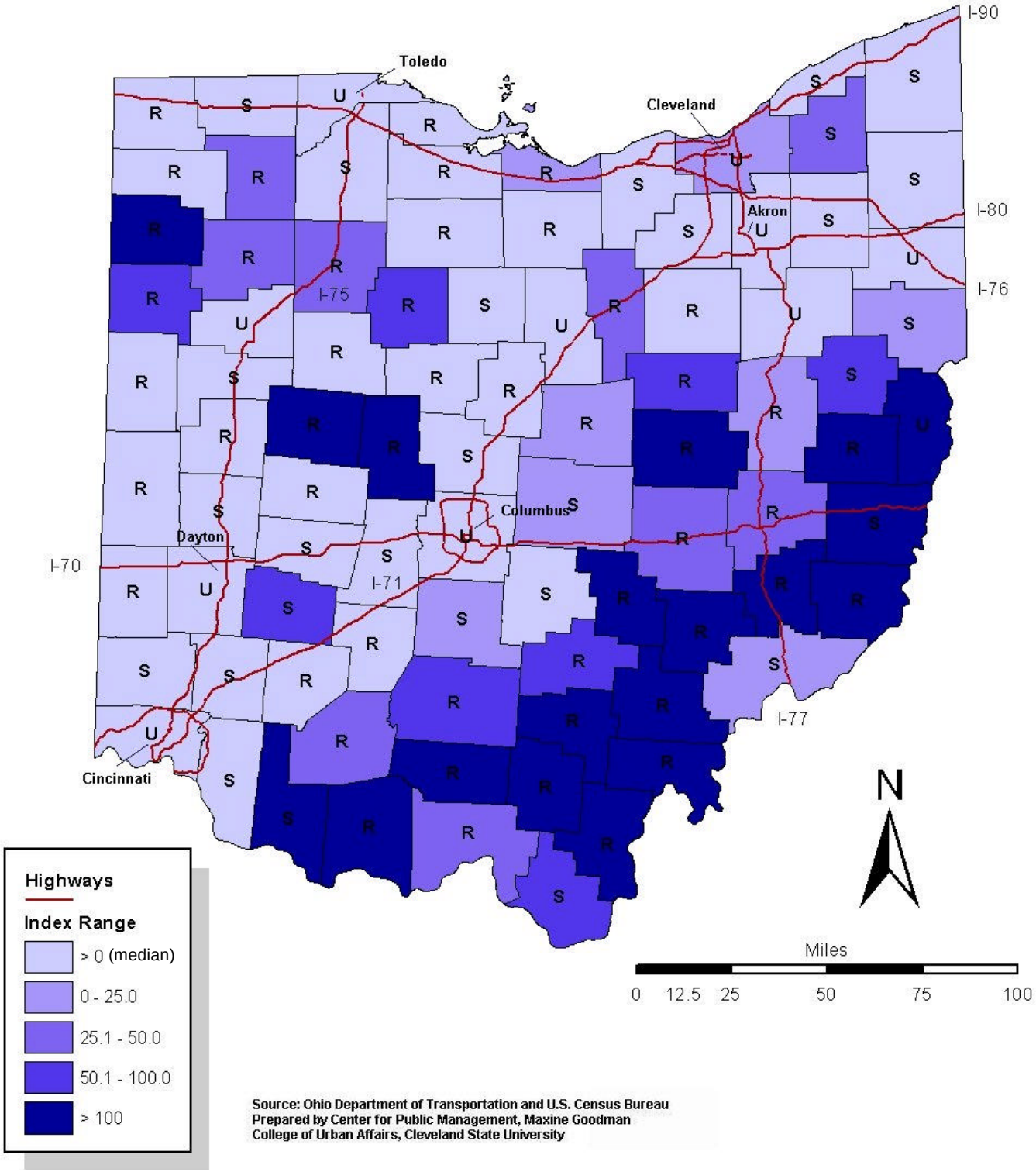
	Maintenance ($)	New Construction ($)	Rehabilitation ($)	Total ($)
Rural	551	474	2,712	3,738
Suburban	445	322	1,785	2,552
Urban	362	446	1,493	2,301
State Average	**423**	**413**	**1,812**	**2,649**

Source data is from the Ohio Department of Transportation with calculations by the authors.

As before, Map 2 reveals clear disparities between rural and urban-suburban locales in highway contracts let per average dollar of retail gasoline sales; urban and suburban counties produce considerably more in retail gas sales than they receive in ODOT contracts.[23]

[23] Map 2 represents an index created by calculating the percentage difference in highway construction contracts let per average dollar volume of retail sales in gasoline stations (an approximation of the location of gasoline tax collections) between each county in Ohio and the median county.

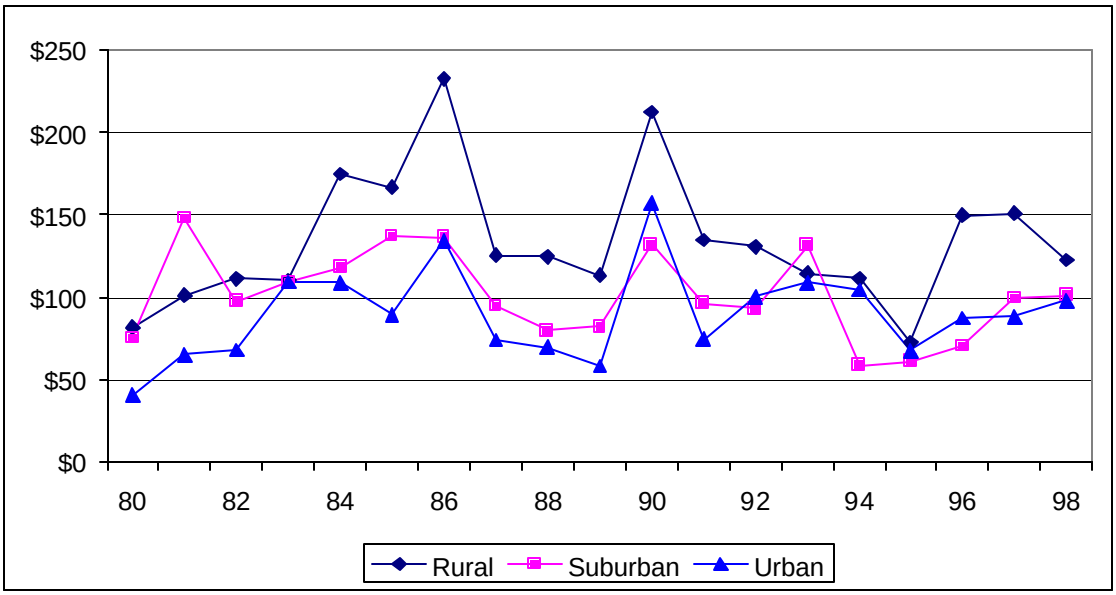
Map 2: Index of Total Spending by ODOT (1980-1988) per Average Dollar of Gas Sales: Ohio Counties (1982, 1987, 1992, 1997)



C. Highway Spending Compared to Registered Vehicles

Vehicle registrations by county also indicate demand on roads. The value of highway contracts per registered vehicle was the highest in rural areas in every year since 1983 but one. Spending in suburban areas exceeded those in urban areas 12 of the 19 years analyzed (Figure 5).

Figure 5. Highway Spending per Registered Vehicles by County Type, 1980–1998



Total highway spending in rural areas during the 19-year period exceeded spending in suburban and urban areas by 34 and 48 percent, respectively. Only in new construction did urban counties outspend others (Table 4).

Table 4. Total Highway Spending per Vehicle Registrations, 1980–1998 (1999 dollars)

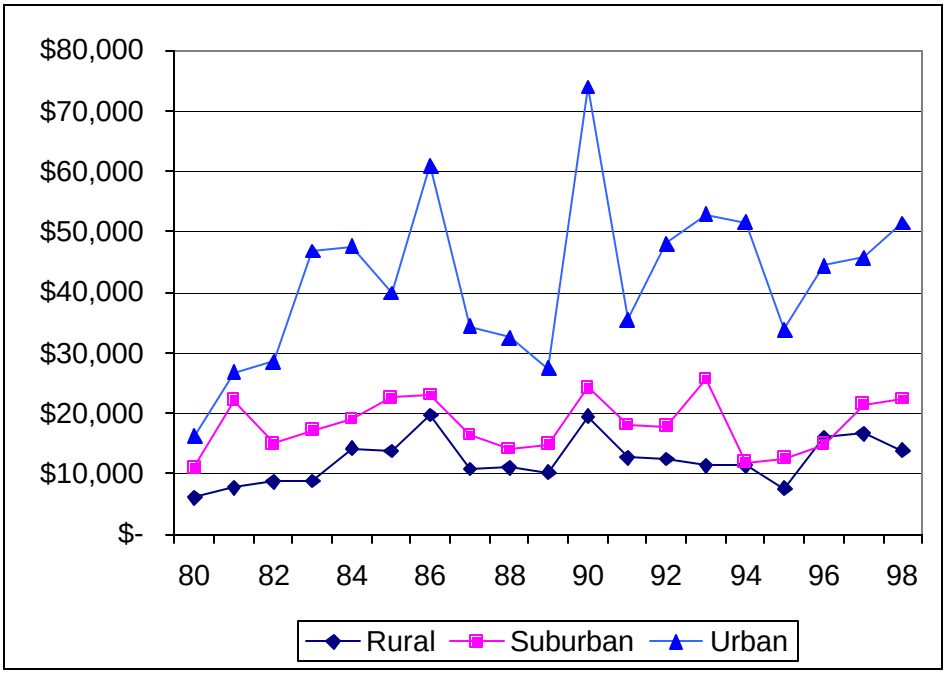
	Maintenance ($)	New Construction ($)	Rehabilitation ($)	Total ($)
Rural	369	317	1,815	2,502
Suburban	326	236	1,309	1,871
Urban	267	329	1,100	1,695
State Average	**306**	**298**	**1,308**	**1,912**

Source data is from the Ohio Department of Transportation with calculations by the authors.

D. Highway Spending Compared to Lane Miles of Roadway

Urban counties contain only 21 percent of the state's total roadway lane miles (see Appendix Table 2). However, urban areas receive more highway investments per lane miles than suburban and rural areas. This is not because urban areas contend with the greatest needs, but because the highway projects in urban areas are the most expensive. It is more expensive to build and rehabilitate highways in urban areas than in rural areas. In addition, two of Ohio's most populous counties, Cuyahoga and Hamilton, possess extensive bridge networks, which tend to be much more costly to rehabilitate than the regular roadway.

Figure 6. Highway Contracts per Lane Mile, by County Type, 1980–1998



During the 19-year period, total highway spending by lane mile was highest in urban counties, followed by suburban and, finally, rural counties. These trends were consistent in all three spending categories (Table 5).

Table 5. Total Highway Spending Contracts per Lane Mile, 1980–1998 (1999 dollars)

	Maintenance ($)	New Construction ($)	Rehabilitation ($)	Total ($)
Rural	34,367	29,549	169,030	232,947
Suburban	60,171	43,510	241,411	345,092
Urban	125,732	154,957	518,195	798,884
State Average	**62,742**	**61,271**	**268,633**	**392,646**

Source data is from the Ohio Department of Transportation with calculations by the authors.

To be sure, no one perfect piece of data measures the demand, or "need," for highway funds, the degree of redistribution by locale, or the impact of highway spending on the budgets of different levels of government. However, using the indices we have compiled, we find a consistent anti-urban bias in Ohio's highway programs. That urban areas receive more highway dollars per lane mile than other jurisdictions does not make highway financing equitable. It only verifies that urban roads are expensive to build and repair. The other two indicators are better measures of the amount of vehicle use on the roadway network. That urban areas consistently receive far fewer highway dollars than other areas for all their vehicle miles traveled, number of registered vehicles, and high demand for gasoline shows that urban areas are getting the short end of the financial stick relative to the wear and tear on their roads.

One cause of bias stems from preventing arterials within municipalities from qualifying for state and motor fuels tax funding. The array of special programs that have been instituted remains insufficient to offset this fundamental bias and to overcome a historical legacy of highway building. A second source of bias lies within highway expenditures for maintenance. Again, this is no surprise. If there are incentives within funding programs to overbuild in rural counties, then requirements to maintain what was built will create a rural tilt in maintenance programs.

Further exacerbating the rural bias in Ohio's highway spending programs are the distribution formulas for how the gas and registration taxes are distributed to local governments. This issue is treated in the next section.

E. Behind the Spending Trends: Disparities in Distribution Formulas

Almost 60 percent of Ohio's highway funds come from the gasoline tax and vehicle registration. A significant portion of these revenues is distributed to local governments to build, improve, and maintain their roadways. The formulas used to distribute these revenues are also biased toward rural areas.[24]

[24] This is true, with one caveat. There is some overlap between the state spending statistics and the

In this section, we analyze funds distributed to local governments (counties, municipalities, and townships) from the gas tax and the vehicle registration tax. We totaled these funds by county and grouped them as rural, suburban, or urban county, and compared these figures to the three indicators of highway funding demand (vehicle miles traveled, retail sales at gasoline stations, and vehicle registrations), and to the number of lane miles of roadway. Once again, urban counties fared the worst, and rural the best, when revenue distributions were compared with every indicator of demand. These trends are reflected in Table 6.

Table 6. Gas Tax Distributions by County Type, 1984–1999 (in constant 1999 dollars)

County Type	Gas Tax Distributions by Vehicle Registrations ($)	Gas Tax Distributions per Average Daily Vehicle Miles Traveled ($)	Gas Tax Distributions by Retail Sales at Gasoline Stations ($)
Rural	899	29,519	1,348
Suburban	466	16,744	636
Urban	325	12,259	441
State Average	**485**	**17,505**	**673**

Sources: Ohio Bureau of Motor Vehicles, Ohio Department of Transportation, Census of Retail Trades, and U.S. Census Bureau.

Note: Gas sales, registered vehicles, and vehicle miles traveled are averages over the 1984–1999 period.

This discrepancy occurs because county and township distributions of the gas tax (as discussed above) are split evenly between jurisdictions. In other words, Cuyahoga County (1.4 million people) receives the same share of the gas tax collections as rural counties such as Harrison County (15,000 people). Only municipalities received funding based on an appropriate indicator—the municipality's share of statewide motor vehicle registration.

The distribution formula for motor vehicle registration tax also favors less-populated counties. Vehicle registration allocations are lowest in urban counties, higher in suburban counties, and highest in rural areas when compared with vehicle registrations, vehicle miles traveled, and retail sales at gasoline establishments (Table 7).

distribution statistics that was impossible to sort out from the database. To the extent that local gas tax and state-collected registration tax distributions were used as a local match on a project that used state and/or federal funds, there will be some overlap between the two sets of analyses. On the other hand, the distribution formulas present a double disadvantage to municipalities because they then have less matching money for state and federal projects than the rural areas that receive greater amounts of these funds.

Table 7. Vehicle Registration Tax Distributions by County Type, 1984–1999 (in constant 1999 dollars)

County Type	Vehicle Registration Tax Distributions by Vehicle Registrations ($)	Vehicle Registration Tax Distributions by Average Daily Vehicle Miles Traveled ($)	Vehicle Registration Tax Distributions by Retail Sales at Gasoline Stations ($)
Rural	40.09	1,507	60.22
Suburban	28.14	1,137	38.47
Urban	23.70	956	32.32
State Average	**28.62**	**1,137**	**39.84**

Sources: Ohio Bureau of Motor Vehicles, Ohio Department of Transportation, Census of Retail Trades, and U.S. Census Bureau.
Note: Gas sales, registered vehicles, and vehicle miles traveled are averages over the 1984–1999 period.

Although 81 percent of the vehicle registration funds are distributed to the county in which a vehicle is registered, 19 percent are not. Furthermore, 14 percent of the total is allocated according to the relative proportion of county and township roads in the state. Such roads are not prevalent in urban counties owing to the fraction of land in urban counties that is incorporated. For example, Cuyahoga County has only 38 miles of county and township roads, while Guernsey County, a rural county in southeast Ohio, has 1,010.

V. POLICY RECOMMENDATIONS

The analysis of transportation spending in Ohio reveals that rural counties receive more funds than urban and suburban counties, even though their highway needs and automobile use, as measured by vehicle miles traveled, retail sales at gasoline stations (our proxy for gasoline sales volumes), population, vehicle registrations, and lane miles, are less. Total contracting expenditures were highest in rural areas for all indicators except lane miles. These findings are important in policy debates of whether states receive their "fair share" of the federal gas tax.

When the highway system was being built, beginning in the 1950s through the mid-1990s, federal funding flowed disproportionately to rural states, states with rapidly growing populations, and states with undeveloped highway systems from more urbanized states and states with highway systems that were more advanced. This interstate redistribution of money allowed the national system of highways to be constructed. The traditional funding mechanism recognized that geographically large, but less densely populated and poorer states had difficulty constructing and maintaining the portions of the interstate highway system that traversed their state and required federal gas tax funds in excess of what was paid in by local drivers.

As a result, many rural states with relatively low highway use received more federal gas tax revenues from the Highway Trust Fund than they contributed. (They were the "donee" states.) By contrast, many urban states, with greater highway use, contributed more than they received. (They were the "donor" states.) For example, in 1985, the average number of registered vehicles and VMT in the top ten donor states was roughly 6.7 million and 73 million, respectively, or nearly ten times the figures in the top ten donee states—727,018 and 7.5 million, respectively. Despite the disproportionate distribution, this formula was necessary to build and maintain political support for the interstate highway system program.[25] Once the interstate system was completed, the rationale for distributing money broke down, and the political compromise that built the system fell apart.

As a result, the Transportation Equity Act for the 21st Century (TEA-21, passed in June 1998) guaranteed each state a return of at least 90.5 percent of its contributions to the highway account of the HTF.[26] Proponents of this policy were, naturally, from those states that paid more money into the trust fund then they received under the old distributional rules. They argued that the new formula in TEA-21 would maintain the system in poorer and rural states while ensuring that the demands of the donor states are met. The pure politics that motivated the passage of the minimum guarantee-funding rule is understandable. The rule acknowledges that the interstate system is largely complete, and that it is time to change the way funds are distributed.

---

[25] Ronald N. Johnson and Gary D. Libecap, "Political Pressures and the Common Pool Problem: The Federal Highway Trust Fund," Paper presented at the International Society for New Institutional Economics Annual Conference, September 22-24, 2000, Tübingen, Germany. Available at www.isnie.org/ISNIE00/Papers/Johnson-Libecap.pdf.

[26] Federal Highway Administration, "Minimum Guarantee Fact Sheet" (1998).

Despite the embrace of this funding logic at the federal level, similar rules generally do not exist at the state level. Our analysis shows that, in Ohio at least, urban counties are the donors of funds into state highway coffers, and rural areas are the donees. It is quite likely that the current system of highway taxes represents a fiscal drag on central cities and older suburbs because they have to maintain roads that are not part of the federal highway system and, in many cases, are not supported adequately by state funds. The rationale for the current system of highway finance may have made perfect sense when the highway system was constructed; however, it no longer makes sense as a way of maintaining that same system.

This unequal treatment is further exacerbated by biased formulas that disproportionately distribute the local government portion of the state gas tax and vehicle registration taxes to rural areas. These revenues overlap with the project database given that there is a local share within many of the projects that may contain gas tax or vehicle registration tax revenues. However, the negative impact on urban and suburban areas is compounded because federal and some state programs can only be accessed with an adequate local match.

Clearly, rural highways are necessary components of the statewide network.[27] Urban roads are no less important, however. Unfortunately, municipal governments have limited ability to raise revenues from the use of its roadways. The primary sources of municipal funds are local income and property taxes, neither of which is related to traffic volumes or is paid by directly by those using the roadways.

It is incumbent on state government, then, to look comprehensively at how federal and state gas taxes—the primary sources of state and local highway revenues—are spent, allocated, and distributed. ODOT has made significant improvements during the last several years by changing the allocation formulas to districts, creating a more rational and less political process for programming "major new" projects, creating local funding programs, and providing assistance to local governments directly.[28] However, even with these amendments, equity remains elusive. The Mayors Think Tank of Northeast Ohio finds that District 12, which includes Cuyahoga, Geauga, and Lake counties, is fourth-largest in population but is next to last in money allocated.[29] There is only so much that can be done to overcome statutes written before the state and federal governments understood their role in the state and national highway systems.

---

[27] The extent to which their importance should skew the funding toward rural areas is unknown. The federal government's Appalachian Highway Program has supported highway construction projects in the southeastern portion of the state as a means of promoting economic development and establishing a state-federal framework to meet the needs of the 13-state region. This program increases new construction dollars in an immediate sense and requires maintenance and rehabilitation spending thereafter. The program dollars are negligible, accounting for only 1.4 percent of ODOT's 2001 construction budget.

[28] ODOT is made up of 12 regional districts.

[29] Mayors' Think Tank in Northeast Ohio, "Policy Statement No. 5: Transportation Funding Issues." Kent State University, Center for Public Administration and Public Policy (undated). Available at http://dept.kent.edu/cpapp/mtt.htm (undated).

The public policy challenge in the near future is to articulate an updated vision for funding highways and to establish goals and practices consistent with the economic and social realities of the early 21st century. Several policy responses would substantially ameliorate the current mismatch between funding and responsibilities:

- **Fix the classification system**. One approach would be to include major arterials in the "state highway system"—the system ODOT maintains. These roads could be treated the same as interstate highways, which are part of the state highway system and are managed by ODOT. This would enable major municipal roads to immediately receive state funds. Alternatively, the state could model its funding programs on the federal program, which bases eligibility on a highway's functional classification rather than its location in an incorporated area. State and U.S. highways located within cities would generally be classified as principal or minor arterials or collectors, thereby putting them on equal footing with roadways of the same classification outside municipal boundaries.

- **Fix the distribution formulas.** The methods for distributing the state gas tax to local governments must better match where travel occurs and where gasoline is purchased. It is essential to ensure that urban and metropolitan areas are not undermined by such formulas.

- **Continue metropolitan devolution**. Another option would be to increase the programming and planning authority of the regional organizations, such as MPOs. Although these organizations have gained importance with each federal transportation authorization act, their programming authority remains incommensurate with their share of the population. ODOT's 2001 construction budget reflects MPO spending of $129 million, or 9 percent of the total. The population in counties encompassed by these MPOs totaled 7.9 million in 1998, or 71 percent of the state total. A more regional approach to planning and programming highway improvements could better match the regional nature of the networks and could better match revenues and responsibilities.

- **Free the gas tax for balanced spending**. On a more basic level, Ohio should remove the restriction that tethers the gas tax revenues to only highway projects. The state should earmark a portion of these funds annually for transit and other projects for spending by local governments or MPOs.

- **Provide better data.** Finally, data should be released on where federal and state gas tax revenues are collected to better inform the public about the spatial equity of highway spending.

VI. Implications for Other State and Federal Leaders

Why should anyone care about the state of highway finding in Ohio except for Ohioans?

First, many, if not most, states have an anti-urban bias in highway distribution formulas. Ohio is an example, not an exception. As the debate over the reauthorization of TEA-21 begins, congressional leaders from donor states will once again clamor to ensure that their state receives an equitable share of the gas tax dollars. These elected leaders should not lose sight of the donor-donee issue within their own states.

Second, the reauthorization of TEA-21 should address the distribution formulas that omit major arterial city streets. This is a federal issue because Highway Trust Fund money supports this pattern of spending.

Third, highway-spending formulas that favor new construction in rural areas contribute to the spread on low-density development through de facto development subsidies. Low-density development is not necessarily objectionable, and Ohio, with an economy that specializes in manufacturing and distribution, depends on truck transportation and a well-functioning interstate highway system. However, highways have distorted the pattern of property values within the state.

Fourth, gas tax funds may not be productive if they are restricted to state highways and interstate highways. Excluding major municipal roadways may compromise the overall system and possibly place the state at a disadvantage in attracting and retaining businesses.

Finally, as mentioned, Ohio, along with 29 other states, forbids spending gas tax receipts to operate transit within the state. Such restrictions are overly burdensome to municipalities, which must seek other limited sources of transit funding to achieve a balanced transportation network.

VII. CONCLUSION

The reauthorization of TEA-21 presents an opportunity to acknowledge that an historic event has taken place in American social and economic history: The interstate highway system has been completed. This landmark event demonstrates that a half century of dedicated, consistent capital investment can result in a stronger and wealthier nation. Now, the time has come to declare victory and move on—on to a more stable system of infrastructure finance (not just highway finance) that maintains this precious gift of the World War II generation.

It is also time to recognize that it was the citizen-taxpayers of our older metropolitan areas who disproportionately paid for the construction of the highway system that made the economic miracle of the rural areas as well as the booming south, west and mountain states possible. Now is the time to level the playing field so that the donor metropolitan areas are not disconnected from the economy that they helped to build.

REFERENCES

Boarnet, Marlon, and Andrew F. Haughwout. 2000. "Do Highways Matter? Evidence and Policy Implications of Highway's Influence on Metropolitan Development." Washington: Brookings Institution.

Brown, Jeffery. 2001. "Reconsider the Gas Tax: Paying for What You Get." *Access* 19 (Fall): 10–15.

Cobin, John, M. 1999. "Market Provisions of Highways: Lessons from Costanera Norte." *Planning and Markets* 2 (1).

Federal Highway Administration. 1998. "Minimum Guarantee Fact Sheet." www.fhwa.dot/tea21/factsheets/minguar.htm

_____. 2002. "Highway Statistics Series, 2001." www.fhwa.dot.gov/policy/ohpi/hss.

Hinton, Hugh, and Michael Beazley. 2002. "Analysis of the Fiscal Impact of Public Service Delivery Practices in Lucas County, Ohio." University of Toledo Urban Affairs Center.

Johnson, Ronald N., and Gary D. Libecap, 2000. "Political Pressures and the Common Pool Problem: The Federal Highway Trust Fund." International Society for New Institutional Economics Annual Conference, September 22-24, 2000, Tübingen, Germany. www.isnie.org/ISNIE00/Papers/Johnson-Libecap.pdf.

Katz, Bruce, Robert Puentes, and Scott Bernstein. 2003. "TEA-21 Reauthorization: Getting Transportation Right for Metropolitan America." Washington: Brookings Institution.

Mayors' Think Tank of Northeast Ohio. Undated. "Policy Statement #5: Transportation Funding Issues." Kent State University: The Center for Public Administration and Public Policy. http://dept.kent.edu/cpapp/mtt.htm.

Metropolitan Area Research Corporation. 2001. "Cincinnati Metropatterns: A Regional Agenda for Community and Stability in the Cincinnati Region." Minneapolis.

Ohio Bureau of Motor Vehicles. 2003. "2002 Tax Distribution Summary Statement of Motor Vehicle Registrations (In Dollars). Columbus. http://www.state.oh.us/odps/division/bmv/03-3taxdst.html.

Ohio Department of Taxation. 2001. "2000 Annual Report." Columbus. www.state.oh.us/tax/publications/2000_Annual_Report.

Ohio Department of Transportation. 2000. "State of the Transportation System." Columbus. www.dot.state.oh.us/sos00.

_____. 2001. "FY 2000–2001 Appropriations Budget By Fund." Columbus. www.dot.state.oh.us/finance/budget/2000-2001bud.htm.

_____. 2001a. "Ohio Transportation Facts Book." Columbus. www.dot.state.oh.us/planning/Fact%20Book/FB-Main.htm

_____. 2002. "Central Ohio Transportation Workshop: Transportation Funding." Columbus. www.dot.state.oh.us/finance/budget/tranfunding.pdf.

_____. 2002a. "Financial and Statistical Report." Columbus. www.dot.state.oh.us/finance/Annual/Annual2002.pdf.

Ohio Legislative Budget Office. 2000. "Local Transportation Needs and Funding Report." Columbus.

Ohio Motor Fuel Tax Task Force. 2002. "Study of the Adequacy and Distribution of the Motor Fuel Tax." Columbus.

Puentes, Robert, and Ryan Prince. 2003. "Fueling Transportation Finance: A Primer on the Gas Tax."

U.S. Department of Transportation. Undated. "TEA-21 Authorization Table Fact Sheet." www.fhwa.dot.gov/tea21/factsheets/factsht$.htm

APPENDIX

Methodology

To conduct this study, we compiled a number of databases, including most importantly ones tabulating all highway contracts let by the Ohio Department of Transportation (ODOT) from 1980 to 1998. The state's database is currently being restructured and, therefore, highway contracts after 1998 are not yet available. The ODOT highway contract database contains the county location, the dollar amount, the highway name, the type of activity, the year, and other descriptive information for each project contracted out during the period.

The project activities were grouped into three categories: new, rehabilitation, and maintenance. New projects include those that expand capacity, such as the construction of new highways, lane additions, and new interchanges. Rehabilitation projects are major reconstructions and redevelopment projects, including bridge and culvert replacements and resurfacing projects. Maintenance projects include bridge repairs, lighting, fencing, pavement markings, signage, and bridge and guardrail painting projects; in other words, projects that do not expand capacity and are not major rehabilitations.

Additional databases include:

1. Vehicle miles traveled (ODOT):
    - State System
        - By county
        - For interstates, U.S. routes, and state routes
        - By vehicle type (trucks versus cars)
        - For the years 1982, 1987, 1992, 1998
    - Total System
        - By county
        - By federal highway classification
        - For each year 1990–1999
2. County population (Census Bureau data): every year, 1980–1999
3. Vehicle registrations (Ohio Bureau of Motor Vehicles):
    - Total number by vehicle type, 1981–1999
    - Total number by county for 1982, 1987, 1992, and 1998
4. Lane miles of roadway on the state highway system 1998(ODOT)
5. Statewide motor vehicle fuel tax and fuel use tax information (Ohio Department of Taxation), 1980–1998

As mentioned, state gas tax receipts or gas sales by county were unavailable through the Ohio Department of Taxation. Therefore, we used retail sales at gasoline service stations from the Census of Retail Trades as a proxy for where gasoline is purchased. The data were available by county for 1982, 1987, 1992, and 1997. The major weakness of these data is that gasoline stations are defined as those that have more than one-half of their dollar sales in gasoline, which means that nearly half of their sales may be something other than gasoline. We assumed that the proportion of non-gasoline sales is consistent across the state.

Counties are the unit of analysis because much of the data we use were only available at that unit of government. We were particularly disappointed that information about the collection of gasoline taxes is not available for local governmental units (municipalities and townships). Motor fuels taxes are collected from wholesalers by the state of Ohio, not from retailers.

Each county was classified as rural, suburban, or urban based on its status within a metropolitan statistical area (MSA). Those outside an MSA were considered to be rural. The counties within MSAs were divided into two groups: the central county of the MSA was considered to be urban and all other counties within the MSA were labeled as suburban. Appendix Table 1 shows a list of the individual counties and their rural, suburban, urban classification. Appendix Table 2 is the lane mile calculation by county type.

Appendix Table 1. Ohio Counties and Their Rural, Suburban, and Urban Classification

County	County Type	County	County Type
Adams	Rural	Licking	Suburban
Allen	Urban	Logan	Rural
Ashland	Rural	Lorain	Suburban
Ashtabula	Suburban	Lucas	Urban
Athens	Rural	Madison	Suburban
Auglaize	Suburban	Mahoning	Urban
Belmont	Suburban	Marion	Rural
Brown	Suburban	Medina	Suburban
Butler	Suburban	Meigs	Rural
Carroll	Suburban	Mercer	Rural
Champaign	Rural	Miami	Suburban
Clark	Suburban	Monroe	Rural
Clermont	Suburban	Montgomery	Urban
Clinton	Rural	Morgan	Rural
Columbiana	Suburban	Morrow	Rural
Coshocton	Rural	Muskingum	Rural
Crawford	Suburban	Noble	Rural
Cuyahoga	Urban	Ottawa	Rural
Darke	Rural	Paulding	Rural
Defiance	Rural	Perry	Rural
Delaware	Suburban	Pickaway	Suburban
Erie	Rural	Pike	Rural
Fairfield	Suburban	Portage	Suburban
Fayette	Rural	Preble	Rural
Franklin	Urban	Putnam	Rural
Fulton	Suburban	Richland	Urban
Gallia	Rural	Ross	Rural
Geauga	Suburban	Sandusky	Rural
Greene	Suburban	Scioto	Rural
Guernsey	Rural	Seneca	Rural
Hamilton	Urban	Shelby	Rural
Hancock	Rural	Stark	Urban
Hardin	Rural	Summit	Urban
Harrison	Rural	Trumbull	Suburban
Henry	Rural	Tuscarawas	Rural
Highland	Rural	Union	Rural
Hocking	Rural	Van Wert	Rural
Holmes	Rural	Vinton	Rural
Huron	Rural	Warren	Suburban
Jackson	Rural	Washington	Suburban
Jefferson	Urban	Wayne	Rural
Knox	Rural	Williams	Rural
Lake	Suburban	Wood	Suburban
Lawrence	Suburban	Wyandot	Rural

Appendix Table 2. Lane Mile Calculations by County Type

County Classification	Number of Counties in Each Classification	Number of Lane Miles	Percent Distribution
Urban	11	10,282	21.3
Suburban	28	16,068	33.3
Rural	49	21,851	45.3
Total	**88**	**48,201**	**100.0**

Current Federal and Ohio Highway Spending Programs

ODOT is charged with maintaining a safe, effective, and accessible transportation system in Ohio, including highways, aviation, bicycles and pedestrians, transit and rail transportation. For highway responsibilities, its first priority is to preserve and maintain the state highway system, and its second mission is to make investments in and improvements to the current system to ensure public safety and to encourage economic development.[30]

As shown in Appendix Table 3, ODOT's capital fund budget totaled $1.2 billion for highways in 2001. The investments are designated as system preservation, major-new, local programs, and "other" (which includes other transportation modes and programs, such as noise barriers and safety, that do not fall within one of the other categories.) ODOT employees carry out most highway maintenance work, while private contractors do nearly all construction work with ODOT oversight.

System preservation funding, which is the largest category, is divided between pavement projects, with $305 million in contracts during FY 2001, and bridge projects ($186 million). These funds are allocated to the 12 districts based on formulas that consider pavement and bridge conditions, lane miles of roadway, square footage of bridge surfaces, traffic volumes, and percentage of cars and trucks. The district offices then determine how to best use those funds based on their knowledge of conditions, use, and role within the transportation network. The “other” category consists of the Appalachian Highway program, federal discretionary projects, safety programs, and noise barriers.

“Major new” projects consist of capacity projects at the state level, generally about $300 million per year. The Transportation Review Advisory Council (TRAC) decides which projects receive major new funding. The TRAC, which was created by the legislature in 1997 at the request of ODOT, is a permanent body of predominantly non-ODOT personnel, the responsibilities of which are to prioritize major new capacity projects, publish a selection process explaining how it prioritized the projects, and keep the major new capacity program in fiscal balance.

[30] Ohio Department of Transportation, "State of the Transportation System," available at www.dot.state.oh.us/sos00 (2000).

The governor appoints six of the TRAC's nine members, the speaker of the Ohio House of Representatives appoints one, and the president of the Ohio Senate appoints one. ODOT's director serves as chairman. The TRAC's duties are limited to the project selection process for the major new program and are not related to the day-to-day operations of ODOT.

Appendix Table 3. ODOT's Capital Funding Programs, 2001 (in millions of dollars)

Program	Total	Category			
		System Preservation	Major New	Local Programs	Other
ODOT Pavement	305	305			
ODOT Bridge	186	186			
Major Bridge	60	60			
Multi-Lane Reconstruction	35	35			
Major New Construction	290		290		
Appalachian Highway	20				20
TEA-21HighPriorityProjects	54				64
MPO Funds	124			124	
Local Bridge	38			38	
Local High Cost Bridge	20			20	
Rural County Engineers Program	20			19	
Small Cities	8			8	
Large Cities	2			8	
Enhancements	11			11	
Noise Barriers	5				5
Safety Projects	30				30
Total	**$1,217**	**$586 (48.1%)**	**$290 (23.8%)**	**$225 (18.5%)**	**$119 (9.8%)**

Source: Ohio Department of Transportation, "Ohio Transportation Facts Book," available at www.dot.state.oh.us/planning/Fact%20Book/FB-Main.htm

Current Federal Highway Programs

TEA-21 provides total authorizations of $217.8 billion from 1998 through 2003, the vast majority of which ($171 billion) goes toward Title I Federal-Aid Highway programs. Of that total, 92.7 percent, or $158.6 billion, is designated for the seven largest highway programs. These figures are summarized in the Appendix Table 4.

Appendix Table 4: Summary of TEA-21 Funding Authorizations, 1998–2003

Programs	$Billions	Percentage Distribution
Title1:Federal-Aid Highways:		
Interstate Maintenance	23.8	
National Highway System	28.6	
Highway Bridge Replacement and Rehabilitation Program	20.4	
Surface Transportation Program	33.3	
Congestion Mitigation/ Air Quality Improvement Program	8.1	
Minimum Guarantee	35.0	
High Priority Projects Program	9.4	
Other	12.4	
Total: Title1	171.0	78.5
Title2:HighwaySafety	1.7	0.8
Title3:FederalTransitAdministrationPrograms	41.0	18.8
Title4:MotorCarrierSafety	0.6	0.3
Title5:TransportationResearch	2.9	1.3
Title7:Miscellaneous	0.5	0.2
Total	217.7	100.0%

Source: U.S. Department of Transportation, "TEA-21 Authorization Table Fact Sheet," available at www.fhwa.dot.gov/tea21/factsheets/factsht$.htm

These funds are apportioned to the states according to formulas that consider various combinations of lane miles, population, vehicle miles traveled, relative contributions to the Highway Trust Fund, and in the case of bridges, the relative share of total costs to repair or replace deficient highway bridges.

Federal aid eligibility is based on a highway's functional classification. The functional classification system is a means of classifying all roadways according to their role in the overall transportation network. Functional classification categories are as follows:

Rural Principal Arterial	Urban Principal Arterials
Rural Minor Arterial	Urban Minor Arterials
Rural Collectors	Urban Collectors
Rural Major Collectors	
Rural Minor Collectors	
Rural Locals	Urban Locals

Since the 1920s, functional classifications have been used to assign facilities to a Federal-Aid Highway system. Traditionally, a street, road, or highway was classified higher than a local in urban areas and higher than a local and minor collector in rural areas before qualifying for federal funds. TEA-21 changed this requirement slightly to allow federal aid to be spent on rural minor

collectors—up to 15 percent of state rural funds. Urban and rural local access roads are ineligible for federal aid.

The primary highway funding programs in TEA-21 generally require a 20 percent state or local contribution and are described below.

Interstate Maintenance (IM)—The 46,000 mile Dwight D. Eisenhower National System of Interstate and Defense Highways is a part of the national highway system yet retains its separate identity. Because all remaining work to complete the interstate system has been fully funded by previous highway authorizations, this program ensures the continued maintenance and improvement of the system. States with no remaining interstate completion work may transfer surplus interstate construction funds to their National Highway System (NHS) fund account.

National Highway System (NHS)—The NHS consists of 163,000 miles of rural and urban roads serving major population centers, international border crossings, intermodal transportation facilities, and major travel destinations. It includes the interstate system, other urban and rural principal arterials, and other strategic connectors.

Highway Bridge Replacement and Rehabilitation Program (HBRRP)—This program provides assistance for eligible bridges located on any public road. Although a state may transfer up to 50 percent of its bridge funds to NHS or Surface Transportation Program apportionments, the amount transferred is deducted from national bridge needs for calculating apportionments in the following fiscal year.

Surface Transportation Program (STP)—This program provides flexible funding that may be used by state and localities for projects on any Federal-Aid highway, including the NHS, bridge projects on any public roads, transit capital projects, and public bus terminals and facilities. A state may augment its STP funds by transferring from other programs. In addition, a portion of the Minimum Guarantee funds is administered as if they were STP funds. Once the funds are distributed to the states, 10 percent is set aside for safety construction activities, and 10 percent is set aside for transportation enhancements.

Congestion Mitigation/Air Quality Improvement Program (CMAQ)—This program provides a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available for areas that do not meet the National Ambient Air Quality Standards (non-attainment areas), as well as former non-attainment areas that are now in compliance (maintenance areas). Funds are distributed to states based on county population and severity of air quality problems within the non-attainment or maintenance area.

High Priority Projects Program—Specific projects (commonly known as demonstration projects) are eligible for funding under this program. These projects are those specifically identified

by Congress and are included in the law itself. The funds do not expire and cannot be flexed to other projects or programs.

Minimum Guarantee—The Minimum Guarantee program is designed specifically to ensure that states receive at least a 90.5 percent return on their contributions to the Highway Trust Fund. Most of these funds are administered as STP funds, with the remainder split by formula among the other major programs.