

FINANCING AMERICA'S ROADS: THE PAST IS PROLOGUE

Michael J. Gravier
University of North Texas

M. Theodore (Ted) Farris II
University of North Texas

The views in this article are those of the authors and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

ABSTRACT

This article provides a historical perspective of American roadway financing. It explores revenue collection and expenditures at the federal, state, and local governmental levels. Accounting practices of the Highway Trust Fund are discussed including the enactment of the Truth in Budgeting Act to shift revenue collection closer to a direct-user tax. Factors affecting roadway tax revenues are identified and the impact of increasing taxes is discussed. Four key considerations which will continue to shape roadway revenue collection are identified.

INTRODUCTION

The methods by which direct users finance American roadways continue to evolve. This discussion begins with a historical perspective of American roadway financing. It then explores revenue collection and expenditures at the federal, state, and local governmental levels. Accounting practices of the Highway Trust Fund are discussed including the enactment of the Truth in Budgeting Act to shift revenue collection closer to a direct-user tax. Factors affecting roadway tax revenues are identified and the impact of increasing taxes is discussed. Finally, the paper concludes by offering four key considerations which will continue to shape roadway revenue collection and expenditures in the future.

HISTORICAL PERSPECTIVE OF ROADWAY DEVELOPMENT

The federal government entered highway construction in 1806 with the authorization of the 824 mile National Pike (also known as the Cumberland Road) from Cumberland, Maryland to Columbus, Ohio as a means of encouraging westward expansion (Weingroff 2004). This began the initial development of a public road system which now exceeds 3.9 million miles (see Table 1). Historically, the development of the national roadway system has benefitted from financial participation of federal, state, and local governments and through taxes levied upon users. The total cost of the original National Pike project, including

maintenance, was \$6.8 million (Sampson, Farris, and Shrock 1990). By comparison, this would build less than two miles of interstate today (Federal Highway Administration 2004c).

State's Rights Shifted Responsibilities

Federal involvement in the development of a national roadway network was greatly reduced under the State's Rights movement of the Jackson administration when the responsibility for roadway development shifted to state and local municipalities. Subsequently, early road-way development occurred as a result of localized efforts. Various forms of state aid programs began to develop to expand statewide systems.

Federal Funding Re-Emerges

Federal involvement did not increase sub-stantially until the Federal-Aid Highway Act of 1916 allocated federal funds to states primarily to build rural post roads. One key clause of the act required that, in order to receive the funds, each state must establish a public roads department (Weingroff 1996c). Originally, only rural mileage was funded. Rural mileage accounted for 7 percent of total road mileage and was supported on a 50-50, federal-state basis. The federal aid secondary system, which originated during the Depression, was concerned with less heavily traveled roads. Approximately 398,000

miles were designated as secondary aid roads and received matching support from the federal government. These secondary roads along with the primary and urban systems were known as the ABC aid program. Federal aid was generally limited to 75 percent of the expenditures on the ABC system. In 1944, urban extensions of the primary system were brought under the federal aid program. By 1998, much of the control of the highway mileage had been placed at the state and local levels. Table 2 reflects the current state of governmental control in 2003. Many readers may be surprised to find that 96.9 percent of roads are supported through local and state taxes.

Federal Highway Trust Fund Created

Recognizing that the nation's highway system was deficient, Congress authorized the selection of pre-existing roads for the National System of Interstate Highways in the Federal-Aid Highway Act of 1944. The intent was to develop a state-of-the-art, 40,000-mile national roadway system serving all principal metropolitan areas and connecting as many state capitals as possible (Jacobson 1996). However, funding posed a major obstacle to the construction of a national roadway system (Smith 2004; Weingroff 2003).

**TABLE 1
U.S. PUBLIC ROAD AND STREET MILEAGE**

	1960	1970	1980	1990	2000	2001	2002	2003
Rural	3,116,12	3,169,41	3,233,62	3,122,78	3,083,98	3,071,33	3,071,76	3,033,13
	5	2	6	8	8	1	1	8
Urban	429,568	560,670	623,232	757,364	852,241	877,004	894,724	940,969
TOTA	3,545,69	3,730,08	3,856,85	3,880,15	3,936,22	3,948,33	3,966,48	3,974,10
L	3	2	8	2	9	5	5	7

Source: Federal Highway Administration, *Highway Statistics 2003*, Table HM-20

TABLE 2
ROADWAY MILEAGE IN THE U.S. BY TYPE OF CONTROL, 2003

	Federal Control	State Control	Local Control	TOTAL
Urban mileage	3,560	120,033	817,376	940,969
Rural mileage	120,208	652,522	2,260,408	3,033,138
TOTAL	123,768	772,555	3,077,784	3,974,107

Source: Federal Highway Administration, *Highway Statistics 2003*, Table HM-10

Congress decided that expenditures for this system should be on a pay-as-you-go basis. After much controversy, the Highway Revenue Act of 1956 created a fenced revenue source (called the Highway Trust Fund) and construction began. While federal motor taxes existed prior to this, the receipts were directed to the General Fund with no relationship between the receipts from these taxes and federal funding for highways (Goldman and Wachs 2003; Rao 1986). With the Highway Trust Fund, tax revenues generated from excise taxes on fuel and heavy vehicles funded highway improvements, and general revenue funds were no longer to be used for this purpose (Federal Highway Administration 1998a). A federal fuel tax of 4 cents per gallon, a weight tax of \$3 per 1,000 pounds gross weight on larger vehicles, and excise taxes on heavy motor vehicles, tires, tubes, and retread rubber were enacted.

The basic aid formula on the Interstate System was 90 percent federal and 10 percent state, with a federal maximum of 95 percent under some circumstances (Federal Highway Administration 2004a). The 1956 Act authorized the federal government to spend \$25 billion from 1957 to 1969 to build the system to the highest highway standards (Weingroff 1996a). In a real sense, this was a crash program of providing high-speed, limited access highways for commerce and defense. Construction proved slower than anticipated and costs larger than planned. The Interstate System was not completed until 27 years later

in 1993. Outlays from the Highway Trust Fund to support its construction and maintenance have totaled more than \$370 billion (Federal Highway Administration 1998a).

SOURCES OF REVENUE

Most citizens generally perceive that roadways are heavily subsidized by the government. In fact, just the opposite is true. Federal, state, and local governments typically collect more revenues from users than are expended to support the transportation system. Revenues to support the roadway system are collected by federal, state, and local governments from fuel, vehicle registration, and user fees. As shown in Table 3, fuel-related user taxes historically have represented between 11 percent and 35 percent of the retail cost of a gallon of gasoline.

The highway program began to show indications of potential financial shortfalls in the late 1970's because of three factors. First, inflation had greatly accelerated the cost of completing the Interstate System and maintaining the other federal-aid highways. Second, in response to the energy program started in the 1970's, both smaller cars and increased fuel efficiency led to a leveling out of funds available in the Highway Trust Fund. Finally, many of the parts of the Interstate System constructed earlier were in need of repair and rehabilitation (Sampson, Farris, and Shrock 1990). Beginning in 1976, a special category of Interstate funds was authorized specifically for the resurfacing, restoration, and

**TABLE 3
RETAIL PRICE TREND OF A GALLON OF GASOLINE IN THE U.S. (INCLUDES TAXES)**

Year	Regular	Unleaded	State/ Federal Taxes	Taxes as a Percentage
1955	\$0.291		\$0.077	26.3%
1960	\$0.311		\$0.101	32.5%
1965	\$0.312		\$0.105	33.7%
1970	\$0.367		\$0.111	30.2%
1975	\$0.448		\$0.124	27.7%
1980	\$1.191	\$1.245	\$0.138	11.1-11.6%
1985	\$1.115	\$1.202	\$0.220	18.3-19.7%
1990	\$1.149	\$1.164	\$0.269	23.1-23.4%
1995		\$1.147	\$0.404	35.2%
2000		\$1.485	\$0.420	28.3%
2001		\$1.426	\$0.429	30.1%
2002		\$1.340	\$0.423	31.6%
2003		\$1.559	\$0.421	27.0%
2004		\$1.825	\$0.423	23.2%

Source: Energy Information Agency (2005)

1981, the program was amended to include reconstruction (4R) and funding was substantially increased (Federal Highway Administration 2004b).

purposes and 0.5 cents for transit (Bureau of Transportation Statistics 2004). As of

Table 4 reflects how the direct user burden has changed over time. In 1983 the tax rate per gallon was significantly increased to help complete the Interstate System and rehabilitate the street and highway system. Users also saw motor fuel taxes increase when the Highway Trust Fund’s revenue-generating processes became a venue for gathering other transportation-related taxes. In April 1983, one cent per gallon of the federal gasoline tax was set aside for transit purposes in the Mass Transit Account of the Highway Trust Fund. The amount was increased to 1.5 cents per gallon in 1990 and to 2.0 cents in 1995. On October 1, 1993, the gasoline tax was levied at a rate of 18.4 cents per gallon, with 6.8 cents of that amount earmarked for federal budget deficit reduction. On October 1, 1995, 2.0 cents of the 6.8 cents was dedicated for highway

October 1997, 15.44 cents of the 18.4 cents collected was directed to the Highway account, 2.86 cents to the Mass Transit account, and 0.1 cents to the Leaking Underground Storage Tank (LUST) Trust Fund (Federal Highway Administration 1998a).

**TABLE 4
HIGHWAY TRUST FUND
TAX RATE PER GALLON**

Year	Gasoline	Diesel
1951	2.0 cents	2.0 cents

Under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), resurfacing, restoration and rehabilitation were funded under the Interstate Maintenance (IM) Program. The federal share of IM projects is generally 90 percent. While ISTEA primarily addressed high-way construction, it also placed a special emphasis on intermodal connections so as to enhance the overall transportation system, and sparked controversy by diverting some revenue from the Highway Trust Fund to reducing the federal deficit. The ISTEA eliminated the historical federal-aid system designations of Primary, Secondary, and Urban, and created the National Highway System which includes the existing Interstate System routes, a large percentage of urban and rural principal arteries, the Strategic Highway Network, and major connectors. ISTEA also created a new flexible funding program, the Surface Transportation Program (STP), that can be used for roads and streets not functionally classified as local or rural minor collector, for bridges on any public road, and for transit capital projects (Public Law 102-240 1991; Sutton and Marks 1999; FHWA 1999; Nystrom 1999).

The Transportation Equity Act for the 21st Century (TEA-21), enacted June 9, 1998, extended the ISTEA program structure through Fiscal Year 2003 at higher program levels making important changes in Federal Highway Trust Fund legislation. Beginning with Fiscal Year 1999, TEA-21 provided that a

1956	3.0 cents	3.0 cents
1959	4.0 cents	4.0 cents
1983	9.0 cents	9.0 cents
1984	9.0 cents	15.0 cents
1987	9.1 cents	15.1 cents
1990	14.1 cents	20.1 cents
1993	18.4 cents	24.4 cents
1996	18.3 cents	24.3 cents
1997	18.4 cents	24.4 cents

Source: Federal Highway Administration (2003),

substantial portion of highway support receive special budgetary treatment by creating a separate budget category outside the domestic discretionary cap for a significant part of the funding. This creation of a separate category is often referred to as putting up a “firewall” around the spending. A firewall ensures that the protected funding no longer has to compete with other programs for a place in the annual budget. Authorizations in excess of this guaranteed funding level remain subject to the domestic discretionary budget cap and must continue to compete with other discretionary spending priorities (Federal Highway Administration 1998a). Significantly, TEA-21 ties federal-aid highway funds directly to receipts of the Highway Account of the Highway Trust Fund. However, the Highway Account no longer earns interest on balances, and excess balances in the Highway Account will be transferred to the General Fund (Federal Highway Administration 2004a).

TEA-21 officially expired in September of 2003 and Congress has yet to approve a bill to replace it. Now, more than a year overdue, the Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2003 (SAFETEA) is a bill that will authorize federal surface transportation programs for highways, highway safety, and transit for the 6-year period from 2004-2010. The administration proposal allocates \$27.7 billion for 2004. In the general bill, apart from the research sections, there is an extraordinary commitment to the

concepts, policies, and practices of intelligent transportation systems, pavement preservation, and pavement management. Provisions are also made for asset management. About 77 percent of funds would account for highway maintenance, 20 percent for public transportation, and 1 percent for research. There are commitments to highway safety and congestion, freight, borders, fraud, tax evasion, and specific federal highway programs, such as the Appalachian Highway. SAFETEA expands the role of the federal government in all aspects of surface transportation policy and operations. The DOT will set agendas, allocate funds per federal priorities, and increase oversight of state operations (Federal Highway Administration 2005).

State and Local Participation

State and local user taxes and fees actually generate more revenue than federal programs as shown in Table 5. The federal aid system provides for only a portion of the total construction costs, with state and local funds responsible for the remainder. Only 3.1 percent of the 3,974,107 miles of streets and highways are supported through federal aid. The vast majority of U.S. streets and highways, over 3.8 million miles, are supported by state and local

TABLE 5
ROADWAY REVENUES VERSUS EXPENDITURES
(CURRENT \$ MILLIONS)

Revenues	1985	1990	1995	1996	1997	1998	1999	2000	2001	2002
Federal	12,906	13,453	19,377	22,692	21,314	24,307	33,823	30,347	26,917	27,983
State & Local	25,260	36,492	47,366	48,487	50,500	52,992	54,845	57,453	59,173	N/A
Total	38,166	49,945	66,743	71,179	71,814	77,299	88,668	87,800	86,090	N/A
Expenditures										
Federal	15,039	15,517	20,144	20,695	21,425	20,725	23,553	27,759	29,950	33,214
State & Local	31,574	47,112	59,232	60,927	62,865	68,802	72,003	76,192	80,515	N/A
Total	46,613	62,629	79,375	81,623	84,290	89,527	95,556	103,952	110,465	N/A

Source: Bureau of Transportation Statistics (2004)

governmental revenues. State and local user taxes and fees represented 68.7 percent of all transportation user fees in 2001. State taxes include fuel tax (ranging from 8 cents per gallon in Alaska to 32 cents per gallon in Connecticut), vehicle registration fees, ton-mile fees, and special use permits (Federal Highway Administration 2003a: Table MF-121T). Local governments may have additional gasoline taxes, but property taxes and sales taxes are typically important sources of revenue for maintaining local streets (Sampson, Farris, and Shrock 1990).

EXPENDITURES

Roadway expenditures include capital outlays, maintenance and traffic services, administration and research, and highway law enforcement and safety. Expenditures have not been without controversy as there have been 1) problems with the collection and allocation of funds, 2) pro-posals that the expenditures Many states claim their annual allocations fall far short of matching their annual contributions. In a June 2000 Report to the Committee on Transportation and Infrastructure of the House of Representatives, the General Accounting Office (GAO) stated that the Federal Highway Administration's "attribution" process—which estimates each state's relative roadway motor fuel usage from

resulting in social benefits be borne by social or defense programs, and 3) advice that expenditures should be dramatically increased to pay for road repair and bridge upgrades.

Problems Allocating Highway Funds

Motorists pay taxes as they purchase the various taxed items comprising the Highway Trust Fund, but the U.S. Department of Treasury actually collects most of these taxes twice a month from large corporations whose corporate headquarters are located in a handful of states. The collected funds go into the Treasury Department's General Fund. The funds are returned to the states in accordance with legislatively established formulas. Each state is guaranteed that at least 90.5 percent of its highway user percentage attributions to the Highway Account will be returned to the state (U.S. Government Accounting Office 2003).

state tax data and uses that information to estimate the relative contributions to the Highway Account from each state's roadway users—has significant weaknesses that raise concerns about its reliability. The methodology is susceptible to error since it 1) has never been fully documented or independently re-viewed, 2) is extremely complicated, involving nearly 200 formulas that are needed to accomodate

all of the differences in states' methods for taxing and reporting on motor fuels, and 3) has been repeatedly adjusted over several decades in response to changing state tax laws and federal program requirements (U.S. Government Accounting Office 2000).

and upgrade the roadways will never be available without other sources of support.

Social Considerations

A portion of the fuel taxes support more than just highway construction and maintenance. For example, public transportation does not pay for itself and tends to be a social program in which funding is justified in part by difficult-to-measure social benefits. In addition, the fact that highway expenditures have "a defense goal and a general policy goal of mobility and safety of our population as well as of assisting commerce and industry with an improved transportation system," supports the argument that a portion of the expenditures should come from social or defense programs instead of from direct users.

The Call to Dramatically Increase Revenues

While some new road construction has been completed, there is an on-going need to maintain, repair, and upgrade the current infrastructure. In an April 1995 letter to every Congressional Senator and Representative, Highway Users Federation President William D. Fay pointed out that revenues in the Highway Trust Fund were insufficient to meet the backlog of \$212 billion required for roadwork and \$78 billion required to make needed bridge improvements. At the time the Federal Highway Administration reported 242,567 highway miles in mediocre-to-poor condition and 102,207 bridges structurally deficient (PR Newswire 1995). Chairman of the House Transportation and Infrastructure Committee, Bud Shuster, estimated \$315 billion in repairs and upgrades were needed. In 2001, federal roadway revenues totaled \$26.917 billion, federal roadway expenditures totaled \$29.950 billion; resulting in a reduction in the cash balance of the Highway Trust Fund to \$26.917 billion. The funds required to repair

It is reasonable to suggest that users should continue to be the most likely, as well as most logical, candidates to provide funding. For example, the tax rate on diesel fuel, used primarily by trucks, is 6 cents more per gallon than the tax on gasoline. This “diesel differential,” along with the non-fuel taxes that target the heaviest trucks, reflects an effort to charge heavy-vehicle users for the substantially higher damage (and the resulting repair and replacement costs) their vehicles inflict (Federal Highway Administration 1999).

The argument for an increase in transportation-related tax revenues also includes the growth of roadway use, wear and tear of the system over time, and elimination of two sources of funding as a result of the discontinuation of the new automobile excise tax in 1970 and the 1983 discontinuance of the tax on parts and accessories.

ACCOUNTING PRACTICES OF THE HIGHWAY TRUST FUND

Given the need for additional funds, the

TABLE 6		
CASH BALANCES OF HIGHWAY TRUST FUND-RELATED ACCOUNTS		
(\$ MILLIONS)		
Year	Highway Account	Transit Account
1957	516	-
1960	119	-
1965	285	-
1970	2,612	-
1975	9,597	-
1980	10,999	-
1985	12,906	1,420
1990	13,453	1,977
1995	19,377	2,813
2000	30,347	4,625
2001	26,917	4,553
2002	27,983	4,621
2003	28,964	4,762

Sources: Bureau of Transportation Statistics (1997); Department of Transportation and Bureau of

balance in the Highway Trust Fund has grown as reflected in Table 6 as Congress appropriated less expenditures than it received into the fund from user taxes. A minimum balance must be maintained in the Highway Trust Fund. A safety cushion equal to 3 months of expenditures is recommended to ensure that obligations could be liquidated during an emergency until Congress can act to reduce future commitments or to increase future revenues. Based on the projections of Highway Account expenditures for the 6-year TEA-21 authorization period, a minimum balance averaging \$7 billion is needed (Federal Highway Administration 1999). Proponents argue that the excess funds should be made available for roadwork repair.

On September 19, 1995 the Senate Environment and Public Works Committee dipped into the Highway Trust Fund to solve budgetary problems that had little to do with roads. The committee took \$919 million that would otherwise be spent on roads as part of its effort

Transportation Statistics (2004).

to cut federal spending by \$2.3 billion through 2002 (Carney 1995). A powerful alliance of about 100 transportation, business and labor organizations lobbied hard for a bill (HR 842 titled the “Truth in Budgeting Act) to prevent this practice, contending that each \$1 billion in highway spending would support 42,100 full-time jobs. Also backing the bill was an array of local government groups, such as the National Association of Counties, which wanted more money for road projects. Proponents of the Truth in Budgeting Act argued that the government should stop using gasoline taxes and other transportation user fees to offset the federal deficit because the money is collected specifically for much-needed transportation projects. Transportation and Infrastructure Chairman, Bud Shuster, stated,

These transportation trust funds have

been distorted and manipulated and used, so we have not kept faith with the American people. We should either spend this money, these user fees, for the purpose for which they were created, or if we do not have the needs, we should reduce the tax (Hosanky, 1996).

After a decade of failed attempts, on April 17, 1996 transportation advocates won over-whelming House passage of the bill that moved all four transportation trust funds off budget and increased spending on infrastructure. Under the bill, trust funds would not be counted as new budget, outlays or receipts in budgetary proceedings and would be exempt from congressional spending rules such as “pay as you go” requirements when lawmakers offset new spending with tax increases or spending cuts (Hosansky 1996). With the passage of this bill, the Highway Trust Fund moved closer to truly being a direct user tax.

Improving Fuel Efficiency

During the “energy crisis” of 1975, the Corporate Average Fuel Economy standards (known as CAFE) were legislated to improve fuel economy. Since then the average fuel economy required of new domestic cars and trucks has risen significantly as shown in Table 7.

**TABLE 7
NEW GASOLINE CAR AND LIGHT
TRUCK FUEL EFFICIENCY**

Year	Domestic	Imported
1980	21.4	28.6

FACTORS AFFECTING ROADWAY TAX REVENUES

Any action to increase roadway tax revenues must also override government incentives promoting alternative fuels and improving motor vehicle fuel efficiencies, overcome tax evasion, and modify the tax structure to take into account demand elasticity as fuel prices increase.

Promoting Alternative Fuels

The Energy Policy Act of 1992 and the Department of Energy required the energy secretary to assess the feasibility of replacing 10 percent of petroleum-based fuels with “alternative” fuels by the year 2000, rising to 30 percent by 2010. The Act also mandated that federal, state, and certain private fleets acquire alternative fuel vehicles (Mobile Corporation 1995). To help meet these goals, the government exempts ethanol— an alcohol commonly made from corn—from 5.4 cents of the gasoline tax. It boosts ethanol as a blend with gasoline to reduce air pollution, while unsubsidized antipollution additives remain available. It is estimated that in 1996 this policy resulted in between \$500 million and \$3.5 billion in lost tax revenue (Samuelson 1995).

1985	24.0	30.3
1990	23.9	28.5
1995	23.8	27.9
1996	24.1	27.7
1997	23.3	27.5
1998	23.3	27.6
1999	23.7	26.9
2000	28.7	28.3
2001	28.7	29.0
2002	29.1	28.8
2003	29.0	29.8
2004	29.3	29.3

Source: National Highway Transportation Safety Administration (2004)

Gains in fuel economy have been achieved by automakers by reducing the average weight of vehicles by 1,000 pounds, reducing engine size, installing fuel injection systems and converting vehicles to front wheel drive (O'Brien 1996). Improvements in fuel efficiency have reduced per-mile revenues collected. If the average fuel economy of all passenger cars in today's fleet were the same as 1975's fleet, we would consume a billion more barrels of oil each year and collect another \$7.728 billion annually (Federal Highway Administration 1999). The efforts in the 1970's have resulted in an overall improvement in the average miles per gallon in America as shown in Table 8.

Reducing Tax Evasion

Improved compliance with the diesel fuel tax law has helped to increase the amount of revenues collected. In the early 1990's it is estimated that the federal highway program faced an annual loss of over \$1 billion in revenues due to motor fuel tax evasion schemes. In the aggregate, states suffered comparable revenue losses due to evasion of state level fuel taxes (Federal Highway Administration 1999). The Federal Highway Administration began the Joint Federal-State Motor Fuel Tax Compliance Project, which forged alliances among the IRS, state revenue

**TABLE 8
ROADWAY DEMAND FOR MOTOR FUEL**

	1960	1970	1980	1990	2000	2001	2002	2003
Fuel Consumed	57,880	92,329	114,960	130,755	162,260	163,047	167,730	174,141
Vehicle Miles	719,000	1,110,000	1,527,000	2,144,000	2,746,925	2,781,462	2,855,756	2,890,893
MPG	12.4	12.0	13.3	16.4	16.9	17.1	17.0	16.6

Fuel consumed cited in millions of gallons, vehicle-miles traveled cited in millions of miles

Sources: Federal Highway Administration (2004); Department of Transportation and Federal Highway Administration (2004)

agencies, other federal and state regulatory and enforcement agencies, and petroleum industry members. After adjusting for changes in the motor tax rates, the total amount of diesel fuel tax receipts credited to the Highway Trust Fund increased by over \$1.2 billion between calendar years 1993 and 1994. The Treasury Department has estimated that up to \$700 million of this amount was due to improved tax compliance alone. State revenues rose by an average of approximately 7 percent as well, largely due to these increased enforcement initiatives (Federal Highway Administration 1999). The Compliance Project meets annually to report results for each state. For example, at the 2003 meeting, Massachusetts indicated it had completed 68 special fuel and gasoline audits since July 1, 2002 with a total assessment of \$3.5 million (Federal Highway Administration 2003b).

Countering the Flat Tax

Demand for fuel is partially elastic. When fuel prices increase, the amount of fuel purchased drops as users seek alternative means of transportation. User taxes are essentially a flat tax. Lower fuel purchases result in fewer taxes collected to support the system. Legislation cannot quickly or effectively change a flat user-tax based on fuel prices which constantly change due to market conditions. To counter the effect of changing fuel prices, many states are switching from a per-gallon to a percent-of-sales-price method (also known as an “ad valorem tax”) of fuel-based taxation. The percent-of-sales-price approach can avoid much of the revenue decline experienced during periods of increasing prices resulting in a more stable tax base.

The Impact of Increasing Taxes

Fuel prices in the U.S. are very low compared to many other countries due to the amount of tax applied to each gallon. Table 9 reflects a significant disparity in prices throughout the world.

**TABLE 9
GASOLINE PRICES
THROUGHOUT THE WORLD
(PER GALLON, 2003)**

Country	
Norway	\$5.33
United Kingdom	\$4.95
France	\$4.74
Sweden	\$4.45
Italy	\$4.41
Germany	\$4.39
Spain	\$3.43
Japan	\$3.36
Brazil	\$2.44
Mexico	\$2.31
Argentina	\$2.27
Canada	\$2.24
Ecuador	\$1.94
U.S.	\$1.65
Saudi Arabia	\$0.91
Nigeria	\$0.82
Russia	\$0.69
Venezuela	\$0.16

Source: Energy Information Agency (2004).

In 1995, Jerry Flint, writing for *Forbes Magazine*, pondered the effect of adding \$1 tax to each gallon of gasoline to help bring American prices more in line with those found in other countries. Flint argued that every penny increase in the gasoline tax would produce about \$1 billion in tax revenue (Flint 1995). Based on 2003 consumption, a \$1 per gallon increase in the federal gasoline tax would annually bring in up to \$174 billion in additional tax revenue. These funds could be directed toward badly needed roadway and bridge repair, replacement of the current infrastructure, as well as state-of-the-art upgrades.

While tax increases are unpopular and an increase of this magnitude is unlikely, consider the impact. The average passenger auto owner would experience an increase in operating costs averaging approximately \$551 per year. Sales of fuel-efficient automobiles would increase. Use of alternative fuels may become more economically viable. Use of public transportation may increase. Bringing fuel taxes in line with those levied by other countries not only would increase government revenues, it could dramatically influence the characteristics of the entire U.S. roadway transportation system.

CONCLUSIONS

Roadway financing continues to evolve. There are four key considerations which will continue to shape roadway revenue collection and expenditures.

First, there are factors which may positively impact collection of revenues in the future including changing the tax levy method and further efforts to reduce reporting errors and improve reporting reliability. The gradual change toward collection of fuel taxes on a percentage-of-the-sales-price would help solidify the tax base of revenue derived from the users. The impact resulting from significant changes in price in either direction will be reduced. Continued efforts to improve and simplify revenue reporting, modify allocation formulas, and continuing reduction of tax evasion will also help ensure revenue collection is a direct user tax.

Second, there are factors which will continue to negatively impact revenue collection, including alternative fuels, CAFE and fluctuating fuel prices. As long as gasoline tax incentives are offered to promote a social agenda and changing

usage patterns are not addressed, revenues will fluctuate.

Third, reducing the amount of legislative “gaming” and clamping down on collection fraud has helped make revenue collection much more of a direct user tax. Users should be responsible for “paying their way” and should be charged accordingly. Taxation beyond “paying the way” is excessive. Legislative changes installing a firewall to eliminate or reduce outside interests and efforts at fraud reduction have gone a long way to equally match revenues with expenditures to make roadway revenue collection more of a direct user tax. These efforts are progressive and should continue.

Finally, in addition to properly tying tax revenues collected to directly benefit the users, increasing taxes could significantly influence the characteristics of the entire U. S. roadway transportation system. While a tax increase is unpopular, increasing needs of society to address urban roadway congestion and failing infrastructure could swing public opinion.

This article has provided a historical perspective of American roadway development. It explored revenue collection and expenditures at the federal, state, and local governmental levels. Accounting practices of the Highway Trust Fund were discussed including the enactment of the Truth in Budgeting Act to shift the revenue collection closer to a direct user tax. Factors affecting roadway tax revenues were identified and a discussion of the impact of increasing taxes was offered. The presentation concludes by offering four key considerations which will continue to shape roadway revenue collection and expenditures.

REFERENCES

- Bureau of Transportation Statistics (2004), "Government Transportation Financial Statistics: 2003," Washington, DC: U.S. Department of Transportation.
- Bureau of Transportation Statistics (1997), "Transportation Receipts and Outlays in the Federal Budget, Fiscal Years 1977-94, BTS97-E-01," Washington, DC: U.S. Department of Transportation.
- Bureau of Transportation Statistics (1996), "Transportation Annual Statistics Report 1995," Washington, D.C.: U.S. Department of Transportation.
- Carney, Dan (1995), "Committee Takes Highway Money," *Congressional Quarterly Weekly Re-port*, 53(37, September 23): 2892-2895.
- Energy Information Agency (2005), "Retail Gasoline Historical Prices," [Online]. Available: http://www.eia.doe.gov/oil_gas/petroleum/data_publications/wrgp/mogas_home_page.html. Accessed: 2/14/2005.
- Energy Information Agency (2004), "International Energy Annual 2002," Office of Energy Markets and End Use, Publication DOE/EIA-0219, [Online]. Available: <http://www.eia.doe.gov/iea/>. Accessed: 2/14/2005.
- Federal Highway Administration (2005), "Safe, Accountable, Flexible and Efficient Transportation Equity Act of 2003: Section-by-Section Analysis," [Online]. Available: http://www.fhwa.dot.gov/reauthorization/safetea_analysis.htm. Accessed: 2/14/2005.
- Federal Highway Administration (2004a), "Highway Statistics 2003," Washington, DC: U.S. Department of Transportation.
- Federal Highway Administration (2004b), "Highway Statistics Summary to 1995," Washington, DC: U.S. Department of Transportation.
- Federal Highway Administration (2004c), "Price Trends for Federal-Aid," *Highway Construction*, 2Q2004 Report.
- Federal Highway Administration (2003a), "Highway Statistics 2002," Washington, D.C.: U.S. Department of Transportation.
- Federal Highway Administration (2003b), "Joint Federal/State Motor Fuel Tax Compliance Project, 23rd Steering Committee Meeting", Meeting Minutes, March 24, [Online]. Available: <http://www.fhwa.dot.gov/policy/23scmin1.htm>. Accessed: 2/14/2005.
- Federal Highway Administration (2003c), "Tax Rates on Motor Fuel," *Highway Statistics 2002* (Table MF-121T) Washington, DC: U.S. Department of Transportation.
- Federal Highway Administration (2000), "Highway Finance," *Highway Statistics 1999* (Section 5) Washington, DC: U.S. Department of Transportation.
- Federal Highway Administration (1999), "Financing Federal-Aid Highways," Office of Legislation and Strategic Planning, Publication No. FHWA-PL-99-015, Washington, DC: U.S. Department of Transportation.
- Federal Highway Administration, (1998a), "Primer: Highway Trust Fund," November (Informational report, Office of Policy Development) Washington, DC: U.S. Department of Transportation.
- Federal Highway Administration (1998b), "Strategies to Reduce Greenhouse Gas Emissions from Transportation Sources," *Transportation and Global Climate Change: A Review and Analysis of the Literature*, DOT Publication DOT-T-97-03 (Chapter 5,

pp. 28- 96), Washington, DC: U.S. Department of Transportation.

- Flint, Jerry (1995), "The Devil You Know," *Forbes*, November 6, 156(11):108.
- Goldman, Todd and Wachs, Martin (2003), "A Quiet Revolution in Transportation Finance: The Rise of Local Option Transportation Taxes," *Transportation Quarterly*, 57(1):19-32.
- Hosansky, David (1996), "House Panel OKs Moving Trust Funds Off-Budget," *Congressional Quarterly Weekly Report*, April 20, 55(6): 365.
- Jacobson, Louis (1996), "Driving Force," *Planning*, 62(6):19-21.
- Mobile Corporation (1995), "The Hidden Price Tags #2," advertisement.
- National Highway Transportation Safety Administration (2004), "Summary of Fuel Economy Performance," Table NVS-220, March, [Online]. Available: <http://www.nhtsa.dot.gov/cars/rules/cape/CAFEDData.htm>. Accessed: 2/14/2005.
- Nystrom, Christina (1999), "TEA Time for the Nation's Roads," *The American City and County*, 114(11):58-74.
- O'Brien, Catherine (1996), "Some Lawmakers Pushing Freeze on Fuel Efficiency," *Mobile Press Register*, January 6:11-B.
- Pr Newswire*, "Don't Use Highway Repair Money to Bail out Amtrak, Highway Users Tell Congress," (Section: Washington Dateline) April 7, 1995.
- Public Law 102-240, *Intermodal Surface Transportation Efficiency Act of 1991*.
- Rao, Kant (1986), "Policy Issues in Financing Future Highway Investments in the United States," *Transportation Journal*, 26(1): 45-54.

- Sampson, Roy J., Martin T. Farris, and David L. Shrock (1990), *Domestic Transportation*, 6th Ed., Boston, MA: Houghton-Mifflin Co.
- Samuelson, Robert J. (1995), "Surviving the Guillotine," *Newsweek*, 126 (21, November 20): 65.
- Smith, Jeremy (2004), "The Interstate Highway System" *World Trade*, May:74.
- Sutton, Jr., Walter L. and Marks, David (1999), "Highways and the New Wave of Economic Growth," *Public Roads*, 63(1):10-12.
- U.S. General Accounting Office (2002), *Highway Trust Fund: Overview of Highway Trust Fund Financing* (GAO-02-435T: Testimony before the Subcommittee on Transportation, Infrastructure, and Nuclear Safety, Committee on Environment and Public Works, U.S. Senate) Washington, DC: U.S. General Accounting Office.
- Weingroff, Richard F. (1996b), "From 1916 to 1939: The Federal-State Partnership at Work," *Public Roads*, Summer, 60(1): 7-10.
- U.S. General Accounting Office (2000), *Highway Funding: Problems with Highway Trust Fund Information Can Affect State Highway Funds* (GAO/RCED/AIMD-00-148) Washington, DC: U.S. General Accounting Office.
- Weingroff, Richard F. (2004), "The Quest for a National Road," *The National Old Trails Road*, (Part 1), [Online]. Available: <http://www.fhwa.dot.gov/infrastructure/trails.htm> . Accessed: 3/12/2005.
- Weingroff, Richard F. (2003), "The Man Who Changed America, Part I," *Public Roads*, March/April, 66(5): 22-37.
- Weingroff, Richard F. (1996a), "Federal-Aid Highway Act of 1956: Creating the Interstate System," *Public Roads*, 60(1, Summer): 10-20.
- Weingroff, Richard F. (1996c) "The Federal-Aid Road Act of 1916: Building the Foundation," *Public Roads*, Summer, 60(1): 2-6.

AUTHOR BIOGRAPHY

Michael J. Gravier is a doctoral candidate in the Department of Marketing and Logistics at the University of North Texas. He holds a master in logistics management from the Air Force Institute of Technology and a BA with majors in Spanish and anthropology from Washington University in St. Louis. Mr. Gravier is an active duty logistics readiness officer in the United States Air Force and upon completing his degree at the University of North Texas will join the faculty at the Air Force Institute of Technology in Dayton, Ohio.

AUTHOR BIOGRAPHY

M. Theodore Farris, II, is an associate professor of logistics at the University of North Texas. He holds a Ph.D. in business logistics and an M.A.B.A. in management information systems from the Ohio State University, an MBA in materials logistics management from Michigan State University, and a BS in business administration from Arizona State University. Prior to his academic career, Dr. Farris was employed with IBM Corporation and INTEL Corporation. He holds professional certification status (C.T.L.) with the American Society of Transportation and Logistics, and his research interests include cash-to-cash, supply chain mapping, and real options. Dr. Farris has numerous publications in *Transportation Journal*, *International Journal of Logistics Management*, *Journal of Business Logistics*, *Journal of Transportation Law*, *Logistics*,

and Policy, International Journal of Physical Distribution & Logistics Management, and the Journal of Applied Business Research.