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The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

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Introduction

Transportation and infrastructure funding remains a significant issue for public administrators at all levels of government. Aging infrastructure requires ongoing maintenance and attention. Increased mobility and growing demographics place further strain on existing transportation systems and necessitate future planning for expansion. This growing demand coupled with a rise in fuel-efficient vehicles, renders current levels of fuel taxes insufficient. Federal, state, and local levels of government are currently searching for new revenue mechanisms to supplement transportation funding.

This paper will evaluate the feasibility of alternative methods of transportation funding, focusing specifically on the emergent theory of road user fees. After outlining general philosophical principles behind road user fees, this paper will examine road user fees in the context of a vehicle mileage traveled fee, hereafter known as a VMT-F. This discussion will focus on the challenges of gaining political acceptance for a vehicle mileage tax as well as methods of implementation.

An overview of the philosophical principles behind the theory of road user fees will aid in evaluating specific policy proposals such as a VMT-F. Road user fees have accrued academic support for numerous reasons. First, user fees are better than tax increases at directly connecting usage with costs. (Scribner, 2014). Broad tax increases are blunt policy instruments that target the general population. General tax increases indiscriminately spread the tax burden over the entire tax base without regard for usage rates. User fees are more precise policy instruments. The amount consumers pay depends on the level of participation in the taxed activity.

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

Second, user fees provide transparency and are clearly linked to incentives. General tax increases are often complex and complicated. Their byzantine structure and lack of precision can cloud the link between incentives and financial payment. User fees provide clarity by directly linking usage to financial payment. This clarity allows users to easily understand charges and adjust consumption behavior. If the benefit derived from participating in the taxed activity outweighs the cost of the user fees, then the individual will participate. If it does not, then the individual can easily realize this and pursue substitutes and alternative courses of action. Either way, user fees are easily understandable and allow for simple calculations to be made. Having discussed user fees in the abstract, this paper will examine the VMT-F.

VMT-F

The concept of a VMT-F is simple. Drivers would pay a set rate per vehicle mile traveled. The amount of vehicle miles traveled by an individual would be tracked through GPS technology or by physical inspection. At the end of a set period each individual would then be assigned total fee based on the number of miles they traveled. This proposed policy measure shares the same benefits as a user fee. It charges drivers based on how much they travel. Those who drive more inflict more damage on roads. The VMT-F would directly charge on the amount of use and damage inflicted on roads. It has the advantage of demonstrating the true cost of traveling a mile to drivers. The VMT-F presents itself as an alternative source of transportation funding. Currently, federal and state fuel taxes serve as the primary method of transportation funding.

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

Before discussing the transportation funding situation further, it is important to examine the relevant literature concerning this topic. Doing so will provide context and demonstrate why alternative sources of funding are necessary.

Literature Review

The nation faces a transportation-funding crisis at all levels of government, but particularly at the national level. The problems at the national level reverberate down to lower levels of government. The Federal Highway Trust Fund, the primary funding mechanism for the national highway system, was projected to have a negative balance in 2015 (Basso & Duvall, 2013). This poses a major problem for intergovernmental relations. State and local governments often rely on a large number of federal grants for transportation funding when dealing with highways. Problems with federal funding affect them.

In answer to this, the *National Employment Law Project* proposes several solutions at the federal level. These solutions include raising the gas tax and levying general sales tax funds for transportation costs. However, these measures are regressive and can be disproportionately burdensome to low-income workers (Christman, 2013). Because of this the *National Employment Law Project* proposes three different methods that include variants of road user fees. These methods are VMT-Fs, Congestion Fees, and Parking Fees (Christman, 2013). Pilot programs indicate that VMT's are less regressive and would have an annual tax burden of less than twenty dollars for 98% of the population. Congestion fees could lower the bill for maintaining the highway system by 40 billion dollars. Parking fees could allegedly help public transit job creation and lower automotive emissions.

These targeted fees have garnered academic support because they are more precise than other methods. *Competitive Enterprise Institute* contends that user fees are more direct and

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

efficient than tax increases. They directly charge individuals based on their use. Additionally, the *Competitive Enterprise Institute* provides data that indicates user fees are more politically feasible than alternative-funding methods such as tax increases (Scribner, 2014). They cite the *University of California Transportation Center*, which argues that user fees are more transparent and less regressive than tax increases (Schweitzer & Taylor, 2010). The *Tax Foundation* reviews historical data and points out the limitations of both user fees and tax increases. It raises implementation concerns by showing that both these mechanisms can currently only account for half of transportation expenditures (Henchman, 2014). Additionally, transportation expenditures are projected to increase significantly in the coming years. The *Tax Foundation* also addresses concerns about funding road transportation costs from the general revenue fund. Doing so can result in problematic incentives such as free-riding which can increase congestion and costs (Henchman, 2014). The study compares data from differing states and analyzes the various approaches utilized.

When evaluating proposals, it is always important to keep long-term implications in mind. The *RAND Corporation* examines several unique trends that will affect the future. For example, improving fuel economy in the automobile industry poses challenges for gasoline taxes which are based on fuel consumption (Ecola & Sorenson & Wachs, 2012). Government officials must find alternative methods of funding in the face of instability that threatens traditional funding sources. The *RAND Corporation* offers mileage-based fees as a more stable source of funding because it charges fees based on mileage traveled instead of fuel consumption (Ecola & Sorenson & Wachs, 2012). Additionally, user based fees could have cheaper implementation costs.

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

However, a series of studies by the *Texas A&M Transportation Institute* addresses a host of issues regarding transportation funding and user fees. This includes the use of performance measurements to include air quality and energy into mileage-based user fees (Baker & Farzaneh & Goodin & Novak, 2012). The following series of papers addresses specific implementation challenges such as technology issues and institutional issues. A case study of VMT-F's in Texas provides some concrete evidence of how these theories will work in practice (Baker & Goodin, 2011). Perhaps the most informative article that documented both theory and case studies was *Road User Fees Instead of Fuel Taxes: The Quest for Political Acceptability* (Duncan & Graham, 2013). Although this paper reached slightly different conclusions, this article provided a wealth of technical information and data used in this paper.

Findings

When discussing such a complex issue, it is important to understand both the history and context of the situation. Therefore, this paper will address the history of transportation funding mechanisms to gain a better understanding of the current situation. The impact of recent trends in regulation, technology, and consumer preferences on transportation funding will also be considered. The paper will then transition to an overview of various policy options for transportation funding. The advantages and disadvantages of all options will be discussed. It will conclude with recommendations for research in the arena of transportation funding.

Overview of Transportation Funding History

Construction of the Interstate Highway System was authorized by the Federal Aid Highway Act of 1956 (FHWA, 2015). The objective of the Interstate Highway System was to

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

create an integrated transportation system that spread across the nation. The national defense and economic benefits of such a system were significant. Creating, constructing, and maintaining this massive transportation infrastructure required large amounts of funding. Originally, the U.S. Treasury's General Fund financed the Interstate Highway System. However, the ongoing demands and expansion of the transportation system soon required more sophisticated and detailed mechanisms of funding. The Highway Revenue Act of 1965 created the Highway Trust Fund. Run by the federal government, this served as a designated funding mechanism for the National System of Interstate and Defense Highways. It played a crucial role in providing a stable source of funding for transportation infrastructure improvements. One of the most influential programs it financed was the Federal-Aid Highway Program.

The Federal-Aid Highway Program acted as an intergovernmental funding mechanism. It promoted top-down sharing of funds for transportation purposes. The Federal-Aid Highway Program specifically resulted in the proliferation of categorical grants from the federal government to lower levels of government (Duncan & Graham, 2013). These categorical grants served as the primary funding mechanism for state construction and maintenance of the highway system. The rapidly expanding scope of the transportation system inevitably resulted in new problems and obstacles. The growing complexity of the financing system posed new challenges for state and local governments seeking to properly utilize the federal funds. Restrictions placed on aid hampered efforts to direct funding to certain areas of need. To rectify this, Congress enacted the Federal-Aid Highway Act of 1973.

The Federal-Aid Highway Act of 1973 sought to address concerns and complaints regarding the restrictions placed on federal aid funds. Specifically, it authorized greater flexibility in the use of Urban System Funds. Many officials began to use the designated Urban

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding System Funds for exploratory mass transit projects. Eventually, the Highway Trust Fund was split into two accounts. Established in 1982, the smaller Mass Transit Account was dedicated specifically towards mass transit projects. The Highway Trust Account remained dedicated to road construction. A third and final split occurred in 1986 with the establishment of the Leaking Underground Storage Tank Trust Fund. It was designed to address petroleum releases from federally regulated underground storage tanks. The fund was later expanded to include prevention techniques. The final arrangement of the Highway Trust Fund was broken down into three parts and consists of the Highway Account, the Mass Transit Account, and the Leaking Underground Storage Tank Account.

Current Funding Transportation Mechanisms

Currently all three accounts receive funding primarily from the federal motor vehicle fuel tax. State transportation funds often receive funding from state fuel taxes in the same way. The federal motor vehicle fuel tax has a tiered system of multiple rates that vary by fuel type (Duncan & Graham, 2013). Gasoline and other blends of ethanol fuel mixtures are taxed at a rate of 18.4 cents per gallon. Diesel is taxed at a higher rate of 24.4 cents per gallon. Various other special fuels are taxed at rates ranging from 9.15 cents per gallon to 13.6 cents per gallon. While the motor vehicle fuel tax comprises the majority of revenue, it does not account for all revenue. Approximately 10% of the Highway Account revenue comes from excise taxes on the purchase of tires, heavy trucks, trailers, and an annual heavy vehicle tax (Duncan & Graham, 2013). However, these funding mechanisms have been inadequate sources of revenue over the last several years.

Inadequate Sources of Revenue

The last decade has provided conclusive evidence regarding the inadequacy of current federal funding mechanisms for the Highway Trust Fund. Both the Government Accountability Office and the Congressional Budget Office estimated declining balances through 2011 and fund depletion as early as 2010. Federal law mandates the Highway Trust Fund cannot have a negative balance. Therefore, the Highway Trust Fund has been forced to rely on transfers from the U.S. Treasury's General Fund. In 2011 alone, the Highway Trust Fund had a deficit of eight billion dollars (Duncan & Graham, 2013). The total amount of funds transferred from the U.S. Treasury's General Fund to the Highway Trust Fund since 2008 totals over 65 billion dollars. Congress has relied on a series of stopgap funding plans to prevent funding lapses, the most recent of which was passed in July 2014.

The declining revenue from the federal motor vehicle tax is attributed to a combination of technological and regulatory trends. First, technological advances in fuel efficiency have substantially decreased the revenue obtained from the federal motor vehicle tax. Greater fuel efficiency means that vehicles can drive farther and require less fuel. The result is that they inflict greater damage on roadways while using less fuel. Therefore, revenue for repairs is declining while road usage is rising.

Secondly, regulatory trends are reinforcing the advancement of fuel efficiency trends. This is occurring at the federal and state level. The federal government has increased passenger vehicle mileage standards from around 25 miles per gallon to more than 50 miles per gallon by 2025. (Duncan & Graham, 2013). Additionally, for the first time, the federal government has regulated commercial trucks to achieve gains in fuel efficiency. Some states have also adopted similar regulatory directives. For example, California requires that at least 15% of vehicles sold

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

in-state run either on electricity or achieve zero fuel emissions. These regulatory trends have further incentivized the automotive industry to pursue fuel efficiency. Fuel efficiency trends appear poised to dominate the future, which will further harm the motor vehicle tax's revenue-raising capability unless the current structure is changed. The evidence clearly demonstrates the instability of the current funding mechanism structure and the need for change. This paper will now examine several of the key policy proposals that have arisen in response to the current transportation funding problem.

Proposed Policy Solutions

The need for increased transportation funding and revenue will remain a significant problem if it is not addressed in the near future. Current levels of spending are nearly 40 billion dollars per year. Current levels of federal motor vehicle tax revenues are nearly 27 billion dollars per year. This creates an approximate 13-billion-dollar shortage. Additionally, the U.S. Department of Transportation estimates that merely maintaining the current level of highway performance would require 54 billion dollars per year (Duncan & Graham, 2013). This understates the problem as it does not account for any expansions or improvements. Three key policy proposals have surfaced to address this need: General Funding Financing, Fuel Tax Increases and Indexation, and VMT-F. We will examine the advantages and disadvantages of each proposed policy method individually.

Criterion of Evaluation

Before evaluating the various policy proposals, it is necessary to establish a set of criteria that we can use to judge all options. This paper will rely on Adam Smith's canons of taxation.

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

These canons of taxation are recognized as an essential part of economic history. They are accepted and generally relied upon by scholars in various fields, such as in economics and public administration. The canons themselves are simple and easy to apprehend. They include adequacy, equity, simplicity, and efficiency. A well-constructed taxing system should strive for adequacy of revenue, equity of tax burden, administrative simplicity, and economic efficiency. Having established the criterion of evaluation, we will now proceed to examine the various policy proposals.

General Fund Financing

General Fund financing is frequently used and has played an integral role in transportation funding. As stated earlier, transfers from the U.S. Treasury Fund have totaled over 65 billion dollars since 2008. General Fund financing is also very common at the state and local levels of government. Overall, approximately half of the combined federal, state, and local spending on highways comes from General Fund financing. It has many advantages, particularly at the state and local level. Money from the General Fund is in competition with other programs for financing which forces budget proposals to be competitive and efficient. It also forces legislators to make explicit trade-offs amongst priorities. More importantly, General Fund financing is a simple mechanism for funding projects. It can cover an unexpected rise in one-time expenditures and provide the necessary fiscal power for capital projects. General Fund financing is a useful complementary funding mechanism. Danger arises when General Fund financing is relied upon so much that it ultimately becomes the primary funding mechanism. This can happen at any level of government. However, the costs and differences in revenue are

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

much greater at the federal level and this tends to exacerbate the problem. Overreliance on General Fund financing as a primary funding mechanism has several major disadvantages.

General Fund financing is not a dedicated source of funding, meaning the funds are not specifically reserved for transportation purposes. This means that the primary source of funding for transportation is not stable. It is subject to changes and unforeseen circumstances that can drastically affect other areas and divert funding away from transportation. For example, emergencies such as a natural disaster could divert massive amounts of funding toward relief efforts and away from transportation. This instability and uncertainty in funding is always troublesome, but it is particularly troublesome for transportation planning. Transportation planning almost always involves long-range planning. Capital projects take years to complete. Planning must take demographics into account and forecast years into the future to prepare for increased traffic, congestion, and growth. Instability in financing severely hampers the effectiveness of such long-range planning. This poses an additional problem at the federal level. The poor fiscal state of the federal government makes any reliance on long-term contributions from General Fund financing risky.

When applying the canons of taxation, General Fund financing earns a mixed review. It can provide adequate revenue at times. However, the instability and poor fiscal state of the federal government and various state governments call the continued adequacy of revenue into question. At the federal level, simply continuing to transfer money from the U.S. Treasury General Fund is not a sustainable, long-term plan.

General Fund financing also raises concerns regarding equity. Because it eliminates any sort of user charge fee, General Fund financing indiscriminately charges everyone the same amount. Low-mileage and high-mileage users pay the same amount regardless of usage.

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

Someone who rarely uses the highway system and inflicts minimal wear and tear will pay as much as someone with a higher usage rate. Aside from outright equity concerns, this type of indiscriminate charging can cause problems with incentives. General Fund financing lowers the perceived cost of driving a mile. This will increase usage and result in a need for additional funding. User fees control these incentives because they charge based on usage and provide a more accurate cost of driving a mile. General Fund financing lacks this precision and accuracy.

With regards to administrative simplicity, General Fund financing does well, as it is simple to administer. In fact, when compared with a tiered motor vehicle fuel tax or user charge road fees, it may be the simplest of all policy options presented in this paper. However, one must weigh its simplicity against the other problems it causes with adequacy of revenue, equity, and incentives.

General Fund financing faces significant problems when judged according to economic efficiency. Distorting the true cost of driving a mile and indiscriminately charging everyone the same amount can promote perverse economic incentives. However, the administrative simplicity does mean General Fund financing is easily carried out. Overall, inadequacy of funding, lack of equity, and creation of perverse economic incentives makes the use of General Fund financing as a primary funding mechanism highly questionable. It can serve as a useful complementary measure for unique instances where it is needed. However, it should not be relied upon as a primary funding mechanism going into the future.

Increased Fuel Tax Rates and Indexation

The last decade has shown that the current iteration of both federal and state motor vehicle taxes have failed to keep pace with transportation funding needs and provide adequate

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

revenue. However, this does not mean that the motor vehicle fuel tax structure as a whole is inadequate. Increasing fuel tax rates and marking rates for indexation has several advantages which make it eligible to serve as a primary funding mechanism for transportation funding.

Raising motor vehicle fuel tax rates could provide adequate short-term revenue.

However, there are serious concerns regarding the adequacy of long-term revenue. The central flaw with using motor vehicle fuel tax rates is that it does not account for the growing trend of fuel efficiency. As demonstrated earlier, fuel efficiency is an undeniable trend in the automotive industry that is also mandated and incentivized by the federal government. High fuel efficiency vehicles will continue to proliferate in the future. They represent a high one-time fixed cost for consumers, followed by years of low marginal costs. Increasing trends in the automotive industry and regulatory trends within federal and certain state governments will also incentivize consumers. High fuel efficiency vehicles will continue to utilize highways and increase damage without providing commensurate additions to highway revenues. Therefore, this policy option raises serious concerns about adequate long-term revenue generating capability.

Increased fuel tax rates perform favorably from an equity perspective. It avoids blind and indiscriminate charges. Those who use the road more will use more gas and therefore pay more. Additionally, fuel tax rate infrastructure is already in place. Consumers are accustomed to operating under it and an administrative system is already in place. Raising the rates would incur little costs in terms of administrative simplicity. The tiered taxing structure for different kinds of fuel does add some complexity, but overall it seems to perform well. Therefore, increased fuel tax rates satisfy the canons of equity and administrative simplicity.

Increasing fuel tax rates earns mixed reviews regarding economic efficiency. The tiered tax rate structure has performed decently well, but increasing rates raises some concerns. Taxing

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

an activity disincentives that activity. This could be beneficial if companies seek alternative means of transportation such as freight or air travel. However, if alternative means are not cheaper, increasing fuel taxes could harm businesses, especially small businesses. Regarding consumers, the fuel tax is regressive and raising rates could disproportionately affect low-income people.

Fuel tax rates are currently unmarked for indexation. Indexing the fuel tax rates would have several benefits. It would avoid the distortion and perverse economic incentives created by General Fund financing. Indexing would maintain purchasing power and demonstrate the rising costs of maintaining roadways. This would remove distortion caused by General Fund financing and provide drivers with an accurate cost of driving a mile. It would attempt to keep funding levels commensurate with increasing costs of transportation construction and repairs. Once again, this ability is limited by increasing fuel efficiency trends.

A quick note on the political aspect of increasing fuel tax rates and marking them for indexation is that a review of political history shows that voting for fuel tax increases is very rare, particularly at the federal level. There have only been four major changes to the federal motor vehicle fuel tax rate in its entire 80 year history (Duncan & Graham, 2013). Changes have occurred more frequently at the state level, but overall politicians and legislators have been recalcitrant to vote for fuel tax increases. This is a serious concern when discussing fuel tax increases. It does not appear politically palatable and may not occur until a crisis or focusing event rallies popular support. A partial solution appears in the form of indexation. Indexation has the added advantage of not requiring politicians to continually vote for tax increases. Therefore, pursuing indexation first may be a wise political step.

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

Overall, increasing the motor vehicle fuel tax rates and marking them for indexation appears to be a good short-term option. It should be noted that the U.S. Chamber of Commerce has endorsed this method. While there are some concerns about political feasibility, it performs well under the canons of taxation. It can provide adequate short-term revenue, is more equitable than General Fund Financing, and has a pre-existing administrative structure. Concerns arise when considering economic efficiency and long-term adequacy of revenue. The main concern with using it as a primary funding mechanism is its inability to keep up with the growing trend of fuel efficiency. This inability poses serious concerns about its viability as a long-term option.

VMT-F Implementation

As discussed earlier, the VMT-F works like a road user charge. While the general benefits of a user charge have already been outlined, we must first examine several implementation methods before offering a conclusion. There are two prominent implementation methods for the VMT-F. There is a high-tech method and a low-tech method. We will discuss each in turn before evaluating them according to the canons of taxation.

High-Tech Implementation

High-tech implementation is the most accurate, most expensive, and most costly iteration of the VMT-F. It would center on using a global positioning system, otherwise known as a GPS. Data could be recorded in a variety of ways. First, data could be transferred directly from the GPS via satellite or wireless technology to the responsible agency. The agency would then compile a statement and send it to a driver. This report could be monthly, semi-annually, or annually. While innovative, this type of technological reporting could pose serious privacy

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

concerns. A second major concern is that this method would require the installation of GPS devices in all automotive vehicles at a high cost.

Secondly, the VMT-F could be read and assessed at a gas station like the current fuel tax. This method has been used in various pilot studies sponsored by the state of Oregon (Duncan & Graham, 2013). This method requires gas station operators to purchase the proper technology to read and assess the VMT-F. A third option would assess the VMT-F at the DMV when owners renew their vehicle registration tag. This would require state DMV's to invest in the proper technology and staffing to carry out this operation.

Several major disadvantages accompany all the high-tech implementation methods. They all require tamper-proof devices to be professionally installed in cars. They also all require costly new infrastructure to read and store data and then to bill drivers. For example, in Oregon it would cost 33 million dollars in capital costs and an additional 1.6 million dollars annually in operating costs (Duncan & Graham, 2013). The costs for a large state such as New York are 1.44 billion dollars in capital costs (Duncan & Graham, 2013). A second major concern involves privacy. The government would require the number and location of miles driven to facilitate tolls and congestion areas. This would undoubtedly engender political resistance.

Low-Tech Implementation

A low-tech system aims to address cost and privacy concerns. It would replace technological monitoring with self-reporting and visual inspection. The fee would be assessed based on the physical odometer and read at the DMV when tags are renewed. Obviously, defenses against tampering would be required as well as a physical inspection. Auto service centers are already required to collect mileage information and could provide this data to the

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

agency. This data could be used to create profile histories of drivers that would establish a baseline between expected fees and reported fees. Additionally, a random auditing mechanism would be required to minimize cheating. An analogy to this system is the personal income tax (Duncan & Graham, 2013). Both rely upon self-reporting combined with audit mechanisms to ensure compliance. The actual cost of implementing a low-tech system would be relatively low. Mileage data is already collected by the DMV, authorized auto centers, and dealer such as CARFAX. However, concerns about administrative simplicity remain.

Conclusion and Further Research

VMT-F's have an admittedly mixed record when evaluated according to Smith's canons of taxation, however they undoubtedly could provide adequate short-term and long-term revenue. Assuming the total amount of miles traveled stays relatively constant, a tax of \$0.018 per vehicle miles traveled would result in an annual tax bill of 360 dollars for the average household (Duncan & Graham, 2013). This would satisfy the 54 billion dollars per year needed to maintain current infrastructure and substantially eclipse the 27 billion dollars currently produced by the fuel tax. Most importantly, it would move in the same direction as fuel efficiency trends and continue producing long-term adequate amounts of revenue.

As a user fee, it would be more equitable than the other methods and would directly link cost with road usage. Current fuel-efficient vehicles inflict the same amount of damage as other vehicles but pay less. VMT-Fs would correct this inequality. Concerns arise when considering administrative simplicity and economic efficiency. Mileage data is already recorded and has an existing infrastructure. However, high-tech implementation would require professional installation of GPS devices and additional processing capabilities. This would entail high fixed

The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

costs of infrastructure as well as additional staff. Both raise serious concerns about economic efficiency and administrative simplicity. Low-tech implementation raises different concerns in the same areas. The processing and auditing mechanisms raise concerns about administrative simplicity. The administrative growth and potential for cheating threatens economic efficiency.

These potential difficulties should not preclude VMT-Fs from being considered a viable policy option. It alone provides long-term adequate funding. General Fund financing works as a complementary measure but not as a primary funding mechanism. Higher fuel tax rates and indexation hold great promise as a short-term measure. However, they are constrained by their inability to match fuel-efficiency trends and provide adequate long-term revenue. In addition to the canons of taxation, VMT-Fs pose privacy concerns. These privacy concerns impact political feasibility. Further areas of research should examine the potential of third party reporting to alleviate privacy concerns. Private companies already collect mileage data and this has achieved relative public acceptance. Looking at utilizing these companies as third-party reports from data on VMT-F is an interesting area of further research.

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The Feasibility of Road User Fees and Other Alternative Sources of Transportation Funding

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