IMPLICATIONS OF AN INFLATION-ADJUSTED FUEL TAX ON GOVERNMENT REVNUE AND CONSUMER WELFARE

John Marron, Indiana University Public Policy Institute, (317) 261-3037
Fengxiu Zhang, Indiana University - Purdue University Indianapolis, zhang368@iupui.edu
Jerome Dumortier, Indiana University - Purdue University Indianapolis, (317) 274-1817, jdumorti@iupui.edu

Overview

Gasoline and diesel taxes are an important stream of revenue for state and federal government to fund the construction and maintenance of the road infrastructure. According to the Institute on Taxation and Economic Policy (ITEP), gasoline and diesel taxes raise $30 billion annually and cover 85% of funding for road construction and maintenance (ITEP, 2013). However, the funding for road construction and maintenance coming from fuel taxes has been eroded over the years for two reasons: First, cars have become more fuel efficient and thus, reduce the fuel tax revenue over time. In its Annual Energy Outlook 2013, the Energy Information Administration (EIA) estimates that motor gasoline consumption will decrease by 0.9% annually in the period between 2011 and 2040. Second, the fuel tax in most states is a fixed per-gallon amount that is not adjusted in regular intervals. Over time, this leads to a funding gap because the cost of road construction and maintenance is increasing. Since 1972, the earliest year for which data is available, transportation construction costs have grown on average by roughly 4% per year. A July 2013 testimony to the Subcommittee on Highways and Transit by the Congressional Budget Office states that beginning in 2015 the federal Highway Trust Fund will have insufficient funding. To close the gap, it is estimated that the gasoline taxes would have increase up to 15.8 cents per gallon to compensate for the increase in transportation construction cost growth since the last tax adjustment (ITEP, 2011). Similar increases are necessary for diesel taxes. After adjusting to account for growth in construction costs, the average state's gas tax rate has effectively fallen by 20% or 6.8 cents per gallon since the last time it was increased. Overall, the states are losing over $10 billion in revenue each year as a result of failing to plan for transportation cost growth.

Concerns about the financial sustainability of the current taxation scheme for gasoline and diesel to finance the transportation infrastructure has triggered interest in alternative approaches to tax gasoline and diesel. Without policy adjustments, the gap between revenue and infrastructure expenses will continue to widen. Our analysis aims to evaluate a different approach to levy income to finance road construction expenses given the abovementioned problems with the current funding scheme. We model and assess the indexing of gasoline and diesel taxes to inflation. We use a dynamic simulation model that assesses the financial implications of the proposed policy change for multiple stakeholders (e.g., states, federal government, consumers, etc.). The model is flexible enough to allow for varied future scenarios.

Methods

We are developing a dynamic, economic simulation model to quantify the financial impacts of fuel taxes indexed to inflation. Simulation models have the ability to explore scenarios that are characterized by complex interactions and assess potential future outcomes based on adjustable policy parameters. They can also answer questions about "What might have been". The state level model allows a flexible analysis of alternative policy scenarios and different assumptions about the future evolution of key parameters. The outputs include government revenues, fuel prices and consumption, and cost to consumers for different tax policies over time. The simulation model has a time frame of ten years into the future to project state revenue, fuel consumption, fuel prices, and cost to consumers differentiated by fuel and states. Our model links projected fuel prices based on the new tax policy on fuel consumption and driving behavior which in turn will influence government revenue and consumer welfare. We have data on historic cost of road construction which will be important to estimate future needs (new construction due a growing economy) and maintenance of the current system. Our model will also include a demand model that uses gasoline and diesel price elasticities. Because we are using a partial equilibrium approach in our model, we use estimates of those elasticities from the literature.

Since 2005/2006, the vehicle miles travelled (VMT) has been relatively constant. This leads to a decrease in tax revenue under the current scheme given the trend in lower fuel economy of cars. In addition, increasing share of hybrid and electric cars is projected to further undermine the motor fuel tax base. The Energy Information Administration will provide us a with a baseline on the projected VMT but we will use a flexible approach, i.e., different parameterization, to get an upper and lower bound on our estimates of government revenue and also to assess the sensitivity of our model results to key parameters.

Each policy scenario below will be compared to a baseline (status quo). The difference between the baseline and the scenario with respect to prices, income, consumption, etc., will be attributable to the change in policy implemented in the scenario. This allows us to calculate the financial implications of each policy. Key input variables in our model are the evolution of inflation into the future. Our model allows for the indexation of the gasoline and/or diesel tax to inflation, i.e., the CPI. The U.S. Department of Transportation (U.S. DOT) also keeps track of road construction cost via the National Highway Construction Cost Index (NHCCI). Note that the NHCCI will replace the U.S. DOT Federal Highway Administration Bid-Price Index which has been used since 1933 to track road construction costs. Having the possibility to index fuel taxes to different indices representing cost will allow us to determine the appropriateness of each.

There are alternatives to the proposed policy of linking gasoline and diesel taxes to inflation. The first alternative could be simply eliminating gasoline and diesel taxes and rely on the state's sale tax to replace the revenue. Some but not all states already impose the sale tax on fuels. A second possibility would require an annual state tax in addition the registration fee based on vehicle weight. This would include hybrid and alternative fuelled vehicles as well. Some researchers have proposed a road user fee instead of motor fuel taxes. Those road user fees would be based on vehicle miles travelled (VMT) and would require tracking the miles (and perhaps the location) travelled by a vehicle. Our model will incorporate the evolution of VMT in the future and fees could be assessed based on the funding necessary and VMT by all cars.

Because the model is composed of different interacting modules mentioned above, a simulation model is appropriate to assess the interactions of those components and it also makes the implementation of other policy scenarios easy.

Results

At the current time, the model is still under development and the complete set of results is not yet available. However, preliminary analysis indicates that linking gasoline and diesel taxes to inflation does stop the funding gap from becoming bigger. To restore the tax to the initially intended level (in real terms), an immediate increase in the tax rate is necessary in addition to a subsequent linking of the taxes to inflation or road construction cost. Additionally, at its completion our model may be used to:

- Quantify additional annual revenue to be realized by each state as a result of indexing fuel taxes to inflation, and project additional revenue one, two, five, and ten years into the future with sensitivities to changes in VMT, fuel costs, fuel consumption, etc.
- Quantify foregone revenue as a result of having not indexed fuel taxes to inflation at those taxes' adoption;
- Quantify the cost of indexing fuel taxes to inflation for average American drivers, by state;
- Illustrate various scenarios of the gap in funding for highway construction and maintenance based on sensitivity to various inputs, including elasticity of VMT to fuel costs;
- Provide a basis of comparison for indexing fuel taxes to inflation relative to other highway funding schemes (annual vehicle fees, sales taxes, etc)

The complete and final set of results associated with this model will be delivered by the end of March 2014; draft results will be available sooner.

Conclusions

The decrease in the real tax rate on gasoline and diesel has led to an underfunding of state and federal government sources for road construction and maintenance. In this paper, we analyze an alternative approach to fuel taxation by linking taxes to inflation. We simulate different evolutions of key parameters and assess the impact on government revenue as well as fuel prices and consumption. Our model results will provide important insights to policy makers and stakeholders on the future evolution of government revenue and the ability to fund road construction and maintenance.

References

Institute on Taxation and Economic Policy. Building a better gas tax: How to fix one of state government's least sustainable revenue sources. December 2011.

Institute on Taxation and Economic Policy. A federal gas tax for the future. September 2011.