

IS GASOLINE UNDERTAXED IN THE UNITED STATES?

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Even though the environmental and public safety benefits from higher taxes could be substantial, the United States has the lowest gasoline tax among industrial countries for a number of reasons.

Gasoline taxes vary dramatically across different countries. While the United Kingdom has a gasoline tax equivalent to \$2.80 per gallon, the highest among industrial countries, the United States has the lowest tax of 40¢ per gallon (18¢ federal tax and on average about 22¢ state tax) (see Figure 1). It is commonly thought that Europeans have a greater tolerance for high fuel taxes than Americans, as they have shorter distances to travel and better access to public transport, although the fuel tax protests in Britain in September 2000 suggested that the political limits of such taxes might have been reached.

A number of arguments are made for implementing high gasoline taxes. By discouraging driving and fuel combustion, gasoline taxes help

to reduce local air pollution, carbon dioxide emissions (a greenhouse gas), traffic congestion, traffic accidents, and oil dependency. Taxing gasoline is one way of forcing people to take into account the social costs of these problems when deciding how much, and what type of vehicle, to drive.

Gasoline taxes also provide a source of government revenues. In Britain, gasoline tax revenues are several times highway spending, and the Labour government has argued that if gasoline taxes are reduced, schools and hospitals will have to close. But this argument is somewhat misleading as the revenues could always be made up through other sources, such as income taxes. The real issue is what level of gasoline taxation might be justified when account is taken of the full social costs of driving, and the appropriate balance

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between gasoline taxes and other taxes in raising revenues for the government.

ENVIRONMENTAL EFFECTS

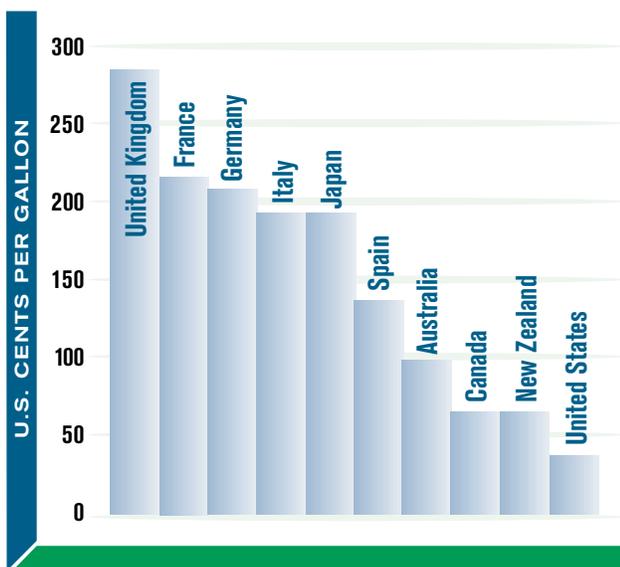
Gasoline combustion causes local air pollution, notably smog and carbon monoxide. This pollution can reduce visibility, but its main harm is to human health. For example, poor air quality can exacerbate respiratory problems and lead to premature mortality. Economists have assessed the damages caused by air pollution using epidemiological evidence on the link between air quality and human health, and studies estimating people's willingness to pay to reduce risks of adverse health effects. Damage estimates have fallen over the last 20 years or so as the vehicle fleet has become cleaner, at least partly in response to emissions-per-mile regulations that are imposed on new vehicles. According to a recent study by Kenneth Small

and Camilla Kazimi (University of California–Irvine), pollution damages are around 2¢ per mile (after updating to 2000), or about 40¢ per gallon, though there is still much uncertainty over these estimates.

Economists have also attempted to assess the potential damage from carbon emissions, such as the economic damage to world agriculture from future climate change and the costs of protecting valuable coastal regions against rising sea levels. These estimates are highly speculative; for example, it is difficult to value the ecological impacts of climate change, to allow for the small possibility of catastrophic climate change from instabilities within the climate system, and there is much controversy over the appropriate discount rate to use for converting future damages into current dollars. A typical estimate from the literature is around \$25 per ton of carbon, which translates into only 6¢ per gallon, though some studies obtain much higher numbers. These preliminary figures suggest that advocates of higher transportation taxes to reduce carbon emissions may be on weak ground. Their efforts might be better spent focusing on reducing combustion of other fossil fuels, particularly coal.

FIGURE 1

GASOLINE EXCISE TAXES IN DIFFERENT COUNTRIES



Source: Parry and Small, 2002

TRAFFIC CONGESTION AND ACCIDENTS

Raising gasoline taxes nationwide is not well suited to addressing traffic congestion, which is specific to certain roads in urban centers at particular times of day. Gasoline taxes do encourage people to use public transportation and to car-pool, but they also penalize driving on uncongested roads, such as in rural areas or urban centers on weekends. A much better way to alleviate congestion on, say, I-66 in the northern Virginia suburbs of metropolitan Washington, DC, would be to charge people to drive on the road at

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peak periods. (This could be done electronically by deducting from a pre-installed credit card on the windshield). Time-of-day pricing would be more effective at reducing congestion than gasoline taxes as it would encourage people to use busy roads at off-peak periods and look for alternative routes. With regard to accidents, it would be better to tax a driver's annual mileage, taking account of vehicle type and personal characteristics (such as experience and prior crash history). And raising the penalties for drunk drivers would be a more direct way to reduce alcohol-related crashes.

Nonetheless, peak-period fees and mileage related taxes have not been widely implemented in the United States (though there have been limited experiments with congestion pricing in California and Texas). Gasoline taxes might be the next-best response for curbing congestion and accidents, so it is still appropriate to consider congestion and accident benefits in an overall assessment of gasoline taxes. For congestion, this would require estimating marginal congestion costs averaged across both urban and rural roads and peak and off-peak travel periods, for the whole United States. Congestion costs are measured by the extra time it takes to drive under congested conditions compared with free-flowing traffic, multiplied by the monetary value of travel time (usually taken to be about half the market wage). Based on the available evidence, Kenneth Small and I concluded that the best estimate for the "averaged" congestion cost is about 3.5¢ per mile, or 70¢ per gallon.

The cost to society from traffic accidents largely depends on human fatalities and injuries—in the United States around 40,000 people are killed on the roads each year. Other costs include traffic hold-ups and property damage. The costs of fatalities and injuries include not only economic costs (such as med-

ical expenses) but also the personal or "quality-of-life" costs; economists usually measure people's willingness to pay for improved safety at the equivalent of several million dollars per fatality avoided.

It is very tricky to decide what portion of accident costs individuals might take into account in their driving decisions, and what portion they might not consider. It seems plausible that people will take into account the injury risks to themselves (and other occupants of their vehicles), and some of the property damage if they anticipate higher insurance premiums in the event of a crash. Most likely, they will not take into account the costs of traffic delays or the injury risk to pedestrians.

Whether one person's driving raises the accident risk to other drivers is not clear: the frequency of collisions rises with more traffic, but, if people drive more slowly or more carefully in heavier traffic, a given accident will be less deadly. Based on earlier work by Mark Delucchi (UC-Davis) and the U.S. Federal Highway Administration, Kenneth Small and I put the average accident externality at around 3¢ per mile (60¢ per gallon) for the United States, although there is a wide range of other plausible estimates.

Adding up the tally of the costs of driving that individuals do not take into account gives a total, so far, of \$1.76 per gallon, which is a substantial amount (though the uncertainty and controversy surrounding damage estimates should be borne in mind). However, a major problem with the gasoline tax is that it taxes fuel rather than distance traveled. Over the long haul, it is estimated that roughly 60% of the tax-induced reduction in gasoline will be from improvements in fuel efficiency (people buying smaller cars, retiring older, fuel-inefficient cars more often, etc.); only about 40% will come from people driving less. For each gallon of gasoline reduced by fuel taxes, the accident and

congestion benefits are only 40% as large as they would be if all of the reduction in fuel were due to reduced driving and none to improvements in fuel efficiency. Since imposing fuel taxes also creates economic costs by altering travel behavior, this reduction in benefits results in the optimal tax being smaller by a similar portion. Adjusting the above figures reduces the appropriate gasoline tax to less than a dollar.

GASOLINE TAXES AS PART OF THE OVERALL TAX SYSTEM

Gasoline taxes also provide revenues for the government and this raises the issue of whether the ability to provide revenues constitutes a reason to set higher levels of taxation than warranted on the grounds of pollution, congestion, and accidents. Leaving aside other considerations, whether it is better to finance some of the government's budget through gasoline taxes or not depends on the economic costs of gasoline taxes compared with other taxes, such as income taxes. Income taxes lead to economic costs or "excess burdens" because they distort the overall level of employment in the economy; for example, by reducing take-home pay they reduce the labor force participation rate of married women. Gasoline taxes cause economic costs by changing travel behavior and raising transportation costs for businesses.

Economists usually find that it is less costly to raise revenue from taxes with very broad bases, such as income taxes, than narrowly focused taxes on specific products that are easy to avoid by spending on other products. However, exceptions to this rule are products whose demand is relatively insensitive to price, which is the case for gasoline. Consequently, some level of taxation might be appropriate, in excess of that justified for curbing pollution, congestion, and acci-

dents. Kenneth Small and I calculated this component of the optimal tax at roughly 20¢ per gallon for the United States.¹

Taking account of both the revenue-raising benefits and the benefits from reduced fuel consumption, the optimal gasoline tax is just over \$1 per gallon for the United States, according to our estimates, though the estimate is sensitive to different assumptions and may change over time. This is 2.5 times the current U.S. gasoline tax, but still less than half of the current tax rate in the United Kingdom.

It is often thought that low-income groups bear a disproportionate burden of gasoline taxes, although the actual evidence on this is more mixed. For example, a study by James Poterba (MIT) found that spending on gasoline as a share of total household expenditure was only slightly lower for the richest 10% of households than for the poorest 10%, and the gasoline expenditure share was highest for middle-income groups. In my view, gasoline taxes should mainly be evaluated by weighing their overall economic benefits and costs. Distributional concerns are much better addressed through altering the progressivity of the income tax system, or providing a safety net through the benefit system.

OTHER ARGUMENTS FOR GASOLINE TAXES

The September 2001 terrorist attack, the recent debate in the House and Senate over competing energy bills, and fears about a resurgent Organization of Petroleum Exporting Countries (OPEC) have

¹ This calculation assumes that extra gasoline tax revenues would substitute for income tax revenues, leaving total public spending the same. If extra revenues instead financed more highway spending, the optimal gasoline tax could be higher or lower, depending on whether the social benefits of the extra spending were larger or smaller than the social benefits of lower income taxes.

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heightened concerns about U.S. dependency on imported oil, particularly from the Middle East. Oil dependency makes the U.S. economy vulnerable to volatile oil prices that might result from deliberate exercise of market power or changes in world market conditions. However, the United States will always be vulnerable to oil price fluctuations—regardless of how much it imports from the Middle East—because the domestic price of oil is determined by the world price. The only way to reduce the economic disruptions from volatile world oil prices is to reduce the oil intensity of the U.S. economy.

In principle, an economic argument can be made for some level of gasoline taxation on the grounds of macroeconomic vulnerability, although a broader oil tax would be a more appropriate policy. Changes in oil prices can impose costs elsewhere in the economy that are not taken into account by energy producers and consumers. For example, it is costly in the short term for other firms to adjust their capital stocks in response to sharp, and unforeseen, swings in oil prices. A recent report on fuel economy standards by the National Research Council put the economic cost of our dependency on foreign oil at less than 12¢ per gallon.

Some people argue that we need to maintain a larger military in order to ensure uninterrupted oil supplies from the Middle East. The amount of extra military expenditure is tricky to assess; for example some Middle East military spending is to protect the security of Israel. Moreover, most research, for example a study by Douglas Bohi and Michael Toman at RFF, suggests that we may not need to spend more to ensure a continued supply of imports because it would be hard for Middle East countries to prevent other countries they supply from redirecting oil to the United States. Even if they were successful in stopping such shipments to the United States, the sharp

increase in world oil prices would provide strong incentives for other OPEC members to defect and sell to the United States, or for non-OPEC suppliers such as Canada, Russia, and Mexico, to increase production.²

Another consequence of motor vehicle driving is the wear and tear on the road network that must be repaired at taxpayers' expense. However most of the damage is caused by heavy trucks rather than autos: road damage increases exponentially with a vehicle's axle weight so that a truck weighing 10 times as much as a car does one thousand times the damage. This problem really calls for a tax on diesel fuel rather than gasoline or, better still, a tax on truck mileage adjusted for axle weight.

There is a range of other unintended consequences associated with the production, transportation, and use of gasoline, including the costs of oil spills, leakage from storage tanks at refineries, and disposal of non-recycled cars. However, the costs involved tend to be small in magnitude relative to those of congestion, accidents, and pollution, and they are better dealt with by policies other than higher gasoline taxes.

THE POLITICS OF TAX REFORM

Congress has ducked the issue of whether to raise the Corporate Average Fuel Economy (CAFE) standards, which impose minimum miles-per-gallon requirements on sales of new vehicles, and left the National Highway Traffic Safety Administration to review and recommend new standards. The argument

² It could also be argued that the United States could raise gasoline taxes to take advantage of its market power in world oil markets. Effectively some of the burden of the tax increase would be borne by Middle East suppliers in lower world oil prices. This argument calls for an oil import tariff rather than a gasoline tax; however, it might do more harm than good by provoking retaliatory tariffs against the United States.

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for tightening the CAFE standards is to address some of the factors discussed above, particularly greenhouse gases and oil dependency. However a much more effective policy to address these two concerns would be to raise the federal gasoline tax. Higher gasoline taxes would reduce fuel consumption not only by encouraging the development of more fuel-efficient vehicles, but also by encouraging people to drive cars rather than sport-utility vehicles and minivans, to buy new (more fuel-efficient) vehicles more often, and to reduce the overall amount of mileage. Indeed, tighter CAFE standards would lower the cost per mile of driving, and could worsen some of the other problems discussed above, such as traffic congestion.

However, substantially higher taxes on motorists are not on the political radar screen for the foreseeable future; despite a major effort in 1993, the Clinton administration was able to raise the federal gasoline tax by only 4¢ per gallon, and the rate has remained unchanged since then. Nonetheless, there is considerable scope for reducing the social costs of driving, without increasing the overall burden of taxation to motorists as a group. For example, opposition to local peak-period pricing schemes—which are much more effective at reducing congestion than gasoline taxes—might be dampened somewhat by returning revenues collected to motorists in the form of lower state gasoline taxes. ■

Ian W.H. Parry is a fellow at RFF. The author is grateful to Joel Darmstadter, Felicia Day, and Ken Small for their helpful comments.

For More Information:

Most of the above discussion is based on Ian W.H. Parry and Kenneth A. Small, "Does Britain or the United States have the Right Gasoline Tax?" RFF Discussion Paper 02-12, 2002, (www.rff.org/disc_papers/PDF_files/0212.pdf, accessed July 19, 2002).

For an excellent, non-technical discussion see Richard Porter. 1999. *Economics at the Wheel: The Costs of Cars and Drivers*. New York: Academic Press.