A Pigou tax on gasoline is robust to further considerations.

Response to Nye

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John Nye reminds us of some important — and often neglected — principles of welfare economics for converting estimates of externalities into Pigovian tax recommendations. Most significant among these are:

- Pigovian taxes are reduced when there is some scope for the private sector to internalize externalities.
- Pigovian taxes interact with pre-existing tax distortions in labor and capital markets, and this affects their optimal levels.
- Pigovian taxes also need to account for pre-existing regulations, or distortions, affecting activities that are closely related to the taxed activity.
- The behavioral response to Pigovian taxes may be very limited.

Despite the usefulness of these points, we dispute Prof. Nye's claim that they cast doubt on Pigovian tax estimates in the specific case of gasoline.

INTERNALIZING EXTERNALITIES Clearly, the case for corrective taxation is undermined to the extent that private agents might account for "externalities" in their own decisions. For example, a dominant airline might partly internalize congestion at a hub airport in its fares and flight schedule if the costs of delays are largely borne by its own passengers and crews. However, the main externalities relevant for fuel taxes — including local pollution, congestion, and climate change — involve huge numbers of individuals producing widely dispersed external costs. That makes any internalization infeasible — by Coasian bargaining or any other means.

The accident externality is trickier, as motorists presumably account for some accident costs when choosing how much to drive. For example, motorists may internalize much of the risk of single-vehicle collisions through their own pain and suffering, monetary payment, and/or elevated premiums following an insurance claim. Therefore, in calculating the optimal fuel tax, we relied on studies of accident costs that carefully separate out just the uninternalized portion.

BROADER FISCAL INTERACTIONS Interactions between externality taxes and the broader fiscal system have received considerable attention recently in literature on environmental tax shifts. Those interactions take two forms: First is the potential efficiency gain from using Pigovian tax revenues to cut other distortionary taxes such as those on personal and corporate income, including payroll taxes. Second is efficiency losses in factor markets as Pigovian taxes drive up the general price level (e.g., through higher energy costs); the resulting lowering of real household wages and real return on capital compounds the depressing effects of taxes on work effort and capital accumulation.

Nye is right that the general thrust of this literature is that the net impact from these two effects can be an overall loss of economic efficiency, implying that the optimal externality tax is (moderately) lower than the Pigovian tax. But there are exceptions to this; for example when the taxed activity is a relative complement for leisure — which, we believe, applies to the case of passenger travel by auto. That is why the fiscal component to the optimal gasoline tax estimate in our 2005 *American Economic Review* paper turned out to be positive, implying that some gasoline taxation may be desirable even without any externalities.

OTHER DISTORTIONS Prof. Nye brings up a whole host of complicating factors within the transport sector that might, in principle, influence optimal fuel tax estimates. To treat each of them fully would require an article at least as long as his. But our general feeling is that the omitted factors are either unimportant empirically or would actually strengthen the case for higher fuel taxes. We briefly illustrate with four examples:

First, Nye notes that OPEC raises world oil prices above free market levels. However, this does not imply that domestic oil

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consumption should be subsidized. That would only push consumption beyond the economically efficient level — that is, the level at which the benefit from the last barrel consumed equals the cost to the nation from importing that barrel. In fact, Paul Leiby, in a 2007 Oak Ridge National Laboratory report, suggests that market power issues would, if anything, *raise* the optimal domestic fuel tax (a consideration that we ignored in our 2005 paper). This is because the United States is a large oil consumer and has a moderate degree of monopsony power. In turn, this implies that world oil prices will fall somewhat following a tax-induced reduction in U.S. oil consumption, which, up to a point, would improve domestic welfare. Concerns about the vulnerability of the economy to oil shocks, compromises in foreign policy from our oil dependence, military spending to protect oil supplies, etc., would, if anything, further strengthen the case for higher fuel taxes.

Next, consider other transport markets. We believe that fare subsidies for mass transit have little relevance for optimal fuel tax calculations because, nationwide, transit accounts for less than one percent of passenger travel. By contrast, parking is very relevant, but the big problem is not monopoly pricing (as Nye suggests) but rather underpricing of both publicly owned and employer-provided parking that results from tax and zoning regulations. Accounting for these subsidies for driving would strengthen the case for higher fuel taxes.

As regards fuel economy regulation of new vehicles, this factors into optimal fuel tax calculations by weakening the impact of taxes on fuel economy relative to their impact on miles driven. Higher fuel taxes will still encourage people to drive less and to use fuel-efficient vehicles when possible instead of gas-guzzling vehicles. But they may do little to encourage auto manufacturers to incorporate advanced fuel-saving technologies into new vehicles, if those technologies are already being adopted to satisfy tighter fuel economy regulations (which were recently passed by Congress). Therefore, for any given tax-induced reduction in fuel use, more of it will come from reduced driving and less from reducing the average fuel consumed per mile from vehicles on the road. This makes the tax more effective in reducing driving, which, as noted below, actually justifies a *higher* tax rate.

LIMITED RESPONSES A substantial body of empirical work suggests that gasoline demand is only moderately sensitive to higher fuel prices. This partly explains, for example, why transportation is expected to account for a disproportionately small share of the carbon reductions that would occur if a price were imposed on carbon emissions.

So why bother with fuel taxes if their effects are so small? A main point of our 2005 paper is that uninternalized externalities varying with mileage (especially congestion and accidents) are much larger, empirically, than those varying with fuel use. Thus, it is much more efficient to address them directly with taxes on mileage rather than indirectly with fuel taxes. In the latter case, the improved fuel economy resulting from the fuel tax undermines its Pigovian purpose by limiting the reduction in driving associated with an extra amount of fuel tax revenue. In fact, we estimate that an optimized tax on auto mileage would generate much more revenue than raising the fuel tax to its optimal level (around $1 per gallon) and would produce four times the annual efficiency gains. An even better policy would be a true congestion charge that varies across different urban centers and across time of day.

It is much more efficient to address uninternalized externalities by directly taxing mileage or instituting a true congestion tax.

CONCLUSION To sum up, it is entirely legitimate for Prof. Nye to question whether optimal gasoline tax estimates might change when we take into account a whole host of complicating factors across the transportation sector and the broader economy. However, some of those complications can be and were taken explicitly into account in our analysis; others would have a minor impact; and others would reinforce, rather than undermine, the efficiency rationale for heavier taxation of automobiles. R

Readings

- "Does Britain or the United States Have the Right Gasoline Tax?" by Ian W. H. Parry and Kenneth A. Small. *American Economic Review,* Vol. 95 (2005).
- "Estimating the Energy Security Benefits of Reduced U.S. Oil Imports," Report No. ORNL/TM-2007/028, by Paul N. Leiby. Oak Ridge National Laboratory, February 2007.
- "Optimal Environmental Taxation in the Presence of Other Taxes: General Equilibrium Analyses," by Lans A. Bovenberg and Lawrence Goulder. *American Economic Review,* Vol. 86 (1996).
- "Policy Analysis in the Presence of Distorting Taxes," by Ian W. H. Parry and Wallace E. Oates. *Journal of Policy Analysis and Management,* Vol. 19 (2000).
- *The High Cost of Free Parking*, by Donald C. Shoup. American Planning Association, Planners Press, 2005.