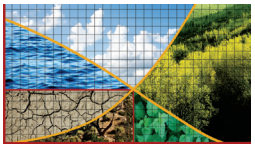

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Internalities, Externalities, and Fuel Economy

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The Harvard Environmental Economics Program

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Cass R. Sunstein*

Abstract

It is standard to think that corrective taxes, responding to externalities, are generally or always better than regulatory mandates, but in the face of behavioral market failures, that conclusion might not be right. Fuel economy and energy efficiency mandates are possible examples. Because such mandates might produce billions of dollars in annual consumer savings, they might have very high net benefits, complicating the choice between such mandates and externality-correcting taxes (such as carbon taxes). The net benefits of mandates that simultaneously reduce internalities and externalities might exceed the net benefits of taxes that reduce externalities alone, even if mandates turn out to be a highly inefficient way of reducing externalities. An important qualification is that corrective taxes might be designed to reduce both externalities and internalities, in which case they would almost certainly be preferable to a regulatory mandate.

I. Market Failures, Old and New

Many regulatory problems involve externalities; consider the problem of air pollution. On standard economic grounds, there is a market failure, and some kind of corrective tax or cap-and-trade system is the best response, designed to ensure that polluters internalize the social costs of their activity. The choice between corrective taxes and cap-and-trade raises a

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host of important questions.[1] But the more fundamental point is that corrective taxes are far more efficient than regulatory mandates; for any given reduction in pollution levels, they impose a lower cost.[2]

My particular goal here is explore a possible justification for fuel economy standards (and also energy efficiency standards, on which I will touch lightly) and to suggest that an externality-correcting tax will fail to remedy "behavioral market failures,"[3] captured in insufficient consumer attention, ex ante, to economic and time savings. The most general problem is the existence of "internalities," understood as the costs that choosers impose on their future selves.[4] A welfare-promoting regulatory regime should simultaneously reduce internalities and externalities. In the face of internalities, the preferred remedy is a disclosure mandate or an internality-correcting tax, designed to ensure that consumers take account of the cost imposed on their future selves.[5] But a fuel economy mandate might be imposed for the same purpose.

One of my major points is that on plausible assumptions, such a mandate might turn out to have higher net benefits than externality-correcting taxes, because the former, unlike the latter, delivers consumer savings.[6] To say the least, this is not a conventional view, because fuel economy standards are a highly inefficient response to the externalities produced by motor vehicles.[7] In the face of internalities, it is standard to think that disclosure is the best remedy, but disclosure might not work. My goal is not to run the numbers or to reach a final conclusion, but to make two more general points. The first is that in important contexts, regulators should be addressing both internalities and externalities. The second is that a regulatory mandate might have higher net benefits than a tax that is addressed only to externalities.

II. Internalities and Externalities

For obvious reasons, a great deal of recent analysis has been focused on greenhouse gas emissions and how best to reduce them.[8] In principle, regulators have a host of options. They might create subsidies (say, for electric cars). They might use nudges (say, by providing information about greenhouse gas emissions on fuel economy labels).[9] They might impose regulatory mandates (say, with fuel economy and energy efficiency standards). Careful analysis suggests that carbon taxes can produce reductions in greenhouse gas emissions at a small fraction of the cost of fuel economy mandates.[10] On one account, "a fuel economy standard is shown to be at least six to fourteen times less cost effective than a price instrument (fuel tax) when targeting an identical reduction in cumulative gasoline use."[11]

These are points about how best to reduce externalities; greenhouse gas emissions represent of course only one set of externalities from motor vehicles. But behaviorally informed regulators focus on consumer welfare, not only externalities. They are concerned about a different kind of market failure. They speculate that at the time of purchase, many consumers might not give sufficient attention to the costs of driving a car.[12] Even if they try, they might not have a sufficient understanding of those costs, because it is not simple to translate differences in miles per gallon (MPG) into economic and environmental consequences.[13] An obvious response, preserving freedom of choice, would be disclosure, in the form of a fuel economy label that would correct that kind of behavioral market failure.[14] In principle, such a label, if behaviorally informed, should solve the problem. In short: labels should be used to promote consumer welfare, by increasing the likelihood that consumers will make optimal choices, and corrective taxes should be used to respond to externalities.

But it would be possible to wonder whether a label will be sufficiently effective; this is an empirical question, not resolvable in the abstract. Perhaps some or many consumers will pay

too little attention to the label, and hence will not purchase cars that would save them a significant amount of money.[15] And if some or many consumers are genuinely inattentive to the costs of operating a vehicle (at the time of purchase), then more aggressive options are worth considering.

In support of that argument, it would be useful to focus directly on two kinds of consumer savings from fuel economy standards, involving internalities rather than externalities: money and time. In fact, the vast majority of the quantified benefits from recent fuel economy standards come not from environmental improvements, but from money saved at the pump; turned into monetary equivalents, the time savings are also significant. Under the Obama Administration, the Department of Transportation found consumer savings of about $529 billion; time savings of $15 billion; energy security benefits of $25 billion; carbon dioxide emissions reductions benefits of $49 billion; other air pollution benefits of about $14 billion; and less than $1 billion from reduced fatalities.[16] The total projected benefits were $633 billion over fifteen years, of which a remarkable 84 percent come from savings at the pump, and no less than 86 percent from those savings along with time savings.[17] The Trump Administration is rethinking those numbers by reference to recent work[18] raising questions about whether consumers are insufficiently attentive to the economic savings, but note that at least for now, the consumer savings are projected to be in the same general vicinity (and actually are actually even higher).[19]

The problem is that on standard economic grounds, it is not at all clear that these consumer benefits are entitled to count in the analysis, because they are purely private savings, and do not involve externalities in any way.[20] In deciding which cars to buy, consumers can certainly take account of the private savings from fuel-efficient cars; if they chose not to buy such cars, it might be because they do not value fuel efficiency as compared to other vehicle attributes (such as safety, aesthetics, and performance).[21] Where is the market failure? If the problem lies in a lack of information, the standard economic prescription is the same as the

behaviorally informed one: *Fix the label and provide that information so that consumers can easily understand it*.

We have seen, however, that even with the best fuel economy label in the world, some of many consumers might turn out to be insufficiently attentive to the benefit of improved fuel economy at the time of purchase, not because they have made a rational judgment that they are outweighed by other factors, but simply because they focus on other variables, such as performance, size, and cost.[22] The problem might be present bias; it might be one of insufficient attention.[23] A behavioral hunch, discussed below, is that motor vehicle purchasers do not give adequate consideration to economic savings.[24] Recall that apart from savings, there is the question of time: How many consumers think about time savings when they are deciding whether to buy a fuel-efficient vehicle?

III. "The Central Conundrum"

Such questions raises a host of empirical issues, to which we lack full answers.[25] But if consumers are not paying enough attention to savings in terms of money and time, a suitably designed fuel economy mandate might well be justified, because it would produce an outcome akin to what would be produced by consumers who are at once informed and attentive.[26] Energy efficiency requirements might be justified in similar terms, and indeed, the argument ontheir behalf might be stronger.[27] If the benefits of mandates greatly exceed their costs, and if there is no significant consumer welfare loss (in the form, for example, of reductions in safety, performance, or aesthetics), then the mandates would seem to serve to correct a behavioral market failure. And indeed, the U.S. Government has so argued:[28]

The central conundrum has been referred to as the Energy Paradox in this setting (and in several others). In short, the problem is that consumers appear not to purchase products that are in their economic self-interest. There are strong theoretical reasons why this might be so:

- *Consumers might be myopic and hence undervalue the long-term.*
- *Consumers might lack information or a full appreciation of information even when it is presented.*
- *Consumers might be especially averse to the short-term losses associated with the higher prices of energy-efficient products relative to the uncertain future fuel savings, even if the expected present value of those fuel savings exceeds the cost (the behavioral phenomenon of "loss aversion").*
- *Even if consumers have relevant knowledge, the benefits of energy-efficient vehicles might not be sufficiently salient to them at the time of purchase, and the lack of salience might lead consumers to neglect an attribute that it would be in their economic interest to consider.*
- *In the case of vehicle fuel efficiency, and perhaps as a result of one or more of the foregoing factors, consumers may have relatively few choices to purchase vehicles with greater fuel economy once other characteristics, such as vehicle class, are chosen.*

Of course we should be cautious before accepting a behavioral argument of this kind. Behavioral biases have to be demonstrated, not simply asserted; as I have noted, important research suggests that consumers do pay a great deal of attention to the benefits of fuel-efficient vehicles.[29] Some of that research finds that with changes in gas prices, consumers adjust their purchasing decisions, strongly suggesting that in choosing among vehicles, consumers are highly attentive to fuel economy.[30] Other research points in the same direction. It finds that when aggressive steps are taken to inform consumers of the benefits of greater fuel economy, they do not choose different vehicles, which suggests that a lack of information, and perhaps a lack of salience, are not causal factors here.[31]

On the other hand, some evidence cuts the other way. A large-scale study of actual behavior finds that after a significant correction of an erroneously stated miles per gallon measures, consumers were relatively unresponsive.[32] As Gillingham et al. write, "Using the implied changes in willingness-to-pay, we find that consumers act myopically: consumers are indifferent between $1 in discounted fuel costs and 15-38 cents in the vehicle purchase price when discounting at 4%."[33] Puzzlingly, many consumers do not buy hybrid vehicles even in circumstances in which it would seem rational for them to do so.[34] According to the leading study, a significant number of consumers choose standard vehicles even when it would be in their economic interest to choose a hybrid vehicle, and even when it is difficult to identify some other feature of the standard vehicle that would justify their choosing it.

It is also possible to think that even if consumers are responsive to changes in gasoline prices, they are still myopic with respect to choices of vehicles that have technological advances. Graham et al. put it crisply[35]:

> *"Consumers are more familiar with changes in fuel price than with changes in technology, since consumers experience fuel prices each time they refill their tank. Vehicle purchases are much less common in the consumer's experience, especially purchases that entail major changes to propulsion systems. Many consumers – excluding the limited pool of adventuresome "early adopters" – may be reticent to purchase vehicles at a premium price that are equipped with unfamiliar engines, transmissions, materials, or entirely new propulsion systems (e.g., hybrids or plug-in electric vehicles), even when such vehicles have attractive EPA fuel-economy ratings."*

More broadly, the government's numbers, finding no significant consumer welfare loss from fuel economy standards, are consistent with the suggestion that consumers are suffering from some kind of behavioral bias.[36]

It remains possible that the government's numbers, projecting costs and benefits, miss something of importance.[37] Engineering estimates might overlook some losses that consumers will actually experience. No one doubts that consumers have highly diverse preferences with respect to vehicles, and fuel economy standards should be designed to preserve a wide space for freedom of choice.[38] Appropriate standards ensure that such space is maintained.[39] Corrective taxes have inherent advantages on this count.

The real question, of course, is the magnitude of net benefits from alternative approaches. If the consumer savings are taken to be very large, fuel economy standards are likely to have correspondingly large net benefits.[40] To give a very rough, intuitive sense of how to think about the comparative question, let us suppose that the U.S. government imposed an optimal carbon tax. Simply for purposes of analysis, suppose that it is $50 per ton, understood to capture the social cost of carbon.[41] Suppose that in relevant sectors, including transportation, a certain number of emitters decide to reduce their emissions, on the ground that the cost of reducing them is (on average) $Y, which is lower than $50. The net benefit of the carbon tax would be $50 minus Y, multiplied by the tons of carbon emissions that are eliminated. The resulting figure would be very high. But in the transportation sector, it is not necessarily higher than the net benefits of well-designed fuel economy standards.

I have noted that an internality-correcting tax should be the preferred approach. In principle, it would be best to adopt a tax that includes both the externality and the internality. At least in principle, estimates of both should be feasible.[42] As compared to a fuel economy standard, the advantage of a corrective tax is its flexibility, and this is true for internalities as well as externalities. Suppose, for example, that certain consumers greatly enjoy cars with poor fuel economy; perhaps they find them fun to drive, pleasantly big, or especially attractive. If the tax is set at the right amount, people will not ignore the cost to their future selves. The carsthey buy will take full account of that cost. By contrast, fuel economy rules will be too rigid, even if they attempt to build in a high degree of flexibility.[43]

IV. Lodestars

If the goal is only to reduce externalities, a pollution tax is far better than a regulatory mandate, because it can produce pollution reductions at a much lower cost, and because it imposes a smaller information-gathering burden on regulators.[44] In theory, internalities and externalities should be handled separately, and the best approach to internalities is appropriate disclosure, designed not only to provide information but also to promote salience and to overcome limited attention. But with an understanding of behavioral findings, we cannot rule out the possibility that a regulatory approach or a tax that corrects both internalities and externalities, promoting consumer welfare as well as reducing externalities, might turn out to have far higher net benefits than the standard economic remedy of externality-correcting taxes and disclosure.

Notes

[1] For a defense of carbon taxes, see William Nordhaus, Climate Change Casino (2015).

[2] For an excellent treatment, see Bruce Ackerman and Richard B. Stewart, Reforming Environmental Law, 13 Colum. J. Envtl. L. 171 (1987); for some complications, see Vidar Christianson and Stephen Smith, Externality-Correcting Taxes and Regulation, 114 Scand. J. Econ. 358 (2012).

[3] See Oren Bar-Gill, Seduction by Contract (2012).

[4] Hunt Allcott and Cass R. Sunstein, Regulating Internalities, 34 Journal of Policy Analysis and Management 698 (2015).

[5] See Hunt Allcott et al., Regressive Sin Taxes, With an Application to the Optimal Soda Tax, 134 Q. J. Econ 1557 (2019), available at https://www.nber.org/papers/w25841. Something like the analysis by Allcott et al. might be done to capture optimal fuel taxes, capturing both externalities and internalities.

[6] Ryan Bubb and Richard Pildes, How Behavioral Economics Trims Its Sails and Why, 127 Harv L Rev 1593 (2014), similarly contend that fuel economy regulation might be justified by reference to behavioral considerations, but they focus only on externalities. The conclusion is much easier to justify by reference to internalities, which Bubb and Pildes bracket in their provocative discussion.

[7] Valerie Karplus et al., Should A Vehicle Fuel Economy Standard Be Combined With an Economy-Wide Greenhouse Gas Emission Eonstraint? Implications for energy and climate policy in the United States, 36 Energy Economics 322 (2013);

[8] See, e.g., Nordhaus, supra note.

[9] See Cass R. Sunstein & Lucia A. Reisch, Automatically Green: Behavioral Economics and Environmental Protection, 38 Harv. Envtl. L. Rev. 127 (2014).

[10] See Valerie Karplus et al., Should a vehicle fuel economy standard be combined with an economy-wide greenhouse gas emissions constraint? Implications for energy and climate policy in the United States, 36 Energy Economics 322 (2013); Chrisopher Knittel et al., Diary of A Wimpy Carbon Tax (2019), available at http://ceepr.mit.edu/files/papers/2019-013.pdf; Lucas Davis and Christopher Knittel, Are Fuel Economy Standards Regressive? (2016), available at https://www.nber.org/papers/w22925

[11] Karplus et al., supra note.

[12] See Bubb and Pildes, supra note.

[13] See Richard P. Larrick and Jack B. Soll, The MPG Illusion, 320 Sci 1593, 1593 (2008).

[14] For one example, see https://www.epa.gov/greenvehicles/learn-about-fuel-economy-label

[15] See Bubb and Pildes, supra note.

[16] Nat'l High. Traf. Safety Administration, Final Regulatory Impact Analysis: Corporate Average Fuel Economy for MY 2017–MY 2025, August 2012, table 13.

[17] https://www.nber.org/chapters/c14288.pdf

[18] See Hunt Allcott and Christopher Knittel, Are Consumers Poorly Informed About Fuel Economy?, 11 American Economic Journal: Economic Policy 1 (2019); James Sallee et al., Do Consumers Recognize the value of Fuel Economy? Evidence from Used Car Prices and Gasoline Price Fluctuations, 135 J Public Economics 61 (2016); Meghan Busse et al., Are Consumers Myopic? Evidence from New and Used Car Purchases, 103 Am Econ Rev 220 (2013).

[19] See Arthur Bento et al., Estimating the Costs and Benefits of Fuel Economy Standards (2019), available at http://www.nber.org/chapters/c14288

[20] Ted Gayer and W. Kip Viscusi, Overriding Consumer Preferences With Energy Regulations, 43 J Regul Econ 248 (2013).

[21] See id.

[22] See Xavier Gabaix & David Laibson, Shrouded Attributes, Consumer Myopia, and Information Suppression in Competitive Markets, 121 Q.J. Econ. 505, 511 (2006).

[23] See Xavier Gabaix, Behavioral Inattention (2018), available at https://www.nber.org/papers/w24096

[24] The hunch is questioned in Hunt Allcott and Christopher Knittel, Are Consumers Poorly Informed About Fuel Economy? Evidence From Two Experiments, 11 Am. Econ J.: Economic Policy 1 (2019); James Sallee et al., Do Consumers Recognize the Value of Fuel Economy? Evidence from Used Car Prices and Gasoline Price Fluctuations, 135 J Public Economics 61 (2016); Meghan Busse et al., Are Consumers Myopic? Evidence from New and Used Car Purchases, 103 Am Econ Rev 220 (2013). The hunch is supported in Kenneth Gillingham et al., Consumer Myopia in Vehicle Purchases (2019), available at https://www.nber.org/papers/w25845. A sharp, balanced discussion can be found in John Graham et al., Co-Benefits, Countervailing Risks, and Cost-Benefit Analysis (2019), available at https://cdn1.sph.harvard.edu/wp-content/uploads/sites/1273/2019/09/Graham-Wiener-Robinson-2019.pdf, with a prudent conclusion: "it seems that agency analysts should adopt a middle-ground position between full consumer valuation of fuel economy and no consumer valuation of fuel economy, and perform sensitivity analyses with different partial degrees of consumer valuation."

[25] See id.

[26] Cass R. Sunstein, Rear Visibility and Some Unresolved Problems for Economic Analysis, 10 J of Benefit-Cost Analysis 317 (2019).

[27] For suggestive evidence, see Richard Newell and Juha Siikamaki, Individual Time Preferences and Energy Efficiency (2015), available at https://www.nber.org/papers/w20969. Note that the miles-per-gallon measure is hardly hidden, and there is nothing quite as salient for energy efficiency.

[28] See Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule, Part II, 75 Fed. Reg. 25,324, 25,510-11 (May 7, 2010), http://www.gpo.gov/fdsys/pkg/FR-2010-05-07/pdf/2010-8159.pdf.

[29] See note supra. For valuable, inconclusive discussions, see Hunt Allcott, Paternalism and Energy Efficiency: An Overview, 8 Annual Review of Economics 145 (2016); Hunt Allcott & Michael Greenstone, Is There an Energy Efficiency Gap?, 26 J. ECON. PERSP. 3 (2012).

[30] James Sallee et al., Do Consumers Recognize the Value of Fuel Economy? Evidence from Used Car Prices and Gasoline Price Fluctuations, 135 J Public Economics 61 (2016); Meghan Busse et al., Are Consumers Myopic? Evidence from New and Used Car Purchases, 103 Am Econ Rev 220 (2013).

[31] Hunt Allcott and Christopher Knittel, Are Consumers Poorly Informed About Fuel Economy? Evidence From Two Experiments, 11 Am. Econ J.: Economic Policy 1 (2019).

[32] See Kenneth Gillingham et al., Consumer Myopia in Vehicle Purchases (2019), available at https://www.nber.org/papers/w25845.

[33] Id.

[34] Denvil Duncan et al., Most Consumers Don't Buy Hybrids: Is Rational Choice a Sufficient Explanation? 10 Journal of Benefit-Cost Analysis 1 (2019).

[35] See Graham et al., supra note.

[36] See note supra.

[37] See Gayer and Viscusi, supra note.

[38] See Michael Greenstone et al., Fuel Economy 2.0, Harv Env L Rev (forthcoming).

[39] On the current flexibilities, see Takahiko Kiso, Evaluating New Policy Instruments of the Corporate Average Fuel Economy Standards: Footprint, Credit Transferring, and Credit Trading. 72 Environmental and Resource Economics 445 (2019).

[40] See note supra.

[41] A great deal depends on whether a domestic or global figure is chosen. See Gayer and Viscusi, supra note; Matthew Kotchen, Which Social Cost of Carbon? A Theoretical Perspective, 5 JAERE 673 (2018), available at https://environment.yale.edu/kotchen/pubs/whichscc.pdf

[42] Cf. Allcott et al., supra note.

[43] See Kiso, supra note.

[44] See note supra.

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