ESSAYS

Curb Your Enthusiasm for Pigovian Taxes

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Pigovian (or "corrective") taxes have been proposed or enacted on dozens of harmful products and activities: carbon, gasoline, fat, sugar, guns, cigarettes, alcohol, traffic, zoning, executive pay, and financial transactions, among others. Academics of all political stripes are mystified by the public's inability to see the merits of using Pigovian taxes more frequently to address serious social harms, some even calling for the creation of a "Pigovian state."

This academic enthusiasm for Pigovian taxes should be tempered. A Pigovian tax is easy to design—as a uniform excise tax—if one assumes that each individual causes the same amount of harm with each incremental increase in activity on the margin. This assumption of uniform marginal social cost pairs well with the limited information and enforcement capacity of government institutions. But when marginal social cost varies significantly, a Pigovian tax may not lead to an optimal allocation of economic resources. Focusing on carbon emissions, where the assumption of uniform marginal social cost happens to be reasonable, obscures this common design flaw.

Broadly speaking, Pigovian taxes are likely to be the optimal regulatory instrument only when (1) the harm is (or is properly analogized to) global pollution, and where the harm does not vary significantly based on the source, or (2) the variation in marginal social cost is easily observed and categorized, as with traffic congestion charges.

This straightforward insight has broad implications for how we design any targeted tax or subsidy. It explains why a carbon tax would work well, but

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some other environmental taxes would not. It explains why many food taxes would be ineffective in improving public health. It explains why most sin taxes raise revenue but do not change behavior. Pigovian taxes are, under certain conditions, a useful instrument of regulatory policy, but we should resist the temptation of a Pigovian state.

I. INTRODUCTION

Law professors have a tendency to act as if we are philosopher kings, descending into the cave to educate the prisoners.[1] We identify the ideal, and, embracing our role as guardian of the republic, we sketch out a plan to engineer the best social policy to reach that identified goal. In the twentieth century this tendency was most apparent in the form

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1.   *See* PLATO, THE REPUBLIC 214 (Benjamin Jowett trans., Barnes & Noble Books 1999) ("[T]hey must be made to descend again among the prisoners in the den, and partake of their labours and honours, whether they are worth having or not.").

of the command-and-control model of regulation, an approach that has fallen out of grace.[2] For the newest generation of Platonic guardians, a Pigovian tax is a tempting gadget.[3]

Corrective taxes are taxes that are designed primarily to change behavior rather than raise revenue. These taxes are often called "Pigovian" taxes in reference to Arthur Pigou, the British economist who pioneered the approach.[4] The idea is that by placing a small tax, equal to marginal social cost, on each unit of an activity to be discouraged—environmental pollution is the most common example— prices will rise, forcing polluters to internalize the social cost of the harmful activity. As a result, production will decrease, leading to an allocation of economic resources that reflects the true cost of the activity causing the pollution.[5]

Policy advocates have often inferred, erroneously,[6] that using a Pigovian approach means that one need not know who is causing harm, where it is occurring, or how much it would cost each firm or individual to reduce the harmful activity. Indeed, if that were the case, one would only need an estimate of the total amount of an activity and the total social harm that results. While making such estimates would be challenging, it would be less challenging than the aggregate cost-benefit analysis required of many agency decisions under current law.[7]

These seemingly relaxed design specifications make Pigovian taxes a tempting instrument of social engineering, especially when compared to traditional command-and-control regulation.[8] One finds considerable academic support for Pigovian taxes on a wide range of products and activities, including carbon, gasoline, fat, high fructose corn syrup, guns, financial transactions, executive pay, excessive zoning, and sport utility vehicles.[9] Law professors and economists of all

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2.   *See* Rena I. Steinzor, *Reinventing Environmental Regulation: The Dangerous Journey from Command to Self-Control* 22 HARV. ENVTL. L. REV. 103, 103 (1998) (noting widespread acceptance of command-and-control critiques); Thomas H. Tietenberg, *Economic Instruments for Environmental Regulation*, 6 OXFORD REV. ECON. POL'Y, Spring 1990, at 17, 17 (noting widespread recognition of the benefits of economic incentive regulation).

3.   Jonathan S. Masur & Eric A. Posner, *Toward a Pigovian State* 1 (Coase-Sandor Inst. for Law & Econ., Working Paper No. 716; Pub. Law & Legal Theory, Working Paper No. 503, 2015), http://ssrn.com/abstract=2559393 [http://perma.cc/Q9DX-K34J] ("It is time for the regulatory state to take a Pigovian turn.").

4.   *See* ARTHUR C. PIGOU, THE ECONOMICS OF WELFARE 172, 192–93   (4th ed. 1932) (describing situations where social costs and private costs diverge).

5.   *See* JONATHAN GRUBER, PUBLIC FINANCE AND PUBLIC POLICY 134–35 (4th ed. 2013).

6.   *See infra* text accompanying notes 25–26.

7.   *See* Masur & Posner, *supra* note 3, at 1.

8.   Quantity regulation, often referred to as "cap and trade," has many of the same institutional characteristics as a corrective tax. *See infra* text accompanying note 133.

9.   *See infra* text accompanying notes 10–11, 24.

political stripes, led by such luminaries as Louis Kaplow, Greg Mankiw, Gary Becker, and Robert Frank, are mystified by the public's inability to see the merits of using Pigovian taxes more frequently to address serious social harms.[10] Most recently, Jonathan Masur and Eric Posner have issued a "Pigovian call to arms" on the grounds that not only do regulators have the legal authority to implement Pigovian taxes, they should replace any instance of command-and-control regulation with a tax.[11]

This academic exuberance for Pigovian taxes should be tempered. My goal is not to defend command-and-control regulation. Rather, I wish to highlight some often-overlooked weaknesses in the Pigovian instrument. In the circumstances where a Pigovian tax is not the right instrument, the right answer may be command-and-control regulation, or it may be some other approach, such as information disclosure, behavioral nudges, or ex post tort liability.[12] Or it may be best to let sleeping dogs lie.

I understand the temptation of a Pigovian state. Externalities are all around us. Your neighbor's lawnmower is too loud. You can smell the garbage from the restaurant downstairs. You take your daughter to Disneyland and worry about the unvaccinated kids running around alongside. And a Pigovian tax is easy to design—as a uniform excise tax—if one simply assumes uniform marginal social cost across all individuals and firms.[13]

This assumption of uniform marginal social cost pairs well with the limited information and enforcement capacity of government institutions.[14] The problem is that when marginal social cost varies,

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10.   *See, e.g.*, N. Gregory Mankiw, *Smart Taxes: An Open Invitation to Join the Pigou Club*, 35 E. ECON. J. 14, 15 (2009):

> For believers in Pigovian taxation such as myself, the primary task ahead is one of education. To many economists, the basic argument for increased use of Pigovian taxes is so straightforward as to be obvious. But as George Orwell once put it, "We have now sunk to a depth where the restatement of the obvious is the first duty of intelligent men."

11.   Masur & Posner, *supra* note 3, at 38:

> Just as regulators discovered (with some prodding from the executive branch) that they could use cost-benefit analysis to evaluate proposed command-and-control regulations, they can also recognize that they possess the authority to impose Pigovian taxes in lieu of command-and-control regulations. It's time to transform the "cost- benefit state" into the Pigovian state.

12.   Brian Galle, *Tax, Command . . . or Nudge? Evaluating the New Regulation*, 92 TEX. L. REV. 837, 841 (2014) (arguing that nudges are preferable to price instruments under some circumstances).

13.   *See infra* text accompanying notes 17, 24–26. "Social cost" is the amount of the cost or harm resulting from an activity that is borne by people other than the person conducting the activity. "Marginal social cost" is the incremental cost of an additional unit of the activity.

14.   *See infra* text accompanying notes 24–26.

average cost does not equal marginal cost, and Pigovian taxes may not lead to an optimal allocation of economic resources. Our focus on carbon emissions, where the assumption of uniform marginal social cost happens to be reasonable, obscures this common design flaw.[15]

Consider guns. If a carbon tax is the most promising application of Pigovian taxation, a tax on guns is among the least. The Seattle City Council recently imposed an excise tax of $25 per gun and two to five cents per round of ammunition, citing the economic cost in Seattle and King County of $181 million per year.[16] In the aggregate, there is no question that the social cost of guns far exceeds the private cost of manufacturing a gun. At the individual level, however, where incentives matter most directly, people vary widely in how they use a gun. Some people attend gun safety workshops, practice shooting at the range, and keep guns secure. Others are more lackadaisical, increasing the risk of accidental shootings. And of course, a small number of criminals use guns to commit violent crimes. Making matters worse from a tax design standpoint, this variation in marginal social cost is especially troubling when it is negatively correlated with demand elasticity.[17]

Consider the effect that the Seattle excise tax on ammunition would have on two individuals: Eugene, a law professor and Second Amendment scholar, and John, a cocaine dealer. For Eugene, gun ownership causes little or no social cost. He practices regularly at the range and keeps his guns secure in a locked safe. In fact, his gun ownership arguably creates positive social externalities for his neighbors.[18]

The case for Pigovian intervention is stronger for John, who carries his gun to protect himself when buying and selling cocaine. Even if John is careful, carrying a gun raises the risk of armed confrontation and accidental or intentional death.[19] Suppose that the marginal social cost from John owning a gun is $200,000, the marginal social cost from

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15.   *See infra* text accompanying note 24.

16.   SEATTLE, WASH. MUN. CODE 5.50 (2015).

17.   The basic intuition is that if those with the highest marginal social cost are least likely to change their behavior, a Pigovian tax set at the level of average social cost will do little to change behavior among the group that causes the most harm, and will change the behavior of those causing little harm, thereby creating deadweight loss.

18.   Pigovian taxes may be used to address activities that cause only internal harm. One may imagine one's future self as the party external to one's present self; cognitive limitations may lead us to discount the preferences of one's future self excessively. The case for governmental intrusion into one's personal choices, however, is considerably more challenging than in the case where an individual harms others.

19.   Demand for the product in question must be somewhat elastic, allowing for a behavioral response, but it is equally important that close substitutes not create external social cost.

Eugene owning a gun is $0, and the excise tax is set at $10,000 per gun, the average social cost per gun.

Despite the variation in their marginal social cost, Eugene and John each face the same marginal cost increase of $10,000. Under these conditions, the uniform tax rate does more harm than good. If John and Eugene each stop buying guns, each one loses utility, but only John was causing harm to others.[20] Worse yet, if only Eugene stops buying guns, and John buys his illegally, the tax revenue must be balanced against the deadweight loss created when Eugene decides not to buy a gun or, worse, stops going to the practice range. In light of the negative correlation between elasticity (responsiveness to the tax) and social cost, it is unlikely that a positive tax on guns or ammunition is the optimal government intervention under these conditions.[21]

The inefficacy of the tax in changing behavior or reducing social cost does not necessarily mean that a tax on guns is bad policy. If Eugene (and similar consumers) continue to buy guns and ammunition in spite of the tax, the tax may be a very efficient way of raising government revenue to fund gun safety programs or for more general purposes. An ineffective Pigovian tax may be an optimal commodity tax.

It is worth pausing here to underscore that the problem of variation in marginal social cost results from how our political institutions work rather than from the economics of tax instruments as such. In a world with costless information, perfect political institutions, costless enforcement, and no concerns for autonomy or privacy, Pigovian taxes would not be uniform. They would be tailored perfectly to account for variation among different people and firms. John would pay a tax of $200,000, and Eugene would be exempt. However, except in the few cases where the variation in marginal social cost is related to income, our tax institutions are not well positioned to design or implement such a tax. Other policy instruments (such as regulation,

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20.   A Pigovian tax on bacon could arguably be justified on other grounds. Suppose we believe it is immoral to eat pigs, and we think bacon is particularly repugnant. Each strip of bacon consumed pollutes the atmosphere, so to speak, making additional pig consumption that much more socially acceptable. A uniform excise tax would succeed in reducing aggregate consumption, perhaps changing social norms as well. On the other hand, it is not clear that a bacon tax would be more effective than a regulation banning bacon consumption; criminal or civil laws may well have greater expressive value than a tax, which implicitly suggests that it is okay to indulge so long as you are willing to pay the price.

21.   It is possible that other instruments, like regulation, information disclosure, and behavioral nudges, are more problematic than a corrective tax. But few tax proposals even recognize that we may be forcing Jane, who causes no harm, to pay tax or change her behavior, nor do most proposals acknowledge that Joe will not fully internalize the social cost of his behavior.

government spending, behavioral nudges, education, and information disclosure) may achieve better results at lower cost.[22]

The remainder of this Essay outlines the narrow conditions when a corrective tax or subsidy is likely to be the most effective policy instrument. Generally speaking, a Pigovian tax is likely to work well when marginal social cost is roughly equal to average social cost. More precisely, a Pigovian tax is likely to be optimal when there is a normal and narrow distribution of marginal social cost across the different firms and individuals that engage in the activity.[23] Under these conditions, a uniform excise tax may be appropriate.[24]

The common design flaw of failing to account for variation in marginal social cost results from a simplifying assumption that makes Pigovian taxes easier to design, explain, implement, and enforce. The traditional classroom design of a Pigovian tax takes an estimate of the total social cost of a product and divides it by the total units of production to come up with a uniform tax rate that will force producers to internalize the social cost of the activity. But the social cost of an activity often varies widely among individuals or firms.[25] Even the most sophisticated economic models, which account for nonlinear variation in marginal cost as production increases or decreases in the aggregate, do not account for variation among firms or individuals.[26]

Advocates for a Pigovian tax thus face a dilemma. They can ignore variation in marginal social cost, hoping that the average social cost approximates the marginal social cost closely enough to induce

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22.   *See infra* text accompanying note 35.

23.   *See infra* Section III.D.

24.   Pigovian taxes have been studied most closely in the context of carbon emissions, where there is thought to be little variation in marginal social cost. Most scientists assume that a unit of carbon causes the same amount of global warming whether it is emitted from my car or your lawnmower, in California or Maine, in small increments or all at once. There is, in fact, some evidence that marginal social cost varies depending on the location of the source of emission. *See infra* text accompanying note 135.

25.   Indeed, even in some areas of pollution regulation, there is variation in marginal social cost; it matters a great deal if a toxic chemical leaks into the desert, or if it seeps into a river that supplies drinking water. *See* Trip Gabriel, *Thousands Without Water After Spill in West Virginia*, N.Y. TIMES (Jan. 11, 2014), http://www.nytimes.com/2014/01/11/us/west-virginia-chemical-spill.html?_r=0 [http://perma.cc/8BQP-X3PU] ("As 300,000 people awoke on Friday to learn that their tap water was unsafe for brushing teeth, brewing coffee or showering, residents and businesses expressed a mix of anger and anxiety in coping with an industrial accident with no clear end in sight.").

26.   *See* Louis Kaplow & Steven Shavell, *On the Superiority of Corrective Taxes to Quantity Regulation*, 4 AM. L. & ECON. REV. 1, 4–5 (2002) (describing possibility of nonlinear tax rate but not accounting for variation in marginal social cost among firms*). But see* Peter A. Diamond, *Consumption Externalities and Imperfect Corrective Pricing*, 4 BELL J. ECON. & MGMT. SCI. 526, 527–28 (1973) (accounting for variation among individuals with respect to externalities in various contexts).

more efficient behavior. This approach works well when the variation is small and normally distributed.[27] It may not work well when the variation is large, when the variation is bimodal or highly skewed, or if the distribution has a long or fat tail.[28] For example, in a skewed distribution of marginal social cost, where a few bad actors cause most of the harm, a uniform excise tax set at the rate of average social cost per individual is not likely to be effective.[29] It will under-deter the bad actors, and over-deter those who cause little or no harm.[30] Under those circumstances, a different policy instrument may be more effective and less costly. Command-and-control regulation can be targeted at bad actors, uniform rules can be selectively enforced, information can be disclosed to shame bad actors, and so on.

Alternatively, policymakers can try to carve up the population more carefully, departing from the traditional uniformity of excise taxes. This approach improves the effectiveness of the tax instrument, but it creates greater administrative costs in designing, administering, and enforcing the tax.[31] This approach may work well when categories are easy to observe and define. Traffic congestion charges, for example, often distinguish between cars, trucks, and taxis.[32] Categorization will not work well when variation in marginal social cost is difficult to observe before the social cost occurs, as with a gun buyer who may use the gun for home protection, or may use it for a bank robbery.[33] Nor will it work well when observing the characteristics that drive variation in social cost is intrusive or in conflict with other norms.[34]

This Essay makes three main contributions to the literature. First, its critique of the design of Pigovian taxes contributes to the literature on instrument choice.[35] The Essay provides a new reason to

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27.   *See infra* text accompanying notes 100–06.

28.   *See infra* text accompanying notes 96–97.

29.   *See infra* text accompanying note 139.

30.   *See infra* Section III.E.

31.   *See infra* text accompanying notes 137–40.

32.   *See infra* text accompanying note 166.

33.   *See infra* text accompanying notes 139–40.

34.   *See infra* text accompanying notes 151–56.

35.   *See generally* Maureen L. Cropper & Wallace E. Oates, *Environmental Economics: A Survey*, 30 J. ECON. LIT. 675 (1992) (discussing policy instruments available to establish economic incentives for pollution abatement); Kaplow & Shavell, *supra* note 26 (discussing the relative superiority of particular control instruments in different situations); Martin Weitzman, *Prices vs. Quantities*, 41 REV. ECON. STUD. 477 (1974) (examining the advantages of price and quantity as control instruments). Until recently, there was little legal literature on instrument choice; one notable exception is Jonathan Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677 (1999). In recent years, the literature has focused more on insights from behavioral economics. *E.g.*, RICHARD H. THALER & CASS R. SUNSTEIN, NUDGE (2008); On Amir & Orly Lobel, *Stumble, Predict, Nudge*, 108 COLUM. L. REV. 2098 (2008); M. Ryan Calo,

be skeptical of Pigovian taxes when there is significant variation in the harm caused by different individuals or firms. Pigovian taxes may still be a "second best" solution compared to all the other imperfect regulatory approaches; by identifying the conditions when Pigovian taxes are likely to work, this Essay may help policymakers regulate more effectively.

Second, the Essay contributes to the literature on tax expenditures, which can be viewed as Pigovian subsidies.[36] The same design flaws observed with Pigovian taxes apply equally to Pigovian subsidies. Just as a poorly designed Pigovian tax burdens many who cause no harm and does not burden harm-doers enough, most tax expenditures provide windfall gains to many and not enough subsidy to those who need encouragement. Tax expenditures should be reviewed with targeting effectiveness in mind, and many should be eliminated.

Finally, this Essay makes a methodological contribution. I challenge the tendency among law professors, economists, and public policy scholars—especially from outside of the tax field—to rely too heavily on tax policy as an instrument for social change.[37] While it is inevitable that tax policy shapes social policy, our institutions of tax policy and administration are quite limited in their ability to achieve challenging social policy goals. Only where the policy goal is closely related to the measurement of income is a tax instrument likely to be optimal.

This Essay is organized into five short sections. Following this Introduction, Part II provides some context from the relevant literature. Part III examines the problem of variation in marginal social cost and describes the limited conditions under which a Pigovian tax is likely to be the optimal policy instrument. Part IV concludes.

Code, Nudge, or Notice?, 99 IOWA L. REV. 773 (2014); Galle, *supra* note 12 (arguing that nudges are preferable to price instruments under some circumstances); Brian Galle, *The Tragedy of the Carrots: Economics and Politics in the Choice of Price Instruments*, 64 STAN. L. REV. 797 (2012).

36.   *E.g.*, Boris Bittker, *Accounting for Federal "Tax Subsidies" in the National Budget*, 22 NAT'L TAX J. 244 (1969); Stanley S. Surrey, *Tax Incentives as a Device for Implementing Government Policy: A Comparison With Direct Government Expenditures*, 83 HARV. L. REV. 705 (1970) [hereinafter *Tax Incentives*]; Stanley S. Surrey, *Federal Income Tax Reform: The Varied Approaches Necessary to Replace Tax Expenditures With Direct Governmental Assistance*, 84 HARV. L. REV. 352 (1970); Stanley S. Surrey and William F. Hellmuth, *The Tax Expenditure Budget – Response to Professor Bittker*, 22 NAT'L TAX J. 528 (1969); Edward A. Zelinsky, *James Madison and Public Choice at Gucci Gulch: A Procedural Defense of Tax Expenditures and Tax Institutions*, 102 YALE L.J. 1165 (1993).

37.   *See, e.g.*, Joshua D. Wright & Douglas H. Ginsburg, *Behavioral Law and Economics: Its Origins, Fatal Flaws, and Implications for Liberty*, 106 NW. U. L. REV. 1033, 1058–59 (2012) (describing use of behavioral law and economics to justify sin taxes).

II. The Weapon of Choice for Philosopher Kings

The particular appeal of Pigovian taxes today can be traced back to our collective awareness of the pitfalls of command-and-control regulation.[38] Even those who prioritize social justice over economic goals recognize that information is elusive and incomplete, that lobbying takes place, that bureaucracies are vast, that agencies can be captured, and that government officials are sometimes misguided, misled, or corrupted. It is tempting to see in a Pigovian tax a policy instrument that minimizes the weaknesses of the administrative state. Pigovian taxes respect the functioning of competitive markets just enough to shield the academic from accusations of improper overreach.

Of course, a Pigovian tax is neither immune from the challenges of regulatory design nor a magic bullet that solves any problem of externalities. To fully understand why Pigovian taxes are such a tempting social policy instrument among academics, it may be useful to review how we got here. As with many journeys from economics to public policy, some important considerations were lost in translation.

A. Tax as an Alternative to Command-and-Control Regulation

Arthur Pigou, a professor of Political Economy at King's College, Cambridge, wrote *The Economics of Welfare* in the early twentieth century against the backdrop of England's rapid industrialization.[39] His influential book extensively discussed several new economic challenges that resulted from the Industrial Revolution: labor issues associated with factory production, inequality, antitrust concerns, noise and smoke pollution, and railroad regulation, among others.[40] The pressing social issues associated with the period challenged the then existing economic models, which can be traced back to the "invisible hand" of the marketplace famously illuminated by Adam Smith.[41] Industrial factory production generated many costs that were externalized, creating a gap between the private cost of production and the total private and social cost.[42] The Pigovian model offered a way to conceptualize the problem.

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38.   *See generally* Thaler & Sunstein, *supra* note 35 (advocating for libertarian paternalism as the superior form of choice architecture).

39.   Pigou, *supra* note 4, at 192–93.

40.   *Id.*

41.   One assumption of the First Fundamental Theorem of Welfare Economics, which proves that market outcomes are efficient under certain conditions, is an absence of externalities.

42.   Pigou, *supra* note 4, at 192–93.

Pigou focused on this gap between the private and social costs of industrial production.[43] Self-interest, he noted, will tend to bring about equality in the values of marginal private net products of resources, even when those resources are invested in different ways.[44] "But it will not tend to bring about equality in the values of the marginal social net products," he wrote, "except when the marginal private net product and the marginal social net product are identical."[45] If the marginal social cost is higher than the marginal private cost, then factories are likely to overproduce the product in question. The task was to find a policy instrument to equalize private cost and social cost, and tax was one instrument to consider.

Pigou concluded that state intervention could equalize private and social costs (or private and social benefits) by providing "extraordinary encouragements" or "extraordinary restraints."[46] The most obvious forms, he suggested, were bounties and taxes.[47] His specific examples were not focused on pollution, but rather a tax on businesses that produce and distribute alcoholic drinks,[48] a tax on building in crowded areas,[49] and a tax on petrol.[50]

The classic illustration. Following this Pigovian approach of focusing on externalities, economists gravitated toward a standard, salient example of the industrial factory, where smoke pollution causes the social cost of production to exceed the private cost.[51] The solution, which came to be known as Pigovian taxation, places a tax on the factory owner, varying with the amount of smoke produced, equal to the

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43.   *See id.* at 172 ("In general industrialists are interested, not in the social, but only in the private, net product of their operations.").

44.   *Id.*

45.   *Id.*

46.   *Id.* at 192.

47.   *Id.*

48.   *Id.*

49.   *Id.* at 192–93.

50.   *Id.* at 193. Confusingly, he also includes nontax instruments as examples: motor vehicle license fees, the proceeds of which are devoted to the service of the roads, and increased premiums to the British national health insurance program for employers, local authorities, and water companies "[w]hen the sickness rate in any district is exceptionally high" and "the high rate can be shown to be due to neglect or carelessness on the part of any of these bodies." *Id.*

51.   *Id.* at 185–86. Pigou provides the following example:

[External costs] are rendered, again, when the owner of a site in a residential quarter of a city builds a factory there and so destroys a great part of the amenities of the neighbouring sites; or, in a less degree, when he uses his site in such a way as to spoil the lighting of the houses opposite; or when he invests resources in erecting buildings in a crowded centre, which, by contracting the air space and the playing-room of the neighbourhood, tend to injure the health and efficiency of the families living there.

Id.; *see also* Ronald H. Coase, *The Problem of Social Cost,* 3 J.L. & Econ. 1, 1–2 (1960) (using the example of smoke from a factory).

monetary damage caused by the smoke. If, for example, a widget costs $5 to produce but also causes $1 of externalized harm via smoke pollution, a tax of $1 per unit would force the factory to internalize the external harm. Market forces would then lead prices to rise and production to decrease until a new equilibrium was found. The tax increases the marginal cost to reflect not just the private cost of production, but also the total social cost, leading to the efficient amount of the activity.

Figure 1: Pigovian Tax
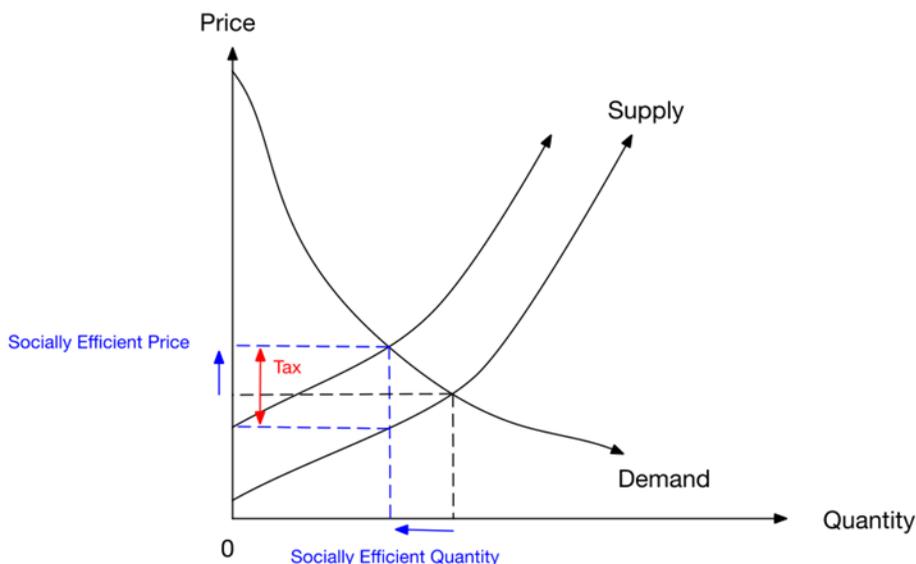
The Coasean Critique. Over time, economists have challenged different aspects of the foundations of Pigovian taxes. In *The Problem of Social Cost*, Ronald Coase focused on the reciprocal nature of many externalities, noting that in the absence of transaction costs, the factory's neighbors could bargain with the factory owner to efficiently limit pollution.[52] For the many situations where bargaining costs are prohibitive, of course, further action—the assignment of legal rights, government regulation, or Pigovian taxation—may still be required to

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52.   *See* Coase, *supra* note 51, at 17:

   In the standard case of a smoke nuisance, which may affect a vast number of people engaged in a wide variety of activities, the administrative costs might well be so high as to make any attempt to deal with the problem within the confines of a single firm impossible. An alternative solution is direct Government regulation.

achieve a more efficient allocation of economic resources.[53] Coase emphasized that a further alternative exists, which is to do nothing about the problem at all.[54] Given that the costs involved in solving the problem by the "governmental administrative machine" will often be heavy, he noted, "it will no doubt be commonly the case that the gain which would come from regulating the actions which give rise to the harmful effects will be less than the costs involved in Government regulation."[55]

  A Second Best Solution. Against this backdrop, economist William Baumol wrote a robust defense of the Pigovian approach in *On Taxation and the Control of Externalities*.[56] Baumol defended the theory of Pigovian taxes and subsidies as an approach to achieving optimal resource allocation.[57] Baumol was primarily responding to critics who noted the operational shortcomings that emerge when moving from theory to practice, particularly in the presence of monopoly.[58] Baumol suggested a modified approach consisting of two basic steps. First, policymakers should set a standard level of pollution, congestion, and the like, more or less arbitrarily, at a level considered to be tolerable in light of experience.[59] Second, policymakers should set tax rates at a level shown by experience to be sufficient to achieve that goal.[60] This practical approach, he argued, achieves an efficient reduction of the harmful externality even if the polluting firms are neither pure competitors nor profit maximizers.[61] According to Baumol, the case for Pigovian taxes rests on a willingness to focus on minimum acceptable standards, and to be satisfied with the benefits of somewhat reduced

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    53.   Guido Calabresi, *Transaction Costs, Resource Allocation and Liability Rules—A Comment*, 11 J.L. & ECON. 67, 68–69 (1968); Robert Cooter, *The Cost of Coase*, 11 J. LEGAL STUD. 1, 19 (1982); Carl J. Dahlman, *The Problem of Externality*, 22 J.L. & ECON. 141, 151 (1979); Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 350 (1967).

    54.   Coase, *supra* note 51, at 18.

    55.   *Id.* Other critics of the Pigovian approach included James Buchanan, who argued that corrective taxes and subsidies could actually increase resource misallocation in the presence of monopoly. James M. Buchanan, *External Diseconomies, Corrective Taxes and Market Structure*, 59 AM. ECON. REV. 174, 174–77 (1969); *see also* James M. Buchanan & W.C. Stubblenbine, *Externality*, 29 ECONOMICA 371, 381–82 (1962) (arguing that the Pigovian approach is misleading because it does not account for the externally affected party); Otto Davis & Andrew Whinston, *Externalities, Welfare and the Theory of Games*, 70 J. POL. ECON. 241, 261 (1962) (questioning the effectiveness of Pigovian taxes in the presence of oligopoly).

    56.   William J. Baumol, *On Taxation and the Control of Externalities*, 62 AM. ECON. REV. 307 (1972).

    57.   *Id.* at 307.

    58.   *Id.*

    59.   *Id.*

    60.   *Id.*

    61.   *Id.* at 307–08.

externalities, rather than achieving an optimal allocation of resources in a complex world.[62]

Environmental Economics. Attention to Pigovian taxes blossomed in the 1970s as the field of environmental economics grew.[63] A seminal article by Martin Weitzman compared corrective taxes to quantity approaches to regulation where a quota or cap is placed on production.[64] Taxes fix the marginal cost of production, while leaving some uncertainty about abatement and final production levels. Quantity regulation fixes the level of production, while leaving some uncertainty about cost.[65]

One area of conflict in the literature concerns nonlinear harm.[66] Suppose there is a tipping point effect, when small amounts of pollution are benign, but above a certain level additional emissions are highly toxic. Where the maximum quantity is certain, many believe that quantity regulation via cap-and-trade is superior to a tax instrument, as the quantity limit may be specified with particularity.

Louis Kaplow and Steven Shavell have argued that not only are taxes generally more efficient, but can also replicate most of the features of regulatory mandates—like nonlinear schedules—through careful design of tax instruments.[67] As I discuss below, designing a tax at the level of particularity necessary to achieve the Pigovian goals is not just a problem of nonlinearity of harm, but also one of heterogeneity across taxpayers.[68] Tax is a poor policy instrument not because of features of the instrument as such, but rather because of institutional limitations of the organizations that implement taxes.[69]

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62. *Id.* at 319.

63. *E.g.*, ANTHONY C. FISHER, RESOURCE AND ENVIRONMENTAL ECONOMICS (Phyllis Deane & Mark Perlman eds., 1981); KARL-GÖRAN MÄLER, ENVIRONMENTAL ECONOMICS: A THEORETICAL INQUIRY (1st ed. 1974); Kenneth Arrow et al., *Economic Growth, Carrying Capacity, and the Environment*, 15 ECOLOGICAL ECON. 91 (1995); Martin L. Weitzman, *Free Access vs. Private Ownership as Alternative Systems for Managing Common Property*, 8 J. ECON. THEORY 225 (1974); Weitzman, *supra* note 35.

64. Weitzman, *supra* note 35. Weitzman's basic result was that price instruments were preferable when the marginal benefit schedule was relatively flat, so that mistakes as to cost would create a large amount of deadweight loss. Quantity instruments would be favorable when the marginal cost schedule was relatively flat, so that mistakes as to production levels would be costly.

65. Quantity regulation should be preferred when certainty about production levels is critical, as some believe is the case regarding carbon. Weitzman argues that tax is superior to quantity regulation when the private demand is fairly inelastic compared to the social cost, as mistakes as to demand are more costly. *See id.* at 488–90.

66. Kaplow & Shavell, *supra* note 26, at 7–10.

67. *See id.* (arguing corrective taxes can be implemented even where harm is uncertain).

68. *See infra* text accompanying note 81.

69. *See infra* text accompanying notes 83–87.

Aside from the occasional skirmish over which instrument (price or quantity) is superior, a consensus has emerged that under most conditions, tax is superior to cap-and-trade, and either one is superior to command-and-control regulation under most conditions.[70] In recent years, law professors, economists, public health advocates, and others have increasingly turned to Pigovian taxes as the "go to" policy instrument to address harmful externalities.[71] Food taxes, in particular, receive widespread academic support, and have been implemented (and repealed) in Denmark.[72] Other proposals include excise taxes on cigarettes, alcohol, gambling, added sugar, financial transactions, and SUVs.[73]

B. Choice of Instrument

The academic literature comparing the use of tax instruments to other regulatory instruments is small but growing. In particular, the broad success of behavioral economics has encouraged scholars to look for instruments that can shape behavior in low cost ways, and tax is sometimes perceived as a suitable instrument to nudge behavior in a socially preferred way.

Tax law scholars have not paid much attention to Pigou, especially compared to the volumes of articles in economics and public finance.[74] But because tax exemptions, deductions, and credits are often used to achieve social policy goals, tax expenditures can be relabeled as Pigovian subsidies. And so it is useful to briefly discuss the more extensive literature on tax expenditures.[75]

Tax expenditures are a broad concept defined as "revenue losses attributable to provisions of the Federal tax laws which allow a special exclusion, exemption, or deduction from gross income or which provide a special credit, a preferential rate of tax, or a deferral of tax liability."[76]

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70.   *See* Masur & Posner, *supra* note 3, at 1–4 (arguing economists endorse Pigovian taxes over cap-and-trade or command-and-control regulations).

71.   I am not entirely certain why there is an obvious preference for tax rather than tradable permits; presumably, allocating permits to consume alcohol, gasoline, bacon and so forth would reveal the high administrative costs that are less salient and more centralized with a tax instrument.

72.   *See infra* note 173.

73.   *See* Appendix.

74.   A search for the term "Pigovian subsidy" in the Westlaw JLR database finds seventeen hits, only two before the year 2000. A search for the term "Pigovian tax" in the same database finds 278 hits. A search for the term "Pigovian subsidy" in Google Scholar finds 391 mentions; a search for "Pigovian tax" yields 4,740 (searches conducted March 21, 2014).

75.   *See supra* note 36.

76.   STAFF OF JOINT COMM. ON TAXATION, 112th CONG., BACKGROUND INFORMATION ON TAX EXPENDITURE ANALYSIS AND HISTORICAL SURVEY OF TAX EXPENDITURE ESTIMATES 2 (Comm.

Because many tax expenditures are designed to encourage behavior that generates positive externalities, it is often appropriate to evaluate them in the Pigovian tradition, and to weigh their effectiveness as compared to direct government spending, regulation, and other policy instruments.

Scholars have only recently begun to explicitly evaluate tax expenditures through this Pigovian lens. In a paper that focuses on refundable tax credits, Lily Batchelder, Fred Goldberg, and Peter Orszag argue that when policymakers want to use a tax instrument to encourage activities with positive social externalities, the tax instrument should typically take the form of a uniform refundable tax credit.[77] Unless there is reason to think that the subsidy is better targeted to particular income groups and not others, they argue, tax deductions, exemptions, and nonrefundable credits are suboptimal.[78] I disagree with Batchelder et al. not on the economics, but rather on the frequency of cases where uniformity is optimal.[79] Variation in the marginal social benefit suggests that Pigovian subsidies are often better targeted to some groups and not others.[80]

Print 2011) (citing Congressional Budget and Impoundment Control Act of 1974, 93d Cong. § 3(3) (1974)).

77. Lily Batchelder et al., *Efficiency and Tax Incentives: The Case for Refundable Tax Credits*, 59 STAN. L. REV. 23, 24–25 (2006).

78. *Id.* at 24.

79. *Id.* at 27–28.

80. Batchelder, Goldberg & Orzsag argue in favor of uniform subsidies. Their attention to institutional design, however, focuses on the choice between uniform refundable tax credits and tax instruments that are tailored to other income groups, such as nonrefundable credits and deductions. They argue that one generally minimizes deadweight loss with uniform taxes (or subsidies) rather than targeting income classes more precisely. They explain:

> This theory of [Pigovian] subsidies suggests that the optimal tax incentive generally should apply uniformly across the income distribution unless there is evidence that marginal externalities generated by the subsidy or marginal responsiveness to the subsidy vary by income class. Stated differently, tax incentives should provide the same price adjustment to all households unless the balance of the evidence suggests that more social benefits are generated by certain households engaging in the behavior than by others or that certain households are more responsive.

Id. at 47–48. To reframe their argument, the distribution of marginal social benefit may not vary across different income groups, and if that is the case, the optimal tax design is a uniform refundable credit. But in situations where distribution of marginal social cost varies according to other characteristics, such as industry, education, age, family size, immigration status, or countless other demographic characteristics, uniformity may not be optimal. A critical assumption in their paper is that price elasticities do not vary systematically across income groups. *See id.* at 27 n.16. If the assumption holds, a uniform subsidy minimizes the deadweight efficiency loss from mistargeted subsidies. But their paper assumes that a tax or price instrument is the optimal regulatory tool. Consider housing assistance. A refundable tax credit may minimize deadweight loss compared to a tax deduction for mortgage interest, but that hardly makes the case for subsidizing all housing in the first place, or doing so through the tax code rather than direct government spending.

The literature often compares tax expenditures with direct government spending.[81] Tax instruments have the benefit of minimizing government interference with the competitive market. Direct government spending, by contrast, is often said to put the government in the business of "picking winners and losers."[82] A uniform tax subsidy helps all the firms in an industry, but it may not give a particular advantage to one competitor versus another.

Institutional Design. David Weisbach and Jacob Nussim steered the debate about tax expenditures to focus more on institutional design.[83] When the government decides to pursue a policy goal, such as supporting higher education, it could choose to do so through a spending program (such as grants from the National Science Foundation or Department of Education) or the tax system, through a tax credit or deduction. The decision, they argue, should be driven not by tax norms or economics alone, but rather by the potential benefits of coordination and specialization within governmental departments.[84] Transfer programs based on income, like food stamps and the earned income tax credit, are likely best implemented as tax expenditures and administered within the tax system.[85] The IRS already collects data on income, and it is well positioned to deliver government benefits that are tied to income.[86] Other programs, like energy policy or national defense, have no obvious ties to income measurement or any other specialized expertise within the Treasury Department or IRS.[87]

While the focus of this Essay is different, it is in the same spirit as Weisbach and Nussim's incisive article. Uniform Pigovian taxes (or subsidies) may work where there is little variation among taxpayers. Where there is variation, uniform taxation (or subsidies) will be inefficient. Unless the variation is closely related to income, the tailoring necessary to address the variation is likely beyond the institutional capacity of the Treasury Department and Internal Revenue Service.

Nudges. Finally, many scholars in recent years have incorporated insights from psychology and behavioral economics to

81.   *See supra* note 36.
82.   *E.g.*, Paul Chesser, *Government Shouldn't Pick Winners and Losers*, THE AMERICAN SPECTATOR (Mar. 24, 2011 3:52 p.m.), http://spectator.org/blog/26160/government-shouldnt-pick-winners-and-losers [http://perma.cc/4AU9-NNG8].
83.   David Weisbach & Jacob Nussim, *The Integration of Tax and Spending Programs*, 113 YALE L.J. 955, 957 (2004).
84.   *Id.* at 959.
85.   *Id.* at 961.
86.   *Id.* at 994.
87.   *See id.* at 958–59 (pointing out the different areas of expertise among federal agencies).

guide regulation.[88] The "softer" regulation of framing, de-biasing, and other behavioral "nudges" may have advantages over command-and-control regulation.[89] Brian Galle, for example, has argued that policymakers irrationally prefer spending to taxes.[90] Galle prefers a third instrument, behavioral "nudges," to the traditional alternatives of price instruments and command-and-control regulation.[91] Choice architecture, default rules, framing, and other tools from the behavioral economics toolkit may do a better job of shaping behavior, at lower cost, than more direct forms of regulation.[92]

Mirror Image of Pigovian Taxes. Unlike Pigovian taxes, which are popular with academics but not with Congress, academics have criticized tax expenditures for over forty years.[93] Tax expenditures distort the budget process, favor well-connected industries with powerful lobbyists, and are not well understood by the median voter.[94] Perhaps for these reasons, they are immensely popular in Congress. Tax expenditures have nearly doubled in number and size (adjusted for inflation) over the last thirty years,[95] and there appears to be little political appetite for turning the tide. Before returning to the topic of subsidies in Part IV, I turn now to a deeper analysis of the problem of variation in marginal social cost.

III. TEN IMPLICATIONS FOR PIGOVIAN TAX DESIGN

In this Part, I offer ten implications that follow from tackling the problem of variation in social cost. Before turning to the particulars, it is worth stating two general principles.

The first principle is that the distribution of marginal social cost matters. Abnormal distributions of variation in marginal social cost are

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88. *See supra* note 37.

89. *See supra* note 35.

90. *See* Galle, *supra* note 35, at 840–43 (suggesting public choice theory and the federalist system generally contribute to the preference for tax expenditures over taxes).

91. *See* Galle, *supra* note 12, at 841–42 (arguing that nudges are preferable to price instruments under many circumstances).

92. *See generally* THALER & SUNSTEIN, *supra* note 35 (discussing the use of these tools in such areas as health care and retirement savings).

93. *See* Surrey, *Tax Incentives*, *supra* note 36, at 738 (suggesting changes to tax incentive programs and tax expenditures).

94. *See* Diane Lim et al., *Expert and Public Attitudes Towards Tax Policy: 2013, 1994, and 1934*, 66 NAT'L TAX J. 755, 798–802 (2013) (explaining the difference in views on tax policy held by the general public and experts).

95. William McBride, *A Brief History of Tax Expenditures*, THE TAX FOUNDATION (Aug. 22, 2013), http://taxfoundation.org/article/brief-history-tax-expenditures [http://perma.cc/2XSS-9HZP].

most problematic.[96] Variation is less problematic when it is easily predicted before the targeted behavior takes place, and when the distribution of marginal social cost is not skewed toward a few bad actors.[97] Tax instruments are easiest to use to achieve social policy goals when policymakers can readily observe the relationship between the activity causing the harm and the amount of harm caused, and where there is little variation among taxpayers, or where the distribution is normal and narrow.[98] In such cases, a uniform excise tax may be set to make the externality-producer bear an additional tax burden so that the private cost of the activity equals the social cost.

The second general principle is that institutional context matters. Variation in marginal social cost creates both regulatory design and political challenges.[99] To achieve an optimal allocation of resources, a Pigovian tax may require a highly detailed set of rules and exceptions about to whom, where, and under what conditions the tax applies. Under some conditions, it is more plausible that regulation, whether by prescription, information, or nudge, may come closer to achieving this result. Specialized agencies have better information about harm than the taxing authorities, and they are better positioned to exercise discretion in enforcement than the IRS is.

A. The Assumption of Uniformity Holds For Global Pollution

The standard assumption in economic models of Pigovian taxation is that firms are identical, with constant and uniform unit costs.[100] Under these conditions, a uniform excise tax on the activity equalizes across firms the marginal costs of controlling the activity. Efficiency, however, requires that the marginal costs of controlling harm be equalized across sources.[101] If the relationship between the activity and the marginal harm varies across sources, a uniform charge cannot achieve the (first best) optimal result.

This assumption works for some pollution taxes. In the case of a carbon tax, let us assume that a unit of carbon production causes a unit of carbon emission, and let us further assume that a unit of carbon

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96.   *See infra* text accompanying notes 140, 157.

97.   *See infra* text accompanying notes 139–40.

98.   *See infra* text accompanying notes 137–38.

99.   *See infra* text accompanying notes 166–67.

100.   *See, e.g.*, Albert L. Nichols, Targeting Economic Incentives for Environmental Protection 31 (Richard Schmalensee ed., 1984) ("The analysis becomes more complicated and less amenable to formal analysis when we drop the assumption that firms are identical, with constant and uniform unit costs.").

101.   *Id.* at 77.

emission causes a unit of external harm in the form of harmful global warming. Under these conditions, a properly calibrated uniform tax on carbon production increases the marginal cost of carbon production to the optimal level while minimizing other distortions of economic activity.[102]

The literature has focused on variation in mitigation costs across firms, and tax is believed to be a superior instrument to quantity regulation because of this variation.[103] But scholars have paid little attention to the problem of variation in harm across individuals or firms.[104] An early article by Susan Rose Ackerman noted that the geographic location of pollution may affect marginal cost.[105]

In a 1984 book, economist Albert Nichols examined the EPA's approach to benzene. Using data available to the EPA at the time, Nichols argued that conditional standards based on specific plants' benzene exposure would have been superior to the uniform charge based on benzene emission actually used by the EPA.[106] The problem becomes even greater when a firm or individual can substitute an untaxed activity, as the substitution by a firm that causes no (or little) harm creates deadweight loss.[107] According to one model, while a direct tax on the external harm would increase overall welfare at all tax rates,

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102. Gilbert E. Metcalf & David Weisbach, *The Design of a Carbon Tax*, 33 HARV. ENVTL. L. REV. 499, 556 (2009). The case for a carbon tax is still not complete. Calibrating the tax schedule correctly is challenging, and a strong case can be made for quantity regulation (cap-and-trade). But a carbon tax satisfies the conditions for uniformity that I focus on here.

103. *See* Kaplow & Shavell, *supra* note 26, at 4–5.

104. *See* NICHOLS, *supra* note 100, at 83; *see also* Don Fullerton et al., *A Tax on Output of the Polluting Industry Is Not a Tax on Pollution: The Importance of Hitting the Target*, *in* BEHAVIORAL AND DISTRIBUTIONAL EFFECTS OF ENVIRONMENTAL POLICY 13–44 (Carlos Carraro & Gilbert E. Metcalf eds., 2001) (focusing on targeting output of the polluting industry rather than emissions); Susan Rose-Ackerman, *Effluent Charges: A Critique*, 6 CAN. J. ECON. 512, 518 (1973) (noting that if marginal damages vary across sites, a simple uniform effluent charge will not be optimal and that "it is only a sophisticated effluent charge which is certain to be more efficient than a primitive nonmarket mode of allocation").

105. Rose-Ackerman, *supra* note 104, at 520–21:

> A single tool, the effluent charge, cannot be expected to resolve two distinct allocation problems[—]that of plant location and that of treatment level[—]in an efficient manner. Since the marginal benefits obtained from different levels of cleanup will vary depending upon the location of the regional plant, the fee should vary with plant location.

See also id. 520–21 n.15 ("An analogous point has been developed by macroeconomic and international trade theorists who have argued the necessity of having at least as many policy instruments as policy goals.").

106. NICHOLS, *supra* note 100, at 162–63.

107. *Id.*

an indirect tax on the activity may generate either welfare gains or welfare losses, depending on the size of the substitution effect.[108]

Mostly overlooked in this vast literature is the problem of variation in marginal social cost.[109] In a 1973 paper, economist Peter Diamond examined the role of corrective pricing where externalities vary among individuals, but the price is uniform.[110] "In most real world situations," he noted, "government-imposed surcharges cannot vary from transaction to transaction."[111] To account for variation in externalities, Diamond starts with the suggestion of using a weighted average of externalities to set the amount of the tax. Even so, as aggregate demand declines, some consumers will increase demand, and it is not certain that any price will be efficient for all parties. "Even the widely valid public finance proposition that some corrective taxation raises welfare may fail to be true."[112]

Diamond's paper emphasized one aspect of the problem of variation in marginal social cost—that demand may shift in unexpected ways in response to the tax.[113] For example, if a new highway toll charge causes more commuters to take light rail to work, companies might respond to the faster roads by moving more goods by truck instead of rail. And if trucks cause more negative externalities than cars, it is possible that no one is better off than in the absence of the tax.

My point is a broader one. Only when the externality at issue is global pollution, or a harm closely analogous to global pollution, will the assumption of uniform marginal social cost be accurate. The more localized the harm, the less reasonable the assumption becomes.

B. Use (Only) When Harm Can Be Estimated Ex Ante

One useful way to think about the problem is from an ex ante vs. ex post perspective. Professor Shavell, for example, has compared the use of corrective taxes on the one hand with liability rules on the other.

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108. In the Fullerton et al. model, any increase in the tax rate on output above twelve percent decreases welfare. *See* Fullerton et al., *supra* note 104, at 32.

109. Other papers include Philip J. Cook & Michael J. Moore, *This Tax's For You: The Case For Higher Beer Taxes*, 47 NAT'L TAX J. 559, 573 (1994); Willard G. Manning et al., *The Demand for Alcohol: The Differential Response to Price*, 14 J. HEALTH ECON. 123, 123–48 (1995); Ted O'Donoghue & Matthew Rabin, *Optimal Sin Taxes*, 90 J. PUB. ECON. 1825, 1825–49 (2006).

110. Diamond, *supra* note 26, at 527.

111. *Id.*

112. *Id.* For further discussion of the problem of variation in the environmental context, see Arden Rowell, *Allocating Pollution*, 79 U. CHI. L. REV. 985, 1035 (2012) (distinguishing between global and local pollutants). *See generally* James Salzman and J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 STAN L. REV. 607 (2000) (discussing fungibility).

113. Diamond, *supra* note 26, at 530–32.

In the general context of pollution, tax will tend to be a superior instrument, "for there may be relatively little variability among parties in expected harm per unit of pollutant discharged."[114] But in other domains, liability may be superior, "due to the significance of variability among parties in expected harm and of opportunities to take precautions."[115]

Car accidents cause external harm, but a uniform tax of $40,000 per accident is unlikely to provide the right incentives.[116] We want to deter risky activities that lead to harmful crashes, and an ex ante tax is unlikely to be superior to an ex post liability rule. Many drivers would become "too" safe, incurring longer travel times and avoiding roads whenever possible. People would stop reporting accidents to insurance companies and the police, perhaps leading to an increase in fraudulent accidents by criminals seeking side payments. As Shavell notes, the corrective tax has long been viewed as the theoretically preferred remedy for the problem of harmful externalities. The problem is that for many activities, the variables that cause external harms vary, and the tax instrument cannot be as finely adjusted as necessary to reach the optimal amount.[117]

C. Place Discretion in the Agency with Specialized Expertise

At the other extreme, where there is great variation, there may still be a compelling argument for government intervention. But if government intervention is required, the taxing authorities are probably not the right administrative agency for the job. When there is a great deal of variation among producers of external harm, Congress

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114. Steven Shavell, *Corrective Taxation versus Liability*, 101 AM. ECON. REV. 273, 274 (2011).

115. *Id.*

116. Approximately five million police-reported car accidents cause approximately $200 billion in costs each year.

117. Steven Shavell, *Taxation Versus Liability as a Solution to the Problem of Harmful Externalities*, 54 J.L. & ECON. 249, 255–56 (2011):

> Taxes would often be inaccurate, unequal to the expected harm. The tax on crane operations would often be inaccurate if it were not based on the loads that a crane lifts and the exposure of victims to risk; the tax on driving would often be biased if it did not reflect the care and skill of drivers and the types of roads on which driving is done; the tax on snow and ice left on sidewalks would often be erroneous if it did not depend on the slipperiness of the snow, how long it takes to melt, and the amount of foot traffic on the sidewalks. Hence, the tax would sometimes be too high, such as when a crane lifts lighter than average loads and few individuals are exposed to risk at a construction site, when ice and snow quickly melts and there is little foot traffic on the sidewalks, or when drivers are careful and drive new cars mainly on well-designed, limited access roads. And sometimes the tax would be too low, such as when an older crane lifts heavy loads and many individuals are exposed to risk, or when ice and snow will remain for a long period where foot traffic is high, and so forth.

is not likely to write a statute at a level of detail necessary to achieve the goal. Instead, that task will fall on regulators. In the tax context, the Treasury Department and the I.R.S. jointly make policy, write regulations, interpret, implement, and enforce the law.[118]

The taxing authorities have specialized expertise at measuring income. If the variation among externality producers is linked to income, then a carefully tailored Pigovian tax may be appropriate. As noted by Professors Weisbach and Nussim, this is plausible for certain tax and transfer programs like food stamps and the EITC.[119] Outside of income measurement, the IRS has little institutional comparative advantage.[120] The Department of Health and Human Services, for example, may be better at designing a program to encourage healthy eating.[121]

Put another way, regulation is likely to be a superior instrument where there is substantial variation among externality-producers on any metric other than income. If the variation is observable at a reasonable cost, regulators have a range of instruments (legal prohibitions, direct spending, contests, education programs, behavioral nudges, among others) that are likely to be a better fit than a uniform excise tax. Tax is not just a price instrument; it is an institutional choice.

There is the possibility that one agency with specialized expertise, like the Department of Health and Human Services, could design the tax and set the rate, allowing for more variation among different firms or individuals, while allowing the IRS to merely enforce the tax.[122] But this approach too may be difficult to implement.[123]

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118. *See, e.g.*, Ellen P. Aprill, *The Impact of Agency Procedures and Judicial Review on Tax Reform*, 65 NAT'L TAX J. 917, 917 n.1 (2012) (describing the guidance process).

119. See Weisbach & Nussim, *supra* note 83, at 998.

120. *Id.* at 994, 1027–28.

121. Of course, it is also possible that specialized agencies are more susceptible to regulatory capture. *See* Michael E. Levine & Jennifer L. Forrence, *Regulatory Capture, Public Interest, and the Public Agenda: Toward a Synthesis*, J.L. ECON. & ORG. 167, 190 (1990) (describing how lack of public attention to small, discrete issues can make capture more likely); Jonathan R. Macey, *Separate Powers and Positive Political Theory: The Tug of War over Administrative Agencies*, 80 GEO. L.J. 671, 702 (1991) ("[I]t is more difficult for the executive branch, which is politically accountable to a national constituency, to be captured by narrow special interests than it is for a specialized administrative agency to be captured by such interests.").

122. *See* Nat'l Fed'n Indep. Bus. v. Sebelius, 132 S. Ct. 2566, 2594 (2012) (describing the IRS as the enforcement mechanism for a tax created by a different entity).

123. The implementation of Obamacare has not been smooth sailing. For an example, see Robb Mandelbaum, *The I.R.S.'s Final Mandate Reporting Rules? Still Complicated*, N.Y. TIMES: YOU'RE THE BOSS (Mar. 14, 2014), http://boss.blogs.nytimes.com/2014/03/14/the-i-r-s-s-final-mandate-reporting-rules-still-complicated/?smid=pl-share&_r=0 [http://perma.cc/2895-TG8T].

The broader point is that tax is not just a regulatory instrument: it is an institutional choice. To an economist, a tax is simply a price instrument, no different than a fine or a fee.[124] Price instruments make the marginal cost of an activity higher or lower. To a lawyer, however, a tax has a more specific meaning. A Pigovian tax is an excise tax on the production or consumption of a particular good or service.[125] Excise taxes are normally uniform—that is, they apply to anyone who purchases the product or engages in the activity.[126]

Economists are often puzzled by the tendency to impose uniform taxes. Price theory holds that prices should generally be set to equal marginal cost, and so where there is variation in marginal cost there should be variation in price. The tendency to uniformity is thus better understood in terms of institutional design, not microeconomics.[127]

Uniformity is not unique to tax. In the regulatory context, the government typically sets uniform standards.[128] But the stated uniform standards may differ from the actual standards as enforced. The actual standard is a function of agency discretion under conditions of a constrained budget; agencies pick and choose enforcement actions to target the greatest harm-doers.[129] Agencies, moreover, are often partially funded by non-compliance penalties linked to damages, further refining the incentive to target harm-doers.[130]

The taxing authorities, however, are not permitted quite the same flexibility in enforcement.[131] If a tax is due, IRS agents are

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124. *See generally* Uri Gneezy & Aldo Rustichini, *A Fine is a Price*, 1 J.L. STUD. 29 (2000) (reporting the results of a field study showing that penalties may have an effect opposite what is expected; specifically that when a late pick-up fee was introduced at a daycare center, late pick-ups numbers actually *increased*).

125. *See supra* note 13 and accompanying text.

126. *See* Anthony Atkinson & Joseph E. Stiglitz, *The Design of Tax Structure: Direct Versus Indirect Taxation*, 6 J. PUB. ECON. 55, 64 (1976); Bruce C. Greenwald & Joseph E. Stiglitz, *Externalities in Economies with Imperfect Information and Incomplete Markets*, 101 Q.J. ECON. 229, 241 (1986); Joel Slemrod, *Optimal Taxation and Optimal Tax Systems*, 4 J. ECON. PERSP. 157, 159 (1990).

127. Howard Latin, *Ideal Versus Real Regulatory Efficiency: Implementation of Uniform Standards and "Fine-Tuning" Regulatory Reforms*, 37 STAN. L. REV. 1267, 1267–1332 (1985).

128. Carol A. Jones & Suzanne Scotchmer, *The Social Cost of Uniform Regulatory Standards in a Hierarchical Government*, 19 J. ENVTL. ECON. & MGMT. 61, 61–72 (1990).

129. *Id.* at 70–71.

130. *Id.*

131. Uniformity is not required by the Constitution, with one exception. The Constitution requires excise taxes to be uniform across states. U.S. CONST. art. 1, § 8. Congress could not, for example, tax coal-fired electric plants in Colorado (where emissions could cause acid rain in the Adirondack Mountains) but not Kentucky (where the acid rain would fall harmlessly into the Atlantic Ocean.) Congress could, however, tax all coal-fired electric plants, even if more of those happened to be in Colorado. While one can imagine excise taxes that might be constrained by the

generally expected to collect the tax, and a firm cannot avoid tax liability by pointing out that the tax is not well designed.

There is a strong theoretical case for allowing the IRS greater discretion in enforcement, at least if its standards are stated in advance.[132] In situations where the IRS has discretion, it appears to be particularly bad at exercising its discretion in a timely and fair manner.

D. Beware Bimodal or Skewed Distributions

The "targeting" problem can be conceptualized as one of distributions of marginal social cost across the population. Take carbon emission. The implicit assumption of many environmental policy proposals is that the location of the emission does not affect outcomes. Recent research suggests that marginal cost may vary somewhat with geography.[133] So long as the distribution is normal and narrow, a carbon tax calibrated to average marginal cost may suffice as a "second best" instrument. If, for example, marginal social cost varies, but most source emissions cause between $4 and $6 of externalized harm per unit of activity, a uniform tax of $5 per unit may be close enough. Those at the right and left tails of the distribution will be over-deterred and under-deterred, respectively, but the deadweight loss will be relatively small.

Constitution, in the usual case it is institutional limitations, not Constitutional limitations, which lead to uniformity in practice.

132. Leandra Lederman & Ted M. Sichelman, *Enforcement as Substance in Tax Compliance*, 70 WASH. & LEE L. REV. 1679, 1687 (2013) ("In more theoretical terms, the tax agency can achieve a beneficial price discrimination of sorts in applicable tax rates, normally reserved to the monopolistic substantive lawmaking process, by differentiating the enforcement of otherwise uniform laws.").

133. Mark Z. Jacobson, *Enhancement of Local Air Pollution by Urban CO2 Domes*, 44 ENVTL. SCI. TECH. 2497, 2497 (2010) ("[A]ir pollution regulations worldwide assume arbitrarily that such [CO2 domes over cities] have no local health impact, and carbon policy proposals, such a 'cap and trade[,']implicitly assume that CO2 impacts are the same regardless of where emissions occur.").

Figure 2: Normal Distribution
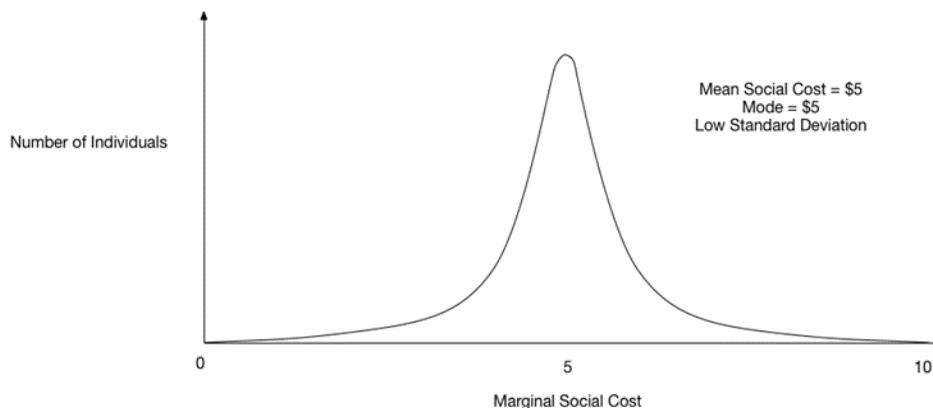

But suppose now that the research shows a bimodal distribution of marginal social cost. Assume, as in Figure 2, that the average social cost is $5, but that in urban areas the marginal social cost is $7 and in rural areas, $3. Carbon emissions in urban areas would be reduced, but not to the level necessary to eliminate external social costs. Carbon emissions in rural areas would be reduced beyond the level necessary to account for external costs, creating deadweight loss as rural residents "under-pollute." How big of a problem this is depends on how far apart the two modes are, how the revenue raised is redistributed among the population, and comparisons to other policy instruments.

Alternatively, policymakers could try to divide the population into two categories, urban and rural, and impose a different rate to each group.[134] This approach, however, might not work in the case of air contaminants, where production is used as a proxy for emission, and tracing production through the supply chain to determine if it is likely to be emitted in an urban or rural area would be unworkable.

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134. Brian D. Galle, *In Praise of Ex Ante Regulation*, 68 VAND. L. REV. (forthcoming 2015).

Figure 3: Bimodal Distribution
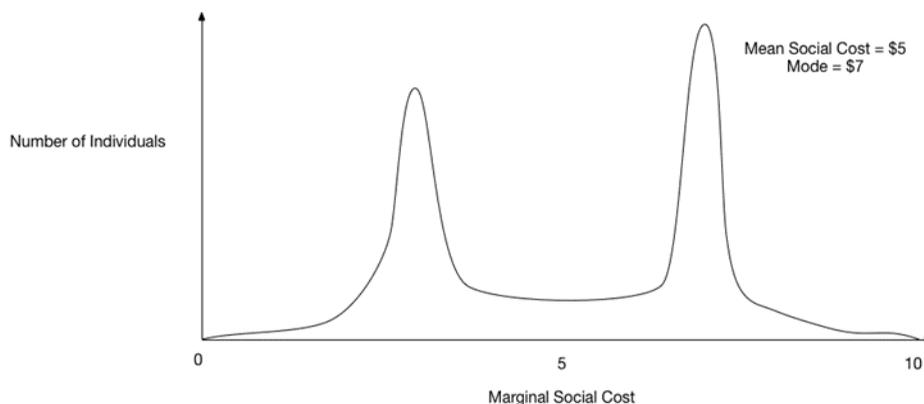
The design gets even more complicated, but not necessarily unwieldy, in the case of multimodal distributions. Take an activity like driving on a congested freeway. At any particular moment in time and place, there is variation in the marginal congestion caused by individual cars and trucks, depending on the size of the vehicle, individual driving behavior, road conditions, and so forth.

But if one were to graph the distribution of marginal social cost, the distribution would likely be clustered around identifiable modes and normal around estimable numbers. You might have one mode for motorcycles, another for cars, and another for trucks. So long as the variation is easily observable or estimable, the tax rate can be varied accordingly and administered without too much difficulty. This is why congestion charges, in the spirit of Baumol,[135] may be a second best solution against the backdrop of an imperfect administrative state with limited resources.

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135. *See supra* notes 56–62 and accompanying text.

Figure 4: Multi-modal Distribution
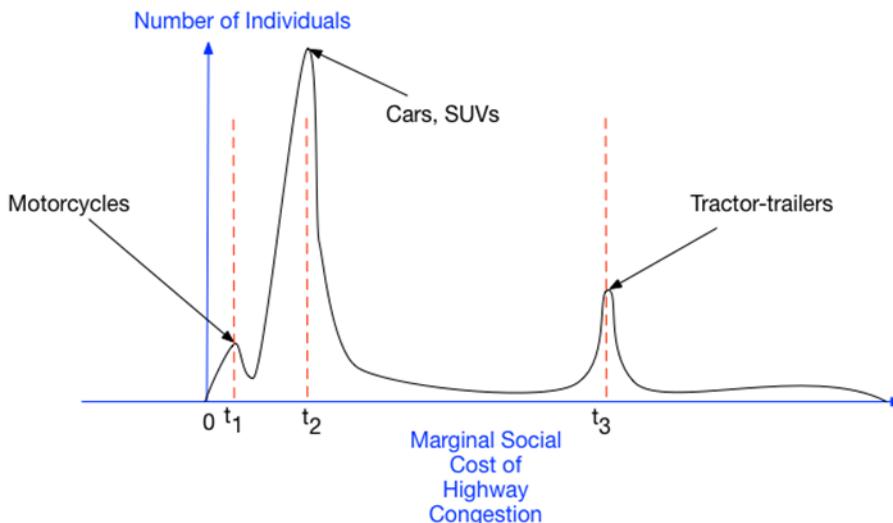
There is a further complication from the presence of marginal social benefits. We tolerate tractor-trailers on our roads because we benefit from moving goods from one place to another. There is also presumably variation among the marginal social benefit of private individuals; we care more about the ER doctor trying to get to work on time than the college student driving to meet friends at a bar. When congestion impairs private benefit (like the college student), policymakers can rely on price discrimination to sort drivers, as we see with express toll lanes on bridges and highways. But where the benefit is social, policymakers may need to carve out exemptions from the congestion charge, as is often done for taxis, delivery trucks, certain public servants, and so on.

By contrast, consider the impact of a Pigovian tax where the distribution of marginal social cost is normal but wide—the consumption of fatty foods, perhaps.[136] For the obese, overweight children, and for untreated diabetics, the marginal social cost is

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136. Food taxes are designed to address the rising social problem of obesity. *See, e.g.*, E. Katherine Battle & Kelly D. Brownell, *Confronting a Rising Tide of Eating Disorders and Obesity: Treatment vs. Prevention and Policy*, 21 ADDICTIVE BEHAV. 755, 762 (1996); Tom Marshall, *Exploring a Fiscal Food Policy: The Case of Diet and Ischaemic Heart Disease*, 320 BRIT. MED. J. 301, 301 (2000); Katherine Pratt, *A Constructive Critique of Public Health Arguments for Anti-obesity Soda Taxes and Food Taxes*, 87 TULANE L. REV. 73, 114–39 (2012); Jeff Strnad, *Conceptualizing the "Fat Tax": The Role of Food Taxes in Developed Economies*, 78 S. CAL. L. REV. 1221, 1294–1322 (2005); Stephen D. Sugarman & Nirit Sandman, *Fighting Childhood Obesity Through Performance-Based Regulation of the Food Industry*, 56 DUKE L.J. 1403, 1429–90 (2007); *see also* Robert H. Lustig et al., *The Toxic Truth About Sugar*, 482 NATURE 27, 28 (2012) (describing taxes as "the most effective" policy for curbing excess sugar consumption).

substantial. For many, the marginal social cost is probably zero. And for some, the marginal social cost may be negative. In this case, the lack of precision means that many who cause great social cost will fail to change behavior, leading to overconsumption of sugar; many who cause little or no social cost will change behavior, leading to an underconsumption of fatty foods. While overall fat consumption may fall to a level previously thought to be optimal, social cost is not fully internalized, and the benefits must be weighed against the deadweight loss of those who change their behavior despite causing no harm. It is not clear that this calculation could be performed with any level of precision for most activities.

Figure 5: Wide Distribution
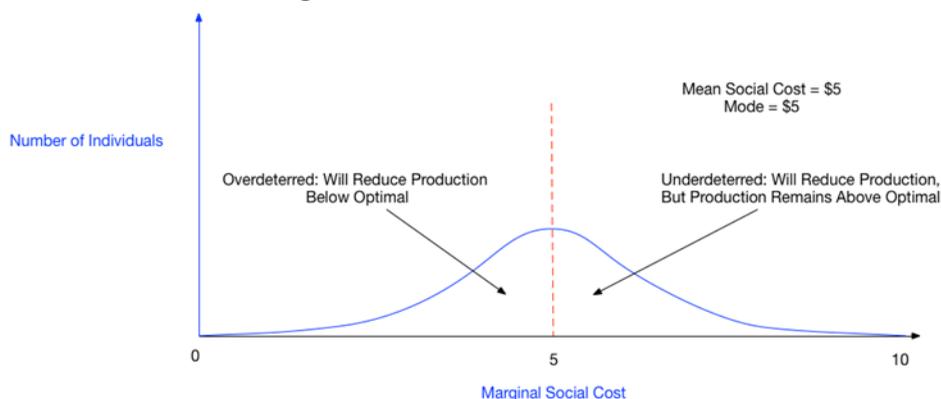
Certain bimodal or skewed distributions are not amenable to control with tax instruments. Most of the social cost of guns, for example, comes from a relatively small number of actors.[137] Suppose guns cause $1 billion of social cost annually, and that there are 100 million guns. Using average social cost, we would impose a tax of $10 per gun. Such a tax would have no effect on criminals, whose private benefit from using the gun presumably vastly exceeds $10 per year.

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137. *See generally* Philip J. Cook & Jens Ludwig, *The Social Costs of Gun Ownership*, 90 J. PUB. ECON. 379 (2006) (estimating average annual marginal social cost in the range of $100 to $1800). Cook & Ludwig measure the social harm in terms of gunshot injuries and deaths—a harm that is not inflicted randomly across the population. Yet they do not account for the variation in marginal social cost among different gun owners, instead recommending a license fee of as high as $1800. Their intuition seems to be that the higher prevalence of gun ownership in a region will tend to increase the number of guns purchased on the black market, and that reducing the prevalence of gun ownership through a Pigovian tax would reduce the number of illegal guns, thereby reducing the number of homicides and suicides.

Figure 6: Multi-modal, Skewed Distribution
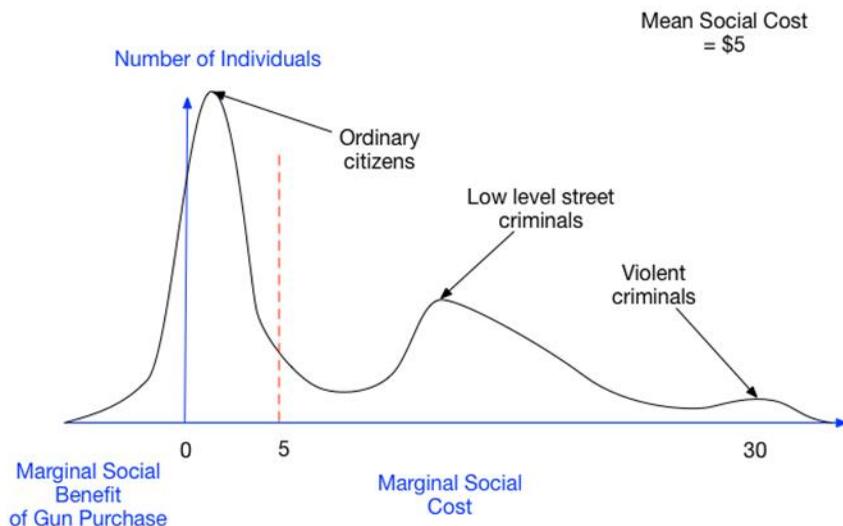
This is not to say that there is not a case for taxing guns.[138] Guns are hard to trace once they enter the population, and reducing the production of guns would have a beneficial effect. If one identifies the social harm from guns as the risk that the gun will slip into the wrong hands—rather than the risk that the gun will be used as intended—the distribution of marginal social cost may be narrower.

In sum, a Pigovian tax is most promising as an instrument when the distribution of marginal social cost is normal and narrow, or when the variation is tied to categories that are easy to observe. If there are multiple modes, it may be possible to categorize the population into groups and tax at different rates, creating multiple normal and narrow distributions.

E. Do Not Use if Elasticity Correlates Inversely With Social Cost

Variation in marginal social cost creates another concern for Pigovian tax design: variation in elasticity of demand. In the case of carbon emissions, where the goal is to decrease aggregate output, variation in the elasticity of demand is not important. In response to a carbon tax, some producers and consumers will reduce production and consumption, and some will not. That is a feature, not a bug. It is

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138. *See generally* Tom Griffith & Nancy Staudt, Guns and Taxes (Jan. 24, 2014) (unpublished manuscript) (on file with authors) (advocating taxing high-risk gun users to subsidize safe gun use).

efficient for those who derive the least utility from a high carbon footprint to give it up first.

But when elasticity of demand and marginal social cost are negatively correlated, tax is a poor instrument. Returning to the gun example, it may be the case that a drug dealer (high marginal social cost, low elasticity of demand) values a gun much more highly than its closest substitute, whatever that may be. The homeowner seeking protection (low marginal social cost, high elasticity) values a gun somewhat, but will easily substitute a guard dog or home security system. A Pigovian tax set at the level of average social cost will cause the homeowner to get a dog instead of a gun, but the drug dealer will buy a gun anyway.

The same may be true of many food taxes. If, as some of the scientific literature suggests, junk food is addictive, then those who are most addicted and obese (high marginal social cost) will be unable to switch to healthy foods without Herculean effort (low elasticity of demand).[139]

F. Get Used to Disappointment

This Essay has thus far identified a theoretical reason—variation in marginal social cost across different firms and individuals—that, in the face of information costs and imperfect political institutions, may make Pigovian taxes more problematic to use than generally thought. This section examines what we can learn in light of experience. What recent history teaches us, unsurprisingly, is that policymakers appear to lack the institutional capacity to make the fine distinctions necessary to achieve an optimal allocation of economic resources. The good news is that when the variation is easy to observe, as with congestion charges, a Pigovian tax remains a promising tool, provided that rate variation and categorization is not too infected by rent-seeking and lobbying.

Congress has relatively little history with Pigovian taxes, and its limited success in deploying them is almost accidental. What Congress does have experience with is a variety of sin taxes. As noted above, these taxes tend to be imposed as uniform excise taxes and seem to be designed with revenue, not behavior, in mind.

A 1994 paper by Thomas Barthold, who is now the Chief of Staff of the Joint Committee on Taxation, found that of the dozens of environmental taxes enacted by Congress, only two examples (the gas-guzzler excise tax and the tax on ozone-depleting chemicals) resemble

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139. Galle, *supra* note 12, at 858–59.

the textbook model of a Pigovian tax. Barthold explained that economists focus on choosing the right magnitude for the tax, and they tend to ignore political considerations or the practical problems of design and implementation.[140] To achieve political goals, many environmental taxes were structured as insurance pools or user benefit fees.[141]

In the case of Chlorofluorocarbons (CFCs), Congress enacted an excise tax in 1989 on the production of certain chemicals identified under the Montreal protocol as contributing to ozone depletion.[142] Even though the environmental harm comes from leaky refrigerants, not from CFC production as such, administrability concerns led Congress to impose the tax on chemical manufacturers rather than, say, the use of leaky car air conditioners. While the tax schedule was scaled to tax more harmful chemicals at a higher rate than less harmful chemicals, there is no reason to believe that the overall level of the taxes corresponded to the marginal environmental harm.[143] Instead, it appears that the tax was designed to achieve a specific revenue goal as part of the budget reconciliation process.[144]

The CFC tax worked, more or less, because the variation in marginal social cost of CFC production does not vary much according to geographic source; a chemical leaking in Iowa is just as harmful to the ozone as a chemical leaking in California. But the process also shows the institutional limitations that explain why few Pigovian taxes have been successful.

G. Food Taxes Are Likely to Fail

Our knowledge of what causes obesity is somewhat limited. In general, poor diet and inadequate exercise are the most likely causes.[145] But what is a poor diet? Should we have an excise tax on carbohydrates or on fat? All carbohydrates or just simple sugars? Should we tax inactivity? Subsidize exercise? The answer may not be uniform across individuals.[146] The effect of tax incentives in this context is largely

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140. Thomas A. Barthold, *Issues in the Design of Environmental Excise Taxes*, 8 J. ECON. PERSP. 133, 136 (1994) ("These problems usually involve a lack of clear identification of costs and benefits, asymmetric information about tastes and available technology, lack of precise measures of supply and demand, and different regional impacts.").

141. *Id.*

142. *Id.* at 136–37.

143. *Id.* at 140.

144. *Id.* at 140–41.

145. *See* Jason M. Fletcher et al., *The Effects of Soft Drink Taxes on Child and Adolescent Consumption and Weight Outcomes*, 94 J. PUB. ECON. 967, 968 (2010).

146. *Id.*

inframarginal, taxing people on foods they lack the willpower to avoid or subsidizing good food choices they would have made anyway. When the tax incentives miss the mark, it exacerbates distributional challenges—the rich already tend to eat well and exercise, while the poor tend not to.

Soda taxes have also proven problematic. As soda prices increase, consumers tend to substitute other high calorie drinks, like fruit juices.[147]

Denmark passed the world's first fat tax in 2011, only to repeal it a year later.[148] As many as 48% of Danes crossed the border to buy meat and cheese; local producers complained they were at a competitive disadvantage.[149] Because the tax was imposed on each meat carcass, rather than by specific cuts of meat, the tax targets those who consumed a lean cut of sirloin as much as a fatty rib eye.[150]

A fat tax could be more efficient if we were willing to tax the outcome—obesity—instead of the inputs that lead to obesity.[151] For example, waist to height ratio is a better predictor of poor health than body mass index, or BMI.[152] We could impose an excise tax on individuals to the extent that one's waist to height ratio exceeds 0.5. The tax rate could be scaled by gender, and non-linear to account for the fact that morbidly obese individuals create more external costs than the run-of-the-mill-American obese.

But such a tax on obese people, instead of fatty foods, would be punitive, politically unpopular, normatively unjustified, and arguably immoral. The tax would be regressive and would have a disparate racial impact. Unlike a tax on specific types of food and drink, it would operate as a sort of reverse endowment tax, with the incidence of the tax falling most heavily on those saddled with bad genes and poor ability to

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147. *Id.* at 973:

> Additionally, soft drink taxes do not appear to have countered the rise in obesity prevalence because any reduction in soft drink consumption has been offset by the consumption of other calories. Cast in this light, the revenue generation and health benefits of soft drink taxes appear to be weaker than expected.

148. S. Vallgårda et al., *The Danish Tax on Saturated Fat: Why It Did Not Survive*, 69 EUR. J. CLINICAL NUTRITION 223, 223 (2015); *A Fat Chance*, THE ECONOMIST (Aug. 31, 2015), http://www.economist.com/news/europe/21566664-danish-government-rescinds-its-unwieldy-fat-tax-fat-chance [http://perma.cc/N95Z-3PKT].

149. *See A Fat Chance*, *supra* note 148 (describing how Denmark, famous for its blue cheese and bacon, repealed the world's first fat tax a year after enactment).

150. *Id.*

151. I am indebted to a former student, Chris Weigand, for developing this observation.

152. S.C. Savva et al., *Waist Circumference and Waist-to-Height Ratio Are Better Predictors of Cardiovascular Disease Risk Factors in Children than Body Mass Index*, 24 INT'L J. OBESITY 1453, 1457–58 (2000).

compensate.[153] One can imagine a politician trotting out a story of an exhausted, poor, single, working mother with three kids having to pay an annual excise tax of $500 because she cannot find enough time to exercise after working an eight hour day, going to the grocery store, cooking, and putting the kids to bed.[154]

H. Sin Taxes Modify Revenue, Not Behavior

Taxes on alcohol, tobacco, and gambling are a unique set of taxes because they are typically set at a level that raises revenue, but does not bear a close relationship to the negative externalities associated with the activity.[155]

Cigarettes mostly cause internal harm, not external harm. Smoking increases health care costs, some of which are externalized. But it also reduces lifespan, which reduces other externalized costs, like Social Security payments. One oft-cited estimate of the external costs of cigarettes is $0.27 per pack, well below the federal-state-local combined tax rate of as much as $6.00 per pack.[156]

The case for cigarette taxes instead rests on internal harm and the cognitive limitations and bounded rationality of smokers, including adolescents.[157] There is a reasonably close relationship between activity

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153. An endowment tax is a tax based on one's natural ability or talents. Kyle Logue & Joel Selmrod, *Genes as Tags: The Tax Implications of Widely Available Genetic Information*, 61 NAT'L TAX J. 843, 844–45 (2008); Daniel N. Shaviro, Commentary, *Inequality, Wealth, and Endowment*, 53 TAX L. REV. 397, 406–12 (2000); Kirk J. Stark, *Enslaving the Beachcomber: Some Thoughts on the Liberty Objections to Endowment Taxation*, CANADIAN J.L. & JURIS. 47, 50 (2005); Lawrence Zelenak, *Taxing Endowment*, 55 DUKE L.J. 1145, 1145–48 (2006).

154. If the distribution of marginal social cost is bimodal or right-skewed, a tax on fatty foods is almost economically equivalent to a tax on obese people; because the average marginal social cost is lower for this population than the marginal social cost, their consumption is not likely to fall to optimal levels, and they will continue to cause social cost while bearing a portion of the burden of the tax. The difference is that a food tax shifts some of the burden of the tax onto people who cause no social harm from consuming fatty foods. Other than optics, it is not immediately apparent to me why this outcome would be preferred to a tax on obese people. What this suggests to me is that we instead focus efforts on changing the behavior of obese people through the use of nontax instruments: education, improving food label design, improving urban planning, improving workplace design, increasing the availability of healthy foods, eliminating subsidies for unhealthy foods, and so on.

155. *See infra* notes 158–62 and accompanying text.

156. W. Kip Viscusi, *Cigarette Taxation and the Social Consequences of Smoking*, *in* 9 TAX POL'Y AND THE ECON. 51, 73 (James M. Poterby ed., 1995).

157. Jonathan Gruber & Jonathan Zinman, *Youth Smoking in the United States: Evidence and Implications*, *in* RISKY BEHAVIOR AMONG YOUTHS: AN ECONOMIC ANALYSIS 69, 87–93 (Jonathan Gruber ed., 2001); Jonathan H. Gruber & Sendhil Mullainathan. *Do Cigarette Taxes Make Smokers Happier*, 5 ADVANCES IN ECON. ANALYSIS & POL'Y, no. 1, 2005, at 1, 1–2; Jonathan Gruber, *Tobacco at the Crossroads: The Past and Future of Smoking Regulation in the United States*, 15 J. ECON. PERSPECTIVES 193, 202–06 (2001).

and harm—doctors typically measure smoking in terms of pack-years (a smoker who smokes two packs a day for ten years bears roughly the same health risks as smoker who smokes one pack a day for twenty years). Raising cigarette prices may be a good idea, and tax may be the right instrument, but not if the goal is to control externalities.[158]

Other sin taxes are even harder to justify on Pigovian grounds. Take alcohol. The variation in marginal social cost is vast and complex. For the majority of drinkers, alcohol causes no external harm.[159] For alcoholics and teenagers, on the other hand, external costs are high, mainly in terms of drunk driving and domestic abuse.[160] The external costs of alcohol may be higher in car-centric cities like Los Angeles than in New York City or Washington, D.C. To address the external harm effectively, we would need to tax the second glass of wine for women and the third glass of wine for men, and escalate the tax in a non-linear fashion from there.[161] Instead, most alcohol taxes are uniform, with no attempt to calibrate the tax to the harm. Like cigarette taxes, the policy design centers on revenue collection rather than a meaningful attempt to regulate behavior.

What sin taxes have in common are relatively low demand elasticities, which make it easier to tax them and raise revenue without reducing demand.[162] The very unwillingness to modify behavior that

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158. Gary Lucas, Jr., *Saving Smokers from Themselves: The Paternalistic Use of Cigarette Taxes,* 80 U. CIN. L. REV. 693, 693–94, 726 (2012) ("If smokers are heterogeneous, the appropriate self-control tax will vary from person to person and may be zero for some smokers. Unfortunately, the government can select only one tax rate.").

159. *See* Thomas K. Greenfield et al., *Externalities from Alcohol Consumption in the 2005 US National Alcohol Survey: Implications for Policy*, 6 INT'L J. ENVTL. RES. & PUB. HEALTH 3205, 3216–20 (2009); Michael Grossman et al., *Policy Watch: Alcohol and Cigarette Taxes*, 7 J. ECON. PERSPECTIVES 211, 215 (1993); Dale M. Heien & David J. Pittman, *The External Costs of Alcohol Abuse*, 54 J. STUD. ON ALCOHOL & DRUGS 302, 302–06 (1993); Jody Sindelar, *Social Costs of Alcohol*, 28 J. DRUG ISSUES 763, 772–74 (1998); Preety Srivastava & Xueyan Zhao, *What Do the Bingers Drink? Micro-Unit Evidence on Negative Externalities and Drinker Characteristics of Alcohol Consumption by Beverage Types*, 29 ECON. PAPERS: J. APPLIED ECON. & POL'Y 229, 248–49 (2010).

160. *See* Greenfield et al., *supra* note 159.

161. Indeed, we might want to subsidize the first glass of wine, if it is red. But perhaps only if it is a Merlot, a variety shown to have higher levels of resveratrol than lighter varieties like Pinot Noir. *See* S. Vincenzi et al., *Comparative Study of the Resveratrol Content of Twenty-One Italian Red Grape Varieties*, 34 S. AFR. J. ENOLOGY & VITICULTURE 30, 32 (2013). For a contrary view, see SIDEWAYS (Fox Searchlight 2004).

162. In 2009, then-Mayor Gavin Newsom of the city of San Francisco took aim at a nagging problem: cigarette butts. Some smokers flick cigarette butts onto the streets and sidewalks, decreasing the quality of life, however slightly, for everyone else. The city was spending about $10 million a year cleaning up the butts. Newsom proposed a thirty-three-cent per pack municipal fee, which when multiplied by the thirty million or so packs sold a year, would at least cover the costs of cleaning the streets. It was hoped, but not necessarily expected, that cigarette smoking might decline slightly in response to the tax. But not all smokers are litterbugs. Vima Patel et al.,

dooms many attempts at Pigovian taxation becomes a useful feature for optimal commodity taxation, which posits that tax rates should be set in inverse proportion to elasticity.

I. Consider Using When Variation is Easy to Observe

Carbon is not the only potential success story. Traffic congestion charges, while sometimes designated as fees (London) rather than taxes (Stockholm), illustrate the conditions where variation in marginal social cost can be effectively addressed. Regulators can easily observe the amount of likely congestion caused by a vehicle based on the time of day, location, and type of vehicle. The tax can then be applied at a different rate to different categories. Within these categories, variation in marginal social cost with respect to congestion is trivial; despite a smaller environmental impact, a Tesla causes roughly the same amount of congestion as a Cadillac. Congestion charges may work because the variation in marginal social cost is attributable to factors—type of vehicle, location, time of day, and day of the week—that are readily observable. The design of the tax may not be calibrated perfectly, but perfection is not necessary to make things better.[163]

J. Zero Is an Institutional Choice

What remains unclear is when, in the face of variation in marginal social cost, a nonzero uniform tax rate is better than nothing. In the vast majority of cases, it is best not to get the taxing authorities involved in regulation, which means that zero is the correct rate.

In theory, we might want an infinite number of Pigovian taxes to address an infinite number of activities. Every activity, after all, creates some positive or negative externalities. And zero is just a number. One could imagine, in a world without transaction costs, placing a tax or subsidy on every activity from brushing your teeth in the morning to turning out the light at night. Presumably, from a purely Pigovian perspective, the optimal tax rate will be nonzero (positive or negative) after accounting for external costs, external benefits,

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Cigarette Butt Littering in City Streets: A New Methodology for Studying and Results, 22 TOBACCO CONTROL 59, 60 (2013). Suppose half are. Of the roughly 100,000 people who regularly buy cigarettes in San Francisco, perhaps 50,000 dispose of their butts properly in an ashtray. They nonetheless share roughly half of the incidence of the municipal fee, or about $100 per smoker per year. In a city where someone in the lowest quintile of income earns about $12,000 annually, an extra $100 is not trivial.

   163. Jonathan Nash, *Economic Efficiency Versus Public Choice: The Case of Property Rights in Road Traffic Management*, 49 B.C. L. REV. 673, 708–15 (2008) (discussing design choices in road pricing).

deadweight loss, and the interaction with other taxes, labor, and consumption incentives and disincentives for any given activity.

Of course, such a system would only work in a world with perfect political institutions working in the public interest, with costless information and seamless enforcement by saintly revenue agents. In reality, each additional excise tax increases the complexity of the tax system, increases administrative costs, and reduces compliance. There is no free lunch, with or without a fat tax.

In a world where human behavior is complex, information is costly, and political institutions imperfect, our taxing authorities should not be expected to shoulder the burden of social engineering that outstrips our economic and social expertise. A tax on carbon production is the exception, not the rule; Pigovian taxes should generally be avoided.

K. Pigovian Subsidies Aren't Any Better

If the theoretical case for Pigovian taxes is so imperfect, so too is the case for Pigovian subsidies. Why, then, are subsidies so common?

The answer lies in human nature. Arbitrary harms are especially despised, but windfall gains are loved as if they were earned.[164] Much of the effect of Pigovian subsidies is inside the margin, or inframarginal; people are rewarded for behavior that they would have engaged in anyway.[165] Tax subsidies should only be used to achieve social policy goals when the marginal social benefit of engaging in the activity is close to uniform. Few examples in the tax code can survive this analysis.

Tax expenditures are the mirror case to Pigovian taxes. When Congress grants a particular activity a lower rate of tax, it usually does so to encourage a particular behavior that is thought to have social benefits. As with Pigovian taxes, the problem is complicated by variation in the marginal social benefit. For any given beneficial activity, some actors cause more benefit than others.

The home mortgage interest deduction, for example, is usually defended as a subsidy for homeownership.[166] Home ownership may

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164. *See* Hal R. Arkes et al., *The Psychology of Windfall Gains,* 59 ORG. BEHAV. & HUM. DECISION PROCESSES 331, 342–45 (1994). *But see* Christine Hurt, *The Windfall Myth,* 8 GEO. J.L. & PUB. POL'Y 339, 377–93 (2010) (examining the negative perception of others' easily earned or "too-large" profits and the resulting regulatory backlash).

165. *See generally* Gilbert E. Metcalf, *Tax Policies for Low Carbon Technologies*, 62 NAT'L TAX J. 519 (2009) (discussing the inframarginal nature of low-carbon subsidies).

166. Edward L. Glaeser & Jesse M. Shapiro, *The Benefits of the Home Mortgage Interest Deduction* 1–5 (Nat'l Bureau of Econ. Research, Working Paper No. 9284, 2002).

create positive externalities: homeowners may participate in community activities, take better care of their properties, and provide stability to a neighborhood. The effectiveness of the subsidy, however, is questionable. One reason is that the cost of the subsidy—about $89 billion annually—does not affect the margin: most homeowners would have purchased a home with or without the subsidy.[167] There are, of course, some people on the margin who would not have bought but for the tax treatment; to the extent that the subsidy is capitalized into the purchase price, there are more single family homes than would be built in a system without the subsidy.

But we really have no clear picture of which homeowners create social benefits. It seems likely that a subsidy might be better targeted at urban middle class and poor communities where homeownership might substitute for other costly government interventions. Instead, current policy encourages suburban sprawl and geographic immobility. Before the bursting of the housing bubble, there was likely a stronger case for a Pigovian tax on home ownership than a Pigovian subsidy.

Furthermore, Pigovian subsidies in the form of a tax deduction have the perverse effect of assuming that the marginal social benefit increases according to tax bracket. Tax deductions are "upside down" subsidies because the value increases with one's marginal tax rate. If there is variation in marginal social benefit, there is little reason to think that it is the rich, not the poor or middle class, who fail to internalize the benefits of homeownership.[168]

IV. CONCLUSION

The academic enthusiasm for Pigovian taxes outpaces the ability of our political institutions to design and implement taxes. While certain activities remain good candidates for Pigovian taxes—carbon production, congestion charges, and certain other pollutants—we should not substitute glib back-of-the-envelope policy design for the rigorous work our complex social problems demand.

Experience teaches us that Congress, the tax-writing committees, the IRS, industry groups, and others responsible for designing and implementing tax laws are likely to incorporate only a few factors into the design of a tax. Institutional capacity is not infinite.

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167. Dennis J. Ventry, Jr., *The Accidental Deduction: A History and Critique of the Tax Subsidy for Mortgage Interest*, 73 LAW & CONTEMP. PROBS. 233, 277–84 (2010); Gillian Reynolds & C. Eugene Steuerle, *Tax Expenditures: What Are the Largest Tax Expenditures?*, TAX POL'Y CENTER (July 20, 2009), http://www.taxpolicycenter.org/briefing-book/background/expenditures/largest.cfm [http://perma.cc/9JRP-VWB8].

168. Ventry, *supra* note 167, at 277–84.

We should reserve our use of the elegant instruments of Pigovian taxes and subsidies for the small number of activities where it is most likely to deliver the lofty social goals we aspire to achieve.

V. APPENDIX

Selected Pigovian Taxes and Proposals		
Activity	Design	Citation
Environmental Taxes		
Carbon Production	Uniform	Gilbert E. Metcalf & David Weisbach. *The Design of a Carbon Tax*, 33 HARV. ENV. L. REV. 499, 500–02 (2009).
CFCs	Varies according to ozone depletion factor of chemical	I.R.C. §§ 4681–82.
Cigarette Butts	Uniform excise tax	Vima Patel et al., *Cigarette Butt Littering in City Streets: A New Methodology for Studying and Results,* 22 TOBACCO CONTROL 59, 60 (2013).
Animal Food	Varies by food product (Ruminant Meat, Pork, Poultry, Eggs, etc.)	Stefan Wirsenius et al., *Greenhouse Gas Taxes on Animal Food Products: Rationale, Tax Scheme and Climate Mitigation Effects*, 108 CLIMACTIC CHANGE 159, 160 (2011).
Food Taxes		
Fat	Uniform excise tax, by weight on foods with high saturated fat context	Sinne Smed, *Financial Penalties on Foods: The Fat Tax in Denmark*, 37 NUTRITION BULLETIN 142, 142–47 (2012).

Selected Pigovian Taxes and Proposals		
Activity	Design	Citation
High Fructose Corn Syrup	Uniform	Julie Ann Elston, Kenneth R. Stanton, David T. Levy & Zoltan J. Acs, *Tax Solutions to the External Costs of Obesity*, in OBESITY, BUSINESS AND PUBLIC POLICY 171 (Zoltan J. Acs & Alan Lyles eds., 2007).
Salt	Uniform	Fred Kuchler, Abebayehu Tegene & J. Michael Harris, *Taxing Snack Foods: Manipulating Diet Quality or Financing Information Programs?*, 27 APPLIED ECONOMIC PERSPECTIVES AND POLICY 4, 16–19 (2005).
Soda	10% per liter (Mexico)	Sarah Bosely, *Mexico Enacts Soda Tax in Effort to Combat World's Highest Obesity Rate*, THE GUARDIAN (Jan. 16, 2014), http://www.theguardian.com/world/2014/jan/16/mexico-soda-tax-sugar-obesity-health [http://perma.cc/PHT7-T67Y].
Sin Taxes		
Tobacco	Rate varies by product	I.R.C. § 5701 et seq.
Alcohol	Rate varies by product	I.R.C. § 5001 et seq.
Gun Manufacturers and Dealers	Uniform	I.R.C. §§ 5801-5822.
Transfer tax on guns	$200 per gun	I.R.C. § 5811.
Pornography	Proposed uniform excise tax (California)	Legislative Text

Selected Pigovian Taxes and Proposals		
Activity	Design	Citation
Greenmail	50% of income from greenmail	I.R.C. § 5881.
Financial Industry		
Tobin Tax	European Union financial transaction tax (proposed)	Huw Jones, *EU Legal Opinion Opens Door to Tobin Tax on Forex*, REUTERS (Mar. 18, 2014, 3:57PM), http://www.reuters .com/article/2014/03/18/us-eu-tax-bankingidUSBREA2H20B20140318 [http://perma.cc/2W5P-29R6].
SIFIs	0.35% of assets above $500 billion	Camp proposal (legislative text)
Miscellaneous		
Zoning	Varies according to decrease in zoned land value	Michelle J. White, *Suburban Growth Controls: Liability Rules and Pigovian Taxes*, 8 J. LEGAL STUD. 207, 210 (1979).
Executive Pay	Uniform	David I. Walker, *A Tax Response to the Executive Pay Problem*, 93 B.U. L. REV. 325, 368–75 (2013).
Traffic Congestion	Varies by type of vehicle, time of day, location	Alan A. Walters, *The Theory and Measurement of Private and Social Cost of Highway Congestion*, 29 ECONOMETRICA 676, 676–77 (1961).