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ARTICLE

TOWARD A PIGOUVIAN STATE

JONATHAN S. MASUR & ERIC A. POSNER[†]

Most economists believe that the government should impose Pigouvian taxes on firms that produce negative externalities like pollution, yet regulatory agencies hardly ever use their authority to create Pigouvian taxes. Instead, they issue command-and-control regulations. Our major point is that, contrary to the conventional wisdom, regulators typically have legal authority to create Pigouvian taxes—they just do not use it. While regulators may hesitate to impose Pigouvian taxes for a range of political and symbolic reasons, we argue that these reasons do not justify this massive failure of regulatory efficiency. It is time for the regulatory state to take a Pigouvian turn.

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[†] Jonathan Masur is the John P. Wilson Professor of Law and David and Celia Hilliard Research Scholar, University of Chicago Law School. Eric Posner is the Kirkland & Ellis Distinguished Service Professor and Arthur and Esther Kane Research Chair, University of Chicago Law School. We thank Will Baude, Omri Ben-Shahar, Ryan Bubba, Stephen Choi, Ryan Doerfler, Brian Galle, Lee Fennell, Michael Gerrard, William Hubbard, Aziz Huq, Saul Levmore, Richard McAdams, Gillian Metzger, Jennifer Nou, Nathan Richardson, Julie Roin, Karen Bradshaw Schulz, Lior Strahilevitz, David Strauss, Mark Templeton, and David Weisbach, and participants in workshops at the University of Chicago Law School, Columbia Law School, and the 2015 American Law and Economics Association Annual Meeting, for helpful comments and conversations, and Jonathan Hawley, Ellen Murphy, Jullia Park, Paul Rogerson, Paulina Wu, and Morgan Yates for excellent research assistance. Masur thanks the David and Celia Hilliard Fund for research support.

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INTRODUCTION

According to most economists, the optimal form of regulation of firms that produce negative externalities is a tax known as a Pigouvian tax, named

after the English economist, Arthur Pigou.¹ A Pigouvian tax is a tax equal to the harm that the firm imposes on third parties. For example, if a manufacturer pollutes, and the pollution causes a harm of \$100 per unit of pollution to people who live in the area, then the firm should pay a tax of \$100 per unit of pollution. This ensures that the manufacturer pollutes only if the value of the pollution-generating activities exceeds the harm, such that the social value of those activities is positive.

Other forms of regulation are inferior to the Pigouvian tax. Consider command-and-control regulation, in which a regulator forces a firm to take a particular action, such as installing a pollution-reducing scrubber.² Under this form of regulation, the regulator may conduct a cost-benefit analysis to determine whether the benefit of alleviating the pollution for the firm's neighbors is greater or less than the cost to the firm of having to install the scrubbers or take other precautions.³ If scrubbers pass a cost-benefit analysis, then the regulator orders the firm to install them. If they do not pass, the regulator allows the firm to continue its activity unabated. A perfectly conducted cost-benefit analysis should produce results as efficient as a Pigouvian tax, but in a world of administrative costs, command-and-control regulation will be inferior. The reason is that in order to determine the correct command-and-control rule, the regulator must know both the cost and benefit of the activities.⁴ In contrast, the regulator only needs to know the cost of the activity to determine the correct Pigouvian tax. It is not necessary to know the benefit. Thus, as long as regulators make errors (as they unavoidably do), a Pigouvian tax is superior to command-and-control regulation.

¹ See generally Agnar Sandmo, *Direct Versus Indirect Pigouvian Taxation*, 7 EUR. ECON. REV. 337 (1976) (exploring how the Pigouvian tax solution stands up to the theory of optimal taxation in the presence of externalities).

² See *Terminology Services*, U.S. ENVTL. PROT. AGENCY, [http://ofmpub.epa.gov/reports/rwservlet?termepa&report=termReport.jsp&desformat=PDF&p_report_id=11792&p_criteria=\[http://perma.cc/2DZA-MVHD\]](http://ofmpub.epa.gov/reports/rwservlet?termepa&report=termReport.jsp&desformat=PDF&p_report_id=11792&p_criteria=[http://perma.cc/2DZA-MVHD]) (last visited Sept. 19, 2015) (defining "scrubber" as "an air pollution device" that "trap[s] pollutants in emissions").

³ See, e.g., Exec. Order No. 12,291, 3 C.F.R. § 127.2 (1982) (directing agencies to only implement regulations if "the potential benefits to society . . . outweigh the potential costs to society"); Exec. Order No. 12,866, 3 C.F.R. § 638.1 (1994) (instructing agencies "to assess both the costs and benefits of [an] intended regulation" and implement only those for which the benefits outweigh the costs).

⁴ See Brief of Economists Thomas C. Schelling, Vernon L. Smith, and Robert W. Hahn as Amici Curiae in Support of Petitioners at 15, *Chamber of Commerce of the U.S. v. EPA*, 134 S. Ct. 1051 (2014) (No. 12-1272), 2013 WL 6673703, at *14-15 (noting that having to assess both the costs and the benefits to determine the efficacy of a proposed regulation favors moving away from command-and-control regulations).

It would be an understatement to say that economists endorse Pigouvian taxes over command-and-control regulation. Pigouvian taxes are constantly advocated by economists who seek to influence public policy.⁵ Professor Greg Mankiw, a prominent Harvard economist and chairman of the Council of Economic Advisers under President George W. Bush, invited numerous public figures to join his “Pigou Club,” which advocates a Pigouvian tax on gasoline.⁶ Club members include several Nobel laureates with diverse views, including Gary Becker, Paul Krugman, and other prominent journalists, scientists, and politicians.⁷

Yet, turning from the scholarly literature to government practice, one discovers that Pigouvian taxes are used rarely by Congress and almost never by regulators, at least in a self-conscious way.⁸ There is no political support for a Pigouvian tax on gasoline.⁹ And while gasoline taxes do exist, they do not appear to be based on Pigouvian theory;¹⁰ they are not calculated on the basis of an assessment of the social costs of gasoline-powered driving, and they are much too low.¹¹ As far as we have been able to discover, the Environmental Protection Agency (EPA) has never ordered a Pigouvian

⁵ See, e.g., Steven Shavell, *Corrective Taxation Versus Liability as a Solution to the Problem of Harmful Externalities*, 54 J.L. & ECON. S249, S249 (2011) (“The corrective tax has long been viewed by most economists as a, or the, theoretically preferred remedy for the problem of harmful externalities.”). However, Shavell himself criticizes this view, as we discuss *infra*. See also N. Gregory Mankiw, *Smart Taxes: An Open Invitation to Join the Pigou Club*, 35 E. ECON. J. 14, 15 (2009) (“To many economists, the basic argument for increased use of Pigouvian taxes is so straightforward as to be obvious.”).

⁶ Mankiw, *supra* note 5, at 15 (“What I would like to do here is to make the case for increased use of Pigouvian taxation.”).

⁷ Greg Mankiw, *Al Gore in the Pigou Club*, GREG MANKIW’S BLOG (June 24, 2006), <http://gregmankiw.blogspot.com/2006/06/al-gore-in-pigou-club.html> [http://perma.cc/PGD8-44NX] (listing the current members of the Pigou Club).

⁸ See, e.g., Omri Ben-Shahar & Kyle D. Logue, *Outsourcing Regulation: How Insurance Reduces Moral Hazard*, 111 MICH. L. REV. 197, 232-34 (2012) (describing how the government rarely employs Pigouvian taxes as a method of ex ante regulation); David B. Spence & Lekha Gopalakrishnan, *Bargaining Theory and Regulatory Reform: The Political Logic of Inefficient Regulation*, 53 VAND. L. REV. 599, 604-05 (2000) (detailing the growing push for regulatory reform, including the use of Pigouvian taxes); Robert N. Stavins, *Experience with Market-Based Environmental Policy Instruments* (noting that “conventional wisdom” holds that the U.S. has “totally ignored” regulations like Pigouvian taxes), in 1 HANDBOOK OF ENVIRONMENTAL ECONOMICS 355, 362 (Karl Göran Mäler & Jeffrey R. Vincent eds., 2003).

⁹ See Becky Bright, *Many Americans Are Trimming Travel, But Few Car Pool to Cut Fuel Use*, WALL ST. J. (July 7, 2007), <http://www.wsj.com/articles/SB118304470725951593> [http://perma.cc/Y6HB-48MU] (noting that “[o]nly 5 percent of [Americans] polled said they support creating a tax on driving”).

¹⁰ For a summary of the current U.S. approach to gasoline taxes, see Evan N. Turgeon, *Triple-Dividends: Toward Pigouvian Gasoline Taxation*, 30 J. LAND RESOURCES & ENVTL. L. 145, 146-49 (2010).

¹¹ *Id.*

tax. Nor has any other agency. We have been able to find only a few isolated examples of a pure Pigouvian tax in U.S. law.¹² Indeed, we located only twenty references to Arthur Pigou or Pigouvian taxes in the entire history of the Congressional Record.¹³ All but one of these references were general comments on Pigou's work or theories. The lone Pigouvian reference directly involving pending legislation related to a bill that eventually became the Noise Control Act of 1972.¹⁴ That law provides EPA with authority to impose—wait for it—command-and-control regulations governing aircraft noise pollution.

There are laws and regulations that could be rationalized on Pigouvian grounds, and that probably reflect some of the economic theory that underlies the Pigouvian tax. As we noted, gasoline taxes do exist, and while they are not Pigouvian in the sense of being equated to the social cost of driving, they obviously do deter excessive driving on the margins. One can also find examples of usage fees, congestion pricing, and the like, but these are found in contractual settings that are distinguishable from the problem of negative externalities that Pigouvian taxes seek to correct.¹⁵ Tradable-permit regimes also reflect a kind of Pigouvian thinking, and are superior to command-and-control regulation, but as we discuss in Part I, they are inferior to Pigouvian taxation in the pure sense. Moreover,

¹² See *infra* Section I.B.

¹³ By way of comparison, there were also six references to the ship *Pigou*, an Eighteenth-Century vessel (which predates the birth of the economist of the same name) used to transport communications to and from Chief Justice John Jay while he was in London negotiating the Jay Treaty in 1794. The ship was later captured by the French and then became the subject of a lawsuit in the Court of Claims. We have no information regarding any taxes the ship's owners might have paid.

¹⁴ See 42 U.S.C. § 4901 (1996).

¹⁵ See, e.g., Eben Albert-Knopp, Note, *The California Gas Charge and Beyond: Taxes and Fees in a Changing Climate*, 32 VT. L. REV. 217, 219 (2007) (noting that in California, a small fee was placed on gasoline in order to fund alternative fuel and emissions-reduction programs); Michael H. Schuitema, Comment, *Road Pricing as a Solution to the Harms of Traffic Congestion*, 34 TRANSP. L.J. 81, 83 (2007) ("Congestion pricing seeks to aid drivers in making more efficient decisions by making them aware of the true costs of driving."); Laura Barron-Lopez & Keith Laing, *Momentum Builds in Congress for Raising the Federal Gas Tax*, THE HILL (Jan. 9, 2015, 6:01 AM), <http://thehill.com/policy/energy-environment/228986-momentum-seen-in-push-for-gas-tax-hike> [<http://perma.cc/N5SB-7S5S>] (describing talks amongst lawmakers to raise the federal gas tax as a means to fund infrastructure upgrades); *Congestion Pricing*, VA. DEP'T OF TRANSP., http://www.vdot.virginia.gov/info/congestion_pricing.asp (last modified May 14, 2015) [<http://perma.cc/NZ4H-QNBB>] (listing examples of congestion pricing in five states). This is despite the fact that the federal government has explicitly suggested employing user fees in a Pigouvian role. See U.S. GOV'T ACCOUNTABILITY OFF., GAO-08-386SP, FEDERAL USER FEES: A DESIGN GUIDE 2, <http://www.gao.gov/assets/210/203357.pdf> [<http://perma.cc/BH95-Z2MC>] ("If those benefiting from a service do not bear the full social cost of the service, they may seek to have the government provide more of the service than is economically efficient.").

essentially all of the examples we have found of rules that resemble Pigouvian taxes derive from legislation, rather than administrative regulation. So the existence of some laws and regulations that bear a family resemblance to Pigouvian taxation, and reflect some of the economic thinking that motivates Pigouvian taxation, reinforces rather than solves the puzzle of why regulators never, or very rarely, use Pigouvian taxes.

In this Article, we attempt to solve the puzzle. We suggest that the principal reason regulators do not employ Pigouvian taxes is that they do not believe they have the authority to do so under existing law. We then demonstrate that regulators' pessimism is misplaced. Across a variety of regulatory areas covering a vast swath of economic activity, existing regulatory statutes provide regulators with at least plausible authority to use Pigouvian taxes in regulation. If we are correct, this would not be the first time that regulators have discovered such authority where conventional wisdom held that none existed. The Obama Administration's 2014 proposal that states regulate greenhouse gases using cap-and-trade was spurred in part by a Natural Resources Defense Council argument that EPA possessed such authority under section 111(d) of the Clean Air Act.¹⁶ One objective of this Article is to map out similar arguments for Pigouvian taxes across a range of regulatory areas and statutes.

Having concluded that administrative agencies likely have authority to regulate using Pigouvian taxes, we next consider whether there is any compelling reason why they should not or will not be capable of doing so. We canvas five potential objections or hurdles. First, Pigouvian taxes do not solve a significant information problem, which is how the regulator values the harm caused by economic activity. This problem is compounded by the second-best nature of regulation: gasoline taxes, for example, may be inefficient if cars are already over- or adequately regulated.

Second, Pigouvian taxes may lack political support because they do not serve the interests of those with political power. Suppose that laws and regulations typically reflect interest-group compromises, and not the general interest of the public because it is too costly for the public to organize. If so, one would expect regulations that reflect the interests of those groups—industry, unions, and so on. Some types of regulation produce natural interest-group constituencies: the firms that will produce the scrubbers or

¹⁶ See DANIEL A. LASHOF ET AL., NAT. RES. DEF. COUNCIL, CLOSING THE POWER PLANT CARBON POLLUTION LOOPHOLE: SMART WAYS THE CLEAN AIR ACT CAN CLEAN UP AMERICA'S BIGGEST CLIMATE POLLUTERS 7 (2013), <http://www.nrdc.org/air/pollution-standards/files/pollution-standards-report.pdf> [<http://perma.cc/9VTN-KC4Z>] ("Section 111 of the Clean Air Act gives EPA the responsibility to set emission performance standards for categories of stationary sources that contribute to dangerous air pollution.").

other technologies that the regulation will mandate. Command-and-control regulation will also sometimes serve the interests of regulated parties by serving as a high barrier to new market entrants. Pigouvian taxes possess neither of these features, at least not to the same degree.

Third, Pigouvian taxes have negative symbolic resonance. For the right, they are unattractive because they are “taxes,” which people on the right oppose. For the left, they are unattractive because they seem to put a price on intrinsically valuable goods like human life and the environment, and because they seem to permit a firm to commit ongoing harm so long as it is willing to pay a fee. In contrast, tradable permits are more attractive to the right because they seem to create markets, while command-and-control regulation is more attractive to the left because it seems to avoid pricing intrinsically valuable goods and bans harmful activity outright.

Fourth, Pigouvian taxes breach the divide between taxation and regulation, which is firmly entrenched in the institutional organization of the U.S. government. We suspect that in the minds of many government officials, only Congress can tax—regulators cannot.

Fifth, risk-averse regulators whose personal interests diverge from the public interest might see no advantage to regulatory innovation. From their perspective, the gain from employing a more efficient system of Pigouvian taxes may be outweighed by the risk of initiating regulatory action outside of the mainstream, which may provoke criticism by people suspicious of innovation.

These theories may, individually or in the aggregate, help to explain why regulators have refused to create or even experiment with Pigouvian tax systems. But from a normative perspective, none of the theories provides an acceptable reason for sticking to command-and-control regulation. We thus conclude that Congress and regulators *should* implement Pigouvian taxes. And because Congress has already delegated vast discretionary power to regulators and today seems stymied by gridlock, we direct our argument to the executive branch. We argue that just as the executive branch, starting in 1981, ordered regulators to use cost–benefit analysis to evaluate regulations,¹⁷ it can order regulators to implement Pigouvian taxes. Indeed (as we explain below), Pigouvian taxes are usually the most efficient means of regulation and so would be required by cost–benefit analysis. In a sense we are just urging the executive branch to follow through on its commitment to cost–benefit analysis by subjecting the mode of regulation, as well as the decision to regulate, to a cost–benefit test.

¹⁷ See Exec. Order No. 12,291, *supra* note 3; Exec. Order No. 12,866, *supra* note 3.

In Part I of this Article, we discuss the theory of Pigouvian taxation and explain why economists endorse it. In Part II, we provide a focused survey of the legal and regulatory landscape. In particular, we examine some of the most economically significant areas of regulation in which Pigouvian taxation is most clearly called for by economic theory. In Part III, we consider objections to implementing Pigouvian taxes. The conclusion is a call to Pigouvian arms.

I. PIGOUVIAN TAXES IN THEORY AND PRACTICE

A. *The Theory of Pigouvian Taxes*

The idea of the Pigouvian tax is at the center of economic approaches to public policy. Government intervention in the market is generally assumed to be justified when the market fails. A common type of market failure is the negative externality—a cost imposed on third parties by the activity of an individual or firm. If people can engage in an activity that benefits themselves and harms others, without being liable for the harm to others, then they will engage in an excessive amount of that activity relative to the social optimum.¹⁸ In order to deter people from engaging in excessive amounts of activity, they must be forced to bear the cost to others.

To illustrate, suppose a factory produces widgets. The factory also emits pollution into the atmosphere. The smoggy air depresses housing prices and harms the health of those who breathe it. If the factory is unregulated, it will produce too many widgets relative to the social optimum. The reason is that the factory seeks to maximize profits, and to maximize profits it will set the marginal cost (the cost of the last widget) equal to the marginal benefit (the price paid by buyers). As the factory produces more widgets, marginal costs normally increase and marginal benefits normally decline; the number

¹⁸ For some recent, lucid accounts of the standard economic justification for Pigouvian taxes, see CASS R. SUNSTEIN, *RISK AND REASON* 270-71 (2002) (noting how such taxes have dramatically increased government revenues around the world); Victor Fleischer, *Curb Your Enthusiasm for Pigouvian Taxes* 9-14 (San Diego Legal Studies, Paper No. 14-151, 2014), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2413066 [<http://perma.cc/2V75-H66F>]; David A. Weisbach, *Instrument Choice is Instrument Design* 6-10 (Univ. of Chi. Law & Econ., Working Paper No. 490, 2009), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1493312 [<http://perma.cc/WV2R-NK9P>]. For a classic statement, see WILLIAM J. BAUMOL & WALLACE E. OATES, *ECONOMICS, ENVIRONMENTAL POLICY, AND THE QUALITY OF LIFE* 230-45 (1979). For a textbook treatment, see TOM TIETENBERG & LYNNE LEWIS, *ENVIRONMENTAL ECONOMICS & POLICY* 253-54 (3d ed. 2001) (discussing the conditions under which Pigouvian taxes should be used). See also Jonathan B. Wiener & Barak D. Richman, *Mechanism Choice* (same), in *RESEARCH HANDBOOK ON PUBLIC CHOICE AND PUBLIC LAW* 363, 367-68 (Daniel A. Farber & Anne Joseph O'Connell eds., 2010).

of widgets it produces will be the point where the two curves cross. The factory will ignore the cost incurred by neighbors. By contrast, social welfare is maximized only if the marginal benefit of the widget is set equal to the social cost of production, which includes the harm to the neighbors. Because the social cost is higher than the factory's marginal cost, the factory will produce too many widgets.

The Pigouvian tax is a tax equal to the amount of money necessary to ensure that the firm produces the socially optimal number of widgets. If the factory must pay a tax equal to the harm that each unit of production causes to the neighbors, then the factory will be forced to take into account the social cost. The harm to the neighbors now plays a role in the factory's profit maximization. To maximize profits, the firm produces up until the marginal benefit equals the marginal cost to the factory plus the social cost to the neighbors. Thus, the factory produces fewer widgets, the number equal to the socially optimal number.

Other instruments can also be used to ensure that the factory produces the socially optimal number of widgets. For example, if a regulator performs a cost-benefit analysis, it can in principle determine the optimal number of widgets and order the factory to produce just that number of widgets. Many commentators favor tradable permit schemes, under which firms are given permits to pollute, which they can then sell (if they engage in low levels of production) or buy (if they engage in high levels of production).¹⁹ However, neither approach is superior to Pigouvian taxes. The problem with cost-benefit analysis is that the regulator must know both the benefits and the costs of production.²⁰ By contrast, to set Pigouvian taxes, the regulator only needs to know the costs. Thus, Pigouvian taxation should produce fewer errors. In addition, Pigouvian taxes are dynamic and technology-forcing in a way that command-and-control regulation, coupled with cost-benefit analysis, can rarely be. Regulators can only perform a cost-benefit analysis with respect to extant technology, materials, and processes—a regulator cannot estimate the cost of a technology that has not yet been invented. Proposed regulation might fail a cost-benefit test based on the state of existing technology, whereas a

¹⁹ For an overview of the debate and empirical evidence, see Tom Tietenberg, *The Tradable-Permits Approach to Protecting the Commons: Lessons for Climate Change*, 19 OXFORD REV. ECON. POL'Y 400 (2003).

²⁰ See Brief of Economists, *supra* note 4, at 15 ("Uncertainty—as to costs and benefits—increases the difficulty for regulators seeking to judge whether a policy gives rise to net benefits to society.").

Pigouvian tax could give firms incentives to develop new technologies that would control pollution or other externalities more cheaply.²¹

The inferiority of cap-and-trade schemes is subtler. A cap-and-trade scheme is similar to a Pigouvian tax; the difference is that for cap-and-trade systems the government sets the aggregate quantity of production rather than the price. To set the aggregate quantity of production, it needs the same information that it needs to set the tax—the social costs of the activity. However, cap-and-trade systems are more vulnerable to uncertainty about costs than Pigouvian taxes are, and Pigouvian taxes are often easier to design and implement.²² For these reasons, most economists prefer Pigouvian taxes under most conditions.²³ However, we do not take the position that Pigouvian taxes are always superior to cap-and-trade; rather, we argue that Pigouvian taxes are plausible regulatory instruments, and often likely to be superior, in a range of circumstances.

Another common alternative to Pigouvian taxes is the liability system. Rather than require the factory to pay a Pigouvian tax to the government, the government could simply make the factory liable in tort to the victims. If the tort system requires the factory to pay victims an amount equal to their harm, then the effect of the liability system is similar to that of a Pigouvian tax. However, there is an important distinction: under a liability system the “tax” is paid to the victim, while a Pigouvian tax is paid to the government. As is well known, the problem with using the liability system is that payment to the victims will create perverse incentives on the part of the victims to engage in excessive activity.²⁴ The liability system is also beset by numerous procedural and practical limitations, including the

²¹ Relatedly, cost-benefit analysis is often accused of overstating the costs of regulation because it fails to account for technological innovation. See, e.g., Douglas A. Kysar, *Politics by Other Meanings: A Comment on “Retaking Rationality Two Years Later,”* 48 HOUS. L. REV. 43, 59-60 (2011).

²² See Weisbach, *supra* note 18, at 1-2 (analyzing the choice between taxes and cap-and-trade systems and concluding that taxes should be the favored method for controlling greenhouse gas emissions).

²³ See Louis Kaplow & Steven Shavell, *On the Superiority of Corrective Taxes to Quantity Regulation*, 4 AM. L. & ECON. REV. 1, 2 (2002) (“[T]he traditional notion of the superiority of corrective taxes should continue to be a benchmark for economists’ thinking about the control of externalities.”); Martin L. Weitzman, *Prices vs. Quantities*, 41 REV. ECON. STUD. 477, 477 (1974) (“[I]t is a fair generalization to say that the average economist in the Western marginalist tradition has at least a vague preference towards indirect control by prices”); Edward Nell, Willi Semmler & Armon Rezai, *Economic Growth and Climate Change: Cap-and-Trade or Emission Tax?* (Schwartz Ct. for Econ. Pol’y Analysis & Dep’t of Econ., The New Sch. For Soc. Research, Working Paper Series, Working Paper No. 2009-4, 2009) http://www.economicpolicyresearch.org/images/docs/research/climate_change/SCEPA%20Working%20Paper%202009-4.pdf [<http://perma.cc/9VFK-KFBP>] (last visited Sept. 19, 2015) (using economic theories by Pigou and Coase to argue that taxes should be preferred over market oriented schemes).

²⁴ See generally STEVEN SHAVELL, FOUNDATIONS OF ECONOMIC ANALYSIS OF LAW (2004).

difficulty of aggregating many small claims when the activity imposes small losses on a large number of people. Perhaps for this reason, with limited exceptions, the liability system is focused not on activity-level issues, but instead on ensuring that people take care or use sufficient precautions.²⁵

Finally, a more fundamental objection to Pigouvian taxes comes from Ronald Coase's classic article, *The Problem of Social Cost*.²⁶ Coase attacked Pigouvian taxes because they do not take into account the possibility of bargaining.²⁷ Consider the example of the factory that pollutes and causes harm to neighboring residents. According to Coase, the neighbors could pay the factory to reduce pollution; if they do so, the socially optimal level of taxation is achieved without the necessity of government intervention in the form of a tax.²⁸ And if (as seems likely) the government may err in setting the tax, then the outcome will be inferior to one that is reached through bargaining.

While bargaining may produce better outcomes in certain contexts, it is not a substitute for Pigouvian taxes in general regulatory settings. The Coasean solution would require thousands or even millions of people who are harmed by pollution to pay the factory if the factory is granted the entitlement. These people would need to coordinate with each other and act through an agent or bargain directly with the factory; neither is practical. If the entitlement were given to the property owners, they would need to bring lawsuits to defend their property rights. Normally that will be impossible as well, because the cost of a lawsuit exceeds an individual's share of potential damages.

Coase also pointed out that Pigouvian taxation abstracts away from the reciprocal nature of social costs.²⁹ Consider again the factory and the residents. While it is possible that the optimal outcome is for the factory to shut down, install scrubbers, or take some other action to reduce pollution, it is also possible that the optimal outcome is for the factory to do nothing and for the residents to change their behavior—to move away or to wear

²⁵ For these and related reasons, Shavell argues that the liability system is superior to Pigouvian taxes for many activities traditionally governed by liability rules, such as operating heavy machinery and shoveling sidewalks. See Shavell, *supra* note 5, at S258-61. The liability system takes into account the level of care of the relevant parties, and may also lead to more accurate determinations of the harm caused by an activity. *Id.*

²⁶ R. H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

²⁷ *Id.* at 31.

²⁸ *Id.* at 42.

²⁹ See *id.* at 2 ("We are dealing with a problem of a reciprocal nature. To avoid the harm to B would inflict harm on A. The real question that has to be decided is: should A be allowed to harm B or should B be allowed to harm A?").

breathing masks, for example. Thus, a Pigouvian tax on the factory might produce an inefficient outcome.³⁰

But this argument is not so much an objection to Pigouvian taxation *per se* as it is another reason for preferring a bargaining solution when bargaining is possible. When bargaining is not possible, the government faces the choice between Pigouvian taxation, command-and-control regulation, no regulation, and so on. There are various ways the government can account for Coase's point. For example, if it determines that the residents can more cheaply avoid the harm than the factory can, it can simply decline to impose a tax on the factory. While the setting of Pigouvian taxes will never be simple, it will, for the reasons we have given, be simpler and more reliable than the alternative of using command-and-control regulations.

B. Existing Pigouvian Taxes

The government does not use Pigouvian taxes very often, but they are not unheard of.³¹ There are a number of instances in which a tax is addressed to an externality of one form or another. Perhaps the best example of a Pigouvian tax we have found is the Ozone Depleting Chemicals Tax (ODC), which was implemented by Congress in 1989 in order to comply with the Montreal Protocol.³² The ODC applies to the sale or use of ozone-depleting chemicals and is assessed at a rate proportional to their potential for depleting the ozone layer.³³ Similarly, in the wake of the *Exxon Valdez* oil spill in 1989, Congress created an oil pollution fund, called the Oil Spill Liability Trust Fund, to provide compensation to those who

³⁰ This assumes that the Pigouvian tax will be set equal to the harm the activity imposes on residents, which is the standard approach. Ideally, a policymaker might set the Pigouvian tax equal to the lesser of the harm imposed on residents or the cost to residents of mitigating that harm. Such a solution would eliminate the potential for inefficient outcomes. However, this would require the regulator to assemble a great deal of information—not just the harm from the factory's activities, but also the residents' mitigation costs—which replicates the disadvantage of cost-benefit analysis relative to Pigouvian taxes.

³¹ We limit our consideration to situations in which the government acts as a regulator, rather than a property owner. If the government leases a building it owns, or if it requires that private citizens pay for parking at a parking meter, we do not count these as Pigouvian taxes. The distinction is to some extent arbitrary, but it serves to highlight the degree to which regulators do not consider Pigouvian taxes to be within their regulatory toolkits.

³² See Bruce Pasfield & Elise Paeffgen, *How to Enforce a Carbon Tax: Lessons from the Montreal Protocol and the U.S. Experience with the Ozone Depleting Chemicals Tax*, 14 VT. J. ENVTL. L. 389, 393, 395 (2013).

³³ *Id.* at 395-96; see also Dana Clark & David Downes, *What Price Biodiversity? Economic Incentives and Biodiversity Conservation in the United States*, 11 J. ENVTL. L. & LITIG. 9, 35 (1996).

have suffered losses or damages due to an oil spill.³⁴ The Fund is primarily funded by a tax of five cents per barrel of oil produced and imported to the United States. In addition, the Surface Mining Control and Reclamation Act, which was passed in order to mitigate the negative effects of coal mining on the environment, imposes a tax on the extraction of coal from domestic mines.³⁵ Congress has employed a similar mechanism in the context of copyright infringement: importers of digital audio recording devices and blank recording media must pay royalties of two percent,³⁶ which are then distributed to copyright owners whose copyrights have been violated by unauthorized recordings.³⁷ With respect to these latter two taxes, though the tax is meant to address the social cost of the taxed activity, we have been unable to find any indication that Congress actually attempted to calculate that social cost and set the tax equal to it. Accordingly, it is difficult to know whether to consider these to be true Pigouvian taxes.

As these examples illustrate, it is not always apparent whether a tax is Pigouvian or not. Many taxes are used to raise revenue, not to deter socially undesirable conduct.³⁸ Some taxes both raise revenue and deter socially undesirable conduct. The government may impose a tax on activities that create negative externalities without trying to ensure that the tax equals the negative externality. So as we provide additional examples of Pigouvian taxes, one should keep in mind that these examples, like the initial ones, provide only rough and limited evidence that governments think in Pigouvian terms.

Various states have implemented waste disposal taxes that operate loosely as Pigouvian taxes. North Carolina, for example, imposes an excise tax on the disposal of municipal solid waste or construction and demolition debris in any landfill.³⁹ A number of states, including New York and Washington, have run similar “pay-as-you-throw” programs for the past several decades.⁴⁰ These programs charge customers based on the amount of

³⁴ See generally George M. Chalos, *A Practical Guide to the Oil Spill Liability Trust Fund Claim Submission Procedures*, 3 U. DENV. WATER L. REV. 80 (1999); John M. Woods, *Going on Twenty Years—The Oil Pollution Act of 1990 and Claims Against the Oil Spill Liability Trust Fund*, 83 TUL. L. REV. 1323 (2009).

³⁵ Clark & Downes, *supra* note 34, at 36.

³⁶ 17 U.S.C. § 1004(a) (2012).

³⁷ *Id.* § 1006(a).

³⁸ For a discussion of the functions of taxes as opposed to penalties, see Robert D. Cooter & Neil S. Siegel, *Not the Power to Destroy: An Effects Theory of the Tax Power*, 98 VA. L. REV. 1195 (2012).

³⁹ See N.C. GEN. STAT. § 105-187.61 (2014).

⁴⁰ David H. Folz & Jacqueline N. Giles, *Municipal Experience with “Pay-as-You-Throw” Policies: Findings from a National Survey*, 34 ST. & LOC. GOV’T REV. 105, 105-15 (2002).

solid waste that they discard.⁴¹ Some states and localities, including California and Washington, D.C., have also recently imposed surcharges on plastic bags from retailers based on the bags' propensity to end up as litter. These charges are akin to Pigouvian taxes and are occasionally referred to as such.⁴² For instance, Washington, D.C. imposes a five-cent charge on paper and plastic bags at all food and liquor retailers.⁴³

Deposit-refund systems function similarly. A deposit-refund system is one in which a consumer pays an upfront tax for a good and then receives a refund when that good is returned.⁴⁴ The five- or ten-cent redemption value on beverage containers in many states is the canonical example of such a system.⁴⁵ Like a tax on plastic bags, deposit-refund systems are meant to control pollution from discarded goods such as plastic bottles and thus operate roughly as Pigouvian taxes.⁴⁶

In addition, state workers' compensation systems bear a family resemblance to Pigouvian taxes, in that employers are forced to internalize the costs of accidents that occur in their workplaces.⁴⁷ In its most common form, workers' compensation functions as an alternative to the tort system for employees within the scope of their employment. If an employee is injured while on the job, she can collect damages from a state workers' compensation agency in lieu of suing her employer in tort. Workers' compensation is no-fault—the employee need not prove that the injury was due to an unsafe working condition—and compensation is determined based on a fixed schedule.⁴⁸ The system is funded by fees paid by employers, and those fees are determined by the amount of payments made to that employer's employees.⁴⁹ The more unsafe the workplace, the more that employer will be forced to pay. A workers' compensation system thus

⁴¹ *Id.* at 105.

⁴² See Jennie R. Romer & Shanna Foley, *A Wolf in Sheep's Clothing: The Plastics Industry's "Public Interest" Role in Legislation and Litigation of Plastic Bag Laws in California*, 5 GOLDEN GATE U. ENVTL. L.J. 377, 382-85 (2012).

⁴³ Annie Gowen, *D.C. Bags Wasteful Shopping Habit with Tax on Paper and Plastic*, WASH. POST (Jan. 2, 2010), <http://www.washingtonpost.com/wp-dyn/content/article/2010/01/01/AR2010010101673.html> [<http://perma.cc/74V6-6SYD>].

⁴⁴ Margaret Walls, *Deposit-Refund Systems in Practice and Theory* (Res. for the Future, Discussion Paper 11-47, 2011), <http://www.rff.org/RFF/Documents/RFF-DP-11-47.pdf> [<http://perma.cc/9EN5-9JLC>].

⁴⁵ *Id.*

⁴⁶ *Id.*

⁴⁷ ALA. CODE § 25-5 (2014); CONN. GEN. STAT. ANN. § 31-284 (West 2013); 820 ILL. COMP. STAT. ANN. 305/1 (West 2012); N.J. STAT. ANN. § 34:15-1 (West 2014).

⁴⁸ That is, each type of injury (or death) is assigned a fixed dollar amount, and employees who suffer that injury receive the fixed amount without reference to their individual conditions.

⁴⁹ See, e.g., ALA. CODE § 25-5-293(g) (2014).

mimics a Pigouvian tax by forcing employers to internalize the harms they impose upon their workers. It does so more directly and effectively than the tort system because employers are more likely to have to make workers' compensation payments and do so with respect to a higher percentage of injuries than they would if they were governed only by the tort system. Even small workers' compensation claims are typically asserted and processed because it is much less administratively costly to file and pursue a workers' compensation claim than to bring a tort lawsuit.

At the same time, workers' compensation is only an imperfect proxy for a Pigouvian tax because it is not fault-based. Workers' compensation measures the total amount of harm that befalls employees as a result of both unsafe conditions and their own negligence (or overly high activity levels). It thus accounts for more than just the risk created by employers, which is the "externality" that matters in the context of workplace safety (this means that employees will not necessarily have incentives to take efficient precautions, unlike under a well-calibrated Pigouvian tax). At the same time, payouts from workers' compensation are generally lower than what an employee would receive in a tort lawsuit based on the same harm.⁵⁰ It is possible, then, that the overall payments made by employers in a worker's compensation system are roughly equivalent to what they would pay in optimal Pigouvian taxes on the same workplace conditions. Payouts for accidents that are not the fault of the employer could be balanced by lower awards. If this is the case, however, it would be a matter of coincidence (and an unlikely one at that).

More importantly, even if an employer paid an amount of money roughly equivalent to an optimal Pigouvian tax on dangerous workplace conditions, workers' compensation does not create the same efficient incentives for employers as a Pigouvian tax. Like a Pigouvian tax, workers' compensation creates incentives for employers to reduce injuries by forcing them to internalize the costs of those injuries. But because workers' compensation applies to injuries caused by employees as well as employers, it creates incentives for employers to try to reduce their employees' negligence as much as their own. An employer might expend resources attempting to reduce the number of employee-generated accidents, even if the employer is not the lowest-cost avoider of such accidents. And if the employer has limited resources to spend on safety, expenditures on preventing employee-generated accidents could crowd out expenditures on

⁵⁰ Filing a workers' compensation claim involves a tradeoff for the worker between speed, certainty of payment, lower administrative costs, and the lack of obligation to prove employer fault, against the higher reward amount she would receive from a successful tort lawsuit.

reducing hazardous conditions of the employer's own making. These caveats should not obscure the fact that workers' compensation bears a relatively close resemblance to a Pigouvian tax, even though it was not created for that reason.

Lastly, gas taxes have often been thought of as Pigouvian, but as we described in the introduction, they are much too low and bear little relation to the social cost of driving. Relatedly, in 1978 Congress enacted a "gas-guzzler excise tax" on automobiles with fuel efficiencies below 22.5 miles per gallon.⁵¹ There is a Pigouvian element to this tax, as it is meant to target the types of vehicles that impose the greatest social costs. Yet the tax has relatively little correspondence to the actual amount of environmental harm that is being done. Someone who drives 20,000 miles per year in a fuel-efficient car imposes far greater environmental externalities than someone who drives 2,000 miles per year in an inefficient one. The fuel efficiency of the automobile is a weak proxy for the overall level of social harm.

The Pigouvian taxes we have found are notable for their rarity: amidst thousands of regulatory actions, both administrative and legislative, few could be characterized as Pigouvian taxes, and even fewer appear to be properly calibrated to match the social cost of the taxed activity. Moreover, all of these Pigouvian taxes were created legislatively rather than via regulation. This only deepens the puzzle as to why regulators have not employed Pigouvian taxes with greater frequency. We address that issue in the next Part.

II. AGENCY AUTHORITY AND THE ABSENCE OF PIGOUVIAN TAXES

Over the past forty years, federal administrative agencies have become the locus of U.S. regulatory activity. They have promulgated thousands of regulations aimed at mitigating externalities. Yet, as far as we are able to tell, not one of these regulations has taken the form of a Pigouvian tax. Few prior scholars have considered why this might be, but the few to have done so have generally concluded that agencies simply lack the authority to regulate by Pigouvian tax.⁵² Agencies are thought to have the power to require that firms meet certain standards, employ particular types of technology or business practices, obtain permits, submit to inspections or

⁵¹ Clark & Downes, *supra* note 34, at 37.

⁵² See, e.g., Janet E. Milne, *Environmental Taxation in the United States: The Long View*, 15 LEWIS & CLARK L. REV. 417, 426 (2011) ("[I]n the legislative branch of the federal government, environmental committees within Congress have jurisdiction over environmental matters, while tax-writing committees have jurisdiction over 'revenue measures.' The tax writers are therefore in the position of controlling environmental policies executed through the tax code.").

report information, train employees in particular ways, or engage in any number of other types of activities related to the nature of the business. But the imposition of Pigouvian taxes, or anything that looks like a Pigouvian tax, is not thought to be among this suite of powers.

In this Part, we will refute that conventional wisdom. Numerous agencies, operating under a wide range of organic statutes and regulating a wide swath of the economy, have the authority to implement Pigouvian taxes. Because we have limited space and resources, we will examine a representative sample of notable statutes that have led to significant regulations across several areas of economic activity. In each case, we will demonstrate that a plausible reading of the agency's controlling statute would permit the agency to enact regulation that functions as a Pigouvian tax.

A. *The Clean Air Act*

We begin with the Clean Air Act, a statute that has spawned a vast number of economically significant regulations.⁵³ The Clean Air Act provides EPA with authority to regulate any type of air pollutant with the capacity to cause harm to human health or welfare.⁵⁴ The Clean Air Act is traditionally (and almost unanimously) understood to give EPA the authority to set “technology standards”—in other words, to define what types of technology firms must use to control pollution. The legal standards most commonly associated with the Clean Air Act—firms must install the “best available control technology” (BACT), or “reasonably available control technology” (RACT)—seem to invoke the idea that the statute empowers the agency to set technological standards. Indeed, this was the common public understanding regarding EPA regulation of greenhouse gases.⁵⁵ During President Obama's first term in office, when legislative

⁵³ Since the beginning of the Reagan administration, EPA has produced a greater number of regulations than any other administrative agency (or cabinet department). See Anne Joseph O'Connell, *Political Cycles of Rulemaking: An Empirical Portrait of the Modern Administrative State*, 94 VA. L. REV. 889, 925-926 (2008) (depicting all reported rulemaking activities of the fifteen cabinet departments, as well as thirty-two executive and independent agencies, including EPA, FTC, and SEC). The Clean Air Act is only one of several statutes under which EPA regulates, but it is the primary one.

⁵⁴ 42 U.S.C. §§ 7401-7626 (2012).

⁵⁵ See Dallas Burtraw et al., *Greenhouse Gas Regulation Under the Clean Air Act: A Guide for Economists* (Res. for the Future, Discussion Paper No. 11-08, 2011), <http://www.rff.org/documents/RFF-DP-11-08.pdf> [<http://perma.cc/567K-8L6E>]; Chris Lau, *Bottom Line on Regulating Greenhouse Gases Under the Clean Air Act*, WORLD RES. INST. (May 2009), <http://www.wri.org/publication/bottom-line-regulating-greenhouse-gases-under-clean-air-act> [<http://perma.cc/ZMY3-U7AF>]; see also *Events Leading to Regulation of Greenhouse Gases Under the Clean Air Act*, CTR. FOR CLIMATE & ENERGY SOLUTIONS (Dec. 2012), <http://www.c2es.org/publications/sequence-events-leading-regulation->

action seemed possible, discussion of greenhouse gas regulation included consideration of cap-and-trade systems and even Pigouvian taxes.⁵⁶ During President Obama's second term, when it became clear that regulation would occur through EPA action via the Clean Air Act, the public consensus was that EPA would mandate that factories stay within particular greenhouse gas emissions limits.⁵⁷ This is known as "command-and-control regulation," and it is usually positioned as the default option, to which market-based regulations such as cap-and-trade or Pigouvian taxes are alternatives.

The consensus understanding of the Clean Air Act is incorrect. The Clean Air Act actually provides EPA with multiple different routes for establishing a type of Pigouvian tax. We will survey the most important of these statutory options.

1. National Ambient Air Quality Standards

First, EPA has the authority under section 110 of the Clean Air Act to set National Ambient Air Quality Standards (NAAQS), which limit the quantity of a pollutant in the ambient air to the extent "requisite to protect the public health."⁵⁸ Consistent with their description, these air quality standards concern the quantity of a pollutant in the air or the extent to which individuals will be exposed to that pollutant, *not* a particular type of technology that must be used to control pollution.⁵⁹ They are ambient air standards, not technology standards.

Following the promulgation of a NAAQS, the states, rather than the federal government, are charged with reducing pollution to EPA's mandat-

greenhouse-gases-through-epa [<http://perma.cc/926Q-NDJ4>] (noting that EPA's new program will require power plants and manufacturing facilities to "implement 'best available control technologies' for pollution abatement").

⁵⁶ Matt Negrin, *Whatever Happened to Cap and Trade?*, ABC NEWS (July 17, 2012), <http://abcnews.go.com/Politics/OTUS/environment-happened-cap-trade-global-warming/story?id=16790018> [<http://perma.cc/PN64-TWCS>].

⁵⁷ See Robert Barnes, *Supreme Court: EPA Can Regulate Greenhouse Gas Emissions, with Some Limits*, WASH. POST (June 23, 2014), http://www.washingtonpost.com/politics/supreme-court-limits-epas-ability-to-regulate-greenhouse-gas-emissions/2014/06/23/c56fc194-f1b1-11e3-914c-1fbd0614e2d4_story.html [<http://perma.cc/8J2Q-CJUD>] (discussing *Utility Air Regulatory Group v. EPA*, in which the Supreme Court held that the Clean Air Act gave EPA the authority to regulate major sources of greenhouse gas emissions); Coral Davenport, *Obama to Introduce Sweeping New Controls Aimed at Ozone*, N.Y. TIMES (Nov. 25, 2014), http://www.nytimes.com/2014/11/26/us/politics/obama-to-introduce-sweeping-new-controls-on-ozone-emissions.html?_r=0 [<http://perma.cc/E268-6EET>] (discussing the Obama administration's expected release of a "contentious and long-delayed" environmental regulation to reduce ozone).

⁵⁸ 42 U.S.C. § 7409(a)-(b) (2012).

⁵⁹ See 42 U.S.C. § 7410(a) (permitting states to craft their own plans for implementation, maintenance, and enforcement of NAAQS instead of mandating the use of certain technology).

ed levels. States are required to submit “state implementation plans” (SIPs) that outline the measures the states will take to reach the mandated air quality levels.⁶⁰ If a state fails to create such a plan, if the plan is judged inadequate by EPA, or if the plan fails to produce the requisite degree of reduction in pollution, EPA may intercede and instead implement a “[f]ederal implementation plan” (FIP) designed to meet the NAAQS.⁶¹

The Clean Air Act contains no limitations on the types of measures that state (or federal) implementation plans may employ. To the contrary, the Clean Air Act explicitly contemplates a wide range of regulatory modalities, including what appear to be Pigouvian taxes and cap-and-trade systems. The Act states that each plan shall “include enforceable emission limitations and other control measures, means, or techniques (including economic incentives such as fees, marketable permits, and auctions of emissions rights)”⁶² The phrase “other control measures, means, or techniques” clearly encompasses a tax system that had the effect of limiting emissions; the word “fee” in the parentheses reinforces this interpretation, as a tax is a kind of fee. Indeed, EPA has used this language to create emissions trading programs, including a program governing interstate air pollution that the Supreme Court blessed in 2014.⁶³ Yet despite the equally plain invocation of taxes, neither the states nor EPA have used Pigouvian taxes.

2. Regulation of Stationary Sources

EPA also possesses separate authority to regulate “stationary sources”—factories and power plants, for the most part—contained in section 111 of the Clean Air Act.⁶⁴ This section of the Clean Air Act delegates to the EPA the authority to establish “standards of performance” governing both new and existing stationary sources.⁶⁵ Here again, the Clean Air Act is commonly thought to require technology-based command-and-control regulation, but that perception is misguided. The statute defines a “standard of performance” as

⁶⁰ *Id.* § 7410(a)(1).

⁶¹ *Id.* § 7410(c).

⁶² *Id.* § 7410(a)(2)(A).

⁶³ See *EPA v. EME Homer City Generation, L.P.*, 134 S.Ct. 1584, 1610 (2014) (“EPA’s cost-effective allocation of emission reductions among upwind States, we hold, is a permissible, workable, and equitable interpretation of the Good Neighbor Provision.”).

⁶⁴ 42 U.S.C. § 7411 (2012).

⁶⁵ *Id.* § 7411(b), (d) (2012). This section is commonly thought to confer authority over new sources, § 111(b), but it also provides authority over existing sources, § 111(d), as the recent greenhouse gas regulations indicate.

[A] standard for emissions of air pollutants which reflects the degree of emission limitation achievable through the application of the best system of emission reduction which (taking into account the cost of achieving such reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.⁶⁶

A standard of performance is thus an “emission limitation”—a limit on how much of a pollutant a given stationary source may release into the air.⁶⁷ EPA’s emission limit must be feasible, or “adequately demonstrated” in the language of the statute.⁶⁸ And it must be feasible in light of the best “system of emission reduction” that is currently available.⁶⁹ But once EPA has established such a limitation on pollution, there are no strictures on the type of regulatory mechanism EPA or the states may use to meet the pollution standard.⁷⁰ EPA could employ Pigouvian taxes, as well as cap-and-trade systems or any other type of pollution reduction plan. The Obama Administration’s proposed regulation of greenhouse gases, with which we began this Article, takes advantage of precisely this flexibility.⁷¹ The Administration proposes to regulate greenhouse gases under this provision of the statute—section 111(d), to be precise—and has offered state regulators a menu of options regarding what type of regulation to employ, including the possibility of cap-and-trade systems. It is surprising that, to our knowledge, this is the first time that proposed regulation under section 111 of the Clean Air Act has involved anything other than purely technological command-and-control.⁷²

3. Hazardous Air Pollutants

EPA has separate authority to regulate “hazardous air pollutants” directly under section 112 of the Clean Air Act.⁷³ This section of the Act contains a list of chemicals known to be dangerous to human health or to

⁶⁶ *Id.* § 7411(a)(1) (2012).

⁶⁷ *Id.*

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ *See supra* Introduction.

⁷² There have of course been other non-command-and-control environmental measures, such as the cap-and-trade system for the sulphur oxides (SO_x) and nitrogen oxides (NO_x) that cause acid rain. *See generally* 42 U.S.C. § 7651 (2012). But these measures, as well as the Pigouvian taxes we described in Part I, have been implemented legislatively rather than through regulation.

⁷³ 42 U.S.C. § 7412 (2012).

the environment and authorizes EPA to add to the list any chemical it discovers to be similarly dangerous.⁷⁴ As with other sections of the Clean Air Act, EPA is then delegated authority to make regulations setting “emissions standards” governing the emissions of those chemicals into the air.⁷⁵ Similarly, these emissions standards are described not in technological terms but as limitations on the amount of the chemical that may be released:

Emissions standards promulgated under this subsection and applicable to new or existing sources of hazardous air pollutants shall require the maximum degree of reduction in emissions of the hazardous air pollutants subject to this section (including a prohibition on such emissions, where achievable) that the Administrator . . . determines is achievable for new or existing sources⁷⁶

Setting this standard requires EPA to determine what is “achievable.”⁷⁷ The Clean Air Act describes in broad terms the regulatory methods that EPA may use in making that determination. In determining what standards are achievable, EPA may consider “measures, processes, methods, systems or techniques including, but not limited to, measures which—(A) reduce the volume of, or eliminate emissions of, such pollutants through process changes, substitution of materials or other modifications”⁷⁸

Of course, a Pigouvian tax is precisely a system that leads to reductions in the volume of emissions through “process changes, substitution of materials or other modifications.”⁷⁹ If Congress had intended to preclude the use of such measures and force EPA to regulate only with respect to certain technologies, it could easily have used much narrower language. This section of the Clean Air Act is thus best understood to contemplate that EPA may set an emissions standard with reference to the use of a Pigouvian tax or similar measure.

4. Regulating Through Taxation

The most significant legal hurdle in imposing a Pigouvian tax under any of these three sections of the Clean Air Act concerns the manner in which

⁷⁴ *Id.* § 7412(b).

⁷⁵ *Id.* § 7413(d).

⁷⁶ *Id.* § 7412(d)(2).

⁷⁷ *Id.*

⁷⁸ *Id.*

⁷⁹ *Id.* § 7412(d)(2)(A).

EPA would go about collecting a tax. The Act contains no bar to such a tax, no requirement that only technological standards may be used, and even seems to specifically contemplate the use of Pigouvian taxes or similar measures. At the same time, EPA does not have the authority to levy “taxes” by that name. Rather, the Clean Air Act affords the agency three remedial options against polluters: (1) EPA may refer a polluter to the Attorney General for criminal prosecution;⁸⁰ (2) it may commence a civil suit in federal district court;⁸¹ or (3) it may, after an administrative proceeding, assess fines.⁸² EPA’s power to employ these remedies is triggered when a polluter exceeds an EPA emission standard or fails to comply with a State (or Federal) Implementation Plan.⁸³

A court could interpret the language of the Clean Air Act as sufficiently capacious to permit EPA to establish a Pigouvian tax directly. This seems most plausible under section 109, the section setting National Ambient Air Quality Standards,⁸⁴ and section 110, the section requiring the states (or EPA, if the states fail) to design implementation plans to meet them.⁸⁵ Under section 110, a state or federal plan could simply be a Pigouvian tax, and the state (or EPA) could then operate and enforce that tax as it would any other type of plan. There is no barrier to this regulatory route, and as we noted above, the Clean Air Act seemed to contemplate it explicitly. If the regulated polluters within a state failed to pay the tax, EPA could enforce it via civil or criminal litigation.⁸⁶

The path to a Pigouvian tax under section 111 (stationary source regulation) or section 112 (hazardous air pollutants) is more circuitous. Under the plain text of these sections, EPA must regulate by limiting emissions to some achievable level. If a regulated entity exceeds that level, EPA may assess administrative fines or initiate litigation.⁸⁷ When EPA is using standard command-and-control regulation, the agency sets the emissions limitation at whatever quantity of the pollutant it believes a source should be allowed to emit. Accordingly, EPA will only attempt to

⁸⁰ *Id.* § 7413(a)(3)(D).

⁸¹ *Id.* § 7413(a)(1)(C).

⁸² *Id.* § 7413(d).

⁸³ *Id.* § 7413(a).

⁸⁴ *Id.* § 7409.

⁸⁵ *Id.* § 7410.

⁸⁶ *Id.* §§ 7413(a)(1)(C), (3)(d).

⁸⁷ It is of course possible that a court would read section 110 of the Clean Air Act to require the same procedure, but for the reasons described above, we believe that this would be a flawed reading of the statute.

collect a fine (or worse) from the regulated entity if it does not comply with that limitation.

Under a system of Pigouvian taxes, however, the idea would be for a polluter to pay a small amount of money for every incremental amount of a pollutant that it releases. For example, a coal-fired electrical plant that produced carbon dioxide might be forced to pay \$25 per ton of CO₂ that it releases.⁸⁸ In order to implement a Pigouvian tax under these sections of the Clean Air Act, the EPA would:

- (1) Set an emissions limitation at or near zero emissions;
- (2) Set the fine that scales with the amount of pollution in excess of the limitation, so that it is equal to the desired level of Pigouvian tax; and
- (3) Initiate an administrative proceeding against every polluter in order to collect the appropriate taxes (fines).

The third of these steps would be procedurally costly but nonetheless feasible. The only issue at such a proceeding would be the amount of a given pollutant being released into the ambient air, which is a quantity that should be readily knowable and relatively straightforward to establish.⁸⁹ The EPA could also design more abbreviated procedures for assessing and collecting taxes that nonetheless afford the necessary procedural protections to regulated entities and permit them an opportunity to contest EPA's findings before a neutral magistrate, which courts have required.⁹⁰

The second of these steps would be straightforward and is even contemplated by the text of the Clean Air Act. The Act states that EPA should set the fine for noncompliance with an emissions limitation at "no less

⁸⁸ Jonathan S. Masur & Eric A. Posner, *Climate Regulation and the Limits of Cost-Benefit Analysis*, 99 CALIF. L. REV. 1557, 1580 (2011).

⁸⁹ One small wrinkle is that the Clean Air Act only permits EPA to regulate polluters directly, rather than regulating the inputs to pollution. In general, in some cases it might be more efficient to regulate a source or input to pollution that occurs up the production chain from the polluter itself. For instance, economists have suggested that the most efficient means of implementing a carbon tax would be to tax fossil fuels when they are extracted from the ground, rather than taxing the emitter of carbon dioxide. The tax would be applied to the lump of coal or the barrel of oil, rather than to the electrical power plant or the automobile. The reason is that points of extraction are generally larger in size and fewer in number, making it less costly to administer the tax. This might not be possible under the Clean Air Act. However, even with respect to such pollutants, a nonideal Pigouvian tax might be well superior to EPA's best command-and-control alternative.

⁹⁰ See, e.g., *Tenn. Valley Auth. v. Whitman*, 336 F.3d 1236, 1243 (11th Cir. 2003) (holding that the Clean Air Act violates the Due Process Clause and the separation-of-powers principle).

than the economic value” of the excess pollution.⁹¹ That “economic value” is precisely the level at which an optimal Pigouvian tax should be set.⁹²

It is the first of these steps that may in some cases prove difficult. Whatever emissions limitation EPA sets under section 111 or 112 must be “achievable.”⁹³ EPA has typically interpreted this to mean that the limitation must be “economically feasible,” in the sense that complying with the regulation would not lead to massive job loss or bankrupt the entire industry.⁹⁴ In earlier work, we criticized the “feasibility” test and argued that EPA and other agencies should employ cost–benefit analysis instead.⁹⁵ Nevertheless, it is quite clear that EPA can regulate pursuant to a feasibility standard if it so wishes, and regulation along those lines has repeatedly been upheld in court.

Accordingly, EPA could argue that the regulation it means to impose—which involves an emissions limitation of zero but a low penalty for noncompliance—passes the feasibility test because the agency does not intend that regulated firms will actually comply with the zero emissions limitation. Rather, the EPA anticipates that many firms will violate the limitation and pay manageable “fines” (taxes, really) in the appropriate amount. The regulation would also pass a cost–benefit test, as all properly designed Pigouvian taxes are meant to. The regulation will not necessarily cause greater economic harm to the industry than a less stringent regulation with much higher penalties for noncompliance, which a court would bless as feasible.

This is a very practical reading of the Clean Air Act. EPA would be entitled to *Chevron* deference were it to create such regulations,⁹⁶ and so it is likely that a court would allow such a regulation.⁹⁷ But it is possible that an overly literalist court would interpret the Clean Air Act to require (unambiguously) that an emissions limitation be feasible if polluters were strictly to comply with it, rather than treating the limitation in context with its accompanying penalty. If this were the case, then EPA could only set an emissions limitation of zero when it would be possible for emitters of the

⁹¹ 42 U.S.C. § 7420(d)(2)(A) (2012).

⁹² *Id.*

⁹³ *Id.* §§ 7411(a)(1); 7412(d)(2) (2012).

⁹⁴ Jonathan S. Masur & Eric A. Posner, *Against Feasibility Analysis*, 77 U. CHI. L. REV. 657, 691 (2010) [hereinafter Masur & Posner, *Against Feasibility*].

⁹⁵ *Id.* at 712.

⁹⁶ See *Chevron U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 844 (1984) (ruling that where legislative delegation to an agency on a particular issue is implicit rather than explicit, a court may not substitute its own construction of the statutory provision for a reasonable interpretation made by the administrator of an agency).

⁹⁷ *Cf. Util. Air Regulatory Grp. v. EPA*, 134 S.Ct. 2427, 2448 (2014) (granting *Chevron* deference to EPA’s choice of remedial structure under the Clean Air Act).

pollutant in question to actually reduce their emissions to zero without causing massive unemployment or widespread bankruptcies within the affected industry.⁹⁸ Such a dramatic reduction would be feasible with respect to a great number of pollutants. EPA regularly considers total bans on certain types of pollutants⁹⁹ and has implemented complete bans with respect to some pollutants in the past.¹⁰⁰ Such a ban is even plausible with respect to the most currently salient pollutant, carbon dioxide, where carbon-free energy sources such as solar and wind have been adequately demonstrated.¹⁰¹

Where a complete ban is not economically feasible, and where a court decides to read the Clean Air Act in the most literal fashion possible, EPA might be forced to opt for what might be described as a semi-Pigouvian tax. The agency would set a baseline emissions limitation above zero, at the lowest level deemed feasible. The agency would then “tax” (fine) polluters for every unit of pollution released above this baseline.¹⁰² In some cases such a system might permit inefficiently high levels of pollution and turn out to be inferior to standard command-and-control regulation; in other cases, where the baseline can be set quite low, it could function effectively if it creates appropriate incentives at the margin. The EPA could evaluate this on a pollutant-by-pollutant basis. The upshot is that Pigouvian taxes may not be workable or advisable for some types of pollutants under some circumstances, if courts were to interpret particular provisions of the Clean

⁹⁸ Masur & Posner, *Against Feasibility*, *supra* note 96, at 686.

⁹⁹ *See id.* at 681 (discussing EPA’s exploration of a “totally chlorine free” option).

¹⁰⁰ *See* 42 U.S.C. § 767ii (2012) (prohibiting the sale or distribution of chlorofluorocarbons and hydrochlorofluorocarbons).

¹⁰¹ *See* Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 79 Fed. Reg. 34,829, 34,834 (June 14, 2014) (to be codified at 40 C.F.R. pt. 60) (finding that solar and wind technologies are “adequately demonstrated”). Separately, some scholars have suggested that the Federal Energy Regulatory Commission (FERC) might have the authority to impose what amounts to a Pigouvian tax on carbon produced via electrical generation under its authority to set electricity rates. *See* STEVEN WEISSMAN & ROMANY WEBB, ADDRESSING CLIMATE CHANGE WITHOUT LEGISLATION: HOW THE FEDERAL ENERGY REGULATORY COMMISSION CAN USE ITS EXISTING LEGAL AUTHORITY TO REDUCE GREENHOUSE GAS EMISSIONS AND INCREASE CLEAN ENERGY USE 7 (Berkeley Ctr. for Law, Energy, & the Env’t 2014), https://www.law.berkeley.edu/files/CLEE/FERC_Report_FINAL.pdf [<http://perma.cc/D5PY-KRW3>].

¹⁰² EPA may want to use a baseline above zero even for standard Pigouvian taxes in order to avoid the administrative hassles of collecting small taxes from small polluters. *Cf. Util. Air Regulatory Grp.*, 134 S.Ct. at 2442-43 (describing the costs involved in forcing every carbon dioxide emitter to obtain a permit). EPA regularly establishes a threshold demarcating only de minimis emissions, below which it does not regulate. *See* Ala. Power Co. v. Costle, 636 F.2d 323, 360 (D.C. Cir. 1979) (upholding EPA authority to elect to regulate only emissions that are more than de minimis); Prevention of Significant Deterioration of Air Quality, 40 C.F.R. § 51.166(b)(2)(i) (2012).

Air Act in an especially literalist fashion. But these limited pockets in which the EPA could not properly implement Pigouvian taxes do not explain the utter absence of any attempt by the EPA over the past four decades to regulate air quality using Pigouvian taxes or any other type of economic mechanism.

Of course, because neither the EPA nor any state agency has ever attempted to regulate using a Pigouvian tax, no court has ever adjudicated whether the statute is in fact capacious enough to permit one. Nonetheless, as we have explained here, the plain text and what precedents exist would seem to support such a reading.

Lest our reading of the Clean Air Act seem dubious, we hasten to point out that the EPA created emissions trading regimes (e.g., cap-and-trade) decades ago with even less textual statutory authority. Many observers believe that EPA emissions trading programs begin and end with the sulfur oxide and nitrogen oxide programs implemented under the Clean Air Act Amendments of 1990.¹⁰³ Those amendments also produced the language regarding “enforceable emission limitations and other control measures . . . (including economic incentives such as fees, marketable permits, and auctions of emissions rights)” referenced above.¹⁰⁴ In fact, during the 1980s the EPA created a number of emissions trading programs without this language or any other obvious statutory warrant.¹⁰⁵ The most notable of these programs was a cap-and-trade system for lead content in gasoline.¹⁰⁶ So far as we can determine, these programs were never challenged in court. Of course, emissions trading programs and Pigouvian taxes are not the same thing—that is partly our point. But the fact that the EPA believed it possessed the authority to regulate other than by command-and-control, without explicit statutory warrant, is indicative of similar authority to employ Pigouvian taxes.

¹⁰³ See, e.g., Richard Schmalensee & Robert N. Stavins, *The SO₂ Allowance Trading System: The Ironic History of a Grand Policy Experiment 2* (MIT Ctr. for Energy and Env'tl. Policy Res., Working Paper No. 2012-012, 2012), <http://web.mit.edu/ceepr/www/publications/workingpapers/2012-012.pdf> [<http://perma.cc/2VMZ-PZ6F>]; Gar Lipow, *Emissions Trading: A Mixed Record, with Plenty of Failures*, GRIST (Feb. 20, 2007), <http://grist.org/article/emissions-trading-a-mixed-record-with-plenty-of-failures/> [<http://perma.cc/6GYJ-EEXW>]; Robert N. Stavins et. al., *The US Sulphur Dioxide Cap and Trade Programme and Lessons for Climate Policy*, VOXEU (Aug. 12, 2012), <http://www.voxeu.org/article/lessons-climate-policy-us-sulphur-dioxide-cap-and-trade-programme> [<http://perma.cc/5DYT-8K26>].

¹⁰⁴ 42 U.S.C. § 7410(a)(2)(A) (2012).

¹⁰⁵ For a discussion of these programs, see generally Robert W. Hahn & Gordon L. Hester, *Where Did All the Markets Go? An Analysis of EPA's Emissions Trading Program*, 6 YALE J. REG. 109 (1989).

¹⁰⁶ *Id.* at 153.

There is one additional hurdle to Pigouvian regulation of this type. A number of existing laws and regulations trigger additional penalties for any emitter found to be in violation of EPA regulations. For instance, any firm found in violation of the Clean Air Act is barred from contracting with the government.¹⁰⁷ Some states will refuse to issue permits for mining or other environmentally sensitive activities to any firm in violation of environmental laws and regulations.¹⁰⁸ Private citizens could also independently bring suit against violators of the Clean Air Act and Clean Water Act, seeking damages above what the EPA would normally impose under a Pigouvian tax.¹⁰⁹ If the EPA is forced to regulate such that any emission above zero is technically considered a violation, even an emitter that is properly paying its Pigouvian taxes could run into these and other legal problems.

These are not trivial considerations, but they are not insurmountable. The federal government could alleviate problems related to contracting or other violations of federal law simply by declining to enforce those provisions as a matter of prosecutorial discretion. In fact, it appears that the government already regularly declines to enforce these laws.¹¹⁰ State laws could be preempted by EPA regulations and overridden under the Supremacy Clause.¹¹¹ Citizen suits are a bit trickier, but the EPA could always argue to a court that it was “diligently prosecuting” the violation pursuant to its own regulatory policy, depriving private citizens of the right to bring suit.¹¹² Courts would likely defer to this policy choice under *Chevron*.¹¹³

¹⁰⁷ See 42 U.S.C. § 7606 (2012); Federal Acquisition Regulations System, 48 C.F.R. § 9.402(a) (2010) (“Agencies shall solicit offers from, award contracts to, and consent to subcontracts with responsible contractors only.”); Rena Steinzor & Anne Havemann, *Too Big to Obey: Why BP Should Be Debarred*, 36 WM. & MARY ENVTL. L. & POL’Y REV. 81, 85 (2011) (describing how statutes such as the Clean Air and Clean Water Acts trigger automatic disqualification for contractors who are found to have engaged in prohibited conduct and how federal agencies may exclude entities from contracting with or receiving assistance from the federal government pursuant to administrative rules).

¹⁰⁸ See, e.g., 225 ILL. COMP. STAT. ANN. 720/3.20, 2.07–2.08 (2015); ILL. ADMIN. CODE tit. 62, § 1774.15(c)(1)(B) (2010).

¹⁰⁹ 42 U.S.C. § 7604 (2012).

¹¹⁰ See Steinzor & Havemann, *supra* note 109, at 85.

¹¹¹ U.S. CONST. art. VI, cl. 2.

¹¹² 42 U.S.C. § 7604(b)(1)(B) (2012).

¹¹³ See *Chevron U.S.A., Inc. v. Nat. Res. Def. Council, Inc.*, 467 U.S. 837, 843 (1984).

B. *The Clean Water Act*

The Clean Water Act provides the EPA with the authority to regulate the discharge of water-borne pollutants from a wide variety of sources, including industrial and municipal sources. Like the Clean Air Act, the Clean Water Act is widely viewed as authorizing “technology-based” regulation.¹¹⁴ This characterization is slightly more appropriate as applied to the Clean Water Act than the Clean Air Act. Nevertheless, as we will demonstrate, the Clean Water Act similarly provides ample opportunity for regulators to use Pigouvian taxes in lieu of standard command-and-control regulation.

Like the Clean Air Act, the Clean Water Act provides multiple mechanisms through which the EPA can regulate the discharge of water-borne pollutants. We will canvas the most important ones.

1. Existing Point Sources

The Clean Water Act provides the EPA with blanket authority to regulate all water-borne pollutants that emanate from “point sources”—factories, residences, and even boats and other vehicles.¹¹⁵ Similar to the Clean Air Act, the Clean Water Act charges the EPA with specifying “effluent limitations”—limits on the quantity of the pollutant that may be released into the water.¹¹⁶ Importantly, however, the Clean Water Act states that in setting effluent limitations EPA “shall require application of the best available technology [“BAT”] economically achievable”¹¹⁷ (or the “best practicable control technology” (“BPCT”),¹¹⁸ depending upon the type of pollutant and the circumstance). This is in contrast to the Clean Air Act, which requires that EPA set emissions limitations at a level “achievable through the application of the best system of emission reduction.”¹¹⁹ There is a potentially significant distinction between the two statutes: while the Clean Air Act requires only that the emissions limitation be set at a level that could be achieved by application of a particular type of technology, the Clean Water Act appears to indicate that EPA “shall require application” of the technology itself. To a greater degree than the Clean Air Act, the Clean

¹¹⁴ See, e.g., DANIEL A. FARBER, JODY FREEMAN, & ANN E. CARLSON, CASES AND MATERIALS ON ENVIRONMENTAL LAW 701 (8th ed. 2010) (explaining how EPA sets standards according to currently available technology).

¹¹⁵ 33 U.S.C. § 1311(b)(1)(A) (2012).

¹¹⁶ *Id.*

¹¹⁷ *Id.* § 1311(b)(2)(A)(i) (emphasis added).

¹¹⁸ *Id.* § 1311(b)(1)(A)(i).

¹¹⁹ 42 U.S.C. § 7411 (2012).

Water Act may be understood by courts to require explicitly technology-based regulation.

This is not how the EPA has regulated in the past, however. Many EPA regulations are phrased in terms of effluent limitations—the quantity of the pollutant released—even though they are understood to refer to a particular type of technology.¹²⁰ Thus, EPA might find that an effluent limitation of *X* parts per million is feasible based upon a particular existing technology. It would then mandate that polluters meet the standard of *X* parts per million but without requiring that they adopt that particular technology.¹²¹ Courts have routinely upheld these regulations as permissible under the Clean Water Act.¹²²

In order to establish a Pigouvian tax, EPA would—as with the Clean Air Act—set an emissions limitation at or near zero and then fine polluters who exceed that level. This again raises the question of whether a court will view an emissions limitation of zero as meeting the statutory requirement of the “best practicable control technology” or the “best available technology economically achievable.” That is, will a limitation of zero be seen as too stringent? Courts have held that under these statutory frameworks, EPA must consider the costs of its regulations.¹²³ As we explained above, we think that a court would understand that a regulation imposing an effluent limitation of zero would be “practicable” and “economically achievable” in light of the low fines and the fact that the agency does not expect all polluters to fully comply. In fact, when an agency has imperfect information about the BAT or BPCT, a Pigouvian tax will often induce regulated entities to adopt effluent reduction technology that meets the statutory standard. Under these circumstances, a Pigouvian tax will be more

¹²⁰ See, e.g., Centralized Waste Treatment, 40 C.F.R. § 437 (2003) (regulating effluent limitations on centralized waste treatment point sources considering the “best practicable control technology currently available”); Airport Deicing, 40 C.F.R. pt. 449 (2013); Pulp and Paper Reg. Cluster Rule, 63 Fed. Reg. 18504-18751 (Apr. 15, 1998) (establishing discharge limits for pulp and paper production in accordance with the best available technology economically achievable); 63 Fed. Reg. 42238-42240 (Aug. 7, 1998) (correcting minor errors in the pulp and paper regulation).

¹²¹ EPA seems to view it as somewhat unseemly for the government to mandate that private parties purchase a particular type of technology. Nonetheless, many regulations are promulgated with a particular technology in mind. We address the ramifications of this in Part III below.

¹²² See *Am. Petrol. Inst. v. EPA*, 787 F.2d 965, 974 (5th Cir. 1986) (upholding EPA regulations controlling the amount of pollutants discharged from offshore drilling); *Am. Meat Inst. v. EPA*, 526 F.2d 442, 466 (7th Cir. 1975) (upholding regulations limiting toxic discharge from slaughterhouses and packinghouses).

¹²³ See *Rybachek v. EPA*, 904 F.2d 1276, 1289 (9th Cir. 1990) (ruling that EPA did consider the mining company’s cost); *Weyerhaeuser Co. v. Costle*, 590 F.2d 1011, 1036-37 (D.C. Cir. 1978) (ruling that EPA regulations limiting discharges from mills must consider various economic factors in order to be within the bounds of “best practicable” regulations).

effective at producing the correct level of pollution reduction than a standard command-and-control regulation. This is a good reason for courts to favor Pigouvian taxes, or at least to permit them. It is also at least plausible that even a formalist court would approve an arrangement setting an effluent limitation at or near zero for certain chemicals where EPA can demonstrate that feasible technology exists to eliminate all pollutant discharges. Courts have approved zero effluent limitations in the past.¹²⁴

As with the Clean Air Act, there is one final issue: regulated parties would face additional penalties under current regulations if they fall out of compliance with governing EPA regulations promulgated under the Clean Water Act.¹²⁵ EPA will have to take steps to ensure that Pigouvian taxpayers in good standing are not penalized as though they were failing to abide by EPA rules.¹²⁶

2. New Sources

EPA has separate authority to regulate water pollution emanating from “new sources” that have been constructed or brought on line since the passage of the Clean Water Act.¹²⁷ The Clean Water Act treats new sources more strictly than existing sources, which are governed by the provisions discussed immediately above. With respect to new sources, EPA has the authority to set “standard[s] for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants.”¹²⁸

This statutory section differs from EPA’s more general authority over existing sources of pollution in two important ways. First, it is not technology-focused in the same way. The statute references the best available technology but does not suggest that EPA must mandate this technology as part of the standard. Rather, the “standard for the control of the discharge of pollutants” is tied to “the greatest degree of effluent

¹²⁴ See, e.g., *Chem. Mfrs. Ass’n v. EPA*, 870 F.2d 177, 263 (5th Cir. 1989) (suggesting that a zero discharge rule may be appropriate).

¹²⁵ See *supra* Section I.A.; 33 U.S.C. § 1368 (2012) (regulating government contracting); 33 U.S.C. § 1365 (2012) (authorizing citizen suits).

¹²⁶ See, e.g., 33 U.S.C. § 1365(b)(1)(B) (noting that no private citizen can bring suit against someone in violation of the Clean Water Act or regulations if EPA is “diligently prosecuting” the violation).

¹²⁷ 33 U.S.C. § 1316 (2012).

¹²⁸ *Id.* § 1316(a)(1).

reduction.” The result is ambiguity regarding whether the standard must be structured in terms of a type of technology or an effluent limitation.

Second, the statute permits more stringent regulation. A standard based upon the “best available demonstrated control technology” is stricter than one based upon the “best practicable control technology” or the “best available technology economically achievable,” which are the standards governing existing sources.¹²⁹ The statute even explicitly contemplates an effluent limitation of zero pollution. This should facilitate EPA imposition of an effluent limitation of zero for purposes of creating a Pigouvian tax.

3. Toxic Pollutants

Finally, EPA has separate authority to regulate pollutants that have been designated as toxic.¹³⁰ Under this section, each toxic pollutant “shall be subject to effluent limitations resulting from the application of the best available technology economically achievable”¹³¹ Though this section of the Clean Water Act uses language that again differs slightly from other parts of the statute, it resembles the statutory section governing existing sources in significant respects. The effluent limitations chosen by EPA are meant to “result [] from the application” of pollution-controlling technology, suggesting that regulation should specifically incorporate a mandate to install a particular type of technology.¹³² The “best available technology economically achievable” language is also identical to the language governing existing sources.¹³³ Accordingly, the above analysis of Pigouvian taxes for existing effluent sources should apply here as well.

All told, there would undoubtedly be hurdles to any EPA attempt to regulate certain types of pollutants and certain types of sources with Pigouvian taxes. But these complications, which are neither insurmountable nor ubiquitous, can hardly explain the complete absence of any regulations styled as Pigouvian taxes or, to our knowledge, any serious attempt to regulate using Pigouvian taxes. For such an explanation we must look elsewhere.

¹²⁹ FARBER, ET. AL, *supra* note 116, at 600 (“[N]ew sources are regulated more stringently than existing sources . . .”).

¹³⁰ 33 U.S.C. § 1317 (2012).

¹³¹ *Id.* § 1317(a)(2).

¹³² *Id.*

¹³³ *Id.*

C. Financial Regulation

We next turn to financial regulation. Although commentators do not typically discuss financial regulation in terms of Pigouvian taxation, Pigou's theory applies to financial regulation just as it does to environmental regulation.¹³⁴ Financial institutions, like factories, generate negative externalities, and will not reduce their activity to the socially optimal level unless forced to do so by regulators.

1. Negative Externalities in Finance

a. *The Risk of a Panic*

Banks and other financial institutions frequently fund themselves through very short-term debt, including debt that is due on demand. Commercial banks heavily rely on deposit accounts, where customers park funds for short periods in return for interest and checking services, and can also withdraw those funds at any time. Commercial banks and other financial institutions—including investment banks—also fund themselves through the repo market. In this market, large institutions, like pension funds, make short-term (one- or two-day) collateralized loans that are routinely rolled over. “Withdrawing” effectively occurs when the lender refuses to roll over a loan because it prefers to invest those funds elsewhere.

Short-term debt creates a negative externality.¹³⁵ When a depositor or other short-term lender withdraws money, it increases the probability that the borrower will not have enough funds to pay other lenders when the loans are due or demanded. Those lenders will not be able to recover in full because of bankruptcy. To protect themselves, lenders may withdraw funds in response to other lenders withdrawing their funds, leading to a run. The firm may be forced to sell assets into a declining market, resulting in losses. If firms are shut down, then real value consisting of the firm's private information and contacts may be lost.¹³⁶ And if the collapse of one firm

¹³⁴ There are a number of exceptions. For a general discussion in Pigouvian terms, see Douglas A. Shackelford et al., *Taxation and the Financial Sector* (Pub. Law & Legal Theory Research Paper Series, Working Paper No. 10-30, 2010), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1601330 [<http://perma.cc/3NLY-4EBV>]. We cite another example, *infra* at note 138.

¹³⁵ For a discussion with citations to the literature, see Eric A. Posner, *How Do Bank Regulators Determine Capital Adequacy Requirements*, 82 U. CHI. L. REV. (forthcoming Summer 2015) (explaining the causes and mechanisms in place that contribute to regulatory failures in the financial market).

¹³⁶ See generally Mark Gertler & Nobu Kiyotaki, *Financial Intermediation and Credit Policy in Business Cycle Analysis*, in HANDBOOK OF MONETARY ECONOMICS (Ben M. Friedman & Michael Woodford eds., 2011); Olivier Jeanne & Anton Korinek, *Managing Credit Booms and Busts: A Pigouvian*

leads to the collapse of other firms, resulting in a full-blown contagion of the sort seen in 2008, the sudden massive withdrawal of credit from the economy can cause severe macroeconomic effects, including unemployment.

The government tries to deter runs by requiring banks to offer FDIC insurance to depositors and by acting as a lender of last resort.¹³⁷ The idea is that if short-term lenders know that the government will protect them, they are less likely to jump the gun and withdraw. However, government insurance creates a new problem in the form of moral hazard. Because financial institutions expect to be rescued, they will take greater risk, enjoying the upside if the risk pays off and transferring the loss to the government if it does not. Moreover, even if deposit insurance were correctly priced, or creditors adequately monitored financial institutions, every institution would still create a negative externality from risk-taking behavior by increasing the probability of default and losses to other institutions, which could in turn trigger a system-wide collapse with negative effects for the economy.¹³⁸

As John Cochrane has argued, the simplest response to this problem is a Pigouvian tax.¹³⁹ Every time a bank borrows \$100, there is a tiny increase in the risk of a run that could result in a financial crisis.¹⁴⁰ Although the risk is tiny, the losses associated with financial crisis are huge, so the tax itself may well be substantial. Cochrane suggests a tax of five percent—meaning that the bank would be required to pay \$5 to the government for every \$100 it borrows, with the precise amount depending on various factors including the maturity of the debt.

With the Pigouvian tax in place, the bank would borrow on the short-term debt market only when its private gains exceed the social costs—the private cost of paying interest to the creditor plus the expected social cost of a run. If the cost is too high, the bank will either lend less money, or raise money on the equity markets. Because equity investors have no right to payment, an equity investment does not raise the risk of a run. Cochrane believes that a Pigouvian tax would reduce banks' reliance on short-term debt, which should create a safer banking system and a lower risk of financial crises.

Taxation Approach 33-34 (Nat'l Bureau of Econ. Research, Working Paper No. 16377, 2010), <http://www.nber.org/papers/w16377> [<http://perma.cc/8V3Z-4U2Z>]; John H. Cochrane, *Toward a Run-Free Financial System* 11-14 (Apr. 16, 2014) (unpublished manuscript), http://faculty.chicagobooth.edu/john.cochrane/research/papers/run_free.pdf [<http://perma.cc/9YBC-ALPD>].

¹³⁷ Cochrane, *supra* note 138, at 33.

¹³⁸ Jeanne & Korinek, *supra* note 138, at 33.

¹³⁹ Cochrane, *supra* note 138, at 19.

¹⁴⁰ *Id.*

b. *Races to Information*

A second example of the social cost of financial activity is the problem of “races,” first identified by Jack Hirshleifer.¹⁴¹ The value of an asset is a function of information about the various factors that affect the supply and demand of that asset. For example, the price of oil depends on information about the prospect of war in the Middle East or the likelihood of continued economic prosperity in China. When new information about events like these comes into existence, market participants will scramble to be the first to trade on the information.

To understand why, suppose that a barrel of oil currently trades at \$100. A terrorist attack destroys a pipeline in an obscure part of the world and raises the possibility of additional disruption of the oil supply. When the market learns of the attack, the price of oil will rise to \$105. Any person who learns about the terrorist attack first, can buy oil (or oil futures or other derivatives) at \$100 and reap a quick profit of \$5 per barrel by selling when the price rises.

The prospect of such profits will encourage investors to spend money to obtain information about events before others. Investors have spent vast sums to construct fiberoptic cables that increase the flow of information by nanoseconds. For example, Spread Networks, a high-speed trading firm, paid \$300 million to build cables from New York to Chicago so that they could trade on the Chicago exchange using New York information microseconds before the market learned the information.¹⁴² Investors have purchased and leased buildings close to exchanges for the same reason.¹⁴³

This activity is socially wasteful.¹⁴⁴ To see why, consider first why it is valuable for information to spread at a relatively speedy rate. If terrorism is

¹⁴¹ See generally Jack Hirshleifer, *The Private and Social Value of Information and the Reward to Inventive Activity*, 61 AM. ECON. REV. 561 (1971) (highlighting the problem with races, and how use of superior information can lead to the detriment of the public good); see also Itzhak Gilboa et al., *Utilitarian Aggregation of Beliefs and Tastes*, 112 J. POL. ECON. 932, 935 (2004) (arguing that institutions where contradictions between beliefs and taxes exist, society should not endorse free choice).

¹⁴² See Nick Baumann, *Too Fast to Fail: Is High-Speed Trading the Next Wall Street Disaster?*, MOTHER JONES (Jan./Feb. 2013), <http://www.motherjones.com/politics/2013/02/high-frequency-trading-danger-risk-wall-street> [<http://perma.cc/VZ3M-ANNM>] (discussing the explosion of firms like Spread); see also SPREAD NETWORKS, <http://spreadnetworks.com/> [<http://perma.cc/8XYF-J66F>] (last visited Sept. 19, 2015) (providing a general overview of Spread’s business activities).

¹⁴³ Baumann, *supra* note 144, at 6.

¹⁴⁴ There is a large amount of literature on this. See, e.g., Mao Ye, Chen Yao & Jiading Gai, *The Externalities of High Frequency Trading* (2013) (unpublished manuscript) http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2066839 [<http://perma.cc/RVQ5-G53V>] (discussing the implications of competition in speed and proposing strategies for improvement); Andrei A. Kirilenko et al., *The Flash Crash: The Impact of High Frequency Trading on an Electronic Market* (2014) (unpublished manuscript) http://papers.ssrn.com/sol3/papers.cfm?abstract_id

increasing, then oil will become more expensive because it will be harder to produce and ship. If the market learns this information quickly, then airlines, trucking companies, consumers, and others can quickly adjust by engaging in alternative activities—for example, by relying more on electricity. However, the key point is that the broader market will not benefit at all if information about terrorism, as embodied in market prices, reaches them a nanosecond quicker than it otherwise does. Thus, high-speed investors incur expenses in a socially wasteful race.

This problem can be addressed with a Pigouvian tax. The economist James Tobin famously advocated just such a tax, now known as a Tobin tax, on financial transactions.¹⁴⁵ Because high-speed traders make tiny profits on numerous trades, a tax on each trade would deter them from much of their wasteful activity. But because the Tobin tax is low, it will not deter valuable financial transactions.

c. *Speculation on Asset Prices*

A third social cost of financial activity is the problem of gambling or “speculation.”¹⁴⁶ Financial transactions are different from transactions in the “real economy” because they involve a pure transfer of money instead of the exchange of money for goods or services. When one person buys an asset from another—say, a share of stock—the buyer gains at the seller’s expense or the seller gains at the buyer’s expense, depending on whether the price is less than or greater than the true value of the asset. A transfer of money does not generate social value unless it is part of a transaction that reduces risk or otherwise enables people to spread receipts of money across times or states of the world in a way that advances their interests.

Imagine, for example, that one person sells a Greek sovereign bond to another person. If the seller owns a huge amount of Greek assets while the

=1686004 [<http://perma.cc/33JY-7PNZ>] (analyzing the causes of the flash crash); Peter Gomber et al., *High-Frequency Trading* (2011) (unpublished manuscript) http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1858626 [<http://perma.cc/7M3J-UCY9>].

¹⁴⁵ See generally James Tobin, *A Proposal for International Monetary Reform*, 4 E. ECON. J. 153 (1978) (arguing for a tax necessary to slow down a system that is harmfully efficient).

¹⁴⁶ See, e.g., Gabrielle Gayer et al., *Pareto Efficiency with Different Beliefs*, 43 J. LEGAL STUD. S151 (2014); Timothy E. Lynch, *Gambling by Another Name: The Challenge of Purely Speculative Derivatives*, 17 Stan. J.L. Bus. & Fin. 67, 98 (2011) (discussing how speculative derivative contracts can be economically irrational); Lynn A. Stout, *Are Stock Markets Costly Casinos? Disagreement, Market Failure, and Securities Regulation*, 81 VA. L. REV. 611, 616 (1995) (arguing that “costly and imperfect” speculation leads to harmful consequences); see also Eric Posner & E. Glen Weyl, *An FDA for Financial Innovation*, 107 NW. U. L. REV. 1307, 1308 (2013) (“Financial products are socially beneficial when they help people insure risks, but when these same products are used for gambling they can instead be socially detrimental.”).

buyer owns none, the transaction could very well reduce the amount of risk in both the seller's and buyer's portfolio (the seller's, by reducing her dependence on the value of Greek assets; the buyer's, by diversifying a portfolio that is loaded with assets in other countries). If it does reduce their risk, the transaction also decreases the total amount of risk in the economy. But if the seller and buyer are in opposite positions, the transaction will increase risk. The seller and buyer are simply gambling about what will happen in Greece—the seller believes that Greece may default, while the buyer believes that Greece will not default. Their behavior is not any different from people betting on horses.

Some commentators see no problem with such gambling, but there are several reasons to be concerned about the motivations underlying the transaction. First, if the buyer and seller are rational and risk averse (as is usually assumed), the transaction can take place only if they are gambling with other people's money. One possibility is that each person represents an institution that is guaranteed by the government. Another possibility is that they are agents for funds whose investors do not carefully monitor their behavior, and who have contracts that give them payoffs if they make money while not forcing them to fully absorb losses.

Second, if the buyer and seller are risk averse, but poorly informed or boundedly rational, they may enter the transaction believing that each has special insight about the likely direction of the value of the asset when in fact they do not. In such a case, the transaction is just a wasteful transfer from one person to another, and there is no reason for society to tolerate it.

Third, if the buyer and seller are rational but not risk averse (e.g., they enjoy gambling) then it is almost certainly better to direct them to casinos than to allow them to gamble using the financial system. Casinos are heavily regulated because governments recognize that people may develop an addiction to gambling and subsequently act against their interest. Casinos are also not vulnerable to financial panics and systemic risk. Financial institutions are. Accordingly, the government should discourage purely speculative activity that takes place in the financial system.

If financial instruments are used to gamble, then a Pigouvian tax can be used to deter this behavior.¹⁴⁷ As before, the social problem is that the buyer and seller enter into a transaction without taking account of its effect on society. A Pigouvian tax equal to the social harm caused by gambling would result in the optimal level of financial activity along this dimension.

¹⁴⁷ As advocated most prominently in the legal literature by Stout, *supra* note 148 at 699-702 (arguing for the use of taxes to increase the marginal costs of stock speculation).

2. The Legal Regime

a. *Capital Regulation and Risks of Panic*

Do financial regulators have the authority to impose Pigouvian taxes in lieu of minimum capital requirements? Regulators' authority to regulate the capital levels of banks derives from several different statutes. Under the International Lending Act of 1983, regulators shall "cause banking institutions to achieve and maintain adequate capital by establishing minimum levels of capital for such banking institutions and by using such other methods as the appropriate Federal banking agency deems appropriate."¹⁴⁸ A subsequent provision states that each regulator shall have the authority to establish capital regulations that the regulator "in its discretion, deems to be necessary or appropriate in light of the particular circumstances of the banking institution."¹⁴⁹ Another section makes it clear that the regulator has discretion to decide whether a bank that falls short of capital requirements has engaged in an unsafe and unsound practice, warranting enforcement action.¹⁵⁰ Thus, while the statute gives regulators the authority to issue capital requirements, it does not require them to do so.

In response to the Savings & Loan crisis of the 1980s, Congress passed the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA).¹⁵¹ The Act was motivated in part by the perception that S&L regulators did not enforce regulations strictly enough, and created a "prompt corrective action" system that was supposed to encourage regulators to act with greater alacrity.¹⁵² But, like the ILA, the FDICIA gave the regulators a great deal of discretion. Regulators determined adequate capital levels, but the precise levels were left to their judgment.¹⁵³ Indeed, the FDICIA authorized regulators to rescind a "relevant capital measure [that] . . . is no longer an appropriate means for carrying out the purpose of this section."¹⁵⁴ So while regulators probably were required to establish capital levels, they could make them low enough to facilitate a

¹⁴⁸ 12 U.S.C. § 3907(a)(1) (2012).

¹⁴⁹ *Id.* § 3907(2).

¹⁵⁰ *Id.* § 3907(b)(1).

¹⁵¹ Pub L. No. 102-242, 105 Stat. 2236 (1991) (codified as amended at 12 U.S.C. § 1811).

¹⁵² See Richard Scott Carnell, *A Partial Antidote to Perverse Incentives: The FDIC Improvement Act of 1991*, 12 ANN. REV. BANKING L. 317, 317-18 (1993).

¹⁵³ See 12 U.S.C. § 1831o(c)(2) (2012) ("Each appropriate Federal banking agency shall, by regulation, specific for each relevant capital measure the levels at which an insured depository institution is well capitalized, adequately capitalized, undercapitalized, and significantly undercapitalized.").

¹⁵⁴ *Id.* § 1831o(c)(1)(B)(ii).

Pigouvian approach by allowing banks to keep even low levels of capital reserves so long as they were willing to pay the appropriate tax.

The Dodd–Frank Act of 2010 took the system mainly as it was and focused on ensuring that it was applied generally, including to non-bank financial institutions, and with a minimum of loopholes.¹⁵⁵ It also increased capital requirements for financial institutions that pose systemic risk.¹⁵⁶

It seems plausible that these laws authorize a Pigouvian approach. The key statutory text is the previously quoted provision of the ILA, which requires regulators to “cause banking institutions to achieve and maintain adequate capital by establishing minimum levels of capital for such banking institutions and by using such other methods as the appropriate Federal banking agency deems appropriate.”¹⁵⁷ While the statute requires regulators to create minimum capital levels, it does not specify their magnitude, and at the same time it authorizes regulators to use “such other methods as [they deem] appropriate.”¹⁵⁸ Thus, a regulator could impose very low minimum capital requirements, while treating a Pigouvian tax as the “other method,” arguing that a Pigouvian tax more effectively ensures bank safety and soundness than capital regulations do because the tax cannot be arbitrated as easily through the purchase of risky assets. “Such other methods as [they deem] appropriate” is very broad language. A regulator entitled to *Chevron* deference would have a great deal of leeway under such a provision to select its preferred mode of regulation.

A counterargument is that in all the provisions, Congress clearly sees minimum capital regulations as the main approach to ensuring capital adequacy. And the systemic risk provision of the Dodd–Frank Act seems to mandate capital requirements. But while the latter provision may rule out the Pigouvian approach for systemically important financial institutions (mainly because Congress has piggybacked on existing capital regulations issued by regulators), the sections that apply to ordinary banks clearly give regulators vast discretion both to determine how to ensure an adequate capital-asset ratio and how to enforce the rules. Moreover, the effect of a Pigouvian tax would be, in aggregate, to cause banks to increase capital so as to avoid paying the tax. The Pigouvian tax is just a tax on debt; raising the cost of debt will cause banks to issue more equity. As in other contexts, the Pigouvian tax is just an indirect but more efficient method of achieving the desired behavioral outcome—here, less borrowing by banks relative to the

¹⁵⁵ *Id.* § 5371(a)–(b).

¹⁵⁶ *Id.* § 5371(b)(7).

¹⁵⁷ *Id.* § 3907(a)(1).

¹⁵⁸ *Id.*

amounts they loan. Thus, Pigouvian taxes would advance Congress's purpose. In sum, a system of Pigouvian regulation would be consistent with both the spirit and, we think, the letter of the governing statutes.

b. *Regulation of High-Speed Trading and Information Races*

The SEC and the CFTC have in recent years initiated regulation of high-speed trading. In 2009, the SEC proposed a rule to ban "flash trading"—a type of high-speed trading that allows certain traders to see and respond to orders before other traders do.¹⁵⁹ In 2010, the SEC and the CFTC issued a set of recommendations for addressing some of the pathologies of high-speed trading, including circuit-breakers that halt trading when price volatility exceeds a certain threshold and screening of algorithms by regulators.¹⁶⁰ Under the latter proposal, algorithms that appear likely to cause excessive volatility would simply be banned. All of these recommendations are classic command-and-control regulations that ban or restrict certain practices. Some have been implemented.¹⁶¹ In the last year, the SEC and the CFTC have further developed initiatives to regulate high-speed trading. The SEC seeks to compel high-speed traders to register and disclose their algorithms; once the SEC has this information, it will determine whether and how high-speed trading algorithms should be limited.¹⁶² The CFTC has launched investigations to determine whether high-speed traders have violated its rules.¹⁶³

The SEC's authority to regulate national securities markets is extremely broad. The Securities Exchange Act of 1934 directs the SEC "to use its authority under this chapter to facilitate the establishment of a national

¹⁵⁹ Elimination of Flash Order Exception from Rule 602 of Regulation NMS, 74 Fed. Reg. 48632 (proposed Sept. 23, 2009).

¹⁶⁰ See JOINT CFTC-SEC ADVISORY COMMITTEE ON EMERGING REGULATORY ISSUES' REPORT, RECOMMENDATIONS REGARDING REGULATORY RESPONSES TO THE MARKET EVENTS OF MAY 6, 2010 (2011) (outlining circuit-breaker considerations); see also Charles R. Korsmo, *High-Frequency Trading: A Regulatory Strategy*, 48 U. RICH. L. REV. 523, 583-85 (2014) (describing the recommendations).

¹⁶¹ See Korsmo, *supra* note 161, at 583 (discussing how the SEC adopted a recommendation requiring those with direct access to exchanges to implement risk controls).

¹⁶² See generally Elimination of Flash Order Exception from Rule 602 of Regulation NMS, *supra* note 161; see David Michaels, *High-Speed Trading Rules Coming From SEC, White Says*, BLOOMBERG (June 6, 2014), <http://www.bloomberg.com/news/articles/2014-06-05/high-speed-trading-rules-coming-from-sec-white-says> [<http://perma.cc/V4S4-53RS>] (discussing how proprietary traders now must provide their rules for matching bidders with sellers to regulators).

¹⁶³ Douwe Miedema, *U.S. Futures Regulator CFTC Probing Speed Traders*, REUTERS (Apr. 3, 2014), <http://www.reuters.com/article/2014/04/03/us-hedgefunds-speed-trading-cftc-idUSBREA321QU20140403> [<http://perma.cc/3QRR-CRQ9>] (describing an investigation of high frequency trading practices).

market system for securities.”¹⁶⁴ The SEC is given the power “by rule or order, to authorize or require self-regulatory organizations to act jointly with respect to matters as to which they share authority under this chapter in planning, developing, operating, or regulating a national market system (or a subsystem thereof) or one or more facilities thereof.”¹⁶⁵ The SEC is specifically given the authority to counter market manipulation.¹⁶⁶ But more broadly, its mandate is to pursue Congress’s stated objectives, which include

(i) economically efficient execution of securities transactions; (ii) fair competition among brokers and dealers, among exchange markets, and between exchange markets and markets other than exchange markets; (iii) the availability to brokers, dealers, and investors of information with respect to quotations for and transactions in securities; (iv) the practicability of brokers executing investors’ orders in the best market; and (v) an opportunity . . . for investors’ orders to be executed without the participation of a dealer.¹⁶⁷

The constraints on this authority are narrow. The SEC must act with “due regard for the public interest, the protection of investors, and the maintenance of fair and orderly markets.”¹⁶⁸ And it must consider whether an “action will promote efficiency, competition, and capital formation.”¹⁶⁹

If the conventional economic wisdom on the negative externalities associated with high-speed trading is accurate, then the SEC can plainly regulate high-speed trading, as it (and the CFTC) have already started doing.¹⁷⁰ The question of present interest is whether the SEC could use Pigouvian taxes to regulate high-speed trading. Clearly, the goal of the (Pigouvian) Tobin tax is consistent with congressional objectives as embodied in the statute. A Tobin tax would promote economically efficient securities transaction, fair competition, and so on.

Does the SEC have the authority to impose a Pigouvian tax? It is not clear that the market manipulation sections provide such authority; they

¹⁶⁴ 15 U.S.C. § 78k-1(a)(2)(2012).

¹⁶⁵ *Id.* § 78k-1(a)(3)(B).

¹⁶⁶ *Id.* §§ 78i, 78j.

¹⁶⁷ *Id.* §§ 78k-1(a)(1)(C); 78k-1(a)(2) (providing the SEC with broad authority to enforce these objectives).

¹⁶⁸ *Id.* § 78k-1(a)(2).

¹⁶⁹ *Id.* § 78c(f).

¹⁷⁰ *But see* David D. Gruberg, *Decent Exposure: The SEC’s Lack of Authority and Restraint in Proposing to Eliminate Flash Trading*, 65 U. MIAMI L. REV. 263, 265 (2010) (arguing that the SEC lacks this authority because high-speed trading is efficient).

speak in terms of prohibitions of certain practices like churning. However, the statute quoted above, which authorizes the SEC to regulate exchanges, provides one possible source of authority.¹⁷¹ Another, overlapping provision gives the SEC broad authority to issue rules for exchanges that “the Commission deems necessary or appropriate to insure the fair administration of the self-regulatory organization, to conform its rules to requirements of this chapter and the rules and regulations thereunder applicable to such organization, or otherwise in furtherance of the purposes of this chapter.”¹⁷² Under these sections, the SEC could issue a rule requiring exchanges to impose Pigouvian taxes on members and turn over the revenues to the Treasury (or to pay a tax to the Treasury based on membership activity) if such a rule advanced the purposes of the chapter. If the purposes of the chapter include, as suggested above, economically efficient transactions and fair competition, then a Pigouvian tax approach would seem lawful.

c. *Regulation of Financial Instruments in Order to Deter Speculation*

Congress has long regarded speculation as a socially costly behavior that should be regulated.¹⁷³ The most important source of authority for regulating speculation is section 5c(c)(1) of the Commodity Exchange Act.¹⁷⁴ Under this statute, the CFTC may ban certain derivative contracts from exchanges if the contracts involve, among other things, “gaming” or “other similar activities determined by the Commission, by rule or regulation, to be contrary to the public interest.”¹⁷⁵ Pursuant to this authority, the CFTC recently banned certain political events contracts—basically, bets on the outcomes of certain elections—from the North American Derivatives Exchange, which had sought to list them.¹⁷⁶

This is a typical kind of command-and-control regulation. The regulator evaluates proposed derivatives contracts and either approves or bans them based on a loose cost–benefit analysis. While such an approach can

¹⁷¹ 15 U.S.C. § 78k-1(a)(3)(B) (2012).

¹⁷² *Id.* § 78s(c).

¹⁷³ *See id.* § 78b(3) (“Frequently the prices of securities on such exchanges and markets are susceptible to manipulation and control, and the dissemination of such prices gives rise to excessive speculation.”); *Id.* 78b(4) (“National emergencies . . . are precipitated, intensified, and prolonged by . . . excessive speculation.”).

¹⁷⁴ 7 U.S.C. § 7a-2 (2012).

¹⁷⁵ *Id.* § 7a-2(c)(5)(C)(i)(V), (VI).

¹⁷⁶ *See* COMMODITY FUTURES TRADING COMM’N., ORDER PROHIBITING THE LISTING OR TRADING OF POLITICAL EVENT CONTRACTS (2012), http://www.knowledgemosaic.com/gateway/cftc/general-press-releases/file_nadexorder.pdf [<http://perma.cc/26TE-RK4G>].

eliminate the worst forms of speculative derivatives, it is fundamentally unable to address the problem of excessive speculation because parties can bet using all kinds of derivative contracts.¹⁷⁷

Could the CFTC impose Pigouvian taxes on all derivative contracts under existing authority? Unfortunately, the answer is probably not. The law authorizes the CFTC to approve or ban the listing of derivatives; there is little room for an argument that the CFTC could approve a listing conditional on the exchange (or seller of the contracts) paying Pigouvian taxes. In theory, the CFTC could declare that all derivatives contracts violate the public interest and then “settle” with exchanges by permitting them to list contracts conditional on agreement to pay Pigouvian taxes. But such an approach would be unlikely to survive a judicial challenge. The statute does not imply that all derivatives contracts violate the public interest or impose social costs—indeed, to the contrary, contracts are presumptively listed—and an effort to jury-rig a Pigouvian system by threatening to block contracts unless payments are made may run afoul of the statute.

D. *The Occupational Safety and Health Act*

Another very substantial source of regulation is the Occupational Safety and Health Act and the regulatory body it spawned, the Occupational Safety and Health Administration (OSHA). OSHA regulates the health and safety conditions to which workers are exposed in the workplace, including the machines they use, the types of chemicals with which they come into contact, and the workplace environment itself.¹⁷⁸ OSHA has been responsible for a wide variety of economically significant regulations since its inception in 1971. Yet, to our knowledge, none of them has ever involved a Pigouvian tax.

The Occupational Safety and Health Act gives OSHA broad authority to regulate workplace health and safety. The agency has jurisdiction over all “places of employment”¹⁷⁹ and has the authority to promulgate regulations as “reasonably necessary or appropriate to provide safe or healthful employment and places of employment.”¹⁸⁰ OSHA regulations take the form of workplace standards, and the statute describes these standards in very broad terms: a standard must require “conditions, or the adoption or use of

¹⁷⁷ For a discussion, see Posner & Weyl, *supra* note 148, at 1308-09.

¹⁷⁸ See generally 29 U.S.C. §§ 651-678 (2012).

¹⁷⁹ 29 U.S.C. § 652(8).

¹⁸⁰ *Id.*

one or more practices, means, methods, operations, or processes.”¹⁸¹ In addition, the statute directs OSHA to promulgate stringent standards that are highly protective of worker health and safety. The agency

shall set the standard which most adequately assures, to the extent feasible, on the basis of the best available evidence, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life.¹⁸²

Like EPA, OSHA has typically employed feasibility analysis when deciding upon the appropriate regulatory strictness.¹⁸³ (Feasibility analysis draws its name from this section of the Occupational Safety and Health Act.) As we explained above, in practice this means that the agency can regulate up to the point at which regulation will generate massive job loss or widespread bankruptcies within the industry. In many cases OSHA will stop well short of this level, but it is at least theoretically available to the agency.

OSHA’s route to creating a Pigouvian tax would largely mirror that of EPA. OSHA would begin by setting a workplace standard that, if followed, would impose zero or negligible risk of injury on employees. That standard could take the form of a requirement that firms cease use of a particular hazardous chemical or dangerous machine, or that the firm install some type of protective mechanism that reduces the effective harm to zero. Any firm that violated this standard, thus imposing some level of risk (and expected harm), would be issued a citation¹⁸⁴ and then fined by OSHA.¹⁸⁵

The Occupational Safety and Health Act gives OSHA broad authority to cite and then fine firms that violate its regulations. Even with respect to “minor” violations, OSHA can levy fines up to \$7000 per incident each time it issues a citation.¹⁸⁶ The statute gives OSHA complete discretion to set the amount of the fine up to this statutory cap. Thus, OSHA could characterize each instance of the use of a hazardous chemical, machine, or process as a violation, issue a citation, and then assess a fine in an amount equal to the expected harm from the workplace hazard—the optimal Pigouvian tax. If a firm intended to create a particularly dangerous type of

¹⁸¹ *Id.*

¹⁸² 29 U.S.C. § 655(b)(5).

¹⁸³ Masur & Posner, *Against Feasibility*, *supra* note 96, at 662-63.

¹⁸⁴ 29 U.S.C. § 658(a).

¹⁸⁵ 29 U.S.C. § 666(c).

¹⁸⁶ *Id.*

workplace condition such that the expected harm would exceed \$7000, OSHA could always pursue more a more substantial remedy in the form of a civil suit. Thus, OSHA's typical regulatory process—create a workplace standard, cite violators, and issue fines—could, with minimal adjustments, be made to mimic a system of Pigouvian taxes.

Of course, as with Pigouvian taxes under the Clean Air and Clean Water Acts, such a system could create both administrative and legal complications. OSHA, like EPA, would need to collect taxes (fines, that is) from every employer that creates a meaningful workplace risk, rather than design standards intended for compliance and then only cite violators. This could be administratively costly, and the agency would need to have in place a mechanism for the timely issuance of these citations and their contestation, should employers object. In the context of the Clean Air and Water Acts, we explained that we did not think this would be a significant hurdle, and the same is true here. It is worth noting, in addition, that any complications arising from such a system stem from the collection of a Pigouvian tax in general, not from any problems particular to OSHA's use of Pigouvian taxes in regulation. If Congress, rather than an agency, were to establish a system of Pigouvian taxes, it would still have to provide for the collection of taxes from a multiplicity of affected parties. In addition, as a general matter, any system of taxation must provide a mechanism for a taxpayer to challenge a tax assessment as incorrect or improperly levied. A legislatively created system of Pigouvian taxes would need to surmount the same types of hurdles. These administrative issues are not a product of the agency context.

The principal legal issue is again whether OSHA would be permitted to impose regulations that effectively prohibit all harmful workplace conditions. As we described above with respect to the Clean Air and Water Acts, an overly formalist or literalist court might hold that such a regulation is not economically "feasible" in the sense that full compliance would lead to widespread bankruptcies within an industry. A more pragmatic judge *should* understand that the entire regulatory scheme—extremely stringent standard, coupled with lower "fines" for noncompliance—is feasible and will not cause undue economic hardship. Indeed, it might turn out to be more lenient than existing workplace safety regulations. Even if a judge adopts a more formalist bent, however, Pigouvian taxes should still be feasible with respect to a great number of workplace hazards. There are many workplace hazards—chemical, machine, or otherwise—that could be eliminated without disabling an industry, and OSHA has frequently considered (and

sometimes enacted) regulations that eliminate a workplace harm entirely.¹⁸⁷ Thus, while a combination of extremely stringent standards and formalist jurisprudence might sometimes derail the use of Pigouvian taxes, this should affect at most a subset of potential regulations.

Finally, we note that workplace safety differs from other areas of potential Pigouvian regulation in the sense that workplace hazards are not really externalities. Workplace hazards only affect employees who are in contractual privity with their employers. In theory, then, all workplace hazards could be priced into workers' employment contracts. Indeed, the most prominent methods of calculating the value of a statistical life for purposes of cost-benefit analysis assume that they are. If one conceives of Pigouvian taxes as strictly meant to regulate externalities, then they would be inappropriate in the context of workplace safety. Of course, this is a critique of workplace safety regulation in general, rather than Pigouvian taxes in particular. There may well be employment market failures, such as high information costs for workers or hold-up problems, that justify workplace regulation. If market failures exist, Pigouvian taxes and other types of regulation would be justified.

III. OBJECTIONS AND OBSTACLES

We explained in Part I that most economists believe that Pigouvian taxes are the best means of regulating a wide variety of harms across a wide variety of contexts. In Part II, we argued that many federal regulators have the authority under existing law to implement Pigouvian taxes. If Pigouvian taxes are not infeasible or undesirable for some other compelling reason, regulators should be employing them much more frequently than they currently do (which is never). This Part explores whether a reason to avoid Pigouvian taxes exists. We canvas five potential objections or obstacles to implementing Pigouvian taxes. The first three apply equally to legislatures and administrative agencies, while the latter two are specifically relevant to administrative agencies.

Our conclusion is that none of these obstacles is either normatively compelling or politically insuperable. If agencies and legislatures have refrained from using Pigouvian taxes for some combination of these reasons, they are unjustified in having done so.

¹⁸⁷ See Masur & Posner, *Against Feasibility*, *supra* note 96, at 673 (examining the cost-benefit analysis of various regulatory standards for toxic exposure).

A. Administrative Problems

One concern about Pigouvian taxes is that they may be difficult to administer. If the regulator cannot reliably determine the social cost of an activity, it cannot calculate the optimal Pigouvian tax. This problem would of course affect Pigouvian taxes whether imposed by statute or regulation. Economists have discussed these issues for decades and the consensus appears to be that administrative problems are generally manageable.¹⁸⁸ In a recent paper, Professor Victor Fleischer argues that Pigouvian taxes are frequently inefficient because they are typically calculated based on an assumption of uniform marginal social cost when in fact the social cost of an activity often varies across individuals or firms.¹⁸⁹ He provides the example of taxes on fatty foods, which may be justified on the theory that obesity creates social costs.¹⁹⁰ However, some people eat fatty foods without becoming obese. They should not be taxed; and a tax might deter them from a valuable activity. A tax based on the average contribution of fatty food to social costs will also under-deter obese people. A better tax would vary according to the likelihood that any person becomes obese, but such a tax would be difficult to administer.

Fleischer's point is a valuable one, but it does not affect our thesis. Fleischer is surely right that Pigouvian taxes will be difficult to calculate in some cases, but this argument would apply equally to any type of regulation where the regulator must calculate social costs, not only Pigouvian taxes. As we have explained, Pigouvian taxes impose a lower informational burden than command-and-control regulation and will generally be easier to implement. Regulators already engage in an enormous amount of command-and-control regulation; to the extent that regulation is justified,¹⁹¹ then Pigouvian taxation would be justified as well.

¹⁸⁸ For a recent survey, see generally Fleischer, *supra* note 18 (discussing appropriate candidates for Pigouvian taxes and stating that they should only be applied in situations where the harm does not vary based on the source and the "variation in marginal social cost is easily observed and categorized").

¹⁸⁹ *Id.* at 6.

¹⁹⁰ *Id.* at 26.

¹⁹¹ Various attempts to calculate the costs and benefits of regulation tend to conclude that in aggregation, U.S. regulation produces more benefits than costs, although individual regulations do not always satisfy cost-benefit tests. See, e.g., Robert W. Hahn & Patrick M. Dudley, *How Well Does the U.S. Government Do Benefit-Cost Analysis?*, 9 REV. ENVTL. ECON. POL'Y 192 (2007) (analyzing the use of cost-benefit analysis over time).

B. Interest Group Explanations

Another potential explanation for legislative and administrative reluctance to employ Pigouvian taxes relates to interest-group politics.¹⁹² In addition to the organizations and individuals advocating greater regulation, there is a natural constituency for command-and-control regulation: the firms that sell to regulated entities the means for complying with regulations. With respect to environmental regulation, these firms produce pollution-controlling (or safety-enhancing) equipment or manufacture the alternative chemicals and machinery that regulations will mandate. Environmental regulatory standards are often based upon a particular type of technology, and the firm that manufactures it stands to benefit directly from regulation imposing that standard. Indeed, some researchers have estimated that regulation can produce significant employment gains in industries that supply new equipment or material to regulated firms.¹⁹³ Those firms thus have an incentive to lobby strongly for new regulation.

Similarly, an enormous industry sells its services to financial institutions so that they can comply with regulations. Accountants and lawyers belong to this industry. So do credit rating agencies, which profited enormously in the years leading up to the financial crisis by selling the ratings that investment banks needed in order to market collateralized debt obligations.¹⁹⁴ Indeed, there is a sense in which the same entities that were subject to regulation—banks, hedge funds, investment banks—also profited by inventing financial instruments that allowed themselves and others to comply with (or circumvent) those regulations. Put differently, command-and-control financial regulations bifurcated the finance industry, creating a group of supporters who profited from them and lobbied to support them, and a group that objected to them.

The incentive to lobby for new legislation or regulation dissipates when the regulation takes the form of a Pigouvian tax. Of course, a Pigouvian tax makes pollution-controlling equipment or materials more valuable and

¹⁹² See generally Jonathan B. Wiener and Barak D. Richman, *Mechanism Choice*, in RESEARCH HANDBOOK ON PUBLIC CHOICE AND PUBLIC LAW 363, 363-96 (Daniel A. Farber & Anne Joseph O'Connell eds., 2010), http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=2906&context=faculty_scholarship [<http://perma.cc/9R6D-KMD5>].

¹⁹³ See Richard D. Morgenstern, et al., *Jobs Versus the Environment: An Industry-Level Perspective*, 43 J. ENVTL. ECON. & MGMT. 412, 429 (2002) (finding that regulation can create jobs in industries such as plastics and petroleum).

¹⁹⁴ See Matt Kratz, *2008 Crisis Still Hangs Over Credit-Rating Firms*, USA TODAY (Sept. 13, 2013), <http://www.usatoday.com/story/money/business/2013/09/13/credit-rating-agencies-2008-financial-crisis-lehman/2759025> [<http://perma.cc/AF36-QY2R>] (explaining how pre-recession problems with credit rating agencies could return again).

induces firms to install that equipment—that is precisely the point. But it does not do so as directly as regulation that forces firms to reduce emissions below a particular level or install a particular type of equipment. Any given firm would be less certain that regulated entities would install its products. Those firms will then have a smaller incentive to lobby for regulation, and might instead advocate for particularized command-and-control regulation as a substitute for Pigouvian taxes.

In addition, Pigouvian regulation might in many cases be considered inferior by regulated entities because it does less to inhibit new market entrants. There is voluminous literature documenting the ways in which existing firms can use regulation to block competitors.¹⁹⁵ Generally speaking, regulation can impose significant upfront costs on doing business, as when firms are required to purchase an expensive piece of equipment or obtain a costly or complicated permit. Large, existing enterprises may be able to surmount these regulatory hurdles, while new entrants might have much greater difficulty.¹⁹⁶ Pigouvian taxes do not have this feature, however. The cost of complying with a Pigouvian tax scales linearly with the externality imposed; there is no initial upfront cost and thus no especially great hurdle to new entrants. Conditional upon being regulated, then, existing firms might in some contexts prefer conventional command-and-control regulation.

There is also an interest-group advantage to regulating with Pigouvian taxes rather than using lawsuits. When a polluter is sued for violating environmental laws and settles, there are no legal constraints on the form that settlement may take. In some cases, interest groups jockey to receive part of a monetary settlement as a donation, even if they were not part of the original lawsuit. Litigation settlements are thus subject to wasteful rent-seeking. By contrast, Pigouvian taxes collected by agencies would be deposited directly into the federal treasury and made part of general revenues. They would not increase the overall amount of rent-seeking that surrounds the federal budget. Of course, this is yet another reason that interest groups might oppose a move toward Pigouvian taxes.

¹⁹⁵ See generally Daniel W. Bromley, *Environmental Regulations and the Problem of Sustainability: Moving Beyond "Market Failure,"* 63 *ECOLOGICAL ECON.* 676 (2007); Thomas J. Dean & Robert L. Brown, *Pollution Regulation as a Barrier to New Firm Entry: Initial Evidence and Implications for Future Research*, 38 *ACAD. MGMT. J.* 288 (1995); Eric Helland & Mayumi Matsuno, *Pollution Abatement as a Barrier to Entry*, 24 *J. REG. ECON.* 243 (2003); David Kline, *Positive Feedback, Lock-in, and Environmental Policy*, 34 *POL'Y SCI.* 95 (2001).

¹⁹⁶ Bromley, *supra* note 197, at 682 (examining how the standard paradigm for environmental economics breaks down in the presence of positive feedback or lock-in).

These may be barriers to regulatory implementation of Pigouvian taxes, but they are not insuperable ones. Agencies that are less beholden to their regulatory constituencies or executives who are less politically bound (second-term presidents, for example) might forge ahead with Pigouvian regulation despite greater opposition from regulated parties. For that matter, if our analysis is correct, Pigouvian regulation represents something of a collective action problem for regulated parties. There are many regulated parties that should weakly prefer Pigouvian regulation to standard command-and-control regulation because it is more efficient, compared with a few entities that might strongly prefer command-and-control regulation. This is a canonical public choice problem. Political entrepreneurs within the regulated community would have incentives to form trade groups to lobby for Pigouvian regulation (if there must be regulation at all), as a counter-weight to firms that prefer command-and-control regulation.

C. *Negative Symbolism & Ideology*

The rarity of Pigouvian taxes could also be based in part upon the negative expressive and symbolic nature of such measures. Taxes have long had a negative connotation in American politics, even when they are not being imposed directly upon individuals.¹⁹⁷ When the Obama Administration began to pursue legislation to reduce greenhouse gas emissions, it rejected Pigouvian taxes as politically unpalatable, precisely (and entirely) because of the word “tax” in the name.¹⁹⁸ President Clinton encountered stiff resistance to a much more modest energy tax several years

¹⁹⁷ There is an extensive literature on so-called “tax aversion.” See, e.g., Christopher C. Fennell & Lee Anne Fennell, *Fear & Greed in Tax Policy: A Qualitative Research Agenda*, 13 WASH. U. J.L. & POL’Y 75 (2003) (discussing the economic impact of tax aversion); Steffen Kallbekken, Stephan Kroll & Todd L. Cherry, *Do You Not Like Pigou, or Do You Not Understand Him? Tax Aversion and Revenue Recycling in the Lab*, 62 J. ENVTL. ECON. & MGMT. 62 (2011) (describing the importance of informing the public of where the proceeds of a tax will go); Edward A. McCaffery & Jonathan Baron, *Thinking About Tax*, 12 PSYCHOL. PUB. POL’Y & L. 106 (2006) (explaining that people suffer from a wide range of heuristics and biases when it comes to thinking about taxes); Andrew T. Hayashi et al., *Experimental Evidence of Tax Salience and the Labor-Leisure Decision: Anchoring, Tax Aversion, or Complexity?* (N.Y. Univ. Ctr. for Law & Econ., Working Paper No. 12-14, 2012), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2067157 [<http://perma.cc/S9H6-HGG7>] (examining the effects of framing on people’s views of taxes); Judd B. Kessler & Michael I. Norton, *Tax Aversion in Labor Supply 2* (June 15, 2014) (unpublished manuscript) http://assets.wharton.upenn.edu/~juddk/papers/KesslerNorton_TaxAversion.pdf (“[I]ndividuals respond more to taxes that are more salient.”).

¹⁹⁸ Coral Davenport, *Republicans Pounce on Obama’s Global-Warming Regulations for Political Fodder*, NAT’L J. (Sept. 22, 2013), <http://www.nationaljournal.com/energy/republicans-pounce-on-obama-s-global-warming-regulations-for-political-fodder-20130922> [<http://perma.cc/2CFD-RNNS>].

earlier.¹⁹⁹ This was despite the fact that, as economists have shown, a properly structured Pigouvian tax and a properly structured cap-and-trade system will function almost identically.²⁰⁰ Then, when Obama eventually proposed a cap-and-trade system, opponents attacked it as “cap and tax,”²⁰¹ seeking to tar it with the same brush. The word “tax” is toxic, particularly for political conservatives.²⁰²

At the same time, Pigouvian taxes have a bad reputation among many political liberals, particularly when compared with the alternative of direct regulation. Part of the opposition relates to the fact that Pigouvian taxes allow a company to continue polluting so long as it is willing to pay the appropriate price. If pollution is a moral wrong, in that the polluter is imposing harm upon an unconnected victim, then it strikes some commentators as immoral to permit a firm to continue to pollute on the condition that it pays a fee.²⁰³ This objection evokes concerns of compensatory or distributive justice: if a polluter pays a Pigouvian tax in order to harm some victim, the tax payment may go to the general fisc rather than the victim herself. Of course, this concern ignores the fact that an ideally designed Pigouvian tax would reduce pollution and harm to the same level as an ideal system of command-and-control regulation.

Relatedly, there is a powerful resistance within both academia and public opinion to the idea of putting a price on human life or health.²⁰⁴ That opposition is typically voiced with reference to cost-benefit analysis,²⁰⁵ but Pigouvian taxes trigger the same considerations with equal force. A Pigou-

¹⁹⁹ Richard J. Pierce, Jr., *Energy Independence and Global Warming*, 37 ENVTL. L. 595, 601 (2007) (“Many politicians and business leaders prefer a cap and trade system to a carbon tax, but those preferences are based on dubious reasoning. Many politicians prefer cap and trade because it allows them to avoid the dreaded ‘t’ word.”).

²⁰⁰ See Weisbach, *supra* note 18, at 1 (arguing that in the domestic context a tax and cap-and-trade system “are essentially the same”).

²⁰¹ Opinion, *The Cap and Tax Fiction*, WALL ST. J. (June 26, 2009), <http://online.wsj.com/news/articles/SB124588837560750781> [<http://perma.cc/D5BN-CZMG>]; Chris Arnold, *GOP Demonizes Once Favored Cap-and-Trade Policy*, NPR (June 3, 2014, 4:59AM), <http://www.npr.org/2014/06/03/318414868/gop-demonizes-once-favored-cap-and-trade-policy> [<http://perma.cc/43DF-46UX>].

²⁰² Tim Shoemaker, “*Cap and Tax*” is Back!, CAMPAIGN FOR LIBERTY (June 2, 2014), <http://www.campaignforliberty.org/national-blog/cap-tax-back> [<http://perma.cc/9SAX-L6UW>].

²⁰³ See Wallace E. Oates, *From Research to Policy: The Case of Environmental Economics*, 2000 U. ILL. L. REV. 135, 138 (explaining that some saw this approach as immoral, because many polluters would simply pay a fee and continue with their behavior).

²⁰⁴ Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553, 1556 (2002) (“[C]ost-benefit analysis is so inherently flawed that if one scratches the apparently benign surface of any of its products, one finds . . . absurdity.”).

²⁰⁵ *Id.*

vian tax requires the regulator to price the externality being created and then allows the regulated entity to continue producing that externality if it pays the requisite price. Human lives are being converted into dollars even more directly. From this standpoint, command-and-control regulation appears superior because (at least ostensibly) it entirely prohibits the disfavored activity.

We have criticized these approaches to monetization and regulation in other work,²⁰⁶ but the normative issues are not the central point. The negative symbolism of using a tax to control pollution or other harms can have powerful political effects, particularly when the tax is viewed negatively on both sides of the political spectrum. It is tempting to believe that efficiency will win out in the long run—that if Pigouvian taxes really are superior to command-and-control regulation, policymakers will eventually enact them as the various constituencies come to recognize their advantages. On this view, costs and benefits will eventually triumph.²⁰⁷ We suspect (and hope) that the negative connotations attached to Pigouvian taxes will eventually disappear as norms and attitudes shift. There are certainly precedents for this type of change, such as liberals' eventual adoption of market-based regulation of the environment (cap-and-trade legislation dealing with acid rain) and health care (the Affordable Care Act).

D. Legal and Conceptual Hurdles

We now turn to explanations that are primarily relevant to Pigouvian regulation, as opposed to Pigouvian taxes imposed through legislation. In the preceding Part we considered specific agency authority to regulate via Pigouvian taxes. But there are broader legal and conceptual issues as well. Pigouvian taxes also raise a legal question of whether regulators can, in fact, “tax” regulated entities. The legal community thinks of “taxes” and “regulations” as different creatures. Regulators do not impose taxes; they issue regulations and fine companies that violate them. Congress creates taxes and delegates to the Treasury Department the authority to issue regulations that implement them.²⁰⁸ A large and complex set of norms and

²⁰⁶ See generally Masur & Posner, *Against Feasibility*, *supra* note 96; Jonathan S. Masur & Eric A. Posner, *Regulation, Unemployment, and Cost-Benefit Analysis*, 98 VA. L. REV. 579, 580 (2012) (discussing cost-benefit analysis in the context of EPA).

²⁰⁷ Cf. Cass R. Sunstein, *Of Montreal and Kyoto: A Tale of Two Protocols*, 31 HARV. ENVTL. L. REV. 1, 5 (2007) (arguing that the Montreal Protocol has been significantly more successful than the Kyoto Protocol because of the cost-benefit analysis perceived by the United States).

²⁰⁸ See, e.g., Michael S. Greve, *Wheeler of Fortune*, LIBR. L. & LIBERTY (June 1, 2015) <http://www.libertylawsite.org/2015/06/01/wheeler-of-fortune> [<http://perma.cc/8DRX-ZGP9>] (“To rephrase the constitutional question: do we *really* believe that Congress can constitutionally delegate

practices surrounds the process by which taxes are authorized. Can regulators impose Pigouvian taxes consistently with these rules?

The Supreme Court has answered this question in the affirmative. Adjudicating a constitutional challenge to a system of pipeline fees, the Court in 1989 held that “Congress may wisely choose to be more circumspect in delegating authority under the Taxing Clause than under other of its enumerated powers, but this is not a heightened degree of prudence required by the Constitution.”²⁰⁹ In reaching this conclusion, the Court swept aside a series of earlier cases in which it had suggested that the ability to levy taxes might be a solely “legislative” power that Congress cannot delegate.²¹⁰ Even if an agency’s Pigouvian tax were understood as a tax, rather than a fine, it should raise no special constitutional problem.

The only other relevant law we can think of is the Origination Clause of the U.S. Constitution, which provides that “[a]ll Bills for raising Revenue shall originate in the House of Representatives; but the Senate may propose or concur with Amendments as on other Bills.”²¹¹ It is possible to argue that a regulator can impose a tax only if its authorizing statute originated in the House, which will not be the case for many regulators, or may be ambiguous. However, the Supreme Court has held that the Origination Clause applies only to statutes whose purpose is to raise revenue. For example, the Supreme Court held that a law that imposed a tax on bank notes was not subject to the Origination Clause because the purpose of the law was not to raise revenue but to finance a national currency.²¹² The D.C. Circuit similarly rejected a challenge to the Affordable Care Act based on the Origination Clause on the grounds that the purpose of the tax imposed on people who fail to obtain health insurance is not to raise revenue but to encourage people to obtain health insurance, even if a byproduct of the law is an increase in tax revenues.²¹³ Likewise, the purpose of a Pigouvian tax is

the power to tax and spend? Congress has exceedingly little to do with modern-day government except to write checks. Once agencies have the power to tell companies and their customers to write checks and to then write their own checks, what can they not do, and what’s left for Congress?”).

²⁰⁹ *Skinner v. Mid-Am. Pipeline Co.*, 490 U.S. 212, 223 (1989).

²¹⁰ See *Nat’l Cable Television Ass’n, Inc. v. United States*, 415 U.S. 336, 340-41 (1974) (“Taxation is a legislative function, and Congress . . . is the sole organ for levying taxes It would be such a sharp break with our traditions to conclude that Congress had bestowed on a federal agency the taxing power that we read 31 U.S.C. § 483a narrowly as authorizing not a ‘tax’ but a ‘fee.’”); *Fed. Power Comm’n v. New Eng. Power Co.*, 415 U.S. 345, 349-51 (1974) (reinterpreting a fee as a tax in order to avoid constitutional questions about delegation of the taxing power).

²¹¹ U.S. CONST. art. I, § 7.

²¹² *Twin City Nat’l Bank of New Brighton v. Nebecker*, 167 U.S. 196, 202 (1897).

²¹³ *Sissel v. U.S. Dep’t of Health and Human Servs.*, 760 F.3d 1, 10 (D.C. Cir. 2014).

not to raise revenue but to deter socially harmful behavior.²¹⁴ Accordingly, a regulator whose authority is based on a Senate-originated bill does not violate the Origination Clause by imposing a Pigouvian tax.

E. Risk-Averse Regulators

We close with one final potential explanation. It is conceivable that regulators are simply highly risk averse—they understand that they have the authority to employ Pigouvian taxes, but they have little incentive to experiment and prefer to opt for tried-and-true methods that have been repeatedly validated. Risk aversion might be coupled with misaligned institutional incentives: it is plausible that an agency head has more to lose from attempting a new type of regulation and having it be rejected (judicially or politically) than she has to gain if the regulation succeeds. The safer path of command-and-control regulation might also be the more personally advantageous one. The uncertainty embedded in agencies' organic statutes might be heightening these tendencies. In addition, the length of time required to promulgate regulations might mean that if a Pigouvian regulation were rejected by the courts, a given president (or administrator) would not have an opportunity to promulgate a fallback command-and-control regulation before her term concluded. This could accentuate the importance, to the administrators, of getting it right the first time.

The story is more complex as applied to state behavior under the Clean Air Act. As we described above, when EPA creates a national ambient air quality standard, the states can formulate state implementation plans designed to achieve the air quality standard in any manner they choose. Yet to our knowledge no state has ever employed a Pigouvian tax as part of its state implementation plan. This is despite the fact that there can be no doubt that the states would have authority to do so (as the Obama Administration's stance regarding greenhouse gases makes clear). It is possible that state legislators and regulators fear that a SIP that relied upon Pigouvian taxes might be rejected by EPA officials as too outlandish or unlikely to succeed. In other words, state regulators might be trying to avoid the negative consequences of EPA risk aversion. Nonetheless, true uncertainty as to the legality of state-implemented Pigouvian taxes under the Clean Air Act cannot be driving the behavior of state policymakers.

²¹⁴ Cf. Robert D. Cooter & Neil S. Siegel, *Not the Power to Destroy: An Effects Theory of the Tax Power*, 98 VA. L. REV. 1195, 1239-41 (2012) (discussing the difference between taxes and mandates).

CONCLUSION

Economists have extolled the virtues of Pigouvian taxes for decades. Yet regulators have hardly ever enacted Pigouvian taxes, instead relying almost exclusively upon the command-and-control regulation that economists have denigrated in comparison. This is despite the fact that agencies with authority over a vast swath of economic activity in most cases are permitted by their organic statutes to impose Pigouvian taxes. We suspect that the absence of Pigouvian taxes is due to a combination of practical and political factors, possibly coupled with a failure of imagination (or nerve) on the part of state and federal regulators, plus the overwhelming force of bureaucratic inertia.

A first step for remedying this problem would be for the executive branch to instruct agencies to give serious consideration to Pigouvian taxes. There is precedent for such an action. President Clinton's Executive Order 12,866, which reaffirmed the requirement that agencies conduct cost-benefit analysis, also contains an implicit requirement that agencies consider Pigouvian taxes: "Each agency shall identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public."²¹⁵ Even more recently, the Office of Information and Regulatory Affairs (OIRA), the White House agency that provides guidelines to executive-branch agencies, issued a guidance document for regulatory agencies. Among other things it encouraged regulators to use "market-oriented approaches."

Market-oriented approaches that use economic incentives should be explored. These alternatives include fees, penalties, subsidies, marketable permits or offsets, changes in liability or property rights (including policies that alter the incentives of insurers and insured parties), and required bonds, insurance, or warranties. One example of a market-oriented approach is a program that allows for averaging, banking, and/or trading (ABT) of credits for achieving additional emission reductions beyond the required air emission standards. ABT programs can be extremely valuable in reducing costs or achieving earlier or greater benefits, particularly when the costs of achieving compliance vary across production lines, facilities, or firms. ABT can be allowed on a plant-wide, firm-wide, or region-wide basis rather than vent by vent, provided this does not produce unacceptable local air quality outcomes (such as "hot spots" from local pollution concentration).²¹⁶

²¹⁵ Exec. Order No. 12,866, *supra* note 3, § 1(b).

²¹⁶ OFFICE OF MGMT. & BUDGET, EXEC. OFFICE OF THE PRESIDENT, CIRCULAR A-4: REGULATORY ANALYSIS (September 17, 2003) at 8-9, <https://www.whitehouse.gov/sites/default/files/omb/assets/omb/circulars/a004/a-4.pdf> [<http://perma.cc/ZDA8-UPUQ>].

By referring to economic incentives including fees, OIRA suggested that agencies should explore the use of Pigouvian taxes (OIRA's reference mirrors similar language in the Clean Air Act).²¹⁷ But OIRA could and should have recommended Pigouvian taxes explicitly. As we have explained, Pigouvian taxes are no less market-oriented than tradable emission-permit programs, and will usually be more efficient. So a simple step toward reform would be for OIRA to amend A-4 to explicitly advocate Pigouvian taxes.

Beyond that, we hope that this Article will persuade regulators to start experimenting with Pigouvian taxes. Just as regulators discovered (with some prodding from the executive branch)²¹⁸ 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 Pigouvian taxes in lieu of command-and-control regulations. It's time to transform the "cost-benefit state"²¹⁹ into the Pigouvian state.

²¹⁷ See *supra* Section II.A.

²¹⁸ Exec. Order No. 12,291, *supra* note 3; Exec. Order No. 12,866, *supra* note 3.

²¹⁹ CASS R. SUNSTEIN, *THE COST-BENEFIT STATE: THE FUTURE OF REGULATORY PROTECTION* (2002).

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