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# Regulatory Change and Optimal Transition Relief

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Revesz, Richard L. and Westfahl Kong, Allison L., "Regulatory Change and Optimal Transition Relief" (2010). *New York University Law and Economics Working Papers.* Paper 235.
http://lsr.nellco.org/nyu_lewp/235

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Northwestern University Law Review
Printed in U.S.A.
Vol. 105, No. 4

# REGULATORY CHANGE AND OPTIMAL TRANSITION RELIEF

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We are grateful for the financial support of the Filomen D'Agostino and Max E. Greenberg Faculty Research Fund at NYU. For helpful written comments, we thank Oren Bar-Gill, Ryan Bubb, Oscar Chase, Richard Epstein, Barry Friedman, Bernard Grofman, Mitchell Kane, Michael Levine, Daryl Levinson, Mike Livermore, Daniel Rubinfeld, Adam Samaha, Steven Shavell, Daniel Shaviro, and Richard Stewart. We are also grateful to the participants at the NYU Faculty Workshop, the Harvard Law and Economics Seminar, and the annual meeting of the American Law and Economics Association. Jonathan Grossman provided excellent research assistance. John Meixner, Nassim Nazemi, Lyndsie Schmalz, Devlin Su, Derek Wikstrom, and the editors and staff of the *Northwestern University Law Review* provided insightful editorial suggestions.

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## INTRODUCTION

Every time legislators and regulators adopt a legal change, they must decide whether to provide actors that are negatively affected by the new regime with some form of transition relief. For example, when lawmakers decide to adopt more demanding pollution restrictions, should they grandfather existing plants so that these plants will (at least temporarily) be exempted from the new requirements? Or should they require existing plants to immediately comply with the new regulations even if doing so would prove very costly? Every time environmental laws and regulations are made more stringent, one must determine how existing actors should be required to respond. The appropriate level of transition relief to grant, if any, is one of the most salient issues in U.S. regulatory policy, particularly in light of two looming concerns: the threat of global warming, which is likely to lead to significant new regulation, and the ongoing economic crisis, which will create pressure to reduce the burden of regulatory policies on private actors.

As the experience under the Clean Air Act demonstrates, the efficacy of new regulations often depends upon the transition relief that is afforded to existing actors. When the transition relief is too generous, existing plants continue to operate and no new plants (or few new plants) come into existence. Indeed, as a result of the very generous grandfathering afforded to existing plants under the Clean Air Act, very few new electric utilities have been built in the U.S.,[1] and thus the stringent standards adopted for new plants have not had their intended effect.

This Article's principal contribution to regulatory policy is to show the deep flaw in the standard academic approach to setting optimal regulatory standards, which proceeds in two steps: (1) selecting the new standard solely by reference to new sources and (2) choosing the transition relief in light of that new source standard. This approach often yields a suboptimal result because there may be no new sources to meet the stringent standard, rendering the new standard entirely meaningless. This Article demonstrates that the socially optimal approach is to jointly determine the new source

[1] 42 U.S.C. § 7411(a)(1)–(2), (b)(1)(B) (2006) (providing that stringent federal performance standards only apply to "new sources" of air pollution); *see also, e.g.*, Jonathan Remy Nash & Richard L. Revesz, *Grandfathering and Environmental Regulation: The Law and Economics of New Source Review*, 101 NW. U. L. REV. 1677, 1717–18 (2007) ("The early Clean Air Act legislative history reflects a compromise to accept an extension of existing plants' lives in exchange for the application of very strict standards to the new plants that would replace them in the future. More than a third of a century after that compromise was struck, many of the plants that were in existence then remain in service now—far beyond the retirement date that most initially expected, even taking into account the introduction of life-extending differential regulatory standards." (footnote omitted)).

standard and the transition rule. This Article also challenges the main public choice justification for providing transition relief: while accompanying new regulations with transition relief may make it easier for political actors to adopt new regulations in the first place, transition relief may also render the new regulations entirely ineffective such that it would be preferable to maintain the status quo.

The appropriate scope of transition relief has been discussed extensively in the academic literature, as has the question of whether transition relief is desirable at all.[2] The position now referred to as the "old view" favors transition relief because existing actors have relied on the previous laws in ordering their affairs and hence should be granted some time to adjust to new laws.[3] What is now referred to as the "new view" argues against transition relief on the ground that it can discourage actors from anticipating socially desirable legal changes.[4] The new view was first articulated by Michael Graetz in the tax context[5] and Louis Kaplow in the regulatory context.[6] While the new view has been very influential, it has recently been challenged by Steven Shavell.[7] Thus, Shavell and Kaplow—colleagues at Harvard Law School and frequent coauthors[8]—have taken different positions on the subject of optimal transition relief. While Kaplow contends that transition relief is generally undesirable because it gives

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[2] *See, e.g.*, DANIEL SHAVIRO, WHEN RULES CHANGE: AN ECONOMIC AND POLITICAL ANALYSIS OF TRANSITION RELIEF AND RETROACTIVITY (2000); Michael J. Graetz, *Legal Transitions: The Case of Retroactivity in Income Tax Revision*, 126 U. PA. L. REV. 47 (1977); Louis Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509 (1986); Steven Shavell, *On Optimal Legal Change, Past Behavior, and Grandfathering*, 37 J. LEGAL STUD. 37 (2008).

[3] *See, e.g.*, Harold M. Hochman, *Rule Change and Transitional Equity*, *in* REDISTRIBUTION THROUGH PUBLIC CHOICE 320, 324 (H. Hochman & G. Peterson eds., 1974); Frank I. Michelman, *Property, Utility, and Fairness: Comments on the Ethical Foundations of "Just Compensation" Law*, 80 HARV. L. REV. 1165, 1219, 1224 (1967). This argument has also been made in the tax context. *See, e.g.*, U.S. DEP'T OF THE TREASURY, BLUEPRINTS FOR BASIC TAX REFORM 187–88 (1977); Comm. on Tax Policy, N.Y. State Bar Ass'n, *Retroactivity of Tax Legislation*, 29 TAX LAW. 21, 23, 27–28 (1975); Note, *Setting Effective Dates for Tax Legislation: A Rule of Prospectivity*, 84 HARV. L. REV. 436, 439 (1970).

[4] *See, e.g.*, SHAVIRO, *supra* note 2, at 2–3; Kaplow, *supra* note 2, at 531; Graetz, *supra* note 2, at 64–66, 85.

[5] Graetz, *supra* note 2.

[6] Kaplow, *supra* note 2.

[7] Shavell, *supra* note 2.

[8] *See, e.g.*, LOUIS KAPLOW & STEVEN SHAVELL, CONTRACTING (2004); LOUIS KAPLOW & STEVEN SHAVELL, DECISION ANALYSIS, GAME THEORY, AND INFORMATION (2004); LOUIS KAPLOW & STEVEN SHAVELL, FAIRNESS VERSUS WELFARE (2002); Louis Kaplow & Steven Shavell, *Economic Analysis of Law*, *in* 4 HANDBOOK OF PUBLIC ECONOMICS 1661 (Alan J. Auerbach & Martin Feldstein eds., 2002); Louis Kaplow & Steven Shavell, *Fairness Versus Welfare: Notes on the Pareto Principle, Preferences, and Distributive Justice*, 32 J. LEGAL STUD. 331 (2003); Louis Kaplow & Steven Shavell, *Moral Rules, the Moral Sentiments, and Behavior: Toward a Theory of an Optimal Moral System*, 115 J. POL. ECON. 494 (2007); Louis Kaplow & Steven Shavell, *Notions of Fairness Versus the Pareto Principle: On the Role of Logical Consistency*, 110 YALE L.J. 237 (2000); Louis Kaplow & Steven Shavell, *Property Rules Versus Liability Rules: An Economic Analysis*, 109 HARV. L. REV. 713 (1996).

actors little incentive to anticipate desirable legal changes,[9] Shavell correctly notes that, in the regulatory context, because of the significant investments that new actors must make in order to respond to previous regulations, it is desirable in some instances to grandfather existing actors.[10] This Article attempts to reconcile these two competing positions by reconsidering Shavell's and others' arguments in favor of transition relief and by pointing out how existing analyses of this issue must be revised and expanded to deal with matters that have received insufficient attention.

This Article proceeds as follows. Part I summarizes the academic debate over transition relief and includes a detailed discussion of Shavell's recent article and the model he uses to advance his thesis. It also identifies what we believe to be the key gap in the current literature: Shavell and Kaplow both give insufficient attention to each other's strongest argument. Shavell does not fully address Kaplow's argument that providing transition relief discourages actors from anticipating legal changes, and Kaplow does not deal with Shavell's argument that not providing transition relief to actors who have already invested in expensive technology in order to comply with existing law may be socially undesirable. Part II discusses limitations of the domain over which Shavell's theory is applicable and demonstrates that, even in a regulatory regime, actors can be induced to anticipate socially optimal legal changes. Part III considers some of the long-term consequences of grandfathering as existing plants become more inefficient over time. It shows that this inevitable decay counts as a significant argument against grandfathering.

Our major contribution to the literature is presented in Part IV, where we discuss how the academic literature's overarching approach to determining the desirability of grandfathering must be revised and expanded. Under the current approach of the academic literature, the regulator first picks a socially optimal standard for new sources and then chooses the optimal transition rule for existing sources in light of that standard. We argue that regulators should instead be making these two decisions simultaneously. Indeed, the approach presently favored by the academic literature, which leads to a stringent new source standard and a permissive transition rule that is appropriate in light of the stringency of this new standard, might significantly discourage the construction of new plants and leave existing plants in operation over a long period of time. In this situation, we argue that it would be socially desirable to select a somewhat-less-stringent prospective standard coupled with a somewhat-more-stringent grandfathering rule. But unless regulators make both decisions simultaneously, they cannot devise the optimal outcome. Finally, in Part V, we discuss public choice pathologies associated with transition relief, focusing on the experience under the Clean Air Act. Specifically, we

[9] Kaplow, *supra* note 2, at 615–16.

[10] Shavell, *supra* note 2, at 38–39.

suggest that coupling new regulations with generous transition relief can prevent those new regulations from having their intended effect and can also lead to wasteful lobbying.

## I. ACADEMIC DEBATE OVER LEGAL TRANSITIONS

This Part briefly discusses the old view, but focuses on the new view and on qualifications of the new view. In discussing these competing positions, we distinguish between the tax and regulatory literatures. Because this Article is focused on transition relief in the context of environmental regulation,[11] we devote more attention to the latter.

### *A. Old View*

What the literature now refers to as the old view is the position that transition relief should generally be provided so as to avoid upsetting settled expectations and to promote fairness.[12] The basic argument is simply stated: because actors rely on the current law when organizing their affairs, it would be unjust to not provide them with transition relief.[13] The argument presupposes that when investors and taxpayers make investment decisions, they are doing so based on the expectation that the law will not change. Thus, when the law does change in a way that decreases the value of their investments, these actors unexpectedly experience losses for which they should be compensated.[14]

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[11] This Article focuses on command-and-control regulation and thus does not discuss market-based regimes. We also generally assume regulations that are enforced by injunction as opposed to a system of monetary damages. For an argument that liability-based transition relief is preferable to property-based relief in the context of environmental regulation, see Jonathan R. Nash, The Cathedral of Transition Relief in Environmental Law 2 (Nov. 11, 2010) (unpublished manuscript) (on file with authors). For a discussion of which institutional actor is best suited to provide transition relief, see Jonathan S. Masur & Jonathan Remy Nash, *The Institutional Dynamics of Transition Relief*, 85 N.Y.U. L. REV. 391, 436–55 (2010).

[12] SHAVIRO, *supra* note 2, at 2–3 (referring to the position that favors transition relief to protect reliance interests as the "old view").

[13] This argument has often been advanced in the tax context. *See, e.g.*, U.S. DEP'T OF THE TREASURY, *supra* note 3, at 187–88; Comm. on Tax Policy, N.Y. State Bar Ass'n, *supra* note 3, at 23, 27–28; Note, *supra* note 3, at 439. Fairness arguments have also been made in favor of transition relief in a more general context. *See, e.g.*, Hochman, *supra* note 3, at 324; Michelman, *supra* note 3, at 1219, 1223–24. Jill Fisch has argued that "legal changes must be evaluated individually" and that "[i]n analyzing the effect of a particular new rule, it is necessary to consider the change in context":

> [I]n the context of an unstable equilibrium our intuitions about the legitimacy of retroactivity are justified, and retroactive lawmaking is an appropriate and efficient means of clarifying, correcting, and incrementally adjusting the regulatory climate. In a stable equilibrium, however, legal change imposes considerable costs on individuals subject to the change and on the legal system as a whole.

Jill E. Fisch, *Retroactivity and Legal Change: An Equilibrium Approach*, 110 HARV. L. REV. 1055, 1100, 1123 (1997).

[14] While old-view scholarship is not as common as it was in the 1960s and 1970s, some recent work continues to support the old view. *See, e.g.*, Richard A. Epstein, *Beware of Legal Transitions: A*

Frank I. Michelman uses John Rawls's theory of "justice as fairness" to develop a fairness argument in favor of transition relief, with the relief being provided in the form of compensation to actors negatively affected by the policy change.[15] Michelman argues that the goal of a transition relief policy should be to minimize the long-run risk to individuals who will be potentially harmed by a legal change.[16] Without a compensation policy, certain individuals will suffer significant losses when forced to comply with a new law. With a compensation policy, however, the overall gains from a particular legal change will not be as high as they otherwise would be because of the costs of compensating those individuals—which Michelman refers to as "settlement costs."[17] Thus, Michelman argues that transition relief should be required "when settlement costs are low, when efficiency

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*Presumptive Vote for the Reliance Interest*, 13 J. CONTEMP. LEGAL ISSUES 69, 70 (2003) ("The proper approach starts with a strong presumption and not a categorical denial: beware of legal transitions. Wherever possible try to keep the legal framework constant, and allow the response to societal changes to take place through private adjustments."); Daniel E. Troy, *Toward a Definition and Critique of Retroactivity*, 51 ALA. L. REV. 1329, 1341–42 (2000) (arguing that retroactive legislation should be avoided because individuals base their behavior on the existing law and providing fair notice of legal changes is "fundamental to the rule of law"). David Hasen has also recently attacked new-view scholarship as being "analytically deficient." David M. Hasen, *Legal Transitions and the Problem of Reliance*, 1 COLUM. J. TAX L. 120, 123–24 (2010) (arguing that new-view literature has failed to both "develop consistent definitions of such key concepts as 'transition,' 'legal transition,' and 'transition norm' . . . [and] demonstrate that a reliance-based view is unable to reach correct results on the question of the proper default norms for changes to positive law and for judicial decisions that adopt new rules").

The topic of retroactivity in the tax context was also recently debated at the 2010 European Association of Tax Law Professors Congress in Leuven, Belgium. Daniel Shaviro argued against the provision of transition relief when disadvantageous tax changes are implemented, while Charlotte Crane argued in favor of transition relief. *See* EUROPEAN ASS'N OF TAX LAW PROFESSORS, PROGRAM FOR CONGRESS (2010), *available at* http://www.eatlp.org/uploads/public/Program%20Leuven.pdf. For a summary of the arguments advanced by Shaviro and Crane, see DANIEL SHAVIRO & CHARLOTTE CRANE, *Retroactivity in Law & Economics*, *available at* http://www.law.nyu.edu/ecm_dlv3/groups/public/@nyu_law_website__faculty__faculty_profiles__dshaviro/documents/documents/ecm_pro_065857.pdf.

[15] Michelman, *supra* note 3, at 1219–21 (discussing transition relief in the context of the Takings Clause). For a detailed discussion of optimal compensation under the Takings Clause, see Lawrence Blume, Daniel L. Rubinfeld & Perry Shapiro, *The Taking of Land: When Should Compensation Be Paid?*, 99 Q.J. ECON. 71 (1984).

[16] *See* Michelman, *supra* note 3, at 1223.

[17] "Settlement costs" are measured by the dollar value of the time, effort, and resources which would be required in order to reach compensation settlements adequate to avoid demoralization costs. Included are the costs of settling not only the particular compensation claims presented, but also those of all persons so affected by the measure in question or similar measures as to have claims not obviously distinguishable by the available settlement apparatus. *Id.* at 1214. Michelman also discusses what he terms "demoralization costs":

> "Demoralization costs" are defined as the total of (1) the dollar value necessary to offset disutilities which accrue to losers and their sympathizers specifically from the realization that no compensation is offered, and (2) the present capitalized dollar value of lost future production (reflecting either impaired incentives or social unrest) caused by demoralization of uncompensated losers, their sympathizers, and other observers disturbed by the thought that they themselves may be subjected to similar treatment on some other occasion.

*Id.* (footnote omitted).

gains [of the regulatory change] are dubious, and when the harm concentrated on one individual is unusually great."[18] In contrast, he argues that transition relief is not desirable when "settlement costs are high," and the loss experienced by each individual is comparatively low.[19]

### *B. New View*

Proponents of the new view contend that transition relief is generally undesirable primarily because it removes the incentives to anticipate legal change. We first discuss the new view in the tax context—where the view was first articulated—and then focus on the arguments advanced in the regulatory context.

*1. Tax Context.*—Michael J. Graetz was the first scholar to present a sustained challenge to the old view that transition relief is necessary when a new tax law is adopted.[20] Graetz first argues that, as market principles suggest, it is in fact efficient to anticipate changes.[21] Investors must always anticipate changes in the markets; similarly, they should anticipate changes in the law.[22] Moreover, Graetz argues that transition relief in the form of grandfathering "reduce[s] whatever benefits are expected to be realized from the change in the law" and "increase[s] planning and enforcement costs for both taxpayers and the government."[23]

Graetz also attacks the reliance argument used by old-view scholars, which states that because taxpayers have relied on the laws in making investment decisions, an uncompensated change is unfair and tantamount to the government suddenly changing the terms of a contract.[24] He points out that it is not reasonable for people to assume that tax laws will never

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[18] *Id.* at 1223.

[19] *Id.* Louis Kaplow agrees that the failure to compensate will somewhat discourage certain investments but argues that "this 'disincentive' [is] necessary to eliminate the overinvestment that would result from compensation." *See* Kaplow, *supra* note 2, at 561. While Michelman does discuss efficiency concerns and maximizing total utility, he stresses that the compensation decision should ultimately be based on justice "without regard to the effect of the decision on the net social product." Michelman, *supra* note 3, at 1219. Martin Feldstein, writing in the tax context, suggests that transition relief is important to avoid "inefficient precautionary behavior." Martin Feldstein, *On the Theory of Tax Reform*, 6 J. PUB. ECON. 77, 93 (1976). For example, he argues that proposals to nullify the "oil depletion allowance" have inefficiently decreased investment in oil. *Id.* He contends that the way to prevent this inefficient behavior is to consistently provide transition relief because then "investors know that they will be fully compensated for any losses that result from reform." *Id.* at 98. Michael J. Graetz criticizes Feldstein for providing no explanation as to why anticipating legal changes leads to inefficient behavior and argues that market principles suggest that the opposite is true. *See* Graetz, *supra* note 2, at 64–65.

[20] *See* Graetz, *supra* note 2.

[21] *Id.* at 65.

[22] *Id.* at 65–66.

[23] *Id.* at 71.

[24] *Id.* at 74.

change, especially when particular events signal that a change in tax law is very likely.[25] He also explains that granting compensation or providing grandfathering provisions whenever a law is changed delays or stifles legal and regulatory innovation.[26]

Daniel Shaviro adopts a similar approach in his book, *When Rules Change: An Economic and Political Analysis of Transition Relief and Retroactivity*, which analyzes transition relief primarily in the tax context, though it also includes some discussion of the regulatory context.[27] Shaviro suggests that whether transition relief is desirable depends on whether the legal change should be described as a policy change or an accounting change and notes that all tax rules have these two types of characteristics—"those that are policy relevant and those that are merely accounting conventions."[28] Shaviro goes on to state that "[policy relevant] features . . . decide how tax burdens are actually distributed between taxpayers and allocated between economic activities at equilibrium . . . [while] accounting conventions [refer to] the details of exactly how, when, and from whom the taxes that give rise to these relevant burdens are collected."[29]

Like Graetz, Shaviro finds that transition relief is generally inappropriate in the context of policy changes.[30] He notes a large imbalance

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[25] *Id.* at 75–76 (noting that reliance may no longer be reasonable once the President publicly endorses a change or one or both houses of Congress pass a bill).

[26] *See id.* at 71 ("[G]randfathered effective dates will often reduce whatever benefits are expected to be realized from the change in the law. The social gains to be realized from the change will often be delayed with a grandfathered effective date.").

[27] SHAVIRO, *supra* note 2, at 2–3, 7, 10–11, 62–63, 81–86.

[28] *Id.* at 8; *accord id.* at 7–8, 13, 53 (discussing "policy change" retroactive taxes).

[29] *Id.* at 8. To use Shaviro's example, consider the municipal bond preference which exempts from taxation interest earned on municipal bonds. *Id.* The policy-relevant feature is to prefer municipal bonds to other investment types. There are also various accounting features which were adopted in order to accomplish the policy goal. *Id.* at 8–9. For example, this tax benefit is provided to bondholders rather than issuers, even though providing the tax preference to issuers would have the same intended economic effect. *Id.* at 9. In the case of a policy change, a general norm of not providing transition relief serves the purpose of that policy change by producing desirable ex ante incentive effects. *See id.* at 7, 60. For example, banning a hazardous product constitutes a "policy change" because not providing transition relief in the event of the ban advances the purpose of the legal change—product safety—by giving manufacturers an ex ante incentive to only invest in safe products. However, with an accounting change, a general norm of not providing transition relief does not advance the purpose of the legal change. *See id.* at 62. To use Shaviro's example, suppose the prevailing currency, which has a green color, is abandoned in favor of a red currency because the green currency is easily forged. *Id.* at 10. In this case, providing no transition relief—and thus not permitting individuals holding green currency to trade in their green currency for new red currency—would be undesirable because it would not advance the purpose of the new law. *Id.* Our discussion in the text concerns only policy changes.

[30] While Shaviro's conclusion regarding policy changes is in line with Graetz's, his reasoning is somewhat different. While Graetz suggests that "change[s] in tastes or societal conditions [are] reflected through the political process," *see* Graetz, *supra* note 2, at 65, Shaviro questions the extent to which "public political choice" (which is reflected in the laws that are passed) is actually similar to "private consumer choice" (which is reflected by market demand). SHAVIRO, *supra* note 2, at 64. It is

in transition relief policy when it comes to gains versus losses.[31] While transition relief is often afforded to those who are harmed by a particular legal change, those who benefit typically do not have to pay back their resulting gains.[32] Indeed, while individuals who experience a windfall loss from a change in the tax law are often compensated, individuals who experience a windfall gain are almost never required to pay it back.[33] In light of this asymmetry, Shaviro opposes transition relief for policy changes regardless of whether the underlying policy change is desirable.[34]

*2. Regulatory Context.*—Louis Kaplow presents a general version of the argument against transition relief in the regulatory context.[35] He argues that market-based solutions to transition problems are generally preferable to government solutions and points out that this position is well-accepted in the case of market-induced transitions.[36] Indeed, a person who invests in a product that turns out to be unsuccessful is not compensated for her poor investment decision. Kaplow argues that just as transition relief is inappropriate in market-induced transitions, it is similarly inappropriate in the case of government-induced transitions.[37]

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desirable to "let[] the owners of an ice cream parlor absorb the loss from a decline in the public's taste for ice cream [because] it may induce them to try harder to determine what the public wants." *Id.* Shaviro, however, suggests that making investors bear the risk of a legal change may not make as much sense as making them bear the risk of a market change because, while the demand for a particular product tends to be a good indicator of consumer choice, the laws that are passed are not necessarily good indicators of overall public opinion, partly for public choice reasons. *Id.* at 67–71. Shaviro argues that this is the case for three reasons: problems of aggregation, problems of organization, and problems of information:

> [C]ollective choice requires aggregating people's preferences rather than giving each one the result he wants. Hence, the point that 49 percent of the people can buy their own ice cream but not pass their own law. Amongst other implications, aggregation is likely to reduce the level of voter investment in attempting to make good decisions.

*Id.* at 67. Other aggregation problems also arise because people may choose not to vote because "[t]he value of a single vote is so low" and because "voting, unlike the use of money to buy consumer goods, is ordinal rather than cardinal" and thus does not reveal the intensity of voter preferences. *Id.* at 67, 69–72 (discussing how interest group theory suggests that "democratic politics tends to produce transfers from the many to the few" and noting that information problems are even worse "in the realm of public political choice" than in the market context).

[31] SHAVIRO, *supra* note 2, at 89–90.

[32] *Id.* at 89 (explaining that, in the tax context, "the political impetus to compensate transition losses exceeds that to deny transition gains").

[33] *Id.* at 229 (noting that a norm of not providing transition relief for policy changes "would tend to reduce the prevailing asymmetry in favor of providing greater transitional adjustment when income tax preferences that worsen resource allocation are curtailed than when they are expanded").

[34] *Id.*

[35] *See* Kaplow, *supra* note 2.

[36] *Id.* at 513–14.

[37] In making his argument, Kaplow primarily discusses the transition policy of compensation; however, he explains that his argument generally applies to other forms of transition relief as well. *See id.* at 556 n.133.

The thrust of Kaplow's analysis involves a discussion of transition relief in terms of risk and incentives. First, he argues that compensating "losers" under the new law "insulates investors from the real effects of their decisions, and thus distorts their behavior," leading to overinvestment in their activity.[38] To illustrate this point, Kaplow presents two examples. In one, a particular piece of land is at risk of being seized by the government in order to build a highway.[39] If the landowner knew that she would be fully compensated for the value of the property, she might have an incentive to improve the land, even knowing that the land would eventually be leveled. She would not undertake such improvements, however, if she had to bear the risk of uncompensated government action. In the other example, if a product manufacturer knows that it will be compensated by the government in the event that its product is subsequently banned, it might continue to invest resources in manufacturing the product even when the probability of a ban is high.[40] Thus, in both cases, government-sponsored transition relief can promote inefficient behavior.

Kaplow argues that while uncertainty about future changes in law produces risk, market-based approaches to risk management are preferable to government compensation schemes. Specifically, because government compensation can result in overinvestment, it is better for actors to deal with risk by purchasing insurance or by diversifying their investments.[41] Kaplow acknowledges that the insurance solution is not perfect because there are many cases in which actors will underestimate risk and thus not purchase insurance.[42] Still, he argues that instead of compensating individuals who have failed to purchase insurance, the government can better deal with this problem by requiring people to purchase such insurance in the first place.[43]

Saul Levmore has also contributed to the transition relief debate in the regulatory context.[44] He explains that not granting transition relief can cause meaningful social reforms to occur more quickly than they otherwise would.[45] For example, if a chemical manufacturer is compensated in the event that a chemical it produces is banned, it has no incentive to acquire more information about the chemical.[46] As a result, a ban that would be

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[38] *Id.* at 513, 519.

[39] *Id.* at 529.

[40] *Id.*

[41] *Id.* at 527–28.

[42] *Id.* at 548.

[43] *Id.* at 549.

[44] *See* Saul Levmore, *Changes, Anticipations, and Reparations*, 99 COLUM. L. REV. 1657 (1999).

[45] *See id.* at 1663 ("[R]egulated firms know or could know more than the government about likely subjects of regulatory concern and, therefore, might be in the best position to forecast the coming, good law . . . [but] if the law is such that these firms know that they will be compensated for the cost of legal change, then they have little incentive to anticipate new law.").

[46] *Id.* at 1658–59.

socially valuable could be delayed. If, however, the manufacturer must bear the risk of a ban, it has an incentive to gather such information. If it finds that the chemical is harmful, it might fear the possibility of a subsequent ban and therefore invest resources in developing an alternative chemical that does not produce harmful results. Thus, where actors have an incentive to anticipate changes, they might do so prior to government action.[47] And even if a firm does not stop using the product voluntarily, it will be more likely to develop a contingency plan if it knows that it would be affected by a subsequent ban.

### *C. Qualifications of the New View*

While the arguments advanced by Kaplow, Graetz, Shaviro, and Levmore have been very influential, they have not gone unchallenged.[48] Recently, Steven Shavell has offered a compelling critique of the new view by demonstrating that, in the context of regulatory standards, a policy of grandfathering will often minimize total social costs.[49] Specifically, he suggests that for actors who have already complied with previous

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[47] *Id.* at 1663 ("The more aggressive the expected application of these new rules, the more it seems likely that well-informed firms will choose to substitute other, less harmful inputs before the government . . . devises the new controls.").

[48] In the tax context, a few scholars have attacked or at least qualified the view that transition relief is generally inappropriate. *See* Kyle D. Logue, *Tax Transitions, Opportunistic Retroactivity, and the Benefits of Government Precommitment*, 94 MICH. L. REV. 1129, 1138–40 (1996) (arguing that it is economically efficient to provide transition relief in the context of incentive subsidies); J. Mark Ramseyer & Minoru Nakazato, *Tax Transitions and the Protection Racket: A Reply to Professors Graetz and Kaplow*, 75 VA. L. REV. 1155, 1163–65 (1989) (arguing that transition relief can be desirable because it minimizes wasteful postenactment lobbying costs). Like Shaviro, Ramseyer and Nakazato criticize the assumption that most tax legislation is efficient and thus desirable. Ramseyer & Nakazato, *supra*, at 1163. Ramseyer and Nakazato also suggest that, even if new tax legislation is generally desirable, providing transition relief is more efficient than not providing it because transition relief minimizes wasteful postenactment lobbying costs. *Id.* at 1173. Kyle Logue argues that it is economically efficient to provide transition relief in the context of incentive subsidies, which he defines as "provisions whose primary purpose is to alter taxpayers' decisions regarding how they will invest their resources." Logue, *supra*, at 1138 (emphasis omitted). He argues that if transition relief is not provided for incentive subsidies, then "future incentive credits would have to be more generous . . . to achieve the same amount of increased investment in the targeted asset or activity." *Id.* at 1139. To use Logue's example, suppose there was a dearth of low-income housing. *Id.* at 1144. To remedy this situation, the government might decide to pass an incentive subsidy and grant a tax credit to individuals who invest in low-income housing. *Id.* By granting this credit, people who otherwise would not invest in low-income housing would be encouraged to do so. If this incentive subsidy was later repealed and transition relief was not provided, those investors would suffer a transition loss. *See id.* at 1133, 1139. This would cause future investors to be more cautious when making investments based on promised tax credits because there is a possibility that the government would repeal the tax credit, making their investments unprofitable. *Id.* at 1140. Thus, in order to ensure that the proper level of investment is achieved, the government would have to increase future incentive subsidies or, to use Logue's terminology, increase the "default premium." *Id.* at 1139.

[49] Shavell, *supra* note 2, at 38–39.

regulations by purchasing durable precautions,[50] such as smoke scrubbers, it can be socially costly to require the purchase of new durable precautions in response to new regulations.[51] Before explaining Shavell's argument in detail, it is useful to describe Shavell's model and some of his background assumptions.

*1. Shavell's Model.*—First, Shavell considers two periods of time. In period one, he assumes that some actors are already participating in a particular activity, and in period two, new actors may enter the activity.[52] Thus, some actors will participate in the given activity during both periods one and two while others will participate only in period two. The number of firms entering in each of the periods is exogenous to Shavell's model and is therefore not affected by the transition rule.[53]

Second, Shavell assumes that in period one there is uncertainty about the magnitude of the harm caused by the activity. For example, it might be known that the harm caused falls somewhere between $100,000 and $1,000,000, but the exact amount might be unknown. Shavell further assumes that this uncertainty is resolved by the beginning of period two.[54] At that point, the actual magnitude of the harm becomes known and the desirable level of investment for safety can then be determined. The participants in period one have already invested in some level of abatement technology. Shavell assumes that this technology is not optimal in period two once the precise harm is ascertained.[55]

Third, Shavell distinguishes between durable precautions and nondurable precautions. Durable precautions "involve the acquisition of a safety device . . . or relate to fixed physical aspects of property," and nondurable precautions "take the form of effort to reduce risk."[56] While an actor can continue to use in period two at little or no cost a durable precaution that was purchased in period one, the cost of a nondurable precaution in period two is independent of its cost in period one.[57] For example, if a company purchases a smoke scrubber in period one, it can continue to use the smoke scrubber in period two at no cost (assuming no maintenance costs). In contrast, the cost of nondurable precautions, such as frequent inspections to ensure that equipment is operating properly, will cost the same in period two as they do in period one, and the fact that a

[50] *See infra* text accompanying notes 56–59.

[51] Shavell, *supra* note 2, at 38–39.

[52] *See id.* at 41.

[53] *Id.* at 56–57. Shavell acknowledges that grandfathering may actually increase participation in certain activities and that "because such enhanced participation would tend to be socially undesirable, grandfathering would be socially desirable less often than [he] found it to be." *Id.* at 57.

[54] *Id.* at 42.

[55] *Id.* at 42–43.

[56] *Id.* at 41–42.

[57] *Id.*

nondurable precaution was undertaken in period one does not affect its cost in period two.[58] Shavell shows that, while grandfathering is never optimal for nondurable precautions, it is sometimes optimal for durable precautions.[59] Because the only controversy about grandfathering involves durable precautions, they will be the focus of the remainder of this Article.

Using this model, Shavell demonstrates that, for durable precautions, total social costs—which he defines as "the costs of precautions over the 2 periods plus the expected harm done"[60]—will often be minimized with a policy of grandfathering. Specifically, when the cost of a new precaution exceeds the benefit from the expected reduction in harm achieved by switching to the new precaution, social welfare is enhanced if the actor continues to use the precaution used in period one.

To illustrate that grandfathering can be socially desirable in such instances, Shavell offers the following numerical example.[61] Suppose that in period one a firm is engaging in a particular activity and, in an effort to decrease the probability of harm caused by the activity, the firm purchases a device that lowers the risk of harm to 7%. In period two, the total harm caused by the activity absent any precautions is determined to be $700,000. Suppose that for this harm the optimal precaution for a new firm costs $20,000 and would decrease the risk of harm to 5%. The existing firm could continue to use its period-one precaution during period two at no additional cost or it could transition to the optimal precaution at a cost of $20,000. Suppose a new regulation requires that firms take the optimal precaution. Shavell argues that, in this instance, grandfathering is appropriate because the total social cost of investing in the new technology exceeds the social cost of maintaining the old technology. If the firm keeps its old technology, it bears no additional pollution control costs, so the total social cost just equals the probability of harm times the magnitude of the harm: 0.07 x $700,000 = $49,000. However, if the firm switches to the new technology, it must pay $20,000 and the expected harm to society is 0.05 x $700,000 = $35,000. Thus, the total social cost of transitioning is $55,000. Because this cost is greater than the social cost of not switching to the new technology—$49,000—grandfathering is socially optimal in this example.

*2. Gap in the Literature.*—To summarize, Graetz and Kaplow made a significant contribution by identifying that, just as transition relief is inappropriate in market-induced transitions, transition relief is inappropriate in government-induced transitions. The expectation of transition relief discourages actors from considering the risk of legal change in making decisions and thus induces them to make socially inefficient decisions.

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[58] *Id.*

[59] *Id.* at 46–47.

[60] *Id.* at 44.

[61] *See id.* at 46–47.

Shavell presented a significant counterargument by demonstrating that a policy of no transition relief can prove socially costly when actors have already invested in expensive technology in order to comply with previously enacted regulations.[62]

Each of the competing positions, however, is incomplete. In a regulatory context, where there is investment in durable precautions, Kaplow's article does not consider the costs facing existing actors that are confronted with new regulations. As Shavell demonstrates, the costs of retrofitting an existing facility may sufficiently outweigh the benefits, making it socially desirable to grandfather existing sources.[63] At the same time, as we show in Part II, given certain realities of the administrative state, Shavell's article does not completely address the problem recognized by Kaplow: actors have no incentive to anticipate legal changes if transition relief is provided.[64] Thus, two of the strongest arguments concerning grandfathering point in different directions and so far no effort has been made to reconcile the positions in order to derive a more complete theory concerning the desirability of transition relief. We now turn to that inquiry.

## II. ANTICIPATING NEW LEGAL STANDARDS

In this Part, we expand upon Shavell's analysis to demonstrate that grandfathering might discourage actors from voluntarily anticipating legal changes where grandfathering would be socially optimal. Specifically, we discuss three of Shavell's assumptions—(1) that regulations effectively dictate actors' behavior,[65] (2) that new regulations are adopted swiftly following the discovery of new information,[66] and (3) that regulators have perfect information about future conditions[67]—and suggest that they are inconsistent with the general structure of the administrative state. We focus on the environmental context because environmental regulations account

[62] *Id.* at 79.

[63] Perhaps the reason Kaplow does not address this argument is that his article is primarily concerned with a strict liability regime, and grandfathering is always undesirable in strict liability regimes where "parties will automatically be induced to take past behavior into account in a socially appropriate manner." *Id.* at 39.

[64] Kaplow, *supra* note 2, at 531–32. Shavell argues that "[t]he key to understanding the difference in conclusions is to note that the transitions literature does not distinguish between legal rules based on legal standards and legal rules based on strict liability." Shavell, *supra* note 2, at 78. However, as we demonstrate, actors can also be expected to anticipate legal changes when those changes are based on legal standards. *See infra* Part II.

[65] *See* Shavell, *supra* note 2, at 79.

[66] *Id.* at 42–43, 80 (assuming that "present regulated behavior . . . appropriately reflect[s] all possible future changes in the world").

[67] *Id.* at 80 ("[T]he legal standard in period 1 impounds correctly all possible future changes in harm in period 2.").

for a significant portion of federal regulatory activity[68] and because most of Shavell's examples involve regulations aimed at reducing pollution.[69]

First, Shavell suggests that an actor's behavior is prescribed by the legal standards and thus that the actor cannot choose to anticipate a future standard by installing technology that deviates from the existing regulations. "In the first place, parties' present behavior is by hypothesis regulated—it must satisfy a legal standard; it is not behavior that parties are free to choose and thus that could be influenced by anticipated future changes in the law."[70] For Shavell, the regulatory regime prescribes the adoption of a particular technology: "The smoke scrubber that a firm installs today is not one that the firm is free to choose; in a regulated world, the scrubber must be of the type prescribed by the regulators."[71] Thus, in period one, a party could not choose to install more advanced technology if it suspected that the regulation would be strengthened in the future.

As we argue in section A, most environmental regulatory standards, however, are performance standards. They typically require that plants meet an emissions standard that is achievable through the use of the "best available technology," as determined by the regulator.[72] They are not design standards, which actually mandate the use of a particular technology.[73] Actors subject to performance standards can use whatever technology they want, as long as the resulting emissions are no higher than those that would result from the "best available technology." Thus, regulated firms are not precluded from making pollution abatement decisions that anticipate regulatory change.

If there is no promise of transition relief, actors subject to a performance standard may rationally decide to comply with a more stringent standard that they believe will be adopted in the near future. For example, if regulations require the installation of smoke scrubbers that reduce emissions by a certain percentage, a firm that anticipates stricter regulations in the future might rationally choose to spend more money now for more efficient scrubbers that would reduce emissions by a higher-than-required percentage, thus saving the higher costs of retrofitting its plant in the future. Of course, because Shavell also assumes that regulators have perfect information regarding future uncertainties, a firm under his model

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[68] *See, e.g.*, Nicholas Bagley & Richard L. Revesz, *Centralized Oversight of the Regulatory State*, 106 COLUM. L. REV. 1260, 1268 (2006) (noting that the Office of Information and Regulatory Affairs (OIRA) primarily focuses on Environmental Protection Agency (EPA) regulations due to their economic significance).

[69] *See* Shavell, *supra* note 2, at 38 ("Consider a firm that installed a type of smoke scrubber that satisfied pollution-control rules 5 years ago when the firm built a factory.").

[70] *Id.* at 79.

[71] *Id.*

[72] *See infra* notes 78–83 and accompanying text.

[73] *See infra* notes 78–79 and accompanying text.

would never elect to do more than the regulation required.[74] As we argue in section C, however, in a world where regulators do not have perfect information or are precluded by law from promulgating regulations based on their probabilistic assessment of future changes, firms may rationally invest in more effective pollution control technology in anticipation of future regulations.

Second, Shavell's model assumes that regulatory changes occur immediately following the generation of new information. While acknowledging that in the real world laws are generally stable and do not change very often,[75] for the purposes of his model he assumes that the law swiftly changes in response to new information.[76] Thus, once the regulator determines that a particular pollutant is more harmful than was originally thought, it immediately promulgates new regulations reflecting this new information. In section B we suggest, instead, that there is inevitable delay—often lengthy delay—between new information and regulatory changes and that, during this period, actors can be encouraged to anticipate socially optimal legal changes if they are not promised transition relief.

Third, Shavell's model assumes that regulators have perfect information and that legal standards are optimally developed, taking into account present information regarding future changes.[77] Thus, under Shavell's model, a regulated actor would never adopt technology that is more stringent than the technology required by the legal standard because the legal standard reflects all information about future uncertainties. In section C, we argue that regulators do not have access to perfect information about future uncertainties in crafting regulations and that the regulated firms often have superior information about such uncertainties. We also suggest that, because of certain administrative law constraints, regulators would not be able to develop standards based on probabilistic assessments of future changes even if they had perfect information about the future.

Finally, in section D, we use an extension of Shavell's model to demonstrate that a policy of no transition relief can induce actors to anticipate future legal changes in a way that is socially optimal. Thus, we show that Shavell's restrictive assumptions skew the argument in favor of

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[74] Shavell, *supra* note 2, at 49–50, 61–62.

[75] *Id.* at 68–69 (discussing general stability of the law).

[76] *Id.* at 42–43 (noting that the uncertainty about the level of harm is resolved by the beginning of period 2 and that, at this time, the law will change "in the light of the new information and circumstances"); *see also id.* at 80 (assuming that present regulations reflect "all possible future changes in the world").

[77] *Id.* at 80 (assuming that "present regulated behavior . . . appropriately reflect[s] all possible future changes in the world" and that "the legal standard in period 1 impounds correctly all possible future changes in harm in period 2"). Shavell does, however, acknowledge that imperfect information of the state may change the analysis. *Id.* at 54–55.

grandfathering by ruling out the possibility that firms could desirably anticipate future legal regulatory requirements.

### *A. Performance Standards Versus Design Standards*

In determining the desirability of grandfathering provisions, an important consideration is whether the regulatory regime imposes a performance standard or a design standard. We show in this section that the regulatory regime strongly favors performance standards over design standards.

A performance standard sets an emission limitation by reference to the pollution level that would be attained through the use of the best available technology, but does not actually mandate the use of any particular technology.[78] In contrast, a design standard requires an actor to use a particular technology. Generally, performance standards are considered preferable because they give regulated actors more flexibility and encourage technological innovation.[79] If the regulation requires all plants to purchase a particular type of smoke scrubber, there is little incentive for someone to develop a more effective or cheaper scrubber because regulated plants would not be able to use the better scrubber until the regulator changed the design standard.[80] In some cases, however, it is very difficult (or even impossible) to measure the pollution being emitted.[81] In those cases, design standards are desirable because the benefit of ensuring that an actor is using a particular technology known to reduce pollution may in fact

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[78] *See* RICHARD L. REVESZ, ENVIRONMENTAL LAW AND POLICY 168 (2008) (noting that performance standards are set "by reference to what the best available technology can accomplish, but . . . each source [may] choose the actual technology that it intends to use in order to meet the standard"); Nathaniel O. Keohane, Richard L. Revesz & Robert N. Stavins, *The Choice of Regulatory Instruments in Environmental Policy*, 22 HARV. ENVTL. L. REV. 313, 313 (1998) (noting that although design standards "requir[e] a particular technology's usage . . . performance standards prescrib[e] the maximum amount of pollution that a source can emit"); Sydney A. Shapiro & Robert L. Glicksman, *Goals, Instruments, and Environmental Policy Choice*, 10 DUKE ENVTL. L. & POL'Y F. 297, 308 (2000) ("Performance standards rely on particular technologies to formulate pollution reduction goals, but do not dictate that those same technologies be used as policy instruments to achieve those goals.").

[79] *See, e.g.*, Cass R. Sunstein, *Congress, Constitutional Moments, and the Cost-Benefit State*, 48 STAN. L. REV. 247, 268 (1996) ("[I]f an industry can comply with a sulfur dioxide emission standard by either using clean coal or implementing energy conservation methods, government should not command a particular method of compliance."); Edward W. Warren & Gary E. Marchant, *"More Good Than Harm": A First Principle for Environmental Agencies and Reviewing Courts*, 20 ECOLOGY L.Q. 379, 425–26 (1993) ("'[P]erformance standards,' which allow regulated companies to choose their own methods of compliance, are more cost effective than 'design standards,' which impose specific compliance methods.").

[80] *See* REVESZ, *supra* note 78, at 168; Shapiro & Glicksman, *supra* note 78, at 305 ("In theory at least, regulated entities subject to a performance standard have an incentive to develop such alternative means if they provide a more efficient means of achieving the regulatory goal.").

[81] *See infra* text accompanying notes 101–05 (discussing Adamo Wrecking Co. v. United States, 434 U.S. 275, 289 (1978)).

exceed the cost of stifling technological innovation by removing the incentive for the actor to seek more effective technology.

Some may wonder whether performance standards are effectively design standards in that there may only be one way to meet a particular performance standard. In practice, however, there are often multiple ways to comply with typical performance standards. For example, an electric utility can meet the applicable standard of 1.2 pounds of sulfur dioxide per million BTUs of heat input by burning low-sulfur coal (without any treatment technology) or by scrubbing high-sulfur coal.[82] Moreover, even if there was only one way to meet a particular standard, a standard styled as a performance standard and not a design standard would not impede a higher level of control, which a polluter might choose in anticipation of a more stringent standard.

For the most part, federal environmental statutes impose performance standards as opposed to design standards.[83] The Clean Air Act requires that new and modified[84] sources meet federally set best available technology (BAT) standards.[85] While these emission standards are set by reference to what the best available technology, as defined by the EPA, would achieve, the regulated firm is free to use any technology that will achieve the emission standard.[86] The Clean Air Act originally required that all new and modified sources comply with a New Source Performance Standard (NSPS), which is defined as:

> [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

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[82] *See* Bruce A. Ackerman & William T. Hassler, *Beyond the New Deal: Coal and the Clean Air Act*, 89 YALE L.J. 1466, 1485 & n.71 (1980); REVESZ, *supra* note 78, at 216–17; *see also* BRUCE A. ACKERMAN & WILLIAM T. HASSLER, CLEAN COAL/DIRTY AIR 31–54 (1981) (discussing political considerations that motivate alternate methods for complying with the applicable standard).

[83] *See* Shapiro & Glicksman, *supra* note 78, at 306–07; Wendy E. Wagner, *The Triumph of Technology-Based Standards*, 2000 U. ILL. L. REV. 83, 90 ("[A]lmost all technology-based standards . . . take the form of quantitative pollution limits and thus allow industry to choose how to best meet the standards—a choice that includes developing new pollution control technologies that run more cheaply or effectively.").

[84] For a detailed discussion of what constitutes a modification, see Jonathan Remy Nash & Richard L. Revesz, *supra* note 1. *See also infra* notes 232–34 and accompanying text (discussing how certain modifications trigger new source review under the Clean Air Act).

[85] 42 U.S.C. § 7411(a)(1)–(2), (b)(1)(B), (b)(4) (2006) (providing that stringent federal performance standards apply to "new sources" of air pollution and including modified sources within the definition of "new source").

[86] *See, e.g.*, Robert L. Glicksman, *Balancing Mandate and Discretion in the Institutional Design of Federal Climate Change Policy*, 102 NW. U. L. REV. COLLOQUY 196, 205 (2008) ("The EPA must identify the best available technology for a particular industry and calculate the performance-based results that the identified technology is capable of achieving. Industry is then free to comply by using the identified technology or any other means it prefers that allow more efficient compliance." (footnote omitted)).

> reduction and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated.[87]

Thus, NSPS is set in reference to the level of emissions that would result from the "best system of emission reduction," taking costs into account, that has been "adequately demonstrated."[88] It does not, however, actually require the adoption of the "best system of emission reduction."[89] A firm can use any technology it wants as long as its resulting emissions are no higher than those that would result from the technology that the regulator deems to be "best."[90]

The 1977 Amendments to the Clean Air Act adopted two additional federal emission standards—Best Available Control Technology (BACT) and Lowest Achievable Emission Rate (LAER).[91] Major new or modified stationary sources[92] located in states with air quality that is better than the quality required by the federal ambient standards must comply with BACT.[93] Major new or modified stationary sources located in nonattainment regions—areas that are not in compliance with the federal ambient standards—must comply with LAER. BACT is defined as "an emission limitation based on the maximum degree of reduction of each pollutant . . . [determined] on a case-by-case basis, taking into account energy, environmental, and economic impact[]."[94] LAER is defined as the most stringent emission standard in any state implementation plan[95] or the most stringent emission standard achieved in practice by category of source, whichever is more stringent.[96] Both BACT and LAER prescribe a

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[87] § 7411(a)(1).

[88] *Id.*

[89] *Id.*

[90] *Id.*

[91] The 1977 Clean Air Act Amendments created two new programs—the Prevention of Significant Deterioration (PSD) Program and the Nonattainment Program. PSD was aimed at preserving the air quality in regions where air quality was superior to the quality required by the National Ambient Air Quality Standards (NAAQS). Clean Air Act Amendments of 1977, Pub. L. No. 95-95, 91 Stat. 685 (1977); REVESZ, *supra* note 78, at 373, 384–85. The Nonattainment Program provisions are aimed at those areas that have not achieved compliance with the primary NAAQS. REVESZ, *supra* note 78, at 384–85.

[92] The term "major emitting facility" is defined by the source's "potential to emit." § 7479(1). The term "stationary source," as opposed to mobile source, is defined in § 7602(z).

[93] *Id.* § 7479(3).

[94] *Id.*

[95] The relevant statutory language reads:

> Each State shall . . . adopt and submit to the Administrator . . . a plan which provides for implementation, maintenance, and enforcement of such primary standard in each air quality control region . . . within such State. In addition, such State shall adopt and submit to the Administrator . . . a plan which provides for implementation, maintenance, and enforcement of such secondary standard in each air quality control region . . . within such State.

*Id.* § 7410(a)(1).

[96] *Id.* § 7501(3)(A)–(B).

maximum level of emissions, not the use of any particular technology. Because all air quality control regions are either in attainment or nonattainment, BACT and LAER are the primary relevant standards for "major" sources. NSPS, though, applies to all new or modified sources that are not major sources and also sets a floor for both BACT and LAER.[97]

While the Clean Air Act requires new or modified sources to comply with performance standards, it does not generally impose such requirements on existing sources. As long as states develop implementation plans that result in compliance with the relevant federal ambient standard, states have great discretion in how they will regulate particular existing sources.[98] Even so, states generally employ performance standards in their state implementation plans.[99] The one significant exception to the federal deference on existing sources concerns nonattainment regions. The 1990 Amendments to the Clean Air Act prescribe that existing sources in nonattainment areas are subject to an emission standard set by reference to Reasonably Available Control Technology (RACT)[100]—again a performance standard because it does not require the adoption of a particular technology.

In enacting the Clean Air Act, Congress indicated a "strong preference for numerical emission limitations,"[101] though the Act does permit the Administrator to implement design standards or work-practice standards when "it is not feasible . . . to prescribe or enforce an emission standard."[102] Thus, when it is difficult to measure emissions, the Administrator may adopt a design standard instead of a performance standard. For example, in order to regulate asbestos emissions, the Administrator originally proposed a prohibition of "all visible emissions of asbestos during the course of demolitions."[103] The Administrator, however, later determined that the "no visible emission" requirement might prohibit demolitions altogether because "it would be impracticable, if not impossible, to do such work

[97] *Id.* §§ 7479(3), 7501(3); *see* REVESZ, *supra* note 78, at 374, 387.

[98] § 7410(a)(1).

[99] The Clean Air Act requires states to adopt enforceable emission limitations. *See* § 7410(a)(2)(A); *see also* D. R. van der Vaart & John C. Evans, *Location, Location, Location: Did* North Carolina *Go Far Enough?*, 10 VT. J. ENVTL. L. 267, 269 (2009) ("The strategy that states develop to satisfy their obligation as the primary implementing agency—typically a mixture of emission standards and regulations—is collectively referred to as the [State Implementation Plan].").

[100] Clean Air Act Amendments of 1990, Pub. L. No. 101-549, § 172(c)(1), 104 Stat. 2412, 2414 (1990); *see* Arnold W. Reitze, Jr., *Air Quality Protection Using State Implementation Plans—Thirty-Seven Years of Increasing Complexity*, 15 VILL. ENVTL. L.J. 209, 227 (2004).

[101] Adamo Wrecking Co. v. United States, 434 U.S. 275, 289 (1978) (quoting S. REP. NO. 95-127, at 44 (1977)).

[102] 42 U.S.C. § 7412(h)(1); *see also Adamo*, 434 U.S. at 286 (quoting Clean Air Act Amendments of 1977 § 110).

[103] *See Adamo*, 434 U.S. at 287.

without creating visible emissions."[104] As a result of these feasibility concerns, the Administrator mandated that certain work practices be followed during a demolition, adopting a design standard instead of a performance standard.[105]

The Clean Water Act also primarily imposes performance standards. All point sources[106] of pollution must comply with one of the federally set effluent limitations. New sources are subject to the new source standard, which is defined as "a standard for the control of the discharge of pollutants which reflect[s] the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology."[107] Existing sources are subject to effluent limitations determined by reference to the best practicable control technology (BPT),[108] or the best available technology (BAT).[109] All three of these standards are set for categories of sources rather than for individual sources, but the Clean Water Act does allow variances to be granted in certain instances when plants cannot meet the relevant performance standard.[110] In all cases, the requirement is the meeting of the maximum permissible level of effluents, not the use of any particular technology.

As with the Clean Air Act, the Clean Water Act does not impose performance standards when it would be difficult to measure the level of effluents, as is the case with nonpoint source pollution.[111] Rather than imposing effluent limitations, "measures designed to curtail nonpoint source pollution typically focus upon the regulation of inputs."[112] State management programs are required to develop "best management practices" aimed at the most common nonpoint sources.[113] But while best

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[104] *Id.* (quoting 38 Fed. Reg. 8820, 8821 (Apr. 6, 1973)) (internal quotation mark omitted).

[105] *Id.*

[106] The Clean Water Act defines point source as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged." 33 U.S.C. § 1362(14) (2006).

[107] § 1316(a)(1). *See* CPC Int'l Inc. v. Train, 515 F.2d 1032, 1045 n.25 (8th Cir. 1975) (citing S. REP. NO. 92-414, at 1477 (1971)).

[108] § 1311(b)(1)(A)(i).

[109] *Id.* § 1311(b)(2)(A)(i).

[110] REVESZ, *supra* note 78, at 535 ("The three main types of variances are § 301(c) variances (allowing modifications of BAT standards on the basis of economic capability), § 301(g) variances (allowing modification to BAT standards on water quality grounds), and fundamentally different factor (FDF) variances (allowing modifications to individual point sources that demonstrate characteristics that are fundamentally different from those which define the category in which the source is placed).").

[111] In the case of "point sources" the pollution comes out of a "discernible, confined and discrete conveyance," § 1362(14). Typically, the pollution comes out of a pipe. Nonpoint sources, in contrast, are typically agricultural or urban runoff. *See* REVESZ, *supra* note 78, at 545–46.

[112] *Id.* at 546.

[113] *Id.*

management practices are not performance standards, they are not design standards either because they focus on the use of inputs, such as the amount of fertilizer that can be used on agricultural land.[114] Thus, these regulations deal with nondurable precautions for which transition relief is undesirable under both Kaplow's and Shavell's analyses.

In summary, the major environmental statutes use performance standards to a much greater extent than design standards. Given this significant feature of the regulatory regime, parties can choose to utilize more stringent pollution technology than is required by current regulations.[115] In a world of no transition relief, if an actor believed that the legal standard would change in the future—due to technological developments or new information regarding the harm of the regulated activity—it might voluntarily reduce its emissions by purchasing new technology such that it was actually "overcomplying" with the current regulations. In that way, it would save having to purchase technology twice: once to meet the current standard and again to meet the more stringent future standard that would apply to it in the absence of grandfathering. And even if the newly developed "end-of-pipe" technology was too expensive, the actor could instead limit its emissions by making changes to its production process.[116] For example, a plant using high-sulfur coal could decide to switch to low-sulfur coal in anticipation of more stringent pollution regulations.[117]

Indeed, in the climate change context, we have already seen examples of industry actors voluntarily reducing their greenhouse gas emissions, even though a comprehensive climate change regulatory regime has not yet been enacted.[118] For example, the Walt Disney Company and over two hundred other large companies have pledged to reduce greenhouse gas emissions.[119] In 2005, General Electric launched its "Ecomagination" plan, a public

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[114] *Id.* at 515, 546.

[115] *Id.* at 546.

[116] *See* RICHARD L. REVESZ & MICHAEL A. LIVERMORE, RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH 135–37 (2008) (noting that switching production processes can be a cheaper method of complying with pollution regulations than purchasing end-of-pipe technology).

[117] *Id.* at 136–37.

[118] *See, e.g.*, Jeff Civins, Mary Mendoza & Adam Sencenbaugh, *Environmental Due Diligence—Counting Carbon*, 24 NAT. RESOURCES & ENV'T 37, 38 (2009) ("Driven by a variety of stakeholders, and perhaps in anticipation of upcoming regulation, many sources of GHG emissions have undertaken voluntary measures to reduce $CO_2$ and other GHGs attributable to their operations."); *see also* Commission Guidance Regarding Disclosure Related to Climate Change, 75 Fed. Reg. 6290, 6291 (Feb. 8, 2010) (to be codified at 17 C.F.R. pts. 211, 231, 241) (discussing potential for future climate change regulation and noting "increasing calls for climate-related disclosures by shareholders of public companies").

[119] Civins et al., *supra* note 118, at 38–39 (noting that in addition to reducing emissions from stationary sources, which are most likely to be regulated, companies are also voluntarily taking efforts to reduce their overall carbon footprint).

relations and investment campaign that pledged to improve the efficiency of the company's energy usage by 30% by 2012.[120] Walmart has begun experimenting with solar panels for new stores,[121] Citigroup has announced plans to cut its global emissions of greenhouse gases by 10% by 2012,[122] Google has installed a solar rooftop on its California headquarters,[123] and Goldman Sachs has created a research team, GS Sustain, to specifically identify companies with a commitment to sustainability that present promising investment opportunities.[124]

More generally, in response to this increasing awareness among shareholders of the importance of reducing GHG emissions, the Chicago Climate Exchange, a voluntary greenhouse gas reduction and offset trading platform whose members make a voluntary, legally binding emission reduction commitment, was created in 2003.[125] In the first phase of the program, participating firms committed to lowering emissions by 1% per year for four years, until 2006.[126] In the second phase, the firms agreed to continue to lower emissions for a total decrease below the original baseline of 6% by 2010.[127] By the beginning of Phase II, over 300 companies had joined the Exchange.[128] But as the prospects of climate legislation in the near future were dashed at the end of the 111th Congress, this market collapsed and the Chicago Climate Exchange put an end to the trading.[129]

These examples show that even when actors are not promised substantial transition relief, they may rationally respond to future legislative changes by voluntarily altering their behavior to comply with a more

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[120] *See* Jeffery Marshall, *Corporate Social Responsibility: Hard Choices on Soft Issues*, FIN. EXECUTIVE, July/Aug. 2005, at 44, 45–46; *The Greening of General Electric: A Lean, Clean Electric Machine*, ECONOMIST, Dec. 10, 2005, at 77; ECOMAGINATION, http://www.ecomagination.com (last visited Nov. 23, 2011) (describing the program and its success so far).

[121] *See* Paul Davidson, *Wal-Mart to Double Solar Initiative*, USA TODAY, Apr. 22, 2009, at 3B.

[122] Jim Carlton, *Citigroup Tries Banking on the Natural Kind of Green*, WALL ST. J., Sept. 5, 2007, at B1.

[123] *Greening of Google*, SOLARIPEDIA, http://www.solaripedia.com/13/63/greening_of_google.html (last visited Aug. 11, 2011).

[124] *See* ANDREW HOWARD ET. AL, GOLDMAN SACHS, CHANGE IS COMING: A FRAMEWORK FOR CLIMATE CHANGE—A DEFINING ISSUE OF THE 21ST CENTURY 15 (2009), *available at* http://www2.goldmansachs.com/our-thinking/gs-sustain/gs-sustain/climate-change-research-pdf.pdf.

[125] CHI. CLIMATE EXCH., OVERVIEW BROCHURE 3 (2008) (on file with authors) (listing one of the benefits of joining the exchange as the opportunity to "demonstrate unique commitment through a legally binding goal, to shareholders").

[126] *Id.* at 2.

[127] *Id.* If a special event requires a member to emit more than its allotted amount of emissions, the member can purchase a Carbon Financial Instrument contract (CFI) to offset the extra emissions released. *Id.*

[128] *Id.* at 4.

[129] John Collins Rudolf, *Cap-and-Trade Exchange Calls It Quits*, N.Y. TIMES GREEN BLOG (Nov. 17, 2010, 8:22 AM), http://green.blogs.nytimes.com/2010/11/17/climate-futures-exchange-calls-it-quits ("With climate legislation in the United States dead in the water for the foreseeable future, participants in the exchange have lost interest . . . .").

stringent standard that is socially desirable. While these voluntary efforts may have also been motivated by a desire to improve public relations, they were likely motivated at least in part by investors' concerns about future climate change regulation.[130] In fact, the collapse of trading on the Chicago Climate Exchange supports the proposition that the threat of future regulation plays a role in firms' decisions to anticipate future legal standards.

### *B. Regulatory Delay*

Shavell also assumes that regulators will be able to quickly amend the legal standards once uncertainties about the nature of the harm are resolved.[131] Given the inertia of Congress and the costs associated with notice-and-comment rulemaking by administrative agencies, this assumption is unrealistic.[132]

*1. Congress.*—Even when it becomes known that an existing environmental measure is no longer socially optimal, it will often take Congress several years to respond to this new information and amend the statute.[133] This delay is likely to occur even assuming that Congress acts consistently with a popular democracy model, under which it faithfully represents the interests of the citizenry.[134] There are a number of reasons

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[130] *See* Pet. for Interpretive Guidance on Climate Risk Disclosures at 8 (2007) (No. 4-547), *available at* http://www.sec.gov/rules/petitions/2007/petn4-547.pdf ("Investors of all types are aware that climate change, and greenhouse gas regulation, will have enormous implications for long-term capital investments that are being made right now by corporations. They want to know how fully (if at all) companies are taking climate change into account in making those decisions. They want to identify, and invest in, companies that are 'out front' in responding to climate risks and opportunities, and to avoid firms that are behind the curve."); *see also* Andrew Schatz, Note, *Regulating Greenhouse Gases by Mandatory Information Disclosure*, 26 VA. ENVTL. L.J. 335, 371 (2008) (discussing how investors are increasingly putting pressure on companies to disclose greenhouse gas emissions).

[131] *See supra* note 76 and accompanying text.

[132] *See* Lynn E. Blais & Wendy E. Wagner, *Emerging Science, Adaptive Regulation, and the Problem of Rulemaking Ruts*, 86 TEX. L. REV. 1701, 1701 (2008) ("[W]hen new information threatens to unsettle existing regulatory requirements governing powerful stakeholders in the rulemaking process, using it to develop stricter environmental standards is unlikely to be a simple or straightforward matter.").

[133] *See* Richard J. Lazarus, *Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future*, 94 CORNELL L. REV. 1153, 1180 (2009) ("The essentially conservative, fragmented, and deliberately cumbersome process for lawmaking in the United States does not readily lend itself to such responsive, iterative lawmaking initiatives."); Donald Stever et al., Air Pollution Standards for Stationary Sources: Next Moves (Oct. 6, 2009), *in* 40 ENVTL. L. REP. 10012, 10013 (2010) ("[W]e don't want to go through a period like the 1980s again, when we waited around for Congress to pass what eventually became the 1990 [Clean Air Act] Amendments."). Delay may be particularly problematic in the environmental context given its "inherently dynamic nature." *See* Lazarus, *supra*, at 1180, 1227 ("Environmental law's inherently dynamic nature creates further obstacles in that multiple statutes, statutory amendments, and regulatory revisions are likely to be necessary over time.").

why congressional enactment of new environmental standards may take significant time.

First, Congress can tackle only a limited number of matters during a congressional session,[135] and issues that are particularly salient to the American public are likely to capture Congress's attention. While environmental harms can have significant effects on public health, they might not be perceived as a priority if people lack information about these harms or improperly discount these harms because, as is the case with climate change,[136] they are likely to cause problems only in the future.[137] Even when environmental issues do become momentarily salient, the public's limited attention span can lead to an environmental statute being derailed in favor of another hot-button issue that might arise contemporaneously.[138] For example, while climate change was discussed at length during the 2008 presidential election, concerns about health care and the struggling economy soon took center stage, leading Congress to at least temporarily put off considering climate change legislation.[139]

Looking back at the history of the environmental statutes reveals that it often takes several years for Congress to revisit these statutes and pass amendments. The Clean Air Act, originally passed in 1970, saw major

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[134] *See, e.g.*, Wendy E. Wagner, *Congress, Science, and Environmental Policy*, 1999 U. ILL. L. REV. 181, 222 ("The oldest model of congressional behavior, the popular democracy model, depicts a federal legislator as the direct representative or agent of the people."). We will consider a less representative model of Congress when we discuss interest group theory and public choice pathologies in Part V.

[135] *See* FRANK R. BAUMGARTNER ET AL., LOBBYING AND POLICY CHANGE: WHO WINS, WHO LOSES, AND WHY 22 (2009) ("The information environment in Washington is overwhelmingly complex, with thousands of bills being considered each year in Congress, hundreds of hearings occurring in more than a hundred different subcommittees, and public concerns moving from issue to issue at a rapid pace."); RICHARD L. HALL, PARTICIPATION IN CONGRESS 24 (1996) ("Congressmen in committees simply have too much to do legislatively and too little time, energy, and other legislative resources to do it. They cannot take on every issue; they must choose.").

[136] *See* REVESZ & LIVERMORE, *supra* note 116, at 108 ("[T]he benefits of mitigating climate change will occur in the future . . . .").

[137] Of course, some environmental issues—such as hazardous waste disposal—are highly salient. *See, e.g.*, Barry G. Rabe, *Legislative Incapacity: The Congressional Role in Environmental Policy-making and the Case of Superfund*, 15 J. HEALTH POL. POL'Y & L. 571, 576 (1990) (describing hazardous waste disposal as a "high-salience" issue, leading to the enactment of both the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)).

[138] *See* James J. Florio, *Congress as Reluctant Regulator: Hazardous Waste Policy in the 1980's*, 3 YALE J. ON REG. 351, 380 (1986) (noting that because of Congress's "limited attention span," regulatory programs may be subject to "long periods of stagnation"); *see also* BAUMGARTNER ET AL., *supra* note 135, at 22 (noting "scarcity of space on the public agenda").

[139] Andrew C. Revkin, *Global Warming*, ASOCIACIÓN DE VOLUNTARIOS PARA EL SERVICIO EN AREAS PROTEGIDAS DE COSTA RICA, http://www.asvocr.org/english/noticias/index.php?subaction=showfull&id=1268024383&archive=&start_from=&ucat=57& (last visited Aug. 11, 2011) ("[A] national preoccupation with the slow economy and competing issues, led by health care, threaten to delay or weaken [climate change] legislation.").

amendments 1977 and 1990,[140] and the Clean Water Act, originally passed in 1972, saw major amendments in 1977 and 1987.[141] Thus, while a particular environmental statute might be revisited every decade or so, it is unlikely to be immediately amended upon the discovery of new information.

Second, before Congress even focuses on particular issues as a collective body, these issues generally must first be considered by congressional committees and subcommittees. Often, several committees exercise overlapping jurisdiction, adding to the delay at the committee level.[142] When different committees hold separate hearings and recommend different versions of bills, the bills that do reach the full Congress tend to be more complex and their enactment is therefore likely to be significantly delayed.[143] For example, despite its salience, the passage of hazardous waste legislation—the Superfund Amendments and Reauthorization Act of 1986 (SARA)—was significantly delayed because "five [House] committees and a series of subcommittees [were] repeatedly bogged down in disputes."[144]

Third, moving away from a public-interest vision of congressional action, industry lobbying can also delay the enactment of environmental legislation. Especially when environmental legislation imposes high costs on certain industries, those industries' trade associations have a strong incentive to lobby Congress against stringent measures, even if those measures are socially desirable.[145] One standard argument, which tends to

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[140] Stever et al., *supra* note 133, at 10013 (suggesting that congressional delay caused amendments to the Clean Air Act discussed in the 1980s to not actually be adopted until 1990).

[141] Ari N. Sommer, Note, *Taking the Pit Bull off the Leash: Siccing the Endangered Species Act on Climate Change*, 36 B.C. ENVTL. AFF. L. REV. 273, 283 n.80 (2009) ("The Clean Water Act (CWA) was passed in its modern form in 1972, with significant amendments in 1977 and 1987.").

[142] Rabe, *supra* note 137, at 573 ("This transformation [from committee to subcommittee governance] enabled multiple House subcommittees to explore the same policy area, compounding the historical problems of overlapping committee jurisdiction."); *see also* Lazarus, *supra* note 133, at 1181 ("Fragmentation of congressional committee jurisdiction over environmental issues is inevitable given the ways in which ecological cause and effect span so many diverse human activities.").

[143] *See* Rabe, *supra* note 137, at 573 ("Multiple hearings and bill referrals became commonplace, resulting . . . in the enactment of fewer laws and the submission of fewer reports to the full House. . . . However, those laws that were passed were longer and more complex."); *see also* Lazarus, *supra* note 133, at 1180 ("Securing passage of environmental law . . . . requires multiple debates.").

[144] Rabe, *supra* note 137, at 576.

[145] *See, e.g.*, Eric Biber, *Climate Change and Backlash*, 17 N.Y.U. ENVTL. L.J. 1295, 1319 (noting that socially desirable environmental regulations often impose concentrated costs on particular industries, thus giving them an incentive to resist the regulation); Krista Yee, *"A Period of Consequences": Global Warming Legislation, Cooperative Federalism, and the Fight Between the EPA and the State of California*, 32 ENVIRONS: ENVTL. L. & POL'Y J. 183, 200 (2008) ("Global warming legislation often impacts the automobile industry, forcing manufacturers to create new cars in compliance with recently enacted environmental standards, sometimes at great cost. Thus, from a business perspective, it is natural for the automobile industry to resist new environmental legislation." (footnote omitted)).

resonate with members of Congress, is that stringent regulation will result in a loss of American jobs.[146] Lobbyists often also hire their own experts to testify before Congress and dispute the scientific research supporting proposed legislation, potentially persuading some members to oppose the initiative and to try to block its passage.[147] Finally, if lobbyists represent companies that make substantial donations to congressional and senatorial campaign funds, members of Congress, fearing that they will endanger this important source of revenue, might be reluctant to support measures that will harm the economic interests of those companies, even if those measures enjoy broad public support and are backed by solid scientific evidence.

In several important instances, Congress has delayed implementing environmental standards as a result of industry pressure. The automobile emission standards provide a good example: as one commentator has noted, "[f]ederal law required dramatic reductions in auto emissions in the 1970 [Clean Air Act], independent from California's actions, yet industry pressure led Congress to postpone the standards twice."[148]

Of course, interest-group theory also suggests that there are reasons why industry might sometimes support federal environmental regulation. For example, an industry might prefer a uniform federal standard over conflicting standards across the fifty states.[149] Also, a firm might favor more stringent environmental standards if it can meet these standards more cheaply than its competitors.[150] Nonetheless, it is the case that interest groups can contribute to the slow pace of environmental legislation.

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[146] Even if environmental legislation has numerous benefits, members of Congress tend "to weigh the prospect of potential losses more heavily than the possibility of gains" and thus may be wary about passing legislation "that may generate unintended and deleterious consequences" even when the legislation is also likely to produce beneficial results. BAUMGARTNER ET AL., *supra* note 135, at 114.

[147] *See* Wendy E. Wagner, *Administrative Law, Filter Failure, and Information Capture*, 59 DUKE L.J. 1321, 1325–26, 1329 (2010) (discussing the problem of information capture, noting that because "[a]dministrative law . . . imposes almost no filtering requirements . . . on any of the participants who engage in the rulemaking," well-financed interest groups can "gain[] control over regulatory decisionmaking in informal rulemakings" through "the excessive use of information . . . [and a] continuous barrage of letters, telephone calls, meetings, follow-up memoranda, formal comments, post-rule comments, petitions for reconsideration, and notices of appeal").

[148] Ann E. Carlson, *Iterative Federalism and Climate Change*, 103 NW. U. L. REV. 1097, 1117 (2009).

[149] *See* E. Donald Elliott, Bruce A. Ackerman & John C. Millian, *Toward a Theory of Statutory Evolution: The Federalization of Environmental Law*, 1 J.L. ECON. & ORG. 313, 329 (1985); *see also* Carlson, *supra* note 148, at 1111 ("Elliott, Ackerman, and Millian theorize that this federal legislation [regulating automobile emissions] came about largely because automobile manufacturers, along with the coal industry, feared inconsistent and potentially more stringent regulations from state and local governments.").

[150] *See, e.g.*, ACKERMAN & HASSLER, *supra* note 82, at 11 n.*, 31; Michael G. Faure & Jason Scott Johnston, *The Law and Economics of Environmental Federalism: Europe and the United States Compared*, 27 VA. ENVTL. L.J. 205, 273 (2009) ("[I]ndustry in countries with a high demand for environmental protection would lobby to impose tough standards on competitors in other jurisdictions,

*2. Agencies.*—Even when regulatory policy is delegated to agencies, which might be thought to be more flexible than Congress, significant delay is likely to occur. Like Congress, agencies cannot immediately respond to new information given the variety of taxing procedural hurdles of notice-and-comment rulemaking, which is the vehicle for the adoption of most of the important environmental regulations.[151] This phenomenon, referred to as agency ossification, has received extensive scrutiny in the administrative law literature.[152] All three branches contribute to this phenomenon. The executive branch requires agencies to perform cost–benefit analyses of major rules and subjects them to Office of Management and Budget review.[153] Congress sometimes requires agencies to perform procedures beyond what is required in the Administrative Procedure Act in order to enact rules,[154] and the judiciary has developed a "hard look" jurisprudence under which it strikes down agency rules that are not accompanied by an agency report "discuss[ing] in detail each of scores of policy disputes, data disputes, and alternatives to the [adopted] rule,"[155] and responding to relevant comments.[156]

Ossification has also been extensively discussed in the context of environmental regulatory policy. Despite advances in science and technology, it can take years for new rules to be enacted and for old rules to be amended given the stringent procedures. An oft-cited report suggests that it takes the EPA five years to adopt a rule.[157] A more recent study of rulemaking in the context of both the Clean Air Act and the Clean Water Act confirms that rulemaking proceeds at a much slower pace than technological advancement.[158] Writing in the context of the Clean Air Act,

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thus benefiting from their higher levels of environmental regulation by effectively creating barriers to entry.").

[151] *See* David Schoenbrod, *Goals Statutes or Rules Statutes: The Case of the Clean Air Act*, 30 UCLA L. REV. 740, 812–13 (1983) ("A supposed advantage of delegation is that delegated authorities can respond more quickly than Congress to significant new information. Practice under the Clean Air Act, however, has proved far different than theory.").

[152] *See* Thomas O. McGarity, *Some Thoughts on "Deossifying" the Rulemaking Process*, 41 DUKE L.J. 1385 (1992); Richard J. Pierce, Jr., *Seven Ways to Deossify Agency Rulemaking*, 47 ADMIN. L. REV. 59 (1995). For examples in more general works, see STEPHEN BREYER, BREAKING THE VICIOUS CIRCLE: TOWARD EFFECTIVE RISK REGULATION 48 (1995); Blais & Wagner, *supra* note 132, at 1704–06; Daniel T. Deacon, Note, *Deregulation Through Nonenforcement*, 85 N.Y.U. L. REV. 795, 825–26 (2010).

[153] Pierce, *supra* note 152, at 62.

[154] *Id.* at 64.

[155] *Id.* at 65.

[156] *Id.* at 84.

[157] CARNEGIE COMM'N ON SCI., TECH., & GOV'T, RISK AND THE ENVIRONMENT: IMPROVING REGULATORY DECISION MAKING 108 (1993).

[158] Blais & Wagner, *supra* note 132, at 1715–25 ("EPA is not revising standards frequently, and . . . when it does revise its standards, it is not necessarily because of advances in pollution-control technologies.").

David Schoenbrod explains that the requirements on agencies are so taxing that it can take several years to adjust a rule in response to new information:

> Suppose there were a significant new discovery about a pollutant suggesting that it is much less or much more dangerous than previously thought. . . . Under the Clean Air Act, however, [this] information would require a rule-making procedure to change the applicable national ambient air quality standards, state proceedings to adjust the applicable state plans, and then federal approval or disapproval of each state plan revision. Even if judicial review of ambient air standards and state plans did not slow down the administrative process, the entire process would take several years and probably far more.[159]

In addition to the procedural difficulties associated with notice-and-comment rulemaking, the presence of organized interest groups is likely to further delay the development of new rules and the amendment of old rules.[160] In the environmental context, trade associations representing polluters in a particular industry are likely to oppose changes that would strengthen emission and effluent standards. As a result, these standards will likely not be amended as frequently as would be socially optimal.[161]

In summary, there is likely to be substantial delay between the time at which uncertainties about the harmful effect of an activity are resolved and the time at which legal changes are enacted. As a result, if there was no expectation of grandfathering, a new actor entering a regulated activity might rationally choose to purchase more expensive, higher performing technology than is required by current regulations if recent information made it sufficiently likely that the legal standard would be changed and the actor had knowledge of this information. That way, it would avoid having to purchase two different pollution control technologies instead of just one. In contrast, in a world in which generous grandfathering policies accompany legal changes, a new actor would have no incentive to purchase more expensive technology, even if it was apparent that a strengthening of the regulatory regime was afoot.

### *C. Imperfect Regulation*

In addition to assuming that regulators will quickly amend the legal standards in response to new information, Shavell assumes a world of perfect regulation where regulators set standards optimally in light of the current estimates of the as-yet-unknown magnitude of risks.[162] We argue

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[159] Schoenbrod, *supra* note 151, at 812–13 (footnote omitted).

[160] *See* Amy Whritenour Ando, *Waiting to be Protected Under the Endangered Species Act: The Political Economy of Regulatory Delay*, 42 J.L. & ECON. 29, 30, 45–48, 52 (1999) (using empirical analysis to demonstrate how interest group pressure delays endangered species listings).

[161] Blais & Wagner, *supra* note 132, at 1713–15.

[162] Shavell, *supra* note 2, at 79–80 ("[B]y the design of the regulators, present regulated behavior will in principle appropriately reflect all possible future changes in the world. In the model that I

that regulated parties often possess superior information about the risks of the regulated activity and thus are better able to assess future risks than regulators. We also contend that the legal framework considered by Shavell—where regulations are set before the magnitude of the risk is known—is at odds with the existing administrative law framework. Indeed, it is likely that the courts would reject standards that are based on information deemed to be too speculative.

As the administrative law literature reveals, regulated parties often possess more information about the risks of the regulated activity than regulators.[163] Even putting to one side the inertia of Congress and administrative agencies discussed in section B, it is often the case that new information is discovered by the regulated actors in the course of ongoing research regarding their own business before it is discovered by the government. Thus, when actors know that they will not be shielded from the effects of legal changes, they are more likely to change their behavior in light of new information that the government has not yet uncovered. For example, Levmore suggests that because industry actors are generally in a better position than the government to evaluate the risks associated with their activities, a policy of no transition relief can induce them to voluntarily respond to new risks that the government is not even aware of, such as the risk that a particular chemical is more dangerous than was originally thought.[164]

Also, given certain features of administrative law, regulators are often forced to develop imperfect legal standards that do not reflect their estimates about how current uncertainties will be resolved in the future. Agencies are typically tasked with setting regulatory standards, but these determinations are subject to judicial review.[165] While some courts defer to agency determinations even when those determinations are based on estimates of harms of still-uncertain magnitude,[166] other courts will strike

examined, for example, the level of precaution chosen by the regulators to be the legal standard in period 1 impounds correctly all possible future changes in harm in period 2.").

[163] *See* Wendy E. Wagner, *Commons Ignorance: The Failure of Environmental Law to Produce Needed Information on Health and the Environment*, 53 DUKE L.J. 1619, 1641–42 (2004).

[164] *See* Levmore, *supra* note 44, at 1659.

[165] The standard of review for agency regulations depends on the relevant statute. For example, the Occupational Safety and Health Administration (OSHA) has the burden of demonstrating that it developed regulations based upon substantial evidence—a more demanding standard of review than the "arbitrary and capricious" standard. *See* Indus. Union Dep't, AFL-CIO v. Am. Petroleum Inst., 448 U.S. 607, 705 (1980) (Marshall, J., dissenting) ("This standard represents a legislative judgment that regulatory action should be subject to review more stringent than the traditional 'arbitrary and capricious' standard for informal rulemaking.").

[166] *See, e.g.*, United Steelworkers of America, AFL-CIO-CLC v. Marshall, 647 F.2d 1189, 1266 (D.C. Cir. 1980) ("As for technological feasibility, we know that we cannot require of OSHA anything like certainty. Since 'technology-forcing' assumes the agency will make highly speculative projections about future technology, a standard is obviously not infeasible solely because OSHA has no hard evidence to show that the standard has been met.").

down regulations that are based on evidence they deem to be too speculative.[167] In *Industrial Union Department v. American Petroleum Institute* (*The Benzene Case*), the Supreme Court held that in order to decrease the exposure limit on airborne concentrations of benzene from the standard of ten parts of benzene per million parts of air (10 ppm) to one part per million (1 ppm), OSHA had to "show, on the basis of substantial evidence, that it is at least more likely than not that long-term exposure to 10 ppm of benzene presents a significant risk of material health impairment" notwithstanding the agency's argument that this approach "would render it helpless, forcing it to wait for the leukemia deaths that it believes are likely to occur before taking any regulatory action."[168] And in *Portland Cement Ass'n v. Ruckelshaus*—where industry challenged a proposed performance standard under the Clean Air Act as not being "adequately demonstrated"[169]—the U.S. Court of Appeals for the D.C. Circuit held that while a regulator "may make a projection based on existing technology, . . . that projection is subject to the restraints of reasonableness and cannot be based on 'crystal ball' inquiry."[170] Especially when standards are being put into effect immediately, "the latitude of [future] projection[s] is correspondingly narrowed. If actual tests are not relied on, but instead a prediction is made, 'its validity as applied to this case rests on the reliability of the prediction and the nature of the assumptions.'"[171]

Because agencies realize that their findings are subject to judicial scrutiny, they will often opt for less stringent standards they can more easily defend rather than more stringent standards that may better reflect future uncertainties.[172]

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[167] *See, e.g.*, *Indus. Union Dep't*, 448 U.S. at 652–53, 662 (holding that OSHA must demonstrate "a significant risk of material health impairment" before issuing standards); Gulf S. Insulation v. U.S. Consumer Prod. Safety Comm'n, 701 F.2d 1137, 1146 (5th Cir. 1983) (overturning formaldehyde regulation because "it is not good science to rely on a single experiment, particularly one involving only 240 subjects, to make precise estimates of cancer risk. . . . To make precise estimates, precise data are required."); Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 391 (D.C. Cir. 1973) ("The Administrator may make a projection based on existing technology, though that projection is subject to the restraints of reasonableness and cannot be based on 'crystal ball' inquiry." (quoting Int'l Harvester Co. v. Ruckelshaus, 478 F.2d 615, 629 (D.C. Cir. 1973)); *Int'l Harvester Co.*, 478 F.2d at 645 (rejecting EPA's assumption used to calculate lead adjustment factor as too speculative).

[168] *See Industrial Union Dep't*, 448 U.S. at 652–53 (footnote omitted).

[169] *See Portland Cement Ass'n*, 486 F.2d at 379 ("The action of the Administrator has been challenged on [three] grounds . . . [including that] [t]he achievability of the standards was not adequately demonstrated."); *see also supra* note 87 and accompanying text.

[170] *Portland Cement Ass'n*, 486 F.2d at 391 (quoting *Int'l Harvester Co.*, 478 F.2d at 629).

[171] *Id.* at 392 (quoting *Int'l Harvester Co.*, 478 F.2d at 642).

[172] *See, e.g.*, Howard Latin, *Good Science, Bad Regulation, and Toxic Risk Assessment*, 5 YALE J. ON REG. 89, 133 (1988) [hereinafter Latin, *Good Science*] ("[J]udicial requirements for comprehensive agency assessments of all potentially relevant factors and for a high degree of scientific precision have substantially emasculated environmental control programs in the past decade."); Howard Latin,

As Howard Latin has observed:

> If one examines administrative behavior realistically, there are numerous reasons why regulators would resist any statutory prescription to "guess." EPA and other agencies must function in a setting where every factual finding, scientific inference, and policy choice is vigorously contested by affected parties. Agency judgments must also survive intensive judicial review in which regulators normally bear the burden of proving regulatory decisions are rational and supported by substantial evidence. If agencies concede they have had to guess, their decisions may become fair game for interest-group and media ridicule . . . . Environmental protection programs often entail high regulatory costs that agencies may be reluctant to impose on the basis of speculation, but that is precisely the effect of regulation under uncertainty.[173]

We thus show that regulated actors may be better able to assess future risks than the regulators themselves and that regulators may be unable to develop optimal legal standards in the manner contemplated by Shavell's model. As a result, regulated actors may be induced to adopt more stringent pollution controls than those required by current regulations in anticipation of the future regulations likely to be implemented when the information possessed by the actors becomes available to regulators and is sufficiently certain to be acceptable to the courts. If new legal standards are accompanied by grandfathering, however, regulated actors will never have an incentive to anticipate more stringent regulation because they are given guaranteed protection from the effects of such future regulation.

### *D. Extending Shavell's Model*

In this section, we extend the Shavell model to show why actors may in fact voluntarily adopt greater pollution reduction beyond that required by current legal standards if they anticipate the adoption of new, more stringent standards. To Shavell's two periods, we add a third. To use Shavell's example, suppose that in period one the level of harm is unknown and the existing source's safety device, designed to comply with the then-existing regulatory standard, lowers the risk of harm to 7%. In period two, the level of harm is determined to be $700,000 and the optimal precaution for a new source, in light of this harm, costs $20,000 and reduces the risk of harm to 5%. But unlike in Shavell's example, suppose that the regulatory requirement applying to new sources is not adopted until period three, as a result of the delays discussed in Part II.B.

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*Regulatory Failure, Administrative Incentives, and the New Clean Air Act*, 21 ENVTL. L. 1647, 1663 (1991) [hereinafter Latin, *Regulatory Failure*] (noting that judicial review leads agencies to avoid regulating under uncertainty); Wagner, *supra* note 147, at 1422 ("Rather than focusing its energies on developing public-oriented regulatory policy, the agency finds instead that it must devote most of its analysis to preparing rules that can withstand fierce attack from an aggressive group of affected interests and respond to the flood of information loaded into the system by these same groups.").

[173] Latin, *Regulatory Failure*, *supra* note 172, at 1663 (footnote omitted).

Now suppose that a new actor enters the regulated activity in period two and needs to decide what precautions to take. The actor can take the precaution that meets the standard then in effect, or it can take what is then known to be the optimal precaution even though this level is not yet legally required. As discussed in Part II.A, we assume that these standards take the form of performance standards. Suppose that the precaution that meets the standard legally in effect in period two costs $15,000 (as opposed to the $20,000 cost of the optimal precaution). The socially optimal choice would be for the actor to purchase the new technology in period two. The total social cost would then be $20,000 + ($700,000 x 0.05) = $55,000. In contrast, the total social cost over period two if the actor purchases the older technology would be $15,000 + ($700,000 x 0.07) = $64,000.

The actor's decision, however, is not determined by the social cost, but rather by the actor's private cost, which is $5000 lower if it does not purchase the new technology. Thus, an actor believing it would be grandfathered would make the socially undesirable choice by purchasing the old technology. In contrast, if the actor believed that it would not benefit from grandfathering, it would make the socially optimal choice by purchasing the new technology. Otherwise, it would end up spending $15,000 on the old technology in period two and an additional $20,000 on new technology in period three.[174] As long as the present discounted value in period two of an expenditure of $20,000 in period three is more than $5000, the actor would be better off purchasing the new technology in period two if it did not expect to be grandfathered.[175]

## III. THE INEFFICIENCY OF OLD PLANTS OVER TIME

While Shavell has made a compelling case for a policy of grandfathering in the context of durable precautions, he acknowledges that indefinite grandfathering is probably not optimal for two reasons.[176] First, because equipment deteriorates over time, it becomes increasingly costly to maintain old plants and high maintenance costs "reduce[] the cost

[174] The choice would be different, of course, if the old technology could simply be upgraded for the $5000 difference in the cost of the technologies. But just like we cannot upgrade our laptops by paying the difference between the cost of our obsolete three-year-old laptop and the cost of a new one with far greater computing power, typically this type of choice is also not available in the pollution-control context. *See infra* text accompanying notes 187–91.

[175] One might argue that the regulator could consider the date when the actor entered the activity in determining whether to grandfather the actor. That is, the regulator could choose to not grandfather entrants who should have adopted newer precautions. In practice, however, this policy would be difficult to implement because the regulator would have to make assumptions about when this information was first known and would have to be able to defend the decision against the inevitable judicial challenges.

[176] Shavell, *supra* note 2, at 73 ("[U]nlimited duration of grandfathering of plants raises questions.").

advantage of grandfathering."[177] Second, the advantages of taking pollution precautions may increase over time either because certain harms, such as the greenhouse effect, are understood to be more harmful than originally thought or because more cost-effective technology is developed.[178] Shavell therefore implies that there will come a time when it will be socially desirable for old plants to comply with the new regulations either by transitioning to newer technology or by closing down. He does not consider, however, that as long as the costs of shifting to new technology are an eventual necessity, it might be socially optimal to not grandfather at all so that society can benefit from the more socially desirable level of pollution at an earlier period. Thus, at least in certain cases, it might be desirable to require existing plants to comply with new regulations.

Let us return to Shavell's example, discussed in Part I.C.1, and consider a source that is already participating in the activity in period one. A new standard is adopted in period two and would cost the source $20,000 to come into compliance with this standard, which would reduce the risk of harm from 7% to 5%. The level of harm, which had previously not been known, is determined in period two, to be $700,000. As Shavell explains, it is socially desirable to grandfather this existing actor: the social cost of complying with the new standard would be $55,000 ($20,000 for the new technology plus a 5% probability of a $700,000 harm) whereas the social cost of not complying is $49,000 (a 7% probability of a $700,000 harm).

Shavell acknowledges that there will come a time when the equipment degrades and the actor will have to purchase new equipment,[179] but he does not analyze the consequences of this phenomenon. Suppose that in period three, the equipment of the existing source has deteriorated so that, in order to keep the probability of the $700,000 harm limited to 7%,[180] the source needs to expend $10,000 in maintenance costs.

It then turns out that it would be socially optimal for the source to come into compliance in period three with the regulatory standard adopted in period two. Indeed, the social cost of compliance is still $55,000 but the social cost of continued grandfathering is now $59,000 (a 7% probability of a $700,000 harm plus the $10,000 in maintenance costs). But the source will not come into compliance with the regulatory standard unless it is required to do so, because the $10,000 in maintenance costs are lower than the $20,000 cost of the new pollution control equipment.

At first glance, it might appear that the optimal regulatory policy is to grandfather the source in period two but to have the grandfathering end in period three. But is such time-limited grandfathering actually desirable? Given the fact that the source will be required to buy the new pollution-

[177] *Id.*
[178] *Id.*
[179] *Id.*
[180] We assume that the harm is $700,000 in each of the periods.

control equipment in period three, should it instead be required to buy it in period two? The cost of doing so is no longer $20,000 because this amount will be expended anyway and the only question is whether the equipment is bought sooner rather than later.

Instead, the additional cost of purchasing the equipment in period two rather than waiting until period three is the $20,000 that it would cost to buy it in period two minus the present discounted value in period two of expending $20,000 in period three (the amount saved by purchasing the equipment earlier). If the difference between these two figures is less than $14,000—the difference between a 7% and a 5% probability of a $700,000 harm in period two—then grandfathering in period two is not desirable either. In other words, the deterioration of the source's equipment in period three changed the calculus regarding the desirability of grandfathering not only in period three, but in period two as well.

This example reveals that the determination of the desirability of grandfathering in one period cannot be made in isolation. If we just look at period two, grandfathering appears to be desirable. But the fact that grandfathering should not be extended in period three calls into question its desirability in period two as well. More generally, the phenomenon we describe reduces the range of cases for which grandfathering is desirable.

## IV. JOINT DETERMINATION OF REGULATORY STANDARDS AND TRANSITION RELIEF

So far, we have presented arguments that challenge some of the most prominent justifications for transition relief. Our approach calls for turning the dial away from where Shavell left it, though not all the way to where the new view proponents had it.

In this Part, we change course and develop a new approach for determining the desirability of grandfathering that directly addresses the central regulatory problem: stringent standards for new sources of pollution coupled with grandfathering create undesirable incentives for existing sources to remain in place. In developing this argument, we add further support to our general skepticism of broad grandfathering provisions.

The current literature proceeds from the mostly implicit assumption that decisions concerning grandfathering should take place in two steps.[181]

[181] The transition relief literature does not include detailed discussion about how new legal rules are selected, but it is implicit that new, prospective rules are those rules that would be optimal for new sources. Shavell assumes at the outset that the newly adopted regulation is the one that is optimal for new entrants. Shavell, *supra* note 2, at 48. He then discusses which grandfathering policy would be socially optimal in light of the new rule. *Id.* Kaplow also implies that the new rule is selected in light of what is optimal for new actors. He suggests that the new rule should be the rule we would want all existing sources to anticipate even in the face of uncertainty. Kaplow, *supra* note 2, at 521. He also assumes that the substantive policy decision is not affected by the choice of transition policy. *Id.* ("[T]he discussion assumes that the reforms themselves are desirable at the time they are made. . . . A

First, regulators should determine the optimal prospective rule by reference only to new sources constructed after the promulgation of the rule. Second, in light of the choice of a prospective, new source standard, regulators should determine what grandfathering, if any, of existing sources is desirable.

If one assumes, as Shavell does in his model,[182] that the number of firms entering and exiting the activity is exogenous to the grandfathering rule, then the sequential approach makes sense. However, because the grandfathering rule that is selected has a real impact on entry decisions, this approach is flawed. If the grandfathering rule is so generous that all of the existing plants continue to operate, there may be no demand for additional plants, and no new plants (or few new plants) may actually come into existence. Also, even though new plants are able to operate more efficiently than old plants, new plants may nonetheless be unable to compete with old plants because the new plants have to bear the costs of complying with new regulations while the old plants do not. Even when, in the absence of regulatory standards, it would be efficient for old plants to shut down, they would continue running in the face of stringent regulations of new sources in order to avoid having to bear the costs of complying with new regulations. Thus, a policy of imposing very stringent standards on new sources and grandfathering existing sources can have the effect of prolonging the existence of old plants and "discourag[ing] the introduction of those new sources that would be subject to their requirements," a result known as the "old-plant effect."[183] In some circumstances, when old plants operate beyond their useful lives, the resulting environmental quality is actually worse than it would be with no regulation at all.[184]

In a prior article, Jonathan Nash and Richard Revesz illustrated the decision of the owner of an existing plant, *A*, as follows:

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significant related assumption, implied by the stronger assumption just stated, is that substantive policy decisions are not themselves affected by the choice of transition policy.").

[182] *See supra* note 53 and accompanying text.

[183] Nash & Revesz, *supra* note 1, at 1708–09. Several authors have provided an overview of the old-plant effect. *See* ACKERMAN & HASSLER, *supra* note 82, at 67–68; Keohane, Revesz & Stavins, *supra* note 78, at 315 n.10; *see also* Howard K. Gruenspecht, *Differentiated Regulation: The Case of Auto Emissions Standards*, 72 AM. ECON. REV. 328, 328 (1982) ("The adoption of more stringent emissions standards for new vehicles is shown to prolong the retention of old, high-emission-rate vehicles in the fleet."); Robert N. Stavins, *Vintage-Differentiated Environmental Regulation*, 25 STAN. ENVTL. L.J. 29, 41–56 (2006) (describing "effects of vintage-differentiated regulation on the lives of durable plant and equipment"); Richard Webster & Julia LeMense, *Spotlight on Safety at Nuclear Power Plants: The View from Oyster Creek*, 26 PACE ENVTL. L. REV. 365, 367 (2009) (describing how NRC regulations which have only "increased the safety requirements for new plants" have produced a "trend . . . toward relicensing of old plants rather than replacement with new plants").

[184] *See, e.g.*, Stavins, *supra* note 183, at 43 (noting that vintage-differentiated regulation "can lead to short-term emissions increases" and that "when the sources subject to regulation have especially low rates of deterioration and technical obsolescence . . . the 'short term' is very long").

> Say that the annual operating cost of an existing facility is $100, while—as one might expect because of the greater efficiencies offered by newer plants—the annual operating cost of a new facility with the same production capacity is $90 (including annualized capital cost). . . . *A* will chose to construct a new facility.
>
> But now say that the applicable environmental regulation imposes costs of $20 if *A* constructs a new facility but no cost if *A* retains her existing facility. The modified annual operating cost of a new facility is $110, while the annual operating cost of the existing facility remains $100. Accordingly, *A* will now opt to retain her existing facility in operation.[185]

The example then shows why the stringent regulation of new sources can lead to perverse results: "Assume that the old plant emits five units of pollution per ton of output; that a new, unregulated plant would emit three units because of its greater efficiency; and that a new plant subject to regulation would emit one unit."[186] In this example, in the absence of regulation, the pollution would be three units because the old plant gets replaced by a new plant, but with the stringent regulation the pollution remains at five units because the old plant continues to operate.

This example illustrates why the current approach to determining the desirability of grandfathering is seriously flawed. It does not take into account the impact that the disparity between the regulatory stringency that applies to new sources and grandfathered sources has on the rate at which grandfathered sources close down and are replaced by new sources. If this disparity is too great because the new source standards are far more stringent than the standards applying to grandfathered sources, grandfathered sources will continue operating for a longer time than they would in the absence of the stringent new source regulations. Thus, there will not be demand for new sources and the stringent standard will exist only on paper; there will be no sources to which it actually applies, while the grandfathered standards persist for a long time.

The current approach engages in sequential optimization. It first picks the optimal standard for new sources, ignoring the presence of existing sources. Then, it chooses the optimal level of grandfathering in light of the choice of the new source standard. Instead, the correct approach to the problem would seek to jointly optimize the new source standard and the grandfathering rule. Only in this manner can social welfare be maximized.

The joint-optimization approach is likely to lead to a less stringent new source standard and a more limited grandfathering rule than the sequential optimization approach. The first prong is necessary in order to provide sufficient incentive for existing sources to close down. One might ask why that incentive should not be provided instead by denying grandfathering to

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[185] Nash & Revesz, *supra* note 1, at 1710.

[186] *Id.* at 1711.

existing sources. The reason is given by Shavell: in light of a stringent new source standard, grandfathering is sometimes optimal (though perhaps less often than Shavell claims because of the issues concerning the anticipation of new standards discussed in Part II). Just as it is cheaper to purchase a new hybrid car than it would be to convert a gasoline-powered car into a hybrid car, it is almost always cheaper to impose stringent pollution regulations on plants that are being newly constructed than it is to impose such regulations on plants that have already been built and have already installed different pollution abatement equipment.[187] Unlike a new plant, an old plant faces transition costs—such as removing previously installed safety devices (if any) and possibly retrofitting the plant so that it is compatible with new pollution abatement technology.[188] Of course, the costs associated with requiring an old plant to comply with new regulations may be overstated because, at least with performance standards, an old plant could also meet the standards by makings changes to its production process, which may be cheaper than retrofitting the plant or implementing new pollution-control technology.[189] For example, a plant could reduce its emissions by switching from high-sulfur coal to low-sulfur coal or from coal to natural gas.[190] Even so, old plants will likely face higher costs than new plants. Grandfathering existing actors will not always be optimal, but is appropriate when their compliance with the new rule would cost more "than the reduction in the expected harm" that would result from complying with the new rule.[191]

As a result, the socially optimal approach is to pick not only a less stringent new source standard than would be ideal if there were no existing sources, but also a less generous transition rule than the one that results from the current, sequential approach. Only through joint (as opposed to sequential) optimization can one achieve the socially optimal portfolio of new source standards and grandfathering rules.

We now develop some examples to illustrate the nature of the problem.

### *A. Example 1*

Let us return to Shavell's initial example. Recall that the old source, which operated in period one, produces a 7% risk of a harm of $700,000,

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[187] *See* Matthew D. McCubbins, Roger G. Noll, & Barry R. Weingast, *Structure and Process, Politics and Policy: Administrative Arrangements and the Political Control of Agencies*, 75 VA. L. REV. 431, 467 (1989) ("[T]he abatement system can be included in a new plant's original design, but must be fit into an older plant."); Stavins, *supra* note 183, at 30.

[188] *See* Peter Huber, *The Old-New Division in Risk Regulation*, 69 VA. L. REV. 1025, 1027 (1983) ("[The regulation of old risks] therefore often faces large economic and social obstacles and incurs transition costs."); Shavell, *supra* note 2, at 51–52 (discussing transition costs).

[189] REVESZ & LIVERMORE, *supra* note 116, at 135–37.

[190] *Id.* at 136–37.

[191] Shavell, *supra* note 2, at 44–45.

yielding an expected harm of $49,000. In period two, the optimal standard for a new plant leads to a risk of 5%, but it would cost $20,000 for the existing source to purchase the technology necessary to reduce risk to this level. Shavell then shows that grandfathering is optimal because the total social cost of requiring the existing source to meet the new source standards would be "20,000 + 5% x $700,000 = $55,000"[192]—more than the social cost of $49,000 that would result from grandfathering. Now assume that the market demand is only for the goods produced by a single plant. Then, no new plant would be constructed and the existing plant would remain in operation for a total social cost of $55,000.

Consider what would happen if a less stringent new source standard was picked. Let's say that at a cost of $10,000 the existing source could reduce its risk of harm to 5.5%. Would grandfathering then be optimal? The social cost of requiring the existing plant to meet the new standard would be $10,000 + 5.5% x $700,000 = $48,500—less than the social cost of $49,000 that results from continuing to operate the new plant. Thus, in the face of a new source requirement of reducing the risk to 5.5%, it is optimal not to grandfather the existing source. Additionally, the social cost here would be less than it would be under the more stringent standard. So, the joint optimization approach that we advocate in this Article leads to a new source standard producing a risk of 5.5% and no grandfathering, whereas the sequential approach leads to a new source risk of 5% but grandfathers the existing source.[193]

### *B. Example 2*

Example 1 should not be read to suggest that the lack of grandfathering is always optimal. Indeed, now consider a situation in which there is one existing plant in operation but there is unmet demand for its product sufficient to justify the building of one new plant of the same size. Again, the optimal standard for the new plant considered in isolation leads to a 5% risk of harm. If this standard is set, one new plant will be built to meet the additional demand. We know, from Shavell's example and the discussion above, that it is desirable to grandfather the existing plant. Would it be better, instead, to set the new source standard at 5.5%, in which case the optimal rule for the existing plant would be not to have grandfathering? The social harm produced by the existing plant would be less—$48,500 instead of $49,000—but the new plant would produce greater social harms,

[192] Shavell, *supra* note 2, at 46.

[193] In all three examples, the question is whether the existing source should meet the new source standard or whether, instead, it should be grandfathered. It is possible to design a regulatory scheme under which there is an additional option: the existing source could meet a standard that is less stringent than the one that applies to the new source but that leads to less risk than grandfathering. Analyzing this additional option would complicate the examples but would not change the key argument of this Part: that sequential optimization does not produce the socially beneficial regulatory policy.

because by definition 5% is the risk level that minimizes that harm. So, there is a tradeoff that must be considered. The expected harm produced by the new source at a 5% risk is $35,000 whereas at a 5.5% risk it is $38,500. Say that it would be $3200 cheaper for the new source to reduce its risk to 5.5% instead of 5%. Thus, social welfare would be increased if the new source standard prescribed a risk of 5.5% instead of 5%. The social cost imposed by the new plant would be $300 more at 5.5% than at 5%: the additional harm imposed would be $3500 greater but there would a resulting savings of $3200 in pollution control equipment. But the social cost imposed by the existing plant would be $500 less. Thus, the total social cost would be $200 less if the standard for the new source is set at a risk level of 5.5% instead of 5%. So, in this example, as in the prior one, a regulatory standard for the new source prescribing a risk of 5.5% is preferable to one prescribing a risk of 5%. And, in both cases, it is desirable not to grandfather existing sources.

### *C. Example 3*

But now consider a situation in which it is only $2700 (rather than $3200) cheaper for the new source to give rise to a risk of 5.5% instead of 5%. Then the social cost imposed by the new plant would be $700 more and the social cost imposed by the existing plant would be only $500 less. As a result, it would be optimal to set the standard for the new plant at a 5% risk and to grandfather the existing plant.

### *D. Example 4*

Finally, consider another situation, identical to Example 2, except that there is even more unmet demand so that the market could support three plants and there is only one existing plant, and where it is $3200 cheaper for a new source to meet a regulatory standard prescribing a 5.5% risk level instead of a 5% risk level. As a result of the larger demand, there will be two new sources plus the existing source. At a prescribed risk level of 5.5%, each new source would impose social costs of $300 more than at a risk level of 5%, as in Example 2. These additional social costs of $600 are now greater than the social cost savings of $500 if the existing source produces a risk of 5.5% instead of the status quo of 7%. As a result, a new source standard prescribing a 5% risk is optimal as is a rule grandfathering the existing source.

A full microeconomic analysis of our joint optimization approach is beyond the scope of this Article, but some important conclusions emerge from the preceding examples. Most significantly, the optimal standard for new sources cannot be determined in isolation from the transition rule. We have shown that in some cases it is desirable to compromise the stringency of the new source standards and to deny grandfathering to existing sources, even though grandfathering would have been desirable if the new source

standard had not been compromised. In other cases, however, it is preferable not to compromise the new source standard and to grandfather existing sources. The desirability of grandfathering depends on two important factors. First, the greater the growth in demand for the product, the more likely it is that grandfathering would be desirable because the benefits of not compromising the new source standards will be more compelling the more new sources there are likely to be. Accordingly, if the new source standard is not compromised, it is more likely that grandfathering the existing sources would be desirable. In contrast, if demand is stagnant so that the existing sources are likely to satisfy the existing demand for the long term, it is better to compromise the new source standards and to deny grandfathering to the existing sources. Otherwise, the new source standard would be irrelevant because there will be no demand for new plants, and the existing source would pollute more than is socially optimal.

Second, the period of time during which a grandfathered source continues in operation is also relevant. The shorter that time, the less desirable it is to compromise the new source standard in order to make it socially preferable to deny grandfathering. Indeed, the reduced social costs of this transition rule would lapse at the time that the grandfathered source would have closed down and would therefore be less likely to be sufficient to justify compromising the standard for new sources. This discussion underscores the undesirability of extending grandfathering in midstream—the common phenomenon described in Part V.C. If the regulator had known ex ante that any grandfathering was likely to be extended in the future, it might have been able to increase social welfare by weakening the standards for new sources and denying grandfathering altogether. Not knowing about this extension, the regulator would choose a new source standard and a grandfathering rule that, ex post, would become undesirable as a result of the extension of the grandfathering.

## V. PUBLIC CHOICE CONSIDERATIONS

We now turn to public choice arguments advanced in favor of transition relief. Many scholars have argued in favor of transition relief because it increases the likelihood that socially desirable legal changes will be enacted.[194] Relatedly, J. Mark Ramseyer and Minoru Nakazato have

[194] *See* Eric Biber, *Climate Change and Backlash*, 17 N.Y.U. ENVTL. L.J. 1295, 1328 (2009) (noting that opposition to climate change legislation can "be bought off with grandfather exemptions and side-payments"); David Dana & Susan P. Koniak, *Bargaining in the Shadow of Democracy*, 148 U. PA. L. REV. 473, 483–84 n.24 (1999) ("Grandfather clauses, in contrast to compensation payments, may well facilitate the passage of reform legislation. When the legislature grandfathers current beneficiaries of a certain regulatory regime from new regulations, it reduces or eliminates the opposition of those beneficiaries without extracting money from some other interest group and entailing associated political costs."); Glynn S. Lunney, Jr., *A Critical Reexamination of the Takings Jurisprudence*, 90 MICH. L. REV. 1892, 1955 (1992) ("Absent the promise of compensation, a concentrated group will too often be

argued that transition relief is desirable because it can reduce wasteful public choice expenditures.[195] If interest groups will be harmed by the repeal of an existing law or the passage of a new law, they may expend fewer resources opposing the initiative if it will be accompanied by transition relief for those groups. From a societal perspective, it is desirable to avoid these expenditures because, as Gordon Tullock has noted, "[t]hese expenditures . . . are spent not in increasing wealth, but in attempts to transfer or resist transfer of wealth."[196]

In this Part, we begin in section A by presenting the main public choice arguments for transition relief and discussing some of the responses that have been made in the literature. In section B we argue that, contrary to some of the dominant claims in the literature, public choice considerations might caution against providing generous transition relief when there is

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able to block even those concentrated-dispersed measures that would benefit society as a whole. By promising compensation, and thereby replacing the concentrated group with a dispersed group, the Court would make enactment of these measures more likely."); Stavins, *supra* note 183, at 34 ("[G]randfathering is likely to be a politically expedient option for legislators . . . . By limiting the scope of regulation to new capital assets, the burden of regulatory compliance is concentrated on a small subset of the electorate and the cost is transferred to unspecified, future 'new sources.'").

[195] *See* Ramseyer & Nakazato, *supra* note 48, at 1171–73. We use the term "public choice expenditures" to refer to expenses aimed at influencing governmental officials to adopt particular positions on policy issues. These include campaign contributions, salaries for lobbyists who meet with government officials, and expenses for informational purposes such as commissioning studies in order to bolster the interest group's position. Sometimes the academic literature uses the term "lobbying" to refer only to the transmission of information to political officials for the purposes of accomplishing a particular policy goal, thus excluding campaign contributions. *See* Frank R. Baumgartner & Beth L Leech, *The Multiple Ambiguities of "Counteractive Lobbying,"* 40 AM. J. POL. SCI. 521, 529 (1996). However, some authors define lobbying more broadly to include campaign contributions. *See* JEFFREY M. BERRY, LOBBYING FOR THE PEOPLE: THE POLITICAL BEHAVIOR OF PUBLIC INTEREST GROUPS 263 (1977) (describing four strategies of lobbying: law, confrontation, information, and constituency influence which includes campaign contributions). For a description of case studies measuring the influence of interest groups, see FRANK R. BAUMGARTNER & BETH L. LEECH, BASIC INTERESTS: THE IMPORTANCE OF GROUPS IN POLITICS AND IN POLITICAL SCIENCE 120–46 (1998). For an overview of the game theoretical literature on interest groups, see Jan Potters & Frans van Winden, *Models of Interest Groups: Four Different Approaches*, *in* COLLECTIVE DECISION-MAKING: SOCIAL CHOICE AND POLITICAL ECONOMY 337–62 (Norman Schofield ed., 1996) (discussing four models of interest groups: models employing an influence function, models employing a vote function, models employing a composite utility function, and models focusing on the transmission of information).

[196] Gordon Tullock, *The Welfare Costs of Tariffs, Monopolies, and Theft*, 5 W. ECON. J. 224, 228 (1967). There are three types of rent-seeking expenditures that are generally considered socially wasteful: "The efforts and expenditures of the potential recipients of the monopoly[,] . . . [t]he efforts of the government officials to obtain or to react to the expenditures of the potential recipients[,] . . . [and] [t]hird-party distortions induced by the monopoly itself or the government as a consequence of the rent-seeking activity." DENNIS C. MUELLER, PUBLIC CHOICE III 334 (2003) (citing James M. Buchanan, *Rent Seeking and Profit Seeking*, *in* TOWARD A THEORY OF THE RENT-SEEKING SOCIETY 12–14 (James M. Buchanan, Robert D. Tollison, & Gordon Tullock eds., 1980)). Of course, as Ramseyer and Nakazato acknowledge, "resources spent in . . . lobbying do produce a social good to the extent they create accurate information about the effects of . . . reform." Ramseyer & Nakazato, *supra* note 48, at 1171–72 n.44.

regulatory change. In section C, we present empirical evidence that supports our argument by discussing lobbying efforts to extend the Clean Air Act's grandfathering provisions.

### *A. Public Choice Arguments Advanced in Favor of Transition Relief*

Various scholars have suggested that transition relief may be desirable given certain public choice realities.[197] An argument commonly advanced in favor of transition relief is that it may be politically necessary to include transition relief in new legislation in order to overcome opposition to this legislation.[198] Thus, even if the socially optimal regulatory policy would not involve transition relief, it is better to adopt a new policy with transition relief than to fail to adopt a new policy altogether. Saul Levmore notes that:

> Legislatures . . . can engage in the strategic and selective protection of new losers. . . . [W]here losers have sufficient power to delay or block desirable change, winners (including the polity as a whole) [may] find it worthwhile to compensate losers in order to go forward with good new law.[199]

Indeed, we have seen examples of desirable environmental legislation that probably would not have been enacted without transition relief. For example, the tradable-permit program established under the Clean Air Act to combat acid rain allocates permits for sulfur dioxide emissions to current polluters at no charge.[200] While it would probably have been more socially desirable to initially allocate permits through auction,[201] allocating permits through grandfathering probably made the program politically viable.[202]

A related argument made in favor of providing transition relief is that transition relief can reduce wasteful lobbying expenses. Ramseyer and Nakazato—focusing on transition relief in the context of tax reform[203]—argue that guaranteeing transition relief is desirable in that it can decrease rent seeking.[204] If Congress is considering the repeal of an existing tax benefit, those groups currently benefiting from the tax benefit have a strong incentive to lobby against the repeal.[205] "In so doing, some will kill tax reform altogether, some will obtain a grandfather clause for their members,

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[197] *See supra* note 194.

[198] *See id.*

[199] Levmore, *supra* note 44, at 1665–66.

[200] *See* Keohane, Revesz & Stavins, *supra* note 78, at 317.

[201] *Id.* at 316.

[202] *See* Brennan Van Dyke, Note, *Emissions Trading to Reduce Acid Deposition*, 100 YALE L.J. 2707, 2720 (1991) (noting that initially allocating permits through a system of grandfathering "has one great advantage over an auction scheme: its political appeal to influential interest groups").

[203] Ramseyer & Nakazato, *supra* note 48, at 1158.

[204] *Id.* at 1171–73.

[205] *See id.* at 1171 ("They will pay honoraria, organize grass-roots political organizations, and contribute to campaigns; to protect their projects from reform, they will coax, cajole, and bribe.").

and some will simply fail. To the extent they can organize, however, they will fight."[206] In order to mount a fight against tax reform, a great deal of time, money, and resources are wasted: "The amount these groups spend to fight tax change is partially a loss, and partially a transfer of wealth to legislators."[207] They argue that promising transition relief in advance results in less wasteful lobbying.[208]

For example, suppose that, in an effort to encourage the use of solar energy, Congress grants a tax credit to those investing in such energy. At the time Congress enacts this law, it also promises to grandfather the tax benefit for the life of the solar energy investment, and in the event of "breach," agrees to pay "damages" in the form of a lump-sum payment equal to the net present value of the tax benefit.[209] In this case, Ramseyer and Nakazato argue that wasteful lobbying expenditures are less likely to occur at the stage where the credit is repealed, because Congress has guaranteed that the beneficiaries of the existing tax credit are protected against the negative consequence of a repeal.[210] When promised transition relief in advance, beneficiaries of tax legislation will no longer care if the law is repealed or maintained because either way they will receive the same benefits.

Shaviro, however, questions whether the promise of transition relief will actually result in a net reduction in lobbying expenses.[211] He points out that there may just be a tradeoff between enactment lobbying expenditures (expenses occurring when the tax benefit is first granted) and postenactment lobbying expenditures (expenses occurring when the tax benefit is being repealed, directed at protecting the benefit).[212] In the case of a "tax-guaranteed"[213] approach, where actors have been promised transition relief with the initial legislation in the event of repeal, we would expect to see more enactment lobbying and less postenactment lobbying.[214] And in the case of a "tax-contingent"[215] approach, where actors are not initially

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[206] *Id.*

[207] *Id.* (footnote omitted).

[208] *Id.* at 1171–73.

[209] *Id.* at 1167–68.

[210] *Id.* at 1172. Congress would essentially agree that, in the event of a repeal, beneficiaries of the tax benefit would receive a "lump sum equal to the net present value of the expected, but as-yet-uncollected, tax benefit[]." *Id.* at 1168.

[211] SHAVIRO, *supra* note 2, at 74–75.

[212] *Id.* at 74–81.

[213] *See* Ramseyer & Nakazato, *supra* note 48, at 1171 (defining "tax-guaranteed strategy" as "a promise to grandfather, coupled with a promise to pay damages for breach").

[214] SHAVIRO, *supra* note 2, at 74–81.

[215] *See* Ramseyer & Nakazato, *supra* note 48, at 1171 (defining "tax-contingent strategy" as "Graetz and Kaplow's never-grandfather strategy").

promised transition relief, we would expect more postenactment lobbying and less enactment lobbying.[216]

Like Shaviro, Kaplow argues that public-choice considerations paint a more complicated picture than that described by Ramseyer and Nakazato and suggests that such considerations actually support his position against transition relief.[217] He explains that the strategy advocated by Ramseyer and Nakazato, where groups are promised transition relief in advance, would increase the amount of inefficient, undesirable legislation.[218] If regulated parties know they will benefit from grandfathering, they have a strong incentive to lobby for inefficient regulation that creates barriers to entry and thus gives them a competitive advantage.[219] He also contends that if transition relief is the norm when policies that bestow special benefits are repealed, then the special interests' "incentive to lobby for such policies will be increased."[220] Thus, in addition to leading to the enactment of an

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[216] SHAVIRO, *supra* note 2, at 74–81. However, Ramseyer and Nakazato dismiss the concern that greater enactment-period lobbying expenses might offset the reduced postenactment lobbying costs:

> When Congress decides to grant tax benefits to promote investment, it could either guarantee the benefits or keep then [sic] contingent. All else equal, however, rational investors will consider only the expected net present value of those benefits when deciding how much to invest. As a result, when comparing the enactment-period lobbying costs generated by the tax-contingent and tax-guaranteed strategies, the correct comparison is between strategies that produce postenactment benefits of equal net present value.
>
> Yet between tax-guaranteed and tax-contingent benefits of equal net actuarial value, investors will not care. And because they will not care, the tax-guaranteed strategy will induce the same amount of enactment-period lobbying as the tax-contingent one. If so, then the optimal strategy is the one that minimizes the social loss from *post* enactment period lobbying. The analysis above suggests the tax-guaranteed strategy does just that.

Ramseyer & Nakazato, *supra* note 48, at 1173 (footnote omitted).

In Ramseyer and Nakazato's view, the actual value of the benefit Congress chooses to adopt will vary depending on whether Congress adopts a tax-guaranteed or tax-contingent benefit. *Id.* To borrow an example from Shaviro, if Congress were to adopt a municipal bond tax preference in order encourage investment in municipal bonds, it could "fine-tune the preference upon enactment to take account of the anticipated transition rule in the event that the preference is later repealed . . . ." SHAVIRO, *supra* note 2, at 74. Thus, if Congress intended not to grant transition relief in the event of repeal, it would enact a more generous tax benefit than it would if it promised transition relief, "thus keeping the preference's value from being affected by the transition regime." *Id.* at 75. Assuming such "scaling" occurs, interest groups standing to benefit from the tax benefit would be indifferent between the two approaches to transition relief in the pre-enactment stage. *Id.* at 74–75. Thus, we would expect that enactment lobbying expenditures would not vary according to the transition rule. However, if Congress later decides to repeal the tax benefit, we would expect postenactment expenditures to be greater when investors have not been promised transition relief—making the tax-guaranteed strategy preferable to the tax-contingent strategy. Ramseyer & Nakazato, *supra* note 48, at 1172–73.

[217] Louis Kaplow, *Transition Policy: A Conceptual Framework*, 13 J. CONTEMP. LEGAL ISSUES 161, 198–99 (2003).

[218] *Id.* at 198.

[219] *Id.* Kaplow levies this same critique against the argument that transition relief may be necessary in order to "reduce[] opposition to desirable reforms." *Id.* at 197. He explains that consistently providing transition relief may merely "buy off . . . opposition to undesirable reforms"—thus making it easier for policies that have net social costs to prevail. *Id.* at 198.

[220] *Id.* at 198.

increased amount of socially costly legislation, a norm of transition relief also leads to more wasteful expenditures ex ante.[221] Kaplow argues that even if the beneficiaries of the current law are less likely to oppose a change to the law when promised transition relief, "[i]t is not obvious that the net effect of buying off opposition ex post, when one includes effects of undesirable policies ex ante and wasteful rent-seeking expenditures, would be positive."[222]

### *B. How Transition Relief Can Lead to Undesirable Legal Changes and Wasteful Lobbying*

In this section, we critique the public choice arguments advanced in favor of transition relief and suggest that grandfathering does not necessarily bring about desirable legal changes or reduce wasteful lobbying expenses. Specifically, we suggest that the public choice literature discussing transition relief pays insufficient attention to the problem that we identified in Part IV: transition relief provides existing actors with a competitive advantage and thus discourages new actors from entering the regulated activity. When no (or very few) new actors enter the activity, there is no one to meet the new, more stringent standards, and thus the standards do not have their intended effect. In addition, because transition relief provides existing actors with a competitive advantage, it is not necessarily the case that existing actors will spend less money on lobbying expenses. In fact, existing actors may actually engage in lobbying in support of the new legislation so they can benefit from stringent regulation coupled with generous grandfathering.

First, in arguing that transition relief is often necessary to pass desirable legal changes, the literature ignores how transition relief can affect the desirability of the legal changes. Suppose it is socially desirable to require all sources to emit less pollution than they are currently allowed to emit. If existing sources are grandfathered, then these sources are likely to stay in operation longer than they otherwise would. In turn, very few new firms, if any, may actually come into existence because they will be at a competitive disadvantage compared to those grandfathered existing sources. If there are no new firms to meet the more stringent standards, it would be better to maintain the status quo than to pass the more stringent regulations coupled with grandfathering. Indeed, under the status quo, inefficient existing sources would gradually be replaced by more efficient, and therefore cleaner, new sources.[223]

Second, the argument that public choice expenditures are lower at the outset when transition relief accompanies proposed legislation is flawed

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[221] *Id.*

[222] *Id.* at 198–99.

[223] *See supra* notes 183–86 and accompanying text.

because it assumes that existing sources are indifferent between the status quo on the one hand and new source standards with grandfathering on the other, so they do not invest in public choice expenditures to fight such standards if grandfathering is provided. In reality, however, existing sources benefit from new source standards with grandfathering because such standards impose no costs on existing sources but do impose additional costs on new sources, thereby deterring potential competitors from entering the market. Operators of existing sources are thus more likely to make public choice expenditures in support of the new source standards at the time that the initial program is adopted. Indeed, industry actors have, in fact, lobbied for legislation that ostensibly improves the environment when doing so puts them at a competitive advantage.[224] Thus, it is not clear that grandfathering reduces public choice expenditures at the outset when the supposedly desirable legislation is first enacted.

Third, the argument that transition relief lowers wasteful lobbying expenses is flawed because it assumes that once transition relief is granted, there will be no additional lobbying expenses in order to extend the transition relief. To use the example discussed by Ramseyer and Nakazato to illustrate the common thinking, suppose that Congress adopts a tax credit for those taxpayers who invest in solar energy and promises that in the event of repeal, the "investors . . . [will be] grandfather[ed] . . . for the life of those projects," or the investors will be paid "a lump sum equal to the net present value of the expected, but as-yet-uncollected, tax benefits."[225] Thus, if a taxpayer invests in a solar energy project expecting to receive tax benefits equaling $1000 over the life of the project, the taxpayer will be entitled to this amount regardless of whether the tax credit is later repealed. The taxpayer is therefore indifferent about whether the law changes in the future.[226]

But consider a situation in which the transition relief takes the form of limited-time grandfathering, under which the legislation giving rise to the legal change specifies that grandfathering will come to an end at a certain point. There is then no reason to believe that existing actors will cease lobbying once the initial legislation is adopted, because the benefits of grandfathering are ongoing.[227] The legislation giving rise to the legal change might specify that sources will be required to come into compliance with the new regulatory standards after a certain period of time.[228]

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[224] *See, e.g.*, ACKERMAN & HASSLER, *supra* note 82, at 26–54, 117–18 (describing how producers of high-sulfur coal lobbied for more stringent regulation of new sources and for standards favoring coal scrubbing over low-sulfur coal to secure a competitive advantage over producers of low-sulfur coal).

[225] *See* Ramseyer & Nakazato, *supra* note 48, at 1168.

[226] *Id.* at 1169, 1172.

[227] *See* Nash & Revesz, *supra* note 1, at 1729. For a useful overview of "vintage-differentiated regulations" in environmental law, see Stavins, *supra* note 183, at 30, 36.

[228] The Clean Water Act employs this approach. *See* 33 U.S.C. § 1311(b) (2006) (establishing timetable for achievement of effluent limitation standards); *see also* REVESZ, *supra* note 78, at 507

Alternatively, the legislation could require old sources to come into compliance with the new regulatory standards when they undergo certain modifications,[229] as we discuss in detail in Part V.C. In either event, beneficiaries of grandfathering will have incentives to lobby for the purpose of extending the time period during which they receive the benefit. Further, if they are successful in obtaining an extension, they will certainly start lobbying for an additional extension when the original extension is about to expire, a process that may continue indefinitely and greatly increase total lobbying expenses.

### *C. Lobbying Efforts to Extend Grandfathering Under the Clean Air Act*

In this section, we use the Clean Air Act as a case study to illustrate how existing actors lobby extensively for continued grandfathering as the existing grandfathering benefit is about to expire.[230] Under the Act, existing actors were not required to immediately comply with stringent federal new source performance standards.[231] But once an existing source undergoes a "modification" that increases its emissions, the source becomes subject to these more stringent standards through a process known as New Source Review (NSR).[232] Congress's expectation was that old plants would eventually shut down or undergo modifications to upgrade their equipment and thereby become subject to the federal standards applying to new sources.[233] In practice, however, grandfathering bestowed a competitive

("[T]he [Clean Water Act] adopted a phased approach to the setting of federal standards for existing sources, such that EPA was directed to set increasingly stringent effluent limitations for point sources over time.").

[229] The Clean Air Act adopts this approach. *See infra* notes 231–32 and accompanying text. Some land use regulations also provide for initial grandfathering, but require grandfathered buildings to comply with the new regulations once major modifications are made. *See* Shavell, *supra* note 2, at 75 & n.55.

[230] *See generally* Nash & Revesz, *supra* note 1 (presenting an economic analysis of transition relief through a case study of the Clean Air Act).

[231] 42 U.S.C. § 7411(a)(2) (2006) (stating that federal performance standards apply to stationary sources, "the construction or modification of which is commenced after the publication of regulations").

[232] "Modification" is defined in the statute as "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollutant not previously emitted." *Id.* § 7411(a)(4). The EPA, however, has promulgated rules exempting from the definition of "modification" certain plant changes, including "routine maintenance, repair, and replacement; an increase in production rate, if the increase did not exceed the 'operating design capacity of the affected facility'; an increase in hours of operation; and use of alternative fuel or raw material if the affected facility could accommodate such use." Nash & Revesz, *supra* note 1, at 1684–85.

[233] *See* Nash & Revesz, *supra* note 1, at 1681 ("Commentators regularly note that Congress expected most existing sources to gradually phase out over the course of their ordinary economic lives or to upgrade and trigger the new source performance standards, leaving most major stationary sources subject to federal control."); David B. Spence, *Coal-Fired Power in a Restructured Electricity Market*, 15 DUKE ENVTL. L. & POL'Y F. 187, 195 (2005) ("Congress does not seem to have intended for grandfathered plants to be grandfathered indefinitely, since the [Clean Air] Act calls for application of a

advantage on existing sources because they were not subject to the stringent new source regulations; these existing sources continued to operate decades after the adoption of the new source standards.[234]

Absent pollution regulations altogether, an old plant may rationally decide to retire its equipment and build a new plant because its old equipment will become increasingly inefficient as it begins to degrade. The existence of pollution regulations applying to new sources, however, may give the plant an incentive to bear these inefficiencies for longer than it otherwise would because doing so would be less costly than complying with the standards applicable to new sources. Of course, eventually the equipment becomes so old that modifications triggering the new source standards become necessary, but firms have a strong incentive to delay this moment as long as possible.

The Clean Air Act provides a compelling example of this phenomenon. In the 1990s, many old plants—including at least twelve utility companies—decided to make major modifications without complying with the new source review standards as their equipment began to degrade.[235] The U.S. Department of Justice (DOJ) filed suit on behalf of the EPA against nine of these companies in 1999 and 2000.[236] These enforcement actions were the first to target the coal-fired electric utility industry in the more than twenty years since the new source rules had been enacted.[237]

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'new source' permitting standards to 'stationary source[s] the construction *or modification* of which is commenced after' the effective date of the Act's new source permitting requirements." (second alteration in original) (emphasis added) (citing § 7411(a)(2))).

[234] Nash & Revesz, *supra* note 1, at 1708–09 ("[D]ifferential environmental regulations delay plant retirement."); Spence, *supra* note 233, at 195 ("[O]lder coal-fired power plants, many of them in the Midwest, continued to pollute at essentially unregulated rates long after the passage of the [Clean Air] Act, depositing acid rain and other pollution on downwind states."). Although the acid rain program

> has dramatically reduced total sulfur dioxide emissions from coal-fired power plants, by imposing a nationwide cap on emissions, and permitting individual sources to buy and sell emissions allowances (tradable permits) . . . [it] does little to solve other pollution problems posed by unregulated coal-fired power plants, including those associated with emissions of particulates, nitrogen oxides, carbon dioxide and mercury.

*Id.* at 197 (footnotes omitted).

[235] Press Release, U.S. Dep't of Justice, U.S. Sues Electric Utilities in Unprecedented Action to Enforce the Clean Air Act (Nov. 3, 1999), *available at* http://www.usdoj.gov/opa/pr/1999/November/524enr.htm.

[236] *See* PUB. CITIZEN, EPA'S SMOKE SCREEN: HOW CONGRESS WAS GIVEN FALSE INFORMATION WHILE CAMPAIGN CONTRIBUTIONS AND POLITICAL CONNECTIONS GUTTED A KEY CLEAN AIR RULE 6 (2003), *available at* http://www.cleanupwashington.org/documents/epasmokescreen.pdf. The Department of Justice sued nine utility companies: American Electric Power, Cinergy, Duke Energy Corp., Illinois Power Co. (Dynegy), FirstEnergy Corp., Southern Co., Southern Indiana Gas & Electric Co. (SIGECO), Tampa Electric Co., and the Tennessee Valley Authority. *Id.* at 7. Three other companies—Virginia Power (VEPCO), PSEG, and Wisconsin Electric—were threatened with a lawsuit but settled. *Id.*

[237] *Id.* at 6.

When the first settlements exceeded a total of $3 billion,[238] the industry quickly began a coordinated lobbying effort to attack these rules.

Utility companies made substantial campaign contributions during this period. The Edison Electric Institute (EEI), the largest trade association of the electric utilities, contributed more than $17 million to federal candidates for the 1998, 2000, and 2002 elections.[239] In the 2000 presidential campaign, executives, employees, and political action committees of the electric utility industry gave $4.8 million to George W. Bush's campaign, the Republican National Committee, and the inaugural committee.[240] The companies facing enforcement action and the EEI contributed over $2 million of that amount.[241] In addition, Thomas Kuhn—the head of the EEI—personally contributed over $100,000 to the Bush campaign.[242]

When President Bush took office, the Energy Department's transition team included Kuhn and officials from three companies facing NSR litigation.[243] In addition, Bush appointed Jeffrey Holmstead, who had lobbied against NSR on behalf of two clients as the assistant administrator for the Office of Air and Radiation (OAR).[244] Nine days after taking office, Bush created an energy policy task force headed by Vice President Cheney, which submitted its recommendations to the President in May 2001.[245] The group called for a formal review of both the NSR rules and the legal basis for the DOJ's pending enforcement actions.[246] With advocates for their

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[238] *Id.*

[239] BRANDON WU, U.S. PIRG EDUC. FUND, PAYING TO POLLUTE: CAMPAIGN CONTRIBUTIONS AND LOBBYING EXPENDITURES BY POLLUTERS WORKING TO WEAKEN ENVIRONMENTAL LAWS 17 (2004), *available at* http://cdn.publicinterestnetwork.org/assets/PV0eprpcb4arS_TojM2EPA/payingtopollute2004.pdf.

[240] PUB. CITIZEN, *supra* note 236, at 3.

[241] *See id.* at 3, 20.

[242] CHARLES LEWIS, THE BUYING OF THE PRESIDENT 2004: WHO'S REALLY BANKROLLING BUSH AND HIS DEMOCRATIC CHALLENGERS—AND WHAT THEY EXPECT IN RETURN 102 (2004). While the industry did give money to the Democrats as well, the lion's share of the campaign contributions went to the Republican Party. *Id.* at 101–02 ("The top five electric utility contributors to the political parties in the 2000 and 2002 election cycles—Dominion Resources, Inc., Southern Company, Exelon Corporation, Texas Utilities Company, and the National Rural Electric Cooperative Association—gave nearly three-quarters (74 percent) of their party donations, $5.1 million, to the Republican national committees and just $1.8 million to the Democrats.").

[243] PUB. CITIZEN, *supra* note 236, at 4. The three officials were Anthony Alexander, president of FirstEnergy, Stephen Wakefield, a vice president at Southern Co., and Thomas Farrell, a vice president at Dominion. *Id.* at 21.

[244] *Id.* at 4. The OAR is the arm of the EPA directly responsible for drafting NSR rules, whereas a different arm, the Office of Enforcement and Compliance Assurance, primarily serves an enforcement role. *See id.* at 10–11.

[245] Joel A. Mintz, *"Treading Water": A Preliminary Assessment of EPA Enforcement During the Bush II Administration*, 34 ENVTL. L. REP. 10912, 10918 (2004).

[246] NAT'L ENERGY POLICY DEV. GRP., RELIABLE, AFFORDABLE, AND ENVIRONMENTALLY SOUND ENERGY FOR AMERICA'S FUTURE 7–14 (2001), *available at* http://www.wtrg.com/EnergyReport/National-Energy-Policy.pdf.

cause firmly in place in both the White House and the EPA, the stage was set for major policy changes.

In addition to making campaign contributions, the industry engaged in direct forms of lobbying. Rather than merely relying on its trade association, in 2000,[247] Southern Company and five other electric utilities created a new association, the Electric Reliability Coordinating Council (ERCC), to lobby exclusively for NSR changes.[248] According to official disclosure documents, the ERCC has spent over $8 million pushing for pro-industry new source rules over the last decade.[249] In addition, the EEI spent over $49 million on lobbying for this purpose between 1999 and 2002.[250]

The industry succeeded in its quest to extend grandfathering when the EPA implemented two new rules that made it significantly easier for old plants to avoid triggering NSR. The first rule altered the baseline used to determine whether a physical or operational change has resulted in increased emissions.[251] Recall that only modifications that increase emissions trigger NSR.[252] Instead of requiring plants to use emissions from the last two years as a baseline, the new rule allows plants to "choose any consecutive twenty-four month period from the ten years immediately preceding the proposed modification."[253] Thus, a plant can pick a period of time when its emissions were comparatively high, making it "less likely that a plant's modernization will be found to result in increased emissions."[254]

The second rule expanded what would be considered "routine" maintenance, which does not count as a "modification," thereby allowing plants to make significant changes without triggering NSR.[255] The rule

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[247] The ERCC filed its first lobbying report with the Senate Office of Public Records (SOPR) for the second half of 2000. *See LDA Reports*, U.S. SENATE, http://www.senate.gov/legislative/Public_Disclosure/LDA_reports.htm (last visited Nov. 23, 2011).

[248] WU, *supra* note 239, at 14.

[249] All data taken from *LDA Reports*, *supra* note 247 (follow "Search the Lobbying Database (LD-1, LD-2)," click the box next to "client name" in the new window that opens and click "submit," type "Electric Reliability Coordinating Council" in the field for client name and click "submit," filter results by year by clicking on "Filing Year" in the chart, and add the amounts in the column "Amt Reported" to get a total of over $10 million).

[250] *See id.* (follow "Search the Lobbying Database (LD-1, LD-2)," click the box next to "client name" in the new window that opens and click "submit," type "Edison Electric Institute" in the field for client name and click "submit," filter results by year by clicking on "Filing Year" in the chart, then add the amounts in the "Amt Reported" column to reach a total of $74,655,466,000 spent between 1999 and 2002).

[251] *See* Nash & Revesz, *supra* note 1, at 1697–98.

[252] *See supra* note 232 and accompanying text.

[253] Nash & Revesz, *supra* note 1, at 1698.

[254] *Id.* at 1699.

[255] *Id.* at 1702–03. Under this rule, three out of the nine utilities sued by the DOJ claimed that they were no longer in violation of the Clean Air Act and that the actions should be dropped. OFFICE OF INSPECTOR GEN., ENVTL. PROT. AGENCY, REPORT NO. 2004-P-00034, NEW SOURCE REVIEW RULE

provided a safe harbor for changes that cost up to 20% of the replacement value of the entire plant.[256] Various state governments and environmental organizations challenged the 20% rule, arguing that it undermined enforcement of the Clean Air Act, and the D.C. Circuit issued a stay on the rule, causing the EPA to withdraw it for further consideration.[257] In June 2005, the EPA reissued the rule, leaving it essentially unchanged.[258] Eventually, however, the D.C. Circuit struck down the 20% rule.[259]

In summary, while the initial grandfathering under the Clean Air Act may have somewhat appeased industry actors—perhaps resulting in less overall political opposition to its enactment—it also bestowed a competitive advantage upon existing actors that gave them an incentive to lobby to extend the grandfathering beyond its expiration date. Even if the presence of a grandfathering provision were to decrease wasteful lobbying when the legal change is initially enacted (a proposition that we question in Part V.B), additional wasteful lobbying will almost certainly take place when the grandfather provision nears expiration.

## CONCLUSION

Every time a new law is enacted, legislators and regulators must decide how to treat actors negatively affected by the legal change. In the environmental context, the question of transition relief will be particularly significant when legislation is enacted to respond to the threat of climate change. Indeed, the very efficacy of a new climate change regime may depend on the transition policy that is adopted. While optimal transition policy certainly varies depending on the circumstances surrounding the legal change, we provide a more nuanced understanding of optimal transition relief than has been offered by the academic literature. In this Article, after noting that both proponents and opponents of transition relief have paid insufficient attention to certain important issues and after considering the long-term effects of grandfathering, we demonstrate the flaws of the prevailing approach of first setting a standard for new sources without taking existing sources into account and then choosing the best transition rule in light of this standard. Then, we present a novel argument for why the joint optimization of these two decisions is preferable to the existing sequential approach. In some cases, our approach would lead to a

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CHANGE HARMS EPA'S ABILITY TO ENFORCE AGAINST COAL-FIRED ELECTRIC UTILITIES 21 (2004), *available at* http://www.epa.gov/oig/reports/2004/20040930-2004-P-00034.pdf.

[256] *See* OFFICE OF INSPECTOR GEN., *supra* note 255, at 21.

[257] William S. Eubanks II, *The Clean Air Act's New Source Review Program: Beneficial to Public Health or Merely a Smoke-and-Mirrors Scheme?*, 29 J. LAND RESOURCES & ENVTL. L. 361, 370 (2009).

[258] Prevention of Significant Deterioration (PSD) and Non-Attainment New Source Review (NSR): Equipment Replacement Provision of the Routine Maintenance, Repair, and Replacement Exclusion: Reconsideration, 70 Fed. Reg. 33,838 (June 10, 2005) (to be codified at 40 C.F.R. pts. 51–52).

[259] *See* New York v. Envtl. Prot. Agency, 443 F.3d 880, 890 (D.C. Cir. 2006).

less stringent new source standard but no grandfathering for existing sources. In contrast, the sequential approach followed until now in the academic literature would choose a less desirable combination: a more stringent new source standard coupled with grandfathering. We also critique the public choice justifications for providing transition relief and suggest that routinely accompanying new regulations with generous transition relief can result in undesirable legal changes and wasteful lobbying. Finally, we show that even in the regulatory context where existing actors have made significant investments in order to comply with previous regulations, it may still be socially desirable not to provide transition relief because a policy of no transition relief encourages existing actors to anticipate socially desirable regulatory changes.

While this Article focuses on command-and-control regulation—largely because command-and-control regulation still dominates the regulatory field—it is important to acknowledge that many of the difficulties associated with optimal transition relief in a command-and-control regime are avoided under a cap-and-trade or tax system. While most discussion of cap-and-trade and tax schemes has focused on their cost-minimizing properties,[260] these schemes are also advantageous in that they provide an optimal mechanism for transitioning from existing sources to new sources. Indeed, under a cap-and-trade or tax system, an old plant that is no longer operating efficiently must either close its doors and sell its permits to a new plant or develop more efficient pollution-reduction techniques. Thus, there is no need for regulators to craft separate standards for new and existing sources.

[260] *See, e.g.*, Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333, 1341–42 (1985) ("A system of tradeable rights will tend to bring about a least-cost allocation of control burdens, saving many billions of dollars annually."); Robert W. Hahn & Robert N. Stavins, *Incentive-Based Environmental Regulation: A New Era from an Old Idea?*, 18 ECOLOGY L.Q. 1, 7–8 (1991) ("In contrast to traditional command-and-control approaches, policy mechanisms based on economic incentive systems ensure that firms 'automatically' undertake pollution control efforts in precisely the manner and degree which will result in the cost-effective allocation of the overall control burden." (footnote omitted)).