Environmental Regulation in Federal Systems

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I. Introduction

In the United States of America (USA), vesting control over environmental regulation at the federal level is most commonly justified both in the legal academic literature and the legislative arena by reference to three distinct arguments. First, advocates of federal control argue that in its absence inter-state competition would result in a “race to the bottom”. Secondly, they maintain that federal regulation is necessary to prevent inter-state externalities. Thirdly, proponents of centralization raise the public choice claim that environmental interests will be systematically under-represented at the state level relative to business interests.

This article, which builds upon my prior works in the area, has three major purposes. First, it casts serious doubt on the validity of some of the arguments made in favour of centralizing environmental regulation. Secondly, it shows that, to a large extent, there has been a mis-allocation of responsibility over environmental regulation: the federal government has taken too aggressive a role with respect to matters best handled at the state level, but has been too constrained in its exercise of authority with respect to issues over which it enjoys a distinct comparative advantage. Thirdly, it attempts to extract from the experience in the USA lessons that might be of interest to the European Union (EU) and to the international trading regime.

Section II develops the arguments for a presumption for decentralization, which calls for vesting responsibility over environmental protection at the state rather than federal level, as a result of differences in preferences over environmental protection, as well as differences in the benefits and costs of

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such protection. This presumption can be rebutted if decentralization gives rise to some pathology that could be cured through federal regulation.

Sections III to V examine the three most prominent justifications offered in the academic literature and in the legislative histories of the federal environmental statutes in the USA for vesting responsibility over environmental regulation at the federal level. First, the “race to the bottom” rationale posits that states, in an effort to induce geographically mobile firms to locate within their jurisdictions, will offer them sub-optimally lax environmental standards, so as to benefit from additional jobs and tax revenues. Second, the problem of inter-state externalities arises because a state that sends pollution to another state incurs the labor and fiscal benefits of the economic activity that generates the pollution, but does not suffer the full costs of the activity. Thus, a sub-optimally large amount of pollution will cross state lines. Thirdly, a public choice claim posits that state political processes will systematically under-value the benefits of environmental protection or overvalue its costs. I show that these three arguments do not justify the broad role over environmental regulation accorded to the federal government in the USA.

Section VI attempts to define an appropriate federal role. It focuses on the types of federal regulation that may be desirable in light of (1) different types of inter-state externalities (pollution externalities, benefits that accrue outside the jurisdiction in which the need for environmental protection arises, and existence or non-use values placed by out-of-state citizens to certain natural resources); (2) economies of scale; (3) benefits that might flow from uniformity in regulation; and (4) the vested views concerning the protection of minimum levels of public health. It shows that these arguments justify a far narrower federal role than that embodied in the current environmental statutes.

Section VII shows that much of the criticism of centralized regulation that flows from the preceding analysis of the institutional framework in the USA applies with equal force to the EU. It also underscores the importance for the EU of debates concerning the proper allocation of authority currently waged primarily on this side of the Atlantic.

Section VIII explains why the assessment of centralized intervention is different in the international community from federal systems. It also provides a framework for analyzing the desirability of environmentally-based trade restrictions in the international community.

II. A Presumption in Favour of Decentralization

My starting point is a rebuttable presumption in favour of decentralization. This presumption rests on three independent grounds. First, the USA is a large and diverse country. It is therefore likely that different regions have different preferences for environmental protection. Environmental protection entails an important resource allocation question. We can generally purchase additional environmental protection at some price, paid in the currency of jobs, wages, shareholders’ profits, tax revenues, and economic growth. Given the existence of the states as plausible regulatory units, the trade-off reflecting the preferences of citizens of different regions should not be wholly disregarded in the regulatory process. Absent strong reasons for doing so.

In the case of some social decisions, such reasons are present. The example of federal civil rights legislation, which trumped deeply held preferences of a large region of the country, is perhaps most prominent. But while I am sympathetic to the argument that the protection of a minimum level of public health ought to be viewed in quasi-constitutional terms and guaranteed throughout the country, as I explain below it would stretch this principle beyond its breaking point to say that it calls for the federalization of every decision having public health consequences.

Secondly, the benefits of environmental protection also vary throughout the country. For example, a stringent ambient standard may benefit many people in densely populated areas but only a few elsewhere. Similarly, a particular level of exposure to a contaminant may be more detrimental if it is combined with exposure to other contaminants with which it has synergistic effects. Thirdly, the costs of meeting a given standard also differ across geographic regions. For example, a source may have a large detrimental impact on ambient air quality if it is directly upwind of a mountain or other topographical barrier. Similarly, a water pollutant will have a far larger impact on water quality standards if it disposes of its effluents in relatively small bodies of water. Climate might also play a role: certain emission or effluent standards may be easier (and cheaper) to meet in warmer weather.

In principle, federal regulation could be attentive to these differences. Such a differentiated approach, however, would require a staggering amount of information. Clearly, the federal government does not have a comparative advantage at gathering such information. Thus, not surprisingly, federal regulation generally imposes uniform requirements throughout the country. Moreover, even when federal regulation imposes uniform standards, the differences are not explainable by the factors discussed above.

This presumption for decentralization should be overcome, however, if there is a systemic evil in letting states decide the level of environmental protection. This is the case with the Clean Air Act, for example, which imposes uniform air quality standards on all states.

See note 46-47 below.

2 See note 46-47 below.

3 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.


5 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.

6 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.

7 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.

8 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.

9 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.

10 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.

11 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.

12 See Chemical Mfrs. Ass’n v. Ruckelshaus, 47 F.4th 305 (D.C. Cir. 1980); see also note 18 above.
protection that will apply within their jurisdictions. Sections III to V examine, respectively, the strength of the race-to-the-bottom, inter-state externality, and public choice justifications for federal environmental protection.

### III. The Race-to-the-bottom Justification

The discussion proceeds in four parts. First, it argues that inter-state competition over environmental standards is, in essence, competition for the sale of goods. Secondly, it shows that the leading economic model of the effects of inter-state competition on the choice of environmental standards shows that interjurisdictional competition leads to the maximization of social welfare, rather than to a race to the bottom. Thirdly, it argues that game-theoretic inter-action among the states leads to a departure from optimality, the result could be over-regulation or under-regulation thus, even under this scenario there is no compelling justification for federal minimum standards, which are designed to correct only for under-regulation. Fourthly, it shows that even if states systematically enacted sub-optimally lax environmental standards, federal environmental regulation would not necessarily improve the situation.

#### A. Market Analogy

Race-to-the-bottom advocates must clear an initial hurdle. If one believes that competition among sellers of, say, widgets is socially desirable, why is competition among states, as sellers of goods—the right to locate within their jurisdictions—socially undesirable?  


Indeed, states sell location rights because, even though they might not have the legal authority to prevent firms from locating within their borders, such firms must comply with the fiscal and regulatory regime of the state in which they wish to locate. The resulting costs to the firms can be analogized to the sale price of traditional goods. If federal regulation mandates a supra-competitive price for widgets is socially undesirable, why should it be socially desirable to have federal regulation mandating a supra-competitive price for location rights, in the form of more stringent environmental standards than those that would result from inter-state competition? It is easy to identify possible distinctions between a state as seller of location rights and sellers of widgets. These differences, however, do not provide support for race-to-the-bottom claims. First, if individuals are mobile across jurisdictions, the costs that polluters impose on a state’s residents will depend on who ends up being a resident of the state; the resulting supply curve is thus far more complex than that of a widget seller. In the context of environmental regulation, however, race-to-the-bottom claims have focused exclusively on the mobility of capital, thereby assuming, at least implicitly, that individuals are immobile. Moreover, it is not clear that individual mobility readers competition among states different from competition among widget sellers. Indeed, even if individuals move in search of the jurisdiction that has the level of environmental protection that they favour, and if there is capital mobility, the choice of environmental standards can nonetheless be efficient.

Secondly, while a seller of widgets is indifferent to the effect of the sale price on the welfare of the goods’ purchaser, a state ought to be concerned about the interests of the shareholders of the polluting firm who reside in the jurisdiction, both as individuals adversely affected by pollution and as owners of capital adversely affected by the costs of meeting regulatory requirements. But this difference does not support race-to-the-bottom arguments. Indeed, if some of the regulated firm’s shareholders did not reside in the regulating jurisdiction and if capital were immobile, a state could extract monopoly profits by setting suboptimally stringent standards, benefiting its in-state breathers at the expense of out-of-state shareholders. (If capital is mobile, competition eliminates this problem.) Nothing in this account provides support for the opposite proposition: that inter-state competition leads to sub-optimally lax standards.

Thirdly, states are not subject to the discipline of the market. If a producer of widgets consistently sells at a price that does not cover its average costs, it will
capital and labour, and produces waste emissions. The various jurisdictions set a total permissible amount of emissions as well as a tax on each unit of capital. Capital is perfectly mobile across jurisdictions and seeks to maximize its after-tax earnings, but labour is immobile.17 Each individual in the community, who is identical in both tastes and productive capacity, puts in a fixed period of work each week, and everyone is employed. Additional capital raises the productivity of workers, and therefore their wages.

Each jurisdiction makes two policy decisions: it sets a tax rate on capital and an environmental standard. Oates and Schwab show that competitive jurisdictions will set a net tax rate on capital of zero (the rate that exactly covers the cost of public services provided to the capital, such as police and fire protection). For positive net tax rates, the revenues are less than the loss in the wages that results from the move of capital to other jurisdictions. In contrast, net subsidies would cost the jurisdiction more than the increase in wages that additional capital would generate.

In turn, competitive jurisdictions will set an environmental standard that is defined by equating the willingness to pay for an additional unit of environmental quality with the corresponding change in wages. Pollution beyond this level generates an increment to wage income that is less than the value of the damage to residents from the increased pollution; in contrast, less pollution creates a loss in wage income greater than the corresponding decrease in pollution damages.

Oates and Schwab show that these choices of tax rates and environmental standards are socially optimal. With respect to tax rates, one condition for optimality is that the marginal product of capital—the increase in the output of the goods produced by an additional unit of capital—must be the same across jurisdictions. Otherwise, it would be possible to increase aggregate output, and, consequently, aggregate social welfare, by moving capital from a jurisdiction where the marginal product of capital is low to one where it is high. Because capital is fully mobile, the market will establish a single rate of return on capital. This rate is equal to the marginal product of capital minus the tax on capital. The choice by competitive jurisdictions of a net tax of zero equalizes the marginal product of capital across jurisdictions and is therefore consistent with optimality.

With respect to environmental standards, competitive jurisdictions equate the marginal private cost of improving environmental quality (measured in terms of foregone consumption) with the marginal private benefit. For net tax rates of zero, the marginal private cost is, as noted above, the decrease in wage
income produced by the marginal unit of environmental protection. This decreases the marginal social cost, since it represents society's foregone consumption. Thus, instead of producing a race-to-the-bottom, competition leads to the optimal levels of environmental protection.13

C. NON-OPTIMALITY AS A RESULT OF GAME-THEORETIC INTERACTIONS

So far, the inquiry has not revealed support for the claim of systematic environmental under-regulation in a regime without federal intervention. It is possible, however, that in particular instances, the game-theoretic interactions among the states would lead to under-regulation absent federal intervention. In such cases, federal minimum standards would be desirable. But it is equally plausible that in other instances the reverse would be true: that the game-theoretic interactions between the states would lead to over-regulation absent federal intervention. In such cases, federal regulation would be desirable as well, but in such cases the federal mandate could be called for. Accordingly, there is no compelling race-to-the-bottom justification for across-the-board federal minimum standards, which are the cornerstone of federal environmental law.

As an example of such game-theoretic interactions, consider, in the Oates and Schwab model, a situation in which states decide to impose a positive net tax rate on capital, perhaps because they cannot finance the provision of public goods through a non-discretionary tax, and thus on a head tax. In such a situation, environmental standards will be sub-optimally lax because the jurisdiction will continue to relax these standards beyond the optimal level in order to benefit from the additional net tax revenue that results from attracting additional capital.

A corollary, however, is that environmental standards will be sub-optimally stringent if a jurisdiction, perhaps because of the visibility that attaches to attracting a major facility, chooses a tax rate on capital that is less than the cost of the public services that capital requires. Under this scenario, the optimal strategy for the jurisdiction is to strengthen the environmental standards beyond the optimal level so as to reduce the negative fiscal consequences.14

Similarly, recent studies relax the assumptions of constant returns to scale and perfect competition, which are a cornerstone of the Oates and Schwab model.15 Instead, it considers the effects of state regulation on an industry that exhibits increasing returns to scale, a condition generally associated with imperfect competition. The conclusions of the model are that, depending on the levels of firm-specific costs, plant-specific costs, and transportation costs, inter-state competition can produce either sub-optimally lax or sub-optimally stringent levels of pollution.

Alternatively, if a firm has market power enabling it to affect prices, it will be able to extract a sub-optimally lax standard. Conversely, if a state has market power, the reverse will be true. In summary, just as there are game-theoretic situations in which inter-state competition produces environmental under-regulation, there are other plausible scenarios under which the result is over-regulation.

D. FUTILITY OF FEDERAL Regulation

But even if, left to their own devices, states systematically enacted sub-optimally lax environmental standards, federal environmental regulation would not necessarily improve the situation. Race-to-the-bottom arguments appear to assume, at least implicitly, that jurisdictions compete over only one variable—in this case, environmental quality. Consider, instead, the problem in a context in which states compete over two variables—for example, environmental protection and worker safety. Assume that, in the absence of federal regulation, state one chooses a low level of environmental protection and a high level of worker safety, State two does the opposite: it chooses a high level of environmental protection and a low level of worker safety protection. Both states are in a competitive equilibrium, with industry not migrating from one to the other.

Suppose that federal regulation then imposes on both states a high level of environmental protection. The federal scheme does not add to the costs imposed upon industry in state two, but it does in state one. Thus, the federal regulation will upset the competitive equilibrium, and unless state one responds, industry will migrate from state one to state two. The logical response of state two is to adopt less stringent worker safety standards. This response may mitigate the magnitude of the industrial migration that would otherwise have occurred.

Thus, if a race to the bottom exists, federal environmental standards can have adverse effects on other regulatory programmes, in this case, worker safety. On this account, federal environmental regulation is desirable only if its benefits outweigh the costs that it imposes by shifting to other programmes the pernicious effects of inter-state competition.

More generally, the presence of such secondary effects implies that federal regulation would not be able to eliminate the negative effects of inter-state competition, if such negative effects existed. Recall that the central tenet of Environmental Regulation in Federal Systems and Management 80, J. R. Markson, E. R. Money, and N. D. Olesker, "Competition in Regional Environmental Policies when Plant Locations are Endogenous" (1995) 59 Journal of Public Economics 55.
race-to-the-bottom claims is that competition will lead to the reduction of social welfare; the assertion that states enact sub-optimally lax environmental standards is simply a consequence of this more basic problem. In the face of federal environmental regulation, however, states will continue to compete for industry by adjusting the incentive structure of other state programmes. So, for example, if states cannot compete over environmental regulation, they will compete over worker safety standards. One might respond by saying that worker safety should also be (and is) the subject of federal regulation. But states would then compete over consumer protection laws or tort standards, and so on. And even if all regulatory functions were federalized, the competition would simply shift to the fiscal arena, where the competition would lead to the under-provision of public goods. Thus, the reduction in social welfare implicit in race-to-the-bottom arguments would not be eliminated.

The race-to-the-bottom rationale for federal environmental regulation is, therefore, radically under-inclusive. It seeks to solve a problem that can be addressed only by wholly eliminating state autonomy. In essence, then, race-to-the-bottom arguments are frontal attacks on federalism. Unless one is prepared to federalize all regulatory and fiscal decisions it is far from clear that federal intervention in the environmental arena would mitigate the adverse social welfare consequences of a race to the bottom, if such a race existed.

IV. The Inter-state Externality Justification

The presence of inter-state externalities provides a compelling argument for federal regulation under conditions in which Coasian bargaining is unlikely to occur. A state that sends pollution to another state obtains the labour and fiscal benefits of the economic activity that generates the pollution, but does not suffer the full costs of the activity. Thus, a sub-optimally large amount of pollution will cross state lines.

Several reasons might explain why transaction costs are sufficiently high to prevent the formation of inter-state compacts. First, the baselines are not well defined in the current legal regime. Does an upstream state have the right to send pollution downstream unconstrained? Alternatively, does the downstream state have the right to enjoin all upstream pollution? Secondly, for different pollution problems, the range of affected states will vary, making less likely the emergence of conditions favouring co-operation. For example, in the case of air pollution, the states affected by a source at a particular location will depend to a large extent on the nature of the pollutant and the height of the stack. Thirdly, the causation questions are not likely to be straightforward. Considerable scientific work needs to be undertaken in order to determine what sources of pollution are having an impact on the downstream state, and it makes little sense for these determinations to be replicated with respect to each compact.

The fact that inter-state externalities provide a compelling justification for intervention, however, does not mean that all federal environmental regulation can be justified on these grounds. For environmental problems such as the control of drinking water quality, there are virtually no inter-state pollution externalities; the effects are almost exclusively local. Even with respect to problems for which there are inter-state externalities, such as air pollution, the rationale calls only for a response well targeted to the problem, such as a limit on the amount of pollution that can cross state lines, rather than the control of pollution that has only in-state consequences.

The analysis of the effectiveness of the environmental statutes at remedying inter-state pollution spills over proceeds by reference to the Clean Air Act—the statute designed to deal with the pollution that gives rise to the most serious problems of inter-state externalities. It examines the statute's ambient and emission standards, which are the core of the regulatory effort, as well as its acid rain provision and inter-state spillover provisions, which are more directly targeted to the problem of inter-state externalities. It shows that federal regulation has been both ineffective and potentially counter-productive.10

A. Ambient and Emission Standards

The core of the Clean Air Act consists of a series of federally prescribed ambient standards and emission standards. Ambient standards determine the maximum permissible concentration of a particular pollutant in the ambient air, but do not directly constrain the behaviour of individual polluters. Emission standards, in contrast, determine the maximum amount of a pollutant that can be discharged by an individual source. The federal emission standards are not a good means by which to combat the problem of inter-state externalities. These standards constrain the pollution from each source, but do not regulate the number of sources within any given state or the location of the sources. Similarly, the various federal ambient air quality standards also are not well targeted to address the problem of inter-state externalities, because they are both over-inclusive and under-inclusive. From the perspective of constraining inter-state externalities at a desirable level, ambient standards are over-inclusive because they require a state to restrict pollution that has only in-state consequences. Concern about inter-state externalities can be addressed by limiting the amount of pollution that can cross inter-state borders. Because some air pollution has only local effects, such externalities can be controlled

10 Sect. IV relies heavily on Revesz, "Federalism and Inter-State Environmental Externalities", n. 4 above; Revesz, "Federalism and Environmental Regulation: A Normative Critique", n. 1 above. 197-20.
11 Similar criticisms can be raised against the Clean Water Act, which is designed to combat an environmental problem for which the inter-state pollution spills over are also salient. See Revesz, "Federalism and Inter-State Environmental Externalities", n. 4 above, 2370.
even if the upwind state chooses to have poor environmental quality within its borders. Conversely, the federal ambient air-quality standards are also under-inclusive from the perspective of controlling inter-state externalities because a state could meet the applicable ambient standards but nonetheless export a great deal of pollution to downwind states because the sources in the state have tall stacks and are located near the inter-state border. In fact, a state might meet its ambient standards precisely because it exports a great deal of its pollution.

The federal ambient and emissions standards could perhaps be justified as a second-best means by which to reduce the problem of uncontrolled inter-state externalities. One might believe that by reducing pollution across the board they reduce inter-state externalities proportionately.

Such a view, however, is incorrect as a matter both of theory and empirical observation. The amount of aggregate emissions is not the only variable that affects the level of inter-state externalities. In particular, two other factors play important roles. The first is the height of the stack from which the emissions are emitted. The higher the stack, the lesser the impact close to the source and the greater the impact far from the source. Thus, absent a federal constraint, states have an incentive to encourage their sources to use tall stacks, as a way to externalize both the health and environmental effects of the pollution and the regulatory costs of complying with the federal ambient standards.

Secondly, the level of inter-state externalities is affected by the location of the sources. In the eastern part of the USA, where the problem of inter-state pollution is most serious, the prevailing winds blow from west to east. Thus, states have an incentive to locate their sources to locate close to their downwind neighbors so that the bulk of the effects of the pollution is externalized. They can induce this result, for example, through the use of tax incentives or subsidies, or through permitting and zoning decisions.

The best evidence that states do indeed encourage sources to use tall stacks can be found in the provisions of the SIPs adopted by at least fifteen states in response to the enactment of the Clean Air Act in 1970. These SIPs allowed sources to meet the NAAQS by using taller stacks rather than by reducing emissions.16 In those SIPs, the permissible level of emissions was an increasing function of the height of the stack.20 If the stack was sufficiently high, the

19 e.g., the Georgia regs. that were struck down In Natural Resources Defense Council. v. EP A, 489 F. 2d 990, 1033-11 (5th Cir. 1974), reviewed on other grounds sub nom. Train v. Natural Resources Defense Council provided that, for sulphur dioxide, allowable emissions could be proportional to the cube of the stack height, for stacks under 300 feet, and proportional to the square of the stack height for stacks over 300 feet. See Georgia Rules and Regulations for Air Quality Control 270-5-24-02(b)(2)(c)(1) (1972). A similar formula applied to particulate emissions. See ibid., 270-5-24-02(b)(2)(c)(m). Thus, a sufficiently high stack would eliminate the need for any emissions reduction.
20 The savings can be substantial, e.g., a study in the early 1970s when tall stack credits were most prevalent, showed that the cost of complying with regulatory requirements were between $600/kw and $1500/kw for new lime scrubbers, as compared with between $4/kw and $10/kw for a tall stack. See Sen. Comm. on Public Works, n. 20 above, 210, 215.
Clean Air Act, tall stacks remain a means by which excessive pollution can be externalized. In contrast to the experience with tall-stack provisions, it is difficult to find direct evidence concerning whether states also provided incentives for sources to locate close to their downwind borders, because such incentives are unlikely to be reflected in regulatory documents. These is, however, literature suggesting that such incentives are present in the case of the siting of waste sites. It would thus not be implausible to believe that states acted in the same manner with respect to air pollution facilities.

In summary, far from correcting the problem of inter-state externalities, the Act’s ambient and emission standards may well have exacerbated it.

B. ACID RAIN PROVISIONS

The acid rain provisions of the 1990 amendments are often hailed as a means of reducing inter-state externalities because acid rain is produced by pollution that travels long distances. However, these provisions apply only to the two pollutants that lead to the formation of acid rain: sulphur dioxide and nitrogen oxides. Further, they apply to only one type of facility: electric utilities. Moreover, these provisions are not structured to allocate emissions between upwind and downwind states in a desirable manner.

With respect to nitrogen oxides, the provisions set emission standards for new and existing sources. As discussed above, emission standards are not a well targeted means for controlling inter-state externalities. With respect to sulphur dioxide, the acid rain provisions establish a system of grandfathered permits, under which existing emitters are assigned, for free, a number of permits equal to their historical emissions, subject to certain constraints. These permits are tradeable in a single national market. Although these constraints on the grandfathering of permits are likely to reduce the amount of acid rain, particularly after 2006, they make no attempt to allocate emissions between upwind states and downwind states in an optimal way. The acid rain problem manifests itself primarily in the North East, but is caused primarily by emissions from the mid-West. Because the market is national, mid-Western sources can buy, without restriction, permits from the West and the North East. Such trades would have an undesirable impact on the North East. In fact, downwind states are attempting to prevent their sources from selling permits to upwind sources, tugs such measures may well be struck down on constitutional grounds.


38 See 42 USC 7410a(2)(D), 7428(b) (1994).

39 See, e.g., New York v. EPA, 716 F 2d 440, 443 (7th Cir. 1983); New York v. EPA, 710 F 2d 1200, 1204 (4th Cir. 1983).

40 See, e.g., New York v. EPA, 716 F 2d 440, 443 (7th Cir. 1983); New York v. EPA, 710 F 2d 1200, 1204 (6th Cir. 1983).

41 See Connecticut v. EPA, 696 F 2d 147, 164–5 (2nd Cir. 1982); B. A. Ackerman and W. T. Hardesty, Clean Coal/Dirty Air (New Haven, Conn.: Yale University Press, 1981; 65–72.)
determine the permissible amount of upward pollution that can enter the downwind state?

In Category I, absent a violation of the federal ambient standards—either the NAMQs or the PSD increments—the EPA has chosen to place no limits on the upward pollution. In this situation, the upward pollution will be unconstrained even if it leads to a violation of a state ambient standard in the downwind state that is stricter than the federal standard. Further, the upward pollution will be unconstrained even if the downwind state has limited the emissions of its sources in order to preserve a margin for growth that will permit it to attract new industry. Finally, the upward pollution will be unconstrained even if the downwind state has been unable to set a baseline under the PSD programme, thereby constraining further environmental degradation, because no major source has applied for a permit.

In Category II cases, where the upward pollution exacerbates a violation of a federal ambient standard in the downwind state, the EPA has never found upward pollution to meet the “significant contribution” standard and has given little guidance on what factors distinguish a “significant” contribution from an “insignificant” one. In cases involving a single upward source, the EPA concluded that contributions of 1.5 per cent and of 3 per cent were not excessive. It reached these conclusions with no analysis, apparently basing its determination on the fact that those percentages do not seem particularly large. Nor did the EPA engage in any inquiry as to the cumulative impacts of upward emissions. In light of the large number of sources that are likely to affect ambient air-quality levels in the downwind state, this approach is quite unprotective of the interests of downwind states.

In Category III, the EPA has indicated that the plain meaning of the statutory phrase “prevent attainment” requires the Agency to deem excessive any upward pollution that was the but-for cause of a violation of the federal ambient standards in the downwind state. In the only case in which the situation was presented, however, the Agency rejected the downwind claim, stating that it doubted the accuracy of the modelling analysis performed by the downwind state.

In summary, three principal rules emerge from the administrative interpretations of sections 110(a)(2)(D) and 126(h), which have been uniformly upheld by the courts: upward pollution is never constrained if the downwind state meets the federal ambient standards; upward pollution that exacerbates a violation of the federal ambient standards in the downwind states is constrained only if the upward source “significantly contributes” to the violation; and upward pollution that is the but-for cause of the violation of federal ambient standards in the downwind state is always constrained.

As to each of these categories, two questions are relevant. First, should the federal government play a role in controlling the upward pollution? Secondly, assuming that such a role is appropriate, how should the federal government

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The combination of these rules leads to illogical and, in practice, unprotected results. Consider first the Category I case of a downwind state that is not violating the NAAQS or the PSD increments. The amount by which the downwind state's ambient air-quality levels are better than the federal ambient standards represents that state's margin for growth. If the downwind state is not able to attract new sources, because, for example, it is experiencing a temporary economic downturn, the rules allow an upwind state to consume the downwind state's margin for growth without constraint. Indeed, the rules even allow an upwind state to consume the downwind state's margin for growth by amending its SIP to permit its existing sources to increase their emissions up to the point at which the federal ambient standards become constraining in the downwind state. Once the air-quality levels in the downwind state reach the level of the federal ambient standards (with the help of the upwind state), the downwind state will be unable to attract any sources without requiring emission reductions from its existing sources. At the extreme, a downwind state with no existing industrial base would be precluded from ever acquiring one.

In contrast, if the downwind state consumes its margin for growth first, either by attracting new sources or by amending its SIP to allow existing sources to pollute more, any increase in the pollution that the upwind state sends downwind would be deemed a violation of sections 110(a)(2)(D) and 126(b). An upwind state without an industrial base at the time that the downwind state reaches the federal ambient standards might be effectively precluded by this rule from attracting any polluting sources in the future if, as a result of the state's geography, any in-state emissions would be likely to migrate downwind.

Accordingly, the margin for growth in the downwind state would be allocated on a "first-come-first-served" basis. Such rules of capture are undesirable; they create incentives for both upwind and downwind states to use the downwind state's margin for growth at a faster rate than is economically desirable, and do not allocate this margin for growth to whichever state values it most highly.

The discussion so far has focussed on a downwind state that intends to use its margin for growth for economic expansion. Instead, states might set state ambient standards that are more stringent than the federal standards because they attach more value to environmental protection. The federal environmental laws emphasize, as explicitly reflected in section 116 of the Clean Air Act, that federal standards are floors and not ceilings, and that, with exceptions not relevant to this discussion, states remain free to enact standards that are more stringent than the federal standards. Indeed, more stringent standards are undesirable only if they are an effort to externalize to other states the costs of pollution control.

The administrative and judicial approach to Category II situations, in which the upwind pollution aggravates a violation of the federal ambient standards, also is misguided. In Category II cases, the downwind state would be unable to constrain the upwind pollution unless the pollution was deemed a "significant contribution" to the violation. Under the non-attainment provisions of the Clean Air Act, however, the downwind state has an obligation to reduce its emissions until it meets the NAAQS. Thus, absent a "significant contribution" from upwind sources, the full burden of pollution reduction falls initially on the downwind sources, even if upwind reductions would be far less costly.

But once the downwind state made sufficient improvements so that it could meet the NAAQS it were in for the upwind pollution, the situation would change. The upwind pollution would then be the but-for cause of the violation of the NAAQS in the downwind state—a Category III problem. The upwind pollution would be enjoined as "preventing the attainment" of the NAAQS, even if the cost to the upwind state of doing so were wholly disproportionate to the cost to the downwind state of somewhat more stringent pollution controls. As already indicated, in cases in which all emissions from the upwind state have at least some impact downwind, such a rule would prevent any polluting activity in the upwind state. The downwind state, by reducing its emissions to the point at which it could meet the NAAQS in the absence of the upwind pollution, but no further, could effectively destroy the upwind state's industrial base.

In summary, of the three rules articulated by the EPA and the courts to address the problem of inter-state spillovers, two are overly lenient. In contrast, the third is overly harsh, though, perhaps as a result of its harshness, EPA has failed to apply it to any specific case.

Perhaps the best illustration of the ineffectiveness of the Clean Air Act's inter-state pollution provision is provided by a dispute in which Kentucky complained about excessive emissions from an electric utility just across the border in Indiana. The Indiana utility was emitting six pounds of sulphur dioxide per million BTU of heat input—a level that reflected no pollution controls at all. In contrast, the electric utility in Kentucky had spent $138 million installing scrubbers in order to meet a standard of 1.2 pounds per million BTU. Moreover, the Indiana utility consumed almost half of the permissible pollution levels in parts of Kentucky. Nonetheless, despite the compelling nature of the facts, the downwind state lost its challenge.\footnote{See Air Pollution Control District v. EPA, 739 F.2d 1071, 1062-3 (6th Cir. 1984).}
V. The Public Choice Justification

As indicated above, I have not yet tackled in any comprehensive way the public choice analysis of issues concerning federalism and environmental regulation. I have taken a somewhat sceptical view, however, of the assertion, largely unrefuted in the legal literature, that federal regulation is necessary to correct for the systematic underprotection of environmental quality at the state level.77

First, it is not enough to say that state political processes undervalue the benefits of environmental regulation, or overvalue the corresponding costs. Federal regulation is justifiable only if the outcome at the federal level is socially more desirable, either because there is less under-regulation or because any over-regulation leads to smaller social welfare losses.

Secondly, given the standard public choice argument for federal environmental regulation, it is not clear why the problems observed at the state level would not be replicated at the federal level. The logic of collective action would suggest that the large number of state citizens balances with a relatively small stake in the outcome of a particular standard-setting proceeding, will be overwhelmed in the political process by concentrated industrial interests with a large stake in the outcome. But this problem could occur at the federal level as well as at the state level.

In fact, the logic of collective action might suggest the under-representation of environmental groups would be more serious at the federal level. The costs of organizing on a larger scale magnifies the free-rider problems faced by environmental groups. Moreover, because environmental concerns vary throughout the country, there will be a loss in the homogeneity of the environmental interests when they are aggregated at the federal level, thereby further compounding the organizational problems. For example, environmentalists in Massachusetts may care primarily about air quality whereas environmentalists in Colorado may rank the environmental implications of water allocation as most important. Other things being equal, state-based environmental groups seeking, respectively, better air quality in Massachusetts and a more environmentally sensitive allocation of water in Colorado are therefore likely to be more effective than a national environmental group seeking, at the federal level, better environmental quality with respect to both of these attributes.

In contrast, the situation is likely to be different for industry groups. For many environmental problems, an important portion of the regulated community consists of firms with nationwide operations. For such firms, operating at the federal level poses no additional free-rider problems or loss of homogeneity.

It is possible, however, that the additional organizational problems faced by environmental groups at the federal level are outweighed by benefits arising from the fact that the clash of interest groups takes place before a single legislature, a single administrative agency, and, in part, as a result of the exclusive venue of the DC Circuit over important environmental statutes, in a single court.78 One can imagine models under which public choice problems are, indeed, ameliorated at the federal level—a task that none of my critics has taken on. The problem, though, is that such models are unlikely to provide a good account of reality.

For example, if one assumed that beyond a certain threshold, additional resources do not increase a group's probability of being successful in the political process, and if this threshold at the federal level is sufficiently lower than the sum of the corresponding thresholds at the state level, it may be that environmental groups would not be at a disadvantage at the federal level even if they were at a disadvantage in the states. In this case, the economies of scale of operating at the federal level more than outweigh the increased free-rider problems.

The assumptions behind such a model, however, are not particularly plausible. The threshold concept might properly describe certain costs associated with effective participation in the regulatory process. For example, with respect to the regulation of a particular carcinogen, each group might need to hire a scientist to review the regulator's risk assessment. It may well be the case that a certain minimum will secure the services of a competent scientist and that devoting additional resources to the problem would be of little, if any, use. Thus, for costs of this type, the marginal benefit of additional expenditures is zero, or close to zero, regardless of the other party's expenditures.

The structure of other costs, however, is likely to be quite different. For example, with respect to access to the legislative process, the standard public choice account is that the highest bidder prevails.79 Thus, the benefit that a party receives from its expenditures is a function of the expenditures of the other party. Unless the costs of this type are quite small, the economies of scale of operating at the federal level are unlikely to outweigh the additional free-rider problems. Finally, if the relevant public-choice interactions are characterized as involving the diffuse interests of brothers or other environmental beneficiaries on one side and the concentrated interests of industrial firms on the other side, the debate over which forum is relatively better for the environmentalist interests is not of great practical importance. What is important, instead, is that both fora are bad for these interests as a result of the diffuse nature of their interests. As a result, given this characterization of this problem, it is difficult to explain, in public choice terms, why there would be any environmental regulation at all.80


79 See id. at 21.

80 Note, however, that the straightforward public choice analysis presented here, the puzzle remains how environmental protection ever succeeds in the political process.”
VI. Toward Desirable Federal Intervention

The preceding discussion shows why the three principal justifications for federal intervention are unlikely to justify an absolute displacement of state authority. Nonetheless, there is an important role for federal intervention to correct various pathologies that otherwise would result.

(1) Inter-externalities: the preceding discussion has focussed on pollution externalities, principally air pollution that crosses state lines, and shown why the existence of such externalities provides a compelling reason for federal regulation. Other externalities that merit federal regulation arise with respect to different environmental problems. For example, to the extent that certain endangered species are located in a particular state, the costs of protection are largely concentrated in that state. The benefits of preservation, however, accrue nationally, or, for that matter, globally. Similarly, out-of-state citizens place value on the existence of certain natural resources—even resources that they never plan to use. Such existence, or non-use values provide a powerful justification for federal control over exceptional natural resources such as national parks.

(2) Economies of scale: advocates of federal regulation often maintain, though without much empirical support, that centralization has strong economies of scale advantages. The economies of scale argument is most plausible in the early stages of the regulatory process, particularly with respect to the determination of the adverse effects of particular pollutants through risk assessment. Indeed, there is little reason for this determination to be replicated by each state. In this area, however, the federal government appears to have substantially under-invested. The force of the rationale, however, is far less compelling at the standard-setting phase. At this stage, not only are the savings from eliminating duplication of efforts likely to be much lower, but centralization will have serious social costs as a result of the difficulty of setting standards that are responsive to the preferences and physical conditions of different regions.

(3) Uniformity: as previously discussed, federal environmental standards are generally minimum standards. The states remain free to impose more stringent standards if they wish. Some standards that apply to pesticides and mobile sources such as automobiles, however, are both floors and ceilings; they pre-empt both more stringent and less stringent state standards. Uniformity of this sort can be desirable for products with important economies of scale in production. In such cases, disparate regulation would break up the national market for the product and boost costs in terms of foregone economies of scale. The benefits of uniformity, however, are less compelling in the case of process standards, which govern the environmental consequences of the manner in which goods are produced rather than the consequences of the products themselves. Indeed, unlike the case of dissimilar product standards, there can be a well-functioning common market regardless of the process standards governing the manufacture of the products traded in the market.

(4) Protection of minimum levels of public health: there is a powerful notion, informed in part by constitutional considerations, that a federal polity should ensure all its citizens a minimum level of environmental protection. At some level, this justification is compelling: a minimum level of health ought to count as a basic human right, in the same manner as minimum levels of education, housing, or access to employment. There are two major problems, however, with justifying federal environmental regulation in this manner. First, federal environmental regulation seeks to limit the risk of exposure to particular pollutants or from particular sources, rather than limiting aggregate levels of environmental risk. As a result, such regulation is both over-inclusive (it regulates more than that which has a claim to quasi-constitutional legitimacy) and under-inclusive (it makes no effort to determine aggregate exposure levels).

establishment of a common market: this justification has not been nearly as prominent in federalism debates in the USA.

The harmonization rationale has some force in the case of product standards. Indeed, a product cannot trade freely throughout a common market if states within the market can exclude it on environmental or health and safety grounds. Harmonization arguments, however, have also been invoked to justify the vesting of centralized responsibility over process standards, such as environmental ambient and emissions standards. There are several serious problems with extending the argument in this manner.53

First, as long as product standards are harmonized, there can be a well-functioning common market regardless of the stringency of the process standards governing the products' manufacture. Thus, more accurately, the argument must call for the harmonization of the products' production costs, so as to deny a comparative advantage to states with lax environmental standards.

The second problem, however, is that the costs of complying with environmental regulation, or, for that matter, the costs of complying with any regulation, are only one component of the total costs of production. Other components include a state's investments in infrastructure, health care, and education, as well as its wages, labour productivity, and access to raw materials. These factors, which can have a significant effect on production costs, are unlikely to be (or are incapable of being) the subject of the EU's harmonization efforts. Thus, rather than eliminating cost differences, the harmonization of environmental standards has the effect of conferring a competitive advantage on states with lower non-harmonizable components of costs.

Thirdly, the harmonization argument cannot be used, as it has in the EU, to justify both uniform ambient standards and uniform emissions standards. A centralized regulatory regime consisting only of uniform ambient standards, which permits the states to allocate the pollution control burden among existing and new sources in any way they see fit, would confer a competitive advantage on the states with the smaller industrial base. Indeed, states with lower

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53 Despite its weak intellectual pedigree, it is not surprising that the harmonization argument has been influential. The European Union (EU) (then known as the European Economic Community (EEC)) was established by the Treaty of Rome in 1957 (Treaty Establishing the European Economic Community, 25 Mar. 1957, 288 UNTS 111 (hereafter EC Treaty)). This treaty did not contain any specific rules dealing with environmental protection. Environmental regulation between 1957 and 1986 was based primarily on Art. 90 EEC, which authorizes the issue of directives, "for the approximation of such provisions laid down by law, regulation or administrative action in Member States as directly affect the establishment or functioning of the common market" ibid., 54. Thus, centralized involvement had to be justified by reference to the benefits of harmonization. The Treaty of Rome was amended by the Single European Act (SEA) in 1986, (1985) OJ L149/1, and by the Treaty on European Union (the Maastricht Treaty) in 1992 (Treaty Establishing the European Community (TEEC), 7 Feb. 1992, 1992 OJ C224/1). (1992) CMLR 57 (hereinafter EC Treaty). Now, Arts. 95 and 174-8 EC provide the EU with explicit authority to promulgate environmental standards.
pollution output could offer their sources less stringent emissions standards without violating the ambient standards. The addition of centralized emissions standards moderate this comparative advantage but does not
wholly eliminate it. Highly industrialized states, where the centralized ambient standards constrain further growth, would be unable to attract new sources without imposing additional costs on existing sources.

In light of these weaknesses, it is not surprising that recent European scholarship has sought to re-characterize the quest for harmonization in race-to-the-bottom terms. Commentators have argued, as have race-to-the-bottom advocates in the USA, that the goal of centralized intervention is to protect states from the pressure to impose sub-optimally lax environmental standards as a means of attracting jobs and tax revenues.52 But, obviously, the weaknesses of the race-to-the-bottom rationale for centralized environmental regulation are not confined to this side of the Atlantic.53

In addition, the legal status of the debates concerning the strength of the rationales for centralized environmental regulation is also different in the EU and the USA. In the USA, the choice between federal and state regulation (except when state regulation is coupled with trade restrictions) is, for the most part, a matter of policy. The constitutional constraints are extremely weak, even after the Supreme Court’s decisions in New York v. United States,54 United States v. Lopez,55 and Printz v. United States.56

In the EU, in contrast, the subsidiarity principle adopted in the Maastricht Treaty in 1992 permits action at the federal level “only if and insofar as the objectives of the proposed action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the proposed action, be better achieved by the Community.”57 Thus, in the EU, the subsidiarity principle constitutionalizes the inquiry concerning the level of government at which responsibility for environmental regulation should be allocated. Although commentators are divided about the likely role of the European Court of Justice in enforcing the subsidiarity principle, some believe

52 See L. Klinstra, E.C. Treaty and Environmental Law (12th edn., London: Sweet & Maxwell, 1995), 62; Lessenrodt, n. 51 above, 481; van den Berg, Prante, and Lieferin, n. 50 above, see also Stewart, n. 50 above, 45.
53 See Sect. II above.
54 503 U.S. 144 (1992) (holding that Congress may not require states to enact or administer a federal programme).
56 117 S.Ct. 2365 (1997) (holding that Congress may not compel state officers to execute federal laws).

VIII. Lessons for the International Community

Section A explains the analytical differences between the paradigmatic federal and international cases for centralized regulation. Section B explains why, even for the same type of case, the assessment of the desirability of centralized intervention is different in the two situations.58

A. ANALYTICAL DIFFERENCES BETWEEN THE PARADIGMATIC FEDERAL AND INTERNATIONAL CASES

Some commentators maintain that the cases for centralized intervention in federal systems and in the international community are analytically analogous. For example, in a recent article, Daniel Farber argues that “free trade and environmental regimes have much in common.”59 He adds:

Notably, the rationale for both the trade and environmental regimes is the fear that a “prisoner’s dilemma” may lead to a race to the bottom, whether of trade restrictions or environmental laxity. It turns out that both kinds of races can occur only under particular—and rather similar—circumstances. Thus, the appropriate conditions for multilateral trade regimes are similar to those for multilateral environmental regimes.60

Before exploring why these two types of measures are analytically distinct, it is useful to define with some precision what Farber must mean by “free trade” and “environmental” regimes. The structures of these two regimes can best be understood by reference to the two-by-two matrix shown in Table II.

The rows in the table indicate that a jurisdiction’s standard can be either a product standard, which regulates the environmental consequences of the product itself, or a process standard, which regulates the environmental consequences of the industrial process through which the product is produced. The table’s columns indicate whether, in addition to being enforced against

58 Commentators are divided about the role of the European Court of Justice (ECJ) in subsidiarity matters. See, e.g., Lessenrodt, n. 50 above, 894 (Court could merely require reasons for federal action); A. C. Toft, “A Legal Analysis of Subsidiarity,” in D. O’Keeffe (ed.), Legal Issues of the Maastricht Treaty (London: Chancery Law Publishers, 1994), 57. 48 (subsidiarity principle raises political questions); J. Steiner, “Subsidiarity Under the Maastricht Treaty,” in Legal Issues of the Maastricht Treaty (above), 49. 50 (subsidiarity principle is fully justifiable).
61 Ibid., 1284–5.
domestic producers, the standards are also enforced by means of trade restrictions. In the case of product standards, a trade restriction would bar the entry into the jurisdiction of products that violate the jurisdiction’s product standard. In the case of process standards, a trade restriction would bar the entry into the jurisdiction of products manufactured through an industrial process that violates the jurisdiction’s process standard.

The paradigmatic case of a “free trade” regime is the regulation, by a federal or international authority, of overly stringent product standards that are coupled with trade restrictions. Such measures are sometimes motivated by a desire to reduce the negative effects of a product that are external to its pur- chaser. For example, a product’s price might not fully reflect the cost of disposing of its packaging. Similarly, the consumption of the product (as is the case, for example, with tobacco products) might have negative effects on the health of third parties, or on the public health system. Alternatively, the restriction might be adopted at the behest of in-state producers of the product, who might be able to meet the more stringent product standard more cheaply than their out-of-state counterparts. The reason for federal regulation or international regulation is the concern that the jurisdiction externalizes, to individ- uals and firms outside the jurisdiction, too many of the costs of meeting its product standard.

In contrast, the paradigmatic case of an “environmen- tal” regime is the regu- lation, by a federal or international authority, of overly lax process standards not enforced by means of trade restrictions. The concern here is that the jurisdiction imposes unacceptable environmental consequences upon its residents. As Table II shows, these two types of measures are not exclusive; the table reveals the existence of two other categories. Product standards need not be coupled with trade restrictions. Such measures are not commonplace, how- ever, because domestic producers would be put at a disadvantage compared to their out-of-state counterparts, and the benefits of the standard would be defeated if the consumption of imports became prevalent. Similarly, process standards can be coupled with trade restrictions. Such measures are not part of the legal regimes of the USA and the EU, but they are becoming a prominent feature of international trade disputes.

Table II: A Taxonomy of Regulatory Standards

<table>
<thead>
<tr>
<th>Type of Standard</th>
<th>Product</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enforcement through trade restrictions</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>“Free trade” regime</td>
<td>“Environmental” regime</td>
<td></td>
</tr>
</tbody>
</table>

“Free trade” and “environmental” regimes are different in three important respects: (1) the winners and losers, both in-state and out-of-state, from the regulatory regime; (2) the instances in which there is a divergence between the in-state calculus and the global social calculus concerning the desirability of the regulatory measures; and (3) the impact of public choice considerations. These differences severely undercut the force of the analogy between the two types of regimes.

First, the two types of measures produce different winners and losers. Within the regulating jurisdiction, a product standard coupled with trade restrictions imposes costs on consumers, who must pay higher prices for the product. In turn, it confers benefits on the victims of the externality, who suffer fewer adverse consequences. It also confers benefits on producers of the product within the jurisdiction if they have a comparative advantage in meeting the jurisdiction’s product standard, or to in-state producers of substitute products. In deciding whether to impose the regulatory measure, a welfare-maximizing jurisdiction would weigh these benefits to environmental victims and producers against the costs to consumers.

The jurisdiction would not concern itself, however, with the effects of the measure outside its borders, which are likely to be negative. Out-of-state pro- ducers will have a smaller market in which to sell their products, leading to a loss of jobs, profits, and tax revenues in that jurisdiction. In addition, out-of-state consumers will face higher prices if there are economies of scale in produc- tion.

In contrast, the winners and losers, both in-state and out-of-state, are dif- ferent in the case of process standards not coupled with trade restrictions. As with product standards, in-state victims of environmental externalities are beneficiaries of the regulatory measure. In-state producers, however, must bear higher operating costs. Thus, here, there is a divergence between the interests of in-state producers and environmental beneficiaries, which were aligned for product standards coupled with trade restrictions. Moreover, as a result of the higher operating costs, industrial plants may move to a state with less stringent process standards, leading to fewer jobs, lower wages, and lower

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64 A jurisdiction might attempt to enforce its standards only by means of trade restrictions, exempting domestic producers. Such discriminatory measures would fall foul of any plausible system of trade regulation. Thus, Table I does not contemplate this possibility. A complete description of the problem, however, would require a two-by-two-by-two matrix.


66 Father’s terminology is somewhat confusing. Both regimes have environmental consequences. In one case, the purpose of the higher level of regulation is to pre-empt overly lax envi- ronmental regulation whereas in the other it is to pre-empt overly stringent environmental regulation. Similarly, both regimes may have trade consequences. Constraints on coupling overly strin- gent product standards with trade restrictions expands the market for products manufactured by states with less stringent standards. Constraints on overly lax process standards expand the mar- ket for products manufactured in states with more stringent process standards by reducing a dif- ferential in production costs.

67 See nn. 70-72 below (discussing the tuna-Dolphin case).
tax revenues in the state adopting the process standard. In assessing the desirability of a particular process standard that is not coupled with trade restrictions, a state must strike a different balance, weighing the standard’s health benefits against its labour and fiscal costs.

Secondly, in the case of product standards coupled with trade restrictions, there is the possibility of divergence between the in-state calculus of the importing jurisdiction and the global social calculus: the regulatory measure that maximizes the jurisdiction’s welfare might not maximize the overall welfare. Indeed, the jurisdiction imposing the restriction will not concern itself with the negative impact of the restriction on out-of-state producers and consumers. Thus, left to its own devices, a welfare maximizing jurisdiction might impose restrictions that reduce the global social welfare.

In contrast, in the case of process standards not coupled with trade restrictions, there is no divergence between the in-state calculus and the global social calculus (difference in net benefits: the choice that maximizes the jurisdiction’s welfare would also maximize the overall welfare: get rid of costs). Even though a decision to weaken or strengthen a process standard may have consequences outside the jurisdiction, in the form of industrial inflow or outflow, respectively, these consequences do not give rise to the type of externality that reduces the global social welfare. The process standard can be thought of as a component of the price charged by the jurisdiction for the right to locate within its borders. The external effect is thus the result of the normal competitive mechanism for the reallocation of resources in response to changes in prices. Thus, the weakening or strengthening of a state environmental standard gives rise to a pecuniary externality, with no adverse social welfare consequences, rather than a true or technological externality.

Thirdly, public choice considerations suggest that the two types of measures would be the product of political pressures from distinct groups. Disproportionate political influence on the part of environmental beneficiaries would lead to overly stringent product and process standards. In contrast, disproportionate political influence on the part of manufacturers might lead to overly stringent product standards but overly lax process standards.

Undoubtedly, under certain conditions jurisdictions will reach the socially optimal result, absent higher-level intervention, with respect to both product and process standards. There are also some similarities in the instances in which higher-level intervention is appropriate. Nonetheless, the paradigmatic models of the two situations are analytically distinct. Inattention to those differences is likely to impede the development of desirable public policy concerning when a jurisdiction’s decision-making processes ought to be displaced.

56 Nonetheless, if the jurisdiction cannot pursue a welfare maximizing strategy, as a result perhaps of the presence of discretionary taxes, its choice of process standard might have discretionary effects elsewhere. For a discussion of the difference between technological externalities and pecuniary externalities, see W. J. Baumol and W. E. Oates, The Theory of Environmental Policy (2nd edn., Cambridge: Cambridge University Press, 1988), 29-31.

B. DESIRABILITY OF FEDERAL INTERVENTION IN FEDERAL SYSTEMS AND THE INTERNATIONAL COMMUNITY

The issues concerning the desirability of centralized intervention are different, in two important respects, in the international community from federal systems. First, in the international community, there is only weak capacity for centralized environmental standard-setting and virtually no capacity for centralized environmental enforcement. Secondly, the differences in wealth and economic development are far more salient in the international community than in federal systems.

As a result of the lack of a viable system of environmental standard-setting and enforcement, there are stronger arguments in the international community than in federal systems for allowing countries to impose environmentally-based trade restrictions. Even where centralized regulation might be preferable, for example as a result of inter-jurisdictional externalities, state regulation coupled with trade restrictions might be the best available outcome if centralized regulation is not feasible, or if it is not feasible in an enforceable manner.

The different treatment of process standards in federal systems and in the international community is therefore not surprising. In both the USA and the EU, state-imposed trade restrictions have been coupled with product standards but not with process standards. Instead, environmental regulation with respect to processes has been the domain of the federal government. There is little justification for allowing a state to impose a process standard designed to change the environmental behaviour of another state when a centralized authority can do so directly.

In contrast, process standards have been coupled with trade restrictions in the international community—the USA’s restrictions on the import of certain tuna products at issue in the Tuna Dolphin case is probably the best known example, even though the Secretariat of the General Agreement on Tariffs and Trade (GATT), the WTO’s predecessor, took a sceptical view with respect to the permissibility of such measures, the issue continues to draw the body’s attention and may well be decided differently in future negotiating rounds.

The second important difference between the systems of the USA and the EU on the one hand and the international community on the other arises as a result of the more extreme differences in wealth and levels of economic development in the international community. This factor, coupled with the lack of

59 See GATT Secretariat, Trade and Environment, GATT/1520, 18 (13 Feb. 1992), in World Trade Materials, Jan. 1992, 37, 59 ("in principle, it is not possible under GATT’s rules to make access to one’s own market dependent on the domestic environmental policies or practices of the expanding country").
a viable, widespread system for economic redistribution in the international community, implies that the distributional consequences of each policy ought to play a far more salient role in evaluating their relative desirability.

For example, in a federal system of relatively homogeneous states, it might be desirable to adopt policies that lead to the maximization of social welfare without undue concern about how the costs and benefits of such policies are distributed across different geographic subdivisions. Indeed, federal governments regulate in many areas, and the distributional consequences may well even out across programmes. Thus, it may not be sensible to compromise the social welfare properties of each programme in order to achieve a better programme-specific distribution. Moreover, even if such evening out of the aggregate distributional consequences does not occur, it is likely to be more desirable to redistribute through a system of taxes and subsidies than by promising the efficiency of the various regulatory programmes. The situation is different in the international community with its larger differences in wealth and economic development, and lesser opportunities for redistribution.

A full analysis of when process standards coupled with trade restrictions ought to be permissible in the international community obviously cannot be undertaken here. The following taxonomy, however, seeks to provide a useful way to begin to analyse the relevant issues.

The first element of this taxonomy is defined by reference to the geographic scope of the physical effects of the pollution that gives rise to the trade restrictions. Six situations are relevant:

(a) purely domestic effects in the exporting country;
(b) physical spillovers into the importing country;
(c) physical spillovers into third countries;
(d) impairment of existence values in the importing country;
(e) impairment of existence values in third countries; and
(f) effects on the global commons.

In the first situation, if the effects of the pollution are confined to the exporting country, trade restrictions are hardest to justify. Producers in the importing country may be upset that one factor of production is cheap in the exporting country, but restrictions imposed for this reason are unlikely to be welfare enhancing. Moreover, given that the costs of production have many non-harmonizable components, such as wages, labour productivity, infrastructure, and educational systems, it is not clear why a single factor should be singled out for special treatment.13

A sufficiently egregious disregard for human health can be thought of as akin to the violation of a basic human right, and therefore sanctionable.14 (The use of child labour might be seen as an example of such a violation.) Many environmental disparities between exporting and importing countries, however, do not give rise to problems of this magnitude.

In the second situation—the case of physical spillovers—trade restrictions might be the only way for the importing country to protect itself. In the USA, the permissibility of such restrictions is sometimes determined by comparing the welfare gains in the importing state with the corresponding welfare losses in the exporting state.15 In the international community, however, the distributional concerns discussed above complicate the inquiry.

In the third situation—where the physical spillowers affect third countries—the importing country’s trade restriction might nonetheless increase the global social welfare. Because the importing country is not affected by the pollution, however, one might be concerned that the asserted environmental reason for the restriction is a mere subterfuge, masking a protectionist motivation.

With respect to the fourth and fifth situations, there is no analytical reason for treating existence values, also known sometimes as non-use values, different from physical spillowers. Citizens of the importing country might suffer a real loss in utility from learning about the destruction of a valuable natural resource abroad, even if they never planned to visit it. The claims of citizens of wealthy countries for trade measures to protect their existence values might not seem particularly sympathetic if the costs fall on citizens of far poorer countries, whose very livelihood might be at stake. Moreover, the controversy surrounding the use of the contingent valuation methodology, which is used to value existence values, makes problematic any attempt to weigh the interests of the various jurisdictions.16 As a result, trade measures motivated by the impairment of existence values are likely to be viewed as less legitimate than trade measures motivated by physical spillowers.

Finally, with respect to the global commons, in some cases trade measures will be expressly permitted by international treaties.17 Such treaties, however, often take a long time to negotiate (and an even longer time to result in the imposition of specific obligations). In the interim, unilateral trade measures may well be the best available way to protect the global commons.

The second element of the classification system is defined by reference to how the environmental standards in the exporting and importing countries compare to those that would maximize social welfare in the respective jurisdictions. The relevant categories are set forth in Table III.

To illustrate this table by means of an example, consider the following situation, which is consistent with the box labelled "g". A's actual standard is ten parts per million (ppm) of a pollutant, whereas its optimal standard is twelve ppm; thus, A's actual standard is more stringent than its optimal standard. In turn, B's actual standard is eight ppm (more stringent than A's actual standard) but its optimal standard is six ppm (thus, B's standard is less stringent than its optimal standard).
In the event that B's environmental standards are more stringent than A's, should B use of trade measures be appropriate merely because its standards are more stringent than A's? Such an approach was embodied in the proposed International Pollution Deterrence Act, 78 which would have authorized the imposition of countervailing duties equal to the amount that the foreign firm would have to expend in order to comply with the US standards. 79 Similarly, Vice-President Gore wrote, while he was still a senator: "[j]ust as government subsidies of a particular industry are sometimes considered unfair under the trade laws, weak and ineffectual enforcement of pollution control measures should also be included in the definition of unfair trading practices." 80 The problem with this approach is that it would authorize the erection of trade barriers even when the disparity in the environmental standards is justified by differences in the preferences for environmental protection, differences in the costs of pollution control, and differences in the extent to which pollution produces adverse health and environmental effects in the two countries. Alternatively, should trade measures be appropriate only in situations a, b, and c, in which A's standards are laxer than optimal? Such an approach would recognize the reasons why it is desirable for different countries to have different levels of environmental protection. Or should B be barred from using trade measures in situations a, d, and g because its own standards are laxer than optimal, even though A's are laxer still? Such an approach would create incentives for B to adopt socially desirable standards.

In situations c, f, and i, where B's standards are more stringent than optimal, should B be permitted to use trade measures only if its optimal standards are more stringent than A's standards? An affirmative answer might be predicated on the undesirability of allowing B to penalize other countries as a result of its own public choice problems that lead it to adopt suboptimally stringent standards.

IX. Conclusion

In summary, in a well designed system, the allocation of authority between the federal government and the states would look very different from the way it does now. The federal government currently performs many functions that would better be discharged at the state level, and fails to perform some functions that can only be effectively carried out at the federal level. Perhaps this gap results in part from confusion over the strength of the race-to-the-bottom, inter-state externality, and public choice justifications for federal environmental regulation, which this article hopes to help dispel. The analysis of these issues in the domestic context also has important implications for the EU and the international community.

79 Ibid., 3-4.