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Regulation of externalities: rights, options, and procedure

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When governments regulate externalities, they inevitably create, modify or reassign property rights. Although these rights have important distributional implications, they are rarely at the center of economic evaluations of policy instrument choice, where the main focus is on allocative efficiency. This is problematic for two reasons. First, the allocation of rights may not receive the attention it deserves, and decisions about rights and more technical policy advice are easily mixed up. The second reason is a circularity problem: proposed (Pareto) efficient regulations modify the same property rights that determine what economists identify as an efficient environmental target. To avoid these difficulties, we propose a perspective in regulation that brings the allocation of rights to the front. We classify basic regulatory options based on how rights are allocated between polluters and potential victims and across income groups and we outline how these options may be implemented through choice of policy instruments. We then propose a regulatory procedure that takes the interdependence of rights and environmental targets into account. Based on this analysis, we discuss the potential of a rights-centered approach for designing environmental policies with desirable distributional outcomes and assumptions about the rights to environmental resources.

KEYWORDS

environmental policy, efficiency, externality, instrument, polluter-pays principle, property rights, regulation, transaction costs

1. Introduction

Economic activity typically involves effects on other individuals who are not involved in that activity and who are not compensated for any related harm. In economics, these effects are called externalities. In standard economic theory, externalities are a cause of market failure, resulting in an inefficient allocation of resources. An additional motivation for solving externality issues is fairness considerations, including a “level playing field” among firms and countries. Economic theory offers concepts and instruments to solve externality problems. Due to climate change, loss of biodiversity and other externality issues from the local to the global level, these solutions are in high demand and receive much attention in public policy debates today.

The most widely appreciated contributions to externality theory are seminal works by Pigou (1920) and Coase (1960). Pigou was the first to propose taxes and subsidies to correct market failure due to externalities. He argued that a tax/subsidy rate that equals the marginal external cost/benefit yields a Pareto efficient allocation of environmental resources. Coase, in turn, argued that under certain conditions, efficient allocation of resources requires only that property rights for the contested resources are assigned to any one of the involved parties. The parties then reach an efficient allocation through bargaining independently of

the allocated rights. Hence, the term “property rights approach” is used with reference to Coase’s (1960) bargaining solution to externality issues (e.g., Baumol and Oates, 1988, p. 35). However, when governments regulate externalities, they inevitably create, modify or reassign property rights (Bromley, 1991; Guerin, 2003). Property rights therefore play an equally important – although less visible – role also when instruments like environmental taxes, marketable permits, technology standards and bans are used.

The implicit allocation of property rights is important not least because it defines who should carry what costs – be it the polluters or the polluted as well as taxpayers. The importance of cost distribution for the political acceptance of environmental policies has long been recognized in the literature (e.g., Baumol and Oates, 1988). The distribution of costs is therefore seen as an important evaluation criterion in environmental policy design in addition to economic efficiency. For instance, in a review on instrument choice in environmental policy, Goulder and Parry (2008) state that economists focus first of all on the criteria of economic efficiency and cost-effectiveness. Among “other important criteria” they then mention the distribution of costs. From this perspective it is surprising that the allocation of property rights has not been more systematically used to structure regulatory options and policy-instrument choice.

The costs involved regards abatement costs, transaction costs and remaining damage costs (e.g., Richards, 2000). Moving property rights rather than other criteria to the center should offer opportunities for purposefully designing policies with desirable distributional implications with respect to the distribution between polluters and those affected and among income groups in a society.

There are also other arguments for following such a strategy. The focus on rights may be useful for structuring the regulatory procedure. The regulation of externalities involves both fundamentally normative issues and decisions and more technical aspects. Policymakers and economists as well as other technical experts have important roles to play in the law-making process. One important task for the policymakers is to decide about the allocation of rights and correspondingly of costs. The task of the technical experts is then to propose policy instruments that implement these rights. Certainly, there may also be a need to clarify for the politicians what options there are for the allocation of rights.

Choices about policy-instruments – through the mentioned implications for property rights – also affect wealth positions, which in turn affect willingness to pay for the right to pollute. This aspect is typically ignored in policy analyses – most probably since the impact on wealth is in each case assumed to be rather small compared to total income for those involved. If some are systematically losing out, who has the right to pollute may, however, change wealth positions more substantially over time. Furthermore, the literature on the differences between willingness to pay and willingness to accept estimates shows that differences go far beyond what would be expected from a wealth perspective (e.g., Kahneman and Knetsch, 1992; Horowitz and McConnell, 2002; Hammitt, 2015). Hence, what rights structure is chosen has an impact on the measured levels of environmental damage – see also Vatn (2015) on

this issue. The initial allocation of the right to one party rather than the other will therefore not only affect the distributional outcome but also the level of pollution reached between the bargaining parties (in the case of Coasean bargaining) and what becomes the efficient or politically preferred pollution targets (in environmental policy more generally). The issues of rights and efficiency are interdependent (Vatn and Bromley, 1997).

The interdependence of rights and efficient or politically preferred pollution targets may have implications for regulatory procedure that have not been examined. Specifically, when the choice of policy instrument implies a shift in property rights, which in turn affect the choice of pollution targets, then the order of the steps in regulation becomes important. To avoid circularity, the regulatory procedure should account for the interdependence of rights, allocative efficiency and policy targets.

Based on this reasoning, we pursue two objectives. First, we structure regulatory options based on how property rights are allocated, explicitly or implicitly, between polluters and victims and across income groups. Existing frameworks in the law literature by Calabresi and Melamed (1972), Bromley (1991) and Richards (2000) have proposed to structure the set of available policy instruments with respect to the allocation of property rights and rules to protect these rights, providing a useful basis for this purpose. Second, we propose a principled regulatory procedure that accounts for interdependence of rights, allocative efficiency, and policy targets and clarifies the respective roles of policymakers and experts in this procedure.

The paper is organized as follows. In the next section, we introduce our rights-centered perspective on the regulation of externalities. Sections 3 and 4 use this framework to structure the regulatory options and propose a regulatory procedure. In section 5 we discuss the potential of the framework for designing policies with desirable assumptions about rights to contested environmental resources and distributional outcomes. Section 6 concludes.

2. Rights-centered approach

Following Bromley (1978, p.15), property rights are “the capacity to call upon the collective to stand behind one’s claim to a benefit stream”. The property rights approach of Bromley (1978; 1991, Chapter 3) builds on the literature on law and economics, in particular Calabresi and Melamed (1972). Most importantly for the present purpose, Bromley distinguishes property rights and rules for their protection. Regarding the latter, basic options are (1) that rights can be freely traded – if someone wants to infringe on my right, she needs to ask for my permission (“property rule”); (2) I must tolerate infringements but I am compensated for it, and the level of compensation is determined by a third party (“liability rule”), and (3) the rights cannot be sold (“inalienability”).

Richards (2000) reviews existing classifications of policy instruments and criteria to choose among them. Building on the Calabresi and Melamed framework, he proposes six dimensions to structure the list of policy instruments. The first of these dimensions concerns Calabresi and Melamed’s rules for protecting rights, omitting, however, the inalienability option (Richards, 2000). The third dimension concerns the distribution of abatement

TABLE 1 Classifying policy instruments by (property) rights.

Property rights option	Abatement cost paid by...	Residual damage cost borne by...	Policy instruments (examples)
Polluter has right	Victims or society	Victims	Subsidy
Polluter has right up to target	Polluters	Victims	Individual allowance, standard
Victim has right	Polluters	Two cases (see Table 2): -(No residual damage) ^a -Polluters ^b	Ban, zero-baseline externality charge, auctioned tradable permit

^aRights are fully protected with an inalienability rule. There is no residual damage. ^bVictims bear the costs of pollution, but they are compensated.

and environmental damage costs.¹ The policy options span from subsidies, contracts and government production where “society directly or through its government agent bears the cost of both abatement and environmental damage” to “zero-baseline taxes or auctioned marketable allowances”, where “regulated parties bear both types of costs fully”.

Building on this literature, we classify policy instrument along two dimensions. The first dimension concerns the allocation of rights. Table 1 presents three basic options to allocate rights: Following a victim-pays principle, abatement costs are paid by the victims. The target-baseline principle places the abatement costs up to a politically defined target on the polluters but burdens the victims with the costs of any residual damage. A comprehensive polluter-pays principle places both abatement costs and the costs of any residual damage on the polluter. Available policy instruments may be grouped by these options to allocate rights (Table 1, rightmost column). For instance, following the option of a victim-pays principle, a population suffering from air pollution (or a government acting on behalf of the population) may offer a subsidy to cover the polluters’ abatement cost.

The second dimension concerns the rules to protect these rights. Table 2 classifies policy instruments by the three basic rules described in Calabresi and Melamed (1972) and Bromley (1978, 1991). The first option defines rights as inalienable and directly protected, for instance through a (non-tradeable) individual emission allowance or a standard. The second option is a property rule. Rights may be traded, and prices are determined by sellers and buyers. The main policy instrument here is tradeable pollution permits as in emissions trading schemes. A third option to protect rights is through a liability rule: Polluters may infringe on others’ rights but have to pay a compensation. The amount of compensation is not a matter of bargaining between polluters and victims but determined by the government. Policy instruments following this rule include charges and subsidies, for instance.

This framework can be used both ways: to classify regulatory options in environmental policy and to implement desired allocations of property rights and rules of protection. For example, based on perceptions of property rights in the population,

1 The other dimensions concern: (2) the extent to which the government controls the selection of abatement practices – whether it controls the selection “as in the case for command-and-control regulations” or whether it “allow[s] the polluter or private parties themselves to identify the best ways to meet pollution abatement requirements.”; (4) regulation of prices vs. quantities; (5) control of inputs vs. outputs; and (6) intertemporal flexibility of the instrument.

TABLE 2 Classifying policy instruments by rules used to protect rights.

Regulation ^a	Rule to protect rights	Policy instruments (examples)
Direct	Inalienability	Individual allowance, standard, ban
Indirect	Property rule	Tradeable permits, Coasean bargaining solution
	Liability rule	Externality charge, abatement subsidy

^aWe use the terms “direct” and “indirect” rather than “command-and-control” and “incentive-based”, as any substantive regulation involves changes in incentives and government control.

a government may require that property rights follow the polluter-pays principle but also that certain infringements on these rights are tolerated if the polluters compensate the victims. Responding to this request, lawyers and economists may design a pollution tax and a tax rate approximating the external cost of the taxed unit of pollution. For another pollution problem, the government may prefer a polluter-pays principle that does not allow any infringements and may therefore ban the polluting activity.

Further criteria for policy instrument choice as presented in Richards (2000) and elsewhere are important as well, as they determine abatement and transaction costs. However, as mentioned, these costs depend on (property) rights. Logical consistency requires a procedure that determines a desirable (or targeted) allocation of (property) rights (and hence distribution of abatement and residual damage costs) first and additional criteria second.

In the following section we explore basic regulatory options with respect to desired allocations of property rights. The subsequent section explores how this rights-centered approach to the regulation of externalities could be systematically implemented in a step-by-step regulatory procedure.

3. Regulatory options

In the following, we use the property rights framework of section 2 to define and organize basic options for regulation (Table 3). As a starting point, we refer to basic principles of how costs may be allocated between “polluters” and “victims” (Table 3, column 2). By these terms we refer to those who cause and suffer damage or nuisance from pollution or other impacts. Building on terms used by the OECD and Richards (2000) we distinguish the following principles (1) the “victim-pays principle”; (2) the

TABLE 3 Regulatory options.

#	Targeted rights: Who should have the right?	Principle ^a	Term for regulation	Mode of compensation to victims or revenue recycling	Policy instruments (examples)	Required cost information
1	Polluters (privilege)	VP	“Victim-pays”	None	–	None
2	Polluters	VP/ SP	“Shared victim-and-society-pays”	None	-Subsidy to reach environmental or other target, financed from general tax revenue	None
3	Above target: victim; below: polluters	VP/ PP	“Shared victim-and-polluter-pays”	None or lump-sum payment (in case of charge)	-Technology standard -Charge calibrated to reach target and zero net payment by those who just comply) -Tradeable permits, grandfathered	None
4a	Victims	PP	“PP”	Individual compensation of victims	-Private liability -Charge or tradeable permits fully auctioned and revenue used for individual compensation	Harm at level of individual
4b	Potential victims (equal)	PP	“PP”	Lump-sum payment, equal	-Charge or tradeable permits, auctioned with revenue returned to members of population	Total harm
4c	Potential victims (proportional to vulnerability)	PP	“PP”	Lump-sum payment, unequal, e.g., favoring poor	-As above	Total harm
4d	Potential victims (prop. to tax)	PP	“PP”	Reduction of other taxes, unequal	-As above but revenue used as general revenue	Total harm
4e	Potential victims (prop. to benefits from fund)	PP	“PP”	Earmarked fund (special purpose), unequal	-As above but revenue earmarked for special purpose	Total harm

^a VP, victim-pays; SP, society-pays; PP, polluter-pays.

“victim-and-society-pays principle”; (3) “the victim-and-polluter-pays principle” also denoted “target-baseline principle”, which corresponds to the polluter-pays principle as recommended by the OECD (1972/2022); and (4) a (zero-baseline) “polluter-pays principle” where the polluters are responsible for any damage or nuisance inflicted upon the victims.

In the mentioned OECD definition, the principle means that the polluter bears the expenses of carrying out measures to ensure that the environment is in an “acceptable state”.² The OECD document further states that national differences in tolerable pollution and quality and emission standards are justified by different social objectives and priorities, which implies that the acceptable state is politically defined.

² The OECD (2022) states: “3. In many circumstances, in order to ensure that the environment is in an acceptable state, the reduction of pollution beyond a certain level will not be practical or even necessary in view of the costs involved. 4. The principle to be used for allocating costs of pollution prevention and control measures to encourage rational use of scarce environmental resources and to avoid distortions in international trade and investment is the so-called ‘Polluter-Pays Principle’. This principle means that the polluter should bear the expenses of carrying out the above-mentioned measures decided by public authorities to ensure that the environment is in an acceptable state.”

The principles map to regulatory options, which we term “victim-pays regulation”, “shared victim-and-society-pays regulation”, “shared-victim-and-polluter-pays regulation” and “polluter-pays regulation”.

Victim-pays regulation (following a victim-pays principle) means there are no legally or politically defined limits to pollution, and victims are not compensated.

Shared victim-and-society-pays regulation denotes a regulation where (i) the damage or nuisance is within politically defined targets such as a politically acceptable state of the environment, and (ii) society pays for subsidies to cover abatement costs.

Shared victim-and-polluter-pays regulation denotes a regulation where (i) applies, and (iii) polluters pay for abatement costs (or a net charge for units below target). Applications may or may not allow for financial mechanisms such as charges or tradable permits. In the case of charges, this means that the charge is gauged to obtain the environmental target (see section 4) and any tax revenues are recycled among polluters rather than used to compensate victims.

Polluter-pays regulation denotes a regulation where, in addition to (i) and (iii), polluters are responsible for any damage or nuisance (baseline of zero damage). The damage is assessed, and the liability rule enforced by government or other institution using appropriate mechanisms.

Five basic variants of polluter-pays regulation may be distinguished based on how the tax revenue is used or recycled (cf. Table 3):

- a) Individual compensation based on harm individually suffered;
- b) Equal compensation through equal payment to all individuals (of a country, for instance);
- c) Compensation proportional to proxy for exposure or vulnerability such as low income;
- d) Compensation proportional to taxes paid (through reduction of other taxes); and
- e) Unequal compensation based on individual benefits from earmarked tax revenues. In the last option, the revenues may be earmarked for specific purposes ranging from e.g., subsidies for research in less polluting technologies to targeted support for people with low incomes.

“Intermediate forms” may be used – i.e., regulations that share aspects of “target-baseline” and “polluter-pays” principles. For instance, the revenue from a charge is split between polluters and victims or the population at large. Another example would be cases where physical harm is taxed and compensated only under specific circumstances as defined in detailed provisions in environmental liability laws, for instance.

The different regulatory options may be implemented through different policy instruments or measures (Table 3, second-to-last column).

Finally, the regulatory options have different requirements for external cost information (last column). Due to the difficulty of assessing external costs, the assessor needs considerable discretion for assessing the damage. Difficulty to assess costs may also be a reason to favor measures that protect rights with an inalienability rule rather than compensation.

4. Regulatory procedure

As emphasized, the regulation of externalities involves decisions about rights. Such decisions are of an inherently political nature. Furthermore, as mentioned in the introduction, Pareto efficient outcomes depend on how the property rights are defined. The same applies for individually preferred outcomes, notably that preferred by the “median voter” who may be decisive for political choice (e. g. [Borcharding and Deacon, 1972](#); [Bergstrom and Goodman, 1973](#)). Regulation therefore requires an interplay of political guidance and decisions and of technical analysis and advice. We therefore suggest a procedure that describes this interplay and identifies the roles of political actors and technical experts (Table 4).

In step 1, the political actors clarify “property rights targets”. Property rights targets refer to an intended allocation of rights to the involved resources, as opposed to the property rights that are implied by the actual measures (step 3). The distinction is useful because, as explained below, the choice of measures also needs to take transaction costs into account. Designing cost-efficient measures requires some flexibility with respect to the implied allocation of property rights. The property rights allocation implied by the measures that are finally chosen (step 4) may differ somewhat from the property rights targets. To facilitate transitions, these

TABLE 4 Regulatory procedure.

Step	Task	Main actors in task
1	Define the targeted allocation of rights	Political
2	Define environmental targets	Political and technical expert
3	Design policy measures	Technical expert
4	Choose policy measures	Political
5	Implement, monitor, evaluate, and propose adjustments	Technical expert
6	Adjust policy measures (to obtain targeted rights and environmental targets) and possibly the targets themselves	Political

property rights targets may also be defined with reference to future points in time, as target paths, just like environmental targets.

In step 2, policy makers define pollution (or other environmental) targets. Technical experts have a supporting role to play in this step as technological aspects may influence the choice of targets. For instance, the policymakers may require estimates of the abatement and transaction costs of reaching alternative targets.

Regarding the sequence of these steps, clarification of the intended or targeted property rights comes before any decision about intended environmental outcomes. This is because the allocation of rights determines the distribution of cost, which in turn determines which outcomes become Pareto efficient ([Vatn and Bromley, 1997](#)) or preferred by decisive voters. The steps 1 and 2 are by their nature normative and therefore need to be made by (or involve) policymakers. They logically precede the more technical step of designing policy measures.

In step 3, once targeted rights and environmental targets are defined, economists and other technical experts have the lead in designing policy measures. Evaluating the pros and cons of specific options for regulation involves many further considerations including costs of administration and enforcement (transaction costs), effects on innovation beyond immediate targets (“dynamic incentives”), cost per unit of pollution reduction (“abatement costs”), predictability of the ecological effect, predictability of costs for those who bear them, ease of communication and flexibility (cf. [Richards, 2000](#) and lists of criteria therein – see also Footnote 1). The relative importance of these criteria depends on the application and must be judged on a case-by-case basis. Devising measures requires a diversity of expertise in e.g., natural, technical, social, legal, economic and political systems and environments to be able to take important aspects of relevance into account ([Richards, 2000](#), p. 278).

Transaction costs are a particularly important consideration in the design of cost-efficient measures. For instance, taxing greenhouse gas emissions from fossil fuels has turned out to be feasible when basing the taxation on the content of carbon in the fuel. This reduces administrative costs vastly compared to taxing the emissions themselves. Taxing fuels or emissions from fuels is equally “precise”, since greenhouse gas emissions are proportional

to the amount of fuel used and the place of emissions does not affect damages. The situation is different in a case like nitrogen emissions from agriculture. Taxing the inputs of nitrogen has much lower administrative costs than taxing the emissions themselves. However, taxing the input is much less precise than taxing the emissions because, in this case, the damages caused depends on the production system – how the nitrogen is used – and where the emissions happen – effects are localized. Precise taxes on nitrogen emissions require gathering information about production systems and location, which is costly. This case illustrates that the choice of the regulatory tool needs to consider the transaction costs which must be balanced with the benefits of precision obtained (e.g., Vatn, 1998; McCann, 2013). Administrative costs also vary with the form of compensation chosen. Equal payments to individuals in a population (see option 4b in Table 3) or differentiated only by income/tax payment (option 4d), should imply low administrative burdens, while in the case of payments differentiated according to experienced damage (option 4a) these costs most typically will be high. A wider perspective on cost per unit of emissions must take administrative costs into account. Moreover, the above reasoning also illustrates that administrative costs may influence what rights distributions are deemed feasible.

In step 4, policymakers, using the information produced in step 3, choose among proposed measures. A fundamental decision concerns the rule that is used to protect rights (cf. Table 2). Politically relevant aspects concern the extent to which money can or cannot buy the “freedom to pollute” or the political messages that may be implicit in introducing or announcing one instrument vs. another, as the phase out of combustion engines, for instance.

In step 5, technical experts implement the measures, monitor the outcomes, evaluate them and propose adjustments to better approximate them. Today, monitoring and evaluation procedures are widely established and used for environmental policy targets. Following our framework, the monitoring and evaluation should additionally address the targeted allocation of rights and corresponding distribution of costs.

In step 6, policymakers may adjust the policy measures chosen in step 4 to better achieve their targeted outcomes, both environmental and in terms of the allocation of rights and hence, costs implied by the measures (cf. steps 1 and 2). They correct and improve on their earlier decisions. Of course, they may also adjust the targets themselves, as defined in steps 1 and 2. For instance, they may use iterations of the procedure to gradually shift targeted property rights from polluters to victims and adjust the policy measures in ways to obtain the new target.

5. Discussion

The perspective taken in this study helps clarify how we can more systematically design regulations with desirable distributional implications and desirable allocations of rights to contested environmental resources among polluters and those affected by pollution. In the following we consider these issues in turn.

The literature on environmental regulations emphasizes that the primary purpose of environmental programs is allocative (e.g., Baumol and Oates, 1988, p. 255). Baumol and Oates note, however, also that programs for environmental improvement

promote the interests of higher-income groups more than those of the poor and may therefore increase the degree of inequality in the distribution of income. This belief and acceptance that environmental policy instruments are inherently “regressive” has long dominated in the literature and textbooks. Ohlendorf et al. (2021), for instance, mention a widespread belief that consumption taxes, and particularly environmental taxes, would particularly impose a burden on the poor.

Ohlendorf et al. (2021) who reviewed distributional impacts of carbon pricing policies, write that many studies find an overall tendency for regressive impacts, while others detect mostly regressive findings for developed countries and inconsistent picture for developing countries. They add that, nevertheless, progressive impacts have also been shown for developed countries like Australia, Canada and Spain. In line with our conceptual findings, the authors conclude that regressive distributional impacts are by no means inevitable. The term “property rights”, however, does not appear in their paper – illustrating our argument that these aspects are not offered explicit consideration. Their metanalysis includes “subsidy” and “pricing” schemes as moderator variables but does not otherwise examine how property rights or modes of revenue recycling affect distributional outcomes. The authors, however, conclude that distributional impacts of different revenue recycling schemes are an interesting avenue for further research.

As we show in this study, the targeted rights and the implied responsibilities and modes of revenue recycling can be taken as the starting point of instrument choice just like environmental targets are often used as a starting point today (see Tables 3, 4). The added advantage of conceiving targeted rights as the starting point of the regulatory procedure is that one avoids a problematic circularity that results from choosing (Pareto efficient) environmental targets first and measures with their property rights implications second (cf. Introduction).

Hence, targeted rights and modes of returning revenues may be purposefully designed to have desired distributional properties. A notable empirical finding here is that emissions often strongly increase with income (Oswald et al., 2020). For instance, total greenhouse gas emissions roughly double from the bottom to the top ten percent of the income distribution in Switzerland (Bruderer and Diekmann, 2019). This means that, for instance, merely by defining equal rights to a stable climate and choosing policy measures accordingly, one may obtain policy outcomes that favor the poor. Interestingly, due to the asymmetric distribution of income and pollution (Bruderer and Diekmann, 2019), even those in the middle of the income distribution may benefit, suggesting that such solutions may also be politically feasible.

Current allocations of property rights are far from polluter-pays principles as defined in section 3 (see e.g., ECA, 2021 for regulatory perspective or Guth, 2008 for a historical perspective). In some policy fields, as in climate policy, there is an increasing consensus that property rights should be shifted from polluters to the polluted. An important question is then which strategies may be used to facilitate policy transitions involving changes in the allocation of rights. As Trebilcock (2014) shows, referencing to climate change policies, the available policy instruments allow a wide range of strategies to manage transitions. For instance, they can be facilitated through gradual introduction of pollution taxes, grandfathering of

pollution permits, exemptions, or price ceilings, to name only a few of the available strategies.

Our perspective and interpretations are also consonant with the analysis of Heller and Salzman (2021) who explore “hidden ownership rules” that “control our lives”. Our perspective likewise treats ownership of environmental resources as a policy variable rather than an accident of random technological and economic developments. A similar perspective is also implied by the emerging notion that “a clean, healthy and sustainable environment” should have the status of a human right, as recently endorsed by the United Nations (2022). Accordingly, if jointly used contested environmental resources like clean water, climate stability or the services of biodiversity are defined as jointly owned, a consistent regulation would mean that polluters are responsible for any harm caused and any polluted populations would be compensated.

6. Conclusions

This paper used a rights-centered perspective to structure the options in regulation of externalities and to propose a principled regulatory procedure. Options for regulation may be usefully defined based on alternative definitions of rights which relate to alternative principles for the distribution of responsibility between the polluters and victims. Measures to protect the desired rights can be purposefully designed using available policy instruments, including alternative ways of returning revenue from pricing instruments to obtain a desired distribution of costs across income groups. The proposed procedure follows from the premise that politically desired rights to involved resources should be defined before any analysis and choice of policy targets or policy instruments.

The term “efficient”, variously used for “Pareto efficient” and “cost efficient”, has often caused confusion in the policy arena. We suggest that, when following the proposed rights-focused perspective, the term “Pareto efficient” becomes largely dispensable in regulation. What we look for, at the conceptual level, is the least costly measures to implement politically defined (property) rights, with “costs” including also transaction costs defined on

the basis of targeted rights. Furthermore, “polluter pays principle” has many different interpretations. Statements require clarifications regarding the responsibility of polluter and any entitlement to compensation on the part of the victims.

As the paper has shown, a rights-centered perspective can help separating political/legal and technical issues in the regulation of externalities. Especially, bringing the rights issues to the front makes visible the fundamental political issues faced and prevents misconceptions that a narrower focus on efficiency aspects sometimes creates in the policy arena.

Author contributions

FS and AV contributed to conception of the paper. FS wrote the first draft of the manuscript. Both authors contributed to manuscript revision, read, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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