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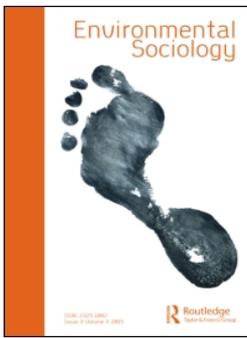
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Externalities: why environmental sociology should bring them in

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The concept of externalities represents the core of environmental economics but appears much less in sociology and other social sciences. This article presents the concept of externalities and makes a case for its usefulness, noting reasons why environmental sociologists should like it and use it more than they do currently. The concept is closely tied to theories – of why environmental problems occur and how they can be addressed – which contradict influential perspectives in environmental sociology. But an externalities-centred approach to environmental issues is nonetheless highly sociological and consistent with current research in other subfields. From an externalities perspective, environmental problems and protection are intrinsically social, and often highly political, rooted in relations of injustice and/or distrust. Practically, the most promising solutions to environmental problems embody a balance of market liberalism and strong state regulation. Externalities should therefore be a constructively unifying concept for environmental research across the social sciences. The concept is also provocative; however, in that its diagnosis of environmental problems amounts to powerful advocacy for major policy changes – even if within capitalism and given continued economic growth.

Keywords: environmental externalities; treadmill of production; ecological modernization; collective action; environmental policy

1. Introduction

This article presents the concept of externalities, makes a case for its usefulness, and identifies a range of implications that follow from studying environmental issues through the conceptual lens of externalities.¹ The concept defines a theoretical perspective on – and thus clarifies – what environmental problems are, where they come from, and how to solve them. This perspective stands apart from much of contemporary environmental sociology. Many studies in environmental sociology today focus on the propensity of individuals and/or firms to engage in voluntary altruistic actions. Others make sweeping claims about the inherently and inescapably anti-environmental properties of capitalism and/or economic growth. In contrast, an externalities perspective sets individuals' actions in social perspective, emphasizes that environmental protection is a collective rather than individual endeavour, and acknowledges that some environmental problems get resolved while others do not. In this view, environmental protection is a variable outcome, which depends on how social and political factors shape key institutions and public policies. Capitalism, growth, and rising standards of living are not necessarily impediments.

This article recommends that sociologists make greater use of the concept of externalities, despite its origins in a rival discipline – economics – that many sociologists regard with suspicion. Currently, sociological literature references externalities much less often than does literature

in economics. Two recent reviews of the field of environmental sociology make no reference to the concept at all (Dunlap 2015; Lidskog, Mol, and Oosterveer 2015). Pellow and Brehm (2013, 234) use the word 'externalize' only once, in the context of discussing the rich world's imposition of environmental costs on poor countries. On one quite active environmental sociology e-mail list, the word 'externality' (or any variant thereof) received only a few dozen mentions over the course of a decade, in contrast for example to thousands of references to capitalism.² Incorporating the concept of externalities would therefore represent a substantial change for environmental sociology.

The next section of this article defines externalities, clarifies the fundamental reason why environmental problems occur, and provides a precise definition of what environmental problems are. Section 3 discusses how the concept of externalities suggests that the most promising public policy solutions to environmental problems embody a balance of market liberalism and strong state regulation of markets. Section 4 explains how strongly sociological and political reasons explain why environmental problems get solved in some instances and contexts, but not others. Section 5 describes how an externalities perspective speaks to current debates and influential theoretical perspectives in environmental sociology and helps to resolve their limitations. Section 6 concludes with suggestions for future research.

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2. Why do people pollute the environment (too much)?

What is an ‘externality’? The costs of some activity are ‘externalized’ when they are imposed on someone without compensation.³ In many domains of social and economic life, producers and consumers engage in activities or make exchanges wherein everyone involved believes s/he has something to gain, and where all the costs and benefits are borne and enjoyed by parties internal to the process or transaction. But sometimes the production, consumption, transportation, or exchange of a good or service entails the imposition of costs on other parties – such as in the form of some unwanted transformation of the natural or physical world called ‘pollution’. (All of the following holds not just for pollution, but also for the use of a resource consequently less available to others.) The burning of jet fuel in the course of my air travel imposes costs on others, for example, in forms such as noise pollution and climate change. In eating a fish, I am making one less fish available to everyone else. In clearing my land of forest, I may endanger a species that helps pollinate flowers in a nearby park. In each of these situations, I enjoy the benefits of consuming a service or good, or of effecting some transformation of nature; but some of the costs of my activity are borne by (external, uncompensated) others.

Looked at this way, externalities are the root of all problems typically called ‘environmental’,⁴ and indeed one of the merits of the concept of externalities is that it clarifies what environmental problems are. As people collectively impose many costs on others – and potentially on each other – the overall consequence is a situation of substantial unwanted environmental change: irritatingly high ambient noise levels, global warming, shrinking fish stocks, biodiversity loss. Environmental problems are therefore problems of social coordination (Ostrom 2003), or in the terminology of economists a form of market failure. That is, in such cases, markets – which are often quite effective in coordinating people’s pursuit of well-being – do not achieve optimal well-being. Protecting the environment, conversely, is a solution to this collective action problem, a means of achieving greater human welfare (Pearce 2002).

Aside from providing a clear definition of what environmental problems are, the concept of externalities has the merit of explaining why environmental problems occur. Such problems reflect that each of us individually decides whether to engage in some polluting activity without fully taking into account the costs of our pollution – precisely because we can externalize some of those costs onto others. Since individuals receive all the benefits but pay only part of the price, they engage in some activities that are actually more costly than beneficial for society as a whole, particularly if ‘society as a whole’ is taken to include future generations. It is for this reason that environmental degradation is a collective action problem, and, as per the well-known parable of the tragedy of the commons (Hardin 1968), ‘a wedge exists between what a private person does given market prices and what society might want him or her to do to protect the environment.

Such a wedge implies wastefulness or economic inefficiency’ (Hanley, Shogren, and White 2007, 42). We can distinguish and label transformations of nature that do society as a whole more harm than good as ‘overpollution’ – pollution that surpasses the optimal level, which would be achieved if the price incentives facing individuals reflected activities’ full social costs.⁵

It may sound odd to suggest that the optimal level of pollution is not zero, but once we reflect on what it would cost to eliminate pollution from activities of value, or alternatively the cost of foregoing those activities entirely, it becomes clear. Eliminating all pollution would require the transformation of human existence in ways that would severely undermine our quality of life. Many activities generate modest amounts of pollution relative to their benefits, such that the pollution is worth the cost. We should not therefore seek to eliminate all pollution, and indeed the problem is not that we have some pollution. The problem is that we have too much: the overpollution.

In a sense, this perspective even helps clarify what ‘pollution’ is. Without the concept of externalities, we are left with little guidance about how to classify and assess the merits of many human activities. Why do we call some transformations of nature ‘pollution’ (which we instinctively classify as bad) and others ‘development’ (which is good)? To weigh the pros and cons and make an overall assessment, an externalities-based approach provides us with a relatively clear criterion: do the benefits of an action to *all* people (including future generations) exceed the costs? If there is a net cost, we would probably wish for some polluting activity not to occur.⁶

3. Arresting overpollution

To summarize thus far, environmental problems are instances where negative externalities are imposed through the medium of the physical and natural worlds – in non-living forms such as SO₂ and living forms like lost honeybees. An externalities-based view of environmental degradation emphasizes not just that pollution and resource use have costs, but that polluters and resource users over-engage in polluting and resource-using activities specifically *because* they burden others with some of the costs of those activities, rather than themselves.

For that reason, from an externalities perspective, the most effective means of minimizing pollution is to stop it from being artificially cheap to the polluter – by intentionally attaching an additional cost to the polluting activity in question. This can take the form of a tax or a requirement that polluters buy permits and surrender them when engaging in some polluting or resource-depleting activity (e.g., Prasad 2010). In the former case, the price of polluting is fixed, while in the latter the price of polluting depends on the market price of a permit. Both types of measures raise the price of polluting activities to the polluter, reflecting the social costs of the environmental harms they cause (see e.g., Endres 2011).⁷ Making polluters pay to pollute also furthers the cause of fairness, in allocating the costs to the

responsible party and beneficiary rather than to actors who played no role in causing the problem and who suffered because of it. Such measures also provide an incentive for firms to develop technologies that will meet consumers' demands at declining environmental cost over time.

The track records of environmental taxes and tradable emission permits systems are generally very good (e.g., Dietz, Ostrom, and Stern 2003; Tietenberg 2013). The first large-scale, market-based scheme under which pollution was specifically discouraged with a price signal was an SO₂ allowance trading program established by the United States in the early 1990s. The program proved highly successful, with the value of its benefits – including unanticipated ones for human health – far exceeding the costs (Schmalensee and Stavins 2013).⁸ Charges and taxes have also been effective in mitigating other kinds of environmental externalities. Road charges have worked to reduce traffic congestion (Albalade and Bel 2009; Leape 2006). Attaching even a minuscule charge substantially reduces people's use of plastic bags (Luís and Spínola 2010). With respect to climate change, a carbon tax in British Columbia has led to significant reductions in CO₂ emissions per capita relative to other provinces in Canada (see Elgie and McClay 2013).

That said, such measures have not always achieved as much as environmental advocates have hoped, and so they have come in for some criticism (e.g., Foster, Clark, and York 2009).⁹ The European Union's Emissions Trading Scheme (ETS) has been a disappointment, for example, insofar as it has provided firms with little incentive to reduce their greenhouse gas emissions. Yet, that is not a reason to think that the ETS was flawed in principle. Instead, like in many cases (Dietz, Ostrom, and Stern 2003), political forces shaped the scheme's design in ways that have limited its effectiveness (Anthoff and Hahn 2010). The number of allowances issued under the ETS proved excessive given the massive economic contraction unleashed in the scheme's early years by the global financial crisis (Sandbag 2012). Consistent with theory, this major over-allocation (a large supply relative to demand) led to a very low market price per permit, and raising the price of pollution only slightly above its prior price of zero meant the scheme would never have much impact on firms' behaviour. Even despite this problem, however, the ETS did lead to some – small – reduction in greenhouse gas emissions (Anthoff and Hahn 2010). And notwithstanding the modest contribution of the ETS, total emissions from the EU-28 declined 20% from 1990 to 2013 – albeit because of other policies.¹⁰

If measures were taken to internalize more externalities than at present, people would still be free to pollute, though polluting activities would become more expensive. Would buying or doing everything, then, be depressingly costly? Not necessarily. Many goods and activities would not be so expensive, because their environmental impacts are minor. Their prices would remain about the same, while the revenues from taxes/permits levied on pollution would effectively allow states to lower the price of many

other things (most obviously, other taxes). As such, living standards would be largely unchanged, even while the balance of incentives would change, making environmentally harmful activities much more expensive relative to benign ones.

Pricing environmental externalities can raise distributional concerns, because they sometimes reduce the disposable incomes of lower income households proportionately more than they do higher income households – though sometimes they can also do the opposite (e.g., Santos and Rojey 2004). Where the impacts are potentially regressive, compensatory measures can be taken. British Columbia's carbon tax was, for example, introduced in tandem with a 'Low Income Climate Action Tax Credit' weighted towards poorer households. As a consequence, the tax's overall impact has probably been progressive (Murray and Rivers 2015).

Even if the full internalization of environmental externalities would alter many incentives facing firms and consumers, the enactment of measures to achieve this end would not require any fundamental or revolutionary social transformation (contrary, for example, to arguments such as Foster 2002). Such measures would embody a balance of market liberalism and strong state regulation of markets. The internalization of environmental externalities is therefore consistent with the main thrust of most economic sociology since the 1990s: rejecting *laissez-faire* and the ability of markets to regulate themselves, holding that states must govern markets in order for their influence to be benign, but also recognizing that – governed appropriately – markets can serve people well. Competent governance by capable states can make markets work for development (Evans 1995), while social democracy and the welfare protections can substantially tame and mitigate the destructions of unregulated capitalism (Esping-Andersen 1990).

4. The sociopolitical foundations of externalities and their prevention

So why do some environmental externalities get addressed and corrected in some instances, but not others? An externalities-based view points to strongly sociological and political reasons for environmental degradation versus protection.

Pollution is always an injustice, insofar, as polluters force others to pay for something from which they get no benefit: they 'cause damage to third parties [without being] required to pay for that damage' (Pearce 2002, 58). Pollution could even be taken as a 'by-product of a production or consumption process that harms or otherwise violates the property rights of others' (Cordado 2001, 11), in which case it is even a kind of theft – a theft of well-being. Since externalities are ubiquitous, from this perspective we are all thieves, all the time. The fact that we do it reciprocally to each other does not stop it from being theft, though situations of reciprocal

externalization are somewhat distinct from those where the externalization runs only one way (Mitchell 2003). It is useful to consider these scenarios separately in principle, though in practice the difference between them is a question of degrees.

In situations of reciprocal pollution, environmental protection is strongly dependent on the very sociological concern that is trust. Generalized and political trust strongly influence people's support for public policies that protect the environment (Fairbrother 2016) – just as sociologists have found they contribute to many other forms of collective action (Simpson and Willer 2015). People who are trusting expect others to make offsetting efforts to protect the environment, and they have confidence that public authorities will implement systems for environmental protection as promised, because they have the requisite levels of expertise and administrative capacity and are not corrupt. Such people therefore engage more in activities like recycling, conserving water, using public transport, and buying green products (Irwin and Berigan 2013), and they are more willing to pay money for the environment (Jones, Malesios, and Botetzagias 2009; Meyer and Liebe 2010).

Situations entailing the imposition of an externality by one party on others, but not the reverse, are based on power imbalances. Environmental degradation here yields clear winners and losers and depends on the power of the former to impose costs on the latter (Boyce 1994). There are also many power imbalances in the vulnerability to externalities. For some people, it may be easy to avoid paying some environmental price – buying water privately, paying for residences outside of areas with severe air pollution, and so on (Torrás and Boyce 1998). Activities whose benefits to an individual or group exceed the costs to society as a whole (including future generations) may therefore not only harm society collectively, but also entail a problematic distribution of the costs and benefits. Some people benefit at the expense of others, and so it might be the case that some people have reason not to want externalities internalized: they stand to lose out.

Consequently, environmental economics has long been concerned with (in)justice (Sandmo 2015), though as long as the net benefits to society of some measure for environmental protection are positive, environmental economics tends to say little about equity or justice. Economists' typical concern is instead Pareto efficiency, a criterion met when no party could be made better off without one being made worse off. Economists emphasize that where gains by one party come at the cost of another, if the former's gains exceed the latter's losses, compensation from the former to the latter could in principle increase aggregate welfare. Yet, economists tend not to ask whether winners actually do compensate losers. Whether remedies for degradation are actually implemented is the domain of political researchers, then, not economists (Boyce 1994, 170). Enter, then, sociology.

5. Externalities and current perspectives in environmental sociology

The concept of externalities challenges a number of influential macro- and micro-level perspectives in contemporary environmental sociology and helps resolve key ambiguities in the most important extant perspective at the meso level.

The neo-Marxist treadmill of production (TP) perspective elaborates a strongly macro-focussed theory of environmental degradation, arguing that inherent properties of capitalism demand economic growth while ensuring that states will never take adequate steps to make growth environmentally benign.¹¹ As Clark and York (2005, 412) put it, 'the social structure of the capitalist system sets limits and constraints on what mitigating actions will and can be taken'. Foster, Clark, and York (2009, 1090) completely dismiss arguments 'that the growth of economic value and even the production of goods can be decoupled from the consumption of nature's resources, through ever greater efficiency. ... All such dreams have proven illusory'. They argue that capitalism, with 'its insatiable drive for accumulation, is the main engine behind impending catastrophic climate change'. Since capitalism is premised on endless growth and exploitation of natural resources (e.g., Foster 2012, 2015; O'Connor 1994; Klein 2014), nothing short of a 'revolution...is required in order to prevent a planetary disaster' (Foster, Clark, and York 2009, 1085). Arguments about an ineluctable 'logic of capital' mean there is 'no compatibility between the law of value imposed by capitalism and the laws of nature imposed by the biosphere' (Foster 2015, 319).

Yet, just as the expansion of the middle class challenged Marxist theory in the twentieth century (Manza and McCarthy 2011), the many forms of environmental improvement that clearly have been achieved under capitalism sit awkwardly alongside pessimistic predictions of inevitable worsening (e.g., Foster 2001). Such reforms belie determinist claims of hard limits on what capitalist states can or will do. The large differences in environmental impacts across societies and communities with similar standards of living also demonstrate the indeterminacy of the relationship between economic output and environmental impact. Just to take one example, urban air pollution in the form of particulate matter is significantly lower in American cities compared to German cities – despite the higher GDP/capita of the United States. Conversely, greenhouse gas emissions per capita are much lower in Norway and Switzerland than in the United States, despite their higher incomes.¹²

The TP perspective is therefore right that states have – at least to this point in history – responded very inadequately to many environmental problems. But it is theoretical overreach to claim that there is an *inevitably* anti-environmental 'logic of capital'. Such suggestions are redolent of the structural-functionalist 'logic of industrialism' perspective prevalent in mid-twentieth century

scholarship on the rise of the welfare state: determinist, abstract, and not empirically faithful to many unexplained cross-societal differences (Skocpol and Amenta 1986). Unlike modernization theory, with its attempts to identify universal trajectories, the social sciences today study and seek to account for macrosocial differences: in the process of economic development, the institutional foundations of capitalism, and the character of postsocialist transitions (e.g., Evans 1995; Hall and Soskice 2001; Stark and Bruszt 2001). With respect to the environment, then, as Dietz, Rosa, and York (2012, 25) suggest, ‘there may be substantial heterogeneity across countries in their paths towards or away from sustainability’.

Such diversity arises largely from politics. In the domain of social protection, workers can sometimes impose their preferences against the wishes of capital, or state managers may decide to favour workers, with key outcomes varying across time and space because of variations in the varying power resources of different classes or differences in key institutions (e.g., Orloff 1993; Olsen and O’Connor 1998). Similarly, with respect to the environment, states sometimes opt for protection, and there are even instances of firms welcoming such protection (Bonds 2016; Vogel 2000; Pulver 2007). Given the extremity of its claims, then, TP is not an empirically defensible theory. It holds that capitalism and economic growth make environmental protection not just unlikely but impossible, yet there are many examples of environmental externalities that have in fact been regulated and of environmental outcomes that have improved over time even in increasingly affluent capitalist societies (e.g., Dasgupta et al. 2002). Ironically, in taking capitalism as a hard constraint on efforts to protect the environment, this perspective also lets poor environmental performers off the hook: they cannot be guilty of destroying nature if capitalism made them do it.

Advocates of TP may dislike the concept of externalities because they find the utilitarian microfoundations of the economic theory with which they associate it implausible (e.g., Foster 1997, 2002). But believing in the challenges of collective action does not require especially extreme utilitarianism; most sociologists readily agree that under some conditions individuals act selfishly in ways that lead to collectively negative outcomes (e.g., Baldassarri 2009; Evans 1995; Granovetter 1985; Simpson and Willer 2015). Elinor Ostrom, the social scientist arguably most celebrated for her research on the challenges of environmental management, even made a name for herself – including among economists, to the point of winning the Nobel Prize – striking a balance between utilitarianism and a more socialized theory of action. In her view, there are social situations where predictions from models presuming ‘complete rationality are well supported empirically’ (2003, 25), but also others where such predictions are ‘repeatedly shown to be empirically false’ (26). There is no contradiction: ‘what the research on social dilemmas demonstrates is a world of possibility rather than one of necessity’ (62). Trust, long-time horizons, and norms of reciprocity and fairness shape people’s actions, but they are not always

present. The same holds for monitoring and sanctioning institutions. At the level of firms, key decisions are broadly rational: compliance with environmental regulations increases as the risk of getting caught cheating increases, and as the size of potential fines increases (Gray and Shimshack 2011).

Advocates of TP also express reservations about the possibility of capturing the value of nature in financial terms, and about the technical methods and principles by which prices on pollution and resource use are decided (e.g., Foster 1997). Critics have been particularly hostile towards the contingent valuation techniques used to determine what subjective value the public attaches to environmental goods. Yet, economists too agree that determining *the* optimal price for pollution is next to impossible, and many accept criticisms of contingent valuation specifically as well (e.g., Leape 2006; Parks and Gowdy 2013). Questions certainly remain about how to put prices on many kinds of externalities and about how to reflect the values of environmental goods when weighing them against the benefits of polluting activities (see e.g., Gsottbauer, Logar, and van den Bergh 2015; Pindyck 2013). But even if the prices set are less than perfect, it would seem perverse to make the perfect the enemy of the good and not attach some kind of price to pollution. It is unclear why critics would support the alternative of keeping the price at zero.

Standing in contrast to TP, other studies take a much more micro-level approach to environmental issues. A normative approach focuses on individuals and the issue of their moral commitments to take steps individually to avoid externalizing environmental costs onto others and conversely to help provide environmental public goods. Empirical studies investigate why people do not make individual efforts in these regards, and why others do – voluntarily, and at some cost to themselves (e.g., Carrico et al. 2015; Dietz 2015).

While it is undoubtedly useful to investigate voluntary actions for sustainability, the thrust of this approach risks reinforcing the thinking behind former US Vice-President Dick Cheney’s suggestion that conservation is as ‘a sign of personal virtue’. In focussing on voluntary normative actions, this perspective individualizes the challenge of environmental protection and removes the spotlight from politics, power, and the state (for a similar comment, see Gould, Pellow, and Schnaiberg 2008, xi). Normative commitments shape individuals’ behaviours, but in the absence of public regulatory coordination, people will not make sufficient efforts to protect the environment. Otherwise, why would uncoordinated, normatively driven behaviour not already have succeeded? While norms are certainly influential, supportive institutions and policies are always necessary to deal with significant environmental problems (e.g., Chong et al. 2015). To use an analogy with the welfare state: Could voluntary charitable contributions by firms and households ever yield the same benefits to the poor and the unfortunate as do social insurance schemes funded out of tax revenues?

Third, an approach known as ecological modernization (EM), on the other hand, adopts more of a meso-level focus. As discussed above, most sociology today works at this kind of level, having dispensed with universalistic theories and seeking instead to explain variation in time and space. Yet, environmental sociology adopting an EM perspective has suffered from being frustratingly vague. In contrast to TP, EM expects capitalism to be tameable, such that economic growth can accompany substantial environmental improvements (Mol, Spaargaren, and Sonnenfeld 2014). But where TP has been boldly definitive in its claims – to the point of overreaching – EM has suffered from timidity, becoming weighted with a confusing diversity of facets and meanings (Buttel 2000). It is variously used to describe (a) a normative policy agenda; (b) a positive social theory (a predictive theory of how societies act in practice); and (c) a theory of possibility (about how societies could act, in principle).

EM emerged in a somewhat haphazard way out of efforts to understand how environmental improvement – evidence of which was growing in the 1980s – could be possible (Buttel 2000; Murphy 2000). Jorgenson and Clark (2012, 1) therefore interpret it to be making the *predictive* claim ‘that even though economic development harms the environment, the magnitude of the harmful link decreases over the course of development’. York, Rosa, and Dietz (2003, 286) on the other hand suggest that, according to EM, firms ‘willingly internalize the environmental costs of production’ (see also Rudel, Roberts, and Carmin 2011). Jänicke (2008, 558) defines ecological modernization as ‘the innovation and diffusion of environmental technologies’, while Brulle and Antonio (2015, 900) summarize EM as a normative agenda ‘designed ... to sustain the regime of accumulation and the political, economic, and cultural drivers of climate change’. In light of this wide range of definitions, EM seems more of a Rorschach test than a scientific theory. Advocates of TP might object that critics are misinterpreting the theory, but if so their own imprecision seems largely to blame.

Empirical tests of EM in its predictive guise do not find it to be particularly successful, since many environmental problems are not going away (e.g., Jorgenson and Clark 2012). Adjudicated this way, EM performs no better than TP. EM is more credible than TP; however, in its recognizing and allowing for the *possibility* of environmental improvement: ‘capitalist production, complex technologies, industrialisation and state bureaucracies *do not have to be* environmentally harmful’ (Mol 2000, 48, emphasis added). Yet, it has yielded few insights about the conditions under which economic growth accompanies environmental protection rather than degradation.

The concept of externalities helps resolve the tensions among these perspectives. Where normative approaches de-emphasize the role of regulatory actions by the state – whether market-based or otherwise – the concept of externalities draws attention to them, as well as to the public goods character of environmental protection, and the importance of incentives. Where neo-Marxist approaches

struggle to explain positive cases of environmental protection, an externalities perspective identifies effective state regulation as a critical proximate cause – and points to options for many more such measures. Where EM makes vague predictions of environmental improvement in contexts of rising incomes, an externalities perspective focuses on the political question of why the state may or may not take regulatory action against externalities in a given case.

From an externalities perspective, economic growth is neither inevitably bad nor good for the environment, and the same holds for capitalism. Rather than maintaining that capitalism (e.g., Wright 2015) or growth (Victor 2010; Dietz and O’Neill 2013) or population increases (Ehrlich and Harte 2015; Royal Society Science Policy Centre 2012) need to disappear, sociologists therefore should be investigating what kinds of policies – and indeed what kinds of capitalism – are more conducive to sustainability, and can make economic growth and population increases environmentally benign.¹³

6. Conclusions

Externalities should be a constructively unifying concept for environmental research across the social sciences. In providing a common understanding of the sources of the contemporary crisis of environmental degradation, the concept of externalities could help the social sciences work together more constructively, such as in identifying solutions. The concept is provocative, in that its diagnosis of environmental problems amounts to powerful advocacy for major policy changes – albeit possibly within a capitalist framework of continued economic growth and technological innovation. It is perhaps not quite radical, then, but it comes close.

Future research in environmental sociology could constructively address a wide range of issues, three of which I will touch on briefly here.

First, there is the question of the power of corporations to prevent the introduction of measures for environmental protection – fitting into broad themes of political economy, and the power of business generally. Some firms externalizing the costs of their activities use their political influence to ensure that governments do not get in their way. On the other hand, there are also those that accept or even ask for more stringent environmental regulations (e.g., Bonds 2016; Pulver 2007; Vogel 2000). And even when corporations resist the introduction of new environmental protections, they do not always get what they want. There remains much room for research then on how much power corporations have over environmental policy, the conditions under which that power increases or decreases, and conversely the conditions under which firms do not work to prevent the introduction of stronger environmental protections.

Second, sociologists have already articulated very political views of issues of environmental degradation and protection – see for example Dietz et al. (2015), who find that CO₂ emissions across US states and within states

over time are correlated with features of state politics. Yet, there remains considerable scope for further research on the politics of environmental protection. Some research for example finds surprisingly weak relationships between the ideologies of countries' governing parties and their actual track records in terms of environmental performance (Fankhauser, Gennaioli, and Collins 2015; Neumayer 2003).¹⁴ There are also important questions to be addressed about the power of the rich vis-à-vis the poor. For the very rich, some studies have found that climate change is a minor concern, unlike for professionals (Page, Bartels, and Seawright 2013). Yet, such research has focused particularly on America, and there is a need for more comparative perspectives. Likewise, the sources of public preferences remain poorly understood (Keohane 2015).

Third, finally, sociologists could make further contributions to our understanding of the ubiquitous inequalities in communities' exposures to environmental pollution (Brulle and Pellow 2006). Recent trends in pollution exposure in America show enduring inequalities, even as pollution exposure has overall been declining (Ard 2015; Pais, Crowder, and Downey 2014; Grant et al. 2010). Different communities are differentially able to prevent the incursion (or maintenance) of industrial facilities polluting the local environment (power plants, chemical factories, incinerators, etc.). Yet, we do not yet know much about the resources that give some communities more power than others (Ard and Fairbrother forthcoming).

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Supplemental data

Supplemental data for this article can be accessed [here](#).

Notes

1. Pearce (2002) provides a good intellectual history of environmental economics, placing externalities at the centre. The modern concept of externalities originates largely with Arthur Cecil Pigou, an early twentieth century English economist (see Sandmo 2015).
2. See Appendix A in the supplemental online material for details.

3. Technically, not only costs but also benefits can be externalized – such as the aesthetic benefits to passers-by of an attractive garden in front of a private house.
4. Unless speaking of 'environmental hazards' like earthquakes and hurricanes that would occur even in the absence of any human forcing, this article will not consider that usage of 'environmental';.
5. On the optimum level of biodiversity, for example, see Helm and Hepburn (2014).
6. Though, arguably, we might weight net costs or benefits to some people more than others—perhaps in the interest of greater social equality, for example; in a utilitarian sense, such weighting might favour actions that reduce social well-being on aggregate.
7. Thus, the 'Polluter-Pays Principle', which was adopted for example by the OECD in 1972 as an official guiding principle for policy design (OECD 1992).
8. For a long time, states predominantly responded to environmental externalities not using market-based measures, but regulations that have become known as 'command-and-control'. The track record of policies of this kind is also generally good.
9. The most stinging critiques within sociology come from advocates of the neo-Marxist Treadmill of Production perspective described below.
10. According to Eurostat—see "<https://protect-us.mimecast.com/s/VAz4BRUDa0XEux?domain=ec.europa.eu>" http://ec.europa.eu/eurostat/statistics-explained/index.php/Greenhouse_gas_emission_statistics. This reduction includes international aviation but excludes emissions due to land use change.
11. It is arguably an over-simplification to attach the 'Treadmill or Production' label to a variety of different eco-Marxist perspectives (see Buttel 2004), but for the purposes of the argument here, the differences among them are minor.
12. According to data from the World Health Organization www.who.int/phe/health_topics/outdoorair/databases/cities/en/ and the World Bank's World Development Indicators (<http://data.worldbank.org/indicator/EN.ATM.CO2E.PC>, respectively). Per capita greenhouse gas emissions are also highly variable across U.S. states—much lower in California, for example, than in much poorer Louisiana <http://www.eia.gov/environment/emissions/state/analysis/pdf/stateanalysis.pdf>.
13. As noted even by some Marxist commentators (e.g., Harvey 2006), capitalism is remarkably adaptable and may therefore be better placed to survive the challenge of ecological crisis (and/or the policy response to it) than TP and other Marxists suggest.
14. Fankhauser, Gennaioli, and Collins (2015) find little relationship between governments' left/right ideologies 'except perhaps in Anglo-Saxon countries'.

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