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Note from the editor

Ecologizing economic sociology

Leon Wansleben

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Financialization, globalization through digital networks and flows, deindustrialization, and the rise of economies dominated by the knowledge and service sector: if one tries to understand the global economy through the lens of economic sociology's major themes, one is left with the impression that socioeconomic structures have become dematerialized as they have grown more complex and global. But in the very period most strongly associated with post-Fordist economic change (1970 ff.), global material extraction has almost tripled (Krausmann et al. 2018). Growing extractions of biomass, fossil fuels, ores, and non-metallic minerals are performed through global divisions of labor. Stagnating material production in the Western capitalist core has been overcompensated by rising primary material and energy use in China. Major extraction economies in Africa and Latin America have redrawn their relationships accordingly, loosening ties with Europe and North America while strengthening those with

the production centers in South-East Asia.

The nexus between the economy and nature also becomes increasingly visible at the "other end" of the entropic sequence (Georgescu-Roegen 1971; Pineault 2022). Economic activities force earth systems to undergo dramatic changes while some ecosystems collapse. In consequence, conditions for economic activities change, sometimes rapidly and sometimes in slow motion. Extended dry zones, regions and cities with deadly heat, coastal areas gradually drowning in the sea, as well as unexpected, yet ever more expectable, catastrophes of wild fires, floods, and storms undermine diverse economic activities and destroy economic assets. Small-scale farmers as well as big insurance companies account for growing losses, recalculate risks, and anticipate fundamentally more uncertain, unstable futures (Scoones 2024).

In this context, economic sociologists can no longer afford to study selected markets and firms as if they existed in some immaterial

social space rather than on planet earth. They should also abandon the last bastion of modernization theory, namely the supposition that all economies will somehow tend towards dematerialization as they become more advanced. Even high finance has impacts on, and is affected by, transformations in geobiochemical processes. Economic growth implies ever more goods production, digital as well as physical, which consumes increasing amounts of energy and matter. And value chains do not just cause locally specific environmental problems (often discussed in sustainability literatures) but also create “telecouplings” (Liu et al. 2013) and induce profound changes in earth systemic cycles. Pandemics are an example of this. Warnings of ever higher pandemic risks due to intensified trade linkages reaching from extractive commodity frontiers to metropolitan consumer centers were long ignored. They suddenly became all too real when SARS-CoV-2 spread rapidly and with devastating consequences around the globe.¹

I am making this wake-up call to economic sociologists to recognize economy’s strong and consequential couplings with natural environments as somebody who has been socialized neither as an environmental sociologist nor as a social or political ecologist. But this is precisely the point, and why I am making it. Ecologizing economic sociology should not remain a task just for those who have always been interested in environmental matters. The destabilization of key earth systemic processes is too existential for “conventional” economic sociologists to push the respective questions outside of their accustomed fields of inquiry. We must recognize that today’s massively expanded economy feeds ever faster and more consequential feedback loops with natural environments, forcing the atmosphere, oceans, and earth’s surfaces to evolve away from the conditions that have provided benign conditions for human development for more than 10,000 years. Evidence for this is overwhelming, no matter whether we use the term Anthropocene or not (Ghosh 2024).

In the past, social scientists often treated global warming and other environmental issues in terms of risk, recognizing their importance but also framing the consequences in terms of avertable possibilities. Just four years ago, Anita Engels edited three issues of this publication on the topic of climate change and issued the warning that, should policymakers and corporate leaders fail to deliver on the promises of the Paris Accord, existential risks were looming. But we are past this point. Even with a real surge in emission reduction efforts unleashed by Paris, oceans have warmed much faster than scientists had ever antici-

pated; glaciers and ice sheets are disappearing; temperature records are the new normal; and even if signatories deliver on the promises made in Paris, CO₂ forcing will still lead us to a planet with temperature rises above two degrees Celsius. Earth systems and environmental scientists also point out that accelerating climate change is intimately connected to other unfolding earth-spanning environmental crises, such as species extinction, loss of biodiversity, the eutrophication of waters, deforestation, the poisoning of soils.

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Many of these developments entail major risks. But risk as a sociological framework downplays and somehow fictionalizes what is actually at stake. The speed and depth of current human forcing of different earth systems is too systemic to be adequately framed as risk. Risk also fails to articulate irreversible and highly unpredictable transitions in ecosystems (Petryna 2024). Not just “out there” in nature but also within socioeconomic institutions and structures, ecological polycrisis has become a pervasive socioeconomic reality (Elliott 2018, 304).

This situation opens up rich research opportunities for economic sociologists. If we only concentrate on decarbonization efforts, we confront exciting questions about developments in, and variations between, sectors, countries, and firms (e.g., Aklin and Mildenberger 2020; Colgan, Green, and Hale 2021; Finnegan 2022; Mildenberger 2020; Nahm 2022). While fossil incumbents (and petrostates) remain the main opponents of decarbonization, scholars identify other interesting distributional conflicts, e.g., between and within trade unions, within and between currently fossil-dependent but “decarbonizable” sectors (Kupzok and Nahm 2024), as well as within (former) fossil extraction regions (Beckfield and Evrard 2023). The study of decarbonization efforts also reinvigorates research on state capacities and industrial policies (Bradlow and Kentikelenis 2024; Ergen and Schmidt 2023; Rodrik 2014). One great advancement in this burgeoning literature is that, rather than selecting and perhaps overemphasizing some avantgarde areas of “green transition” (e.g., the renewables sector), it tackles decarbonization efforts, resistances, and conflicts much more systematically and systemically, widening considerably what has hitherto been theorized as “carbon lock-ins” (Unruh 2000). The literature thereby

also connects to broader debates on the deep fossil dependencies of modern capitalism (Malm 2018; Mitchell 2013) and the limits of a market-driven climate policy approach. Another great advancement is that this new scholarship critically discusses socioeconomic redistributions, the emergence of new extraction frontiers (Riofrancos 2023), and power shifts (Gabor 2021; Rice et al. 2020) within “green capitalism.” Beyond these important debates, deep questions linger. If capitalism – green or brown – fails in its response to growing environmental instabilities and stress and confronts new legitimacy challenges in the face of deteriorating living conditions, what kind of Polanyian “great transformations” can we expect in the decades to come?

Even if greenhouse gas emissions and other dislocations generated by economic activities have increasingly palpable socioeconomic feedback effects through asset losses and growing instabilities, individual harm cannot be mitigated through individual decarbonization efforts. It is worth reminding ourselves of this all too obvious point, which has been extensively discussed in terms of common goods dilemmas and the temporal mismatch between short-term decision horizons and long-term carbon cycles. For even if we are increasingly confronted with global warming as a crisis rather than a risk, the crisis does not in itself motivate stronger mitigation efforts. For instance, in financial markets, attempts to tie the issues of mitigation and adaptation together have been discussed in terms of *double materiality* and *ESG*. The idea behind both of these terms is that long-term investors anticipate increased risks and therefore, to safeguard their own profits, decide to put their money into sustainable activities. But empirical studies find that the reality on markets looks quite different. In the time horizons that matter to economic actors, investments in sustainable activities are just as much – or more – exposed to climate risks than fossil investments; and for individual companies as well as for whole countries, rating agencies punish expensive mitigation activities while rewarding the buildup of financial buffers to establish capacities for dealing with concrete damages and losses when and if they occur (Barta 2024). While major polluters thus are in a more advantageous situation if they make good money from polluting to be well-prepared for an environmentally destabilized world, those already most affected by these destabilizations have hardly any means to practice adaptation, let alone mitigation, because “their” climate risks are already priced into borrowing costs. These distributional mechanisms work at the level of countries as they do at the level of individual households, which are extremely unequally exposed to the costs of asset losses, insurance coverage, and costs. Indeed, while

Elliott (2021), Cox (2023), and others (for a review, see Klinenberg, Araos, and Koslov 2020) have explored these issues for the American housing market – the US’s major social policy pillar – it is worth pointing out that most loss absorption and adaptation work happens invisibly in the Global South (Johnson et al. 2023), triggering no action from a potent bailout state.

Relying on climate modeling, the economist Esther Duflo recently suggested that, with their carbon emissions, the US and Europe cause losses of life in Global South countries due to excess heat whose value she estimates to be USD 518 billion *per year* – a cruel process of redistribution.² Still, the politics of restitution remains notoriously weak and is dramatically overshadowed by intensified competition over means of geopolitical power, fossil or otherwise. Meanwhile, in rich capitalist countries we observe a renewed emphasis on an exclusionary protective politics in favor of one’s own (sometimes racially defined) people at the expense of refugees, humanitarian/development aid, etc. If these are contours of the politics of loss that gain traction as the atmosphere and oceans heat up (Elliott 2018), we should indeed prepare for Polanyi-sized transformations.

I am writing this not to encourage more works in the dystopian genre but to emphasize that *ecologizing economic sociology* is not some niche project occupying the small area at the intersecting circles of economic and environmental sociology. Rather, more than any other intellectual maneuver, ecologization implies a destabilization of the usual distinctions and separations between micro, meso, and macro, as well as between topics covering the “here and now” versus those that engage long temporalities. The climate crisis covers the time of geological ages as well as sudden disruptive events (Chakrabarty 2021); and it is at home in our daily consumption patterns as it is in the history and ongoing legacy of the English industrial revolution (Wrigley 2010). The question of ecology makes particular demands on reconnecting empirical work and theory in our field. This means recognizing important ideas (as well as methods) in adjacent fields, but also going to the heart of economic sociology itself in order to rethink its defining categories and concepts.

I am happy that the contributors to this issue have agreed to take up this challenge. In Limerick, Ireland, at the SASE conference in June 2024, Jens Beckert and Neil Fligstein sat down with me to discuss the legacies and future of economic sociology in the face of our ecological polycrisis. In our conversation, these eminent economic sociologists describe their own motivations to turn to environmental issues and where they see the specific strengths of economic sociology in studying climate change. With some subtle differ-

ences in their perspectives, Jens and Neil debate the promises and limits of “green capitalism.”

In the next piece, Ute Tellmann articulates a more principled critique of new economic sociology as an intellectual project that carries with it the ecological forgetfulness of both economics and modernist sociology. She suggests that, as markets, firms, and the world economy are always already embedded in earth systems and concrete ecologies, a research program of ecologized economic sociology should trace how these entanglements are rendered selectively invisible and selectively calculable through processes of “disembedding.” To map the entanglements, calculative exclusions, and dislocations of this process, she chooses the concept of “land.”

Caleb Scoville, in the next contribution, discusses the relationship between environmental sciences and economic sociology. The tension that Scoville negotiates is that between sociologists’ reliance on environmental sciences as an indispensable resource to observe ecological consequences and conditions (in the simplest – but not so simple case of – measurements of CO₂ emissions), on the one hand, and a necessary methodological as well as theoretical distance to such sciences, on the other. The latter argument for distance arises particularly from Scoville’s own work on the predominant economic thinking in environmental sciences when researchers are urged to translate their data into socioeconomically meaningful categories. Scoville advocates a critical-constructive engagement with environmental expertise that combines careful examinations of measurements and concepts with useful, practicable divisions of intellectual labor.

In the last, but equally important, contribution, Annika Rieger brings to light the meso-level neglect of much climate sociology and points to the importance of firms in driving the greenhouse gas effect. Indeed, it would not take a major football stadium to hold the CEOs of those companies that are majorly responsible for the rise in temperatures. In 2022, 28% of CO₂ emissions could be attributed to 13,500 corporations. Rieger goes on to argue that the most fruitful approach to understanding firms’ emissions behavior is to draw on established as well as new contextualizations. Sectors certainly count, as do varieties of capitalism and material production structures (input energy is more easily decarbonizable than carbon feedstock). Much work remains to be done to reveal these contexts and structures. Rieger thereby reconnects to and innovates a tradition of economic sociology associated with the study of institutions, cognitive frames, and networks constituting markets (e.g., Beckert 2010). This and the other pieces make evident that, now that nature-economy couplings have been taken out of “pandora’s box,” there is a tremendous amount of work ahead of us.

Endnotes

- 1 Another, less recognized but well-researched example is the import of fire ants to the USA together with goods imports from South America, and from there to new habitats. This is not only a story about ants but about losses in agricultural income, damaged property, and yet uncertain impacts on local ecosystems.
- 2 <https://www.lse.ac.uk/Events/2024/05/202405021845/climate>.

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Economic sociology for an age of ecological crises.

Interview with Jens Beckert and Neil Fligstein

In the tradition of new economic sociology, how have the topics of climate change or other environmental issues been taken up?

NEIL. Generally, economic sociologists haven't been that engaged with this issue. People interested in the environment have formed their own community. There are a lot of people who have been working on these issues since at least the 1970s. But they're very intellectually isolated from much of sociology. I don't think that they have absorbed much economic sociology. So they have had their own ways of speaking about the nexus between the environment and the economy. But what's happened is that the climate crisis is becoming more and more central in societies and politics. It's like Max Weber said: People study topics that are culturally relevant in their own times. I think that's why it's a topic on the rise in economic sociology and political economy. Economic sociologists have increasingly started to turn towards ecological issues, particularly climate change. We have a lot of tools for that, both from the political economy side and from the markets side

JENS. I agree with this. It's interesting to see that the first *Handbook of Economic Sociology*, edited by Smelser and Swedberg, had a chapter on the environment, written by Johannes Berger. So in a way the topic was there, but it never had any significant impact in eco-

nomic sociology. Like Neil, I would say that the tools developed in economic sociology can be usefully applied to the topic of climate change and environmental issues. To the perspective focusing on markets and political economy, I would add micro perspectives, for instance those coming from science and technology studies (STS) that look in detail at how measurements and categorization take place. The tradition of economic sociology offers interesting insights that can be fruitfully applied to issues of climate change.

NEIL. I would add that the sociology of consumption will be a part of this as well. But I agree that STS approaches are important because a lot of what's going on out there turns on measurement, and how to measure, and what to measure, and how to think about it. There are all kinds of contestation about that. That's someplace that we can really try to evaluate whether something provides a real measure, or a measure that's a fair measure, or a measure that's a reproducible measure. Measures can often be smoke screens. So, for example, there are more than 100 different ESG measures [indices measuring firms' compliance with environmental, social, and governance criteria, lw]. They can be used by mutual fund companies to entice investors who are being told they are doing good as well as investing in their future. But because of the heterogeneity of the measures and the lack of standardization, many individuals are not aware that they are being sold a product that might have little to do with doing good.

There exist strong traditions in Marxist literature, called ecological Marxism and political ecology. These scholars talk a lot about the role of the economy in producing environmental crises and climate change, and they expose the structural power that the economy has over political actors. How do you see the relationship between this literature and new economic sociology?

NEIL. One of the dominant ways in environmental sociology to speak about the economy is to invoke the idea of the treadmill of production. This idea says that as long as economies grow, they will depend more and more on the exploitation of resources and more environmental degradation. There is good empirical evidence that this is true. A Marxist interpretation of this is that capitalism is thus the problem, and as long as capitalism exists, you are going to have large-scale ecological damage. Obviously, this is a very macro and structural framing of the problem. The question for me is: Is capitalism capable of transforming itself? Recently, the expert predictions have been revised downward from a 4.5 degree Celsius increase in temperatures by 2100 to a 2.5 degree Celsius increase. This revision is almost entirely the result of the transition towards re-

newable energy that is underway under capitalism. Some of the people identifying as eco-Marxists have started to recognize this. Their renewed criticism is that this, of course, is not enough of a reduction, and it's going to be unequally distributed. Some people are going to benefit, and some people are going to get hurt. I think these are important parts of the debate and discussion, particularly around the kinds of unequal distributions of the costs of climate change and environmental degradation.

Let me push you a bit harder on this. From one angle, one could say that economic sociologists have focused so much on the details of markets that they have missed this picture of the economy undermining its ecological conditions of existence. On the other hand, you can argue that eco-Marxists have not been able to say much new because their views on environmental exploitation remain the same, whereas economic sociology would be more interested in variation. How do you see this, Jens?

JENS. First of all, I think it's true that the macro picture didn't appear much in recent economic sociology. One has to go back to the history of the new economic sociology. In Granovetter's article from 1985, there was a deliberate attempt to distance the new economic sociology from macro approaches and Marxism in American sociology of the 1970s. It was a research program aiming at understanding the social foundations of markets mostly on a micro and meso level. This was a very productive research program. But by doing so, the larger picture was lost out of sight. This has changed already, especially with the financial crisis. After 2008, economic sociology already engaged much more with macro developments. One can see this especially well in the literature on finance. The field has moved, and today economic sociology is probably better prepared than 15 years ago to address the climate crisis. I believe that you really need both. We need to be able to locate the pieces of the puzzle within a bigger picture, but it is also important to understand the pieces of the puzzle in detail, and how they interact.

NEIL. In my own studies of capitalism, I have been incredibly amazed by how dynamic capitalism is. It does good and evil. But it always surprises you. I think Marx himself appreciated that the profit motive is a very powerful incentive. So things that have happened and could happen just are mind-blowing.

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JENS. I fully share this. Capitalism is this fascinating in its dynamics. But the issue at stake here is whether capitalism is able to internalize the environmental costs that it has externalized so far, its exploitation of and impact on nature. With regard to social costs, the welfare state led to the internalization of at least many of the social costs. So this might be a historical precedent. But can the economy be regulated in a way that also ecological costs become internalized? Nobody knows this. It's important not to automatically assume that because capitalism is such a dynamic system, it will succeed in this gigantic task. And at what point or on what timescale it will succeed. When it comes to climate change, time is critical.

That's a good point. Another way to look at the issue is to focus on the material underpinnings of the capitalist process. Ecological Marxists speak about material throughput. So even if you ignore climate change or the energy issue a little bit, the idea is that the economic process implies an expansion of the use of material resources and essentially putting them through a process of entropy, where they become waste in a broad sense. Is that a dimension that you think can be built into an economic sociology perspective?

NEIL. These are open questions at the moment. One of the reasons why CO₂ emissions have dropped in the Global North is because people consume more services and fewer goods. On the issue of resources, the picture is uncertain. Is the mining of lithium worse than the mining of coal and oil? Will the hydrogen economy succeed or not? I don't think we know that. It is really important to monitor these things over time because then you can describe the trajectories. In

India, people are using coal as they develop their economy. But in China, the renewable energy economy has become the basis of their industrial policy. The question is, over time, what is going to matter more? That is why we need to disaggregate these trends across industries and across countries. We need to get a clearer picture of how and where the possible decreases in greenhouse gas emissions will occur.

Another problem is that prospects for capitalist growth in the South, particularly Africa, will inevitably mean larger material throughput because a substantial share of the consumption you will see there will consist of material goods, TVs, fridges, and so on. So the trend you are describing only captures the advanced end of our global economy where the material throughput that provides us with goods remains stable and growth primarily happens via a highly differentiated service economy. But in other parts of the world, the picture may be more towards resource-intensive versions of growth. So how do you make sense of that?

JENS. The empirical evidence is that, at aggregate level, a decoupling between resource use and economic growth has not happened in absolute terms. And partly that has to do with the expansion of material goods consumption in the South. But then the results in the service industry are also more complicated. If you think about the energy use from artificial intelligence or from a more leisure-oriented economy – I am thinking, for example, of tourism – the decoupling trend is not so clear. There exist these ideas about recycling and a circular economy, and in principle, these are good proposals to slow down the process of entropy. But if you look again at what's happening and what's projected, then I don't think one can put one's hopes in these mechanisms to rescue us. *The New York Times* recently reported that 10% of materials are recycled in the American economy, not more. And the International Energy Agency has projections of what happens with regard to batteries. Only very little of lithium batteries will be recycled. Partly for technical reasons, but partly also for economic reasons, because it is simply cheaper to mine new raw materials than to take lithium out of batteries and recycle it. And it is important to bear in mind that we are looking at a more encompassing ecological crisis and planetary boundaries. The energy transition is only one part of resolving the ecological crisis. It is perfectly imaginable that one day only very little fossil fuel will be used. But with increasing population and economic growth, it is difficult to imagine that absolute resource use can be significantly reduced.

NEIL. That may be true, but I just want to point to another trend. The Chinese are producing electric cars

for 10,000 USD. If the Europeans and Americans don't want them, they're going to be part of the development project in the Global South. To be sure, material use is going to go up, but the question is, how is it going to be powered? With renewables or coal? That's where I think that you're going to see some transformations. The other thing that can happen in the Global South is that they will leap, like they've leapt with cell phones. They never installed landlines. They haven't been wedded to the technologies that we have. At this point, the renewables and electric vehicles will be where those economies will develop. That said, I am not contesting the general trend of growing resource use. When the demand for air conditioners grows, it's going to be a big business for somebody.

JENS. Let me comment on your argument about leapfrogging, Neil. There's one aspect why the comparison between cell phones and electricity may be inaccurate. For electricity, you need a huge infrastructure. You need electricity that is locally available. And in the Global South, there are hundreds of millions of people who have no access to electricity. So you have to build this very costly infrastructure. This depends on financing. And in the Global South, infrastructure financing is extremely costly. You have interest rates of typically around 15%. That's why there is so little of this. And so what people are often doing, if they need electricity, is to use diesel generators because there is no grid electricity coming to the village. I thus think that we need to be a little careful with the leapfrogging argument, because going electric has so many infrastructural presuppositions that are currently not met in many poor countries.

Let's take a step back. I want to ask you how you came to be interested in ecological and particularly climate questions.

NEIL. About eight years ago I was invited to a conference that was organized by academics who are associated with the United Nations, and they are interested in climate change. I asked them why they would want me, because I didn't know anything about it. But they said, you do something called field theory, and we want to hear about that because it may help us to understand the international political field of climate policy, which is made up of non-profits, intergovernmental organizations, states, corporations, social movement actors, people working on measurement, etc. They were trying to make sense of what it was and how it worked. I came away intrigued by the extent of the organization of this community of disparate actors. It opened the question for me of what does and does not work in this policy field. Before, I had proba-

bly been more like the ecological Marxists, thinking that climate change was a disaster and that there wasn't much that we could do about it. But now I was interested in figuring out what people do who are actually trying to change something. How are they organized? What are they doing? What are their goals? What's working? What isn't working? As someone who has studied corporations, it was natural for me to be interested in what corporations were or weren't doing. So my initial foray was to try to say, OK, how much greenhouse gas emissions are companies emitting? Is anybody measuring it at the corporation level? What variations can we observe and how do we explain them? That's how I started.

Are these the kinds of questions you work on these days?

NEIL. Yes, I focus on sectors and am interested in whether corporations are measuring their greenhouse gas emissions and if any of them are reducing emissions. I am also interested in the growth of the professions and industries being constructed around sustainability. A large consulting industry has grown up and the big accounting firms are developing expertise in these issues. In many corporations there has been the rise of chief sustainability officers who report directly to the CEO and are part of the C-suite, as they call it in corporate parlance. This means that the discussions about sustainability get taken into account in corporate strategy. But there are a lot where these officers don't have any power or influence. So my research wants to uncover the part of sustainability rhetoric that in the language of institutional theory is "myth and ceremony" and the part that is real and the conditions under which people are actually trying to do something.

Jens, can you tell us about your motivations to write a book on climate change?

JENS. My own story is not so different. I was asked a couple of years ago to consult the Max Planck Society in the process of founding a new institute, which has just opened its doors and which combines natural, climate, and social sciences. I was asked to comment on their proposal, and this was the moment when I started to get interested in the topic of climate change. I started to see the magnitude of the problem. I started to understand that there is something really interesting in the topic from a social science perspective. If we know about the seriousness of the problem and in principle know how to mitigate global warming, why do societies' responses to this existential threat remain so insufficient? If you are looking for a puzzle in the

social sciences, here you have one. It is this question that I address in my new book. My answer focuses on the general incentive and power structures of capitalist societies. But I also see much value in studying the specific questions that Neil mentioned: What is it that corporations are doing? What are the specific organizational incentive structures? How do measurements and categorizations affect corporate as well as policy-makers' actions? How do the relationships between state and society evolve with climate change, and what role do consumers play? You can get into all these facets that are familiar ground for economic sociology and sociology in a broader sense. So in a way, the topic is ripe to be investigated by economic sociologists. But what's important for me is that we are dealing with an issue that is not just of academic interest. We are ultimately talking about the future of mankind. So there is an obligation for the social sciences to generate knowledge, which can somehow help societies to deal with the climate crisis in a productive way. Accordingly, research questions in this field should not just be framed in terms of research gap X, but with a broader normative problem in mind: What do we actually need to know in order to be able to make some progress in tackling these existential problems?

NEIL. That's why I emphasize this notion that we should be researching what people are doing and what works. And that's one of the things that we know a lot less about. One of my colleagues at Berkeley, Jonas Meckling, addresses this issue at the level of policies. It's really important because we should be able to go to the public and say, These are the things that we know have really helped. Let's just take something that a lot of people think is unimportant: bicycle paths. Bicycle paths have proliferated across cities around the world. One of the reasons for this are concerns about climate change. Every major city in the world now has set off streets for bikes. Obviously, Copenhagen is different from San Francisco, but we see a diffusion process. Bicycle paths are an example of a solution that is relatively cheap and can be framed in terms of broader welfare benefits. We want to identify these kinds of solutions if we become more public-facing, and we can do so because there is a lot of experimentation going on. Sociologists can help identify best practices without ignoring context to figure out which practices can be scaled up, in the policy sphere, amongst NGOs, and in the corporate world.

Thanks a lot to you both for this interview.

The interview was conducted by Leon Wansleben in Limerick 2024 and transcribed by Tobias Burgwinkel and Leon Wansleben.

Ecologizing economic sociology: A tale of (dis)embedding?

Ute Tellmann

The destruction of existing modes of exchange and production in many places is a likely outlook for a world that is unable to deal adequately with its dependency on a “critical zone” of livability (Latour and Weibel 2020). In the Anthropocene, food and water security will probably be more difficult to achieve; social and political protection against loss through floods, heatwaves, and hurricanes will be more costly; and the provisioning of goods, services, and public health will become more demanding (Elliot 2021; Thomas, Williams, and Zalasiewicz 2020, 12). Given the rapidness with which the tipping points of the earth system seem to be reached, a considerable reinvention of economies appears to be imminent in the near future: changes in the calculation of risks, reassessments of values, changes in the transferability of goods and in the acceptance of collateral, upheaval in the circulation of matter, and, last but not least, rising costs of (re)production are to be expected. The question is not if economies and societies are ecologized, but how, at whose expense, and with what dynamics and effects. The current modes of ecologization under the heading of “green finance” give no adequate sense of the transitions required and underway. As has been pointed out, they are motivated by political cultures of regulation that favor market solutions, coexist with cultures of denial, deepen existing patterns of social exclusion, thrive on the inequality of political influence, and have paradoxical or insufficient effects (Bridge 2011; Chiapello 2020; Langley et al. 2021).

One might assume that economic sociology is specifically suited to analyzing the contentious and various articulations between ecologies and economies, however catastrophic or potentially benign, however unintended or planned. It is surprising to learn that economic sociology has been comparatively reluctant to make the ecological and material conditions of livability into a main topic of interest. Economic sociology has a dim presence in the lively debate on the environmental humanities or energy humanities to which social theory, political theory, anthropology, and geography contribute. Of course, there are always exceptions to the rule, but the relative sparseness of contributions to this topic is noteworthy (Gray and Barral 2021). Is there something in its own heritage that makes it more difficult for economic sociology to open up to the task at hand? What would the unique perspective that economic sociology can offer in the ongoing debates be? And what would it imply to ecologize this subdiscipline and to increase its strength for studying the economy of the Anthropocene?

As I show below in further detail, economic sociology currently fails the “Anthropocene test” due to a double intellectual burden that stems from its development as a subdiscipline in the 1980s. In its founding moment, new economic sociology accepted from neo-classical economics the *formal* definition of scarcity and a dematerialized account of the market as the central allocation mechanism. At the same time, it defined its own program as making economics “more real” by embedding it in social structure. Economic sociology grew its sociological expertise for rethinking econom-

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ics, thus carrying with it sociology’s own forgetfulness of material and ecological relations (Charbonnier 2021). In other words, new economic sociology sits at the intersection of two dematerialized accounts of order: economic and social.

Given the sheer weight and extent of such intellectual history, there is no easy and unequivocal solution. New economic sociology always has been a loosely conjoined field of many different perspectives; hence, there will be many ways of addressing the task of ecologization. In this essay, I want to plot one possible way of ecologizing economic sociology by making three points. First, economic sociology should further

materialize/ecologize the processes of “disembedding” that it has focused on in recent decades. Second, I argue that such materialization/ecologization is greatly enhanced by a methodological stance that makes space and land a more prominent concern. In recent years, a focus on temporality has afforded the most innovative account of economic action and logic; but that account has overlooked how many different temporalities of diverse species and matter are involved when economic futures are imagined, traded, and claimed. Third, economic sociology should no longer understand the act of “embedding in social structure” as making economics “more real.” Quite the contrary, the social-cum-economic order must be addressed in terms of the ignorance, denials, and immunities it affords in respect of ecological relationalities. Such shielding from exposure is radically unequally distributed, while ignorance of the expected upheavals still pays off for selected groups within and across species.

In the following sections, I will first look more closely at how and why economic sociology became ill-disposed to addressing ecological relations, before exploring which strategies of ecologization are already at play and might further be pursued along the three lines indicated above.

Ecological limits of accounting for (dis)embeddedness

New economic sociology has described its own program as a genuinely sociological analysis of “economic core phenomena” (Granovetter 1990, 95). It describes as its “important achievements” to “have opened up the sociological studies of markets” (Swedberg 1987, 105). The key concept for achieving such sociological analysis consists in “embedding” economic action in social structure. Instead of dealing with “fictitious actors” and “hypothetical interactions,” sociologists look at “concrete ongoing systems of social relations” (Granovetter 1992, 58) and “real actors” (Swedberg 1987, 105). While economics conceives of markets that are “virtually nonexistent in economic life” (Granovetter 1992, 65), sociologists claim to look at the reality of economic life. Economic sociology prized itself on overcoming the abstractions of neoclassical economics by bringing the conception of the market “close to reality” (Swedberg 1987, 105).

While seeking to overcome and oppose the fallacies of neoclassical economics, new economic sociology consciously and deliberately retained two crucial tenets of neoclassical economics. First, it understood the market as a central allocation mechanism

for scarce means. Neoclassical economics, despite all sociological critique, was praised for having “conceived of the market as the central mechanism of allocation in the economy. This idea no doubt reflected the change that had gradually come about in the West: the economy was increasingly centered around markets” (Swedberg 1994, 259). By taking the market as an allocation system and the economic actor as a central building block for defining the core economic phenomena, new economic sociology “reflects the success of one discipline, and of one doctrine within that discipline, neoclassical economics, in asserting the primacy of the market as the most important economic institution” (Friedland and Robertson 1990, 3). Second, by adopting the neoclassical account of markets as a formal allocation mechanism, new economic sociology intently did away with a more material account of economic order: “Definitions of the economy that focus on the production of material objects...are considered unsuitable today. Economic theory and economic sociology also agree in a general way that economic action is a type of behaviour that has to do with choosing among scarce means that have alternative uses” (Swedberg and Granovetter 1992, 6). The core economic phenomenon was thus deliberately defined in opposition to a material understanding of economic processes, which was closely associated with the substantive traditions of anthropology.

New economic sociology intently and explicitly distanced itself thereby from a material or substantive account of economies that had still informed Karl Polanyi’s understanding of the conceptual pairing of embedding and disembedding. For Polanyi, economic order was defined as the organization of livelihood. Labor, land, and money were seen as the key material, symbolic, and social elements of such organization. For Polanyi, any attempt at disembedding land, labor, and money *as if* these were commodities would necessarily imply their “demolition” (Polanyi 1957, 73). New economic sociology shunned these substantivist and normative claims linked to the pairing of (dis)embedding. Instead, all economies were seen to be embedded; that is, all markets are social structures.

Doing away with these substantivist and normative connotations of the notions *embedding* and *disembedding* resulted in significant blindspots. As Jens Beckert pointed out, by seeking distance from the normative implications of the notions of embedding/disembedding, new economic sociology also turned away from studying the macrological societal and political effects of processes of economization (Beckert 2009). Furthermore, new economic sociology also lost the ecological and material dimension of economic life that Polanyi’s tale of (dis)embedding had kept central. The program of embedding economies in the “so-

cial” – that is, in networks, states, institutions – offered no substitute for what has been left behind. As many debates about sociology, new materialism, and technology in recent decades have shown, the “social” as it has been defined in this discipline was built on “fossil capital” or “fossil modernity” without any proper account of it (Malm 2016; Mitchell 2013). In sum, the attempt to make neoclassical economics “more real” by adding and stirring the social into the mix ignored that this novel ingredient had problems and omissions of its own. The dematerialized account of economic order became coupled with an equally dematerialized and narrow account of social order.

Ecologizing – but how, what, and where?

How can economic sociology be ecologized? Do sociological economists now have to become ecologists? Ecologization is a different undertaking than embedding a given social entity in a pregiven ecological system – for the simple reason that there is no pregiven ecological system into which social-cum-economic orders can be placed. First, natures are coproduced with cultures, most dominantly so in the age of the Anthropocene (Cronon 1983; Descola 2014; Moore 2016). Economic ecologies emerge in processes of co-constitution, some are benign, others are catastrophic – for humans and more-than-human-species alike. Ecology is not a benign order; it is not a bigger system into which social order can be put, nor does it represent a normative ideal of a good society (Latour 2009). Second, our conceptualization of the ecological system has a history, just as sociology and economics have as respective disciplines (Sprenger 2019). Economy, ecology, and sociology are rivals and partners in shaping discourses of how order is possible. They share concepts such as cooperation, competition, conflict, systems, interests, and dependencies. The recent rise of the concept of resilience is a case in point. While it emerged as an ecological concept, it is now used for understanding social cohesion, psychological strength, and the security of the financial system alike (Walker and Cooper 2011; Nelson 2014). We speak of the “resilience of finance” and the “sustainability of debt” – without necessarily having to wonder about the mingling of economic and ecological meanings and without taking note of the material dependencies involved in debt and finance. Given these conceptual histories and overlaps, what should and could ecologizing economic sociology mean?

One pragmatic point of departure is the most recent take on (dis)embedding that has been developed by scholars working in adjacent fields, such as

cultural economy, social studies of finance, and heterodox Marxist political economy (Callon and Muniesa 2005; Best and Patterson 2010). These fields have slightly reframed the meaning of embedding and disembedding – implicitly or explicitly. They suggest starting with the observation that practices of disembedding, abstraction, or disentanglement indeed define modern economic practices and forms: goods, labor, services, or resources are made rationalizable, transferable, valuable, saleable, investible by disentangling them. At the same time, such disentanglement is itself embedded, so to speak, since such processes depend on political, technical, and calculative relations, practices, and tools which make disentanglement successful, possible, operative, and, not to forget, hegemonic.

In this research perspective, many scholars have already started working on questions of ecologization. They have been analyzing how “nature” has become a disentangled value, a commodity, a financial claim, or has been reframed as an “ecosystem service” to be part of offsetting regimes. Especially the financialized politics of climate adaptation have been looked at in terms of regulatory design of carbon markets (Engels 2006), in terms of practices of classification and valuation that define “green” finance, as knowledge infrastructures of risk (Folkers 2024), or as a question of compensation for loss and harm (Elliot 2021). The limits of translating “nature” or “material interdependencies” into financial portfolios, carbon credits, values, or taxonomies has been highlighted (Fourcade 2011). Scholars have problematized the reduction of the climate issue to a single denominator of CO₂ (Langley et al. 2021) and have criticized the selective perception of risk and the lack of properly penalizing further investment in fossil fuels (Chiapello 2020).

This study of the modes and limits of ecologization can and should be pushed further by paying more attention to the mobilization of matter and multispecies interdependencies involved. There are some models for doing this. In the following section, I take the example of economic futures as a case for probing how a more material and ecological perspective might be gained. For this purpose, I selectively discuss some works in the environmental humanities and energy humanities that help to interlace the study of economic futures with ecological ones. My key point is that ecologizing one’s perspective is greatly stimulated if the methodologies for studying economic futures give more weight to spaces, “patches,” and land. Futures are not just financial papers traded in rooms and dealt with on desks: they belong to acts of terra-forming, social-political hierarchies, and the shaping of species living.

Landing futures

Questions of temporality and especially futurity have become important venues for rethinking finance, debt, and processes of capitalization over recent years (Levy 2017; Tellmann 2020; Adkins, Bryant, and Konings 2023; Suckert 2022). Instead of taking economic calculations and valuations at face value, cultural economy, economic sociology, and social studies of finance have dissected the social conventions of valuation, the role of affects like hope or fear, the fundamental question of trust and imagination, and the devices of obligation at work in making financial futures durable (Beckert 2013; Callon and Muniesa 2005; Holmes 2014; Tellmann 2017; 2021; Zaloom 2009). In sum, the cultural, political, and social conditions of the possibility of making economic futures hegemonic have been explored.

But what about ecology? If politics, cultures, and social orders paradoxically “embed” economic futures, how are we to address the intersections of economic, ecological, and social futures? If economic futures are not just made by calculating the risks of derivatives, managing portfolios, trading algorithms, valuating and pricing them, but also through the modulation, disruption, and reorganization of material and (multi)species temporalities, how does this show up in economic sociology and to what extent and end?

In the seminal book *Nature's Metropolis*, William Cronon tells the history of economic futures on grain, regulated by the Chicago Board of Trade and traded on the stock market. The chapter on financial futures starts with an unlikely place from the vantage point of economic sociology: the prairie grass, the soil, and the specific breeding histories of corn and wheat. It goes on to recount the development of the transportation system and somewhat unexpectedly comes to focus on the invention of the steam-powered grain elevator. According to Cronon, the elevator became crucial because it turned an individually owned sack of grain into a “golden flow.” It enabled the emergence of an “abstract claim on the gold stream flowing through the city's elevators” and thus “effectively created a new form of money, secured not by gold but by grain” (Cronon 1991, 120). In this way, a “transmutation of one of humanity's oldest foods” took place, “obscuring its physical identity and displacing it into the symbolic world of capital” (Cronon 1991, 120). What interests Cronon is showing how the physical and the financial become interconnected in multiple ways – both through a material-symbolic connectivity between soil, seed, farming, transportation, and property rights *and* through an intersection of price signals, expectations, and capital influx. However distant and incomprehensible the Chicago Board of Trade appeared to

the farmers, and however disconnected the ecology of the prairie appeared to the traders, both have material-spatial as well as symbolic-monetary links that are forged together. For Cronon, the main point of this story is to show how the perception of “nature” as being out there, apart from the city, ignores myriad relations of material conditioning.

Within the context of the current argument, Cronon's pioneering work of interlacing natural and human history is instructive in two ways: First, he demonstrates that telling the history of financial futures need not and should not confine itself to the traders, regulators, stock market, and price signals – even though this is of course of utmost importance. Second, Cronon succeeds in establishing a connection between finance and soil, between grain and financial claim *because* he makes space, land, and soil his vantage point. He approaches the city through its *Hinterland*, moving back and forth between the different human and more-than-human worlds. In other words, a multi-sited, or landed, story about financial futures becomes the methodological key for materializing and ecologizing the history of economic futures.

Timothy Mitchell's recent work on the connection between infrastructure and capital develops a kindred perspective. He argued that the “speculative fragility” and the “world of financial promises” had a condition of possibility in the colonial history of large-scale infrastructure projects and corporate ownership (Mitchell 2014, 438): “the future flow of income” claimed the “long-lived equipment” as its guarantee, and “capital bulked itself up through the scale and longevity of the material grids of modern collective life, and then traded the expectation of this future income by selling speculative shares in the present.” The history of capitalized futures becomes tied to the materiality of infrastructure and multispecies living while still attending to the regimes of labor and care. As Mitchell argued in his book *Carbon Democracy* (2013), the materiality of oil came to underpin the dematerialized conceptions of “the economy” that could be steered towards future growth in the postwar world. The economists “laid out the no-man's land” between “nature and politics” by rendering the materiality and ecology of the energy system invisible (Mitchell 2013, 241). Mitchell renders this link visible by focusing on the international relations of power as well as the labor regimes that secured its flow towards the Western states. Mitchell's argument about economic futures depends, like Cronon's, on a particular methodological stance. He tells the history of economic futures by starting from “other spaces”: the countries and locales of energy extraction. He works from the outside in, instead of the inside out, by linking the study of economic futures to different sites, or lands.

Most recently, Anna Tsing has pushed this argument on the methodologies of space most forcefully. She and her coauthors suggest studying the Anthropocene through the concept of the “patch,” a landscape formed by economic and productivist, infrastructural changes that show the making of the Anthropocene and its effects: “Patches make the Anthropocene” (Tsing et al. 2024, 1). They trace ecological interdependencies through the concept of “feral biologies.” With this term, Tsing and her coauthors refer to the unplanned and unintended effects that monocultural, intensified, and rationalized modes of production have. They produce or induce responses of other species and matter which make the ecological entanglement of all involved palpable. While feral biologies can in principle be benign or catastrophic, they will currently most likely result in worlds inhospitable to humans through the proliferation of sickness and pollution, as well as the reduction of livable spaces. As the authors point out, the spatial focus aids understanding of the “heterogeneity of time” since “temporal coordination – and discontinuities – are key elements of the Anthropocene” (Tsing et al. 2024, 3). The making or unmaking of futures is again observed by making land, landscapes, or patches into a methodological point of departure.

Taking up the task of linking the study of futurity and temporality by turning to the patch is not foreign to the history of economic sociology. In some ways it is a return to Polanyi’s insight into the importance of land for telling the story of disembedding: “What we call land is an element of nature inextricably interwoven with man’s institutions” (Polanyi 1957, 178). He calls it the “weirdest of all undertakings of our ancestors,” to subjugate land to what he called the self-defeating creed of the “self-regulated market” (Polanyi 1957, 178). To Polanyi, land stands for nature, but land is much more: it is social, symbolic, physical all at once, for it is habitat, political territory, soil, and landscape, which is interwoven with social relations. Among labor, land, and money – the three fictitious commodities that Polanyi set out to describe as impossible to subject to market exchange tout court – land demonstrates most intensely and most violently the consequences of particular modes of (dis)embedding. Land becomes a litmus test for how disembedding is put into motion and plays itself out. Land, patches, landscapes – these are not natural foundations from where economic-cum-social order is deduced, but lo-

cales in which the coproduction of ecologies/economies become observable.

Coda: Overcoming the denials of the social

New economic sociology hoped to rectify the abstractions and factiousness of economics by making it more “real.” But the social thus is itself defined by how it selects the perception of its “environment,” however this term is defined. As Luhmann put it lucidly four decades ago in a text about the ecological problem: “One does not have to be asocial to ruin society; indeed, maybe the disaster occurs exactly because of one’s sociality” (Luhmann 1988, 47; own translation). Instead of taking the social as making economics more real, the question of the social should be approached in terms of how it shields perception of feedback cycles, how it offers immunity against ecological interdependencies, and how it habitually, if not cognitively, ingrains denials of what it means to live in a “critical zone” of livability that depends on the more-than-human biosphere. Economic sociologists can use sociological expertise to explain and account for how economic life allows for ignorance, immunity, and denial.

The task of overcoming the denials of the social is not a one-sided affair. The contribution of economic sociologists might be to strengthen a more symmetrical account of the social and the ecological, without trading one for the other. The task is to understand how hierarchies of exposure, uneven distribution of security, and selective granting of livable spaces concern human and more-than-human species alike. Again, the methodologies of land benefit such symmetrical perspective. If we study economic futures in patches, the social, ecological, and material dimensions are already intermingled. Economic sociologists are well-equipped to trace how futurity is produced, distributed, and colonized unevenly – within, across, and beyond the social. When economic sociologists start from “other spaces” for extending their tales of (dis)embedding to include material and more-than-human livability, they are more than well-equipped to understand the economic ecologies/ecological economies of the Anthropocene.

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Economic sociology, the natural environment, and the intellectual division of labor

Caleb Scoville

Suddenly it appears that the natural environment is at the front of sociologists' minds.¹ It's an exciting moment, but it's also a bit awkward. Environmental sociologists, alongside other environmental social scientists in adjacent disciplines and interdisciplinary fields, have been working on ecological crises and environmental inequalities for decades, but they have largely been relegated to the margins of sociology. How should economic sociologists navigate this complex intellectual landscape, in light of their track record of having little to say about nature, environmental issues, or climate change?

I can of course only provide a partial perspective on this topic, but I have spent more time stumbling across intellectual boundaries than I have fortifying them. I came to sociology relatively late in my intellectual development, after starting in economics and political science. I have so far refused to settle in a single subfield within sociology, and frequently collaborate with natural scientists and humanists. Despite my proclivity for intellectual trespassing, I have unwaveringly focused my attention on environmental problems all along. This has forced me to translate my concerns to others with different conceptual repertoires, including communities with little extant interest in the natural environment.

Needless to say, I welcome the current state of flux caused by an increased interest in the natural environment in economic sociology and "mainstream" sociology in general. Yet, whenever a field "discovers" an object like the natural environment, its practitioners will soon realize it is not a fresh discovery at all. Those new entrants will encounter incumbents who already have established ways of thinking about these things. It is worth considering why ecology has been so marginal in economic sociology, what demarginalizing it will do for the field, and conversely, what contributions economic sociologists might make to the topic. My reflections will be idiosyncratic and incomplete, but the general issues I raise are likely unavoidable.

This essay begins with a brief discussion of the marginality of the natural environment in economic sociology in particular, and sociology in general, and the challenges to sociological anthropocentrism that historically originated in environmental sociology and science and technology studies. It then proceeds with a discussion of a source of tension inherent in the project of demarginalizing ecology in environmental sociology: the status of natural science in sociological analysis. I suggest that economic sociologists are well-equipped to embrace a pluralistic approach to this question, rather than divide themselves into antagonistic camps.

I then take cues from Elliott's (2018, 302) distinction between the questions: "What can sociology contribute to climate change," and "What can climate change contribute to sociology?" To engage the question of what "ecologizing" economic sociology can do for economic sociology, I consider the example of environmental inequality. In ways that a focus on economic inequality does not, the study of environmental

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inequality reorients economic sociology to specific production processes and their concrete effects. Next is the question of what economic sociologists can contribute to the study of environmental problems and solutions. I suggest that the analytical repertoire of economic sociology can displace dichotomous theory contests that pit technocratic reform against revolu-

tionary transformation, by emphasizing the agonistic character of economic life, and how the technical and political are mutually constituted. I close with brief reflections on how economic sociologists can engage with the dominant incumbent social scientists in the arena of environmental policy: economists.

The marginality of nature in (economic) sociology

As recently as 2021, Gray and Barral (2021, 5) remarked in their “(rapid) climate audit of economic sociology” that the field of economic sociology was “barely warming up to the topic” of climate change. Although there has been discernable growth in interest in the intervening years, climate change remains marginal in economic sociology. To date, *Socio-Economic Review* has published only four articles with “climate change” in the abstract. Searching abstracts for the broader term “environmental” paints a similar picture. After excluding uses of the word unrelated to the natural environment, the search yields only six such articles ever published in *Socio-Economic Review*.

Economic sociology is hardly exceptional. Environmental problems have historically received little attention in sociology writ large. One explanation is simply that they fall outside of the dominant conception of the discipline’s jurisdiction. The idea that the division of labor between natural and social scientists denotes an ontological distinction between nature and society goes back at least to Durkheim’s ([1895] 1938) foundational writings on “social facts.” It remains well-ingrained in dominant research practices, publication hierarchies, and curricula in the broader discipline (Scoville and McCumber 2023; Hiltner 2024).

Environmental sociologists have criticized this traditional way of carving things up for decades. In an influential and programmatic statement, Catton and Dunlap (1980) argued against an intellectual division of labor that they believed ultimately led sociologists to assume that humans were fundamentally “exempt” from ecological laws or planetary limits. Their corrective centered on how humans are influenced by, dependent on, and constrained by the biophysical environment. Practically speaking, overcoming sociological anthropocentrism in this vein entailed bringing biophysical into sociological analysis.

A second major challenge to sociological anthropocentrism came from science and technology studies, an interdisciplinary field that has occasionally intersected with economic sociology. Rather than revalue “nature” by incorporating biophysical data into sociological analysis, proponents of Actor-Network

Theory (Latour 1987; Callon 1984), alongside defenders of a host of adjacent “new materialist” approaches, took issue with the conceptual division between “Nature” and “Society” altogether and instead argued for distributing agency more broadly to include non-humans.

These two criticisms of sociological anthropocentrism – one that limits human agency by embedding it in ecology, and another that distributes agency beyond the human – each raise complex ontological, epistemological, and methodological questions that traditional sociology tends to sidestep. Those who sought to demarginalize the nonhuman/natural environment subsequently divided themselves into various camps that answered these questions in divergent ways. Within environmental sociology, a result was the divide between “realists” and “constructivists” (Dunlap 2010).

Navigating tensions in the project of ecologizing economic sociology

The realist-constructivist debate in environmental sociology exhausted itself years ago, but how to treat natural science remains problematic in the environmental social sciences. Porcelli and Besek (2022) aptly conceive of the tension in terms of treating natural science as a *resource for analysis* (i.e., treating biophysical data as data) versus as an *object of analysis* (i.e., critically analyzing how natural science is made).

Economic sociologists are well-equipped to embrace this tension, rather than be paralyzed by it. There is no need to reproduce old debates or divide the field into acrimonious factions. Rather, in my view, the best way forward is to think through the relationship between the heterogeneous categories like “biophysical data,” “nonhuman agency,” and “sociological analysis” in an unapologetically concrete manner. The already pluralistic subdiscipline can accommodate multiple ways of renegotiating the division of intellectual labor.

Consider first a mode of analysis that can respond to the charge of sociological anthropocentrism without fundamentally changing course. Studying the relationship among greenhouse gas emissions, macroeconomic variables, and public policies, for instance, fits the mold of traditional quantitative socioeconomic analysis, while also accounting for the relationship between society and nature (e.g., Soener 2024; Rieger 2019).

Such analyses of course delegate the question of the implications of carbon emissions to climate scientists, and for good reason. The problem structure of the social causes of climate change is particularly

amenable to this division of labor. Climate scientists explain the relationship between anthropogenic greenhouse gas emissions and global climate change with a high degree of certainty. Social scientists, on the other hand, have a comparative advantage in explaining why greenhouse gas emissions vary across and within societies, and over time.

In other contexts, however, such a neat delegation is not possible, and this is where the classic environmental sociological critique becomes more challenging to absorb. Far from simply being “out there,” ecological knowledge is often produced in conjunction with extractive relations to nature that make our economic lives possible. In my research on water politics and endangered species conservation in the American West, for instance, I find that a species called the Delta Smelt was discovered as a consequence of the construction of California’s modern water infrastructure system that supports the state’s agricultural industry and southern cities. The scientific knowledge of this species in turn became a problem for those reliant constituencies when the Delta Smelt was given protected status under the United States Endangered Species Act and scientists showed that the operation of the very infrastructure that made its discovery possible was to blame for its decline (Scoville 2019). In this work, biophysical data is not an “input” in the socioeconomic analysis. It is both an outcome to be explained and a phenomenon with causal force.

In some ways, these varied encounters with natural science parallel the longstanding relationship between economic sociology and economists. Economic sociologists frequently appropriate traditional economic data as resources for their own analyses, whether it is for understanding the dynamics of economic growth, wealth inequality, or financialization. In others, economic sociologists analyze the construction of economic data, indicators, algorithms, and devices themselves (e.g., Espeland and Stevens 1998; Pardo-Guerra 2019).

These two modes of analysis, while sometimes in tension, can ultimately enrich each other. A better understanding of the social contingencies that underlie economic datasets can lead to more robust and thoughtful uses of them. This is also true of environmental data that is used in political and economic decision-making. For example, drawing on an analysis of global biodiversity datasets, my colleagues and I argue that if used uncritically to inform investment in conservation initiatives or the design of biodiversity offset markets, they could reproduce the very social inequalities that unevenly pattern the collection and maintenance of biological data (Chapman et al. 2024). While there is no single technical fix to this problem, a more reflective use of biodiversity data is the precondition

of more ecologically sound, economically efficient, and socially just policy design.

Yet there are significant differences between the traditional objects of economic sociology and those of environmental social science that add a layer of complexity to the task of ecologizing economic sociology. Disagreements between economic sociologists and economists are often grounded in competing conceptions of the same analytical objects, for instance, human agency, and markets. The relationship between economic sociology and natural science is fundamentally different. Economic sociologists have less natural authority over the domain of “nature” itself. Instead of providing competing social scientific frameworks for understanding economic phenomena, they will encounter knowledge claims about phenomena like sea level rise, air pollution, greenhouse gas emissions, biodiversity loss, and a whole host of phenomena outside of their traditional jurisdiction.

No matter the style of analysis one engages in, participating in the project of ecologizing economic sociology requires some degree of conversancy with concrete environmental problems, and by extension relevant natural science. Compared to the traditional objects of economic sociology, focusing on environmental problems involves a significant shift in the direction of empirical specificity and concreteness. This can be illustrated by considering the analytical differences between environmental and economic inequality.

Inequality of what?

The study of environmental inequality – how and why environmental harms and benefits are distributed in society – is a central focus of environmental sociology. Following the concerns of the American environmental justice movement, much of this work is conducted at the community level, such as analyzing the race and class disparities in toxic siting decisions (Taylor 2014). A growing body of work on “ecologically unequal exchange,” by contrast, takes a global view, which situates cross-national and regional environmental inequalities in a world system framework (Givens, Huang, and Jorgenson 2019).

At one level, this is familiar ground for economic sociologists. Inequality as such is a mainstay of the field. However, economic sociologists tend to conceive of and measure inequality in monetary terms. For all of economic sociologists’ critiques of economists, this is something that the two fields share.

Environmental inequalities – which range from air and water pollution to vulnerability to hurricanes, to access to greenspaces – have no such single numéraire

re. This is not merely an accounting problem. It matters little *what* is being made, bought, and sold if the outcome in question is commensurate throughout the economy. In other words, treating monetary value as the primary measure of inequality has allowed economic sociologists to discuss inequality at a high level of generality and abstraction.

A limitation of this analytical posture is that markets begin to look not only like each other but also like any other social institution. An emphasis on environmental inequalities shifts the focus to the materiality of what is being distributed, and its concrete impact on people (e.g., exposure to toxins or hazards). Ultimately, this means reorienting economic sociological analysis to production processes, including but not limited to the extraction of natural resources, manufacturing, and the articulation of supply chains.

Environmental inequality is an obvious topic for economic sociology because at every stage of economic production, consumption, and waste disposal, some costs are not borne by formal parties to the eventual market transaction. Economists conceptualize such spillover effects as “externalities,” which can be remedied with interventions in the price system. Economic sociologists can and have adopted such interventions as objects of analysis (e.g., Fourcade 2011; MacKenzie 2009; Callon 1998).

But economic sociologists’ potential contribution to the topic of externalities goes beyond the critique of economic orthodoxy. Economic sociologists needn’t look further than the writings of their own foundational figure Karl Polanyi (1944) for inspiration on this topic. While economic sociologists made much of Polanyi’s idea that markets are “socially embedded” (Krippner 2001), they have made less of his writings on the embeddedness of markets in nature (Kaup 2015). A focus on environmental inequalities will redirect economic sociology to how specific economic production processes are embedded in ecological systems, and how the effects of those processes are distributed socially.

Problems, technical and political

If contending with environmental inequality illustrates how ecology can enhance economic sociology, there are other ways that economic sociology can make significant contributions to the broader study of environmental problems, despite their historical ecological neglect.

There are reasons why economic sociologists are becoming increasingly interested in ecology now. The same trends that are turning many environmental problems into mainstream sociological objects are

also changing their concrete character. Among these trends, the most obvious – and dire – is that humanity is careening into uncharted climatic territory (IPCC 2024). At the same time, while fossil fuels remain thoroughly ingrained into every aspect of social life (Huber 2013), the politics and economics of energy are in flux. In the last several years, the deployment of solar energy has wildly exceeded estimations (Nijssen et al. 2023), driven by the plummeting cost of solar deployment (Evans 2020). On the political side, changes are afoot as well. In many countries around the globe, concern about climate change is at an all-time high (Poushter, Faga, and Gubbala 2022). In the United States, a relative bastion of climate obstruction and denial, for the first time, climate change has risen to be a “top priority” issue for a majority of Democratic voters, partly explaining why the Biden Administration was able to push the most significant federal climate action in American history, the Inflation Reduction Act (Egan and Mullin 2024).

From the standpoint of environmental sociology’s most prominent and longstanding political economic debate, these developments are a bit of a theoretical Rorschach test. Proponents of ecological modernization theory will see evidence vindicating their view that policy reforms and technological innovation can resolve the conflicts between nature and society (Spaargaren and Mol 1992; Mol, Spaargaren, and Sonnenfeld 2014). Their Marxian counterparts will point to the ever-accelerating treadmill of production, or the widening metabolic rift that the nascent energy transition has hardly disrupted, perhaps representing only a newly opened frontier of unsustainable extraction (Gould, Pellow, and Schnaiberg 2004; Clark, Bellamy Foster, and Longo 2019). This debate turns on two opposing conceptions of progressive social change: technocratic reformism versus those who argue for the necessity of a “revolutionary transformation in the socioeconomic relationships that govern our productive lives” (Clark, Bellamy Foster, and Longo 2019, 658).

The relative merits of these positions aside, the *structure* of this debate – an either-or theory contest about the relationship between capitalism and the natural environment – is markedly different from the ones that animate economic sociology. In my reading, economic sociologists generally espouse an agonistic view of social change and stability. This lends itself less to absolute or fixed positions on the (im)possibility of green capitalism, and instead to an empirical focus on the dynamic struggle among incumbent and challenger firms, and states. This is a conception, in Fligstein’s (1996) terms, of “markets as politics.”

To be sure, viewing markets as politics does not resolve broader debates or render them obsolete. In-

stead, it orients analysis toward the “how” questions of market construction and transformation and understanding the relationships among state, market, and non-institutional actors empirically. Whether or not the rise of the renewable energy sector and the electrification of the automobile industry (to name just two high-profile examples) will help us mitigate climate catastrophe, these changes can still be analyzed as dynamic incumbent-challenger struggles rather than merely as fodder for the debate over whether or not capitalism as such can be greened in some definitive sense.

This analytical orientation similarly displaces the common refrain that ecological problems are “political economic,” rather than “merely technological.” Instead, it draws attention to how technologies such as energy systems reshape the political terrain by altering the balance of power, and enabling and constraining forms of collective life. As Mitchell’s (2013) history of fossil fuels shows, the transition from coal to oil reshaped political economic relations at multiple scales. This included, for instance, a decline in labor’s ability to obstruct the flow of energy to exact demands and Western democracies’ material reliance on Middle Eastern petrostates. Economic sociologists are well-equipped to similarly analyze the political dynamics of the rise of solar and wind, the scramble for minerals used to make batteries (Battistoni and Riofrancos 2023), and what will happen to the most carbon-intensive economic sectors in the face of these changes (Beckfield and Evrard 2023).

Interrupting the dominance of economists

Environmental issues may be finally moving from the margins of sociology to the mainstream, but not all social scientific disciplines have been equally neglectful of nature in the past. Anyone who wanders into the world of environmental decision-making will see that, as in many other policy domains, traditional economic analysis is a powerful force (Elliott 2018; Berman 2023). It has been for decades. Yet, for all of economic sociologists’ criticisms of economists, they have by and large not followed economists into the terrain of environmental policy. With traditional economic thinking unchallenged, environmental scientists often uncritically adopt analytical toolkits from neoclassical economists to operationalize their findings and communicate them to policymakers (Scoville 2017).

Important exceptions exist. One variant has been to extend the analytical approach of the “perfor-

mativity” of economics to environmental applications. MacKenzie (2009) has done much to open up the black box of how greenhouse gas emissions markets are constructed. Taking the approach into the context of international development, Gray (2017) delves into the unintended environmental and social consequences of climate finance.

Work extending economic performativity to environmental contexts moves beyond taking the self-stylizations of environmental economists at face value, but it still places economists and their constructions at the center of the analysis. Others show the limitations of economists’ conceptions of actually existing environmental policy and forward alternative diagnoses. One example is Rea’s (2017) research on species conservation banking. Rea forwards a theory of “command-and-commodify regulation,” which moves beyond economists’ dichotomous characterization of environmental regulation as either “market-based” or “command-and-control” in a political and institutional framework.

Economic sociologists have been more hesitant to offer policy proposals that directly challenge economists’ dominance in the environmental domain. However, they can take inspiration from political scientists like Stokes (2020), whose work on policy feedbacks in energy policy has contributed to shifting the policy consensus away from microeconomic orthodoxy. The focus on policy feedbacks – the observation that while politics create policy, policy can also shape politics – is a marked departure from traditional economists’ singular focus on Pareto efficiency. It explains why traditional climate solutions like carbon taxes and tradeable emissions permits often produce backlash rather than buy-in and are so vulnerable to retrenchment (see also Driscoll 2023). It stands behind the emphasis on subsidies rather than taxes in the Inflation Reduction Act, the development and passage of which may not have happened without advocacy from Stokes herself (Welsh 2023). With the rise of the green industrial policy paradigm (Meckling 2021), the time is ripe for economic sociologists to contribute their understanding of how to make environmental policies that are effective, durable, and just. The stakes are too high to remain at the margins.

Note

- 1 In this essay, I treat the terms “natural environment,” “environment,” “nature,” and “ecology” as essentially interchangeable, while acknowledging that the terms have distinct meanings in other contexts.

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What have corporations got to do with it?

A political economy approach to organizations and climate change

Annika Rieger

Ecological issues are often seen as only one of the many “problems” societies face today, even though they go deep and affect everything – from physical disruption and displacement to perhaps more subtle long-term changes in temperature, flora, and fauna that alter the face of the planet and the norms of everyday life. As a result of this view, the study of the environment has been siloed into the realm of “environmental sciences” with a few “environmental fill-in-the-social-science-blank” subfields scattered about. This is not to say that only “environmental” problems are important, but that across all disciplines and subfields, greater attention needs to be paid to these issues – especially to the ways in which environmental problems intersect with other social problems, including those of race, gender, and class.

When studying environmental problems, social scientists, especially sociologists, have concentrated their efforts on two “levels”: the macro level, focusing especially on nations, where most environmental data is recorded and where many publicized efforts (e.g., the annual UN COP, Emissions Trading Systems, etc.) have been made to address the problem; and the micro level, focusing especially on individuals, where environmental problems are keenly felt (e.g., pollution of the local environment and result-

ing health issues such as asthma) and people’s opinions on climate and science impact their decision-making. This leaves the meso level of organizations largely underexplored. Economic sociologists could make important contributions at this level, adding to a growing body of literature (see, for example, Coen, Herman, and Pegram 2022; Galli Robertson and Collins 2019; Grant, Jorgenson, and Longhofer 2020; Grant and Vasi 2017; Leffel, Lyon, and Newell 2024; Rieger 2024). More specifically, there is a particular lack of theory that reaches across the macro-meso gap, one that economic sociology is well poised to help fill.

Beyond the gap in the literature, there are pressing reasons to study environment at the meso level. What corporations “do” matters. They have contributed, and continue to contribute, an outsized proportion of environmental harm. The organizational sociologist Charles Perrow, in an oft-cited quote, once described corporations as “the most intensive and effective environmental destroyer” (Perrow 1967, 6). CO₂ emissions are the most common metric for measuring this contribution, given their role in driving global warming and subsequently climate change. Since 1988, over 70% of all CO₂ emissions can be attributed to the economic interests of 100 oil and gas “majors,” the largest corporations in the industry.¹ In 2022, 28% of that year’s CO₂ emissions could be attributed to 13,500 corporations.²

Corporations have also supported the duality between “green” and “brown,” with a select few who see potential for profit pursuing green products and the rest doing their best to ignore the environmental implications of their operations. But even for the most powerful transnational corporations, this is becoming a more difficult task. Environmental social movements are increasing pressure on and scrutiny of corporate actions. Consumers are increasingly seeking out better green alternatives for mainstream products and services. Governments at the national and subna-

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tional level are requiring more transparency in corporate environmental outcomes, as well as plans and reporting on action to improve those outcomes. Even some shareholders and financial institutions, worried about the long-term horizon of their investments, are ramping up pressure on corporations to discontinue

business as usual. This raises the question of what the next steps might be for corporations and what the options are.

Many of sociology's key insights involve contextualizing social problems to understand how to move forward. While much work has already been done to understand the social contexts driving the climate crisis, more work is needed to integrate the different levels of analysis. Corporate emissions are an ideal example here: corporations are major contributors to climate change, and so overlooking their role leaves a major component of the crisis unexamined. However, focusing on corporate-level variables alone to explain corporate-level outcomes also risks overlooking the importance of the larger context in which corporations operate.

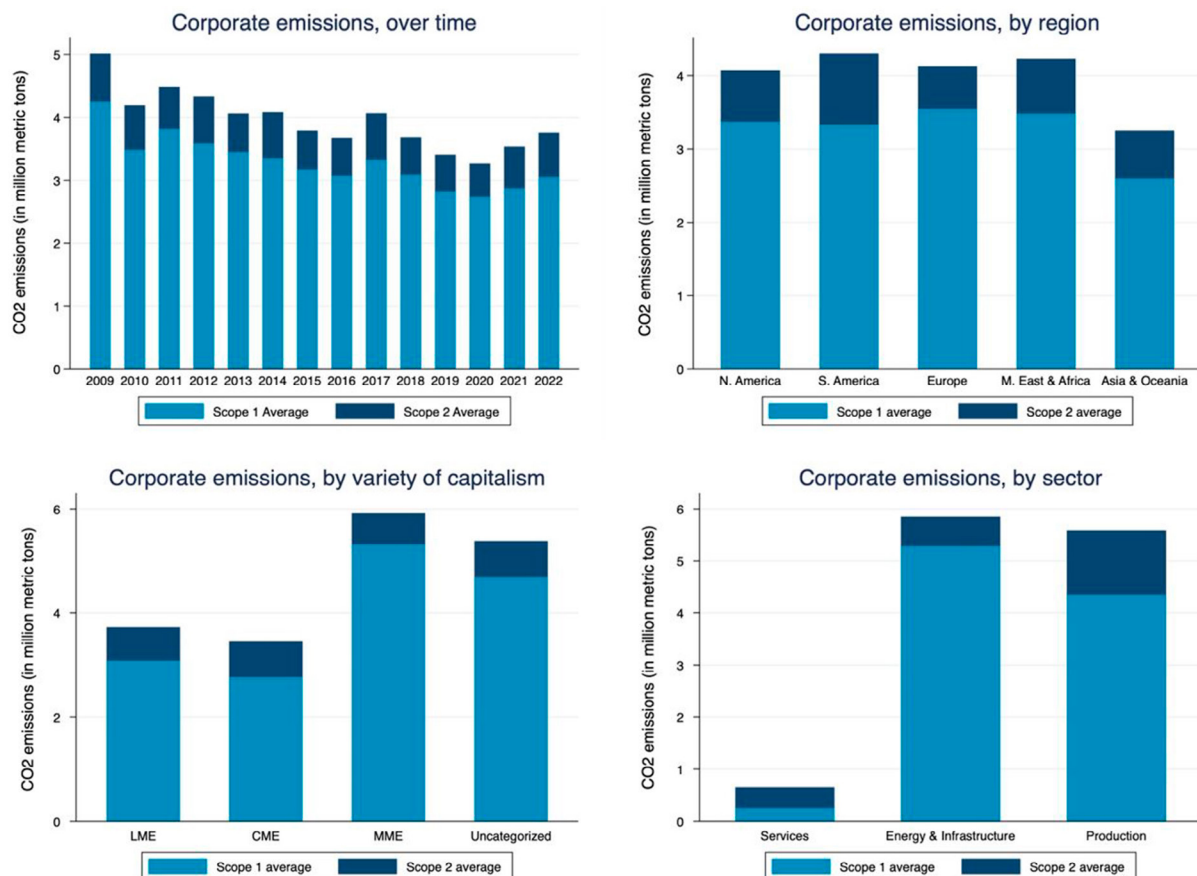
This is the first area where economic sociology's strengths could contribute to environmental sociology. The field has given rise to many theories that consider the impact of higher-level context in influencing organizational outcomes. Some, like Pulver's (2007) contestation approach, were developed with environmental outcomes in mind. Others, like Fligstein and McAdam's (2012) field approach, focus on the meso level but suggest the importance of considering actors beyond corporations themselves. The Varieties of Capitalism (VoC) theory, which focuses on categorizing coordination styles between governments and corporations (Hall and Soskice 2001), has already been applied to understand national outcomes (for example, Benney 2019); it could also be applied to organizational outcomes. There are certainly other theories that could prove useful.

Deciding on a theory is one thing; deciding what to use as an "outcome" is another. In quantitative research on environmental outcomes, carbon dioxide emissions are used most often. Readers might already be familiar with the different ways of accounting for national emissions – as the result of production (location-based) or consumption (embodied in trade). Corporate emissions are also broken down, but into three scopes, each measuring emissions from different sources that a corporation is responsible for. Scope 1 emissions are those produced via the direct consumption of fossil fuels, while scope 2 emissions are considered "indirect" in that they are associated with the production of energy that is then consumed by the corporation, typically in the form of electricity. Often not accounted for are scope 3 emissions, which encapsulate all indirect emissions for which the corporation is responsible, notably those from the consumption and disposal of products after purchase. While scope 3 emissions are, for many corporations, the largest component of the three, there is disagreement over the best way to account for them. Many corporations do not

track their scope 3 emissions at all, and most accounting and reporting requirements have made it optional. This is no accident – while true that accounting for these emissions will be more difficult than accounting for scopes 1 and 2, it is much easier for corporations to appear sustainable if they can push their scope 3 emissions off onto consumers.

Perhaps one of the more pragmatic reasons why organizational environmental outcomes have been understudied is a relative lack of data availability. Some corporations are required to report some environmental data, but not all corporations, and there is little consistency across nations. Privately held and small and medium enterprises (SMEs) are often exempt from much standardized reporting. Some industries are required to report environmental outcomes, but often only when they are above a certain size. An example of this inconsistency is the US Environmental Protection Agency's (EPA) Toxic Release Inventory, which provides important data on pollutants that are harmful to both human and environmental health. Reporting is required and the data are compiled by the national government, resulting in a comprehensive and reputable data source. But there are still downsides: only corporations in certain industries are required to report and, even then, only those above a certain size. Further, the data are reported by the corporations rather than collected directly by the EPA, provoking self-reporting concerns – but this is an issue that plagues many sources of emissions, even at the national level. The current most comprehensive dataset of corporate emissions (and the one I use in my own research) is from the CDP (formerly the Carbon Disclosure Project), which collects emissions and Environment Social Governance (ESG) information via survey. While the dataset represents a powerful and polluting bunch – responsible for almost a third of global greenhouse gas (GHG) emissions in 2022 – it is also from a self-selected group, albeit with some nudging from shareholders. A "gold standard" for environmental outcomes data is that on emissions from powerplants from the CARMA database, which reports emissions data measured via sensor directly, so with no worries about reporting bias.

However, there are two trends that I see improving the variety and quality of environment data – and thus the desirability of studying organizational outcomes. First is the advent of "big data" and computational methods which have widened not only the size but also the scope of what can be used as a dataset. Environmental reports, earnings calls, and other kinds of corporate documents can be collected and analyzed en masse. Another benefit of the wealth of data is the ability to look for "rare" cases; here much is to be learned from what is given less attention. The large size of



Figures 1–4. Corporate emissions, over time and broken down by region, sector, and political economy type

LMEs: Australia, Canada, India, Ireland, New Zealand, South Africa, Thailand, United Kingdom, United States.

CMEs: Argentina, Austria, Belgium, Brazil, China, Denmark, Finland, Germany, Japan, Mexico, Netherlands, Norway, Peru, Philippines, South Korea, Sweden, Switzerland.

MMEs: Chile, Colombia, France, Greece, Italy, Portugal, Spain.

Uncategorized: Bermuda, Guernsey, Hong Kong, Hungary, Israel, Kenya, Luxembourg, Singapore, Taiwan, Turkey.

these datasets means that even relatively rare instances can have enough cases for further study. My coauthor, Isak Ladegaard, and I used this approach to identify, track, and analyze discussions of climate change topics in earnings calls (Ladegaard and Rieger, forthcoming). The quarterly earnings calls from 24 oil and gas majors over 14 years produced enough data to quantitatively track different topics over time and by region, as well as qualitatively analyze the framings these terms were used to convey. Second, growing scrutiny of organizations is improving the quality and availability of their data. Publicly traded corporations in particular are increasingly required to disclose environmental information – nine nations and the EU have laws on the books or in the pipeline.³ The CDP dataset has certainly benefited from the mainstreaming of reporting pressure, with the sample size improving every year: over 23,000 corporations reported their emissions in 2023, up from 9,500 in 2020.⁴ While this will ease concerns of sample selection bias for some nations, other nations and industries will remain underrepresented without international pressure and requirements to report emissions.

Sociologists are no strangers to finding ways to work with the data at hand. In this spirit, figures 1–4 show variations in corporate scope 1 and 2 emissions from 2009 to 2022 to illustrate some general patterns in corporate emissions. The data are from the CDP and represent a subset of 1,362 corporations with at least nine years of emissions data, representing 43 different nations. Figure 1 shows change over time; overall, the average amount of emissions reported has declined since 2009, indicating either some improvement in the sustainability of the subsample – or perhaps some sort of emissions offshoring. Notably, 2020 represented a low point for average emissions, but like national emissions, there was a rebound in subsequent years, erasing any improvement (i.e., decrease) since 2017. The variation is largely attributable to scope 1 emissions. Scope 2 emissions are more stable. Figure 2 shows differences between regions; there is perhaps a surprising amount of similarity, excepting Asia and Oceania, where corporations report lower emissions on average. There is also some variation in scope 1 emissions, with the lowest average amount reported in Europe and the highest in South America.

Figure 3 shows the differences between sectors; the CDP reports 14 industries, which I have collapsed into three general areas. Unsurprisingly, the services sector has the lowest average emissions – but over half of the reported emissions are from the consumption of energy. Corporations in the energy and infrastructure sector have the highest average emissions overall, but those in the production section have the highest average scope 2 emissions. Finally, figure 4 suggests some ways in which theory might be pressed into service; corporate emissions are broken down by political economy type with respect to the VoC theory. The theory distinguishes between coordinated market economies (CMEs), where government and corporations interact directly via national institutions, and liberal market economies (LMEs), where the market acts as a mediator between government, institutions, and corporations (Hall and Soskice 2001). This has implications for how each kind of nation might approach sustainability problems: for example, corporations in CMEs can be encouraged to create more efficient versions of existing technologies by co-created governmental regulations, while corporations in LMEs pursue technological innovations in response to market pressures, sometimes with little official governmental support (Mikler and Harrison 2012). Only those nations identified in previous literature as belonging to either LMEs, CMEs, or MMEs (mixed market economies, which combine elements of both coordination styles) are classified, with the rest “uncategorized.” Corporations in CMEs report the lowest average emissions, while those in LMEs and especially MMEs report higher average emissions.

There is a growing body of literature that has sought to better understand and explain variation in corporate environmental impacts. Research has shown how corporate-level factors, such as size, age, and sector, can increase corporate emissions – larger and older companies pollute more, as do those in production-focused sectors (see Grant, Jorgenson, and Longhofer 2020). But on their own these characteristics offer little insight into why corporations diverge in their sustainability and environmental outcomes. More useful is putting corporations into a broader social context – be it an organizational field, local or regional government, or national and international conditions.

Corporations can, and to some degree have, adopted sustainability and efficiency measures of their own accord (Vandenbergh and Gilligan 2017). However, widespread adoption of CSR and ESG initiatives is most successful with the addition of outside pressure (Reid and Toffel 2009; Sharkey and Bromley 2015). Much of this pressure occurs at the national level. Governments have worked to influence corporate actions both directly, via regulation, or indirectly,

by shaping the institutional context from which corporations gain legitimacy (Mikler 2018). While environmental regulations are the most direct way for a government to pressure corporations to act sustainably, few countries have managed to pass lasting or far-reaching legislation (Mildenberger 2020). But the pressure on corporations to address climate change is mounting from actors beyond governments. Civil society pressure has taken the form of increased public interest in value-aligned investments, the rise in third-party rating systems (Gerber, Norman, and Gamble 2023), and organizing on the part of INGOs and IGOs, among other local, national, and international environmental groups. This movement is part of a broader trend identified by World Society theory, which argues that global civil society has increasingly disseminated pro-environmental norms (Hironaka 2014).

On which “level” ecological issues are studied might seem like a purely academic debate. But it has implications for the larger debate about responsibility. Corporations have certainly recognized the importance of pushing their responsibility off onto other actors as a way to maintain the status quo. The metric for determining a person’s carbon footprint was created and popularized by oil and gas companies looking to share the burden of emissions with the individuals consuming their products (Supran and Oreskes 2021). Corporations often cite lack of clarity in regulation as a reason to delay their own actions, putting the blame for stalled progress on governments. This framing narrows the field of possible climate change mitigation strategies to individual consumption patterns and national environmental policies, leaving corporations free to continue business as usual while they await pressure from below and above to coalesce – by which time it might be too late. This debate plays out most noticeably during climate negotiations, where the most polluting nations use an array of excuses to avoid blame: “We won’t sign unless China does,” “we’re still a developing nation,” “we only extract fossil fuels, other nations use them,” “our fossil fuels are cleaner than other nations’ fossil fuels,” and so on. In recent years, those nations already being hit by climate change have banded together to demand reparations (Fanning and Hickel 2023). Clearly, they see the value of correctly assigning blame.

Previous research shows how studying organizations in context can lead to concrete suggestions for reducing emissions. One such suggestion is to take advantage of “disproportionality” in corporate environmental outcomes: the discrepancy between the lowest and highest polluters (Freudenburg 2006; Galli Robertson and Collins 2019). Grant, Jorgenson, and Longhofer (2020) show that not all powerplants are

equal, with some being particularly inefficient in the amount of emissions created per unit of energy produced. Even more to the point, these “super polluters” are the product of certain contexts – combinations of plant and national characteristics – that make them potentially easy targets for closure. The resulting policy proposal is to identify and target corporations with disproportionately higher emissions, starting with those in nations identified as creating social contexts leading to reduced emissions (Grant, Jorgenson, and Longhofer 2020). Another example would be implementing different types of policy proposals depending on the political and economic context of the nation, such as continuing incremental regulations in CMEs and encouraging innovation in LMEs. This is already being done to some extent: in the US, the 2022 Inflation Reduction Act contains efforts to boost the domestic clean energy sector via government funding and tariffs on foreign goods, protecting the domestic market from cheaper competition and boosting domestic demand. However, globally it is still essential to work on reducing inequality between nations; otherwise, the corporate emissions reductions in core nations could come at the expense of emissions increases in non-core nations.

This question of responsibility to act, and act first, mirrors that of the choice between the use of the terms “Anthropocene” and “Capitalocene.” Proponents of the latter argue that the former conflates all human actions as the driver, while in reality the climate crisis is the result of the actions of a few, and the vast major-

ity of humanity past and present played a negligible role. Why should it matter who is responsible and who is not? Should not everyone do their part to address climate change? But some have more power, money, ability to enact changes that would have widespread impact – and others can control only their limited consumption, further limited by social, economic, and even spatial ability. Corporations, clearly, have money, power, and ability; their actions would be impactful if they were to address climate change. In this essay, I have shown ways in which this can happen, including working from below on sustainable business alternatives, and from above by pressuring existing corporations to clean up their act. What is needed is probably a combination of these various approaches, but it starts with the recognition of the essential role of the meso level that needs more study and attention.

Endnotes

- 1 <https://www.cdp.net/en/articles/media/new-report-shows-just-100-companies-are-source-of-over-70-of-emissions>
- 2 https://cdn.cdp.net/cdp-production/comfy/cms/files/files/000/008/925/original/CDP_full_GHG_emissions_dataset_2023_summary_.pdf
- 3 <https://www.nortonrosefulbright.com/en/knowledge/publications/9261bbcf/review-of-climate-related-financial-disclosure-regimes-around-the-world>
- 4 <https://www.cdp.net/en/companies/cdp-2023-disclosure-data-factsheet>

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Book reviews

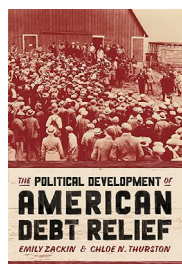
Emily Zackin and Chloe N. Thurston · 2024

The Political Development of American Debt Relief

Chicago: University of Chicago Press

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The United States has one of the most debtor-friendly bankruptcy codes among post-industrial democracies. To the outside observer, it might seem that the only social right associated with US legal residency is the right to debt relief and a “fresh start.” Yet, in most graduate courses on varieties of capitalism and comparative social policies, mentions of debt relief and bankruptcy law are nowhere to be found. Emily Zackin and Chloe Thurston’s new book, *The Political Development of American Debt Relief*, helps address this gap.

In *Political Development*, Zackin and Thurston unpack the political processes that have shaped the American bankruptcy code into its current de jure and de facto state. Starting in the pre-Civil War era, Zackin and Thurston describe the key role played

by agrarian interests. As perennial borrowers, farmers were keen to see debtor-protective measures enshrined into law. They succeeded by organizing and leveraging federal institutions at the expense of creditors, who were as perennially divided as farmers were indebted. Political geography also played a key role with spatially concentrated farmers wielding disproportionate influence in Congress. Another important pro-debtor factor was market building: eager for a Federal bankruptcy law that would impose certainty and legal uniformity throughout the territory, creditors were more willing to compromise on its content. Finally, in a fascinating chapter, Zackin and Thurston describe how Civil War and the politics of Reconstruction also helped tilt early social policy in a pro-debtor direction, with Republicans using debt relief, especially homestead exemptions, to attract indebted white voters. From the politics of this early period emerged something resembling a Marshallian “social right,” i.e., a right to live the life of a truly free “civilized being” (Marshall’s words) embodied in government-backed economic protection against the arbitrary risks of a capitalist credit-based economy. This right implied a political imaginary in which indebted households were not only deserving of help – i.e., “victims” of forces beyond their control – but were also owed this help as citizens of a republic of the free.

Until the 1980s, the debtor-friendly legal regime was preserved through a mix of status quo bias and interest group lobbying, with the latter culminating in the Bankruptcy Reform Act of 1978. In this instance, pro-debtor reform happened without debtors. Instead, the lobbying charge was led by bankruptcy experts and professionals working for the bankruptcy system. This is a classic story of policy feedback, with past policies

creating new organized interests that help protect the status quo.

In the 1980s, creditors, who used to be fragmented, started organizing, with some success. In 2005, access to personal bankruptcy was significantly scaled back, especially for individual households. The political imaginary that presented debtors as victims was also significantly eroded. Why were creditors finally able to push back? One factor identified by Zackin and Thurston is the deregulation of the credit card industry and its subsequent consolidation. Other factors include the financial innovations that turned previously worthless consumer debt into a revenue stream, thus increasing the incentives to lobby against full debt discharge (Chapter 7 bankruptcy) and in support of long-term payment plans (Chapter 13 bankruptcy). All these factors mattered, but Zackin and Thurston’s story is first and foremost one of relative differences in interest group mobilization and strength. In their account, creditors were able to push back because, in contrast to earlier periods, there were no pro-debtor popular movements to fight to preserve the status quo. To explain this, the book provides an interesting analysis of the collective action problem among debtors in the late 20th century. One of their main points is a simple but important one: in the second half of the 20th century, organizations that represented those most affected by the burden of high debt (i.e., low-income workers, women, and racial minorities) tended to lobby for free and fair access to credit instead of lobbying for debt relief. The authors tie this to high reliance on credit for income-smoothing and wealth creation. In such a context, access to social citizenship means access to better credit, which ultimately undermines the pro-debtor agenda. This stands in sharp contrast to the politics of debt relief

as they played out in the 18th and 19th centuries.

Documenting the dynamic relationship between unequal (and racialized) access to social citizenship, on the one hand, and debt relief policy, on the other, is another of the book's main contributions. Zackin and Thurston, for example, show how support for debt relief in the South during Reconstruction did not only participate in the emergence of a proto-welfare state; it also impeded land and wealth redistribution at the expense of Black people, who had little to gain from debtor protection (indeed, they had no assets to protect). With regard to more recent changes, Zackin and Thurston convincingly connect the 2005 reform (which has limited access to immediate discharge and locked debtors into long-term repayment plans) to the "personal responsibility" politics of welfare reform. A common thread is the stigmatization of beneficiaries as (usually non-white) undeserving free riders. Another is the introduction of work or payment requirements (for welfare and debt relief, respectively) as a solution to moral hazard, with well-documented implications for racial inequality.

More generally, I was particularly stimulated by the book's approach to debt relief as a type of social policy. For readers who, like me, have a strong interest in the study of wealth and inequality, I recommend reading or assigning *Political Development* alongside Katharina Pistor's *Code of Capital*. In her book, Pistor describes the ways in which the legal code turns "a piece of dirt," a building, an IOU, or an idea into wealth-generating "capital." Bankruptcy law is central to Pistor's account: in combination with contract law, property rights, collateral, trust and corporate law, bankruptcy law ranks competing claims to the same assets and extends creditors' claims in time

and space (features of the code of capital that Pistor calls *priority*, *durability*, and *universality*). Having Pistor's conceptual framework in mind while reading Zackin and Thurston's book helped me better conceptualize some of their findings regarding the distributive and redistributive consequences of bankruptcy law. Pistor, however, has little to say about the politics underpinning the writing of "the code" (she gives too much credit to legal innovation by income-maximizing lawyers), while Zackin and Thurston's book focuses on this exact topic. After reading *Political Development*, I was finally able to put some political meat on Pistor's conceptual bones. Zackin and Thurston show, for example, how, in the American case, the politics of extending creditors' claims in space and time produced a relatively debtor-friendly outcome. In contrast, in Pistor's apolitical account, durability and universality always seem to help the "big guy" at the expense of the "little guy."

While *Political Development* is relatively short, it is also densely written. It requires some basic knowledge of American constitutional history and US bankruptcy law: Google was my friend (though I now expect my credit score to go down in light of too many bankruptcy-related searches). There were also a few surprising omissions. For example, in the concluding chapter, Zackin and Thurston draw a parallel between early debtor movements and the *Occupy* movement. Nowhere do they mention the *Tea Party*, which started with a famous rant *against* debt relief. I would have also welcomed a detailed analysis of the origins, regulation, and impact of credit scores. Without these scores, it is difficult for creditors to "punish" debtors. How has this "technology" affected collective action? What have been the efforts to regulate it?

Overall, this is a great book, one that raises important follow-up questions: What might a comparative analysis of debt relief teach us about the politics of social insurance? How different might a comparative study of capitalism look if we take debt relief and bankruptcy law more seriously? For anyone interested in thinking about the politics of redistribution beyond taxation, pensions, and healthcare, it is a must read.

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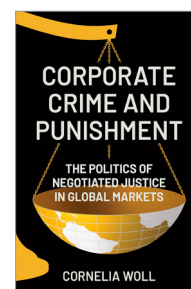
Cornelia Woll · 2023

Corporate Crime and Punishment: The Politics of Negotiated Justice in Global Markets

Princeton: Princeton University Press

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Not long ago, many considered large multinational companies to be effectively above the law. In a globalized economy, where companies can withdraw investment if government actions threaten their inter-

ests, corporate impunity seemed inevitable. The absence of serious enforcement actions against major corporations seemed to confirm this view.

In the last two decades, this has changed considerably. High-profile investigations, head-quarter raids, and record-breaking fines for major companies, including global giants such as Volkswagen, Siemens, and BNP Paribas, indicate that companies are no longer above the law.

In *Corporate Crime and Punishment: The Politics of Negotiated Justice in Global Markets*, Cornelia Woll, professor of international political economy and director of the Hertie school in Berlin, examines this recent strengthening of corporate accountability. How, she asks, did law enforcement agencies succeed in cracking down on multinational corporations? And what have been the motivations and stakes behind these efforts?

Weaving together detailed case studies and country comparisons with insights from legal and international relations theory, Woll shows that behind the recent surge in corporate criminal enforcement actions lies a paradigm shift in the global policing of corporate conduct. Once a domestic affair that focused on establishing guilt and deciding on punishment that meets the moral condemnation of corporate misconduct, over the last two decades corporate criminal law enforcement has become an international and geopolitical affair in which punishment has become negotiable and prevention of future recidivism, rather than condemning past behavior, the main objective.

Woll explains this shift toward “negotiated justice” in four steps. In chapter 3, she documents how negotiated justice originated in the US. Corporate criminal law enforcement in the US had long been hampered by two challenges.

One was that market reactions to legal proceedings can drive firms out of business, even before an actual judgment has been made. The resulting economic fallout is a form of collateral damage that affects many beyond those responsible for the misconduct under investigation. The second challenge consisted in the fact that, to effectively prosecute a case, prosecutors need access to information that is often hidden within the complex organizational structures of large corporations.

Frustrated by the untenable position of prosecutors, the Department of Justice issued new guidelines in the early 2000s that gave prosecutors discretionary power to negotiate settlements with target companies out of court. In exchange for the payment of fines, relevant information, and structural reforms, prosecutors can now either drop criminal charges (non-prosecution agreement) or file them until an agreed end date (deferred prosecution agreement). This new route to corporate prosecution allowed prosecutors to bring more challenging cases, without risking unwarranted economic fallout.

In chapter 4, Woll describes how this domestic innovation gained global significance as the US gradually extended the reach of its criminal law beyond territorial boundaries. Traditionally, US criminal law applied only to acts conducted within US territory, but today courts can claim jurisdiction over almost all corporate conduct that in some way affects the US economy or involves the use of American economic infrastructure. This extraterritorial expansion of jurisdiction, Woll shows, occurred across different sectors of US criminal law – she examines the legal regimes governing securities trading, foreign bribery, economic sanctions, organized crime, money laundering, tax evasion, intelligence, and data security.

If expanding extraterritoriality and negotiated settlements provided the legal basis for the prosecution of foreign companies, ultimately, extraterritorial prosecution depends on law enforcement authorities’ capacity to actually enforce their laws abroad. This is where the added value of Woll’s interdisciplinary approach really plays out. Credible enforcement power, she explains, relies on the ability to control access to important markets and critical infrastructures. The US, she shows, is uniquely positioned for this: its massive home market and control over crucial financial and digital infrastructures gives it unique leverage over foreign companies.

The extraterritorial reach of US criminal law, the availability of negotiated settlements, and the market power endowed by its economy enable the US to police corporate conduct in the global economy more effectively than any other country. In chapter 5, Woll explores the geopolitical implications of this, arguing that the US government uses the long arm of American justice not just to regulate corporations but as a foreign policy tool. Speaking to the emerging literature on “geoeconomics” and the “weaponization of interdependence” in the international relations discipline, Woll suggests that, in many cases, extraterritorial law enforcement serves as a form of “economic lawfare.”

In chapter 6, Woll examines how countries whose companies have been on the receiving end of US extraterritorial law enforcement have responded. She argues that US unilateral enforcement actions act as “irritants” that governments cannot ignore. They must respond to two key challenges: the geopolitical implications of US unilateral actions, in particular when US foreign policy objectives clash with their own, and a chal-

lenge to the credibility of domestic law enforcement. Criminal investigation abroad does, after all, reveal weak oversight at home. To regain judicial sovereignty, these governments must show that they take corporate misconduct seriously, at the very least by cooperating in the investigation of domestic companies. This, however, requires them to integrate elements of the American-born negotiated justice paradigm into their domestic legal frameworks.

Woll compares how five countries – the United Kingdom, Canada, France, Germany, and Brazil – have dealt with this twin challenge. She finds that all have integrated elements of negotiated justice into their domestic legal frameworks, though the extent and approaches vary. Countries tailor instruments and practices to fit their local legal traditions. Rather than a global “Americanization” of criminal justice, we thus see distinct solutions to make national legal traditions compatible with the newly emerging paradigm.

Where does this worldwide transformation of corporate criminal law leave us? Some are supportive of the shift toward negotiated justice, emphasizing that negotiated settlements finally made it possible to hold corporations accountable for their actions in global markets. They see in multilaterally coordinated enforcement efforts a convergence around universally shared norms for corporate conduct. Others are more skeptical. They see in negotiated settlements a way for powerful corporations to buy their innocence, for senior managers to escape criminal liability, and for American foreign policy interests to be pursued under the guise of corporate justice. For them, this reality conflicts with what they consider to be the purpose of criminal justice: to distinguish right from wrong and establish guilt.

Woll’s position is more nuanced. She views negotiated justice as the only viable approach for disciplining large corporations in a world of global markets and fragmented jurisdictions, while still acknowledging its critics’ concerns. Instead of denouncing negotiated justice, she advocates for aligning it more closely with principles of democratic legitimacy and the rule of law. Drawing on her comparative analysis in chapter 6, Woll highlights lessons from countries outside the US that in recent years have translated elements of negotiated justice into their legal systems. Among other things, these include statutory limitations on the use and scope of negotiated settlements and a stronger role for courts in reviewing the terms agreed in those settlements.

Corporate Crime and Punishment is a well-researched and engaging book that offers different insights to different sets of readers. For legal scholars, chapters 3 and 4 might cover familiar ground, but the argument developed in chapters 5 and 6 – that the economy shapes the law, rather than the other way around – turns much thinking in legal scholarship on its head. For international relations scholars, Woll’s assertion that corporate criminal law has become a weapon of choice in interstate conflict is particularly novel.

Though theoretically rich and broad in scope, Woll’s analysis has one notable gap. While she repeatedly emphasizes how private companies figure as key players in transformation toward the negotiated justice paradigm, she often portrays them as passive objects of the geoeconomic games played by states. By doing so, she leaves unexplored all kinds of questions about the ways in which businesses navigate and shape the new reality of negotiated justice. Rather than a critique of Woll’s impressive accomplishment, this observation

serves as an invitation to scholars in corporate law, international business studies, and organizational sociology to further investigate these dynamics.

A timely book, *Corporate Crime and Punishment* documents and theorizes a profound transformation in the policing of global markets. By identifying the dimensions of change and laying bare the mechanisms that drive them, it is highly recommended reading for anyone interested in the evolution of global capitalism today.

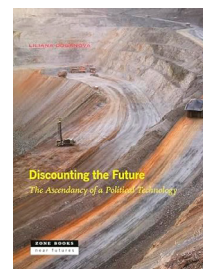
Liliana Doganova · 2024

Discounting the Future: The Ascendancy of a Political Technology

New York: Zone Books

Reviewers **Zachary Huxley** and **Marion Brivot**

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How do we account for and act upon the future in the decisions that we make in the present? Doganova’s book,

Discounting the Future: The Ascendancy of a Political Technology, elaborates on one commonly used method and, more importantly, on how this

method is inherently political. The book posits that discounting — a ubiquitous calculative technology that aims to quantify the value of things by projecting their future flows of costs and benefits and devaluing them to account for uncertainty and temporal distance — is the reason why we can or cannot act on the future. This is a matter of concern in the age of lasting societal challenges such as the climate crisis. To Doganova, discounting is not only a theory of value; it is a theory of action whose political qualities must be investigated.

The first chapter develops the theoretical argument of discounting as a political technology. Four of its “political qualities” are articulated: making things valuable (through its performativity), allocating resources (as a crutch for “rational” decision-making processes), governing behavior (as a lens through which action — even that of government — can be evaluated), and acting on the future (as a way of reconfiguring the future into a political domain in which some are capable of acting while others are not).

The remaining chapters support this theoretical argument via a succession of case studies in which discounting was either promulgated as a solution to a problem or contested and transformed. In chapter 2, the author explores the origins of discounting in the context of 19th-century German forestry. The chapter underlines the politics of clashing interests between the imperishable state (which has the luxury of envisioning a long-term future and therefore seeks to maintain the forest), investors (who seek to extract the value of their investment over a shorter period), and the poor (who require the forest’s resources in the present). Chapter 3 argues that discounting played a central role in the mid-20th-century shift toward a shareholder-oriented manage-

ment, showing how the cost of capital was used to “reward” investors for their risk-taking. In chapter 4, the author leverages the context of drug development projects in the pharmaceutical industry to argue that the uncertainty of the future in discounting is understood as the *investor’s concern*, or, in other words, as a “sacrifice” that the investor makes for which a profit is merited. This perspective grants investors the power to determine which projects are worth pursuing, effectively giving them control over the future. Chapter 5 presents an insightful analysis of the nationalization and privatization of Chilean mining. The author argues that discounting changed the temporality of the issue at stake: what mattered was not control of the present (i.e., ownership), but rather control over the future value that the mines held, which once again empowered and indulged the figure of the investor.

The book concludes with a slightly repetitive but helpful consolidation of the political dimensions of discounting that were raised in the case studies. Having documented discounting’s underlying reasoning and how it enables the investor to take control of the future, the author suggests that the reason why social discussion and decision-making have become imbued with financial and investment logic is that “questions in the form ‘What should be done?’ are reformulated as questions in the form ‘Is it worth it?’” (p. 261). Interestingly, however, the author does not argue for the end of discounting. Instead, she suggests using it as a political technology *against itself* — that is, as a means of contesting the investor-focused future and imagining a better one.

Overall, Doganova succeeds in her aim of unfolding the political qualities of discounting — a rather technical matter — for an audience of sociologists. Those

who are already familiar with the topic should not be deterred by the relatively simplistic introduction, as the author subsequently exhibits a clear grasp of discounting’s subtleties. Indeed, the case studies that follow are instructive, varied, meticulously documented, and usefully diverge from well-known and oft-studied concerns with discounting such as measurement uncertainty and debates about what constitutes value.

However, the author’s broader argument that a seemingly innocuous quantitative instrument is a political technology will be of little surprise to scholars who are familiar with the interdisciplinary literature in accounting, where the subthemes of performativity, “rational” decision-making, and public governance (e.g., new public management) have already been widely discussed. The book’s greatest contribution to the ongoing discourse is thus its examination of the fourth “political quality” of discounting, namely the matter of temporality and acting on the future. The important questions the author raises, including “What makes the future count?” and “Who has control over the future?” have significant moral ramifications that are not explicitly discussed; Doganova’s book thus paves the way for a promising future research agenda that investigates how the implicit temporalities of quantitative technologies interweave with significant societal issues, leading to intergenerational injustice and other moral challenges. For instance, should political decisions regarding the necessary ecological transition be based on a cost-benefit analysis of *when* it would be most economically rational to act? Or should these decisions be guided by other considerations, and if so, which? The author touches upon this issue in the introduction and conclusion by referencing climate inaction, but more in-depth

empirical work, akin to that presented in the main chapters, would be a valuable addition.

On a slightly more critical note, the political significance the author attributes to discounting may at times seem somewhat overstated. Its performative effects arise not so much from the discounting technique itself but from the contractual and legal frameworks within which this technique operates. For example, when the author states that “Armed with his Present Value sword, Piñera [the Chilean Mining Minister in 1981] granted investors not ownership of the present, but control over the future” (p. 221) in the context of the privatization of Chilean copper mines, one could argue that the performativity of discounting was made possible by the enactment of a new law granting foreign investors the right to compensation in the event of expropriation. Thus, it is the interplay between discounting and the new law that creates this shift in power dynamics, rather than discounting alone. Moreover, chapters 3 and 4 illustrate the prevalence of an investor-focused mindset in private business, which is purported to be associated with the technology of discounting. Yet one could contend that corporate executives act with the primary objective of serving the interests of investors (i.e., their shareholders) not because of the discounting instruments that they use, but because it is their legal obligation. Of greater concern, therefore, is what is at stake when *governments* construe the future as the investor’s concern through discounting, which makes chapters 2 and 5 stand out as the highlights of the book.

Discounting the Future — which we thoroughly enjoyed reading — is a critical contribution to the literature, offering a compelling analysis of discounting that transcends the more conventional

debates, such as the appropriate selection of discount rates for specific contexts or the “veracity” of fair value assessments. This work will be an essential resource for scholars interested in the political dimensions of valuation techniques and their influence on the temporal frameworks that governments and companies use to make decisions which carry significant, yet often unexamined, moral implications.

Éric Pineault · 2023

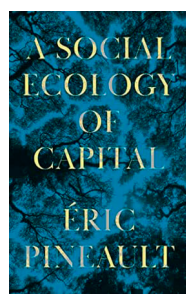
A Social Ecology of Capital

London: Pluto Press

Reviewer **Leon Wansleben**

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With its famous U-curves, Thomas Piketty’s *Capital in the 21st Century* has given us a powerful picture of the past century: a sequence running from highly exploitative unstable capitalism until the world wars; followed by a social democratic period with a healthier balance of forces and lower within-country inequalities; towards the highly unequal capitalism of market liberalization and globalization of today. In canvassing capitalist development from a social ecology perspective, Éric Pineault provides

us with an equivalent, equally important set of images. On pages 98 and 99 of his work, we can see that, both in terms of global primary energy consumption and material extraction, 1950 is the inflection point. We moved then from moderate linear growth of resource extraction starting in the mid-19th century to exponential expansion, boosted since the early 2000s by China’s catch-up, whose per capita material footprint now equals that of Europe (approx. 20 gigatons per capita). Depicted here is the metabolism of capital, which has developed into an enormous geological and ecological force, changing the carbon, nitrogen, and phosphorus cycles that had created stable and favorable conditions for life on earth for more than 10,000 years. Social scientists should memorize and internalize these images as much as they have been “primed” by Piketty’s U-curves.

Éric Pineault’s work is different from Piketty’s, though, in that his contribution is not in (collaborative) data collection. Indeed, his book relies heavily on an existing tradition of social ecology headquartered in Vienna, around Marina Fischer-Kowalski and Helmut Haberl. Since the 1990s, these scholars have introduced the idea and most of the measurements of societal metabolism, captured in long-term statistics of different material throughputs and stock-building processes, usually disaggregated at country or global regional levels (see, e.g., Fischer-Kowalski and Schaffartzik 2015). In his own statement, Pineault aims to “re-socialize” (p. 14) the brute facts from these statistics. But he accomplishes more than that. By deploying clear and simple Marxist ideas to the analysis of society–nature relationships, Pineault provides a synthetic framework to think about the dominant mechanisms behind these biogeochemical forcings and a comprehensive historical narra-

tive of an unrelenting dynamic of acceleration.

The framework rests on the now widely shared idea in ecological economics that by adding extraction at the beginning and dissipation at the end, we can capture how any economic process exploits negentropy and returns the same amount of matter and energy to nature, albeit in highly entropic states. We are thus challenged to extend our economic analyses from source to sink. Importantly, even though entropy is inescapable, it matters for specific socioeconomic and ecological reasons. Life on earth relies directly and indirectly on energy from the sun, which itself is subject to entropic laws. However, the sun's entropy unfolds in temporal horizons that are not discernible on earth. Autotrophs, such as plants, perform net primary production (NPP) directly with solar energy. If heterotrophs, such as humans and animals, live off NPP, they are part of an ever renewed cycle fed by the sun. The story is different for negentropy embodied in metals, fossil fuels, and other geological elements. If these elements are extracted, biophysically transformed, and dissipated in the economic process, entropy appears irreversible. CO₂ in the atmosphere never becomes fossilized wood again; cement does not turn back into limestone; and iron cannot disappear into rocks as ore. The irreversible extraction-production-consumption-dissipation sequence induces profound changes in the composition of the atmosphere, the oceans, soil, and ecosystems. Entropy induced by the economic process is thus one side, and the extremely dynamic geobiochemical reactions (involving tipping points) the other, of what we conveniently call planetary boundaries (Rockström et al. 2009).

Pineault makes clear that one does not need Moore's notion

of nature as underpaid surplus value-producer (equivalent to workers), nor any other fancy post-humanist theory, to understand what is going on here. Instead, his framework rests on the convincing proposition that social scientific understandings of capitalist economy and earth sciences' empirical insights into changing biogeochemical cycles can be effectively combined in order to expose the ecological foundations and consequences of capitalism.

The key question then is how and why Western societies invented forms of economy that constitutively depend, and capitalize, on geology – fossil fuels, metals, non-metal minerals, etc. Agrarian societies also produced metal tools and used coal for generating heat. Moreover, the beginnings of capitalism in England – understood as the establishment of markets for “free labor” along Polanyian lines – were agricultural (on this, see also Charbonnier 2021). But once “capitalist development...integrated fossil fuels into the social relations of production as a way to organize the labor process as a machine process, they would come to define the overall trajectory of capitalist accumulation” (Pineault, *A Social Ecology*, p. 123). Pineault draws on Edward Anthony Wringley's work to theorize this inflection point. Key is the recursive application of fossil fuels and metals to further extract geological resources, which feed an exponential, rather than cyclical self-correcting, growth trajectory (p. 92). With this recursivity established, the economic process could come to rely on serialized biophysical throughput; expand divisions of labor; geographically separate extraction, production, consumption, and dissipation; and build stocks as well as more encompassing social and material infrastructures (large cities) that lock in massive material and energetic

throughput. In short, “It is...when coal was put to work to extract more coal, that one can consider that a transition to a new metabolic regime had commenced” (p. 93).

Pineault convincingly argues that, as yet, no decoupling from increased throughput as the key condition for industrial capitalist growth, driven by accumulation impetuses and imperatives, has occurred. After the age of coal, steel, and iron came the age of oil, gas, and cement. If one measures the material intensity of GDP, there is indeed some decline, but emphatically not for the crucial metallic, non-metallic mineral, and fossil inputs (p. 105) that matter for atmospheric and other earth system change. Indeed, productivity-enhancing investments so characteristic of recent global capitalism usually imply lower shares of labor, but higher shares of energy, per unit of production. Moreover, instead of relying on just a few sources of energy and matter, contemporary capitalism has become “omnivorous”: it relies on an increasing “flow of molecularly complex and composite materials” (p. 125).

It is on these questions of more recent transformations in capitalism and its environmental couplings that I see potential to develop Pineault's superb work further. For instance, his analysis of the Great Acceleration lacks some key macro elements. By and large, he draws on Allan Schnaiberg's *treadmill of production* to argue that monopolistic corporations have driven this process through their distinct investment behaviors (securing the value of a growing fossil-dependent stock) and their influence over (if not manipulation of) mass consumption. Neither global geopolitical factors nor macroeconomic policies allowing for sustained growth (both discussed in Timothy Mitchell's *Carbon Democracy*) sufficiently enter the pic-

ture. Perhaps more importantly, on the final page, Pineault asserts that the “sirens of progressive eco-modernism” (p. 162) provide but a veil for the continuation of entropic, ecologically destructive capitalism. The argument to support this assertion is that renewable technologies could not possibly cover the global population’s energy demand, and that building the respective infrastructures for renewables requires so much fossil and other material inputs that the “transition” itself would significantly warm an increasingly uninhabitable planet. For that, one would have wanted to see more evidence. Precisely because solar energy is not dependent on biogeochemical cycles on planet Earth (while solar panels are), it theoretically seems plausible that we here have a source of energy that allows humankind to significantly reduce its geological and atmospheric forcing.

But it is precisely because the book remains consistently focused on the big picture and does not engage with any specific empirical issues that it can serve as an extremely valuable source for economic sociologists. Their task will be to explore specific changes in patterns of investment, production, and consumption while heeding Pineault’s call to incorporate the constitutive environmental couplings of the investigated economic activities into their analyses.

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