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Research Articles

Order out of Chaos: Public and Private Rules for Managing Carbon

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In many respects, the Kyoto Protocol has been a policy failure. It has not achieved the necessary reductions to avoid the "dangerous anthropogenic interference with the climate system" identified in the 1992 Framework Convention.[1] It created a market for carbon offsets of dubious efficacy. Although these less-than-ambitious targets for reduction were extended for a second commitment period at the Doha conference in December 2012, a number of developed nations refused to renew their commitments, leaving only 15 percent of global emissions covered by the Protocol.[2] The Protocol is also waning in political importance: states are moving toward a number of different forums to pursue policy goals. Some of these are alternative intergovernmental forums, such as the Major Economies Forum or the World Bank. Others are forms of private authority: situations in which private actors (including firms and NGOs) are serving as both *de facto* and *de jure* global rule makers.[3] The result is an increasingly complex institutional landscape, with hundreds (if not thousands) of institutions at global, national, and local levels that seek to address various facets of the climate change problem. Does this proliferation of institutions (i.e., institutional complexity) contribute to or undermine effective regulation?

This paper sheds light on the question of institutional complexity by inserting a factor often overlooked in research to date: the presence of private authority. Specifically, it examines the proliferation of privately created standards to measure and manage greenhouse gas (GHG) emissions within the "regime complex" for climate change, which can be understood as the group of loosely coupled and non-hierarchical institutions that address the problem of climate

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1. UNFCCC 1992, Article 2.
2. Earth Negotiations Bulletin 2012.
3. Green 2014.

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change.[4] Using a newly constructed dataset and employing network analysis, it shows that the case of carbon standards provides some surprising evidence of policy convergence—both around publicly created rules and a select subset of privately created rules. Drawing from theories of policy convergence, I offer an explanation for the observed variation.

The paper makes three arguments. First, in order to understand the regime complex for climate change, we must include *all* forms of governance, including those created by private forms of authority. Second, and more importantly, when we include private authority in the analysis, the presence of private standards affirms the centrality of the Kyoto Protocol within the broader regime complex. A network analysis of recognition among standards reveals that fully 79 percent of standards created by private actors recognize rules created under the Kyoto Protocol. This finding suggests an unintended consequence of private authority: it can serve as a venue for the embedding of public rules. Third, the order that emerges out of the seeming chaos within the regime complex can be explained by private regulators' desire to distinguish themselves from competitors and to minimize users' exposure to switching costs in the future.

The high level of recognition of public authority by private standards suggests an unanticipated consequence of public authority as embodied by Kyoto Protocol: its vestiges will likely remain, irrespective of the outcome of the intergovernmental process, perpetuated through private authority. This suggests the possibility of long-term residual effects of the Kyoto Protocol, even as its future legal form remains uncertain. In contrast to those who argue that Kyoto has been a failure, I suggest an unexpected way in which it has been a success. To borrow Sidney Tarrow's metaphor, the institutions created by the Kyoto Protocol have served as a kind of "coral reef." In Tarrow's version, activists are drawn to international institutions, which provide venues in which they may interact and "form horizontal connections" among themselves.[5] The Kyoto Protocol has served a similar "coral reef" function, attracting private rule makers whose governance activities come to form part of the regime complex. In this case, the reef serves not as a way for activists to organize, but rather for private authority to contribute to an orderly expansion of the regime complex.

The paper proceeds as follows. I first examine the literature on institutional complexity, highlighting the oft-overlooked role of private authority. I then turn to the literature on policy convergence for potential explanations of why we observe convergence under conditions of complexity. Second, using a new dataset, I systematically map and describe the proliferation of private authority in the regime complex for climate change. Third, I use network analysis to illustrate how order arises out of chaos. I show that public rules are the clear anchor for private rules on carbon management. I further demonstrate that not all private rules are created equally: there is hierarchy among them. The

4. Keohane and Victor 2011; Raustiala and Victor 2004.
5. Tarrow 2001, 15. I am grateful to Bob Keohane for suggesting this metaphor.

final section offers an explanation for the observed convergence among rules, based on the network analysis and supplemented by interviews with private standard setters.

Literature Review

This section briefly reviews the literature on private authority and focuses on two bodies of literature that seek to explain the effects of institutional complexity: regime complexity and policy convergence. The literature on regime complexity largely ignores the role of private actors; work on environmental governance and climate governance is much further along in this respect. Moreover, the work on regime complexity tends to emphasize the negative effects of complexity over causal explanations; the policy convergence literature, by contrast, offers clear explanations for convergence across competing sets of rules.

Private Authority and Regime Complexity

The role of private authority, understood as the ways that private actors make rules and set standards which others adopt, is well explored in the literature on climate change and on environmental governance more broadly.[6] Biermann and Pattberg point to the emergence of new types of actors, and thus, new institutional arrangements that permeate global environmental governance, calling for more research on the dynamics of institutional change.[7] Pattberg and Stripple lay out a reconceptualization of climate governance that moves beyond the simple dichotomy of public and private, and identify a similar need for better knowledge about the interactions among institutions in a densely populated landscape of diverse actors.[8] Recent work from Bernstein and colleagues is similarly cognizant of the growing importance of private authority, noting that the complex interactions between actors and practices in carbon markets blur the boundaries between "public" and "private" governance."[9] A number of additional works share an interest in the relationship between governments and markets, and provide a similar perspective on the fluid relationship between the public and private realms in carbon governance.[10] This analysis answers the call for further research, and to show in fine-grained detail the ways in which this "blurring" occurs.

The research presented here has an additional goal: to link explicitly the work on private authority in the realm of environmental governance with a

6. Some earlier works include *inter alia* Cashore 2002; Cashore et al. 2004; Falkner 2003; Garcia-Johnson 2000; , Pattberg 2005; Prakash and Potoski 2006.
7. Biermann and Pattberg 2008, 28.
8. Pattberg and Stripple 2008.
9. Bernstein et al. 2010, 168.
10. See, e.g., Bumpus 2011; Lövbrand and Stripple 2011; Lovell and Liverman 2010; Newell and Paterson 2010.

broader set of works in international relations and public policy which takes up similar issues. The literature on regime complexity (RC) has recently evolved as a way to understand the causes and effects of the proliferation of international institutions. Because of the increasing number and density of institutions, Raustiala and Victor argue that one must study the ensemble of institutions working in a given issue area in their totality, rather than examining each individually. This group of institutions constitutes a regime complex: "an array of partially overlapping and nonhierarchical institutions governing a particular issue-area."[11] In short, RC theory is a way of understanding institutional complexity as constituted by a group of related institutions treated as a single unit.

Despite the widely held view that private actors are increasingly important in world politics, RC theory has largely overlooked their role. In their description of the regime complex for climate change, Keohane and Victor make only passing reference to initiatives undertaken by private actors, though interestingly, they note that the way private initiatives interact with bilateral and multilateral efforts will determine their future utility in addressing climate change.[12] In their excellent symposium on international regime complexity, Alter and Meunier consider the role of nonstate actors more carefully. They expect that "complexity contributes to making states and IOs [international organizations] more permeable, creating a heightened role for experts and nonstate actors."[13] Nonetheless, when contemplating the effects of regime complexity on the fragmentation of international law, they only consider the preferences and actions of states. The "increased permeability" of states and IOs to private actors is therefore restricted to activities such as problem definition, strategic dissemination of information, and proposing solutions.[14] Certainly, the authors identified the need to understand the role of private actors. However, their conceptualization of this role is still overly narrow.[15] They do not consider the ways in which private actors may be exercising authority—that is, making rules—in the context of the regime complex. This paper contributes to this underexplored part of the literature.

Much of the RC literature outlines the ill effects of institutional complexity. Forum shopping, shifting, competition, and exploitation of legal ambiguities are all ways that actors can pick and choose among institutions to select the one most hospitable to their aims. There are fewer works that discuss the positive effects of complexity, which include innovation, experimentation, and the ability to avoid deadlock.[16] However, these works do not elaborate clear conditions under which we should expect to observe either set of effects,

11. Raustiala and Victor 2004, 279.
12. Keohane and Victor 2010, 19.
13. Alter and Meunier 2009, 17.
14. Alter and Meunier 2009, 17.
15. A small number of authors in the 2009 *Perspectives on Politics* symposium examining regime complexity mention the interactions with NGOs, primarily through IOs, including Hafner-Burton 2009 and Helfer 2009.
16. Alter and Meunier 2009, 18; Hoffmann 2011; Overdevest and Zeitlin 2012.

positive or negative. For this reason, I turn to work on regulatory harmonization, which provides a useful framework for understanding the effects of institutional complexity.

Policy Convergence

Studies of policy convergence can be viewed as another way to explain the effects of institutional complexity. Policy convergence can be understood as "any increase in the similarity between one or more characteristics of a certain policy across a given set of political jurisdictions."[17] The proliferation of rules across governance units (whether provinces, states, or other geographic units) has led scholars to ask, what factors contribute to their eventual convergence or continued divergence? Explanations for convergence are varied. Vogel famously described a "California effect," in which leaders set the bar high, and laggards must adjust if they wish to gain market access.[18] Simmons provides a slightly different explanation where harmonization of capital market regulation arises due to material incentives to emulate the hegemon, which has the freedom to set standards as it pleases.[19] Drezner has argued that effective, harmonized standards only emerge in global politics when Great Powers have shared preferences about regulatory outcome.[20] McNamara offers an ideational explanation in which shared normative and causal beliefs among leaders about neoliberal policies led to low rates of inflation across Europe, which in turn enabled nations to enact the domestic policies needed to promote further integration.[21] Still other explanations of convergence focus on a hierarchical process, where policies converge due to imposition via international law or international organizations.[22]

These explanations of policy convergence, while useful, do not explicitly consider the role of private regulation. A few scholars have begun to consider whether and how harmonization among private rules might occur.[23] One explanation is similar in logic to the California effect. When private standards certify environmental or social quality (such as fair trade or organic products), convergence on a stringent standard may occur to meet the demands of customers and suppliers and thus maintain market share. Consumers may demand standards that guarantee high quality, rather than those that engage in mere greenwashing. Suppliers may seek to insulate themselves from naming and shaming campaigns by activists. Governments (some of which support private environmental standards financially) may use certain standards in their procurement

17. Knill 2005, 768.
18. Vogel 1997.
19. Simmons 2001.
20. Drezner 2007.
21. McNamara 1999.
22. Knill 2005.
23. Cashore et al. 2004; Fransen 2011.

practices as a way to promote wider use.[24] Sabel et al. describe a similar process, whereby transparency about labor practices allows leading firms to "credibly document their accomplishments to the public in a way that compels emulation by laggards, and points the way to an enforceable regulatory regime."[25] At the same time, private rule makers have an incentive to distinguish themselves from other competitors, and demonstrate the quality of their "product."

A second explanation of convergence hinges on social and ideational factors. In this view, convergence occurs through interactions among private standard setters. Repeated interactions may facilitate learning, or a diffusion of norms about appropriate practices.[26] In other words, "process dynamics" are the key explanator of harmonized standards.[27] While this explanation makes intuitive sense, in practice, it is difficult to disentangle the effects of norms and ideas when strategic and material incentives are also present. For this reason, I acknowledge this potential explanation, but do not consider it in my empirical analysis below.

In sum, the literature policy convergence helps pick up where discussions of regime complexity end. The RC literature explains different effects of complexity, but not the conditions under which they occur. By contrast, the work on convergence offers a clear explanation for why convergence among private standards might occur: to ensure that standard setters are meeting the demands of their users for both environmental quality and reputational benefits.

Mapping Institutional Complexity: Private Standards for Carbon Measurement

Addressing climate change involves many different types of policies and actors. Generally, the focus has been on the complex landscape of public efforts, at the national and international levels.[28] In this section, I expand the notion of institutional complexity with respect to climate change by describing privately created standards to manage GHGs. Private actors include NGOs, private firms, and transnational networks. For clarity, I refer to the rules promulgated by these actors as private standards; these are distinct from the organizations that create them, which I refer to as private rule makers. I exclude IOs and national governments, while acknowledging that the boundaries between public and private are not always neatly drawn.

I also bring a new methodological approach to the literature on regime complexity. Most work to date has been qualitative, either mapping the constellation of governance activities that constitute the regime complex, or explaining the effects of complexity in a small number of intergovernmental agreements

24. Bernstein and Cashore 2007.
25. Sabel et al. 2000, 2.
26. Bernstein and Cashore 2007; Ruggie 2002.
27. Fransen 2011, 361.
28. Keohane and Victor 2011; Michonski and Levi 2011; for an exception, see Bernstein et al. 2010; Okereke et al. 2010.

and/or organizations. I seek to map complexity in a different way, using social network analysis.[29] A network can be understood as "a finite set or sets of actors and the relation or relations defined on them."[30] The set of actors in this network is transnational carbon governance initiatives, both public and private. The relations are the ties that connect them (or do not), and are operationalized as recognition of others' rules. These ties show us the structure of the network, which in turn provides insight into the relative importance of individual nodes based on their position in the network.

Mitigation efforts are premised on the ability to measure emissions. We need to know either the amount of GHGs emitted, or be able to calculate the amount being "saved" (i.e., prevented from being emitted) due to some activity. Just as banks need robust ways to account for gains and losses, so too do states and other entities need credible, accepted procedures for calculating their emissions; these needs are distributed across many types of actors and levels of governance.

The tools for counting carbon are similarly diverse. Households will calculate their emissions differently from firms or states. Partially as a result of these different needs, different measurement tools, or standards, have emerged. Yet there is not a one-to-one correlation between the type of standard and its users. Instead, there are multiple tools for measurement at the transnational level, some created by governments. Yet, there is also a strong presence of privately created standards. I turn now to a description of this institutional complexity, focusing first on the private standards and then on analysis of the relationship among public and private standards.

The data presented here comprise all of the private transnational standards for carbon measurement currently in use.[31] The transnational criterion means that the standard must function in at least two countries, so standards that operate in just one country are not included in the data set.[32] In this initial description of private standards, I exclude those created by governments or international organizations, though these are considered below. I include only those whose primary aim is carbon measurement and management. Those that apply more generally to energy efficiency, sustainability, or other environmental issues are not included.[33]

29. For an excellent discussion of the application of this methodology in international relations, see Hafner-Burton et al. 2009.
30. Wasserman and Faust 1994, 20.
31. This data was originally compiled in February 2010, and updated in August 2011. By triangulating among multiple sources, I have reasonable confidence that this list is exhaustive. The data excludes: national level standards, standards promulgated by governments, and those created and applied to a single firm's activities. A full list of coding rules is available from the author upon request.
32. The "two-country" criterion can be met in two ways. It can mean that the standard is used in multiple countries. Alternatively, it can mean that to apply the standard, certification and verification activities must take place in multiple countries. For example, while the standard may be used by a firm in Canada, offsets are generated by a project in Brazil. If the standard requires activities in both the producer and the consumer nation, then the two-country criterion is met.
33. These decisions were made by the author based on extensive research of public and private environmental standards.

I compiled this data by triangulating among several sources, updating the data as new sources have become available.[34] Table 1 lists all the standards in the dataset. The dataset presents basic information on these standards: the year they were created, their organizational goal, and whether they require third party verification. I gathered this information in three complementary ways. First, I used the website for each organization to see whether they self-identify as linked to any other standards in the data set. Second, most of the websites contained one or more document that described the methodological details of the standard. If any other standard-setting organization was mentioned in that document, this was coded as recognition. Third, to ensure the robustness of my coding, I also conducted a brief email survey, sent to each organization included in Table 1.[35] I asked about the basic data listed above and about which other standards and/or verification systems they recognized (if any). Positive answers to either of these questions were coded as recognition. Additional interviews, in person and by Skype, were conducted with five organizations.[36]

Figure 1 shows the cumulative number of private standards by year. There is a clear and steady increase in the creation of standards over time. The majority of standards, 73 percent, were created between 2005 and 2009, after the Kyoto Protocol entered into force. Although countries recently agreed to extend the Kyoto Protocol, its fate was unclear until December 2012. Considerable uncertainty about the status and permanence of the current regulatory arrangements remains; its end date remains undecided.[37] The spike in private standards after 2005 provides preliminary evidence that private actors responded to the finite lifespan of the Kyoto Protocol by creating additional rules that could possibly outlast the Protocol.

Figure 2 shows the different types of standards, categorized by their functions.[38] Standards have four different functions. First, offset standards provide rules for measuring avoided emissions (and in some cases, other environmental co-benefits) of carbon mitigation projects. The emphasis in offset standards is the methodology for calculating emissions reductions. Second, accounting standards provide a protocol for actors to measure their emissions, and focus on total emissions, rather than reductions. Third, transparency standards provide a centralized repository for users to report their emissions to others. Accounting and transparency standards differ in one important respect. Accounting standards are first-party standards, often used by actors to catalogue information on their GHG emissions, with no requirement to make such information public.

34. The sources include: Abbott 2010; Bulkeley et al. 2012, Hale and Roger 2011; Hamilton et al. 2009; Kollmuss et al. 2008; www.ecolabelindex.org (last accessed June 27, 2011).
35. The text of the survey is available from the author. Of the 30 carbon standards listed in Table 1, only four did not reply. In all of these cases, I was able to obtain information about recognition from the published standard.
36. These are: CarbonFix, CarbonNeutral, Climate, Community and Biodiversity Sustainable Carbon and the Verified Carbon Standard
37. UNFCCC 2012.
38. I allow for standards to have multiple goals, and code them as such. Hence, $N > 30$.

Table 1
Private Carbon Standards

Name	*Year*
Cleaner and Greener Certification	2000
Climate Action Reserve	2001
Greenhouse Gas Protocol Corporate Standard	2001
Carbon Neutral	2002
Plan Vivo	2002
Chicago Climate Exchange (and offset standard)	2003
Gold Standard	2003
Carbon Disclosure Project	2003
Climate, Community and Biodiversity Standard	2005
Green Tick Carbon Neutral	2005
Greenhouse Gas Protocol Project Standard	2005
ISO 14064-2	2006
Voluntary Carbon Standard	2006
ISO 14064-1	2006
ISO 14064-3	2006
CarbonFix	2007
Certified CarbonFree	2007
Climate Change Action	2007
Green-e (climate)	2007
VER+	2007
ISO 14065	2007
The Climate Registry	2007
Planet Positive	2008
Social Carbon	2008
Sustainable Carbon	2008
Carbon Trust Standard	2008
CEMARS	2008
Good Climate	2008
American Carbon Registry	2008
GreenCircle	2009

Transparency standards are third-party standards because the information is made public by a third party. These are often emissions registries, where entities calculate their emissions and make them publicly available in one central place. As discussed below, some of these require verification, while others do not. The Climate Registry, for instance, provides a platform for participating entities to publicly report their GHG emissions. Fourth and finally, there was one private standard that created a market: the Chicago Climate Exchange established a system for quantifying and trading carbon emissions. However, as of January 2011,

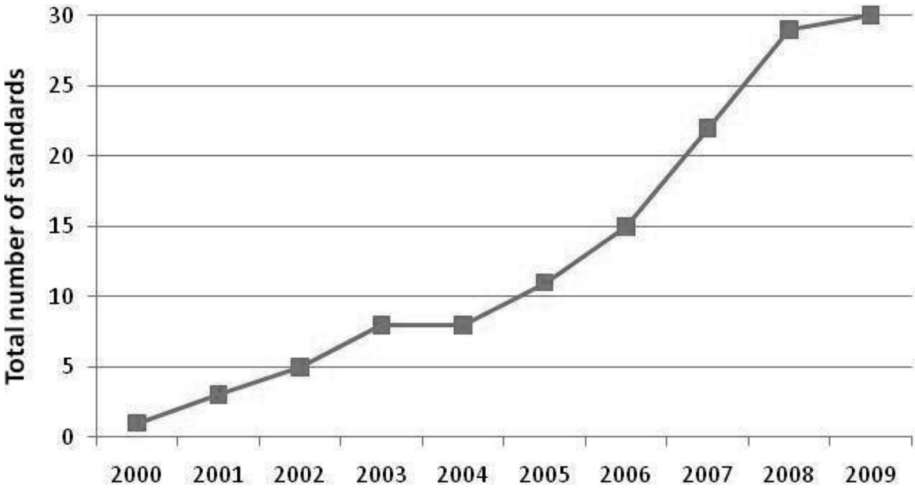

Figure 1
Creation of Climate Standards, Cumulative

the market was phased out and has been replaced with an offsets program. There is, of course, overlap among these different functions; the goal is to provide a sense of how institutional complexity manifests itself in terms of the different types of standards.

Figure 2 yields two interesting findings. First, private actors are typically not in the business of creating carbon markets, despite the fact that we tend to associate private actors with market activities. In their ideal form, markets are independent of the state.[39] Buyers and sellers interact based on quantities and prices. Here we find evidence of the opposite: those interactions are conditional upon states that have explicitly created those markets—the framework within which those transactions may occur. Thus, contrary to Strange's assertion that in the postwar period, markets "are the masters over the governments of states," this data shows that markets fall within the realm of states.[40] Figure 2 shows that private actors rarely create markets. Indeed, this has happened only once, and one could reasonably interpret the closure of the Chicago Climate Exchange as the failure to create a fully, self-sustaining private carbon market. In sum, creating markets for GHGs is almost exclusively the province of public authority.

Second, Figure 2 shows where private actors are especially active: they are in the business of creating offset standards. Offsets can exist without markets, but in such cases, must rely on altruistic consumers to purchase them. Coupled with markets however, they become an important tool for market participants to achieve compliance. As the discussion below shows, a very large proportion

39. Gilpin 1987, 11.
40. Strange 1996, 4.

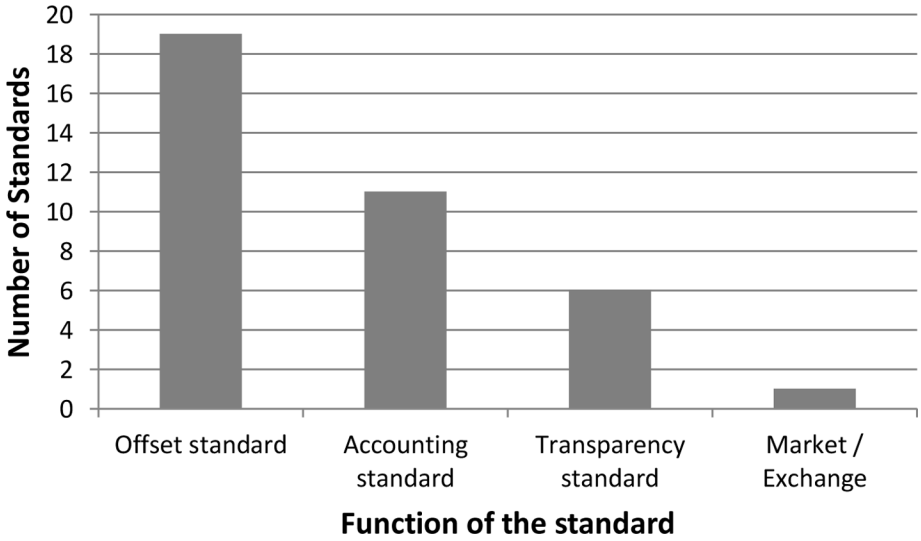

Figure 2
Private Climate Standards, by Function

of private standards are linked to public markets, suggesting that altruism is not the dominant driver in the growth of private standards.

Fully 80 percent of private standards require third-party verification. This finding shows that most standard setters care about credibility and compliance, or at least wish to appear that they do. There is some helpful variation across organizational goals. The majority of offset standards require third-party verification (89 percent). By contrast, only 67 percent of transparency standards require third-party verification. This is unsurprising: transparency standards have the straightforward simple goal of getting emitters to report. This is a much shallower form of cooperation, where free-riding is not an issue. Thus, third-party verification is less important. Of course, verification of these reports is desirable; however, if the goal is incremental—to get organizations to begin thinking about and measuring their emissions—compulsory verification might scare off the more reluctant participants. In short, transparency standards aim to ensure broad participation, so cooperation is relatively shallow.

By contrast, since offsets are essentially creating a currency from an intangible good (the removal of emissions, vis-à-vis a previously established baseline), verification is a key element for credibility.[41] Without verification that offsets have been generated, the issuing of credits is akin to printing money—creating a commodity with no physical value. Unverified projects allow for the possibility that the offset credits grant have no correlation to the actual physical

41. Victor and House 2004.

reductions. This is not only inefficient in terms of combating climate change, but also has the effect of deflating the value of the "currency." Thus, third-party verification is an important signal in offset standards, to ensure the value of the commodity being purchased. Put another way, since free-riding is possible (which is not the case for transparency standards), verification is needed.[42]

The Effects of Complexity

The general hypothesis put forward in this paper is that policy convergence among private standards will be demand driven: private rule makers seek to maximize the environmental and reputational benefits to those using their rules. Reputational benefits accrue when standard users can claim that they are responsible global citizens taking voluntary action to combat climate change. Reputational benefits are contingent on high environmental quality: if users choose low quality standards, they cannot make the same "green" claims. Thus, if the hypothesis holds, we should also expect private rule makers to be concerned about signaling the quality of their standards to potential users. A second benefit that private standards can provide is to minimize users' exposure to switching costs or future regulatory requirements. If this hypothesis holds, we should expect private rule makers to be concerned about the interoperability of their rules with others, particularly public rules.

There are two main observable implications of the hypothesis. First, we should expect these private standards to exhibit high amounts of compatibility. If private actors within the regime complex are concerned about their users' exposure to future regulatory costs, or about switching costs more generally, they will try to "hedge their bets" by maximizing their compatibility with other standards. Maximizing compatibility increases the likelihood that their rules will continue to be usable in a future regulatory regime. In particular, we should expect to see compatibility between private and public standards. Second, if private rule makers are concerned about providing reputational benefits to their users, they will try to maximize compatibility with those that they perceive as high quality. Thus, we should observe a race to the top, which eventually produces leaders among the myriad private standards. Conversely, if private actors are unconcerned about the quality of competing standards, then we should not see the emergence of particularly important private standards. In fact, the analysis below demonstrates that both predicted effects—high levels of compatibility and the emergence of private leaders—are observed.

To analyze the effects of complexity, I draw on two sources of data. First, I map the connections among standards through network analysis to show the degree of compatibility among them. The nodes represent each of the stan-

42. This does not preclude the possibility that verified offsets do not actually produce the reductions that are sold. The incentive for verifiers to approve projects that generate credits of dubious quality or veracity has been point out a number of critics including Green 2008; Wara 2007.

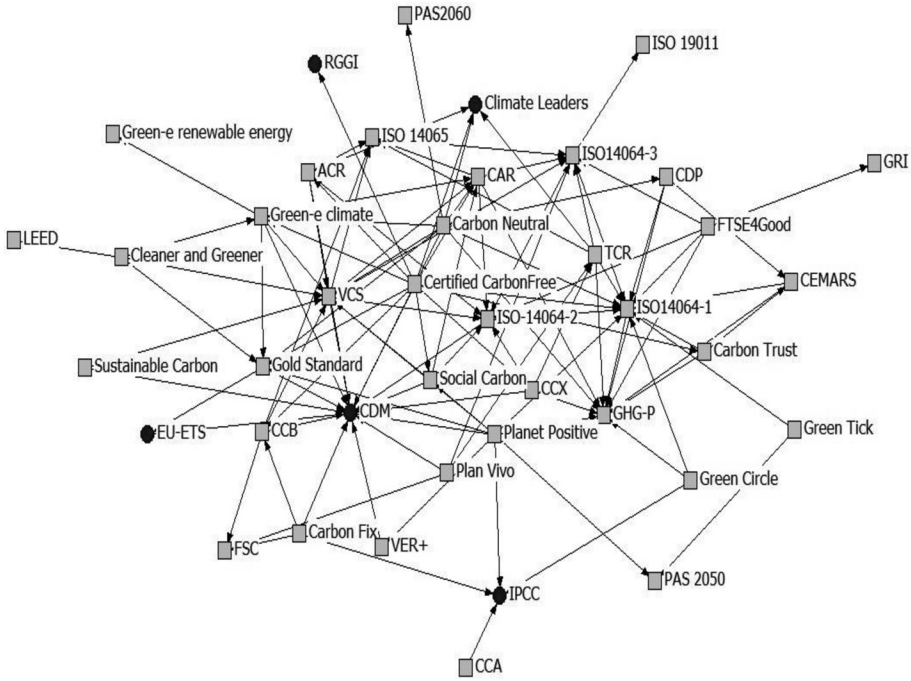

Figure 3
Network of Carbon Management Standards

dards that meet the criteria described above. The ties represent whether there is recognition of the standards through the procedures detailed in the previous section. Second, I augment the network analysis with data gathered from semi-structured interviews with the standards organizations from which I asked basic questions about motivations for the creation of the standard and considerations about compatibility.

Figure 3 shows the network of carbon standards. The network is based on the original 30 private standards presented in the previous section; it then adds all of the other standards that these original 30 recognize. Whereas there are 30 private transnational standards measuring carbon, there are 41 standards in the network, including public standards.[43]

Figure 3 suggests visually that a few standards are more important than others, given their number of ties. These include the Clean Development Mechanism (CDM), the Greenhouse Gas Protocol, the Verified Carbon Standard, the Climate Action Registry, and the family of ISO-14000 standards. As the discus-

43. The standards named by the original 30 constitute the "cutpoint" for the network. I do not include the standards that are recognized by the "second-level" standards. This decision was made for manageability of the data rather than any research-based rationale.

sion below indicates, while the visualization of the network provides a useful "first cut" at the key standards, more information, including the direction of these ties, is needed for a fuller interpretation.

Recognition operates in two ways. Standard A may accept Standard B. For example, the Carbon Neutral standard certifies entities that have offset 100 percent of their emissions. It accepts offsets from a variety of other private standards including the Gold Standard, the Chicago Climate Exchange, and the CDM. Alternatively, Standard A may appropriate the rules and practices of Standard B. I operationalize recognition by examining the document(s), which outline the details of the standard. If this document specifically invokes the rules or practices of other standards or their verifiers, I code this as recognition. For example, the Climate, Community, and Biodiversity standard can be combined with a number of other offset standards to ensure that benefits beyond emissions reduction are achieved. Both acceptance of other standards and appropriation of parts of other standards constitute forms of recognition. It is important to note that this operationalization does not require *mutual* recognition. Standard A may recognize standard B in one of the two specified ways, but Standard B may not recognize Standard A. Nonetheless, this one-way relationship is still coded as recognition. In the parlance of network analysis, this is a one-mode directed network.

Future Costs in the Regulatory Market

Descriptive analysis helps to understand the degree to which standards adopt a strategy of maximizing compatibility. A first cut at this hypothesis would predict a dense network, with high levels of recognition across all of the standards. In fact, the density of the network is rather low, at 14.2 percent. This means that only 14.2 percent of all possible ties among the offset standards are present.[44] However, a more refined version of this hypothesis is that strategic actors will recognize the *most important* standards, rather than simply trying to recognize all of them. Indeed, this is the pattern we observe. Despite the low level of overall density, there are some standards in the network that are much better connected than others. The distribution of ties demonstrates a conscious strategy by private actors to connect to other specific standards in the network. This provides preliminary evidence that although there is an explosion in the number of private standards post-Kyoto, clearly some have emerged as more important—and indeed more credible—than others. In other words, to understand the strategic nature of compatibility, we must look beyond the overall density of the network to ties to specific actors.

To identify the important actors in the network, I turn to the centrality of

44. I exclude transparency, accounting, and market standards in this calculation to focus on standards of the same function.

individual standards. Because this is a directed network, we can examine who is being chosen by others (i.e., a measure of prestige) as well as who is doing the choosing. Choosers are important for diffusing regulatory practices, whereas those being chosen are important for the rules they create. I turn first to the prestigious actors—those who are chosen—and their characteristics. Table 2 shows normalized values for both indegree centrality (prestige) and outdegree centrality (diffusion).

Figure 3 shows that the CDM is a key node in the network. The CDM, which was created by the Kyoto Protocol, allows developed countries to fund offset activities in the developing world to help meet their emissions targets. Quantitatively, it also has the highest level of prestige, as measured by indegree centrality.[45] Of all standards, 37.5 percent have chosen to recognize the CDM's standards. Moreover, if the population is restricted to only those standards that include offsetting as an organizational goal, the proportion rises to 79 percent. The CDM is prestigious in the sense that many other standards are choosing it. In general, public standards tend to be more prestigious than private ones (.233), as indicated in Table 3.

The high level of recognition of this public standard can be understood as a response to future costs of regulation. Since it is unclear whether the CDM will remain in effect after the expiry of the Kyoto Protocol, maintaining compatibility with its standards is a reasonable strategy to ensure the continued relevance of private standards in the event that the CDM continues to operate. Moreover, it is an important way to demonstrate to the users of these standards that their voluntary efforts may be consistent with future regulatory requirements.

Another interesting potential effect of the CDM's prestige is the likelihood that the standards set by the CDM will persist, even if the institution itself does not. This suggests the possibility of long-term residual effects of public rules within the seeming chaos of the regime complex. Even if the intergovernmental process continues to deteriorate, the strength of publicly created rules is being reaffirmed and embedded through private actors.[46]

Interestingly, although the CDM is the most prestigious of all the standards in the network, it is the anomaly among the public standards in the network. The dark circles in Figure 3 are national and international public carbon standards. There are only five named by the original thirty private standards: the CDM, the EU Emissions Trading Scheme, Climate Leaders (a voluntary program created by the US EPA), the Regional Greenhouse Gas Initiative (an emissions trading system in the Northeast of the US), and the Intergovernmental Panel

45. Actors with a high degree of centrality have the most ties to other actors in the network. Since this is directed network—ties can either be incoming or outgoing—centrality can take the form of indegree or outdegree centrality. Actors with high indegree centrality have a large number of incoming ties: other actors in the network choose to link themselves to a given actor. Thus, an actor with high indegree centrality is the object of many ties.
46. See also Lovell 2010 on the co-evolution of compliance and voluntary markets.

Table 2
Centrality of All Standards in the Network

	Outdegree (normalized)		*Indegree (normalized)*
Certified CarbonFree	30	CDM	37.5
Carbon Neutral	25	ISO14064-1	30
Planet Positive	22.5	GHG-P	27.5
VCS	12.5	VCS	22.5
CAR	12.5	ISO-14064-2	20
Green-e climate	12.5	ISO14064-3	17.5
TCR	12.5	CAR	12.5
ACR	12.5	Gold Standard	12.5
FTSE4Good	12.5	ISO 14065	12.5
CCB	10	Climate Leaders	10
Social Carbon	10	IPCC	10
CCX	10	Green-e climate	7.5
Carbon Fix	10	FSC	7.5
Cleaner and Greener	10	TCR	5
Plan Vivo	10	CCB	5
ISO14064-1	7.5	Social Carbon	5
ISO14064-3	7.5	CEMARS	5
Carbon Trust	7.5	PAS 2050	5
CDP	7.5	ACR	2.5
Green Circle	7.5	CCX	2.5
ISO-14064-2	5	Carbon Trust	2.5
Gold Standard	5	CDP	2.5
CEMARS	5	VER+	2.5
Green Tick	5	EU-ETS	2.5
Sustainable Carbon	5	Green-e renewable energy	2.5
ISO 14065	2.5	GRI	2.5
VER+	2.5	ISO 19011	2.5
CCA	2.5	LEED	2.5
CDM	0	PAS2060	2.5
GHG-P	0	RGGI	2.5
Climate Leaders	0	Certified CarbonFree	0
IPCC	0	Carbon Neutral	0
FSC	0	Planet Positive	0
PAS 2050	0	FTSE4Good	0
EU-ETS	0	Carbon Fix	0
Green-e renewable energy	0	Cleaner and Greener	0
GRI	0	Plan Vivo	0
ISO 19011	0	Green Circle	0

Table 2
(Continued)

	Outdegree (normalized)		*Indegree (normalized)*
LEED	0	Green Tick	0
PAS2060	0	Sustainable Carbon	0
RGGI	0	CCA	0
Mean	6.951	Mean	6.951
Std. deviation	7.017	Std. deviation	9.198

on Climate Change.[47] All except for Climate Leaders have prestige values below the mean.

The low level of prestige of the other public standards provides additional support for the regulatory uncertainty explanation. There is no need to hedge when the trajectory of these standards is clearly established. Put another way, there appears to be no demand for private authority in these instances. The EU-ETS, despite implementation challenges, is firmly established, as are the myriad accounting procedures established by the IPCC.[48] Two other public standards are on their way out: Climate Leaders is being phased out, and the Chicago Climate Exchange is transitioning from a market to an offsets program. The Regional Greenhouse Gas Initiative was created in spite of the intransigence of the US federal government. Although it is pursuing links to other regional programs in the US, this process is still in its preliminary stages. Thus, it has yet to establish itself as a well-functioning and prominent set of rules. Hedging through recognition would be premature at this point.

Competition for Quality among Private Standards

Private standards are seeking to maximize their flexibility with respect to public rules under the CDM. But this fact does not explain recognition among private rules. Surely, these private standards are unlikely to become public law. This raises the question: why recognize other private standards? The reason for recognition, I argue, stems from the need to demonstrate quality to standard users.

The explosion of private standards following the entry into force of the Kyoto Protocol created great variability among the quality of standards. Higher quality standards, concerned about establishing and maintaining their reputation, sought to associate themselves with other high quality standards—creating

47. Among other duties, the IPCC has created numerous methodologies for carbon measurement.
48. The IPCC accounting practices present a slightly different story. They are frequently used for basic calculations such as emissions factors. Because these are widely accepted, but often used in small pieces, the IPCC is not frequently named by other standards.

a club of standards that lead the pack in terms of prestige. An examination of the network shows that not all standards are created equal. Despite an overall low density of the network, there are there are several clear leaders among private standards, which enjoy high levels of prestige; they provide evidence for the concern about credibility. Interestingly, the most prestigious standards, both public and private, tend to be older; there is a small, positive correlation between the age of a standard and its level of prestige, or indegree centrality (0.173) as indicated in Table 3.

Along with the CDM, there are five other particularly prestigious standards (greater than one SD above the mean), as demonstrated by Table 2. Three ISO standards (for simplicity, referred to as the 14064 series) are very frequently recognized by others. Two of these are accounting standards (1 and 3), and the third is used for measuring offsets (2). The GHG Protocol was the basis for ISO 14064-1; hence many other standards recognize both ISO 10464-1 and the GHG Protocol, which are substantively very similar.[49] Finally, the Verified Carbon Standard, an offset standard that emphasizes its compatibility with the CDM, is also frequently selected by others—22.5 percent of all possible incoming ties are present. Together, these seven standards represent 40 percent of the total ties in the network.

Credibility of one's own standard boosts consumer confidence, which is certainly important for the continued viability of the organization and its work.[50] Indeed, one organization noted that firms who buy offsets are very concerned about the credibility of the standard and its work: "firms are motivated to be savvy consumers in the voluntary market because one false step would sink them."[51] Credibility may also be useful in cultivating long-term relevance. As discussed below, some governments now recognize some of the more prominent private standards. In other cases, offset purchasers want to enhance the likelihood that credits purchased in the voluntary market could be used to meet future regulatory requirements. Indeed, one interviewee noted that big emitters are coming to them to purchase large quantities of offset credits. They are motivated by the impending expiration of the Kyoto Protocol, at which point, they may need offsets to meet reduction requirements under other regulatory systems (such as the EU trading scheme), but will not have Kyoto credits as an option.[52] To the extent that emitters take this view, they are trying to "pick winners"—by purchasing those credits they believe will be compatible with regulatory requirements in the future. Another interviewee added that the expiry of Kyoto could be a positive development for private standard setters precisely for this reason.[53]

49. Green 2010.
50. Personal communication, Gold Standard, June 30, 2011.
51. Personal communication, Sustainable Carbon, June 29, 2011.
52. Ibid.
53. Personal communication, TUV Sud, July 13, 2011.

Finally, many of those interviewed emphasized the importance of credibility, both for their own standards, and for those that they recognize. This translates most frequently into openness, transparency, widespread consultation with interested parties, and periodic review of the rules and their application.[54] In the words of one interviewee, credibility and robustness stem from "how many eyes have looked at [the standard]," as well as the caliber of those reviewers.[55]

Thus, the rapid growth of carbon standards coupled with their individual concerns about maintaining credibility gave rise to an important effect: clear leaders have emerged among the patchwork of private carbon standards. Institutional complexity has produced some consensus about which carbon standards should be used: those that are transparent, have had an open drafting process, and have been (and continue to be) the subject of rigorous review. As one interviewee succinctly noted: "[M]ore standards—better quality. The competition [makes] the market and [as a result], users win."[56] High quality standards have emerged, and they are at the center of the network.

Diffusion of Leading Practices

High quality standards do not simply appear; they are made. One way they are made is through recognition by other standards. I turn now to the "choosers" of standards, as indicated by their outdegree centrality. These are important consumers of standards, enhancing the network effects of those with high prestige.[57] Interestingly, the most outdegree central standards are all private: Certified CarbonFree, Carbon Neutral and Planet Positive.[58] Certified CarbonFree, for example, recognizes 30 percent of all standards in the network. This provides additional support for the hypothesis: private standards are hedging by maximizing compatibility with other standards, both public and private. One effect of hedging is to reinforce the importance of public rules. A second effect, as indicated in this section, is to create leaders among private standards.

Indeed an analysis of the key players in the network shows that two private standards are the best connected: VCS and ISO 14064-1 reach 98 percent of the network via a maximum of one intermediary.[59] The high prestige (as indicated in the previous section) and the impressive reach of these two standards provide additional evidence that quality standards occupy key positions in the network. VCS has also received an additional affirmation of its quality: the Australian Government recognizes it in its voluntary National Carbon Offset Stan-

54. Personal communication, CarbonNeutral, July 5, 2011.
55. Personal communication, Sustainable Carbon, June 29, 2011.
56. Personal communication, TUV Sud, July 13, 2011. Similar sentiments were expressed by representatives of the American Carbon Registry and the Chicago Climate Exchange.
57. On network effects, see Katz and Shapiro 1994.
58. These are the only three standards with outdegree centrality greater than one SD above the mean.
59. As computed by Borgatti 2003.

Table 3
Similarity Matrix for Selected Network Attributes

	Age	*Public?*	*Private?*	*Outdegree (Normalized)*	*Indegree (Normalized)*
Age	1.000	0.221	−0.221	−0.289	0.173
Public?	0.221	1.000	−1.000	−0.363	0.233
Private?	−0.221	−1.000	1.000	0.363	−0.233
Outdegree (normalized)	−0.289	−0.363	0.363	1.000	−0.222
Indegree (normalized)	0.173	0.233	−0.233	−0.222	1.000

dard.[60] Other standards are also recognized by public entities. The Australian government also recognizes the Gold Standard. The California cap and trade system is basing its offset standards on those created by the Climate Action Reserve.

By contrast, four of the five public standards have an outdegree centrality of 0. The CDM, RGGI, Climate Leaders and the IPCC have not chosen to recognize any other standards. The one exception is the EU-ETS, which accepts offsets generated under CDM standards, as codified by the "Linking Directive."[61] Again, this underscores the finding that private rules, rather than public ones, are serving as diffusers of authority. This is further evidenced by an observed correlation between private standards and outdegree centrality, illustrated in Table 3. Private rules are correlated with recognizing more standards (.363); by contrast, public rules are correlated with being recognized by more standards (.233).

In sum, the network analysis points to three drivers of convergence. First, private standards' desire to maintain relevance for their users in the face of future regulatory changes has led almost all offset standards to recognize the rules created under the CDM. Second, the need for credibility has given rise to a set of leading private standards, which are more prestigious (in the sense of network centrality) than other private standards in the network. The former "wild west" of carbon markets is consolidating around a clear set of leaders. Third, the fact that private standards tend to have higher outdegree centrality shows their important role as diffusers of leading standards—both public and private. By contrast, public standards virtually never choose to link themselves to other standards, with the one exception of the EU-ETS and the CDM. The interaction among public and private actors shows that private actors, not public ones, are reacting to the need to signal quality and minimize the costs of future regulatory changes. This has had the unanticipated effect of producing some convergence around what constitutes a good standard for measuring and managing carbon.

60. Australian Department of Climate Change and Energy Efficiency 2010, 8.
61. European Parliament 2004.

Conclusion

Complexity is not the same as chaos. This paper shows an emerging order in the complex institutional landscape that governs climate change. The mix of public and private actors and their accompanying standards for GHG management provides new spaces for interaction and unexpected effects. The presence of private actors coupled with concerns about demonstrating credibility and providing benefits for users, has reaffirmed the importance of the CDM rules and produced clear leaders among private rules. Bumpus and Liverman argued that the private standards are "a network of often small private organizations and NGOs [which exist] without reference to national or supranational bodies or "higher levels of administration."[62] Evidence here suggests otherwise. Rather, a distinct order—and even a hierarchy—has emerged out of the messy landscape of carbon standards. There is an order emerging from the chaos.

Three main arguments can be derived from the data. First, institutional complexity is, well, complex. It is incumbent upon scholars to recognize the full range of variation with respect to complexity, and this means including sources of private authority. To exclude private authority is to exclude a key form of variation. Second, when we include private authority, we observe public authority in a different light—as the hub for carbon rules within the broader regime complex. Third, the literature on regime complexity tends to emphasize the negative effects of complexity, as an engine for further chaos that fuels strategies of forum shopping, and opportunities for exploitation of ambiguities. However, this paper shows that it also provides an opportunity for convergence.

There are several broader implications of these findings, both for theory and for policy. With respect to policy, the future of carbon markets remains uncertain. Decisions taken at Durban affirmed a second commitment period for Kyoto. However, this decision trades one type of uncertainty (whether the compliance market will persist) for another (whether or not there will be a gap between the two periods). Durban also created a new, yet-to-be-defined market mechanism, and reaffirmed a future role for REDD+. All of these developments suggest that private rule makers should continue to be concerned about future regulatory requirements, and by extension about interoperability with public standards as well as leading private standards. Moreover, the possibility of a future REDD market has led a number private rule makers to develop standards for this potential market. Indeed, roughly one-third of all credits traded on the voluntary market in 2010 were REDD projects.[63] Since the CDM explicitly excluded avoided deforestation as a source of credits, there are no public rules in place. It appears that private rule makers are leading the way in this regard.[64]

62. Bumpus and Liverman 2008, 141.
63. Peters-Stanley et al. 2011.
64. Peters-Stanley et al. 2011, vi. This is also supported by interviews with Carolyn Ching, VCS, March 12, 2012 and Gareth Wishart, CCBA, March 12, 2012.

In addition, there are three key theoretical implications of the analysis presented here. First, this paper demonstrates that convergence may have a distinct flavor under conditions of complexity. Clearly, it does not mean the consolidation of myriad institutions. Rather, convergence results in an emergence of some sense of order across these diverse sets of rules and actors. Much work remains to be done to elaborate both the mechanisms that produce order within complex institutions, and the conditions under which we might expect such order to emerge.[65]

Second, despite harsh criticism and general pessimism about the Kyoto Protocol, there may yet be a silver lining. The offset standards created by the CDM are now well embedded in private standards operating in the voluntary market. Some of these standards are even recognized by governments. It is very likely that these rules are here to stay. Institutions are sticky, and as Raustiala and Victor note, "extant arrangements in the various elemental regimes will constrain and channel the process of creating new rules."[66] Thus, it is reasonable to expect that the present rules on carbon will affect future ones. With private standards as faithful users and diffusers (and in some cases, improvers), CDM rules will likely provide a common baseline for future offsets.

Third, and related, the case of carbon standards is redefining the nature of "public."[67] The interactions between public and private show the ways in which public goods—emissions reductions—are being created and provided through a complex network structure and heterogeneous actors. As politicians and scholars wrestle with ways to provide global public goods, they must keep this definitional shift in mind. Finally, studies of regulatory dynamics suggest conditions under which we can expect to upward or downward harmonization.[68] This paper shows that we should include private regulation in the mix as one of the potential explanators.

References

Abbott, Kenneth W. 2010. Interactions within a Governance Complex. Memo Prepared for Dynamics of Interaction in Transnational Business Governance Regimes. October 22, 2010. Toronto, Canada. On file with author.

Abbott, Kenneth W. 2012. The Transnational Regime Complex for Climate Change. *Environment and Planning C: Government and Policy* 30 (4): 571–590.

Alter, Karen J., and Sophie Meunier. 2009. The Politics of International Regime Complexity. *Perspectives on Politics* 7 (1): 13–24.

Auld, Graeme, and Jessica Green. 2012. Unbundling the Regime Complex: The Effects of Private Authority. Unpublished manuscript. Ottowa, Canada. On file with author.

Australian Department of Climate Change and Energy Efficiency. 2010. National Carbon Offset Standard. Available at http://www.climatechange.gov.au/government/

65. For discussion of additional mechanisms, see Auld and Green 2012.
66. Raustiala and Victor 2004, 279.
67. Cerny 2010.
68. Vogel 1997; Vogel and Kagan 2004.

initiatives/~/media/publications/carbon-accounting/revised-NCOS-standard-2010-pdf.ashx, accessed December 12, 2012.

Bernstein, Steven, and Benjamin Cashore. 2007. Can Non-state Global Governance be Legitimate? An Analytical Framework. *Regulation and Governance* 1 (1): 1–25.

Bernstein, Steven, Michele Betsill, Matthew Hoffmann, and Matthew Paterson. 2010. A Tale of Two Copenhagens: Carbon Markets and Climate Governance. *Millennium—Journal of International Studies* 39 (1): 161–173.

Biermann, Frank, and Philipp Pattberg. 2008. Global Environmental Governance: Taking Stock, Moving Forward. *Annual Review of Environment and Resources* 33 (1): 277–294.

Borgatti, Steve. 2003. KeyPlayer Software. Analytic Technologies: Boston. Available at http://www.analytictech.com/products.htm, accessed December 12, 2012.

Bulkeley, Harriet, Liliana Andonova, Karin Backstrand, Michele Betsill, Daniel Compagnon, Rosaleen Duffy, Ans Kolk, et al. 2012. Governing climate change transnationally: assessing the evidence from a database of sixty initiatives. *Environment and Planning C: Government and Policy* 30 (4): 591–612.

Bumpus, Adam G. 2011. The Matter of Carbon: Understanding the Materiality of tCO2e in Carbon Offsets. *Antipode* 43 (3): 612–638.

Bumpus, Adam G., and Diana Liverman. 2008. Accumulation by Decarbonization and the Governance of Carbon Offsets. *Economic Geography* 84 (2): 127–155.

Cashore, Benjamin. 2002. Legitimacy and the Privatization of Environmental Governance: How Non-State Market Driven Systems Gain Rule-Making Authority. *Governance* 15 (4): 508–529.

Cashore, Benjamin, Graeme Auld, and Deanna Newsom. 2004. *Governing Through Markets: Forest Certification and the Emergence of Non-state Authority.* New Haven, CT: Yale University Press.

Cerny, Philip G. 2010. *Rethinking World Politics: A Theory of Transnational Neopluralism.* Oxford: Oxford University Press.

Drezner, Daniel W. 2007. *All Politics is Global: Explaining International Regulatory Regimes.* Princeton, NJ: Princeton University Press.

Earth Negotiations Bulletin. Summary of the Doha Climate Change Conference: 26 November–8 December 2012. 12 (567): 1–30. Available at http://www.iisd.ca/download/pdf/enb12567e.pdf, accessed December 12, 2012.

European Parliament. 2004. Directive 2004/101/EC. Amending Directive 2003/87/EC Establishing a Scheme for Greenhouse Gas Emission Allowance Trading within the Community, in Respect of the Kyoto Protocol's Project Mechanisms October 27, 2004.

Falkner, Robert. 2003. Private Environmental Governance and International Relations: Exploring the Links. *Global Environmental Politics* 3 (2): 72–87.

Fransen, Luc. 2011. Why Do Private Governance Organizations Not Converge? A Political–Institutional Analysis of Transnational Labor Standards Regulation. *Governance* 24 (2): 359–387.

Garcia-Johnson, Ronie. 2000. *Exporting Environmentalism: US Multinational Chemical Corporations in Brazil and Mexico.* Cambridge, MA: MIT Press.

Gilpin, Robert. 1987. *The Political Economy of International Relations.* Princeton: Princeton University Press.

Green, Jessica F. 2008. Delegation and Accountability in the Clean Development Mecha-

nism: The New Authority of Non-State Actors. *Journal of International Law and International Relations* 4 (2): 21–56.

Green, Jessica F. 2010. Private Standards in the Climate Regime: The Greenhouse Gas Protocol. *Business and Politics* 12 (3).

Green, Jessica F. 2014. *Rethinking Private Authority: Agents and Entrepreneurs in Global Environmental Governance.* Princeton: Princeton University Press.

Hafner-Burton, Emilie. 2009. The Power Politics of Regime Complexity: Human Rights Trade Conditionality in Europe. *Perspectives on Politics* 7 (1): 33–37.

Hale, Thomas N., and Charles Roger. 2011. Orchestration and Transnational Climate Governance. Unpublished manuscript, European University Institute, Florence, Italy.

Hamilton, Katherine, Milo Sjardin, Allison Shapiro, and Thomas Marcello. 2009. *Fortifying the Foundation: State of the Voluntary Carbon Market 2009*. New York: Ecosystem Marketplace and New Carbon Finance. Available at http://www.ecosystemmarketplace.com/documents/cms_documents/StateOfTheVoluntaryCarbonMarkets_2009.pdf, accessed December 12, 2012.

Helfer, Lawrence. 2009. Regime Shifting in the International Intellectual Property System. *Perspectives on Politics* 7 (1): 39–44.

Hoffmann, Matthew J. 2011. *Climate Governance at the Crossroads.* Oxford: Oxford University Press.

Katz, Michael L., and Carl Shapiro. 1994. Systems Competition and Network Effects. *The Journal of Economic Perspectives* 8 (2): 93–115.

Keohane, Robert O., and David G. Victor. 2011. The Regime Complex for Climate Change. *Perspectives on Politics* 9 (1): 7–23.

Knill, Christoph. 2005. Cross-national Policy Convergence: Concepts, Approaches and Explanatory Factors. *Journal of European Public Policy* 12 (5): 764–774.

Kollmuss, Anja, Helge Zink, and Clifford Polycarp. 2008. 117 *Making Sense of the Voluntary Carbon Market A Comparison of Carbon Offset Standards.* Stockholm Environment Institute and Tricorona. Available at http://www.sei-international.org/publications.

Lövbrand, Eva, and Johannes Stripple. 2011. Making Climate Change Governable: Accounting for Carbon as Sinks, Credits and Personal Budgets. *Critical Policy Studies* 5 (2): 187–200.

Lovell, Heather C. 2010. Governing the Carbon Offset Market. *Wiley Interdisciplinary Reviews: Climate Change* 1 (3): 353–362.

Lovell, Heather, and Diana Liverman. 2010. Understanding Carbon Offset Technologies. *New Political Economy* 15 (2): 255–273.

McNamara, Kathleen. 1999. Consensus and Constraint: Ideas and Capital Mobility in European Monetary Integration. *Journal of Common Market Studies* 37 (3): 455–76.

Michonski, Katherine, and Michael Levi. 2010. *Harnessing International Institutions to Address Climate Change.* New York: Council on Foreign Relations.

Newell, Peter, and Matthew Paterson. 2010. *Climate Capitalism: Global Warming and the Transformation of the Global Economy.* Cambridge: Cambridge University Press.

Okereke, Chukwumerije, Harriet Bulkeley, and Heike Schroeder. 2008. Conceptualizing Climate Governance Beyond the International Regime. *Global Environmental Politics* 9 (1): 58–78.

Overdevest, Christine, and Jonathan Zeitlin. 2012. Assembling an Experimentalist Re-

gime: EU FLEGT and Transnational Governance Interactions in the Forest Sector. *Regulation and Governance* (early view).

Pattberg, Philipp. 2005. The Institutionalization of Private Governance: How Business and Nonprofit Organizations Agree on Transnational Rules. *Governance* 18 (4): 589–610.

Pattberg, Philipp, and Johannes Stripple. 2008. Beyond the Public and Private Divide: Remapping Transnational Climate Governance in the 21st century. *International Environmental Agreements* 8 (4): 389–408.

Peters-Stanley, Molly, Katherine Hamilton, Thomas Marcello, and Milo Sjardin. 2011. *Back to the Future: State of the Voluntary Carbon Market 2011*. New York: Ecosystem Marketplace and New Carbon Finance. Available at http://www.ecosystem marketplace.com/documents/cms_documents/StateOfTheVoluntaryCarbonMarkets_2009.pdf, accessed December 12, 2012.

Prakash, Aseem, and Matthew Potoski. 2006. *The Voluntary Environmentalists: Green Clubs, ISO 14001, and Voluntary Environmental Regulations.* Cambridge: Cambridge University Press.

Raustiala, Kal, and David G Victor. 2004. The Regime Complex for Plant Genetic Resources. *International Organization* 58 (2): 277–309.

Ruggie, John Gerard. 2002. The Theory and Practice of Learning Networks: Corporate Social Responsibility and the Global Compact. *Journal of Corporate Citizenship* 5 (Spring): 27–36.

Sabel, Charles F., Dara O'Rourke, and Archon Fung. 2000. Ratcheting Labor Standards: Regulation for Continuous Improvement in the Global Workplace. KSG Working Paper *No. 00-010*. Cambridge, MA: Harvard University.

Simmons, Beth A. 2001. The International Politics of Harmonization: The Case of Capital Market Regulation. *International Organization* 55 (3): 589–620.

Strange, Susan. 1996. *The Retreat of the State.* Cambridge: Cambridge University Press.

Tarrow, Sidney. 2001. Transational Politics: Contention and Institutions in International Politics. *Annual Review of Political Science* 4: 1–20.

United Nations Framework Convention on Climate Change. 1992. New York: United Nations.

United Nations Framework Convention on Climate Change. 2012. Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol. FCCC/KP/CMP/2012/L.9. Available at http://unfccc.int/resource/docs/2012/cmp8/eng/l09.pdf. Accessed December 12, 2012.

Victor, David G, and Joshua C House. 2004. A New Currency: Climate Change and Carbon Credits. *Harvard International Review* (2): 56–59.

Vogel, David. 1997. *Trading Up: Consumer and Environmental Regulation in a Global Economy.* Cambridge, MA: Harvard University Press.

Vogel, David, and Robert A Kagan, eds. 2004. *The Dynamics of Regulatory Change: How Globalization Affects National Regulatory Policies.* Berkeley: University of California Press.

Wara, Michael. 2007. Is the Global Carbon Market Working? *Nature* 445 (7128): 595–596.

Wasserman, Stanley, and Katherine Faust. 1994. *Social Network Analysis: Methods and Applications.* Cambridge: Cambridge University Press.