

# Who Ratifies Environmental Treaties and Why? Institutionalism, Structuralism and Participation by 192 Nations in 22 Treaties

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Since the early 1970s, global environmental problems such as ocean pollution, bio-diversity loss, climate change and ozone depletion have raised awareness among scholars, activists and governments throughout the world that issues once considered local now demand extraordinary levels of international cooperation. In seeking solutions to these problems, treaties have proved an important mechanism by which states make promises to each other to administer natural resources and manage the global environment.<sup>1</sup> Nation-states are of course the principal political units held accountable for addressing these global environmental problems, but the million-dollar question is, will they? As Hurrell and Kingsbury<sup>2</sup> put it a decade ago, "Can a fragmented and often highly conflictual political system made up of over 170 sovereign states and numerous other actors achieve the high (and historically unprecedented) levels of cooperation and policy coordination needed to manage environmental problems on a global scale?"<sup>3</sup>

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1. Brown-Weiss and Jacobson 1998; Mitchell 1994; and Hurrell and Kingsbury 1992.
2. Hurrell and Kingsbury 1992, 1.
3. Critics rightly point out that many nations sign environmental treaties to gain a positive international image, and that the treaties lack viable enforcement mechanisms (Hurrell and Kingsbury 1992; Young 1994; and Congleton 2003). However, in spite of their many limitations, other scholars argue that international environmental agreements can function as important tools to help foster equitable and efficient strategies to ameliorate the effects of ecological damage (for example, Mitchell 1994; Brown Weiss and Jacobson 1998; Athanasiou and Baer 2002; and Barrett 2003). Because resolving global environmental problems will require international cooperation, we believe there is value in understanding state behavior on environmental treaties regardless of their current effectiveness.

Even a casual observer of Earth Summits and Kyoto treaties would be struck by the vast differences in how states respond to the effort to build environmental treaties. Some nations rush to pen and ratify all of them, some ignore them, and others actively resist participation or undermine them altogether.<sup>4</sup> Analysts of international environmental politics (IEP) have offered a range of competing and complementary explanations to make sense of this variance. Primarily through case studies and small-*n* quantitative research, we have learned a great deal about comparative foreign policy and begun untangling complex causal processes.<sup>5</sup> However, in terms of theoretically self-conscious attempts to systematically produce generalizable findings from a large sample of treaties and participants, it is widely agreed that our collective knowledge in IEP is found wanting.<sup>6</sup> To address the persistent problem of overdetermination, we have constructed an index of environmental treaty ratification that covers participation by 192 nations in the 22 major international environmental agreements negotiated between 1946 and 1999.<sup>7</sup> With this index we subject the predictions that logically follow from constructivism, realism, and rational choice institutionalism—the mainstream “core” of the field of International Relations—to cross-sectional testing.

A further limitation hindering the accumulation of knowledge in IEP is the yawning gap between proximate political explanations and theorization on the deeper “social roots” of state behavior. We aim to rectify this shortcoming by developing a theoretically-sequenced model of state behavior. To gain greater leverage on our dependent variable, we endogenize state preferences and capabilities (as well as reduce the risk of omitted variable bias) by integrating structural insights from world-systems theory with the micro-motives of rational choice institutionalism. Understanding environmental treaty ratification patterns, we argue, requires an analysis of *both* the proximate political factors and deeper social determinants of state action.<sup>8</sup> Whereas institutionalists explain why states voluntarily create institutions that facilitate environmental cooperation, world-systems theorists address the underlying factors that condition a state’s *willingness* and *ability* to participate in such arrangements. Each of these traditions, then, speak to different links in a chain of causation.

In constructing a synthetic model, we provide a partial answer to Andrew

4. Victor and Skolnikoff 1999; Meyer et al. 1997; and Roberts 1996, 2001.

5. Benedick 1991; Sprinz and Vaahoranta 1994; Young 1994; Susskind 1994; Brown Weiss and Jacobson 1998; and Schelling 2002.

6. Mitchell 2002a, 2002b; and Sprinz 2004. A few scholars have addressed the puzzle of environmental treaty ratification in a large-*n* empirical context. However, these studies have either focused on particular treaties, single theories, or subsets of potential participants (Roberts 1996; Meyer et al. 1997; Recchia 2001; and Neumayer 2002).

7. We have excluded all bilateral and regional agreements to isolate those cases where all states had the opportunity to participate.

8. Theories are, of course, constrained—ontologically and epistemologically—in the questions that they can address, but IR commentators observe that even when complementarities are self-evident, opportunities for synthesis are routinely overlooked (and often for highly dubious reasons). See Lake 2002; Moravcsik 2003a; Jupille et al. 2003; and Tierney and Weaver 2004.

Moravcsik's<sup>9</sup> question: "How should analysts combine major theories into testable explanations of classes of phenomena in world politics without permitting the resulting empirical analysis to degenerate into a mono-causal approach, on the one hand, or an indeterminate 'everything matters' approach, on the other?" Here we allow the major theories of IEP to "compete" with each other in cross-sectional OLS regressions, but we also identify these theories' analytical weaknesses and explore possibilities for synthesis. Again, we conclude that the Achilles heel of rational choice institutionalism is its inability to explain state preferences and capabilities. But rather than discarding the theory altogether, we build upon its valuable insight that "credibility matters" and use world-systems theory to address the prior question of how nations "acquire" credibility in the first place.<sup>10</sup> Had we tested a single theory, only employed competitive theory-testing, or simply delimited each theory's "domain of application,"<sup>11</sup> the complex causal chain we describe would have almost certainly remained hidden. Placing theories in their proper causal order is, of course, only one way to synthesize theoretical insights; however, we argue that this approach has special relevance for IEP.

The paper proceeds as follows. We first examine the record of previous IR theories in explaining the environmental policy behavior of nation-states, and go on to expound the under-applied central tenets of world-systems theory. We then describe our cross-national approach to predicting treaty ratification, and our development of an index of participation by states in environmental treaties through April 1999. We operationalize a series of factors suggested by IR and world-systems theories, and go on to test their ability to predict treaty ratification rates in ordinary least squares regression and path analysis. We conclude with an assessment of the indices, the method, and the relative usefulness of the different IEP traditions. Our results indicate that new theoretical, methodological and policy approaches are needed to address structural barriers to international cooperation, and our last words suggest some implications of this shift.

### Theorizing State Participation in Environmental Treaties

The crescendo of evidence implicating our species in the creation of environmental crises of global proportions might suggest that states would rapidly and uniformly jump on an environmentalist bandwagon to address these issues before it is too late. Such an expectation, of course, is sadly naïve. Over three decades, efforts to solve global environmental crises have proven to be spotty and contentious. Moments of progress are infrequent, and hopeful signs are often undermined by self-interested players.<sup>12</sup> The central theoretical traditions of international relations scholarship offer different explanations for why some nations accept and others reject environmental treaties. We review their insights

9. Moravcsik 2003b, 200.

10. On "acquiring" sound institutions and policies, see Rodrik 2000; and Acemoglu et al. 2001.

11. Tierney and Weaver 2004; and Jupille et al. 2003.

12. For example, Vaillancourt No Date; and Guimaraes No Date.

briefly, but focus most on rational choice institutionalism, which has gone the furthest in developing an argument about state behavior in this policy area.

*Constructivists* offer a constitutive model of international relations, whereby global environmental “culture” gradually spreads its tentacles around the world, enveloping more and more states into a world institutional structure. They argue that for over a century the global norm of environmentalism has spread universally and increased steadily. These common global values have in turn created a social system that subsumes the traditional international political world. Thus, treaty ratifications pile up as a growing global network of scientists in International Councils for Science (ICSUs) and International Non-governmental Organizations (INGOs) disseminate their global environmental ideas and values.<sup>13</sup> To gain and keep legitimacy in this evolving cultural “club,” states must participate in the major treaties on important issues, including those on the environment. A main hypothesis of theirs is that national memberships in international norm-setting institutions (such as international environmental nongovernment organizations or international scientific unions) will positively correlate with the number of environmental treaties ratified by a country.<sup>14</sup>

*Realists*, quite differently, consider treaties as barely worth the paper upon which they are printed.<sup>15</sup> They argue that international “regime-building” and treaty-making are just so much talk, obscuring the deeper agendas of states to secure power.<sup>16</sup> Treaties, much like international institutions, are written off as a set of epiphenomena that states will contravene when they no longer perceive benefits to continued participation.<sup>17</sup> It should therefore come as no surprise that realist scholarship has paid little attention to the creation, maintenance, and implementation of international environmental treaties.<sup>18</sup> While the sharp increase and growing importance of voluntary international cooperation after World War II has been difficult to deny, realists insist that a power-based explanation still retains the most analytical purchase over the study of international environmental politics.<sup>19</sup> Oran Young<sup>20</sup> and Elizabeth DeSombre<sup>21</sup> highlight a number of cases where powerful states have imposed an environmental regime

13. Frank 1997; Meyer et al. 1997; Boli and Thomas 1999; and Yearly 1996.

14. What is not made clear is why countries participate to different extents in this global scientific and diplomatic culture. To say that participation in global culture and institutions *causes* countries to ratify environmental treaties is to risk offering a spurious explanation: underlying causes may be driving both processes.

15. Congleton (2003, 6) explains that “treaty language is often vague in both environmental and nonenvironmental sections of treaty documents and little provision is made to enforce the environmental commitments of signatory nations. For example, there are no explicit penalties for failure to make contributions to the Rio trust funds, nor a clear statement of the methods by which those funds would be used.”

16. Waltz 1979.

17. Grieco 1988; and Waltz 1979.

18. To be fair, realist theorization is now much less dismissive of voluntary international cooperation and more focused on developing nuanced power-based explanations (Gruber 2000; DeSombre 2000; and Drezner 1999).

19. DeSombre 2000. For a contrasting view, see Zürn 1998.

20. Young 1989.

21. DeSombre 2000.

on otherwise disinterested states. To take one example, the Whaling Convention suffered from frequent non-compliance until the United States threatened—and in some cases, actually used—economic sanctions against free-riders.<sup>22</sup> The observable implications of realist theory therefore seem relatively straightforward. Given the convergence of Western policy preferences around “green” issues,<sup>23</sup> we would expect powerful states (or coalitions of powerful states) to coerce countries of global environmental significance into cooperative ventures. Countries with high levels of “natural capital” (e.g. large forested land areas and biodiversity) should therefore be more likely to participate in environmental treaties than those of little global environmental significance.

As a response to the perceived shortcomings of realism, *rational choice institutionalists* have made it their central preoccupation to explain the flowering of *voluntary* international cooperation. Faced with the spread of international law, institutions, and organizations, scholars from this camp have offered a functional explanation for the creation, maintenance, and implementation of international regimes.<sup>24</sup> Specifically, they posit that under conditions of interdependence, uncertainty, and high transaction costs, states actually need institutions (or regimes—the terms are used interchangeably here) to facilitate cooperation. By increasing transparency and providing reliable information, monitoring and verifying state behavior, assisting implementation, and sanctioning non-compliance, institutions help states to move away from pursuing relative gains—where “my gain is your loss”—toward positive-sum outcomes.<sup>25</sup> In short, institutions help states overcome collective action problems and promote their shared interests in a shifting and complex world. International treaties are similarly understood as functional solutions to efficiency problems.<sup>26</sup> Lipson explains that when treaties are *ratified*,

states wish to signal their intentions with special intentions and gravity . . . The decision to encode a bargain in treaty form is primarily a decision to highlight the importance of the agreement and, even more, to underscore the durability and significance of the underlying promises . . . The effect of treaties . . . is to raise the political costs of non-compliance. The cost is raised not only for others, but also for oneself. The more formal and public the agreement, the higher the reputational costs of non-compliance.<sup>27</sup>

The rub, however, is that the prospects for international cooperation fundamentally depend upon the credibility of state commitments.<sup>28</sup> If a state’s will-

22. Mitchell 2002b.

23. There appears to be virtually no disagreement among IEP analysts that the revealed environmental policy preferences of wealthy OECD countries have coalesced around issues of *global* concern (Keohane and Levy 1996; Nielson and Tierney 2003; and Parks et al. No Date).

24. Keohane 1982, 1984; Axelrod 1984; Oye 1986; and Yarborough and Yarborough 1990.

25. Young 1994.

26. Keohane 1997; Abbott and Snidal 2000; and Simmons 2000.

27. Lipson 1991, 508.

28. Oye 1986; Keohane 1988; and Martin 2000. We define a credible commitment as the belief by one party to an international agreement that a potential cooperator will live up to their end of

ingness or ability to implement an international environmental policy is weak, or even in question, institutionalists argue that cooperation is unlikely. We would therefore expect a state's propensity to ratify environmental treaties to positively correlate with our measures of credibility.<sup>29</sup> To be sure, multiple observable implications follow from this hypothesis. Some authors emphasize how *international* factors—for example, interdependence, the stability of institutional environments, and reciprocity—affect the credibility of state commitments,<sup>30</sup> while others focus on *unit-level* explanations. Within the latter camp, “new institutionalism” has undoubtedly yielded the most consistent predictions and persuasive findings.<sup>31</sup>

Here we have chosen three variables that condition the ability of a sending state to convince a receiving state that it will indeed implement the policy adjustments required by an environmental agreement. As proxies for willingness, we use measures of environmental vulnerability and civil society strength. And to capture elements of willingness *and* ability, we include an indicator of “voice and accountability.”<sup>32</sup> Nations experiencing high levels of environmental vulnerability, we predict, will demonstrate a greater willingness to take on international environmental commitments. Unlike theories that causally privilege the spread of global environmental norms or external coercion, a functionalist approach suggests that one's international environmental policy may reflect the degree to which environmental degradation impinges upon national welfare. As Sprinz and Vaahtoranta<sup>33</sup> put it, “the worse the state of the environment, the greater the incentives to reduce the ecological vulnerability of the state.” However, state preferences are obviously a function of more than just vulnerability. Some states face robust domestic environmentalist pressure, while in many other countries civil society has languished for generations. Following Dalton,<sup>34</sup> we argue that “the existence of an active environmental movement is a sign of the public's interest in environmental issues, as well as a stimulant for

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the bargain. Credibility, then, requires that the receiving state make a positive assessment of the sending state's willingness and ability to carry out its promises (Schelling 1960).

29. Following Simmons (2000, 819), we assume that “the acceptance of treaty obligations [represents] . . . a bid to make a credible commitment to a particular policy stance . . . that, once made [is] reputationally costly for governments to violate.” However, some treaties also impose *economic* costs on defectors. The Montreal Protocol is said to hold a credible punishment technology by issuing both trade sanctions and providing environmental assistance, thus “ensur[ing] that no developing country or transition economy will lose by being party to the agreement . . . [and] any country will lose by not signing” (Barrett 1999, 216). For a large-*n* quantitative look at the relationship between environmental aid and environmental treaties, see Parks et al. No Date.

30. Axelrod and Keohane 1986.

31. New institutionalists have studied the relationship between state credibility and electoral structure (Cowhey 1993), regime type (Lake 1991; Fearon 1994; Martin 2000; and Schultz and Weingast 2003), ideological orientation (Simmons 1994), transparency and government effectiveness (Tierney 2003).

32. Note that many of these unit-level characteristics are ascriptive, rather than behavioral. As our argument unfolds, it will become increasingly clear why this is such an important distinction.

33. Sprinz and Vaahtoranta 1994, 79.

34. Dalton 1994, 1.



politicians and the public to pay even greater attention to environmental concerns." Intuitively one might think that the number of domestic environmental nongovernment organizations (NGOs) would be an ideal proxy, but the definition of "environmental" NGO has become increasingly fuzzy. In the developing world, where the natural environment is often situated in a broader social context, NGO work tends to cut across issue areas and not lend itself to simple categorization. Therefore, as a next-best measure, we take the total number of NGOs as a measure of a nation's civil society, as a proxy for environmentalist pressure.<sup>35</sup>

Our third hypothesis concerning the domestic sources of credibility is a new institutionalist one, drawing on the body of scholarship that addresses regime type. Lake,<sup>36</sup> Fearon,<sup>37</sup> Gaubatz,<sup>38</sup> Leeds,<sup>39</sup> Martin,<sup>40</sup> Mansfield et al.,<sup>41</sup> Schultz and Weingast,<sup>42</sup> Jensen,<sup>43</sup> and Tierney<sup>44</sup> all suggest that states with strong democratic institutions are more likely to make credible international policy commitments.<sup>45</sup> Where such open and responsive domestic political institutions are in place, it is thought that the "domestic audience costs" of defection are higher.<sup>46</sup> With re-election weighing heavily on the minds of elected representatives, "democratic leaders make only the commitments that they can keep, and once made will tenaciously attempt to comply with those commitments."<sup>47</sup> Conversely, where there are no clear lines of political accountability, defection is relatively costless and therefore common.

To be clear, new institutionalism makes no substantive claims about international *environmental* commitments. The relationship is thought to hold across issue areas. Neumayer<sup>48</sup> has recently put forth an alternative explanation that hinges on the uniqueness of international environmental agreements. He proposes that "in democracies citizens are better informed about environmental problems (freedom of press) and can better express their environmental concerns and demands (freedom of speech), which will facilitate an organization of environmental interests (freedom of association), which will in turn put pres-

35. The underlying assumption is that receiving states strategically assess their potential cooperator's environmental vulnerability and civil society strength to determine credibility.

36. Lake 1991.

37. Fearon 1994.

38. Gaubatz 1996.

39. Leeds 1999.

40. Martin 2000.

41. Mansfield et al. 2002.

42. Schultz and Weingast 2003.

43. Jensen 2003.

44. Tierney 2003.

45. Lisa Martin's book *Democratic Commitments: Legislatures and International Cooperation* is perhaps the most thorough treatment of this popular hypothesis.

46. Fearon 1994.

47. Tierney 2003, 50. Implicit in the logic of this argument is that democratic leaders who take on treaty obligations are willing and able to implement their commitments. If this is indeed true and the empirical evidence matches our theoretical expectations, there would be greater reason to celebrate the current push for democratization in the developing world.

48. Neumayer 2002.

sure on policy entrepreneurs operating in a competitive political system to respond positively to these demands (freedom of vote).<sup>49</sup> Though data limitations do not permit a satisfactory discriminating test at this time, we strongly suspect that Neumayer's argument will not survive serious scrutiny. There is a well-established theoretical and empirical body of scholarship supporting a general link between democracy and credibility. Democratic leaders are better able to carry out their military, trade, investment, aid, and debt commitments.<sup>50</sup> Neumayer's idiosyncratic interpretation is therefore at best observationally equivalent and at worst a spurious correlation.<sup>51</sup>

### A New Direction: Insights from World-Systems Theory

Realism, constructivism, and rational choice institutionalism all explain the proximate political reasons for state participation in environmental treaties, but leave unanswered the deeper questions of how states came to be in their global positions in the first place. Institutionalism, in particular, has provided parsimonious and powerful models of international environmental cooperation, and we recognize its achievements.<sup>52</sup> However theories are only as useful as what they attempt to explain, and institutionalism only sheds light on interstate *managerial* problems.<sup>53</sup> The now orthodox notion that solving international environmental problems is a matter of engineering efficient institutions—to increase information, decrease transaction costs and uncertainty, facilitate implementation, and reduce the risk of opportunism—is frankly an artifact of the historical era in which institutionalist theory grew up. Institutional analysis originally sought to explain puzzles of international political economy—why,

49. Neumayer 2002, 140. This alternative argument suggests that democracies will implement better domestic *and* international environmental policies. The author thus ignores a large body of evidence in the international relations (IR) literature on why democracies are better able to make international policy commitments (of all types). For Neumayer, the defining characteristic of democracy is that they enable environmentalists to influence policy-makers, not that they increase the credibility of state commitments.

50. Lake 1991; Fearon 1994; Gaubatz 1996; Leeds 1999; Martin 2000; Mansfield et al. 2002; Schultz and Weingast 2003; Jensen 2003; and Tierney 2003.

51. A further problem exists with Neumayer's methodology. While the results of his large-*n* empirical study appear robust, the left side of his equation raises serious cause for concern. Participation is measured for only four environmental agreements—the Kyoto Protocol, the Montreal Protocol, the Rotterdam Convention, and the Cartagena Protocol—and the domain of cases to which the argument applies is not made clear.

52. For two excellent reviews of the literature, see Mitchell 2002b and Zürn 1998. Notable institutionalist contributions include Haas 1990; Hurrell and Kingsburg 1992; Haas, Keohane and Levy 1993; Keohane and Levy 1996; Mitchell 1994; Schreurs and Economy 1997; Brown Weiss and Jacobson 1998; Young 1989, 1994; Sprinz and Vahtoranta 1994; Victor et al. 1998; and Wettestad 1999.

53. Like the drunk who searches for his keys beneath the lamppost "because that's where the light is," rational choice institutionalism's inability to explain the deeper social determinants of environmental degradation is more a reflection of its epistemological and ontological limitations than some egregious oversight on the part of its proponents. As Snidal (2004, 227) puts it, "[models] are descriptively incomplete and even inaccurate, yet they are tremendously valuable." Indeed, a "good model is a radically simplified description that isolates the most important considerations for the purpose at hand" (2004, 231).



for example, states ever cooperated for mutual economic gain under conditions of anarchy.<sup>54</sup> So when growing global interdependence began to create severe environmental problems, institutionalists instinctively turned to textbook models of collective action.<sup>55</sup> But the managerial approach, while providing “solutions” to particular environmental problems, does not address the role that existing social structures play in producing and reproducing environmental degradation and non-participation in international governance.<sup>56</sup>

In the context of our study, this means that if developing countries are indeed less likely to participate in environmental treaties because of credibility concerns, we must then ask how they “acquire” credibility. Put differently, we must bridge the gap between structure and agency by accounting for environmental policy behavior in the world *as it exists*, where rationality is conditioned by the experience of repeatedly losing out in efforts to better one’s nation’s position in the world system.<sup>57</sup> Developing countries face unique structural constraints. These include the unpredictability and long-term decline in the prices of their crucial export commodities, internally-unarticulated economies, and feeble post-colonial government institutions, all of which limit their ability to implement good environmental policies and participate in treaty drafting conferences. They also suffer worst and first from deforestation, land degradation, pollution from mining, agriculture, and manufacturing for export, as well as so-called “collective bads” shared across boundaries.<sup>58</sup> Yet curiously, the overwhelming impression one gets from the extant IEP literature is that states are making rational choices in a vacuum.

We need, then, to press backwards from institutionalist theories which explain treaty participation as a result of environmental vulnerability, domestic political institutions, and pressure from civil society (among many other ascriptive factors), to understand the “structural roots” of national preferences and capabilities. We needn’t reinvent the wheel, as there are decades of accumulated debate on the topic. Most helpful for our project are political economic ideas loosely associated with “*world-systems theory*,” which attempts to explain the development and persistence of global inequality.<sup>59</sup> In a useful review, Thomas Shannon argues that world-systems theory has four pillars: its attention

54. Keohane 1984.

55. For example Young 1989; Hurrell and Kingsburg 1992; and Haas et al. 1993.

56. Roberts and Parks No Date.

57. Most social scientists, we suspect, would agree (at least in principle) that an understanding of agency and structure is necessary to any meaningful representation of our socially complex world (Dessler 1989; Granovetter 1985; and Wendt 1987). Yet the IR and IEP literatures are awash with rational choice theorization, which denies by omission the structural positions in which choices are made.

58. Roberts and Thanos 2003; and Parks and Roberts No Date.

59. Some useful sources are the review by Shannon 1996; Wallerstein 1974, 1979; Chase-Dunn 1989; and pieces in Roberts and Hite 2000. The world-systems literature has not addressed environmental treaties, and some authors may believe, with realists, that such treaties are mere epiphenomena, corporate and national obfuscations of power relationships. Again, we take an agnostic approach, attempting here to explain participation without judging value.

to structural constraints on nations; its attention to history and especially colonialism; its interest in material exchange; and its global focus.<sup>60</sup>

*Structuralism* is one of the most important postulates of world-systems theory, with its argument that national development cannot be understood in isolation from the global system where other nations wield greater economic and military power.<sup>61</sup> Any number of words describes the disparity: a small number of “developed,” “high-income,” or “core” nations sit atop a pyramid of wealth and power, while vast numbers of “underdeveloped,” “low income,” or “peripheral” nations sit at the bottom. Countries between them are “in development,” “middle income,” or “semi-peripheral.” This global “structure” of inequality is a central concern of world-systems theorists. It was not coincidence that Europe developed during the times of colonial conquest: it developed *because* it was extracting the wealth of the colonies. Colonial relationships placed host economies at a sharp disadvantage, as they were routinely forced to specialize in low-value commodities and trade only with and on the terms of their colonial powers. Even in later years when they mounted drives to develop their national industries, poorer nations did so in a world where there were already powerful economic players with developed industrial bases and relatively overwhelming military might.

World-systems theory was an elaboration and Americanization of dependency theory, which was developed in Latin America in the 1950s and 1960s. However, dependency theory did not have one singular line, as is often portrayed. Rather, theorists of this stripe shared the belief that states were constrained by the global capitalist system, but drew quite different conclusions from this starting position. Radical dependency theorists like Frank believed that nations had to close themselves off from that system in order to advance their development. More moderate “structuralists” such as Raul Prebisch, Hans Singer, and Fernando Henrique Cardoso argued that limited but significant “dependent national development” could occur with strategic actions by states within their global constraints.<sup>62</sup>

In response to the critique that dependency theory failed to offer testable hypotheses, one group of US scholars has moved away from descriptive methods and developed more sophisticated statistical tools designed for cross-sectional and longitudinal analysis. The field has also gone well beyond the common “straw-man” portrayal of dependency and world-systems theories as deterministic and disproven by the upward mobility of individual states such as the United States, Japan, South Korea, or Hong Kong. The theory does not argue that such mobility is impossible, only that it is rare. In fact the cycle of hegemony among “core” wealthy nations *requires* mobility. Like a nation’s internal class structure, the overall structure of the world stratification system stays in place, even while certain nations ascend and descend. What has occurred in the pro-

60. Shannon 1996; see also Roberts and Grimes 1999.

61. Braudel 1981; Wallerstein 1972; and Frank 1969.

62. Cardoso and Faletto 1979; Evans 1979; Kay 1998; and Roberts and Hite 2000.

cess of refining and systematizing some of these earlier arguments is that the majority of nations now are viewed as operating within the constraints of a “development path” or trajectory. There are paths of development based on types of specialization in exports and state strategies for their participation in the economy and global political system.<sup>63</sup> A few paths provide a few nations upward mobility in certain historical moments; most do not. Realists, of course, similarly stress how power structures constrain state behavior, but offer little insight into how economic forces shape the social relations of production in the international system.

Though world-systems theory has fallen out of favor among many international relations theorists, this shift can hardly be attributed to a lack of empirical evidence. A 2001 report from the World Bank confirms Raul Prebisch’s observation a half century ago that poor nations’ export commodity prices tend to consistently fall relative to the prices of items exported by wealthy nations.<sup>64</sup> Indeed, the most reliable econometric studies indicate that countries suffering from terms-of-trade deterioration, especially natural resource and agricultural commodity exporters, experience consistently lower levels of economic growth.<sup>65</sup> “Extractive states” are also infamous for their feeble domestic institutions which tend to lead to authoritarianism and corruption for a variety of reasons:<sup>66</sup> large resource rents may provide government officials with enough money to suppress civil society’s desire for democracy; windfall profits (seen especially from oil) tend to promote patronage and edge ordinary citizens out of public participation; and, crucially, resource booms often relieve government officials of their usual need to raise taxes.<sup>67</sup> Finally, as a stylized fact, primary commodity production generates very few backward and forward linkages in the economy, which in turn leads to internally-unarticulated economies and low levels of resilience to external shocks.

The curses of the global South are many, and with them come severe environmental consequences. In particular, chronic underdevelopment sharpens

63. Gereffi and Wyman 1989; and Gereffi and Korzeniewicz 1994.

64. “During the twentieth century, non-oil commodity prices fell about one percent per year relative to the prices of manufactures . . . Since the peak of real non-oil prices in the early 1970s and the peak of oil prices in 1980, real prices of both have declined by about two-thirds . . . These trends are expected to continue and lead to continued declines in real commodity prices over the long run” (World Bank 2001, 213). Observing a downtrend in the price of primary commodities and a steady improvement in the price of industrial manufactures, Prebisch and colleagues at the UN’s Economic Commission on Latin America argued that even with aggregate growth in global GDP, some nations would grow and others would stagnate (or decline) due to the type of “natural comparative advantage” they held (Prebisch 1950).

65. Reporting these relations for terms of trade are Barro and Sala-i-Martin 1995; and Mendoza 1997; for natural resource exporters are Auty 2001; Leite and Weidmann 1999; and Sachs and Warner 1999.

66. Ross 1999; Leite and Weidmann 1999; Karl 1997; Auty 2000; Acemoglu et al. 2001; and Bunker 1985.

67. Since taxation and representation have historically gone hand in hand, this “insulation effect” may make constituents “less likely to demand accountability from . . . their government” (Ross 1999, 332).

the logic of searching for quickly exportable commodities that often harm the environment, perpetuating a vicious cycle.<sup>68</sup> States beholden to narrow groups of “export elites” also tend to have ineffective and corrupt bureaucracies and therefore little capacity to deliver public goods, including environmental protection.<sup>69</sup> Without recognizing these constraints, our collective understanding of the causes and consequences of environmental degradation and retrogressive environmental policy will remain theoretically-lopsided and empirically frail. On the rare occasions when institutionalists have discussed social structure, they have done so only in vague terms.<sup>70</sup>

Second, world-systems theorists would charge that many models of mainstream international relations and economics have done violence to the *historical context* in which social events take place.<sup>71</sup> Prominent world-systems theorists such as Wallerstein, Braudel, Chase-Dunn and Frank all have taken deep historical approaches to explaining current national relations to the world economy, and some scholars have begun to do the same for understanding environmental degradation and state response in the world system.<sup>72</sup> Though each author focuses on specific regions and/or time periods, the basic story is the same: repressive labor relations were established in colonized nations which were forced to specialize in raw materials exports, usually mining or plantation agriculture commodities. Trade relations were extremely unfair, and, if anything, these inequalities have been reinforced.<sup>73</sup>

From the perspective of international relations, then, we believe that the value-added of world-systems theory is that it endogenizes state preferences and capabilities, explaining many of the variables that institutionalists take as given.<sup>74</sup> In this article, we seek to use this historical approach to explain why some nations have particularly vulnerable natural environments, feeble domes-

68. Arden-Clarke 1992.

69. Evans 1995; and Karl 1997.

70. Haas et al. (1993, 7), for instance, make mention of “population pressures, unequal resource demands, and reliance on fossil fuel and chemical products,” but these factors are presented as unrelated, free-floating, and theoretically ungrounded. They do acknowledge that “while environmental degradation is ultimately the result of aggregated individual decisions and choices, individual choices are responses to incentives and other forms of guidance from governments and other national institutions via laws, taxes, and even normative pronouncements” (1993, 7). Yet notably, no mention is made of the *international* structures that guide behavior.

71. Snidal (2002, 73) provides excellent commentary on this point. In a discipline increasingly dominated by regression equations, one commentator jokes, “History is irrelevant, . . . except when it provides a longitudinal data set” (Halliday 1995, 738) Another writes that “if history mattered at all it was a data field to be mined, for cases to be shoehorned in the pursuit of grand theory building.” (Barnett 2002, 100).

72. Barnham, Bunker, and O’Hearn 1994; Bunker 1985; Shafer 1994; Chew 2001; and Roberts and Grimes 1999.

73. Despite the fact that virtually no industrialized country ever developed by pursuing their static comparative advantage, current multilateral, regional and bilateral arrangements on trade, investment, and intellectual property rights provide strong incentives for developing countries to do precisely that (Wade 2003; Chang 2002; and Rodrik 2001).

74. History is a therefore a theoretical starting point, not just evidence to be marshaled in support of extant theories.

tic political institutions, and unorganized civil societies. Following Acemoglu et al.,<sup>75</sup> we argue that in places where colonists focused mostly on *extraction*—measured as the narrowness of one’s export profile—domestic institutions (such as voice and accountability and government effectiveness) will be weakest. Long legacies of resource extraction will also correlate with higher levels of environmental vulnerability.<sup>76</sup> Finally, civil society, we expect, will be weakest where entrenched “export elites” are strongest.<sup>77</sup> Of course, sometimes historical legacies are not amenable to quantitative analysis. While also faulted for excessive empiricism, world-systems theory often attempts with current statistics to capture the legacy of historical trends. When historical data cannot be found or utilized, we argue that historical knowledge must inform current analysis. Here we use the lack of a diversified export base as a proxy for a nation’s repressive colonial legacy.

Third, world-systems theory’s *materialism* can clarify the relation between economic and environmental relationships, since human actions based on subsistence (as socially-defined and ever changing) and profit-making are the core of the economy. Political and cultural structures are also built around the needs of the economy.<sup>78</sup> Again, the unique world-systems contribution to that discussion is that much production activity is either directly for trade or designed to facilitate trade and/or make it more profitable. Such can arguably be said of most military foreign policy. As sourcing and production sites move farther and farther around the globe, this is increasingly the case.

The relations of extraction, production and consumption between core and peripheral nations have shifted but not reversed since colonial times. The core wealthy nations import raw materials and export high value services and industrial manufactures, while governing powerful financial institutions. The poor peripheral nations export their natural resources and some supply cheap labor directly to manufacturers. Importantly, the volatility and periodic collapse of prices for their very few exports often leads many poor nations to *increase* the extraction and sale of material goods that they are already selling near a loss.<sup>79</sup> Semi-peripheral middle-income nations lie somewhere in between, with some industry, higher value services, and a partially diversified export structure.

What’s more, rich nations increasingly import most of the *material- and energy-intensive* goods that their lifestyles require from the global South.<sup>80</sup> Two

75. Acemoglu et al. 2001.

76. Parks and Roberts 2003.

77. Roberts and Grimes 1999.

78. Roberts and Grimes 1999. Also see Gilpin 1987; Foster 1994; Harper 1996; and Paterson 2000. World-Systems Theory emerged in opposition to cultural and stage theories of development, especially modernization theory, and this explains perhaps why world-systems theorists have “foregrounded” economic structures as determinant while expressing an aversion to cultural explanations. This aversion may go too far.

79. Roberts and Thanos 2003.

80. Fischer-Kowalski and Amman 2001; Muradian and Martinez-Alier 2001a, 2001b; and Martinez-Alier 2002.

thirds of all primary commodity exports come from the Third World.<sup>81</sup> But dollar figures mask even deeper environmental inequalities. When national export-import ratios are measured in terms of *physical weight*, the developed world becomes a much greater net-importer of environmentally-intensive products.<sup>82</sup> What this implies is a new round of “peripheralization” of environmental burdens.<sup>83</sup> That is, rich nations are increasingly “out-sourcing” the material consequences of the goods and services they consume. The overall pattern is clear—the shifting of industrial pollution and the damage of resource extraction from the world’s core nations to the “periphery.”

Finally and perhaps most challenging, is Ferdinand Braudel’s admonition to think in *global* terms. Braudel<sup>84</sup> argued that no description of development and social change can even begin to lead to a valid explanation if it does not effectively encompass the whole world. Without allowing ourselves to be overwhelmed by these words, Braudel’s proposition implies that we cannot limit ourselves to looking at the relation of one community or nation to the environment, but that we must also understand how they are linked to larger social organizations and the global society, and how they collectively influence and are influenced by the environment. To understand why poor and rich countries decide to devastate their soils and contaminate their rivers with agrottoxins or air pollutants, we need to understand the pressures they are under to compete in a shifting global economy.

Many authors in the world-systems tradition argue that the current wave of globalization is nothing new, pointing out the 500 or 5000 years of capitalism’s globalizing project,<sup>85</sup> or that international trade was as important in the economy of 1900 as it is today.<sup>86</sup> However, others insist that there is something new going on: some of the original colonial contacts as they were established involved the trade of a relatively small number of products, whereas the current phase of globalization includes new types and levels of influence that cross national boundaries and continents.<sup>87</sup> Transnational environmental linkages may illustrate this “thickening” of globalism best. As we have already seen with the concept of “environmental space,” it has literally become the case that the consumption of resources by one society can have profound economic, social, political, institutional, and environmental effects on other human beings thousands of miles away.<sup>88</sup>

81. Arden-Clarke 1992.

82. In 1998, the richest twenty percent of the world’s population consumed 46% of all meat and fish, 65% of all electricity, 58% of all energy, 74% of all telephones, 84% of all paper and 87% of all cars. The poorest twenty percent, by contrast, consumed less than 10% of all these products (UNDP 1998). See also Andersson and Lindroth 2001; and Fischer-Kowalski and Amman 2001.

83. Martinez-Alier 2002.

84. Braudel 1981.

85. Frank and Gills 1993.

86. Chase-Dunn 1999.

87. For example McMichael 2001; Sklair 2002; and Roberts and Hite 2000.

88. Spangenberg 2002; and Roberts and Parks No Date.



### Modeling Environmental Treaty Ratification

This section links these theories to our measures and hypotheses, and moves on to model-building and our predicted empirical results. Beyond institutionalism's focus on how qualities of the state and society determine treaty participation, world-systems theory provides us with three important insights. First, it offers a theory for why international inequality matters in how states behave. Second, it proposes explanations of how that inequality developed. Third, it has suggested a direction for the type of measure we might seek to show the lingering impacts of colonial history, one of which is the level at which a nation is dependent upon a small number of exports for its foreign exchange.

As we've discussed above, the historical legacy of a country's "incorporation" into the global economy has a critical impact on the avenues of development which are available to it. This legacy helps to shape the types of products a country makes, the conditions for both capital and labor there, which commodities are traded and with whom, as well as its global power vis-à-vis other nations. In terms of its direct effect, we expect that a "colonial" insertion into the world economy (reliance on the export of a few, barely processed raw materials) will negatively influence a nation's environmental policy. Countries facing severe commodity volatility, declining terms-of-trade, and relatively slower economic growth will have fewer resources and thus fewer opportunities to participate in international environmental agreements. Dominant "export elites" in these countries will also have a strong interest in seeing that environmental policy does not improve. Our (admittedly imperfect) measure to test all these impacts of colonial legacy is the United Nations Conference on Trade and Development (UNCTAD)'s index of export diversification.

Indirectly, we also expect that colonial "overhang" will have strong effects on governmental policies towards the environment, decisions by firms within countries, and the life conditions of its peoples. In other words, we expect that the consistently impoverishing colonial legacies will affect a state's *ability* to participate in environmental accords. "Core" nations, for example, will be more likely to have strong civil societies and responsive governments that seriously take into consideration the requests of environmentalists, whereas "peripheral" nations will be less likely to. We also expect that a nation's path of development will have strong *indirect* effects on its willingness to make international environmental commitments. Elsewhere, Roberts, Grimes, and Manale proposed that behind the dual restraint of workers and environmentalists lay the interests of local ruling classes, transnational corporations, and governments in sustaining both the profitable structures of internal production and the links between these structures and the world economy.<sup>89</sup> Here we test that proposition's value in explaining treaty participation.

89. Roberts et al. 2003; and Roberts and Grimes 1999; see also Sklair 2002.

As we described above, nations with high levels of “structural vulnerability” because of their dependence on a small number of largely unprocessed goods face 1) empty (and/or unreliable) coffers, and 2) substantial export elite pressure to not implement environmental policies. Therefore, our prediction is that a nation’s level of participation in environmental treaties will be negatively correlated with a narrow export structure. As we discussed above, countries highly dependent on a few exports typically have a noticeable exporting sector elite that depends on the state and its rents,<sup>90</sup> which in turn suppresses civil society.<sup>91</sup> Not surprisingly, these “weak states”<sup>92</sup> are also infamous for their feeble domestic political institutions, which is relevant to our study because repressive, unaccountable governments may have a greater ability to ignore the demands of environmentalists. Operationalizing such complex domestic institutional variables for comparative research may be impossible, but here we utilize Kaufmann et al.’s index of “voice and accountability” as it seems to best capture the concept of government responsiveness.<sup>93</sup>

These arguments lead us to propose three possible indirect paths of causation of environmental treaty ratification. First, the narrowness of a nation’s export base will be negatively correlated with measures of domestic voice and accountability. Domestic voice and accountability will in turn be positively correlated with the degree of domestic civil society mobilization, as measured by the total number of NGOs in a nation.<sup>94</sup> Less responsive governments resulting from colonial legacies will be less concerned with the demands of civil society, including those of environmentalists. Therefore these nations will be less likely to ratify environmental treaties. “Unaccountable” states, we theorize, will have a direct impact on treaty participation and an indirect impact conditioned by the strength of civil society groups. Controlling for voice and accountability, we expect civil society (and particularly high levels of domestic environmental-

90. See Karl 1997; Shafer 1994; Barnham et al. 1994; and Roberts and Grimes 1999.

91. Raymond Vernon’s work (1993) also suggests that to understand a country’s willingness or hesitance to participate in global environmental agreements, one needs to pay attention to the structure of the state and its dependence on the “polluting elites” that are tied to these export sectors. Vernon’s analysis points out the complexities of the internal political structures that affect approaches taken by states, especially whether the division of powers among its branches influences the country’s negotiating flexibility.

92. Krasner 1985; and Katzenstein 1985.

93. Kaufmann et al. 2002. The list of possible indicators of that internal climate is potentially endless, but here we have chosen Kaufmann et al.’s carefully constructed measure, which “captures both the degree to which citizens choose those who govern them and the independent role that the media plays in keeping government accountable. This measure represents an aggregation of numerous political rights, civil liberties and political process indicators from various think tanks, NGOs and risk rating agencies.”

94. Unfortunately, no indicators yet exist over a sufficient number of countries for the number of domestic environmental NGOs nor levels of environmental activism (see for example, Dunlap et al. 1993). Frank (1999) uses number of international scientific and environmental organization memberships by a nation. We consider this an inadequate proxy of environmental activism by civil society groups since it excludes domestic environmental NGOs.

ist pressure) to induce greater participation in international environmental accords.<sup>95</sup>

We also control for external pressure from “world society” and powerful rich nations. Based on constructivist claims, we predict that international environmentalist pressure on a country will positively affect its ratification of environmental treaties.<sup>96</sup> Here we have chosen data on national memberships in international environmental NGOs from Meyer et al. 1997. Following realist theory, we also expect rich nations—concerned with their own security and well-being—to employ heavy-handed coercive tools against countries perceived as having *global* environmental significance (e.g. Brazil, Indonesia, and China). For this variable we take a nation’s “natural capital” as a proxy for external pressure placed on nations by outsiders to deal with environmental problems.<sup>97</sup> Brazil is an obvious example, since it has the huge Amazon forest and faces continuing pressures from outsiders to protect it.

Finally, though it may seem counterintuitive, colonial legacies might actually have a positive effect on environmental treaty participation if one closely follows the logic of world-systems theory. That is, if having a relatively undiversified export structure does indeed spell environmental disaster,<sup>98</sup> non-core states should theoretically be more open to (potentially mitigating) environmental cooperation and policy reform. That is, countries with poor ecological conditions may be more likely to yield national sovereignty to international environmental institutions to promote potentially helpful interstate agreement. Therefore our third prediction is that the narrowness of a nation’s export base—often associated with raw materials extraction and/or dirty industries—will be correlated with a poor ecological well-being. We conceptualized the ecosystem wellbeing index (EWI) from Prescott-Allen<sup>99</sup> as an indicator of national environmental vulnerability and overall condition of the environment. Note that this index is in reverse direction, with high scores indicating poor “ecosystem wellbeing.” Our overall predicted path model is shown in Figure 1.

## Findings

With caveats about the important limitations to cross-national analysis of a complex conjunctural issue,<sup>100</sup> the findings confirm the value of path analysis

95. Haas et al. 1993. At the same time, it is plausible that absent open and accountable government, civil society’s voice will be ignored or marginalized.

96. Meyer et al. 1997; and Frank 1999.

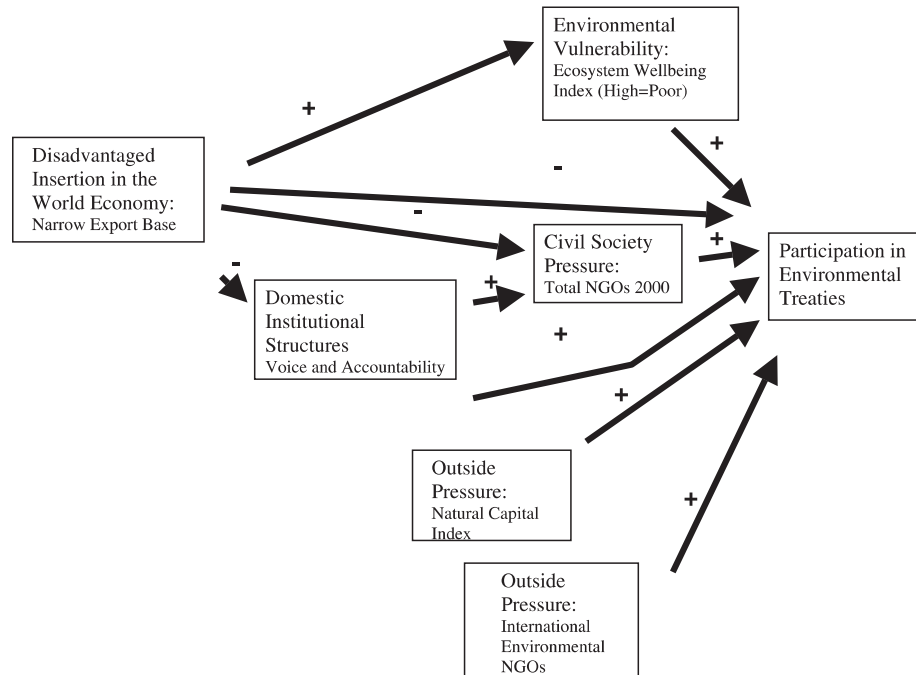
97. Rodenburg et al. 1995.

98. Roberts and Grimes 1999.

99. Prescott-Allen 2001.

100. Data for a few variables was lacking in non-random ways for different sets of countries. In this less-than-ideal situation we believe pairwise deletion of missing data creates less bias in the sample. By this method all cases which have data for any two of the variables is used to determine the relationship between these two, and that information is used to estimate the overall model.

**Figure 1**  
 Predicted Direction of Causation of Environmental Treaty Ratification



and the importance of institutional and structural causation of the proximate forces driving treaty ratification (Table 1; Figure 2). The full regression equation (Column 4 in Table 1) suggests that over three-quarters of environmental treaty ratifications can be explained by essentially three variables: the narrowness of a nation's export base, the voice and accountability of citizens through their domestic institutions, and the total number of NGOs in the nation. In particular, the number of NGOs in a nation appears virtually synonymous with its likelihood to participate in environmental treaties.

While all correlated at the bivariate level with a nation's propensity to ratify treaties, the other variables—natural capital, international environmental NGOs and environmental vulnerability—lose all explanatory power when we consider the impacts of dependency and its effect on domestic politics. This suggests why international pressure from civil society is successful only in certain cases to encourage nations to participate in environmental treaties: in many cases local groups do not have a voice or, more fundamentally, cannot organize. Another important finding is that narrowness of the export base, which we use as a proxy for peripheral dependency in world-systems terminology, strongly predicts environmental vulnerability. However, environmental vulner-

ability has little impact on whether nations actually ratify treaties to address those problems.

At first glance, a major unexpected finding appears in the full regression model (Column 4: Table 1): that narrow export base is associated with a *higher number* of treaties ratified by nations. However, closer analysis suggests the imperative of examining indirect routes of causation from structural dependency to treaty participation. The *overall* effect of a nation's disadvantaged position in the world-economy is *negative*, if one considers the three other pathways we theorized in Figure 1. That is, the narrowness of the export base predicts both the strength of civil society and domestic political institutions.<sup>101</sup> Adding these indirect effects (Table 2) entirely outweighs the positive relation seen in the final model.<sup>102</sup> The overall picture is that narrow export base—our proxy for disadvantaged position in the world-economy—explains nearly six-tenths of national propensity to sign environmental treaties. While NGO numbers are closely correlated with treaty ratification, we have apparently revealed an important part of the structural roots of that civil society strength. Adding the direct path and indirect path through domestic institutions, one's export profile explains eighty percent of the number of NGOs in a nation.<sup>103</sup>

### Discussion and Conclusion: Institutionalism, Structuralism and Environmental Treaty Ratification

Though there are limits to international environmental accords, and noted problems associated with their implementation and enforcement, they remain

101. New institutionalist critics may suggest that the more relevant domestic institutional variable is the ability of governments to effectively and dependably deliver public goods. Environmental protection is, after all, the archetypal public good and requires strong state capacity. We shared the same suspicion, and Kaufmann et al.'s (2002) measure of "government effectiveness" seemed ideal for testing this alternative hypothesis. Combining measures of "the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies" (2002), their index captured many of the characteristics that we would expect a "willing and able" government to possess. When we replaced "voice and accountability" from the *Governance Matters* database with the "government effectiveness" metric, and held all else constant in models 1, 3, and 4, we found remarkably similar results. In the first model, our "insertion into the world economy" measure had a statistically and substantively significant effect (-.565) on government effectiveness, accounting for 31 % of the total variance in our treaty ratification measure. In model three, government effectiveness and "insertion in the world economy" were both statistically and substantively significant and explained 74% of the variance (adjusted  $r^2 = .745$ ). Both of these models performed similarly to the original models 1 and 3. Yet interestingly, in model 4, only export diversification and civil society strength were statistically and substantively significant, accounting for 74% of the variance (adjusted  $r^2 = .749$ ). Government effectiveness did, however, exhibit a .622 bivariate correlation with the environmental treaty ratification index (adjusted  $r^2 = .383$ ).

102. We follow Boswell and Dixon (1990) in this presentation of the method of calculating total effects in path analysis.

103. The size of a nation's population is a significant predictor of its export diversification, but the  $r$ -squared is very small (.035,  $n = 119$ ;  $p > .05$ ). Total population explains only 2 percent of treaty ratifications ( $r^2 = .018$ ;  $n = 186$ ;  $p > .05$ ). Population explained less than 3 percent of the count of NGOs in a nation ( $r^2 = .028$ ;  $n = 161$ ;  $p > .05$ ).

**Table 1**  
Standardized Regression Coefficients and (t-ratios) for Environmental Treaty Participation Index and other dependent variables. Cases deleted pairwise.

<i>Independent Variable</i>	<i>Dependent Variable</i>			
	1 Domestic Institutions	2 Ecosystem Wellbeing Index	3 NGOs 2000	4 Enviro Treaty Ratif's
Narrow Export Base (Export Diversifica- tion Index)	-.543*** (-6.69)	.461*** (5.50)	-.633*** (-9.62)	.296** (3.53)
Domestic Institu- tional Structures (Voice and Account- ability Index)	—	—	.300*** (4.56)	.145* (2.22)
Civil Society Pressure (No. of NGOs 2000)	—	—	—	.980*** (7.33)
Environmental Vul- nerability (Ecosystem Wellbeing Index)	—	—	—	.042 (-0.74)
Outside Pressure (Natural Capital Index)	—	—	—	.002 (0.04)
Outside Pressure (International Enviro NGOs)	—	—	—	.001 (0.01)
Adjusted R <sup>2</sup>	.288***	.206***	.691***	.763***
Minimum Pairwise N of cases	109	114	102	98

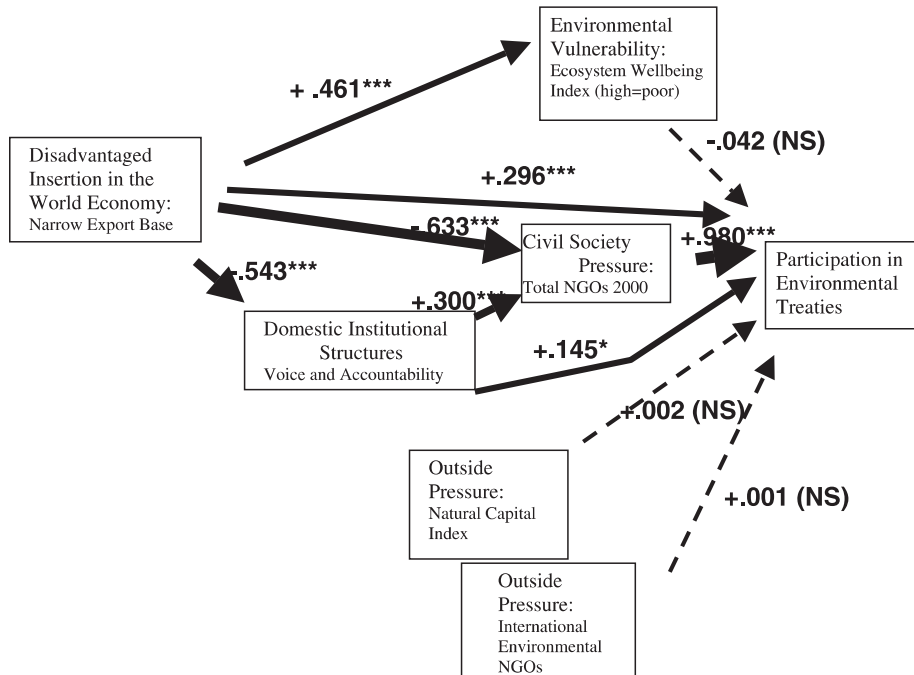
Note: \* p<.05; \*\* p<.01; \*\*\* p<.001

“the centerpiece of international efforts to deal with global environmental problems.”<sup>104</sup> While previous studies in the international relations tradition have focused on case studies, the effects of single variables, or subsets of treaty participants, our large-*n* cross-national analysis reveals and attempts to explain broad patterns of states’ behavior in this important area of global governance. As global environmental issues grow in scope, we believe that understanding the diverse factors that motivate countries to cooperate will become increasingly important.

104. Hurrell and Kingsbury 1992, 10.



**Figure 2**  
Path Diagram and Standardized Regression Coefficients Explaining Environmental Treaty Ratification



We have sought in this article to fill an important empirical gap in the IEP literature by offering a theoretically-sequenced, multi-step model that distinguishes between the proximate political causes and deeper social determinants of environmental treaty ratification. Our study demonstrates that the world-systems tradition and other conventional IR theories are not necessarily mutually exclusive, and that an additive approach may be useful. By placing new institutionalism and world-systems theory in their proper causal order (without any attempt to merge ontologies or epistemologies), we find that a more complete explanation of environmental treaty ratification can be offered. Simple correlations between civil society, democracy, and national participation in treaties hide a great deal. Credibility matters, yes, but credibility is strongly conditioned by nations' economic structure and vulnerability in the world economy. Thus, we would reiterate Koremenos et al.'s<sup>105</sup> observation that "[m]uch IR research has implicitly endorsed an erroneous presumption that an argument can only be shown to be right by showing that an alternative argument is wrong."

105. Koremenos et al. 2001, 1052.

**Table 2**

Direct and Indirect Effects of Disadvantaged Insertion in the World Economy (Narrow Export Base) on Environmental Treaty Ratifications.

<i>"Stage II" Variable(s)</i>	<i>Path Coefficients</i>	<i>Indirect Effects</i>
Ecosystem Wellbeing Index	$(.461 \times -.042)$	-.0193
Civil Society Pressure	$(-.633 \times .980)$	-.6203
Domestic Institutions and NGOs	$(-.543 \times .300 \times .980)$	-.1596
Domestic Institutions	$(-.543 \times .145)$	-.0878
Direct Effect		+.2960
Total Effects (Direct + Indirect)		-.5910

To be fair, institutionalists, constructivists, and realists have emphasized in the qualitative literature the same key variables that we also find to be significant in bivariate analysis. All three of our proxies for willingness and ability correlated with environmental treaty ratification in the expected direction. And strikingly, our civil society proxy explained more variance than any other single variable.<sup>106</sup> Meyer et al.<sup>107</sup>—who best represent the constructivist camp in IEP—argue that the true agent of change is “world culture.” Their key variable, national memberships in international environmental NGOs, also correlated closely with environmental treaty ratifications. Even the realist emphasis on countries of global environmental significance proved statistically and substantively significant in bivariate analysis. However, as we have argued, mainstream IEP theorization is severely lacking in that none of these approaches explain the earliest (and perhaps most important) links in the chain of causation.

As expected, in multivariate models the bulk of explanatory power afforded by these proximate variables is best explained by a nation’s disadvantaged insertion in the world-economy. Differences in national scores on this variable—which we approximated with an index of export diversification—are rooted in historical legacies of the colonial expansion of the European world-system. It also appears that, among proximate political variables, the institutionalist emphasis on credibility fits the empirical evidence best. Notably, neither constructivism nor realism held up in the full model. *One’s willingness and ability to carry out international environmental commitments is the best proximate predictor of environmental treaty ratification.* But lest the reader rush to an overly optimistic conclusion, we must remember that most of the countries failing to “acquire” credibility fell short because of a colonial legacy of extraction. Since “extractive states” systematically score lower on indicators of democracy and civil

106. Voice and accountability, government effectiveness, and environmental vulnerability also correlated in the expected direction with our environmental treaty ratification index. See Appendix E for a correlation matrix of all variables tested.

107. Meyer et al. 1997.

society, they also sign fewer environmental treaties. In other words, many countries “inherit” constrained choice sets which predispose them toward retrogressive environmental policy. Our study, then, offers a substantial shift of focus by clarifying why some states have strong civil societies, healthy environments and robust domestic political institutions in the first place, while others persistently lack all these.

The lack of participation by economically “disadvantaged” nations in environmental treaties documented here may of course have several explanations. It could be simply due to their lack of the financial wherewithal and staff to show up at the treaty drafting meetings. Alternatively, countries may not sign on because they believe it to be unjust to be asked to forego economic development to resolve environmental problems for which they bear little responsibility.<sup>108</sup> Poorer nations are also growing frustrated at unmet promises by rich nations to provide them sufficient environmental loans and foreign assistance to comply with obligations under the new treaties. But our cross-sectional OLS regression and path analysis suggests that the single best predictor of treaty ratification is the number of NGOs in a country. Further, we find strong support for our hypothesis that civil society strength and strong domestic institutions (such as democracy) are determined largely by one’s “insertion” in the world-system.<sup>109</sup> Driving non-ratification, therefore, is a fragile, authoritarian and often corrupt economic structure built on the production and export of a very narrow range of products.

Another goal of this work was to develop a much-needed index of environmental treaty ratification. The index presented and tested here goes some way towards producing a satisfactory metric against which we can test our theories, and we hope to see further examination of its potential. However, such an index may suffer the inevitable disadvantages of data reduction—that is, attempting to boil a number of factors into one. To provide this one index of state behavior concerning international environmental issues, we assumed in this study that the first principal component—the factor that explains the most variance of the seven discovered in our factor analysis—is the best indicator of a nation’s propensity to act politically on behalf of the environment. However, valuable future work might examine the remaining six factors or other ways to examine patterns in environmental treaty ratifications. Our study shows that while the contribution of Dietz and Kalof<sup>110</sup> in developing the original index of “state environmentalism” is significant, it may be more useful to address how countries agree to participate in international environmental agreements in smaller groups of treaties. Treaties might be analyzed in groupings along a series of lines: by the process by which they were negotiated, the era in which they

108. Parks and Roberts 2003.

109. This was also the case with the causal pathway from world-system position to environmental vulnerability.

110. Dietz and Kalof 1992.

were introduced, the distribution of their benefits and costs, and conflicting political, economic, and cultural forces. Still, the strength of the present findings strongly supports the value of looking at the broadest patterns of environmental treaty ratification.

What have we learned about how to improve ratification rates for environmental accords? No matter how important a nation is ecologically (natural capital) or how vulnerable it is (ecosystem wellbeing), other factors tend to drive treaty adoption. International environmental NGOs were seen to have little direct impact on treaty participation. When one considers indirect effects, the strongest predictor by far of likelihood to sign is the narrowness of a nation's export base which directly and indirectly explained nearly sixty percent of the treaty ratification rates. This suggests that the spread of institutions and values may not create a world with more adherents to environmental treaties. We may, in fact, be approaching an upper limit in the number of countries that will cooperate on international environmental issues since their willingness and ability to participate may be structurally constrained. On the other hand, if we embed greater development assistance and wealth redistribution mechanisms within environmental treaties, there may be greater interest from those on the bottom.<sup>111</sup>

The strength of the relationship between state behavior on environmental treaty ratification and the rights and position of civil society (voice/accountability and NGO strength) suggests that institutional and grassroots democratization is critical to progress. The powerful predictive strength of our "colonial overhang" proxy suggests that dependency and world-systems theories still have a lot to teach us. National economic development strategies indeed have wide implications for enduring relations between civil society and domestic political institutions. Returning to Raymond Vernon's point, export elites shape state and society relations. Our analysis shows convincingly that these relations, in turn, have an impact on our ability to build global institutions that protect the environment.

Based on these findings, we conclude that an entirely different tack might need to be taken to improving participation in global environmental treaties. To address the credible commitment dilemma which strikes at the heart of Southern non-participation in international agreements, egoistic OECD nations must help poor countries diversify their export profiles, strengthen their domestic political institutions, and mobilize "homegrown" civil society groups. Improvements in these areas will almost certainly bolster credibility, which we believe will ultimately result in better environmental policy positions. Eventually we will have to address the savage inequalities in the global economy, empowering those at the bottom. Progress on addressing global environmental issues requires it.

111. Barrett 2003; and Parks et al. No Date.

## Appendix A: Description of Treaties Included in the Analysis

(Contracting Parties as of April 1999)

- *International Convention for the Regulation of Whaling* (12/2/46)—To protect all species of whales from overfishing and safeguard for future generations the great natural resources represented by whale stocks. To establish a system of international regulation for the whale fisheries to ensure proper conservation and development of whale stocks. **Contracting Parties: 40**
- *International Convention for the Prevention of Pollution of the Sea by Oil* (5/2/54)—To take action to prevent the pollution of the sea by oil discharged from ships. **Contracting Parties: 69**
- *Convention of Fishing and Conservation of the Living Resources of the high Seas* (4/29/58)—Through international cooperation, to solve the problems involved in the conservation of the living resources of the high seas, considering that through the development of modern techniques some of these resources are in danger of being over-exploited. **Contracting Parties: 55**
- *Convention on the High Seas* (4/29/58)—To codify the rules of international law relating to the high seas. **Contracting Parties: 34**
- *International Convention on Civil Liability for Oil Pollution Damage* (11/29/69)—To ensure that adequate compensation is available to persons who suffer damage caused by pollution resulting from the escape or discharge of oil from ships. To standardize international rules and procedures for determining questions of liability and adequate compensation in such areas. **Contracting Parties: 90**
- *Convention on Wetlands of International Importance Especially as Waterfowl Habitat (RAMSAR)* (2/2/71)—To stem the progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific and recreational value. **Contracting Parties: 76**
- *Convention for the Protection of the World Cultural and National Heritage* (11/16/72)—To establish an effective system of collective protection of the cultural and natural heritage of outstanding universal value, organized on a permanent basis and in accordance with modern scientific methods. **Contracting Parties: 138**
- *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (12/29/72)—To control pollution of the sea by dumping, and to encourage regional agreements supplementary to the convention. **Contracting Parties: 73**
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (4/3/73)—To protect certain endangered species from over-exploitation by means of a system of import/export permits. **Contracting Parties: 127**

- *Convention for the Prevention of Marine Pollution from Land-Based Sources* (6/4/74)—The convention forms part of a comprehensive set of progressive and coherent measures to protect the marine environment from pollution. **Contracting Parties: 12**
- *Convention for the Protection of the Mediterranean Sea Against Pollution* (2/16/76)—In the light of the special characteristics and vulnerability of the Mediterranean, to achieve international cooperation for a coordinated and comprehensive approach to the protection and enhancement of the marine environment in the Mediterranean area. **Contracting Parties: 17**
- *Convention on the Conservation of Migratory Species of Wild Animals* (6/23/79)—To protect those species of wild animals that migrate across or outside national boundaries. **Contracting Parties: 45**
- *Convention on Long-Range Transboundary Air Pollution* (11/13/79)—To protect man and his environment against air pollution and to endeavor to limit and, as far as possible, gradually reduce and prevent air pollution, including long-range transboundary air pollution. **Contracting Parties: 44**
- *United Nations Convention on the Law of the Sea* (12/10/82)—To set up a comprehensive new legal regime for the sea and oceans and, as far as environmental provisions are concerned, to establish material rules concerning environmental standards as well as enforcement provisions dealing with pollution of the marine environment. **Contracting Parties: 73**
- *Vienna Convention for the Protection of the Ozone Layer* (4/22/85)—To protect human health and the environment against adverse effects resulting from modifications of the ozone layer. **Contracting Parties: 167**
- *Montreal Protocol* (9/16/87)—To protect the ozone layer by taking precautionary measures to control global emissions of substances that deplete it. **Contracting Parties: 167**
- *International Convention on Oil Pollution Preparedness, Response and Cooperation* (11/30/90)—To strengthen the legal framework for the control of environmental pollution by oil, in general, and marine pollution by oil in particular, by providing a basis for preparedness, and for a response-capability, to deal with incidents of oil pollution in the marine environment. **Contracting Parties: 19**
- *Convention on Environmental Impact Assessment* (2/25/91)—To promote environmentally sound and sustainable economic development, through the application of environmental impact assessment, especially as a preventive measure against transboundary environmental degradation. **Contracting Parties: 25**
- *Convention on the Transboundary Effects of Industrial Accidents* (3/17/92)—The Convention is concerned with the adverse effects of industrial accidents, in relation to human life and environmental safety. It seeks to enhance individual and collective national responsibility and capacity in the



prevention and control of industrial accidents, as well as the trans-boundary effects of such accidents. **Contracting Parties: 10**

- *United Nations Framework Convention on Climate Change (5/5/92)*—To regulate levels of greenhouse gas concentration in the atmosphere, so as to avoid the occurrence of climate change on a level that would impede sustainable economic development, or compromise initiatives in food production. **Contracting Parties: 177**
- *Convention on Biological Diversity (6/5/92)*—To conserve biological diversity, promote the sustainable use of its components, and encourage equitable sharing of the benefits arising out of the utilization of genetic resources. Such equitable sharing includes appropriate access to genetic resources, as well as appropriate transfer of technology, taking into account existing rights over such resources and such technology. **Contracting Parties: 174**
- *United Nations Convention to Combat Desertification (6/17/94)*—To combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international cooperation and partnership arrangements, in the framework of an integrated approach which is consistent with Agenda 21, with a view to contributing to the achievement of sustainable development in affected areas. **Contracting Parties: 150**

## Appendix B: Factor Analysis of Environmental Treaty Participation

### (i) Total Variance Explained

Component	Total	Initial Eigenvalues	
		%of Variance	Cumulative%
1	4.599	20.906	20.906
2	2.285	10.386	31.292
3	1.815	8.251	39.452
4	1.642	7.384	46.926
5	1.393	6.33	53.256
6	1.153	5.239	58.495
7	1.002	4.555	63.05

Rotated Factor Matrix

**(ii) Structure Matrix**

	Component						
	1	2	3	4	5	6	7
Envt. Impact	0.838						
Long-Range Air Pol.	0.822						
Industrial Accidents	0.648						
Law of the Sea	-0.457						
Marine Pol., Land		0.766					
Whaling		0.701					
Oil Pollution		0.693					
Migratory Species		0.578			0.571		
Montreal Protocol			0.964				
Vienna Convention			0.955				
Pollution of Sea, Oil		0.462		0.77			
Civil Liability, Oil		0.457		0.713			
Mediterranean				0.712			
Marine Pol., Dumping		0.548		0.591			
CITES					0.74		
Wetlands					0.719		
World Heritage					0.519		
Conv. on High Seas						0.905	
Resources, High Seas						0.904	
Climate Change							0.782
Biological Diversity							0.77
Desertification	-0.401						0.493

Extraction Method: Principal Component Analysis

Rotation Method: Promax with Kaiser Rotation

Values below .4 not shown.

**Appendix C: Environmental Treaty Participation Index for 192 Nations, through April 1999**

Country	Scale A	Scale B	Country	Scale A	Scale B
Afghanistan	4	-.77942	Australia	11	1.46426
Albania	4	-.76093	Austria	10	1.05373
Algeria	7	.14369	Azerbaijan	4	-.56685
Angola	1	-1.51012	Bahamas	5	-.34771
Antigua and Barbuda	5	-.24536	Bahrain	4	-.56796
Argentina	10	1.26195	Bangladesh	6	-.08410
Armenia	4	-.65753	Barbados	5	-.34970
			Belarus	5	-.27809

Country	Scale A	Scale B	Country	Scale A	Scale B
Belgium	12	1.86711	Ecuador	6	-.14448
Belize	4	-.63588	Egypt	10	1.16515
Benin	6	-.09931	El Salvador	4	-.64373
Bhutan	0	-1.73006	Equatorial Guinea	2	-1.19332
Bolivia	5	-.37227	Eritrea	1	-1.51766
Bosnia and Herzegovina	4	-.56427	Estonia	4	-.68876
Botswana	3	-.86367	Ethiopia	4	-.64373
Brazil	8	.46628	Fiji	7	.15032
Brunei Darussalam	4	-.63588	Finland	15	2.56135
Bulgaria	8	.44098	France	14	2.59816
Burkina Faso	8	.43485	Gabon	6	-.12976
Burundi	4	-.64373	Gambia	5	-.41594
Cambodia	2	-1.28233	Georgia	5	-.33648
Cameroon	6	-.09931	Germany	13	2.15327
Canada	11	1.42965	Ghana	8	.46032
Cape Verde	2	-1.22394	Greece	10	1.01100
Central African Republic	5	-.41161	Grenada	3	-.75148
Chad	4	-.59221	Guatemala	8	.37382
Chile	10	1.07108	Guinea-Bissau	2	-1.24620
China	8	.46628	Guinea	7	.23253
Colombia	6	-.15758	Guyana	4	-.64373
Comoros	3	-.59221	Haiti	4	-.73345
Congo	5	-.35556	Honduras	6	-.08609
Cook Islands	0	-1.73006	Hungary	10	1.04379
Costa Rica	8	.47061	Iceland	9	1.26624
Cote d'Ivoire	7	.15841	India	9	.78490
Croatia	8	.51043	Indonesia	7	.08764
Cuba	5	-.35755	Iran	5	-.37227
Cyprus	9	.68239	Iraq	1	-1.51012
Czech Republic	9	.75761	Ireland	11	1.70875
Democratic People's Republic of Korea	2	-1.07607	Israel	6	-.02674
Dem. Republic of the Congo	2	-1.07607	Italy	12	1.55976
Denmark	15	2.70090	Jamaica	6	-.07946
Djibouti	3	-1.00170	Japan	10	.98657
Dominica	3	-.75148	Jordan	7	.20208
Dominican Republic	9	.64890	Kazakhstan	3	-.84827
			Kenya	11	1.24494
			Kiribati	4	-.56209
			Kuwait	4	-.56010
			Kyrgyzstan	0	-1.73006

Country	Scale A	Scale B	Country	Scale A	Scale B
Lao PDR	3	-.85613	Paraguay	4	-.64373
Latvia	6	-.04721	Peru	7	.18010
Lebanon	5	-.34017	Philippines	7	.24725
Lesotho	4	-.58558	Poland	11	1.24312
Liberia	5	-.34771	Portugal	13	2.08705
Libyan Arab Jamahiriya	5	-.28178	Qatar	5	-.34017
Liechtenstein	6	-.01108	Republic of Korea	8	.48299
Lithuania	5	-.29282	Republic of Macedonia	3	-.78421
Luxembourg	9	.76801	Republic of Moldova	4	-.49493
Madagascar	7	.13492	Romania	7	.15171
Malawi	6	-.15325	Russia	12	1.56771
Malaysia	7	.11821	Rwanda	1	-1.51766
Maldives	5	-.34017	St. Kitts and Nevis	6	-.09136
Mali	6	-.05564	St. Lucia	6	-.03297
Malta	9	.72172	St. Vincent and the Grenadines	5	-.31129
Marshall Islands	3	-.84827	Samoa	2	-1.07607
Mauritania	4	-.58467	San Marino	2	-1.21826
Mauritius	5	-.37318	Sao Tome and Principe	0	-1.73006
Mexico	12	1.66359	Saudi Arabia	6	-.02353
Micronesia	2	-1.07607	Senegal	11	1.43568
Monaco	9	.79963	Seychelles	8	.61348
Mongolia	4	-.62401	Sierra Leone	4	-.79938
Morocco	8	.47504	Singapore	4	-.63588
Mozambique	4	-.64373	Slovakia	7	.23622
Myanmar	3	-.85613	Slovenia	6	-.05030
Namibia	3	-.86367	Solomon Islands	8	.47291
Nauru	1	-1.44388	Somalia	2	-1.20102
Nepal	6	-.14015	South Africa	9	.78201
Netherlands	15	2.83139	Spain	16	3.11956
New Zealand	8	.48299	Sri Lanka	8	.46032
Nicaragua	4	-.64373	Sudan	4	-.64373
Niger	5	-.32710	Suriname	6	-.01786
Nigeria	11	1.38418	Swaziland	3	-.84394
Niue	0	-1.73006	Sweden	12	2.06834
Norway	13	2.35762	Switzerland	14	2.14270
Oman	4	-.67156	Syrian Arab Republic	5	-.34017
Pakistan	7	.36301	Tajikistan	3	-.85613
Palau	0	-1.73006			
Panama	9	.74650			
Papua New Guinea	7	.20993			

Country	Scale A	Scale B	Country	Scale A	Scale B
Thailand	6	-.15325	United Republic of	4	-.64373
Togo	3	-.86367	Tanzania		
Tonga	4	-.58558	United States of	12	1.72765
Trinidad and Tobago	6	-.10173	America		
Tunisia	9	.74650	Uruguay	8	.65118
Turkey	5	-.29282	Uzbekistan	3	-.85613
Turkmenistan	3	-.85613	Vanuatu	6	-.06153
Tuvalu	3	-.84827	Venezuela	11	1.37741
Uganda	7	.11821	Viet Nam	5	-.37227
Ukraine	7	.24331	Yemen	5	-.34017
United Arab Emirates	6	-.06153	Yugoslavia	10	.99981
United Kingdom	15	2.70090	Zaire	4	-.69491
			Zambia	5	-.37227
			Zimbabwe	4	-.64373

#### Appendix D: Description of the Variables in Multivariate Analysis

**VOICE: The Voice and Accountability Index** from Kaufmann et al. (2002) “captures both the degree to which citizens choose those who govern them and the independent role that the media plays in keeping government accountable. This measure represents an aggregation of numerous political rights, civil liberties and political process indicators from various think tanks, NGOs and risk rating agencies.”

**EFFECTIVE: The Government Effectiveness Index** from Kaufmann et al. (2002) “combine[s] perceptions of the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government’s commitment to policies into a single grouping. The main focus of this index is on ‘inputs’ required for the government to be able to produce and implement good policies. The second cluster, which we refer to as ‘regulatory burden’, is more focused on the policies themselves. It includes measures of the incidence of market-unfriendly policies such as price controls or inadequate bank supervision, as well as perceptions of the burdens imposed by excessive regulation in areas such as foreign trade and business development.”

**EWI: The Ecosystem Wellbeing Index (EWI)** from Prescott-Allen (2001) we conceptualized as an indicator of national environmental vulnerability and overall condition of the environment. It includes 51 indicators, including indicators for land, water, air, species and resource protection. Examples for land protection are “How well a country conserves the diversity of its natural land ecosystems [4 indicators] and maintains the quality of the ecosystems that it de-

velops [1 indicator].” Note that this index is in reverse direction, with high scores indicating poor “ecosystem wellbeing.”

**EXPDIV: The Export Diversification Index** from UNCTAD (2001) measures the number of exported product worth over \$100,000 (or greater than .3% total national exports) in a country. The index itself is derived from the “absolute deviation of the country share from world structure” (UNCTAD 2001). Higher scores reveal highly concentrated export structures. For more on the construction of this index, see Finger and Kreinin (1979).

**NGOS: Number of NGOs per country in 2000**, Table A 1.2 Number of registered nongovernmental organizations in a nation. (Objective Indicators of Governance) in UNDP (2002).

**NATCAP: The Natural Capital Index** comes from Rodenburg et al. (1995). Nations scoring high have larger land areas, more valuable natural species diversity, and resources. We take a nation’s “natural capital” as a proxy for external pressure placed on nations by outsiders to deal with environmental problems.

**EINGO: Number of national memberships in international environmental NGOs in 1995**, from Meyer et al. 1997.

**TREFAC: Factor score of number of environmental treaties ratified for each nation.** See Appendix below for development of this index (Scale B in Appendix C).

	N	Minimum	Maximum	Mean	Std. Deviation
VOICE—Voice and Accountability Index	171	−1.927	1.730	.00532	.962
EWI—Ecosystem Wellbeing Index	180	14	72	43.84	13.48
EXPDIV—Export Diversification Index 2000	119	.2403	.9145	.6455	.1742
NGOS—No. of NGOs in 2000	161	1	3551	840	859
NATCAP—Natural Capital Index	174	0	12.25	.5745	1.610
EINGO—International Environmental NGOs	156	0	19	7.295	5.3512
TREFAC—Treaty Ratification Factor Score	186	−1.730	3.120	.02516	.9933
Valid N (listwise)	82				



## Appendix E : Correlation Matrix

	VOICE	EWI	EXPDIV	NGOS	NATCAP	EINGO	TREFAC
VOICE	Pearson Correlation	1					
Voice and	Sig. (2-tailed)	-.353(**)	-.543(**)	.644(**)	.088	.575(**)	.631(**)
Accountability	N	.000	.000	.000	.266	.000	.000
		171	109	153	162	144	170
EWI-	Pearson Correlation	1	.461(**)	-.465(**)	-.117	-.464(**)	-.413(**)
Ecosystem	Sig. (2-tailed)	.000	.000	.000	.127	.000	.000
Wellbeing	N	170	114	161	172	154	180
EXPDIV	Pearson Correlation	-.543(**)	1	-.796(**)	-.238(*)	-.679(**)	-.583(**)
Export	Sig. (2-tailed)	.000	.000	.000	.012	.000	.000
Diversification	N	109	114	102	111	98	114
NGOS	Pearson Correlation	.644(**)	-.465(**)	1	.249(**)	.884(**)	.858(**)
No. of NGOs	Sig. (2-tailed)	.000	.000	.000	.002	.000	.000
2000	N	153	161	161	154	136	161
NATCAP	Pearson Correlation	.088	-.117	.249(**)	1	.294(**)	.194(*)
Natural Capital	Sig. (2-tailed)	.266	.127	.012	.000	.000	.011
Index	N	162	172	111	174	154	173
EINGO90	Pearson Correlation	.575(**)	-.464(**)	-.679(**)	.294(**)	1	.769(**)
International	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
Enviro NGOs	N	144	154	136	154	156	155
TREFAC	Pearson Correlation	.631(**)	-.413(**)	-.583(**)	.194(*)	.769(**)	1
Treaty Parti-	Sig. (2-tailed)	.000	.000	.000	.011	.000	.000
icipation Index	N	170	180	114	173	155	186

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

## Appendix F: Development of the Dependent Variable

To develop an index of a state's participation in past environmental treaties we replicated Thomas Dietz and Linda Kalof's 1992 article, which examined the participation by 146 nations in 12 treaties over the period 1963–1989. We have updated and expanded the Dietz and Kalof index, measuring the participation of 192 nations in 22 multilateral environmental treaties through April, 1999.

Data come from three sources. The first is the *Register of International Treaties and Other Agreements in the Field of the Environment, 1989* which is a presentation of data and information of all multilateral treaties deposited with the Secretary General of the United Nations as of December 13, 1988. Subsequent treaty information comes from the United Nations' on-line register of *Multilateral Treaties Deposited With the Secretary General*, which contains the status of all treaties that came into force after 1988. The database used in this study was updated on April 6, 1999. The final source, *Participation in World Treaties on the Protection of the Environment: A Collection of Data* by Maffei et al. was used to verify the status of each treaty that came into force before 1990. The data now include information on the response of 192 nations to 22 global conventions on the environment promulgated between 1946 and 1994 (Appendix C).<sup>112</sup> Like Dietz and Kalof, we have scored nations that are contracting parties 1; other nations are scored 0.<sup>113</sup> Appendix A shows the treaties and the proportion of nations that were contracting parties as of our cutoff date, April, 1999. Following Dietz and Kalof, we used factor analysis to create an index of participation by the countries to the treaties. Much of the methodological detail on the development of the index has been removed from this paper and is available from the lead author upon request. Appendix C, Scale A is a simple count of the number of treaties ratified by each nation (see above). Scale B is the national factor scores on the Environmental Treaty Ratification Index.

Chronology, as Dietz and Kalof point out, is potentially problematic (1992: 365). This index measures countries' environmental treaty ratifications which have accumulated over thirty-six years (1963–1999), but because a single index is computed it can only be treated as cross-sectional. Our predictor variables are treated as cross-sectional, and most are from 2000. Our interest, however, is in the position of states relative to each other, which tend to be fairly stable over time, and the broad patterns of treaty signing (see Chase-Dunn 1989; Smith and White 1993 on these types of methodological issues). The result is that our estimates of the amount of variance they explain should be *conservative*

112. Hundreds of international treaties have been promulgated since 1945, but only a fraction are significant global attempts to address environmental problems. The treaties used in this study were selected on the basis of their overall importance and were done so in consultation with Gunther Handl, Professor of International Law at Tulane University, editor of *Participation in World Treaties on the Protection of the Environment: A Collection of Data*.

113. As in the study by Dietz and Kalof, "contracting party" is used to mean states that have ratified, accepted, acceded or succeeded to a given treaty. Each of these terms means that the treaty has acquired an internationally binding legal effect for the country concerned.

ones. Again, the analysis here is meant to be exploratory as to the value of our expanded index of treaty participation.

The Dietz and Kalof study found only one significant factor in their study (that is, with an eigenvalue of greater than one) accounting for 39% of the overall variance, leading the authors to conclude that there is a single underlying factor of environmentalism among nations. Our analysis found that there are as many as seven significant factor groupings (see Appendix B). In an effort to provide an index of the inclination of a country to take international political action on behalf of the environment, we limited our analysis to the first principal component, which accounts for 20.9% of the overall variance. Though the first principal component explains only one-fifth of the variance, it includes the majority of the treaties under consideration and therefore represents a reasonable, albeit imperfect, measure of a country's propensity to take action in support of the environment. This factor is also correlated significantly to the total number of treaties signed (see Appendix C for index scores and counts).

Based on the results from the first principal component, and following Dietz and Kalof, Appendix C shows Scale A, the unweighted sum of the 16 variables (the number of treaties that each country has ratified) and Scale B, weighted by its loading on the first principal component.<sup>114</sup> Scale A ranged from 0 ratifications (Bhutan, Cook Islands, Kyrgyzstan, Niue, Sao Tome and Principe) to 16 (Spain). Analysis of the data suggests that larger, wealthy, "core" countries tend to ratify more treaties than do very small and/or poor, "peripheral" countries. This is also true for nations with high numbers of NGOs.

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114. Since six treaties were not sufficiently correlated with the others, they were dropped from the factor scoring.

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