The Life Cycle of Regimes: Temporality and Exclusive Forms of International Cooperation

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In three important areas of international cooperation—global trade, nuclear security, and climate change—states are shifting away from inclusive multilateralism toward more exclusionary forms of interstate cooperation. In this article, we offer a historical institutionalist account of this change. We propose that the maturation of the existing multilateral regimes changed the payoff structure, creating incentives for states to establish alternative institutions centered on the principles of selective and discriminatory cooperation. Our findings suggest that the growth in exclusive forms of cooperation in trade, nuclear nonproliferation, and climate change should not be considered aberrations but are rather part of a process of regime maturation.

Introduction

In this article, we explain an empirical puzzle. In three important areas of international cooperation—global trade, nuclear security, and climate change—states are shifting away from inclusive multilateralism toward more exclusionary forms of interstate cooperation (which we term "exclusionary cooperation agreements" or ECAs). Governments are increasingly negotiating lower barriers to trade and invest on a bilateral or regional basis for example, rather than through the GATT/WTO framework. In the area of nuclear nonproliferation, bilateral contracting and mini-lateral arrangements appear to take precedence over multilateral negotiations through the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Finally, in the case of climate change, important forms of cooperation are increasingly occurring outside, rather than within, the United Nations Framework Convention on Climate Change (UNFCCC).

How can we explain this common trajectory despite little evidence of a weakening in the commitment of states to the public policy goals each is designed to achieve? In this article, we propose that temporality and policy feedbacks, concepts central to historical institutionalism, help explain this pattern of change in international cooperation. We propose that states in each of these areas made a choice to cooperate through inclusive multilateral organizations (IMOs), defined by principles of inclusivity and homogeneity. This choice, we argue, had important consequences for future cooperation. Specifically, the initial decision to pursue cooperation through inclusive and homogeneous rules increased the likelihood states would choose more exclusive forms of cooperation over time. We suggest that the shift toward more discriminatory forms of cooperation is a natural result of the initial choice to pursue interstate cooperation through multilateral, inclusive organizations.

In making this argument, we contribute to the scholarship on international cooperation in two ways. First, we explain the puzzling evolution of three important but substantively different areas of interstate cooperation toward a common outcome. The shift from multilateral forums to more exclusionary forms of international cooperation remains under-studied in the literature on institutional choice (Koremenos, Lipson, and Snidal 2004; Raustiala and Victor 2004). We propose that incorporating temporality makes it possible to account for changes in forms of

international cooperation across these different issue areas. While the explicit inclusion of temporality is not inimical to a rationalist approach to explaining international cooperation, it has not been a sustained focus of research (Martin and Simmons 2001: 203; Peters 2005; Drezner 2010).

Theoretically, our study demonstrates the utility of using analytic tools drawn from historical institutionalism for explaining recent changes in patterns of international cooperation. Concepts advanced in comparative political economy and American political development are increasingly deployed by scholars seeking to explain patterns of international cooperation (Farrell and Newman 2010; Fioretos 2010; Sell 2010). We show how a historical institutionalist explanation focused on the role of policy feedback may help to explain changes in patterns of international cooperation in trade, nuclear security, and climate change, three areas with important public policy implications.

We proceed in four stages: First, we situate our argument within existing explanations of changes in forms of international cooperation. Second, we introduce our argument, which focuses on the importance of sequencing, through the analytic framework of the regime life cycle. Third, we demonstrate the utility of the framework for explaining recent changes in forms of international cooperation across trade, nuclear security, and climate change, three important areas of international cooperation with substantially different characteristics. We conclude by discussing the scope conditions and generalizability of the argument and broader lessons for policies and theories of international cooperation.

Explaining Choice in Forms of International Cooperation

International organizations are defined as "explicit arrangements, negotiated among international actors that prescribe, proscribe, and/or authorize behavior" (Koremenos, Lipson, and Snidal 2001: 762). Studies show that forms of cooperation vary across membership, issue, organizational design, and rules. There is also variation within each of these categories. Membership of international organizations (IOs) range, for example, from a few members to larger, inclusive regimes (Downs et al. 1998).

An important focus of studies on international cooperation asks why particular forms of cooperation are reached in equilibrium and what effects they have (Martin and Simmons 1998). A number of studies of international cooperation also seek to explain change in forms of international cooperation (Jupille and Snidal 2005). One notable focus is explaining the shift toward greater inclusivity over time. Ruggie (1992), for example, describes a shift toward multilateral regimes characterized by homogeneity and universality. Other scholars have focused on the diversification in forms of cooperation and growth in the number of IOs, identifying a regime complex of "nested, partially-overlapping, and parallel international regimes that are not hierarchically ordered" (Martin and Simmons 1998: 736–38; Aggarwal 1998, Koremenos et al. 2001). Here, newly emerging IOs fit within broader regimes, ensuring a certain measure of conformity with institutional arrangements (Rixen 2010; Rixen and Rohlfing 2007).

There has been less scholarly focus on why exclusionary forms of international cooperation might emerge to challenge inclusive multilateral forms of cooperation. This is an important gap, given the trend toward more exclusionary forms of cooperation in the areas of trade, nuclear nonproliferation, and climate change. We identify two general theoretical approaches that could be adapted to explain this outcome.

The first focuses on ideational change. Here, new organizational forms are taken to follow shifts in the preferences of states. This shift in preference in turn occurs because of changes in information or because of normative changes (Oye 1985: 11). Yet there is little evidence that information or normative changes are responsible for the shift toward more exclusive forms of international cooperation in the areas examined in this paper. In the case of trade, governments remain committed to lowering barriers to trade and investment, as evidenced by the regional and bilateral trade agreements that extend international cooperation beyond tariffs into investment-related measures and nontariff measures. The launch of

the Trans-Pacific Partnership (TPP) trade negotiations and Trans-Atlantic Trade and Investment Partnership (TTIP) demonstrates the even greater commitment among participants to adopt a deeper agenda of economic liberalization. In the area of nuclear nonproliferation, NPT member states have not given up on the goal of limiting nuclear proliferation. Western powers regularly pressure countries like Iran and North Korea not to develop nuclear weapons, and nuclear weapons states also remain formally committed to achieve complete nuclear disarmament. Finally, in the area of climate change, members of the UNFCCC remain committed to the need to reduce greenhouse gas (GHG) emissions and agreed at COP 18 in 2012 to negotiate a successor agreement to the Kyoto Protocol. Indeed, the scientific evidence in favor of an anthropogenic explanation for climate change is increasing over time, suggesting that information should be mitigating in favor of greater cooperation, rather than against it.

A second possible explanation for a shift toward more exclusive forms of international cooperation focuses on changes in relative power. A well-known strand of realism—hegemonic stability theory—links greater levels of international cooperation to extreme concentration of power (Krasner 1976). Realists argue changes in the balance of international power alter the range of possible cooperative outcomes between states. Great powers, for example, may use access to their internal markets and lower levels of vulnerability to external coercion to alter forms of international cooperation (Drezner 2007). Hence, changes in forms of interstate cooperation in trade, nuclear nonproliferation, and climate change could reflect the shifting balance of international power.

Power-based arguments are insufficient, however, to explain patterns of international cooperation. In general, the raw capabilities of states are a poor indicator of patterns of cooperation given that the leading state in the system may be unwilling to display leadership in regime construction. Further, the timing of changes in relative power are not consistent with shifts in forms of interstate cooperation in the cases examined here. The U.S. negotiated preferential trade agreements both in moments of unipolarity (NAFTA soon after the end of the Cold War) and of emerging multipolarity and diminished economic influence (the Trans-Pacific Partnership Agreement). The number of bilateral nuclear cooperation agreements (NCAs) has risen steadily over the past five decades, despite shifts in polarity structures. NCAs have also been negotiated between states that lack strategic relationships. Finally, the preferences of states central to negotiating within the COP process toward forms of cooperation are poorly predicted by relative levels of power.

Policy Feedback and Decreasing Returns to IMOs

The continued commitment to the pursuit of interstate cooperation in each area makes it difficult to explain change in forms of cooperation using changes in norms or information. Changes in relative power are also an implausible explanation for outcomes. How, then, can we explain the shift toward exclusionary cooperation agreements in the areas of trade, nuclear nonproliferation, and climate change?

We propose that in these areas cooperation was initially commonly pursued through IMOs, which in trade, nuclear nonproliferation, and climate change shared three traits. First, they sought to establish *universality*, allowing any state to join, subject to conditions of membership. Second, they attempted to achieve *homogeneity* by adopting a common set of rules. Third, these institutions strove for *regime deepening* by expanding the scope of cooperation and improving compliance with regime rules.

The initial choice of establishment is informed by states' assessment of the costs and benefits of cooperation through existing or alternative arrangements. Once made, however, we suggest it marked the beginning of a process we refer to as the IMO life cycle. In the first stage of the life cycle, states perceived sufficient benefits obtainable through cooperation to overcome the costs associated with the establishment of an international organization. In the second stage,

participants sought to expand cooperation by acquiring more members (universality), adopting a common set of rules (homogeneity), and increasing issue scope (regime deepening).

While each of these accomplishments may be characterized as an improvement, we argue that over time their combined effects made it increasingly difficult to deepen cooperation in multilateral forums. Thus, in the third stage, which is the primary empirical focus of this study, states shifted to pursue cooperation through alternative, and more exclusive, forms of international cooperation.

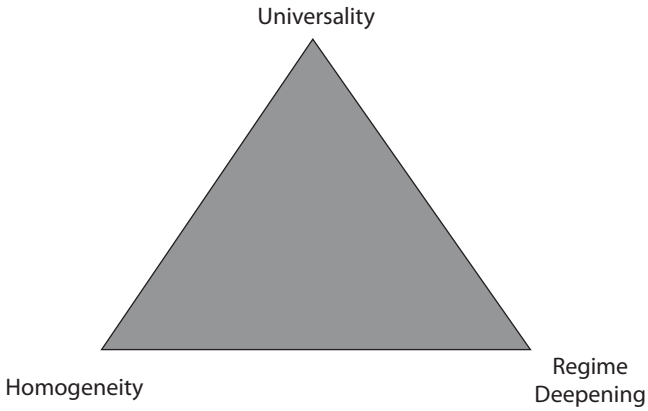
Why might this be the case? Scholars of historical institutionalism argue feedback effects tend to increase the returns to existing institutions (Pierson 2000). This argument is incorporated in studies of international cooperation, which emphasize the "the costs and risks of institutional change" (Jupille and Snidal 2005: 35). Recent theoretical advances in historical institutionalism suggest, however, that in addition to promoting institutional stability, feedback mechanisms can also drive endogenous change in which the "expected operation of institutions itself . . . generates pressures for change" (Mahoney and Thelen 2010: 9).

Adapting this to the problem of international cooperation, we identify two mechanisms that led to decreasing returns to cooperation through the existing IMOs governing trade and investment, nuclear nonproliferation, and climate change over time. First, expanding participation, adopting homogeneous rules, and deepening cooperation—each of which are features of the IMOs promoting cooperation in these areas—increases the possible benefits from cooperation. As the number of states grew, however, this also increased transaction and information costs (Oye 1985). Membership expansion also increased the likelihood a state determines that the distributional consequences of an agreement are not in its favor, which is a reason for choosing alternative institutions as the focal points for cooperation (Jupille and Snidal 2005).

Second, the adoption of egalitarian and stricter decision making in each of these areas increased the costs of compliance. This in turn gives states dissatisfied with the distribution of costs and benefits greater incentives to pursue alternative forms of cooperation (Kahler 1992; Tsebelis 1995; Depledge 2006). In the case of trade, the move toward greater legalization of dispute-resolution practices increased the transparency concerning the distributional costs of proposed outcomes, while in the case of climate change, the move to expand legally binding national emissions targets increased the costs of compliance, contributing to the problems in deepening the regime.

Together, we argue this creates a trilemma of universality, legalization, and deeper collaboration in the IMOs governing cooperation in trade, nonproliferation, and climate. As cooperation

Figure 1: Cooperation trilemma in mature IMOs



within these international organizations approached this ideal type (depicted in Figure 1), difficulties in negotiating further regime advancement increased.

How did states respond to the falling returns to cooperation through the IMOs governing trade, nuclear nonproliferation, and climate change? Existing research suggests states facing stagnation in IMOs have two choices: internal adjustment by seeking to change rules within the IMO or external adjustment through the pursuit of more exclusive forms of cooperation. Institutional choice theory suggests internal adjustment is more likely because of the costs of creating new institutions (Goldberg 1974; Majone 1989; Hall 2010:207; Koremenos et al. 2001). In the cases examined here, the costs to shifting toward forms of cooperation that relaxed the principles of universality or homogeneity were not prohibitive because cooperation through the IMO already revealed information about states' negotiating positions, reducing the transaction costs of pursuing new forms of cooperation.

Together, these feedback effects reduced the likelihood of deepening cooperation through inclusive, homogeneous organizations. This does not mean, however, that existing IMOs are rendered redundant. Instead, to the extent states cease seeking to deepen cooperation through the IMO, it can remain useful. In the case of the international trade regime, dispute resolution processes are likely to continue to be useful even as states increasingly pursue further cooperation through ECAs. Member states regularly participate in review conferences for the Treaty on Non-Proliferation of Nuclear Weapons (NPT), and the International Atomic Energy Agency (IAEA) program of monitoring, inspections, and verification of nuclear safety and security remains a centerpiece of the regime. In the case of climate change, reporting requirements under the UNFCCC continue to play a useful function in tracking national changes in GHG emissions.

The willingness to pursue cooperation through ECAs does suggest, however, that IMOs in these areas are likely to be displaced as the focal point for forward-looking cooperation. To borrow once again from historical institutionalism, the emergence of exclusionary forms of international cooperation may be characterized as a form of incremental change akin to "layering" identified by Mahoney and Thelen (2010: 16–17) and Streeck and Thelen (2005). Just as within domestic societies institutions emerge that overlap existing institutional structures and may displace them over time, so differential rates of growth in the degree of cooperation pursued through more exclusionary forms of cooperation, as opposed to IMOs, may lead to a substantially different structure of international cooperation over time (Streeck and Thelen 2005: 23–24).

Empirical Section

The temporal explanation for changes in forms of international cooperation in trade, nuclear nonproliferation, and climate change focuses on the timing and content of alternative forms of cooperation. Governments are likely to identify and consider more exclusionary forms of cooperation after stagnation has set in the IMO. Empirically, this means we should see evidence of extended times to agreement and an increased likelihood of failed summit meetings (Narlikar 2010). Compared to a baseline of prior rounds of bargaining within the IMO, once the IMO stagnates, negotiations for further regime deepening should remain inconclusive for much longer periods of time, and will result in open failures of high level meetings that operate as markers of critical events in the negotiation process.

We also expect the newly emergent forms of cooperation to relax at least one of the principles of the IMOs identified above. Additionally, we should see a shift in intentions among policymakers, who express unhappiness with the IMO and consciously decide to shift the location of cooperation. In this case, the evidence should be manifest in speech or documentary evidence. In the section below, we assess the usefulness of our explanation for changes in forms of international cooperation in the areas of trade, nuclear nonproliferation, and climate

change in that order.[1] We then move on to discuss the generalizability of the findings and the implications for theories of international cooperation.

International Trade

Timing

The General Agreement on Tariffs and Trade (GATT) emerged as the focal point for multilateral trade liberalization by default. Architects of the Bretton Woods system planned for an international trade organization (ITO) with an extensive mandate, an expansive administrative structure, and judicial enforcement through the International Court of Justice (Barton et al. 2006).

Disagreement within the U.S. doomed this institution (Narlikar 2005). By 1950, an obscure agreement negotiated under the shadow of the ITO talks in Havana in 1947 to deal with tariff reductions in manufactures (GATT) emerged as the international regime for trade liberalization.

GATT nevertheless launched multilateral cooperation based on two core principles: nondiscrimination and reciprocity, with periodic exchanges of trade concessions in multilateral negotiation rounds. GATT successfully delivered several rounds of tariff cuts (with participating countries ranging from thirteen to twenty-six). After the mid-1960s a qualitatively different process of expansion began with the Kennedy (1964–67) and Tokyo Rounds (1973–79): country participation grew significantly (to sixty-two and 102 nations, respectively), and GATT began to focus on nontariff barriers through codes that were voluntary but had dispute settlement mechanisms, thereby creating a multi-speed GATT in which countries could sign on to a diverse range of commitments (Winham 1986). The multilateral trade regime slipped with the emergence of a complex system of textile quotas embodied in the Multi-Fiber Agreement, but overall GATT membership increased, new economic issues were covered, and decision-making processes were put in place.

By the late 1980s there was widespread consensus that the GATT regime was in trouble. While developing countries complained about the agricultural and textile carve outs, industrialized nations were frustrated by the lack of liberalization in services and knowledge-based industries. States also manipulated loopholes in the multilateral regime through voluntary export restraints, anti-dumping charges, and countervailing subsidies, as well as blocking the implementation of panel rulings against them.

The Uruguay Round (1986–94) represented an attempt at internal adjustment. It restructured cooperation in four ways. First, it engineered a "grand bargain" whereby developing nations agreed to new rules in services, intellectual property, and trade-related investment measures, in exchange for developed countries accepting that textiles and agriculture would be subject to GATT disciplines. Second, regime members adopted a single undertaking approach where all disciplines would apply equally to every member. Third, the trade regime acquired a much firmer institutional footing with the establishment of a formal international organization, the World Trade Organization (WTO), including the creation of an appellate body that made nonimplementation of panel rulings rare.

These internal reforms moved the multilateral trade regime closer to the IMO ideal type. The WTO acquired near universality in membership with 153 participating economies. A sharp north-south disagreement emerged with developing countries mostly expecting "transfers" (nonreciprocated market concessions) in order to rebalance the skewed distribution of net benefits from the Uruguay Round, whereas industrialized nations expected to bargain for fresh concessions in order to acquiesce to demands from the south (Collier 2006: 1428). Hence, developing countries have engaged in purely distributive bargaining strategies and have developed strong south coalitions that do not fragment internally and whose members cannot be peeled off individually by offers from industrialized nations (Narlikar and Van Houten 2010: 151).

1. Together, the three cases examined in the paper are "most different" research design, in which the characteristics of the cases differ, or are invariant, across theoretically relevant variables other than those identified as important in the study (Seawright and Gerring 2008).

The WTO also approached homogeneity and deepened rules. In GATT, countries had the option to subscribe or not to the pluri-lateral agreements to deal with nontariff barriers such as dumping, subsidies, and government procurement. However, in the WTO, members eschewed the à la carte approach in favor of a single undertaking whereby all disciplines would apply to every member.[2] The new WTO deepened the process of interstate cooperation in several key ways. First, all WTO commitments now apply across the entire membership. Second, the WTO became a vehicle for multi-sectoral liberalization as textiles, agriculture, and services were incorporated into its liberalization mandate. Third, the WTO tackled "behind-the-border" issues such as intellectual protection that affect core regulatory capabilities of states. The bite of these commitments was increased given the changes to the dispute settlement mechanism.

The limitations of the new institutional formula to sustain trade liberalization nevertheless came to the fore. Disagreement emerged over expanding the mandate of the WTO: Developing countries refused to incorporate labor standards and rejected the adoption of the Singapore issues (investment, competition, transparency in government procurement, and trade facilitation). This ended in the collapse of the Cancun Ministerial in 2003. Whereas in the past the U.S. and Europe had de facto controlled the decision-making process by dominating green room proceedings where decisions on market access and rules adoption were made, this process broke down (Bluestein 2008), and developing nations have challenged the governance practices of the WTO. As early as 1996, most of the ninety-member delegations present in the Singapore Ministerial argued, "The way in which the draft declaration had been prepared was undemocratic, unfair, and disgraceful" (Blackhurst and Hartridge 2004: 705).

Agriculture has been one of the most divisive issues. Industrialized countries have resisted the elimination of agricultural subsidies (U.S.) or steep cuts to tariff peaks (EU) while developing nations have demanded exemptions to sensitive products and a special safeguard to protect subsistence agriculture (Narlikar and van Houten 2010: 149). But the fundamental flaw is of institutional design. Hence, the main proposals for WTO reform address in piecemeal fashion each of the vectors of the trilemma. On universality, there are now calls to establish executive boards or steering committees that aim for small-N bargaining to ensure effectiveness (Jones, 2010; Collier, 2006; Blackhurst and Hartridge 2004). On the depth of collaboration, there are appeals to revert back to the pluri-lateral approach or to restrict the organization's scope to market access (dropping behind-the-border issues) (Hoekman and Vines 2007; Collier, 2006). And on enforcement, some have advocated for carving out areas from the enforcement process or returning to a diplomatic style for dispute resolution (Collier 2006; Barfield 2001).

None of these institutional fixes have been implemented, and the Doha Round has drifted from failed ministerial meetings to an actual suspension of negotiations in 2006, with no successful conclusion in sight. The signs of decay of the multilateral trading system are evident in open negotiation failures at high-level events (Seattle 1999, Cancun, 2003) as well as the unprecedented length of the Doha Round (eleven years and counting).[3] The institutional crisis of the WTO has coincided with the robust proliferation of preferential trading agreements. Regional and preferential trade agreements are not new. Previous waves of regionalism occurred in the interwar period, in the late 1950s with the launch of the European community and in the 1960s and 1970s as developing countries sought to enhance regional autonomy under the aegis of an ISI development model (Mansfield and Milner 1999). But the speed of free trade agreement proliferation during the WTO years is dramatically different. There were thirty-one active FTAs in 1994, and that number increased to 303 in 2011. Virtually all WTO

2. Through special and differential treatment, developing countries are given more time to implement obligations, but they cannot excuse themselves from all the agreements that constitute the WTO (Narlikar, 2005).

3. The Bali package adopted in December 2013 represented the first membership-wide agreement since the WTO was established. However, WTO members were unable to ratify the trade facilitation agreement by the deadline of July 2014 as India refused to do it citing the lack of progress on relaxing rules on trade distorting-subsidies for food stockpiles. The Bali process underscored once again the fragility of a negotiation process where the veto of any country may torpedo an agreement years in the making.

members have now signed at least one FTA, rendering preferential liberalization a universal practice in the world trading system precisely at the time when the cooperation trilemma symptoms have manifested at the WTO.

Content

Continued deadlock at the WTO led policymakers to pursue their trade strategies in preferential forums due to the decreasing returns to cooperation within the existing institution, and the gains available through preferential agreements. Policymakers have explicitly cited these concerns to justify their departures from multilateralism. In the words of USTR Zoellick: "The key division at Cancun was between the can-do and the won't-do countries. . . . As WTO members ponder the future, the U.S. will not wait: we will move towards free trade with can-do countries" (*Wall Street Journal*, 17 November 2003). Similarly, the European Union decided to put aside a de facto FTA moratorium (in effect since 1999) after its key priority for the multilateral agenda—the incorporation of the Singapore issues—came to naught in the aftermath of the Cancun meeting (Wolcock 2007: 5). The EU Commission (2006) noted: "The EU would be putting itself at a disadvantage if we did not seek to improve investment conditions in our bilateral negotiations."

ECAs relax the principles of universality and legalization to customize the negotiation agenda and facilitate the process of inter-state bargaining. The large number of ECAs prevents easy characterization of the content of these agreements. Some broad trends, however, are unmistakable. The vast majority of these trade agreements are bilateral (90 percent) pairing countries at very different levels of development (69 percent of these agreements are north-south) (Acharya et al. 2011: 42–43). Thus, states are attracted to FTAs, because they can select "common view" partners and increase the likelihood of bypassing negotiation deadlock due to unbridgeable differences. For industrialized nations, the north-south bilateral FTAs offer the advantage of relying on asymmetrical bargaining since developing countries are more dependent on access to the larger economy and cannot resort to coalition tactics (Pekkanen et al. 2007). And developing countries agree to the inclusion of issues they reject at the multilateral level, because "the smaller number of negotiating parties makes it easier to exclude issues that are sensitive and to identify quid pro quo deals" (Hoekman 2011: 99).

Further, while earlier FTAs dealt mostly with tariff reduction, FTAs incorporating rules on competition, investment, customs, government procurement, etc., grew to the hundreds in the 2000s. This agenda deepening has been pursued with an a-la-carte approach. Sectoral carve outs are rampant in sensitive areas, and the most divisive topics of export subsidies and domestic support programs have been left as under the purview of the WTO. An analysis of 28 EU and U.S. preferential trade agreements reveals that services, intellectual property, and labor standards are always present in the U.S. FTAs but not in the European ones. On the other hand, European trade agreements have more exacting disciplines in the area of competition (Acharya et al. 2011: 47). Japan, too, has added its own spin to preferential trade agreements with a cooperation chapter that addresses issues such as human resource development and small enterprises (Solís and Katada 2009). Moreover, the incorporation of regulatory issues in FTAs has called for the customized application of legalized dispute resolution to reflect the sensitivities specific to each nation (Chauffour and Maur 2011: 30). While the competition chapters in European FTAs generate legally enforceable provisions, the U.S. and Japanese do not (Acharya et al. 2011: 48).

Nuclear Nonproliferation

Timing

Leaders explored a range of alternative arrangements to respond to international security challenges in the early nuclear era. U.S. representative Bernard Baruch proposed the creation of a UN Atomic Development Authority, a multilateral oversight body to control all aspects of the

nuclear fuel cycle, in 1946. Soviet opposition scuttled the deal, however, and the 1950s and 1960s saw a rise in the number of nuclear weapons states, coupled with alliance formation and the development of regional security pacts.

The NPT was opened for signature at the UN in 1968, and it became the cornerstone of a nonproliferation regime that grew to include a network of multilateral nonproliferation agreements, export controls, and safeguards. The NPT established three pillars: 1) Nonproliferation: nonnuclear weapons states pledge not to acquire weapons, while nuclear weapons states pledge not to share them; 2) Peaceful Uses of Nuclear Energy and Civilian Cooperation: all parties have the right to develop research, production and use of nuclear energy for peaceful purposes "without discrimination," with support from the International Atomic Energy Agency (IAEA) to prevent diversion of nuclear technology for weapons; and 3) Disarmament: nuclear weapons states should "pursue negotiations in good faith at an early date on effective measures regarding cessation of the nuclear arms race and disarmament."

By the early 1970s, the NPT had established principles for multilateral cooperation that helped move it closer to the IMO ideal type. The expansion phase of the regime included the enlargement of NPT membership and widening of the scope of nonproliferation initiatives. The IAEA concluded safeguard contracts with member states of the NPT and commenced regularized inspections. These achievements moved the multilateral regime closer to the cooperation trilemma. The NPT acquired near universality in membership with 190 member states.[4] The NPT also approached homogeneity and deepened rules. The five declared nuclear-weapons states were granted special status by the treaty and had de facto dominance in the decision-making process of the organization, but they were held to most elements of the treaty and singled-out in the Article VI call to pursue disarmament. Once established, parties to the NPT held Review Conferences (RevCons) every five years. In general, progress was made toward preventing the diversion of peaceful technologies or materials to weapons programs, and, in 1995, the Fifth NPT RevCon called for the "indefinite extension" of terms of the agreement.

The first signs of regime decay emerged soon after India's nuclear test in 1974; the cornerstone of the regime, the NPT—with its principles of universality and nondiscrimination, sharing technologies and "peaceful uses"—appeared flawed. In response, countries engaged in a process of internal adjustment by forming the London Suppliers Group to control the spread of technologies that could be used for clandestine weapons programs. Seven member states adopted new controls on technology exports through the establishment of the Nuclear Suppliers Group (NSG). The NSG reflected basic principles of the NPT, but offered a more focused institutional arrangement: a cartel of nuclear supplier states with a requirement for consensus. The NSG developed lists of nuclear material, equipment, and technology to be subject to export controls (a discriminatory selection of "what" could be shared and "with whom"). The NSG helps enforce monitoring and verification programs, and refers safeguards violations to the UN Security Council (Verdier 2008). While member states were secure in the knowledge that they could control the spread of key technologies, nonmembers of the NSG were resentful that a new and exclusive organization would regulate a market guaranteed for it by the terms of the NPT.

However, the NSG faced two immediate problems. First, members of the NSG disagreed over many specifics of the nuclear trade. Relations in the group were so bad from 1978 to 1991 that "the founders lost their capacity to sanction nonparticipants and monitor cheating" (U.S. General Accounting Office 2002: 8). NSG member states divided into two groups with different interests in the regime: The U.S., Canada, and Australia held near monopolistic control of supply of uranium, and France, Germany, Switzerland, and Belgium dominated technology exports for the nuclear fuel cycle. For more than thirteen years, "no change was

4. The NPT did fall short of inclusion of several non-declared nuclear weapons states, including Israel and, later, India and Pakistan. This evolution of institutions in the nuclear realm was driven by a diverse array of security objectives along with the temporal process itself.

made to the NSG Trigger List, despite pressing need for regular updating and extension to keep up with new technologies" (Verdier 2008: 461).

States began to break away from adherence to NPT principles in this period. Treaty signatories Libya, Iran, Iraq, and North Korea all began clandestine nuclear programs. Nonsignatories Brazil and Argentina launched nuclear weapons programs, and South Africa successfully built a nuclear device. States also negotiated nuclear sharing deals for sensitive technologies, including a 1975 agreement for Germany to provide Brazil with elements of the entire nuclear fuel cycle. France concluded reprocessing plant contracts with Pakistan and South Korea (which they later cancelled under direct U.S. pressure), and China provided technology and assistance to Pakistan.

By the 2000s, nuclear tests by India and Pakistan showed countries could break with the NPT despite the threat of sanctions. The Nuclear Suppliers Group also deadlocked over two critical issues. The IAEA Board of Governors passed the Additional Protocol in 1997, which offered a more rigorous nuclear inspection program and cooperation by all states, but NSG members could not reach consensus on whether the protocol should be a requirement for future trade of all nuclear materials. NSG members became locked in a stalemate over restrictions on uranium enrichment and reprocessing (ENR) technology. The George W. Bush administration pushed this issue in the NSG, but each round of negotiations saw a new set of opponents and arguments against the plan. Thus, the "expansion of regime membership and the inclusion of states with highly varied perceptions of threat and concern regarding trade in sensitive technologies" stymied progress (Hibbs 2010).

The 2005 NPT RevCon represented the nadir of the multilateral nonproliferation regime. Since 2000, diplomats found little common ground on multilateral standards. Differences arose at the 2005 RevCon over how to respond to noncompliant countries, and the implications of secret supplier networks for states and non-state actors. Developing countries in the non-aligned movement also became more vocal in their criticism of greater power reluctance to accept Article VI commitments (Verdier 2008; Strulak 1993). All precepts of the cooperation trilemma served to foster divisions at the conference. Some states resisted commitments to deeper collaboration due to their differences, questions were raised about the universality of the NPT, and the rule of unanimous consent to pass an Outcome Document also contributed to the collapse of diplomacy. One expert, Harald Müller, characterized this as the "biggest failure in the history of the NPT" (2005: 1).

In response, states have moved toward bilateral arrangements and exclusive mini-laterals to pursue nonproliferation objectives. States have not ignored opportunities to address concerns in multilateral settings, rather they have shifted to bilateral or mini-lateral arrangements outside traditional channels to achieve specific objectives. Nuclear weapons states and other suppliers have negotiated bilateral nuclear cooperation agreements (NCAs—a form of exclusionary cooperation agreements) with client states since the 1950s. In the spirit of the Atoms for Peace pledge, these were primarily designed to help developing countries achieve the promise of nuclear energy. Indeed, the vast majority of NCAs worldwide focus on civilian nuclear assistance, not sensitive technologies that might be more easily diverted for weapons programs. Uncertainty coupled with deadlock has fostered substantial growth in the number of NCAs, however. In the ten-year period after India's nuclear test, NCAs increased by 70 percent (from 344 in 1974 to 573 in 1984) (Keeley 2009). In the past seven years, negotiations underway have reached an all-time high. Today, 441 nuclear power reactors operate in thirty countries. Fifty reactors are now under construction outside the U.S., and more than forty new countries have expressed their desire to develop nuclear energy programs, including Albania, Morocco, the Philippines, New Zealand, and Nigeria (Gourley and Stulberg 2009).

Content

Great powers and nuclear supplier states have entered into arrangements that relax the boundaries of the NPT. They have established exclusionary regimes that challenge principles of

universal membership and broader "democracy" in decision making on nuclear technology. Bilateral nuclear agreements sometimes allow countries to relax the rules of multilateral institutions—providing latitude for states to shape the content of export deals, the partners engaged with, and the monitoring of, exported materials.

U.S. leaders became vocal about multilateral cooperation in the 2000s. Christopher Ford, principal deputy assistant secretary of state for Arms Control, Nonproliferation, and Disarmament Verification, criticized the past administration for its "fetishistic attachment to formal instruments" at the cost of U.S. interests (Ford 2008). In 2003, President George W. Bush created the new Proliferation Security Initiative, a program for interdiction of illicit shipments of materials related to proliferation of weapons of mass destruction. And in 2004, he announced that future U.S. nuclear cooperation agreements should include a clause banning client states from the development of uranium enrichment or reprocessing. The Bush administration subsequently signed a series of memoranda of understanding for nuclear cooperation with Saudi Arabia, the United Arab Emirates, Jordan, and Bahrain that included statements regarding uranium enrichment and reprocessing. The 2005 decision to negotiate an NCA with India also allowed nuclear trade without the guarantee of full-scope IAEA safeguards (von Hippel 2009). India would remain a nonsignatory of the NPT, agreeing only to open fourteen of its twenty-two nuclear reactors to international inspections. In addition, it promised to carefully contain its nuclear program and avoid exporting technology to third parties (Levi and Ferguson 2006; Carter 2006; Tellis 2005; Joshi 2007).

How could U.S. leaders rationalize a dramatic turnaround in policy and a potential challenge to the nonproliferation normative order? Bush administration officials acknowledged this as a challenge to the old way of doing business. They viewed the NPT as flawed, because nonproliferation policy "should not be to constrain or burden good actors . . . but rather to concentrate power on removing or nullifying bad actors" (Perkovich 2006: 2; Ayoob 2001; Harrison 1997). Under this new approach, officials said, "The non-proliferation policies of other countries would be judged more in terms of whether they constituted a threat to U.S. national security than whether they contributed to strengthening the international regime" (Weiss 2007: 440).

Western powers also faced frustration in the multilateral setting of the UN Conference on Disarmament. Beginning in 1995, diplomats attempted to launch negotiations in the Conference on a Fissile Material Cut-off Treaty (FMCT), a treaty banning the production of fissile material for nuclear weapons. However, the organization has been largely paralyzed and inactive since completing the Comprehensive Test Ban Treaty in 1996. One expert identifies the primary problem in the conference's operation on an "extreme version of the consensus rule" whereby "no decision, procedural or substantive, can be taken by the conference without the approval of all sixty-five member states." Opponents of an FMCT have stopped progress on the treaty. Meanwhile, all outside pressures for the conference to move on with its work have been "ignored by the [organization], mired as it is in a procedural bog of its own making" (Meyer 2011).

The U.S. and other great powers continue to focus on bilateral and mini-lateral arrangements. In 2010, the president invited foreign nations to attend a Nuclear Security Summit set up outside the purview of the UN or traditional NPT membership. Both the 2010 and 2012 summits directly addressed the challenge of proliferation of fissile materials and debated mini-lateral initiatives to control or eliminate stocks of highly enriched uranium. In the realm of nuclear cooperation agreements, President Obama pledged deeper cooperation with India through a strategic partnership. In 2011, a senior U.S. official announced plans to negotiate up to seventeen new or renewed NCAs with other countries by 2014. And at this writing, U.S. diplomats continue to press clients in ECA negotiations to renounce plans for uranium enrichment or reprocessing.

Climate Change

Timing

International negotiations over climate change began more recently than the cases of trade and nuclear nonproliferation, reflecting the more recent consensus that greenhouse gas (GHG) emissions require coordination between sovereign governments.[5] In 1985, a scientific conference released a statement that increasing levels of CO2 in the atmosphere made it "'highly probable' there would be significant climate change" (Bodansky 1993: 458). The establishment phase began with the creation of a scientific body through the World Meteorological Organization (WMO) and UN Environment Program (UNEP) to assess the size and impact of climate change. The choice of the UNEP made this the locus for discussions over how to develop an international agreement. A committee for negotiating a climate agreement was established in the UN in 1990, and the Framework Convention on Climate Change (UNFCCC) was adopted in 1992.

The expansion of membership was rapid: 166 countries signed the convention in the first year, and the convention entered into force in 1994, once fifty states ratified it in domestic legislatures. By 2012, 195 states and the European Union were parties to the UNFCCC (United Nations Treaty Database 2012). All states are eligible to join the UNFCCC, and, by ratifying, agree that greenhouse gas concentrations in the atmosphere should be stabilized to "prevent dangerous anthropogenic interference with the climate system" (Article 2). Under Article 4, parties commit to collecting and to publishing data on national anthropogenic emissions and publicizing national measures taken to mitigate climate change. Parties to the convention also agree to promote the development and diffusion of technologies useful to achieving these ends and to support mitigation and adaptation policies adopted by developing countries.

The UNFCCC, therefore, establishes the twin goals of homogeneity and universality. It also establishes a Conference of the Parties (COP), through which negotiations over regime deepening are conducted. As with trade and nuclear nonproliferation, efforts to deepen cooperation have proven fraught. The U.S. and European governments deadlocked over whether to include quantitative targets in a binding multilateral agreement (von Stein 2008). Developed and developing countries were also divided over how to distribute the costs associated with responding to climate change. As a result the UNFCCC included no mandated minimum level of international transfers to support technology transfer or adaptation measures in developing countries, and the Special Climate Change Fund (SCCF), which was established within the GEF to support the transfer of technology to developing countries, approved just US$128 million for thirty-one projects by 2010. Countries also were not required to take on commitments to lower GHG emissions levels within the UNFCCC.

While the UNFCCC was established as an IMO with universal membership and homogeneous rules applied across members, it had limited legal commitments between member states in the initial agreement. Attempts to deepen cooperation have focused on expanding commitments through the UNFCCC and are carried out in negotiating rounds called the Conference of the Parties (COP). The first agreement reached through the COP process was the Kyoto Protocol. The negotiations over the Kyoto Protocol, and its subsequent adoption and ratification, demonstrate the difficulty of deepening cooperation while retaining the principles of universality and homogeneity. The protocol was adopted by the COP in 1997, but it took eight years to enter into force. It included greater commitments than the UNFCCC by relaxing the IMO principles by binding thirty-seven industrialized countries, in addition to the EU, to national emissions targets across six GHG gasses.

Developing countries, in contrast, were not required to take on quantitative targets under the protocol. Instead, three market-based mechanisms were established to enable the transfer of technology and finance: emissions trading, the clean development mechanism, and joint implementation. A system for monitoring performance was also established along with a registration

5. This section draws on Bodansky's review of the establishment of the UNFCCC (Bodansky 1993).

system for projects initiated under the Kyoto mechanisms. In 2001 at Marrakech, Morocco (COP 7), governments adopted more detailed rules governing the Kyoto mechanisms.

The creation of national emissions targets for industrialized countries recognizes these states are responsible for the majority of the stock of GHG emissions, and the unwillingness of developing country governments to cap GHG emissions. Regime deepening through differential targets has nevertheless proven impossible to implement through the IMO structure. The protocol took eight years before entering into force in 2005, once fifty countries representing at least 55 percent of global GHG emissions ratified. The U.S. initially committed to reducing emissions by 6 percent from 1990 levels between 2008 and 2012. The Clinton administration did not bring the Kyoto Protocol up for ratification, however, because it would not survive a senate vote (Harris 1999). The U.S. Senate passed the Byrd-Hagel Resolution in 1997, calling for the White House not to sign a treaty that bound the U.S. to emissions cuts, while not imposing binding emissions constraints on industrializing countries or countries that threatened the U.S. economy.

Difficulties with deepening cooperation, as demonstrated by the length of time for the Kyoto Protocol to be ratified and the nonparticipation of the U.S., led to two responses. The first—internal adjustment—is designed to reestablish homogeneity as a key principle of the IMO. The second—external adjustment—could be seen in government negotiation of alternative forms of cooperation through ECAs. Further, the rate at which these agreements are signed has increased as regime deepening under the UNFCCC has faltered, as expected by the life-cycle model. Between 1990 and 2011, 118 agreements were signed by the major emitting countries outside the UNFCCC.[6] Nine percent of these agreements were signed between 1990 and 1997 when countries sought to deepen cooperation through the UNFCCC by negotiating the Kyoto Protocol with a mean annual number of agreements of 1.2 signed during this period. Between 1998 and 2011, during which time governments failed to deepen cooperation beyond the Kyoto Protocol, the mean annual number of agreements reached 7.6 (107 agreements). Of these, forty-seven agreements were signed from 2008, which is the first year the Kyoto Protocol came into effect, with a mean number of annual agreements reaching to 11.75 agreements during this period. A significant number of these agreements are signed by countries that refuse to adopt emissions caps under the Kyoto Protocol, as discussed below. This suggests they function as substitutes for, rather than complements to, the IMO.

Content

The Kyoto Protocol itself relaxes the principles of universality and homogeneity within the UNFCCC framework. Yet deepening cooperation has proven impossible. Developing countries agree to voluntary targets but reject countries "graduating" from developing to developed country status (von der Goltz 2009). The most important developing countries, negotiating as BASIC (Brazil, South Africa, India, and China) propose a two-speed approach, in which developed countries take on more ambitious targets under a second commitment period, while developing countries are not required to adopt national targets (Bodansky 2010). The BASIC countries are willing to set targets for improving energy intensity, measured as the use of energy per unit of GDP, and urge developed countries to commit to long-term financing for developing countries to promote GHG emissions mitigation and adaptation.

How have governments responded to slow progress within the UNFCCC framework? One response has been to seek to renegotiate terms within the IMO framework. Since the ratification of the Kyoto Protocol, negotiations have focused on operationalizing the flexibility mechanisms, and negotiating a post-Kyoto agreement. Industrialized states have sought but failed to redefine "common but differentiated responsibilities" to include binding emissions commitments from developing countries. At the 2009 Copenhagen conference, the final agreement was not adopted because of opposition by Bolivia, Cuba, Sudan, Nicaragua, and

6. See Appendix for a full list of agreements.

Venezuela. Rather, an agreement was reached to "take note" of the accord. In the COP meeting at Cancun (COP 16), Japan, Canada, Russia, and Australia announced they would not take on national targets for GHG emissions reductions under a second commitment period of the Kyoto Protocol. While negotiations continue within the existing IMO, therefore, it is unclear whether we remain in a process of regime deepening, or whether more exclusionary forms of cooperation will become the dominant form of international cooperation.

A second response has been to develop ECAs that function as partial substitutes to the UNFCCC process. These ECAs relax the principles of universality and homogeneity at the core of the UNFCCC–COP process. The most pronounced growth in ECAs began in the 2000s, as progress to ratification of Kyoto floundered. These agreements commonly involve countries that have not taken on targets under the Kyoto process. The Bush Administration, for example, announced the Asia–Pacific Partnership on Clean Development and Climate (APP) in July 2005. Six countries initially joined: the U.S., Japan, Australia, China, India, and South Korea, followed by Canada in 2007. Although smaller in number, the APP member countries represented 50 percent of global GHG emissions and 48 percent of global energy use. The charter of the organization claimed it was designed as a complement to, rather than a substitute for, the UNFCCC process. It nevertheless relaxed a number of the conditions associated with the IMO. First, membership was limited geographically to the Asia–Pacific region. Second, membership was constituted by states that were either not Annex I countries under the Kyoto Protocol, or had not ratified the agreement, suggesting these states saw the APP as an alternative to cooperation through the UNFCCC. Third, the APP did not focus on legally binding national emissions targets. Instead it used a sectoral approach focused on nonbinding targets in technology development and transfer. It simultaneously promised deeper cooperation in technology, which was only weakly incorporated in the UNFCCC-COP commitments while relaxing the principles of universality and enforcement. Taken together, the APP tended to act as a substitute for, rather than a complement to, the UNFCCC-COP process (McGee and Taplin 2007).

Though the APP was abolished in 2011 by the Obama administration, the approach of focusing on ECAs has not disappeared. The Major Emitters' Forum was established in 2007 and again relaxes the universality principle. It was transformed into the Major Economies' Forum in 2009 and is made up of the seventeen largest economies globally. It relaxes the notion of hard targets, asking member countries for voluntary commitments in funding for research, development, and deployment. The Obama administration has also focused on signing bilateral agreements, such as the U.S.–China Renewable Energy Partnership with the People's Republic of China to promote research, development, and deployment of a portfolio of renewable energy and energy efficiency technologies. Neither the U.S. nor China has commitments under the Kyoto Protocol, demonstrating that cooperation in this format represents a substitute for U.S. and Chinese participation in the UNFCCC process, rather than acting as a complement to it.

The bilateral agreements signed by the U.S. relax the principles of universality and homogeneity, allowing for greater flexibility. The U.S. government has begun to pursue a similar bilateral structure with other countries, announcing an agreement in 2009 between the U.S. and Mexico, called the U.S.–Mexico Bilateral Framework on Clean Energy and Climate Change. Once again it relaxes the principles of universality and homogeneity and allows for greater flexibility in outcomes. This is also the case with the U.S.–India Partnership on Clean Energy, Energy Security, and Climate Change, announced in 2011. Less comprehensive agreements have also been signed with Indonesia, such as the Indonesia Marine and Climate Support (IMACS), which is managed by USAID and seeks to improve marine resources management in order to protect biodiversity and to respond to climate change. The signing of ECAs is not limited to the United States. India, Indonesia, South Korea, China, Japan, and other states have also signed agreements that operate outside the principles of universality and homogeneity at the heart of the UNFCCC. The number of these agreements has increased over time.

Discussion

The goal of this paper is to explain an empirical puzzle. Exclusionary and bilateral forms of cooperation are typically considered inferior to multilateralism since they may generate large transaction costs and idiosyncratic rules and undermine the principle of nondiscrimination. Yet across three issue areas, states are shifting towards exclusionary forms of cooperation despite states' continued commitment to the public-policy goals existing regimes are designed to promote.

We argue that the increasingly exclusionary nature of international cooperation is best understood as a temporal process. The initial choice of cooperation through IMOs marks the beginning of the IMO life cycle, followed by the maturation phase, in which states seek to universalize membership, deepen cooperation, and adopt more stringent enforcement. In the third stage of the life cycle, the principles of universality and homogeneity make it harder to deepen cooperation. Cooperation within IMOs thus has diminishing returns, increasing the likelihood states will promote further cooperation through ECAs.

We developed two arguments associated with the *timing* of the shift towards exclusionary arrangements and the *content* of the ECAs. Our empirical analysis offered support for these arguments. Across the diverse issue areas of trade and investment, nuclear nonproliferation, and climate change, ECAs proliferated as negotiations within the relevant IMO deadlocked, and states responded by external as well as internal adjustment strategies by signing ECAs. We also found these ECAs relaxed principles that limited progress through the IMOs. In the area of climate change, the APP, Major Economies' Forum, and bilateral agreements relax the principle of homogeneity and universality and do not aim to establish legally binding targets. The nuclear exclusionary regimes also move away from the principle of universal membership and offer greater flexibility in terms of partners involved, the content of export deals, and issues of control of exported materials and byproducts. Finally, in trade, FTAs offer an à-la-carte approach to undertake deepening commitments in WTO plus areas and flexibility in the areas subject to hard law enforcement.

What do our findings suggest about the nature of international cooperation? Scholars have moved from examining whether and how international organizations matter to analyzing the nature of regime complexity. For some, institutional nesting deepens cooperation by binding actors ever further to internationally agreed upon regulations. For others, regime complexity undermines the prospects for cooperation through regime shopping and increasing complexity. Our study demonstrates that the changes in international cooperation are best understood as a temporal process in which decisions made by states about the best forum for international cooperation are influenced by choices made about the structure of previous forms of cooperation. Rather than understanding newly emerging organizations as nested within the relevant regime, or as undercutting IMO agreements, the emergence of more exclusionary forms of international cooperation is part of an evolutionary process. The emergence of these agreements is a *symptom* of IMO maturation, rather than a *cause* of dysfunction. Our findings suggest that rather than opposing the proliferation of more exclusionary forms of international cooperation, we should accept them as a natural part of the life cycle of international cooperation in which smaller groups negotiate deeper cooperation over issues that are no longer amenable to bargaining between larger numbers of actors.

What is the generalizability of these findings? We argued above that the cases examined in the paper are dissimilar in terms of the structure of public policy problems being addressed, and the balance of power cannot explain the timing of ECA proliferation and the institutional design choices made to further international cooperation through exclusive arrangements. We also argued that the ideational commitment to the public policy goals has not changed over time in the three cases, making each of these accounts implausible explanations for outcomes. Instead, we contend the three are the same in terms of temporal dynamics introduced by the similar way in which international cooperation was institutionalized. As such, the cases repre-

sent a different research design in which "just one independent variable as well as the dependent variable, covary, and all other plausible independent variables show different values." (Seawright and Gerring 2008: 306).

This research design offers a promising approach to identifying causal relationships, particularly when coupled with process-tracing techniques. The ability to generalize beyond the cases examined through this technique, on the other hand, is limited. While there is no *a priori* reason why the temporal logic outlined in the paper should not hold in other institutional settings, there are at least two ways in which the external validity of this explanation might be limited. Most obviously, it is clear that not all IOs seek to achieve the goal of inclusiveness and homogeneity. The Organization of Economic Cooperation and Development (OECD), and the Association of South East Asian Nations (ASEAN), for example, limit membership based on levels of development or geographic area, while the Asia Pacific Economic Cooperation (APEC) takes a voluntary approach to solving problems of international cooperation. In these cases, it is plausible that a different temporal dynamic might emerge. As such, they do not fit the characteristics of an IMO. This is also likely to have an effect on the probability of the mechanisms identified above. A geographically defined organization, such as ASEAN, is less likely to face the problem of the growing heterogeneity of preferences that may reduce the likelihood of cooperation. The dynamics also may not apply to an organization such as the International Monetary Fund (IMF), given that decision making does not occur along the lines of universal democracy, which is another characteristics of the IMO.

We noted above that states have two responses to increasing difficulties promoting cooperation through existing IOs: internal adjustment or using alternative organizations that relax IMO conditions. An important question is what the conditions are under which states are likely to choose the former or the latter strategies. Historical data from the trade case suggests one possibility: Internal reforms only exacerbated the situation of diminishing returns to cooperation as the WTO approximated even further the cooperation trilemma. Confronted with the limits of internal advancement, external options with more negotiation flexibility became more enticing. Recent developments in the climate case suggests another possibility: Exogenous changes in the public policy problem affect states' perception of the benefits of continuing to seek to cooperate within the existing institution given its potential for deeper and broader cooperation. Identifying the relative importance of these and other factors in determining when internal adjustment or exclusionary cooperation occurs requires the addition of new data, ideally testing across a large number of cases. While beyond the scope of this paper, this represents an important topic for further research on the relationship between institutions, temporality, and changing forms of international cooperation.

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APPENDIX

Intergovernmental and Subnational International Climate Change-related International Agreements (Non-UNFCCC related), 1990–2012*

Name of Agreement	**Participants to Agreement**	**Top Ten Country Participant**	**Year of Creation**
Energy Cities*	Union of the Baltic Cities, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Macedonia, New Zealand, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland,NALAS-Network of Associations of Local Authorities, The Netherlands, Turkey, Ukraine, United Kingdom	Germany, United Kingdom	1990
International Human Dimensions Programme on Global Environmental Change	Ministry for Education and Research, Germany, National Science Foundation, USA, Ministère de l'Enseignement Supérieur et de la Recherche, France, Ministry of Science and Innovation, Spain, Royal Academy of Arts & Sciences, The Netherlands, Chinese National Committee for the International Human Dimensions Programme, China (Beijing), The Research Council of Norway, AustriaDelegation of the Finnish Academies of Science and Letters, ICSU Regional Office for Africa, The Swedish Secretariat for Environmental Earth System Sciences, Sweden, United Nations Environment Programme (UNEP), David and Lucile Packard Foundation, Asia Pacific Network for Global Change Research (APN), "Schweizerische Akademie der Geistes- und Sozialwissenschaften, Switzerland" Academia Sinica, International Social Science Council, (ISSC), UNESCO, International Council of Science (ICSU), United Nations University	China, United States, Germany	1990

Local Governments for Sustainability	Argentina, Armenia, Australia, Austria, Bangladesh, Belgium, Bhutan, Bolivia, Botswana, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Chinese Taipei, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Equador, Estonia, Finland, France, Georgia, Germany, Ghana, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Kenya, Latvia, Mauritius, Mexico, Mozambique, Namibia, Nepal, Netherlands, New Zealand, Nigeria, Norway, Ocidental Mindoro, Peru, Philippines, Poland, Portugal, Republic of Korea, Romania, Russia, Rwanda, Senegal, Serbia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Tanzania, Thailand, Turkey, Uganda, Ukraine, United Kingdom, Uruguay, United States of America, Zambia, Zimbabwe	China, United States, India, Russia, Japan, Germany, Canada, United Kingdom, South Korea	1990
The Asia–Pacific Network for Global Change Research	Australia, Bangladesh, Bhutan, Cambodia, China, Fiji, India, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Russian Federation, Sri Lanka, Thailand, United States of America, Viet Nam	China, Japan, South Korea, Russia, United States	1990
Enterprise for the Americas Iniative in Bolivia	United States, Bolivia	United States	1991
Union of the Baltic Cities	Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia, Sweden	Russia	1991
ENERGY STAR International Partnerships	Australia, United States, Canada, European Union, Japan, New Zealand, Taiwan	United States, European Union, Japan, Canada	1992
Enterprise for the Americas Iniative in Colombia and Fondo Para la Acción Ambiental	United States, Colombua	United States	1992
El Salvador Enterprise for the Americas Initiative Fund	El Salvador, United States	United States	1993
Enterprise for the Americas Iniative in Argentina	United States, Argentina	United States	1993
Environmental Foundation of Jamaica	United States, Jamaica	United States	1993
Energy Charter Protocol on energy efficiency and related environmental aspects	European Atomic Energy Community, European Coal and Steel Community, European Community, Albania, Armenia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Georgia, Germany, Greece, Hungary, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Mongolia, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Ukraine, United Kingdom	European Union, Germany, United Kingdom, Japan	1994
Forest Conservation Agreement	United States, Peru, Conservation International (CI), The Nature Conservancy (TNC), and the World Wildlife Fund	United States	1998
Integrated Environmental Strategies	United States, Argentina, Brazil, Chile, China, India, Mexico, the Philippines, and South Korea	United States, China, India, South Korea	1998

Memorandum of Understanding on environmental matters	Germany, India	Germany, India	1998
Americas Fund of Peru	United States, Peru	United States	1999
Collaborative Labeling & Appliance Standards Program	ClimateWorks Foundation, Sweden, United States, Argentina, GEEA Member Countries, Saudi Arabia, South Africa, China, Colombia, Israel, Pakistan, Denmark, Slovakia, Vietnam, France, India, New Zealand	China, United States, India	1999
Prototype Carbon Fund	Canada, Finland, Norway, Sweden, Netherlands, Japan International Cooperation AgencyBritish Petroleum - Amoco, Chubu Electric Power Co., Chugoku Electric Power Co., Deutsche Bank, Electrabel, Fortum, Gaz de France, Kyushu Electric Power Co., MIT Carbon, Mitsubishi Corp., Norsk Hydro, RaboBank, RWE, Shikoku Electric Power Co., Statoil ASA, Tohoku Electric Power Co., Tokyo Electric Power Co.	Canada	2000
Conference of New England Governors and Eastern Canadian Premiers	United States, Canada	United States, Canada	2001
MOU on Science and Technology Related to Meteorology, Hydrology, Environmental Prediction and Climate Change:	China, Canada	China, Canada	2001
The International Nuclear Energy Research Initiative	United States/France	United States	2001
The International Nuclear Energy Research Initiative	United States/Republic of Korea	United States, South Korea	2001
Tropical Forest Conservation Act with Belize	United States, Belize, Programme for Belize, Toledo Institute for Development and the Environment, PACT Foundation	United States	2001
Tropical Forest Conservation Act with El Salvador	El Salvador, United States, FIAES	United States	2001
FORCLIMIT-India research network	India, United Statea	India, United States	2002
Group on Earth Observations	Algeria, Burkina Faso, Cameroon, Central African Republic, Republic of Congo, Egypt, Ethiopia, Gabon, Ghana, Guinea-Bissau, Republic of Guinea, Madagascar, Mali Mauritius, Morocco, Niger, Nigeria, South Africa, Sudan, Tunisia, Uganda, Argentina, The Bahamas, Belize, Brazil, Canada, Chile, Colombia, Costa Rica, Honduras, Mexico, Panama, Paraguay, Peru, United States, Australia, Bahrain, Bangladesh, China, India, Indonesia, Iran, Israel, Japan, Republic of Korea, Malaysia, Nepal, New Zealand, Pakistan, Philippines, Thailand Kazakhstan, Moldova, Russian Federation, Tajikistan, Ukraine, Uzbekistan, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Estonia, European Commission, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, Malta, Netherlands, Norway, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom	China, United States, European Union, India, Russia, Japan, Germany, Canada, Iran, United Kingdom, South Korea	2002

Johannesburg Renewable Energy Coalition	Afghanistan, Antigua and Barbuda, Argentina, Austria, Bahamas, Barbados, Belgium, Belize, Bolivia, Bosnia-Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Cape Verde, Chile, Colombia, Comoros, Congo, Dem. Rep. of Congo, Rep. of (Brazzaville), Cook Islands, Cuba, Cyprus, Czech Republic, Denmark, Dominica, Estonia, Federated States of Micronesia, Fiji, Finland, France, Germany, Ghana, Greece, Grenada, Guinea-Bissau, Guyana, Hungary, Iceland; Ireland, Israel, Italy, Jamaica, Kenya, Kiribati, Latvia, Lithuania, Luxembourg, Maldives, Mali, Malta, Marshall Islands, Mauritius, Morroco, Nauru, New Zealand, Norway, Papua New Guinea, Poland, Portugal, Romania, Samoa, Sao Tome and Principe, Serbia and Montenegro, Seychelles, Singapore, Slovakia, Slovenia, Solomon Islands, South Africa, Spain, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Sweden, Switzerland, The Gambia, The Netherlands, The Philippines, Tonga, Trinidad and Tobago, Turkey, Tuvalu, Uganda, United Kingdom, Vanuatu	Germany, United Kingdom, European Union	2002
Network of Regional Governments for Sustainable Development	Portugal, France, Spain, Argentina, Peru, Democratic Republic of Congo, Belgium, Brazil, Fatick Senegal, Haut Bassins, Zambia, Uganda, Burkino Faso, Indonesia, Canada, Mozambique, Mali, Romania, United Kingdom	United Kingdom, Canada	2002
Network of Regional Governments for Sustainable Development	Portugal, France, Spain, Argentina, Peru, Democratic Republic of Congo, Belgium, Brazil, Fatick Senegal, Haut Bassins, Zambia, Uganda, Burkino Faso, Indonesia, Canada, Mozambique, Mali, Romania, United Kingdom	United Kingdom, Canada	2002
Philippine Tropical Forest Conservation Foundation	United States, Philippines	United States	2002
Renewable Energy and Energy Efficiency Partnership	Australia, Austria, Canada, the European Union, Germany, Ireland, Italy, Netherlands, New Zealand, Norway, Spain, the US and the United Kingdom	United States, Germany, Canada, United Kingdom	2002
SAARC Environment Plan of Action	Nepal, Afghanistian, Bangladesh, Bhutan, India, Maldives, Pakistan and Sri Lanka	India	2002
The International Nuclear Energy Research Initiative	United States/OECD-NEA	United States	2002
Bangladesh Tropical Forest Conservation Foundation (The Arannayk Foundation)	Bangladesh, United States	United States	2003
Carbon Sequestration Leadership Forum	Australia, Brazil, Canada, China, Colombia, Denmark, European Commission, France, Germany, Greece, India, Italy, Japan, South Korea, Mexico, Netherlands, New Zealand, Norway, Poland, Russia, Saudi Arabia, South Africa, United Arab Emirates, United Kingdom, Unites States	China, United States, EC, India, Russia, Japan, Germany, Canada, United Kingdom, South Korea	2003
Community Development Carbon Fund	Austria, Belgium, Canada, Italy, Luxembourg, the Netherlands, Spain, Companies and organizations: BASF, Daiwa Securities SMBC Principal Investments, EdP, Endesa, Fuji Photo Film Co. Ltd., Göteborg Energi AB, Hidroeléctrica del Cantábrico, IBRD as Trustee of the Danish Carbon Fund, Idemitsu Kosan, KfW, Nippon Oil Corporation, Okinawa Electric Power Co., Rautaruukki, Gas Natural, Statkraft Carbon Invest AS, Statoil ASA, Swiss Re.	Canada	2003

International Partnership for Hydrogen and Fuel Cells in the Economy	Australia, Brazil, Canada, China, European Commission, France, Germany, Iceland, India, Italy, Japan, Republic of Korea, New Zealand, Norway, Russian Federation, Republic of South Africa, United Kingdom, United States	China, United States, India, Russia, European Union, Canada, United Kingdom	2003
Memorandum of Understanding for Enhanced Cooperation in the field of Renewable Energy	India, China	India, China	2003
Memorandum of Understanding on Environmental Cooperation	China, Canada	China, Canada	2003
Multilateral Nuclear Environmental Programmet in the Russian Federation	Belgium, Denmark, Finland, France, Germany, Netherlands, Norway, Russian Federation, Sweden, Great Britain, Northern Ireland, the European Community, and the European Atomic Energy Community	Germany, Russia, United Kingdom	2003
The International Nuclear Energy Research Initiative	United States/Brazil	United States	2003
The International Nuclear Energy Research Initiative	United States/Canada	United States, Canada	2003
The International Nuclear Energy Research Initiative	United States/European Union	United States, European Union	2003
Tropical Forest Conservation Act with Panama	United States, Panama, The Nature Conservancy (TNC)	United States	2003
Japan-People's Republic of China Climate Change Dialogue	Japan, China	Japan, China	2004
The Climate Group	Governments • Belgium, United Kingdom, Australia, China, India, United States, Philippines, Canada, Mexico, South Africa, Spain, France, Senegal, Sweden, Basque Country, Italy, Poland, Scotland, Germany, Austria, Malaysia Corporations • Alstom, Arup, Barclays, Better Place, Bloomberg, Broad Group, BT, CBRE Group, CECEP (China Energy Conservation and Environmental Protection Group), China Mobile, Cisco, CLP Holdings Limited, Coca-Cola Company, Dell, Deutsche Bank, Duke Energy, EN+ Group, GE Capital Finance Australasia Pty Ltd, Goldman Sachs, Greenstone Carbon Management, Hanergy Holdings Group, HDR, Hewlett Packard, HSBC, IWC Schaffhausen, Johnson Controls, JP Morgan Chase, Landsea, Munich Re, News Corporation, Nike, Origin Energy, PassivSystems, Philips Lighting, Procter & Gamble, Skadden LLP, Smith Electric Vehicles, Standard Chartered Bank, Suntech, Suzlon, Swire Pacific, Swiss Re, Taobao, Tiptop Real Estate, TNT, VantagePoint Venture Partners, Veolia Environment, Visy"	China, United States, India, Germany, Canada, United Kingdom	2004
The International Nuclear Energy Research Initiative	United States/Japan	United States, Japan	2004

The Jamaica Protected Areas Trust Limited	United States, The Nature Conservancy Jamaica Program, Jamaica Environment Trust (JET), Jamaica Forestry Department, University of the West Indies,National Environment & Planning Agency	United States	2004
Tropical Forest Conservation Act with Colombia	the U.S. and Colombia, The Nature Conservancy, Conservation International, the World Wildlife Fund	United States	2004
C40 Cities Climate Leadership Group*	USA, Ethiopia, Greece, Thailand, China, Germany, Colombia, Argentina, Egypt, Venezuela, India, Bangladesh, Vietnam, Turkey, Indonesia, South Africa, Pakistan, Nigeria, Peru, United Kingdom, Spain, Australia, Mexico, Russia, France, Brazil, Italy, South Korea, Japan, Canada, Poland, The Netherlands, Switzerland, Republic of Korea, Denmark, Germany, Chile, Sweden	United States, Japan, India, Russia, China, Germany, Canada, United Kingdom, South Korea	2005
EU–India Joint Initiative on Clean Development and Climate Change	European Union, India	European Union, India	2005
India–US Energy Dialogue	India, United Statea	India, United States	2005
Joint Committee on Environmental Cooperation	United States, China	United States, China	2005
The Canada-China Climate Change Working Group (CCWG)	China, Canada	China, Canada	2005
World Mayors Council on Climate Change	Australia, Brazil, Cameroon, Canada, Chinese Tapei, Croatia, Denmark, France, Germany, India, Israel, Italy, Japan, Kenya, Madagascar, Mexico, Nigeria, Philippines, Senegal, South Africa, South Korea, Spain, Sweden, Switzerland, Uganda, United Kingdom, United States	United States, India, Germany, Canada, United Kingdom, South Korea, Japan	2005
Asia–Pacific Partnership on Clean Development and Climate	Australia, Canada, India, Japan, the People's Republic of China, South Korea, and the United States	United States, China, South Korea, India, Japan, Canada	2006
Connected Urban Development	The Netherlands, United States, South Korea, Portugal, Germany, United Kingdom, Spain	United States, United Kingdom, Germany, South Korea	2006
International Thermonuclear Experimental Reactor	Russia, the USA, the European Union, Japan, China, South Korea, India	US, EU, Japan, China, South Korea, India, Russia	2006
Tropical Forest Conservation Act with Botswana	Botswana, United States	United States	2006
Tropical Forest Conservation Act with Guatemala	United States of America, the Republic of Guatemala, The Nature Conservancy and Conservation International	United States	2006
Tropical Forest Conservation Act with Paraguay	United States, Paraguay	United States	2006

CEBU declaration on East Asian Energy Security	Member Countries of the Association of Southeast Asian Nations (ASEAN) (Cambodia, Indonesia, Lao, Malaysia, Union of Myanmar, Philippines, Singapore, Thailand, Viet Nam), Australia, People's Republic of China, Republic of India, Japan, Republic of Korea and New Zealand	India, China, Japan, South Korea	2007
China–Canada Joint Committee on Environmental Cooperation	China, Canada	China, Canada	2007
India–Japan Energy Dialogue	India, Japan	India, Japan	2007
International Carbon Action Partnership	Denmark, European Commission, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, United Kingdom, United States, Canada, Australia, New Zealand, Norway, Japan	European Union, Germany, United Kingdom, United States, Japan	2007
ISO GHG Accounting Standards 14064–14065	Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Chile, China, Colombia, The Democratic Republic of the Congo, Congo, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Côte d'Ivoire, Denmark, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Guyana, Honduras, Hong Kong, China, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Democratic People's Republic of Korea, South Korea, Kuwait, Kyrgyzstan, Lao People's Democratic Rep., Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Luxembourg, Macau, China, Madagascar, Malawi, Malaysia, Mali, Malta, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Nigeria, Norway, Oman, Pakistan, Palestine, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Rwanda, Saint Lucia, Saint Vincent and the Grenadines, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, The former Yugoslav Republic of Macedonia, Togo, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, United Kingdom, Uruguay, USA, Uzbekistan, Viet Nam, Yemen, Zambia, Zimbabwe	China, United States, India, Russia, Japan, Germany, Canada, United Kingdom, South Korea, Iran	2007
Joint Statement by the Republic of India and Japan on the Enhancement of Cooperation on Environmental Protection and Energy Security	Japan, India	India, Japan	2007
Memorandum of Understanding (MOU) to cooperate on Industrial Energy Efficiency	United States, China (The Department of Energy of the United States of America (DOE) and the National Development and Reform Commission of the People's Republic of China (NDRC))	United States, China	2007

The Midwest Greenhouse Gas Reduction Accord	United States, Canada	United States	2007
Tropical Forest Conservation Act with Costa Rico	United States of America and Costa Rica, Conservation International and The Nature Conservancy	United States	2007
U.S.–China Biofuels MOU	United States, China (The Department of Energy of the United States of America (DOE) and the National Development and Reform Commission of the People's Republic of China (NDRC))	United States, China	2007
Western Climate Initiative**	United States, Canada	United States, Canada	2007
Cool Earth Partnerships (Cool Earth 50)	Japan, Peru, SICA, Surinam,e, Kazakhstan, Kiribati, Cook Islands, Nauru, Niue, Vanuatu, Marshall, Bangladesh, PNG, Philippines, Egypt, Colombia	Japan	2008
Cool Earth Program Loan	Indonesia, Japan	Japan	2008
International Renewable Energy Agency	AlbanIRENA Members - 88 Albania, Angola, Antigua and Barbuda, Armenia, Australia, Bangladesh, Belarus, Bosnia and Herzegovina, Brunei Darussalam, Bulgaria, Cameroon, Cape Verde, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominican Republic, Ecuador, Eritrea, European Union, Fiji, Finland, France, Gambia, Georgia, Germany, Grenada, Greece, Iceland, India, Israel, Japan, Kenya, Latvia, Lesotho, Liechtenstein, Lithuania, Luxembourg, Malaysia, Maldives, Mali, Marshall Islands, Malta, Mauritius, Mexico, Monaco, Mongolia, Montenegro, Mozambique, Nauru, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Philippines, Poland, Portugal, Qatar, Republic of Korea, Republic of Moldova, Romania, Samoa, Senegal, Serbia, Seychelles, Sierra Leone, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, The former Yugoslav Republic of Macedonia, Togo, Tonga, Tunisia, United Arab Emirates, United States of America, Uruguay IRENA Signatories/applicants for membership - 68 Afghanistan, Algeria Argentina, Austria, Azerbaijan, Bahrain, Belgium, Belize, Benin, Burkina Faso, Cambodia, Central African Republic, Chad, Chile, Colombia, Comoros, Congo, Costa Rica, Côte D'Ivoire, Cuba, Democratic Republic of the Congo, Egypt, Estonia, Ethiopia, Gabon, Ghana, Guatemala, Guinea, Guinea-Bissau, Honduras, Iran (Islamic Republic of), Iraq, Ireland, Italy, Jordan, Kazakhstan, Kiribati, Kuwait, Kyrgyzstan, Lebanon, Liberia, Libya, Madagascar, Mauritania, Morocco, Nepal, Pakistan, Papua New Guinea, Peru, Rwanda, Saint Lucia, Saint Vincent and the Grenadines, Sao Tome and Principe, Saudi Arabia, Solomon Islands, Somalia, Syrian Arab Republic, Tajikistan, Timor-Leste, Turkey, Uganda, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, Uzbekistan, Vanuatu, Yemen, Zambia, Zimbabwe	United States, European Union, India, Japan, Germany, Iran, United Kingdom, Swouth Korea	2008
Japan–UNDP Joint Framework for Building Partnership to Address Climate Change in Africa	Japan, UN, various African countries	Japan	2008
The Tripartite Policy Dialogue among Japan, People's Republic of China, and Republic of Korea on Climate Change	Japan, South Korea, China	Japan, South Korea, China	2008

Transatlantic Climate Bridge	Germany, United States	Germany, United States	2008
United Nations Collaborative initiative on Reducing Emissions from Deforestation and forest Degradation	Norway, Denmark, Spain, Japan, European Commission, Bolivia, Cambodia, Democratic Republic of the Congo (DRC), Ecuador, Indonesia, Nigeria, Panama, Papua New Guinea, Paraguay, the Philippines, Solomon Islands, Tanzania, Viet Nam and Zambia, Argentina, Bangladesh, Benin, Bhutan, Cameroon, Central African Republic, Chile, Colombia, Costa Rica, Ethiopia, Gabon, Ghana, Guatemala, Guyana, Honduras, Ivory Coast, Kenya, Mexico, Mongolia, Myanmar, Nepal, Pakistan, Peru, Republic of Congo, South Sudan, Sri Lanka, Sudan and Suriname	European Union, Japan	2008
21st Century Coal	United States, United States, China Power Engineering and Consulting Group Corporation, Peabody Energy, GE Energy and China's Shenhua Group , AES, Shenzhen Dongjiang Environmental Recycled Power Company and Songzao Coal and Electricity Company. U.S. National Energy Technology Laboratory, West Virginia University, the Wyoming State Geological Survey, the Shaanxi Institute of Energy Resources and Chemical Engineering	United States, China	2009
Energy Efficiency Action Plan	United States, China	United States, China	2009
High Level Dialogue between Japan and Republic of Korea on Climate Chang	Japan, South Korea	Japan, South Korea	2009
International Partnership for Energy Efficiency Cooperation	Australia, Brazil, Canada, China, EU, France, Germany, Italy, India, Japan, Mexico, Russia, South Korea, United Kingdom, United States	Canada, European Union, India, Russia, South Korea, The United States, United Kingdom, China, Japan, Germany	2009
Major Economies Forum on Energy and Climate	Australia, Brazil, Canada, China, the European Union, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Russia, South Africa, the United Kingdom, and the United States	China, United States, European Union, Russia, Japan, Germany, Canada, United Kingdom	2009
Memorandum of Understanding for Cooperation in the area of energy	India, Canada	India, Canada	2009
Russian–German Energy Agency	Russia, Gemany	Russia, Gemany	2009
Sino–German electro-mobility Forum	Germany, China	Germany, China	2009
Super-efficient Equipment and Appliance Deployment	Australia, Brazil, Canada, the European Commission, France, Germany, India, Japan, Korea, Mexico, Russia, South Africa, Sweden, the United Arab Emirates, the United Kingdom, and the United States	United States, EU, India, Russia, Japan, Germany, Canada, United Kingdom	2009

The U.S.–China Energy Cooperation Program	United States, China, AECOM, Applied Materials, Boeing, Caterpillar, Celanese, Cisco, Cummins, DOW, Duke Energy, First Solar, GE, Honeywell, IBM, ICF, Lanza Tech, LP Amina, Peabody Energy, Rockwell Automaton, Timken, TRAX, UPC Renewables, United technologies	United States	2009
Tropical Forest Conservation Act with Indonesia	United States of America, the Republic of Indonesia,Conservation International and Yayasan Keanekaragaman Hayati Indonesia (KEHATI)	United States	2009
U.S.–Canada clean energy dialogue	United States, Canada	United States, Canada	2009
U.S. DOE and the Indian Ministry of New and Renewable Energy (MNRE) Memorandum of Understanding (MOU)	United States, India	United States, India	2009
U.S.–China Clean Energy Research Center	United States, China	United States, China	2009
U.S.–China Electric Vehicles Initiative	United States, China	United States, China	2009
U.S.–China Renewable Energy Partnership	United States, China, NREL, China's State Grid Energy Research Institute, Alcoa, General Electric, HydroChina and Duke Energy	United States, China	2009
U.S.–Mexico Bilateral Framework on Clean Energy and Climate Change	United States, Mexico	United States	2009
Carbon Capture, Use and Storage Action Group	Australia, Canada, China, France, Germany, Japan, Republic of Korea, Mexico, Norway, South Africa, United Arab Emirates, United Kingdom, United States, Aker Clean Carbon, Alstom, Bellona, the Carbon Capture and Storage Association, the Center for American Progress, the Clinton Foundation, the Global CCS Institute, the International Energy Agency, the International Energy Agency Greenhouse Gas R&D Programme, Sasol, Scottish Power, Shell, the World Coal Association, and the World Resources Institutes	China, United States, Japan, Germany, Canada, United Kingdom, South Korea	2010
Carbon n Cities Climate Registry	Japan, South Africa, Canada, Argentina, Belgium, India, Nigeria, Portugal, Mexico, Guatemala, Bolivia, Ghana, Brazil, Italy, Philippines, Chinese Taipei	Japan, Canada, India	2010
Clean Energy Education and Empowerment	Australia, Denmark, Mexico, Norway, South Africa, Sweden, United Arab Emirates, United Kingdom, United States	United Kingdom, United States	2010
Clean Technology Fund	Australia, France, Germany, Japan, Spain, Sweden, United Kingdom, United States. Brazil, China, Egypt, India, Morocco, Nigeria, South Africa, Turkey. the World Bank, Multilateral Development Banks	Germany, Japan, United Kingdom, United States, China, India	2010
Global Methane InitIative	Argentina, Australia, Brazil, Bulgaria, Canada, Chile, China, Colombia, Dominican Republic, Ecuador, Ethiopia, European Commission, Finland, Georgia, Germany, Ghana, India, Indonesia, Italy, Japan, Jordan, Kazakhstan, Mexico, Mongolia, Nicaragua, Nigeria, Norway, Pakistan, Peru, Philippines, Poland, Republic of Korea, Republic of Serbia, Russia, Sri Lanka, Thailand, Turkey, Ukraine, United Kingdom, United States, Vietnam	China, United States, EC, India, Russia, Japan, Germany, Canada, United Kingdom, South Korea	2010

Global Shale Gas Initiative	United States, China, India, Jordan and Poland	United States, China, India	2010
Global Superior Energy Performance Partnership	Canada, Denmark, the European Commission, Finland, France, India, Japan, South Korea, Mexico, Russia, South Africa, Sweden and the United States	Canada, European Union, India, Russia, South Korea, The United States	2010
Indonesia Marine and Climate Support Project	Indonesia, United States	United States	2010
Joint Statement between the Ministry of Economy, Trade and Industry of Japan and the Planning Commission of India on the Occasion of the Fourth Meeting of the Japan-India Energy Dialogue	Japan, India	India, Japan	2010
The Global Alliance for Clean Cookstoves	Denmark, Finland, Germany, Ireland, Italy, Malta, The Netherlands, Norway*, Spain, United Kingdom, United States of America*, Dow Corning Corporation, Shell*, U.S. Department of Health and Human Services (National Institutes of Health and Centers for Disease Control and Prevention)*, U.S. Department of State / Agency for International Development*, U.S. Department of Energy*, U.S. Environmental Protection Agency*, German Federal Ministry for Economic Cooperation and Development (BMZ)*, Morgan Stanley*, Shell Foundation*, SNV Netherlands Development Organisation*, United Nations Foundation*, World Bank, Barr Foundation, Bosch and Siemens Home Appliances Group, The Korein Foundation, Love The Earth Project 21 managed by Fuji Television Network, Inc., Osprey Foundation, Baker & Mckenzie, Deloitte (* indicates founding members, implementing members can be found on the website)	Germany, United Kingdom, United States	2010
Thimphu Statement on Climate Change	Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka	India	2010
Tropical Forest Conservation Act with Brazil	Brazil, United States	United States	2010
USAID's Indonesia Forestry and Climate Support	Indonesia, United States	United States	2010
Global Green Growth Iniative	South Korea, Australia, Cambodia, Brazil, Denmark, Ethiopia, Indonesia, Japan, Kazakhstan, Mongolia, Philippines, Thailand, United Arab Emirates,Asian Development Bank, Danfoss Group, Deutsche Gesellschaft fur Zusammenarbeit European Bank for Reconstruction and Development, Global Green Growth Forum, Ministry of Environment and Natural Resources of Mexico, National Research Council for Economics, Humanities and Social Sciences, UN Economic and Social Commission for Asia Pacific, Vestas Wind Systems A/S, World Economic Forum	South Korea, Japan	2010
Clean Enery Solutions Center	Australia, France, India, Italy, Japan, Mexico, South Africa, Sweden, United Arab Emirates, and the United States, as well as the International Energy Agency and ClimateWork	Japan, India, United States	2011

Framework Agreement on Cooperation on Development between India and Maldives	Maldives, India	India	2011
Global Research Alliance on Agricultural Greenhouse Gases	Argentina, Australia, Brazil, Canada, Chile, China, Colombia, Costa Rica, Denmark, Finland, France, Germany, Indonesia, Ireland, Italy, Japan, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Peru, the Philippines, Republic of Korea, Russia, Spain, Sweden, Switzerland, Thailand, UK, USA, Uruguay and Vietnam	Canada, China, United States, United Kingdom, Russia, Japan, South Korea, Germany	2011
International Smart Grid Action Network	Australia, Austria, Belgium, Canada, China, European Commission, France, Germany, India, Italy, Japan, Korea, Mexico, Netherlands, Norway, Russia, Sweden, Switzerland, United Kingdom and the United States	China, United States, European Union, India, Russia, Japan, Germany, Canada, United Kingdom,	2011
MOU between India and Bangladesh on Renewable Energy Cooperation	Bangladesh, India	India	2011
Partnership to Advance Clean Energy	India, United Statea	United States, India	2011
Sustainable Development of Hydropower	Brazil, France, United States, Mexico, Norway	United States	2011
The Indonesia Clean Energy Development	United States, Indonesia	United States	2011

* Note on data collection procedure: Climate-related agreements for the top-ten emitters were identified as follows. First, we used government websites to identify agreements. We then used internet resources dedicated to the agreement or alternative sources of data on the agreement—usually in the form of a press release or other official public material. The process differed by country as the information available differed. Major data sources were: 1. United States—Department of State and the Department of Energy websites, White House releases; 2. United Kingdom—Department of Energy and Climate Change, main government website of the United Kingdom; 3. China—Press releases, which were sorted through filters of climate, environment and energy. and White Papers; 4. European Union—EU treaty database sorted by relevant key words (climate, energy, environment); 5. India—Government database of bilateral agreements and treaties from 2000–2012; 6. Russia—Press releases from the Ministry of Foreign Affairs, Russian President's website, archives of country visits; 7. Japan—Ministry of Foreign Affairs website; 8. Germany—Official government website; 9. Canada—Official government website; 10. Iran—No significant data identified; 11. South Korea—White papers on climate change, government website. In selecting for agreements, wefirst ensured there was no direct ties to the UNFCCC, and then reviewed the stated mission or goals to see if combating climate change was explicitly mentioned or implicitly through issues such as carbon emissions, clean energy, etc. When possible and practical all actors are listed, but for some agreements with a preponderance of industry members, only a representative sample was included for brevity sake. All member countries are included.