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A Dynamic Institutional Theory of International Law

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INTRODUCTION

International relations and international law scholars have moved beyond the question of *whether* international law matters and have turned their attention to questions of *why* and *how* international law leads to international cooperation.[1] In doing so, many scholars employ game

1. *See* Richard Steinberg, *In the Shadow of Law or Power? Consensus-Based Bargaining and Outcomes in the GATT/WTO*, 56 INT'L ORG. 339, 339 (2002)

theory (often in the broader context of rational choice theory) to frame their analysis and explain the need for international institutions designed to increase the likelihood of cooperation.[2] In recent years, scholars have theorized about the optimal design of institutions and have examined and evaluated existing institutions to determine whether the institutions are rationally designed.[3] Despite the significant advancements made in the study of international cooperation, there remains a gap between the types of institutions that traditional game theory predicts should exist and the types of institutions found in reality.[4] The traditional game theory model suggests that States will create institutions that reduce the risk of opportunism, for example, by monitoring State behavior and adjusting payoffs either by rewarding cooperators or punishing defectors. Such institutions exist in a variety of forms and

("Analysis of international institutions and law is shifting from earlier concerns of whether institutions matter to questions of which aspects matter, how, and in what contexts.") (footnote omitted). In the past two decades, many scholars have devoted attention to integrating international relations and international law theories. *See infra* note 59. As Pierre-Hugues Verdier recently put it, "[t]he most significant recent development in international legal studies has undoubtedly been the collapse of the intellectual barrier between the disciplines of international law and international relations." Pierre-Hugues Verdier, *Cooperative States: International Relations, State Responsibility and The Problem of Custom*, 42 VA. J. INT'L L. 839, 840 (2002).

2. *See* Duncan Snidal, *Rational Choice and International Relations*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS 73, 77 (Walter Carlsnaes et al. eds., 2002) (observing that "[n]on-cooperative game-theoretic models are the predominant approach" to modeling rational choice). For a discussion on rational choice theory, see generally *id.* There is a rich literature on the application of game theory to international cooperation. *See infra* note 59 (listing sources). Game theory encompasses both cooperative games, in which promises are assumed to be binding, and noncooperative games, in which promises are not necessarily binding. Given the absence of a supranational governance regime, international games are analyzed as noncooperative games. *See, e.g.*, ERIC RASMUSEN, GAMES AND INFORMATION: AN INTRODUCTION TO GAME THEORY 16-19 (2d ed. 1994); Moshe Hirsch, *Game Theory, International Law and Future Environmental Cooperation in the Middle East*, 27 DENV. J. INT'L L. & POL'Y 75, 80 (1998). Accordingly, the article will address noncooperative game theory hereinafter.

3. *See generally* Special Issue, *The Rational Design of International Institutions*, 55 INT'L ORG. 761 (2001). *See infra* Part II.D.

4. *See* Snidal, *supra* note 2, at 85 ("More dramatically, states make rational plans to join international institutions like the EU, WTO or international legal agreements with the understanding . . . that those institutions will significantly shape their own future course. Rational choice has a largely unfulfilled role to play in analyzing this sort of deliberate preference change.").

are the predominant focus of legal and institutional analyses. Yet such institutions arguably are not the predominant (institutional) feature of international cooperation.[5] There are a host of institutions created by parties to international agreements that are unrelated to monitoring and enforcement and cannot be explained by the traditional game theory model.

This article advances the body of interdisciplinary scholarship addressing the questions of *why* and *how* international law leads to international cooperation by developing a dynamic institutional theory of international law. The theory extends the iterated game theory model (for example, the iterated prisoners' dilemma), which is often used by rational choice theorists in the international relations and international law disciplines to study international cooperation,[6] by recognizing first that iterated games actually *evolve*[7] and second that States create

5. *See* ABRAM CHAYES & ANTONIA HANDLER CHAYES, THE NEW SOVEREIGNTY: COMPLIANCE WITH INTERNATIONAL REGULATORY AGREEMENTS (1995) (arguing that management-oriented compliance institutions are more important than enforcement-oriented compliance institutions); James Fearon, *Bargaining, Enforcement, and International Cooperation*, 52 INT'L ORG. 269 (1998) (arguing that institutions focused on facilitating bargaining are as important to international cooperation as those focused on monitoring and enforcement).

6. *See* Snidal, *supra* note 2, at 77.

7. The theory decidedly focuses on international legal regimes as *evolving games*. The concept of an *evolving game* developed in this article is a step beyond an iterated game, such as the iterated Prisoners' Dilemma, because the game evolves dynamically as it iterates. Dynamic evolution is different from iteration, although the two concepts are related. Iteration involves repeated interactions over time and is important because repeated interactions increase the likelihood of cooperation over time, particularly when the number of iterations is unknown. *See, e.g.*, John K. Setear, *An Iterative Perspective on Treaties: A Synthesis of International Relations Theory and International Law*, 37 HARV. INT'L L.J. 139 (1996) [hereinafter Setear, *An Iterative Perspective on Treaties*] (analyzing treaties from an "iterative perspective"); John K. Setear, *Responses to Breach of a Treaty and Rationalist International Relations Theory: The Rules of Release and Remediation in the Law of Treaties and the Law of State Responsibility*, 83 VA. L. REV. 1 (1997) (using iterated prisoners' dilemma to analyze international law). Essentially, payoffs expected in the future (from future iterations) become relevant to decisions made in the present (in the current iteration).

Dynamic evolution goes a step further. In an evolving game, the game structure evolves as it iterates due to internal changes resulting from the operation of institutions responding to external events, such as new scientific or technological findings, that cause the underlying game structure to change. As demonstrated below, the function of international institutions need not be (and in reality is not) limited to making modifications in response to parties'

institutions to cope with this evolution and sustain cooperation in the face of dynamic change.[8] States understand when entering into an international agreement not only that they face noncompliance risks as traditionally conceived (defection based on incentives presented in iterated game context, for example), but also that dynamic change may threaten the stability of the game (unforeseen events may cause payoffs to change in magnitude or become more or less certain, for example). Accordingly, *ex ante*, States design institutions to monitor State behavior and adjust payoffs either by rewarding cooperators or punishing defectors—as predicted by traditional game theory—but also to maintain cooperation in the face of dynamic change. States create institutions to reduce uncertainty and transaction costs associated with dynamic change and to adjust commitments in future iterations. Such institutions facilitate internal change and maintain cooperation by relieving parties of the need to return to the bargaining table every time the game structure changes.[9] This new theory provides a powerful framework for analyzing international legal commitments, institutional mechanisms created by parties to an international agreement to encourage and facilitate cooperation over time ("compliance institutions"), and the dynamic process by which international legal regimes evolve.

Scholars concerned with understanding why States bother to negotiate international agreements and why States normally comply with their commitments should benefit from a more nuanced understanding of international law and compliance institutions. Legal scholars tend to view the international compliance dilemma (*i.e.*, the perceived risk that States will not comply with commitments) as an inevitable and inherent weakness of

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decisions not to cooperate (*e.g.*, to breach obligations). *See infra* Part II.D-F. *See also* John K. Setear, *Ozone, Iteration, and International Law*, 40 VA. J. INT'L L. 193, 201 (1999) (describing the role of institutions in facilitating cooperation); *id.* at 227-282 (discussing the evolution of the Ozone regime). For an interesting and comprehensive model of dynamic evolution of global regulatory regimes, see JOHN BRAITHWAITE & PETER DRAHOS, GLOBAL BUSINESS REGULATION (2000).

8. *See* CHAYES & CHAYES, *supra* note 5, at 225-27 (discussing institutions designed for treaty adaptation). In his overview of rational choice theory and international relations, Duncan Snidal describes the issue of dynamic change as an important challenge for rational choice theory. Snidal, *supra* note 2, at 82-86.

9. *See* Snidal, *supra* note 2, at 85.

international law for which politically dependent, negative repercussions, such as reputational harm, exclusion from participation in other "linked" arrangements, or direct sanctions, are the only real cure, although a cure that is not always available or effective.[10] As noted above, this view fails, however, to consider the wide-range of innovative institutions that States can and do employ to increase the likelihood of compliance and continued cooperation. Simply put, States are aware of various risks while negotiating commitments, and accordingly, States negotiate over the

10. *See* Andrew T. Guzman, *A Compliance-Based Theory of International Law*, 90 CAL. L. REV. 1823 (2002) (suggesting that most international law scholars believe sanctions are the only real cure); Joel P. Trachtman, *The Domain of WTO Dispute Resolution*, 40 HARV. INT'L L.J. 333, 338, 338 & n.26 (1999) (asking "what would be the purpose of entering into an unenforceable agreement?" and explaining further that "[b]y 'enforceable,' I mean not just enforceability in a court of law but also enforceability through reputation or other informal sanctions. Of course, one can find many examples of unenforceable agreements that nonetheless serve a useful purpose. If they are neither formally nor informally enforceable though, they have no direct effect on the parties and may rather be designed for political theater, that is, to impress domestic constituencies or other onlookers."); TSEMING YANG, A THEORY OF INTERNATIONAL TREATY ENFORCEMENT AS A PUBLIC GOOD: THE ROLE OF INSTITUTIONAL DETERRENT SANCTIONS IN ASSURING COMPLIANCE WITH ENVIRONMENTAL REGULATORY AGREEMENTS 3 (Sept. 2002) (working paper on file with the author) ("The lack or ineffectiveness of deterrent sanctions in the international legal system is at the root of the debate about whether international law is really "law" instead of a set of ethical or moral obligations."); *cf.* David J. Bederman, *Counterintuiting Countermeasures*, 96 AM. J. INT'L L. 817, 818 (2002) ("There is no world policeman to command or coerce obedience to international law rules; instead, states and other actors rely on a combination of other mechanisms such as countermeasures to win respect and compliance for these duties."); John Norton Moore, *Enhancing Compliance With International Law: A Neglected Remedy*, 39 VA. J. INT'L L. 881, 884-85 (1999) ("I believe that the greatest challenge for the future of the rule of law internationally is to enhance rates of compliance . . . . The need for enhanced compliance with international norms today, as well as the more effective promotion of liberal democracy (a subject for another day), far outweighs the need for further development of general normative systems, or further refinements in the existing international rules. Yet we continue to focus more attention on refinement of such systems rather than on enhanced compliance with them.") (footnotes omitted). Of course, not all legal scholars take this view; many argue for a management-oriented approach, see, e.g., CHAYES & CHAYES, *supra* note 5 (championing the management-oriented approach and attacking the enforcement-oriented approach), for a more nuanced approach. *See also* ENGAGING COUNTRIES: STRENGTHENING COMPLIANCE WITH INTERNATIONAL ENVIRONMENTAL ACCORDS (Edith Brown Weiss & Harold K. Jacobson eds., 1998) (*framework and conclusion*) [hereinafter ENGAGING COUNTRIES].

content of the law, the level of commitments, *and* the creation of compliance institutions.[11]

Legal scholarship has only recently begun to address the importance of compliance institutions in international law.[12] Professor Andrew T. Guzman has recently proposed a compliance-based theory of international law that focuses primarily on the roles of reputation and direct sanctions as

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11. *See, e.g.*, CHAYES & CHAYES, *supra* note 5, at 110; Kenneth W. Abbott, *Modern International Relations Theory: A Prospectus for International Lawyers*, 14 YALE J. INT'L L. 335, 337-38 (1989); *see also* Laurence R. Helfer, *Overlegalizing Human Rights: International Relations Theory and the Commonwealth Caribbean Backlash Against Human Rights Regimes*, 102 COLUM. L. REV. 1832, 1841 (2002) ("States consciously design human rights agreements in response to specific problems, choosing the degrees of obligation, precision, and delegation required to solve those problems. But legalization is not costless. To the contrary, greater legalization necessarily requires a more far-reaching diminution of sovereignty, raising the important question of what motivates states to create legalized human rights agreements in the first place.") (footnote omitted); *cf.* Warren F. Schwartz & Alan O. Sykes, *The Economic Structure of Renegotiation and Dispute Resolution in the World Trade Organization*, 31 J. LEGAL STUD. 179, 180-82 (2002) (analyzing WTO Agreements as "contracts among the political actors who negotiated and signed them" and suggesting that like parties to private contracts, the relevant political actors "employ [mechanisms specified in the contract] to encourage efficient performance of commitments while facilitating efficient breach of commitments"). While Schwartz and Sykes begin to address the importance of compliance mechanisms woven into international agreements themselves, the comparison with private contracts sidesteps the underlying compliance dilemma associated with international law.

12. On compliance generally, see Kal Raustiala & Anne-Marie Slaughter, *International Law, International Relations and Compliance*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 2, at 538; Guzman, *supra* note 10; Kal Raustiala, *Compliance & Effectiveness in International Regulatory Cooperation*, 32 CASE W. RES. J. INT'L. L. 387, 392-99 (2000); YANG, *supra* note 10. On compliance in specific issue-areas, see Oona A. Hathaway, *Do Human Rights Treaties Make a Difference?*, 111 YALE L.J. 1935 (2002); John H. Knox, *A New Approach to Compliance with International Environmental Law: The Submissions Procedure of the NAFTA Environmental Commission*, 28 ECOLOGY L.Q. 1 (2001); Moore, *supra* note 10, at 884-85; Edith Brown Weiss, *Understanding Compliance with International Environmental Agreements: The Baker's Dozen Myths*, 32 U. RICH. L. REV. 1555 (1999); Christopher C. Joyner, *Recommended Measures Under the Antarctic Treaty: Hardening Compliance with Soft International Law*, 19 MICH. J. INT'L L. 401 (1998). There have been a few major empirical studies of compliance with international environmental law. *See* ENGAGING COUNTRIES, *supra* note 10; Kal Raustiala & David G. Victor, *Conclusions*, *in* THE IMPLEMENTATION AND EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL COMMITMENTS: THEORY AND PRACTICE 681-84 (David G. Victor et al. eds., 1998) [hereinafter IMPLEMENTATION AND EFFECTIVENESS]. *See also* Hathaway, *supra* (advancing a quantitative analysis of compliance with human rights treaties).

influences on State behavior.[13] In a similar vein, this article develops a compliance-based theory of international law and uses a model of rational, self-interested States based in part on theories in the fields of international relations (especially, institutionalism) and economics (especially, game theory). However, the theoretical framework developed in this article views international cooperation as a dynamic process and focuses more carefully on the legal institutions[14] created by States to address noncompliance

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13. *See* Guzman, *supra* note 10. Responding to inadequacies in existing legal scholarship concerning international law and compliance theory, Professor Guzman develops a model of rational, self-interested States, which he summarized as follows:

> The model of international law presented . . . is an infinitely repeated game that operates as follows. Any given international obligation is modeled as a two-stage game. In the first stage, states negotiate over the content of the law and the level of commitment. In the second stage, states decide whether or not to comply with their international obligations. International law affects a state's self-interest, and thus its compliance decision, in two ways. First, it can lead to the imposition of direct sanctions such as trade, military, or diplomatic sanctions. Second, it can lead to a loss of reputational capital in the international arena. If the direct and reputational costs of violating international law are outweighed by the benefits thereof, a state will violate that law.

Id. at 1846 (footnotes omitted). Professor Guzman applies this model to demonstrate how international law affects the behavior of States and concludes that international law scholars should devote more attention to compliance theory. While I generally agree with Professor Guzman's assertions that international law matters and that compliance issues deserve considerably more attention, I find his model adopts an oversimplified view of States' decision making processes, the manner in which international legal regimes evolve, and, perhaps most importantly from the perspective of compliance theory, the role of compliance institutions themselves.

14. The article focuses in large part on the institutions that States create and utilize to maintain cooperation over time as the *regime* evolves. A "regime" is the "implicit or explicit principles, norms, rules and decision-making procedures around which actors' expectations converge in a given area of international relations." Stephen D. Krasner, *Structural Causes and Regime Consequences: Regimes as Intervening Variables*, *in* INTERNATIONAL REGIMES 1, 2 (Stephen D. Krasner ed., 1983). According to Krasner: "Principles are beliefs of fact, causation and rectitude. Norms are standards of behavior defined in terms of rights and obligations. Rules are specific prescriptions or proscriptions for action. Decision-making procedures are prevailing practices for making and implementing collective choice." *Id.*; *see also* Harold Hongju Koh, *Transnational Legal Process*, 75 NEB. L. REV. 181, 200 (1996) (arguing that a regime is a set of governing arrangements developed by governmental and private parties in a given issue-area). For a useful analysis of the components of a regime, see Laurence R. Helfer, *Regime Shifting: The TRIPs Agreement and New Dynamics*

risks, including but not limited to the incentive-based institutions discussed by Professor Guzman.[15] Analysis of compliance institutions reveals important differences in the manner in which States address perceived risks of strategic defection and dynamic change.

The article specifically contends that States pursue three types of compliance strategies: *Type I strategies* focused on adjusting States' incentives to comply by altering payoff structures (the expected costs and benefits of (non)compliance); *Type II strategies* focused on facilitating cooperation by reducing transaction costs and uncertainty as the legal regime evolves; and *Type III strategies* focused on maintaining cooperation and improving regime effectiveness by dynamically adjusting commitments over time.[16] Comparative analysis of compliance institutions illustrates that these strategies may be implemented through different types of institutions[17] and that the optimal choice of strategy and institutions may vary considerably across issue-areas.[18] Thus, after developing a

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of International Intellectual Property Lawmaking, 29 YALE INT'L L.J. (forthcoming 2004).

15. While it is true, as Professor Guzman demonstrates, that the possibility of reputational and direct sanctions affects the incentives of States considering whether or not to comply, these two examples are simply a subset of incentive-based compliance institutions.

16. *See infra* Part II.F.

17. For example, incentive-based strategies may be implemented through adjudicative processes with the possibility of sanctions, contingent funding mechanisms, and a wide-range of other options. *See infra* Parts II.F.1. (explaining incentive-based strategies), III.A.2.a.i & c.i (analyzing dispute settlement process in GATT and WTO), and III.B.2.a (analyzing contingent funding mechanisms and other options in Ozone regime).

18. *See* Kenneth W. Abbott, *"Trust But Verify": The Production of Information in Arms Control Treaties and Other International Agreements*, 26 CORNELL INT'L L.J. 1, 1 (1993) ("In situations of interdependence, [rationalist international relations] theory suggests, states will, and should, tend to design their international agreements and institutions to address the particular strategic situations in which they find themselves.") (footnotes omitted); *id.* (examining different kinds of informational arrangements); Duncan Snidal, *Coordination versus Prisoners' Dilemma: Implications for International Cooperation and Regimes*, 79 AM. POL. SCI. REV. 923 (1985) (considering different institutional arrangements that should be expected for different games). There are two competing institutional approaches to promoting compliance that are considered by international law and relations scholars, an enforcement-oriented approach based essentially on the threat and/or use of deterrent sanctions and a management-oriented approach based essentially on making compliance possible by reducing ambiguity regarding obligations

theory of international law that accounts for compliance strategies and the influence of compliance institutions, this article applies the theory to examine and compare the strategic institutional approaches taken to address compliance issues in international trade and international environmental agreements.[19]

The emergence of effective international regimes built on robust, powerful institutional structures has been seen as an important, although to some frightening, step towards effective international governance.[20] For example, the World Trade Organization ("WTO") currently acts as an umbrella forum for a variety of issue-areas beyond trade liberalization, such as intellectual property harmonization.[21] Increasingly, it is also seen as the likely forum for addressing other issue-areas perceived to be in need of international cooperation,[22] such as antitrust law harmonization[23] and some aspects of environmental law.[24]

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themselves and creating positive incentives to comply prior to an incidence of noncompliance. *See infra* Part II.D.

19. Specifically, Part III.A applies the dynamic institutional theory developed in Part II to the international trade regime that evolved from the GATT into the WTO ("GATT/WTO regime"), and Part III.B applies the theory to the international environmental regime that regulates ozone depleting substances ("Ozone regime"). *See infra*.

20. *See* John O. McGinnis and Mark L. Movsesian, *The World Trade Constitution*, 114 HARV. L. REV. 511, 512-13 (2000).

21. *See* Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPs"), Apr. 15, 1994, WTO Agreement, Annex 1C, Legal Instruments—Results of the Uruguay Round vol. 31, 33 I.L.M. 1197 (1994); *see also* Paris Convention for the Protection of Industrial Property, Mar. 20, 1883, as last revised at Stockholm, July 14, 1967, 25 Stat. 1372, 828 U.N.T.S. 305; Berne Convention for the Protection of Literary and Artistic Works, Sept. 9, 1886, as last revised at Paris, July 24, 1971, S. Treaty Doc. No. 99-27, 828 U.N.T.S. 221. On international intellectual property harmonization, see, e.g., John H. Barton, *The Economics of TRIPs: International Trade in Information-Intensive Products*, 33 GEO. WASH. INT'L L. REV. 473 (2001); J. H. Reichman, *From Free Riders to Fair Followers: Global Competition Under the TRIPs Agreement*, 29 N.Y.U. J. INT'L L. & POL. 11, 12 (1996-97). *See also infra* Conclusion.

22. *See, e.g.*, Jeffrey L. Dunoff, *The WTO in Transition: Of Constituents, Competence and Coherence*, 33 GEO. WASH. INT'L L. REV. 979 (2001); David W. Leebron, *Linkages*, 96 AM. J. INT'L L. 5 (2002); McGinnis & Movsesian, *supra* note 20, at 550-52; *see also id.* at 550 (suggesting that the "possibility of covert protectionism necessarily forces the WTO to address environmental, health, and safety issues"). On the "boundaries" of the WTO, see generally *Symposium: The Boundaries of the WTO*, 96 AM. J. INT'L L. 5 (2002).

23. The recent Doha meeting of the WTO calls for putting antitrust harmonization on the agenda for the next round of trade negotiations. *See* Ministerial Declaration, WTO Doc. WT/MIN(01)/DEC/1, *available at*

Although this article does not evaluate these developments directly from a normative standpoint, comparative analysis of compliance strategies and institutions utilized in the GATT/WTO regime and the Ozone regime suggests that a uniform compliance approach does not "fit" all issues-areas.

The article proceeds as follows: Part I introduces the international compliance dilemma and the critical role that compliance institutions play in the creation and evolution of international legal regimes. Part II then develops a dynamic institutional theory of international law in six sections. The first four sections discuss background principles derived primarily from the game theory and international relations disciplines. The final two sections develop a model of international cooperation that (1) extends beyond the concept of an iterated game to that of an evolving game, and (2) helps explain the disconnect between the role of institutions predicted by theory and the role of institutions seen in the real world. The fifth section develops a model of the dynamic, three-staged process by

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http://docsonline.wto.org (Adopted Nov. 20, 2001 at the WTO Doha Ministerial Conference, 9-14 Nov. 2001). On international antitrust harmonization, see, e.g., Andrew T. Guzman, *Is International Antitrust Possible?*, 73 N.Y.U. L. REV. 1501 (1998); Spencer Weber Waller, *The Internationalization of Antitrust Enforcement*, 77 B.U. L. REV. 343 (1997); Diane P. Wood, *The Impossible Dream: Real International Antitrust*, 1992 U. CHI. LEGAL F. 277; Diane P. Wood, *International Harmonization of Antitrust Law: The Tortoise or the Hare?*, 3 CHI. J. INT'L L. 391 (2002).

24. On the "trade and environment" debate, see DANIEL C. ESTY, GREENING THE GATT: TRADE, ENVIRONMENT, AND THE FUTURE (1994); C. FORD RUNGE ET AL., FREER TRADE, PROTECTED ENVIRONMENT: BALANCING TRADE LIBERALIZATION AND ENVIRONMENTAL INTERESTS (1994); EDITH BROWN WEISS & JOHN H. JACKSON, RECONCILING ENVIRONMENT AND TRADE (2001); Daniel C. Esty, *Economic Integration and the Environment*, *in* THE GLOBAL ENVIRONMENT: INSTITUTIONS, LAW, AND POLICY 190 (Norman J. Vig & Regina Axelrod eds., 1999); Steve Charnovitz, *Free Trade, Fair Trade, Green Trade: Defogging the Debate*, 27 CORNELL INT'L L.J. 459 (1994); David M. Driesen, *What is Free Trade?: The Real Issue Lurking Behind the Trade and Environment Debate*, 41 VA. J. INT'L L. 279 (2000-01); Richard H. Steinberg, *Trade-Environment Negotiations in the EU, NAFTA, and WTO: Regional Trajectories of Rule Development*, 91 AM. J. INT'L. L. 231 (1997); Trachtman, *supra* note 10, at 355-69. *See also* UNITED NATIONS ENVIRONMENT PROGRAMME, ENVIRONMENT AND TRADE: A HANDBOOK (2000); WTO Secretariat, *Trade and Environment*, SPECIAL STUDIES 4 (1999), *available at* http//www.wto.org/english/tratop_e/envir_e/environment.pdf (last visited Sept. 4, 2003); *Trade, Global Policy, and the Environment* (World Bank, Discussion Paper No. 402) (Per G. Fredriksson ed., 1999); GATT Secretariat, *Industrial Pollution Control and International Trade*, *in* GATT STUDIES IN INTERNATIONAL TRADE NO. 1 (July 1971).

which States identify and delineate interdependency problems, devise cooperative solutions, and implement those solutions. The sixth section focuses on the design of compliance systems that institutionalize a suite of compliance strategies to sustain cooperation over time. Part III applies the theoretical framework in two sections. The first section applies the framework to international trade, focusing on the GATT/WTO regime and its compliance institutions, and the second section applies the theoretical framework to international environmental law, focusing on the international regime that regulates ozone depleting substances (the "Ozone regime") and its compliance institutions. Attention is given to these regimes and compliance institutions because they have been effective in achieving treaty objectives, are often considered as models for the development of institutions in related areas of international law, and are increasingly the focal point of interdisciplinary legal issues.

Applying the dynamic institutional theory developed in this article to the GATT/WTO regime reveals that, while international trade law has evolved into a relatively strong version of public international law, the strength of the current WTO regime does not derive from strict enforcement-oriented institutions aimed at deterring intentional noncompliance through the threat of sanctions, a Type I strategy. Despite its adjudicative, rule-based orientation, the WTO dispute settlement institution, which is the cornerstone of the WTO regime, actually appears to be management-oriented and facilitative in the sense that it primarily implements Type II and Type III compliance strategies and implements Type I strategies only on a limited prospective basis.[25] This important finding is contrary to conventional wisdom and should inform debates regarding reform of the WTO as well as the design of future compliance systems.[26] Overall, the WTO compliance system is designed to maintain regime stability by internalizing (within the structure of formal, legalistic institutions) issues that otherwise might prompt parties to work outside the system (in the realm of pure politics).[27]

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25. *See infra* Part III.A.2.c.ii.

26. *See infra* Part III.A.2.c.ii (discussing conventional wisdom).

27. *See* JOHN H. JACKSON ET AL., LEGAL PROBLEMS OF INTERNATIONAL ECONOMIC RELATIONS: CASES, MATERIALS AND TEXT ON THE NATIONAL AND

Applying the dynamic institutional theory developed in this article to the Ozone regime reveals the complex, multifaceted nature of the Ozone compliance system, which implements all three strategies through a host of innovative institutions. As a result of this system, the Ozone regime has experienced very high rates of participation and compliance while dynamically adjusting commitment levels and adding newly identified ozone depleting substances to the list of regulated substances. Notably, although the system includes institutions empowered to implement Type I strategies through both positive and negative means (side-payments and penalties), no significant penalties have been given. To date, the compliance system has operated primarily in "managerial mode" with the threat of enforcement lurking in the background.[28]

I. INTERNATIONAL LAW AND COMPLIANCE INSTITUTIONS

States create international agreements to deal with problems that arise as a result of their economic, ecological, technological, and social interdependence.[29] To the extent that the actions and decisions of one State (or its citizens) may affect the welfare of another State (or its citizens), negatively or positively, there is room for negotiation and potential cooperation between the two States to minimize joint costs or maximize joint benefits. If transaction costs were zero, information was perfect, and States were of equal bargaining power, we might expect effective

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INTERNATIONAL REGULATION OF TRANSNATIONAL ECONOMIC RELATIONS (4th ed. 2002). Of course, power and politics are important influences on States, even when operating within the system. *See* Anne-Marie Slaughter, *Liberal International Relations Theory and International Economic Law*, 10 AM. U. J. INT'L L. & POL'Y 717, 722 (1994-95) ("[P]ower determines the outcomes of state interactions. . . .[S]tates can be treated as if their dominant preference were for power."); *see also* Stephen D. Krasner, *State Power and the Structure of International Trade*, 28 WORLD POL. 317, 317 (1976) ("[T]he structure of international trade is determined by the interests and power of states acting to maximize national goals."). The compliance system reduces the risks of destabilization through, *inter alia*, retaliatory trade wars or exit (or perhaps credible threats to exit) followed by a return to bargaining with a clean slate.

28. *See infra* Part III.B.2.

29. *See* CHAYES & CHAYES, *supra* note 5, at 1. For an interesting discussion of interdependence and globalization theories (and a useful bibliography), see Michael Zurn, *From Interdependence to Globalization*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 2, at 235.

agreements to be reached frequently.[30] In the real world, however, there are impediments to cooperation, including:

- *transaction costs* associated with identifying interdependencies and opportunities to cooperate, communicating preferences, obtaining "approval" of domestic constituents, negotiating and implementing a workable agreement, identifying future contingencies, and monitoring, facilitating, and enforcing compliance;

- *uncertainty* associated with payoffs, time horizons, and information generally; and

- *strategic considerations* associated with static and dynamic bargaining positions, asymmetric information, asymmetric preferences, and opportunism through actual or threatened intentional noncompliance.[31]

In the absence of a supranational government, States often find themselves in need of governance structures, or "institutions," to facilitate cooperation, prevent and resolve conflicts, and generally serve as a locus for coordination, information sharing, and other important activities that assist States in overcoming the impediments noted above.[32]

States often cooperate by creating international law and by complying with the commitments they have undertaken. We do not live in a world dominated by anarchy; rather, we live in a world in which international rules, norms, and other products of cooperative decision-making effectively constrain the behavior of States and private actors in many areas.[33] Even when States are not perfectly constrained and find it necessary to breach or not comply fully with an obligation, the existence of international law influences the manner in which and the degree to which States deviate from the rule. Moreover,

30. *See generally* R. H. Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1 (1960).

31. *See generally* DOUGLASS C. NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC IMPORTANCE (1990).

32. *See infra* Part II.D.

33. As Louis Henkin famously put it, "almost all nations observe almost all principles of international law and almost all of their obligations almost all of the time." LOUIS HENKIN, HOW NATIONS BEHAVE 47 (2d ed. 1979) (emphasis omitted).

beyond the rule of law itself, other institutions play a significant role in discouraging a breach or encouraging compliance and affecting the manner in and degree to which States breach or comply with international commitments.[34]

Compliance is the degree to which a State behaves in a manner that conforms to its legal obligations.[35] Scholars have drawn important distinctions between treaty implementation, compliance, and effectiveness.[36] Generally, implementation refers to the (domestic) actions that States take to give effect to international commitments, and effectiveness refers to the degree to which the treaty objectives are met.[37] Although strict compliance with treaty obligations alone does not ensure that the underlying problem motivating international cooperation will be effectively addressed,[38] this article nonetheless focuses on compliance, adopting "the widespread belief that an agreement is likely to be more effective the greater the degree to which its parties comply with its obligations."[39] Moreover, as described below, "compliance institutions" are broadly defined to encompass institutions designed (by parties) to modify parties' incentives to comply with obligations, including those institutions that modify parties' obligations over time so as to sustain cooperation in the face of dynamic change and improve the effectiveness of the regime.[40]

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34. *See infra* Part II.D-F.

35. *See* Harold K. Jacobson & Edith Brown Weiss, *A Framework for Analysis*, *in* ENGAGING COUNTRIES, *supra* note 10, at 4; Raustiala & Slaughter, *supra* note 12, at 539; David G. Victor et al., *Introduction and Overview*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 7.

36. *See, e.g.*, Jacobson & Brown Weiss, *A Framework for Analysis*, *in* ENGAGING COUNTRIES, *supra* note 10, at 4-5 & Table 1.1; Raustiala & Slaughter, *supra* note 12, at 539.

37. *See* Jacobson & Brown Weiss, *A Framework for Analysis*, *in* ENGAGING COUNTRIES, *supra* note 10, at 4-5; Raustiala & Slaughter, *supra* note 12, at 539.

38. *See* Raustiala, *supra* note 12, at 392-99 (distinguishing compliance with rules and the effectiveness of those rules in addressing the underlying problem justifying their creation).

39. Knox, *supra* note 12, at 4 n.1.

40. *See* Raustiala, *supra* note 12, at 415-16 (describing "[s]ystems for implementation review" or "SIRs"); Jacobson & Brown Weiss, *A Framework for Analysis*, *in* ENGAGING COUNTRIES, *supra* note 10, at 4 & Table 1.1 (adopting a broad definition of compliance that includes conformance with both procedural and substantive obligations as well as with the "spirit of the treaty").

States entering into an international agreement perceive *ex ante* a compliance dilemma *ex post*. In simple terms, given the lack of supranational adjudicative and enforcement bodies to "guarantee" compliance,[41] there is a risk to State A (and other parties) that State B will sign on but not comply with its obligations. Of course, State B faces the risk that State A (and other parties) will do the same. The perception of this dilemma prior to negotiations may affect negotiations primarily in two ways. First, the perceived dilemma may affect the substantive commitments that States are willing to undertake, possibly leading to overblown commitments that some parties do not intend to honor fully or to minimal commitments that may easily be met.[42] On one hand, opportunistic States may attempt to push the level of commitments higher (than would be the

41. Of course, even at the domestic level, where adjudicative and enforcement bodies exist and arguably perform well, compliance is imperfect and never guaranteed. *See, e.g.*, Daniel A. Farber, *Taking Slippage Seriously: Noncompliance and Creative Compliance in Environmental Law*, 23 HARV. ENVTL. L. REV. 297 (1999); Roger Fisher, *Bringing Law to Bear on National Governments*, 74 HARV. L. REV. 1130 (1961). Fisher stated:

> No absolute guaranty can be given that a government will always respect a rule. We have no guaranty that our Government will always respect the Constitution or the decisions of the Supreme Court. But by seeking to understand why governments so generally obey domestic law, we shall be better able to undertake the task of securing respect for international law. Current efforts to deal with pressing international issues . . . are being hamstrung by antiquated dogma about what law is and by an insufficient realization of why governments comply with it. No more in the international than in the domestic sphere should the argument be heard that governments must be lawless because they cannot be coerced.

Id. at 1140. *See generally* HANS J. MORGENTHAU, POLITICS AMONG NATIONS: THE STRUGGLE FOR POWER AND PEACE 263-98 (4th ed. 1967) (comparing the strength of international and domestic law). Some "slippage" is unavoidable and arguably desirable. On one hand, efficient slippage may be facilitated through a liability rule. For example, domestic contract law scholars have argued that legal institutions ought to allow a party to breach a contract and sustain damages attributable to its breach under certain circumstances to promote efficiency (the concept of the "efficient breach"). *See* RICHARD A. POSNER, ECONOMIC ANALYSIS OF THE LAW 95-96 (4th ed. 1992). On the other hand, efficient slippage may be facilitated through flexible interpretation, modification or application of the rules. *See* Farber, *supra*, at 313-14 (discussing how the courts have created "slack" for regulated parties under environmental regulatory regimes). Both approaches, however, also open the door for inefficient strategic behavior.

42. *See* George W. Downs et al., *Is the Good News about Compliance Good News about Cooperation?*, 50 INT'L ORG. 379 (1996).

case in the absence of the compliance dilemma) so as to free ride on the actions of others or simply to experience relative gains by not bearing the same costs as others.[43] On the other hand, non-opportunistic States may push the level of commitments lower to counteract such pressures. The degree to which strategic misrepresentations and attendant reactions cause negotiations to diverge from the commitment levels that would result in the absence of the compliance dilemma depends on the information held by the negotiators regarding each other's preferences, intentions, and capabilities.[44]

Second, in addition to affecting substantive commitments, perception of the compliance dilemma may prompt States to set forth dispute resolution[45] and/or other compliance procedures in international agreements.[46] Some such institutions dynamically alter both the incentives to comply with existing commitments and the commitments

43. *See* Brett Frischmann, *Using the Multi-Layered Nature of International Emissions Trading and of International-Domestic Legal Systems to Escape a Multi-State Compliance Dilemma*, 13 GEO. INT'L ENVTL. L. REV. 463, 500 (2001) ("Opportunistic States may feign strict commitments, relying on a weak, politicized enforcement process and weak sanctions, such as delayed reductions. These States may wish to appease domestic constituencies on both sides of the issue, or they may wish to exploit the system in order to gain economic benefits—competitive advantages and cash inflow.").

44. *See* James D. Morrow, *Modeling the Forms of International Cooperation: Distribution Versus Information*, 48 INT'L ORG. 387, 389 (1994).

45. In addition to being aware of the compliance dilemma, each "country will also be aware, *ex ante*, that it may find, *ex post*, itself in a position where it would [wish not to comply with its obligations]. This is the *reciprocal—conflict problem*: Each country knows that it might turn out to be either the accuser or accused. Thus it is no country's interest, *ex ante*, to agree that, *ex post*, either the accuser should be unconstrained in its ability to punish or the accused should be unconstrained in its ability to proceed without punishment. This generates a role for dispute settlement." WILFRED J. ETHIER, PUNISHMENTS AND DISPUTE SETTLEMENT IN TRADE AGREEMENT 5 (2001), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=273212 (last visited Sept. 11, 2003) (PIER Working Paper 01-021).

46. This article generally focuses on the institutions created by Parties to supplement remedies for a breach of treaty obligations under customary international law, see, e.g., RESTATEMENT (THIRD) OF FOREIGN RELATIONS § 901 (1987) and Patricio Grane, *Remedies Under WTO Law*, 4 J. INT'L ECON. L. 755, 757-58 (2001), although the importance of customary international law as a backdrop is recognized. On the law of remedies and the International Law Commission's articles on reparations, see Dinah Shelton, *Righting Wrongs: Reparations in the Articles on State Responsibility*, 96 AM. J. INT'L L. 833 (2002). For game-theoretic, institutionalist analyses of the law of State responsibility, see Verdier, *supra* note 1; Setear, *Responses to Breach of a Treaty*, *supra* note 7.

themselves. The approach taken in various international agreements for dealing with the compliance dilemma varies considerably, as demonstrated in the third part of this article, which analyzes the GATT/WTO regime and the Ozone regime.[47]

International trade and international environmental law reflect considerably different evolutions of international law in large part due to evolving institutional approaches to compliance.[48] For example, international trade law has evolved into a relatively strong version of public international law because of the evolution of innovative compliance institutions, particularly the WTO Dispute Settlement Understanding ("DSU").[49] This compliance institution has enabled States to effectively coordinate their behavior around explicit substantive legal obligations with a credible means of detecting and evaluating violations and prospectively sanctioning on-going violations. The DSU embodies a legalistic approach to international cooperation,[50] which works well in the trade context for various reasons associated with the nature of the underlying dilemma States face.[51] Notably, the DSU evolved from the GATT

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47. *See infra* Part III.

48. Dinah Shelton makes the following observation regarding evolving institutional approaches to compliance:

> Interstate issues of compliance and breach are increasingly handled through nonconfrontational procedures within international organizations and treaty bodies. The rise of such nonadversarial compliance procedures seems to have brought a corresponding decline in recourse to the law of state responsibility. The shift to compliance mechanisms from enforcement procedures is seen especially in the environmental field. . . .
>
> Increasingly, compliance procedures are centered on promoting changes in state behavior rather than sanctioning breaches of international obligations. Environmental agreements, in particular, focus on transparency and positive incentives rather than coercive measures, while most global human rights agreements utilize state reporting and "constructive dialogue" as means to encourage compliance.

Shelton, *supra* note 46, at 855 (footnotes omitted).

49. *See* Understanding on Rules and Procedures Governing the Settlement of Disputes, Apr. 15, 1994, Final Act Embodying the Results of the Uruguay Round of Multinational Trade Negotiations, Annex 2, arts. 16(4), 17(14), *reprinted in* THE RESULTS OF THE URUGUAY ROUND OF MULTILATERAL TRADE NEGOTIATIONS: THE LEGAL TEXTS 404, 417-18 (1994).

50. *See* JOHN H. JACKSON, THE WORLD TRADING SYSTEM 109-11 (2d ed. 1997). *See infra* Part III.A.

51. *See infra* Part III.A.1 (discussing interdependency problem); III.A.2.b

dispute settlement system, which was primarily a political institution.[52]

Recent innovations in international environmental law have also enabled States to effectively coordinate their behavior, but not typically in the legalistic (adversarial) manner accomplished in trade.[53] Instead, progress in international environmental regimes involves varying degrees of binding and nonbinding commitments and multi-faceted compliance systems. These compliance systems tend to be facilitative and directed at encouraging compliance through positive incentives and constructive norm-building rather than discouraging noncompliance through the possibility of sanctions.[54] This "management-oriented" approach to international cooperation works well and is arguably necessary in the environmental context for various reasons associated with the nature of the underlying problem motivating cooperation among States.[55]

Interestingly and importantly, both international trade law and international environmental law are still evolving and, in a sense, "learning" from each other and adopting successful institutional innovations made in one issue-area to work to the benefit of the other.[56] For example, the WTO regime increasingly relies on nonadversarial, management-oriented institutions to encourage cooperation in pursuit of trade liberalization by existing and potential members. These institutional developments range from the Trade Policy Review Mechanism ("TPRM"), which periodically evaluates domestic implementation and compliance with trading rules, to capacity-building programs and financial

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(discussing evolution of GATT in response to the growing importance of nontariff barriers).

52. On the differences between legal/rule-oriented institutions and political/power-oriented institutions, see, e.g., JACKSON, *supra* note 50, at 109-11; William J. Davey, *Dispute Settlement in GATT*, 11 FORDHAM INT'L L.J. 51 (1987).

53. *See infra* Part III.B.2.

54. *See infra* Part II.F (discussing the "management-oriented" approach).

55. *See id.*; *infra* Part III.B.1 (discussing the underlying interdependency problem motivating cooperation in the Ozone regime).

56. *See* Edith Brown Weiss, *Strengthening National Compliance with Trade Law: Insight from Environment*, *in* NEW DIRECTIONS IN INTERNATIONAL ECONOMIC LAW 457 (M. Bronckers & R. Quick eds., 2000) (hereinafter NEW DIRECTIONS) (discussing ways in which trade law has learned from environmental law).

and technical assistance.[57] Furthermore, international environmental regimes increasingly include enforcement-oriented institutions, ranging from legalistic adjudication to compliance panels with authority to impose sanctions of various types.[58]

II. A DYNAMIC INSTITUTIONAL THEORY OF INTERNATIONAL LAW

This part of the article develops a dynamic institutional theory of international law that integrates and builds from insights in the legal, economics (game theory), and international relations disciplines.[59] While a number of

57. *See infra* Part III.A.2.c.ii (discussing the TPRM and other institutional developments in the WTO regime).

58. *See generally* GLENN M. WISER, COMPLIANCE SYSTEMS UNDER MULTILATERAL AGREEMENTS (Center for International Environmental Law, Oct. 1999), *available at* http://www.ciel.org/Publications/SurveyPaper1.pdf (last visited Sept. 11, 2003).

59. There are numerous articles setting forth the various international relations theories regarding international cooperation and how those theories relate to international law. *See* Abbott, *supra* note 11; Kenneth W. Abbott, *International Relations Theory, International Law, and the Regime Governing Atrocities in Internal Conflicts*, 93 AM. J. INT'L L. 361 (1999); Jack L. Goldsmith & Eric A. Posner, *A Theory of Customary International Law*, 66 U. CHI. L. REV. 1113 (1999); Anne-Marie Slaughter Burley, *International Law and International Relations Theory: A Dual Agenda*, 87 AM. J. INT'L L. 205 (1993); Anne-Marie Slaughter et al., *International Law and International Relations Theory: A New Generation of Interdisciplinary Scholarship*, 92 AM. J. INT'L L. 367 (1998). Scholars have also applied international relations theories to particular issue-areas of international law. *See* G. Richard Shell, *Trade Legalism and International Relations Theory: An Analysis of the World Trade Organization*, 44 DUKE L.J. 829 (1995) (trade); Richard W. Parker, *The Use and Abuse of Trade Leverage to Protect the Global Commons: What We Can Learn From the Tuna-Dolphin Conflict*, 12 GEO. INT'L ENVTL. L. REV. 1, 57-98 (1999) (international environmental law case study); Hathaway, *supra* note 12 (human rights); Helfer, *supra* note 11; *Note, Tackling Global Software Piracy Under TRIPs: Insights From International Relations Theory*, 116 HARV. L. REV. 1139 (2003) (TRIPs). On institutionalism and international law, see, e.g., William J. Aceves, *Institutionalist Theory and International Legal Scholarship*, 12 AM. U.J. INT'L L. & POL'Y 227 (1997); Edwin M. Smith, *Understanding Dynamic Obligations: Arms Control Agreements*, 64 S. CAL. L. REV. 1549 (1991); Setear, *An Iterative Perspective on Treaties*, *supra* note 7. There is rich literature on the application of game theory to international cooperation. *See generally* THOMAS SCHELLING, THE STRATEGY OF CONFLICT (2d ed. 1960); ROBERT AXELROD, THE EVOLUTION OF COOPERATION (1984); ROBERT O. KEOHANE, AFTER HEGEMONY: COOPERATION AND DISCORD IN THE WORLD POLITICAL ECONOMY (1984); Robert Axelrod & Robert O. Keohane, *Achieving Cooperation Under Anarchy: Strategies and Institutions*, *in* COOPERATION UNDER ANARCHY 226 (Kenneth A.

scholars have applied game theory and international relations theories to international law, the theory is both novel and useful because it provides a theoretic framework for (1) analyzing international commitments, compliance institutions, and the dynamic process by which international legal regimes evolve; and for (2) examining and comparing the strategic institutional approaches taken to address compliance issues in different regimes.[60] Each of these contributions is significant. With respect to the first contribution, international scholars have not developed a rational choice theory that integrates consideration of commitments, institutions and dynamicism. The theory that comes closest is iterated game theory, but, as noted above and developed more fully below, the iterated game theory[9] fails to account for the dynamic nature of international cooperation and the institutions that States create to maintain regime stability in the face of dynamic change. With respect to the second contribution, international scholars have not developed a theory that supports comparative analysis of the strategic institutional approaches taken to address compliance issues. The dynamic institutional theory highlights compliance strategies that have received very little attention by international scholars despite the prominence of such strategies in practice.[61]

The theory is developed in six sections. The first four sections discuss background principles derived primarily from the game theory and international relations disciplines. The first section sets forth the assumptions and limitations that flow from viewing States as rational decision makers. The second section provides an introduction to game theory and describes four simple two player games that illustrate different types of interdependency problems and the need for cooperative solutions. The third section builds from the first two sections and explains why devising cooperative solutions to most international problems is significantly more

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Oye ed., 1986); RASMUSEN, *supra* note 2, at 16-19; JON HOVI, GAMES, THREATS & TREATIES: UNDERSTANDING COMMITMENTS IN INTERNATIONAL RELATIONS (1998).

60. While the focus is on treaty-based regimes, the theory can be extended to other areas of international law.

61. As discussed below, managerial theorists have discussed institutions that implement Type II and Type III strategies. *See infra* note 162; *see also infra* notes 179-82 and accompanying text.

complicated and difficult than suggested by two player games. This section concludes with a brief summary of the iterated game, which is frequently used in the game theory and international relations disciplines (and increasingly in the legal discipline) as a model for international cooperation. The fourth section considers the role of institutions within the framework of iterated game theory. This section suggests that there is a gap between theory and reality in the sense that the iterated game fails to explain the existence of a host of important institutions.

The final sections develop a new theory of international cooperation that extends beyond the concept of an iterated game to that of an evolving game, and helps explain the disconnect between the role of institutions predicted by theory and the role of institutions seen in the real world. The fifth section develops a model of the dynamic, three-staged process by which States identify and delineate interdependency problems, devise cooperate solutions, and implement those solutions. The sixth section focuses on the design of compliance systems that institutionalize a suite of compliance strategies to sustain cooperation over time. First, it presents two competing theories on compliance strategies—an enforcement theory based on the threat and/or use of deterrent sanctions as a means of coercing compliance and a managerial theory based on facilitating compliance by reducing ambiguity regarding obligations themselves, creating positive incentives to comply prior to an incidence of noncompliance, and adapting treaties to changing conditions—and explains how these theories can be reconciled. It then analyzes the different strategies that States implement to maintain continued cooperation over time and classifies these strategies according to the different types of impediments to cooperation that States may target through jointly created institutional mechanisms.

A. *Rationalist Assumptions and Limitations*

Game theory, a form of rational choice theory, provides a useful framework for analyzing international cooperation and institutions because it provides a relatively straightforward model of rational decision-making by entities in situations where their decisions are interdependent and they face conflicting strategic incentives. The primary

variables are the players (States), possible actions (cooperate/comply or defect/breach), and outcomes (payoffs). Taken together, these variables constitute the "rules of the game." Other important factors include information, strategies, and the number of iterations (how many times will the game be played). When the rules of the game are set, one can predict an equilibrium (or more often, a set of equilibriums) in terms of expected actions and outcomes.[62] International cooperation has often been analyzed as a Prisoners' Dilemma or some variant thereof, described below.[63]

As with any theoretical framework, it is important to recognize that a number of assumptions come into play. Consideration of the assumptions themselves provides insight into the complexities that shape international cooperation. Game theoretic (and institutionalist) analyses often focus on States as "players" and assume that States are unitary rational actors acting to maximize their "individual" welfare.[64] Of course, this assumption builds on additional assumptions that may not hold up perfectly in all cases.[65] Although the point here is not to debate the fine details, it is important to recognize and consider briefly the following limitations: (1) the actions taken by States are the products of complicated domestic and international processes involving public and private actors and institutions; (2) numerous public actors within State governments have active roles in international negotiations, implementation of agreements, decisions whether and to what extent to comply with commitments, and other State actions;[66] and (3) defining a State's "individual welfare" is

62. *See, e.g.*, RASMUSEN, *supra* note 2, at 10.

63. *See, e.g.*, Snidal, *supra* note 2, at 77 (noting ubiquity of game theory); *see* sources cited *supra* note 2.

64. *See* Abbott, *supra* note 11, at 348-51; *see also* Slaughter, *supra* note 27, at 722 (citations omitted) (Realism assumes that first, "states are the primary actors in the international system, rational unitary actors who are functionally identical;" second, "power determines the outcomes of state interactions;" and third, "states can be treated as if their dominant preference were for power.").

65. *See* Graham Allison, *Conceptual Models and the Cuban Missile Crisis*, 63 AM. POL. SCI. REV. 689 (1969) (seminal piece exposing weakness of assumptions).

66. There are various game theoretic approaches to modeling the interactions between domestic and international politics. The seminal paper setting forth the theory of two-level games was written by Robert Putnam. Robert Putnam, *Diplomacy and domestic politics: the logic of two-level games*,

itself a complicated task, particularly given the fact that States sometimes act in the best interest of a particular domestic group rather than the country as a whole.

Acknowledging these complications, this article nonetheless folds them into the game theoretic framework. In reality, States are the dominant (although by no means exclusive) actors in international relations[67] and the primary sources of international law.[68] The international agreements

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42 INT'L ORG. 427, 460 (1988); *see also* GRAHAM ALLISON & PHILIP ZELIKOW, ESSENCE OF DECISION 39 (2d ed. 1999) (discussing the importance of domestic politics).

67. This is true at least for realists and rational choice theorists. *See, e.g.*, Ryan Goodman & Derek Jinks, *Toward an Institutional Theory of Sovereignty*, 55 STAN. L. REV. 1749, 1751 (2003) ("For realist (or rational choice) approaches, the state is modeled as a rational, unitary actor pursuing fixed preferences in an anarchic international arena."); Hirsch, *supra* note 2, at 81 ("Prevailing international relations theory assumes that . . . [s]tates are the central actors in the international system."); Kenneth W. Abbott & Duncan Snidal, *Why States Act Through Formal International Organizations*, 42 J. CONFLICT RESOL. 3 (1998) (assuming that States are the principal actors in world politics); Slaughter, *supra* note 27, at 722 (citations omitted) (Realism assumes "states are the primary actors in the international system, rational unitary actors who are functionally identical.").

68. *See, e.g.*, IAN BROWNLIE, PRINCIPLES OF PUBLIC INTERNATIONAL LAW 1-2 (5th ed. 1998); MICHAEL AKEHURST, A MODERN INTRODUCTION TO INTERNATIONAL LAW 1 (4th ed. 1982) (stating that "international law is primarily concerned with states") (emphasis omitted); ANTHONY CLARK AREND, LEGAL RULES AND INTERNATIONAL SOCIETY 43 (1999) (discussing states as the primary actors in international relations); RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE UNITED STATES, pt. I, ch. 1 introductory n. (1987) ("The principal entities of the international political system are states."); *see also* Kal Raustiala, *The Architecture of International Cooperation: Transgovernmental Networks and the Future of International Law*, 43 VA. J. INT'L L. 1 (2002) (acknowledging the dominant role of States); *cf.* Joel Richard Paul, *Cultural Resistance To Global Governance*, 22 MICH. J. INT'L L. 1, 13-14 n.55 (2000) (commenting that since international law is focused on states, non-state actors have traditionally not been addressed); SAMUEL P. HUNTINGTON, THE CLASH OF CIVILIZATIONS AND THE REMAKING OF WORLD ORDER 35 (1996) ("While states remain the primary actors in world affairs, they also are suffering losses in sovereignty, functions, and power. International institutions now assert the right to judge and to constrain what states do in their own territory."); *but cf.* Kal Raustiala, *The "Participatory Revolution" in International Environmental Law*, 21 HARV. ENVTL. L. REV. 537, 537-38 538 (1997) ("But while states have traditionally been the dominant actors in the creation and maintenance of conventional international law, recent changes in international environmental law have afforded a historically unparalleled opportunity for participation by private, nongovernmental organizations ("NGOs"). As has long been the case in domestic environmental law, NGOs are now major actors in the formulation, implementation, and enforcement of international environmental law.") (citations omitted); Edith Brown Weiss, *The Rise or Fall of International Law?*, 69 FORDHAM L. REV. 345,

considered in this article are agreements among States to undertake commitments and to create compliance institutions.[69] Thus, as far as commitments and compliance are concerned, "the State" undertakes commitments and "the State" either complies or does not comply with its commitments, even if (non)compliance is, practically speaking, the result of actions by sub-national actors. Although not discussed in detail here, international agreements create complicated webs of legal (and nonlegal) relationships such that compliance with and the effectiveness of an agreement may depend on the actions of both States and private actors.[70] While actions by domestic (public or private) actors may lead to State noncompliance, States remain "responsible" for the commitments undertaken in an international agreement (of course, what "responsibility" means depends on the compliance institutions involved).[71]

States make decisions based on some notion of expected payoffs (*i.e.*, cost-benefit or welfare analysis). It is clear that decisions are not made solely on the basis of "national welfare" or some objective evaluation of aggregate individual preferences within a country, because domestic

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346 (2000) (arguing that "[i]t is necessary to redefine international law to include actors other than States among those who make international norms and who implement and comply with them, and to include legal instruments that may not be formally binding"). I recognize that in some cases NGOs play a dominant role in forming an international agreement. *See, e.g.*, Kenneth Anderson, *The Ottawa Convention Banning Landmines, the Role of International Non-Governmental Organizations and The Idea of International Civil Society*, 11 EUR. J. INT'L L. 91 (2000) (discussing the predominant role of NGOs in forming the Landmines Convention).

69. *See infra* Part III.

70. *See* CHAYES & CHAYES, *supra* note 5, at 27; BRAITHWAITE & DRAHOS, *supra* note 7, at 550-563 (discussing various webs among public and private actors). For example, if States commit themselves to curb domestic greenhouse gas emissions and agree to implement their commitments through an international emissions trading system, the effectiveness of the trading system would ultimately depend on private trading and the effectiveness of the overall regime would ultimately depend on State regulation of private parties, *i.e.*, domestic enforcement of emissions limitations. *See* Frischmann, *supra* note 43, at 469-80.

71. *See* IAN BROWNLIE, SYSTEM OF THE LAW OF NATIONS: STATE RESPONSIBILITY, PART I (1983); Daniel Bodansky & John R. Crook, *Symposium: The ILC's State Responsibility Articles*, 96 AM. J. INT'L L. 773 (2002); International Law Commission, DRAFT ARTICLES ON STATE RESPONSIBILITY, UN Doc. A/CN4/L528/Add.2 (July 16, 1996); UNITED NATIONS CODIFICATION OF STATE RESPONSIBILITY (Marina Spinedi & Bruno Simma eds., 1987).

processes are imperfect and often involve a competition among domestic preferences.[72] Moreover, because States act through people, such as politicians and bureaucrats, the individual preferences and biases of those people may skew perceived payoffs from particular decisions away from the socially optimal ideal.[73] Again, the point here is not to model fully the processes by which payoffs are perceived by States (or delegated decision makers). It should be sufficient for the purposes of this article to highlight that States make decisions based on an estimation of expected payoffs and that ultimate payoffs are uncertain and are subject to continuous reevaluation by relevant decision makers. The extent to which the relevant measure of payoffs is "national welfare" as opposed to "politicians' welfare" (or the most powerful domestic interest's welfare) varies among States and across issue-areas.[74] As described below, the payoff structure in both international trade and international environmental games depends on both measures: the payoffs associated with cooperation are generally diffuse, widespread, long-term, and arguably more closely linked to perceptions of national welfare, while the payoffs associated with defection are generally concentrated among particular industry groups, short-term, and more closely linked to the welfare of politicians and special interests. Rather than belabor the point that there are important limitations in

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72. *See, e.g.*, JOAN E. SPERO & JEFFREY A. HART, THE POLITICS OF INTERNATIONAL ECONOMIC RELATIONS 49 (5th ed. 1997) ("Congress tends to link trade policy with particular domestic interests, [while] the U.S. executive branch often links trade policy with larger foreign policy and foreign economic goals.").

73. *See, e.g.*, Alan O. Sykes, *Regulatory Protectionism and the Law of International Trade*, 66 U. CHI. L. REV. 1, 24-25 (1999) (discussing the public choice perspective on international trade agreements); Jonathan R. Macey, *A Public Choice Model of International Economic Cooperation and the Decline of the Nation State*, 18 CARDOZO L. REV. 925 (1996) (discussing public choice theory and its application to international cooperation).

74. *See, e.g.*, Schwartz & Sykes, *supra* note 11. Schwartz & Sykes stated:

> Public choice teaches that the objectives that individual countries pursue through international agreements are determined by an interaction among organized interest groups. While this process is not fully understood and assuredly varies across nations, there is wide agreement that producer interests will exercise disproportionately greater influence than will consumer interests, at least in the democracies that dominate the developed world (and thus the trading community).

Id. at 183-84 (footnote omitted).

the underlying assumptions that States are unitary rational actors that make decisions with the intent to maximize national welfare, it is sufficient for the purposes of this article to apply the game theoretic framework and keep in mind its limitations.[75]

B. *Basic Game Theory*

This section provides a basic introduction to game theory in order to highlight the importance of inter-dependent decision-making and the need to identify problem structures and opportunities to devise cooperative solutions.[76] At its most basic level, game theory may be explained in terms of simple two player games such as Prisoners' Dilemma, Harmony, Chicken, Suasion, and others.[77] Prisoners' Dilemma is a commonly told story[78] that

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75. Acknowledging the differences between realist, rationalist/utilitarian, liberal/institutional, norm-driven, process-oriented, and sociological theories of international relations and international law, this article contends that a flexible game theoretic framework is a useful organizational construct that may encapsulate the key considerations of many of these theories. A full exploration of this idea is beyond the scope of this article. For an overview of these theories, see generally THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 2.

76. *See* KEOHANE, *supra* note 59, at 68-69 (discussing the heuristic value of the Prisoners' Dilemma).

77. There are numerous two player games in a "two-state, two-choice, one-play world." Snidal, *supra* note 18, at 926 (citing A. Rapoport & M. Guyer, *A Taxonomy of 2 X 2 games*, 11 GENERAL SYSTEMS YEARBOOK 203 (1966)). Abbott stated:

> There are 78 different 2 x 2 games, the simplest and most common form, in which two players must each choose between two moves. Out of this total, there are six games in which (a) each player prefers mutual cooperation to mutual defection, providing an incentive for agreement, and (b) each player prefers that if one player is to defect, it be the one to do so, providing a basis for conflict. These six games, including [Prisoners' Dilemma] and [Stag Hunt], as well as Chicken and complex coordination games, have been the subject of most research in the application of game theory to social, political and economic cooperation.

Abbott, *supra* note 19, at 3 n.15. *See* Jack Hirshleifer, *Evolutionary Models in Economics and Law: Cooperation Versus Conflict Strategies*, *in* ECONOMIC BEHAVIOR IN ADVERSITY 211 (1987) (discussing a variety of games). This section touches on a few types of games simply to introduce the basic dynamics of interdependency, incentives, and strategic decision making. For a more detailed but still accessible introduction to game theory and its application to international law, see Hirsch, *supra* note 2, at 78-94; Lisa Carlson, *Game Theory: International trade, conflict and cooperation*, *in* GLOBAL POLITICAL ECONOMY: CONTEMPORARY THEORIES (Ronen Palan ed., 2000); AXELROD, *supra*

describes the difficulty of getting two players to cooperate when the action taken by each player affects the welfare of the other (*i.e.*, interdependency).[79] Suppose that two players, A and B, face a decision regarding whether to cooperate with each other and that they expect the following payoffs:[80]

(1) If both players cooperate, each receives a payoff of 3, for a total of 6.
(2) If both players defect (or decide not to cooperate), each

note 59. For a more sophisticated introduction to game theory, see SHAUN P. HARGREAVES HEAP & YANIS VAROUFAKIS, GAME THEORY: A CRITICAL INTRODUCTION (1995); RASMUSEN, *supra* note 2.

78. The traditional story goes something like this:
Suppose two co-defendants are being interrogated in separate cells and that the police have sufficient evidence to convict both defendants of a robbery but insufficient evidence of specific factors that would enhance their sentences—say, for example, violence. The police attempt to get each prisoner to "rat" on the other (defect) regarding his or her violent conduct in exchange for leniency. The payoffs may be the number of years of imprisonment less than the ten-year maximum, for example. If both prisoners refuse to talk with the police (and thus cooperate with each other), they both receive a sentence of seven years; if one prisoner implicates the other (defects) while the other refuses to do so (cooperates), the defector receives a sentence of 6 years while the cooperator receives a sentence of nine years; if both prisoners defect, they each receive a sentence of eight years. If the prisoners understand the payoff structure, are unable to communicate, and have no other assurance mechanism, they will follow their dominant strategies and end up with eight year sentences. If, however, the prisoners care about their reputations (in or out of jail), expect to partner up in the future, have a pre-existing agreement or understanding regarding future dealings (in or out of jail), have the ability to retaliate against defection, etc., cooperation is more likely.
For other variations, see Kenneth A. Oye, *Explaining Cooperation under Anarchy: Hypotheses and Strategies*, 38 WORLD POL. 1, 7-8 (1985); R. DUNCAN LUCE & HOWARD RAIFFA, GAMES AND DECISIONS 94-95 (1957); MICHAEL TAYLOR, ANARCHY & COOPERATION 4-8 (1976); RUSSELL HARDIN, COLLECTIVE ACTION 2 (1982).

79. *See* KEOHANE, *supra* note 59, at 68.

80. Payoffs refer simply to some normalized measure of utility. *See id.* at 79. In the traditional Prisoners' Dilemma story, for example, the payoffs refer to the expected length of jail sentences. I should note that, for purposes of this article, payoffs need not be conceived of narrowly in terms of economically measurable units but rather may be thought of more abstractly in terms of utility. Thus, when States evaluate whether to enter into an agreement and form a game, *see infra*, the perceived legitimacy of commitments may be a factor in each State's utility function. The reason I mention this is to clarify that game theoretic analysis need not focus on "dollars and cents" and may instead incorporate broader notions of welfare. Even when such a broader view is taken, game theory remains a useful organizational construct for analyzing strategic decision making and the factors that influence international cooperation.

receives a payoff of only 2, for a total of 4.
(3) If one player cooperates and the other defects, then the cooperator receives a payoff of 1 and the defector receives a payoff of 4, for a total of 5.[81]

The result that maximizes joint welfare is for both to cooperate and receive joint benefits of 6. Each player knows, however, that it can get a better individual payoff if it defects and the other player cooperates. Moreover, each player knows that if it cooperates and the other player defects, the cooperator will get a payoff of only 1, and therefore it would have been better off had it also defected. In other words, if each player knows what the payoff structure looks like *ex ante*[82] and must decide whether to cooperate, each player will reach the conclusion that it is in its best interest to defect—if A cooperates, B is better off defecting (4>3), and if A defects, B is better off defecting (2>1). Thus, in the end, each player has a *dominant strategy to defect.*[83]

Achieving cooperation when facing the Prisoners' Dilemma payoff structure requires mutual assurance in some form or another. Where an enforceable agreement between the players can be reached (for example, a contract between two individuals enforceable under domestic law), cooperation is possible, although not guaranteed (transaction costs, uncertainty, opportunistic behavior, strategic bargaining and other factors may inhibit effective cooperation by contracting). Other forms of assurance mechanisms include reputation and the expectation of future interactions between the same players as well as linking the outcome in a particular game to actions taken in other unrelated games between the players. Importantly, assurance mechanisms are intended to make cooperation an equilibrium strategy by altering the expected payoffs, whether by expected damages for breach of contract, reputational harm, or costs inflicted in future iterations or other linked games in the event of defection, or by expected side-payments for contractual performance, reputational gains, or benefits gained in future iterations or other linked

81. I have chosen to present the payoffs in an atypical manner (neither in a chart or tree diagram) for ease of presentation to those unfamiliar with game theory.

82. This key assumption illustrates the importance of information and its role in strategic decision making.

83. *See* Carlson, *supra* note 77; AXELROD, *supra* note 59.

games (perhaps through the promise of continued cooperation) in the event of cooperation.

The counterpart to the Prisoners' Dilemma game is a game called Harmony.[84] Again, suppose that two players, A and B, face a decision regarding whether or not to cooperate with each other and that they expect the following payoffs:

(1) If both players cooperate, each receives a payoff of 4 for a total of 8.
(2) If both players defect, each receives only a payoff of 1, for a total of 2.
(3) If one player cooperates and the other defects, then the cooperator receives a payoff of 3 and the defector receives a payoff of 2, for a total of 5.

In contrast to the Prisoners' Dilemma, both players have a *dominant strategy to cooperate*, hence the name Harmony. The primary impediment to cooperation where the interdependence among States gives rise to a Harmony game is identification of such a situation. In other words, once identified, States should be able to reach an agreement without much concern over noncompliance. Coordination or standardization problems essentially precede a Harmony game.[85] International aviation rules and the choice of which side of the road to drive on are often cited as examples.[86] Once the rules are established and "parties understand the

84. *Illustration continued*: Suppose that the police in our previous example misrepresented the payoff structure to the co-defendants by exaggerating the possibility of leniency and understating the cumulative effect of additional evidence concerning violence on a jury. In reality, the payoff structure might be that of a Harmony game—cooperating with the police can only lead to more jail time. Unless the prisoners learn of this, however, they may proceed to defect because they view the payoff structure as a Prisoners' Dilemma. *See* Guzman, *supra* note 10, at 1858-59 (analyzing how parties' mistaken beliefs about the payoff structure may affect their decisions to enter into a legal agreement to coordinate their behavior); Ronald B. Mitchell & Patricia M. Keilbach, *Situation Structure and Institutional Design: Reciprocity, Coercion and Exchange*, 55 INT'L ORG. 891, 904 (2001).

85. On the Harmony game, see Abbott, *supra* note 11, at 355-57; KEOHANE, *supra* note 59, at 51-52. On coordination games, which can be quite complicated, see Snidal, *supra* note 18.

86. *See, e.g.*, Raustiala, *supra* note 12, at 400; Abram Chayes et al., *Managing Compliance: A Comparative Perspective*, *in* ENGAGING COUNTRIES, *supra* note 10, at 43-44.

rules, no actors have incentives to violate them."[87] Moreover, due to potential network externalities, non-parties have an incentive to adopt the rules as well.[88]

The Prisoners' Dilemma and Harmony represent two extremes where players have symmetric dominant strategies and incentives to negotiate a cooperative solution.[89] There are variations of the basic two-player scenario that involve asymmetries in strategies and incentives. Consider, for example, a game called Suasion. Again, suppose that two players, A and B, face a decision regarding whether or not to cooperate with each other and that they expect the following payoffs:

(1) If both players cooperate, A receives a payoff of 4 and B receives a payoff of 3, for a total of 7.
(2) If both players defect, A receives a payoff of 1 and B receives a payoff of 2, for a total of 3.
(3) If A cooperates and B defects, then A receives a payoff of 2 and B receives a payoff of 4, for a total of 6.
(4) If A defects and B cooperates, then A receives a payoff of 5 and B receives a payoff of 1, for a total of 6.

In Suasion, mutual cooperation is optimal, B has a dominant strategy to defect (regardless of what decision A makes, B should defect), and A does not have a dominant strategy. However, if A knows what the payoff structure looks like, A will cooperate because it expects B to defect. To maximize joint benefits through mutual cooperation, A must make a side-payment to B to adjust the payoff structure and make cooperation more appealing than

87. Chayes et al., *Managing Compliance: A Comparative Perspective, in* ENGAGING COUNTRIES, *supra* note 10, at 44.

88. *See* Nicholas Economides, *The Economics of Networks*, 14 INT'L J. INDUS. ORG. 673 (1996); Mark Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479 (1998).

89. Deadlock is a less interesting game where the parties each have the dominant strategy to defect and no incentive to cooperate because the joint payoff from cooperation is the minimum joint payoff. *But see* Oye, *supra* note 78, at 7 ("When you observe conflict, think Deadlock—the absence of mutual interest—before puzzling over why a mutual interest was not realized. When you observe cooperation, think Harmony—the absence of gains from defection—before puzzling over how states were able to transcend the temptations of defection.").

defection.[90] International cooperation often hinges on the promise of such side-payments.[91]

Finally, in the game called Chicken, neither player has a dominant strategy.[92] Suppose that two players, A and B, face a decision regarding whether or not to cooperate with each other and that they expect the following payoffs:

(1) If both players cooperate, both players receive a payoff of 3, for a total of 6.
(2) If both players defect, both players receive a payoff of 1, for a total of 2.
(3) If A cooperates and B defects, then A receives a payoff of 2 and B receives a payoff of 4, for a total of 6.
(4) If A defects and B cooperates, then A receives a payoff of 4 and B receives a payoff of 2, for a total of 6.

In this game, mutual cooperation is not the only way to maximize joint welfare; maximizing joint benefits requires that at least one player cooperate. Given the possibility of a relative gain if one player defects when the other cooperates, each player has an incentive to defect and free-ride on the other's cooperation. Of course, the risk in Chicken is that both players end up defecting, and the challenge is to coordinate their behavior.[93]

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The simple games discussed in this section highlight the importance of interdependent decision-making and the need to identify problem structures and opportunities to devise cooperative solutions. While scholars have employed these two player models to yield important insights regarding international cooperation, it is well-recognized that it is necessary to move beyond these (and other related) two player single-play games to more complex

90. The side-payment would have to be greater than one, in order to provide B with sufficient incentive to cooperate, and, given the hypothetical payoff structure, A would not go as high as two. Essentially, A and B must split the surplus created by their cooperation. Of course, the promise to make a side-payment must be credible. *See* Ulrich J. Wagner, *The Design of Stable International Environmental Agreements: Economic Theory and Political Economy*, 15 J. ECON. SURVEYS 377, 395-97 (2001).

91. *See infra* Parts II.F. (discussing positive incentives); III.B.2. (discussing side-payments in the context of the Ozone regime).

92. *See* Oye, *supra* note 78, at 8-9.

93. *See* RASMUSEN, *supra* note 2, at 72-73 (explaining the Chicken game).

frameworks that better reflect international legal regimes.[94] Hereinafter, this article will focus on games with a "mixed motive" component, where the risk of defection is present (collaboration games).[95]

C. *Moving Beyond the Basic Games to Game Structures that Better Represent International Legal Regimes*

Devising cooperative solutions to most international problems is significantly more complicated and difficult than suggested by two player games. For most international legal regimes, the "rules of the game"—the number and identity of participants, range of possible actions, payoff structures, number of iterations (or times that the game is played in succession)—are considerably more complex than the two player games suggest.[96] Not surprisingly, so are the mechanisms used to coordinate behavior.

First, the number and identity of (potential) participants are particularly important considerations for compliance purposes. Games involving N players, where N is greater than two, are considerably more complex than two player games.[97] In some cases, the scope of the interdependency problem may require the cooperation of only a small number of States while in other cases a large coalition of States may be necessary.[98] Generally, it is easier to coordinate behavior among a smaller group, in part because it is easier to bargain and in part because it is

94. For a discussion on the limitation of two player games see Barbara Koremenos et al., *The Rational Design of International Institutions*, 55 INT'L ORG. 761, 765 (2001) and Snidal, *supra* note 18, at 925, 925 n.6.

95. As the next section suggests, multiplayer games are tricky because they may involve complex payoff structures that may involve both collaboration and coordination subgames. As a general matter, this article focuses on international regimes in which the risk of strategic defection is one pressing concern that States must overcome to sustain cooperation. On the differences between coordination and collaboration games and the institutional solutions to such problems, see Snidal, *supra* note 18, at 925.

96. *See* Koremenos et al., *supra* note 94, at 765.

97. *See, e.g.*, RICHARD CORNES & TODD SANDLER, THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS 141-42 (1986); Oye, *supra* note 78, at 18-20.

98. *See, e.g.*, Daniel G. Arce, *The Evolution of Heterogeneity in Biodiversity and Environmental Regimes*, 44 J. CONFLICT RESOL. 753, 754, 762-68 (2000) (analyzing the importance of coalition size for producing global environmental benefits).

easier to monitor compliance and overcome the compliance dilemma.[99] Apart from the numbers, the importance and identity of particular participants may stifle or facilitate cooperation. The participation of a particular State (or group of States) may be essential to successfully dealing with a particular problem, in which case that State gains leverage that can be exploited during negotiations and potentially re-exploited thereafter depending on the nature of the compliance institutions adopted.[100] In addition, the presence of a State (or group of States) with the resources, power, and will to encourage/coerce participation during negotiations; to provide administrative, financial or technical assistance; or to threaten/impose unilateral sanctions in response to noncompliance may facilitate cooperation.[101]

In some cases, a paradox may arise in putting together an international coalition to address a particular problem. On one hand, maximizing the number of participants may

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99. *See, e.g.*, Koremenos et al., *supra* note 94, at 783-84 ("The more severe the enforcement problem, the more restricted the membership."); Amir N. Licht, *Games Commissions Play: 2x2 Games of International Securities Regulation*, 24 YALE J. INT'L L. 61, 76 (1999) (discussing three reasons why larger numbers of participants may inhibit effective cooperation, which include "(1) the fraction of the group benefit received by any one individual declines as the group size increases; (2) larger groups are less likely to exhibit small-group strategic interaction that could help in collective good provision; and (3) organization costs increase with an increase in group size"); MANCUR OLSON, THE LOGIC OF COLLECTIVE ACTION 35 (1965) ("[T]he larger the group, the farther it falls short of providing an optimal amount of a collective good.").

100. *See infra* Part III.B (discussing this dynamic in the context of the Ozone regime).

101. For example, the United States has threatened to use, and at times, has used unilateral sanctions to promote compliance. *See* Adam Smith, *A High Price to Pay: The Costs of The U.S. Economic Sanctions Policy and The Need For Process Oriented Reform*, 4 UCLA J. INT'L L. & FOREIGN AFF. 325, 330 (1999-2000) ("[T]he U.S. [frequently] uses economic sanctions to force another country to change its objectionable policies or, alternatively, to mitigate the effects of those policies."); Joanmarie M. Dowling & Mark P. Popiel, *War By Sanctions: Are We Targeting Ourselves?*, 11 CURRENTS: INT'L TRADE L. J. 8, 8 (2002) ("Historically, the United States has imposed Sanctions to advance a number of its foreign policy goals, such as nuclear non-proliferation, counter-terrorism, environmental conservation, and human rights protection."); Sarah P. Schuette, *U.S. Economic Sanctions Regarding the Proliferation of Nuclear Weapons: A Call for Reform of the Arms Export Control Act Sanctions*, 35 CORNELL INT'L L.J. 231, 233 (2001-02) (discussing the use of unilateral sanctions to deter development of nuclear weapons). On hegemonic stability theory, see KEOHANE, *supra* note 59, at 63-69; Duncan Snidal, *The Limits of Hegemonic Stability Theory*, 39 INT'L ORG. 579 (1985).

be the primary objective of negotiations. This may be due to the global scope of the problem, as in the case of global warming or ozone depletion, where solving the problem may be impossible without broad-based participation or where nonparticipants can effectively hold-up participating States.[102] On the other hand, States may find it necessary to constrain the number of participants to a manageable number for compliance-management purposes.[103] As the number of States increase, it may become more difficult to detect (potential) defections and encourage compliance through either facilitative measures or retaliation.[104] Moreover, transaction costs and uncertainties may increase with the number of participants and thereby inhibit cooperation, for example, by making it more difficult to estimate payoffs due to more complicated interdependent welfare functions.[105] The equilibrium position(s) between these opposing objectives will vary depending on the nature of the underlying problem motivating international cooperation, the particular States involved and their intent and capacity to comply, and their willingness or ability to commit *ex ante* in a sufficiently credible manner.

Second, the range of options or possible actions that participants in a game may take are seldom binary (*i.e.*,

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102. *See infra* Part III.B.

103. For a discussion of the disabling effects of increased numbers on compliance, see, e.g., David Vogel & Timothy Kessler, *How Compliance Happens and Doesn't Happen Domestically*, *in* ENGAGING COUNTRIES, *supra* note 10, at 24-25 (attributing "[m]uch of the variance in national patterns of compliance with the treaties examined . . . to the number of sources that require monitoring"); Harold K. Jacobson & Edith Brown Weiss, *Assessing the Record and Designing Strategies to Engage Countries*, *in* ENGAGING COUNTRIES, *supra* note 10, at 521 ("[O]ur study confirms the conventional wisdom that the smaller the number of actors involved in the activity, the easier it is to regulate it."). *But see* ERIC DANNENMAIER & ISAAC COHEN, PROMOTING MEANINGFUL COMPLIANCE WITH CLIMATE CHANGE COMMITMENTS 31-37 (Nov. 2000) *available at* http:// www.pewclimate.org/docUploads/compliance%2Epdf (last visited Sept. 7, 2003) (discussing the importance of broad participation for compliance purposes).

104. *See, e.g.*, Koremenos et al., *supra* note 94, at 783-84 (conjectures M1 and M2); Oye, *supra* note 78, at 19-20.

105. *See* Oye, *supra* note 78, at 19 ("Cooperative behavior rests on calculations of expected utility—merging discount rates, payoff structures, and anticipated behavior of other players. Discount rates and approaches to calculation are likely to vary across actors, and the prospects for mutual cooperation may decline as the number of players and the probable heterogeneity of actors increases.").

comply or not comply) and may vary along many dimensions. There may be numerous obligations of varying degrees of importance (to the coalition as a whole and to a particular party) within a negotiated treaty structure; compliance with particular obligations may be a higher priority for some participants than for others; and parties may lack the capacity (administrative, economic, scientific, political or otherwise) to comply with particular commitments. In the end, compliance is often a matter of degree along a continuum. Moreover, there is a significant difference between intentional noncompliance (or opportunistic noncompliance), which some scholars have argued is less frequent than presumed to be the case, and unintentional noncompliance, which may result from the lack of capacity.[106]

Third, and related to variability in possible options available to parties, the payoff structures in the real world differ in important ways from the basic two player games. First, the magnitude and relative value of payoffs may vary considerably. Certain players may benefit more than others from mutual cooperation, perhaps by orders of magnitude. This may lead to concerns over the equitable distribution of gains among cooperators as well as opportunities for strategic holdout (i.e., refusal to cooperate unless gains are shared).[107] In the international environmental area, for example, distributional concerns are particularly acute for a few reasons: Not all countries have consumed or polluted natural resources in the same manner or to the same degree; the present welfare status of countries and their citizens is not uniform but rather is markedly differentiated; and the value systems and cultural preferences of domestic constituencies varies considerably among countries. These factors, among others, bring distributional issues to the forefront of international environmental law, as demonstrated prominently by Principle 7 of the Rio Declaration on Environment and Development that, "[i]n view of the different contributions to global environmental degradation, States have common

106. *See, e.g.*, Chayes et al., *Managing Compliance: A Comparative Perspective*, *in* ENGAGING COUNTRIES, *supra* note 10, at 44; Abram Chayes & Antonia Handler Chayes, *On Compliance*, 47 INT'L ORG. 175, 187-88 (1993); Helen V. Milner, *International Political Economy: Beyond Hegemonic Stability*, 110 FOREIGN POL. 112 (1998).

107. *See infra* notes 143, 189.

but differentiated responsibilities."[108] Second, the interdependencies among players may complicate payoff structures considerably based on the number of players and the relative importance of each player's actions to every other player's welfare.[109] This may lead to the emergence of numerous conflicting strategies and/or the formation of internal coalitions with strategic advantages.[110]

Finally, the number of iterations (or as Robert Axelrod has dubbed the notion, the "shadow of the future") is also an extremely important consideration for compliance purposes.[111] Generally, participation in an international legal regime involves a continuous series of decisions regarding compliance such that the game is repeated indefinitely unless and until a party withdraws completely. The "shadow of the future" refers to the fact that players' expectations regarding the future—specifically, future iterations of the game—affect decisions made in the present depending, of course, on "discount factors" and the possession of information regarding future payoffs.[112]

To increase the likelihood of cooperation, players may adopt strategies (decision-making rules) that depend on other players' performance ("reciprocal strategies").[113] Perhaps the most famous reciprocal strategy (used in the

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108. United Nations Conference on Environment and Development: Rio Declaration on Environment and Development, Principle 7, June 14, 1992, U.N. Doc.A/CONF.151/26/Rev. 1 (Vol.I) at 3, reprinted in 31 I.L.M. 874, 878 (1992); *see* Paul G. Harris, *Common But Differentiated Responsibility: The Kyoto Protocol and United States Policy*, 7 N.Y.U. ENVTL. L.J. 27, 30 (1999).

109. *See* Oye, *supra* note 78, at 19.

110. *See* CHAYES & CHAYES, *supra* note 5, at 6-7 ("[A] multilateral negotiating forum provides opportunities for weaker states to form coalitions and organize blocking positions."); Helfer, *supra* note 14 (discussing changes in bargaining coalitions in the TRIPs context).

111. AXELROD, *supra* note 59, at 12; *see, e.g.*, Abbott, *supra* note 18, at 14 ("The most important condition of play, at least if the relationship is PD, is the degree of iteration."); Setear, *An Iterative Perspective on Treaties*, *supra* note 7, at 185-89; *see also* sources cited *supra* note 7 (explaining iteration).

112. *See, e.g.*, Hirsch, *supra* note 2, at 86-87.

113. *See* AXELROD, *supra* note 59; Oye, *supra* note 78, at 14-16. As Axelrod, Oye, and others have noted, the "conditions of play [in international relations] can limit the effectiveness of reciprocity." *Id.* at 15. States may create institutions that modify the conditions to enable reciprocity, for example, by creating institutions that shed light on State behavior and facilitate reciprocation and that "lengthen the shadow of the future" and increase the number of iterations. *Id.* at 16-18; *see also* Setear, *An Iterative Perspective on Treaties*, *supra* note 7 (analyzing institutions in treaty law that promote iteration).

Prisoners' Dilemma context) is "tit-for-tat," where a player cooperates during the first round and thereafter commits to doing whatever the other player did in the previous round.[114] By punishing defection and rewarding cooperation, the tit-for-tat strategy facilitates cooperation when the other player sufficiently values future payoffs; it allows players to *signal* to each other their strategy and their willingness to reciprocate either cooperation or defection. It is important to understand that the point of reciprocal strategies is to "exploit the sequential nature of the game" and affect the incentives to cooperate/defect before players decide what to do.[115] If credible and sufficiently strong to offset the expected gains of defection, the threat to punish in the event of defection (or promise to reward in the event of cooperation) alters the payoff structure perceived *ex ante* by players and removes the incentive to act opportunistically.[116]

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114. *See* AXELROD, *supra* note 59, at 13; Setear, *An Iterative Perspective on Treaties, supra* note 7, at 29-30; *see also id.* at 31-33 n.52 (citing literature on limitations of tit-for-tat strategy in various situations). There are numerous other strategies that players may adopt. *See generally* DREW FUDENBERG & JEAN TIROLE, GAME THEORY (1991). For example, players may adopt penance strategies—after one player defects, other players remain in defection with respect to the initial defector until the defector cooperates, at which point the players return to cooperation. *Id.* at 179-182. Tit-for-tat is not a penance strategy because the defector will have to cooperate in a period, even though the other players did not in the previous period, in order to restore cooperation by all. Players may adopt grim trigger strategies–all players remain in noncompliance forever after noncompliance by a single player is observed. JAMES D. MORROW, GAME THEORY FOR POLITICAL SCIENTISTS 266 (1994). The difficulty with such penalties is that they may not be deemed credible because they are so costly to invoke, and therefore they may fail to deter defection. In particular, penalties may hurt the punisher as much as the punishee, and thus be deemed not "renegotiation-proof" because players expect that any instance of defection will be followed by immediate renegotiation to cooperation. *See* Wagner, *supra* note 90, at 389-90 (explaining renegotiation-proofness). Finally, players may adopt trigger strategies with (exogenous or endogenous) periods of penalty following an instance of noncompliance. The difficulty with such trigger strategies is making the penalty phase not so onerous that it is not credible, nor so short that it is not a deterrent. *See* GEORGE W. DOWNS & DAVID M. ROCKE, OPTIMAL IMPERFECTION? DOMESTIC UNCERTAINTY AND INSTITUTIONS IN INTERNATIONAL RELATIONS 44-54 (1995).

115. Wagner, *supra* note 90, at 389-90 (explaining reciprocity and renegotiation-proofness).

116. *See id.*

While scholars have explored a number of theoretical models that incorporate the complications set forth in this section,[117] the game theoretic model most frequently employed is an iterated multiplayer game,[118] often an iterated N-player prisoners' dilemma.[119] Generally, scholars assume that players recognize *ex ante* (before play begins) that they will play a continuous sequence of rounds and that players decide what strategies to adopt for the initial

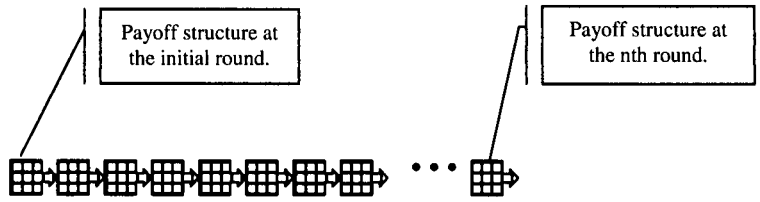
117. *See, e.g.*, SCHELLING, *supra* note 59 (outlining basic game theory and applying it to international conflict); Lisa L. Martin, *Interests, Power, and Multilateralism*, 46 INT'L ORG. 765 (1992) (discussing various games within the confines of international relations); Robert Powell, *Absolute and Relative Gains in International Relations Theory*, 85 AM. POL. SCI. REV. 1303 (1991) (using simple game-theoretic models to discuss relative and absolute gains in international relations); Duncan Snidal, *The Game* Theory *of International Politics*, 38 WORLD POL. 25 (1985) (applying different basic game models to international relations); Snidal, *supra* note 18 (comparing Coordination and Prisoners' Dilemma to highlight issues involving international cooperation); Wagner, *supra* note 90, at 389-90.

118. *See, e.g.*, Daniel G. Arce M., *Leadership and the Aggregation of International Collective Action*, 53 OXFORD ECON. PAPERS 114 (2001) (using various iterated game theoretic models to analyze the role of leadership in collective action); Carlisle Ford Runge, *Institutions and the Free Rider: The Assurance Problem in Collective Action*, 46 J. POL. 154 (1984) (applying an iterated assurance problem to collective action issues); Duncan Snidal, *Relative Gains and the Pattern of International Cooperation*, 85 AM. POL. SCI. REV. 701 (1991) (moving away from two-player Prisoners' dilemmas into more complex games and discussing the effect of relative gains in international cooperation); Wagner, *supra* note 90, at 378-82 (modeling international abatement of environmental problem as a N-player prisoners' dilemma game).

119. *See, e.g.*, Robert Axelrod, *The Emergence of Cooperation Among Egoists*, 75 AM. POL. SCI. REV. 306 (1981) (using an iterated Prisoners' dilemma to discuss cooperation in international relations); Jonathan Bendor & Dilip Mookherjee, *Institutional Structure and the Logic of Ongoing Collective Action*, 81 AM. POL. SCI. REV. 129 (1987) (using an N-person Prisoners' dilemma model to show that the logic of repeated decision making has significant implications for the institutional forms of collective action); Fiona McGillivray & Alastair Smith, *Trust and Cooperation Through Agent-specific Punishments*, 54 INT'L ORG. 809, 810 (2000) ("Scholars typically use the prisoners' dilemma game as a metaphor for international cooperation.") (citations omitted); Wagner, *supra* note 90, at 378-82 (modeling international abatement of environmental problem as a N-player prisoners' dilemma game). John Setear has analyzed the importance of promoting iteration in international relations structured by treaties. *See* Setear, *An Iterative Perspective on Treaties*, *supra* note 7 (applying an "iterative perspective" to analyze a treaty regime); John K. Setear, *Law in the Service of Politics: Moving Neo-Liberal Institutionalism from Metaphor to Theory by Using the International Treaty Process to Define "Iteration"*, 37 VA. J. INT'L L. 641 (1997) (same); John K. Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 208 (same); Setear, *Responses to Breach of a Treaty*, *supra* note 7 (same).

and future rounds based on the information held *ex ante*.[120] While some strands of game theory, such as evolutionary game theory, allow players to alter their individual strategies as the game is played based on the players' performance,[121] the payoff structure itself generally remains fixed.[122] Figure 1 is a simple illustration of an indefinitely repeated multiplayer game.

FIGURE 1: Visualizing an indefinitely repeated game. This figure is intended to be a simple illustration of an iterated game. Each matrix represents the payoff structure for N players in a single round of play, and the ellipsis indicates that the game is expected to be repeated indefinitely.



120. *See* Hirsch, *supra* note 2, at 90-91 (discussing the use of pre-play information to adopt strategies for future rounds of iterated games); *see generally* R. Andrew Muller & Asha Sadanand, *Order of Play, Forward Induction, and Presentation Effects in Two-Person Games*, 6 EXPERIMENTAL ECON. 5 (2003).

121. *See, e.g.*, Arce, *supra* note 98, at 755 ("From a dynamic perspective, the advantage of the evolutionary [game theory] approach over the classic repeated games approach is that agents are no longer committed to a strategy that most often represents a history-dependent preset program. Instead, agents are involved in a dynamic interplay in which they can learn about the relative merits of strategies through a process of trial and error. As a result, cooperation need no longer be achieved through punishment or coercion but through a process of give-and-take that more closely resembles the regime-building experience."); *see generally* HARGREAVES HEAP & VAROUFAKIS, *supra* note 77, at 195-235. On the role of reputation, see Guzman, *supra* note 10, at 861-64; Snidal, *supra* note 18, at 931.

122. *See* Snidal, *supra* note 2, at 83.

D. *The Role of Institutions*

Game theory suggests that jointly created institutions may play a strong role in facilitating cooperation. In addition to adopting individual reciprocal strategies, players may agree to create institutions to systematically implement strategies that increase the likelihood of sustained cooperation over time.[123] For example, players may "tie their hands" *ex ante* and credibly commit to cooperation by creating monitoring and enforcement institutions that are empowered to reward cooperators or punish defectors.[124] Such institutions directly affect the payoff structure of present and future iterations, and consequently, the players' strategies and decisions as well.[125] Figure 2 is a simple illustration of an indefinitely repeated multiplayer game with a monitoring and enforcement institution.

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123. *See* Hirsch, *supra* note 2, at 110-11 (discussing the use of "international legal mechanisms to modify the structure of settings susceptible to collective action failure"); Beth A. Simmons & Lisa L. Martin, *International Organizations and Institutions*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 2, at 192, 195-96. *See generally* COOPERATION UNDER ANARCHY (KennethA. Oye ed., 1986); KEOHANE, *supra* note 59, at 80-84.

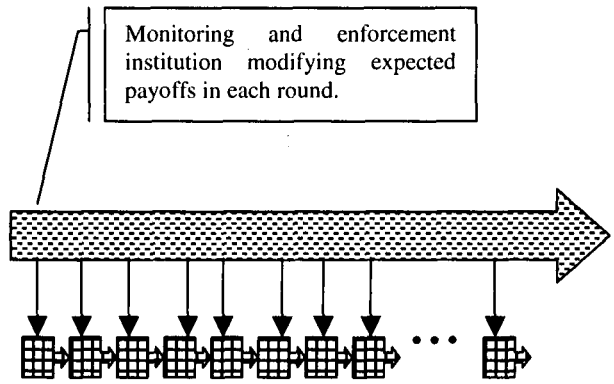
124. *See infra* Part II.F.1 (discussing Type I strategies); sources cited *supra* note 123. As Ernst-Ulrich Petersmann observed regarding the GATT:

> Governments know very well that compliance with their self-imposed GATT commitments, and with GATT dispute settlement rulings, increases national economic welfare; and that by "tying their hands to the mast" (like *Ulysses* when he approached the island of the *Sirenes*), reciprocal international pre-commitments help them to resist the siren-like temptations from "rent-seeking" interest groups at home.

Ernst-Ulrich Petersmann, *Constitutionalism and International Organizations*, 17 NW. J. INT'L L. & BUS. 398, 436-37 (1996-97); *see also* Frischmann, *supra* note 43, at 479-80, 484, 491, 506-07 (arguing that for an international emission trading system to work, States must "bind themselves to intrusive detection and serious reprisal mechanisms").

125. *See, e.g.*, Mitchell & Keilbach, *supra* note 84, at 896-97, 902-03 (discussing the role of institutions in restructuring incentives); Wagner, *supra* note 90, at 385, 389 (noting that international agreements use both "'carrots' and 'sticks' " to adjust payoff structures, and explaining that "[a] credible punishment discourages cheating *ex ante* by virtue of the inevitability by which it is going to be carried out.").

FIGURE 2: Visualizing an iterated game with a monitoring and enforcement institution. Building from Figure 1, this figure depicts an iterated game with the presence of a monitoring and enforcement institution (the shaded arrow).



International relations scholars, in particular institutionalists, have devoted substantial attention to the role of institutions in facilitating international cooperation.[126] From a theoretical perspective, many international relations scholars employ game theory to frame their analysis and evaluate the design of institutions that rational players might create to increase the likelihood of

126. *See* KEOHANE, *supra* note 59; Axelrod & Keohane, *supra* note 59, at 226; Koremenos et al., *supra* note 94; Lisa L. Martin and Beth A. Simmons, *Theories and Empirical Studies of International Institutions*, 52 INT'L ORG. 729 (2001) (providing an overview of the scholarship on institutions); *see also* Raustiala & Slaughter, *supra* note 12, at 542-44 (discussing "solution structure," which "comprises the specific institutional design choices of [an] agreement"). *See generally* COOPERATION UNDER ANARCHY (Kenneth A. Oye ed., 1986). Institutionalism has been described as "a loose composite of transaction cost economics and the noncooperative game theory." DOWNS & ROCKE, *supra* note 114, at 19.

cooperation.[127] From an empirical perspective, international relations scholars examine institutions that States actually create and evaluate whether such institutions are rationally designed.[128]

There is an interesting gap between the types of institutions that traditional game theory predicts should exist and the types of institutions found in reality. Analyses of iterated multiplayer games suggest that rational players would create institutions that affect payoff structures in a predictable manner so that "forward-looking" players choosing strategies *ex ante* (or even as a game progresses) are more likely to cooperate. Accordingly, players should create institutions to monitor players' decisions, to adjust payoffs either by rewarding cooperators or punishing defectors, to promote iteration (or lengthen the shadow of the future), to promote issue-linkage, to enable signaling of preferences and strategies, and to perform other functions that facilitate credible commitment *ex ante*.[129] Such institutions do exist, but there are a number of institutions created by parties to international agreements that cannot be explained by the traditional game theory model. The model does not explain, for example, why parties invest resources in the creation of institutions that have nothing to do with reducing the risk of defection.[130]

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127. *See* Koremenos et al., *supra* note 94 (discussing the rational design of institutions); Snidal, *supra* note 2, at 85. *See generally* Special Issue, *Rational Design: Explaining the International Institutions*, 55 INT'L ORG. (2001).

128. *See generally* Special Issue, *supra* note 127.

129. *See* sources cited *supra* note 126. *But cf.* Andrew T. Guzman, *The Design of International Agreements*, mimeo (Aug. 2003) (analyzing why "rational states sometimes prefer to design their agreement in such a way as to make them less credible"). *See generally* HOVI, *supra* note 59, at 96-100 (discussing modifications to the basic prisoners' dilemma model, including variable discount factors, imperfect detection of violations, incomplete information, multiple options, and package deals).

130. Each of the institutional functions listed above focuses on adjusting the expected payoffs in a manner that lessens the risk of strategic defection—i.e., make cooperation more attractive than defection by adjusting the expected payoffs. I do not mean to suggest that international relations scholars have not observed or analyzed institutions focused on issues other than countering strategic defection. To the contrary, scholars that study international regimes and the manner in which regimes evolve have suggested that States employ institutions that facilitate bargaining, reduce transactions costs, centralize information gathering and processing functions, and perform other functions that promote sustained cooperation. *See* Abbott & Snidal, *supra* note 67, at 8 ("[T]he role of IOs [international organizations] is best understood through a

The next two sections present a model of international cooperation that bridges the gap between traditional game theory and reality. The model is based on the observation that in reality, the games being played by States evolve, meaning that the rules of the game may change dynamically in response to exogenous events, independent from players' performance and chosen strategies. States understand *ex ante* not only that they face noncompliance risks as traditionally conceived (defection based on incentives presented in iterated game context, for example) but also that dynamic change may threaten the stability of the game.[131] Accordingly, *ex ante*, States design institutions (to implement strategies) directed not only at detecting defection and altering payoffs in the event of defection—as predicted by traditional game theory—but also to maintain cooperation in the face of dynamic change triggered by exogenous events.[132] As described in more detail below, States create institutions to reduce uncertainty and transaction costs associated with such events and to adjust commitments in future iterations; such institutions facilitate internal change and maintain cooperation by relieving parties of the need to return to the bargaining

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synthesis of rationalist (including realist) and constructivist approaches. States consciously use IOs both to reduce transaction costs in the narrow sense and, more broadly, to create information, ideas, norms, and expectations; to carry out and encourage specific activities; to legitimate or delegitimate particular ideas and practices; and to enhance their capacities and power."). Snidal, *supra* note 2, at 83-85. My point is that the (game) theory relied upon by many scholars fails to account for the existence of these institutions. In a sense, the theory developed in this article connects game theory and regime theory in a more coherent way.

131. *See* Snidal, *supra* note 18, at 939-40.

132. *See* Abbott & Snidal, *supra* note 67, at 10-12 (suggesting that international organizations may strengthen cooperation in the face of changing conditions); *id.* at 15 (suggesting that states may create procedures to deal with unanticipated contingencies and to "elaborat[e] rules, standards, and specifications . . . even when member states retain the power to reject or opt out"); *id.* at 26 ("Emerging compliance problems due to changing circumstances can be managed by IO [international organization] political and judicial organs with authority to interpret and adapt agreements and elaborate norms."); *see also* Koremenos et al., *supra* note 94, at 792 (suggesting that States "design institutions that protect them from unforeseen circumstances"); *id.* at 793-94 (explaining why states may plan to renegotiate aspects of an agreement when facing uncertainty about the state of the world); *cf. id.* at 788 ("When states are uncertain about the state of the world, all may benefit from joint efforts to gather and pool information.").

table to reform agreements every time the game structure changes.

E. *The Dynamic Process of Framing, Forming, and Playing Games*

International cooperation is the product of a complex, dynamic process that is rife with collective action problems, strategic behavior, transaction costs and uncertainty.[133] This process may be summarized as follows: (1) States identify an interdependency problem, delineate its contours and possible solutions ("framing the game"); (2) negotiate an agreement and create compliance institutions ("forming a game"); and (3) implement the agreement ("playing the game").[134]

1. *Framing the Game.* The first step towards international cooperation involves identification of the interdependency problem (or set of problems), potential participants, options for addressing the problem, expected payoffs, duration (number of iterations) and other factors

133. *See supra* Part I (listing various impediments to cooperation).

134. Each of these stages has been explored in considerably more detail elsewhere (as the footnotes in the subsections below indicate). *See generally* Ronald B. Mitchell, *International Environment*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 2, at 500 (reviewing literature). At each stage, there are repeated interactions between domestic and international, and public and private actors. The point here is to provide a broad outline of the cooperative process and how these three stages dynamically interrelate. The "regime formation process" has similarly been divided. *See, e.g.*, O.R. YOUNG, CREATING REGIMES: ARCTIC ACCORDS AND INTERNATIONAL GOVERNANCE (Cornell Univ. Press 1998) [hereinafter YOUNG, INTERNATIONAL GOVERNANCE] (dividing the cycle of regime formation into three stages—agenda formation, negotiation, and operationalization); O.R. YOUNG, INTERNATIONAL GOVERNANCE: PROTECTING THE ENVIRONMENT IN A STATELESS SOCIETY (Cornell Univ. Press 1994); Mitchell, *supra* (dividing international environmental "policy process" into similar "policy stages"); *see also* EDITH BROWN WEISS ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY 181-87 (1998) (describing international and domestic processes involved in treaty-making); *id.*, App. III (*General Steps in Formulating Multilateral Agreements*); Setear, *An Iterative Perspective on Treaties*, *supra* note 7 (analyzing treaties from an "iterative perspective"); Setear, *Responses to Breach of a Treaty*, *supra* note 7 (using iterated prisoners' dilemma to analyze international law); YANG, *supra* note 10, at 27-28 (analyzing "international legal norm implementation" as "two-phased," bargaining and enforcement); Fearon, *supra* note 5 (same); ROGER FISHER, IMPROVING COMPLIANCE WITH INTERNATIONAL LAW 170 (analyzing "international legal norm implementation" as "two-phased," bargaining and enforcement).

that define the rules of the game.[135] Problem identification and definition may be extremely complex and may involve uncertainty in various dimensions (scientific, economic, and political) relevant to decision-making.[136] During this stage, domestic and international policy makers, bureaucrats, non-governmental organizations ("NGOs"), businesses and other interested entities home in on an issue and begin to debate the merits of potential (international) solutions.[137] In some cases, problem identification, issue framing and informal negotiations may occur at the sub-State level for years before formal diplomatic negotiations take place. When an issue has risen among national priorities to the point where a State is willing to invest the time and resources necessary to fully explore a cooperative solution, negotiations may begin.[138]

2. *Game Formation.* Once an interdependency problem has been identified and potential participants decide that taking action as opposed to maintaining the status quo may be worthwhile, States negotiate some form of agreement,[139]

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135. *See* CHAYES & CHAYES, *supra* note 5, at 110 ("Analytically, the first stage is the development of data about the situation under regulation and the activities of the parties with respect to it."); Abbott, *supra* note 18, at 13 ("At the outset, the crucial facts relate to the nature of the interaction: the strategic structure of the relationship (whether it is actually a PD or some other game) and the conditions under which the game will be played. Many PD analyses assume that all players have complete information on the structure of the game. In international politics, however, the parties are likely to suffer from 'prospective uncertainty' as to all the basic determinants of game structure: (a) the courses of action available to them and the results of different combinations of choices; (b) the preferences of the other side, which determine the payoff structure; and (c) the conditions of play.") (footnotes omitted); *see also* Mitchell, *supra* note 134, at 502-04 (providing an overview of literature on the "agenda-setting" stage in the international environmental policy process).

136. On the reliance of international environmental regimes on science and technology, see Sheila Jasanoff, *Contingent Knowledge: Implications for Implementation and Compliance*, *in* ENGAGING COUNTRIES, *supra* note 10, at 63-87; Peter M. Haas, *Banning Chlorofluorocarbons: Epistemic Community Efforts to Protect Stratospheric Ozone*, 46 INT'L ORG. 187 (1992).

137. *See* Mitchell, *supra* note 134, at 502-04.

138. The complicated processes by which national priorities are set (and changed) are beyond the scope of this article.

139. *See* Mitchell & Keilbach, *supra* note 84, at 895. Of course, negotiations over a new issue area do not always focus on a brand new agreement; negotiations are often highly contingent on the outcomes of past negotiations in related issue areas and may lead to bargaining over which existing regime should serve as the locus for developing cooperative solutions. I thank Larry

such as a treaty.[140] Importantly, this step affects the expected payoffs for participants by virtue of the commitments undertaken, concessions made and compliance systems established.[141]

The negotiation of an agreement is a dynamic process in itself that redefines the rules of the game:[142] While the preliminary game structure may be framed simply in terms of two options (maintaining the status quo or doing something), negotiations modify the initial payoff structure by bringing to light the full range of options with associated costs, benefits, timeframes, and distributional patterns.[143] Thus, negotiations give form and substance to potential commitments expanding the range of options along various dimensions, such as the depth of substantive commitments (for example, to liberalize trade or to regulate emissions of environmentally harmful substances by specific quantita-

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Helfer for bringing my attention to this point. On the strategic dynamics of regime shifting, see Helfer, *supra* note 14.

140. Nonbinding resolutions may also serve the same purpose. Nonbinding agreements may embody commitments with which States intend to comply, while at the same time, explicitly reserving flexibility to adjust commitments as necessary. *See* Guzman, *supra* note 10, at 1854-57, 1879-81; Helfer, *supra* note 11, at 1841; Raustiala, *supra* note 12, at 425-26. *See generally* COMMITMENT AND COMPLIANCE: THE ROLE OF NON-BINDING NORMS IN THE INTERNATIONAL LEGAL SYSTEM (Dinah Shelton ed., 2000); INTERNATIONAL COMPLIANCE WITH NONBINDING ACCORDS (Edith Brown Weiss ed., 1997).

141. *See* Hirsch, *supra* note 2, at 110 ("The most frequent tool employed by international law to change payoff structures is the formulation of substantive norms, which create new rights and obligations for States. Establishing a legal obligation to follow a particular course of action modifies the payoff structure to a party, who then must contemplate whether or not to pursue the legally required course of action."). It may also affect the payoffs for nonparticipants, as in the case of the non-party trade ban in the Ozone regime, discussed below. *See infra* Part III.B.2.

142. On bargaining and negotiation, see Christer Jonsson, *Diplomacy, Bargaining, and Negotiation*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 12. On the application of game theory to bargaining and negotiation, see generally DOUGLAS G. BAIRD ET AL., GAME THEORY AND THE LAW 219-43 (1994); HARGREAVES HEAP & VAROUFAKIS, *supra* note 77, at 111-45. Various actors—public and private, domestic and international—may continue to frame the problem and potential solutions (or at least, attempt to do so) through political and other discursive processes. *See* Mitchell, *supra* note 134, at 505-07.

143. Distributional issues add an extra layer of complexity to the analysis. The folk theorems of noncooperative game theory show that repeated collaboration games, such as the iterated prisoners' dilemma, give rise to multiple equilibria, meaning that "[I]n most circumstances, states have simultaneously to worry about reaching efficient outcomes and resolving distributional conflict." Martin & Simmons, *supra* note 126, at 745.

tive measures) and the timeframes over which commitments must be satisfied, and "generat[ing] expectations of compliance in others."[144] Notably, international negotiations tend to be quite different from legislative negotiations at the domestic level because international negotiations require consensus rather than majority approval,[145] at least when States initially enter into an agreement to undertake commitments and create institutions.[146]

When States negotiate over the details of an agreement, they must take into account a wide range of considera-

144. Chayes & Chayes, *supra* note 106, at 184.

145. This nature of international negotiations results from the fact that a State must consent to an agreement for it to be bound. *See* S.S. *"Lotus"* (Fr. v. Turk.), 1927 P.C.I.J. (ser. A) No. 10, at 18 (Sept. 7) ("The rules of law binding upon States . . . emanate from their own free will . . . ."). *See generally* Vienna Convention on the Law of Treaties, May 23, 1969, 1155 U.N.T.S. 331. Many scholars have explored the comparison with contract law. *See* RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE UNITED STATES, pt. III, introductory note, at 147 (1986) (Treaty law "resembles domestic contract law, as international agreements often resemble contracts."); *see also* ETHIER, *supra* note 45, at 5 (analyzing international agreements as incomplete contracts); Guzman, *supra* note 10, at 1865-66; Schwartz & Sykes, *supra* note 11, at 179. Of course, there are significant differences between treaty law and contract law. *See, e.g.,* Setear, *An Iterative Perspective on Treaties*, *supra* note 7, at 149 (contrasting the legal effect of a party's signature under domestic contract law and treaty law). On consent-based theories of international law, see for example, *id.* at 156-162; Guzman, *supra* note 10, at 1833-34. As noted by Chayes and Chayes, "[t]reaty making is not purely consensual, of course. Negotiations are heavily affected by the structure of the international system, in which some states are much more powerful than others." Chayes & Chayes, *supra* note 106, at 183.

146. One interesting example of dynamic institutionalism is the creation of voting rules within a regime that allow for future negotiations to be governed by something less than a consensus rule, such as a majority rule. *See* Martin, *supra* note 117, at 773. While consent is the baseline for a new agreement, States may foresee the need to make collectively binding decisions to address new problems or issues without obtaining the consent of each party. Adopting voting rules that facilitate amendment of the original agreement, creation of new sub-agreements (or protocols), or creation of new institutions reflects an awareness that international cooperation is a dynamic game that may require repeated cycling through the three stages. *See* CHAYES & CHAYES, *supra* note 5, at 225-27; *see also* Koremenos et al., *supra* note 94 (discussing voting rules as an institutional feature that varies among issue areas); Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 213-15 (discussing the convention-protocol approach). For a discussion of alternative voting rules, see Jonathan Weiner, *Global Environmental Regulations: Instrument Choice in Legal Context*, 108 YALE L.J. 677, 735-42 (1999).

tions.[147] While the substantive commitments often deserve the most attention, institutional design is an important aspect of negotiations. Most importantly for consideration in this article, States are aware of noncompliance risks *prior* to undertaking substantive commitments and may work out the details of a compliance system while negotiating substantive commitments or condition their acceptance of substantive commitments on the development of an acceptable compliance system.[148] As described below, what States consider to be an "acceptable compliance system" depends on the agreement and varies across issue-areas. Commitments and compliance institutions are inexorably intertwined.[149]

3. *Play*. Once an agreement has been negotiated, "play" begins.[150] Participants cooperate by complying with

147. For an interesting analysis of bargaining to create international governance systems, see YOUNG, *supra* note 134, at 81-116.

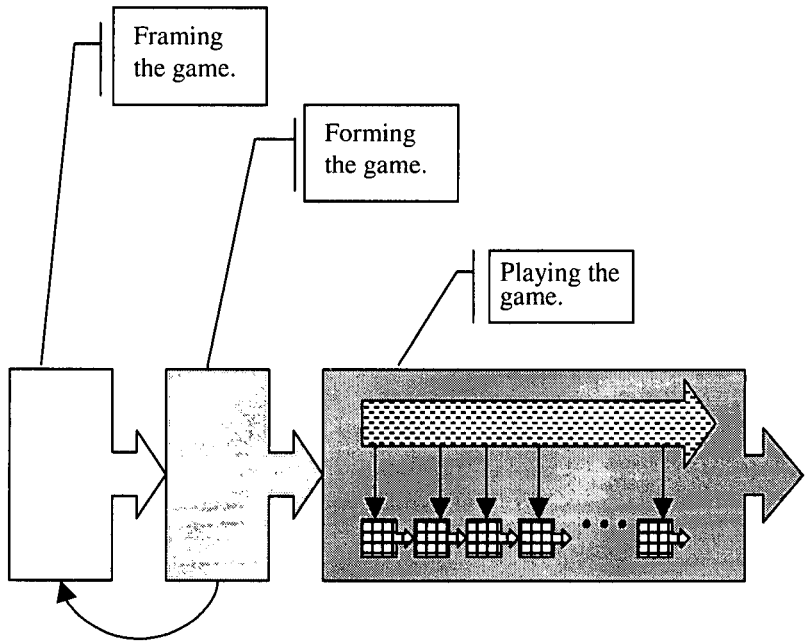
148. States may overestimate the risks of noncompliance. This may inhibit cooperation in the first place if, for example, the costs of creating an "acceptable" compliance institution exceed the benefits of cooperation, or such overestimation may lead to the creation of unnecessary compliance institutions and thereby raise the costs of cooperation. For example, imagine that two States perceive their joint regulation of a shared problem to be a Prisoners' Dilemma game due to uncertain payoffs where in fact it is a Harmony game. *See* sources cited *supra* note 84. The expected costs of creating and maintaining a compliance institution may exceed the expected benefits of cooperation and thus lead both States to opt out of the potential agreement. Alternatively, the States may enter into an agreement and create an unnecessary compliance institution.

149. *See* George W. Downs et al., *The Transformational Model of International Regime Design: Triumph of Hope or Experience?*, 38 COLUM. J. TRANSNAT'L L. 465, 478-79, 502-09 (2000); George Downs et al., *Managing the Evolution of Multilateralism*, 52 INT'L ORG. 397 (1998); Downs et al., *supra* note 42; Ronald B. Mitchell, *Regime Design Matters: Intentional Oil Pollution and Treaty Compliance*, 48 INT'L ORG. 425 (1994); B. Peter Rosendorff & Helen V. Milner, *The Optimal Design of International Trade Institutions: Uncertainty and Escape*, 55 INT'L ORG. 829, 832 (2001); James McCall Smith, *The Politics of Dispute Settlement Design: Explaining Legalism in Regional Trade Pacts*, 54 INT'L ORG. 137 (2000); Alan O. Sykes, *Protectionism as a "Safeguard": A Positive Analysis of the GATT "Escape Clause" with Normative Speculations*, 58 U. CHI. L. REV. 255 (1991); David G. Victor, *Enforcing International Law: Implications for an Effective Global Warming Regime*, 10 DUKE ENVTL. L. & POL'Y F. 147 (1999).

150. Of course, precisely when an agreement becomes effectively binding depends on the type of agreement. Treaties require ratification; some are self-executing while others require domestic legislation to implement the international commitments; nonbinding accords may require much less. *See*

their commitments and defect by not complying with them. Participants repeatedly find themselves faced with the question of whether or not to comply, unless they choose to withdraw, are suspended, or are otherwise forced to withdraw. According to the conventional view (illustrated in Figure 3 below), States go through these stages once, settle in the third stage, and play an iterated game, thereafter deciding on an iterative basis whether to comply.[151]

FIGURE 3: Visualizing the process of framing, forming and playing an iterated game.



Setear, *An Iterative Perspective on Treaties*, *supra* note 7, at 150-51. The relevant distinctions between "start times" for various types of international agreements are not especially important for the purposes of this article. On this issue, see *id.* at 150-51.

151. *See generally* Guzman, *supra* note 10; Oye, *supra* note 78; Setear, *An Iterative Perspective on Treaties, supra* note 7.

This view leads both compliance and institutional analysts to focus on the final stage and the role of monitoring and enforcement institutions in facilitating cooperation.[152]

Yet the three "stages" are not really independent, and the cooperative process is not necessarily linear. Games may reframe and reform dynamically during play,[153] affecting payoff structures, the opportunities for opportunism, and the bargaining/strategic positions of players.[154] Exogenous events unrelated to parties' actual compliance decisions (or adopted strategies) may occur while the iterated game is being played.[155] Such events may prompt States to return to the framing and forming stages. Consider a few possibilities. First, a better understanding of the underlying problem may emerge, for example, through advancements in scientific understanding of an

152. *See* Guzman, *supra* note 10; *supra* Part II.D.

153. In addition, the reframing and reforming of games may have an important constructive function. On constructivism, see generally Emanuel Adler, *Constructivism and International Relations*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 2, at 73. While it is tempting to attempt to connect rational choice theories and constructivist theories through this dynamic, I leave this added complication for another day.

154. *Cf.* MICHAEL TAYLOR, THE POSSIBILITY OF COOPERATION 107 (1987) (arguing that "the most important shortcoming of the Prisoners' Dilemma supergame as a model of the process of public goods provision is that it takes place in a static environment: the supergame consists of iterations of the same ordinary game" and suggesting that a more realistic model would require "a *changing* payoff matrix") (emphasis supplied); Smith, *supra* note 59, at 1598, 1603 (analyzing nuclear arms control agreements between the United States and the Soviet Union as a dynamic regime); Snidal, *supra* note 18, at 930 n.17 (noting similar limitations on the use of iterated games to approximate dynamic situations). I should note that the theory of evolving games presented in this article is distinct from evolutionary game theory, which concerns the evolution of strategies and the search for evolutionary stable strategies based on the decisions, strategies, and conventions of other players. *See* Arce, *supra* note 98, at 755 ("From a dynamic perspective, the advantage of the evolutionary [game theory] approach over the classic repeated games approach is that agents are no longer committed to a strategy that most often represents a history-dependent preset program. Instead, agents are involved in a dynamic interplay in which they can learn about the relative merits of strategies through the process of trial and error. As a result, cooperation need no longer be achieved through punishment or coercion but through a process of give-and-take that more closely resembles the regime-building experience."). *See generally* HARGREAVES HEAP & VAROUFAKIS, *supra* note 77, at 195-235 (noting that evolutionary game theory assumes that people will adjust behavior based on others' performance to seek the highest possible payoff).

155. *See* Martin, *supra* note 117, at 789; Snidal, *supra* note 2, at 83; Snidal, *supra* note 18, at 939-40.

environmental threat.[156] Second, unanticipated (or under appreciated) aspects of a problem may surface and threaten cooperative efforts, for example, when initial efforts successfully abate the most prominent aspect of a problem only to reveal more difficult issues to resolve.[157] Third, the expected costs (benefits) of implementing a particular obligation may be less than expected, for example, when technological advancements reveal alternative, less costly means of achieving agreed-to ends.[158] Finally, a host of exogenous factors may alter the existing payoff structure or the relative priority of a given commitment, for example, when economic or political conditions change in a significant manner. Each of these possibilities (and others) may alter the payoff structure and prompt parties to revisit the existing agreement and, *inter alia*, adjust existing commitments, strengthen enforcement institutions, provide for unanticipated side-payments, or simply exit.[159] From the game theoretic perspective, returning to the game framing

156. Monitoring institutions frequently collect and analyze information relating to the underlying problem itself and the means by which the threat has been addressed; even where full compliance exists, the coordinated effort may be poorly targeted and in need of redirection. *See* CHAYES & CHAYES, *supra* note 5; LAWRENCE E. SUSSKIND, ENVIRONMENTAL DIPLOMACY: NEGOTIATING MORE EFFECTIVE GLOBAL AGREEMENTS 99-121 (1994).

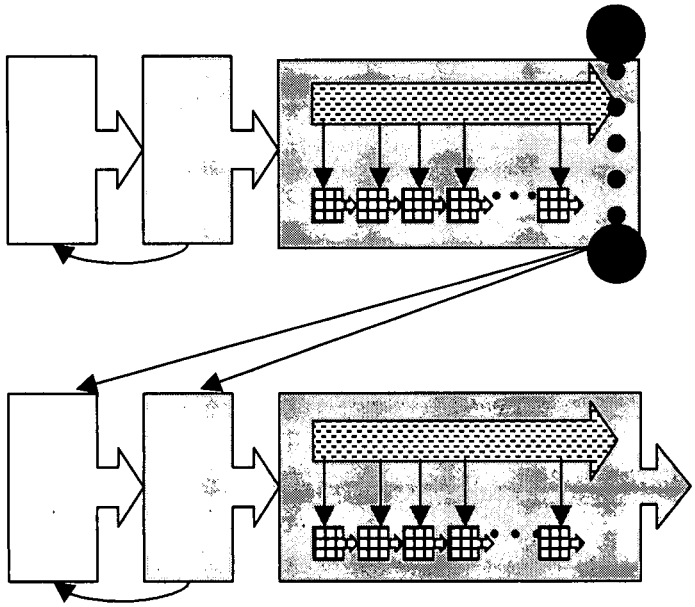
157. *See infra* Part III.A.2.b (discussing the evolution of the GATT regime into the WTO regime and the emergence of issues, such as non-tariff barriers, that were especially challenging for the GATT regime).

158. *See* Jasmine Abdel-khalik, *Prescriptive Treaties in Global Warming: Applying the Factors Leading to the Montreal Protocol*, 22 MICH. J. INT'L L. 489, 510 (2001) ("One of the chief reasons the Montreal Protocol has been effectively implemented is the availability of alternative, ozone friendly, technologies."). *See generally* Colin B. Picker, *A View From 40,000 Feet: International Law and the Invisible Hand of Technology*, 23 CARDOZO L. REV. 149 (2001) (discussing how technology has played an important role in changing the face of international law in various areas, such as agreements on weapons of mass destruction, nuclear weapons, space law, and environmental law).

159. *See* Chayes et al., *Managing Compliance: A Comparative Perspective*, *in* ENGAGING COUNTRIES, *supra* note 10, at 56 ("Treaties do not remain static. To endure, they must adapt to inevitable economic, technological, social, and political changes."); Chayes & Chayes, *supra* note 106, at 184 ("Treaties that last must be able to adapt to inevitable changes in the economic, technological, social, and political setting."); Koremenos et al., *supra* note 94, at 793-94 (recognizing that unforeseen developments may prompt parties to reconsider or revisit an agreement); Rosendorff & Milner, *supra* note 149, at 832-35 (discussing unforeseen developments); Snidal, *supra* note 18, at 939-40.

and forming stages signals the creation of a new game,[160] as illustrated by figure 4 below.

FIGURE 4: Visualizing a series of iterated games. Building from figure 3, this figure depicts the formation of a new iterated game in response to an unforeseen event (vertical dotted line), which prompts players to return to either the framing or forming stage of the process. Although the graphical illustrations of the first and second iterated game look the same, it is important to keep in mind that the rules of the game and the institutional structure may change as a result of exogenous pressures or bargaining.



160. This view is not limited to game theory. For example, in his description of the staged international environmental policy process, Ronald Mitchell states that:

> Evolution and learning constitute something like a fifth policy stage facilitating revision and improvement in the other stages. Policy change may involve simple repetition of the policy process under changed circumstances. New environmental problems may develop and be identified, move onto the international agenda, be addressed through a transnational or international policy process, and be implemented through new mechanisms. When such changes result from changes in exogenous factors, they may deserve our attention but, conceptually, involve simply new instances of these policy processes.

Mitchell, *supra* note 134, at 511.

While this model captures the role of monitoring and enforcement institutions and, to some extent, the dynamic nature of international cooperation, it fails to capture the role of institutions that States employ to facilitate cooperation in the face of dynamic change. States are aware not only of the risk of defection, for which monitoring and enforcement institutions may be needed, but States are also keenly aware of the risk that dynamic change poses for sustained cooperation. Accordingly, when States form games in the first instance, they may create institutions to adjust commitment levels, payoff structures, or other institutional features in response to unforeseen developments and thereby avoid a new round of bargaining and the formation of a new game.[161] The degree to which games reframe and reform during play (*i.e.*, the "dynamicism" of the evolutionary process) is an important factor in the design of such compliance institutions,[162] which is

161. Scholars certainly recognize that States in fact create such institutions. *See* CHAYES & CHAYES, *supra* note 5, at 225-27 (briefly discussing such institutions); Chayes & Chayes, *supra* note 106, at 184-85 ("In sum, treaties characteristically contain self-adjusting mechanisms by which, over a significant range, they can be and in practice are commonly adapted to respond to shifting interests of the parties."). For example, Koremenos et al. refer to the Antarctic Treaty as an example of a treaty that "was designed to allow states to learn from their experience and modify the agreement over time." Koremenos et al., *supra* note 94, at 793. Importantly, the process for modifying the treaty was more flexible than ordinary treaty formation procedures. Thus, foreseeing dynamic change, the parties adopted a flexible agreement with institutional mechanisms for adjusting commitments. *See id.*; *see also id.* at 792 ("[States] design institutions that protect them from unforeseen circumstances."); *id.* at 793-94 (noting that States may plan to renegotiate aspects of an agreement when facing uncertainty about the state of the world); *id.* at 788 ("When states are uncertain about the state of the world, all may benefit from joint efforts to gather and pool information."); *infra* Part III.B.2 (discussing similar institutions in the Ozone regime). Institutions, such as escape clauses, that provide actors with flexibility in the face of uncertainty as to the (future) state of the world are another example. *See* Rosendorff & Milner, *supra* note 149; Sykes, *supra* note 149. Yet the game theoretic account of international cooperation fails to account for the existence of such institutions, and there has been little theoretical attention to these institutions from the rational choice school. *Cf.* Snidal, *supra* note 2, at 82-86 (discussing dynamicism as a challenge to rational choice theory).

162. In his analysis of treaties from an iterative perspective, Setear considers institutions of treaty law designed to facilitate repeated interactions. Setear, *An Iterative Perspective on Treaties*, *supra* note 7, at 190-204, 217-23. His analysis suggests that States may have some degree of control over the dynamicism of regime evolution that depends upon the precision and intended stability of initial commitments and the degree of delegation to institutions

highlighted below in the context of multilateral trade and multilateral environmental agreements.[163] Rather than playing a series of iterated games (as in figure 4 *supra*), States may opt to play an evolving game, where the game structure evolves as it iterates due to internal adjustments resulting from the operation of institutions.[164] Figure 5 below illustrates this model.

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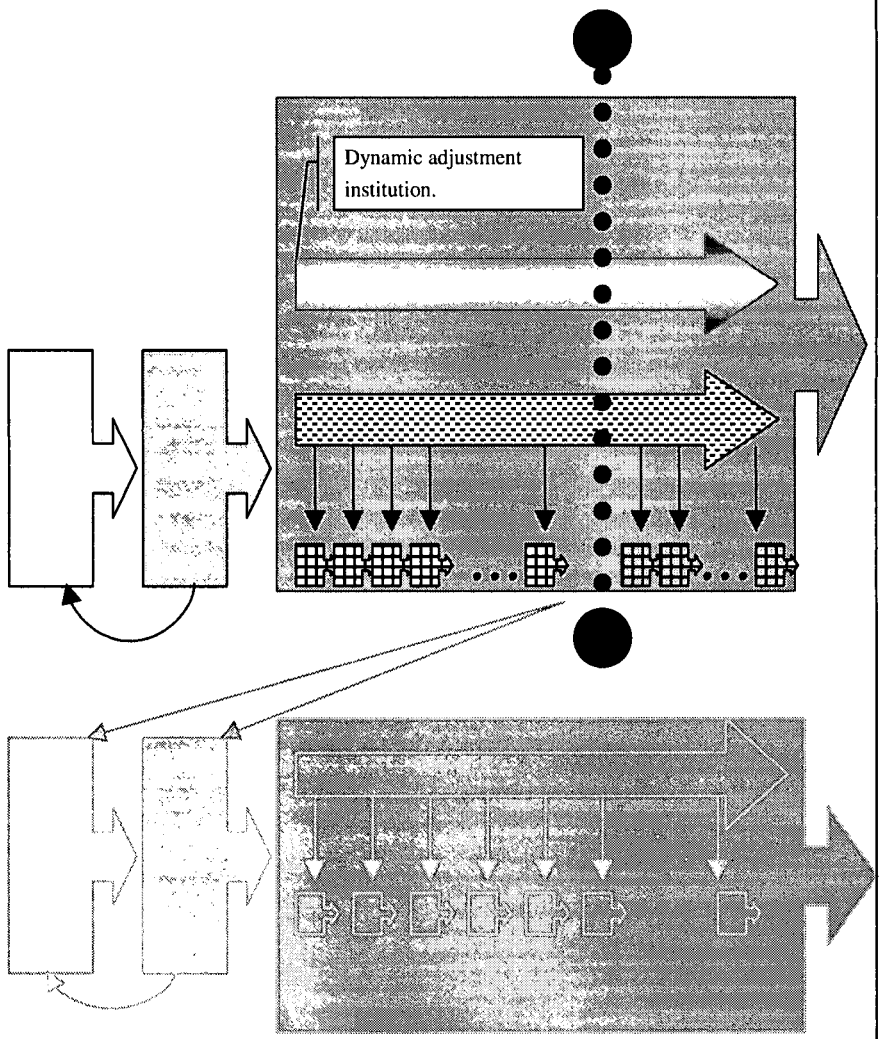
capable of dynamically adjusting commitments in future iterations. *See id.* On the issue of choosing the degrees of obligation, precision, and delegation to institutions required to solve international problems, see Kenneth W. Abbott et al., *The Concept of Legalization*, 54 INT'L ORG. 401, 401 (2000); Kenneth W. Abbott & Duncan Snidal, *Hard and Soft Law in International Governance*, 54 INT'L ORG. 421, 421 (2000); Judith Goldstein et al., *Introduction: Legalization and World Politics*, 54 INT'L ORG. 385, 393-96 (2000); Helfer, *supra* note 11, at 1841 ("States consciously design human rights agreements in response to specific problems, choosing the degrees of obligation, precision, and delegation required to solve those problems. But legalization is not costless. To the contrary, greater legalization necessarily requires a more far-reaching diminution of sovereignty, raising the important question of what motivates states to create legalized human rights agreements in the first place.") (footnote omitted). As noted earlier, States may choose to adopt voting rules that require less than a consensus to create binding commitments in the future. *See* sources cited *supra* note 146 and accompanying text. This would promote a relatively more dynamic regime than a regime without such rules. The Ozone regime, discussed in Part III.B below, presents an excellent example; the regime has evolved rapidly in large part because of its flexible procedures through which parties could adjust commitments (targets and timetables) for covered chemicals without requiring each party's consent. *See infra* Part III.B.2. The "convention-protocol" approach also facilitated iteration and regime evolution. *See id.*; CHAYES & CHAYES, *supra* note 5, at 225 (discussing "convention-protocol" approach as means to evolve); Setear, *An Iterative Perspective on Treaties*, *supra* note 7, at 217-23 (discussing "convention-protocol" approach from iterative perspective and considering the Ozone regime as well as other international environmental regimes); Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 213-15 (discussing "convention-protocol" approach in context of the Ozone regime).

163. *See infra* Part III.

164. *See* DOWNS & ROCKE, *supra* note 114 (analyzing games of imperfect information and the role of institutions designed to cope with uncertainty, but focusing on the risk of defection); Rosendorff & Milner, *supra* note 149 (using a two stage model where the first stage involves bargaining over the form of the institution, the second stage involves a repeated (sub)game in which parties set domestic trade policies, and the escape clause is an institution endogenous to the model). Of course, as illustrated below in the context of both the GATT/WTO regime and the Ozone regime, institutions (or more broadly, regimes) themselves also evolve to meet the demands of parties and changing conditions and to better facilitate sustained cooperation. *See* Koremenos et al., *supra* note 94, at 767-68.

FIGURE 5: Visualizing an evolving game. Building from figure 3, this figure depicts an iterated game with the presence of both a monitoring and enforcement institution and an institution designed to respond to unforeseen events. When a triggering event occurs (vertical dotted line), the second institution adjusts commitment levels, payoff structures, or other institutional features, allowing the game to evolve and avoiding a new round of bargaining and the formation of a new game.



Of course, States do not always choose an evolving game over a series of iterated games; such decisions necessarily vary across issue-areas and depend upon the nature of changes at issue.[165] The next section considers in more detail the types of strategies that States may implement through institutions to sustain cooperation as the game evolves.

F. *Compliance Strategies*

Recognizing *ex ante* that potential compliance problems may plague efforts to address an interdependency problem, States may reach agreement on the design of a compliance system[166] that institutionalizes a suite of compliance strategies.[167] Compliance systems can be thought of as a systematic method of adjusting the rules of the game in

165. *Cf.* CHAYES & CHAYES, *supra* note 5, at 225-27 (discussing a few ways in which "treaty bodies exercise what is in substance legislative power").

166. The advantage of looking at international agreements through the lens of game theory is that the strategic considerations embodied in the agreement and its constituent commitments can be explored. *See, e.g.*, Abbott, *supra* note 18. During negotiations, each party must consider the effects of its and other countries' compliance with the agreement on its citizens, as a whole and taking into account distributional implications. Each party also must contemplate both the likelihood and the potential impact of strategic defection and dynamic change. In some cases, the *ex ante* balancing of expected costs and benefits may lead to outright rejection of any agreement because the costs vastly outweigh the benefits; in other cases, the opposite may occur – for example, easy coordination problems. In the middle, there is a class of situations where the balancing suggests that agreement may be feasible provided that a compliance system is integrated into the agreement, which of course entails its own cost-benefit analysis. *See* BETH V. YARBROUGH & ROBERT M. YARBROUGH, COOPERATION AND GOVERNANCE IN INTERNATIONAL TRADE: THE STRATEGIC ORGANIZATIONAL APPROACH 13 (1992). Creating a compliance system itself may be analyzed as an additional collective action problem, beyond the underlying interdependency problem itself. *See* CHAYES & CHAYES, *supra* note 5, at 64 (discussing organization of sanctions as a collective action problem in itself); *cf.* YANG, *supra* note 10, at 6-9 (arguing that treaty enforcement itself is a public good).

167. *See* Brown Weiss, *Strengthening National Compliance with Trade Law: Insight from Environment*, *in* NEW DIRECTIONS, *supra* note 56, at 458 ("Parties should have a suite of compliance methods available that can be tailored to meet the needs of particular countries for particular agreements."); Brown Weiss, *supra* note 12, at 1559 (stating that "[i]nternational agreements evolve over time, as do the national implementing measures"); Mitchell, *supra* note 149, at 428 (analyzing the "integrated compliance systems" of the international regime controlling intentional oil pollution).

either an evolving game or a series of games.[168] As the tremendous volume of literature discussing monitoring and enforcement institutions indicates, the strategies discussed below may be implemented through a wide range of institutions. The focus here is primarily on function rather than institutional form.[169]

Recent empirical research on national compliance with international commitments suggests that national intent and national capacity to comply are critical variables for actual compliance.[170]

> The level of State compliance depends on having the leaders and the citizenry understand that it is in their self-interest to comply and on their acting on this understanding. While external pressures and assistance can push a country toward compliance, there is no substitute for engaging 'self-interest.' In some cases, the issue is one of prioritization: How much of the country's national resources to devote to complying with particular agreements. This is especially difficult when compliance requires States to coordinate actions among several powerful ministries, with provincial and local governments, or with powerful business and industry organizations.[171]

Furthermore, the capacity to comply with international agreements depends on numerous assets, such as "[a]n honest and effective bureaucracy, economic resources,

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168. *See supra* Figures 4 & 5.

169. For articles focusing on institutional form, see generally Special Issue, *Rational Design: Explaining the International Institutions*, 55 INT'L ORG. 761 (2001) (analyzing institutional design); Special Issue, *Legalization and World Politics*, 54 INT'L ORG. 385 (2000) (analyzing forms of legalization, which is "a particular form of institutionalization"); McCall Smith, *supra* note 149 (comparing institutional form across trade accords). As Duncan Snidal suggested in an important early article on the application of game theory to international cooperation, observed variation in institutional form and function may be explained as "different solutions to the same fundamental problem" or "different solutions to fundamentally different problems." Snidal, *supra* note 18, at 923-24.

170. *See* Jacobson & Brown Weiss, *A Framework for Analysis*, *in* ENGAGING COUNTRIES, *supra* note 10, at 1-18; Jacobson & Brown Weiss, *Assessing the Record and Designing Strategies to Engage Countries*, *in* ENGAGING COUNTRIES, *supra* note 10, at 511-54.

171. Brown Weiss, *Strengthening National Compliance with Trade Law: Insight from Environment*, *in* NEW DIRECTIONS, *supra* note 56, at 458-59; *see* Raustiala & Slaughter, *supra* note 12, at 547 (discussing structural links between international institutions and domestic actors).

technical expertise, and public support."[172] Importantly, these variables change over time, and the variables are subject to endogenous and exogenous influence. Thus, cooperation, particularly over the long-term, depends in part on adjusting the individual benefit-cost structures faced by States to affect the intent of parties and in part on building the capacity of participants so that compliance is feasible.[173]

International law and international relations scholars have suggested two general approaches to designing compliance systems, an enforcement-oriented approach based essentially on the threat and/or use of sanctions as a means of deterring noncompliance, and a management-oriented approach based essentially on reducing ambiguity regarding obligations themselves, creating positive incentives to comply prior to an incidence of noncompliance, and adapting treaties to changing conditions.[174] The

172. Brown Weiss, *Strengthening National Compliance with Trade Law: Insight from Environment*, *in* NEW DIRECTIONS, *supra* note 56, at 459. "The greater the capacity of the political unit to implement the accord, the more likely it is that it will comply. Administrative and bureaucratic capacity depends upon economic resources, but it also involves education, technical training and skills, and attitudes." Jacobson & Brown Weiss, *Assessing the Record and Designing Strategies to Engage Countries*, *in* ENGAGING COUNTRIES, *supra* note 10, at 1, 11; *see also* Vogel & Kessler, *How Compliance Happens and Doesn't Happen Domestically*, *in* ENGAGING COUNTRIES, *supra* note 10, at 19, 20-23 (reviewing compliance with environmental legislation in the United States and the European Community); Mark A. Drumbl, *Does Sharing Know its Limits? Thoughts on Implementing International Environmental Agreements: A Review of National Environmental Policies, A Comparative Study of Capacity-Building*, 18 VA. ENVTL. L.J. 281 (1999).

173. *See* Jackson & Brown Weiss, *A Framework for Analysis*, *in* ENGAGING COUNTRIES, *supra* note 10, at 11; *see also* HOVI, *supra* note 59, at 96-100 (discussing modifications to the basic prisoners' dilemma model, including variable discount factors, imperfect detection of violations, incomplete information, multiple options, and package deals); Abbott & Snidal, *supra* note 67, at 26 ("State incapacity is addressed directly by financial and technical assistance.").

174. *See* CHAYES & CHAYES, *supra* note 5 (championing the management-oriented approach and attacking the enforcement-oriented approach); Downs et al., *supra* note 42 (challenging Chayes and Chayes and defending the enforcement-oriented approach); Harold Hongju Koh, *Why Do Nations Obey International Law?*, 106 YALE L.J. 2599, 2639 (1997) (reviewing THE NEW SOVEREIGNTY and suggesting that the two approaches may complement each other (1995)); Abbott & Snidal, *supra* note 67, at 26-27 (suggesting that the "role of IOs [international organizations] in ensuring compliance with international commitments can best be understood by integrating managerial and enforcement views of the process" and analyzing the role of IOs); Guzman,

enforcement-oriented approach is consciously focused on the problem of opportunistic defection and the solution of altering States' individual incentives and aligning them with the mutually desired cooperative outcome.[175] It relies on the imposition of "hard" sanctions (such as trade or other economic sanctions) in the event of noncompliance.[176] The WTO DSU is often considered a good example of an institution embodying this approach, although the analysis in Part III below suggests otherwise.[177] The management-oriented approach is premised on the belief that "states have a propensity to comply with their international commitments,"[178] de-emphasizes the problem of opportunistic defection,[179] and largely rejects the use of "hard" sanctions

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supra note 10, at 1830-33 (arguing that the managerial model works well for coordination problems but is less useful for other interdependency problems); Frischmann, *supra* note 43, at 493 ("A rough continuum exists where at one extreme there are management-oriented (soft) approaches and at the other end there are enforcement-oriented (hard) approaches."); *id.* at 500-07 (arguing that an enforcement-oriented approach is necessary for an international emissions trading system to work and proposing how to design such a system); *see also* Raustiala & Slaughter, *supra* note 12, at 542-44 (discussing the management-enforcement debate in the compliance literature); YANG, *supra* note 10, at 2-3 (same); Raustiala & Victor, *Conclusions*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 681-84 (same); JAN CORFEE MORLOT, ENSURING COMPLIANCE WITH A GLOBAL CLIMATE CHANGE AGREEMENT, 57-59 OECD Information Paper, ENV/EPOC(98)5/REV1, (1998) (same); Jacob Werksman, *Designing a Compliance System for the UN Framework Convention on Climate Change*, *in* IMPROVING COMPLIANCE WITH INTERNATIONAL ENVIRONMENTAL LAW (James Cameron et al. eds., 1996) (same); Oran Young, *The Effectiveness of International Institutions: Hard Cases and Critical Variables*, *in* GOVERNANCE WITHOUT GOVERNMENT: ORDER AND CHANGE IN WORLD POLITICS 160 (James N. Rosenau & Ernst-Otto Czempiel eds., 1992) (same). An important distinction between the two approaches, which arises from the underlying premises upon which both approaches are based, is the type of compliance problem(s) each is designed to address—intentional noncompliance as opposed to unintentional noncompliance.

175. *See* Downs et al., *supra* note 42; Chayes & Chayes, *supra* note 106, at 187.

176. There are enforcement institutions that do not rely on adjudication/dispute settlement. For example, the United Nations Security Council is a collective mechanism for imposing hard sanctions, U.N. CHARTER arts. 39-51, and, of course, States may fall back on unilateral sanctions as a means to punish noncompliance.

177. *See infra* Parts III.A.2.a.ii, III.A.2.c.ii.

178. Raustiala & Slaughter, *supra* note 12, at 542; *see* CHAYES & CHAYES, *supra* note 5, at 3-4; Chayes & Chayes, *supra* note 106, at 179-80.

179. *See* Chayes & Chayes, *supra* note 106, at 183 ("[I]f the agreement is well-designed—sensible, comprehensible, and with a practical eye to probable patterns of conduct and interaction—compliance problems and enforcement

and other forms of enforcement as "costly, difficult to mobilize, and of doubtful efficacy."[180] It relies primarily on positive incentives, "soft" negative sanctions (such as publication of noncompliance reports and suspension of privileges), dynamic commitment-readjustment, and other mechanisms aimed at encouraging continued participation, building capacity, and increasing public awareness and support.[181] International environmental regimes are often considered good examples of this approach.

The types of compliance strategies that States implement through institutions "can best be understood by integrating managerial and enforcement views of the process"[182] and keeping in mind that the nature of the underlying interdependency problem will have a significant effect on the game structure and attendant demand for compliance institutions.[183] Based on its conception of the manner in which the international cooperative process works (described in the previous section), the dynamic institutional theory developed in this article provides a coherent way to integrate the two approaches within a rational choice framework.[184]

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issues are likely to be manageable. If issues of noncompliance and enforcement are endemic, the real problem is likely to be that the original bargain did not adequately reflect the interests of those that would be living under it, rather than mere disobedience.").

180. *See* Chayes & Chayes, *supra* note 106, at 178.

181. *See* CHAYES & CHAYES, *supra* note 5 (the seminal work on the management-oriented approach to compliance); *cf.* Guzman, *supra* note 10, at 1830-33 (arguing that the managerial model works well for coordination problems but is less useful for other interdependency problems).

182. Abbott & Snidal, *supra* note 67, at 26; *see* Mitchell, *supra* note 149, at 428 ("[T]he [equipment subregime of the international regime controlling intentional oil pollution] elicited compliance when it developed integrated compliance systems that succeeded in increasing transparency, providing for potent and credible sanctions, reducing implementation costs to governments by building on existing infrastructures, and preventing violations rather than merely deterring them.").

183. *See* Downs et al., *supra* note 42, at 379-80; Mitchell & Keilbach, *supra* note 84, at 891-904; Raustiala & Slaughter, *supra* note 12, at 545; Snidal, *supra* note 18, at 924.

184. It should not be surprising that the management-oriented approach can be framed in rational choice terms. *Compare* Hathaway, *supra* note 12, at 1950 n.46 (suggesting that Guzman's game-theoretic model may mesh with the management-oriented approach to compliance), *with* Guzman, *supra* note 10, at 1832 n.30 (suggesting otherwise: "the core of the managerial model is clarity and communication ex ante to prevent conflict. In contrast, the reputational model considers how sanctions, applied ex post, affect the compliance decisions

As the previous section shows, States recognize *ex ante* not only that they face noncompliance risks as traditionally conceived (defection based on incentives presented in the iterated prisoners' dilemma context, for example) but also that dynamic change may threaten the stability of the game.[185] Accordingly, *ex ante*, States design institutions to implement strategies directed not only at monitoring State behavior and altering payoffs based on observed behavior (i.e., decision to cooperate or defect), but also to maintain cooperation in the face of dynamic change. States create institutions to reduce uncertainty and transaction costs associated with such change and to adjust commitment levels, payoff structures, or other institutional features in future iterations. In some cases, such institutions may facilitate internal change and maintain regime stability by relieving parties of the need to return to the bargaining table every time the game structure changes.[186]

While compliance strategies may be grouped and classified in a number of different ways,[187] the theory developed in this article suggests that compliance strategies may be analyzed based on the aspect of the game targeted by the strategies. Specifically, compliance strategies may target (1) expected payoffs, or the payoff structure itself

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of self-interested states."), *and* YANG, *supra* note 10, at 27-28. Yang suggests, in similar fashion as Guzman, that positive incentives and other managerial-approaches to promoting compliance must be treated distinctly from negative incentives because the former occur in the bargaining stage (*ex ante*) and the latter occur in the enforcement stage (*ex post*). *See id.* This view fails to account for the dynamic nature of the process: first, the threat of sanctions act as a deterrent *ex ante* (*i.e.*, prior to an incidence of noncompliance) even though sanctions must be applied *ex post*; and second, positive incentives are often contingent on compliance over time (and thus become a factor *ex ante* and *ex post*). Yang does seem to suggest that legislative agreements may involve a more complicated, dynamic process. *See id.* at 34-36 (discussing norm cultivation, regulatory regime creation, and regulatory oversight).

185. Dynamic change may lead to enforcement-oriented or management-oriented problems, or may prompt parties to reconsider the initial agreement itself. *See infra* Part II.E.3 (listing a few examples of exogenous events that may dynamically change the game structure).

186. *See* Abbott & Snidal, *supra* note 67, at 3, 8, 11-12, 15, 17, 22.

187. *See, e.g.*, ENGAGING COUNTRIES, *supra* note 10 (three strategies are positive incentives, negative incentives and sunshine); *see also* Knox, *supra* note 12 (discussing adjudicatory model and managerial model). The three strategies discussed by Brown Weiss and Jacobson—positive incentives, negative incentives and sunshine methods—are all incentive-based, payoff-altering strategies (Type I). For an interesting classification of mechanisms used to globalize regulation, see BRAITHWAITE & DRAHOS, *supra* note 7, at 532-49.

("Type I strategies"); (2) the cooperation-inhibiting factors, such as transaction costs and uncertainties, that are not contingent upon the decisions of players ("Type II strategies"); and (3) dynamic adjustment (reframing and reforming) of the game in response to exogenous events unrelated to the decisions of players ("Type III strategies").

1. *Type I Strategies—Altering Incentives by Targeting the Payoff Structure.* Through Type I strategies, States seek to reduce the risk of intentional noncompliance. States directly target the payoff structure (and thus, players' incentives) by making concessions or side-payments to encourage cooperation and offset the perceived benefits of defection ("positive incentives") or by committing parties to retaliate against defection through some form of sanction ("negative incentives").[188] Positive incentives tend to influence both national capacity and national intent, for example, by lowering the costs of implementation, while negative incentives tend to influence only national intent. Where a potential participant lacks the capacity to cooperate, positive incentives become an essential ingredient in the mix of institutional mechanisms incorporated into an agreement or negotiated on the side. Importantly, the promise of side-payments (or the threat of sanction) itself effectively adjusts the expected payoffs and thus acts as an inducement (deterrent). Thus, both positive and negative incentives are aimed at making compliance with commitments more attractive than noncompliance from an *ex ante* perspective. This is the basic insight from game theory that informs institutional analyses: institutions facilitate cooperation where they adjust the *expected* payoff structure and thus the incentives to cooperate/defect.[189]

188. Negative incentives, or sanctions, are generally associated with the enforcement-oriented approach to compliance where parties are "coerced" into compliance and deterred from noncompliance through the (threatened) use of force, or power, as punishment. *See* YANG, *supra* note 10, at 10-13 (discussing the concept of enforcement). Positive incentives are generally associated with the management-oriented approach to compliance where cooperation is facilitated by financial or technical assistance. As noted in the previous note, both types of incentive-based mechanisms target the payoff structure. *See* Mitchell & Keilbach, *supra* note 84, at 891-92.

189. Adjusting the payoff structure also may be aimed at making the distribution of net payoffs equitable in the eyes of participants. For example, institutional mechanisms that redistribute gains may lessen the risk of forced

Generally, incentive-based strategies depend on compliance over time, and a necessary component to the success of such strategies is information regarding the parties' performance.[190] To facilitate such strategies, States may develop monitoring systems to improve the likelihood that cheating will be detected, thereby also adjusting the *expected* payoffs.[191]

An important source of information regarding State behavior is the State itself. For example, most international

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renegotiation through holdout strategies. If joint cooperation between A and B is expected to yield a payoff of 20 to A and 4 to B for each iteration of the game, B may threaten to defect (even if B seemingly has a dominant strategy to cooperate, as in a Harmony game) in order to force A to renegotiate and share "more equitably." In such a situation, it may be in both parties' interest to work something out *ex ante* and thereby avoid holdouts, renegotiations, and associated transaction costs in the future. *See* Jacobson & Brown Weiss, *Assessing the Record and Designing Strategies to Engage Countries*, *in* ENGAGING COUNTRIES, *supra* note 10, at 511, 528 (see Table 15.3 listing "perceived equity of the obligations" in a treaty as an important characteristic for compliance analysis); Mitchell & Keilbach, *supra* note 84, at 892 ("The distribution of costs and benefits in asymmetric externalities makes actors reluctant to join an institution and encourages them to violate institutional rules if they do, suggesting that distribution problems are not always separable from, and indeed sometimes drive, enforcement problems.").

190. Although generally associated with a negative incentive strategy (i.e., enforcement-oriented approach), detecting noncompliance is essential under a positive incentive compliance strategy as well. A stream of positive incentives (e.g., financial support, technology transfer, etc.) over the course of many rounds of play may be contingent on compliance, such that detected noncompliance would stop the flow of benefits or at least initiate a facilitative response aimed at bringing the party into compliance. *See* Chayes et al., *Managing Compliance: A Comparative Perspective*, *in* ENGAGING COUNTRIES, *supra* note 10, at 39, 53 (describing conditional assistance). For example, funds made available to States by the Global Environment Facility to facilitate compliance with the Montreal Protocol on Substances that Deplete the Ozone Layer have been contingent on compliance with reporting obligations. *See* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 17-18.

191. *See, e.g.*, Abbott, *supra* note 18 (analyzing informational arrangements); Ibrahim F.I. Shihata, *Implementation, Enforcement, and Compliance with International Environmental Agreements—Practical Suggestions in Light of the World Bank's Experience*, 9 GEO. INT'L ENVTL. L. REV. 37, 37 (1996) (describing "international networks for diffusion of information, verification, and monitoring" as enforcement tool); *see also* Abbott & Snidal, *supra* note 67, at 20 (describing the role of international organizations as neutral information providers); *id.* at 26-27 (describing in more detail the role of international organizations in the enforcement process). For an analysis of institutions that monitor treaty implementation and compliance, see Kal Raustiala, *Police Patrols, Fire Alarms and Treaty Compliance* (Working Paper, June 2003) (on file with author).

environmental agreements that have a monitoring system rely on national reporting. Like the substantive obligations undertaken by States, reporting obligations similarly raise compliance problems. That is, States do not always provide full and accurate reports. Of course, this is not surprising. What distinguishes one monitoring system from another is the degree to which the information can be verified and reviewed.[192] Beyond national reporting obligations, international monitoring systems can be designed in many different ways ranging from the creation of a formal intergovernmental organization ("IGO"), delegation of monitoring responsibilities to an existing organization (IGO or NGO), or other institutional mechanisms. The scope of monitoring responsibilities delegated to an organization may vary considerably.[193] For example, parties may limit the scope to gathering information and disseminating information to the parties and/or the public generally. Or parties may expand the scope to include a more substantive role in assessing and verifying compliance. Informal monitoring may also arise independently through the actions of NGOs or other private parties. For example, in the trade context, importers and exporters regularly monitor State actions as a necessary consequence of doing business. In the environmental context, environmental NGOs also play an important role by voluntarily monitoring the compliance of States with their international commitments and by publicizing reports of noncompliance.

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192. *See, e.g.*, Abbott, *supra* note 18 (analyzing informational arrangements); Raustiala, *supra* note 191 (same); *see also* Chayes et al., *Managing Compliance: A Comparative Perspective*, *in* ENGAGING COUNTRIES, *supra* note 10, at 39, 46 (discussing self-reporting and noting Panama's deliberate misreporting of kills to the International Whaling Commission and the increased use of independent reporting and verification as a means of avoiding the "'self-incrimination' problems inherent in [self-reporting] systems").

193. As Helfer explains:

> Levels of delegation in human rights instruments are also extremely diverse. Most human rights treaties contain their own independent monitoring mechanisms to review states' compliance with their international commitments. These mechanisms take many forms, ranging from fully adversarial courts to nonadversarial managerial bodies, with many gradations in between. A large number of treaties contain some kind of judicial or court-like procedure for individuals and private parties to bring complaints alleging violations of their treaty rights against governments.

Helfer, *supra* note 11, at 1841.

Transparency requirements further assist compliance monitoring. For example, pursuant to GATT Article X, WTO members must publish laws, regulations, judicial decisions and administrative rulings of general application that pertain to classification, valuation, duty rates, taxes or other charges or requirements, restrictions or prohibitions on import or export; or that affect the sale, distribution or transportation, insurance, warehousing, processing mixing or other use of products.[194] Professor Reichman describes how, under TRIPs, a "rule of transparency" "makes all countries aware of the risks of non-compliance with the black letter rules by rendering it difficult to avoid detection of non-conforming laws," which facilitates a managerial approach to avoiding potential compliance problems, and "also reveals disputes that cannot be settled by herbal tea, by consultation or mediation, and for which states may logically turn to the dispute settlement procedures of the DSU."[195]

2. *Type II Strategies—Facilitating Cooperation by Reducing Transaction Costs and Uncertainty*. Through Type II strategies, States seek to reduce transaction costs and uncertainty that inhibit cooperation. In contrast with Type I strategies, the focus is on reducing the risk of unintentional noncompliance due to capacity problems, ambiguity regarding what constitutes compliance, and changing circumstances.[196] Nonetheless, with respect to reducing transaction costs, there is some overlap with the positive incentives component of Type I strategies. The impetus behind capacity-building programs may be facilitative and premised on the managerial belief that States have a propensity to comply, and at the same time, such programs affect incentives, especially when financial, technical, or other support is contingent upon compliance.

194. General Agreement on Tariffs and Trade, Oct. 30, 1947, art. X, 61 Stat. A-11, 55 U.N.T.S. 194 (entered into force Jan.12, 1948) [hereinafter GATT].

195. *See* J.H. Reichman, *The TRIPs Agreement Comes of Age: Conflict or Cooperation with the Developing Countries?*, 32 CASE W. RES. J. INT'L L. 441, 445 (2000).

196. *See, e.g.*, Aceves, *supra* note 59, at 243-45 (describing how institutions may reduce transaction costs); *id.* at 250-51 (describing how institutions may reduce uncertainty); *see also* Abbott & Snidal, *supra* note 67, at 8, 12, 15-17, 22 (describing how IOs may reduce transaction costs).

With respect to reducing uncertainty, there may seem to be an overlap with the informational component of Type I strategies; however, Type II strategies should be viewed more broadly than compliance monitoring (in the assurance and verification sense).[197] For example, States often create organizations, such as a secretariat, to coordinate information gathering, information sharing, communications among parties, and other activities that facilitate cooperation and reduce uncertainties associated with problem identification, possible solutions, payoffs, time horizons, and other variables that affect States' willingness and capacity to participate in negotiations in the first instance, to comply with commitments undertaken in a negotiated agreement, and to continue to cooperate more broadly (beyond express commitments) as the regime evolves.[198] Institutionalizing this strategy may lessen the risk of sudden dynamic change triggered by exogenous events. Depending on the issue area, it may facilitate renegotiation in a new bargaining stage or the operation of institutions implementing a Type III strategy (discussed below).[199]

Consider, for example, the role of an adjudicative (or legalistic) dispute settlement institution. In addition to

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197. For analysis of informational arrangements that implement Type I strategies, see Abbott, *supra* note 18; see also Frischmann, *supra* note 43, at 484-89 (considering functions and design options for an international monitoring institution).

198. *See, e.g.*, David G. Victor et al., *Systems for Implementation Review*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 47-53 (describing Systems for Implementation Review as a series of activities that serve these Type II functions); Chayes et al., *Managing Compliance: A Comparative Perspective*, *in* ENGAGING COUNTRIES, *supra* note 10, at 39, 58-61 (discussing the role of IGOs, including secretariats, and NGOs in performing Type II functions); James Salzman, *Labor Rights, Globalization and Institutions: The Role and Influence of the Organization for Economic Cooperation and Development*, 21 MICH. J. INT'L L. 769, 835 (2000) (discussing the Organization for Economic Cooperation and Development and other IGOs that perform Type II functions); Abbott & Snidal, *supra* note 67, at 8, 12, 15-17, 22 (discussing role of various secretariats and other international organizations that perform these functions).

199. *Cf.* Abbott & Snidal, *supra* note 67, at 10 ("An established international organization provides a stable negotiating forum, enhancing iteration and reputational effects. Such a stable forum also allows for a fast response to sudden developments."); Rosendorff & Milner, *supra* note 149, at 834 ("In the presence of exogenous shocks, international institutions may be much better served by allowing countries to make temporary, ad hoc use of escape clauses that permit them to break the rules for a short period and pay a cost to do so.").

facilitating a payoff-altering, incentive-based strategy by "generat[ing] information about [particular] instance[s] of defection" and providing a basis for imposing sanctions,[200] an adjudicative dispute settlement institution may reduce uncertainty regarding the interpretation, scope, and applicability of various obligations and exceptions within a treaty as the regime evolves.[201] As stated by James McCall Smith,

> In new economics of organization terminology, dispute settlement operates in this respect as a type of relational contract. Because the parties to [an international] agreement cannot foresee all possible contingencies, they find it very difficult *ex ante* to define compliance. The accord they negotiate is inevitably incomplete; it does not specify how the parties are to behave under all possible circumstances. As circumstances change, conflicts of interpretation may arise, potentially jeopardizing the treaty. To avoid such conflicts, parties agree in relational contracts to assign rights and responsibilities to define compliance, a role that [international] accords [sometimes] confer on impartial third parties.[202]

Essentially, to the extent that the line between compliance and noncompliance itself is blurry, adjudicative institutions (and other institutions performing the same function) identify problem areas, provide useful guidance and reduce uncertainty for future iterations.[203] As seen below, this appears to be the primary function of the legalistic, adjudicative approach taken in the multilateral trading regime.[204] Furthermore, there may be an important value associated with the expression of evolving legal norms through such institutions.[205]

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200. McCall Smith, *supra* note 149, at 146.

201. *See, e.g.*, *id.*; Aceves, *supra* note 59, at 245; *see also* Chayes & Chayes, *supra* note 106, at 190-92 (discussing treaty ambiguity).

202. McCall Smith, *supra* note 149, at 146.

203. *See generally* CHAYES & CHAYES, *supra* note 5, at 201-25 (analyzing various types of dispute settlement institutions). Of course, this function need not be performed by an adjudicative institution. Instead, for example, a panel of experts may address technical or legal uncertainty in a nonadversarial process. *See infra* notes 415-26 and accompanying text (describing how the Technology and Economic Assessment Panel and the Non-Compliance Procedure perform this function in the Ozone regime).

204. *See infra* Parts III.A.2.a.ii & c.ii (analyzing the dispute settlement process in GATT and WTO).

205. *See* Abbott & Snidal, *supra* note 67, at 25; Elizabeth S. Anderson &

3. *Type III Strategies—Maintaining Cooperation by Adjusting Commitment Levels, Payoff Structures, or Other Institutional Features.* Finally, States may adopt Type III strategies by incorporating institutional mechanisms for dynamically adjusting commitment levels, payoff structures, or other institutional features.[206] Once commitments are undertaken and an expected payoff structure is in place, States may find it necessary to do more than reward compliance or punish noncompliance. The underlying commitments may need to be relaxed, made more stringent, or changed completely depending on the circumstances.[207] Particularly where the number or identity of participants is important or where the expected benefits of cooperation in future rounds outweigh comparable benefits in a current round, parties may prefer to forgive a party's noncompliance and readjust the party's commitments in a manner that improves the likelihood that it will comply in

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Richard H. Pildes, *Expressive Theories of Law: A General Restatement*, 148 U. PA. L. REV. 1503 (2000).

206. *See* BROWN WEISS ET AL., *supra* note 134, at 186 (discussing "living treaties" and the "devices" "written into a particular treaty" that enable the treaty to change); Chayes et al., *Managing Compliance: A Comparative Perspective*, *in* ENGAGING COUNTRIES, *supra* note 10, at 39, 49 (managerial model of compliance involves "adjusting the rules to improve regime performance"); *id.* at 56-58 (discussing various approaches to adjusting commitments); Chayes & Chayes, *supra* note 106, at 184 ("Treaties that last must be able to adapt to inevitable changes in the economic, technological, social, and political setting."); *id.* at 195-97 (discussing the temporal dimension); Koremenos et al., *supra* note 94, at 793-94 (recognizing that unforeseen developments may prompt parties to reconsider or revisit an agreement); Rosendorff & Milner, *supra* note 149 (same); Victor et al., *Systems for Implementation Review*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 47, 49 (explaining how Systems for Implementation Review "contribute to assessing the adequacy of commitments," and arguing that "[s]uch assessments may lead to the dynamic adjustment (and expansion) of commitments"). International relations scholars describe this strategy in terms of flexibility. *See* Koremenos et al., *supra* note 94, at 793-95; Rosendorff & Milner, *supra* note 149, at 834 (analyzing the use of escape clauses in trade agreements as a "flexibility-enhancing device" and noting that escape clauses add flexibility to an agreement that might be difficult to sustain in the presence of uncertainty).

207. *See* Helfer, *supra* note 11, at 1854; Smith, *supra* note 59. During the formation stage where parties negotiate over the content of the law, the level of commitments, and the creation of compliance institutions, the inclusion of a series of exceptions to substantive commitments serves a similar purpose. *See* Sykes, *supra* note 149, at 281-82, 286-87 (analyzing the economics of GATT escape clause jurisprudence); Rosendorff & Milner, *supra* note 149 (modeling how States design escape clauses).

the future.[208] Furthermore, as Alan Sykes has argued persuasively with respect to the "escape clause" in GATT, the inclusion of such institutions in an agreement may facilitate bargaining over substantive commitments in the formation stage.[209]

Notably, such mechanisms are not always responsive to concerns over opportunism. States may create institutions to facilitate the adjustment of commitments (or other aspects of the agreement) for the purpose of attaining collective goals without having to reform a new agreement.[210] Such adjustment may be accomplished through structured bargaining conventions, as in the case of ratcheting down tariffs in the GATT/WTO regime,[211] or through institutional mechanisms delegated authority to adjust commitments in a less formal manner, as in the case of ratcheting up production and consumption limitations for ozone-depleting substances.[212] Interestingly, as discussed below, both the GATT/WTO system and the Ozone regime work toward their respective goals of liberalized trade and significantly limited consumption of ozone-depleting substances by successive ratcheting of commitments made possible through institutional mechanisms. In both cases, the parties anticipated dynamic change and chose to

208. *See infra* Part III.B (examples in the Ozone regime); *cf.* Rosendorff & Milner, *supra* note 149, at 834 ("In the presence of exogenous shocks, international institutions may be much better served by allowing countries to make temporary, ad hoc use of escape clauses that permit them to break the rules for a short period and pay a cost to do so. There is no retaliation."); CHAYES & CHAYES, *supra* note 5, at 105 (discussing "possible future costs" of retaliation against a defector).

209. GATT art. XIX (permitting member States to suspend GATT obligations when increased imports "cause or threaten serious injury to domestic producers of . . . competitive products . . . to the extent and for such time as may be necessary to prevent or remedy such injury."). *See* Sykes, *supra* note 149 (analyzing GATT art. XIX); *see generally* Rosendorff & Milner, *supra* note 149 (analyzing the use of escape clauses in trade agreements).

210. Chayes and Chayes refer to these institutions as "the less cumbersome 'nonamendment amendment' devices devised by modern treaty lawyers." CHAYES & CHAYES, *supra* note 5, at 7.

211. *See infra* Part III.A.2.

212. *See infra* Part III.B.2; *see also* sources cited *supra* note 146 (discussing voting rules).

participate in an evolving game rather than a series of iterated games.[213]

Furthermore, beyond adjusting commitment levels, States may wish to modify existing institutions or create new ones as necessary to respond to unforeseen developments. Of course, States may hesitate to delegate the power to make such "adjustments" as a general matter, but they also may hesitate when contemplating the prospect of repeated multilateral negotiations over institutional details, particularly in an issue area where States expect a significant degree of dynamic change and the expected bargaining costs are high.[214]

* * *

This part developed a dynamic institutional theory of international law. The theory extends the traditional game theory model of iterated games in an attempt to explain the class of international institutions focused not on deterring opportunism—intentional, strategic noncompliance—but rather on sustaining cooperation in the face of dynamic change. States rationally decide to create institutions to implement Type II and Type III strategies based on a realistic conception of the dynamic process of international cooperation, which the iterated game theory model fails to capture. The dynamic institutional theory provides a rational choice bridge between the enforcement and managerial theories of compliance that arguably removes the need to choose one school of thought over the other as a matter of principle and allows the choice of enforcement-oriented or management-oriented strategies to be context-driven.[215] As this part has necessarily been rather abstract in setting forth a general theory, the next part applies the theory and demonstrates its utility for evaluating compliance system design.

213. Of course, as discussed below, the transition from GATT to WTO involved a transition from one evolving game to another. *See infra* Part III.A.2.B.

214. *See* sources cited *supra* notes 161-62.

215. As noted above, the dynamic institutional theory also provides a more coherent bridge between game theory and regime theory. *See supra* note 130.

III. APPLYING THE DYNAMIC INSTITUTIONAL THEORY TO INTERNATIONAL TRADE AND INTERNATIONAL ENVIRONMENTAL REGIMES

This part applies the dynamic institutional theory set forth above to two regimes: the GATT/WTO regime within international trade law, and the "Ozone regime" within international environmental law. Rather than exhaustively survey the substance of both fields, the purposes here are to (1) illustrate the applicability of the theoretic framework for interdisciplinary analysis of international legal regimes generally and (2) shed light on the compliance strategies and institutions involved in these particular regimes. Analysis of the strategic considerations in international trade and international environmental regimes provides important insights into the choices made regarding compliance strategies.

A. *International Trade Law and the GATT/WTO Regime*

This section begins by analyzing the interdependency problem motivating international cooperation in the area of international trade. This first step is important because the nature of complex interdependency problems often shapes the institutions created by States to facilitate cooperative solutions.[216] The section then describes the basic contours of both the GATT regime and the WTO regime, and analyzes the relevant compliance strategies and institutions. Attention is also given to the manner in which the GATT regime evolved into the WTO regime.

1. *The Underlying Interdependency Problem and the Need for International Cooperation.* Since World War II, the level of economic interdependence among nations has increased dramatically and national economies have

216. *See* Mitchell & Keilbach, *supra* note 84, at 891-904 (analyzing the relationship between "situation structure" and institutional design); Raustiala & Slaughter, *supra* note 12, at 545 ("[T]he nature of the necessary . . . institution[s] flows from the nature of the underlying problem: the type and degree of cooperation that must be achieved."); Snidal, *supra* note 18 (considering different institutional arrangements that should be expected for different problems).

become increasingly dependent on international trade.[217] International trade is understood to be a positive, welfare-enhancing activity that benefits both importing and exporting States.[218] Essentially, the argument in favor of international trade can be simplified as follows: (1) competitive markets are generally the most efficient way to provide private goods to consumers; (2) international trade simply involves competition between domestic and foreign firms in domestic markets; (3) government-imposed restrictions on international trade—whether tariffs, subsidies, quotas, or regulatory measures—artificially raise the costs of foreign firms, reduce the scope of entry and reduce competition; and (4) removing existing restrictions on international trade makes markets more competitive, is generally efficient, and is thus economically desirable.[219]

It is well-understood that international cooperation on trade liberalization is needed because of the conflict

217. *See, e.g.*, JACKSON ET AL., *supra* note 27, at 6-7; Helen V. Milner, *International Trade*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS 448, 448-50 (2002).

218. Liberal economists argue that assuming competitive markets, the absence of production or consumption externalities, and the absence of economies of scale, unrestricted international trade maximizes global welfare for a fixed quantity of resources and technology due to efficient specialization. *See, e.g.*, JOHN H. JACKSON, RESTRUCTURING THE GATT SYSTEM 9-14 (1990) [hereinafter JACKSON, RESTRUCTURING]; EDWIN MANSFIELD, ECONOMICS: PRINCIPLES, PROBLEMS, DECISIONS 357-58 (7th ed. 1992); PETER H. LINDERT, INTERNATIONAL ECONOMICS 15-39 (9th ed. 1991); YARBROUGH & YARBROUGH, *supra* note 166, at 357-58. Even when the aforementioned assumptions are relaxed, the argument goes, the case for unrestricted international trade generally remains quite strong because of the dynamicism of markets. As natural barriers to international trade become less formidable – for example, when technological advances lead to reductions in transportation and/or communication costs or when cultural differences are overcome through increased social interdependency and relationship building – foreign entry into non-competitive markets may challenge incumbents and lead to the development of competitive markets over time. Moreover, the possibility of such a dynamic serves as an incentive to invest in technologies and social relations that facilitate international trade.

219. Of course, this analysis breaks down at the same points that traditional arguments in favor of "the market" or against "government intervention into the market" break down. As the analysis generally goes for government intervention into domestic markets, the presence of positive or negative externalities may justify government action aimed at encouraging or discouraging production or consumption. *See generally* ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS 40-41 (2d ed. 1997); W.H. Oakland, *Theory of Public Goods*, *in* 2 HANDBOOK OF PUBLIC ECONOMICS 485, 486 (Auerbach et al. eds., 1987); OLSON, *supra* note 99.

between efficiency gains associated with minimizing artificial government-made barriers to foreign competition ("liberalization") and the political gains associated with protecting domestic industry from foreign competition ("protectionism"). Ignoring the transaction and adjustment costs, trade liberalization can be seen as a positive sum game. Classic economic theory suggests that States, acting in their own individual self-interest, would unilaterally liberalize trade (i.e., adopt a cooperative strategy regardless of what others do) and make the whole world better off while doing so.[220] The primary explanation for why this behavior does not occur,[221] and why domestically-constructed barriers to trade persist, is typically associated with the distributional consequences of liberalizing trade. Liberalizing trade provides dispersed benefits, such as lower prices to consumers, at concentrated costs to domestic industries that are hurt by competition. Under this view, the "political economy of trade" biases domestic policy away from trade liberalization and towards protectionism because politicians may maximize the sum of social welfare and campaign contributions (and other personal payoffs), rather than simply maximize social welfare.[222]

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220. *See, e.g.*, Milner, *International Trade*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 217, at 448 ("The central theoretical conclusion of the [economics] field, of course, has been that free trade is the best policy for most countries most of the time. Thus economists have puzzled over why, given this finding, countries invariably employ at least some protectionist policies."); Sykes, *supra* note 149, at 260-61 (discussing the classical economic theory of trade policy that "[t]he purported source of net gains to the international community (and to the importing nation) lies with the eventual emergence of efficient competitors"). In the presence of adjustment costs, liberalizing trade may lower social welfare in the short run; thus, States with a high discount factor seeking to maximize social welfare may decide not to liberalize trade.

221. *See* YARBROUGH & YARBROUGH, *supra* note 166, at 56-61 (explaining that in the mid-Nineteenth century, Britain adopted a unilateral trade policy of liberalization but suggesting that such a policy is not viable "[o]nce relation-specific investments enter the picture."). *Cf.* Milner, *International Trade*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 217, at 448 ("Since the 1970s countries across the globe have adopted freer trade policies. Many lesser developed countries, like Mexico, India, Poland, Turkey, Ghana and Morocco, have chosen to unilaterally liberalize their trade policies.").

222. *See* Milner, *International Trade*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 217, at 448-49. As Yarbrough and Yarbrough explain, various theories have been developed to explain the trade liberalization-protectionism paradigm and the conditions under which States adopt certain policies and institutional arrangements. *See* YARBROUGH & YARBROUGH, *supra*

Economists have also pointed out that, in certain special cases, strategic trade policy may encourage protectionist measures as a means to obtain/retain market dominance in imperfectly competitive, winner-take-all markets. Consider, for example, the simple illustration presented by Paul Krugman.[223] Krugman explains how in a winner-takes-all game, where the stakes are high, States may find it in their best interest to subsidize (or otherwise provide a regulatory benefit to) a domestic producer with a chance at the stakes. Krugman uses the example of Boeing and Airbus and suggests that the hypothetical payoff structure absent government intervention would be as follows:

(1) If both companies produce a particular plane, each company receives a payoff of -5.
(2) If neither company produces, each receives a payoff of 0.
(3) If one company produces and the other does not, then the producer receives a payoff of 100, while the other receives a payoff of 0.

There is not a unique solution to this game; if one company was able to decide first, it would choose to produce

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note 166, at 7-13. The neoclassical economic explanation of the liberalization-protectionism paradigm supposes that States balance efficiency gains from trade against distributional concerns. *Id.* at 7-9. Business cycle theories suggest that States will liberalize trade when unemployment is low (or when the economy is booming), but will revert to protectionism when unemployment is high (or in times of contraction). *Id.* at 9-10. Political power theory focuses on the political power of gainers and losers from liberalized trade. *Id.* at 10-11. Hegemony theory focuses on the power of a single powerful nation (a hegemon) to coerce or entice liberalization. *Id.* at 12. And there are others. *See, e.g.*, Milner, *International Trade*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 217, at 450-53 (discussing various theories). Each theory has its advantages and disadvantages, but none fully explains the institutional form that accompanies trade liberalization.

Yarbrough and Yarbrough apply a strategic organizational approach to the problem of institutional form and argue that the degree to potential opportunism between trading parties (i.e., the risk of intentional noncompliance) and the effectiveness of third-party mechanisms for enforcing commitments influences the institutional form. *See* YARBROUGH & YARBROUGH, *supra* note 166; *see also* DOWNS & ROCKE, *supra* note 114, at 76-104 (analyzing how uncertainty about domestic interest group demands affects institutional design).

223. Paul R. Krugman, *Is Free Trade Passé?*, 1 ECON. PERSP. 131-44 (1987), *reprinted in* JACKSON ET AL., *supra* note 27, at 24-29.

and then the other would not. Absent a head start, it is essentially a race between the companies to commit to producing in order to discourage the other company from doing so. Krugman explains through his example how a subsidy of ten from Europe to Airbus would adjust the payoff matrix, give Airbus a dominant strategy to produce (regardless of what Boeing decides, Airbus is better off producing), and thereby deter Boeing from producing, provided, of course, that Boeing is made aware of the altered payoff structure.[224] Thus, with government intervention, the following payoffs are expected:

(1) If both companies produce, Airbus receives 5 while Boeing receives -5.
(2) If neither company produces, each receives 0.
(3) If Airbus produces and Boeing does not, Airbus receives 110 while Boeing receives 0.
(4) If Boeing produces and Airbus does not, Boeing receives 100 while Airbus receives 0.

Thus, for a cost of 10, Europe may help secure the surplus for domestic industry. Of course, in reality, both Europe and the United States are capable of, and have the incentive to, subsidize their respective producer. Action by Europe is likely to spur retaliation on the part of the United States. Much like the race to commit first that the companies would find themselves in without a head-start, the States similarly may find themselves in a race to subsidize, or even a trade war.[225] Such a dynamic is particularly troublesome economically where the game is iterated and the companies (and host States via protectionist measures) are competing for a dominant market position.

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224. *Cf.* Suasion game, discussed *supra* Part II.B.

225. A race to subsidize would involve competition between governments in "investments" made in a particular industry (or company) to secure a dominant market position in an international market. Government "investment" may take many forms, e.g., direct subsidies, tax subsidies, procurement advantages, etc. To the extent that a domestic market constitutes a major portion of the international market, a race to subsidize may involve protectionist measures, e.g., tariff and/or non-tariff barriers. A trade war (narrowly defined) would involve retaliation (rather than "subsidy competition"), which may be accomplished through trade sanctions in a separate, unrelated market (e.g., automobiles rather than airplanes).

The importance of this simple strategic trade policy example is that it illustrates first, a situation in which protectionist policy may be in the national interest (by "securing" a surplus for domestic industry with attendant jobs and tax revenue at a "small" cost), and second, additional impetus for international cooperation in order to avoid wasteful "races to subsidize" and potential trade wars.[226]

A third reason why States do not unilaterally tear down all domestic barriers to international trade is that some domestic measures that act as barriers, in the sense that the measures impose "artificial" (government-induced) costs on foreign firms, are directed at legitimate domestic ends.[227] It is well-understood that domestic "intervention" into the market is (economically and socially) justified where positive or negative externalities (or other forms of market failure) are prevalent.[228] Basically, where markets fail (e.g., to produce public goods), the government is legitimately

226. The simple strategic trade policy example discussed above can be expanded into a more complex, theoretical argument for government promotion of particular industries that generate positive externalities and for government measures aimed at ensuring that the surplus thereby created is captured domestically. Research and development ("R&D") intensive industries are a prime example. *See, e.g.*, Gene M. Grossman & Elhanan Helpman, *Trade, Innovation and Growth*, 80 AM. ECON. REV. 86, 86-91 (1990); *see also* Brett Frischmann, *Innovation and Institutions: Rethinking the Economics of U.S. Science and Technology Policy*, 24 VT. L. REV. 347, 407-11 (2000) (discussing the Bayh-Dole Act as a potential U.S. response to foreign free-riding on U.S. government research investments). In a sense, this strategic trade policy argument looks very similar to the basic market failure justification discussed below.

227. *See, e.g.*, Sykes, *supra* note 73, at 46 ("Regulatory measures can have protective effects, however, without constituting 'regulatory protectionism' as defined herein—measures that are nondiscriminatory and are essential to the attainment of some regulatory objective other than protectionism may burden foreign firms.").

228. *See, e.g.*, Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. PAPERS AND PROC. 347, 348 (1967) (Externality is an ambiguous concept that includes external costs, external benefits, and non-pecuniary as well as pecuniary externalities.). Elsewhere, I have argued that the traditional "government intervention into the market" analysis is incomplete and perhaps biased towards market-oriented solutions to public goods, governance, and other social problems. *See* Brett Frischmann, *Privatization and Commercialization of the Internet Infrastructure: Rethinking Market Intervention into Government and Government Intervention into the Market*, 2 COLUM. SCI. & TECH. L. REV. 1, (June 8, 2001) *at* http://www.stlr.org/cite.cgi?volume=2&article=1 (last visited Sept. 18, 2003). I do not develop that analysis here, however.

expected to step in and regulate, tax, stimulate, subsidize or otherwise promote the public welfare.[229] The problem in the international trade context is that, on the one hand, governments take a wide range of actions aimed at achieving legitimate regulatory objectives rather than protectionism, even though the measures may have protectionist effects by giving competitive advantages to domestic firms.[230] On the other hand, governments may mask protectionist measures under the guise of legitimate regulatory objectives for political or strategic reasons.[231] Perhaps the most difficult situation that arises along these lines in the international trade context is where a domestic

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229. For example, national security is an important public good that on one hand may justify particular border measures aimed at inspection and verification of imports and on the other hand may justify particular explicitly protectionist measures aimed at particular defense-related markets. On national security exceptions in the GATT and WTO context, see for example, Dapo Akande and Sope Williams, *International Adjudication on National Security Issues: What Role for the WTO?*, 43 VA. J. INT'L L. 365 (2003); Rene E. Browne, *Revisiting "National Security" in an Interdependent World: The GATT Article XXI Defense After Helms-Burton*, 86 GEO. L.J. 405 (1997); Wesley A. Cann, Jr., *Creating Standards and Accountability for the Use of the WTO Security Exception: Reducing the Role of Power-Based Relations and Establishing a New Balance Between Sovereignty and Multilateralism*, 26 YALE J. INT'L L. 413 (2001).

230. *See* Sykes, *supra* note 73, at 3-5.

231. McGinnis and Movsesian aptly describe the problem in the WTO context as follows:

> The WTO's success in lowering tariffs and prohibiting open discrimination against imports creates pressure for concentrated interests to adopt a more subtle strategy. Because protectionist groups cannot successfully lobby their governments for measures that overtly discriminate against imports, they are likely to make even greater efforts to lobby for substitute measures that covertly accomplish the same end. For example, because protecting the environment, health, and safety is a public good that governments traditionally provide, measures ostensibly aimed at these objectives furnish a particularly useful disguise for the imposition of burdens on competing imports.

McGinnis & Movsesian, *supra* note 20, at 549. *See also* Howard F. Chang, *An Economic Analysis of Trade Measures to Protect the Global Environment*, 83 GEO. L.J. 2131, 2164-65 (1995) (discussing ways in which countries "may abuse environmental trade measures for protectionist reasons"); ESTY, *supra* note 24, at 45 (noting that there is a "danger that environmental regulatory processes will be 'captured' by protectionist interests, who will use environmental standards as a guise for erecting barriers to imports"); McGinnis & Movsesian, *supra* note 20, at 516-17, 572-73 (discussing "covert protectionism" problem); Sykes, *supra* note 73, at 3-4, 17 (discussing the same problem). *But cf.* Driesen, *supra* note 24, at 353-55 (arguing that the concept of protectionism is not very clear and that disguising protectionism is a myth in the environmental area).

regulation addresses a valid non-trade concern and is applied in the same manner to domestic and foreign firms but imposes a significant burden on foreign firms that is not felt by domestic firms (for example, where domestic firms are technologically equipped to meet the burden without any additional incremental cost while foreign firms are not). In the end, the "legitimacy" of domestic measures is difficult to define, much less measure, because it hinges on the motives and objectives of sovereign States.[232]

In framing the trade liberalization game and delineating the underlying problem and potential solutions, it is important to recognize the difficulty that arises in distinguishing between legitimate restrictions and illegitimate (intentionally protectionist) restrictions.[233] It is also important to note that the existence of this difficulty is one further reason for international cooperation on trade liberalization.[234] Unilateralism leaves it to States to individually assess the "legitimacy" of other States' domestic programs and to decide whether to retaliate through similar measures or other means (e.g., unilateral trade sanctions). International cooperation through a legal and institutional framework provides both a set of principles and a forum for assessing legitimacy collectively. Such cooperation may take place within the trade regime, other international regimes, or both. The GATT/WTO regime provides what might be considered, depending on one's perspective, default principles and a forum for assessing the legitimacy of various trade-inhibiting measures.

Although envisioning the "trade liberalization game" through classic economic theory tends to evoke images of a Harmony game where each State has a dominant strategy to cooperate by liberalizing trade with every other State, the political benefits of "defecting" by maintaining or creating barriers to protect domestic industries may transform the game into a Prisoners' Dilemma (or in some instances another mixed-motive game).[235] In the first

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232. *See, e.g.*, McGinnis & Movsesian, *supra* note 20; Sykes, *supra* note 73.

233. *See* discussion of non-tariff barriers *infra* Part III.A.2.b.

234. Hereinafter "liberalization" will refer to the removal of illegitimate restrictions on international trade.

235. In some cases, "trade liberalization" very well may be a "disguised" Harmony game. Like the police officers that misrepresent the payoff structure (*i.e.*, the consequences of their actions) to the prisoners, domestic lobbyists and

instance, trade liberalization is seen as a two-player game because trade barriers, such as tariffs and quotas, tend to be bilateral when actually applied (i.e., the barrier directly affects a foreign firm). In addressing the problem of trade liberalization, States have entered into bilateral, regional and multilateral agreements, linking and integrating two player games. The Most-Favoured Nation principle ("MFN") of the GATT/WTO regime has effectively made international trade a multiplayer game for its members.

The payoff structures across sets of countries vary considerably and are not amenable to simple generalization. It is worth noting, however, that beyond the internal (or domestic) distributional consequences of liberalizing trade, the magnitude of payoffs derived from cooperating to liberalize international trade varies considerably based on differences in, *inter alia*, the size and economic development of potential cooperators, and the existing level and types of restrictions. For example, gaining access to U.S. markets on better terms may be considerably more valuable than gaining equally liberal access to the markets of a smaller or less-developed country.[236] Moreover, as evidenced by the formation of various bilateral, trilateral, regional and other coalitions, the identity of participants in a particular trade liberalization game is an important factor because of the complex economic interdependencies across different sets of countries.[237] Finally, States expect to play the game

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special interests may distort decision-makers' perceptions of the payoff structure. *See supra* note 84. In other words, if politicians sought to maximize social welfare rather than the sum of social welfare and campaign contributions (or other special interest-related payoffs), liberalization might be a dominant strategy, at least for some States.

236. Interestingly, trade negotiations proceed on the basis of exchanging liberalization concessions (e.g., reductions in a particular tariff) where the benefits are seen as increased access to a foreign market for particular domestic industries. Thus, looking at the payoff structure, these concessions may be seen as political benefits that offset the political gains from defection. *See* Kyle Bagwell et al., *It's a Question of Market Access*, 96 AM. J. INT'L L. 56 (2002); Sykes, *supra* note 73, at 24-25. The more diffuse national welfare benefits of cooperating almost seem incidental. *See id.*; *cf.* Sykes, *supra* note 149, at 255 (observing that while the "GATT can largely be justified by sound arguments about the public interest in a liberal trading order, it is best understood with the aid of public choice theory").

237. The economic interdependencies themselves arise not simply from government policies but also from, *inter alia*, social and cultural

indefinitely (cessation of trade relations altogether is not generally foreseeable).[238]

2. *The GATT/WTO Regime.* The most important institutional arrangement of the post-World War II trading system is the GATT/WTO. The GATT/WTO regime is a multilateral regime that originated with the General Agreement on Tariffs and Trade ("GATT"),[239] evolved through many trade rounds, and culminated with the creation of the WTO.[240] The analysis below focuses primarily on the manner in which the regime has evolved with respect to substantive obligations, principles, commitments, and compliance institutions.

a. *The GATT Regime.* The GATT was established shortly after World War II.[241] The Parties agreed to a multilateral cooperative effort generally aimed at liberalizing trade through a series of tariff reductions. Four principles constitute the most important (although by no means exclusive) substantive obligations between Parties. The core principle of the GATT system, set forth in article II, is that Parties will not charge a tariff for a particular product above the level agreed to and set forth in the tariff schedules. To be clear, tariffs themselves are legal, and Parties may charge whatever tariff they like for products

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interdependencies. Such complexities are, however, beyond the scope of this article.

238. *See, e.g.,* Sykes, *supra* note 149, at 279 ("GATT is not a 'single-play' game.").

239. General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A11, 55 U.N.T.S. 194 (entered into force Jan. 12, 1948). "Parties" or "contracting parties" refers to those nations that have acceded to (1) the GATT under the Protocol of Provisional Application; (2) a Special Protocol (Chile, Sept. 1948); or (3) respective Protocols of Accession. Notably, the 1947 GATT has been superceded by the 1994 GATT and is no longer in effect, although GATT commitments continued or were enhanced in the 1994 GATT. The 1994 GATT is essentially the same as the 1947 GATT, although some modifications were made during the Uruguay Round. *See* Marrakesh Agreement Establishing the World Trade Organization [hereinafter WTO Agreement], Annex 1A, Legal Instruments—Results of the Uruguay Round vol. 31, 33 I.L.M. 1226 (1994) (incorporating the 1947 GATT into the WTO). Nonetheless, because the focus of this article is the evolving GATT/WTO regime, the article generally uses the GATT to refer to the operative agreement at a given time and distinguishes between the two agreements only where necessary.

240. For background on the evolution of the GATT/WTO regime, see JACKSON, *supra* note 49; JACKSON ET AL., *supra* note 27, at 208-45.

not listed in the schedules. But once a "tariff binding" has been negotiated for a particular product, Parties are bound to charge at or below that level.[242] This simple obligation provides the institutional foundation for gradually "ratcheting" down artificial barriers to trade through negotiations and reciprocal commitments. Furthermore, it is relatively easy obligation to police for compliance purposes. First, the obligation itself is rather clear and not open for renegotiation[243] or broad interpretation, and the tariff schedules themselves provide a precise, detailed, quantitative baseline for gauging compliance. Second, with respect to detecting noncompliance, "governments and international organizations collect mountains of trade statistics; tariff lists are publicly available; and the possibility of tracing goods through customs exists."[244]

A second principle, set forth in Article I, is General MFN Treatment. This nondiscrimination principle, which "has long been a cornerstone of international trade law,"[245]

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241. On the evolution of the GATT regime, see generally JACKSON, RESTRUCTERING, *supra* note 218, at 9-17; JOHN H. JACKSON, WORLD TRADE AND THE LAW OF GATT (1969) [hereinafter JACKSON, WORLD TRADE]; JACKSON ET AL., *supra* note 27, at 208-45. When negotiated, GATT was intended to be "a subsidiary agreement" under the charter of a broad international organization called the "International Trade Organization" ("ITO"). *See, e.g.*, JACKSON, RESTRUCTERING, *supra* note 218, at 9-17; JACKSON ET AL., *supra* note 27, at 212-14. The GATT was provisionally adopted through a "Protocol of Provisional Application" under the assumption that the Protocol would "fall by the wayside" when the ITO Charter entered into force. *See* JACKSON ET AL., *supra* note 27, at 213; *see also* Shell, *supra* note 59, at 840-41 ("The provisional nature of GATT's early history shaped its dispute resolution processes, which began as a diplomatic system of dispute settlement and gradually evolved into a rule-oriented but formally nonbinding arbitration scheme."). However, the U.S. Senate ultimately rejected the ITO Charter, and it instead fell to the wayside, leaving the GATT in effect. JACKSON ET AL., *supra* note 27, at 213. On the long, "troubled history" of the GATT, see generally *id.* at 211-18.

242. Paragraph 1(a) of Article II of the GATT specifically provides: "Each contracting party shall accord to the commerce of the other contracting parties treatment no less favourable than that provided for in the appropriate Part of the appropriate Schedule annexed to this Agreement." *See* GATT art. II, para. 1(a).

243. The bindings themselves are subject to renegotiation, but the core obligation not to charge a tariff above the relevant binding is not.

244. YARBROUGH & YARBROUGH, *supra* note 166, at 35.

245. Jeffrey L. Dunoff, *Institutional Misfits: The GATT, the ICJ & Trade-Environment Disputes*, 15 MICH. J. INT'L L. 1043, 1049, n.15 (noting that MFN clauses have been included in trade agreements since the twelfth century) (citing STAFF OF SENATE COMM. ON FINANCE, 93D CONG., 2D SESS., THE MOST-

requires that each Party grant to every other Party treatment with respect to any imports and exports no less favorable than it grants to any other nation. Thus, MFN ensures that any trading advantages given by one Party to another nation, whether a Party or not, will also be given to each Party. In essence, this principle "multilateralizes" the trade liberalization game (at least with respect to obligations and negotiations) and provides a significant incentive for non-members to join.[246]

A third principle, set forth in Article III, is National Treatment on Internal Taxation and Regulation. This nondiscrimination principle requires that with respect to internal taxation and regulatory measures, each Party treat imports from other Parties no less favorably than domestically produced goods. Finally, a fourth principle, set forth in Article XI, is that "No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licenses or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party."[247] In essence, these latter two principles, along with a number of other GATT clauses limiting government actions affecting imports and exports, are aimed at restricting measures that could be substituted for tariffs as protectionist tools and at protecting the potential benefits of binding and then reducing tariffs.[248] While the GATT treaty system is extremely complex, incorporating hundreds of agreements, and protocols, incredibly detailed schedules of tariff bindings and many important exceptions,[249] these four

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FAVORED-NATION CLAUSE PROVISION, EXECUTIVE BRANCH GATT STUDY NO. 9 (Comm. Print 1974)).

246. JACKSON, WORLD TRADE, *supra* note 241, at 258 (discussing MFN status as an incentive to join GATT).

247. GATT art. XI, para. 2. Notably, this principle is subject to significant exceptions; for example, the use of quotas to maintain agricultural price support schemes is permissible. *See id.* While the exceptions are an extremely important aspect of the GATT and its evolution as sources of friction, bargaining power, and demand for side-agreements, analysis of the exceptions is beyond the scope of this article.

248. *See* Sykes, *supra* note 73, at 14-17.

249. *See, e.g.*, GATT art. XIX (escape clause allowing temporary use of import restraints when imports cause serious injury to domestic industry); *id.*

principles create the basic institutional framework for multilateral trade liberalization through reciprocal tariff concessions. By most accounts, the framework has been extremely successful in reducing or eliminating tariffs, quotas, and other traditional instruments of protectionism.[250]

i. *GATT Compliance Institutions.* The GATT itself did not set forth a comprehensive, integrated compliance system.[251] It imposed reporting and publication obligations on Parties.[252] In addition to formal obligations, a substantial amount of information is available regarding trade: Governments and international organizations collect "mountains" of trade information,[253] and, most importantly, the experience of importers and exporters naturally exposes barriers to trade.[254]

The GATT compliance system generally relied on the parties to initiate and participate in dispute settlement procedures beginning with consultations and shifting into

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GATT art. XX (health and safety regulation); GATT art. XXI (national security); GATT art. XXIV (allowing customs unions and free trade areas); GATT art. XXV (waiver authority); GATT art. XXVIII (authorizing renegotiation of tariff bindings).

250. *See* Alan O. Sykes, *Domestic Regulation, Sovereignty, and Scientific Evidence Requirements: A Pessimistic View*, 3 CHI. J. INT'L L. 353, 353 (2002).

251. On the GATT dispute settlement system, see Shell, *supra* note 59, at 840-42.

252. For example, Article XVI states:

> If any contracting party grants or maintains any subsidy, including any form of income or price support, which operates directly or indirectly to increase exports of any product from, or to reduce imports of any product into, its territory, it shall notify the contracting parties in writing of the extent and nature of the subsidization, of the estimated effect of the subsidization on the quantity of the affected product or products imported into or exported from its territory and of the circumstances making the subsidization necessary.

GATT art. XVI. Likewise, Article X states that virtually all "[l]aws, regulations, judicial decisions and administrative rulings of general application pertaining to [imports and exports] shall be published promptly in such a manner as to enable governments and traders to become acquainted with them." GATT art. X. On the role of notice, reporting and publication requirements in unveiling regulatory protectionism, see Sykes, *supra* note 73, at 18-23.

253. YARBROUGH & YARBROUGH, *supra* note 166, at 35.

254. *Cf.* Susan K. Sell, *TRIPs and the Access to Medicines Campaign*, 20 WIS. INT'L L.J. 481, 491-92, 517-18 (2002) (discussing how industry actors remain "vigilant in monitoring implementation [of] and compliance" with TRIPs).

arbitration if necessary.[255] The major dispute settlement provision in the GATT was Article XXIII, although other compliance-oriented clauses permeate the treaty text—for example, numerous clauses in the GATT require consultation between parties, permit compensatory withdrawal or suspension of concessions, and delineate exceptions.[256]

Article XXIII requires parties to consult first and in the event that consultations are unsuccessful, "the matter may be referred to the Contracting Parties."[257] "If the Contracting Parties consider that the circumstances are serious enough . . .they may authorize a contracting party or parties to suspend the application to any other contracting party or parties of such obligations or concessions under this Agreement as they determine to be appropriate in the circumstances."[258] Article XXIII does not set forth comprehensive procedures for determining when "circumstances are serious enough to justify such action," or what actions would "be appropriate in the circumstances."[259] Rather, the dispute settlement procedures (in contrast with the substantive rules) evolved over time into a detailed practice where a panel of arbitrators preside over the dispute and issue a report recommended for adoption by the Parties.[260]

Two important aspects of the GATT dispute settlement process significantly limited its effectiveness. First, panel reports (i.e., final decisions of an arbitration panel) were not

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255. *See, e.g.*, JOHN H. JACKSON, THE JURISPRUDENCE OF GATT AND THE WTO 122-23 (2000) [hereinafter JACKSON, JURISPRUDENCE].

256. *See* JACKSON, WORLD TRADE, *supra* note 241, at 163-89; JACKSON, JURISPRUDENCE, *supra* note 255, at 119-20.

257. GATT art. XXIII, para. (2).

258. *Id.*

259. *Id.*

260. *See, e.g.*, JACKSON ET AL., *supra* note 27, at 257; JACKSON, RESTRUCTERING, *supra* note 218, at 56-66. The procedures used were codified in the 1979 Tokyo Round Understanding and subsequently modified through various understandings, interpretations and declarations. *See* Understanding Regarding Notification, Consultation, Dispute Settlement and Surveillance, Nov. 28, 1979, GATT B.I.S.D. (26th Supp.) at 210-14 (1980); 1982 Ministerial Declaration on Dispute Settlement Procedures, Nov. 19, 1982, GATT B.I.S.D. (29th Supp.) at 13-16 (1983); 1984 Action on Dispute Settlement Procedures, Nov. 30, 1984, GATT B.I.S.D. (31st Supp.) at 9-10 (1985); 1989 Improvements to the GATT Dispute Settlement Rules and Procedures, Apr. 12, 1989, GATT B.I.S.D. (36th Supp.) at 61-67 (1989); *see also* ROBERT E. HUDEC, ENFORCING INTERNATIONAL TRADE LAW: THE EVOLUTION OF THE MODERN GATT LEGAL SYSTEM (1993).

adopted by the Parties and thus made "binding" on the participants unless the Parties reached a consensus.[261] The obvious, debilitating result of this rule was that the losing party could block adoption of the report.[262] This veto power restricted the dispute settlement institution's deterrent effect because a party contemplating noncompliance as a strategic decision would know *ex ante* that it could rely on the veto power to avoid a formal finding of noncompliance.

Second, even if a report established, for example, that one party's breach had caused another party's nullification or impairment and the Parties adopted the report, the effect of the report was limited.[263] Specifically, the report would establish the existence of a violation (or situation leading to nullification or impairment) and would require the offending party to bring itself into compliance. As one author notes,

> [t]he recommendations offered by panels under the GATT dispute settlement system sought, first and foremost, cessation of the violation and performance of the primary rule. In cases where the panel found a violation of a substantive provision, it recommended that the respondent cease in its violation by withdrawing the offending measure.[264]

In the event that the offending party failed to do so and the disputants failed to negotiate a compromise solution, the Parties could authorize (again by consensus) the injured State to utilize trade measures to accomplish adequate

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261. *See, e.g.*, JACKSON, WORLD TRADE, *supra* note 241, at 163-89; JACKSON, JURISPRUDENCE, *supra* note 255, at 123.

262. Professor Hudec conducted a study of the actions of "losing" parties from 1947 to 1992 and concluded that the losing party eventually accepted the results of an adverse panel report in approximately ninety percent of the cases. *See* HUDEC, *supra* note 260, at 278.

263. There certainly were other deficiencies with the dispute settlement system created by and developed under the GATT. For example, there was no procedure for appellate review of panel reports. Of course, given the fact that panel reports have no precedential value and the existence of the consensus rule, it is not clear that an appellate body would have been at all useful. Nonetheless, an appellate body has been a crucial element in the successful development of the WTO dispute settlement system. *See infra* Part III.A.2.c.i.

264. Grane, *supra* note 46, at 759.

compensation or retaliation[265] on a *prospective* basis to offset *future* harms from continued noncompliance.[266] An injured

265. In the GATT/WTO context, there is a technical, legal distinction between "compensation" and "retaliation." *See* DSU art. 22; 2 RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE UNITED STATES § 901 (1987); *see also* BROWNLIE, *supra* note 71, at 199-240 (examining in detail the "forms and functions of reparation," i.e., the various remedies for "breaches of duty," under customary international law). A simplified explanation of this distinction is as follows: *Compensation* refers to trade measures implemented by the *noncompliant* party, such as a reduction in existing tariffs, essentially aimed at offsetting the externalized costs associated with its unlawful action; *retaliation* refers to trade measures implemented by the *injured* party, such as the suspension of existing concessions, essentially aimed at offsetting the externalized costs associated with the noncompliant party's unlawful action. Significant complications arise when one analyzes the appropriate aim of such measures under the rules of the dispute settlement system. For example, it is not clear whether compensation or retaliation is limited to some specific measure of externalized cost (e.g., trade effects) or may be broadened to offset more completely the benefits gained by the noncompliant party. The first measure would appear to permit efficient breaches while the latter would not. This issue is beyond the scope of this article, however, and accordingly is left for future work. On the issue of whether the WTO system permits efficient breaches, see Schwartz & Sykes, *supra* note 11. *See also* ETHIER, *supra* note 45, at 5 (Each "country will also be aware, *ex ante*, that it might find, *ex post*, itself in a position where it would [be costly not to comply with its obligations]. This is the *reciprocal—conflict problem*: Each country knows that it might turn out to be either the accuser or the accused. Thus it is in no country's interest, *ex ante*, to agree that, *ex post*, either the accuser should be unconstrained in its ability to punish or the accused should be unconstrained in its ability to proceed without punishment. This generates a role for a dispute settlement mechanism.").

266. *See* JACKSON ET AL., *supra* note 27, at 311-12 (emphasizing that the remedies available under the WTO DSU are determined on a prospective basis) (excerpt from WILLIAM J. DAVEY, WTO DISPUTE SETTLEMENT (2001)); Monika Bütler & Heinz Hauser, *The WTO Dispute Settlement System: A First Assessment From an Economic Perspective*, 16 J.L. ECON. & ORG. 503, 518 (2000) ("Recall that the trade value of the retaliation measures must not exceed the trade value of incurred losses and the complainant gets no retroactive remedy."); Grane, *supra* note 46, at 755-72 (providing a thorough analysis of remedies available under GATT and WTO). On the law of remedies for breaches of international law, see generally Shelton, *supra* note 46, at 855. In a handful of subsidy and countervailing duties cases, however, a panel has recommended retroactive compensation. *See* Grane, *supra* note 46 (analyzing cases). For example, in *New Zealand—Imports of Electrical Transformers from Finland*, the Parties recommended a refund of antidumping duties that were inappropriately collected, but the U.S. blocked adoption of the report. *See* July 18, 1985, GATT B.I.S.D. (32d Supp) at 55-70 (1986). The U.S. later argued that the recommendation was "of an extraordinary retroactive and specific nature." JACKSON ET AL., *supra* note 27, at 309 (quoting GATT Activities 1992, at 40). More recently, in *Australia–Subsidies Provided to Producers and Exporters of Automotive Leather*, a panel recommended that an export subsidy that was deemed WTO-inconsistent could only be "withdrawn" by "full repayment." *See*

party was not authorized to seek compensation for past harms[267] or to implement punitive measures.[268]

This limitation severely constrained the effectiveness of the institution from an enforcement- or deterrence-oriented compliance perspective.[269] The threat of sanction could not adequately alter the expected payoffs for noncompliance from an *ex ante* perspective, where a nation was deciding whether to defect on the basis of the expected payoffs.

Suppose a State was deciding whether to implement a protectionist government measure in conflict with a particular GATT obligation. The expected benefits of noncompliance would depend primarily on the length of

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JACKSON ET AL., *supra* note 27, at 309 n.3 (noting that: (1) the panel report was "quite controversial and heavily criticized at the DSB meeting and (2) there was no appeal because the parties had previously agreed that neither side would appeal) (citing *Australia–Subsidies Provided to Producers and Exporters of Automotive Leather*, WT/DS126/RW (adopted by the DSB on Feb. 11, 2000)).

267. For the purposes of this article, "compensation" generally is used in the ordinary economic sense to refer to the transfer of payoffs from the noncompliant party to the injured party *in an amount equivalent* to the costs imposed upon the injured party. Compare the discussion of remedies, including compensation, in general international law. *See* 2 RESTATEMENT (THIRD) OF THE FOREIGN RELATIONS LAW OF THE UNITED STATES § 901 (1987); BROWNLIE, *supra* note 71, at 222-27; Shelton, *supra* note 46. An important distinction developed in this article is between *prospectively compensatory* and *retroactively compensatory* transfers. Retroactive compensation requires a transfer of benefits from the noncompliant party to the injured party in an amount equivalent to the costs imposed upon the injured party in the past (i.e., prior to the dispute settlement ruling). Prospective compensation, on the other hand, requires a transfer of benefits from the noncompliant party to the injured party in an amount equivalent to the costs to be imposed upon the injured party in the future if the noncompliant party remains in noncompliance. The distinction between these two remedies is important when one considers the incentive effects of each.

268. Notably, the text of Article XXIII does not expressly preclude retroactive compensation or punitive sanctions, but GATT practice generally rejects such measures. *See* Joost Pauwelyn, *Enforcement and Countermeasures in the WTO: Rules are Rules-Toward a More Collective Approach*, 94 AM. J. INT'L L. 335, 337-38 (2000).

269. As described below, the institution primarily served management-oriented functions. Enforcement- or deterrence-oriented functions were accomplished primarily through reputation and unilateral retaliation. *See* Schwartz & Sykes, *supra* note 11, at 179; Downs et al., *supra* note 42, at 395 (suggesting that GATT dispute resolution did not play an overwhelming role in promoting compliance: "far more successful have been the rounds of multilateral negotiations that have operated over time [at ensuring] that certain categories of disputes would reappear less often," but arguing that unilaterally driven enforcement played an "important, if controversial, role in the operation and evolution of the GATT").

time (or number of iterations) that the State could maintain noncompliance without surrendering payoffs thereby obtained if caught.[270] Because the GATT system *first* provided a noncompliant State with the opportunity to bring itself into compliance with no penalty, other than collateral consequences such as a loss of goodwill or reputation and unilateral retaliation,[271] and *second* would withhold benefits only on a prospectively compensatory basis, a State intending to act opportunistically would weigh the expected benefits of defection only against collateral costs that could occur upon detection.[272] Of course, the collateral costs might be quite high in some cases and for some nations.[273] The point here is simply to recognize and emphasize the important, yet unappreciated and

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270. *Cf.* Butler & Hauser, *supra* note 266, at 517-18 (modeling the "implementation stage" that occurs after a negative panel or appellate body ruling and analyzing the strategies of the parties under a similar payoff structure).

271. Of course, these collateral consequences could be quite significant and act as an important deterrent to noncompliance in a vast number of scenarios. *See* Guzman, *supra* note 10, at 1847-51 (modeling the manner in which reputation can affect compliance decisions); Schwartz & Sykes, *supra* note 11, at 193-99, 200-01 (arguing that: (1) formal sanctions were unimportant in encouraging compliance with the GATT; (2) "the incidence of flagrant cheating under the GATT system was indeed quite low;" and (3) "the domestic costs of violations, reputational sanctions for noncompliance, and unilateral retaliation against violators" explain why parties generally complied with their GATT obligations). *But cf.* Jack Goldsmith, *Sovereignty, International Relations Theory, and International Law*, 52 STAN. L. REV. 959, 985 (2000) (asserting that "reputation . . . is a weaker force with nations than with individuals. For example, a reputation for compliance with international norms is not the best means—and certainly not the only means—for a national ruler to accomplish foreign policy objectives.") (book review); Goldsmith & Posner, *supra* note 59, at 1135-39 (examining the role of reputation in explaining compliance with customary international law norms); Robert O. Keohane, *International Relations and International Law: Two Optics*, 38 HARV. INT'L L.J. 487, 496-99 (1997) (analyzing "problem[s] with reputation as a guarantor of compliance").

272. According to Butler and Hauser:

> [T]he preventative power of the WTO dispute settlement system is too limited to discourage new trade restrictions. Even if the probability of winning a case is slim, countries have an incentive to introduce trade restrictions, as rents continue to accrue during the litigation process, and sanctions or compensations for past damages do not exist.

Butler & Hauser, *supra* note 266, at 526 ; *see also id.* at 518 (reaching the same conclusion with respect to parties' behavior after a negative ruling by a panel or the appellate body).

273. *See* Downs et al., *supra* note 43, at 397; Schwartz & Sykes, *supra* note 11, at 179.

overlooked, limitations of the compliance institution as a deterrent to intentional noncompliance. As discussed below, the same institutional limitations persist in the WTO regime, and yet most experts fail to appreciate these limitations and view the WTO dispute settlement institution as a hard-edged, enforcement-oriented institution.[274]

ii. *GATT Compliance Strategies.* On its face, the compliance strategy undergirding the GATT dispute settlement system appears to have been a Type I strategy aimed at the payoff structure, in the sense that it relied on an adjudicative dispute settlement process that authorized an injured party to prospectively withhold benefits that would otherwise flow to the other party.[275] To the extent that one focuses on the GATT dispute settlement institution's capability to effectuate alterations in the *ex ante* incentives to defect, however, the institution appears weak. Besides the difficulty created by the consensus rule, the inability to seek compensation for past harm (much less punitive retribution) severely limited the effectiveness of the institution in deterring intentional noncompliance through alterations in the expected payoff structure.[276]

The most obvious and prevalent reason offered by scholars to explain why the GATT system did not expressly authorize retroactively compensatory or punitive measures (or evolve in a manner that authorized such measures) is rooted in sovereignty concerns and the view that the GATT dispute settlement system was primarily a political institution rather than a judicial one.[277] This view is undoubtedly accurate, but it is not complete.

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274. *See infra* Part III.A.2.c.

275. *See supra* notes 265-74 and accompanying text (discussing the nature of remedies available under the GATT).

276. As Schwartz and Sykes point out, deterrence may not have been a necessary function for the dispute settlement process because unilateral sanctions and reputation sufficiently deterred intentional noncompliance. *See* Schwartz & Sykes, *supra* note 11, at 193-99, 200-01 (arguing that: (1) formal sanctions were unimportant in encouraging compliance with the GATT; (2) "the incidence of flagrant cheating under the GATT system was indeed quite low;" and (3) "the domestic costs of violations, reputational sanctions for noncompliance, and unilateral retaliation against violators" explain why parties generally complied with their GATT obligations).

277. *See, e.g.*, JACKSON, *supra* note 50, at 109-11; YANG, *supra* note 10, at 80 ("The cost of sanctions is also of special concern because states are sovereigns. If

Perhaps another reason is that disputes generally did not concern intentional noncompliance,[278] which would warrant such measures from the perspective of deterrence, but rather concerned either real disputes over the scope and interpretation of the rules or capacity problems, either of which would not warrant such measures from the perspective of deterrence because noncompliance would not

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an enforcement mechanism is effective, . . . [t]he result is the effective loss or diminishment of sovereignty and autonomy of action by the target state."). Yang also asserts that:

> . . . [T]he effective loss of autonomy and power is a cost that does not affect each prospective treaty party equally. Effective enforcement mechanisms restrict state autonomy to a common denominator with regard to matters covered by the treaty—the norm, obligation or restriction set out by the treaty. The result is to restrict the powerful, those who had more autonomy, control, and options to begin with, much more than others. As a result, the effects of the loss of autonomy and power are strongly asymmetrical. The asymmetry suggests that the most powerful nations, those which thus stand to lose the most from effective enforcement mechanisms, are least likely to support them.

Id. at 81. Related to the sovereignty/political institution explanation is the argument that States face a reciprocal-conflict problem, described above. *See* ETHIER, *supra* note 45. Downs and Rocke explain in detail how uncertainty about domestic interest group demands (and the attendant demand to defect) leads to a weak enforcement rule. *See* DOWNS & ROCKE, *supra* note 114, at 76-104. The fact that the dispute settlement system may not be geared properly for enforcement-oriented purposes, such as deterring intentional noncompliance, suggests that the institutions serves other important purposes. *Cf.* Raustiala and Slaughter's assertion that

> [R]ecent work by IR scholars, often using statistical analyses of GATT/WTO disputes, indicates a more mixed story about the influence of GATT enforcement that substantially alters . . . the [managerial-enforcement] debate . . . Busch and Reinhardt, building on Hudec's pioneering work, [found a low level of compliance with GATT panel rulings.] This low level of compliance does not, however, indicate that the GATT dispute process was ineffective. Rather, the major effect of the dispute process seemed to *precede* the issuance of a ruling.

Raustiala & Slaughter, *supra* note 12, at 549 (citations omitted).

278. *See* Schwartz & Sykes, *supra* note 11, at 193-99, 200-01, *quoted supra* note 276. *But cf.* Verdier, *supra* note 1, at 854 ("[M]ost breaches of international law are intentional," and . . . [i]t is because of the intentional nature of breaches that the law of state responsibility deals with facilitating the efficient operation of unilateral retaliative strategies aimed at preventing opportunistic defection."). Perhaps, for political or other reasons, the system was designed with a presumption that disputes would not originate from intentionally noncompliant actions by parties and that a formal finding of noncompliance would be necessary to establish notice and awareness on the part of the noncompliant State. This view comports with the premises of the managerial theory of compliance. *See supra* notes 178-81 and accompanying text.

be the result of a party's lack of intent to comply.[279] Of course, once an adopted panel report established the existence of a violation, parties could work out a cooperative solution if a capacity problem existed; thereafter, continued noncompliance would likely be a problem of intent and thus properly sanctioned on either a compensatory or even punitive basis. In the end, it appears that the institution was not directed primarily at deterring intentional noncompliance, except on an ongoing basis after the noncompliance had been identified and adjudicated.

It seems more appropriate to analyze the effectiveness of the dispute settlement institution with respect to Type II and Type III compliance strategies, which respectively concern developing institutional mechanisms for reducing transaction costs and uncertainties that inhibit cooperation and for dynamically altering commitments as the regime evolves. With respect to Type II, the consultations and dispute settlement process may alleviate uncertainty with respect to the interpretation and proper application of the rules and the scope of the Parties' obligations in particularized factual contexts.[280] To the extent that disputes between parties did not originate from intentional noncompliance but rather from an actual dispute over the rules or obligations, or from a capacity problem, the process would provide significant benefits to the disputants as well as the GATT regime as a whole. The fact that the settlement rate prior to a panel ruling was high and that most panel reports were eventually adopted by the losing party provides support for this conclusion.[281]

With respect to Type III (dynamic readjustment of commitments), when the offending party did not implement an adopted panel report, the injured party might be

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279. According to Schwartz and Sykes:

> [M]any (although not all) of the disputes that arise involve good-faith clashes over ambiguous terms of the bargain. In these circumstances, countries are often genuinely uncertain about what they are obliged to do, and sanctions may have the effect of punishing them for good-faith behavior. Not only is there little deterrence value to such punishment, but it may prove somewhat destabilizing to the trading system and provide further political ammunition to those who would scuttle it on the basis of sovereignty claims and the like.

Schwartz & Sykes, *supra* note 11, at 201.

280. *Id.* (discussing dispute settlement ruling as "constructive gap fillers"); *see supra* Part II.F.2 (discussing Type II strategy).

281. *See* JACKSON ET AL., *supra* note 27.

authorized to readjust its commitments relative to the other party. Readjustment could take the form of renegotiated commitments set forth in a settlement package or of prospective rebalancing based on the remedies made available to the complainant.[282] The prospective nature of such readjustment suggests that it is not responsive to intentional defection (*i.e.*, a strategic decision by one party to defect rather than cooperate) and would not operate as a deterrent to opportunistic strategies.

b. *Evolution of the GATT Regime.* In addition to setting forth the basic principles for liberalizing trade through reciprocal tariff concessions and the dispute settlement process, the GATT served as a structured negotiating forum, most importantly, in a series of trade negotiating rounds.[283] Notably, the first six rounds focused on negotiating tariff reductions. By the seventh round, the Tokyo Round, the parties recognized that non-tariff barriers ("NTBs") needed to be addressed and that the existing broad principles set forth in the GATT were insufficient.[284] In addition to protocols regarding tariff reductions, the Tokyo Round led to the completion of special, side-agreements or "codes" that essentially operated as independent treaties by binding signatories and creating independent obligations and compliance mechanisms. The side-agreements addressed a wide range of issue-areas not directly touched on by the GATT, such as technical barriers to trade and government procurement.

The creation of side-agreements illustrates the dynamicism (or reframing and reforming) of cooperation in a series of iterated games (*see* Figure 4 *supra*). After identifying an interdependency problem and crafting a cooperative solution through an international agreement, parties may need to return to the framing stage and reframe particular aspects of the problem that are not

282. *Cf.* Schwartz & Sykes, *supra* note 11, at 186-87 (considering both the dispute settlement process and Article XXVIII, which establishes procedures for readjustment of commitments, as institutions designed to facilitate efficient breaches).

283. *See* JACKSON ET AL., *supra* note 27, at 227 (describing the rounds).

284. *See* Milner, *International Trade*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 217, at 449 (discussing the problem of NTBs).

adequately addressed under the existing arrangement.[285] Specifically, the inadequacy of the GATT (in terms of applying, interpreting, and enforcing existing obligations relating to NTBs) was exposed in part as a result of its success in reducing tariffs and in part as a result of its inability to adapt internally.[286]

> [B]y the 1970s, it became clear that tariffs were not likely to be the main problem for trade liberalization. As tariffs decreased (especially for industrial goods imported to industrialized countries), many special sector interests began to seek other ways to reduce competition from imports, turning to "non-tariff barriers" (NTBs). These are myriad, and many are the types of things for which human ingenuity can perpetually develop new devices. Most such barriers are internal measures and not border measures, and therefore are often most relevant to the national treatment clause of GATT Article III.
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> In this respect, the GATT was essentially forced to address nation-States' internal economic regulatory measures, or run the risk of becoming almost totally irrelevant to the need for international cooperative mechanisms to resolve thousands of international tensions and problems related to trade, or to keep some movement toward trade liberalization.[287]

While Article III applies to NTBs on its face, enforcing that obligation through the dispute settlement mechanism was difficult. While a common law-like evolution of the GATT

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285. Linkage to "non-trade" areas, such as the environment or labor, is a more complex dynamic that is not considered here. On the linkage issue, see generally Symposium, *The Boundaries of the WTO*, 96 AM. J. INT'L L. 118 (2002).

286. *See* McGinnis & Movsesian, *supra* note 20, at 549-50 (discussing the problem of "covert protectionism," and arguing that due to the "large-scale reductions in global tariffs," the problem will be "increasingly important for the WTO").

287. John H. Jackson, *Afterword: The Linkage Problem–Comments on five Texts*, 96 AM. J. INT'L L. 118, 121 (2002). *See, e.g.*, John H. Jackson, *The Birth of the GATT-MTN System: A Constitutional Appraisal*, 12 LAW & POL'Y INT'L BUS. 21 (1980), *reprinted in part in* JACKSON, JURISPRUDENCE, *supra* note 255, at 38 n.30 ("As tariffs decline, various nontariff measures become relatively more important in their impact on the restriction or distortion of world trade flows."); Milner, *International Trade*, *in* THE HANDBOOK OF INTERNATIONAL RELATIONS, *supra* note 217, at 449 (noting that NTBs "have proliferated, in part countering the decline in tariffs" and that while "the Uruguay Round slowed or reversed this, . . . NTBs still make up an important arsenal of barriers to trade").

principles, particularly Article III, to address NTBs was theoretically possible (even though dispute settlement reports were not formally subject to the doctrine of *stare decisis*), such an approach did not prove to be practically feasible. Evolution through amendment was even less feasible because an amendment would not be binding on a particular Party unless that Party accepted the amendment.[288]

As Jackson and his colleagues explain, the near impossibility of amending the GATT was a major "birth defect:"

> [The] delay required by the treaty acceptance process, the shift in bargaining power involved under the amending procedure in the context of a large membership and the fact that even when an amendment is effective it will not apply to countries which do not accept it, are all reasons why the amending procedure had fallen into disuse . . . caus[ing] a certain rigidity and inability to develop rules to accommodate the many new developments in international trade and other economic interdependence subjects.[289]

While designed to supplement the GATT and address its deficiencies, the side-agreements created a host of other institutional problems. For example, it was not clear whether benefits given in the side-agreements were subject to the MFN provision until the GATT Parties adopted a decision suggesting that they were. The GATT's uniform "multilateralization" of the trade liberalization game gave way, in part, to a balkanized system of side-agreements (often referred to as "GATT a la carte") with multiple systems for dispute settlement.[290]

In addition to the growing importance of addressing NTBs, increased unilateralism on the part of the U.S. as a means to "enforce" its trade-related rights was an important factor in getting nations to explicitly reframe the underlying interdependency problem and reform the existing set of obligations (primarily through significant

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288. *See, e.g.*, JACKSON, RESTRUCTURING, *supra* note 218, at 9-14; JACKSON ET AL., *supra* note 27, at 214-15.

289. JACKSON ET AL., *supra* note 27, at 214-15.

290. *See* Patricia Kalla, Note, *The GATT Dispute Settlement Procedure in the 1980s: Where Do We Go from Here?*, 5 DICK. J. INT'L L. 82, 92 (1986) (noting that former GATT practice involved procedures under "six disparate dispute mechanisms adopted by nine codes at the Tokyo Round").

expansion) and compliance institutions.[291] Both the negotiation of side-agreements and the increased exercise of unilateral sanctions destabilized the GATT regime and prompted States to reform the institutional framework itself.

c. *The WTO Regime.* The evolution of the GATT institutional framework culminated in the Uruguay Round. At the close of the Uruguay Round, the States had negotiated a complex package of agreements that resulted in a comprehensive overhaul of the existing GATT regime.[292] States were not given the option of picking and choosing among agreements but rather were bound to accept or reject the entire package.[293] This decision allowed States to

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291. Specifically, as summed up succinctly by Charles Tiefer:

> Initially, the United States accepted the GATT as the chief means of ensuring that these countries reciprocated U.S. openness. However, by 1962, Congress began to reflect a domestic political conviction that other countries, particularly Japan and members of the European Economic Community (EEC), had not honored U.S. rights. In response, it enacted Section 252 of the 1962 Act authorizing retaliation against other countries' import restrictions of either illegal or "unreasonable" nature. In the 1974 Act, Congress further followed these domestic political convictions, exacerbated by a sense of the shortcomings of the GATT itself and the Kennedy Round agreement. Specifically, Congress created Section 301, allowing measures to be taken against countries that maintained unreasonable barriers to U.S. trade.
>
> In 1988, Congress expanded the Section 301 system significantly. In response to the persistent foreign infringement on intellectual property rights, the 1988 Act added the "Special 301" provision. It provided for identification of countries that infringed on intellectual property rights and imposed unilateral U.S. trade sanctions if those countries did not mend their ways. U.S. sanctions could take the form of suspension of trade agreement benefits or an increase in tariffs or non-tariff barriers against imports from the violating countries. Also, the 1988 Act added the "Super 301" provision, which allowed the USTR to identify foreign country practices that blocked U.S. exports and designate them as priorities. The Super 301 provision [was and] remains the backbone of unilateral U.S. efforts to force trade liberalization on foreign countries.

Charles Tiefer, *SINO 301: How Congress Can Effectively Review Relations With China After WTO Accession*, 34 CORNELL INT'L L.J. 55, 63-64 (2001). *See also* Shell, *supra* note 59, at 845-49.

292. *See* Mitsuo Matsushita, *Competition Law and Policy in the Context of the WTO System*, 44 DEPAUL L. REV. 1097, 1099-01 (1995) (describing the "extensive coverage" of the WTO and the "improved dispute settlement process" as the salient differences between the WTO and the GATT).

293. *See* Steve Charnovitz, *Triangulating the World Trade Organization*, 96 AM. J. INT'L. L. 28, 31 (2002) ("Strategic linkage became the leitmotif of the

engage in a complicated process of negotiations that reframed, reformed, and integrated games across many issue-areas. With respect to commitments and compliance, the WTO package of agreements significantly expanded the range of commitments undertaken by States and significantly deepened them as well.[294] The analysis here will focus not on the range of commitments undertaken via these agreements but instead on the compliance system.[295]

i. *WTO Compliance Institutions.* The WTO regime involves a comprehensive, integrated compliance system that employs all three compliance strategies. The dispute settlement system is the centerpiece of the regime and is perhaps the most advanced and powerful yet created under international law. It represents a significant advance in the international law field, is the "backbone" of the WTO trading system,[296] and has been touted as the model institution for other developing areas of international law.[297] The WTO dispute settlement system builds on the preexisting GATT dispute settlement system,[298] brings together and formalizes many of the procedures set forth in various interpretations and declarations,[299] and creates a formal dispute settlement organization called the Dispute Settlement Body ("DSB").[300] The DSB is formally delegated authority to administer the detailed rules of adjudication contained in the Understanding on Rules and Procedures

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Uruguay Round trade negotiations, particularly with regard to the inclusion of TRIPs. Negotiators sought a 'package deal' of interlocked commitments rather than a collection of stand-alone agreements.") (footnotes omitted); Petersmann, *supra* note 124, at 454.

294. Among many other things, the Members (1) created the World Trade Organization—a formal international organization; (2) significantly broadened the scope of the trading system beyond goods to encompass services and intellectual property as well as previously exempted areas such as agriculture and textiles; and (3) created a more comprehensive compliance system including more effective dispute settlement procedures. *See* Agreement Establishing the World Trade Organization, Apr. 15, 1994, 1867 U.N.T.S. 155, 33 I.L.M. 1144 [hereinafter WTO Agreement]; *see generally* RAJ BHALA & KEVIN KENNEDY, WORLD TRADE LAW: THE GATT: WTO SYSTEM, REGIONAL ARRANGEMENTS AND U.S. LAW 8-15 (1998); JACKSON ET AL., *supra* note 27, at 208-245. States that are parties to the agreements are referred to as "Members." On the international organization and its mission(s), see Peter M. Gerhart, *Slow Transformations: The WTO as a Distributive Organization*, 17 AM. U. INT'L L. REV. 1045 (2002).

295. It is important to note, however, that the positively prescriptive nature of some of the obligations (e.g., TRIPs) reach significantly deeper into domestic regulatory affairs than the GATT.

Governing the Settlement of Disputes ("Dispute Settlement Understanding" or "DSU").[301] The DSB orchestrates the dispute settlement process from beginning to end—it establishes panels, adopts Panel and Appellate Body reports, and even monitors and oversees implementation of such reports. Importantly, the WTO dispute settlement system prevents forum shopping among procedures set forth in side-agreements, for example, and acts as the exclusive adjudicative institution for all agreements under the WTO umbrella. In some cases, provisions in some of the Annex I agreements modify the adjudication rules set forth in the DSU, but the modifications are generally tailored to the particular area covered (e.g., intellectual property).

Besides integrating and formalizing various procedures into a comprehensive set of binding rules and creating the DSB to administer the process,[302] the DSU reflects a number of important changes to the dispute settlement

296. Dispute settlement is considered the backbone of the multilateral trading system. *See Dispute Settlements in the WTO: Hearing Before the Subcomm. on Int'l Trade of the Senate Comm. on Fin.*, 106th Cong. 2 (2000) (opening statement of Sen. Charles Grassley, Chairman, Int'l Trade Subcomm. of the Senate Comm. on Finance); Mike Moore, *WTO's Unique System of Settling Disputes Nears 200 Cases in 2000*, Press Release (June 5, 2000), *at* http://www.wto.org/english/news_ e/pres00_e/pr180_e.htm (last visited Aug. 27, 2003).

297. *See supra* notes 21-24.

298. *See* Shell, *supra* note 59, at 848-53 (describing five ways in which the WTO dispute settlement system differs from its GATT predecessor).

299. *See id.*

300. The DSB was established to, *inter alia*,

> . . .administer these rules and procedures and, except as otherwise provided in a covered agreement, the consultation and dispute settlement provisions of the covered agreements. Accordingly, the DSB shall have the authority to establish panels, adopt panel and Appellate Body reports, maintain surveillance of implementation of rulings and recommendations, and authorize suspension of concessions and other obligations under the covered agreements.

Understanding on Rules and Procedures Governing the Settlement Dispute, Apr. 15, 1994, Annex 2, art. 2, para. 1, 33 I.L.M. 112 (1994) [hereinafter DSU].

301. *See generally id.*

302. The process itself was greatly improved by a series of reforms, including the creation of established timeframes for certain actions such that a default procedural rule would be triggered at the end of the period, thus minimizing the delays endemic to the GATT dispute settlement process. Furthermore, the DSB is vested with the authority to establish panels and to select panel members in the event that the parties cannot agree on the selection.

system.[303] First, a losing party can no longer block the adoption of a panel report; instead, a panel report is automatically adopted unless there is a consensus not to do so.[304] A second related reform was the introduction of appellate procedures and the creation of an Appellate Body consisting of seven members that are appointed to four-year terms.[305] The Appellate Body may consider only issues of law and legal interpretations decided by the panel.[306] As with panel reports, the Appellate Body report is adopted automatically, unless there is consensus not to do so. Together, these modifications significantly de-politicize the dispute settlement process and give weight to the panel's and the Appellate Body's interpretation and application of the rules and determinations with respect to whether a particular State is complying with its obligations. A third important change is that the DSB monitors whether a losing party implements the relevant recommendations and brings itself into compliance. If the Member fails to do so within a reasonable period of time, authority to suspend concessions is automatically granted, absent consensus to the contrary, and the level of suspension is calculated pursuant to a specified procedure.[307] Finally, it is important to note that the types of concessions that may be suspended pursuant to the DSU may include obligations or concessions under any of the WTO multilateral agreements, unless there is a provision precluding such suspension.[308] This development arguably "levels the playing field" because developing nations that would have had little bargaining power under the GATT system may suspend obligations

303. *See* Shell, *supra* note 59, at 848-53.

304. DSU art. 16. *See also* JACKSON ET AL., *supra* note 27, at 264 (noting that the switch to a "reverse consensus" rule was significant).

305. On the Appellate Body, *see* JACKSON ET AL., *supra* note 27, at 264-66.

306. Although the doctrine of *stare decisis* does not formally apply to panel reports and Appellate Body reports, *see id.* at 265, there is a strong argument that, based on WTO dispute settlement practice, the doctrine applies de facto. *See* Raj Bhala, *The Precedent Setters:* De Facto Stare Decisis *in WTO Adjudication (Part Two of a Trilogy)*, 9 FLA. ST. U.J. TRANSNAT'L L. & POL'Y 1 (1999); *see also* Raj Bhala, *The Myth About Stare Decisis and International Trade Law (Part One of a Trilogy)*, 14 AM. U. INT'L L. REV. 845 (1999); Raj Bhala, *The Power of the Past: Towards* De Jure Stare Decisis *in WTO Adjudication (Part Three of a Trilogy)*, 33 GEO. WASH. INT'L L. REV. 873 (2001).

307. DSU art. 22, para. 6.

308. DSU art. 22, paras. 3, 4.

that matter to developed countries, such as those set forth in TRIPs.[309]

The clear preference in the DSU is for withdrawal by the losing party of its offending measure,[310] but the sanction for failing to do so basically remains the same as it was for the GATT:[311] *prospective trade measures intended to offset only the prospective harm imposed on the injured party.*[312] Neither compensation for past harm nor punitive sanctions are permitted.[313]

Article 22 of the DSU sets forth various rules and procedures for compensation or suspension of concessions, which are "temporary measures available in the event that the recommendations and rulings are not implemented within a reasonable period of time." The DSB expressly states that compensation is voluntary,[314] and that:

> suspension of concessions or other obligations shall be temporary and shall only be applied until such time as the measure found to be inconsistent with a covered agreement has been removed, or the Member that must implement recommendations or rulings

309. *See* Andrew S. Bishop, *The Second Legal Revolution in International Trade Law: Ecuador Goes Ape in Banana Trade War With European Union*, 12 INT'L LEGAL PERSP. 1, 3 (Fall, 2001/Spring, 2002) (arguing that the WTO March 24, 2000 arbitration ruling granting Ecuador permission to retaliate through cross-sector retaliation under DSU art. 22, para. 3 by suspending EU intellectual property rights in Ecuador is "the second revolution in WTO dispute settlement because it effectively levels the playing field between the weaker developing WTO members and the stronger, industrial WTO members").

310. *See* DSU art. 22.

311. *See supra* Part III.A.2.a.ii. & iii. (analyzing GATT compliance institutions and strategies).

312. *See* Report of the Panel, *United States – Section 129(c)(1) of the Uruguay Round Agreements Act*, WT/DS221/R, paras. 3.85-.95 (July 15, 2002) (explaining, based on a thorough analysis of the DSU text and panel and appellate body reports, that the DSU requires only prospective remedies when a measure is found inconsistent with WTO obligations); Grane, *supra* note 46, at 755-72 (providing a thorough analysis of the remedies available under GATT and WTO); JACKSON ET AL., *supra* note 27, at 311-12 (excerpt from WILLIAM J. DAVEY, WTO DISPUTE SETTLEMENT (2001)); Pauwelyn, *supra* note 268, at 337-38, 340, 346; *see also* Matthew P. Jaffe, *Are International Institutions Doing Their Job? World Trade Organization*, 90 AM. SOC'Y INT'L L. PROC. 412, 424-25 (1996) (noting that: (1) the issue of whether compensation may cover past harms is controversial; (2) the United States consistently maintained in GATT practice and during the Uruguay Round negotiations that dispute settlement remedies must be prospective; and (3) the DSU reflects this position).

313. *See infra* this section.

314. DSU art. 22, para. 1.

> provides a solution to the nullification or impairment of benefits, or a mutually satisfactory solution is reached.[315]

As the Arbitrators in the *EC-Bananas* case reasoned, the "temporary nature [of suspension of concessions or other obligations] indicates that it is the purpose of countermeasures to *induce* compliance."[316] In that case, the arbitrators assessed the level of proposed suspension of concessions in relation to the measures taken by the European Communities ("EC") to comply with the recommendations and rulings of the DSB rather than the original measures found to be inconsistent with the EC's WTO obligations.[317] Compensation for past harm caused by the original measures was not a relevant consideration in determining whether the proposed countermeasures were appropriate, and the Arbitrators expressly rejected the notion that countermeasures of a "punitive nature" could be authorized pursuant to the DSU.[318]

Still, Article 22 does state that "[t]he level of the suspension of concessions or other obligations authorized by the DSB shall be *equivalent* to the level of the nullification or impairment."[319] Based on this provision, one might argue that, as with the language of GATT Article XXIII, it is not clear based on that particular provision whether "equivalency" includes or precludes retroactive effects. Nonetheless, it is well-settled that the text and purpose of the DSU is clearly aimed at inducing compliance once a violation has been established,[320] and, in accordance with that focus, remedies must be determined on a prospective

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315. DSU art. 22, para. 8.

316. Decision by the Arbitrators, *European Communities - Regime for the Importation, Sale and Distribution of Bananas - Recourse to Arbitration by the European Communities under Article 22.6 of the DSU*, WT/DS27/ARB (Apr. 9, 1999) para. 6.3 (emphasis added).

317. *Id.* at para. 4.3.

318. The Arbitrators noted that:

> [While] the purpose of countermeasures is to induce compliance[,] this does not mean that the DSB [Dispute Settlement Body] should grant authorization to suspend concessions beyond what is equivalent to the level of nullification or impairment. In our view there is nothing in [the relevant provisions of the DSU] that could be read as a justification for counter-measures of a punitive nature.

Id. at para. 6.3

319. DSU art. 22, para. 4 (emphasis added).

320. *See* Decision by the Arbitrators, *supra* note 316, at para. 6.3; *see also* Schwartz & Sykes, *supra* note 11, at 182-83.

basis.[321] Thus, in the *EC—Bananas* case, for example, the Arbitrators set the "level of suspension of concessions" to be authorized

> . . .through a determination of the level of nullification or impairment as of the date that the reasonable period of time for implementation of DSB recommendations expired. The level of nullification or impairment was assessed in light of the relevant measures or markets as of the expiration of the reasonable period of time.[322]

Thus, in deciding what the level of suspension of concessions (or other obligations) to authorize, the Arbitrators compare "the existing situation with that which would have occurred had implementation taken place as of the expiration of the reasonable period of time."[323]

Notably, however, the problem of intentional noncompliance has recently surfaced during the dispute settlement process. In the recent *Canada—Export Credits and Loan Guarantees* case, for example, the Arbitrator "asked Canada to clarify whether it actually did not intend to comply with the DSB recommendations."[324] Based on

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321. *See* Report of the Panel, *United States—Section 129(c)(1) of the Uruguay Round Agreements Act*, WT/DS221/R, paras. 3.85-.95 (July 15, 2002) (explaining, based on a thorough analysis of the DSU text, and panel and appellate body reports, that the DSU requires only prospective remedies when a measure is found inconsistent with WTO obligations); *see also supra* notes 265-69 and accompanying text.

322. Decision by the Arbitrator, *Canada—Export Credits and Loan Guarantees For Regional Aircraft, Recourse to Arbitration by Canada under Article 22.6 of the DSU and Article 4.11 of the SCM Agreement*, WT/DS222/ARB, para. 3.21 (Feb. 17, 2003) ("Thus, in the *EC—Bananas* cases, the Arbitrators considered the level of the nullification or impairment arising from the revised EC measure, while in the *EC—Hormones* cases, the Arbitrators considered the market for beef products existing on the implementation date, which had shrunk as a result of various health concerns as compared to the market existing at the outset of the case.") (discussing Decision by the Arbitrators, *EC—Bananas III (US) (Article 22.6—EC)*, paras. 4.8-.9; *EC—Hormones (Canada) (Article 22.6—EC)*, para. 37; *EC—Hormones (US) (Article 22.6—EC)*, para. 38).

323. *Id.* Thus, in the *Canada—Export Credits and Loan Guarantees* case, the Arbitrator calculated the level of countermeasures (the equivalent in Article 4.10 of the SCM Agreement of the "level of suspension of concessions" in Article 22 of the DSU) based on the amount of subsidy per aircraft, the model of aircraft, and the number of subsidized aircraft not delivered as of May 20, 2002, which was the expiration date for implementation.

324. *Id.* at para. 3.106.

Canada's apparent intention not to comply with the recommendation, the Arbitrator concluded that "in order to induce compliance in this case a higher level of countermeasures than that based on the Canadian methodology would be necessary and appropriate."[325] This conclusion led the Arbitrator to "adjust the level of countermeasures by an amount corresponding to 20 percent of the amount of the subsidy."[326] Despite this decision, the Arbitrator ultimately rejected Brazil's argument for a "significant level of countermeasures" in order to deter intentional noncompliance in general (i.e., beyond the particular subsidized transactions subject to the panel report).[327] Overall, this ruling appears to reflect a step in the direction of stricter prospective enforcement of dispute settlement rulings and away from dynamic readjustment of commitments to facilitate "efficient breaches."[328]

ii. *WTO Compliance Strategies.* In the end, WTO dispute settlement appears to maintain the same orientation as GATT dispute settlement. It appears to implement primarily the Type II and Type III strategies in the same manner as the GATT, discussed above, in the sense that WTO Members can alleviate uncertainty by consultations and adjudication and can readjust commitments dynamically as a result of dispute settlement.[329] However, these strategies are implemented much

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325. *Id.* at para. 3.107.

326. *Id.* at para. 3.121. According to the Arbitrator, "we are convinced that it is a justified adjustment in light of the circumstances of this case and, in particular, the need to induce compliance with WTO obligations. Without such an adjustment, we would not be satisfied that an appropriate level of countermeasures had been established in this case." *Id.* at para. 3.122.

327. *Id.* at para. 3.108-.113. As the Arbitrator explained, "the findings of the Panel do not extend beyond the particular instance where the application of those programmes was found to be illegal. It is likely that an identical application of those programmes would, in identical circumstances, lead to an identical ruling. However, as long as this is not a matter that was before the Panel and it did not lead to recommendations of the DSB, we are not, as Arbitrator under Article 22.6 of the DSU and Article 4.10 of the SCM Agreement, allowed to address it." *Id.* at para. 3.111.

328. *See* Schwartz & Sykes, *supra* note 11 (arguing that the DSU is designed to facilitate efficient breaches).

329. *See supra* Part III.A.2.a.ii. It is not surprising that States would seek to improve the Type II function of the dispute settlement process given the emergence of nontariff barriers as an impediment to sustained cooperation. *See*

more effectively and credibly because of the detailed, integrated framework of rules and the de-politicization of the process (for example, by reversing the consensus rule, creating the DSB, and providing for appellate review of legal determinations). The rule-oriented, adjudicative process established in the DSU and the creation of an appellate review process substantially improve the quality, consistency, predictability, and overall utility of the dispute settlement process as a means for reducing uncertainty regarding the scope, interpretation, and applicability of, and complex interrelationship among, the sets of rules in the various agreements.

As with GATT dispute settlement, the prospective orientation of remedies available through WTO dispute settlement limits the institution's effectiveness as a deterrent to intentional noncompliance from an *ex ante* perspective.[330] The institution does serve a Type I function in the sense that once the process has been invoked and noncompliance has been established, the possibility of suspended concessions may induce compliance[331] and may act as an effective deterrent to intentional noncompliance of the same kind between the same Members in the future. Furthermore, as a result of the improvements made in the evolution from GATT dispute settlement to WTO dispute settlement, the expected duration of undetected noncompliance may shorten (in part because the institutions are more efficient, and in part because the scope of the trading rules and obligations becomes more precise and certain over time), which reduces the expected benefits of intentional noncompliance.

Yet, the fundamental limitations of the dispute settlement system, from an enforcement-oriented perspective—an opportunity to return to compliance without penalty and the prospective nature of available remedies (explored above with respect to the GATT regime)—strongly suggest that the institution is not directed at deterring intentional noncompliance, and therefore, that the institution does not implement a collective strategy to alter the expected payoffs in a manner that makes cooperation more attractive *ex ante*

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supra Part III.A.2.b. (discussing the evolution of the GATT regime and the emergence of nontariff barriers as an issue).

330. *See supra* Part III.A.2.a.ii.

331. *See supra* notes 269-76 and accompanying text.

than defection. Instead, it appears to implement a collective strategy to facilitate internal evolution of the existing (multilateral) game, and thereby avoid collapsing into sequential games (whether bargaining games or trade wars on a bilateral or multilateral basis).

In addition to dispute settlement, the Members also created another Type II compliance institution, the Trade Policy Review Mechanism (Annex 3).[332] As set forth in its statement of objectives:

> The purpose of the Trade Policy Review Mechanism ("TPRM") is to contribute to improved adherence by all Members to rules, disciplines and commitments made under the Multilateral Trade Agreements and, where applicable, the Plurilateral Trade Agreements, and hence to the smoother functioning of the multilateral trading system, by achieving greater transparency in, and understanding of, the trade policies and practices of Members. Accordingly, the review mechanism enables the regular collective appreciation and evaluation of the full range of individual Members' trade policies and practices and their impact on the functioning of the multilateral trading system. It is not, however, intended to serve as a basis for the enforcement of specific obligations under the Agreements or for dispute settlement procedures, or to impose new policy commitments on Members.[333]

The TPRM establishes the Trade Policy Review Body (referred to herein as the "TPRB") to periodically review the trade policies and practices of all Members.[334] The frequency of reviews is based on the impact of a particular country on the trading system.[335] Each Member is obligated to submit a report to the TPRB on a regular basis as well. Specifically, the TPRM provides that:

> In order to achieve the fullest possible degree of transparency, each Member shall report regularly to the TPRB. Full reports shall describe the trade policies and practices pursued by the Member or Members concerned, based on an agreed format to be decided upon by the TPRB. . . . Between reviews, Members shall provide brief reports when there are any significant changes in their trade policies; an annual update of statistical information

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332. *Trade Policy Review Mechanism*, Apr. 15, 1994, WTO Agreement, Annex 3, *at* http://www.wto.org/english/docs_e/legal_e/final_e.htm (last visited Sept. 7, 2003) [hereinafter TPRM].

333. *Id.*

334. *Id.*

335. *Id.*

> will be provided according to the agreed format. Particular account shall be taken of difficulties presented to least-developed country Members in compiling their reports. The Secretariat shall make available technical assistance on request to developing country Members, and in particular to the least-developed country Members. Information contained in reports should to the greatest extent possible be coordinated with notifications made under provisions of the Multilateral Trade Agreements and, where applicable, the Plurilateral Trade Agreements.[336]

The TPRM is not oriented towards dispute settlement; rather it serves an important Type II compliance function in that it collects and makes publicly available information regarding trade policies of WTO Members, and provides an important feedback mechanism for evaluating and understanding the payoff structure.

The WTO has recently begun to focus on the capacity problems that developing countries may face and has been developing capacity-building and technical assistance programs to enable developing countries that lack the resources to fully participate in the WTO.[337] In November 2001, at the Fourth Ministerial Conference in Doha, Qatar, a broad mandate was declared concerning negotiations on, *inter alia*, numerous implementation issues, capacity-building and technical assistance programs, technology transfer, and special and differential treatment provisions.[338] The Doha Development Agenda stresses that WTO trade assistance must be viewed as part of an overall development and poverty reduction strategy.[339] The WTO's

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336. *Id.*

337. *See* Brown Weiss, *Strengthening National Compliance with Trade Law: Insights from Environment*, *in* NEW DIRECTIONS, *supra* note 56, at 457, 465-66 (discussing initiatives).

338. At the Fourth Ministerial Conference of the WTO on November 14, 2001, WTO members agreed to launch new trade negotiations pursuant to the Doha Development Agenda, which specifically puts the concerns of developing countries, such as market access, capacity-building, and development, at the forefront. *See* Fourth Ministerial Declaration, WT/MIN(01)/DEC/1 (Nov. 20, 2001) (memorializing the agreement made between the 142 nations that attended the talks at Doha), *available at* http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm (last visited Sept. 7, 2003); Inaamul Haque, *Doha Development Agenda: Recapturing the Momentum of Multilateralism and Developing Countries*, 17 AM. U. INT'L L. REV. 1097 (2002).

339. *See* WTO Secretariat, *Coordinated WTO Secretariat Annual Technical Assistance Plan 2003*, WT/COMTD/W/104, at 3 (10 December 2002).

recent 2003 Technical Assistance/Capacity Building Plan, for example, focuses on the complementary goals of technical assistance and capacity building for effective participation in negotiations, implementation, and trade integration.[340] To that end, the WTO Secretariat will be engaged in the coordination of a number of technical assistance and capacity building activities (such as internships, trade policy courses, and sustainable capacity building), which coherently link national activities with regional activities.[341] Least developed countries, which have the most urgent and acute trade development needs, will be given priority focus.[342] As a precursor to technical assistance, diagnostic studies are being prepared to identify structural weaknesses and constraints impeding the countries development into the multilateral trading system.[343] In the near future, capacity-building and technical assistance institutions will likely become an important part of the WTO compliance framework.[344] The emergence of these institutions can be explained as a response to the bubbling threat of destabilization posed by exogenous events, such as health crises, and by the capacity problems facing many developing countries.

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Applying the dynamic institutional theory developed in this article to the GATT/WTO regime helps us to focus on the aspects of State decision-making and behavior that are affected by compliance institutions and, at the same time, on the rationale for creating such institutions. While international trade law has evolved into a relatively strong version of public international law, the strength of the

340. *Id.* at 6.

341. *Id.* at 10-13.

342. *Id.* at 15.

343. *Id.*

344. *See* Gerhart, *supra* note 294, at 1083-85 (discussing capacity building issues on the DOHA agenda); *see also* USAID, United States Government Initiatives to Build Trade Related Capacity in Developing and Transition Countries (Oct. 2001) (summarizing the U.S. effort at capacity building in other countries). The Doha Declaration is also a good example of the Type III strategy in operation. *See* Helfer, *supra* note 14, (manuscript at 4) (noting that in response to capacity problems, the Declaration grants least developed countries an extended deadline for providing IP protection for pharmaceuticals) (citing Ministerial Declaration, WTO Doc. WT/MIN(01)/DEC/1, para. 7, *available at* http://docsonline.wto.org (Adopted Nov. 20, 2001 at the WTO Doha Ministerial Conference, 9-14 Nov. 2001)).

current WTO regime does not appear to derive from strict enforcement-oriented institutions aimed at deterring intentional noncompliance through the threat of sanctions. This view is contrary to the opinion of "most of the WTO policy community;" most trade experts believe that the dispute settlement process is, in fact, enforcement-oriented and backed by hard-edged sanctions.[345] The analysis in this section has shown that, despite its adjudicative, rule-based orientation, the WTO dispute settlement institution appears to be management-oriented and facilitative, rather than enforcement-oriented, because it primarily implements Type II and Type III compliance strategies and implements Type I strategies only on a limited prospective basis.[346] The underlying purpose of the WTO compliance

345. *See* Steve Charnovitz, *The WTO's Problematic "Last Resort" Against Noncompliance*, 57 AUSSENWIRTSCHAFT 409, 424-26 (2002) (asserting that the WTO remedy of suspending concessions or other obligations "operates as a sanction because most of the WTO policy community perceives it as such" and then providing a series of quotations from leading policymakers and commentators). Charnovitz and other trade scholars have recognized the limitations I highlight and have argued for reforms. *See id.* at 429-31 (discussing reforms suggested by a few scholars); *see also* Raustiala & Slaughter, *supra* note 12, at 543, 549 (suggesting that GATT and WTO "sanctions for non-compliance correspond to the victim's losses" and stating that "[c]onsistent with the prescriptions of enforcement theory, the reform of the GATT dispute resolution process as part of the creation of the WTO strengthened the enforcement powers of the WTO and the retaliatory powers of member states in tandem with an increase in depth of cooperation."); *but see also id.* at 543 (suggesting that the sanctions system is designed to be weak because of persistent uncertainty regarding the domestic demands for non-compliance) (referencing DOWNS & ROCKE, *supra* note 114).

346. Compare with Raustiala and Slaughter's conclusion that:

> [R]ecent work by IR scholars, often using statistical analyses of GATT/WTO disputes, indicates a more mixed story about the influence of GATT enforcement that substantially alters the [managerial-enforcement] debate. Busch and Reinhardt, building on Hudec's pioneering work, [demonstrate a low level of compliance with GATT panel ruling.] This low level of compliance does not, however, indicate that the GATT dispute process was ineffective. Rather, the major effect of the dispute process seemed to *precede* the issuance of a ruling.

Raustiala & Slaughter, *supra* note 12, at 543, 549 (emphasis in original) (referencing Marc Busch & Eric Reinhardt, *Testing International Trade Law: Empirical Studies of GATT/WTO Dispute Settlement*, unpublished manuscript (2000)).

system is to maintain regime stability, "to keep the system from breaking down."[347]

B. *International Environmental Law and the Ozone Regime*

This section applies the theoretical framework to the Ozone regime, which addresses a fundamentally different interdependency problem than discussed above with respect to the international trade regime. It begins by analyzing the interdependency problem motivating international cooperation to reduce the emission of manmade, ozone-depleting substances ("ODSs"). It then describes the basic contours of the Ozone regime and analyzes the relevant compliance strategies and institutions. While the Ozone regime also appears to be primarily management-oriented and facilitative, it does not rely heavily on dispute settlement, but rather, utilizes a host of innovative compliance institutions to implement all three compliance strategies.

1. *The Underlying Interdependency Problem and the Need for International Cooperation.*

Today, the interdependency problem motivating international cooperation to reduce the emission of manmade ODSs is well-understood.[348] Briefly, ozone in the stratosphere (the "Ozone

347. As Downs and Rocke suggest, the compensation principle of the GATT "allows for opportunistic exceptions but acts to keep the system from breaking down." DOWNS & ROCKE, *supra* note 114, at 134.

348. *See, e.g.*, David L. Downie, *The Power to Destroy: Understanding Stratospheric Ozone Politics as a Common-Pool Resource Problem*, *in* ANARCHY AND THE ENVIRONMENT: THE INTERNATIONAL RELATIONS OF COMMON POOL RESOURCES at 97-121 (J. Samuel Barkin & George E. Shambaugh, eds. 1999); RICHARD ELLIOT BENEDICK, OZONE DIPLOMACY (enlarged ed. 1998); Edward A. Parson, *Protecting the Ozone Layer*, *in* INSTITUTIONS FOR THE EARTH (Peter M. Haas et al. eds., 1993). For recent assessments of the Ozone regime and its compliance institutions, see for example, ENGAGING COUNTRIES, *supra* note 10; IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12; Jennifer S. Bales, *Transnational Responsibility and Recourse for Ozone Depletion*, 19 B.C. INT'L & COMP. L. REV. 259 (1996); Mark A. Drumbl, *Northern Economic Obligation, Southern Moral Entitlement, and International Environmental Governance*, 27 COLUM. J. ENVTL. L. 363, 363-64 (2002) [hereinafter Drumbl, *Northern Economic Obligation*] ("The interdependence of development, environment, regulation and trade in public and political discourse is more pronounced today than at the adoption of the Stockholm Declaration in 1972, which many view as the initiation of the 'modern' era of international environmental law."); Mark A. Drumbl, *Poverty, Wealth, and Obligation in International Environmental Law*,

layer") shields all of us living on Earth from ultraviolet radiation emitted from the sun.[349] There are significant health risks associated with increased exposure to ultraviolet radiation.[350] When certain manmade chemicals are emitted and make their way into the stratosphere, ultraviolet radiation breaks down the chemicals releasing, among other things, chlorine or bromine atoms, which act as catalysts in destroying ozone.[351] Chlorofluorocarbons ("CFCs") and other ODSs, such as halons, methyl bromide, carbon tetrachloride, methyl chloroform, and hydrochlorofluorocarbons ("HCFCs"), have been used in numerous consumer and industrial applications.[352]

International cooperation is necessary to address the problem because doing so involves a tradeoff between the risk of long-term environmental harm and attendant health effects and the short-term economic costs of developing and shifting to alternative chemicals.[353] The Ozone layer can be analyzed as either a global public good or common pool resource, depending on the manner in which the problem is framed.[354] On one hand, an intact Ozone layer performs a service by shielding everyone on Earth from ultraviolet

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76 TUL. L. REV. 843, 843-44 (2002) [hereinafter Drumbl, *Poverty, Wealth, and Obligation*] ("The primus inter pares nature of the selfish justice motivation explains why the environmental issue-areas in which the shared compact has arisen . . . tend to be ones in which common concerns of humanity are threatened or in which externalities are imposed on the developed world and not issue-areas with local impact upon developing nations alone, regardless of the severity of that impact"); Setear, *Ozone, Iteration, and International Law*, *supra* note 7; *see also* Jorgen Wettestad, *The Vienna Convention and Montreal Protocol on Ozone-Layer Depletion*, *in* ENVIRONMENTAL REGIME EFFECTIVENESS: CONFRONTING EVIDENCE WITH THEORY, 149-70 (Edward L. Miles et al. eds. 2002).

349. Drumbl, *Poverty, Wealth, and Obligation*, *supra* note 348, at 863-64 (discussing the composition of ozone and threats posed to the ozone layer by chlorofluorocarbons and other ozone-depleting chemicals). The Ozone Secretariat also has a wealth of information about the environmental threats posed by ozone depletion, *available at* http://www.unep.org/ozone/faq.shtml (last visited Sept. 8, 2003).

350. Drumbl, *Poverty, Wealth, and Obligation*, *supra* note 348, at 863-64.

351. *Id.*

352. *Id.*

353. *See, e.g.*, Oran R. Young, *The Effectiveness of International Governance Systems*, *in* GLOBAL ENVIRONMENTAL CHANGE AND INTERNATIONAL GOVERNANCE 1 (Oran R. Young et al. eds., 1996).

354. For an excellent discussion, *see* Downie, *supra* note 348, at 97-121; *see generally* LOCAL COMMONS AND GLOBAL INTERDEPENDENCE (Robert O. Keohane & Elinor Ostrom eds., 1995); HARDIN, *supra* note 78; OLSON, *supra* note 99.

light. Because this service is both nonrivalrously consumed and nonexcludable, it can be characterized in economic terms as a classic public good.[355] On the other hand, when framed in terms of its capacity to act as a sink for ozone-depleting chemicals, the Ozone layer remains nonexcludable while its capacity is rivalrously consumed.[356] Under either view, *sustaining* the Ozone layer may be analyzed as a dynamic multiplayer game.[357]

Robust international cooperation is especially necessary because the Ozone layer may be depleted by ozone-depleting emissions regardless of where on the Earth the emissions come from.[358] This fact is particularly important because it means that broad international cooperation is essential to protecting the Ozone layer.[359] A State (or group of States) that opts not to participate, either by not making commitments, or by not complying with commitments undertaken, may undermine the efforts of cooperating States by emitting ODSs in a quantity sufficient to "hasten depletion of the ozone layer."[360] This characteristic of the

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355. *See* COOTER & ULEN, *supra* note 219, at 40-41; Oakland, *supra* note 219, at 486; WILLIAM J. BAUMOL & ALAN S. BLINDER, ECONOMICS: PRINCIPLES AND POLICY 543-44 (3d ed. 1985); John Head, *Public Goods and Public Policy*, 17 PUB. FIN. 197 (1962); Paul A. Samuelson, *The Pure Theory of Public Expenditure*, 36 REV. ECON. & STAT. 387 (1954).

356. *See* Downie, *supra* note 348, at 97-121.

357. Both public good and common pool resource problems can be "translated" in multiplayer supergames, often an N-player, iterated Prisoners' Dilemma. *See* Setear, *An Iterative Perspective on Treaties*, *supra* note 7, at 178-79 n.160 (listing sources); *see also* Wagner, *supra* note 90, at 377-79, 382. Wagner suggests that:

> [T]he theory of infinitely repeated games . . . highlights the fact that international cooperation for the environment is better represented as a process than as an outcome. In effect, countries are involved in 'continuous dealings' but in reality this process depends much more on history than is allowed for in a supergame.

Id. at 404-05.

358. *See* Drumbl, *Poverty, Wealth and Obligation*, *supra* note 348, at 880-81.

359. *See* Mitchell & Keilbach, *supra* note 84, at 908-09.

360. *Id.* at 909. *See generally* Downie, *supra* note 348, at 103-04. *But cf.* YANG, *supra* note 10, at 38 (suggesting that for international regulatory agreements, such as those agreements that regulate ozone depleting substances, the "marginal injury caused [by the noncompliance of] any one party is likely to be small. So small, in fact, that the complying party may consider it not to be worthwhile to expend resources on the imposition of punitive actions"). As Yang explains:

> [A]ny one party's failure to control the release of ozone depleting substances or greenhouse gases into the atmosphere under the

interdependency problem provides some States with an opportunity to holdout and demand concessions from others.[361]

2. *The Ozone regime.* The Ozone regime is a popular case study for international environmental cooperation because it has been extremely successful in a number of respects.[362] First, and most importantly, participants have significantly reduced (and in some cases completely banned) the production and consumption of various ODSs.[363] Second, participants have collaborated on identifying additional chemicals that pose a risk to the Ozone layer.[364] Third, newly identified ODSs have been added to the list of chemicals targeted for "ratcheting" down production and consumption quotas.[365] Fourth, in response to institutionalized incentives, countries that were not original participants have gradually joined the regime.[366] Of course, there are additional successes and some shortcomings. The analysis below focuses primarily on the manner in which the regime has evolved with respect to substantive

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> respective multilateral environmental treaties is unlikely to undo all or even most of the environmental benefits gained from compliance by the other parties. After all, the harm to such commons resources arises not from any particular nation's individual contribution, but rather the cumulative actions of many nations over a long period of time. Thus, if only one party is in breach, most of the benefits of the treaty are likely to be preserved.

Id. (footnote omitted). Of course, there is an important distinction between particular small-scale (or short-term) incidences of noncompliance by one party and either refusal to participate or long-term noncompliance by certain important parties, such as China and India. *See* Downie, *supra* note 348.

361. *See* sources cited *supra* note 360.

362. *See, e.g.*, Parson, *supra* note 348, at 27 ("The ozone treaty is widely cited as the most successful example of international environmental cooperation to date and the best model for progress on such issues as climate change."); BROWN WEISS ET AL., *supra* note 134, at 663; BENEDICK, *supra* note 348, at 1; Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 194-95.

363. *See generally* UNEP, Ozone Secretariat, Production and Consumption of Ozone Depleting Substances Under the Montreal Protocol 1986-2000 (Apr. 2002), *available at* http://www.unep.org/ozone/15-year-data-report.pdf (last visited Sept. 7, 2003).

364. *See infra* Part III B.2.a.

365. *See infra* Part III B.2.a.

366. *See infra* Part III B.2.a.

obligations, principles, commitments, and compliance institutions.[367]

a. *The Evolution of the Ozone regime and its Compliance Institutions.* In 1974, a series of scientific papers suggested that CFCs could destroy stratospheric ozone.[368] In the mid-to-late 1970s, scientific and public policy debates ensued and various nations, including the U.S., established domestic controls on the use of CFCs in aerosol sprays.[369] However, the European Community, Japan, the Soviet countries, and various large developing countries would not do so, in part because of uncertainties regarding various aspects of the environmental problem.[370] Accordingly, in the late 1970s, the United Nations Environment Programme ("UNEP") was charged with promoting research to develop a better understanding of the problem and its possible solutions.[371] In 1981, UNEP established an Ad Hoc Working Group of Legal and Technical Experts to draft a global framework convention,[372] and in 1985, States adopted the Vienna Convention for the Protection of the Ozone Layer.[373] The Vienna Convention was signed by twenty countries plus the European

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367. For an extremely thorough and insightful analysis of the Ozone regime from the iterative perspective, see Setear, *Ozone, Iteration, and International Law*, *supra* note 7. Setear explores, in significant detail, the institutional choices made to promote iteration and how the Ozone regime has evolved to facilitate cooperation.

368. R. Cicerone, R. Stolarski, & S. Walters, *Stratospheric Ozone Destruction by Man-Made Chlorofluoromethanes*, 185 SCIENCE 1165-67 (Sept. 27, 1974); Mario Molina & F. Sherwood Rowland, *Stratospheric Sink for Chlorofluoromethanes: Chlorine Atom-catalyzed Destruction of Ozone*, 249 NATURE 810-12 (June 28, 1974); Richard Stolarski & Ralph Cicerone, *Stratospheric Chlorine: A Possible Sink for Ozone*, 52 CAN. J. CHEM. 1610-15 (1974). For a more detailed history of the regime's evolution and a discussion of the role of the "ecological 'epistemic community,' a knowledge-based network of specialists who shared beliefs in cause-and-effect relations, validity tests, and the underlying principled values and pursued common policy goals," see Haas, *supra* note 136.

369. *See* Edith Brown Weiss, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 136.

370. *Id.* at 137-39.

371. *Id.*

372. *Id.*

373. Vienna Convention for the Protection of the Ozone Layer, [hereinafter Vienna Convention] UNEP Doc. IG.53/5; 26 I.L.M.1529 (1987) (signed March 22, 1985, entered into force September 22, 1988).

Community, and it entered into force on September 22, 1988.[374]

Through this "framework" convention,[375] parties did not undertake specific binding controls on their production or consumption of ODSs; instead they agreed to cooperate on (1) conducting research and scientific assessment regarding the problem; (2) information exchange; and (3) adopting "appropriate measures" to deal with the problem.[376] Although quite general in nature, these obligations served as the foundation for significant collaborative efforts to better understand the problem and evaluate appropriate cooperative solutions.[377] This was a crucial first step toward international cooperation because it broadly framed the relevant issues at a time where the underlying problem and potential solutions were relatively uncertain and States were understandably hesitant to undertake specific commitments. In essence, the broad framework convention allowed parties to coordinate their behavior while continuing to reframe the problem and potential solutions, as nonbinding agreements frequently do in international environmental regimes.[378]

Importantly, parties fully expected that their commitments would evolve over time.[379] At the time the

374. The Conference of the Parties ("COP") to the Vienna Convention met every two years until 1993, and now meets every three years. The Meeting of the Parties ("MOP") to the Montreal Protocol meets every year.

375. *See* Drumbl, *Poverty, Wealth, and Obligation, supra* note 348, at 864-65 (discussing the framework convention-protocol approach and how it has worked in the Ozone regime); *see* Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 213-15 (discussing the framework convention—protocol approach and how it worked in the Ozone regime); *see also id.*, *supra* note 7, at 214 (noting that "enthusiasm for the convention-protocol approach depends [on] phenomena (such as the acquisition over time of scientific knowledge) that straightforward descriptions of the iterated Prisoners' dilemma do not incorporate.") (footnote omitted).

376. *See generally* Vienna Convention arts. 2-7 and annexes 1-2; *See also* BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 136

377. *See* BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 136.

378. *See, e.g.*, Raustiala, *supra* note 12, at 426 ("[N]on-binding instruments provide flexibility in the face of uncertain means and costs.").

379. *See generally* Vienna Convention arts. 8-10; *See also* BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 136 ("The Convention contemplates that states will adopt protocols to implement it.").

Vienna Convention was being negotiated, the parties contemplated that a protocol with more specific obligations would be negotiated on the side. Due to a lack of consensus on the substance of such a protocol at the time the Vienna Convention was finally adopted, however, the parties left the drafting of a protocol to future development. As many observers have noted, the framework-protocol approach taken in the Ozone regime was particularly important because getting as many countries as possible on board was crucial to any long-term effort to address the environmental problem.[380]

During the late-1980s and early-1990s, reduced uncertainty regarding the problem (particularly its magnitude)[381] and potential solutions, technological developments, and better alignment of developed countries' preferences combined to push States to agree to undertake significant, quantitative commitments to reduce specific ODSs. In 1987, the Montreal Protocol on Substances that Deplete the Ozone Layer ("Montreal Protocol" or "Protocol") was concluded,[382] and in early 1989, it entered into force.[383] The Montreal Protocol imposes obligations on States to control the production and consumption of ODSs through specific measures and timetables.[384] The 1987 version of the Protocol required that parties (other than developing countries) (1) freeze their production and consumption of CFCs at 1986 levels;[385] (2) reduce their production and consumption of CFCs first by 20% and then by another 30% by 1999;[386] and (3) freeze their consumption of halons at

380. *See, e.g.*, BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 136-37; *See also* Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 213-15.

381. Soon after the adoption of the Vienna Convention, the first empirical findings regarding the Antarctic ozone hole were published. A few years later, shortly after the adoption of the Montreal Protocol, more extensive empirical findings strongly indicated that man-made chemicals were responsible for the observed ozone depletion. *See* Wettestad, *supra* note 348, at 157.

382. Montreal Protocol on Substances that Deplete the Ozone Layer [hereinafter Montreal Protocol], 26 I.L.M.1550 (1987) (signed September 16, 1987, entered into force January 1, 1989).

383. This article focuses on the Vienna Convention and the Montreal Protocol, the two most important agreements, and does not discuss subsequent agreements. *See* Setear, *Ozone, Iteration, and International Law*, *supra* note 7 (analyzing series of ozone treaties).

384. *See* Montreal Protocol.

385. *Id.* art. 2A at 6.

386. *Id.*; *see* BROWN WEISS, *The Five International Treaties: A Living*

1986 levels.[387] Parties are also required to submit detailed annual reports containing statistical data on various controlled substances to the Secretariat for the Protocol in Nairobi, Kenya.[388] The Secretariat compiles the various reports and makes them available to parties, other Ozone regime institutional bodies (such as expert panels), and the public for review.[389] If compliance problems arise, such as a failure to report within deadlines or discrepancies in reports, the Secretariat may bring such problems to the attention of the Implementation Committee.

The primary substantive commitments are quantitative in nature, basically capping the amount of a particular chemical that a particular country can produce and consume within a given year.[390] Like the tariff bindings used in the GATT/WTO regime, these commitments are simple legal obligations (not subject to interpretation) and are a relatively easy obligation to police, provided, of course, that the information is reported by parties and that such information is reliable.[391] As with the trading regime,

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History, *in* ENGAGING COUNTRIES, *supra* note 10, at 138-144 (describing the initial commitments and how the commitments were adjusted dynamically over time through adjustments and amendments).

387. BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 138.

388. Montreal Protocol art. 7 (reporting), art. 12 (secretariat).

389. *Id.* art. 12. *See* BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 147-48 (discussing importance of secretariat and these functions); *see also* Robert O. Keohane & Joseph S. Nye, *Transgovernmental Relations and International Organizations*, 27 WORLD POL. 39, 52 (1974) ("International secretariats can be viewed both as catalysts and as potential members of coalitions; their distinctive resources tend to be information and an aura of international legitimacy.").

390. *See, e.g.*, BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 140-44; *See also* Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 211-13.

391. Although in the "early days" of the Ozone regime many countries failed to submit complete reports and there was concern over the reliability of the data submitted, there have been signs of improvement. *See, e.g.*, BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 153. According to recent report of the Implementation Committee:

> [With respect to] data, Article 7 of the Montreal Protocol required Parties to report yearly data within nine months. Over the last three years about 50 per cent of Parties had reported within the deadline, an improvement on the previous rate of between 25 and 40 per cent. Over time, almost all Parties did manage to report data; rates now stood at

governments, industry and NGOs regularly monitor compliance with reporting requirements and substantive obligations.[392]

Numerous amendments to the 1987 Protocol expanded its reach in terms of chemicals covered (by adding phase-out schedules for newly identified ODSs), ratcheted up (in terms of the phase-out rate) both the targets and timetables for those chemicals already covered, and added institutional mechanisms.[393] As with the GATT 1947, amendments bind only ratifying countries,[394] and there have been a series of amendments.[395] As a result, "the pattern of obligations is complicated. Some states are still party only to the original Protocol, others to the Protocol as amended in London, and others to the Protocol as amended in London and in Copenhagen."[396] In addition to the formal amendment process, which binds only those countries that ratify a particular amendment, the parties adopted a dynamic adjustment process through which parties could adjust commitments (targets and timetables) for covered chemicals in a less formal manner that does not require ratification.[397] Through the adjustment process, parties receive notice of an adjustment, and it becomes binding six months

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99 per cent for 1998 data, 96 per cent for 1999, and 91 per cent for 2000.

Report of the Implementation Committee Under the Non-Compliance Procedure for the Montreal Protocol on the Work of its Twenty-Ninth Meeting, United Nations Environment Programme, U.N. Doc. UNEP/OzL.Pro/ImpCom/29/3, at 3 (November 26, 2002).

392. *See, e.g.*, BROWN WEISS, *The Five International Treaties: A Living History, in* ENGAGING COUNTRIES, *supra* note 10, at 152 (noting that the "handful of large companies that produce ozone-depleting substances have an important financial stake in ensuring that their competitors abide by the treaty, as well as the resources to monitor compliance, albeit quietly.").

393. *See id.* at 140-44, Table 5.6 (detailing amendments and adjustments); *see generally* Ozone Secretariat, United Nations Environment Program, Production and Consumption of Ozone Depleting Substances Under the Montreal Protocol 1986-2000 (April 2002).

394. *See* Vienna Convention art. 9(4). *See also* BROWN WEISS, *The Five International Treaties: A Living History, in* ENGAGING COUNTRIES, *supra* note 10, at 139 (discussing the formal amendment process); Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 220 (same).

395. Brown Weiss, *The Five International Treaties: A Living History, in* ENGAGING COUNTRIES, *supra* note 10, at 140-44, Table 5.6.

396. *Id.* at 139.

397. *See id.* (discussing the adjustment process); *See also* Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 221 (same).

thereafter.[398] By contrast, the amendment procedures require a two-thirds vote and ratification and thus make adaptation quite cumbersome, which is particularly debilitating in a regime dependent on rapid advancements in science and technology.

Given the nature of the interdependency problem, maximizing participation is essential to the long-term success of the Ozone regime and to prevent the entire process from unraveling. Basically, a single country with the potential to domestically produce and consume significant quantities of ODSs presents a risk to the Ozone Layer, even if rest of the world were to halt production and consumption entirely.[399] China and India in particular may pose such a risk in the future because of their size and development trajectory. Accordingly, the regime relies on numerous flexible compliance mechanisms designed to encourage and sustain participation, including, for example, the grandfathering of plants being constructed in September 1987 into a 1986 baseline (to encourage Soviet participation),[400] as well as various financial and technical assistance mechanisms discussed below.

The Montreal Protocol provides for special treatment of developing countries to encourage their initial participation.[401] Specifically, Article 5 of the Montreal Protocol makes special allowances for developing countries, including a ten-year delay for compliance with targets and timetables, a separate per capita consumption limit, Multilateral Fund access, and promotion of bilateral assistance programs.[402]

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398. *See* Montreal Protocol art. 2 (9).

399. *See* Downie, *supra* note 348, at 103-05.

400. *See* Montreal Protocol art. 2(6). *See* BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 139 (explaining the purpose of article 2(6)).

401. Montreal Protocol art. 5. *See also* BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 145 (explaining that the purpose of Article 5 was "to induce developing countries to join the Protocol").

402. Notably, parties must be classified as Article 5 countries to be accorded special treatment, and such classification is not permanent. Rather, an open-ended working group is empowered to classify and declassify countries for Article 5 status. To become classified and maintain classification, countries must submit detailed reports. Thus, the positive incentive of special treatment is made contingent on compliance with reporting and data submission requirements. *See, e.g.*, BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 144-45.

Pursuant to the 1990 London Amendment, an interim $180 million Multilateral Fund was established to attract developing countries to the regime by funding the incremental costs incurred by developing countries in meeting their commitments and technology transfer activities.[403] The fund was to expand to $240 million in the event that China and India joined the Montreal Protocol, which occurred in 1991 and 1992, respectively.[404] These institutional mechanisms encourage participation by adjusting countries' payoff structures through positive incentives and sustain participation similarly.[405] In addition, the Protocol prohibits trade in controlled

403. *Id.* at 145; Mitchell & Keilbach, *supra* note 84, at 909-910.

404. The Multilateral Fund and its implementing agencies form an important part of the Ozone regime. *See* Owen Greene, *The System for Implementation Review in the Ozone regime*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 101-05. Developing countries must submit detailed applications to obtain funding for particular projects. The applications are reviewed by various implementing agencies. Funding Eligibility Guidelines provide that a project proposing to create a new facility to produce ODS substitutes may not be funded unless the original ODS production facility is shutdown. *See id.* at 103 (providing example). If granted, the projects are monitored and reviewed to ensure that implementation proceeds as expected. *Id.* at 104-05 (describing the evolving implementation review system). As described in a recent report of the Ozone Secretariat:

> The Multilateral Fund provides assistance to [Article 5] Parties for institutional strengthening, for the preparation of a country programme to implement the control measures and for ODS phase-out projects. It has been recognized that many developing countries may be unable to submit their data until their country programmes have been prepared. The Sixth Meeting of the Parties permitted temporary classification of non-reporting developing country Parties as operating under Article 5 for a period of two years. It also mandated that the Parties operating under Article 5 must report their data within one year of the approval of their country programme by the Executive Committee of the Multilateral Fund. As can be seen from the data, some developing countries have yet to report their data for some of the years for the period 1986 - 2000. These countries are being helped by the Multilateral Fund to prepare their country programmes.

Ozone Secretariat, United Nations Environment Programme, Production and Consumption of Ozone Depleting Substances Under the Montreal Protocol 1986-2000, at para. 6 (April 2002).

405. Ronald B. Mitchell & Patricia M. Keilbach suggest that "[o]nly [the] unambiguous codification of side-payments [in the London Amendments] convinced most developing states to join the regime." *See* Mitchell & Keilbach, *supra* note 84, at 910 (also noting that "[w]ithin three years fifty more developing countries, including all major prospective CFC users, had joined the regime.").

substances between a party and any non-party.[406] This prohibition also adjusts countries' payoff structures, creating a strong incentive for non-parties to join and a strong disincentive for parties to fall into noncompliance.[407]

These innovative institutional mechanisms were designed to broaden participation and implement a Type I strategy, which, generally, has been quite successful. The ratification rate for the Montreal Protocol has been remarkable—twenty-nine countries and the European Community had ratified the Montreal Protocol when it became effective in 1989, and 184 countries had ratified as of March 3, 2003.[408]

It is important to note, however, that participation has come at a cost.[409] Developing countries have tested the value that developed countries give to protecting the Ozone layer and extracted considerable side-payments in exchange for promised participation. Existing ODS production capacity correlates directly with bargaining power because a country may threaten to utilize such capacity unless concessions are granted, a classic hold-up problem. This tactic is particularly successful in cases where the country has a credibly short time horizon. As developed countries have

406. Montreal Protocol art. 4.

407. *See* Wagner, *supra* note 90, at 399 ("Barrett argues that trade sanctions in the Montreal Protocol . . . encourage[d] accession of developing countries. As a matter of fact, participation in this treaty is close to full and sanctions were never carried out. This is consistent with the game theoretical logic that credible punishments need not be carried out in equilibrium. Moreover, it helps explain the remarkable observation that no country has officially objected to the sanctions although they violate the non-discrimination principle of the GATT/WTO.") (discussing S. Barrett, *The Strategy of Trade Sanctions in International Environmental Agreements*, 19 RESOURCE AND ENERGY ECONOMICS 345 (1997)); *but see* Mitchell & Keilbach, *supra* note 84, at 910 (suggesting that the non-party trade ban had a limited effect on countries with large internal markets).

408. *See* Ozone Secretariat, United Nations Environment Programme, Status of Ratification/Accession/Acceptance/Approval of the Agreements on the Protection of the Stratospheric Ozone Layer (August 27, 2003), at http://www.unep.org/ozone/ratif.shtml.

409. As of January 6, 2003, the Multilateral Fund Secretariat, only one of the agencies that funds ozone-related projects, had approved "more than $1,500 million worth of funding of projects and other activities in over 125 Article 5 countries with grants ranging from $50,000 to multimillion dollar grants to countries such as China." Report of the Implementation Committee Under the Non-Compliance Procedure for the Montreal Protocol on the Work of its Twenty-Ninth Meeting, United Nations Environment Programme, U.N. Doc. UNEP/OzL.Pro/ImpCom/29/3, at 3 (November 26, 2002).

eliminated ODS production capacity, large developing countries that have maintained or even expanded production capacity have gained bargaining strength.[410] As David Downie has observed, large developing countries, such as India, substantially expanded their production capacity in the late 1980s and early 1990s at the same time as developed countries closed production facilities.[411] The long-term success of the regime ultimately depends on the sustained participation of large developing countries.[412]

In 1988, pursuant to Article 6 of the Montreal Protocol, expert panels—the Scientific Assessment Panel, Environmental Assessment Panel, and Technology and Economic Assessment Panel—were established to coordinate research. They have since issued a series of important reports on issues relevant to negotiations and implementation. The Panels "involve several hundred scientists worldwide . . . [and] have played a crucial role in causing parties to ratchet up targets and timetables, add chemicals to the list of controlled substances, address problems such as recycling[, and] . . . provided credible risk assessments and evaluations of control options."[413] By engaging experts, the Ozone regime has significantly reduced the uncertainties and transaction costs that could have inhibited international cooperation.[414]

In particular, the Technology and Economic Assessment Panel ("TEAP") has had an important role in facilitating compliance.[415] TEAP's detailed reports on technical

410. For a discussion of this dynamic, see Downie, *supra* note 348, at 104-05, 108-09.

411. *Id.*

412. A similar dynamic may be taking place in the WTO regime in the context of TRIPs. The long-term success of IP harmonization, which is something the developed nations strongly desire, depends on the participation and compliance of developing countries. Arguably, developing nations are in a relatively strong position to hold-out because they have credibly short time horizons (due to domestic priorities) and also, at least in some cases, lack the capacity to comply fully. Developing countries may hold-up developed countries for side-payments in the form of readjusted commitments (extended deadlines, relaxed standards for compliance, etc.), additional trade concessions, and financial and technical assistance, among other things.

413. BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 146.

414. On the importance of engaging scientific and technical experts in international regimes, see generally, Special Issue, *Power, Knowledge and International Policy Coordination*, 46 INT'L ORG. 1 (1992).

415. For a thorough analysis of TEAP as an important compliance institution, see GREENE, *The System for Implementation Review in the Ozone*

options, controls, and ODS substitutes "have played a crucial role in causing parties to ratchet up targets and timetables, add chemicals to the list of controlled substances, and address problems such as recycling."[416] In addition, TEAP has established Technical Options Committees that perform a number of compliance-related functions including monitoring and reviewing implementation by particular ODS-using sectors.[417] Furthermore, TEAP administers the "essential-use" procedure whereby a party may obtain an "essential-use" exemption to allow production or consumption in special cases but only after a detailed examination by TEAP of the party's application.[418] As Owen Greene aptly points out, this procedure performs a key compliance function in that it tends to focus on implementation issues that pose the greatest non-compliance risk; TEAP reviews potential problems and examines possible "problem-solving responses."[419] By requiring applicants to submit extremely detailed applications and then having TEAP experts thoroughly review and study the issues raised, potential noncompliance problems may be averted by "detailed and expert guidance and assistance on how to implement the phase-out."[420] It is not surprising that this managerial or facilitative approach would work well in situations where implementation problems relate to technical expertise. Although such situations tend to involve issues that pose the greatest risk of noncompliance, the risk does not tend to derive from opportunism but rather from well-intentioned parties that simply lack the technical capacity to comply. By engaging technical experts before a compliance problem arises, parties continue to participate and remain in compliance, and thereby avoid noncompliance procedures.

The Parties to the Protocol created a specific Non-Compliance Procedure,[421] and established an Implementa-

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regime, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 89-136.

416. BROWN WEISS, *The Five International Treaties: A Living History*, *in* ENGAGING COUNTRIES, *supra* note 10, at 146.

417. Greene, *The System for Implementation Review in the Ozone regime*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 98.

418. *Id.*

419. *Id.* at 99.

420. *Id.*

421. For a thorough analysis of the Montreal Protocol's Non-Compliance Procedure, see David Victor, *The Operation and Effectiveness of the Montreal*

tion Committee as well as various procedures for monitoring and assessing compliance and dealing with noncompliance issues. The regime established potent noncompliance procedures that may be initiated by one party against another or, as practice has demonstrated, by a party that does not believe that it will be able to meet its commitments.[422] Importantly, the Implementation Committee was intentionally designed to be multilateral and nonconfrontational—and decidedly not judicial. As described by Kal Raustiala, the Committee "does not act in a judicial mode; discussions are not couched as legal arguments. Rather, the Committee relies on facilitation and whatever political pressure emerges from open, transparent discussion of compliance difficulties. It employs what is essentially an administrative, rather than a judicial, approach to noncompliance."[423]

The Implementation Committee may review reports submitted by parties ad hoc, and is empowered to make on-site inspections to assess compliance and to use both positive and negative incentives to encourage compliance or bring a party back into compliance. Positive incentives may take the form of financial or technical assistance, while negative incentives may include warnings or suspension of rights or privileges (including, for example, the ability to trade in controlled substances with other parties).[424]

Protocol's Non-Compliance Procedure, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 135-76.

422. In 1995, Belarus, Bulgaria, Poland, Russia, and Ukraine made noncompliance submissions regarding themselves that were interpreted as formal applications under the Procedure. For a discussion, *see id.*

423. *See* Raustiala, *supra* note 12, at 418-19. The reports of the Implementation Committee illustrate the facilitative, nonadversarial approach. *See, e.g.*, Report of the Implementation Committee Under the Non-Compliance Procedure for the Montreal Protocol on the Work of its Twenty-Ninth Meeting, United Nations Environmental Programme, U.N. Doc. UNEP/OzL.Pro/ImpCom/29/3 (November 26, 2002). *See generally* Reports of the Implementation Committee under the Non-Compliance Procedure for the Montreal Protocol, United Nations Environment Programme, at http://www.unep.org/ozone/impcom/impcom-reports.shtml. For a listing of past recommendations adopted by the Implementation Committee during the period 1990-2000, see Implementation Committee Under the Non-Compliance Procedure for the Montreal Protocol, Recommendations of the Implementation Committee of the Montreal Protocol (1990-2000), United Nations Environment Programme, U.N. Doc. UNEP/OzL.Pro/ImpCom/Inf.1 (June 7, 2002).

424. *See* Ozone Secretariat, United Nations Environment Programme, *Indicative List of Measures That Might be Taken by a Meeting of the Parties in*

Importantly, positive incentives are generally made contingent on participation of the party seeking assistance in the form of submission of detailed plans for national programs and/or annual reports on production and consumption of ODSs.[425] As David Victor demonstrates, the noncompliance procedures established by the Montreal Protocol and implemented by the Implementation Committee blend the management-oriented and enforcement-oriented approaches to compliance.[426]

The Ozone regime also envisions the possibility of dispute settlement.[427] Specifically, Article 11 of the Vienna Convention suggests that parties should resolve their disputes through negotiation,[428] and if that is not successful,

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respect of Non-compliance with the Protocol (Annex V of the Report of the Fourth Meeting of the Parties), *in* HANDBOOK FOR THE INTERNATIONAL TREATIES FOR THE PROTECTION OF THE OZONE LAYER (2003).

425. *See* Greene, *The System for Implementation Review in the Ozone regime*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12, at 102-06. *See also supra* notes 402-04 and accompanying text.

426. Victor, *The Montreal Protocol's Non-Compliance Procedure*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12. The following decision of the Implementation Committee is representative:

> In considering how to deal with the reported cases of potential non-compliance, the Committee agreed that various groups of Parties needed to be treated differently. The Committee agreed that Armenia, the European Community, France, Hungary, Japan, Germany, Italy and Netherlands should receive letters from the Secretariat, asking them to explain in writing their situations of potential non-compliance. The Committee agreed that Bulgaria and Latvia, which had been the subject of previous decisions of the Parties regarding their non-compliance with the Montreal Protocol, should receive strongly-worded letters reminding them that full reporting of data, or a full explanation in writing for reported discrepancies, constituted part of their obligations under the Montreal Protocol. The Committee agreed that Azerbaijan, Lithuania, Russian Federation and Ukraine should be asked by the Secretariat to explain their situations of potential non-compliance, in writing and preferably also in person before the Committee at its next meeting. Since the latter Parties were operating under agreed phase-out plans set out in previous decisions of the Parties, the Committee might wish to recommend further decisions, probably at its next meeting, noting their continued situations of non-compliance and encouraging them to meet their agreed targets.

See Report of the Implementation Committee Under the Non-Compliance Procedure for the Montreal Protocol on the Work of its Twenty-Sixth Meeting, United Nations Enviornment Programme, U.N. Doc. UNEP/OzL.Pro/ImpCom/26/5, at para. 14 (July 23, 2001)

427. Vienna Convention art. 11.

428. *Id.*, at art. 11 (1).

through the good offices or mediation of a third party[429] or a conciliation commission.[430] The article also provides that parties may elect to settle their disputes through arbitration or through the International Court of Justice. Those parties may accept the compulsory jurisdiction of one of these mechanisms at the time of their ratification of the treaty.[431] In the end, however, dispute settlement has not been invoked by any of the parties.[432] Instead, the non-compliance procedures noted above have been universally invoked.

b. *Compliance Strategies.* The Ozone regime employs all three compliance strategies. With respect to Type I strategies, the focus is on positive incentives that are aimed at modifying the payoff structure to encourage participation and compliance. A complex system of funding and technical assistance programs administered through various organizations works in an integrated but decentralized fashion to sustain cooperation as the regime evolves.[433] In addition, the trade restriction prohibiting trade with non-parties acts as an inducement to join and a deterrent from withdrawal. While there is some prospect for negative sanctions through dispute settlement or suspension of rights by the Implementation Committee, such sanctions have not yet been applied.

With respect to Type II strategies, there are a number of institutional mechanisms aimed at reducing uncertainty regarding the problem itself and identifying additional ODSs, and aimed at reducing the transaction or adjustment costs of compliance through facilitative technology transfer and administrative, legal, and technical assistance. Notably, in contrast with the GATT/WTO regime, the need for legalistic mechanisms for interpreting, clarifying, and

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429. *Id.*, at art. 11 (2).

430. *Id.*, at art. 11 (5).

431. *Id.*, at art. 11 (3).

432. *See* Setear, *Ozone, Iteration, and International Law*, *supra* note 7, at 279. Many other international environmental agreements have formal dispute settlement procedures, and "[t]here is a long history in environmental agreements of ignoring formal dispute resolution provisions." Brown Weiss, *Strengthening National Compliance with Trade Law: Insight from Environment*, *in* NEW DIRECTIONS, *supra* note 56, at 468.

433. For further analysis of this "system," see, e.g., Greene, *The System for Implementation Review in the Ozone regime*, *in* IMPLEMENTATION AND EFFECTIVENESS, *supra* note 12.

applying rules and obligations has not been an essential function of the compliance system in the Ozone regime. This is illustrated by the fact that compliance issues thus far have been resolved through the Non-Compliance Procedure and the TEAP process rather than dispute settlement.

With respect to Type III strategies, the readjustment of commitments is an integral part of the Ozone regime. First, the dynamic ratcheting accomplished through adjustment and amendment as well as the addition of newly identified ODSs to the regime demonstrates a repeated cycling through the cooperative process stages and an evolving game structure. Second, both the Non-Compliance Procedure and the TEAP process facilitate the readjustment of commitments as necessary to respond to capacity-related problems. As illustrated by high rates of ratification and compliance, the Type I and Type III strategies employed in the Ozone regime have been quite successful (so far) in getting and keeping parties on board.

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Despite the effectiveness of the Ozone regime thus far and its well-designed institutional framework,[434] the task of maintaining participation and compliance may become more difficult as developing countries are asked to reduce domestic production and consumption of various ODSs. Given the nature of the problem and use of positive incentives as a means to sustain participation, there is some risk that large developing countries may act opportunistically by refusing to participate or threatening to withdraw from the regime in the future. As David Downie explains, the political objective underlying the Ozone regime boils down to one of resource allocation; that is, allocating the use of the Ozone Layer as a sink for ODSs. Given the nonexcludable nature of the Ozone Layer, the "exploitable power to destroy" it becomes a significant source of bargaining power.[435] As he noted, "[i]n recent years, the relative bargaining strength of the U.S., Japan, Australia, and Europe appears to have weakened somewhat

434. *See, e.g.*, Raustiala, *supra* note 12, at 319-20. *See also* O. Yoshida, *Soft Enforcement of Treaties: The Montreal Protocol's Noncompliance Procedure and the Functions of Internal International Institutions*, 10 COLO. J. INT'L ENVTL. L. & POL'Y 95 (1999).

435. *See* Downie, *supra* note 348, at 103-04.

(as they eliminated CFC productions) while that of large developing countries has increased (along with their production capacity)."[436] It remains to be seen whether the continued flow of positive incentives (e.g., financial assistance and technology transfer), the threat of sanctions, or appreciation of the long-term consequences of destroying the Ozone Layer provide sufficient incentives to large developing countries (in particular China and India) to encourage long-term cooperation.[437] As Downie aptly points out, the nature of the underlying problem is that of a common pool resource, which means that initial regime success does not guarantee continued success because "[b]argaining dynamics and interests in [the common pool resource] . . . change over time, presenting new obstacles to cooperation as actors face new incentives and opportunities to seek distributive gains."[438]

CONCLUSION

This article has developed and applied a novel theory for analyzing international legal commitments, compliance institutions, and the dynamic process by which international legal regimes evolve. As international law evolves to meet the demands of increasingly interdependent networks of States and citizens, it takes many forms and performs various functions (beyond monitoring and enforcement). The analytical framework presented in this article provides a powerful means for evaluating and comparing how international law evolves to address problems that arise in various issue-areas. In particular, it helps explain the strategic institutional decisions made by States to address noncompliance risks and increase the likelihood of stable cooperation in the face of dynamic change.

International trade law and international environmental law reflect two different evolutions of both international law and attendant institutional arrangements. International trade law has evolved into a strong version of

436. *Id.* at 105.

437. Of course, even if China, for example, fully intends to take on significant commitments and to comply with its commitments, the "exploitable power to destroy" may nonetheless be leveraged strategically to obtain concessions from developed countries.

438. Downie, *supra* note 348, at 105.

public international law,[439] in large part because of the institutions employed by States to resolve disputes and maintain the stability of the regime as it evolves. While the WTO DSU is seen widely as an enforcement-oriented institution that deters intentional noncompliance through the threat of sanctions (*i.e.*, by adjusting the expected payoff structure), this view overestimates the strength of the remedy made available by the DSU—prospectively compensatory trade measures—which has little deterrent effect standing alone.[440] The more important function served by the dispute settlement institution is to maintain regime stability. As a management-oriented institution, the DSU effectively resolves disputes where noncompliance is not the result of strategic opportunism but rather is the result of (1) an actual dispute over the rules or obligations and how they apply in a specific context, or (2) a capacity problem. With respect to the former cause of unintentional noncompliance, the DSU has thus far proven effective. With respect to the latter cause, dispute settlement first establishes the existence of noncompliance and then provides the parties with an opportunity to renegotiate. To better address capacity problems, the WTO has recently begun to focus on the specific problems that developing countries may face and has been developing capacity-building and technical assistance programs to enable developing countries that lack the resources to fully participate in the WTO.

International environmental law reflects a shift away from the hierarchical structure of international law towards more complex, multi-layered legal frameworks that blur the lines between public international law, private interna-

439. The commitments undertaken by members of the GATT/WTO and other trade agreements are binding legal obligations between States. *See, e.g.*, Steve Charnovitz, *Economic and Social Actors in the World Trade Organization*, 7 ILSA J. INT'L & COMP. L. 260 (2001) ("The WTO agreements are a code of obligations and rights for member governments. None of these obligations apply directly to individual actors.") (footnote omitted). There are, of course, exceptions, such as the investor-State provisions in NAFTA Chapter 11, which permit private party challenges to State action through arbitration. *See, e.g.*, Chris Tollefsan, *Games Without Frontiers: Investor Claims and Citizen Submissions Under the NAFTA Regime*, 27 YALE J. INT'L L. 141 (2002).

440. Of course, the threat of reputational harm and unilateral sanctions may be a sufficient deterrent in some cases. *See supra* notes 271-276 and accompanying text.

tional law, and domestic law.[441] To the extent that States undertake binding commitments in international environmental agreements,[442] the obligations tend to be positively prescriptive, requiring regulatory action on the part of States that gives rise to subsidiary legal relationships between States and their citizens and among private actors themselves. While some suggest that a broad-reaching WTO-like compliance system might improve compliance with international environmental commitments, such a system has not arisen. Instead, States (and other interested entities) often rely on complex, multi-faceted, compliance systems that utilize, for example, positive incentives to both induce and facilitate compliance as well as institutions that dynamically adjust commitments over time.

The compliance system of the Ozone regime is illustrative. The flexible legal regime has permitted the commitments undertaken by States to be adjusted and expanded to new ODSs in accord with scientific and technological progress. Due to the nature of the underlying interdependency problem, maximizing participation is essential to the long-term success of the Ozone regime and to preventing the entire process from unraveling. As a result, parties rely on positive incentives, such as financial assistance, and negative incentives, such as the threat of a trade ban in controlled substances, to adjust the payoff structure and induce participation and continued compliance. For similar reasons, the focus of the compliance institutions in the Ozone regime is management-oriented and facilitative. Unlike the GATT/WTO regime, however, dispute settlement has not been utilized in the Ozone regime; instead, the Non-Compliance Procedure and the TEAP process substitute a nonadversarial approach to dealing with noncompliance problems.

The theory and framework developed in this article should be applied to other issue-areas. For example, the

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441. *Cf.* Brown Weiss, *supra* note 68, at 351 (suggesting that the lines are blurring for international law generally).

442. States frequently rely on non-binding instruments rather than binding legal obligations to advance international environmental (and other) objectives. *See, e.g.*, Mary Ellen O'Connel, *The Role of Soft Law in a Global Order, in* COMMITMENT AND COMPLIANCE, *supra* note 141, at 100-114; BROWN WEISS, INTERNATIONAL COMPLIANCE WITH NONBINDING ACCORDS, *supra* note 140; Raustiala, *supra* note 12, at 425-26.

author is interested in applying the theory to intellectual property harmonization and the TRIPs agreement. Although this article does not directly address compliance issues associated with TRIPs, the theoretical framework and its application to the GATT/WTO regime provide a useful basis for analyzing such issues. A few preliminary observations are in order. First, the underlying interdependency problem motivating cooperation in the area of intellectual property harmonization is quite different from the problem motivating cooperation on trade liberalization, and accordingly, the "rules of the game" are different along a number of fronts; at the most basic level, GATT/WTO-type obligations are proscriptive, *i.e.,* "thou shall not," while the important TRIPs obligations are positively prescriptive, *i.e.,* "thou shall," and in a sense, more like environmental obligations.[443] Second, it is not clear whether the DSU will even be the most important compliance institution for the long-term success of TRIPs.[444] While the DSU is helpful in the sense that it clarifies obligations and identifies whether a country's domestic implementation is in compliance with TRIPs, the primary compliance issues that are likely to arise in the TRIPs context, at least with respect to developing countries, will either be (1) *capacity-based*: a country lacks the resources, expertise, legal infrastructure, etc. to comply,[445] or (2) *intent-based*: a country lacks the incentives to devote

443. *See* Rochelle Cooper Dreyfuss & Andreas F. Lowenfeld, *Two Achievements of the Uruguay Round: Putting TRIPs and Dispute Settlement Together*, 37 VA. J. INT'L L. 275, 279 (1997) (noting that TRIPs obligations "are somewhat different" than GATT obligations); Charles S. Levy, *Implementing TRIPs—A Test of Political Will*, 31 LAW & POL'Y INT'L BUS. 789, 792 (2000) ("TRIPs is essentially the only WTO agreement that requires the adoption of an entire body of law; other agreements, in contrast, merely provide negative prohibitions. . . .Implementing affirmative requirements, however, is necessarily more difficult than implementing negative prohibitions because it requires members to overcome political inertia to get laws passed, and to implement what may be largely new concepts into a legal tradition that has no established way to accommodate them."); Dunoff, *supra* note 22, at 1004.

444. *See* Raustiala, *supra* note 12, at 434 (noting that a managerial approach may be more effective in resolving conflicts than an approach based purely on the enforcement of compliance through the DSU because violations of TRIPs have to be clear, if not flagrant, to be cognizable by the DSU); Reichman, *supra* note 195, at 445.

445. *See, e.g.,* J.H. Reichman, *Enforcing the Enforcement Procedures of the TRIPs Agreement*, 37 VA. J. INT'L L. 335, 344 (1997); Dreyfuss & Lowenfeld, *supra* note 443, at 325-26.

domestic resources towards compliance because compliance with TRIPs is a relatively low priority or is viewed with reluctance.[446] The DSU is not well-suited to address either of these problems. Perhaps more importantly, there may be a strategic opportunity for developing countries to force renegotiation of concessions.[447] To the extent that this assessment of likely compliance issues is accurate, the TRIPs Council, which is charged with "monitor[ing] the operation of [TRIPs],"[448] and capacity-building institutions are likely to be equally if not more important than the DSU in securing meaningful compliance over the long-term.[449]

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446. *See* Dreyfuss & Lowenfeld, *supra* note 443, at 325-26.; *See also* Peter K. Yu, *The Harmonization Game: What Basketball Can Teach About Intellectual Property and International Trade*, 26 FORDHAM INT'L L.J. 218, 230-31(2003) (noting that many developing countries are "reluctant" to "Westernize (or Northernize)" their intellectual property law); J.H. Reichman & David Lange, *Bargaining Around the TRIPs Agreement: The Case for Ongoing Public-Private Initiatives to Facilitation Worldwide Intellectual Property Transactions*, 9 DUKE J. COMP. & INT'L L. 11, 13 & n.17 (1998) (questioning the "widespread belief that, once the transitional deadlines begin to expire, the developing countries will succumb to an evolving high-protectionist agenda" for intellectual property lawmaking).

447. *See supra* note 412 (discussing the potential for hold-out by developing countries in the TRIPs context). Alan O. Sykes, *TRIPs, Pharmaceuticals, Developing Countries, and the Doha "Solution,"* 3 CHI J INTL L 47, 48 (2002) ("Developing nations subsequently united in an effort to relax (or at least 'clarify') the scope of intellectual property protection required for pharmaceuticals under [TRIPs]."); Charles S. Levy, *Implementing TRIPs—A Test of Political Will*, 31 LAW & POL'Y INT'L BUS. 789, 791 (2000) (discussing risk of backsliding); *cf.* discussion of Ozone regime dynamics *supra* Part III.B.

448. *See* TPRM, *supra* note 332, at art. 68.

449. *See* Raustiala, *supra* note 12; *cf.* J.H. Reichman, *Enforcing the Enforcement Procedures of the TRIPs Agreement*, 37 VA. J. INT'L L. 335, 344-45 (1997) (finding the DSU potentially troublesome because of its confrontational approach and concluding that successful administration of TRIPs will depend on "the mediatory role that the Council for TRIPs ought to play"); *see also* Reichman, *supra* note 195, at 445.