Modem International Relations Theory: A Prospectus for International Lawyers

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I. Introduction

In 1985, in a book entitled *World Politics and International Law*, Francis Boyle delivered a caustic critique of the work of international legal scholars: "contemporary public international lawyers have developed a highly formalistic and exclusively technical international legal positivist approach to international relations." Wholly concerned with questions of legality, they have neglected both "the great issues of American foreign policy and world affairs" and the theoretical study of international relations.¹

In terms of theory, at least, Boyle's criticism is exaggerated. International law ("IL") scholarship includes much theoretical work: the massive edifice of the New Haven School, other sociological theory,² emerging Critical Legal Studies theory,³ and so on.⁴ Still, any perusal of IL casebooks, listings of newly published articles, or similar evidence will demonstrate that, overall, the discipline has fallen behind other fields of law in developing an analytical approach informed by social science. Consider, for example, the major American IL casebooks.⁵ These works appear to be pursuing a rather narrow mission—the description of institutions and doctrine. They devote relatively little space to such fundamental issues as the functions that international rules and institutions perform for states, the allocative and distributional consequences of particular rules, and the circumstances under which desirable rules can be created. When issues like these are discussed, it is only briefly and at a

¹. F. BOYLE, WORLD POLITICS AND INTERNATIONAL LAW 59 (1985); see also id. at 58-60.
⁴. For other examples, see STRUCTURE AND PROCESS OF INTERNATIONAL LAW, supra note 2.
⁵. Casebooks are not the most sophisticated scholarship in the discipline, of course, but they are central to teaching, important tools of reference, and suggestive of how the discipline defines itself. I have reviewed most of the major casebooks, albeit not systematically. The casebook representing the New Haven School—M. McDougal & W. Reisman, INTERNATIONAL LAW IN CONTEMPORARY PERSPECTIVE: THE PUBLIC ORDER OF THE WORLD COMMUNITY (1981)—draws more on theory than its competitors, and that theory is in some ways inconsistent with modern international relations (IR) theory. I will not, however, undertake a comparison of the two theories here. For criticism of the New Haven School as a vehicle for uniting IL and IR scholarship, see F. BOYLE, supra note 1, at 61-67. I will refer in this section to L. HENKIN, R. PUGH, O. SCHACHTER & H. SMIT, INTERNATIONAL LAW: CASES AND MATERIALS (2d ed. 1987) [hereinafter L. HENKIN, INTERNATIONAL LAW] as representative of the standard casebooks.
high level of generality.\textsuperscript{6} As a result, the casebooks have no need to draw on explicit theoretical approaches. Especially noteworthy is the minimal influence of economics; economic analysis, and the rational choice approach of which it is a part, have led to a creative upheaval in most fields of legal study, thoroughly permeating both teaching and scholarship, but they have largely been shunned by IL scholars.

Noteworthy too—and not unrelated—is the estrangement between IL and the most closely related social science discipline, international relations ("IR"). With a few notable exceptions,\textsuperscript{7} scholars in these two fields have long proceeded on separate tracks.\textsuperscript{8} They have for the most part worked independently, published in different journals, attended different conferences, and cited each other's work only to a very limited degree. Over time, scholars in each field have become unfamiliar with the other's research agenda, making cooperation increasingly difficult.\textsuperscript{9}

For IR scholars, the problem has not been mere unfamiliarity, but an aversion to the legalistic approach identified by Boyle: "[the] tradition of positive international law . . . [is] regarded with something approaching contempt by students of international politics . . . ."\textsuperscript{10} IR scholarship, though, has also contributed to the "unwarranted schism."\textsuperscript{11} Realism, the dominant IR theory for over two thousand years, has had little to say to students of international law.\textsuperscript{12} Classical Realists see a world of states

\textsuperscript{6} See, e.g., L. Henkin, International Law, \textit{supra} note 5, at 21 (International law serves policies of "order and stability, peace, independence, justice, [and] welfare.") (quoting L. Henkin, How Nations Behave: Law and Policy 10 (2d ed. 1979) [hereinafter L. Henkin, How Nations Behave]) ("International law is law like other-law, promoting order, guiding, restraining, regulating behavior.") (citing \textit{Restatement (Revised) of the Foreign Relations Law of the United States}, introductory note to pt. I, ch.1). The problem of compliance, which combines supply and demand elements, is most often discussed analytically, but again the analysis is quite general. \textit{See id.} at 19 ("Reciprocity of obligations may function . . . to encourage compliance."); \textit{see also id.} at 20-23.

\textsuperscript{7} See, e.g., F. Boyle, \textit{supra} note 1; M. Kaplan & N. Katzenbach, The Political Foundations of International Law (1961).

\textsuperscript{8} Early in the century, IR scholars were much concerned with international law and organization, particularly in connection with the League of Nations. \textit{See J. Dougherty & R. Pfaltzgraff, Jr., Contending Theories of International Relations} 2-4 (2d ed. 1981).

\textsuperscript{9} For a similar description of the estrangement between the law and society and the law and economics movements, see Ellickson, \textit{Of Coase and Cattle: Dispute Resolution Among Neighbors in Shasta County}, 38 STAN. L. REV. 623 (1986).

\textsuperscript{10} Bull, \textit{Recapturing the Just War for Political Theory}, 31 WORLD POL. 588, 588 (1979); \textit{cf.} F. Boyle, \textit{supra} note 1, at 1-7; Donnelly, \textit{International Human Rights: A Regime Analysis}, 40 INT'L ORG. 599, 639-40 (1986) (most scholarly literature on human rights is legalistic; even the best is predominantly descriptive and positivistic, and ignores politics).

\textsuperscript{11} F. Boyle, \textit{supra} note 1, at 60.

obsessed with their power vis-à-vis other states.\textsuperscript{13} International rules and institutions are mere window-dressing: their creation and decline, and the degree to which states respect them, depend solely on the current power realities.\textsuperscript{14} IL scholars have seen little point in a dialogue with adherents of this view.\textsuperscript{15}

Some postwar Realists, however, have come to acknowledge the relevance of international cooperation and have sought a better theoretical understanding of international rules and institutions.\textsuperscript{16} One particularly important body of theory, emerging only in the 1980s, focuses on normative orders called "international regimes." The development of regime theory and related theories of international cooperation—what I call modern IR theory—offers a long-overdue opportunity to re-integrate IL and IR.

This opportunity does not depend on the "regime" concept itself. The most widely accepted definition of a "regime" is that put forward by Stephen Krasner: regimes are sets of "implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area of international relations."\textsuperscript{17} Although this defi-

\begin{enumerate}
\item See Keohane, Theory, supra note 12, at 508.
\item See Krasner, Structural Causes and Regime Consequences: Regimes as Intervening Variables, 36 INT'L ORG. 185, 190-91 (1982) [hereinafter Krasner, Structural Causes]. International rules may be used, however, as ex post rationalizations for actions taken for reasons of power. See F. Boyle, supra note 1, at 7-8.
\item Henkin refers to such a dialogue as a dialogue de sourds. See L. Henkin, How Nations Behave, supra note 6, at 2-4.
\item See R. McKinley & R. Little, Global Problems and World Order 82-87 (1986); Keohane, Theory, supra note 12, at 530. Other IL scholars have followed more "Utopian" theories, such as the functionalist approach, which holds that international interdependence and transnational contacts through international organizations will gradually overcome state conflict. See, e.g., D. Mitrany, The Functional Theory of Politics (1975). For brief discussions, see F. Boyle, supra note 1, at 5-7; R. Keohane, After Hegemony: Cooperation and Discord in the World Political Economy 7-9, 66 (1984) [hereinafter R. Keohane, After Hegemony]. Modern IR theory, as described in this article, is in a real sense a synthesis of Realism and the functionalist approach, the two principal lines of postwar theory.
\item Krasner, Structural Causes, supra note 14, at 186. Krasner's definition continues: "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." \textit{Id.} Neither "principles" nor "norms" necessarily implies a moral element; the principles of a regime can simply be taken to define its purposes. See R. Keohane, After Hegemony, supra note 16, at 57-58. Regimes, then, are not necessarily "good," though they are often discussed as if they were. See \textit{id.} at 72-73; Strange, Cavel Hic Dragones: A Critique of Regime Analysis, 36 INT'L ORG. 479, 487-88 (1982) [hereinafter Strange, Cavel].
\end{enumerate}
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dition has been heuristically valuable, it lacks precision: it does not re-
ally answer the question, "How do we know a regime when we see
one?" To complicate matters further, the definition does not reflect a
consensus: theorists have advanced both broader and narrower concep-
tions of a regime. None of the prevailing definitions, moreover, is con-
gruent with the usual descriptive categories of IL, such as customary
rules, conventional rules and international organizations. Debate over
the proper definition of "regime" and its relation to IL seems likely to be
sterile, and will not be pursued here. I will use the term in this article,
but only in a non-technical sense to refer to relatively complex normative
orders.

The opportunity to integrate IL and IR stems, rather, from the analyt-
cal approaches, insights and techniques of modern IR theory, which can

illuminating example, see generally Ruggie, International Regimes, Transactions and Change:
Embedded Liberalism in the Postwar Economic Order, 36 INT'L ORG. 379 (1982).


19. See Haggard & Simmons, supra note 18, at 493-96. Narrow regime definitions empha-
size formality or institutionalization. See Strange, Cavel, supra note 17, at 485; Stein, Coordi-

Broader conceptions have also been advanced. Puchala and Hopkins, for example, assert that regimes "exist primarily as participants' understandings, expectations or convictions about legitimate, appropriate or moral behavior," and conclude that "a regime exists in every substantive issue-area in international relations where there is discernibly patterned behavior." Puchala & Hopkins, International Regimes: Lessons from Inductive Analysis, 36 INT'L ORG. 245, 246-47 (1982). For a similar conception, see Young, Regime Dynamics: The Rise and Fall of International Regimes, 36 INT'L ORG. 277, 277-81 (1982) [hereinafter Young, Regime Dy-
namics]; O. Young, RESOURCE REGIMES: NATURAL RESOURCES AND SOCIAL INSTITUTIONS (1982). Such definitions include a great deal of what Stein calls "normal international polit-
ics." Stein, Collaboration, supra, at 300; see also id. at 300 n.1.

"Cognitive" theorists take a very different approach. These scholars assert that "cooperation cannot be completely explained without reference to ideology, the values of actors, the
beliefs they hold about the interdependence of issues, and the knowledge available to them about how they can realize specific goals." Haggard & Simmons, supra note 18, at 509-10. NA
tional interests, structural constraints, and desirable regimes must be understood in terms of
"historically conditioned, interpretive frameworks." Id. at 499. The leading cognitive theorist
is Ernst Haas. See Haas, Is There a Hole in the Whole? Knowledge, Technology, Interdepen-

20. Krasner's definition, for example, envisions a relatively complex arrangement. It
would probably not include a particular rule of customary law or many specific international
agreements. Keohane, in fact, sharply distinguishes regimes from agreements, arguing that a
major function of regimes is to facilitate the conclusion of agreements. See infra text accompa-
nying notes 332-33.
readily be applied to a variety of legal norms and institutions. With the development of this theory, IL and IR have much to contribute to each other. For its part, IL can offer modern IR scholars an immense reservoir of information about legal rules and institutions, the raw material for the growth and application of the theory. Modern IR theory, on the other hand, offers IL scholars an escape from the narrow positivism ecoriated by Boyle. In seeking to explain the underlying bases of conflict and cooperation in international politics, the theory has begun to ask fundamental analytical questions like those noted above, setting out an ambitious research agenda. It brings to bear a powerful analytic approach, viewing international norms as products of sophisticated self-interest, the rational choices of states in a decentralized world. In this respect it forms part of a larger interdisciplinary “rationality project.”

The theory utilizes the rigorous modes of analysis characteristic of rational choice theory, notably economics and simple game theory. In short, modern IR theory incorporates just those modes of inquiry and analysis in which IL scholarship has been weakest.

An example might serve to illustrate the kinds of inquiry that modern IR theory makes possible. Consider the Limited Test Ban Treaty (LTBT) and the Nuclear Non-Proliferation Treaty (NPT), related sets of norms designed to restrict the development and spread of nuclear weapons. The traditional IL approach would focus on the lawfulness of state conduct under these conventional norms or under customary norms arguably derived from them. Modern IR theory would supple-

22. This project motivates scholarship in political science, law, public administration and many other fields. For a critical account, see D. Stone, Policy Paradox and Political Reason 4-7 (1988).
25. A case study of the development of these norms is used in M. McDougal & W. M. Reisman, supra note 5, to illustrate that “[t]he traditional conception of international law as 'rules' quite obviously offers but the faintest glimpse of the structures, procedures and types of decision that take place in the contemporary world community.” Id. at 5; see id. at 8-46 (case study of atmospheric testing of nuclear weapons). A similar case study is used in Reisman, International Law-making: A Process of Communication, 75 AM. SOC'Y INT'L L. PROC. 101, 114-19 (1981) [hereinafter Reisman, International Law-making] to illustrate the New Haven School's approach to law-making. For useful discussions of the background of the LTBT and NPT, see INTERNATIONAL ARMS AGREEMENTS: ISSUES AND AGREEMENTS 126-34 (LTBT), 148-59 (NPT) (C. Blacker & G. Duffy eds. 2d ed. 1984) [hereinafter INTERNATIONAL ARMS AGREEMENTS].
26. Even McDougal's seminal article on nuclear testing takes this approach, albeit in a non-traditional way. McDougal & Schlei, The Hydrogen Bomb Tests in Perspective: Lawful
ment that approach with a broader scholarly perspective based on a rational choice model of state interaction.

First, an analyst using modern IR theory might inquire into the incentives that lead rational states to cooperate in the formation of regimes like the LTBT and NPT: what do states gain from such regimes that makes them willing to restrain the development of important weapons and the export of valuable technology? One might begin by examining the structure of the relationship between the United States and the Soviet Union, the prime movers behind both conventions; game models would be well suited to this task. In analyzing the widespread adoption of the LTBT and NPT, economic models might be more useful: both conventions can be interpreted as institutional arrangements designed to improve the outcome of unregulated market-like interactions.

Second, one might extend this functional analysis to more detailed characteristics of the two regimes. One of the salient institutional features of the NPT, for example, is its reliance on the International Atomic Energy Agency ("IAEA"), particularly for the application of "safeguards" to peaceful uses of nuclear energy. Exactly what functions does the IAEA perform, and what arrangements, if any, take its place in the LTBT?

Third, one might inquire into the conditions that favored U.S.-Soviet agreement and widespread participation in conventions governing these two issue areas, when other bilateral and multilateral security regimes have been difficult to form. One might also pursue the negative of this inquiry: why have important near-nuclear states refused to ratify the NPT? Can any lessons be learned that would assist in designing regimes to restrict biological and chemical weapons, ballistic missiles, or battlefield nuclear weapons? Could conditions in those areas be modified by joint or unilateral action to make cooperation easier?

Fourth, one might ask related questions about compliance, for both the Soviet Union and the United States have seemingly modified their conduct to conform with LTBT and NPT norms. What factors in these areas encourage compliance with international rules in the face of obvious short-run incentives to cheat? How do the LTBT and NPT regimes themselves encourage compliance?

*Measures for Security, 64 YALE L.J. 648 (1955).* A recent, innovative IL casebook adopts the same approach to the NPT and the LTBT in the setting of an hypothetical case. B. WESTON, A. D'AMATO & R. FALK, INTERNATIONAL LAW AND WORLD ORDER: A PROBLEM-ORIENTED COURSEBOOK 410-15, 426-40 (1980). I hasten to add that the article by Professor Reisman, *see supra* note 25, and the McDougal & Reisman casebook, *see supra* note 5, go well beyond the question of lawfulness to explore the process by which international norms are established.
While all these questions cannot be answered here, this article is designed to make it possible for IL scholars, teachers and practitioners to pursue similar inquiries across a wide range of issues. The article introduces the major elements of modern IR theory and the work of its leading contributors, and suggests their relevance to the study of international law. The article is thus appropriately titled a “prospectus”: it is a detailed description of an enterprise designed to inform (and entice) potential participants. The plan of the article is as follows. Section II introduces the basic concepts of modern IR theory. Sections III through V then explore its application in greater detail. Section III introduces elementary game theory and explores several basic game models that epitomize common forms of state interaction. Section IV analogizes international politics to the operation of a market, and examines two common forms of “political market failure.” Section V, drawing on the insights of Ronald Coase, examines certain structural deficiencies of international politics in the light of market theory.

The structure of sections III through V emphasizes what Robert Keohane has dubbed the “demand side” of modern IR theory—why states rationally demand international regimes—because this aspect can provide immediate insight into the functions of familiar norms and institutions. Elements of the “supply side”—how international cooperation is achieved—are also discussed. All three sections offer numerous specific examples, suggesting many possibilities for further research. The final section is a brief summary and conclusion, which returns to the example of the LTBT and NPT regimes.

II. Fundamental Concepts

A. The Third Image

In 1959, the Realist scholar Kenneth Waltz examined the answers given by political philosophers to the question “where are the major causes of war [and, by implication, other events in world politics] to be found?” The answers could be grouped under three headings: “within man, within the structure of the separate states, within the state system.” Waltz labeled these perspectives the first, second and third “images” of international relations.28

27. See Keohane, The Demand for International Regimes, 36 INT’L ORG. 325 (1982) (introducing supply and demand approach to international regimes) [hereinafter Keohane, Demand]. Supply and demand should not be too sharply distinguished, however, since the same actors and many of the same influences are responsible for each. Id. at 326-27.

Hans Morgenthau's first image theory of international conflict, for example, stemmed from beliefs about human nature. Important second image theories stress the internal political processes of states. Graham Allison, for example, suggested that the actions of states in the Cuban missile crisis could be interpreted as the output of large organizations or as the result of bargaining among bureaucracies. Other theorists interpret foreign economic policy in terms of the efforts of politicians to be reelected. All of these approaches are valuable and should be pursued, singly and in combination.

Waltz, however, argued for the use of third image or systemic theory, at least as the starting point of analysis, for two principal reasons. First, the structure of the international system—the relation of its principal units in terms of important variables—creates the context within which lower level causal factors operate. As Waltz explained, "the situation in which [states] act and interact constrains them from some actions, disposes them toward others, and affects the outcomes of their interactions." The constraints and incentives inherent in a situation must therefore be considered at least simultaneously with lower-level variables, and may themselves provide satisfactory explanations of outcomes. Second, third image theory is more parsimonious than lower level theories. Because it deemphasizes the myriad causal variables at the level of the state and the individual, it can suggest explanations based upon relatively little information.

Waltz himself created third image theory on a grand scale. He argued that the international political system is anarchic, that states are primar-
ily concerned with power, and that differences in power are the principal distinctions among states. The distribution of power, especially among the “great powers,” therefore, determines the structure of the international system at any given time. Waltz’s work analyzed the effects of various power distributions on state interactions, particularly balance of power politics. 38

Impressive as it is, Waltz’s theory is of limited relevance to IL scholars. Like traditional Realism, it implicitly denies the value of international law as a discipline. Modern theorists like Robert Keohane, 39 Robert Axelrod, 40 Duncan Snidal, 41 Arthur Stein, 42 Robert Jervis, 43 and Kenneth Oye, 44 however, have built on Waltz’s structural approach and created a third image theory expressly concerned with the role of international rules, regimes and institutions. Many of the systemic factors emphasized by Waltz remain important in modern IR theory. Anarchy, for example, remains a fundamental assumption. 45 The distribution of power can also be important. 46 Yet despite these common elements, modern structural theory differs from Waltz’s analysis in major ways.

The most basic difference is that factors in addition to the distribution of power are seen as determining the structure of state interactions. As discussed more fully below, modern theorists observe that states pursue many goals other than power, and that relative power does not dominate

38. See K. WALTZ, THEORY, supra note 33; R. KEOHANE, AFTER HEGEMONY, supra note 16, at 62, 206.
39. See, e.g., R. KEOHANE, AFTER HEGEMONY, supra note 16; Keohane, Theory, supra note 12; Keohane, Demand, supra note 27.
45. See id. at 1; infra text accompanying notes 59-70.
46. See R. KEOHANE, AFTER HEGEMONY, supra note 16, at 63 (modern regime theory can take account of Realist insights about power); id. at 70-73 (relations of power help determine character of regimes); Snidal, Coordination, supra note 41, at 930, 935 (more powerful states disproportionately influence content of international regimes); Young, Regime Dynamics, supra note 19, at 284-85 (powerful states may impose regimes). Power in the relevant issue area may be as important as power on a world scale, however. See, e.g., R. KEOHANE, AFTER HEGEMONY, supra note 16, at 197 (applying hegemonic stability theorem on issue area basis).
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every interaction. The structure of many interactions, then, largely depends upon the specific characteristics of the issue area: the courses of action among which states must choose and the outcomes expected to result from different combinations of choices. This notion of structure is strategic, emphasizing how each state's actions advance its own goals and affect the situations of others. The analysis of strategic structure characterizes rational choice theory, from which modern IR theory draws heavily.

Other differences follow from this more complex view of structure. Modern IR theorists tend to shift their focus from the international system as a whole to the interactions in particular issue areas. This narrower focus is appropriate, indeed necessary, because different issue areas exhibit strikingly different structures. For example, a concern for relative power may dominate interactions between military rivals on matters of security, making cooperation difficult, but interactions among friendly states on economic or environmental issues may be more conducive to cooperation.

Modern IR theorists also consider some structural attributes that do not figure in Waltz's work, such as the adequacy of the information available to states and the transaction costs of state interaction. Factors like these help determine the extent to which states can act effectively to improve their welfare within particular strategic structures.

Finally, modern IR theory is distinguished by its emphasis on international rules, regimes and institutions, ranging from broad general norms, like those recognizing the authority of states and restraining the use of force, to specific regimes for particular issue areas, such as the rules embodied in arms limitation accords. Norms and institutions figure in the theory in two complementary ways. First, they are often the focus of analysis, interpreted functionally as responses to a situation in which collective action promises superior results. In addition, established norms and institutions become part of the framework of state interaction, and must be included among the "givens" in a structural analysis. Like law

47. See infra text accompanying notes 76-82.
48. See R. KE OHANE, AFTER HEGEMONY, supra note 16, at 65-70; Snidal, Coordination, supra note 41, at 924-25.
49. See Snidal, Game Theory, supra note 41, at 25, 45. An issue area is a subjectively defined set of problems dealt with by states and other actors as a substantive unit. See R. KE OHANE, AFTER HEGEMONY, supra note 16, at 61.
50. See R. KE OHANE, AFTER HEGEMONY, supra note 16, at 26, 57-58; Snidal, Game Theory, supra note 41, at 45. For a discussion of the pitfalls in attempting to reason from functions (effects) back to causes, see R. KE OHANE, AFTER HEGEMONY, supra note 16, at 80-82.
in modern republican political theory, international norms can even change the underlying situation. By making the political environment more benign, for example, international norms may allow states to devote more attention to goals requiring cooperation.

B. "The Anarchical Society"

Like most successful theories, modern IR theory begins with a model: a simplified, abstract description of the relevant entities and relationships. In fact, the theory utilizes many models to represent the diverse structures of particular issue areas. All, however, incorporate certain common assumptions designed to isolate the essential structural features.

Two major assumptions characterize the international political system as a whole.

1. The international system is a system of states. Modern IR theorists recognize that non-state actors—such as multinational enterprises, non-governmental organizations and international institutions—can play significant roles in international politics. Yet they still treat states as the primary actors in the system, much as Realist theorists do. This emphasis is at least in part a product of the theory's concern with rules, regimes and institutions: states are treated as the primary actors because they are observed to be the principal creators and objects of international normative orders. Non-state actors can be incorporated into specific models when their influence warrants it.

53. For discussions of the use of models, see, e.g., A. Isak, Scope and Methods of Political Science 135-49 (1975); K. Waltz, Theory, supra note 33, at 7-13; Snidal, Game Theory, supra note 41, at 32-36; R. McKenzie & G. Tullock, Modern Political Economy 9 (1978). See also W. Riker & P. Ordeshook, An Introduction to Positive Political Theory i (1973).
54. For useful discussions of the kinds of assumptions referred to here, see T. Moe, The Organization of Interests 13-19 (1980); W. Riker & P. Ordeshook, supra note 53, at 8-37.
57. See R. Keohane, After Hegemony, supra note 16, at 25, 61-62 (states typically create regimes; regimes typically affect national controls and interstate agreements, not private activity).
58. See, e.g., R. Keohane, After Hegemony, supra note 16, at 150-77 (analysis of post-war arrangements governing Middle East oil, emphasizing role of private firms).
(2) The system of states is anarchic. Even Realists recognize that the international system is "flecked with particles of government and alloyed with elements of community"; modern IR theorists stress the role of international norms and institutions. Still, both groups take anarchy as the basic ordering principle of the system. In this context, anarchy is not synonymous with chaos or disorder. It means instead that power and authority are decentralized, held only by the constituent units, the states. No central institutions are empowered to decide for all. Similarly, authority is not hierarchical: no institution, and no state, can legitimately control the actions of other states by virtue of its position. More powerful states can influence weaker ones, but all are formally equal, a condition reinforced by the "constitutional" rules of classical international law.

Consistent with the assumption of anarchy, modern IR theorists do not conceptualize international rules and regimes as parts of a naturally emerging supranational order; such a viewpoint would be easy to criticize as Utopian. Rather, they interpret them as intentional artifacts of state interaction. This contractarian approach leads naturally to consideration of the functions that rules and regimes perform for states and

59. K. Waltz, Theory, supra note 33, at 114.
60. See Axelrod & Keohane, supra note 40, at 226; Donnelly, supra note 10, at 601.
61. See, e.g., R. Keohane, After Hegemony, supra note 16, at 62-63; Snidal, Game Theory, supra note 41, at 36 (game theory "illuminates the fundamental issues of international anarchy"); Stein, Collaboration, supra note 19, at 300; Oye, supra note 44, at 1; K. Waltz, Theory, supra note 33, at 114-15; Young, Anarchy and Social Choice: Reflections on the International Polity, 30 World Pol'y 241, 242 (1978) [hereinafter Young, Anarchy and Social Choice]. In contrast to Realist theory and modern IR theory, other schools see social institutions as pervasive in international society. See Krasner, Structural Causes, supra note 14, at 192-94 (discussing theorists in "Grotian tradition").
63. See R. Keohane, After Hegemony, supra note 16, at 63.
64. Because it interprets regimes as products of conscious choice by rational states, modern IR theory will contribute to the debate over those aspects of international law theory in which the contractarian element is controversial: (1) the role of state consent in the creation of customary law, see Cheng, Custom: The Future of General State Practice in a Divided World, in Structure and Process of International Law, supra note 2, at 513; Charney, The Persistent Objector Rule and the Development of Customary International Law, 1985 Br. Y.B. Int'l L. 1, 1-2; Restatement (Third) of the Foreign Relations Law § 102(2) comment b (1987) [hereinafter Restatement (Third)]; (2) the "persistent objector" principle, see Weil, Towards Relative Normativity in International Law?, 71 Am. J. Int'l L. 413, 433-34; Stein, The Approach of the Different Drummer: The Principle of the Persistent Objector in International Law, 26 Harv. Int'l L.J. 457 (1985); Charney, supra, at 2-5; and (3) the emergence of general customary law from treaties, see Restatement (Third), supra, § 102(3).
the conditions that encourage or inhibit their creation, i.e., the demand and supply inquiries emphasized in this article.

Because anarchy implies a lack of central direction, the assumption of anarchy also leads to consideration of the ways in which states select norms, that is, the methods of international social choice. In a decentralized political environment, these methods must rely on more or less direct accommodation of differences in preferences, although voting and other hierarchical procedures are used in some international organizations. IR theorists have identified force and coercion, bargaining, and tacit adaptation through conventions as the principal methods of international social choice. Although this article does not undertake the project, analysis of the sources of international law and other important legal principles in the light of social choice theory could prove highly fruitful.

C. The State as Rational Egoist

Modern IR theory seeks to abstract from the attributes of particular states, their internal political processes, leaders and people. The theory therefore attributes to states, by assumption, certain common, idealized

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65. Social choice methods are the procedures used by political systems to choose among or aggregate individual preferences. See D. Mueller, Public Choice 1-2 (1979); W. Riker & P. Ordeshook, supra note 53, at 2 (politics is process of social choice among individual preferences). The possible methods range from violence to parliamentary democracy. See Young, Anarchy and Social Choice, supra note 61, at 242, 245-48.

66. See K. Waltz, Theory, supra note 33, at 113; R. Keohane, After Hegemony, supra note 16, at 18; Young, Anarchy and Social Choice, supra note 61, at 248. For a survey of the leading organizations, see L. Henkin, International Law, supra note 5, at 1387-412 (organizations for technical, social and cultural cooperation), 1413-69 (European Communities).

67. See Young, Anarchy and Social Choice, supra note 61, at 250-56; see also R. Keohane, After Hegemony, supra note 16, at 51-53, 76.


69. See, e.g., R. Keohane, After Hegemony, supra note 16, at 52. Coordination problems are often resolved through the emergence of conventions, even in the absence of communication. See infra text accompanying notes 189-90.

70. Conceiving of force as a method of social choice, for example, helps explain why the absence of other workable methods, such as a powerful Security Council, places such a strain on Article 2(4) of the U.N. Charter and other legal restraints on the use of force. See Franck, Who Killed Article 2(4)? or, Changing Norms Governing the Use of Force by States, 64 Am. J. Int'l L. 809 (1970); Reisman, Coercion and Self-Determination: Construing Article 2(4), 78 Am. J. Int'l L. 642 (1984).
characteristics, and it treats these as constants, not as variables. Most important are the following:

(1) States are unitary actors. In fact, as already suggested, interest group pressures, bureaucratic or electoral politics, and other internal conflicts affect foreign policy decisions in every state. Structural theory, however, would be virtually impossible without the assumption of unity; analysis of structural incentives would otherwise bog down in attempting to accommodate the variegated internal decision processes of states.

(2) States are egoists. Their preferences are based on assessments of their own well-being. The Realist assumption of egoism is useful in a theory that analyzes the responses of states to external, structural incentives, but it is also retained, at least in part, as an intellectual tactic. Those who assert the relevance of international law and institutions are often criticized as Utopian, forced to invoke fictions like a "world-wide 'community of nations' dedicated to the preservation of peace." With the assumption of egoism, however, modern IR theory can account for international norms and institutions on hard-headed Realist premises, without the need to "smuggle in" assumptions of altruism or cosmopolitanism.

Modern IR theorists diverge sharply from traditional Realists, however, in their understanding of the interests that egoistic states pursue. Realists like Waltz assume that states are primarily concerned with power. Since power is inherently relative—whatever strengthens one rival necessarily disadvantages the other—virtually all state interac-

71. See Keohane, Theory, supra note 12, at 508-09; R. Keohane, After Hegemony, supra note 16, at 25. The theory does not, of course, treat all states as identical, giving great weight to varying state interests and preferences, see supra notes 47-48, and accompanying text; Keohane, Theory, supra note 12, at 529, and to differences in power and other capabilities, see supra note 46, and accompanying text.


73. See R. Keohane, After Hegemony, supra note 16, at 27, 66; cf. Krasner, Structural Causes, supra note 14, at 195; O. Young, Compliance and Public Authority 17 (1979) ("[I]ndividual subjects will act to maximize their own welfare.") [hereinafter O. Young, Compliance]; Snidal, HS Theory, supra note 41, at 593.


76. According to Waltz, states "are unitary actors who, at a minimum, seek their own preservation and, at a maximum, drive for universal domination." K. Waltz, Theory, supra note 33, at 118.

77. See Jervis, Security Regimes, supra note 43, at 359 (speaking about military power); Krasner, Regimes and the Limits of Realism: Regimes as Autonomous Variables, 36 Int'l Org. 497, 498 (1982) [hereinafter Krasner, Regimes and Realism].
tions are zero-sum, and cooperation is meaningless. Modern IR theorists, however, begin with a broader understanding: "[T]he implication that the search for power constitutes an overriding interest in all cases . . . [is] rejected. Under different systemic conditions states will define their self-interests differently." As arms control agreements attest, even military rivals may find it in their interest to control their competition for power. In settings like Western Europe and North America, moreover, what Keohane and Nye called "complex interdependence"—high levels of interaction on many issues, via multiple channels, public and private, formal and informal—can make the use of military force practically irrelevant. States in complex interdependence, and all states to some degree, can turn their attention to the pursuit of wealth and such "quality of life" goals as a cleaner environment. Goals like these are positive-sum: they can only be achieved, or can be more fully achieved, with international cooperation. Even egoistic states, then, will have incentives to cooperate in the creation of regimes that promise superior outcomes.

(3) States are rational. They have consistently ordered preferences and choose among alternative courses of action so as to further those preferences. The rationality assumption is essential to structural theory. It allows the analyst to interpret the actions of states as meaningful,

78. See Krasner, Regimes and Realism, supra note 77, at 498; Snidal, Game Theory, supra note 41, at 39; Grieco, Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Internationalism, 42 INT'L ORG. 485 (1988).

79. Keohane, Theory, supra note 12, at 529; see also Snidal, HS Theory, supra note 41, at 593-94.

80. Even in such relationships, military power may have important political consequences, and force may be a more realistic option in relations with other states. But the easy resort to force seen as characteristic by Realists does not reflect the practice of states in "complex interdependence." See R. KEOHANE & J. NYE, supra note 55, at 24-29. Complex interdependence was designed as an ideal type, to be contrasted with the ideal of Realism. See id. at 23-24.

81. See id. at 23-29 (in complex interdependence, security issues do not always dominate interstate relations); R. KEOHANE, AFTER HEGEMONY, supra note 16, at 18-22; Keohane, Theory, supra note 12, at 508, 529.

82. See Krasner, Regimes and Realism, supra note 77, at 498-99; Snidal, Game Theory, supra note 41, at 39; Stein, Collaboration, supra note 19, at 311; R. KEOHANE, AFTER HEGEMONY, supra note 16, at 51-54. These interactions are best described, in Schelling's phrase, as "mixed-motive games." Id. at 67.

83. Rationality, one should note, is not taken to encompass perfect information; indeed, the functions of regimes in providing information are important subjects of analysis. See infra text accompanying notes 344-63. Keohane has also made use of the theory of bounded rationality originated by Herbert Simon, which recognizes the cognitive limits of the human mind. See R. KEOHANE, AFTER HEGEMONY, supra note 16, at 111-16. For a brief discussion of Simon's theory, see E. MACKAY, ECONOMICS OF INFORMATION AND LAW 135-43 (1980). Although corporate entities like states may be able to devote far more resources to decision-making than individuals, bounded rationality still implies that states simply never consider some opportunities for beneficial cooperation. Keohane suggests, however, that the fact that independent action is likely to be less than optimal reduces the opportunity cost of joining a
purposive conduct, and—together with the assumption of unity—to reason directly from structural incentives to state responses without considering internal decision-making processes.\textsuperscript{84} For precisely these reasons, the assumption of state rationality has also been a “cornerstone of Realism.”\textsuperscript{85}

Modern theorists, though, hold a broad view of state rationality akin to their view of state interests. In this view, rationality goes beyond the “simple pursuit of immediate self-interest.”\textsuperscript{86} Rational states can calculate the future benefits and costs of their actions, and they may forego short-run advantages for greater long-run benefits. They can also choose their actions with reference to the potential responses of other states. What Snidal calls “strategic rationality” makes it possible for states to operate effectively in an interdependent, positive-sum world.\textsuperscript{87}

D. The Rational Actor Approach

1. Simplifying Assumptions

The explicit use of idealized assumptions is unfamiliar to most IL scholars and may lead some to question the value of modern IR theory. A few additional comments on this methodology therefore seem appropriate.

All analysts recognize that assumptions like unity and rationality omit important real-world variables. Without the simplification such assumptions provide, however, a theory could do little more than describe; it would not be a workable, let alone a parsimonious, tool for explanation and prediction.\textsuperscript{88} In addition, the assumptions of a particular theory serve to highlight the elements that figure in its explanatory logic.\textsuperscript{89} The assumptions of unity and rationality, for example, direct attention to the


85. SNIDAL, Game Theory, supra note 41, at 38.

86. SNIDAL, HS Theory, supra note 41, at 594.

87. See SNIDAL, Game Theory, supra note 41, at 38-40.

88. R. MCKENZIE & G. TULLOCK, supra note 53, at 9-10; Friedman, supra note 37, at 30; SNIDAL, Game Theory, supra note 41, at 35, 38-40; K. WALTZ, Theory, supra note 33, at 6-7. Producing explanations and predictions is the aim of the scientific method generally. It is often said that explanation and prediction are logically identical, differing only in whether theory is applied to a past event or to a future one. See A. ISAAC, supra note 53, at 105-06, 113-15; M. BLAUG, supra note 37, at 3-4. In fact, however, some scientific theories predict without explaining (Newton’s theory of gravitation) and others explain without predicting (Darwin’s theory of evolution). See id. at 4-9.

89. See, e.g., SNIDAL, Game Theory, supra note 41, at 28, 32-34.
influence of external incentives on the actions of states; they indicate that internal decision processes do not figure in a structural theory.  

90. Essentially the same assumptions highlight external incentives in microeconomic theory. The same assumptions highlight the role of external incentives in microeconomics. The third image perspective, however, makes it difficult to explain in detail the behavior of individual states. The theory's strength is in explaining general tendencies and patterns of response; it will be more or less powerful as states follow or diverge from those patterns.

Rational actor assumptions do not constrain modern IR theory as much as may appear. Egoism, in particular, is only given content by the specification of state preferences, and these can vary widely. Keohane, for example, discusses the possibility of altruistic preferences, while recognizing that these may be difficult to distinguish from the pursuit of long-run self-interest. In analyzing measures like foreign assistance or the Generalized System of Preferences, consideration of the interplay between egoism and altruism can greatly enrich analysis. Assumptions like anarchy and state primacy can also be modified to reflect international rules and institutions, hierarchical arrangements like the European Communities, or important sub-state actors.

90. See R. KEOHANE, AFTER HEGEMONY, supra note 16, at 27, 29, 66, 70.

91. In standard economic analysis, firms are typically identified as unitary actors making rational decisions aimed at maximizing profits. See R. LIPSEY, P. STEINER & D. PURVIS, ECONOMICS 48-49 (7th ed. 1984). Just as in modern IR theory, these assumptions allow economists parsimoniously to explain, at least generally, how firms and households respond to different market structures. See K. WALTZ, THEORY, supra note 33, at 71-72; R. KEOHANE, AFTER HEGEMONY, supra note 16, at 27. For more detailed analysis, economists have begun to develop theories of the firm. The classic work is Coase, The Nature of the Firm, ECONOMICA 386 (1937); for a more recent analysis, see Alchian & Demsetz, Production, Information Costs, and Economic Organization, 62 AM. ECON. REV. 777 (1972).

92. See, e.g., K. WALTZ, THEORY, supra note 33, at 118, 121-22 (expecting specific predictions is like expecting theory of gravitation to predict exactly path of falling leaf). Economics, similarly, can more easily predict individual behavior under perfect competition or monopoly than under oligopoly, where there is no clearly best course of action for the firm. See W. BAUMOL & A. BLINDER, ECONOMICS: PRINCIPLES AND POLICY 524-25 (3d ed. 1985); R. KEOHANE, AFTER HEGEMONY, supra note 16, at 27-28. Many situations in international politics resemble the conditions of oligopoly. See Snidal, Game Theory, supra note 41, at 25, 31-32; ECONOMIC THEORIES OF INTERNATIONAL POLITICS 131-37 (B. Russett ed. 1968); R. KEOHANE, AFTER HEGEMONY, supra note 16, at 28-29; K. WALTZ, THEORY, supra note 33, at 116-28.

93. See R. KEOHANE, AFTER HEGEMONY, supra note 16, at 120-31; see also Kindleberger, Systems of International Economic Organization, in MONEY AND THE COMING WORLD ORDER 15, 18-19 (D. Calleo ed. 1976) [hereinafter Kindleberger, Systems]. In most cases, the distinction can be maintained, for states infrequently act in ways that even appear altruistic.

94. See Snidal, Game Theory, supra note 41, at 35 (discussing diversity of models possible under game theory). Sub-state actors are not yet well integrated into the theory. See Snidal, Coordination, supra note 41, at 926; Frank, The First Oil Regime, 37 WORLD POL. 586 (1985) (regime analysis does not capture interdependence of states and non-state actors).
Snidal argues that modern IR theory can only purport to explain state behavior if its assumptions, however simplified, accord with reality. If its adherents aspire to become scientific, he asserts, they must test and refine their assumptions. This program is to be applauded. Yet rational actor assumptions have already proven their worth in many fields of inquiry. If used flexibly, with caution, and in their proper domain, they can lead to compelling explanations.

2. "Scientific" Theory

As the preceding discussion indicates, many IR scholars have been greatly concerned with scientific rigor. Both supporters and critics of modern IR theory have attempted to follow the positivistic precepts of the natural sciences—e.g., specifying simplifying assumptions, isolating causal variables, and generating deductive explanations and predictions—in spite of obstacles such as the difficulty of empirical testing. Most international lawyers will not wish to follow such an austere and treacherous path. Fortunately, even a more relaxed approach can yield valuable dividends. Keohane points out that "[m]uch of what students of world politics do . . . is to make the actions of states understandable . . . that is, in [anthropologist Clifford] Geertz's words, to provide 'a context within which they can be intelligibly described.'" Modern IR theory can help IL scholars to "illuminate . . . [the] social phenomena" of international rules, regimes and institutions by describing and interpret-

95. See Snidal, HS Theory, supra note 41, at 584; Snidal, Game Theory, supra note 41, at 27, 33-36, 38 n.17; see also R. Keohane, After Hegemony, supra note 16, at 69-75 (discussing limitations of rational-choice models).

Waltz, in contrast, professes the pure instrumentalist position associated with Milton Friedman: the realism of a theory's assumptions is unimportant; the only test is whether the theory is useful in prediction. See K. Waltz, Theory, supra note 33, at 116-19; Friedman, supra note 37, at 14-15. The essay in which Friedman puts forth this position is the "centerpiece of postwar economic methodology . . . [Unfortunately], so subtle is Friedman's argument that even now it is difficult to find two economists who will agree on precisely what it was that Friedman said." M. Blaug, supra note 37, at 103. For an extensive discussion and critique of this extreme position, see id. at 103-20.

96. See, e.g., Snidal, Game Theory, supra note 41. See also B. Russet & H. Starr, World Politics: The Menu for Choice 25-30 (2d ed. 1985); Keohane, Theory, supra note 12, at 505 (considering applicability of philosophy of science criteria of Imre Lakatos); K. Waltz, Theory, supra note 33, at 1-17. For a general discussion of the application of the scientific method to political science, see A. Isaak, supra note 53, at 47-61.

97. See Keohane, Theory, supra note 12, at 506. For a thorough debunking of the "modernist" method in economics, the social and even the physical sciences, see McCloskey, The Rhetoric of Economics, 21 J. Econ. Lit. 481 (1983). For a somewhat cynical account of why social science has become so rigorously scientific, see Rogowski, Rationalist Theories of Politics: A Midterm Report, 30 World Pol. 296 (1978).

98. See Keohane, Theory, supra note 12, at 505-06, citing C. Geertz, The Interpretation of Cultures (1973).
E. Summary

Modern IR theory differs from structural Realist theories of international politics in its emphasis on the role of international rules, regimes and institutions. The theory looks for causal factors in the structure of state interactions, but views that structure primarily in terms of the interplay of diverse state goals and strategies in particular issue areas, not simply in terms of the distribution of power. Because of this broader strategic view, characteristics like information and transactions costs become relevant; rules, regimes and institutions are also seen as significant structural characteristics.

To make structural analysis possible, states are treated as the primary actors in a decentralized political environment and are assumed to behave as rational egoists: each state's preferences are based on assessments of its own well-being, and courses of action are chosen so as to further those preferences. The creation of international rules, regimes and institutions is seen as a purposeful activity designed to improve unsatisfactory situations. Because of its structural basis, the strength of modern IR theory lies in explaining general tendencies and patterns of state behavior.

III. Game Theory and Problems of Collective Action

A. Introduction

Game theory is an especially concrete and graphic form of rational actor theory. A “game” in game theory is a model of a situation in which two or more rational actors must choose among alternate courses of action.100 Game models are natural adjuncts to third image theory, because they show the results of different combinations of actions in terms of the actors’ own preferences. Games reveal how the conduct of

99. See Snidal, Game Theory, supra note 41, at 26, 28-32.

Game theory can become highly mathematical, beyond the ability of most international lawyers, certainly the present author. See, e.g., R. LUCE & H. RAIFFA, supra. Nonetheless, even sophisticated analysts find valuable insights in elementary game analysis. See, e.g., Snidal, Game Theory, supra note 41; Oye, supra note 44, at 2 n.2.
each player in a situation of interdependence affects itself and others, and expose “the pattern of structural constraints on players’ choices.”

They have become a valuable tool for modern IR scholars.

Four elements are necessary to define a game: the players, their options, the objective outcomes resulting from different combinations of player choices, and the values the players place on those outcomes, called “payoffs.” In modern IR theory, the players are usually states, but they can also be private actors, as in Charles Lipson’s work on international banks. The players’ options must be specified for each issue area. For simplicity, however, theorists often specify two general choices, representing the “basic modalities” of cooperation and non-cooperation, often called “defection.”

The “2x2” game, depicted as a matrix in which two actors each face two choices, is the simplest and most common format. Both dimensions must sometimes be expanded, making the analysis more complex and more difficult to depict graphically. When there are more than two actors, for example, the increased difficulty of bargaining may hamper cooperation. Larger numbers, on the other hand, may make possible some forms of cooperation—Snidal gives the example of the European Airbus—out of reach for smaller groups.

A game known as “Harmony” is shown in figure 1 to illustrate the 2x2 format. In this matrix, State I must choose between the top and bottom rows, representing cooperation and defection. State II must choose between the left and right columns, representing the same options. The four cells of the matrix represent the four possible factual outcomes. These must be specified for particular interactions: in analyzing an international trade issue, cell 1 (CC, indicating mutual cooperation) might

101. Lipson, International Cooperation in Economic and Security Affairs, 37 WORLD POL. 11 [hereinafter Lipson, Cooperation]; see Snidal, Coordination, supra note 41, at 925; Snidal, Game Theory, supra note 41, at 26-28.
103. In some situations, weaker states may in fact have little or no choice. Although game models can depict this situation, some scholars argue that games may be more useful in analyzing West-West or East-West relations than North-South relations. See Snidal, Game Theory, supra note 41, at 40; Snidal, Coordination, supra note 41, at 926; R. Keohane, After Hegemony, supra note 16, at 70-73.
104. See G. Snyder & P. Diesing, supra note 68, at 83; Snidal, Game Theory, supra note 41, at 37.
105. See Snidal, Coordination, supra note 41, at 925. Other formats include the “extensive form,” a decision tree that depicts a sequence of plays, see Wagner, The Theory of Games and the Problem of International Cooperation, 77 AM. POL. SCI. REV. 330, 333 (1983), and a non-graphical statement of the players’ preference orderings, see Oye, supra note 44, at 7-8.
106. See Snidal, Coordination, supra note 41, at 927-30; Snidal, Game Theory, supra note 41, at 52-55; Oye, supra note 44, at 19-20; Wagner, supra note 105, at 344.
FIGURE 1: HARMONY

<table>
<thead>
<tr>
<th></th>
<th>STATE II</th>
</tr>
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<tbody>
<tr>
<td>Cooperate</td>
<td></td>
</tr>
<tr>
<td>Cooperate</td>
<td>4,4</td>
</tr>
<tr>
<td></td>
<td>(cell 1)</td>
</tr>
<tr>
<td>Defect</td>
<td>3,2</td>
</tr>
<tr>
<td></td>
<td>(cell 2)</td>
</tr>
<tr>
<td>STATE I</td>
<td></td>
</tr>
<tr>
<td>Defect</td>
<td>1,3</td>
</tr>
<tr>
<td></td>
<td>(cell 3)</td>
</tr>
<tr>
<td></td>
<td>2,1</td>
</tr>
<tr>
<td></td>
<td>(cell 4)</td>
</tr>
</tbody>
</table>

represent mutual free trade, cell 4 (DD, designating mutual defection) a trade war; in a security setting, cell 1 might represent arms control or mutual disarmament, cell 4 an arms race, cell 2 (DC) or 3 (CD) unilateral disarmament. The pairs of numbers in the cells represent the payoffs associated with these outcomes; the payoff to State I is given first. These payoffs are ordinal, with 4 the highest.107

Assigning payoffs is both the most important and the most problematical aspect of defining a game. Payoffs are intended to represent subjective preferences, but true subjective preferences are necessarily fictional in the case of a collective, inanimate entity like a state. The greatest temptation is to reason backward from outcomes to preferences, but that would render analysis circular. Preferences of political leaders can be researched in official documents, memoirs, and the like, but these sources

107. Payoffs designated by cardinal numbers are usually impossible to specify. When the intensity of the players' preferences is important, one may need to specify interval level preferences, or at least make some estimate of relative intensity. Examples are situations in which a state must compare payoffs between games in different issue areas or over time, and situations in which an interaction is vital to one state but unimportant to the other. In the second case, some comparison of intensity between players would also be required. See Snidal, Game Theory, supra note 41, at 46-47; Oye, supra note 44, at 8-9.
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may be incomplete and even intentionally misleading. Snidal argues that specification of payoffs based on the analyst's theoretical understanding of an issue area is at present the most satisfactory solution,\textsuperscript{108} and that is the approach taken in this article. Ultimately, though, a more complete understanding of state preferences—taking account of the external situation, domestic politics, and prevailing ideas and beliefs—must be integrated into structural theory.

In the Harmony game, each player's first preference is for the jointly cooperative outcome; indeed, each prefers unilateral cooperation to unilateral noncooperation. In these circumstances, relations between the players should be naturally harmonious, with little need for rules or institutions. Although two states with the preferences of liberal economists would find international trade a Harmony game, real-world examples are hard to find.\textsuperscript{109} At the opposite extreme is Deadlock, shown in figure 2. In this game, at least one player (here both) prefers mutual noncooperation to mutual cooperation, and conflict is inevitable. Examples of Deadlock are unfortunately easier to identify. Downs, Rocke and Siverson suggest, for example, that Deadlock may characterize certain arms races.\textsuperscript{110}

In games between the extremes of Harmony and Deadlock, the conditions of play are often crucial to the outcome. International rules and regimes can substantially affect outcomes, payoffs, even the definition of the players and their choices.\textsuperscript{111} Characteristics such as the number of times a game is expected to be played, the number of players, their ability to communicate, the information available to them, and their ability to change their moves can also affect outcomes.\textsuperscript{112} Such characteristics are particularly relevant in analyzing when cooperative solutions can be reached.

Even if all these conditions are carefully specified, though, the use of game models "necessarily entails setting aside some contextual and his-

\textsuperscript{108} See Snidal, \textit{Game Theory}, supra note 41, at 40-44.
\textsuperscript{109} See Stein, \textit{Collaboration}, supra note 19, at 301-02; Oye, supra note 44, at 6-7; see also R. Keohane, \textit{After Hegemony}, supra note 16, at 51-52.
\textsuperscript{110} An arms race would reflect Deadlock preferences where the weaker of two rival states believes that equal military expenditures will increase its relative strength, while arms control will freeze its inferior position. See Downs, Rocke & Siverson, \textit{Arms Races and Cooperation}, 38 \textit{World Pol.} 118, 120-23 (1985). States may also have Deadlock preferences because of the power of an internal pressure group, like the arms industry. \textit{Id.}; see also Oye, supra note 44, at 6-7; Axelrod & Keohane, supra note 40, at 229-31.
\textsuperscript{111} See Snidal, \textit{Game Theory}, supra note 41, at 35, 45; Axelrod & Keohane, supra note 40, at 238.
\textsuperscript{112} See Snidal, \textit{Game Theory}, supra note 41, at 35, 45, 48-52; Snidal, \textit{Coordination}, supra note 41, at 927; Oye, supra note 44, at 12-16; R. Keohane, \textit{After Hegemony}, supra note 16, at 75-76; Wagner, supra note 105, at 331-33.
torical richness.” The simplicity of game models limits their ability to describe real-world phenomena. Games compensate for these limitations, however, “by clearing away the underbrush of detail to facilitate clarity and rigor.”

B. The Prisoners’ Dilemma

1. Demand

To most IR scholars, the famous game known as the Prisoners’ Dilemma (PD) best exemplifies the reasons why states seek collective action and why cooperation is often difficult to achieve. Although all collective action problems are not PDs, many are, and the game dramatically

113. Snidal, *Coordination*, supra note 41, at 925; see also Snidal, *Game Theory*, supra note 41, at 26-28; Lipson, *Cooperation*, supra note 101, at 1, 10-11.

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illustrates the broader class of problems arising from the unrestrained pursuit of short-term self-interest.\footnote{\textcite{115}}

The 2x2 PD matrix is shown in figure 3.\footnote{\textcite{116}} The classic PD game is played only once. Players are assumed to be unable to communicate or to see each other’s moves, but to be aware of all the information on the matrix. Under these restrictive conditions—which can often be relaxed—the incentive structure of the PD can lead to a “tragic” outcome at odds with the players’ own interests.

First, in the symmetrical PD incentive structure, each player has an “offensive” incentive to defect, \textit{i.e.}, an interest in maximizing its payoff. State I, for example, can realize its highest possible payoff by defecting while State II cooperates (cell 3: DC). Offensive defection is predatory: compared to mutual cooperation (cell 1: CC), State I’s payoff increases to 4, while that of State II drops to 1, the “sucker’s payoff.”\footnote{\textcite{117}} Each player also has a “defensive” incentive to defect, \textit{i.e.}, an interest in avoiding a very low payoff. Even if State II wished to cooperate, for example, it can see that cooperation will likely lead to the sucker’s payoff, while defection will guarantee a payoff of at least 2 (cell 4: DD). In short, defection is the “dominant strategy” for each player: each is better off defecting whatever the other does. This feature of the PD explains much international conflict.

If both players defect, however, each receives a lower payoff than it could have received through mutual cooperation. By definition, the joint payoff is less than the social optimum, the maximum amount jointly obtainable by the players. To avoid joint defection and gain the higher payoffs available from cooperation, rational states in a PD will tend to seek international rules and institutions designed to restrain defection. Because of the defensive incentives for defection, such restraints must apply to all players: “states surrender some of their authority or auton-

\footnote{\textcite{115}. See Gowa, \textit{Anarchy, Egoism and Third Images: The Evolution of Cooperation and International Relations}, 40 INT’L ORG. 167, 171-75 (1986); Axelrod & Keohane, \textit{supra} note 40, at 231.}

\footnote{\textcite{116}. The narrative form of the PD is the tale of two guilty prisoners suspected of a major crime. The DA has only enough evidence to convict them of misdemeanors. Each prisoner knows that, if neither confesses, both will receive only light sentences; if both confess, however, both will be subject to more severe felony sentences. To elicit confessions, the DA meets with each prisoner separately and offers the following deal: if either prisoner confesses while the other does not, all charges against the confessor will be dropped, while the nonconfessor will receive the maximum possible sentence. The typical outcome is confession by both prisoners, resulting in prison sentences that they could have avoided by silence. See Conybeare, \textit{Public Goods, Prisoners’ Dilemmas, supra} note 114, at 8. The joint payoff in cell 1 must be greater than the average of the joint payoffs in cells 2 and 3. Otherwise, in an iterated game, the players could profit by alternating defections. See Axelrod & Keohane, \textit{supra} note 40, at 229 n.4.}
FIGURE 3: PRISONERS’ DILEMMA

STATE II

Cooperate  |  Defect
---|---
Cooperate  |  3,3 | 1,4
(cell 1) | (cell 2)
Defect  |  4,1 | 2,2
(cell 3) | (cell 4)

STATE I

For many social contract theorists, similar incentives operating on individuals explain the formation of the state itself as an institution restraining defection from social norms. For many social contract theorists, similar incentives operating on individuals explain the formation of the state itself as an institution restraining defection from social norms.119

2. PDs in International Politics

Situations characterized by PD incentives are common, if not pervasive, in international life. A particularly important PD analogue, emphasized by Realists, is the “security dilemma.”120 Every state will naturally take measures to ensure its own security. Other states, however—uncer-
tain of their neighbors' motives and observing that most weapons can be used to attack as well as to defend—may perceive such actions as a threat. These states in turn will take additional precautions, but these measures will create greater insecurity in other states, and so on, in a spiral of insecurity. The defensive side of the PD—magnified here by the potentially devastating nature of the sucker's payoff—thus drives the security dilemma. Its predatory side, the desire to gain power relative to one's rivals, also contributes. Hostile states and blocs like the United States and the Soviet Union can become enmeshed in an ongoing security dilemma with many manifestations. In such a situation, and in the security area in general, regimes are particularly difficult to create.

Arms races offer a more specific illustration of the security dilemma: each state in an arms race spends enormous sums, seeking a temporary advantage, but all end up less secure than before. States have, however, made some efforts toward negotiated control of arms races. According to Downs, Rocke and Siverson, the 1922 Washington Naval Treaty and modern arms control agreements like SALT I and II can be seen as addressing situations "in which the participants can plausibly be argued to have Prisoners' Dilemma preferences." Similarly, the Nuclear Nonproliferation Treaty ("NPT"), in which non-nuclear-weapon states renounce the acquisition of nuclear weapons, can be interpreted as a device to prevent the escalation of arms race PDs into the nuclear arena. The NPT also addresses a PD among nuclear-weapon states, by attenuating their commercial and political incentives to compete in marketing destabilizing nuclear materials and technology to non-nuclear-weapon states.

PD situations also involve bases of state power other than weapons. Glenn Snyder, for example, describes a PD competition to expand alliances or political blocs: the creation of offsetting alliances could leave the major powers with burdensome commitments yet no greater security. (Once in an alliance, the supporting members face a second PD in decid-

121. See Snyder, "PD" and "Chicken" Models, supra note 114, at 93-94; Gowa, supra note 115, at 175; Stein, Collaboration, supra note 19, at 312-13.

122. See, e.g., Downs, Rocke & Siverson, supra note 110, at 120-21, 127-32; H. Hamburger, supra note 100, at 77-79; Snyder, "PD" and "Chicken" Models, supra note 114, at 68-69, 74-75; Lipson, Cooperation, supra note 101, at 13; Wagner, supra note 105, at 340-42. Arms races can also reflect the games of Deadlock, see supra figure 2, and Stag Hunt, see infra figure 4.

123. See Downs, Rocke & Siverson, supra note 110, at 130.

124. Supra note 24.

125. Id. art. I, 21 U.S.T. at 487, 729 U.N.T.S. at 171. The NPT also addresses, albeit indirectly, the ongoing nuclear arms race PD between NATO and the USSR. Id. art. VI, 21 U.S.T. at 489, 729 U.N.T.S. at 172.
ing how actively to support the alliance leader.\textsuperscript{126} States may enter similar competitions for territory; Wagner observes that international boundaries, and the legal rules that maintain them, are in essence devices to restrain such competition.\textsuperscript{127}

In the area of economics, predatory “beggar-thy-neighbor” policies typically reflect the PD.\textsuperscript{128} Predatory policies include the classic optimum tariff, other strategic trade policies designed to capture rents, competitive exchange rate devaluations, and similar policies designed to alter capital flows.\textsuperscript{129} Many rules of international economic law function to restrain such measures and thus to avoid the reduction in welfare inherent in mutual defection. Since PD incentives characterize cartels, arrangements such as OPEC, the Arab League boycott, and commodity price stabilization agreements must also struggle to restrain predatory defection.\textsuperscript{130}

3. Supply

Although agreements, rules and regimes restraining defection could increase state welfare in PD situations, the PD incentives pull inexorably toward non-cooperation. How is it, then, that such norms are ever created, and why are they created in some situations but not in others? Similarly, why are norms calling for cooperation in PD situations often observed,\textsuperscript{131} even though no sovereign enforces them, and why does compliance occur in some situations and not in others? The “supply side” of modern IR theory has begun to address these questions.

\begin{itemize}
\item \textsuperscript{127} See Wagner, supra note 105, at 330.
\item \textsuperscript{128} See Conybeare, Trade Wars: A Comparative Study of Anglo-Hanse, Franco-Italian, and Hawley-Smoot Conflicts, 38 World Pol. 147, 170 (1985) [hereinafter Conybeare, Trade Wars].
\item \textsuperscript{129} See Abbott, Trading Nation’s Dilemma, supra note 32, at 508-10; Conybeare, Public Goods, Prisoners’ Dilemmas, supra note 114, at 10, 18-19; P. Krugman, Strategic Trade Policy and the New International Economics (1986).
\item \textsuperscript{130} See Stein, Collaboration, supra note 19, at 305, 313 n.12.
\item \textsuperscript{131} The general perception is that states disregard international agreements and rules whenever it advances their immediate interest; international lawyers devote many pages to rebutting this perception. See L. Henkin, How Nations Behave, supra note 6, at 39-98; Restatement (Third), supra note 64, at introductory note to pt. I, ch. 1. Although “occasional, sometimes flagrant violations” undoubtedly occur, see id., examples of compliance are also easy to find, see R. Keohane, After Hegemony, supra note 16, at 98-106. States do not, moreover, face a binary choice between compliance and violation: rules can be bent, reinterpreted, renegotiated or avoided. See id. at 89, 98-99. The empirical question of compliance is thus very difficult to resolve, and the main research to date consists of a few case studies. See, e.g., F. Boyle, supra note 1, at 67 (discussing International Crises and Role of Law series). This dearth of research makes a better theoretical understanding all the more important.
\end{itemize}
To most authorities, the crucial factor in the emergence of cooperation is the degree to which an interaction among states will continue over time. To model continued interaction, analysts assume that a game is played more than once. When a PD game is repeated, the present benefit a state might see in defection—refusing to join in establishing a norm—is frequently offset by the lower payoffs it can foresee resulting from the defection of others in future iterations. In an indefinitely iterated PD game—even in a single-play game in which states can repeatedly change their moves in response to the actions of others—egoistic actors will rationally cooperate. In effect, the prospect of indefinite iteration can change the payoffs on any given play, turning the PD into a more cooperative game.

Once a norm is established, the costs of defection include the weakening of that norm: although a single violation will not usually cause the collapse of a norm or a regime, it may make defections by others more likely, leading ultimately to the loss of a valuable institution. Because new norms restraining defection are difficult to create, a state expecting many future iterations may view a functioning norm as worth preserving, even if noncompliance might produce a more nearly optimal result in any given iteration.

Cooperation can also emerge and be maintained through "horizontal" iteration—the linkage of different issue areas. At the time of regime formation, the linkage of issues through bargaining can make satisfactory trade-offs possible. Once a regime has formed, linkage makes it possible for states to respond to cooperation or defection in one area with appropriate actions in another, much as in an iterated game.

The basic conditions for international cooperation and compliance, then, are frequently present. Most interactions between states recur in-

133. See Snidal, Coordination, supra note 41, at 930.
134. The influence of repeated play will be stronger if the number of iterations is indefinite. See Oye, supra note 44, at 13 (Incidence of cooperation rises under iterated Prisoners' Dilemma); R. Luce & H. RAIFFA, supra note 100, at 97-102. But see R. HARDIN, COLLECTIVE ACTION 145-50 (1982).
135. See Snidal, Coordination, supra note 41, at 931; Wagner, supra note 105, at 332-34. Again, the effect will be stronger if neither side can predict which move will be the last. See Wagner, supra note 105, at 332-33.
136. See R. KEOHANE, AFTER HEGEMONY, supra note 16, at 105.
137. See id. at 100, 102.
138. See Snidal, Coordination, supra note 41, at 939; Axelrod & Keohane, supra note 40, at 226, 239-41; R. KEOHANE, AFTER HEGEMONY, supra note 16, at 76.
139. See, e.g., Downs, Rocke & Siverson, supra note 110, at 130-32 (trade-offs on non-naval issues made Washington Naval Treaty possible).
140. As each PD situation "becomes embedded in a broader social context, cooperation is increasingly possible . . . ." Snidal, Coordination, supra note 41, at 939.
definitely, because states rarely disappear and similar issues constantly arise. Regimes in different issue areas are linked in complex ways. States can often change their moves within a particular game. It is even possible to structure interactions to increase the degree of iteration. Increasing iteration is an important function of ongoing institutions like regular U.S.-Soviet summit meetings, regular Western economic summits, and regular meetings of trade ministers in GATT. Breaking negotiations into smaller parts also increases the level of iteration. 

Even so, the “shadow of the future”—the effect of iterated play—can be longer or shorter depending on several factors. The first is the weight that states give to future payoffs. A state’s time horizon—the number of iterations it is willing or able to consider—and its discount rate—the degree to which it values future payoffs less highly—determine the weight it attaches to future payoffs. Both elements primarily reflect characteristics or decision processes internal to states.

A second important factor in continuing interactions is the relative magnitude of different payoffs. As Jervis observes, cooperation is more likely when the cooperative payoffs, CC and CD, are relatively high and the payoffs for defection, DD and DC, are relatively low. The intriguing point is that states can act to modify these payoffs and improve prospects for cooperation. Consider, for example, the American troops posted in Europe. In the security PD between the United States and the Soviet Union, these “hostages” lower the potential Soviet DC payoff for aggression by committing the United States to the defense of Europe. In the intra-alliance PD among NATO members, these troops reduce the United States’ own potential DC payoff for abandoning its alliance commitments. To take a different example, by permitting important industries to shrink in response to import competition, visibly diminishing national self-sufficiency, a state can reduce its DC payoff for violating liberal international trade rules. Reducing one’s own DC payoff, in both settings, lessens the incentive for defensive defections by others. For a

142. See Oye, supra note 44, at 3. The phrase comes from R. Axelrod, supra note 40.
143. See Snidal, Coordination, supra note 41, at 930-31; Axelrod & Keohane, supra note 40, at 232.
144. In a single-play game, only ordinal payoffs matter: the players simply try for the highest. In an iterated game, though, players must compare the value of their current choices with the values of the streams of future payoffs those choices may engender. See Oye, supra note 44, at 9; Snidal, Game Theory, supra note 41, at 46-47; Snidal, Coordination, supra note 41, at 930-31.
146. See Oye, supra note 44, at 11-12. Of course, such measures also increase a state’s vulnerability. Id.
further example, by limiting oneself to defensive weapons and force postures, as the Soviet Union is now considering, a state can increase its rival’s potential “sucker’s payoff” (CD) and defuse the security dilemma.\footnote{147}

International rules and regimes can also modify payoffs. By providing information, a regime can change the way in which states understand an issue area.\footnote{148} For example, regimes like the GATT and the OECD publish extensive reports aimed at demonstrating the costs of trade protection, hoping to modify states’ perceptions. In addition, by casting defection as a legal violation, a regime lowers the payoff for unilateral defection: the moral and political discomfort of “breaking the law” at least partially offsets the concrete benefits of defection. Furthermore, by increasing expectations of cooperative conduct by others, legal rules can reduce the defensive incentives for defection.\footnote{149}

A third set of factors influencing the effect of repeated play concerns states’ perceptions of the certainty of future interactions\footnote{150} and of appropriate responses by other states.\footnote{151} These perceptions too are subject to modification. Axelrod and others have argued that a policy of conditional cooperation can lead to the emergence of cooperation without the aid of central institutions.\footnote{152} Conditional cooperation means beginning an interaction by cooperating, but thereafter following a policy of reciprocity, or “tit-for-tat,” returning cooperation for cooperation, defection for defection. A credible strategy of reciprocity strengthens the link between present action and future consequences. Most IR scholars see this strategy as the key to decentralized international cooperation.\footnote{153} It is

\footnote{147. \textit{See} Jervis, \textit{Security Dilemma, supra} note 43, at 179-80; Oye, \textit{supra} note 44, at 9-10. Few weapons are purely defensive, however, and states often disagree about the character of particular weapons. \textit{See} Downs, Rocke & Siverson, \textit{supra} note 110, at 138.}

\footnote{148. \textit{See} Oye, \textit{supra} note 44, at 11; Axelrod & Keohane, \textit{supra} note 40, at 229. If states’ perceptions change sufficiently, the nature of the game can change. If the CC outcome becomes more highly valued than DC, for example, PD becomes Stag Hunt, a more cooperative game. \textit{See} Oye, \textit{supra} note 44, at 8. The Stag Hunt game is discussed \textit{infra} text accompanying notes 174-88.}

\footnote{149. \textit{See} Oye, \textit{supra} note 44, at 11; R. KEOHANE, \textit{AFTER HEGEMONY, supra} note 16, at 89-90. For a discussion of the internal political effects of international rules, see Abbott, \textit{Trading Nation’s Dilemma, supra} note 32, at 522-25.}

\footnote{150. As an extreme example, if a surprise attack could end the game, the future offers much less incentive to cooperate. \textit{See} Axelrod & Keohane, \textit{supra} note 40, at 232-33; Jervis, \textit{Security Dilemma, supra} note 43, at 172-73; Oye, \textit{supra} note 44, at 12-13. This possibility tends to distinguish security issues from areas like economics. \textit{See} Axelrod & Keohane, \textit{supra} note 40, at 232-33.}

\footnote{151. \textit{See} Lipson, \textit{Cooperation, supra} note 101, at 5; Oye, \textit{supra} note 44, at 12.}

\footnote{152. \textit{See} R. AXELROD, \textit{supra} note 40.}

\footnote{153. \textit{See}, \textit{e.g.}, Oye, \textit{supra} note 44, at 14; Axelrod & Keohane, \textit{supra} note 40, at 244, 249; Lipson, \textit{Cooperation, supra} note 101, at 4-6. The strategy does, however, have problems, among them the “echo effect,” a mutually reinforcing cycle of defection. \textit{See} Axelrod & Keohane, \textit{supra} note 40, at 245.}

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also a strategy to which the United States increasingly has turned, especially in the area of international economics.\(^{154}\)

Norms legitimizing conditional cooperation permeate international law. The principle of mutual, equivalent commitments and norms of reciprocity in bargaining are crucial to the initiation of cooperation.\(^{155}\) Once rules or regimes are established, international law permits countermeasures in response to violations\(^{156}\) and termination or suspension of agreements in response to material breaches.\(^{157}\) Examples from specific regimes are also plentiful. To choose one, the GATT authorizes states to respond to safeguards and the withdrawal of negotiated trade benefits by withdrawing equivalent concessions, and the GATT contracting parties can authorize similar countermeasures in response to breaches of regime rules.\(^{158}\) All of these rules incorporate the principle of proportionality inherent in tit-for-tat.\(^{159}\)

Conditional cooperation is, however, a difficult strategy to implement. Simply determining whether others have cooperated or defected may pose serious problems.\(^{160}\) It may be difficult to ascertain the relevant facts: whether a state has acquired certain weapons, given support to terrorist groups, waged chemical warfare, or discriminated against foreign companies. States planning to defect also have an incentive to distort or conceal such information. Besides the monitoring problem, the very meaning of “cooperation” or “defection” may be unclear in many

154. The 1988 trade law, for example, calls for restrictions on the import of telecommunications products from countries whose markets are found to be closed to such products. Omnibus Trade and Competitiveness Act of 1988, §§ 1374-1376, Pub. L. No. 100-418, 102 Stat. 1217-22. See generally Keohane, Reciprocity in International Relations, 40 INT’L ORG. 1 (1986).


156. See RESTATEMENT (THIRD), supra note 64, § 905 (state injured by violation entitled to take self-help measures not out of proportion to violation and injury).

157. See Law of Treaties, supra note 155, art. 60, 1155 U.N.T.S. at 346 (material breach entitles other parties to invoke breach as ground for terminating or suspending operation of treaty).


159. See, e.g., RESTATEMENT (THIRD), supra note 64, § 905(1)(b), comment d (proportionality of countermeasures). Conybeare suggests, however, that the impact of some of these rules is reduced by their efforts to constrain retaliation even as they authorize it. See Conybeare, Trade Wars, supra note 128, at 150-51.

160. See Axelrod & Keohane, supra note 40, at 233-34; Oye, supra note 44, at 15-16; Downs, Rocke & Siverson, supra note 110, at 139-40.
contexts, as in the disputes between the United States and the Soviet Union over alleged violations of the Anti-Ballistic Missile Treaty and other arms control agreements. Once a defection has been identified, moreover, if more than one state is affected, the states may find it difficult to respond: since retaliation is costly, each state may seek to free-ride on the actions of others.

International rules, regimes and institutions address many of these problems. First, many regimes produce large quantities of information elucidating the situations and actions of their members. Regimes can also help clarify the meaning of “cooperation” and “defection” by elaborating norms and establishing authoritative means of interpretation. Monitoring procedures are essential in PD regimes because of the continuing incentives to defect. Non-intrusive techniques such as reporting requirements, “transparency” rules, and consultation obligations, surveillance techniques (the IMF and, increasingly, the GATT), de-centralized verification procedures (the recent INF Treaty), and centralized monitoring procedures (IAEA safeguards under the NPT)—all contribute to improved monitoring.

When sanctions are necessary, regimes can help overcome free rider problems by legitimizing and assigning responsibility for retaliation, and by providing for collective enforcement. The linking or “nesting” of regimes increases the possibilities for horizontal retaliation. The institutionalization and formality required for functions like the dissemina-

162. See infra text accompanying notes 346-63.
166. See, e.g., Finlayson & Zacker, supra note 164, at 586-87.
169. For discussion of IAEA monitoring, see National Academy of Sciences, Nuclear Arms Control: Background and Issues 251-65 (1985) [hereinafter Nuclear Arms Control].
171. See Axelrod & Keohane, supra note 40, at 235-38; Oye, supra note 44, at 20.

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tion of information, the articulation of standards, monitoring and enforcement are typical of PD regimes.\textsuperscript{173}

C. \textit{Stag Hunt}

Scholars have perhaps devoted disproportionate attention to the PD game; other games, with quite different characteristics, also epitomize important situations in international politics. The game of Stag Hunt (SH), named for a parable told by Rousseau,\textsuperscript{174} is shown in figure 4. In SH, mutual cooperation is the first preference of both players. As in Harmony, cooperation should emerge with little need for rules and institutions.\textsuperscript{175} Yet even this harmonious incentive structure can lead to "tragic" outcomes in which states fail to achieve the cooperation they desire.

To attain the desired outcome, every player in the group (here only two) must cooperate. If one defects, the others will do the same, for unilateral cooperation brings the sucker's payoff. Unilateral defection, though, also brings a lower payoff than mutual cooperation; in SH, the players have no offensive incentive to defect. Why, then, would one defect? Only for defensive reasons: if one suspects that another player is likely to cease cooperating, defection guarantees that one will at least avoid the worst outcome.

If every player were confident, then, that all the others shared its understanding of the game and its preferences, the SH incentive structure would normally lead to mutual cooperation. Jervis suggests that this harmonious relationship appears among allies after a major war;\textsuperscript{176} similar feelings may have arisen among the Western allies vis-à-vis the Soviet Union during the Cold War. I have elsewhere suggested that the West-

\textsuperscript{173} Snidal, \textit{Coordination}, supra note 41, at 923-25, 936-39; see also Stein, \textit{Collaboration}, supra note 19, at 311-14.

\textsuperscript{174} In the parable, all the members of a group of primitive hunters prefer to eat venison. All must cooperate in order to capture a stag; if one hunter "defects," the stag will escape. Whenever a hunter sees a hare pass by, however, he is tempted to leave the group and pursue it. A single hunter can catch a hare, and will eat lightly, but the others, if they continue after the stag, will not eat at all. If all abandon cooperation and hunt rabbits, all will eat lightly. Waltz and Jervis use Stag Hunt to illustrate the difficulty of international cooperation. See K. WALTZ, \textit{Theory}, supra note 33, at 167; Jervis, \textit{Security Dilemma}, supra note 43, at 167-68. Other scholars interpret the story more optimistically. See Oye, supra note 44, at 8; Stein, \textit{Collaboration}, supra note 19, at 300-03.

\textsuperscript{175} See Downs, Rocke & Siverson, supra note 110, at 135; Stein, \textit{Collaboration}, supra note 19, at 300-03.

\textsuperscript{176} Jervis, \textit{From Balance to Concert: A Study of International Security Cooperation}, 38 \textit{World Pol.} 58, 67-68 (1985). According to Jervis, the SH preferences are based on a common desire to keep the defeated power from rising again. Such unity did not persist after World War II, perhaps because the divided Germany did not pose a real threat.
ern embargo of the Soviet bloc reflected SH preferences, at least as to goods with military applications.  

Because information about the preferences of others is rarely complete and correct, however, SH players may often be rationally suspicious: another player may not understand the game, its preferences may change, it may prefer the security of a DD outcome if it senses even a possibility of receiving the sucker's payoff, and so on. Thus the possibility of a failure of cooperation because of erroneous expectations always exists. The classic example is an arms race neither party desires, begun when one state acquires a destabilizing weapon only because it mistakenly believes that its rival is acquiring it.


179. Downs, Rocke & Siverson, supra note 110, at 135.
As in the PD, iteration of the SH game tends to improve the prospects for cooperation. A player's record of past cooperation may provide information about its intention to cooperate in the future. After considering the undesirable prospect of future defections by others based upon mistrust, a player may be less inclined to defect in the present in response to short-term fears or temptations. Conditional cooperation can communicate both a desire to cooperate and an intention to defect in response to defections by others.  

Even in an iterated SH game, though, states may seek to establish international rules, regimes and institutions as devices to promote cooperation. Regimes can help ensure that states understand the game and their interests in cooperation. Even more important, regimes can help states to convey ongoing assurances of their continued desire to cooperate. The embargo lists and consultation procedures of COCOM serve this function in the Western strategic embargo of the Soviet bloc. Stein suggests that extradition treaties provide such assurances for states concerned with reciprocity. Even codification of the principle of pacta sunt servanda in the Vienna Convention can be seen as an assurance device for states desiring mutual compliance with welfare-increasing agreements.

When the sucker's payoff is very low, as in most security situations, states are likely to be particularly suspicious and to defect quickly once they develop doubts concerning the intentions of others. More formal assurance procedures may therefore be necessary. In this context, measures like the “hot line,” the Nuclear Accidents Agreement, the Nuclear Risk Reduction Centers, and the “confidence-building” arrangements for notification and verification of troop movements in Eu-

180. See Oye, supra note 44, at 13-15; Wagner, supra note 105, at 335; Axelrod & Keohane, supra note 40, at 244; Downs, Rocke & Siverson, supra note 110, at 142 n.50. The discussion of conditional cooperation and the shadow of the future in the PD, supra text accompanying notes 150-73, is in general applicable here.  
181. Stein refers to Stag Hunt as the “assurance game.” See Stein, Collaboration, supra note 19, at 300-03.  
182. See Abbott, Collective Goods, supra note 177, at 122.  
183. See Stein, Collaboration, supra note 19, at 304.  
rope function as devices to avoid “false positives”—erroneous indications of defection.

Comparative analyses of provisions like these suggest that the incentive structures of particular issue areas influence the forms of international regimes. PD regimes typically incorporate measures for external monitoring and verification, and often must be highly institutionalized. SH regimes, in contrast, tend to provide vehicles by which states can provide information and assurances to each other, usually through less intrusive institutions. These differences arise from the fact that, at bottom, PD regimes are designed to restrain states from pursuing their preferred courses of action, while SH regimes are designed to permit states to pursue them, by providing greater confidence in the cooperation of others.

D. Coordination Games

A simple coordination game—shown with three possible courses of action to suggest the complexity of real-world situations—is depicted in figure 5. States in such a situation prefer that all choose the same course of action—only the coordinated outcomes AA, BB and CC produce positive payoffs—but they are indifferent as to which of the possible choices is made. Similar situations are common in everyday life, and can be annoyingly difficult to resolve if communication is restricted. If the parties can communicate, however, agreeing on a solution is a simple matter, since there is no conflict of interest. If play is repeated, conventions are likely to evolve even without communication. Comparative analysis suggests, then, that the incentive structures of particular issue areas influence the social choice methods by which norms are adopted as well as the nature of the norms themselves. To agree on PD regimes, for example, explicit bargaining is likely to be necessary. In dealing with coordination problems, however, adaptation and the development of conventions may well suffice.

Solutions to simple coordination problems tend to be arbitrary guides to behavior, like driving on the right-hand side of the road. The International Civil Aviation Organization (ICAO), for example, prescribes

188. See Snidal, Coordination, supra note 41, at 924-25, 936-41; cf. Stein, Collaboration, supra note 19, at 311-16 (distinguishing regimes requiring “collaboration” versus “coordination”).

189. See Stein, Collaboration, supra note 19, at 310; Snidal, Coordination, supra note 41, at 931. For further discussions of coordination problems in various settings, see T. SCHELLING, STRATEGY, supra note 100, at 69-74, 89-99; D. LEWIS, CONVENTION (1969); E. ULLMANN-MARGALIT, supra note 21, at 78-120.

190. See Snidal, Coordination, supra note 41; Stein, Collaboration, supra note 19, at 314.
many such "rules of the road" for international air traffic: emergency radio frequencies, identification protocols, visual and radio signals and the like. Such rules are of great practical importance, but usually come to public attention only in connection with disasters such as the Downing of Korean Air Lines flight 007. Once established, they are largely self-enforcing.

The more complex and interesting type of coordination game is shown in figure 6. States in such a situation still prefer to coordinate their actions—the coordinated outcomes AA and BB produce the highest benefits.

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payoffs—but they are not indifferent among the possible common choices: they face a conflict of interest over the exact point of coordination.\textsuperscript{192} Agreeing on a solution is therefore more difficult. With a large number of states or many possible coordination points, bargaining will be all the more complex; in their efforts to coordinate macroeconomic policy, for example, the Western democracies must consider the interaction of numerous policies and policy instruments.\textsuperscript{193} When the common interest in coordination is strong enough to overcome the diversity of preferences, however, cooperation by convention or agreement is still possible. Solutions, though, may favor large states, because small states have a greater incentive to coordinate with them than vice versa; solutions may also favor the states that first establish a practice.\textsuperscript{194}

Once a coordination regime is established, it will again tend to be self-enforcing; normally, a state can only hurt itself by deviating from the

\begin{figure}[h]
\centering
\begin{tabular}{|c|c|}
\hline
\textit{STATE II} &  \\
\hline
A & B  \\
\hline
A & 4,3 & 2,2  \\
& (cell 1) & (cell 2)  \\
\hline
B & 1,1 & 3,4  \\
& (cell 3) & (cell 4)  \\
\hline
\end{tabular}
\caption{Complex Coordination}
\end{figure}

\textsuperscript{193} See Snidal, \textit{Coordination}, supra note 41, at 932-34.
\textsuperscript{194} See id. at 932, 934-36; cf. Stein, \textit{Collaboration}, supra note 19, at 313-16 (discussing forms of cooperation in coordination settings).
agreed solution. Surprisingly, iteration actually may make a solution somewhat less stable and may increase the influence of large states on the solution: the prospect of future interactions may create an incentive for a large state to deviate, or threaten to do so, in an effort to shift the solution to its preferred point. Even in iterated settings, though, coordination is remarkably stable. Complex coordination regimes, then, rarely require elaborate institutions for conveying assurances, monitoring or enforcing compliance. Such regimes are typically designed to facilitate bargaining, to spell out and interpret agreed norms, to provide information, and to act as a forum for communication.

The ICAO again provides an apt example of a complex coordination regime. It requires that all member states provide English-speaking air traffic controllers, resolving a need for a common medium of expression, even though all states would prefer to operate only in their native tongues and several would have a plausible case for the use of their languages as the lingua franca. The private convention by which the dollar is used as the unit of account in much international trade carries out a similar function; the more formal regime establishing the European Currency Unit sidesteps powerful conflicts of interest by creating a new coordination point. Common railroad gauges, telecommunications standards, and specifications for weapons used by allied armed forces are all designed to solve coordination problems.

The GATT code standardizing customs valuation methods deals at least in part with a coordination problem. Some of its institutional provisions are typical of coordination regimes: the code establishes a Technical Committee, affiliated with the Customs Cooperation Council, to elaborate and interpret its rules and facilitate communication on technical problems. Treaties harmonizing aspects of international commercial law address coordination problems faced by private traders. The European Economic Community, in its efforts to forge a unified market, must create many coordination norms and regimes.

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195. See Snidal, Coordination, supra note 41, at 936, 939; Stein, Collaboration, supra note 19, at 314.
196. See Snidal, Coordination, supra note 41, at 932, 937-38; Stein, Collaboration, supra note 19, at 313-16.
197. See Snidal, Coordination, supra note 41, at 932; Taylor, Weapons Standardization in NATO: Collaborative Security or Economic Competition?, 36 Int'l Org. 95 (1982); Stein, Collaboration, supra note 19, at 314-15 (examples of coordination standards).
E. Summary

Game models are valuable tools for scholars seeking to explore the strategic interaction of rational states and the influence of structural incentives. This section has presented several important game models, ranging from the purely harmonious to the purely conflictual. It has concentrated on games like PD, SH and complex coordination in which rational egoistic states simultaneously face incentives for cooperation and for self-interested independent action.

In these mixed-motive games, international rules, regimes and institutions can substantially affect outcomes. By the same token, the incentive structure of mixed-motive games may lead states to create and comply with international norms in order to attain the higher payoffs available through cooperation. Yet the incentive structure of such games makes cooperation inherently difficult. Modern IR theory has begun to identify factors and strategies like iteration, conditional cooperation, the provision of information and the modification of payoffs that encourage cooperative outcomes in mixed-motive settings. These factors and strategies are important subjects for further study.

IV. Political Market Failure

A. The Market Analogy

International politics can be studied by analogy to other decentralized social orders as well as through abstract game models. Some primitive “stateless societies,” for example, show “striking similarities” to the environment in which states interact in international politics. The most fruitful analogue to date, however, has been the market. Like firms in a market, rational self-interested states interact in an effort to improve their own welfare on political, military and economic issues, more or less impersonally, in a decentralized arena. The structure of their interactions, however, constrains their conduct, much as the nature of the market in which firms operate shapes their behavior. Moreover, since international politics resembles the interdependent conditions of oligop-

201. See Krasner, Structural Causes, supra note 14, at 191; R. KEOHANE, AFTER HEGEMONY, supra note 16, at 27; K. WALTZ, THEORY, supra note 33, at 89-93.
IR scholars have only begun to exploit the analytical possibilities of the market analogy. As the growth of law and economics has demonstrated, fundamental economic ideas, like the inverse relationship of demand to price, have extraordinarily broad application. The theory described in this section draws on one of those ideas, the concept of "market failure": when certain structural features are present, markets do not produce the efficient, harmonious results attributed to the hypothetical perfect market.

Snidal, Keohane, Conybeare, Russett and other scholars have begun to identify similar structural features in international relations, interpreting them as political market failures. This section discusses two of the most important—collective goods and externalities. Analysis of collective goods and externalities in international politics sheds light on many sources of international disharmony and on the "conscious institutional innovation" by which states seek to overcome market failure.

Some may object that the market analogy is inappropriate, since familiar economic markets are grounded on property rights, rules against force and fraud, and other "governmentally contrived limitations" enforceable through coercion if necessary, all features that are seemingly absent from international politics. A weak institutional framework, however, characterizes any market evolving beyond the effective reach of government, as in the American West. Participants in such a market must create the necessary institutional framework through unregulated


204. For a summary of the most important sources of market failure, see W. Baumol & A. Blinder, supra note 92, at 536-52. The technical definitions and modes of analysis utilized by economists interested in market failure may be less suitable for the study of international relations, where political and institutional factors are more critical. See Snidal, Public Goods, Property Rights and Political Organizations, 23 Int'l Stud. Q. 532, 532-33 (1979) [hereinafter Snidal, Public goods, Property Rights].


206. K. Waltz, Theory, supra note 33, at 91.

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and unassisted market transactions. The same process on an international scale is a major focus of modern IR theory.

B. Collective Goods

1. Demand

Public or collective goods ("CGs") are among the most significant forms of market failure in international politics. In their pure form, CGs share two characteristics not found in ordinary private goods: jointness of supply and non-excludability.

Jointness means that consumption of a CG by one user does not reduce the amount available for others; all potential consumers can benefit from production of the good. In the absence of a sovereign, however, a CG will only be provided if its beneficiaries bear the costs of its production. Although a single state may sometimes find it worthwhile to cover those costs, they often will exceed the benefit any one state stands to receive. Provision of a CG will then require collective action.

Non-excludability means that states who do not contribute to the production of a CG cannot be prevented from consuming it. As a result, each potential beneficiary has an incentive not to contribute, perhaps disguising its true interest in the good, in an effort to free-ride on the contributions of others. The incentives facing CG beneficiaries correspond closely to those of the PD game.

"Jointness of supply is the carrot, making cooperative-collective decisions beneficial to all, absence of the

208. For valuable discussions of public goods and international politics, see Russett & Sullivan, Collective Goods and International Organization, 25 INT'L ORG. 845 (1971); Stein, Collaboration, supra note 19, at 307-08; Snidal, HS Theory, supra note 41; Snidal, Public Goods, Property Rights, supra note 204; Conybeare, Public Goods, Prisoners' Dilemmas, supra note 114.

209. See W. Baumol & A. Blinder, supra note 92, at 543-44; D. Mueller, supra note 65, at 13.

210. See Conybeare, Public Goods, Prisoners' Dilemmas, supra note 114, at 6; W. Riker & P. Ordeshook, supra note 53, at 260. The extreme case is a good actually consumed in equal quantities by all members of the relevant class. See id. at 247, 259-60. This case is rare in practice. See id. at 264-65. Most joint goods actually exhibit some degree of rivalry. An important example is the "crowdable" CG, where rivalry appears at a certain level of crowding, as in a national park. See M. Taylor, Anarchy and Cooperation 15 (1976).


212. See W. Baumol & A. Blinder, supra note 92, at 544.

213. See W. Riker & P. Ordeshook, supra note 53, at 250-52; D. Mueller, supra note 65, at 13; Conybeare, Public Goods, Prisoners' Dilemmas, supra note 114, at 6. A state can expect to free-ride only if it believes that the good will be supplied without its participation and that it will not be excluded from enjoying the good. See M. Taylor, supra note 210, at 15.

214. See W. Riker & P. Ordeshook, supra note 53, at 250-52; Hardin, Collective Action as an Agreeable n-Prisoners' Dilemma, 16 BEHAV. SCI. 472 (1971); Conybeare, Public Goods, Prisoners' Dilemmas, supra note 114, at 6. Many PD games do not involve CGs, however. See id. at 6-8; Snidal, Public Goods, Property Rights, supra note 204, at 541.
exclusion principle the apple tempting individuals into independent non-cooperative behavior.”

The characteristics of CGs lead to two undesirable results. The first is a problem of resource allocation: because of free-riding, CGs are typically supplied at less than optimal levels, if at all. The second is a problem of distribution: when some beneficiaries are able to free-ride, those who contribute may feel exploited and seek to redistribute the burden, creating political conflict.

Groups of beneficiary states seeking to produce a CG and contributor states seeking to reallocate costs can follow a variety of strategies. Often, though, they will seek to create international rules, regimes and institutions designed to ensure an equitable sharing of costs. As with PD regimes, some scholars have advanced much the same line of reasoning to explain the origin of the state.

Common spaces or resources (“commons”) present a variant of the usual CG situation. A commons is a CG that already exists. Many commons, however, are jointly consumable only up to a certain level of use. With more intense use, they become “crowdable,” like a highway, or exhaustible, like a pool of oil; their value is reduced and possibly extinguished. There are no means of excluding users as the critical point is approached, although even then each user may find it worthwhile to further increase its level of exploitation. The “tragedy of the commons” is the overuse and consequent destruction of a valued CG through individ-

216. This problem was elaborated by Mancur Olson, who argued that CG incentives make it difficult to form any large voluntary organization. See M. Olson, The Logic of Collective Action (1965); see also Conybeare, Public Goods, Prisoners’ Dilemmas, supra note 114, at 6; W. Riker & P. Ordeshook, supra note 53, at 247, 250-52. A collective “bad,” like air pollution, will typically be over-supplied because its producers do not bear its costs.
217. See Russett & Sullivan, supra note 208, at 852.
218. See infra note 245.
220. See Hardin, The Tragedy of the Commons, 162 Sci. 1243 (1968). Commons problems have received considerable attention from IR and IL scholars. See, e.g., B. Russett & H. Starr, supra note 96, at 514-16; Stein, Collaboration, supra note 19, at 313; The New Nationalism and Common Spaces (J. Charney ed. 1984). Taylor asserts that the attention given to the commons paradigm has stemmed mainly from its importance in understanding environmental problems, see M. Taylor, supra note 210, at 1-3, but it is also useful in analyzing a wide range of issues, not all of which are concerned with the environment narrowly defined. See, e.g., S. Brown, N. Cornell, L. Fabian & E. Weiss, Regimes for the Ocean, Outer Space, and Weather (1977) [hereinafter S. Brown]; Managing the Commons (G. Hardin & J. Baden eds. 1977).
ually rational actions, the affirmative equivalent of free-riding. In this situation, rational states will often seek to create regimes to restrain exploitation and to preserve the commons.

2. CGs in International Politics

CGs, and regimes designed to produce them, are usefully categorized by their degree of jointness, that is, according to the types and numbers of states or other actors that perceive them as desirable. Some goods are widely, even universally seen as beneficial. These goods are general CGs. A regime under which effective sanctions could be invoked against states that commit aggression or breach the peace, for example, might be a general CG: virtually all states would realize increased security from the regime’s deterrent effect. Chapter VII of the U.N. Charter was intended to constitute just such a regime. The Charter regime has manifested severe free-rider problems, however—reflecting the costs of participation in collective sanctions—and it has greatly underproduced the good of collective security.

The Nuclear Non-Proliferation Treaty can also be seen as producing a general CG: limiting the spread of nuclear weapons increases the security of all states. Important nuclear- and near-nuclear-weapon state holdouts, however, have also weakened the NPT regime. These states can be seen as defectors or free-riders, enjoying the greater security the regime offers while maintaining their own power; however, it may be more appropriate to interpret their actions in terms of their own peculiar situations, most of which evoke the security dilemma and override their interest in a general CG.

Olson and Zeckhauser note that “almost all kinds of organizations provide public or collective goods. . . . Collective goods are . . . the characteristic outputs not only of governments but of organizations in general.”

Much of the work of international organizations, then, can be

222. See B. Russett & H. Starr, supra note 96, at 514-15. The commons problem can also be analyzed as the failure to produce a CG, i.e., the continued availability of the commons, because individuals refuse to contribute to its production by restraining their use. See M. Taylor, supra note 210, at 3-4. Since commons reflect CG problems, they also share the incentive structure of the PD. See T. Schelling, Micromotives, supra note 221, at 110-11; Stein, Collaboration, supra note 19, at 313.


225. See Nuclear Arms Control, supra note 169, at 244, 265-71.

interpreted as the provision of general CGs. The U.N. General Assembly, for example, provides virtually every nation with a forum for communication and political activity. Efforts by the Secretary-General to resolve regional disputes increase the security of all states interested in the region or in the general peace. Other U.N. agencies, and non-governmental organizations like the Red Cross, provide more specialized CGs. Like their domestic counterparts, however, many international organizations suffer from severe free-rider problems (especially the refusal to pay dues), from dissatisfaction by states paying large shares, and even—as in the case of UNESCO—from disagreement over the jointness of the goods they produce.

Many international commons can be regarded as general CGs. Examples include the oceans (fish, whales and other marine life, navigation routes, seabed minerals, sites for dumping waste, and other ocean resources); Antarctica; the atmosphere; the ozone layer; outer space; the moon and other celestial bodies; geostationary orbits; and the frequencies of the radio spectrum. In recent decades, technological advances and the demands of new users have begun to make over-exploitation of these commons a serious problem. A number of commons regimes have been put into place and others have been proposed.

Many of these regimes first seek to establish or maintain the status of an area as a commons to guard against a perceived threat of national appropriation. The Law of the Sea Treaty, for example, reflecting prior conventions and customary law, keeps the high seas “open to all states,” and provides that no state may validly subject any part of them to its

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228. See generally M. Peterson, The General Assembly in World Politics (1986).
229. The International Committee for the Red Cross (ICRC) promotes humanitarian law for armed conflicts, a benefit to any nation that might take part in such a conflict. More recent ICRC activities may be seen as undesirable by certain states. See Armstrong, The ICRC and Political Prisoners, 39 Int'l Org. 615 (1985).
230. See B. Russett & H. Starr, supra note 96, at 511; Russett & Sullivan, supra note 208, at 853.

Seabed minerals are not truly joint: minerals mined by one state cannot also be enjoyed by another. They are simply so abundant that the total supply appears joint. The “highways” on the high seas are closer to the technical definition of jointness, although crowdable. See Snidal, HS Theory, supra note 41, at 595-97; R. Hardin, supra note 134, at 17-18.
232. See S. Brown, supra note 220, at 8-18; Wijkman, supra note 231, at 526-35; Soroos, supra note 231, at 669-70.
souvereignty. Yet the commons regimes also attempt to prevent over-exploitation and otherwise regulate use. The Law of the Sea Treaty reserves the high seas for peaceful purposes, for example, and imposes other restrictions, including obligations to conserve living resources and to control pollution. Other conventions also mandate regulation of ocean pollution. The Antarctic Treaty and related conventions set limits on exploitation of certain living resources.

Some commons have even been placed, or have been proposed to be placed, under supranational management to an extent well beyond the limited powers traditionally granted commissions charged with managing joint rivers and lakes. The most elaborate conception, of course, is the seabed mining portion of the Law of the Sea Treaty. This interest in international management has been linked with the concept that certain spaces and resources are the “common heritage of mankind,” to be managed by supranational authorities for the benefit of the entire world community, particularly those states not currently capable of exploiting the resources for themselves. Although the commons themselves are seen as general CGs, conflict over use and governance between developed


234. Law of the Sea, supra note 233, art. 88, 21 I.L.M. at 1287 (peaceful purposes), arts. 116-20, 21 I.L.M. at 1290-91 (living resources), arts. 192-237, 21 I.L.M. at 1308-16 (pollution).


236. See S. KRASNER, supra note 231, at 255-57.

237. See Wijkman, supra note 231, at 513, 519-21, 522.

238. See Kiss, The International Protection of the Environment, in Structure and Process of International Law, supra note 2, at 1069, 1080.

239. See Law of the Sea, supra note 233, arts. 133-91, 21 I.L.M. at 1293-1308. The International Telegraph Union (ITU) has also been urged to reserve space on the radio spectrum for the future needs of developing nations, rather than allocating frequencies at the request of states. See Soroos, supra note 231, at 672-74; Laver, supra note 231, at 369-71.

and developing nations has impeded progress on virtually all commons issues.\textsuperscript{241}

Other goods and regimes are seen as beneficial by certain states but as neutral or undesirable by others. These goods and regimes are partial CGs.\textsuperscript{242} The clearest example is an alliance like NATO, explicitly designed to strengthen its members at the expense of its rivals. Interestingly, though, to the extent alliances promote peace and stability, as through deterrence, they benefit all states—much like arms control and confidence-building agreements between the superpowers or other military rivals—and function as general CGs. (CG incentives also operate among alliance members; according to Olson and Zeckhauser, alliances tend to produce sub-optimal amounts of defense, with larger states bearing a disproportionate share of the costs.\textsuperscript{243} The prominent disputes over burden sharing between the United States and its allies in Europe and Japan reflect the incentives identified by CG analysis.)

States can also disagree over the jointness of particular goods. From the neoclassical perspective, a liberal trade regime like the GATT produces the joint good of increased prosperity; from a mercantilist or “dependencia” perspective, however, the regime appears less clearly joint.\textsuperscript{244} Similarly, many see a regime for the protection of intellectual property as a general CG, encouraging innovation and the free circulation of new creations; others see such a regime in zero-sum terms, as a legal mechanism functioning to transfer wealth to technologically advanced countries. Some see the United States as providing CGs—while other developed states free-ride—when it applies economic (and occasionally military) sanctions against states that support terrorists, violate human rights, commit aggression and the like. Other nations argue, however, that they simply disagree with the United States as to the desirability of particular actions.\textsuperscript{245} In all such cases, the incentive to disguise one’s preferences greatly complicates the dispute.

\textsuperscript{241} For a provocative analysis of the North-South commons debate, see S. KRASNER, supra note 231.

\textsuperscript{242} See Russett & Sullivan, supra note 208, at 848.

\textsuperscript{243} See Olson & Zeckhauser, supra note 226, at 27-28. The situation can change, though, if alliances also provide valuable private goods, such as armaments available for purely national military purposes. See Cornes & Sandler, \textit{Easy Riders, Joint Production and Public Goods,} 94 ECON. J. 580, 594 (1984).

\textsuperscript{244} See Snidal, \textit{HS Theory,} supra note 41, at 595-96.

\textsuperscript{245} See Abbott, \textit{Collective Goods,} supra note 177, at 123-27. In an effort to redistribute the burden of sanctions, the United States has pursued a number of unilateral strategies, including persuasion, coercion (under the Battle Act, for example), side payments, and extraterritorial trade controls. See id. at 126-27. The Battle Act authorized the State Department to terminate military and economic assistance to any nation that did not cooperate in the U.S. embargo of the Soviet Union. Mutual Defense Assistance Control Act of 1951, Pub. L. No. 213 §§ 101-05, 201-03, 301-05, 65 Stat. 644. It was superseded in 1979 by the Export Administration Act of 1979, 50 U.S.C. § 2416(e) (1982). For a discussion of unilateral strategies, see
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As Snidal and Russett have suggested, it may be dangerous to apply CG theory to particular issue areas or regimes without carefully considering the jointness of the goods in question.\(^{246}\) Charles Kindleberger, for example, in discussing liberal economic regimes, has asserted that intangibles like stability and leadership, or the existence of a regime as such, should be regarded as international CGs. This insight has led to the development of an important branch of modern IR theory.\(^{247}\) Emphasis on the universality of a regime's benefits may well be correct when the alternative to leadership or the creation of an international regime is a crisis like the Great Depression (the subject of Kindleberger’s seminal work). If followed inappropriately, however, Kindleberger’s insight may lead the analyst to ignore the characteristics of the particular goods produced by a regime and to overstate the community benefits the regime provides.\(^{248}\)

3. **Supply**

Like PD situations, CGs pose particularly difficult problems of international cooperation. How are states able to produce CGs or create CG regimes, and why do states comply with the dictates of such regimes, in the face of the underlying incentive to free-ride? Modern IR theory has considered two explanations.

The first explanation turns on the fact that CGs can be supplied even without widespread cooperation whenever a single state is willing to bear the associated costs. Out of a variety of motives, states large and small regularly provide important CGs. For example, Norway often supplies troops for peacekeeping operations, and Switzerland and Sweden provide neutral sites for international arbitrations and conferences; the United States has voluntarily shared data on world weather systems.\(^{249}\) Modern IR theorists have devoted particular attention to developing Olson’s insight that a CG beneficiary large enough to realize benefits from production of a good greater than its total costs should be willing to bear those costs itself, providing the CG for the entire beneficiary group.


247. See *infra* text accompanying notes 250-62.


Hegemonic stability ("HS") theory, the line of theory elaborating Olson's insight, asserts that CG regimes will be created—in the strong form of the theory, will only be created—when a "hegemonic" state, like the United States after World War II, is willing to bear the costs. As the hegemon declines, by the same token, the regimes it has sponsored will tend to weaken. Two important associations among historical events support HS theory: during British (mid-19th century) and American (mid-20th century) hegemony, the world saw the only relatively liberal free trade regimes in modern history; during the 1920's the decline of British hegemony and the failure of American leadership—in Kindleberger's interpretation—led to the collapse of an open world economy and the Great Depression.

Even if one assumes that a hegemonic state will only support regimes from which it stands to benefit, HS theory has startling implications. Far from exploiting smaller states, the actions of a hegemon in promoting regimes that provide CGs should benefit those states, perhaps even more than they benefit the hegemon itself. Other states should welcome the hegemon's leadership and support the regimes it sponsors. As Haggard and Simmons observe, this result "turns realism on its head" by suggesting that the small may sometimes exploit the powerful.

Hegemonic states will be unable to produce many CGs unilaterally. Taking free trade to be a CG, for example, a hegemon will only be able to

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250. For discussions of HS theory, see R. KEOHANE, AFTER HEGEMONY, supra note 16, at 31-46; Snidal, HS Theory, supra note 41; Stein, Hegemon's Dilemma, supra note 42, at 355-56.

251. See Keohane, Theory of Hegemonic Stability, supra note 19, at 143; cf. R. KEOHANE, AFTER HEGEMONY, supra note 16, at 31 ("maintenance of order requires continued hegemony").

252. See Snidal, HS Theory, supra note 41, at 581; R. KEOHANE, AFTER HEGEMONY, supra note 16, at 31, 34-37 (noting, however, tenuous causal link between British hegemony and cooperative relations). See generally Kindleberger, Systems, supra note 93, at 32; Stein, Hegemon's Dilemma, supra note 42, at 385; Snidal, HS Theory, supra note 41, at 581.

253. See C. KINDLEBERGER, supra note 253; Kindleberger, Systems, supra note 93, at 34-35.

254. Kindleberger suggests that a hegemonic state should act altruistically. See Kindleberger, Systems, supra note 93, at 18-20; Lake, supra note 248, at 519.

255. See Snidal, HS Theory, supra note 41, at 581-83.

256. Haggard & Simmons, supra note 18, at 502. Darker views of hegemony also appear in IR theory. Stephen Krasner and Robert Gilpin, for example, argue that the regimes a hegemon supports in its own interest may or may not benefit others. See R. GILPIN, U.S. POWER AND THE MULTINATIONAL CORPORATION 84-85 (1975); Krasner, State Power and the Structure of International Trade, 28 World Pol. 317, 322-23 (1976) [hereinafter Krasner, State Power]; see also Snidal, HS Theory, supra note 41, at 586; Stein, Hegemon's Dilemma, supra note 42, at 356-57; Lake, supra note 248, at 520. According to Snidal, Gilpin's analysis implies that hegemonic states can coerce contributions from weaker states, making it uncertain how net benefits will flow. See Snidal, HS Theory, supra note 41, at 587-88. These views of hegemony shade into broader theories of imperialism and exploitation. See id. at 582, 586, 588.
open its own markets, not those of others. Yet a free trade regime can only be said to exist with the participation of a significant number of states. In these circumstances, leadership, including example, persuasion, assistance and other techniques of the political entrepreneur, is an important hegemonic tool.\footnote{See R. KEOHANE, AFTER HEGEMONY, supra note 16, at 137-38, 182.} Coercive tactics may be available, especially against weaker states, but they are too costly to use on a large scale.\footnote{See Stein, Hegemon's Dilemma, supra note 42, at 358, 364 & n.21; Crawford & Lenway, supra note 245, at 381-82.} In many cases, Stein and others argue, the hegemon will have to purchase cooperation by making concessions and compromises, accepting an asymmetric bargain that shifts even greater benefits to others. In this view, for example, the United States secured support for the GATT by agreeing to exceptions for British Commonwealth trade preferences, customs unions and balance of payments measures, and other provisions that legitimated discrimination against American exports.\footnote{See Stein, Hegemon's Dilemma, supra note 42, at 360-63, 367-72; McKeown, supra note 257, at 80-89; Lawson, Hegemony and the Structure of International Trade Reassessed: A View from Arabia, 37 INT'L ORG. 317 (1983); Krasner, State Power, supra note 256, at 335-41. Cowhey and Long have argued that a theory emphasizing economics and domestic politics better explains protection in a particular industry. Cowhey & Long, Testing Theories of Regime Change: Hegemonic Decline or Surplus Capacity?, 37 INT'L ORG. 157 (1983).} Today, as U.S. hegemony has declined, the asymmetric bargain has become less tolerable, and American trade policy has come to focus on opening foreign markets.\footnote{See, e.g., Trade Act of 1974 § 301, (current version at 19 U.S.C. § 2411 (1982)).}

HS theory has inspired a number of studies, many of them critical.\footnote{For a similar view, see Snidal, HS Theory, supra note 41, at 612-14.} While such studies suggest the need for further refinement, to this observer HS theory remains a valuable component of a theory of international cooperation.\footnote{Stein, McKeown and Lawson, for example, have found discrepancies between the actions of hegemonic states and the predictions of the theory; Krasner has found similar discrepancies in historical trading patterns. See Stein, Hegemon's Dilemma, supra note 42, 260-63, 367-72; McKeown, supra note 257, at 80-89; Lawson, Hegemony and the Structure of International Trade Reassessed: A View from Arabia, 37 INT'L ORG. 317 (1983); Krasner, State Power, supra note 256, at 335-41. Cowhey and Long have argued that a theory emphasizing economics and domestic politics better explains protection in a particular industry. Cowhey & Long, Testing Theories of Regime Change: Hegemonic Decline or Surplus Capacity?, 37 INT'L ORG. 157 (1983).}

A second strand of theory analyzes how states can cooperate to produce CGs even in the absence of a hegemon. Work along this line has been inspired, on the one hand, by concern over the erosion of American
dominance, especially as it might affect the liberal postwar economic regimes, and on the other hand, by the unexpected strength of some of those regimes in the face of apparent American decline.\textsuperscript{263}

One important element in this developing theory is the possibility that noncontributors can be excluded from the benefits of a CG.\textsuperscript{264} Exclusion is almost never literally impossible, as the technical definition of a pure CG would suggest.\textsuperscript{265} It is most often merely difficult or costly—because of the characteristics of particular goods or inadequate institutional arrangements—or in conflict with some other policy. In practice, then, CG regimes can frequently provide for exclusion, reducing the incentive to free-ride.\textsuperscript{266} The stress on exclusion that this analysis encourages is at odds with the traditional concern of IL theory for universality of rules.\textsuperscript{267} It does, however conform with current trends in state practice;\textsuperscript{268} indeed, it may help explain the increasing prominence of international agreements.

Keohane discusses the exclusionary devices in three prominent regimes: (1) only members of the International Energy Agency are entitled to receive oil under the Agency’s emergency sharing program; (2) only members of the IMF are eligible to borrow from the Fund; and (3) only members of the GATT are entitled to most-favored-nation treatment by other members.\textsuperscript{269} The trade regime is a particularly good example, for it has increasingly been structured to allow exclusion, perhaps in proportion to the erosion of American dominance. The benefits of the Tokyo Round codes, for example, are available only to signatories;\textsuperscript{270} the same is likely to be true of agreements reached in the Uruguay Round. Special trade arrangements like the recent U.S.-Canada free trade agreement are of growing importance, and interest in a “GATT Plus,” limited to states willing to make greater commitments, regularly recurs. Exclusion is also

\textsuperscript{263.} See Keohane, \textit{Theory of Hegemonic Stability}, supra note 19, at 143-54; R. Keohane, \textit{After Hegemony}, supra note 16, at 182-216; Lipson, \textit{Transformation of Trade}, supra note 259, at 419-23. It could be that the postwar regimes have remained stronger than expected because the decline in U.S. power has been exaggerated. See Russett, \textit{Vanishing Hegemony}, supra note 246, at 207; Strange, \textit{The Persistent Myth of Lost Hegemony}, 41 Int’l Org. 551 (1987). Snidal also argues that, in theory, it is the hegemon’s absolute size that leads it provide a CG; unless the hegemonic state shrinks absolutely, it should still be willing to provide it. See Snidal, \textit{HS Theory}, supra note 41, at 588-90.


\textsuperscript{265.} See Leslie, \textit{Labor Bargaining Units}, 70 VA. L. Rev. 353, 355 n.3 (1984) (“if literal nonexcludability is required, it is hard to imagine a good that qualifies”).

\textsuperscript{266.} See Snidal, \textit{HS Theory}, supra note 41, at 592. These arrangements may, however, limit the amount of a CG that can be produced.

\textsuperscript{267.} See, e.g., \textit{Restatement (Third)}, supra note 64, § 101, comment d.

\textsuperscript{268.} See Snidal, \textit{HS Theory}, supra note 41, at 592-93.

\textsuperscript{269.} R. Keohane, \textit{After Hegemony}, supra note 16, at 77-78.

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an important strategy for states that seek to redistribute the burdens of providing CGs. It may be possible, for example, to exclude free-riders from an alliance like NATO; withdrawal, like that of the United States from the ANZUS treaty vis-à-vis New Zealand, also functions as a form of exclusion.271

Exclusion has been the most dramatic strategy for protecting international commons: many common areas and resources have been allocated among interested states. The most conspicuous examples are the continental shelf, the broadened territorial sea, and the exclusive economic zone.272 These "enclosure" regimes place most of the exploitable resources of the oceans within the control of coastal states. By protecting those resources from the tragedy of the commons, such regimes should make for more efficient use of the resources. The regimes carry massive distributional consequences, however, that in some respects overshadow their effects on resource allocation: they greatly favor states with long coastlines in areas with abundant marine life, many of which are highly developed.273

A second important element in the theory of non-hegemonic cooperation for the production of CGs without the presence of a hegemonic state—emphasized by Snidal and based on work by Olson, Hardin, Taylor and others—is the enhanced likelihood of cooperation among relatively small groups of states, like those that characterize many international interactions.274 Cooperation in small groups depends first on the ability of states to consider the long-run effects of their actions.275 When the beneficiaries of a CG number only a few, participation by each

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271. Snyder notes that "abandonment" by an important ally is a major concern for members of an alliance. Given the U.S. - Soviet rivalry, however, abandonment of significant western allies is unlikely. See Snyder, Security Dilemma, supra note 126, at 466-67, 483-89. Exclusion, in other words, is difficult.


273. See S. KRASNER, supra note 231, at 235-41; Wijkman, supra note 231, at 527-30. Krasner argues that developing countries have generally sought to create regimes that legitimate authoritative allocation of resources rather than market control. Because their aim is primarily to increase their own political strength, they will support regimes promising greater control even at the expense of greater wealth. The South's support for exclusionary ocean regimes that allocate rich resources to states like the United States and Canada tends to support this interpretation. See S. KRASNER, supra note 231, at 3-6, 12-13, 29-31, 232, 235-41.

274. See Snidal, HS Theory, supra note 41, at 597-603; see also Russett & Sullivan, supra note 208, at 54-55; R. KEOHANE, AFTER HEGEMONY, supra note 16, at 38, 76-77. Only some 150 states exist in total, many of which are relatively inactive; this number is many times smaller than the voluntary organizations studied by Olson. Negotiations among the developed countries involve only some two dozen states. Since the European Community ("EC") often negotiates as a unit, following internal negotiations among a group of twelve, many important negotiations center upon only the United States, the EC and Japan. See id. at 77.

275. See Snidal, HS Theory, supra note 41, at 594. This perspective is an aspect of strategic rationality. See supra text accompanying notes 86-87.
may be crucial. Even when there are many beneficiaries, cooperation among a smaller number—usually designated "k"—can often produce enough of the good to profit the participants, and each state of substantial size may be crucial to formation of a k-group. In either case, so long as states perceive that their participation is essential to the production of the CG, they will have an incentive to cooperate based solely on the benefits they stand to receive.  

Even with a small group of beneficiaries or a potential k-group, cooperation is rarely a sure thing. Some states may fail to realize the importance of their contributions, especially if they have previously relied on a hegemon. Lipson suggests, for example, that Japan has been slow to recognize the importance of its full participation in the liberal trade regime.  

A continuing incentive to free-ride may also operate if alternate k-groups could provide some quantity of a CG. In these circumstances, as in iterated PD games, the reactions of other states become relevant.

A policy of conditional cooperation can encourage contributions: a state will be less likely to free-ride if others credibly convey that their contributions are contingent on its cooperation, or that they are prepared to exclude it from the CG regime. Structural factors such as the ongoing nature of state interactions and strategies like the linkage of CG contributions to other issues can increase the likelihood of cooperation.

International rules, regimes and institutions can help states understand the benefits of a CG and the nature of an appropriate contribution, increase iteration, and facilitate negotiations on the allocation of costs. Regimes can also facilitate monitoring and lend legitimacy to a policy of exclusion.

C. Externalities

Another significant form of market failure, afflicting economic and political markets alike, is the presence of externalities, i.e., situations in which the conduct of market actors affects, negatively or positively, the

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276. See, e.g., T. Schelling, Micromotives, supra note 221. Although participants in a k-group, like a hegemon, receive benefits greater than their contributions, free-riders may still profit even more. See Snidal, HS Theory, supra note 41, at 597-603.

277. Lipson, Cooperation, supra note 101, at 8-9.

278. See Snidal, HS Theory, supra note 41, at 599, 605-06.

279. See R. Keohane, After Hegemony, supra note 16, at 76-77; Lipson, Cooperation, supra note 101, at 6, 8-10.

280. See Snidal, HS Theory, supra note 41, at 594-95; R. Keohane, After Hegemony, supra note 16, at 76-77.

281. For a discussion of similar effects in the context of the PD, see supra text accompanying notes 141, 148-49, 162-73.
circumstances of others. The standard illustration of a negative externality is the pollution emitted by a factory. The firm that owns the factory need not consider the costs borne by its neighbors when it decides at what level to operate. It is therefore likely to engage in more of the externality-producing activity than is socially optimal. Beautification of the factory grounds, on the other hand, benefits the neighbors, creating a positive externality. Since the owner captures only part of the total social benefit, it is likely to invest in this activity at a less than optimal level.

“Spill-over” externalities like these are pervasive in international relations, as in domestic society. The well-known Trail Smelter case, for example, involved the prototypical polluting factory in an international context. Many other transboundary environmental problems, including acid rain and nuclear fallout from weapons tests or incidents like Chernobyl, reflect the same paradigm. Environmental spillovers can also affect other states indirectly by damaging international commons. For example, interference with or pollution of international waterways can have serious negative effects on downstream states.

Economic actions ranging from the protection or subsidization of local industries to the formation of customs unions can create negative externalities for trading partners, even if the actions are not taken with any predatory intent. The GATT recognizes this phenomenon in numerous provisions, most notably in the 1979 Subsidies Code, which obligates signatories to seek to avoid adverse external effects in the use of domestic subsidy programs, even while recognizing the use of such subsidies as legitimate. Conybeare argues, in another context, that the New International Economic Order ("NIEO") proposals advanced by developing countries can be interpreted as an effort to combat negative externalities generated by the trade, investment and aid policies of developed states, a

282. See W. Riker & P. Ordeshook, supra note 53, at 256.
284. See W. Baumol & A. Blinder, supra note 92, at 539-40.
289. See Agreement on Interpretation and Application of Articles VI, XVI and XXIII of the General Agreement on Tariffs and Trade, Basic Instruments and Selected Documents (26th Supp.) at 56, 31 U.S.T. 513, T.I.A.S. No. 9619 (1980); see also GATT, supra note 155, art. XXIII, Basic Instruments and Selected Documents (1st Supp.) at 51 (1952), 61 Stat. at (pt. 5) A64, 55 U.N.T.S. at 266, permitting contracting parties to complain that their benefits under the Agreement are being nullified or impaired by trade measures of another party, whether or not those measures violate any GATT rule.
rationale that would support NIEO policies on grounds of efficiency as well as equity.\textsuperscript{290}

Nuclear weapons tests and the proliferation of nuclear weapons generate negative security externalities for many states, not only the intended targets. These effects are felt, moreover, even when defensive considerations motivate the actions. Thus, the proliferation of nuclear weapons generates both security and environmental externalities.\textsuperscript{291}

Conybeare has identified a variety of other examples, suggesting the potential range of externality analysis.\textsuperscript{292} States that encourage the cultivation of opium and other drug crops, for instance, impose negative externalities on user states; this problem is expected to worsen with the end of the war in Afghanistan.\textsuperscript{293} Countries that force the emigration of large numbers of people, or of "undesirables," create similar externalities for the states that receive them. One might add that a state's maltreatment of its citizens—including the refusal to permit emigration—may create negative externalities for states with similar ethnic or religious populations or strong sympathies for individual liberties.

While "spillover" situations form the core of externality analysis, externalities also underlie most other forms of market failure. Negative externalities are involved, for example, when CG beneficiaries free-ride and when users overutilize a commons. Positive externalities are created when a single state or a few states provide a CG, and when some commons users take conservation measures.\textsuperscript{294} Externality theory is thus applicable to these more complex cases.

A community in which externalities exist will benefit to the extent that its members take into account ("internalize") the external costs or benefits they create, for they will then engage in the relevant activities at more nearly optimal levels.\textsuperscript{295} The classical approach to encouraging internalization calls for extensive government action: taxing or regulating activities that produce negative externalities, and subsidizing or incorporating

\textsuperscript{291} See id. at 320. Reisman observes that the U.S. decision in the late 1940s to test atomic weapons in the South Pacific was made in order to externalize the environmental costs. See Reisman, \textit{International Law-making}, supra note 25, at 114.
\textsuperscript{292} Conybeare, \textit{Property Rights}, supra note 287, at 319 (drug traffic), 320-21 (inefficient national airlines and refugees).
\textsuperscript{293} See N.Y. Times, Mar. 2, 1989, at 1, col. 3.
\textsuperscript{295} See Conybeare, \textit{Property Rights}, supra note 282, at 308-09.
into the public sector those that create positive externalities.\textsuperscript{296} This approach, however, is not wholly satisfactory even in domestic society,\textsuperscript{297} and states have rarely delegated to supranational organizations the authority needed to implement it.

An approach to externalities more congenial to international politics is associated with Ronald Coase.\textsuperscript{298} Coase observed, first, that externalities are potentially reciprocal: while state A’s pollution may harm state B, A would also be harmed if B could force it to eliminate the polluting activity. Thus, to think only of restricting the “active” state is not appropriate; a community should aim “to avoid the more serious harm” and thus to achieve the most efficient allocation of resources.\textsuperscript{299} States have a common interest in attaining this result, though they will also have conflicting interests in the distribution of the associated costs and benefits.\textsuperscript{300}

Coase went on to demonstrate that under certain stringent conditions, market transactions will lead to the internalization of externalities and an efficient allocation of resources without government intervention.\textsuperscript{301} The market will produce this outcome, moreover, whatever the structure of entitlements.\textsuperscript{302} If A were entitled to pollute, for instance, B could bar-

\textsuperscript{296} See id.; W. Baumol & A. Blinder, supra note 92, at 542-43; Coase, Social Cost, supra note 238, at 1-2; Dahlman, The Problem of Externality, 22 J.L. & ECON. 141, 156-57 (1979); Wolf, supra note 294, at 108. Conybeare argues that most international organization scholars are in this tradition. See Conybeare, Property Rights, supra note 287, at 307-08.

\textsuperscript{297} The two principal problems are (1) the difficulty of setting taxes, subsidies and the like at appropriate levels, because of the difficulty of estimating optimal levels of activity and because of second best problems, see Coase, Social Cost, supra note 238, at 41-42; Dahlman, supra note 296, at 157; Conybeare, Property Rights, supra note 287, at 309; and (2) the potentially suboptimal behavior of government, or “nonmarket failure.” See Wolf, supra note 294.

\textsuperscript{298} See R. Keohane, After Hegemony, supra note 16, at 85-93. The literature on the Coase Theorem is vast. For an excellent bibliography, see Hoffman & Spitzer, The Coase Theorem: Some Experimental Tests, 25 J.L. & ECON. 73, 73 n.3 (1982).

\textsuperscript{299} See Coase, Social Cost, supra note 238, at 2; Dahlman, supra note 296, at 159.

\textsuperscript{300} See R. Keohane, After Hegemony, supra note 16, at 88, 97.

\textsuperscript{301} See Coase, Social Cost, supra note 238, at 2-8; Conybeare, Property Rights, supra note 287, at 309-10; Dahlman, supra note 296, at 157-58. “Efficient” is used in the Pareto sense: resources cannot be reallocated so as to make one party better off without making another party worse off. For a complete listing of the conditions necessary to this result, see Hoffman & Spitzer, supra note 298, at 73.

\textsuperscript{302} Coase, Social Cost, supra note 238, at 2-8. Coase suggested that the same allocation of resources would be achieved whatever the structure of entitlements. See id. at 6. This “invariance thesis” is controversial. It may hold only for certain forms of entitlements and only in the short run. See generally Schwab, Collective Bargaining and the Coase Theorem, 72 CORN. L. REV. 245, 273-75 (1987). What seems clear, however, is that different allocations of entitlements in some instances can affect the relative wealth of the parties, and thus the bargains they can make. Such “wealth effects” undermine the invariance thesis. See B. Ackerman, Economic Foundations of Property Law, at 23 (1975).

Conybeare argues that wealth effects are insignificant in international politics. See Conybeare, Property Rights, supra note 287, at 322-23. This issue may be worthy of further study: to a small state, for example, the right to coastal fisheries, see id. at 319, might well be significant.
gain for a reduction in pollution to an efficient level, offering economic assistance, trade concessions, or other compensation. If B were entitled to be free from pollution, A could purchase the right to pollute up to efficient levels. If all the conditions of the Coase Theorem are met, bargains like these will be struck in every externality situation, resolving the parties' conflicts over distribution and maximizing their joint welfare.303 This analysis has powerful implications for a decentralized political system.

In actuality, the ideal conditions of the Theorem are rarely, if ever, met.304 Under those circumstances, the Coasean approach calls for a community to consider whether reliance on private transactions or various forms of public intervention will achieve a more efficient outcome. The first step, however, is to investigate whether private transactions can be facilitated: in Dahlman's words, to "find out if there is a feasible way to decrease the costs of transacting between market agents . . . ." The costs of locating negotiating partners, identifying possible bases of exchange, bargaining, and monitoring any agreements reached are the "heart of the problem." Any measures that reduce these costs will promote private transactions and improve the community's welfare.305 As discussed in the following section, many international regimes and institutions function to reduce transactions costs.

If these efforts are insufficient, Dahlman observes, the next response should be to "[employ] taxes, legislative action, standards, prohibitions, agencies, or whatever else can be thought of that will achieve the allocation of resources we have already decided is preferred."306 The Coasean approach, however, suggests forms of public intervention more suitable to international politics than taxation or direct public administration. The reassignment of property rights and other entitlements, in particular, can often be effective.307

As Calabresi has shown, the most efficient result will be obtained if entitlements are assigned so that the costs of an activity that produces negative externalities are borne by the party that can most cheaply avoid its adverse external effects. When this test is inconclusive, entitlements

303. See Hoffman & Spitzer, supra note 298, at 73-77; Calabresi, Transactions Costs, Resource Allocation, and Liability Rules — A Comment, 11 J.L. & Econ. 67, 68 (1968). Since the conditions of the Theorem are essentially that bargains can be made costlessly and without legal impediment or problems of negotiating strategy, the result is not as surprising as it first seems. See id.; Dahlman, supra note 296, at 158.
304. See Coase, Social Cost, supra note 238, at 15; B. ACKERMAN, supra note 302, at 23.
305. Dahlman, supra note 296, at 158, 160.
306. Id. at 160; Coase, Social Cost, supra note 238, at 17-18.
307. See Dahlman, supra note 296, at 160-61; Conybeare, Property Rights, supra note 287, at 311.
should be structured so that the costs of the activity are borne by the party with the lowest transactions costs, so that it can bargain with others to relocate an entitlement assigned in error.308 Rational states should demand that the international legal order reflect such efficient entitlement structures.

Calabresi and Melamed have gone on to analyze when property rules (which entitle parties to act, or to prevent certain actions, unless they agree otherwise) are sufficient to achieve efficient outcomes, and when liability rules (which entitle parties to act, or to be free of certain actions, unless paid an objectively determined amount) may be necessary, even though the latter require greater government involvement. This decision, too, turns on elements of market failure: transactions costs, opportunities for free-riding, accidental encounters, and the like.309

It is not necessary (or possible) to review here all the implications of these lines of analysis, which have revolutionized torts, property and other areas of legal scholarship. The essential point is that the market analogy makes it possible to apply them to the study of international politics and law. In one extensive application, Conybeare argues that states have created many rules that assign entitlements so as to promote efficient resource allocation.310 He points in particular to international tort and environmental law. “There exist today legal mechanisms for dealing with marine, freshwater, air, space, and radioactivity externalities.”311 He also argues that the extension of national jurisdiction in the oceans should efficiently internalize externalities.312

Apart from his valuable positive analysis, Conybeare takes a strong normative position, arguing from the examples he cites that states can deal with externalities and other market failures through the assignment


309. See Calabresi & Melamed, supra note 308, at 1105-10. The authors also analyze rules of inalienability. Id. at 1111-15; see also Conybeare, Property Rights, supra note 287, at 312-13.

310. See, e.g., Conybeare, Property Rights, supra note 287. Conybeare's position is similar to the arguments of Judge Posner that the common law has developed so as to maximize wealth, and that wealth maximization is an appropriate ethical criterion. See, e.g., R. POSNER, THE ECONOMICS OF JUSTICE 88-115 (1983). Conybeare, however, explicitly refrains from claiming that all rules of international law are efficient. Conybeare, Property Rights, supra note 287.

311. See Conybeare, Property Rights, supra note 287, at 314. For a discussion of such rules, see Kiss, supra note 238, at 1071-75.

312. See Conybeare, Property Rights, supra note 287, at 319. For a similar argument in the context of commons theory, see supra notes 272-73 and accompanying text.
of entitlements and private transactions well enough that extensive supranational institutions are usually unnecessary. This argument is more controversial, since most observers find international environmental law considerably less satisfactory than Conybeare paints it. Kiss, for example, observes that the ambiguities in environmental liability rules “make it doubtful whether in concrete cases redress for damage caused by . . . pollution can be ensured with a probability which allows . . . preventive effects.” Difficulties in dispute resolution and enforcement raise similar doubts. At the same time, it should be noted that some environmental treaties do in fact rely on modest supranational institutions. Closer study of important issue areas should lead to a more nuanced assessment.

In addition to the insights that international rules, regimes and institutions can be interpreted as devices to reduce transactions costs and to allocate entitlements in efficient ways, a third implication of Coase’s approach should be mentioned. Many international interactions and agreements—involving both simple spillovers and more complex market failures—can be analyzed in terms of the presence or absence of the private welfare-increasing bargains the theory predicts. The Nuclear Non-Proliferation Treaty, for example, was explicitly based on such a bargain: non-nuclear-weapons states would renounce nuclear weapons, avoiding negative externalities, in return for materials and technology for the development of peaceful uses of nuclear energy. With the advent of reactors that produce plutonium as a byproduct of peaceful use, however, this policy became internally contradictory, and negotiations to restructure the original bargain soon began.

In other cases—as in similar domestic situations involving individuals—a seemingly feasible and appropriate bargain was not made. For

313. See Conybeare, Property Rights, supra note 287, at 307-08. Conybeare does acknowledge that institutions can assist states in agreeing on property and liability rules and in adjudicating disputes. Id. at 315-16, 332-33.
315. See von Moltke, International Commissions and Implementation of International Environmental Law, in INTERNATIONAL ENVIRONMENTAL DIPLOMACY 87 (J. Carroll ed. 1988); Birnie, The Role of International Law in Solving Certain Environmental Conflicts, in id. at 95, 106-09.
318. For a discussion of an experiment in which Coasean predictions did not occur in spite of apparently favorable conditions, see Donohue, Diverting the Coasean River: Bonus Schemes to Reduce Unemployment Spells (forthcoming in Yale Law Journal, 1989).
example, the Jackson-Vanik Amendment to the Trade Act of 1974—which linked economic cooperation with the Soviet Union to an easing of restrictions on Jewish emigration—\(^{319}\) can be seen as a proposed Coasean bargain designed to reduce the negative externalities created by Soviet policies. Soviet rejection of the offer demonstrates a significant problem with the market approach: even if transactions costs are low, states may simply be unable to agree on a distribution of costs and benefits. Agreement is particularly difficult when negotiations involve a bilateral monopoly—two states that have no alternative to dealing with each other—and when important state prerogatives are involved. Poorly chosen negotiating approaches and strategic behavior can intensify the problem.\(^{320}\)

Numerous situations are amenable to a similar analysis. Consider, for example, the acid rain dispute between Canada and the United States. The heart of the dispute is a standard spill-over externality: cross-border pollution from American factories. Canada has often demanded action by the United States, but no Coasean bargain has been reached. Modern IR theory suggests several explanatory hypotheses: (1) transactions costs may be excessive (this seems unlikely in the circumstances, however); (2) the relevant property or liability rules may be unclear and not easily determined, or improperly assigned; (3) bilateral monopoly problems may be impeding settlement: even if both parties have identified a range of acceptable bargains, haggling over the precise terms of the bargain may be preventing any agreement (while wasting social resources); (4) the parties' negotiating strategies may be obstructing agreement (for example, either or both parties may resist the notion of any Coasean bargain as somehow inappropriate for a sovereign nation); (5) the present situation may be efficient. Beyond merely illuminating significant international controversies, this mode of analysis could ultimately suggest approaches to their resolution.

D. Summary

The analogy between international politics and the workings of the market offers another valuable approach for scholars interested in understanding the interactions of rational states, especially when many states are involved. The study of "market failure," situations in which unregulated market-like interactions fail to achieve efficient and harmonious results, is particularly relevant to IL scholars. This section has presented

\(^{319}\) For a discussion of the Jackson-Vanik Amendment, see A. Lowenfeld, Trade Controls for Political Ends 166-90 (2d ed. 1983). For a more general discussion of the strategy of issue linkage, see Axelrod & Keohane, supra note 40, at 239-41.

two important forms of political market failure, collective goods (including commons) and externalities. Modern IR theory views many international rules, regimes and institutions as devices to overcome such market failures.

As in mixed-motive games, individual states in market failure settings may face incentives to free-ride as well as to cooperate. Here again, modern IR theory has begun to explore the factors and strategies that favor international cooperation. In CG situations, these include the presence of a dominant actor, exclusion, and conditional cooperation. In externality settings, they include the reduction of impediments to negotiation and the reallocation of entitlements, both devices designed to encourage decentralized Coasean bargains. Coasean analysis links modern IR theory with the scholarly tradition of law and economics.

V. Primary Market Failures

Structural impediments to decentralized, welfare-increasing transactions are at the heart of externality problems and other market failures. I call these impediments “primary” market failures. Coase’s approach to externalities focuses attention on the ways in which a community can act to correct primary market failures, making possible, in Dahlman’s words, an economic theory of institutions. Keohane has begun to develop such a theory for the institutions of international politics. His analysis concentrates on two important impediments to Coasean bargaining: high transactions costs and imperfect information. Before turning to these, I will consider a third impediment to which Keohane only briefly alludes—ill-defined property rights.

A. Property Rights

Property rights and other entitlements that are poorly defined and costly to determine can be an impediment to bargaining in any market setting. A party’s entire approach to a negotiation—e.g., whether to proceed by offering compensation or to await offers of compensation—turns on its understanding of how relevant entitlements are assigned. If the location of entitlements is unclear, it will be difficult, though not impossi-

322. See R. Keohane, After Hegemony, supra note 16, at 85-109. See generally Keohane, Demand, supra note 27.
323. With zero transactions costs and multiple actors, shifting coalitions could make bargaining difficult and agreements unstable. For multi-party situations, the ideal may be low yet positive transactions costs. See R. Keohane, After Hegemony, supra note 16, at 87.
ble, for bargaining to proceed at all. If the relevant entitlements depend on imprecise concepts like a "reasonable amount," agreement between states will be all the more difficult. Similar problems in the domestic context lead to the litigation of disputes that might otherwise be settled.

The value of clarifying entitlements suggests interesting subjects for further study. For one thing, the "default" property rights implicit in anarchy leave the costs (or benefits) of externalities where they fall. Whatever the other flaws of this system, its assignment of entitlements is at least clear. Efforts by states, international organizations and publicists to reassign particular entitlements in the interest of equity or efficiency may ultimately lead to laudable results, but may in the interim create such uncertainty that welfare-increasing bargains are difficult to achieve. This uncertainty may be a significant cost of General Assembly resolutions and other forms of "soft law." The doctrine that violations of customary law contain the seeds of new rules, similarly, seems almost custom-made to maximize the difficulty of Coasean bargaining. On the other hand, a desire to clarify entitlements might help account for the increasing popularity of treaties, particularly codification treaties, which directly replace customary law.

When the assignment of entitlements is unclear, or the entitlements themselves are imprecise, it is important to ask whether authoritative interpretation by courts or other institutions is readily available. If the cost of determining the application of a rule to a particular situation is negligible, unclear entitlements will not impede bargaining; if interpretation is costly, however, they will: "even in a situation where transactions costs are low relative to the gains from trade, high entitlement-determination costs may independently frustrate the achievement of an ideal allocation of resources."

324. Stepping outside the Coasean approach, Carol Rose has recently argued that clear entitlements may have unexpected costs and imprecise entitlements expected benefits; imprecise rules may function best in long-term relationships. Rose, Crystals and Mud in Property Law, 40 Stan. L. Rev. 577 (1988). Although beyond the scope of this article, Rose's approach is highly suggestive for the study of international law.


326. See R. Kehane, After Hegemony, supra note 16, at 86; Conybeare, Property Rights, supra note 287, at 314 (discussing pre-20th century rules of international environmental law).

327. See, e.g., Restatement (Third), supra note 64, intro. note to pt. I, ch. 1, at 20 ("A law that not long ago was almost wholly customary is now overlaid by an elaborate network of treaties.").

328. Merrill, supra note 325, at 25.
Unfortunately, the means available to states for clarifying entitlements are far from costless. State practice, at best, requires time to develop. Arbitration and rulings of the International Court of Justice are rarely available without the consent of both parties, and are costly in terms of time and money because of their ad hoc character. Other international dispute settlement procedures—good offices, mediation, fact-finding, conciliation, and recommendations—may further negotiations in other ways, but do not necessarily clarify legal rights. Procedures based on negotiation, moreover, contribute only marginally to clarifying entitlements for the future. The same is true of arbitration when awards are kept private and cannot serve as precedents. Even the statute of the ICJ denies formal precedential value to decisions of the Court. IL scholars might well assess dispute settlement arrangements in international agreements and regimes in terms of their contribution to the collective good of entitlement determination.

B. Transactions Costs

The term “transactions costs” includes the expenditures of time, money and other resources necessary, in Coase’s words, “to discover who it is that one wishes to deal with . . . and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on.” These categories of costs correspond neatly to the phases of a transaction: the costs of search (for negotiating partners and bases of exchange), bargaining, monitoring and enforcement.

Keohane’s theory of international institutions incorporates the concept of transactions costs. His theory distinguishes individual agreements among states, such as a tariff reduction agreement, from regimes and other complex normative orders, such as the GATT: regimes are substantively more comprehensive, include procedural provisions, and are

329. For a brief description of these procedures, see Sohn, The Future of Dispute Settlement, in STRUCTURE AND PROCESS IN INTERNATIONAL LAW, supra note 2, at 1121-31.


331. Coase, Social Cost, supra note 238, at 15; see Merrill, supra note 325, at 21-22. Keohane’s implicit definition of transactions costs is confusingly broad. To Keohane, a particular agreement, such as a discriminatory trade arrangement, will be made more costly to the parties if it violates the norms of a regime like the GATT: the agreement will carry the stigma of a violation and may be met with authorized retaliation. Thus, a regime can increase the costs of transactions inconsistent with its norms relative to the costs of consistent transactions. See R. KEOHANE, AFTER HEGEMONY, supra note 16, at 89-90. This notion of the costliness of transactions differs from the usual meanings of “transactions costs.”
often institutionalized. Many international agreements are not made in isolation, but are "nested" within regimes; the tariff agreement under the GATT is the prototypical example. Regimes, Keohane theorizes, function to facilitate such subsidiary agreements, in part by reducing transactions costs. States will seek to create regimes when they can cost-effectively contribute to the conclusion of desirable agreements.

Regimes can reduce the costs of every phase of a transaction. In the search phase, regimes can help states locate suitable negotiating partners by bringing together those states interested in an issue and willing to negotiate about it. They can also reduce the costs of identifying potential bargains by producing, and requiring states to produce, relevant information. As Frederic Kirgis, Jr. has suggested, consultation requirements can perform a similar function, facilitating contact and identification of issues between parties to externalities. Regimes can also reduce the costs of bargaining, particularly when they provide "forums for meetings and secretariats that can act as catalysts for agreement." An even more pragmatic benefit is that regimes in which bargains have previously been struck will be able to provide "forms" for agreements on the same or related issues. Partial regimes and individual agreements can also perform this function: the Intermediate-Range Nuclear Forces Treaty, for example, is not a regime in Keohane's sense—an umbrella for individual arms control agreements—but its provisions on verification and other matters are still expected to reduce the transactions costs of future negotiations. As these examples suggest, the notion of reducing transactions costs offers a fruitful approach to the analysis of a wide range of international arrangements.

Regimes will not always be cost-effective. When parties can identify and contact each other readily and have only isolated issues to resolve, ad hoc negotiations may suffice. Keohane suggests, however, that re-

332. See R. Keohane, After Hegemony, supra note 16, at 149-50, 153-54. In fact, no sharp boundary separates individual agreements from more complex orders. An example of an arrangement on the borderline—more complex than a tariff bargain but less so than a regime like GATT—is the recent INF Treaty. See supra note 168. The treaty is a bilateral agreement calling for the destruction of missiles, launchers and bases, but it includes complex provisions for verification and creates a specialized institution, the Special Verification Commission, for dispute settlement. This agreement could be considered a partial regime for a narrow set of issues. Cf. Nye, Nuclear Learning, supra note 72, at 391-98.


334. The role of regimes in monitoring and enforcement has already been discussed. See supra notes 162-74 and accompanying text.

335. See Dahlman, supra note 296, at 147; infra text accompanying notes 346-47.


337. R. Keohane, After Hegemony, supra note 16, at 90.
gimes will be valuable in "dense policy spaces," situations in which states must deal with many significant interrelated issues. Ad hoc negotiations on each such issue would be complicated by the need to consider possible overlaps and conflicts. A regime reduces these complications by providing guidelines for consistency through its principles and norms. The clustering of numerous related issues under a single regime also facilitates side payments: "more potential quids are available for the quo." Since national bureaucracies are often organized along the lines of the international regimes with which they deal, it may be easier to gain domestic approval of side payments negotiated in a single forum. When regimes themselves are nested or linked, "crossover" payments are facilitated in similar ways.

Regimes may actually produce effects akin to economies of scale: as more issues are negotiated together, each can be dealt with more cheaply, at least up to a point. Increasing returns in negotiation should tend to produce more extensive regimes, just as increasing returns in production tend to produce larger firms. A similar analysis may explain why regimes themselves are often linked: grafting a new regime onto a functioning one costs less than creating an independent regime from scratch.

An excellent example of these effects is the postwar trade regime. The GATT was initially concerned primarily with tariffs on trade in goods. By the time of the Tokyo Round in the mid-1970s, states had begun to utilize the GATT framework to negotiate complex rules on non-tariff barriers to trade in goods, including internal matters such as government procurement policies that were barely addressed in the original agreement. During the Uruguay Round, the GATT negotiations have expanded to include barriers to trade in services and the trade-related aspects of rules on investment and intellectual property. All three subjects could logically be the subjects of separate regimes—indeed intellectual property is already the subject of several regimes, most administered by the World Intellectual Property Organization—but they are instead being dealt with under the umbrella of the GATT. The services negotiations have been kept formally separate, to placate states opposed to any new rules on services, but they have been linked procedurally to capture economies of scale.

338. See id. at 79; Keohane, Demand, supra note 27, at 339-41.
340. See id. at 90.
341. See id.; W. BAUMOL & A. BLINDER, supra note 92, at 395-96, 413-16.
C. Imperfect Information

Most transactions costs are products of inadequate information. Deficiencies in information obviously account for search costs; in addition, bargaining is only necessary because none of the parties knows in advance the terms on which the others are prepared to deal, and the costs of monitoring and enforcement need only be incurred because none of the parties knows if the others will fulfill their bargains. The search for information, including second-order information on ways to acquire and verify more basic information, is always costly. Imperfect information, then, emerges as perhaps the greatest impediment to welfare-increasing transactions.

Keohane views international regimes as efficiently creating and disseminating many kinds of relevant information, some of which have already been noted. In the search phase of a transaction, regimes reveal the identity of states interested in an issue, willing to negotiate on it, and committed to an acceptable range of outcomes. By the same token, regime membership acts as a form of “signalling,” a shorthand communication of a state’s interests and attitudes. The signalling function may constitute a significant incentive for membership in international regimes.

At the negotiating stage, regimes can modify states’ understanding of an issue area and help them see possibilities for exchange. They can provide facts about the circumstances of the parties and the likely results of particular bargains. They can clarify entitlements and set normative boundaries for permissible agreement, thereby simplifying negotiations. Regimes under which previous negotiations have taken place can provide information about likely problems and potential solutions.

Regimes in mixed-motive settings often include extensive provisions for monitoring compliance with regime norms and subsidiary agreements, ranging from transparency requirements to supranational surveillance. At the enforcement stage, regimes can clarify what activities constitute violations, provide procedures for determining when a violation has occurred, and convey to states the likely consequences of viola-

344. Dahlman, supra note 296, at 148.
346. In addition to their formal functions, Keohane suggests that regimes catalyze informal exchanges of information through the personal contact of national officials. R. Keohane, After Hegemony, supra note 16, at 97; Keohane, Demand, supra note 27, at 349.
347. See E. Mackaay, supra note 83, at 176-77.
348. According to Mackaay, law can often be seen as assisting negotiations by alerting the parties to the contingencies that may befall them. E. Mackaay, supra note 83, at 65.
More generally, the existence of norms and rules constraining state behavior reduces the uncertainty of international transactions to a significant, if less than optimal, degree.\(^{350}\)

From the perspective of a state contemplating an international agreement, the most important information may be the likelihood that its negotiating partners will keep their commitments. The only sources of this information are the other states themselves. In the coordination and Stag Hunt games and other cooperative settings, states have incentives to reveal their intentions truthfully and credibly. In mixed-motive settings, however, states—like sellers of goods and services in an economic market\(^{351}\)—will often have incentives to mislead.\(^{352}\) Where information comes predominantly from "seller" states, then, "buyer" states will, at the very least, be forced to expend extra resources on verification or backup sources, making transactions more costly.\(^{353}\) Where buyer states fear deception and double-crossing, and cannot obtain sufficient information to allay their fears, they may simply refuse to enter into agreements. Some welfare-increasing bargains thus will not be made.\(^{354}\)

Keohane's analysis focuses on this problem of asymmetrical information.\(^{355}\) His model is the "market for lemons" described by George Akerlof: owners of defective used cars ("lemons") have a greater incentive to sell them than owners of quality cars; most used-car buyers cannot easily distinguish between a quality car and a lemon, and so will often refuse to pay the true market value of a quality car; owners of quality cars will thus be reluctant to sell them at the going price; and some mutually beneficial sales of quality cars will not take place.\(^{356}\)

Participants in the used car market address this problem by doing business through reputable dealers. States utilize much the same device: as an inexpensive proxy for hard to acquire information on whether negotiating partners are likely to honor their commitments, states look to the reputation they have acquired by their performance under past agreements. Regimes, Keohane suggests, help buyer states assess the reputa-

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349. See supra text accompanying notes 170-73.
350. R. KEOHANE, AFTER HEGEMONY, supra note 16, at 89.
351. See E. MACKAAY, supra note 83, at 159-61.
352. R. KEOHANE, AFTER HEGEMONY, supra note 16, at 92-93; Keohane, Demand, supra note 27, at 343-44, 346-47. An important example is the disguising of preferences for the production of CGs. See D. MUELLER, supra note 65, at 68-89.
353. E. MACKAAY, supra note 83, at 161-63.
355. Regimes that disseminate information will reduce relative asymmetries by increasing the absolute level of information. See id. at 94.
tions of sellers in the market for international agreements, and help reputable sellers convey their good reputations, enabling advantageous negotiations to go forward. Regimes facilitate the communication and assessment of reputations by "providing standards of behavior against which performance can be measured, by linking these standards to specific issues, and by providing forums, often through international organizations, in which these evaluations can be made."  

At least the first two of these functions can be performed by individual agreements and customary rules as well as by regimes. Performance or breach of almost any obligation, whether customary or conventional, ad hoc or intrinsic to a regime, may be "capitalized" into reputation and considered by others in future negotiations, even in different issue areas. For rational states with an interest in entering welfare-increasing bargains, the importance of reputation creates a significant incentive for compliance with international norms.

Keohane also analyzes information asymmetry in terms of two other models—moral hazard and adverse selection—drawn from the insurance industry. Moral hazard arises when an insured can affect the accuracy of an insurer's estimate of risk, either by failing to disclose risk factors before a policy is issued or by engaging in increasingly risky behavior after its issue. If moral hazard is unchecked, insurance may become unavailable. Similarly, a state entering negotiations in a mixed-motive situation will have the insured's incentive to conceal any intention it may have to cheat or free-ride once agreement is reached. Consummation of an agreement may actually strengthen its incentive to defect by increasing the likelihood that others will keep their commitments. Concern over these problems can inhibit welfare-increasing bargains.

Insurers, and states, address moral hazard in several ways. Insurers typically force insureds to bear a significant part of the risk through deductibles and the like. For states, the use of "hostages," retaliatory sanctions, and reciprocal suspension of obligations may play equivalent roles. Once policies are issued, insurers may try to monitor the conduct of their insureds, although that is often too costly. For states, international regimes can make monitoring more feasible. Finally, insurers

357. See R. KEOHANE, AFTER HEGEMONY, supra note 16, at 94.
358. See id. at 105-06.
359. See id. at 95-96. For a discussion of these phenomena, see E. MACKAAY, supra note 83, at 191-95.
360. See E. MACKAAY, supra note 83, at 191-95.
rely heavily on driving records and other evidence of past behavior;\textsuperscript{362} states look to reputation.

Regimes also address the problem of adverse selection. Adverse selection occurs when high-risk parties seek to enter an insurance pool in disproportionate numbers. If insurers are unable to distinguish sufficiently among applicants with respect to the levels of risk they pose, they may be forced to set insurance premiums at very high levels, driving out low-risk applicants. States entering negotiations, like applicants for insurance and credit, present different degrees of risk. Those that have little to offer may be more enthusiastic about entering agreements than those that have much; those with little compunction about abandoning commitments may be more willing to enter agreements than those that intend to adhere to them faithfully. By providing information about behavior under past commitments, regimes can help states differentiate among negotiating partners the way insurers and lenders seek to differentiate among applicants. States that are the equivalent of teenage drivers should find it more difficult to enter into beneficial agreements.\textsuperscript{363}

D. \textit{Summary}

Structural impediments to negotiation, like ill-defined property rights, high transactions costs and imperfect information, lie at the core of political market failures. Modern IR theory views many international rules, regimes and institutions as devices to ameliorate these impediments, making higher levels of cooperation possible. International rules function to clarify and efficiently allocate entitlements. International regimes and institutions can reduce the costs of search and bargaining and aid in monitoring and enforcement. They can also create and disseminate many kinds of relevant information, especially as to the likelihood that negotiating partners will fulfill potential commitments. Reliance on reputation as a source of information on future compliance constitutes a major incentive for compliance with existing norms and obligations.

VI. Conclusion

International politics is an inherently difficult subject for any theory to explain. The major actors are complex institutions, with preferences and motives that are difficult to ascertain. Multiple causes contribute to most events. The small number of cases typically available for empirical inves-

\textsuperscript{362} E. MACKAAY, \textit{supra} note 83, at 194.
\textsuperscript{363} See R. KEOHANE, \textit{After Hegemony}, \textit{supra} note 16, at 96-97; E. MACKAAY, \textit{supra} note 83, at 188.
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tigation provide "a poor substitute for a laboratory." One must add, in candor, that modern IR theory has significant weaknesses of its own. As a rational choice theory, it relies on simplifying assumptions, and requires the analyst to specify state preferences without a clear understanding of how such preferences are formed or change. As a structural theory, it cannot reliably predict or explain in detail the conduct of particular states.

This article has attempted to demonstrate, however, that in spite of such unavoidable difficulties, modern IR theory presents IL scholars with stimulating opportunities for the study of international rules, regimes and institutions. In this Conclusion, I will summarize the major lines of inquiry and analysis that the theory makes possible. I will illustrate these areas of inquiry with some tentative observations on the example set out in the Introduction: the norms and institutions of the Limited Test Ban Treaty ("LTBT") and the Nuclear Non-Proliferation Treaty ("NPT").

A. Defense of International Norms

Modern IR theory presents IL scholars with an analytically rigorous response to the pervasive skepticism with which observers, from law students to government officials, often view international cooperation in general and international law and institutions in particular. In the long run, the rehabilitation of international norms and institutions could be the most important effect of the integration of this body of theory with IL scholarship. Using modern IR theory, one can explain deductively—without any reference to idealism or altruism—why rational self-interested states might find it in their interest to create norms and institutions like those of the LTBT and NPT and to comply with their dictates, even in an issue area rife with discord and competition. The theory helps justify our confidence in the reality and value of international law, and can help convey that confidence to hard-headed skeptics.

IL scholars may well object that a theory so apparently remote from mainstream IL writings—as illustrated in the Introduction by a compari-

366. The most influential justification of the reality and force of international law to date, L. HENKIN, HOW NATIONS BEHAVE, supra note 6, is essentially inductive, reasoning backward from the ways in which governments seem to take account of international law.
368. Even the United States and the Soviet Union have apparently modified their conduct to accord with these conventions. See, e.g., INTERNATIONAL ARMS CONTROL, supra note 25, at 133 (LTBT); Nye, Nuclear Learning, supra note 72, at 396-97 (NPT).
son with the major American casebooks— is a poor vehicle for the defense of international law. Surprisingly, however, a careful look at the casebooks suggests that modern IR theory is intellectually less alien than might first appear.

For one thing, these works typically adopt a third image perspective, depicting international law as a device by which states, considered generically, pursue their interests within a given political context. For the most part, the casebooks adopt the assumption that states are the principal international actors. More surprisingly, they typically, though often implicitly, characterize states according to the assumptions of rational actor theory. The casebooks almost always treat states as unitary entities and portray them as egoistic and strategically rational.

The major divergence from modern IR theory lies in the casebooks' treatment of anarchy. The casebooks usually present the absence of central institutions in the context of criticism of the international legal system, rather than as one parameter of an explanatory model, and respond to the criticism defensively. This reaction effectively prevents the kinds of demand and supply analysis described in this article. If IL scholars are willing to embrace the analytic approach of modern IR theory, however, they should be able to do so with a minimum of intellectual adjustment.

B. Functional Analysis of International Norms

Modern IR theory can help IL scholars better understand the functions that rules, regimes and institutions perform for states. This func-

369. See supra text accompanying notes 5-6.
370. See supra text accompanying notes 28-38.
371. See, e.g., L. Henkin, INTERNATIONAL LAW, supra note 5, at xxix (law made by states to govern their relations), 20-21 (international law is instrument of policy), 32 (international law reflects emergence of common interests among states). This text is referred to in this section, as well as in the Introduction, as representative of the standard IL casebooks.
372. See id. at 10, 35, 228-29 (states are "principal addressees of international law," its primary subjects and its principal creators). The casebooks also note the growing importance of non-state actors. See id. at 32-33.
373. See id. at 228 (states are legal persons), 229 ("a state is an entity...."). But see id. at 4-5 (states are not persons and have no will) (quoting J. Brierly, THE LAW OF NATIONS (6th ed. 1963))
374. See id. at 8 ("nations recognize that the observance of law is in their interest"), 26-27 (legal obligations further national interests), 33-34 (self-preservation is supreme interest of states), 36 (states act for reasons of power and interest).
375. See id. at 8 ("rational calculation of cost and advantage"), 18 ("rational appreciation of the advantages of a relationship" restrains temptation to violate norms), 21 (states consider responses of victims and consequences for friendly relations with other states).
376. See id. at 1, 8-10, 17-18.
377. See id. at 7-10.
tional approach can immediately add depth and richness to the formal analysis of normative arrangements which is often the subject of current IL scholarship. The approach could even contribute to positive legal analysis, particularly where the purpose of a norm is a relevant consideration.378

Functional analysis suggests that the LTBT and NPT help resolve basic PD situations afflicting the United States and the U.S.S.R. The LTBT brought under control a form of arms race that might have entailed great cost and grave environmental risks without a gain in security for either side. At the same time, it responded to increasing pressure from states suffering negative externalities from atmospheric testing. This pressure has effectively reversed the prevailing entitlements, leading, it appears, to a more efficient allocation. The NPT counteracted PD incentives that might have led the United States and the U.S.S.R. to compete in providing nuclear weapons and technology to potential client states or commercial customers.

The NPT also served to prevent or control nuclear arms race PDs among other rival states, although the force of the security dilemma in some regions has prevented universal adherence. Both conventions also sought to prevent the security and environmental externalities that would be created if additional states sought to develop nuclear weapons capabilities without restraint. Compared with unregulated atmospheric testing and the spread of nuclear arms, both regimes can be considered CGs.

Game theory suggests that, even in PD situations, states resist international cooperation as much out of fear of exploitation as out of a temptation to exploit. The United States was willing to halt nuclear testing, for example, but feared that the U.S.S.R. would be able to cheat. The LTBT served as an assurance of commitment, making agreement by both sides easier. It also provided bright line standards, tied to the ability of each side to monitor the other's behavior, for the assessment of subsequent conduct. The NPT dealt with similar concerns. Although peaceful uses of atomic energy complicated monitoring, and many participating states had limited monitoring capabilities, the unusual safeguard responsibilities of the International Atomic Energy Agency have functioned to fill this gap.

378. See Law of Treaties, supra note 155, art. 31, para. 1, 1155 U.N.T.S. at 340 (treaties to be interpreted, inter alia, in light of “object and purpose.”).
Modern IR theory can help IL scholars better understand the creation, or "supply," of international rules, regimes and institutions. Three separate lines of inquiry can be distinguished: (1) study of the structural conditions that favor or hinder international cooperation—under hegemonic stability theory, the distribution of power; under cooperation theory, such factors as the number of states involved in an interaction, the iteration of the interaction, and other determinants of the "shadow of the future"; (2) study of the techniques by which states seek to achieve cooperation and compliance under existing conditions—devices such as Coasean bargaining, exclusion, and policies of conditional cooperation or tit-for-tat; (3) study of the strategies through which states can modify prevailing conditions and improve the possibilities for cooperation—changing potential payoffs, increasing iteration, increasing the quality and availability of information, linking regimes, and the like. These forms of supply-side analysis constitute a greater innovation for IL scholars than the functional analysis of existing regimes, and they offer the exciting normative possibility of contributing to the development of international law.

Looking first at the structural conditions influencing international cooperation, the LTBT, while ultimately adhered to by more than one hundred states, was initially negotiated among a very small number, primarily between the United States and the U.S.S.R. As the negotiations were politically sensitive and technically complex, the small number of states involved appears to have been an important factor in their success. A larger number of states participated in the drafting of the NPT, but institutions such as NATO and the 18-Nation Disarmament Conference made their participation manageable. In both cases, the General Assembly functioned as a forum in which less-powerful states could voice their positions and exert bargaining pressure.

Another structural attribute, the shadow of the future, was a major factor in producing cooperation and compliance with these regimes, especially between the United States and the U.S.S.R. In negotiating the LTBT, for example, each state could count on the existence of the other, for the indefinite future, as a rival committed to and capable of developing new weapons. Once the convention was signed, violations were almost certain to be observed, and each could expect that the other would quickly resume testing in response. In fact, the United States acted consciously to increase the certainty of its response, maintaining costly testing preparations precisely to communicate its commitment to a tit-for-tat resumption of testing. In the case of the NPT, U.S.-Soviet strategic arms
control negotiations were announced simultaneously with the signing of the treaty, linking issues in a way that gave each side a reputational stake in compliance.

In consolidating their virtual nuclear duopoly through the NPT, both superpowers advanced their common interest in quelling regional conflicts that could prompt their mutual intervention. Incentives to cooperate and comply with the NPT were less strong for small states engaged in regional rivalries: unlike the United States and the U.S.S.R., who already possessed enormous power, a significant nuclear advance by a smaller state could significantly change the local military balance. Fear of a disastrous sucker's payoff has thus made it impossible for some states to join or comply fully with the regime.

Negotiation of the NPT is also noteworthy for the techniques by which the participation of many small states was obtained. Some states, clients of the United States and the U.S.S.R., were undoubtedly influenced by the power of their patrons. Others may have joined for the purpose of signalling their peaceful and cooperative attitudes. Still others, however, were convinced to participate by the Coasean bargain explicit in the convention: the nuclear powers would assist with peaceful uses of atomic energy and commit themselves to restrain “vertical proliferation” in return for a commitment to forego nuclear arms.

The entire bargain, it is worth noting, was not included in the text of the NPT: to assuage non-weapons states concerned that nuclear weapons might be used against them, the United States, the U.S.S.R., and the U.K. issued parallel declarations pledging to act under the U.N. Charter in aid of an NPT signatory threatened by nuclear arms. Modern IR theory directs attention to a variety of such non-legal arrangements that perform the same functions as legal norms. IL scholars, in particular, might fruitfully explore the reasons why states sometimes choose to govern their relations through legal arrangements, and sometimes through informal ones.

The LTBT and the NPT can also be interpreted as efforts to modify existing conditions, making further cooperation easier. The LTBT, in particular, was explicitly seen as a first step toward broader U.S.-Soviet cooperation and eventual détente. The treaty was advertised within the United States, at least, as establishing patterns of negotiation, demonstrating the existence of common interests, providing an opportunity to demonstrate compliance, and showing the effectiveness of national tech-

379. See INTERNATIONAL ARMS CONTROL, supra note 25, at 158.
380. See id. at 131-33.
The IAEA safeguards system may have contributed to broader participation in the NPT by increasing confidence that the sucker’s payoff—i.e., the vulnerability of unilateral nuclear disarmament—could be avoided. The NPT as a whole can be seen as increasing confidence in the security of the political environment in many areas of the world, making other forms of cooperation easier to accept.

D. Generation of New Hypotheses

Snidal and other theorists of a scientific bent argue that the most important contribution of modern IR theory will be the generation of original hypotheses attempting to explain significant features of international politics. Although deemphasized in this article, the rigorous scientific approach holds out the remarkable possibility of producing wholly new knowledge. Modern IR theory is adaptable to such an approach because of its simplifying assumptions, its deductive logical structure, and its parsimony. While full empirical testing in the literal sense of the physical sciences is clearly impossible in international relations, valuable empirical investigations can still be performed. Perhaps the most fruitful empirical approach would combine third and second image analyses by exploring how international norms and commitments figure in domestic decision-making so as to influence the conduct of states.

As this summary has shown, the pursuit of modern IR theory would have a profound effect on IL scholarship. It would permit IL scholars to join forces with students of international norms and institutions in related disciplines, after an estrangement of many years; to utilize, along with their colleagues in the social sciences and law, the powerful analytical tools of rational actor theory, economics, and game theory; and to pursue the fruitful lines of theoretical and empirical inquiry just de-


382. See, e.g., Snidal, Game Theory, supra note 41, at 27-28.

383. See, e.g., Haggard & Simmons, supra note 18, at 513-17. I have attempted to pursue this line in an analytical, though not an empirical, way. See Abbott, Trading Nation's Dilemma, supra note 32.
scribed. Modern IR theory could help international lawyers to expand the bounds of their discipline, to become—in Oran Young's words—"students of international relations in the true sense of the term, endeavoring to shed light on the connecting points of international politics, economics, law, and organizations."384