

# GAME THEORY AND COMPARATIVE POLITICS

## New Perspectives and Old Concerns

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RATIONAL choice theory (RCT) has had a growing influence on political science that can be traced to the impact of a handful of seminal works: John von Neumann and Oskar Morgenstern's *Theory of Games and Economic Behavior*, Kenneth Arrow's *Social Choice and Individual Values*, Anthony Downs's *Economic Theory of Democracy*, and Mancur Olson's *Logic of Collective Action*.<sup>1</sup> The impact of RCT was first felt in the field of American politics, in large part due to the work of William H. Riker and the Rochester school, and by the 1990s it occupied a position of great influence in this field. Within the field of international relations, RCT did not attain the same position of influence as in American politics, but it was also used quite widely. The same cannot be said about comparative politics. Indeed, RCT and, more specifically, game theory—a term I use to refer to the branch of RCT that studies interdependent decision making with a formal methodology—was hardly a standard point of reference for comparativists until quite recently.<sup>2</sup>

Since the early 1990s, however, much has changed in comparative politics. A number of prominent comparativists published widely read

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<sup>1</sup> Von Neumann and Morgenstern, *The Theory of Games and Economic Behavior* (Princeton: Princeton University Press, 1944); Arrow, *Social Choice and Individual Values* (New York: John Wiley and Sons, 1951); Downs, *An Economic Theory of Democracy* (New York: Harper and Row, 1957); Olson, *The Logic of Collective Action* (Cambridge: Harvard University Press, 1965).

<sup>2</sup> On the impact of the foundational texts of rational choice theory on political science, see Dennis C. Mueller, "Public Choice in Perspective," in Mueller, ed., *Perspectives on Public Choice: A Handbook* (New York: Cambridge University Press, 1997); and S. M. Amadae and Bruce Bueno de Mesquita, "The Rochester School: The Origins of Positive Political Economy," *Annual Review of Political Science*, vol. 2 (Palo Alto, Calif.: Annual Reviews, 1999), 272–78. On the impact of RCT on the different fields within political science, see Scott Gates and Brian D. Humes, *Games, Information, and Politics: Applying Game Theoretic Models to Political Science* (Ann Arbor: University of Michigan Press, 1997), 12–14; and Amadae and Bueno de Mesquita.

and influential works applying RCT and game theory to a series of problems of great interest to students of comparative politics—problems that include democratization, economic reform, ethnic mobilization, and nationalism.<sup>3</sup> In addition, a concerted effort was made to promote the potential contributions of RCT and game theory. Many of the claims put forth still rest more on promise than on actual achievements. Nevertheless, the claims are hard to ignore: in essence, RCT and game theory are presented as the approaches best suited to theory building, the integration of research on different substantive issues, and the cumulation of knowledge.<sup>4</sup>

This call for a reorientation of comparative politics has frequently been framed in stark terms that overstate the contributions of RCT and game theory and understate or simply ignore the contributions of other theoretical and methodological approaches. For example, though Barry Weingast recognizes that “formal and traditional approaches are complementary rather than competing paradigms,” he nonetheless argues that formal theory has “the ability to answer questions to which traditional methods are less suited” and specifically suggests that whereas other scholars might provide “detailed descriptions,” formal theorists provide “explanations” and offer a means for synthesizing research on diverse questions that other literatures treat in a compartmentalized way.<sup>5</sup> Similarly, Barbara Geddes argues that RCT lends itself “to the construction of general theories” and makes “theory building possible,”

<sup>3</sup> Robert H. Bates, *Markets and States in Tropical Africa: The Political Basis of Agricultural Policies* (Berkeley: University of California Press, 1981); idem, ed., *Toward a Political Economy of Development: A Rational Choice Perspective* (Berkeley: University of California Press, 1988); idem, *Beyond the Miracle of the Market: The Political Economy of Agrarian Development in Kenya* (New York: Cambridge University Press, 1991); idem, “Comparative Politics and Rational Choice: A Review Essay,” *American Political Science Review* 91 (September 1997); David Laitin, “The Game Theory of Language Regimes,” *International Political Science Review* 14 (July 1993); idem, *Identity in Formation: The Russian-Speaking Populations in the Near Abroad* (Ithaca, N.Y.: Cornell University Press, 1998); idem, “National Revivals and Violence,” in John Bowen and Roger Petersen, eds., *Critical Comparisons in Politics and Culture* (New York: Cambridge University Press, 1999); Adam Przeworski, *Democracy and the Market: Political and Economic Reforms in Eastern Europe and Latin America* (New York: Cambridge University Press, 1991).

<sup>4</sup> Laitin, “Letter from the Incoming President,” *APSA-CP: Newsletter of the APSA Organized Section in Comparative Politics* 4 (Summer 1993); Bates, “Letter from the President: Area Studies and the Discipline,” *APSA-CP: Newsletter of the APSA Organized Section in Comparative Politics* 7 (Winter 1996); Barry R. Weingast, “Formal Theory and Comparative Politics,” *APSA-CP: Newsletter of the APSA Organized Section in Comparative Politics* 8 (Winter 1997a); idem, “The Political Foundations of Democracy and the Rule of the Law,” *American Political Science Review* 91 (June 1997b); Bates et al., *Analytical Narratives* (Princeton: Princeton University Press, 1998). Przeworski represents a special case, in that he does not favor giving primacy to any theory or method in an a priori fashion and has explicitly addressed the limitations of RCT. See Przeworski, “Marxism and Rational Choice,” *Politics and Society* 14 (December 1985); and idem, contribution to Atul Kohli et al., “The Role of Theory in Comparative Politics: A Symposium,” *World Politics* 48 (October 1995).

<sup>5</sup> Weingast (fn. 4, 1997a), 6; and idem (fn. 4, 1997b), 245–46.

whereas the various other approaches used in the study of comparative politics have “accumulated . . . little theoretical . . . knowledge” and produced, at best, “ad hoc inductive generalizations.”<sup>6</sup> Thus, it is hardly surprising that the debate about the status of game theory within comparative politics has been very heated and that considerable support has been gained by two equally implausible positions: that RCT and game theory provide the only path to theory building, thematic integration, and knowledge cumulation and thus that other, more established approaches should be abandoned; or that this new approach has nothing to offer students of comparative politics and therefore should be rejected out of hand.

This article seeks to move beyond this passionate but unenlightening exchange by providing an informed and balanced assessment of game theory that makes reference to game-theoretic research in comparative politics. It bears stressing at the outset, however, that the aim of this article is not to provide an assessment of the contributions game theorists have or have not made to our understanding of substantive issues. RCT and game theory have been used to study a number of central questions in comparative politics, so there is already a fairly long bibliography to assess. Nonetheless, there is also merit to Margaret Levi’s observation that “empirical rational choice [research] in comparative . . . [politics] is in its relative infancy.”<sup>7</sup> Thus, although empirical research is discussed as a way to identify some trends and illustrate some problems already clearly revealed in the RCT and game-theoretic literature in comparative politics, the aim of this article is not to render definitive judgments

<sup>6</sup> Geddes, “Paradigms and Sand Castles in Comparative Politics of Developing Areas,” in William Crotty, ed., *Political Science: Looking to the Future* (Evanston, Ill.: Northwestern University Press, 1991), 2:46, 63–64; and idem, “Uses and Limitations of Rational Choice,” in Peter H. Smith, ed., *Latin America in Comparative Perspective: New Approaches to Methods and Analysis* (Boulder, Colo.: Westview Press, 1995), 102. The tendency to overstate claims is not unique to the debate about rational choice theory and game theory in comparative politics. For similar statements in the context of American politics and international relations, see Riker, who links the possibility of progress in the social sciences directly to the use of rational choice models, and Niou and Ordeshook, who imply that research by formal theorists has a “solid scientific grounding,” while the analysis of nonformal researchers amounts to “mere journalism.” William H. Riker, “Political Science and Rational Choice,” in James Alt and Kenneth Shepsle, eds., *Perspectives on Positive Political Economy* (Cambridge: Cambridge University Press, 1990), 177; Emerson M. S. Niou and Peter C. Ordeshook, “Return of the Luddites,” *International Security* 24 (Fall 1999), 96. See also Bueno de Mesquita, who portrays game theory as a “social-scientific approach,” which is contrasted to an inductive, historical approach that is deemed to suffer from a variety of theoretical and methodological flaws. Bueno de Mesquita, “The Benefits of a Social-Scientific Approach to Studying International Affairs,” in Ngaire Woods, ed., *Explaining International Relations since 1945* (New York: Oxford University Press, 1996), 55, 57.

<sup>7</sup> Levi, “A Model, a Method, and a Map: Rational Choice in Comparative and Historical Analysis,” in Mark Irving Lichbach and Alan S. Zuckerman, eds., *Comparative Politics: Rationality, Culture and Structure* (New York: Cambridge University Press, 1997), 36.

about substantive contributions.<sup>8</sup> Rather, it focuses on the core principles of game theory in order to show how these principles determine both the potential uses of game theory and its limitations. This particular focus is key, because it draws attention to a frequently overlooked distinction between two elements combined in game-theoretic analysis: rational choice *theory* and a formal *methodology*.<sup>9</sup> Moreover, because different core principals are associated with these two elements, this basic approach to assessing game theory offers a sound basis for identifying and isolating distinct sources of strength and weakness, which all too often have been conflated and confused in the debate. In short, a focus on core principles is probably the best way to advance the debate.

To anticipate the basic thrust of this assessment: my views are decidedly mixed, as I identify both important strengths and significant shortcomings associated with game theory. With regard to the status of game theory as an extension of RCT to interdependent decision making, the focus of the first section of this article, the analysis sees game theory's emphasis on actors and strategic choices as an important strength. But even though game theory holds out the promise of contributing to a theory of action, the assessment offered here stresses the inability of game theory to provide a full explanation of actions and its lack of applicability in domains of great significance. It therefore calls

<sup>8</sup> For some early and preliminary efforts to take stock of the rational choice and game theory literature in comparative politics, see Bates, "Macropolitical Economy in the Field of Development," in Alt and Shepsle (fn. 6); idem (fn. 3, 1997); William Keech, Robert Bates, and Peter Lange, "Political Economy within Nations," in Crotty (fn. 6), 243–48; Geddes (fn. 6, 1995); Levi (fn. 7); and Rogers Brubaker and Laitin, "Ethnic and Nationalist Violence," *Annual Review of Sociology* 24 (1998), 437–41. See also Debra Friedman and Michael Hechter, "The Contribution of Rational Choice Theory to Macrosociological Research," *Sociological Theory* 6 (Fall 1988); idem, "The Comparative Advantage of Rational Choice Theory," in George Ritzer, ed., *Frontiers of Social Theory: The New Synthesis* (New York: Columbia University Press, 1990); and Hechter and Satoshi Kanazawa, "Sociological Rational Choice Theory," *Annual Review of Sociology* 23 (1997).

<sup>9</sup> Duncan Snidal, "The Game Theory of International Relations," *World Politics* 38 (October 1985), 25, 32–36; Ordeshook, "Engineering or Science: What Is the Study of Politics?" in Jeffrey Friedman, ed., *The Rational Choice Controversy: Economic Models of Politics Reconsidered* (New Haven: Yale University Press, 1996), 179; Niou and Ordeshook (fn. 6), 93. The rationale for drawing this distinction is quite simple. Game theory can be defined, in part, through its use of a formal methodology, which consists of a series of procedures for building formal models and deriving hypotheses about phenomena of interest to researchers. However, a formal methodology does not stand on its own, in that the solution of formal models requires the use of a theory—the theory of rational choice in the literature on game theory assessed here.

In addition to distinguishing two basic elements of game theory, this distinction between theory and method also helps to distinguish game theory from closely related approaches. On the one hand, the use of a formal methodology underlies the distinction between formal and "soft" versions of game theory. On the other hand, the use of rational choice theory underlies the distinction between "traditional" game theory, which subscribes to RCT, and other, newer variants of game theory, such as "evolutionary" game theory, which rely upon other behavioral assumptions. In these terms, the aim of this article is to assess traditional game theory that uses a formal methodology.

into question standard claims about the theoretical strengths of game theory and points to the need for a broader theoretical framework.

The status of game theory as a form of theorizing that uses a formal methodology, discussed in the second section, is also associated with a valued feature: the ability to generate predictions in a logically rigorous and internally consistent manner. Nonetheless, the analysis shows, most importantly, that the failure of the procedures used in formal modeling to offer guidance pertaining to the first and most critical step in the process of modeling—the conceptualization of the model—calls into question common claims about the methodological strengths of game theory and points to the need for greater attention to standards for the assessment of concepts. Thus, as I argue in the conclusion, the challenge facing scholars in comparative politics is to consider the new perspectives offered by game theory and draw upon its strengths—but without losing sight of those old concerns in the social sciences that game theory is not suited to tackle.<sup>10</sup>

#### THE THEORY IN GAME THEORY: UNIVERSALISM AND ITS LIMITS

Game theory, with its emphasis on strategic choice, makes a significant programmatic promise: to contribute to the development of a theory of action. The importance of this programmatic goal is hard to overemphasize. Indeed, the agenda of game theory dovetails in many ways with recent critiques of structural forms of analysis and the broad-based turn toward actors and actions.<sup>11</sup> Relatedly, this emphasis on action is motivated by a parallel critique of correlational analysis and a recognition of the need to focus more explicitly on the processes and the mechanisms through which outcomes are generated.<sup>12</sup> The widespread recognition of the need for a theory of action notwithstanding, it is equally important to acknowledge that the RCT-based theory of action

<sup>10</sup> It is very hard to convey the strengths and weaknesses of game theory without offering an actual modeling exercise. Though this is precluded here for reasons of space, a companion book-length manuscript presents an extensive exercise in game-theoretic modeling.

<sup>11</sup> Elster, *Ulysses and the Sirens: Studies in Rationality and Irrationality* (New York: Cambridge University Press, 1979), viii–ix, 1, 28–35, 112–17; and idem, “Introduction,” in Elster, ed., *Rational Choice* (New York: New York University Press, 1986), 22–23.

<sup>12</sup> James S. Coleman, “Social Theory, Social Research and a Theory of Action,” *American Journal of Sociology* 91 (May 1986); idem, *Foundations of Social Theory* (Cambridge: Harvard University Press, 1990), chap. 1; Elster, *Nuts and Bolts for the Social Sciences* (New York: Cambridge University Press, 1989), chap. 1; idem, *Alchemies of the Mind: Studies in Rationality and the Emotions* (New York: Cambridge University Press, 1999), chap. 1; Peter Hedström and Richard Swedberg, “Social Mechanisms: An Introductory Essay,” in Hedström and Swedberg, eds., *Social Mechanisms: An Analytical Approach to Social Theory* (New York: Cambridge University Press, 1998), 7–11, 15–17.

proposed by game theorists has been the subject of quite divergent assessments.

There is little dispute concerning some matters. Thus, scholars broadly agree that the theory of action proposed by game theory has at its core a fairly simple structure, consisting of three building blocks. They agree that game theory is driven, first, by an understanding of the process of choice making based on the *expected utility model* of decision making. Second, game theory is seen as generating predictions by linking the analysis of choice making to the concept of *equilibrium*. Third, game theory is seen as treating the *rules of the game*—a phrase used to encompass the set of players in a game, the strategies or choices they confront, the way in which these choices are sequenced, the preferences of actors, and the information actors possess when they make their choices—as exogenous factors that are taken as given and assumed to remain constant. This much is uncontested. However, the commitment of game theorists to this set of theoretical principles is seen in a different light by different scholars.

On the one hand, some see these theoretical building blocks as a source of great strength. Because they are considered to be a coherent set of principles, they are seen as the basis for a rigorous, mathematical form of analysis that makes game theory, unlike other approaches, a *scientific* approach to theory building. Moreover, because these theoretical principles are considered to be universal principles and therefore not limited to any particular substantive domain, they are seen as offering a unifying principle that allows game theorists to *integrate research on diverse substantive issues* and produce a valued yet scarce commodity: *cumulative knowledge*.<sup>13</sup> On the other hand, all these claims rest on an assumption that is seriously challenged for each one of the theoretical building blocks of game theory: the assumption that game theory enjoys a special status as a totalizing theory, both in the sense that it is a *complete theory* that can stand on its own rather than a partial explanatory framework and in the sense that it has *universal scope*, that is, that it can be applied to all domains of research rather than being confined to certain spatial and temporal contexts.<sup>14</sup>

<sup>13</sup> For assessments that stress these strengths, see Riker (fn. 6), 177; George Tsebelis, *Nested Games: Rational Choice in Comparative Politics* (Berkeley: University of California Press, 1990), 42–43; Geddes (fn. 6, 1991), 63–67; idem (fn. 6, 1995), 100–102; James D. Morrow, *Game Theory for Political Scientists* (Princeton: Princeton University Press, 1994), 6–7; and Levi (fn. 7), 20.

<sup>14</sup> Donald Green and Ian Shapiro, *Pathologies of Rational Choice: A Critique of Applications in Political Science* (New Haven: Yale University Press, 1994), 23–29, 183–88, 192–94; idem, “Pathologies Revisited: Reflections on Our Critics,” in Friedman (fn. 9), 261–68; Daniel M. Hausman, *The Inexact and Separate Science of Economics* (New York: Cambridge University Press, 1992), 90–101, 224–26, 270–74.

The issues at stake in these two counterposed assessments of the theory of action offered by game theory are quite complex. Thus, facile defenses and criticisms of game theory usually miss the mark. But the demonstrable evidence about the limits of game theory is also very compelling, as it raises serious questions about its alleged status as a complete, universally applicable theory. Indeed, criticisms of the claim that game theory enjoys a special status as a totalizing theory are hard to ignore and present game theorists with an important option. They may adopt either a *purist* position, which essentially ignores evidence about the limits of game theory, or a *pragmatist* position, which takes this evidence seriously and is thus more defensible, but which thereby opens the door to a series of new problems. (See Table 1).

#### THE EXPECTED UTILITY MODEL

The first challenge to the status of game theory as a universal theory comes mainly in the form of research by cognitive psychologists, who have questioned the expected utility model used in game theory to analyze decision making. There is strong empirical evidence to challenge the behavioral assumption that actors are utility maximizers. Indeed, several decades of research have offered evidence that is hard to ignore.<sup>15</sup> Yet the response of game theorists to this criticism has varied considerably.

One response takes the form of Milton Friedman's classic "as if" argument and summarily dismisses this entire line of criticism. The only thing that matters for these game theorists is a model's predictions and that the alleged universalism of the expected utility model provides a basis for making predictions.<sup>16</sup> Thus, it is of no consequence that these predictions are based on assumptions about behavior that may be "wildly inaccurate descriptive representations of reality."<sup>17</sup> The simplicity and coherence of a theory that allows for prediction trumps any concerns about the realism of the expected utility model.

The value of predictions notwithstanding, the deeply problematic nature of this purist response amounts to nothing short of outright de-

<sup>15</sup> Jennifer J. Halpern and Robert N. Stern, eds., *Debating Rationality* (Ithaca, N.Y.: Cornell University Press, 1998). For a summary of the critique of rational choice theory by psychologists, see Rebecca B. Morton, *Methods and Models: A Guide to the Empirical Analysis of Formal Models in Political Science* (New York: Cambridge University Press, 1999), 84–93; and Arthur A. Stein, "The Limits of Strategic Choice: Constrained Rationality and Incomplete Explanation," in David A. Lake and Robert Powell, eds., *Strategic Choice and International Relations* (Princeton: Princeton University Press, 1999), 210–17.

<sup>16</sup> Elster (fn. 11, 1979), viii–ix, 112–13; and idem (fn. 11, 1986) 4, 22, 26–27.

<sup>17</sup> Friedman, "The Methodology of Positive Economics," in Friedman, ed., *Essays in Positive Economics* (Chicago: University of Chicago Press, 1953), 14.

TABLE 1  
THE THEORETICAL BUILDING BLOCKS OF GAME THEORY AND  
THEIR LIMITATIONS:  
PURIST AND PRAGMATIST RESPONSES

<i>Theoretical Building Blocks</i>	<i>Limitations</i>	<i>Responses to Limitations</i>
Expected utility model	lack of realism of the expected utility model of decision making	purist: ignores contrary evidence about theoretical assumption pragmatist: restricts use of theory to appropriate domain (segmented universalism)
Concept of equilibrium	indeterminacy, that is, the inability to always generate unique predictions	purist: saves theory by changing the model pragmatist: restricts use of theory to appropriate domain (segmented universalism) or generate determinacy with factors outside of theory (partial universalism)
Rules of the game	status of the rules of the game as exogenous factors taken as given and constant	purist: ignores contrary evidence about a theoretical assumption pragmatist: restricts use of theory to appropriate domain (segmented universalism) and explains givens with factors outside of theory (partial universalism)

nial of the problem. Thus, some critics rightly see it as an alarming sign of dogmatism.<sup>18</sup> But this discomfort with the view of purists is not restricted to critics. Indeed, even advocates of game theory have found such views somewhat extreme and have sought a less assailable defense of the expected utility model, arguing that it should be considered, more modestly, as a useful approximation of the manner in which actors make decisions in some contexts but not in others.<sup>19</sup>

This pragmatic response gets around charges of dogmatism by tempering the assumption of universal applicability. But this new position,

<sup>18</sup> Hausman (fn. 14), chap. 13, 256–57, 274.

<sup>19</sup> Morton (fn. 15), 77–79.

which Donald Green and Ian Shapiro capture nicely with the appropriately oxymoronic label of *segmented universalism*, generates its own problems.<sup>20</sup> First, game theorists who adopt this position must contend with the complex problem of domain specification, the formulation of criteria for identifying domains where game theory is deemed applicable.<sup>21</sup> And because game theory's core theoretical principles are explicitly abstracted from context and deny its importance, this means that a critical task cannot be addressed with the tools of game theory. Second, the decision to restrict the application of game theory to certain appropriate domains undermines an important claim about game theory—that it offers a unifying thread that might provide an unrivaled basis for the integration and cumulation of knowledge.

In sum, questions about the realism of the expected utility model of decision making point to an important tension in game theory that has forced game theorists to adopt two different responses, each fraught with its own set of problems. The purists uphold the universality of this principle and hence defend the strengths of game theory by overtly rejecting considerable contrary evidence about the way in which actors make choices. By contrast, the pragmatists offer a more defensible response, but with vast consequences for their theory. Indeed, their response to criticisms of the expected utility model undermines the source of strength of the theory they use. Thus, the debate about the expected utility model suggests that game theorists face a severe internal dilemma—even if they do not always fully recognize it. Moreover, as the ensuing discussion shows, further questions about other theoretical building blocks of game theory only exacerbate this dilemma and increase the distance between the purist's unbudging defense of game theory and the pragmatist's recognition of its limits.

#### THE CONCEPT OF EQUILIBRIUM

A second challenge to the claims of game theory concerns the use of the concept of equilibrium. Its role in game theory is pretty straightforward: to provide a precise criterion for identifying which choices, from

<sup>20</sup> Green and Shapiro (fn. 14, 1994), 27–28.

<sup>21</sup> Though many scholars have dedicated some thought to the problem of domain specification, currently there does not appear to be a consensus about the domains where the behavioral assumptions of the expected utility model hold. Compare, for example, Elster, *Solomonic Judgements: Studies in the Limitation of Rationality* (New York: Cambridge University Press, 1989), 26–27; Tsebelis (fn. 13), 36, 38; Morris P. Fiorina, "Rational Choice, Empirical Contributions, and the Scientific Enterprise," in Friedman (fn. 9), 88; John A. Ferejohn and Debra Satz, "Unification, Universalism, and Rational Choice Theory," in Friedman (fn. 9), 78; Robert E. Lane, "What Rational Choice Explains," in Friedman (fn. 9), 108–9; Michael Taylor, "When Rationality Fails," in Friedman (fn. 9), 225–28; Green and Shapiro (fn. 14, 1994), 27–28; and idem (fn. 14, 1996), 267, 254–55.

a set of possible choices, actors should pursue in light of the behavioral assumptions of the expected utility model. Thus, this concept connects the analysis of the process of choice to the ultimate goal of game theory: generating predictions. However, the use of the concept of equilibrium is greatly complicated because, as game theorists have long recognized, models do not always have one equilibrium, a situation usually presented as the ideal game theorists should strive for and the standard by which the theoretical power of game theory is measured.<sup>22</sup> Indeed, game-theoretic models often give rise to more than one equilibrium or to no equilibria at all.<sup>23</sup>

The failure of game-theoretic models to generate a unique prediction is a source of some insight. After all, this result does provide a means of eliminating many possible choices or outcomes from the entire set of choices and outcomes that are considered or, alternatively, of identifying those situations in which the maximization of expected utility ceases to offer strong guidance to actors. But the lack of determinacy in the predictions offered by game theory is an important limitation of game theory. It suggests that even in those domains where the application of the expected utility model is deemed appropriate, game theory may not necessarily provide a complete explanation.<sup>24</sup>

Once again, game theorists respond to this limitation in two quite different ways. Some are reluctant to acknowledge this limitation at all. Indeed, they suggest that game theorists should not “build models so complex that they cannot yield predictions” and, when faced with models that do not have unique predictions, should consider “changing the model to a model that does predict equilibria.”<sup>25</sup> This purist response thus amounts to a post hoc effort at theory saving—a deeply problematic practice.

But game theorists have also articulated more moderate, pragmatic responses. On the one hand, pragmatists have sought to circumvent the lack of determinate predictions by restricting the use of game theory to those domains where it does yield unique predictions. As with similar efforts with regard to the expected utility model, however, the retreat to a position of segmented universalism is not without its costs—even if it is more defensible than the purist response. First, this response forces game theorists, once again, to address the complex task of domain

<sup>22</sup> Elster (fn. 21), 7–8; Morton (fn. 15), 165.

<sup>23</sup> Elster (fn. 11, 1979), 118–23; idem (fn. 12, 1989), chaps. 4, 11; idem (fn. 21), 7–17.

<sup>24</sup> David M. Kreps, *Game Theory and Economic Modelling* (New York: Oxford University Press, 1990), 97; Elster (fn. 11, 1979), 123; idem (fn. 12, 1989), 110; idem (fn. 21), 26–27; Morrow (fn. 13), 306–7.

<sup>25</sup> Morton (fn. 15), 163, 208.

specification.<sup>26</sup> In addition, this response might restrict game theory to a very narrow domain.<sup>27</sup> Indeed, “situations of the slightest complexity are plagued by multiple equilibria” and models of fundamental issues such as redistributive politics are prone to result in no equilibria at all.<sup>28</sup> Thus, this response could severely limit the theoretical scope of game theory and seriously undermine the claim that game theory offers a set of principles uniquely suited to the integration of research on a broad range of substantive issues and the cumulation of knowledge.

On the other hand, pragmatists have responded to the problem of indeterminate predictions by retreating to a position of *partial universalism*,<sup>29</sup> which entails a recognition that game theory cannot offer complete explanations and must be supplemented by other theories.<sup>30</sup> As attractive as this option may sound, it is deeply problematic from the perspective of game theory. Most fundamentally, the recourse to non-game-theoretic factors virtually ensures that the coherence of game theory will be shattered, thus turning the search for full explanations into an ad hoc affair. This is the case with efforts to solve the problem of multiple equilibria by invoking Thomas Schelling’s concept of focal points.<sup>31</sup> Even more importantly, this is the case with the whole enterprise of “equilibrium refinements,” which addresses a critical question—how to choose among multiple equilibria—with criteria that do not come from game theory proper and that are introduced as an afterthought.<sup>32</sup> The retreat to a position of partial universalism thus jeopardizes the claims that game theory offers a scientific approach to theory building.

<sup>26</sup> Though the task of domain specification concerning the applicability of the expected utility model must be addressed outside of game theory, the domains where game theory yields unique predictions can be determined with the tools of game theory. Thus, this task is less demanding and less of a challenge to game theory.

<sup>27</sup> In light of the problem of indeterminate predictions, Elster suggests that the use of game theory should be restricted to the local, partial, and short-term effects of choice, as opposed to the global, net, and long-term effects of choice. Elster (fn. 21), 181–94. See also James D. Fearon, “Causes and Counterfactuals in Social Science: Exploring an Analogy between Cellular Automata and Historical Processes,” in Philip E. Tetlock and Aaron Belkin, eds., *Counterfactual Thought Experiments in World Politics: Logical, Methodological, and Psychological Perspectives* (Princeton: Princeton University Press, 1996); and Riker (fn. 6), 169–72.

<sup>28</sup> Stein (fn. 15), 218. See also Stephen M. Walt, “Rigor or Rigor Mortis? Rational Choice and Security Studies,” *International Security* 23 (Spring 1999), 18–19; and Douglas W. Rae and Eric Schickler, “Majority Rule,” in Mueller (fn. 2), 175.

<sup>29</sup> Green and Shapiro (fn. 14, 1994), 26–27.

<sup>30</sup> Ferejohn, “Rationality and Interpretation: Parliamentary Elections in Early Stuart England,” in Kristen Renwick Monroe, ed., *The Economic Approach to Politics* (New York: Harper Collins, 1991).

<sup>31</sup> Schelling, *The Strategy of Conflict* (Cambridge: Harvard University Press, 1980).

<sup>32</sup> On the problematic nature of equilibrium refinements, see Kreps (fn. 24), 104, 108–14; Walt (fn. 28), 19; and Stein (fn. 15), 217–19.

## THE RULES OF THE GAME

A third challenge to the claims made on behalf of game theory concerns the rules of the game—the set of players in a game, the strategies or choices they confront, the way these choices are sequenced, the preferences of actors, and the information actors possess when they make their choices.<sup>33</sup> This set of factors plays a fundamental role in game-theoretic analysis. However, because the rules of the game are taken to be exogenous and hence assumed to be given and to remain constant, they yield a limitation even more significant than those discussed above.

Part of the problem is that taking the rules of the game as *given* implies that factors that shoulder a lot of the explanatory burden are not considered part of the game proper.<sup>34</sup> Thus, for all the insight game theory is able to offer about how actors make choices in a certain situation, that is, *how* a game is played, it leaves unanswered a critical question: *why* is one game, as opposed to a range of other conceivable games, played *when* it is? The explanations game theorists can offer are therefore, at best, conspicuously incomplete. This challenge to the theoretical power of game theory has not gone unnoticed or uncontested. Thus, various game theorists have argued that givens do not in themselves constitute a major theoretical problem, because “what is taken as exogenous in one context might be ‘problematized’ and investigated in another.”<sup>35</sup> This ingenious response should not be dismissed lightly. At the very least, it underscores the potential versatility of game theory and the danger of jumping to negative conclusions about it.

Nonetheless, this way around the problem ultimately fails, for two reasons. First, even though factors taken as givens in one game might be explained to a certain extent in terms of another game, there are limits to this effort.<sup>36</sup> Indeed, the primacy given to the principle of means-ends rationality restricts the theoretical elements in the arsenal of game theorists and forces analysts interested in accounting for the rules of the game to go outside game theory in search of supplemental answers. Second, and more seriously, the proposal to bracket the concern about givens and to treat them in isolation from the game proper hinges on

<sup>33</sup> Tsebelis (fn. 13), 93. See also Kreps (fn. 24), 128–32, 182–83.

<sup>34</sup> Johannes Berger and Claus Offe, “Functionalism vs. Rational Choice: Some Questions Concerning the Rationality of Choosing One or the Other,” *Theory and Society* 11 (July 1982), 525.

<sup>35</sup> Jeffrey A. Frieden, “Actors and Preferences in International Relations,” in Lake and Powell (fn. 15), 46, 44. See also Lake and Powell, “International Relations: A Strategic-Choice Approach,” in Lake and Powell (fn. 15), 15, 17–20, 31–34.

<sup>36</sup> Kreps (fn. 24), 128–32; Herbert Kitschelt, “Comparative Historical Research and Rational Choice Theory: The Case of Transitions to Democracy,” *Theory and Society* 22 (June 1993), 415.

the assumption that the rules of the game do not vary but are fixed or *constant*, at least during the course of the game. Yet this fundamental assumption of game theory has been questioned by authors as diverse as Marx, Riker, and current-day constructivists, all of whom raise the simple but extremely critical point that actors behave in manners that can be characterized as rule-bound but that they also engage in rule-shattering and rule-making behavior.<sup>37</sup> Indeed, the assumption that actors as a rule abide by rules is hard to defend. And given the critical role of this assumption in the theoretical foundations of game theory, the significance of this qualification is hard to exaggerate.

The responses by game theorists to this issue, too, vary in interesting ways. The purists simply disregard evidence about the unstable nature of the rules of the game. Moreover, either they brush aside any concern about givens and thus ignore the obvious theoretical weight assigned to factors taken as given in game theory, or they insist that these givens can be fully explained within the framework of game theory and hence overstate the explanatory power of instrumental rationality. The pragmatists, by contrast, acknowledge the problems with the purists' position. Their response comes at a huge cost, however. In seeking to explain elements taken as given by drawing on theories beyond game theory, they open up a potentially fruitful agenda for research. But at the same time this acknowledgment of partial universalism greatly restricts the explanatory power of game theory.<sup>38</sup> In turn, with this admission that the rules of the game cannot always be treated as constants and that the application of game theory should thus be restricted to domains usually described as "structured"<sup>39</sup> comes a host of additional problems. First, the identification of such domains hinges on the viability of conceptualizing processes of strategic interactions as closed systems—a highly questionable assumption. Second, this retreat to a position of segmented universalism would most likely constrain the scope of game theory even more than would similar efforts at domain specification discussed above. Indeed, these limitations probably constitute the single most powerful challenge to claims about the strengths of game theory.

To recapitulate, while the key programmatic goal of game theory is to develop a theory of action, the proposed theory has been subjected to

<sup>37</sup> Elster (fn. 11, 1979), 107–11; Stein (fn. 15), 220–22.

<sup>38</sup> Threats to the internal coherence of game theory—a key weakness of the position of partial universalism—are possibly less of a concern in this context. This is so because the articulation of different approaches does not involve a complex process of interaction, as occurs in the context of games that yield indeterminate results, but involves rather an additive process, in which non-game-theoretic approaches are used to explain the basic inputs of a game.

<sup>39</sup> Ferejohn and Satz (fn. 21), 78; Friedman and Hechter (fn. 8), 214.

serious criticism. Indeed, the alleged source of the strengths of game theory—the assumption that it is a complete rather than a partial explanatory framework and that it can be applied to all domains of research rather than being confined to certain spatial and temporal contexts—is seriously challenged in every one of its theoretical building blocks. Interestingly, these challenges create a dilemma for game theorists, who are forced to choose between responses that have opposite strengths and weaknesses (see Table 2).

The purist response to these challenges is the more simple but also the more problematic. Essentially, the claims about the strengths of game theory are defended by turning a blind eye to considerable contrary evidence. In contrast, the pragmatist response is more complex and defensible. It acknowledges the limits of game theory and thus rests on assumptions that are more valid and that avoid the problems that undermine the purist position. However, because pragmatist game theorists continue to promote the core principles of game theory as the anchor of their theory-building efforts and thus remain reluctant to push their admission about the limits of game theory to its logical conclusion and to focus on developing a broader theoretical framework that better fulfills game theory's promise of contributing to a theory of action, they make a big concession. Indeed, by retreating from the self-confident view of game theory that is the trademark of purist game theorists, pragmatists in effect forfeit the basis for the standard claims about game theory.<sup>40</sup>

#### PURIST AND PRAGMATIST POSITIONS IN COMPARATIVE POLITICS

Attempts to use game theory in the field of comparative politics have had to grapple with challenges to the core theoretical principles of game theory, and thus it is hardly surprising to find both purist and pragmatist positions in this literature. The purist position is most evident and widespread with regard to the first building block of game theory: its reliance on the expected utility model. Indeed, efforts to use game theory in comparative politics have for all practical purposes ignored the entire debate about the expected utility model and proceeded to use the rational actor model without giving much thought to its significant limitations.<sup>41</sup> But various authors take the purist position further. In some

<sup>40</sup>The need to go beyond game theory is not always equally pressing. On the one hand, the reliance on supplementary approaches is necessary when game theorists confront the problem of indeterminacy. On the other hand, when it comes to the rules of the game, a game-theoretic analysis, though incomplete, can stand on its own.

<sup>41</sup>To give but one prominent example, this is a point made about Bates et al. (fn. 4) by Elster, "Rational Choice History: A Case of Excessive Ambition," *American Political Science Review* 94 (September 2000).

TABLE 2  
THE THEORY IN GAME THEORY

<i>Assumptions about Theoretical Building Blocks</i>			
		<i>Strengths</i>	<i>Weaknesses</i>
Purist position	universal scope (universalism)	unrestricted domain of application integration of research on different substantive issues and knowledge cumulation	lack of validity of assumption
	complete theory (universalism)	theoretical coherence: scientific approach to theory building	lack of validity of assumption
Pragmatist position	limited scope (segmented universalism)	validity of assumption	restricted domain of application inability to link theorizing about various substantive issues and hence offer a basis for knowledge cumulation
	incomplete theory (partial universalism)	validity of assumption	restricted explanatory power ad hoc linkage with supplementary explanatory factors and hence lack of coherence of theory

instances applications of game theory show remarkably little concern for justifying the domain to which it is applied. In others game theory is presented as a complete theory, even when the complexity of the phenomenon under consideration suggests the likelihood of indeterminacy or when the status of the rules of the game as given calls for some accounting. In some extreme cases, advocates of game theory go so far as to explicitly resist suggestions that game theorists might want to combine game theory with other approaches, even when these other approaches are seen only as supplements to game theory.<sup>42</sup> In short, game theorists

<sup>42</sup> Youssef Cohen, for example, argues explicitly against the value of structural and institutional approaches; Cohen, *Radicals, Reformers, and Reactionaries: The Prisoner's Dilemma and the Collapse of Democracy in Latin America* (Chicago: University of Chicago Press, 1994), chaps. 2, 4.

in comparative politics have tended to adopt a purist response in the face of challenges to the theoretical principles of game theory.

Fortunately, some game theorists in comparative politics have taken a more pragmatic tack in light of the well established limits of game theory—not only acknowledging the lack of universal applicability of game theory but also seeking to identify its appropriate domain. George Tsebelis provides a noteworthy attempt to address the limits of the expected utility model as a tool for analyzing decision making. He writes that “rational choice cannot claim to explain all human behavior” and tries to identify five criteria that define the domain within which the rational actor model can be considered “a legitimate approximation of real processes.”<sup>43</sup> In turn, Geddes follows Riker and Elster in suggesting that game theorists focus on small rather than big questions, a useful recommendation for restricting game theory to certain domains of research so as to avoid the problem of indeterminacy that emerges in the analysis of equilibria.<sup>44</sup> Finally, Robert Bates’s statement that game theory “appears best able to provide the foundations for scientific inquiry when applied to highly structured settings” demonstrates a sensitivity to the need to ensure that the assumption that the rules of the game are constant factors is justified.<sup>45</sup>

Along the same lines, game theorists in comparative politics have also acknowledged the incomplete nature of game theory and suggested how other approaches might be used to supplement it. Considering this issue in broad terms, Bates, Rui de Figueiredo, and Weingast suggest “the possibility of combining [game theory] with alternative approaches,” such as “cultural modes of analysis” or structural approaches.<sup>46</sup> But more specific suggestions have also been offered. Noting that game theory does not always generate unique predictions, various authors have suggested that a range of factors—from ideas and norms to institutions and legacies—may explain the choices actors make in games with multiple equilibria, usually by providing focal points.<sup>47</sup> In turn, others focus on the shortcoming associated with game

<sup>43</sup> Tsebelis (fn. 13), 38, 33–39.

<sup>44</sup> Geddes (fn. 6, 1991), 67–69; Riker (fn. 6), 169–72; Elster (fn. 21), 181–94.

<sup>45</sup> Bates (fn. 3, 1997), 704. See also Tsebelis (fn. 13), 32; and Levi (fn. 7), 25.

<sup>46</sup> Bates, de Figueiredo, and Weingast, “The Politics of Interpretation: Rationality, Culture, and Transition,” *Politics and Society* 26 (December 1998), 603. See also Laitin, “Game Theory and Culture,” *APSA-CP: Newsletter of the APSA Organized Section in Comparative Politics* 8 (Summer 1997), 9–11; and Bates (fn. 3, 1997).

<sup>47</sup> Levi, “Producing an Analytical Narrative,” in Bowen and Petersen (fn. 3), 168; idem (fn. 7), 30; Weingast (fn. 4, 1997b), 257; Laitin, “Post Soviet Area Studies,” *APSA-CP: Newsletter of the APSA Organized Section in Comparative Politics* 10 (Summer 1999), 30; Gary W. Cox, *Making Votes Count: Strategic Coordination in the World’s Electoral Systems* (New York: Cambridge University Press, 1997), 186.

theory's reliance on rules of the game as givens and suggest that it may be possible to explain significant factors, such as the beliefs of actors and hence the information they possess, by drawing on an interpretivist approach.<sup>48</sup>

Although these efforts to articulate a pragmatist approach to game theory are welcome, lingering problems hamper such efforts. One such problem is the failure to clarify how game theory is to be used if its core theoretical principles are assumed to have a *limited scope*. On the one hand, despite some efforts, little progress has been made in formulating clear criteria for identifying the appropriate domain of game theory. Indeed, the literature is full of vague and contradictory advice. Thus, while Tsebelis suggests that game theory works better when applied to elites than to masses, Elster warns that it may be ill suited to games with a small number of actors.<sup>49</sup> Likewise, whereas Geddes suggests that game theorists should focus on small rather than big questions, Levi suggests that "scholars can still ask big questions, but only certain kinds of big questions," and Elster for his part recommends applying game theory not to small or big problems but rather to "medium-sized problems."<sup>50</sup> Finally, even publications by the same author written at about the same time offer radically different advice.<sup>51</sup> On the other hand, these criteria have not been applied with much consistency. Thus, the connection between statements about domain restrictions and the research problems actually studied may be very tenuous.<sup>52</sup> Or game theory may be applied to large-scale historical phenomena or processes of macrostructural change, domains that far exceed the theoretical scope of game theory. Indeed, the tendency to overreach in the application of game theory is quite pervasive.<sup>53</sup>

The failure of game theorists to tackle the problem of domain specification with clarity and consistency is not insurmountable. But if

<sup>48</sup> Bates, de Figueiredo, and Weingast (fn. 46), 628–36.

<sup>49</sup> Tsebelis (fn. 13), 38; Elster (fn. 21), 27.

<sup>50</sup> Geddes (fn. 6, 1991), 67–69; Levi (fn. 7), 32; Elster (fn. 21), 26–27.

<sup>51</sup> For example, compare Bates's call to focus on "highly structured settings" with the analysis provided by Bates, de Figueiredo, and Weingast: Bates (fn. 3, 1997), 704; Bates, de Figueiredo, and Weingast (fn. 46), 635.

<sup>52</sup> An example of such a disconnect is Geddes' analysis of transitions from nondemocratic regimes. Geddes, "What Do We Know about Democratization after Twenty Years?" *Annual Review of Political Science* 2 (Palo Alto, Calif.: Annual Reviews, 1999), 125–30. It is unclear in what way this is the kind of small question she suggests as appropriate for game theory in Geddes (fn. 6, 1991), 67–69.

<sup>53</sup> An example of this tendency is Bates, de Figueiredo, and Weingast (fn. 46). Though these authors are interested in changes in "the very structure of politics," all they do to capture this feature is acknowledge that actors possess incomplete information (pp. 613–14). Thus, the key fact—that the political transitions they study violate game theory's assumption that the rules of the game are constant—goes unaddressed. A similar point is made by Elster (fn. 41) concerning Bates et al. (fn. 4).

pragmatic game theorists are ever to respond adequately to this problem, they will have to come to terms with the implications of their rejection of the assumption that the core theoretical principles are universally applicable. This means, quite simply, accepting the reality that some important substantive issues or some key aspects of important issues may lie beyond the purview of game theory. However, this is a conclusion that the pragmatists are reluctant to embrace.

A second and more important lingering problem concerns the fact that the core principles of game theory offer only an *incomplete theory*. In some contexts this assumption generates an insurmountable problem. Thus, efforts to formulate a coherent basis for linking game theory to other approaches in the context of games that yield indeterminate results are doomed because the primacy given to game theory means that other factors are treated as residual and necessarily invoked in an ad hoc fashion. The implication is clear: any effort to link game theory systematically to other factors must take as its point of departure a framework that is broader than game theory. But, again, this is a conclusion that pragmatist game theorists have been reluctant to accept. Indeed, given that the standard practice has followed Levi's recommendation that "to get at these [other] factors, we need to turn to the specifics of the case" under consideration,<sup>54</sup> it is hardly surprising that the problem of indeterminacy undermines the ability of game theorists to offer coherent theoretical accounts.

The nature of the problem is different when the concern turns to an accounting of the rules of the game. In this case the connection between game theory and other approaches is, in principle, greatly facilitated because the explanatory impact of each of the different theories can at least in part be neatly segregated. Indeed, combining game-theoretic arguments with the institutional, structural, and cultural factors that are usually invoked to account for the rules of the game might actually be relatively uncomplicated. However, even if the pitfall of theoretical incoherence is potentially avoidable in this context, the assumption that game theory is an incomplete theory has another, very costly implication. That is, as the rules of the game are explained by other theoretical approaches, it is legitimate to question the value added of game theory—a point made by various scholars with regard to the study of revolutions and transitions to democracy.<sup>55</sup> Thus, theo-

<sup>54</sup> Levi (fn. 47), 168.

<sup>55</sup> Theda Skocpol, *Social Revolutions in the Modern World* (New York: Cambridge University Press, 1994), 325; Kitschelt (fn. 36).

retical coherence may be retained, but the explanatory power of game theory—being an incomplete theory—is greatly restricted.

In conclusion, attempts to use game theory in comparative politics face an assortment of challenges. Whereas purists confront the obvious problem of ignoring a significant body of evidence, the pragmatists, having retreated from a position of unbridled universalism, are forced to concede that game theory is not a complete theory of everything even though it anchors their efforts at theory building. The latter therefore put themselves in a deeply ambiguous position. Indeed, to bring their work into conformity with their assumptions, they would have to (1) apply game theory to a fairly restricted domain, (2) recognize that even in those domains where game theory can be legitimately applied, it may not provide the basis for a theoretically coherent explanation, and (3) admit that even when game theory does generate a coherent explanation, the value added may be relatively minor. In short to ensure the validity of their assumptions the pragmatists must sacrifice the very theoretical strengths supposedly associated with game theory (see Table 2); but in remaining committed to game theory, they fail to overcome the acknowledged limits of game theory by developing a new and broader theory of action.

#### THE FORMAL METHODOLOGY IN GAME THEORY: MODELING AND ITS LIMITS

In addition to considering game theory in light of its *rational choice theoretical principles*, a comprehensive assessment of game theory must also evaluate its use of a *formal methodology*. These two aspects of game theory are usually combined in game-theoretic work, and the distinction can be hard to perceive. Nonetheless, these two aspects of game theory play a different role in game-theoretic analysis and raise distinct issues. Briefly, the theoretical principles used in game theory are explicitly formulated so as not to reflect the specifics of any substantive issue and therefore to be applicable across substantive issues. In contrast, the use of formal methodology or formal modeling in game theory is inextricably linked with substantive issues, because the goal of this methodology is precisely to link the principles of rational choice theory to the analysis of substantive issues. Thus, it is important to consider the distinct issues associated with the use of a formal methodology.

To organize this assessment, the process of formal modeling is disaggregated into three steps: constructing, solving, and testing models, as follows:

—*Constructing the model.* Game-theoretic models are constructed through a specification of (1) the actors that play the game, (2) the sequence of choices actors face, (3) the information actors have about the game, (4) all the logically possible outcomes of the game, and (5) preferences over all outcomes of all actors.

—*Solving the model.* Models are solved through an analysis of equilibria that solves the game by identifying the set of strategies, supported by certain beliefs, that actors seeking to maximize expected utility have no incentive to change.

—*Testing the model.* Models are tested through an empirical assessment of hypotheses derived from the analysis of equilibria.

This approach offers a basis for distinguishing tasks of the modeling process that are closely regimented by game theory from those tasks about which game theory is partly or completely silent. And it offers a useful framework for identifying the methodological strengths and weaknesses of game theory.

#### CONSTRUCTING THE MODEL

Game theory offers guidance concerning the construction of models in two ways. First, it indicates clearly the elements necessary for building a complete model. This guidance provides a benchmark for assessing matters of model specification and aids analysts in the detection of problems of misspecification (the incorporation of the wrong element into a model) or problems of underspecification (the omission of relevant elements from the model). This helps ensure that important elements, such as the preferences of all actors with regard to all possible outcomes, are not omitted from a model. Indeed, as Scott Gates and Brian Humes suggest, specification problems “can be avoided to a large degree by using game theoretic models as they should be used.”<sup>56</sup> Thus, the identification of a set of elements that should be included in a model is important advice, especially in light of the tendency of game theorists to build models that are incomplete.<sup>57</sup>

A second way in which game theory offers guidance for constructing models is through its catalog of well-known, ready-made  $2 \times 2$  matrix-form games,<sup>58</sup> the benefits of which are noteworthy. First, these

<sup>56</sup> Gates and Humes (fn. 2), 10–11.

<sup>57</sup> As Gates and Humes note, Przeworski fails to provide the payoffs for one of the actors in his game-theoretic model, thus preventing a formal analysis of equilibria; see Gates and Humes (fn. 2), 113–24; Przeworski (fn. 3), 61–66. This advice also applies to “soft” rational choice theorists, who do not construct formal models and who are even more prone to problems of underspecification.

<sup>58</sup> For a complete list of these games, see Anatol Rapoport, *Two-Person Game Theory* (Ann Arbor: University of Michigan Press, 1966); and Steven J. Brams, *Theory of Moves* (New York: Cambridge University Press, 1994), 215–19.

games contain the essential elements needed for a game-theoretic analysis—the actors, their choices, and the payoffs associated with all outcomes—and therefore ensure that underspecification is avoided. Second, because these games are preconstructed, it is relatively easy to use them. Indeed once an analyst has knowledge of standard matrix-form games (available in any introductory text on game theory), he or she need only determine which game best captures the strategic interaction of the phenomenon of interest. Third, the payoffs appear to be quite great, as game theory holds out the promise of a codification of knowledge through the identification of a manageable set of templates that can be applied across a large range of phenomena. Thus, as Schelling writes, the use of matrix-form games might allow researchers to create “a catalogue of social mechanisms,” that is, something akin to a chemical table of elements for the social sciences.<sup>59</sup> It is no wonder, then, that many comparativists have followed this seductive path.

But advocates of game theory have also criticized this type of game theory. As David Kreps argues, the standard matrix-form games typically used in these exercises, such as Prisoners’ Dilemma, Chicken, and Assurance, are not of much use because they tend to be based on “wild (and largely useless) over-simplification.”<sup>60</sup> Thus, this approach to game theory is associated with a tendency to ignore much of the unavoidable complexity of political phenomena. Moreover, as Gates and Humes state, simply “fitting the structure of some preexisting game theoretic model to a particular situation . . . does not generate new explanations or predictions.”<sup>61</sup> Rather, this approach often tends merely to translate existing knowledge into game-theoretic language or, as Stephen Walt argues, to put “old wine in new bottles.”<sup>62</sup> Finally, and ultimately more important, this use of “off the shelf” models as the basis for the standardization and cumulation of knowledge clashes with the creative energy of scholars who use game theory to produce novel conceptualizations.<sup>63</sup>

The recognition that modeling is more than a scripted procedure and that it can be used in creative and theoretically innovative ways

<sup>59</sup> Schelling, “Social Mechanisms and Social Dynamics,” in Hedström and Swedberg (fn. 12), 40, 37–43; idem, *Micromotives and Macrobehavior* (New York: W. W. Norton, 1978), 42, 89–91.

<sup>60</sup> Kreps (fn. 24), 41, 37–40.

<sup>61</sup> Gates and Humes (fn. 2), 7, 12. See also Snidal (fn. 9), 26–27, 29–30.

<sup>62</sup> Walt (fn. 28), 26–31. Examples of this type of game theory in comparative politics include Josep M. Colomer, “Transitions by Agreement: Modeling the Spanish Way,” *American Political Science Review* 85 (December 1991); idem, *Game Theory and the Transition to Democracy: The Spanish Model* (Aldershot, England: Edward Elgar, 1995); Cohen (fn. 42); and Geddes (fn. 52), 121–30.

<sup>63</sup> Laitin (fn. 47), 33.

opens the door to a new perspective on the practice of modeling. It highlights the versatility of game theory, restricted though it is by its commitment to the set of theoretical principles discussed in the previous section. Moreover, it draws attention to how modeling, for all its emphasis on technique, is really not different from any other approach to theorizing. A formal methodology, then, is merely a tool, in the sense that “theories are formalized . . . *after* they have been created by intuition and insight.”<sup>64</sup> Most critically, as Robert Powell emphasizes, this perspective highlights how “the modeling enterprise is an iterative procedure or dialogue in which research moves back and forth between a more theoretical realm and a more empirical realm” and how “ideas about possible explanations of empirical phenomena” drive the modeling process.<sup>65</sup> Thus, that some researchers use game-theoretic models in a formulaic manner should not obscure the fact that modeling can also be a tool for very creative forms of theorizing.

The creative use of models, however, opens new questions about the guidance offered by game theory concerning the construction of models. The more modeling is used to break new ground, the more relevant is James Morrow’s statement that “the single most important decision in modeling is the design of the game.”<sup>66</sup> Thus, used creatively, models will reflect the way researchers conceptualize an empirical phenomenon and the particular cases they know or observe, and hence will inevitably differ in terms of the *conceptual elements* they highlight and the *scope of cases* they encompass. In this respect, modeling is like any other form of innovative theorizing: it introduces different conceptual elements and/or alters the empirical scope of prior conceptualizations and thus produces a fair amount of conceptual disorder. But game theory does not offer any explicit guidance concerning how to manage the inherent tension between conceptual creativity and conceptual order. Thus, the widespread insistence by advocates notwithstanding, it is an overstatement to claim that game theory, in contrast to other approaches to theorizing, is uniquely capable of generating *general* theories of clearly stated *scope* that *cumulate* in an orderly fashion.<sup>67</sup>

<sup>64</sup> Jonathan Turner, “The Failure of Sociology to Institutionalize Cumulative Theorizing,” in Jerald Hage, ed., *Formal Theory in Sociology: Opportunity or Pitfall?* (New York: State University of New York Press, 1994), 43. See also Bueno de Mesquita (fn. 6), 51.

<sup>65</sup> Powell, *In the Shadow of Power: States and Strategies in International Relations* (Princeton: Princeton University Press, 1999), 28.

<sup>66</sup> Morrow (fn. 13), 57.

<sup>67</sup> The claims to generality are made by Kreps (fn. 24), 6–7; Gates and Humes (fn. 2), 7; and Levi (fn. 7), 20. The claim that modeling generates statements of clear scope is emphasized in Levi (fn. 7), 20; and Geddes, “Comparisons in the Context of a Game Theoretic Argument,” in Bowen and Petersen (fn. 3), 201. The link between modeling and theoretical cumulation is stressed by Riker (fn. 6), 177; Tsebelis (fn. 13), 42–43; Gates and Humes (fn. 2), 7–8, 14–16; and Levi (fn. 7), 20.

The lack of foundation for these common claims about game-theoretic models can be illustrated by reference to the evolving game-theoretic literature on political regime liberalization and transition. Overall, this literature has progressed in a relatively orderly fashion, in large part because of Adam Przeworski's influential and widely accepted model of liberalization.<sup>68</sup> Subsequent exchanges proposed either minor modifications to Przeworski's model—constituting mere variations on this game<sup>69</sup>—or more significant modifications that were spelled out clearly in reference to Przeworski's model.<sup>70</sup> There is thus a real sense in which these works constitute a body of literature. But other authors have approached the same phenomenon from different perspectives, neither taking Przeworski's model as a starting point nor explicitly stating how their models overlap with or diverge from other existing models.<sup>71</sup> As more and more models have been proposed to study transitions, analysts would be hard pressed to show whether these models are competing models or partial but complementary efforts to grasp the same phenomenon and, if the latter, how they might all fit together and provide the basis for the cumulation of knowledge. Rather, we are left with a large number of models that conceptualize key elements—the actors, their choices, and their payoffs—in a range of different ways that are rarely compared and never coherently integrated.

Another, related facet of this problematic diversity is the tendency for authors to propose models that differ quite starkly in their empirical scope. Some models, such as Przeworski's, appear to be fairly broad in scope. But others are driven by very specific questions and are not very general at all. Jakub Zielinski, for example, models the impact of

<sup>68</sup> Przeworski (fn. 3), 62. Though Przeworski's use of game theory in the context of the analysis of transitions was clearly pathbreaking, it builds on ideas first introduced by Guillermo O'Donnell in 1979 and later published in translation as "Notes for the Study of Processes of Political Democratization in the Wake of the Bureaucratic-Authoritarian State," in O'Donnell, *Counterpoints: Selected Essays on Authoritarianism and Democratization* (Notre Dame, Ind.: University of Notre Dame Press, 1999); and O'Donnell and Philippe Schmitter, *Transitions from Authoritarian Rule: Tentative Conclusions about Uncertain Democracies* (Baltimore: Johns Hopkins University Press, 1986).

<sup>69</sup> Jakub Zielinski, "The Polish Transition to Democracy: A Game-Theoretic Approach," *Archives Européennes de Sociologie* 36 (1995); Gates and Humes (fn. 2), chap. 5; Mark J. C. Crescenzi, "Violence and Uncertainty in Transitions," *Journal of Conflict Resolution* 43 (April 1999).

<sup>70</sup> Daniel Sutter, "Settling Old Scores: Potholes along the Transition from Authoritarian Rule," *Journal of Conflict Resolution* 39 (March 1995); Siddharth Swaminathan, "Time, Power, and Democratic Transitions," *Journal of Conflict Resolution* 43 (April 1999).

<sup>71</sup> This is the case with work by Colomer (fn. 62, 1991); idem (fn. 62, 1995); Colomer and Margot Pascual, "The Polish Games of Transition," *Communist and Post-Communist Studies* 27 (October 1994); Gary Marks, "Rational Sources of Chaos in Democratic Transition," *American Behavioral Scientist* 35 (March–June 1992); Gretchen Casper and Michelle M. Taylor, *Negotiating Democracy: Transitions from Authoritarian Rule* (Pittsburgh, Pa.: University of Pittsburgh Press, 1996); and Bates, de Figueiredo, and Weingast (fn. 46).

the threat of a Soviet invasion on the Polish transition. And Bates, de Figueiredo, and Weingast build two different models: one for the transition in Zambia, the other for changes in the former Yugoslavia.<sup>72</sup> This leaves us with a large number of models that are cast at very different levels of generality, a point that is rarely, if ever, explicitly discussed.

Game theory, when used creatively, may therefore contribute to theorizing by constructing a series of models, but these proposed models do not, simply by virtue of being game theoretic, necessarily coalesce in an organized fashion.<sup>73</sup> This is not a problem inherent to game theory or unique to it. Moreover, some features of game theory provide a good basis for tackling the challenge of generating order out of the necessarily messy process involved in innovative theorizing. Specifically, formal modeling forces researchers to be explicit about the conceptual elements they use in building models, thus facilitating a comparison among models. In addition, game theory provides a very rich and useful common language for discussing specification issues.<sup>74</sup> But these features by themselves do not provide direction for bringing order to the multitude of models.

Thus, this discussion highlights two important points concerning the construction of models (see Table 3). First, there is no foundation to the claim that game theory produces general theories of clearly stated scope that cumulate in an orderly fashion. Second, these strong but unfounded claims about game theory tend to desensitize game theorists to the effort required to ensure that theoretical innovation proceeds in an orderly fashion. The fact that game theory is silent about a fundamental aspect of theorizing is not a problem in itself. But it does mean that game theorists, just like other theorists, must turn to a complementary body of literature that addresses the issues involved in concept formation and conceptual change.<sup>75</sup> The problem, however, is that the constant invoca-

<sup>72</sup> Zielinski (fn. 69); Bates, de Figueiredo, and Weingast (fn. 46), 615, 624.

<sup>73</sup> Of course, one might talk about theoretical integration in the sense that game-theoretic research produces a series of models that are unified by virtue of being applications of a single theory. Snidal (fn. 9), 25, 32–36. But this is an entirely different issue from the challenge of cumulation understood in terms of the integration of models.

<sup>74</sup> For example, modelers might debate whether a phenomenon should be modeled as a one-shot or repeated game, as a game of complete or incomplete information, and so on.

<sup>75</sup> For relevant research on the formation and evolving use of concepts, see Giovanni Sartori, "Concept Misformation in Comparative Politics," *American Political Science Review* 64, no. 4 (1970); idem, ed., *Social Science Concepts: A Systematic Analysis* (Beverly Hills, Calif.: Sage Publications, 1984); David Collier and James E. Mahon, "Conceptual 'Stretching' Revisited: Adapting Categories in Comparative Analysis," *American Political Science Review* 87 (December 1993); Collier, "Trajectory of a Concept: 'Corporatism' in the Study of Latin American Politics," in Peter H. Smith, ed., *Latin America in Comparative Perspective: New Approaches to Methods and Analysis* (Boulder, Colo.: Westview Press, 1995); and Collier and Steven Levitsky, "Democracy with Adjectives: Conceptual Innovation in Comparative Research," *World Politics* 49 (April 1997).

TABLE 3  
THE FORMAL METHODOLOGY IN GAME THEORY

<i>Steps in the Research Process</i>	<i>Actual Benefits</i>	<i>Questionable Benefits</i>	<i>Complementary Literatures</i>
Theory building			
1. constructing the model		generality clear scope cumulation	on concept formation, conceptual change, and levels of generality
2. solving the model	generates predictions in a logically rigorous and internally consistent manner		
Theory testing			
3. testing the model		strong tests falsifiability	on quantitative and qualitative forms of causal assessment

tion by game theorists of the power of deductive thinking and the unrelenting insistence that their models are general models<sup>76</sup> make it harder for game theorists to see modeling as a task that inextricably weaves together inductive *and* deductive thinking and to realize that models are inevitably cast at varying *levels* of generality.<sup>77</sup> Thus, though game theorists certainly have no monopoly over the tendency to ignore the need to follow procedures geared toward the establishment of conceptual order, they have to date shown little awareness of its importance.

### SOLVING THE MODEL

In contrast to its significant silences concerning the first step in the modeling process, that of constructing a model, game theory provides a

<sup>76</sup> See, for example, Edgar Kiser and Hechter, "The Role of General Theory in Comparative-Historical Sociology," *American Journal of Sociology* 97 (July 1991); Levi (fn. 47), 155-57, 171; and Lisa Martin, "The Contributions of Rational Choice: A Defense of Pluralism," *International Security* 24 (Fall 1999), 76.

<sup>77</sup> Efforts to portray game theory as a form of general theory are severely misleading. Rather, as Skocpol argues in response to Kiser and Hechter's advocacy of "theory in general," all good work, whether game theoretic or not, combines deduction and induction and thus occupies, to use the phrase of Bates et al., "a complex middle ground between ideographic and nomothetic reasoning." Skocpol (fn. 55), 321-23; Kiser and Hechter (fn. 76), 2; Bates et al. (fn. 4), 12.

great amount of guidance concerning the second step in the modeling process, that of solving the model. Because solutions to models rely on axioms about decision making that allow predictions to be derived mathematically, this is where the real power of a formal methodology lies. Indeed, the decisions analysts must make at this step in the modeling process are thoroughly addressed in game theory, and the claims that the use of a deductive logic generates *predictions* in a *logically rigorous* fashion and in a way that is *consistent* with the assumptions of the model are well justified. Thus, it is with good reason that these virtues of game-theoretic models are acknowledged not only by advocates of game theory<sup>78</sup> but also by some generally critical assessments of game theory.<sup>79</sup>

However, a few caveats bear mentioning. First, it is important to avoid overstating the role of this step in the overall modeling exercise. After all, even if game theory does rely on rigorous deduction, the results are still only as good as the model they seek to solve.<sup>80</sup> That is, insights that are built into the model are preserved, as are confusions concerning the process being modeled and the scope of the model. Thus, as Walt rightly argues, “Mere logical consistency is not sufficient.”<sup>81</sup> Second, because the solution of a model may lead to a prediction of multiple equilibria or to no equilibrium at all, solving a model in a logically consistent manner does not in itself ensure that the theory will be powerful or useful.

Third, and relatedly, even though indeterminate models can be modified to generate more precise and powerful predictions,<sup>82</sup> this possibility points to an even larger problem. As this option indicates, game theory is not immune to exercises in “curve fitting.”<sup>83</sup> Hence, though models generate results in a rigorous fashion, this virtue does not ensure that these results are not the product of post hoc changes in the model and hence suspect. Overall, then, though game theory provides a great amount of guidance concerning this step in the modeling process and though some of the most frequently invoked claims about formal modeling are plainly justified, caution in trumpeting these claims is still advisable.

<sup>78</sup> Tsebelis (fn. 13), 40; Morrow (fn. 13), 6–7, 302–3; Bueno de Mesquita (fn. 6), 66–70; Gates and Humes (fn. 2), 5–6; and Morton (fn. 15), 68, 280.

<sup>79</sup> Green and Shapiro (fn. 14, 1994), 10; Walt (fn. 28), 14–15, 45–46.

<sup>80</sup> Snidal (fn. 9), 33–34.

<sup>81</sup> Walt (fn. 28), 32, 17. See also Abraham Kaplan, *The Conduct of Inquiry: Methodology for Behavioral Science* (Scranton, Pa.: Chandler Publishing, 1964), 278–80, 289–90.

<sup>82</sup> Morton (fn. 15), 182–83, 206–8, 281.

<sup>83</sup> Snidal (fn. 9), 33; Stein (fn. 15), 223.

## TESTING THE MODEL

Turning finally to the third step in the modeling process—testing the models—probably the most important thing to stress is that it has been the subject of much confusion. The importance of this step derives from the fact that the ultimate criterion in an assessment of game theory is its contribution to the understanding of substantive issues. On this point there is little disagreement.<sup>84</sup> Moreover, there is also a fair amount of agreement on a potentially more contentious point: the tendency of game theorists to put more effort into building models than into carrying out empirical tests of the hypotheses generated by such models.<sup>85</sup> Beyond this, however, confusion has reigned on a series of other critical issues.

On the one hand, some critics have been overly skeptical about the potential contribution of a formal methodology to substantive knowledge. It is certainly fair to state that the division of labor between model builders and substantively oriented researchers in the game-theoretic literature has been very stark, to the detriment of the resulting substantive debates. This much is recognized by advocates of game theory, such as Emerson Niou and Peter Ordeshook, who agree that “some formalism exists for its own sake,” and Powell, who concedes that “work that remains in the modeling realm too long can . . . become substantively sterile.”<sup>86</sup> But it is another matter to argue that this division of labor is inherent to the formal methodology used in game theory or, even more significantly, that it even accurately captures the interaction between theory construction and empirical observation in the modeling process.<sup>87</sup> Thus, though there may be some legitimacy to the criticisms of game-theoretic works for being exercises driven more by the desire to model than to contribute to substantive knowledge, it is important to recognize that modeling can also be problem driven, as recently argued by advocates of analytical narratives.<sup>88</sup>

But it is equally important to be cautious in assessing the claims routinely advanced by advocates of game theory about the contributions of a formal methodology to the testing of models. Fairly standard claims

<sup>84</sup> Green and Shapiro (fn. 14, 1994), 32; Walt (fn. 28), 31; Snidal (fn. 9), 55; Powell, “The Modeling Enterprise and Security Studies,” *International Security* 24 (Fall 1999), 104.

<sup>85</sup> Green and Shapiro (fn. 14, 1994), 203; Walt (fn. 28), 8, 32–33; idem, “A Model Disagreement,” *International Security* 24 (Fall 1999), 125–26; Gates and Humes (fn. 2), 12.

<sup>86</sup> Niou and Ordeshook (fn. 6), 84; Powell (fn. 65), 29. See, however, Bueno de Mesquita and Morrow, “Sorting through the Wealth of Notions,” *International Security* 24 (Fall 1999), 71; and Frank C. Zagare, “All Mortis, No Rigor,” *International Security* 24 (Fall 1999), 114.

<sup>87</sup> Powell (fn. 65), 24–29.

<sup>88</sup> Bates et al. (fn. 4), 11. See also Laitin (fn. 3, 1999).

are that modeling leads to strong tests<sup>89</sup> and generates hypotheses that have the virtue of falsifiability.<sup>90</sup> For all that these are important virtues, however, such claims miss the point about modeling entirely. That is, though models are ultimately assessed in terms of the empirically tested knowledge they generate, the exercise of modeling proper culminates in the proposal of hypotheses. Thereafter, modelers should test these hypotheses. But a formal methodology does not have direct implications for the testability of hypotheses; nor does it offer any guidelines about how to conduct the testing.<sup>91</sup> Thus, modeling may lead to strong tests, but it may also generate predictions that are consistent with multiple or even all possible observations.<sup>92</sup> Likewise, modeling may generate hypotheses that have the virtue of falsifiability, but it may also lead to arguments that are practically nonfalsifiable.<sup>93</sup> Moreover, a model can be tested in a variety of ways: focusing on hypotheses concerning point predictions or comparative static predictions,<sup>94</sup> relying on small-N or large-N analysis,<sup>95</sup> and so on. The bottom line, in short, is that a formal methodology “does not prescribe any particular methodology for testing hypotheses.”<sup>96</sup>

Concerning the testing of models, therefore, two important points must be made. First, though some modeling exercises tend to be divorced from substantive concerns, there is nothing inherent in the process of modeling that detracts from its potential to contribute to substantive knowledge. Second, because the process of formal modeling is fundamentally about generating hypotheses, claims about the contributions of game theory to the testing of models only confuse efforts to assess game theory. Certainly, inasmuch as formal models are put to a test, game theorists need to turn to complementary bodies of literature

<sup>89</sup> Snidal (fn. 9), 34; Tsebelis (fn. 13), 40; Gates and Humes (fn. 2), 12; Levi (fn. 7), 27; Geddes (fn. 67), 199; Martin (fn. 76), 77.

<sup>90</sup> Bueno de Mesquita (fn. 6), 50, 58; Levi (fn. 7), 20.

<sup>91</sup> It is important to note that game theory's theoretical emphasis on strategic choice, as distinct from its use of a formal methodology, has some important implications for the way hypotheses are tested. Thus, Bueno de Mesquita makes a good case for how game theory, and specifically the notion of behavior off the equilibrium path, helps alert researchers to the problem of nonevents and offers an interesting way of thinking about counterfactuals. Bueno de Mesquita (fn. 6), 61–63. See also the provocative discussions of the problem of selection bias in Curtis Signorino, “Strategic Interaction and the Statistical Analysis of International Conflict,” *American Political Science Review* 93 (June 1999); and Alastair Smith, “Testing Theories of Strategic Choice: The Example of Crisis Escalation,” *American Journal of Political Science* 43 (October 1999).

<sup>92</sup> Morton (fn. 15), 197–98, 206–8.

<sup>93</sup> Snidal (fn. 9), 27, 56; Morton (fn. 15), 119.

<sup>94</sup> Morton (fn. 15), chaps. 6, 7.

<sup>95</sup> Laitin (fn. 3, 1999); Levi (fn. 47), 158; Hans-Peter Blossfeld and Gerald Prein, eds., *Rational Choice Theory and Large-Scale Data Analysis* (Boulder, Colo.: Westview Press, 1998).

<sup>96</sup> Geddes (fn. 6, 1995), 101.

on a whole host of problems involved in causal assessment using quantitative and qualitative methodologies. But this hardly seems like a contentious point.

To recapitulate: the use of a formal methodology does substantiate one of the key claims made for game theory, that it can generate predictions in a logically rigorous and internally consistent manner. This is a valuable trait, which does much to recommend the use of a formal methodology. But three broad caveats are also in order. First, the fact that a formal methodology helps to produce a rigorous form of analysis does not mean that formal modelers have a monopoly on rigor.<sup>97</sup> Second, as this discussion has shown and as is summarized in Table 3, there are many methodological issues that are not addressed by the procedures of formal modeling. Though the point is rarely appreciated, rigor is a standard that also pertains to these other issues. Indeed, because the ability to compare models in a rigorous fashion affects how their varying predictions are to be assessed, this largely ignored aspect of modeling arguably has a greater impact on the overall rigor of modeling exercises. Third, rigor alone is no guarantee of the substantive worth of research. In short, the value of formal modeling notwithstanding, it is important to not overstate its benefits and to acknowledge that it is a more complex process than game theorists usually acknowledge, one that involves a number of challenges which game theorists simply do not address.

### A PLURALISTIC AGENDA FOR COMPARATIVE POLITICS

This article has sought to offer an assessment of game theory and its uses in comparative politics by considering both the theoretical and the methodological foundations of game theory and by identifying both its strengths and its weaknesses. Rather than consider the substantive contributions of game-theoretic work to comparative politics, the discussion focused on the core principles that determine the potential uses and limits of game theory, whether applied in comparative politics or

<sup>97</sup> Whether formal modelers have a monopoly on rigor, understood in the sense used here, is a claim about which game theorists differ. Some advocates of game theory appear to argue that research using formal models is always superior to research that does not use formal models. Martin (fn. 76), 77–80; Morton (fn. 15), 36, 41–47. Others take a halfway position, arguing that theorizing on the basis of formal models is not inherently superior to nonformal or verbal theorizing but does have a definite advantage. Morrow (fn. 13), 6; Bueno de Mesquita and Morrow (fn. 86), 56–57, 72; Powell (fn. 84), 101–2; idem (fn. 65), 29–33, 38. Finally, yet other advocates are less inclined to such a priori judgments and readily admit there is no basis for claiming that game theory and other forms of modeling have a monopoly on rigor. Tsebelis (fn. 13), 42–43; see also Snidal (fn. 9), 30.

in any other field. Thus, though existing trends in the use of game theory in comparative politics were identified, the basic goal has been forward looking, to provide an informed and balanced consideration of standard practices of game theory that could serve as a basis for a dialogue about the long-term prospects of game theory in comparative politics.

This assessment has implications, first of all, for game-theoretic research. As this article has shown, the core theoretical principles of game theory are limited, both in terms of the domains where it is applicable and in terms of its explanatory power in those domains. Moreover, game theorists have shown little sensitivity to issues of domain specification. Thus, game theorists should focus on two key tasks. First, they should seek to formulate clear criteria for identifying the appropriate domains of game theory and then apply these criteria consistently. Second, they should tackle the more daunting task of seeking to expand the domains they can study and the explanatory power of game theory in those domains, by developing a broader theoretical framework that overcomes the limits of game theory as a theory of action. Concerning this latter task, it may be possible to build upon, rather than simply replace, the rational choice assumptions embedded in game theory. This is something that is still not fully clear. But if a more adequate theory of action is to be developed, it seems that major modifications of the assumptions of game theory will be required. That is, to overcome the limitations of game theory, game theorists may have to transcend game theory.

Concerning game theory's reliance on a formal methodology, this article suggests the need for less sweeping changes. As the discussion has emphasized, formal modeling offers an attractive method of theorizing due to its ability to generate predictions in a logically rigorous and internally consistent manner. Nonetheless, as the article also suggests, two important tasks must be tackled alongside the use of a formal methodology. First, formal modelers need to give greater consideration to the procedures that will allow them to impose order on the multitude of models, which, though proposed as models of the same phenomenon, differ considerably in terms of the conceptual elements highlighted and the scope of cases encompassed. Second, formal modelers need to focus more on how they might test their models by using quantitative and/or qualitative methodologies. In some cases, this task might be quite straightforward, requiring that they simply draw upon existing empirical methodologies. However, when it comes to

testing theories of action, this challenge is likely to be more demanding, calling for important methodological innovations. In short, a key point of this article is that better game theory will result from an explicit acknowledgment of the limits of game theory and a recognition that game theorists need to address a range of the central concerns in the social sciences.

More broadly, this article has important implications for efforts to improve research in comparative politics. As emphasized, an assessment of game theory reveals both a mixed picture of insights and strengths offset by important limitations and the possibility that game theory can be improved through a greater sensitivity to a series of old concerns. But much as in the field of American politics and international relations, advocates of game theory in comparative politics continue to argue for the uniqueness of their theory; as Gabriel Almond observes, they have tended to view “everything that went before . . . as pre-scientific.”<sup>98</sup> Ultimately, the only way to address the limits of game theory systematically is to abandon its most basic contention—that it enjoys a special status, both as a theory with universalistic aspirations and as a type of formal methodology. Otherwise, the various concerns that lie beyond the limits of game theory will be addressed, at best, only as afterthoughts.

As beneficial as the integration of insights derived from the new perspectives offered by game theory and the old concerns of scholars working in the field of comparative politics would be, however, the prospects for this kind of a pluralistic agenda in comparative politics are unclear. Indeed, the counterposition of the alleged strengths of game theory and the alleged weaknesses of other approaches—variously characterized as inductive, historical, area studies, or simply nonformal—is stark. Moreover, the passion with which the supremacy of rational choice and game theory is defended, as well as the tone of the exchange surrounding the informed and careful critiques of rational choice and game theory in the field of American politics by Green and Shapiro<sup>99</sup> and in the context of international relations by Walt,<sup>100</sup> sug-

<sup>98</sup> Almond, “Political Science: The History of the Discipline,” in Robert Goodin and Hans-Dieter Klingemann, eds., *The New Handbook of Political Science* (Oxford: Oxford University Press, 1996), 86.

<sup>99</sup> Green and Shapiro (fn. 14, 1994); idem (fn. 14, 1996); Friedman (fn. 9); James Johnson, “How Not to Criticize Rational Choice Theory: Pathologies of ‘Common Sense,’” *Philosophy of the Social Sciences* 26 (March 1996); Gary Cox, “The Empirical Content of Rational Choice Theory: A Reply to Green and Shapiro,” *Journal of Theoretical Politics* 11 (April 1999).

<sup>100</sup> Walt (fn. 28); idem (fn. 85); Bueno de Mesquita and Morrow (fn. 86); Martin (fn. 76); Niou and Ordeshook (fn. 6); Powell (fn. 84); Zagare (fn. 86). This entire debate is reprinted in Michael E. Brown et al., eds., *Rational Choice and Security Studies: Stephen Walt and His Critics* (Cambridge: MIT Press, 2000).

gests that there is little interest in dialogue. In short, the debate around game theory could very well take the form of a competition and confrontation that might result in profoundly destructive effects on the future of the field.<sup>101</sup>

There is, however, an alternative agenda for comparative politics—one that would stress themes articulated by various contributors to a 1995 *World Politics* symposium on the future of comparative politics and more recently by David Collier: retaining and strengthening the “eclectic center” in comparative politics and engaging in a dialogue focused on the challenge of integrating new perspectives, such as those offered by game theory, and old concerns of comparativists.<sup>102</sup> The big question, as we have seen, is whether the center in comparative politics has been so weakened as to eliminate any basis for this sort of dialogue.

Fortunately, there are signs that even strong advocates of game theory in comparative politics have explicitly acknowledged the limits of game theory. Indeed, looking beyond the frequently overstated programmatic declarations, one finds evidence of pragmatism, especially with regard to game theory’s theoretical claims. Moreover, some users of game theory have either offered exemplary expressions of pluralism or incorporated healthy doses of eclecticism into their own work. Equally crucial, one can detect serious efforts by nonpractitioners to learn about game theory and to form a balanced opinion about its potential and limits. As hopeful as these signs may be, however, the status of rational choice theory and game theory remains a highly charged and divisive issue. Whether the agenda of comparative politics in the years ahead will be a pluralistic one that encourages dialogue is still an open question.

<sup>101</sup> Lichbach, “Social Theory and Comparative Politics,” in Lichbach and Zuckerman (fn. 7), 240–42, 272–74; James Bernard Murphy, “Rational Choice Theory as Social Physics,” in Friedman (fn. 9), 168–73.

<sup>102</sup> Kohli et al. (fn. 4); Collier, “Building a Disciplined, Rigorous Center in Comparative Politics,” *APSA-CP: Newsletter of the APSA Organized Section in Comparative Politics* 10 (Summer 1999).