Chapter 4

Looking for "a genuine science of Politics": Riker's *The Theory of Political Coalitions*

Riker's *The Theory of Political Coalitions*, published in 1962 by Yale University Press, was the foremost product of the author's intense commitment to Game Theory and formal analysis. Only in the Eighties did Riker publish other general works, although his focus shifted toward social choice analysis, political theory, and American history.

This book was an extraordinarily ambitious project. Its goal was to construct a theory of coalitions grounded in exact and verifiable assumptions, using an "existing general theory of coalitions (the theory of n-person games)." (Riker 1962b, p. viii) At the same time, is also a demanding and often difficult text, both for contemporary readers and, perhaps even more, for its original audience. Much of its formal analysis is overly verbal, and for this reason the proofs of Riker's claims are not always easy to follow. Compared with Neumann and Morgenstern, whose pages are much more demanding but also far more rigorous, Riker's exposition offers little of the excitement a young scholar comfortable with mathematical reasoning could feel when following Neumann's exact argument. Instead, this book relies on a limited and sometimes superficial use of game-theoretical notions. This shortcoming was already apparent even to a reader less mathematically sophisticated than Neumann, Nash or Shapley like Morgenstern..

Despite this, Riker's effort deserves considerable consideration. In the first half of the book, he argues that political actors will create coalitions just large enough to ensure winning, and no larger. This is the notion of "Minimum Winning Coalitions", from which he derived the "Size Principle": namely that winning coalitions will be constrained in their size.!Minimum Winning Coalition This insight still occupies a central place in the formal study of political behavior and party formation, even if many scholars challenged, as it will be shown, Riker's results on both theoretical and empirical grounds. In the second half of the book, Riker slightly modified von Neumann and Morgenstern's n-person analysis into a set partition of voting members to describe coalition formation as a process, i.e., the strategic steps that precede the creation of a winning coalition. In this part, his ambitions are fulfilled even less than in the first, largely because the analytical problems involved exceeded his technical capabilities. Nevertheless, this section still offers valuable insights into the practical functioning of

Gianluca Damiani, gianluca_damiani@hotmail.it

Referee List (DOI 10.36253/fup_referee_list)
FUP Best Practice in Scholarly Publishing (DOI 10.36253/fup_best_practice)

Gianluca Damiani, *Looking for a "Genuine Science of Politics": Riker's "The Theory of Political Coalitions"*, © Author(s), CC BY 4.0, DOI 10.36253/979-12-215-0978-6.06, in Gianluca Damiani, *Looking for a Science of Politics. William H. Riker and the adoption of Game Theory in Political Science*, pp. 111-139, 2026, published by Firenze University Press, ISBN 979-12-215-0978-6, DOI 10.36253/979-12-215-0978-6

Book References DOI 10.36253/979-12-215-0978-6.references

political systems. In addition, the opening chapter of the book is entirely devoted to methodological issues and to presenting the core features of the model. For all its technical shortcomings, *Political Coalitions* thus stands as the first serious attempt to produce a book-length game-theoretical analysis within political science.

Riker was very explicit about the nature and the scope of his undertaking. Although his analysis systematically exploits von Neumann and Morgenstern's theory of n-person games, it is not ("most emphatically not." Riker 1962b, p. vii) a book about mathematics. He limited himself to employing and adapting some mathematical notation without offering formal proofs. As a result, *Political Coalitions* differs substantially from the high-theory development of Game Theory in the Fifties (such as those associated with Shapley or other RAND theorists). Therefore, it does not occupy a central place in the history of game theory as a mathematical theory. However, it did play an important role in the history of how game-theoretical ideas moved across disciplinary boundaries and beyond economics.

This chapter examine the content of Riker's work, focusing mainly on how he employed the theory of games and by reconstructing his relationship with contemporary game theorists. It will be shown that, although he developed several insightful intuitions about how Game Theory might be integrated into political science, he did not produce new formal theorems. In this respect, his work shares an important feature with that of other scholars who employed Game Theory during the same period, such as Schelling. Unlike Schelling, however, Riker's use of Game Theory was occasionally based on misunderstandings, and some of the analytical tools necessary to fulfill his objectives were sometimes beyond his reach.

This, however, does not undermine the importance of the book. Riker's adoption of cooperative game theory, and in particular of von Neumann and Morgenstern's original concept of the "stable set", was highly original. Moreover, his emphasis on coalition size paved the way for an entire class of models built around the "size principle." Finally, he was among the first to assess several weaknesses in von Neumann and Morgenstern's theoretical framework.

4.1 The genesis of the work

4.1.1 Riker and Game theorists

In the previous chapter, it was examined Riker's academic formation as a political scientist, his dissatisfaction with the state of the discipline in his time, and the circumstances under which he became acquainted with game theory. This section builds on that discussion by focusing more specifically on Riker's early and rather limited relationship with the community of game theorists.

As noted earlier, Riker's only sustained contact with the kind of high-level theoretical work in the social sciences that he aspired to develop occurred during his one-year fellowship in Palo Alto. During his stay in California, he met Arrow and Clyde Coombs, and interacted with several

other fellows who assisted him with the formal aspects of his work, including the statistician David Wallace from the University of Chicago.

With very few exceptions (Riker being the most significant) political scientists and game theorists remained largely separate intellectual communities throughout the Fifties, despite some early attempts to apply game theory to political analysis already in the first half of the decade. In a broad sense, as discussed earlier, such an application is already implicit in von Neumann and Morgenstern's 1944 work (Simon 1945; Shubik 1954). Even so, Riker's position at the intersection of these two communities can be questioned, at least for the Fifties. While he clearly belonged to the community of political scientists, it is doubtful that he can be considered part of the community of game theorists, given both his training and his professional trajectory. Moreover, despite his strong theoretical interests and methodological ambitions, Riker did not align himself with the Behavioral Revolution, the major transformative movement within American political science at the time, choosing instead to pursue an independent theoretical agenda.

During the Fifties, the community of game theorists consisted largely of young mathematicians primarily concerned with conceptual and theoretical developments rather than concrete applications. Institutions such as the RAND Corporation are often described as centers of applied game theory, particularly in relation to strategic and international political problems. In practice, however, RAND executives quickly became strong supporter of pure theoretical research as well. In this context, Riker was, unsurprisingly, very much an outsider. He lacked the advanced mathematical training required to produce original theoretical contributions, and he was never affiliated with RAND, where the few political scientists present focused mainly on nuclear deterrence and strategic studies (the most prominent example being Albert Wohlstetter). Among the institutions that contributed to shaping what has been described as "Cold-War Rationality", Riker's only direct involvement was his fellowship at Stanford's Center.

One might explain Riker's distance from game theorists partly through his early focus on a well-defined problem, namely coalition formation in politics, within a specific framework, cooperative rather than non-cooperative game theory. The latter was instead mainly adopted in international relations. One could also add that Riker was advancing a theoretical agenda in advocating Game Theory that differed substantially from both traditional political science and the Behavioral Revolution. At the same time, his efforts to integrate Game Theory were constrained by his mathematical limitations, which likely deepened his sense of intellectual estrangement within the discipline in the decade.

Riker was not alone in attempting to explain political phenomena through formal analysis derived from economics, even if not always through game theory strictly speaking. As discussed earlier, the same period witnessed the work of Duncan Black, Anthony Downs, James Buchanan, and Gordon Tullock. These efforts were followed in the Sixties by the emergence of a broader community associated with Rochester and institutions such as Carnegie Mellon, where Otto Davis and Melvin Hinich developed influential

models of Downsian spatial electoral competition. Riker established strong intellectual ties with many of these scholars. Nevertheless, the consolidation of this broader community occurred only after his early engagement with game theory and accelerated significantly following his appointment at Rochester.

Riker's recollections in his interview with Shepsle shed further light on his marginal position within the community of game theorists. When asked whether he had ever shared his ideas with contemporary game theorists, Riker recalled only an exchange with Duncan MacRae, whose response, apparently containing detailed criticisms, seems unfortunately not being preserved among Riker's papers stored at Rochester. More revealing evidence of his outsider status, however, can be found in Oskar Morgenstern's papers housed at the Rubinstein Library at Duke University (Morgenstern n.d., Box 83). Although Riker did not mention this episode in the interview, he submitted the manuscript of *Political Coalitions* to both Princeton University Press and Yale University Press. While Yale accepted the manuscript and sent it out for anonymous review to Martin Shubik, as seen, a former student of Morgenstern at Princeton, Morgenstern himself reacted very negatively and advised against publication.

In a letter to Gordon Hubel, then press editor at Princeton, Morgenstern acknoledged that "The basic attempt is very laudable and nobody doubts that Game Theory will influence Political Science very considerably, but the execution leaves much to be desired." (Morgenstern to Hubel, 16th August 1961, Morgenstern n.d., Box 83) He went on to criticize the manuscript more sharply: "Even the outline of Game Theory itself is full of misunderstandings and gaps. A reader not acquainted with Game Theory would not understand the exposition, and one already familiar with it would quickly spot the error." (ibidem) He attributed the manuscript's weak mathematical quality to Riker's having worked largely alone, and suggested that Riker either cooperate with a real game theorist or spend time acquiring more specialized training. Before drafting his report, Morgenstern tried to gather information about Riker, his education and research profile but without much success, apparently. He concluded: "I am sure that anyone else who is at home in Game Theory and who would see this manuscript, perhaps given to him by some other publisher, would come to the same conclusion." (ibidem)

Despite Morgenstern's harsh assessment, Shubik's referee report was considerably more favorable, and the manuscript ultimately appeared in print. As will become clear later, however, publication did little to improve Riker's standing among game theorists, since the book lacked the technical sophistication that would have appealed to them. Nonetheless, it succeeded in demonstrating to political scientists that a new way of modeling political phenomena, and of developing political theory more generally, was possible.

4.1.2 Martin Shubik's referee report

Shubik's papers, also preserved at the Rubinstein Library, include the original referee report on Riker's manuscript. Although the report is not especially detailed from a technical standpoint, it nevertheless contains

several important observations. The report consists of four typewritten pages, including a general introduction, a series of mostly stylistic comments, and a brief concluding summary. Equally informative, however, are the issues that the report does not address, as they help clarify the different perspectives from which Shubik and Riker approached political Game Theory.

Yale University Press contacted Shubik at the end of June 1961 with a request to review Riker's manuscript anonymously (Marian Neal Ash to Shubik, 30 June 1961, Shubik n.d., Box 8). It seems that Riker never learned that Shubik had refereed his work, although he suspected it (Riker and Shepsle 1979, p. 14). The choice was unsurprising. Shubik was among the few scholars actively working on n-person Game Theory at the time. Although he divided his efforts between RAND and applied consulting work for large corporations (most notably IBM and General Electric) he was also closely associated with Yale, where he was visiting in 1961 and where he would become a full professor in 1963. He was already well known for his collaboration with Lloyd Shapley on the power index, and in 1954 he had edited, as seen earlier, a volume collecting essays by figures such as Marschak, Wald, Black, and Arrow on game-theoretical approaches to political behavior (Shubik 1954).

In his correspondence with Yale University Press, Shubik accepted the invitation and noted that he was probably already familiar with parts of Riker's work, possibly in the form of earlier drafts (Shubik to Marian Neal Ash, 17 July 1961, Shubik n.d., Box 8). Riker's later interview offers no confirmation of this point. Despite travel commitments, Shubik submitted his report on August 9th, "Referee's report on 'The Theory of Political Coalitions' by William H. Riker," (Shubik 1961 in: Shubik n.d., Box 9). As he explained in his earlier reply, his quick turnaround was facilitated by his prior familiarity with parts of the manuscript.

Shubik began his report with strong praise, describing the manuscript as "well worth publishing" and predicting that it would be "a rather controversial book containing several imaginative ideas." He emphasized that its value lay in "an imaginative insight concerning the application of the methodology of game theory to the subject matter of political science" (Shubik 1961, p. 1). In his view, this methodological innovation could help shield the book from what he anticipated would be unfair criticism from both political scientists and game theorists on purely technical grounds.

This emphasis is telling. Shubik's defense of Riker's work focused primarily on its methodological ambition rather than on its technical rigor. He remarked that the discussion of Minimum Winning Coalitions might be "too verbal" for part of its intended audience while still not being verbal enough for the rest. He also questioned how effectively Riker's use of earlier literature, such as the work of Raiffa and Vickrey on coalitions, translated into a coherent theory of political behavior.

Among Shubik's more substantive criticisms, the most important concerned Riker's heavy reliance on the zero-sum framework. Shubik argued that much of the analysis would remain valid in non-zero-sum settings, since what truly mattered was the potentially indeterminate duration of

political interaction. The zero-sum structure, by contrast, applies only to a limited and finite segment of the interaction. More generally, opposition of interests can arise not only in zero-sum and constant-sum games, but also in "more or less strictly competitive non-constant sum" games (Shubik 1961, p. 2).

Other remarks, though more localized, are equally revealing. Shubik challenged the assumption that "side payments" necessarily involve money, while acknowledging that this misconception was widespread in Game Theory. He also criticized the inclusion of threats as a form of side payment, arguing that this leads to a poor model of human behavior: "the result of a threat may be a rather low personal payoff to an individual. However, the threat itself is more properly a part of a strategy". (Shubik 1961, p. 4).

Shubik ultimately recommended publication with only minor editorial revisions and offered a cautious assessment of the book's likely reception: "The odds are that it will receive very mixed reviews, including several very favorable and several highly unfavorable comments. It is certainly not going to make any "best seller' list. However, it should make a worthwile (sic) contribution to the development of political science." (Shubik 1961, p. 4).

Shubik's identity as referee was not disclosed, and there is no evidence of correspondence between him and Riker either before or after the review process. Given the general nature of several comments and their attachment to the manuscript rather than to the published text, it is difficult to determine which suggestions Riker adopted, aside from the explicit inclusion of "threats" among side payments. In the published version, "the threat of reprisal" indeed still appears among the types of side payments discussed (Riker 1962b, 109–10).

The report is valuable for several reasons. For the historian, it provides an informed evaluation of Riker's work by one of the most prominent game theorists of the period. Shubik was arguably an ideal referee: as he repeatedly acknowledged, his strength lay more in economic model building than in highly formal mathematical economics, which might have led another reviewer to focus almost exclusively on technical deficiencies. A different referee might, for instance, have emphasized the fact that coalition theory was being developed at the time with far greater mathematical sophistication in general equilibrium research.[1] Such criticism, however, would have largely missed Riker's objective. He was not attempting to construct a mathematically refined theory of political coalitions, but rather to generate new insights into political processes through the modeling of rational behavior, in line with the methodological reflections laid out in the book's opening chapter. Shubik, despite his distance from political science, clearly grasped this intention, as his report shows. Morgenstern, by contrast, apparently did not.

[1] Notice that Shubik himself contributed to these theoretical developments (Cogliano 2019).

4.2 The assumptions of Riker's model

4.2.1 The "main hope for a genuine science of politics"

Riker devoted the first chapter of his work, significantly titled "The prospect of a Science of Politics", to outlining both the methodological premises of his project and the main features of his model. These pages can be read as a complement to his earlier philosophical papers, and they include a broader discussion of formal modeling and the meaning of rationality.

According to Riker, this chapter "is the most important part of the book." (Riker and Shepsle 1979, p. 15) That claim is somewhat surprising, given the theoretical ambitions of his formal analysis. It can be read as an implicit admission of the mathematical weakness of the argument, but also as a signal of what he regarded as essential: the role of rational choice. As Riker put it, this meant "the notion that people make calculations about what is good for themselves, and try to act based on those calculations." (Riker and Shepsle 1979, p. 16) Downs, Buchanan, and Tullock had advanced closely related views of rationality in politics. Riker, however, coupled his account of rational behavior with a more systematic discussion of Game Theory in politics, moving beyond Down's "self-interest axiom" or Buchanan and Tullock's "economic nexus."

He began with a fairly classical appeal to Physics as a role model for every theoretical and applied science. In Riker's view, Physics is characterized by the existence of a "body of related and verified generalizations which describe occurrences accurately enough to be used for prediction." (Riker 1962b, p. 3) Predictions can be formulated by deducing such generalizations from a set of axioms and then verifying them, despite unavoidable difficulties, through experiments and observation.

Unlike the natural sciences, Riker argued, the social sciences face three major difficulties. The first concerns the normative considerations that permeate any attempt to produce a positive analysis of human affairs: the chief consequence is the impossibility of prediction. The second and third difficulties involve themes already discussed in his earlier philosophical essays: the size of events and the problem of causal determinism. Thus:

> "human action is itself enormously more complex than the motion of things [...] To make matters worse [...] our verbal patterns usually present social reality to us in great big slices. Thus the primitive physicists, even prior to the development of an elaborate special vocabulary, were still presented with rather small events to study [...] Primitive social scientists (that is, we of this century, who are just beginning to develop a special vocabulary) are, on the other hand, presented with vast events such as wars and depressions, love affairs and character formation, elections and systems of Jurisprudence, etc. These classes of events are doubtless of great human interest, but they do not admit of that precise definition which is so necessary in science". (Riker 1962b, p. 5)

For Riker, any attempt to create a science of politics requires, first, a genuine understanding of scientific method.[2] In line with modern developments in the natural sciences and some of the social sciences, the primary tool for rendering political science "scientific" is the "creation of a theoretical construct that is a somewhat simplified version of what the real world to be described is believed to be like." (Riker 1962b, p. 5)

In other words, one builds models: sets of axioms (more or less intuitively defensible) from which one can deduce non-obvious general propositions. Once verified, these propositions become both additions to the model and descriptions of its structure. They also allow scholars to reduce, or at least attempt to reduce, normative elements, while simplifying the units of study.

> "The main advantage of a model is that it is a convenient way of generating hypotheses and something of a brake on inconsistency. Not that a model is any substitute for creative imagination [...] but the model can guide him in imagining hypotheses and deciding whether or not they are useful. Beyond this main purpose, however, models are helpful in overcoming the special obstacles that stand so firmly in the way of a science of politics" (Riker 1962b, pp. 7–8)

Economics and Psychology, for Riker, offered the most relevant examples of social sciences that had become "scientific." Economics, in particular, had developed models of individual behavior, such as consumer theory. Therefore, an analogous model of political behavior could also be constructed. This, he argued, was the "main hope for a genuine science of politics." (Riker 1962b, p. 9)

If political analysis is to follow the economic approach, it must be grounded in individual action. The first step, however, is to define politics itself. Riker adopted as especially suitable the definition proposed by his former colleague at the Harvard Graduate School, David Easton: politics as "the authoritative allocation of values." (Easton 1953; Riker 1962b, p. 10) Despite methodological divergences, Riker argued that this definition captured—through the notion of "allocation"—a central feature of politics: it is an activity, not merely a static study of governmental forms, law, or history. Moreover, it does not discard older traditions in political science, but rather subsumes them.

Most interestingly, Riker also drew an implicit parallel with the well-known definition of economics proposed by Lionel Robbins in 1932 (even though Robbins is not mentioned in the text), namely economics as "the allocation of scarce resources." (Robbins 1932) The parallel rests on the idea that both economics and political science concern "allocation." Yet, for Riker, allocation is not merely a physical process; it is "the social process of deciding how a physical process shall be carried out." (Riker 1962b, p. 11)

[2] As Riker wrote: "Those who are interested in creating a science of politics must, therefore, first become students of the scientific method in the hope they can use it in their own concerns." Riker 1962b, p. 7

Political science, in this sense, belongs to the broader family of disciplines concerned with decision-making.[3]

Not all decision processes, however, are political or of direct interest to political scientists. Riker therefore classified "authoritative allocative decisions of values" in the following way:

1. the decisions made by individuals
2. the decisions made by groups, which are divided into:
   - the decisions made by a conscious process
   - the decisions made in a "quasi-mechanical way"

On this scheme, political science is concerned with conscious group decisions. The first case represents the limiting case of a single decision-maker—a dictator. The "quasi-mechanical" group decisions, by contrast, are characteristic of markets and thus belong primarily to economic analysis.

The presence of a group of decision-makers also implies that, once the group's size exceeds 2, coalition formation becomes central: "[T]he process of reaching a decision in a group is a process of forming a subgroup, which, by the rules accepted by all members, can decide for the whole. This subgroup is a coalition." (Riker 1962b, p. 12) For the study of coalitions, Riker argued, "a model is at hand": John von Neumann and Oskar Morgenstern's theory of n-person games, "which is essentially a theory of coalitions" (ibidem).

The key assumptions of that framework are Rational Choice and Zero-Sum, and these are also the assumptions of Riker's own model of political coalitions. He therefore used the final part of the chapter to clarify them. "Zero-sum" denotes pure conflict situations. As Buchanan and Tullock argued in *The Calculus of Consent*, such situations are relatively rare in political life and, in a sense, less theoretically attractive, because a distinctive feature of politics is "that people consent to remain in them, even when they are on the losing side in particular decisions." (Riker 1962b, p. 30)[4] Still, the zero-sum condition is a plausible assumption in many political contexts, such as elections and voting, where outcomes define winners and losers. Moreover, it can also apply when non-zero-sum situations are experienced as pure conflict by the actors involved. Yet, unlike rationality, the zero-sum assumption is not indispensable for formal political analysis as such. For that reason, it was rationality that Riker treated at greater length.

4.2.2 Rationality and the study of politics

The economists dealt with the problem of rationality, both individual and collective, and with its proper definition since the modern development of the discipline. After the Second World War, the view that became prominent was the "consistency view" of rational action. As game theorist

[3] This resembles Duncan Black's discussion of the unity of politics and economics (see Black 1950)

[4] Buchanan and Tullock 1962) was published the same year as Riker's, and he reviewed it in the *Midwest Journal of Political Science* (Riker 1962a).

and philosopher Ken Binmore explains, this amounts to translating the elements that classical and modern philosophy associated with action into a mathematical and logical framework:

> "[A]n agent's strength of body becomes his feasible set [...]. His passions become his preferences. His experience is summarized by his beliefs. His reason becomes the set of rationality principles that guide his choice of an optimal action from his feasible set, given his preferences over the possible consequences and his beliefs about matters over which he has no control." (Binmore 2015, p. 4)

This view was reinforced by the adoption of the notion of "revealed preferences" in the late Thirties, according to which researchers should infer patterns of choice exclusively from observable decisions (for a general overview, see: Giocoli 2003b; Moscati 2018). Its most significant development, in turn, came with the axiomatization of utility theory following von Neumann and Morgenstern.

Luce and Howard Raiffa, Riker's main reference for Game Theory besides the *Theory of Games*, devoted extensive discussion to utility theory, its axiomatic foundations, and its critical difficulties. In *Political Coalitions*, when he turned to these themes, Riker disputed, in particular, their definition of rational behavior. For Luce and Raiffa, the "postulate of rationality," or the "law of behavior" derived from it, is essentially tautological: it does not describe behavior but merely defines preferences. Hence, "the problem is not to attempt to verify the postulate but rather to devise suitable empirical techniques to determine individual preferences." (Luce and Raiffa 1957, p. 50) The theoretical task, then, is not to prove that individuals maximize money, power, or any other specific objective, but to represent the structure of preference correctly and to investigate it empirically. As they wrote: "Of course, if one attempts to identify utility with some objective measure of the outcome, such as money, then people are not generally rational in the sense of satisfying [the postulate of rational behavior]. But this is irrelevant; it merely implies that the preference patterns of people are not simply related to expected money returns." (Luce and Raiffa 1957, pp. 50–1)

Riker summarized their definition of rationality as follows: "*Given a social situation in which exist two alternative courses of action leading to different outcomes and assuming that participants can order these outcomes on a subjective scale of preference, each participant will choose the alternative leading to the more preferred outcome.*" (Riker 1962b, pp. 18–9, italics in the text)

For Riker, however, the very tautological form of this definition also constituted its main drawback. If every choice is rational by definition, then the concept asserts little more than the existence of agents and alternatives. If rationality is to be useful for modeling political behavior, he argued, one must return to the "cruder and already somewhat discredited" idea of a maximizing economic or political man. The resulting problem becomes: "how can the rationality condition be stated in such a way that it is more than a tautology but not subject to the criticisms implied in those experiments

which show that the scale of individual utility is not the same as a scale of money." (Riker 1962b, p. 20)

Setting aside the maximization of power, an idea that, in his view, lacked empirical support and depended on an ambiguous notion, Riker proposed a definition of rationality based on winning: "What the rational political man wants, I believe, is to win, a much more specific and specifiable motive than the desire for power." (Riker 1962b, p. 22). More precisely, he defined rationality in the following terms:

> *"Given social situations within certain kinds of decision-making institutions (of which parlor games, the market, elections, and warfare are notable examples) and in which exist two alternative courses of action with differing outcomes in money or power or success, some participants will choose the alternative leading to the larger payoff. Such choice is rational behavior and it will be accepted as definitive while the behavior of participants who do not so choose will not necessarily be so accepted."* (Riker 1962b, p. 23, italics in the text)

Riker insisted that not all behavior must be rational, yet rational behavior is crucial for the operation of economic and political institutions. He called this the "summation" argument: institutions should be treated as wholes, in the sense that, just as markets are effectively shaped by those agents who behave as maximizers, political institutions are similarly governed by the agents whose behavior conforms to the rationality condition.[5] Riker found this especially evident in fiduciary relations, a broad category of political and social arrangements. A fiduciary relation links an agent to a principal, and the agent is expected to act on behalf of the principal. Hence, "as long as the fiduciary morality exists, there seems to be some justification for using models containing the rationality condition, at least until we can discover whether or not they are useful for economic and political science." (Riker 1962b, p. 28)

Riker's rejection of a preference-based, tautological account can be understood as an effort to make the notion of political rationality intelligible to an audience of political scientists. He favored a more substantial and concrete definition over one framed in purely mathematical terms, partly because it could be grasped more easily by readers not comfortable with mathematical sophistication. The difficulty, however, is that this move sits uneasily with his own account of modeling. Refusing the preference-based approach pushed him toward a weaker defense of rational choice: even if not everyone is rational, the most important actors are (the "summation argument"). In doing so, he appears to set aside what the rationality assumption functions as in economics: namely, a way of constraining the beliefs and desires that actors may be assumed to hold so that their actions become explainable. Yet he did not provide a fully adequate alternative that could both explain individual action *and* support formal modeling.

[5] Notice that Downs adopted a comparable move when he treated political parties as single units in his model of elections (Downs 1957).

Restricting the set of actors assumed to be rational does not remove the fact that modeling rational behavior still requires strong assumptions about beliefs, preferences, and their formal structure.[6]

A useful parallel can be drawn with von Neumann's characterization of rational behavior as prudence. In his 1928 paper and in *Theory of Games*, rational behavior is represented by the "security payoff" generated by the minimax strategy: a player need not know what an opponent will do, but by playing Minimax he maximizes his expected payoff (Neumann 1928). As discussed earlier, this idea addresses the paradox of perfect knowledge that Morgenstern and Friedrich Hayek raised in different ways (Morgenstern 1976a; Hayek 1937). Like von Neumann, Riker isolated a single feature of behavior, in his case the preference for winning outcomes. By avoiding an overly narrow account of rationality (for example, the claim that "individuals' scales of utility [...] are isomorphic with the scale of some objective measure such as money or even power"), he expected that "rationality as winning" could provide a foundation for a theory of political coalitions grounded in von Neumann and Morgenstern's formal framework.

Interpreting Riker in this way helps clarify why he adopted this strategy. Yet, as suggested above, it remains inconsistent with his own conception of modeling. There is, in principle, no contradiction between formal analysis and a conception of rationality that captures concrete features of action. Von Neumann's solution was criticized for equating rationality with prudence, but this was not what ultimately limited its acceptance. Rather, the central obstacle was the mathematical difficulty of extending comparable results beyond 2PZSG, across both cooperative and non-cooperative settings. That obstacle was later addressed by the development of Nash Equilibrium.

Similarly, Riker's non-mathematical account of political rationality did not, by itself, rule out a more formal approach. In fact, a common move in formal political science, particularly in spatial models of voting, is to treat politicians as vote maximizers and to interpret winning as the relevant objective. In those models, however, the idea is embedded in a formal structure, typically framed through Euclidean distance (Davis and Hinich 1966). Developing that line of work required a stronger mathematical background than Riker possessed in the early Sixties.

To conclude, Riker's treatment of rationality may be best understood as consistent with an instrumentalist posture, one that resurfaces in his discussion of the "size principle." In this respect, his position parallels Milton Friedman's famous argument about the realism of assumptions and the aim of models, above all their predictive power (Friedman 1954). If firms or agents behave *as if* they were maximizers, then the rationality hypothesis can function as an adequate proxy for describing institutional outcomes. The same logic can be extended to political institutions that "[. . .] select

[6] Riker also implicitly relied on a preference-based conception of rationality when adopting the V solution of von Neumann and Morgenstern. In particular, the notion of "imputation," central to their V-solution and used by Riker, presupposes core elements of individual and collective rationality in preference terms. (Luce and Raiffa 1957, pp. 192–3)

and reward with success behavior which is apparently motivated by the intention to maximize power." (Riker 1962b, p. 21) Riker's proximity to this position is also reflected in his emphasis on verification and prediction, rather than on the advanced theoretical developments produced by highly technical mathematical economists.[7]

Riker did not explicitly refer to Friedman in his work on political coalitions. Nonetheless, a relatively straightforward instrumentalist stance persisted in formal political science even after the adoption of more robust mathematical tools, notably in the work of Peter C. Ordeshook, Otto A. Davis, and Melvin Hinich (Davis 1968; Davis, Hinich, and Ordeshook 1970; Riker and Ordeshook 1973). This continuity may mark the central line connecting Riker's early "quasi-formal" posture with the later, fully formal approaches that followed him, united by the same commitment to "the prospect of a science of politics."

4.3 The theoretical model

4.3.1 The Size Principle

The fundamental principle of the theory of coalitions concerns their size. In Riker's view, Game Theory allowed him to restate this principle in a compact form:

> *"In n-person zero-sum game, where side-payments are permitted, where players are rational, and where they have perfect information, only minimum winning coalitions occur."*(Riker 1962b, p. 32, italics in the text)

From this claim, Riker derived a descriptive proposition (or "sociological law") meant to be empirically testable: *In social situations similar to n-person, zero-sum games with side-payments, participants create coalitions just as large as they believe will ensure winning and no larger.* (Riker 1962b, pp. 32–3, italics in the text)

Riker offered only fragments of evidence for this proposition, chiefly by drawing on U.S. political history in the third chapter. Before doing so, however, he devoted several pages to clarifying the features of von Neumann and Morgenstern's theory of games that he intended to use.[8]

Riker's largely positivistic attitude toward the social sciences included the possibility of cumulative knowledge. In that spirit, he presented his theory of political coalitions as a partial improvement upon the rational approach that Downs had developed for the relationship between rational voters and rational parties. The parallel, as Riker framed it, runs through the analogy between parties and coalitions. Downs assumed that parties

[7] Even though Friedman's argument was widely debated among economists and social scientists, I have not found direct proof that Riker knew it when writing on political coalitions. Still, it is unlikely he was unaware of it, since Downs also refers to Friedman.

[8] The discussion in the main text is complementary to a more detailed analysis outlined in the first of the two appendices to his work (Riker 1962b, pp. 247–78).

aim to maximize votes. Similarly, coalitions might be said to maximize their membership. Riker, however, shifted the focus: coalitions expand only up to their minimum winning size. Furthermore, his analysis does not incorporate the discussion of voters' and politicians' spatial preferences and the probabilistic distribution of the former, which instead is the pivotal contribution of Downs' and will be at the core of the subsequent developments of formal political theories from the late Sixties onward, as well as the introduction of non-cooperative game theory.

The idea of a "minimum winning size" had appeared earlier, notably in Shapley and Shubik's Game Theory analysis of power. Riker used the concept in a rather different way. He did not attempt to compute each player's value in a game, nor did he focus on measuring the power of each member of an assembly. Instead, his aim was to use the notion to constrain the coalition structure of a game, explore equilibrium and stability within that constrained space, and ultimately suggest a way to test the resulting claims.

To get there, Riker began by sketching the model's foundations through an overview of the theory of games, drawing chiefly on Luce and Raiffa's textbook and on John Charles C. McKinsey, alongside the more verbal exposition in the first chapter of von Neumann and Morgenstern(Luce and Raiffa 1957; McKinsey 1952). He reviewed basic features of games (the number of players, moves, sets of alternatives, information, the scope for collaboration, and payoffs), but he concentrated in particular on the number of players. He then turned to n-person games, in which agreements are possible, and utility can be transferred among players.

At the same time, as Riker emphasized, such games do not yield a unique solution. In his view, this difficulty followed from game theorists' tendency to emphasize the properties of coalitions (existence, reasonableness, fairness) rather than the possibility of delimiting coalition structures more directly.[9] Since, among the solution concepts proposed after von Neumann and Morgenstern, none seemed to him clearly preferable to the original framework, whether in generality or in empirical testability, Riker chose to build directly on the concepts introduced in *Theory of Games*.

The key idea, as seen earlier, is that when the number of players exceeds 2 (calling N the set of all players) every coalition in the game, from the singleton coalition to the grand coalition, has a value given by its "Characteristic Function," $v(S)$ (with $S \subseteq N$).[10] This value is defined by the solution to a 2PZSG between the coalition and its opposite, i.e., $v(S) = -v(S)$. Each coalition divides its value among members under two constraints: no member receives less than he would obtain as a one-player coalition, and the coalition can distribute no more and no less than its total

[9] To briefly sum up this point: von Neumann and Morgenstern's solution is allegedly never empty (ever exists) but is not unique; the core can be unique (but often non-existent); finally, the Shapley-value is a "fair solution," but players' strategic actions are often obliterated

[10] By coalition, in formal terms, it is intended the number of all the possible subsets of n, also comprising the empty set $\emptyset$ and the set of all players. This number equals 2^n.

value. The resulting vector of payoffs is the "imputation." One imputation dominates another when all its components are greater. The solution of an n-person game is then the set V of all imputations that do not dominate one another (internal stability) and that dominate all imputations outside the set (external stability).

Riker introduced further restrictions on the Characteristic Function. Specifically, he focused on coalitions that are "winning." A winning coalition is defined as one whose size exceeds an exogenously specified threshold (here, m, with $m \geq 1/2$). If a winning coalition exists, its complement is losing. If no winning coalition exists, then all coalitions count as "blocking."

Von Neumann and Morgenstern normalized the Characteristic Function to make it operational, thereby establishing the "range" of possible values for a coalition: $-p\gamma \leq \bar{v}(S) \leq (n-p)\gamma$, where n is the total number of players and p the coalition size (Neumann and Morgenstern 1944, pp. 248–53). [11]

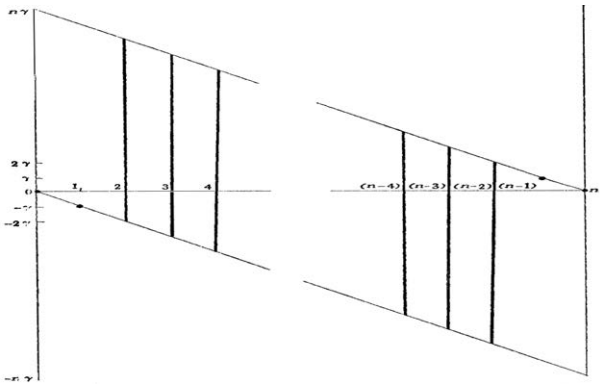

Figure 2. The range of possible values, $v(S)$ for each coalitions in the game. *Source*: Von Neumann & Morgenstern, *The Theory of Games*, p. 252

Figure 2 provides a graphical representation of this range.[12] The maximum loss for a coalition is $-n\gamma$, while the maximum gain is $(n-p)\gamma$. On a Cartesian diagram, the y-axis records the coalition value (from $-n\gamma$ to $n\gamma$), and the x-axis records coalition size (from 0 to n). The boundary lines connecting $(0, n\gamma)$ to $(n, 0)$ and $(0, 0)$ to $(n, -n\gamma)$ delimit the feasible region. As the diagram makes clear, the range contains infinitely many values. For Riker, narrowing the domain therefore required focusing only on those Characteristic Functions that correspond to winning coalitions. To do so, he distinguished winning, losing, and blocking coalitions through what he acknowledged to be a "rather imprecise" notion of majority (Riker

11 From this, it is apparent that each one-player coalition's value is $-\gamma$, and therefore the $n-1$-members coalition has value γ. The $n-1$-members coalition is the complement of the one-player coalition, and by the zero-sum property, $v(S) = -v(S)$.

12 Riker reports this figure in the first appendix of his work. This is the same graph in von Neumann and Morgenstern's work (Riker 1962b, p. 253; Neumann and Morgenstern 1944, p. 252).

1962b, p. 256). Intuitively, no coalition is winning unless it has over $\frac{1}{2}$ the total membership or votes in the decision-making system. Accordingly, $S_p \in W$ if and only if $m \leq p$ (with m the majority threshold, p coalition size, and W the set of winning coalitions). If n is even, m is greater than $n/2$; if n is odd, m lies between $n/2$ and $(n+1)/2$.[13]

In this way, Riker restated von Neumann and Morgenstern's framework in a more straightforward and less mathematically sophisticated language to provide a static description of the coalitional structure of a political situation represented as an n-person game. Yet he also translated that structure into a vocabulary of equilibrium and disequilibrium. For any $v(S)$, the admissible values depend on coalition size and on the size of the opposing "blocking" or "losing" coalition. His notion of equilibrium mirrors the strategic reasoning and rational choices of the players within coalitions:

> "If there are some values of $v(S)$ so unnecessarily disadvantageous for S as a whole that rational players reject S in favor of an immediately available alternative T, then these values of $v(S)$ will be said to be in *disequilibrium* and S will be said to be *unrealizable*. Conversely, those values of $v(S)$ which are not disadvantageous in comparison with an immediately available alternative, will be said to be in *equilibrium* and S will be said to be *realizable*." (Riker 1962b, p. 262, italics in the text)

He then restricted attention to winning coalitions, that is, to the "winning region" of Figure 2 (above the abscissa, and for $n > \frac{n}{2}$), represented in Figure 3 (Riker 1962b, p. 41). This area contains the characteristic functions associated with winning coalitions.

Within it, he distinguished three types of winning coalitions:

1. Those for which the value of the Characteristic Function, in the "winning region," is a function with a negative slope
2. Those with a positive slope in part
3. Those with zero slope

Intuitively, the first type corresponds to coalitions whose value falls as their size increases. The second corresponds to coalitions that benefit from adding members up to a point, after which the value declines. The third type includes coalitions whose value does not depend on size. The central problem, then, is straightforward: if a coalition has already reached

[13] The author discusses a further restriction to take into account the realistic case where different members of the coalition have different importance and therefore different weights. This aspect is important because the majority needed to form a winning coalition can differ in these cases. If the weight of one player is greater than the sum of all the weights of other players, a majority is formed only by that player. Therefore, Riker reworked the definition of m, simply putting it between 1/2 and 1 and imposing restrictions on the weights each player can have. However, when analyzing the specificities of coalition formations and their equilibria, the assumption of equal weight among the members of each coalition will be maintained.

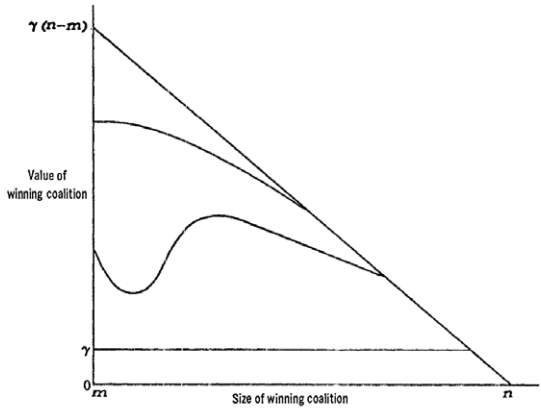

Figure 3. Different types of Characteristic Function
Source: Riker, *The Theory of Political Coalitions*, p. 41

a majority but regards its size as disadvantageous and prefers to exclude some members, the larger coalition cannot be an equilibrium outcome.

Riker summarized his conclusions in general form:

1. For functions with a negative slope throughout the whole range for winning coalitions, only the minimum size coalition is realizable;

2. For functions with a positive slope in part of the range of winning coalitions, i.e., with a peak, the points on the negative side represent disequilibrium values;

3. Finally, for functions with zero slopes, the uniquely realizable winning coalition size is m.

Yet the argument was not presented as a fully rigorous game-theoretical theorem. Rather, these results emerge from a difficult and sometimes opaque verbal discussion of coalition behavior, the permissible ranges of values, and the incentives to add or exclude members.[14]

Still, Riker was pursuing a theory designed to generate predictions and to be confronted with political facts through the formal structure of its

[14] A situation which Riker labeled as a "subgame," even if they are not adequately defined. Indeed, when referring to "subgame," in Game Theory, it is intended as a precise notion, namely the piece of a game that remains to be played beginning at any point at which the complete history of the game thus far is common knowledge among the players (Gibbons 1992). As it will be shown in the next chapter, the main limitation of Riker's analysis is that, albeit using von Neumann and Morgenstern's theory of coalitions, he was still unable to tie his analysis explicitly to their formal solution. Therefore, his attempted proof is not really general (Shepsle 1974). Riker attempted to provide a new and simpler proof of the size principle in 1966 (Riker 1966).

assumptions. As he put it: "whether or not the just-stated conclusion is of any scientific value depends on whether or not an analogous statement about real-world can be verified." (Riker 1962b, p. 47) The "analogous statement" is the size principle: in social situations similar to n-person zero-sum games, only coalitions no larger than the minimum size tend to occur.

Among the model's assumptions, perfect information was probably the one most readily perceived as problematic.[15] A seemingly more realistic formulation would be that coalition-makers form coalitions they *estimate* to be minimum winning. Yet this modification quickly becomes tautological: if an Minimum Winning Coalition is not formed, one can always invoke imperfect knowledge or uncertainty; conversely, even when these coalitions appear, they might result from "irrational motives" rather than from the principle itself.

In a strict positivistic sense, the problem is that verification becomes elusive. One possible escape is experimental work, in which games are simulated in a laboratory setting to collect evidence about the size principle and coalition formation more broadly.[16] Riker devoted several pages to such efforts (Riker 1962b, pp. 49–53). But the results were necessarily partial: he did not lay out a precise methodology, nor did he specify adequate experimental rules. He therefore concluded that "if the behavior in small groups is not likely to produce much information about the behavior under the zero-sum condition, evidence about the usefulness of a model containing it must be found in the behavior of persons in large groups. Here, it is probably impossible to obtain experimental evidence, and one must rely on observation." (Riker 1962b, p. 54) In that setting, even though it can be difficult to separate outcomes produced by rational action from those that are not, the size principle can be assessed through a particular observational argument:

> "Presumably [...] the leaders are subjectively convinced that they have more in the coalition that they need to win. Their conviction is, of course, a certainty if their winning coalition is a coalition of the whole or a grand coalition. When this occurs, one would expect, if the size principle is a valid description of behavior, that they would make strenuous efforts to reduce

[15] About the other two: rationality, as defined above, is clearly a more realistic assumption, although, as I tried to show, Riker's definition is not consistent with what he said about modeling, with the development of Rational Choice Models in economics and the subsequent developments of similar models in Political Science. The assumption of side payments (or "transferable utility") is essential to von Neumann and Morgenstern's solution. However, it is also justifiable as a sort of compensation principle, i.e., if you join me, I can share something with you

[16] Only in recent times the experimental testability of some assumptions regarding the rational behavior of economic agents, or players in Game Theory, have become an important subfield of Economics. Especially after the awarding of the 2003 Nobel Prize in Economics to Vernon Smith, who pioneered this methodology. (Smith 1992) However, yet in the Fifties, some attempts to develop such tests were carried forward.

> their oversized coalition in the direction of a minimum winning one. To the extent that they do so behave, the size principle is verified, and confidence is increased in the validity of the model. Conversely, to the extent that they do not so behave, the principle is proved false, and confidence in the model is shown to be unjustified." (ibidem)

To address the empirical challenges in testing the size principle, Riker turned to historical reconstruction, assembling evidence from selected episodes in American and European political history. He focused in particular on situations in which near-grand coalitions (whose value is assumed to be zero) contracted in size. One example is the collapse of the Federalist Party and the emergence of the Jacksonian Party (or Democratic Party) as a response to the de facto grand coalition represented by the Democratic-Republican Party between 1816 and 1828 (Riker, 1962, pp. 54 et ss.).[17]

In Riker's reconstruction, the Federalist party virtually disappeared after the War of 1812, leaving the Democratic-Republican Party as a near grand coalition. The coalition then dissolved into what he described as a "disorganized melangè of blocking coalitions," under the assumption that a whole coalition gains nothing. As he narrated the episode: "when Jackson took office in 1829, he had command of a relatively valueless coalition to which nearly everybody claimed to belong," and he attempted to reshape it into a minimal winning coalition by expelling some members and adopting a confrontational posture toward those who opposed him. Seen this way, "some of the events of Jackson's administration that heretofore have been viewed as trivial or embarrassing are seen actually to be the crucial events of his revival of the two-party system." (Riker 1962b, p. 58)

This historical reasoning, as well as Riker's own justification of it, also reveals an "instrumentalist" stance, as the following passage suggests:

> "I do not suggest, of course, that these nineteenth-century statesmen appreciated this principle as a law of rational behavior. What I do insist, however, is that it describes their behavior, even though they probably perceived their problems thus: 'With our overwhelming majority, there are so many and so conflicting interests in the party that none can be satisfied. As long as two conflicting interests remain in the party, neither can be satisfied [which, I add, is why a grand coalition is valueless]. For the sake of action for the interest we approve, we shall therefore decide to satisfy one interest, and if others are offended, they may leave the coalition."[...] (Riker 1962b, pp. 65–6)

[17] The other two examples derived from American history are: the emergence of the Republican Party as a consequence of the annihilation of the Whig Party in the 1850s, and the fragmentation of the Democratic Party in different Blocking Coalitions; the end of the "Reconstruction," when the Republican Party, again a grand coalition 'de-facto divided in various coalitions, at state and local levels (Riker 1962b, pp. 59–65).

In the fourth chapter, Riker returned to the model's restrictions, with particular emphasis on information. The central point was that incomplete and imperfect information can lead coalition-makers to form coalitions larger than the minimum winning size. To explore this "information effect," he introduced a numerical example: a zero-sum game with 101 players, in which the minimal winning coalition requires 51 players. The players are distributed as follows:

1. Two sets, S and T, of 48 players each
2. Five sets A, B, C, D, E of 1 player each

To reach a majority, both S and T must persuade at least three of the singleton sets to join them. Then, the solution must be found within the set of all 5-tuples which pay a positive amount to at least three players. Additional assumptions are that members of S and T are loyal (and thus cannot desert), and that information about the moves of the singleton sets is imperfect, namely it is not known the move of each set. Because recruitment requires offers, the setting is explicitly a bargaining one.[18] He represented this by assuming that each 48-player group has "operating funds," with $F_S > F_T$ (so S has greater funds than T). The question becomes how S and T should behave strategically. Each coalition has two strategies:

1. To make an offer only to three players
2. To make an offer to four or five players

Given imperfect information, Riker argued, the first strategy is not preferable to the second. Neither coalition can ensure that offers will be accepted unconditionally, and in addition S must decide how to use its financial advantage to increase the probability of winning. "Hence the problem is, for the coalition which has or believes it has the larger fund, how to exploit its advantage best." (Riker 1962b, p. 83)[19] From the example, Riker concluded that imperfect information pushes "not-yet-winning coalitions to seek more additions than they need to win" (Riker 1962b, p. 88). On that basis, he proposed the following hypothesis:

> *"The greater the degree of imperfection or incompleteness of information, the larger will be the coalitions that coalition-makers seek to form, and the more frequently will winning coalitions actually formed be greater than the minimum size. Conversely,*

[18] A further simplifying assumption is that the uncommitted players receive their promised sum only if the coalition they join becomes a winning coalition effectively

[19] Then, for coalition S, this means to prefer the second strategy above. However, this analysis is again outlined in verbal terms, and the model is not mathematically defined. Therefore, Riker's argument is consistent with the assumption of "imperfect information," as stated above. Still, it is unclear why this effect is ruled out by simply making an offer to four players and not, for instance, making a better offer only to three players. At the same time, even in the case of the second strategy, neither coalition can assure that the others will accept an offer unconditionally.

> *the nearer information approaches perfection and completeness, the smaller will be the coalitions that coalition-makers aim at and the more frequently will winning coalitions actually formed be close to minimum size."* (Riker 1962b, pp. 88–9, italics in the text)

Riker suggested that this information effect might illuminate "critical elections" in U.S. electoral history. V.O. Key had introduced the notion of "critical elections" to denote periods of heightened voter involvement and the formation of new electoral alignments. In Riker's reading, such periods may be interpreted as phases in which information declines and uncertainty increases about the size of the winning coalition.

In this context, Riker also engaged with Downs's economic analysis of democracy. Downs argued that in a two-party model, where voters maximize utility and parties maximize vote shares, both parties may find it advantageous to remain as ambiguous as possible. But this seems to contradict the assumption that voters maximize utility. In Downs's formulation, such ambiguity makes it harder for citizens to vote rationally. When party positions are unclear, voters are pushed to base their choices on factors unrelated to policy, such as the personal characteristics of the candidates. Yet only parties' decisions on issues affect voters' utility derived from government action. Consequently, voting on any other basis must be regarded as irrational. This tension was a challenge for any model that attempted to treat voters and parties as simultaneously rational in the same framework. Riker suggested that his approach could offer a way out: if parties maximize votes only up to the minimum winning size, then they have no general incentive to obscure their positions, but only to do so on issues involving voters about whom they possess imperfect information Riker 1962b, 98 et ss.).

4.3.2 Strategy and coalition building

Until now Riker's analysis has been largely static. The size principle functions as an ideal benchmark: a standard to which rational coalition-building should tend. Even though it is grounded in von Neumann and Morgenstern's framework for n-person games, it does not itself constitute a solution to those games, but rather a "sociological principle." Riker used elements of the structure of such games to clarify the rational logic behind coalition politics, in parliamentary bargaining, in wartime alliances, and, more generally, in international political alignments.

In the second part of *Political Coalitions*, Riker shifted to the question of how political leaders conduct coalition-building in order to reach a stable institutional arrangement, if such stability is achievable. The goal was to exploit what he later recalled as the main promise of Game Theory: the analysis of strategic choice (Riker 1992).

Yet this section is also the weakest part of the book. Here Riker's analytical limits become most visible: the intuitions that supported the discussion of the size principle and the information effect are no longer sufficient to sustain the argument. The analysis now hinges on dynamic

and sequential reasoning—topics that were developed systematically only after the Seventies, in the work of scholars such as David Kreps, Robert Wilson, Ariel Rubinstein, and Ken Binmore, among others. Were these developments that fueled the decisive boom of non-cooperative Game Theory in economics.

Game theory has always been, of course, about strategy, but in von Neumann and Morgenstern's treatment of n-person games strategic behavior is largely subsumed by the general idea of a solution. The value of each Characteristic Function is derived via a Minimax solution in a 2PZSG between a coalition and its complement; and the strategic considerations governing why a player joins one coalition rather than another are embedded in the concept of imputation. The analysis is thus primarily static.[20] To address this limitation, they suggested that the set of imputations "correspond to the 'standard of behavior' connected with a social organization" (Neumann and Morgenstern 1944, p. 41), so that a solution can be read as an accepted standard of behavior.[21]

A different line of thought, initially formulated for two-person cooperative bargaining, was introduced by Nash through the idea of non-cooperative foundations for cooperative outcomes (Nash 2002c). Nash asked how an apparently "algorithmic" bargaining solution could be understood as the outcome of a non-cooperative game that determines what is to be bargained. This move involved a dynamic, multi-stage structure. As Luce and Raiffa (as seen, Riker's main source on Game Theory) summarized it: "Roughly, his [Nash] idea boils down to this: Each player adopts a mixed strategy as a "threat"; the pair of "threats" establishes a payoff, which, in turn, acts as the status quo point for future bargaining; and the bargaining problem is resolved in the manner discussed in [Nash's 1950 paper.] Therefore, the problem is reduced to selecting the threat strategies so as to influence the status quo - which controls the ultimate payoff - in the most favorable manner."(Luce and Raiffa 1957, p. 140)

[20] As the two authors stated explicitly: "We repeat most emphatically that our theory is thoroughly static. A dynamic theory would unquestionably be complete and therefore preferable. But there is ample evidence from other branches of science that it is futile to try to build one as long as the static side is not thoroughly understood." (Neumann and Morgenstern 1944, p. 44)

[21] Furthermore, the two authors returned briefly on this issue at the very end of their chapter on the general theory of zero-sum n-person games. There, they stated that the "negotiations, expectations and fears which precede the formation of a coalition and which determine its conditions" can be regarded as a type of quasi-dynamic theory, which also entails the fact that "conducts approved by an established standard of behavior does not conflict with each other, but can be used to discredit the non-approved varieties." This idea was consistent with how von Neumann and Morgenstern conceived their work on Game Theory as pure theory and the general worldview lying behind it (see, especially for von Neumann Leonard 2010). Instead, it must be specified that Morgenstern's criticisms of the state of economics in the Thirties focused on the latter's incapability to address the issue of dynamics properly and, therefore, adopt a too simplified view regarding equilibrium and perfect knowledge. However, in *Theory of Games*, Morgenstern accepted the purely static nature of such a theory because it represented, in his words, the first step for further elaborations

After Rubinstein's contribution (Rubinstein 1982), it became standard to analyze bargaining in non-cooperative, sequential terms, using Nash Equilibrium in extensive-form games and, in particular, Subgame-Perfect Equilibrium.[22]

This line of reasoning aligns closely with the kind of problem Riker was trying to address. In broad terms, he explored how coalitions form, hold together, or expand across multiple stages, where the final stage delivers the observable outcome. For example, consider a voting body with weighted majorities, in which different coalitional groupings (or, in Riker's vocabulary, "proto-coalitions") exist at the outset. Leaders of these proto-coalitions attempt to recruit new members, when necessary, through side payments. If, by the final stage, the process yields a minimum winning coalition, that outcome can be read as an equilibrium.

When Riker was writing, however, this kind of Game Theory remained underdeveloped. The first major contributions that put such ideas on firmer ground, such as those by Harsanyi and Selten, date only to the mid-Sixties.[23] Riker likely knew Nash's bargaining result, even though he did not cite it in *Political Coalitions*. As noted, Luce and Raiffa devoted a chapter to bargaining and discussed Nash's solution (Luce and Raiffa 1957, pp. 124–34, 140–4). Yet they were skeptical about its practical relevance, regarding it as an artificial mathematical construction. It is plausible that both their verdict and the abstract nature of Nash's work contributed to Riker's limited engagement with it. In any case, when he addressed coalition strategy, he seems to have sensed the theoretical issues at stake, even if his own attempt did not crystallize into a fully coherent theory.

[22] This was a stronger idea of Nash Equilibrium, developed by German economist Reinhardt Selten, which applies to games in extensive form, i.e., multi-stage games. (Selten 1965; Selten 1975) This idea, together with Bayesian Nash Equilibrium, represented the most decisive development of Non-cooperative Game Theory and paved the way for the game-theoretical revolution in the Eighties. In a nutshell, a Non-cooperative game in extensive form, which can be represented as a tree, can be divided into different sub-games regarding the kind of information disposable to each player. Namely, if the information is perfect, then each node of a game tree, let apart from the terminal nodes, can represent the initial node of a sub-game. A Perfect Sub-Game Nash Equilibrium is the strategy profile which is a Nash Equilibrium in every sub-game (Gibbons 1992).

[23] As seen, Game Theory was mainly developed at RAND and Princeton Department of Mathematics. Harsanyi escaped from Communist Hungary, obtained a Ph.D. in Economics at Stanford, and in 1964 joined the faculty of the Business School at UCLA-Berkeley, where he spent the vast part of his academic career. Selten completed his studies in Germany but had many visiting positions at Berkeley, working with Harsanyi, from 1967 onward. Furthermore, he spent research time at Princeton in 1961, where he met Morgenstern and especially Robert Aumann and Michael Maschler. Harsanyi's and Selten's pivotal works on Game Theory in extensive form date back to the second half of the Sixties (see also: Giocoli 2009b; for biographical information about Harsanyi and Selten: https://www.nobelprize.org/prizes/economic-sciences/1994/summary/).

Riker's model can be described in the following way. Begin with a decision-making body I composed of n members (i.e., an n-person zero-sum game with side payments). Members can assume different roles, and each member's power (weight) may vary. The decision rule states that any coalition reaching weight m (with m exceeding half the sum of all weights) can act for the whole body. The zero-sum condition imposes a boundary: no decision can be such that the losers would rather resign from the body than acquiesce. Coalition-building starts when a leader within I undertakes to form a coalition around a particular issue, and to do so he must attract followers among the other members.

Because he was focused on process, Riker distinguished coalitions from "proto-coalitions." Coalitions are the end products of coalition-building and may be "winning," "losing," or "blocking." Proto-coalitions are intermediate groupings: a subset of I in a setting where at least three subsets exist and none yet reaches weight m. Proto-coalitions change in size through moves made by the members of I, and each move alters the internal structure of the body. In the first stage of the process, there are n one-member coalitions; in the second, there are $n-1$ one-member proto-coalitions and one two-member proto-coalition; and so on, up to the final stage, where either a winning coalition emerges or the outcome is a set of blocking coalitions. Since coalition-building triggers counter-moves, the leader's first step toward constructing a proto-coalition invites others to do the same. Proto-coalitions grow insofar as their leaders can recruit followers by offering side payments (Riker 1962b, 122 et ss.).

Side payments, for Riker, take different forms. They include promises concerning policies or future decisions, and they can extend as far as the threat of reprisal. Such payments also have costs borne by the coalition leader, and those costs must be incorporated in the analysis (Riker 1962b, pp. 109–20). Most importantly, he assumed that side payments are scarce and finite, and thus subject to considerations of economic value.

Because dynamic coalition-building raises questions of strategy, equilibrium, and internal stability, Riker introduced a notion that he regarded as "in some respect stronger, and in some weaker" than von Neumann and Morgenstern's set-valued solution, because the latter did not specify if some coalition in the V-set was winning. He proposed instead the idea of a "uniquely preferable winning coalition," which specifies a particular winning coalition: one with higher value than any other feasible winning coalition and in which all participants can meet their initial expectations. An "initial expectation," for a proto-coalition, is defined as the amount it can secure by joining alternative non-minimal winning coalitions.[24] Because proto-

[24] Riker also listed other four types of proto-coalitions: a "uniquely favored proto-coalition," which is proto-coalition s.t. any winning coalition containing it is more valuable than those not containing it, and if more coalitions contain it, at least one of them is a winning coalition; a "uniquely essential proto-coalition" appears in all winning coalitions. A "unique coalition" is a winning coalition, s.t. only one combination of proto-coalitions in the stage before that actually played can produce a winning coalition. Finally, a "strategically weak proto-coalition" is one that cannot become part of a winning coalition (Riker 1962b, 127 et ss.). For

coalitions face shifting advantages and disadvantages across stages, Riker defined equilibrium as the situation in which, once a "uniquely preferable winning coalition" forms, no rival proto-coalition can join it or construct a new winning coalition. Since, under the size principle, equilibrium corresponds to the formation of an Minimum Winning Coalition, this also yields a tidy link between equilibrium and minimum-winning outcomes. Yet the core difficulty is that such equilibrium cannot generally be maintained: it appears unstable, depending on the size and relative strength of the minimum winning coalition (Riker 1962b, 147 et ss.).

For political analysis, the implications of this lack of equilibrium could be troubling. As Riker wrote: "equilibrium in society is a kind of stability despite the change. And to say that this model lacks equilibrium is to say that the social processes it purports to describe are so unstable- that the political society itself is in fact unstable." (Riker 1962b, pp. 147–8) The last three chapters of *Political Coalitions* therefore turn into a largely verbal exploration of the components of this disequilibrium and of its consequences.

However intertwined these theoretical reflections with another attempt at historical testing. The case was a famous—and controversial—episode in presidential history: the election of 1825, the "corrupt bargain," in which Andrew Jackson won a plurality in the electoral college but lost in the House of Representatives to John Quincy Adams.

Interpreted as a dynamic coalition-building process, the episode can be recast as involving four presidential candidates, each the leader of a proto-coalition: Jackson, Adams, William H. Crawford, and Henry Clay. Clay entered the election, but since the House vote could include only three candidates, he had to transfer his support. Riker assigned the proto-coalitions the following values: $w(P) = 11$ (Jackson), $w(Q) = 7$ (Adams), $w(R) = 3$ (Crawford) and $w(S) = 3$ (Clay) In this example, the value of each coalition corresponds to the number of states where each candidate had the majority. In the House, each state had one vote, which was decided by a plurality of its representatives. Since Clay, Adams, and Crawford were hostile to Jackson, Jackson's proto-coalition became "strategically weak," while Q, R, S formed a "uniquely preferred winning coalition." Jackson's coalition shrank, whereas Adams's became the preferred one. The new values were: Adams with 9 states, Jackson with 7, and Crawford and Clay with 4 each. To reach a majority, Adams could ally with Crawford or with Clay, but not with both if he wished to preserve an Minimum Winning Coalition. Ultimately, an alliance between Clay and Adams formed, and Riker interpreted it as Adams's dominant strategy. If Clay allied with Jackson (despite ideological differences), Crawford would ally

instance, assuming three proto-coalitions, at a $(r-1)$th stage of a game, P, Q, and R, such that $P > Q > R$, $(Q \cup R)$ is the Minimum Winning Coalition, and $(P \cup R)$ and $(P \cup Q)$ are other winning coalitions. Given the Size Principle, the values of all the possible winning coalitions are $v(Q \cup R) > v(P \cup R) > v(P \cup Q)$ 'Proto-coalition' R can be defined as a "uniquely favored proto-coalition" (at a given stage of the game) because R is part of both the most valued coalitions (the Minimum Winning Coalition and that immediately next to it). In other words, the winning coalitions containing R are worth more than those which does not.

with Adams, creating an Minimum Winning Coalition. If Clay joined Crawford, their combined value would match Jackson's; together, Jackson and Clay-Crawford could win, but the value would be divided three ways over two. Given these strategic options, Clay joined Adams, a majority was secured, and Adams became the sixth President of the United States. Clay then became Secretary of State.

Once again, the historical case allowed Riker to display the explanatory ambition of his model and to suggest a new perspective on political facts, past and present. And once again he emphasized that the example does not show that Adams, Clay, or Jackson consciously employed game theory or rational choice, but rather that their behavior can be understood *as if* they had.[25]

In conclusion, the description above highlights two central features of Riker's analysis: it is dynamic, unfolding through time, and it is a bargaining process, structured around exchanges between a leader and followers. Yet he did not develop the argument as a non-cooperative multi-stage game, even in a tentative way. What such a move would have required was beyond his technical means at the time. Too much still had to be invented, and what existed, such as the extensive form of games or the notion of "information set," both present in *Theory of Games*, was not sufficient in itself. Even so, Riker showed a notable intuition for what was missing in von Neumann and Morgenstern's static approach, in which the strategic choices preceding coalition formation were absorbed into the general concept of a solution. As he put it:

> "Unfortunately, it has, I believe, been generally assumed by game theorists that the theory did not offer many bases for the discussion of strategy in n-person zero-sum games. And, indeed, the inferences on strategy to be drawn from von Neumann and Morgenstern's exhaustive analysis of the essential three-person game are relatively few and unimpressive: that the winning coalition is unpredictable on the theoretical grounds, that the equilibrium payoff is an equal division between partners in a winning coalition, and that departures from the equilibrium are invitations to disaster."(Riker 1962b, p. 133)

This limitation mattered, especially if one wanted empirical testing or a more explicitly positive characterization of strategic behavior. One might argue, straightforwardly, that the emergence of non-cooperative Game Theory, where binding agreements are not allowed and communication is restricted,

[25] As Riker wrote: "In the case of all three of these crucial actions [...] there are local institutional or personalistic reasons available to explain the adoption or a rational strategy. Yet, in each action, the rational strategy *was* adopted. And this fact leads me to believe that it was not so much custom or payer that determined conduct as it was the intuitive perception of the abstractly 'best' strategy as here calculated from the model. It is not, of course, that the participants made calculations such as these but rather that in the concrete problems they perceived the concrete advantages of minimal winning coalitions and acted accordingly." (Riker 1962b, p. 157, italics in the text)

offered a natural solution. In that setting, strategy is foregrounded, whereas cooperative theory tends to emphasize fairness, enforcement, or other normative aspects (Serrano 2005). Yet a different, more explicitly theoretical path, originating with Nash and revived from the Eighties onward, was the non-cooperative foundation of cooperative games, later known as the "Nash Program" (Nash 2002c; Binmore and Dasgupta 1987). In a sense, Riker was gesturing in the same direction when he tried to expose the strategic logic behind coalition-building. He anticipated where Game Theory could move, but he could not fully pursue that path.

4.3.3 The reviews of Riker's work

To conclude, it is worth examining the impact of Riker's work, focusing on its immediate reception among the scholarly community it primarily addressed. That audience consisted above all of political scientists, although, given the book's engagement with formal analysis, it might also have attracted other social scientists and perhaps game theorists. In practice, however, the second and third groups paid little attention. Political scientists did review it, but typically focused on selected features, without engaging deeply with the work's formal aspects or its methodological claims.

Published in 1962, *Political Coalitions* received less attention than Riker expected. Even so, reviewers generally praised the effort and stressed the originality of the approach. Yet no "real" game theorists reviewed the book, and none addressed in detail the inaccuracies or excessive simplifications in its use of Game Theory.

Among the most enthusiastic reviewers was Alfred J. Hotz, writing in the *Midwest Journal of Political Science* (Hotz 1963). For him "[...] the Riker's effort presents a most stimulating and provocative- study, one worthy of the most serious consideration by all of those within the political science discipline who are eagerly working toward a theory of politics." (Hotz 1963, p. 297) Yet he did not examine the analysis in depth, and his review remained close to a summary of Riker's argument.

Donald Matthews and Morton Kaplan were more critical. Matthews, a leading scholar of the U.S. Senate, wrote in *The Journal of Politics* that Riker's work "[...] scarcely can be dismissed as self-evident or trivial [...] Even the most sympathetic reader, however, is likely to put down the book undecided as to to the utility of such highly abstract and formal models." (Matthews 1963, p. 579) He raised the question of whether political scientists possessed enough substantive knowledge about politics to construct such models. He did not reject formal model-building on epistemological grounds, but suggested that the discipline's empirical knowledge might still be too limited, and that additional empirical theory was needed before highly abstract formalization could become fully useful.

Kaplan, as discussed earlier, had explored game-theoretical implications in international politics during the Fifties (Kaplan 1957). His work relied mostly on non-cooperative bimatrix games and did not aim for high formal sophistication. He deployed Game Theory in a "functionalist" way, without explicitly grounding it in rational choice or a broad methodological defense

of modeling. Yet Kaplan's work was respected by Morgenstern, and they were in touch. Kaplan was not a game theorist in any stronger sense than Riker. Rather, he was an international relations scholar. In his review for *The Annals of the American Academy of Political and Social Science*, he criticized two aspects of Riker's work: its claims to generality and its reliance on rational choice. He argued that alternative models of coalition-building were possible and that political decision-making could be organized around many different values (Kaplan 1963). Despite his earlier use of Game Theory, his review remained at a highly general level.

Richard Fagen's review, published in the *American Political Science Review*, was among the most supportive (Fagen 1963). Fagen was not a specialist in game theory or voting models, but he had previously reviewed recent work on power, including Shapley and Shubik's 1954 paper, and thus had some familiarity with game-theoretical approaches. (Fagen 1961) He emphasized that Riker's work belonged to an emerging political science literature that employed mathematical reasoning, while also noting—correctly—that "[...] this is in no sense a book about mathematics; rather, it is a book about politics written for political scientists." (Fagen 1963, p. 446) Fagen distinguished three purposes of the book: first, to construct a theory of coalitions; second, "[...] to nudge –or shove–his fellow professionals toward the theoretical sophistication which (he feels) characterizes the neighboring disciplines of economics and psychology;" and third, a "policy purpose," mainly oriented toward international politics. Yet this last aim seemed less persuasive to him, since the model's constraints, especially the zero-sum condition, fit legislative settings better than international politics. He concluded:

> "[. . . .] Riker has made an important beginning-one in which he has raised and created enough problems so that many should feel moved or nettled to correct, criticize, extend, or develop his ideas. One of the beauties of his particular effort is that in order to find intellectual stimulation in The Theory the reader need not be entirely conversant with the game theoretical notions which underpin the argument. There are non-mathematical discussions of rationality, leadership, the balance of power, and many other concepts which cut sharply across the substantive compartments of political science. [. . .] one mark of the success of this book will be the number of controversies and derivative efforts that it engenders." (Fagen 1963, p. 447)

The most comprehensive review appeared in *The Journal of Conflict Resolution*, authored by James A. Robinson, an international politics scholar (Robinson 1963). He described Riker's work as "an original and unusually well-written work." (Robinson 1963, p. 763) Robinson offered a brief but detailed summary and then raised two main points. The first concerned the mathematical model: he sensed the imprecision of Riker's argument, although he admitted he lacked the competence to evaluate it fully. The second concerned empirical confirmation. Robinson did not share Riker's skepticism about experimental methods in the social sciences, and he

suggested, by way of example, laboratory experiments on international relations conducted by Harold Guetzow and his research team. Yet Riker's position toward experiments was less hostile than Robinson implied, since Riker himself pursued experimental tests of Game Theory during the Sixties.

As Riker later complained in his interview with Shepsle, few readers grasped the book's theoretical stakes (Riker and Shepsle 1979, p. 24). Political scientists tended to focus on selected elements, especially the last three, largely verbal chapters. Moreover, many reviews framed the book primarily through the lens of international politics: Riker's final chapter, with remarks on the U.S.–U.S.S.R. rivalry, attracted attention more than the model's formal structure. At the same time, his adoption of von Neumann and Morgenstern's solution concept passed largely unnoticed among game theorists.

So where, then, does the importance of *Political Coalitions* lie? The size principle generated a wave of debate and pushed the discussion toward more explicitly formal assessments of ideas that were still only partially articulated in Riker. His arguments on coalition-building itself proved less influential than his claim about coalition size. Yet the broader problem of legislative coalition formation unsurprisingly became a major topic in formal political science, and from the Eighties onward much of that literature moved away from Riker's original framework and toward bargaining models developed in economics.

The importance of Riker's work on political coalitions rests on its being the first sustained attempt to model political behavior explicitly through a game-theoretical lens, even if it remained far from the level of contemporary formal analysis in economics. This book did not contribute new results to game theory as such, but, in light of what formal political theory became from the Sixties onward, it marked the beginning of one of the most successful translations of theoretical tools across disciplinary boundaries. That later and highly formal literature realized Riker's vision and was often closely tied to his work at the University of Rochester.