

Looking for a "genuine science of politics." William H. Riker and the Game Theoretical turn in political science

Recent Shifts in the Boundaries of Economics: Philosophy and History Paris, May, 31, 2022

Gianluca Damiani

Ph.D. Candidate in Political and Social Change, UniFI-UniTO



Introduction



- This paper shows that in the 1950s and 1960s, game theory occupied a central place in a definite intellectual agenda, and this was not part of economics, but political science instead.
- Thanks to the commitment of a political scientist, William H. Riker, game theory became the primary tool of the attempt to develop a truly scientific political science.
- As Riker wrote in the first chapter of his most ambitious theoretical work, *The Theory of Political Coalitions* (1962),"the main hope for a genuine science of politics lies in the discovery and use of an adequate model of political behavior." (Riker 1962b, p. 9).
- Such a model to him was eminently game theoretical.
- From Riker's dedication, a long line of academic research in political science, which he defined as "Positive Political Theory," was established.





- Riker's story fills different narratives: history of game theory and mathematical economics; history of rational choice theory outside economics (as well as the "cold war institutions"); the history of contemporary political science (especially the postwar so-called "behavioral revolution").
- Indeed, Riker was a political scientist doing political theory when the "behavioral revolution" in political science occurred. He joined the "protest," (for instance the "plea" for objectivity in political theory) but not the revolution. In doing so, he explicitly saw economics as a role model and adopted game theory.
- This paper is divided in two parts: first, I will present Riker's life and early commitment to game theory, focusing on his 1962 work; second, I will advance some considerations on the relationship between Riker's use of game theory and the development of mathematical economics





William H. Riker's education and early works



William H. Riker (1920-1993)

- Riker was born in Iowa in 1920 and attended DePauw University and Harvard Graduate School
- At Harvard he developed hostility toward the mainstream methodology in American PS, namely "case studies" and History of political Ideas
- To him, they lacked the necessary generality to be valid explanations of political behaviour.
- His concerns were shared by the "behavioural revolution" in PS.
- But Riker never joined it, preferring instead to focus on how to develop a true, i.e. internally consistent, political theory





- "I began to think that once you raise the question of what can you do to bring a particular moral position into some sort of effective institutional operation, why you also raise the question of whether or not institutions accomplish what they are intended to accomplish" (Riker, interview with Kenneth Shepsle, 1979)
- The issue to be addressed is: what political science is and can it utter true sentences about political phenomena?
- In vN/M's book Riker found "*what I thought that political science needed for constructing theory*", namely n-person ZSGames, a "general theory of coalitions".
- Other works which influenced him were: Arrow's and Black's social choice analysis (especially the latter); Shapley and Shubik's power analysis by the general value for n-person games (Shapley Value) (Shubik and Shapley, 1954)
- In 1962 he published *The Theory of Political Coalitions*, heavily resting on vN/M analysis (Stable Set Solution). This work was made up mainly during his fellowship at the CASBS (Stanford) in 1960-1.
- In 1962 Riker obtained his appointment at the University of Rochester (NY), where he established an innovative, theory-driven and mathematical graduate program in Political Science



Riker and game theory in the 1950s

- Riker recalled that "[...] von Neumann's book was the one that really turned me on because it seemed to me that there were some generalizations there that [...] one could look at in nature and see if those generalizations turned out to be true." (Riker and K. Shepsle 1979, p. 5)
- Riker quickly became "*something of a publicist*" for Game Theory in political science.
- When Riker's path crossed game theory, in the second half of the 1950s, some scholars had made key refinements upon the original theory of von Neumann & Morgenstern
- In a nutshell: cooperative GT vs Noncooperative GT (and also, "Nash Program")
- In 1954 Martin Shubik and Lloyd Shapley (future 2012 Nobel Prize) published a short theoretical work addressing by CGT the issue of political power (power index)





- The first paper Riker devoted entirely to GT was an empirical assessment of Shapley and Shubik
- A decisive step in Riker's commitment toward formal methods was his fellowship at CASBS in Stanford.
- However, he did not really get in touch, at least in these years, with the community of game theorists
- The reasons:
 - Riker lacked advanced mathematical training
 - Riker was pursuing his own methodological agenda within political science







- Two divergent opinions of Riker's work (manuscript)
- Morgenstern at Princeton was very dismissive
- He criticized both how Riker adopted the GT notions, and his formal model
- He rejected the publication
- Otherwise...

Morgenstern's refusal letter to PUP (OMP, Duke University)







- Shubik, Morgenstern closest student (perhaps), accepted it at Yale
- Shubik also criticised some features of the model, but he praised Riker's effort
- Besides, Shubik was more inclined than Morgenstern to recognise how Riker, despite some flaws, was pursuing his methodological agenda in Political Science

Martin Shubik's report of Riker's *Theory of Political Coalitions*, MSP (Duke University)





The Theory of Political Coalitions (1962)



The front-cover of TPC (1962)

- In 1962 Riker published his most ambitious theoretical work, *The Theory of Political Coalitions*
- In the first half of his book, the author argues that political actors will create coalitions just as large as they believe will ensure winning and no larger (the Size Principle)
- In the second half of his book, Riker slightly modified the *n*-person analysis of Von Neumann and Morgenstern into a set partition of the voting members, to describe the dynamics of coalition formations, that is the strategy at the step before a winning coalition is established.
- This was not a mathematical analysis, given the fact that Riker limit himself to adapt vN/M's model of n-PZSG (Characteristic Function Games) to the analysis of political coalitions





- Methodologically, Riker adopted the view that science is built on models, with the aim of prediction.
- Models are based on axioms, derived by experiments and observations
- The main obstacle to the scientific study in social sciences are the normative considerations about human affairs, and the complexity of human actions
- The latter point can be solved by addressing in a precise way what an "event" in social science is and how it is related with/caused by another (deductive-nomological approach)
- Finally, even in social sciences cumulation of knowledge is the aim of general research
- Economics, based on individual action, is a model (alongside Psychology).
 Politics, indeed, defined as an "authoritative allocation of values" (Easton, 1953) embodies individual action and its changes
- Namely, it is not only the study of history, institutions or law, or the description of political systems





- The decision-maker is rational, but rationality is not addressed in the exact terms of preference orderings, instead as a maximising behaviour of the chances of being part of a winning coalition
- As market selects rational behaviour, political institutions select and reward maximising behaviour
- The other condition of his model is the Z-sum condition (although less general than rationality)
- Riker's work is based on on von Neumann & Morgenstern's model of *n*-person Zero-sum Game, with the substantive (not mathematical) difference that Riker's coalitions are not simply subsets of the general sets of players, but can be also defined in terms of being `winning', `blocking' and `losing' coalitions.
- A winning coalition is one larger than some size stated (even arbitrarily) in the rules of the game.
- The smaller the size of a coalition is, the higher its payoff is, as long as this remains a winning coalition





- a statement can be derived from the model: "In n-person, zero-sum games, where sidepayments are permitted, where players are rational, and where they have perfect information, only minimum winning coalitions occur" (Riker, cit., p. 32, italics in the text)
- This is the Size Principle. It must be noted that Riker refers to it as a "sociological law", it's not a mathematical theorem
- Riker devoted much effort to exploring further the main features of the process of coalition building, namely, how to reach a minimum winning coalition and his stability (by mean of the 'Information effect', i.e. the greater the degree of imperfection or incompleteness of information, the larger the coalitions that coalition-makers seek to form and more frequently winning coalitions will be greater than their minimum size (cf. Riker, cit, p. 89).
- Introducing Side-payments, the dynamics of coalition-building can be explored. Then, before a MWC is reached, a series of 'proto-coalitions', led by leaders which attract followers by offering side-payments, can be seen
- But Riker cannot demonstrate that MWC really corresponds to an equilibrium, and if this equilibrium is stable



Political Science and Economic modeling: Riker's unsolvable dilemma?

- Riker's work was reviewed in the American Political Science Review and other social sciences journals (Fagen 1963; Matthews 1963; Hotz 1963; Kaplan 1963; Flanigan 1965). All the reviewers highlighted Riker's methodological originality and the importance of his non-trivial generalizations about politics (although with some reservations about the notion of rationality).
- Yet, none stressed its formal features. Indeed, none of the reviewers was a real expert in game theory. As to economics, the book went completely unnoticed in economic journals.
- Riker showed a sheer interest in some methodological issues
- The main feature of his philosophy of science is represented by the robust faith in the idea of science as a positive discipline: a theory must explain and predict phenomena in its domain of interest.
- A methodological dilemma: Riker advocated the development of positive political science, resting heavily on formal assumptions, but the tools and the kind of analyses he was trying to adopt were far from being able to fulfill his aspirations.





- In a nutshell: the mathematical transformation of economics in the Postwar came to expense of the fairly classical nomologicaldeductive approach to the discipline (explanans, explanandum, laws)
- A long series of debates ensued: the most striking example is Milton Friedman's advocacy of instrumentalism (1953)
- Riker, albeit not picking a well-defined methodological positions, seems to oscillate between as if kinds of explanation (instrumentalism) and the *covering laws* approach (see: Riker, 1962, and Riker 1977)
- An example of the first type is the theory of political coalitions. It is assessed "empirically" by Riker using American History and showing how definite episodes of this story could be explained through CGT.





- "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)
- In Riker 1977 he advocated as a proper method Price Theory: In Riker's words, Price Theory: "contains all the elements in our previous description of a science. It starts with an empirical law, which is presumably universal when properly restricted. This law is then imbedded [sic] in a theory of choice. In turn, this initial theory is elegantly elaborated to produce a nonobvious and far from trivial inference about market clearing, which is in turn strongly supported by empirical evidence." (Riker 1977, pp. 21–2)





- Since his strong emphasis on prediction, Riker was scattered by impossibility results in voting theory, up to define political science, and not economics, as the real *dismal* science because it is impossible to predict what equilibrium will occur. (Riker, 1980)
- However, as Ordeshook pointed out, equilibria are elements of the formal model and therefore display features like existence, uniqueness, and stability but do not necessarily entail predictive power. (Ordeshook, 1980)
- Then, Ordeshook called for political scientists' genuine contribution to developing new formal models and not only to employ notions and ideas taken away from economics
- In a nutshell, Riker's dilemma is, following Giocoli, that he viewed the image of economics as a "system of forces," but adopted a tool that was explicitly elaborated within the image of economics as a "system of relations" (Giocoli, 2002)





- Some hypothesis to explain the dilemma:
 - Riker was an outsider among game theorists and economists, then he simply lacked the adequate knowledge of most recents developments
 - Riker was trying to make sense of the idea of political theory based on rational choice for political scientists, an audience much different from economists. Thus, He preferred a more meaningful definition over a purely mathematical approach because the earlier's meaning could be easily grasped by an audience not comfortable with mathematical sophistication.
- Did Riker solve the dilemma? In my opinion the answer is no, but Positive Political Theory in the 1970s and 1980s evolved toward a fully axiomatised, economics-like, discipline



Thanks a lot for your attention

If you want to get in touch with me:

gianluca_damiani@hotmail.it

@GianlucaDamia14 (Twitter account)