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Uncertainty is an ever-present and ineradicable aspect of politics. It affects all important issues of governance and policy, in both domestic and international contexts. Rather than treating the uncertainty of politics as a mystery, this book provides an original and direct treatment of political uncertainty as a scientifically knowable phenomenon with well-defined principles and substantive properties. Specific applications of this new theory of political uncertainty are demonstrated in diverse areas of politics, examining such questions as when and how wars break out, when and how governments collapse, and when and how political cooperation emerges. The author shows how probability and mathematical modeling can play a central role in understanding such complex and fundamental issues.

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Ad memoriam patris mei

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That randomness and probability are real phenomena, and therefore are not to be accounted for by our ignorance of true causes, is a proposition that I defend from a variety of perspectives.

Patrick Suppes, *Probabilistic Metaphysics*

One way of theory building is to collect empirical facts and assume that they will somehow speak for themselves, that an obvious classificatory scheme will emerge from their gross and conspicuous aspects. More often it turns out that either the facts by themselves do not suggest an obvious classificatory scheme, or if they do, that the obvious scheme is not very good. A better way is to develop on intellectual grounds what might be a good scheme, try it out and see what happens when empirical data are used.

Karl W. Deutsch, *Integration and the Social System*

The approach we have chosen and the concepts we are using can accommodate a great many theories. Within this framework many apparently unrelated theories and generalizations can be related and their usefulness enhanced.

Gabriel A. Almond and G. Bingham Powell, Jr., *Comparative Politics*

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Preface

This book is about uncertainty in politics, about the defining role that this real-world feature plays in political life, and about how political theory is to understand uncertainty in a systematic way that produces new knowledge. Although most readers will not deny the pervasiveness and significance of uncertainty in politics – particularly in this turbulent age of post-Cold War politics – paradoxically, political uncertainty has been traditionally viewed in ways that normally eschew inquiry. That is, either as an unsolvable mystery to be avoided except by the most fearless minds, as if the proposition "political uncertainty = unknowable" were true by definition, or as a statistical nuisance that is best treated as "measurement error" or an "error term" in quantitative models. Few have looked at political uncertainty in order to understand its character. As I argue in this book, however, political uncertainty is a defining quality of politics that cannot be ignored, either by theory or by public policy. Political uncertainty is also mostly a qualitative phenomenon with a well-defined character; only secondarily is it quantitative, and as such it should be directly addressed by contemporary political science using the appropriate tools of inquiry.

The main contribution of this book is to present a theory of political uncertainty applicable to understanding the diverse domains of political life, both domestic and international. I use specific instances of political phenomena related to coalitions, government policy, deterrence, collective action, conflict, and others as running examples to illustrate the broader theory and its potential scope. However, the applications I present are meant only to assist in the interpretation of the theory; they are not meant as in-depth analyses because those would require separate treatment. The theory addresses one of the central dual puzzles in politics: the aggregate behavior of political variables and the individual occurrence of political events, both of which are phenomena that occur with uncertainty. My theory has two branches, a macroscopic part for the explanation of aggregate political behavior in terms of well-defined forces, and a microscopic part for the explanation of individual political events in terms of their

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occurrence structure. Unified principles provide linkages between the two levels of analysis. The theory attempts to advance the standards of contemporary political science in the areas of deductive formalization and empirical validity. I give greater emphasis to the former goal because my chief interest in this book is in theoretical development, an area that in spite of recent advances is still less well established in political science. Empirical methods are now more familiar in scholarship and in teaching.

On the deductive side, the theory is constructed in the traditional deductivist tradition, by defining concepts, postulating a set of axioms and assumptions, and, most important, deriving results that account for observed phenomena. I call the main theoretical results principles because formally these are either theorems or corollaries; but they are propositions about politics, not mathematical propositions as such (or they would be called theorems). Whereas theorems, lemmas, and corollaries are content-free statements (formal propositions), scientific principles are to do with substantive properties of the real world (a distinction that is often neglected). General principles explain the larger patterns of uncertainty in political behavior and events; special principles explain more specific aspects.

On the empirical side, the two levels of the theory differ in terms of the appropriate evidence and technical procedures used for drawing valid inferences. The macroscopic part of the theory uses predominantly quantitative empirical methods, such as maximum likelihood estimation, survival analysis, and other nonlinear data analysis approaches discussed in chapter 4. By contrast, the microscopic part of the theory uses predominantly qualitative case-oriented methods similar to those used in the empirical application of decision models or game-theoretic models to historical material. I illustrate how both types of methods are used to evaluate the theory, and I also hope that this will help discredit some enduring but false distinctions between qualitative and quantitative approaches, as if these were always mutually exclusive in scientific investigation.

From a methodological perspective I view my main contribution in the area of theoretical methodology as the development and application of appropriate formal tools for constructing political theory. My emphasis on appropriate tools is important because many of the mathematical models available today were developed with other sciences and a different set of questions in mind. Fortunately, many different theoretical tools exist because mathematics today covers diverse formal languages, some of which have been directly inspired by social phenomena (parts of probability theory, decisional calculus, game theory, graph theory). Theoretical methods will attract greater interest in political science, now that empirical methods are better known and established, because only they can directly

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assist the scholar in the construction – not just in the testing – of viable theories. What is known as political methodology – including those procedures that are ordinarily taught in "methods courses" – should therefore cover tools for theoretic progress at least as much as tools for checking the empirics; otherwise, there will be little to test empirically, and what there will be will not be adequately systematized to benefit the accumulation of scientific knowledge.

This book is addressed to several scholarly communities, mainly academic but also some in policy areas. The book will be of primary interest to political scientists who wish to develop a better understanding of the nature of uncertainty as it operates in various areas of politics. I demonstrate how political uncertainty is uniformly affected by the same principles. Thus, political scientists who study conflict – domestic or international – will find through this theory much in common with those who study coalitions, policy processes, and collective action – areas where I demonstrate the existence of comparable patterns of political uncertainty that are governed by the same laws.

Another audience consists of social scientists and other academic scholars working in allied disciplines who also study politics from perspectives that differ from those of the political scientist, but who nonetheless acknowledge and wish to develop a better understanding of uncertainty in political life. This broader community includes political sociologists, economists, historians, political anthropologists, and archeologists – scholars who acknowledge uncertainty in the origins and historical evolution of political systems in various civilizations. These allied disciplines may use this theory for comparative purposes, exploring the application of principles across a wider range of time and space than is normal in contemporary political science.

A third community consists of philosophers, epistemologists, and other scholars who share an interest in the advancement of formal political theory, particularly an interest in the role played by *fortuna* in influencing the lives, fortunes, and governance of a collectivity. Members of this community may also be interested in my use of probabilistic causality – as opposed to the older deterministic causality used by more traditional political theories – as a newer and more effective epistemic basis for constructing the theory of political uncertainty presented in this book. While I was writing I also frequently had in mind students of politics in all the above disciplines, particularly those who may feel motivated to develop a better understanding of contemporary approaches to political uncertainty based on rigorous and systematic methods. As a university teacher, I am particularly concerned that students develop early on in their investigation of politics a disciplined and truthful understanding of uncertainty in

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political life, not the more popular misconceptions of political uncertainty as unknowable or haphazard randomness. Pundits in the public arena make their living from political uncertainty; scholars make their living attempting to decipher it.

Finally, the book should be of interest to the more analytically inclined policy analysts who may wish to consider the implications of these principles of political uncertainty for their own areas of policy concerns. Logically, significant areas of public policy – from local government to national security – are endemically affected by political uncertainty, so improvements in our basic understanding of political uncertainty cannot be ignored without risk. As the best engineers know, there is nothing more practical than good theory.

The background needed to read this book is not advanced, but nonetheless may pose a challenge to some readers who share a substantive interest in the subject matter. Most readers will agree with the premise that political uncertainty is not an easily tractable topic. What some find difficult to accept is the obvious conclusion that to analyze politics with uncertainty but without tools that are sufficiently powerful is to require something impossible. There is no wholly satisfactory solution to this dilemma, only a trade-off compromise between how much can be explained about political uncertainty and how much formal power to apply in the investigation; not everything in life can be easily grasped. The approach I have chosen relies mostly on logic, sets, and elementary probability notions, with a minimum of basic calculus (a powerful analytical tool that is widely used in most scientific disciplines, including "softer sciences" such as biology and economics, but still largely underutilized in political theory). However, I have attempted to provide informal interpretations along the way, and the careful reader will note that there are only a few passages in which the precision of the mathematical language simply cannot be replaced by plain English (which was not invented to construct scientific theories, let alone to understand the world of uncertainty). Other analytical tools are reviewed or developed as needed either in the text or in appendix 4.

In terms of formal analysis, I have aimed to strike at a middle range, between basic mathematics (algebra, linear equations), which can contribute little to a theory of political uncertainty, and higher mathematics (advanced calculus, measure theory, stochastic differential equations, topology), which is not well known in political science. I believe this middle range contains many powerful tools that are presently underutilized or neglected in the construction of political theory. I hope to show – primarily through the principles of the theory presented in this book – how mathematical methods can produce new insights that are as true as those

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derived by more conventional empirical methods (what I call Kline's thesis, discussed in chapter 3).

My recommendation to any reader interested in the subject matter of political uncertainty but who becomes frustrated by the formalism that I use is to plunge ahead anyway – as Claude Shannon (1951) demonstrated in a famous theorem from information theory, the human mind is capable of acquiring a considerable amount of knowledge even when the stream of signals contains gaps and noise. At the same time, I also hope that those who labor at sharpening their theoretical tools and revel in the sight of a beautiful nonlinear equation with an aesthetically pleasing form will find some new insights or applications, particularly concerning those aspects of political uncertainty that can be understood only through the medium of mathematics. These readers may also require a higher level of formalization, something that should be pursued elsewhere in the specialized journals but that I have tried to avoid in this book.

As I explain in greater detail in chapter 1, the book consists of four parts, along with a set of supporting appendices. Each part corresponds to a basic element of the theory. The first part – foundations – contains an introductory chapter in which I present the topic of political uncertainty in a disciplinary light, examining its place in political theory, the way in which it has historically been addressed, and the axioms I propose to use as foundations for the theory presented in subsequent chapters. The next two parts – the two main theoretical branches, called macropolitics and micropolitics for reasons I detail in chapter 1 – each contain three parallel chapters, dedicated to the basic concepts, the general principles, and the more specific results (special principles) in each branch of the theory. The chapters within each part of the theory are strictly sequential, but the two parts are less so. I chose to present the macroscopic part of the theory first because the microscopic part investigates in greater detail what lies within the "black box" of political behavior, so to speak, and so it seemed more natural to deal first with aggregate political behavior (macro level) and only later with the more specific individual events that compose it (micro level). However, readers with a greater interest in individual political events – particularly those political occurrences that are viewed as one-of-a-kind, as many historians think – may wish to read part III immediately after chapter 1. The fourth part contains a single chapter which synthesizes the macroscopic and microscopic analysis of political uncertainty by providing a unified treatment and explaining the linkages across levels of analysis.

I had not looked forward to writing appendices, but in a book of this nature they turn out to solve a number of common problems. Appendix 1 can be used as a dictionary reference to clarify the meaning of some new terms that are necessary in constructing a political theory in largely

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unexplored conceptual territory. Appendix 2 explains and summarizes the formal notation used throughout the book; it also helps to identify the key concepts, as any system of notation should. I confess to not being entirely satisfied with the present state of notation, and I suspect that some more creative work along these lines will be necessary to provide the analysis of political uncertainty with a theoretically efficient set of analytical signs – at present an unappreciated need in political theory. Appendix 3 contains the proofs of theorems and corollaries, which I did not include in the text in order to maintain the flow of ideas. I do feel that something is lost by not showing how I first arrived at the main propositions (as opposed to their subsequent proof), but I also realize that moving the technical proofs to the appendix increases the readability of the book. Appendix 4 contains a summary of some formal tools that are useful in the task of theoretical construction – some of the middle-range tools that I referred to earlier. Its main purpose is to highlight some ideas from theoretical methods, not to provide any sort of formal training.

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