# 1 Introduction

Aristotle (1998) famously said that "man is by nature a political animal." In other words, the natural environment of women and men is the *polis*. The book of *Exodus* (2:18) quotes no lesser authority than God in saying that it's not good for people to "be alone." Humans are social beings, and, as a result, their lives are marked by a radical interdependence. One person's goal attainment depends on the behavior of others. My ability to sleep in on a Saturday morning depends on my neighbors' willingness to forebear from cutting their lawns. My neighbors' ability to cut their lawns before the heat of the day sets in without provoking my wrath depends on my willingness to get out of bed at a decent hour. We are social animals in the sense that our behaviors affect each other's well being. In fact, we have a word for people whose behavior demonstrates a callous disregard for their effect on others: anti-social.

This book starts from the premise that the radical interdependence that exists between humans who live together makes virtually all of human behavior conditional. The behavior of individuals is conditional upon the expectations of those around them, and those expectations are conditional upon the rules (institutions) and norms (culture) constructed to monitor, reward, and punish different behaviors. As a result, virtually all hypotheses about humans are conditional – conditional upon the resources they possess, the institutions they inhabit, or the cultural practices that tell them how one "ought to behave." Of course, we can, and often times should, simplify a situation by comparing behaviors at a particular resource level, within a particular institutional context, or among individuals who share a set of cultural practices. But when we do so, we lose the ability to understand how resource endowments, institutions, or culture influence behavior. We must also either give up on generalizing beyond particular contexts or take as a matter of faith that the relationships we have uncovered are invariant with respect to the contexts that we hold constant.

If, instead, we want to understand how resource endowments, institutions, or culture influence human behavior, we must observe human

behavior in contexts where those factors vary. Further, if we have reason to believe that people's behavior depends on these contextual factors in the sense that their responses to changes in their environment depend on the context they find themselves in, we must account for this context dependence in our empirical analyses. This book is about one way to capture and evaluate this context dependence in statistical analyses: multiplicative interaction effects.

An example of a multiplicative interaction effect is the conditional relationship between foreign aid and economic growth. In 2000, two World Bank economists, Craig Burnside and David Dollar, published an influential study in the *American Economic Review* arguing that foreign aid has a positive effect on economic growth in recipient countries but only when those countries adopt "good policies." This study was so influential that it led the administration of President George W. Bush to begin conditioning the giving of foreign aid on the policies of recipient countries (Eviatar, 2003). To test their conditional claim about the relationship between foreign aid and the quality of the policy environment on economic growth, Burnside and Dollar (2000) employed a multiplicative interaction model similar to the one shown here:

$$Growth = \beta_0 + \beta_1 Aid + \beta_2 Good\ Policy + \beta_3 Aid \times Good\ Policy + \epsilon. \tag{1.1}$$

In the next chapter, we show why a multiplicative interaction model like this is a reasonable way to examine how the statistical relationship between two variables, such as economic growth and foreign aid, depends on the value of a third variable, such as the quality of the policy environment.

Before we proceed to the next chapter, we'll attempt to motivate your interest in interaction effects by pointing out the ubiquity of conditional relationships in the study of human behavior.

## 1.1 RESOURCE ENDOWMENTS

Many political economists believe that the assets actors hold influence the way they respond to changes in their environment. Some individuals possess stores of capital – either financial instruments, like stocks, bonds, and stockpiles of monetary assets, or physical capital, such as homes, factories, and machines and equipment, like textile looms or oil derricks. Others possess only their labor. There are many different political economy models and many ways to classify the assets that individuals own, but this class of models shares the idea that individuals will assess policy alternatives by predicting how those policies will influence the value of the assets they hold.

For example, according to a political economy perspective, the effect of an exogenous change in the flow of relatively low skilled immigrants across a nation's borders (perhaps due to war, crime, or economic dislocation in nearby countries) on citizen preferences for legislation restricting immigration will depend on the type of assets that citizens possess. Owners of businesses that employ relatively low skilled workers are likely, all else equal (holding factors such as any non-economic related animus or affection for foreigners constant), to be more welcoming of new immigrants and more resistant to legislation seeking to restrict immigration. In contrast, citizens who own nothing but their relatively low skilled labor will be worried about the increased competition from new immigrants either driving their wages down or causing them to lose their jobs and, as a result, will be in favor of legislation seeking to restrict immigration. We see from this that whether an increase in immigration leads to an increase or decrease in someone's enthusiasm for restrictive legislation on immigration depends on the type of assets that they hold. In effect, the type of assets held by an individual "moderates" or "modifies" the effect of an increase in immigration on attitudes towards immigration restrictions. If we could classify citizens as either workers or capitalists, our theory would make the following prediction:

*Resource Endowment Hypothesis:* An exogenous increase in immigration is likely to elicit increased support for restrictive immigration policy among workers but decreased support among owners of capital.

We can test this conditional hypothesis with a multiplicative interaction model similar to the one shown here:

$$\begin{aligned} \textit{Support for Immigration Restrictions} = \beta_0 + \beta_1 \textit{Immigration} + \beta_2 \textit{Worker} \\ + \beta_3 \textit{Immigration} \times \textit{Worker} + \epsilon, \end{aligned} \tag{1.2}$$

where *Support for Immigration Restrictions* is a measure of an individual's support for restrictions on immigration, *Immigration* captures the level of immigration, and *Worker* is a dichotomous variable that equals 1 if an individual is a worker and 0 if they're a capitalist. Once again, we'll see exactly how this specification is able to capture the conditionality in our theory in Chapter 2.

The above example is just one of many where resource endowments (in this case, capital ownership) might "moderate" or "modify" the relationship between two other factors (an increase in immigration and support for immigration restrictions). A closely related example can be found in work that relies on the Stolper–Samuelson (1941) model of international trade. According to this model, an exogenous change in trade

will affect citizens' income by influencing the value of the assets they hold. However, the precise manner in which it does this will depend on the factor endowments present in the country in question. Because countries can be expected to export goods that use their abundant factor intensively, an exogenous increase in trade, perhaps as a result of the development of containerized shipping, will lead to an increase in the income of workers where labor is the abundant factor but a decline in income where labor is the scarce factor. This suggests that the effect of trade on the policy preferences of workers should depend on whether labor or capital is the abundant factor in a society.

The point here is that according to a broad set of theories, an individual's policy preferences (and by extension, perhaps, their political behavior) are expected to depend on a combination of their individual characteristics (asset ownership) and characteristics of the economy in which they find themselves (resource endowments). Attempts to test explanations about how economic interests influence political behavior that rely only on attributes of the individual are likely, therefore, to be misspecified.

## 1.2 INSTITUTIONS

In August of 1992, renowned political scientist Theodore Lowi (1992, 363) wrote in the *New York Times* that

> "[W]hatever the outcome of this year's Presidential race, historians will undoubtedly focus on 1992 as the beginning of the end of America's two-party system. The extraordinary rise of Ross Perot and the remarkable outburst of enthusiasm for his ill-defined alternative to the established parties removed all doubt about the viability of a broad-based third party."

This statement, made by a preeminent scholar of American politics, was astonishing because it seemed to fly in the face of almost a half century of comparative politics research summarized as "Duverger's Law" (Duverger, 1954) showing that single-member district electoral systems like the one in the United States tend to produce two-party systems. This particular line of comparative politics research had been recognized a decade earlier for demonstrating that the accumulation of knowledge was possible in political science (Riker, 1982).

In the years following Theodore Lowi's prediction, we came to see that much of the evidence for Duverger's Law was presented in a confusing manner that both obscured Duverger's theoretical insights and invited people to regard some observations as being more anomalous than they actually were (Clark and Golder, 2006). In this respect, it was perhaps understandable that Professor Lowi might have been confused about the

possibility of the emergence of an electorally successful third party in the United States.

Maurice Duverger (1954) argued that political parties have their foundations in societal divisions that cause people to place different types of demands on the state. Parties can be thought of as teams of citizens and/or representatives who share policy goals and compete against other teams with different policy goals. Duverger thought that societies differed in the number of latent groups that might form parties and that the way these latent groups were translated into parties, in either the electorate or the legislature, depended on the nature of the electoral system. In proportional representation (PR) systems, where votes are proportionally translated into legislative seats, societal divisions are translated into electoral and legislative parties in a rather frictionless fashion. This means that socially diverse countries with a PR electoral system can expect to have many political parties, while socially homogeneous countries can expect to have only a small number of them. In contrast, majoritarian systems, such as the single-member district plurality systems used to elect representatives in the United States and United Kingdom, where only the largest party can win a seat, act as a brake on the translation of societal cleavages into political parties and thus constrain party systems to always be small. Majoritarian electoral rules constrain the size of the party system for two reasons. First, the mechanical way in which votes are translated into seats in majoritarian systems means that large parties that come first win legislative representation whereas smaller parties that come second or worse don't. Second, this mechanical effect of the electoral system favoring large parties creates incentives for both candidates and voters to act strategically in ways that benefit a small number of large parties even more. Supporters of small parties who don't think that their party will come first have an incentive to vote for the "lesser of two evils" among the two largest parties who can realistically win. The anticipation of this strategic behavior among voters, along with the mechanical effect of the electoral system, creates incentives for strategic entry on the part of political candidates. All other things equal, candidates in majoritarian systems have an incentive to run under the banner of one of the two larger parties that are going to be advantaged by the electoral system even if a smaller party is a better ideological fit. The end result is that countries with majoritarian electoral systems tend to be dominated by a small number of political parties, usually two, irrespective of their degree of social diversity.

As should be clear, the essence of Duverger's theory is that electoral institutions modify the relationship between societal divisions and the number of parties (Clark and Golder, 2006). For Duverger, then, the question was not whether social divisions or electoral laws were the key determinant

of party system size. Rather, he was interested in the *interaction* between these two aspects of a polity. Failure to recognize the centrality of this interaction could lead no less of a scholar than Gary Cox, arguably one of the most important scholars in comparative politics, to become confused about Duverger's argument. For example, in his magisterial monograph, *Making Votes Count*, Cox (1997, 23) says that Duverger

"**took social structure more or less as a residual error**, something that might perturb a party system away from *its central tendency defined by electoral law*" [italics and bold added].

In fact, Duverger argued that

"the influence of ballot systems could be compared to that of a brake or an accelerator. The multiplication of parties, which arises as a result of other factors, is facilitated by one type of electoral system and hindered by another. *Ballot procedure*, however, *has no real driving power.* The **most decisive influences** in this respect **are** aspects of the life of the nation such as **ideologies and particularly the socio-economic structure**" [italics and bold added].

By comparing the italicized text across the two quotes, we see that the argument Cox attributes to Duverger about the centrality of electoral systems is pretty close to exactly the opposite of what Duverger actually said. Similarly, by comparing the bold text across the two quotes, we see that Cox misses the fact that Duverger thought of social structure as the primary driver behind the creation of parties.

We do not bring this up to poke a great scholar in the eye. Rather, we'd like to highlight that a failure to think clearly about the conditional nature of the arguments we encounter can cause even great scholars to become confused. We believe that Cox's confusion about Duverger's argument is caused by his failure to recognize that Duverger was making an argument involving interaction effects. Evidence of this fact is found in Cox's own words. After discussing Duverger, Cox (1997, 23) says that "Later scholars, however, have considered the possibility that cleavage and electoral structures may interact. For example, two recent papers take this tack . . . both come to the conclusion that Duverger's institutionalist claims are conditioned by the nature of social cleavages." But clearly, from the passage we just discussed, Duverger had been making the argument that cleavage and electoral structures interact to shape party systems all along.

Cox is not alone. William Riker, another giant of political science, also fails to fully appreciate the conditional nature of Duverger's argument in his history of science essay looking at Duverger's Law (Riker, 1982). Riker proposes a distinction between what he calls "Duverger's *Law*" (the claim that majoritarian single-member district plurality systems encourage two-party systems) and "Duverger's *Hypothesis*" (the claim that propor-

tional representation electoral systems favor multi-party systems) because Duverger appeared to treat the former relationship deterministically and the latter relationship as "at best probabilistic" (754). Duverger presumably chose to view the former claim as "law-like" and the latter claim as "probabilistic" because there appeared to be a larger number of anomalies for the latter claim (countries with proportional electoral laws but few parties) than the former claim (countries with majoritarian single-member district plurality systems but many parties). But the conditional nature of Duverger's argument actually predicts this outcome. If single-member district plurality systems act as a brake on the translation of social cleavages into parties, then we'd expect countries with these electoral rules to always have a small number of parties irrespective of their level of social diversity. But if proportional representation electoral systems permit social divisions to be accurately translated into parties, then we'd expect countries with these electoral rules to exhibit greater variance in their party system size due to the variation in their level of social heterogeneity.

Our point here is simply that thinking carefully about the effects of institutions, such as electoral rules, often requires clear thinking about conditional arguments. In fact, it may be the case that institutional arguments are intrinsically arguments about modifying effects. If institutions determine how political inputs are translated into political outputs, then it follows that in different institutional contexts, the mapping of inputs to outputs will be different. From this perspective, it's hard to imagine how institutions would be causally important if they didn't act as modifying variables. We believe that it follows, therefore, that good theoretical and empirical work on institutions is unlikely to occur in the absence of clear thinking about arguments involving moderating or modifying variables.

## 1.3 CULTURE/IDENTITY

Cultural arguments also produce hypotheses about the social and political world that are likely to be conditional. Cultures involve shared sets of understandings that help people interpret events that occur in their environment. As such, like institutions, culture moderates the way that political and social inputs get translated into political and social behaviors.

Emile Durkheim (2003/1895) argues that the discipline of sociology should be seen as the empirical study of what he called "social facts" – the "beliefs, tendencies and practices of the group taken collectively." Durkeim believed that these social facts influence individual behavior because they determine the consequences of individual choices, whether those choices are deliberate or driven by unconscious perceptions of what behaviors are socially acceptable. These facts constitute "currents

of opinion, whose intensity varies according to the time and country in which they occur" and "impel us, for example, toward marriage or suicide, toward higher or lower birth rates, etc." These social facts exist outside individuals. Importantly, the "forms these collectives take when they are 'refracted' through individuals are things of a different kind" (2003/1895, 77). In effect, Durkheim saw *social* behavior as the product of individual characteristics and agency on the one hand and the societal context that individuals inhabit on the other. For Durkheim, if individual behavior is unconstrained by such social facts, it would fall in the province of psychology or biology rather than sociology.

One example of how social context shapes individual behavior can be found in the sociology of religion literature. In two initial studies, scholars were surprised to find that church attendance had no statistically discernible effect on the delinquency of teenagers (Hirschi and Stark, 1969; Burkett and White, 1974). Subsequent attempts at replicating these null results, however, were unsuccessful (Rhodes and Reiss, 1970; Albrecht, Chadwick and Alcorn, 1977; Higgins and Albrecht, 1977). Instead, these later studies found a strong negative correlation between church attendance and delinquency: teenagers who went to church more frequently were less likely to engage in delinquency than those who didn't.

Later, Stark, Kent and Doyle (1982) noted that the initial two studies on religiosity and delinquency were conducted in relatively secular communities in Redmond, California, while the latter three studies were conducted in highly religious communities in Atlanta and Mormon-dominated communities in Southern Idaho and Utah, respectively. Perhaps, they speculated, the effect of church attendance on delinquency was moderated by the religious behavior of others in one's community. Specifically, they argued that if we take a more social view of human affairs, it becomes plausible to argue that religion only serves to bind people to the moral order if religious influence permeates the culture and the social interactions of the individuals in question (1982, 7). Where the religious sanctioning system isn't pervasive, the effects of an individual's religious commitment will be muffled and curtailed. This is clearly a conditional claim: the consequences of an individual's religiosity on that person's delinquency depends on their social context. Consistent with their conditional hypothesis, Stark, Kent and Doyle (1982) found that attending church reduces delinquency among youths whose classmates are frequent church attenders but has no discernible effect on youths whose classmates don't attend church.

Despite the fact that Stark, Kent and Doyle (1982) were clearly following Durkheim's dictate to study social behavior (delinquency) as a product of individual behavior (church attendance) and social facts (the level of piety in their surrounding community), studies in

subsequent decades repeatedly attempted to challenge their conditional claim by conducting empirical analyses that attempted to account for the importance of social context by additively including various independent variables to capture an individual's location, school, peer group, religious denomination, and level of alcohol and drug use. These studies produced a variety of findings that obscured the conditional effect that Stark, Kent and Doyle (1982) had hypothesized because they failed to evaluate the effect of these additional social facts with an interactive model specification. Stark (1996) responded by showing that the negative correlation between an individual's church attendance and subsequent "troubles with the law" was strong in regions of the country (East, Midwest, and South) where church membership was high (about 60%), non-existent in the Pacific region where it was low (36%), and modest in the Mountain region, where church membership was moderate (48%).

Given the tremendous influence of Durkheim on the discipline, the fact that social context matters should not be surprising for sociologists. Despite this, studies that examine the modifying effects of social context on the behavior of individuals are actually quite rare in sociology and, perhaps, even more so in social psychology and behavioral political science. Consider voting studies. It's commonplace to consider the effect of demographic information such as ethnic group membership on vote choice or political attitudes. But this is typically done in nationally representative samples where individuals are abstracted from their social context. This is surprising since, surely, it means something different to be a Korean American, for example, in Tuscaloosa, Alabama than it does in Queens, New York or Los Angeles, California, or a Cuban American in College Station, Texas rather than Union City, New Jersey or Miami, Florida.

We have argued that many of the hypotheses we can derive from our theories across a broad array of topics throughout the social sciences will be context-dependent. In economics and political economy, actors' policy preferences are likely to be the product of the types of assets they own and how abundant those assets are in an economy. Institutional arguments common in both political science and economics are likely to point to the way that relationships between variables differ across institutional contexts. Finally, arguments about culture, and indeed, if one follows Durkheim, perhaps all sociological arguments, are likely to involve claims that are context-dependent.

This book recommends best practices in formulating contextual theories and testing context-dependent hypotheses. Our overarching argument is that social scientists should work hard to make the contextual aspects of their theories as clear as possible, they should deduce as many implications from those theories as possible, be as clear as possible regarding the

quantities of interest about which their theories make predictions, and present their findings in a manner that clearly captures the degree of uncertainty we have about those quantities of interest. To provide concrete examples of the practices we recommend, we'll provide myriad examples across a broad range of research questions, many of which present new empirical findings.

## 1.4 PLAN OF THE BOOK

The book is arranged in three parts. The first part of the book looks at a number of fundamental issues that arise when testing conditional claims involving two interacting variables in the context of a continuous dependent variable. In Chapter 2, we provide guidance on how to derive context-dependent hypotheses from social scientific theories and present them in ways to capture as many falsifiable predictions as possible. We also explain why multiplicative interaction models are well-suited to test conditional claims. Chapter 3 provides recommendations for the specification of interaction models, while Chapter 4 indicates best practices when it comes to interpreting and communicating the results of interaction models. We end the first part of the book on the fundamentals of interaction models with three substantive applications in Chapter 5 that show how to put our recommendations into practice. The substantive applications cover interaction effects involving different combinations of dichotomous and continuous independent variables. The first application looks at how race and gender interacted to affect support for the Republican Party in the 2016 presidential elections in the United States. The second examines how ideology and race combined to affect support for President Barack Obama during the 2012 US presidential elections. And the third application investigates how supply-side and demand-side factors interact to influence women's legislative representation around the world.

The first part of the book focuses on theories that posit interaction between two independent variables on a continuous dependent variable. Not all of the theories in which we're interested, though, are as simple as these. In the second part of the book, we begin to look at some more theoretically complex forms of conditionality, still in the context of a continuous dependent variable. In Chapter 6, we turn our attention to theories that imply that the effect of an independent variable depends on the value of more than one other modifying variable. As we'll see, much depends on whether the modifying effects of these other variables are "independent" or "dependent." To illustrate the case where the modifying effects are independent, we employ a substantive application looking at how gender, education, and age interact to affect support for feminism. And to