

## Chapter 11 Interactive, Context-Specific Analysis

To identify and understand the operation of the community responsibility system, the analysis in Chapter 10, like all of the empirical analyses in this book, used a particular case-study method. Specifically, it employed a theoretically informed, case-study method that extensively relied on contextual knowledge of the situation and its history, and context-specific modeling. This chapter first argues that this method usefully responds to the challenge that institutional analysis presents to the traditional empirical methods of the social sciences; it then presents this method in detail.

The challenge that institutions present to the traditional empirical methods of social science has two sources. First, although institutions are not random—those that fulfill a particular function or interest respond to the same forces and considerations—they are inherently indeterminate, historically contingent, and context-specific. We don't have a theory of institutions to guide their empirical analysis and what we know about them suggests that seeking such a theory is likely to be a futile exercise (section 11.1). Second, we cannot generally study institutions by considering only their observable features (section 11.2).

The method presented here responds to institutions' inherent indeterminacy, their context-specificity, and the need to coexamine institutions' observable and unobservable components. This method interactively combines theory, contextual knowledge of the situation and its history, and context-specific modeling. A case-study approach such as this is promising for several other reasons. Institutions' inherent indeterminacy and context-specificity imply that we often need to study an institution as a historically unique phenomenon. The influence of past institutions on subsequent ones means that taking the historical context into account is empirically useful. We can use knowledge of the context to eliminate some theoretically possible but contextually implausible institutions. The limits of our theory of institutions render case studies an important source for evaluating and developing general propositions regarding them. Finally, the case-study method is essential in meeting the interest in comprehensively understanding particular institutions for policy purposes.

The motivating question of an interactive, context-specific analysis is what are the behavioral outcomes—such as exchange or its absence—whose institutional underpinnings are

important to understand? Theory plays an important role in formulating and attempting to address this question (section 11.3). It directs attention to theoretically important behavioral outcomes, facilitates the delineation of the general forces that shape various institutions, describes the conditions required for their functioning, and identifies what evidence one must confirm when considering the relevance of various institutions. Appendix C elaborates in detail on theory's contributions to the case of reputation-based institutions.

Contextual knowledge of the situation, of its history and of comparable situations also contributes to identifying important issues and formulating a conjecture about the relevant institution (section 11.4). Contextual knowledge is used to identify what behavioral outcomes are important in the episode under consideration, what the relevant central and auxiliary transactions and the related institutional elements are, and what institutional and other factors can be treated as exogenous. Historical information is particularly useful in formulating a conjecture regarding the relevant institution because institutional dynamics are a historical process. Knowledge of the institutional heritage is therefore critical in focusing attention to a subset of the theoretically possible institutions.

Context-specific modeling helps to formulate, present and evaluate alternative conjectures about the institutions we seek to identify (sections 11.5.) A context-specific model recognizes that various historically determined, technological and institutional factors should be taken as exogenous in studying a particular institution. Analyzing the model and solving for various equilibria enable the researcher to evaluate—modify, reject, or accept—the conjecture that a particular institution prevailed.<sup>1</sup> Equilibrium analysis helps the researcher evaluate a conjecture by exposing the conditions under which particular beliefs and behavior can be self-enforcing, generating predictions under the assumption that some self-enforcing beliefs prevailed, and facilitating a counterfactual and comparative analysis (section 11.6).

This evaluation process entails the interactive use of context-specific analysis and evidence. The model identifies evidence that can be used to evaluate the conjecture, and the context is then searched to verify its presence or absence. The absence of supporting evidence

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<sup>1</sup> I use the term *accept* in its econometric sense of *inability to reject*.

indicates the need to reformulate the conjecture and evaluate a new one. The challenge in this interactive process is to avoid ending up with a tautology by adjusting the model to fit the data. The model and the conjecture it captures have to be tested based on evidence that was not used in formulating the conjecture.

### **11.1 Insufficiency of Deduction**

In studying endogenous institutions, we cannot generally rely on deductive theory (an inference in which the conclusion about particulars follows necessarily from general or universal premises). Theory enables predicting endogenous variables—in our case, institutions—based on the exogenous features of a situation. In general, the fewer the exogenous features of the situation and the greater the number of endogenous variables, the less powerful (although more general) a theory is likely to be and the less likely it will be able to predict a single outcome. Institutional analysis, however, is about situations in which there are few exogenous features and a large number of endogenous variables. It seems that the lack of a deductive institutional theory does not reflect a lack of scholarly input but rather the inherent nature institutions.

To appreciate the sources of the limits of our deductive theory of institutions, recall the relationship between theory and empirical analysis in neoclassical economics that studies the allocation of goods and services. The general equilibrium model provides a theory of allocation: given the endowments of all economic agents, their preferences, and technology, the model predicts equilibrium price vectors and the allocation associated with each. It reveals the general conditions under which a unique price vector is an equilibrium. The limitations of this theory for positive analyses are well known. But it provides a useful deductive theory, linking any vector of the exogenous variables (endowment, preferences, and technology) with a unique endogenous outcome (a price vector). To study allocations using this theory we need only identify the agents' endowments, preferences, and technology at the time and place under study. It is consistent with the theory to ignore other—contemporary or historical—features of the situation.

Classical, evolutionary, and learning game theory suggests that seeking an equivalent comprehensive, deductive theory of institutions may be futile. In situations of interest to institutional analysis—strategic, recurrent situations with large action spaces—multiple

equilibria, and hence institutions, usually exist. In a repeated prisoners' dilemma game, for example, defection every period and cooperation every period are both equilibria for a large parameter set; both the rule of behavior of perpetual defection and the rule of conditional cooperation can prevail. In fact, an infinite number of equilibria are associated with even such simple games as an infinitely repeated prisoners' dilemma game (appendix A).<sup>2</sup>

This multiplicity of equilibria is not an artifact of a particular feature of the prisoners' dilemma game. Multiple equilibria are more likely to prevail in exactly the kinds of situations of interest to institutional analysis.<sup>3</sup> If the analysis takes as exogenous only noninstitutional aspects of the situation, multiple self-enforcing behaviors are bound to exist. The failure to develop a deductive theory of institutions reflects an inherent institutional indeterminacy: the fact that multiple behavior and beliefs can be self-enforcing in a given environment. Game theory thus suggests that even in a world in which individuals are perfectly rational and share common knowledge of their rationality and the situation, deduction is insufficient for generating a unique outcome. This is even more likely to be the case in the real world. Game theory rejects the ahistorical view that the same environment will lead to the same institutions in all historical episodes.

Furthermore, there is no theory to indicate which game is relevant to a given transaction at a given time and place. Consider institutions governing the provision of credit, for example. For credit to be provided, a borrower must credibly commit *ex ante* to repay his debt *ex post*. Many technologically feasible and nonmutually exclusive institutions can enable a creditor to do so. Social exchange within the family can constrain its members sufficiently to enable credit

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<sup>2</sup> See the discussion of evolutionary and learning game theory in chapters 1 and 5 respectively.

<sup>3</sup> Economists' acceptance of the game-theoretic framework as opposed to the lukewarm reception in political science and sociology may reflect the distinct questions the two groups ask. Economists usually examine situations in which the players' action sets are rather restricted and arguably known to them and the analyst. In these situations the interacting agents are more likely to share common knowledge of the relevant rules of the game, and many institutions can be taken as exogenous to the analysis. The textbook discussion of oligopoly theory, for example, does not even mention that it is assumed that the rivaling firms cannot resort to violence. In contrast, other social scientists are often concerned with situations in which it is not clear what is known and more institutions must be explained rather than assumed.

relations. Expected social and economic sanctions by members of the business community following a transgression can facilitate lending within the group. The expectation that a court of law will punish a cheater or moral beliefs (such as fear of God's punishment) can support impersonal lending. We have no theory to inform us which, if any, of these possible institutions is relevant in a particular historical episode. We have no theory regarding which game-theoretic model we should use. Game theory can be used to consider a meta-game in which each of these institutions can be studied as an equilibrium, but doing so exacerbates the problem of multiple equilibria and hence equilibrium selection.

One response to the problem of institutional selection, noted in Chapter 2, has been to impose on the analysis the deductive postulate that institutions are selected based on their function (efficiency, fairness, the interests of a particular group). But functionalist accounts of this nature are generally valid only when it is possible to establish a causal link between the origin of the institution and its presumed effect (see, e.g., Stinchcombe 1968, pp. 87-93; Elster 1983). In the case of institutions, the causal link itself depends on existing institutions, which determine what individuals are able and motivated to do (Chapter 7).

Other scholars have responded to the problem of institutional selection by considering it as a "second-order coordination" problem, the problem of coordinating on one equilibrium. This coordination is provided by such mechanisms as leadership, culture, authority, bargaining, negotiation, and collective decision-making organizations (Calvert 1992; Knight 1992; Miller 1993; Greif 1994a). The discussion in Part III highlights the importance of these mechanisms. But we have no deductive theory regarding which mechanism is important under what conditions. Deduction alone is therefore insufficient.

Deduction alone is also insufficient because history matters. We cannot study institutions while considering only environmental factors (Field 1981). There is a fundamental asymmetry between institutional elements inherited from the past and alternative, technologically feasible ones. The initial rules of the game are therefore historically determined and cannot be deduced (Chapter 7).

In particular, games reflect and embody people's cognitive models, knowledge, and norms, which are products of, and embodied in, a society's institutions (Chapter 5). These

historically inherited features influence the process of institutional selection and hence new institutions. Thus even if we know the objective structure of the situation, we cannot deductively predict institutions. If we begin the analysis by specifying a game that captures our perception of the situation, we ignore the fact that the players may have a different cognitive understanding of it. If we impose our own cognitive understanding on the players, then instead of learning how the prevailing internalized beliefs influenced and were embodied in institutions, we are likely to end up examining or predicting irrelevant alternatives.

In short, one cannot begin an institutional analysis by considering an environment devoid of any institutions and then deductively proceed to identify the relevant institution. Classical, evolutionary and learning game theory lends support to the claim that institutional analysis cannot be approached deductively. Institutions are not environmentally determined—multiple equilibria are often possible in the formation of institutions in given circumstances—and hence they cannot be deduced.

## **11.2 The Insufficiency of Induction**

Like pure deduction, the purely inductive method associated with Francis Bacon of classifying and generalizing without necessarily understanding the lines of causation is insufficient for studying endogenous institutions.<sup>4</sup> Some institutional elements, particularly beliefs and norms that provide motivation, are unobservable, and the same observable features, such as rules and organizations, can be part of different institutions. The premise of induction, that enough endogenous variables are observable to render classification useful, does not hold in the case of endogenous institutions.

Consider the common practice of identifying and classifying institutions based on their observable features, which are rules and organizations. Focusing on these observable features is sufficient for positive analysis only if the unobservable institutional elements associated with them—beliefs and norms—do not matter. But game theory indicates that these unobservable institutional elements do matter and that ignoring them provides an incomplete picture of the

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<sup>4</sup> Any inductive analysis, however, rests on some deductive assertions regarding what is important to classify.

institution. The multiple equilibria results reveal that many unobservable institutional elements—each potentially motivating different behavior—can be associated with observable ones. Observable institutional elements are generally insufficient for deducing unobservable ones, and hence the institution in its entirety. Studying institutions based only on their observable features implies considering distinct institutions as identical.

Observable institutional elements—rules and organizations—often provide little information about the relevant institution. Formal legal rules, for example, sometimes convey little information about the institution in question, because observable legal rules can be empty words that have no bearing at all on behavior. In the case of the merchant guild, for example, laws guaranteeing property rights to foreign merchants sometimes represented no more than empty promises aimed at luring merchants to travel to foreign lands where their property could be abused. Even legal rules that would be enforced if invoked might not be part of the institutions that influence behavior. Both the Jewish and the Muslim legal systems to which the Maghribi traders had access would have enforced the law stating that one was not legally liable to pay compensation if a family member breached a contract. But this law was not part of the institution that governed the relationships among the Maghribis. Fear of collective punishment, not fear of enforcement of the law, motivated Maghribis to pay compensation if a family member defaulted.

Similarly, a legal rule, even a constitutional rule, can be behaviorally irrelevant because it is unenforceable. In Mexico after the revolutions of 1910-17, a constitutional rule nationalized the oil industry. But nationalization was not implemented for many years. The de facto institution that supported ownership patterns and behavior in the oil industry reflected the power relationships between Mexico, the United States, and the large oil companies, as well as the scarce human capital possessed by the employees of these companies. Mexico's constitutional rule was not part of the relevant institution (Haber et al. 2003). The rule was arguably a means of mobilizing popular support rather than part of an institution assigning property rights.

But laws can also be a component of an institution, even if the behavior they dictate is not followed. Consider building code regulations, which are aimed at ensuring housing safety in the event of an earthquake. In California these regulations are, by and large, adhered to. In Turkey, adherence is much more lax. The regulations may be a part of a different institution in each

place. Presumably in Turkey the regulations only change the division of the surplus from not building according to code by enhancing the bargaining power of inspectors and increasing the level of bribes that they can collect.<sup>5</sup>

Similarly, the existence of a specific organization does not imply that a particular institution prevails. The same organization can be part of distinct institutions with different implications, each of which differs from the others in its unobservable components, such as beliefs. Guild organizations could have been part of an institution that protected property rights, but they could also have been part of one that created monopoly rights. Indeed, they can even be part of both institutions at the same time.

In short, we cannot rely only on induction and study endogenous institutions by examining their observable features, such as rules and organizations. Ironically, the game-theoretic insight regarding multiplicity that supports the assertion that deduction is insufficient for positive analysis of endogenous institutions also implies the insufficiency of induction based on observable aspects of the institutions. Multiple institutions can be associated with the same observable institutional elements.

The traditional empirical methods of the social sciences rest on two premises: first, that theory can sufficiently restrict—*predict*—the endogenous outcomes for a given set of the exogenous and observable features of the situation; and second, that sufficiently many endogenous variables are observable to render classification based on inspection meaningful. These premises, however, do not hold in the case of endogenous institutions.

### **11.3 Initiating Institutional Analysis**

That neither deduction nor induction is sufficient to study endogenous institutions implies that their study can begin from neither the institution nor the game. If an institution is the endogenous factor we want to identify and is not entirely directly observable, it cannot be the starting point of the analysis. Similarly, we cannot begin the analysis by formulating the situation as a game, as

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<sup>5</sup> Indeed, following the disastrous consequences of the 1999 Izmit earthquake, it has been widely claimed that the failure to enforce building codes contributed greatly to the number of casualties. See, for example, the press release at <http://www.geohaz.org/press/izmit99.htm>.



doing so would entail assuming much of what should be empirically identified and analytically understood. We seek to understand how a particular game became and remained relevant and what beliefs and norms established themselves within the rules of the game.

To begin the analysis, we use contextual analysis and deductive theory to identify the substantive issues that merit examining at the time and place under consideration. Contextual knowledge of the society under consideration, including its economic, political, and social features, is necessary. There is no point in asking, for example, what institutions facilitated the employment of agents in long-distance trade if the economy under consideration was a subsistence economy that did not trade. Similarly, there is no point in considering how impersonal exchange was facilitated in a small village in which anonymity does not prevail. In such cases, the historical context implores us to pose other questions, such as why long-distance trade did not prevail or larger settlements were not established. The analysis thus begins by recognizing the context specificity and historical contingency of institutions. In other words, one needs to be familiar with the society under consideration.

Given such contextual knowledge, theoretical considerations foster our ability to identify important issues. Theories of economic growth, for example, highlight the importance of institutions that motivate technological innovations and transform savings into investment. Cultural analysis highlights the importance of institutions that motivate individuals to consider the pursuit of profit and material welfare as morally appropriate. Property rights theory highlights the importance of institutions securing property rights for the operation of markets. Transaction-cost economics highlights the importance of reducing transaction costs to a level at which exchange is possible. Political economy theories highlight the importance of institutions that maintain political order, enable rulers to commit to request property rights, and influence the use of the coercive and regulatory powers of the state.

Using theoretical considerations to identify the relevant issues is important, because observed behavior does not always directly reflect the importance of the institutions to which that theory directs us. The behavior that an institution generates may well be off the equilibrium path and therefore not observable. As Greif et al. (1994) note with respect to contract enforcement institutions, “The effectiveness of institutions for punishing contract violations is sometimes best

judged like that of peacetime armies—by how little they must be used. Thus, in reading the historical record to determine whether a major role of merchant institutions was to ensure contract compliance, the numbers of instances of enforcement is not a useful indicator” (p. 746).

Combining contextual knowledge and deductive reasoning is imperative. For example, property rights theory highlights the importance of property rights security to encourage investment, production, and exchange. Yet we have to look at the context to identify which specific property rights were important and whether the central government, the neighboring tribe, the local elite, the landlord, the army, or one’s relatives threatened them.

Theory and contextual knowledge should therefore be combined to identify welfare-related central transactions and the related regularities of behavior, such as the employment of agents, the establishment of large corporations, the lending of money in the absence of a legal system, the pursuit of a healthy or unhealthy life-style, and the investment of resources in inventive activities. Alternatively, we can begin the analysis by identifying some outcomes of interest, such as the rule of law, economic growth, social stability, political order, property rights security, or a particular income distribution. In this case, we ask: What regularities of behavior in which transactions manifested themselves in, or contributed to, these outcomes of interest? Which transactions are crucial to achieving the outcomes of interest (such as efficiency, political order, resource mobilization, or equity)?

The analysis can also begin by exploring why the dog did not bark—why behavior that could have led to a particular outcome did not occur. What are the auxiliary transactions that are or could have been linked to that central transaction? What are the transactions that could have been entered into but were not, and why? We try to determine what generated the behavior we observe in the central transaction or what could have prevented generating the behavior whose absence we seek to understand.

In twelfth-century England, for example, agency relationships were apparently not established, despite the fact that long-distance trade prevailed. Godric of Norfolk, a seafaring merchant, did not employ agents, although he recognized the danger of traveling overseas. His late medieval biographer noted that in the course of sailing “to and fro between Scotland and Britain” to conduct his trade, Godric “fell into many perils of the sea” (Coulton 1918, pp. 415-

20). Merchants recognized the risk of trading without agents, but they did not adopt technologically feasible behavior that could have mitigated it. Why weren't agency relationships established? What institution, if any, prevented agency relationships from being formed?

By concentrating on central transactions, behavior, and outcomes, we avoid functionalism as well. The analysis does not begin by considering an institution's observable features, such as organizations and rules, and attempt to account for them based on the function they are postulated to serve. Rather, it begins by considering behavior and outcomes that did or did not transpire, and only then exploring the institutions leading to these outcomes. Considering institutions as self-enforcing implies that there is no need to invoke a function to account for the prevalence of a particular institution.

#### **11.4 Toward a Conjecture: Assembling the Pieces**

Once we have identified the issue to be examined, we lay the foundation for forming a conjecture about a relevant institution by defining the scope of the analysis, gathering empirical information, examining the historical context, and relying on generic theoretical insights. The objective is to develop a conjecture about the relevance of one among the many alternative institutions that can generate the behavior we seek to understand.<sup>6</sup> In developing a conjecture, we have to avoid the pitfall of asserting that producing a model generating the observed behavior is sufficient to account for this behavior. In studying the merchant guilds, I could have built a model supporting the assertion that international interactions provided the foundations for an institution securing property rights. The historical context, however, indicates the futility of such analysis.

In any institutional analysis, various institutional (and noninstitutionalized) aspects of the situation must be taken as exogenous: we cannot study every man-made aspect of the situation endogenously at the same time, nor is there a conceptual need to do so, for the reasons elaborated in Part III. It is conceptually sound and analytically useful to take some endogenous institutions as given while studying the other institutions and the forces rendering them self-enforcing.

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<sup>6</sup> It is often sufficient to develop a conjecture about the class of the relevant institution, that is, the institution's general attributes rather than their exact details.

Deciding which institutions to consider endogenous and which exogenous is determined by the central transaction of interest and those conjectured to be linked to it.

To identify exogenous and endogenous institutional features and, more generally, to limit the scope of the analysis, we rely on contextual knowledge and empirical analysis aimed at identifying the relevant transactions and actors. Indeed, identifying the relevant auxiliary transactions is key to developing a conjecture about the relevant institution. In Chapter 3, for example, the key to identifying the Maghribi traders' coalition was recognizing the auxiliary transaction of information sharing. After all, given the technology of the period, other transactions could have been linked to the merchant-agent transaction to support agency relationships. The merchant-agent transaction could have been linked to transactions among family members, to transactions with the legal system, even to the perceived transaction with a divine entity. Central to identifying the Maghribi traders' coalition was recognizing that agents' behavior was not influenced by these possible intertransactional linkages. Likewise, in Chapter 4 identifying the relevant transactions as those between merchants and their guilds—rather than, say, the transactions between nation-states—was crucial.

Once we have identified the relevant transactions and actors, we can differentiate between the institutional elements we can take as exogenous and endogenous. We take as exogenous historically determined institutions beyond the control of all the individuals interacting in the transactions of interest. In studying the Maghribi traders or the merchant guild, for example, I considered such man-made aspects of the situation as language, money, product markets, political units, and a transportation system as exogenous. Given the central transactions of interest and the related institutions—those governing agency relationships and those governing the relationships between foreign merchants and local rulers—there was no need to consider these man-made factors as endogenous. I simply accepted them as part of the context, an exogenous, historically inherited feature of the situation.

We can similarly consider as exogenous some institutions that are endogenous to all the interacting individuals whose behavior we study. This is appropriate if the transactions in which these institutions generate behavior are “farther away” from those of interest. We focus on the institutional elements that directly influence behavior in the central and auxiliary transactions and

create the link among them, ignoring institutions related to other transactions. In studying Genoa's political institutions, for example, I took the institutions governing marriages in the city as given.

We have to consider as endogenous, however, the institutional elements linking the central transaction with the auxiliary ones and generating the related behavior. In the impersonal exchange examined in Chapter 10, the central transaction was the transaction between traders; the auxiliary transactions were those among the courts and between each court and individual traders. The analysis therefore had to consider the institutional elements linking these transactions and generating behavior in them. In the agency relationships among the Maghribis, the central transaction was that between each merchant and agent; the auxiliary transactions were those between each agent and his potential future merchants and those related to information sharing among the traders.

In the process of identifying relevant transactions, we use inductive analysis to identify aspects of the situation that are relevant to forming and later evaluating a conjecture about possible institutions. Of particular importance are organizations, rules, and beliefs about the structure of the situation. Recognizing the importance, and legal independence, of the European communes was crucial to identifying the community responsibility system (Chapter 10). Explicit statements in the primary (historical) sources, interviews, surveys, and other sources can reveal individuals' beliefs, strategies, knowledge, technology, and the magnitude of potentially relevant parameters such as a community's size, demography, and wealth. In analyzing the community responsibility system, I used treaties and charters as a guide to identifying the institution. Patterns of behavior can also provide important clues. The observation that agency relationships were multilateral among the Maghribis but bilateral among the Genoese was important in directing attention to institutions based on multilateral and bilateral reputation mechanisms (Chapter 9).

Historical information is indispensable in generating a conjecture about the relevant institution, because institutional dynamics constitutes a historical process. That history is encapsulated in past institutional elements, and new institutions emerge in the context of existing ones implies that we can benefit from contextual refinement (Chapter 7). We can use historical information to narrow the set of conjectures about possible institutions, because new institutions

reflect the fundamental asymmetry between institutional elements inherited from the past and alternative, technologically feasible ones. Historical knowledge directs our attention to the institutional elements more likely to be complementary to, to coordinate on, and to be part of the institution we are trying to identify. Knowing that communes prevailed in Europe before market expansion took place, for example, directed attention to their possible role in contract enforcement institutions that supported impersonal exchange. Recognizing that clans became important social entities in Italy before the establishment of the Republic of Genoa directed attention toward institutions incorporating clans as institutional elements.

Deductive theory also has an important role to play in developing a conjecture about the relevant institution. Theory fosters our ability to develop a conjecture by identifying the causal mechanisms underpinning various institutions, the problems institutions of a particular type (e.g., reputation-based or legal) have to overcome to be effective, and the general conditions under which a particular institution can be self-enforcing. Generic theoretical insights thus point to evidence that helps identify the relevant institution and even to sort among alternative institutions within that class.

In developing the conjecture that reputational considerations induced behavior among the Maghribis, theory highlighted the importance of establishing whether merchants perceived an agent who cheated to be a “bad type,” who would continue to cheat in the future or not. Generic theoretical insights identified the evidence required to do so. Once the combined theoretical and empirical analysis substantiated the relative irrelevance of the incomplete information model with bad type, theory indicated other problems that reputation-based institutions have to mitigate in this case. It drew attention, for example, to the need to mitigate the end-game problem and retain the credibility of transmitting information about cheating, even when cheating does not transpire. (Appendix C illustrates the general use of deductive theory in developing a conjecture about relevant institutions in the particular case of reputation-based institutions.)

All models of behavior endow interacting individuals with some preferences. In studying institutions, it is useful to gain a sense of the preferences of the relevant actors without succumbing to the fallacy of asserting that behavior necessarily reveals preference. Preferences, however, are unobservable. They differ across historical episodes and are often endogenous to

the institution under consideration. Furthermore, institutions drive a wedge between preferences and behavior, making it difficult to distinguish them from observed behavior without identifying the related institutions. Identifying the institutions, however, may well require knowing the preferences.

No good empirical strategy to deal with this problem has yet been developed. In general, preferences have to be either identified inductively based on knowledge of the broader context or based on some deductive assertion. In either case, verifying the appropriateness of the assertion about the appropriate preferences is part of the process of verifying the conjecture about the institution. In studying the merchant guilds, I assumed that rulers were not deterred from using coercive force to achieve economic ends. Historical evidence supported this assertion. In studying political institution in Genoa, I assumed that norms did not preclude the use of coercive power to achieve political aims. The analysis then noted that the political institutions both reflect norms sanctioning the use of violence and reinforced these norms.

### **11.5 Conjecture and Context-Specific Models**

A conjecture about the relevant institution consists of a statement about the transactions that were or were not linked (and hence the relevant decision makers and their possible actions), the institutional elements that link and influence behavior in these transactions, the important environmental features on which these institutional elements depend, and the causal relationships between the exogenous and endogenous features. Although in some cases we can evaluate a particular conjecture based on deductive, inductive, and contextual knowledge without explicit modeling, a context-specific model is often useful for presenting and evaluating a conjecture.

The justification for using a model that rests on the deductive assumption that individuals act as if they are rational, as I do here, is that institutions provide the microfoundations required for decision making (Chapter 5). It is exactly because rationality is contextual, individuals can act rationally in pursuing well-defined goals within the confines spanned by institutions, which reflect, embody, and structure the sphere that the decision makers comprehend and in which they have well-defined goals.

When game theory is used to capture the conjecture, we present it by specifying the rules of the game (the actors, their actions and information, and the relationships between actions and outcomes); the beliefs that prevailed within these rules; and various causal relationships. A conjecture about a contract enforcement institution, for example, must specify what rewards desirable behavior implies, what sanctions are to be used to deter undesirable behavior, who is to apply the sanction, how the sanctioners learn when to apply sanctions or decide what sanctions to apply, why they do not shirk from their duty, and why offenders do not flee to avoid the sanction. In any case, the model recognizes that the game relevant to the interacting actors and their behavior in it is contingent on what transactions had been linked, how, and to what effect.

The model should be as simple as possible, capturing the exogenous features of the situation and allowing the researcher to investigate the feasibility, rationale, and implications of the endogenous features postulated in the hypothesis. To the extent possible, its details should be based on evidence, and they should not integrate unobservable features of the situation (unless their relevance can be empirically substantiated, as discussed later).<sup>7</sup> A specification based on observable features serves two purposes. First, it constrains the set of possible models, reducing the likelihood of generating a model that has nothing to do with the relevant institution but can still explain its relevant endogenous features. Second, selecting assumptions based on evidence limits the ability (or temptation) to account for the observed phenomenon with ad hoc assumptions about unobservable features of the situation.

I could have argued, for example, that trust among the Maghribi traders was based on their religiosity, communal affinity, or unobservable personal attributes, such as honesty.<sup>8</sup> Although each of these factors may have played a role in the operation of the Maghribi traders' coalition, the context-specific analysis supports the centrality of a reputation mechanism based on economic sanctions.

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<sup>7</sup> This follows the Ockham's razor principle of keeping conjectures simple and of selecting among alternative hypotheses that generate the same predictions as the one making the least number of assumptions.

<sup>8</sup> In the modern context we can sometimes get measures of such unobservable attributes using surveys and experiments.



The challenge, in other words, is to use the model to evaluate a conjecture. It is easy enough to model a game with the behavior we want to explain as an equilibrium outcome. We are not interested in ad hoc modeling, however: we want to *identify* the relevant institutions, not *assert* that a feasible one was relevant. Accordingly, the context-specific model is structured for the purpose of evaluating the hypothesis that a particular institution prevailed. Whenever possible, the analysis should attempt to refute the importance of other institutions whose relevance is reasonable. But attempts to identify theoretically the set of all possible institutions can divert attention to irrelevant alternatives, given the knowledge of the individuals under consideration and the manner in which these institutions were selected. Accordingly, the model is used mainly to substantiate a conjecture about the relevance of a particular institution rather than proving that all other feasible institutions did not.

Before elaborating on the usefulness of a context-specific model, I should note the limitations of modeling in evaluating a conjecture.<sup>9</sup> The need to preserve analytical tractability and models' underlying mathematical techniques restricts the conjectures that can be expressed and analyzed using an explicit model. Game-theoretic models, particularly dynamic game-theoretic models with large action sets, can easily become very complicated. Of course, the right conjecture is preferable to an elegant but irrelevant model. In some cases the best we can do is to use a model that captures only some aspects of the conjecture we want to evaluate. In other cases the problem can be mitigated by conducting the analysis sequentially. In studying organizations, for example, it may be easier first to consider an organization as exogenous to the institution under consideration and only later to extend the analysis to consider the organization as endogenous.

### **11.6 Evaluating a Conjecture through Interactive, Context-Specific Analysis**

Once a conjecture about the relevant institution has been formed and presented using a context-specific model, it is evaluated through an interactive analysis. The model—and the context-specific conjecture it captures—is evaluated based on the evidence, while evidence is used to

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<sup>9</sup> For discussions of the virtues and pitfalls of modeling in empirical analysis, see Kreps (1990a); Scharpf (1997); Bates et al. (1998); and Powell (1999).

reject, accept, or alter the conjecture. What is to be avoided in this interactive analysis is the tautology in which the model is adjusted to fit the evidence. The challenge is to put the model and the conjecture it captures to an empirical test. This can be achieved in several, complementary ways.

A model and its analysis provides an explicit statement of the aspects of the situation the researcher claims are important or unimportant—a statement that can be confronted with the evidence and alternative statements. To evaluate the conjecture and enrich our understanding of the institution, we use the model in various ways. Subjecting the model to game-theoretic equilibrium analysis restricts the set of admissible institutions (by restricting possible beliefs, as elaborated in Chapter 5). Equilibrium analysis subjects the conjecture to the test of logic. If there is no equilibrium that generates the behavior we seek to explain, it may be that the assertion that individuals behave in a manner captured by the logic of game theory is wrong. Alternatively, the model may have been misspecified (important aspects of the situation may have been overlooked). In this case, it will need to be reevaluated. I recognized the importance of the threat to Genoa's political institutions posed by Frederic Barbarossa, for example, only after a model ignoring this factor failed to account for the patterns of Genoa's political and economic history.

An additional check on the admissibility of a conjecture is considering whether the complexity or other attributes of the equilibrium render it unreasonable given our knowledge of the actors and the situation. For example, if the beliefs associated with the equilibrium are very complex, is it reasonable to assume that they prevailed in a particular episode? Does the model reasonably approximate the situation in which the actors are playing against the rule rather than against the rules of the game? Is the analysis robust, particularly with respect to aspects of the situation that are not well reflected in the historical records? Is it reasonable given the coordination and inclusion effects of institutional elements inherited from the past? Is it complementary to existing institutions and the related institutional complex?

If there is an equilibrium corresponding to the behavior we seek to explain, it reveals the internalized beliefs, norms, and on- and off-the-equilibrium-path beliefs associated with it. We can then return to the evidence to evaluate which of the possible equilibrium beliefs (or, more

precisely, the type of beliefs) prevailed.<sup>10</sup> Private correspondence, diaries, questionnaires, public correspondence and debates, and rules are likely to reflect the beliefs interacting individuals hold. Such direct evidence was central to the study of the Maghribi traders, the merchant guild, and the community responsibility system.

Equally important is indirect evidence: the confirmation of qualitative and quantitative predictions generated under the assumption that the conjecture—captured in the game and an equilibrium in it—is correct. By generating predictions—exposing causal relationships between exogenous and endogenous, observable and unobservable features of the situation—the model enables us to further evaluate the conjecture by exposing it to the risk of failing to account for the historical evidence and hence being falsified.

The premise of evaluating whether a conjecture should be rejected based on predictions generated under the assumption that it is correct is the same premise used in econometric analysis. In an econometric analysis, we reject a hypothesis by testing for predictions generated under the assumption that it is correct. The best we can do is fail to reject it; this does not imply that we should either accept it or that every other hypothesis will be rejected. Here, too, a conjecture is evaluated by considering the predictions it generates. Hence econometric analysis and the qualitative, case-study, prediction-based evaluation conducted here are compatible. This compatibility implies that econometric analysis is an integral part of the method advocated here and that we can use it to test various predictions statistically. In some cases it may indeed be best to specify only a reduced-form econometric model that captures our conjecture and to evaluate its implications statistically.<sup>11</sup>

The qualitative, case-study, prediction-based evaluation of a conjecture and statistical evaluation differ, however, in two important ways. First, unlike statistical evaluation, qualitative,

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<sup>10</sup> It is often useful to group beliefs by their qualitative nature (e.g., those entailing a finite punishment) rather than their details (e.g., the length of the punishment).

<sup>11</sup> Okazaki (2005) conjectures that in eighteenth- and nineteenth-century Japan, the organization of the merchant coalition (*Kabu Nakama*) was the organizational manifestation of a reputation-based contract enforcement institution. To evaluate this conjecture, he expresses it as a reduced-form econometric model, which he estimates using data from periods in which the coalition was and was not politically barred from functioning.

case-study, prediction-based evaluation is conducted without the benefit of a confidence interval. Second, econometric analysis is used only to evaluate whether a theoretically induced conjecture should be rejected. The interactive, context-specific analysis adopted here uses evidence to *develop* as well as to evaluate the relevant conjecture. Doing so is required to avoid the fallacy of ad hoc theorizing.

In evaluating predictions, care has to be taken not to endow the interacting individuals with knowledge they may not have had. In Chapter 9, for example, the theoretical analysis implied that the choices of contractual forms by the Maghribi and Genoese traders should be a function of cultural beliefs and that each group should therefore choose different forms. The first step in evaluating the historical relevance of this prediction was to establish that both groups were indeed familiar with all relevant forms of business associations. After establishing that this was the case, I compared the prediction of the model with the historical evidence.

Predictions can be generated using equilibrium analysis, counterfactual analysis, and comparative statics. Equilibrium analysis generates predictions by indicating the observable implications associated with various equilibria. Some of these predictions are straightforward. The model of the merchant guild, for example, predicted that trade expansion would follow the establishment of a guild organization in a particular location. Other predictions are more subtle and can be difficult to reach without a formal model. The prediction that collective punishment of overseas agents, not individualistic punishment, encourages the use of particular contractual forms and a horizontal social network required a model that highlighted the associated line of causation.

A particularly useful feature of game theory is that it generates equilibrium predictions based on off-the-equilibrium-path beliefs, that is, beliefs about behavior in situations that would not actually transpire given the prevailing beliefs. The analytical power of predictions regarding off-the-equilibrium-path beliefs is evident in Chapter 9, where I considered the institutional ramifications of distinct cultural beliefs among the Maghribis and Genoese.

A game-theoretic model facilitates counterfactual analysis of off-the-equilibrium-path beliefs. By exposing the observable implications of various off-the-equilibrium-path beliefs, a model generates refutable predictions. Such counterfactual analysis was indispensable in

studying Genoa's political institutions. In this case, it was crucial to distinguishing whether interclan peace reflected mutual deterrence or peaceful neighborly relations.

Counterfactual analysis can also be used to evaluate a conjecture in other ways. The self-enforceability of institutions often depends on unobservable features of the situation, and institutions exhibit indeterminacy in the sense that more than one institution can prevail in a given environment. An explicit model exposes the relationships between the exogenous parameters and various endogenous variables as well as the relationships between observable and unobservable variables. This facilitates two types of counterfactual analysis. First, we can consider the observable implications of changing an observable or unobservable feature of the situation. The evidence on agency relationships among the Maghribi traders did not reveal the importance of incomplete information about agents' honesty. The issue was resolved by considering the observable implications of a model with and without such incomplete information.

Comparative statics analysis examines the change in the equilibrium level of the endogenous (equilibrium) variables following a marginal change in the value of a parameter, an exogenous variable. In considering the relationships between city size, the distribution of wealth, and incentive to adopt the community responsibility system, I conducted a comparative statics analysis. In game-theoretic models, such analysis has to be conducted with care, because the models usually do not have a unique equilibrium. Conducting a comparative statics analysis may be misleading, as the equilibrium itself may change with the parametric change. Comparative statics can nevertheless be conducted in one of two ways. The first is appropriate when there are good reasons to assert that the same equilibrium will prevail before and after the marginal parametric change. This assertion is usually appropriate because of institutional persistence, discussed in Chapter 6. Individuals draw on knowledge of past institutions in considering behavior in marginally different environments. Marginal parametric changes are not likely to lead to equilibrium change.<sup>12</sup>

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<sup>12</sup> Although the exceptions to this rule are difficult to identify ex ante because, for example, leadership can play a role. (See Chapter 7.)

In studying the community responsibility system, I conducted such a comparative statics analysis in exploring the implication of the increasing sizes and heterogeneity of communities on the institution. In studying the merchant guild, I conducted such an analysis to study cross-sectional changes. I noted that given the prevailing equilibrium, marginal traders—those from relatively small cities—are more likely to be abused.

The second way to conduct a comparative statics analysis is to consider changes in the equilibrium set (the set of all possible equilibria) due to parametric change. I conducted such an analysis in examining Genoa's political institutions, arguing that under the consular system, once the number of commercial privileges abroad and the wealth of the city increased, there was no equilibrium with mutual deterrence.<sup>13</sup>

Organizations are institutional elements that change the equilibrium set. We can evaluate a conjecture about the implications of a particular organization by comparing the implied equilibrium sets with and without this organization. In studying the impact of organizations on outcomes by enabling intertransactional linkages, we change the “relevant” rules of the game. We first consider a “benchmark” game that captures the essence of the central transaction, ignoring the organization whose impact we want to explore. We then consider an augmented game in which an organization—as an institutional element—is incorporated. Organizations are modeled as constituting a new player (the organization itself), changing the information available to players, or changing payoffs associated with certain actions (Greif 1994a, pp. 915–16). We can then repeat the analysis and consider the change in the set of self-enforcing rules, beliefs, and outcomes.<sup>14</sup>

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<sup>13</sup> Monotone comparative statics, which studies the change in the equilibrium set due to a change in the exogenous parameters, is a useful technique for such an analysis (Milgrom and Shannon 1994), although it is not always necessary.

<sup>14</sup> Many of the technical aspects of analyzing the linkage among games (see Bernheim and Whinston 1990; Aoki 2001) can be applied here as well. These analyses examine situations in which a player's choice variable is to link one game with another. By linking games in such a manner, the equilibrium set in one game can be expanded. Here, although organizations are exogenous to each of the interacting players, they influence (limit or expand) the equilibrium set in the central (original) interaction.

Such an analysis was implicit in Chapter 3 and explicit in Chapter 4. The Maghribi traders' coalition changed the rules of the "original" game governing the transaction between merchants and their potential agents. By providing information, the Maghribi traders' group linked the transaction between each merchant and agent to future transactions between that agent and all other member merchants. The guild organizations changed the rules of the game between a ruler and each foreign merchant. The merchant guild organization linked the transaction between a ruler and each merchant to the transactions by all merchants and the ruler and between the merchants and their communal authorities.

From the perspective of each individual in the original game, these organizations (composed of rules, beliefs, and norms beyond the individual's control) are exogenous. Sometimes, as in the analysis of the merchant guild, it is possible to evaluate a conjecture while considering the organization and its behavior as exogenous. But studying the motivation of members of an organization is often required to evaluate a conjecture, particularly because although organizations can change the set of possible self-enforcing beliefs in the central transaction, the basic structure of repeated, strategic interactions—and hence the multiplicity of possible equilibria—is not changed. The introduction of a police force may lead to law-abiding behavior or corruption. Having a legal system with the ability to impose its judgment does not necessarily lead to the rule of law. For the rule of law to take hold, appropriate beliefs must influence the behavior of the individuals who are members of the relevant organizations, such as the court and police. An organization leads to a particular behavior only if it is complemented by appropriate beliefs and norms; studying organizations as an integral part of institutions must take this into consideration.

Hence, to evaluate a conjecture about the impact of an organization, it is often necessary to examine whether the organization itself and its postulated behavior could have been an equilibrium. Such a need arose in analyzing why Maghribi merchants and agents retained their affiliation with the Maghribi community and why traders were motivated to transfer information and participate in collective punishment. The analysis considered as endogenous what motivated the Maghribis to retain their affiliation with their group and what enabled and motivated them to take the actions required to render a multilateral reputation mechanism effective. More generally,

a conjecture about the institutional elements that generate behavior by an organization and its members has to be evaluated in the same manner that we evaluate a conjecture about an institution in general.

The more qualitative and quantitative predictions support a conjecture, the greater is the confidence in it. That the model predicts the observation motivating the analysis (e.g., agents' honesty, peace, or impersonal exchange) confers very limited empirical validity on the conjecture the model captures. It is important to generate several falsifiable predictions. I evaluated the conjecture about the community responsibility system based on predictions about observable features, such as the relationship between the size of a community and participation in intercommunity lending, lenders' behavior, the legal authority over merchants abroad, and the relationship between the expected value of future trade and the actions taken following accusation of default. The more predictions the analysis can account for, the greater the confidence in its validity. Yet we always have more confidence in rejecting a conjecture than in accepting it.

Whether or not we use an explicit, context-specific model to evaluate a conjecture, recognizing that institutional dynamics is a historical process and knowing the general properties of this process provide an important means of evaluating a conjecture about the relevance of a particular institution. Institutions reflect knowledge entailed by past institutions, the fundamental asymmetry between institutional elements inherited from the past and alternative ones, the impact of existing institutions on the extent of this asymmetry, institutional refinement, and institutional interrelatedness. Because current institutions are a function of past ones, historical information is necessary in evaluating a conjecture about them. In asserting that a particular institution generated behavior in some period, we go beyond pointing to its function and the factors that make it an equilibrium.

A conjecture about the relevance of a particular institution gains support by identifying the historical origins of its institutional elements and the knowledge of its feasibility, details, and implications. In considering institutional historical origin we ask: Can we identify the historical origin of the institutional elements central to the institution? How was the knowledge underlying the institution gained? Were past institutions such that the knowledge they imply would have led



to the postulated institution? Were the institutional elements central to the postulated institutions inherited from the past?

Recognizing the Maghribis' cultural beliefs and the fact that they were initially an immigrant group lends support to the claim about the practice of collective punishment among them. The observation that Europe's urban population was concentrated in self-governed communes within which members' identities were known supports the relevance of the community responsibility system. The conjecture about the nature of the *podestà* gained support from identifying the historical processes leading to knowledge regarding its implications.

A conjecture similarly gains support from examining the plausibility of a process leading to it, given the historical context. Distinguishing five issues is useful. The first is the motivation and ability to establish the institution (if it was intentionally established). Does the institution serve the interests of those who have the ability and power to influence institutional selection? Given existing institutions, what motivated and enabled them to implement this institution or refine existing ones to form it? The conjecture regarding the community responsibility system gains support from noting that it used the communes' courts, which were controlled by the same merchants who benefited from the system. They were motivated and able to institute that system. We can use extensive-form games to capture the details of this historical process. Who are the decision makers at each point in time, what did they know, and what options were available to them?

The second issue regards an unintentional process that may have led to the postulated institution. Can we identify a plausible evolutionary process through which the conjectured institution could have emerged given the institutional environment and institutional elements inherited from the past? Here we can use evolutionary and learning models while capturing the influence of existing institutions.<sup>15</sup> Knowledge that such models can be constructed in a particular case lends support to the conjecture. Indeed, the conjecture regarding the Maghribi trader's coalition gains support from observing that it is easy to construct a learning model

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<sup>15</sup> As done, e.g., in Gintis 2000, sect. 11.8

leading to the behavior captured in the repeated-game model used to study them. This observation lends support to the repeated-game formulation and the analysis as a whole.

The third issue regards the fundamental asymmetry and contextual refinement: Do the institutional elements in the new institutions reflect institutional asymmetry? Can we reconcile the conjectured institution with the environmental, coordination, and inclusion effects of previous ones? The conjecture regarding the community responsibility system gained support from noting that it was complementary to the environment in which no state had effective means to enforce contracts. The conjecture is also consistent with coordination provided by existing communal organizations, including these communes' courts. That this institution reflects the environmental, coordination, and inclusion effects of institutional elements inherited from the past lends support to the conjecture that it was relevant.

The fourth issue regards institutional interrelatedness. Is the postulated institution likely to have emerged given the influence of the existing institutional complexes? Is the new institution complementary to existing ones? Were the existing complexes conducive to an institution of this form? What were the transaction cost implications of the existing institutions on the ability to attain or establish the postulated one? The conjecture regarding the community responsibility system gained support from its compatibility with the existing institutional complex. Like the communal system itself, it was based on man-made law, self-governance, explicit coordination, and use of the communes' legal authorities.

The fifth issue regards the process of institutional decline and its ramifications. An assertion that a particular institution prevailed in the past gains support from identifying the exogenous and endogenous processes leading to the institutional decline. It similarly gains support from finding that subsequent institutions reflect the refinement, coordination, and inclusion effects of the previous institutions' components.

The discussion so far implicitly considered equilibrium, counterfactual, and comparative-statics predictions with respect to the case under study. Evaluating such predictions with respect to "out of the sample" cases further validates the analysis and its generality. My analysis of the community responsibility system initially focused on England; Italy generated out-of-sample predictions. The analysis suggested that this institution could have prevailed in other European

regions with relatively large communes, but could not have prevailed where this was not the case; and could not have prevailed in the Muslim world, despite its large urban communities, because of the religious rejection of collective responsibility. The historical records confirm these predictions. Similarly, the analysis of the Maghribis suggests that multilateral punishment is more likely to exist in relatively small and closed communities with internal information flows, a prediction confirmed in various studies (see, e.g., Clay 1997a).

In evaluating out-of-sample predictions, however, it is important to keep in mind the context specificity of the analysis. The inherent indeterminacy of institutions implies that there is no one-to-one mapping from the exogenous features of a situation to its endogenous ones. Situations with identical exogenous aspects can have different institutions. We need to consider the compatibility and distinction in the contemporary and historical contexts to evaluate the appropriateness of comparisons across cases.

The structure of the method suggested here is such that it facilitates comparative institutional analysis over time and societies that furthers our ability to identify an institution in a given historical episode. Focusing on the central and auxiliary transactions lets us consider what distinct auxiliary transactions were linked to the same central transactions in different episodes. Considering the context also facilitates comparative analysis, by revealing the historical contexts that are sufficiently similar to make an examination of the institutional foundations of distinct outcomes constructive. These features of the method allow us to compare the institutions that governed agency relationships among the Maghribis and the Genoese (Chapter 6) as well as the political institutions in Genoa and Venice (Chapter 9).

In short, a conjecture gains support to the extent that the associated context-specific analysis

- is based on the simplest possible assumptions that can be supported by the historical evidence;
- indicates the existence of an equilibrium that captures the essence of the conjecture, particularly with respect to its unobservable elements, such as beliefs;
- is robust to different specifications, particularly with respect to aspects of the situation that are not well reflected in the historical evidence;

- indicates that the expectations and behavior associated with the equilibrium are not unreasonably complex given the historical episode and/or there is an empirically plausible evolutionary and learning process that could have led to their emergence;
- is confirmed by direct evidence;
- is confirmed by indirect evidence, that is, produces predictions that can be falsified either by evidence from the historical episode under consideration or through a comparative study over time and space;
- reflects the influence of past institutional elements and institutional refinement;
- highlights the factors and processes that could have led to the conjectured institution in that particular context;
- accounts for the institution's subsequent decline (if it is observed) and reveals the institution's impact on subsequent institutions;
- is confirmed by comparative and out of sample analysis

The more ways we can support a conjecture, the more confidence we have in its validity. Because different conjectures may be supported by different evidence, however, a partial ordering between analyses is thus possible. It may well be the case that we will not be able to reject two conjectures. In that case, we have learned about the limits of our knowledge.

### **11.7 Concluding Comments**

Interactively using contextual knowledge, deduction, induction, context-specific modeling, and evidence while benefiting from comparative and counterfactual analyses is the hallmark of the empirical method proposed in this chapter. Deduction and induction complement each other and are complemented by a context-specific analysis. Theory highlights the issues to be explored and the general considerations and evidence that have to be examined; knowledge of the historical and current context is used to develop a conjecture regarding the relevant institution—what transactions were linked, by what institutional elements, how, and why—while this conjecture is evaluated, refined, and even overhauled through the interactive use of a context-specific model

and evidence. This empirical method thereby recognizes and takes advantage of the context specificity and historical contingency of institutional analysis.