



Exploring complexity when diversity is limited: institutional complementarity in theories of rule of law and national systems revisited

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Abstract

Categories reflect particular theories about the world in the form of causal and performative claims. Unlike attributes that are the mainstay of statistical analysis, these discrete entities consist of the contradiction of being easy to understand and yet hard to analyze. An important obstacle to the exploration of causal claims about categories (e.g. nations) is the limited diversity of observed cases. We propose the use of methodologies that take greater exploratory account of causal complexity and that respects the importance of case narratives for the *explicit* decisions made to arrive at theoretical claims. One such methodology is qualitative comparative analysis developed by Charles Ragin. This method is applied to data provided by two independent lines of study (i.e. rule of law and governance and varieties of capitalism) to show how the identification, and adoption, of *prototypes* is complex. Through the use of logic (e.g. De Morgan's law) and reductive inferences, we explore the space of observed and unobserved configurations, showing how the identification of institutional configurations relies upon logical assumptions that are rarely made explicit. The analysis rejects the hypothesis of rule of law and financial development and qualifies the institutional prototypes of corporatism and market as useful descriptions of the varieties of capitalism.

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Introduction

For the general public, methodological discussions are tedious. Worse, methodologies often render interesting topics into lifeless entities. Academic knowledge is hard to transmit to a broader audience, because methodologies sprout peacock feathers. Problems are converted into statistical measures that are subjected to complicated quantitative or qualitative analysis.

The gain to statistical measures is the reduction to useful but often misleading generalizations, such as Anglo-Saxon law increases economic development by 10% – an assertion we examine below. The cost to this line of argument is that this average tendency can be prescriptively wrong. Country context is too meaningful to support the claim. At best,

what we can claim is a statement of joint causality for particular *categories* of countries. Yet, these categorizations are frequently ignored or, ironically, too readily assumed in statistical work.

Ironically, qualitative research of small samples, *at its best*, is far more successful in bridging the academic and popular divide and the divisions among disciplines as well. There are many reasons why qualitative research is more engaging. It can be closer to narration and hence to a good story. The argument does not deflect from the allegorical treatment of its subject. Qualitative research relies often upon metonymy, where an individual example stands for an entire category. For William Blake, poetry is 'To see the

world in a grain of sand', and it is a dictum that explains the indisputable appeal of historical narration and some of the most enduring studies in social science.

If Angels can fly because they take themselves lightly, as WH Auden observed, then quantitative analyses are often the devil incarnate. Statistical analysis frequently neglects the story. Rather than allegory or metonymy, quantitative analysis tends towards reductionism, whereby entities are evaluated by the weighted contributions of their parts called attributes. For those who practice this trade, there is an important art in crafting reductionist designs that speak powerfully to an issue. However, all too often, the dissection is well accomplished, an apt metaphor, for the subject at hand is never returned to life.

This opposition between categorical and reductionist methodologies can be hyperbole, especially at a time when increasingly sophisticated strategies exist for the quantitative treatment of qualitative material. An important element to evaluating the methodological attractiveness of these mixed strategies is the preservation of the narrative 'whole'. It is, however, misleading to claim that such preservation can be made by retaining the case as the element of study. As the number of cases increases, as it must under a mixed strategy, the qualitative richness of a case study is lost. Then in what sense can a narrative whole be preserved?

The holistic narrative can be partly preserved through the treatment of cases as instances of categories. This claim is different than Andrew Abbott's proposal that a case is part of a temporal sequence that constitutes a narrative (Abbot, 1992; see also Dumez and Jeunemaître, 2006). The category is, we would suggest, the entity that powerfully links analytical research with the popular imagination. People think contingently, defining causality as relationships among 'categories' instead as among attributes. Popular psychology recognizes the primacy of categories in labeling people as 'narcissists' or 'extroverts'. When people are asked about extroverts, they point to particular people as 'best cases' or what in cognitive sciences is called 'prototypes'.¹ Categories are equivalent to recognizing proximity to these best cases. In more formal psychological research, there is an active debate over whether proximity is polythetic, allowing for cases to be assigned the same category by sharing a trait, or by some weighting of traits overall, as would be conducted in a statistical cluster analysis. The convenience of categories is not just then because the 'lay person' is not rigorous; the human brain is a classifying tool and relies upon some kind of 'prototyping' to decide if a case is a member of a category. The strength of belief in a causal claim then varies by the degree of membership in the category.

Categories are rampant in economics (e.g. developed and developing countries), in sociology (e.g. strong or weak societies), and political science (e.g. welfare or market states). Most early anthropological theories of development assigned societies into two categories, community or society, mechanical or organic, primitive or modern. The denial of categories comes at a certain cognitive, if not moral, cost. Development becomes defined as income per capita, independent of whether income is poorly distributed or urbanization destroys physical and social landscapes.

The irony is that while categories are easy to understand, they are hard to analyze because they disguise causal

complexity. Categories have sometimes an implicit theoretical justification insofar that they embody *interactions* or systemic effects. Thus, the claim that a country is democratic is not simply supported by whether there is a vote (many authoritarian countries vote). Rather, the validity of 'democratic' requires the presence of a litany of conditions that generate a system description that citizens have a sufficient liberty and opportunity to vote in and out their leaders. More strongly, categories often are theorized to have performative implications: a country that is democratic achieves particular outcomes.

Analytically, we are interested in identifying categories per interactions that are responsible for a complex causal relation. We are interested in the class of categories that have a truth claim. Examples would be corporatist nations consisting jointly of a given number of properties perform better than those that do not have all of these properties. Formally, this statement defines a category as consisting of *complementarities*, that is, of super-additive properties that produce a particular degree of performance. It is our proposition that the interactions of any two or more elements are the joint features that render a category theoretically meaningful.²

In this paper, we develop a logic by which complements can be detected to permit causal claims. To render our analysis transparent and simple, this logic is restricted to a Boolean algebra that measures membership grades in particular properties and categories as 'in' or 'out' or similarly as 'on' or 'off'. This binary logic is austere but preserves nevertheless the holistic status of a category. It represents a more accessible insight into the use of 'small N' methods than the fuzzy logic methodology explored in an earlier article (Kogut *et al.*, 2004).

The standard model does not work for a technical reason: the number of possible interactions and the number of countries (usually a non-random sample far less than the population of countries) limit their statistical investigation. But there is a broader claim, namely, that complexity is a property of the process by which national systems are generated. Causal statements are specific to historical *processes* lodged in specific cultural *interpretations*. The perceived affinity among institutions, their inter-correlation, is an expression of an underlying cultural logic that lays claim to a particular 'categorization' and body of causal beliefs.

To explore these ideas, we analyze at length two recent lines of research, one called the new institutional economics as incorporated especially in the work on legal systems, the other called 'varieties of capitalism'. These theories confront a problem that other fields, interested in complementarities, have already encountered. How do we determine whether institutions that are viewed as complements are causally or *spuriously* related to the outcome? We show that this problem can rarely be fully resolved, but that an appropriate methodological approach is to explore the diversity of the available data. This methodology is then applied to data from a study on the efficacy of legal systems on wealth to illustrate the basic approach (and to reject the rule of law theory that has run rampant in recent years). The second example we provide is more ambitious and illustrates how the logical expanse of cases can be expanded for analysis by using De Morgan's rule. The application is to

the varieties of capitalism literature that theorizes the existence of corporatist and liberal institutions that affect the wealth of a country. These applications demonstrate the paradox that causal complexity can be well explored by a combination of a rigid logical methodology and a sample size of countries that is neither too large nor too small.

Categories and comparative institutional analysis

A frequent entity of study is the nation that, as the formation of the European Union shows, is an elusive category. The concept of a nation is a category insofar that it includes and excludes. Regions and cities are not nations. Yet, rules of inclusion and exclusion are a poor justification for a category; even Borges' list of the emperor's animals satisfied, however poorly, such rules. The important property is that a nation has a clear ontological status. It is a category of salience and forms a reference point of everyday life. People ask and infer information from the identification of national origins. In a more potent sense, nations define arenas of identity and discourse; they are not simply symbolic objects. Discussions of politics, almost by definition, are sensitive to borders. But so are life's passages, from educational systems to labor markets, from friendship circles to business acquaintances. As important, discourse assumes often a common adherence to background knowledge that is informed by national origins.

For the purpose of causal knowledge, case studies pose well-known hazards. To isolate a causal claim on what makes a country rich when the number of countries are small, we need to invoke implicitly the framework of Claude Bernard, inventor of the scientific method of experimental control, that we learn in our early science classes.³ This framework creates a factorial design in which the presence or absence of a factor (e.g. vitamin C pills) can be tested to determine whether it affects the outcome (e.g. the common cold).

In some fields, this method has permitted the 'case', such as the nation, to maintain a certain ontological status, even if reduced. Weber's method of the ideal type is an example where the nation, though now a composite of attributes, remains the unit of analysis. Over the past decade, there has been a revival – sometimes sophisticated but not always – of country explanations that take the national system as the unit of analysis.

The rediscovery of the nation as a unit in economics serves as a particularly useful example of how theory can be mislead when a comparative approach is absent. Aoki (1990) for example proposes that Japanese success is based on the relationship of three dualities regarding the financial institutions, the vertical authority in a firm, and the horizontal relationships among workers. The Aoki proposal has four aspects that are worthy of mention because they are shared by many theories claiming complex institutional causality. The first is that the proposal is specific to a national case, but it has the implication that nations that have these three institutional dualities will also achieve a Japanese outcome of high productivity. This claim is not comparatively tested. But of course, even if such institutions are correlated and Japan is rich, it does not mean that this combination is jointly causal. To use a phrase that is forever relearned in social science and is due to Robert

Merton (1949), many functions are *equivalent*. Japanese banks may provide oversight (a hypothesis less well held today), but so do institutional investors in America. There is a difference in form, but not in function. Banks and institutional investors may be *functionally equivalent*.

Second, because the theory is not comparative, we have a Popperian conjecture that will be hard to falsify for two reasons. One is the problem of omitted variables mentioned above. If all three variables are correlated with a fourth factor – such as a cultural disposition, then the inferred causality is spurious. The second reason is the more interesting, for it is not *a priori* obvious if the world generates sufficient variety; Ragin (2000) calls this the problem of 'limited diversity'. In a case of three institutions, we have 2^3 possible configurations. Let us assign upper-case letters if an institution is present, lower case if not. The eight configurations are {FVH} {FvH} {FVh} {Fvh} {fVH} {fVh} {fvH} {fvh}, where F is the financial institution, V the vertical, and H the horizontal. The world may not have generated one or more combinations, Claude Bernard and the experimental method be damned.

The third aspect is that the theory is historical in its reasoning. This assumption of time invariance is important for two separate reasons. One is that history provides some of the experiments that a cross-section in time denies. The Weimar Republic created the institutions of work councils, collective bargaining, and increased central bank independence. It did not have well-organized business associations that existed after World War II, hence there is a possible test essentially along the lines of Weber's ideal types.

On the other hand, history complicates the analysis because institutional understandings surely are not time invariant and hence the concept of the nation becomes less crisp. Some have seen this variance as a chance to permit the case of Russia in 1905 to be viewed as separate from Russia in 1917. Clearly, the cases are not independent and they are not causally symmetrical in relation to omitted variables, for 1917 could not have occurred without 1905 (Ragin, 1987). Clearly, institutional understandings change. The Jeffersonian nation of farmers who renew the fountains of liberty by spilling blood every generation has an echo in modern American discourse, but the notional beliefs of the revolutionary farmer are not those held in the contemporary urban America. The concept of nation is defined by every generation, as much as national histories are rewritten. It is this ongoing discursive dialectic between ideational innovations and historical events that allows nations to change, while adhering to a fiction of an invariant national entity.

The last aspect is the problem of diffusion, which is intrinsically related to history. National studies confront a weighty methodological hurdle offered called 'Galton's problem' dating back to the article by Francis Galton in 1889. The ascription of corporatism to German, Sweden, Austria, and other northern European countries can be explained by conditions internal yet common to each country; it appears we have a causal theory based on national conditions. On the other hand, these common internal causes may be the outcome of an earlier diffusion of a belief. Corporatist or welfare economic policies can reflect common institutions of wage bargaining or it can

reflect a common diffusion ideas, such as Protestant beliefs in diligence.

Now, in some sense, an appropriate answer might be, 'So what? There is always a causal regress.' The 'So what?' is that negligence of this problem is a cause of a half-century of disastrous development policies.⁴ The problem can be very weighty, especially if the theory is used to make policies. However, in our view, this framing is misleading, for the issue is whether the processes by which institutions are created or the institutions themselves are causally responsible. If your theory is that institutions are expressions of evolving beliefs, then process may indeed matter. Consider Weber's argument. Protestant beliefs caused high rates of investment that caused economic growth in the form of capitalism. A policy maker at the World Bank can say, I like the functional relationship between investment and growth, but this Protestant thing is a bit vague (and politically incorrect!). Or McArthur after World War II can say, what Japan needs is American labor and anti-trust law. Can institutions that support investment or embody law be transplanted and work like mechanical gears in a larger system?

This is a pretty serious problem, both methodologically and conceptually. It raises issues of level of analysis along the lines of whether institutions are 'neutral' or not (Kogut, 2002). A practice such as 'teams' used in manufacturing production may be transferred with no conflict with existing institutions in some countries. In other countries, teams will conflict with institutions, as they did in Germany with its competing work councils. Diffusion depends upon existing configurations. This means that if northern European countries share a thousand years of institutional and ideational diffusion, they are more likely to adopt institutions from each other than from other regions because the institutional compliance is more likely.

Yet, this characterization still has a mechanical property to it, whereas the broader observation is that institutions, and practices, are subject historically and comparatively to reinterpretation. The discussion in the Weimar Republic over 'American methods' (see also Gramsci's *Prison Notebooks*) was broad and discursive, ranging from 'just how do you measure time of a task' to 'is this American or German?'. In many regards, it was when the imported practice became German and hence experienced as part of the 'everyday' background knowledge of work and organization that it was accepted (Kogut, 1997). In short, the Protestant belief might be an obstacle to diffusion, but the functional fallacy that A causes B means that A everywhere will cause B is transparently (and tragically) false, suggesting that some affiliated belief structure is required for efficacy.

This caution has the implication that comparative analysis does not avoid the statistical problem of 'unobserved' sources of variation. However, a strength of Qualitative Comparative Analysis, described below, is to analyze this complexity through the identification of logical contradictions and a humble reminder that causal assessment is contingent. The logic of complementarities and configurational analysis is confronted with an irreducible problem of causal complexity. For studies involving small Ns, a reasonable methodology is to strike a balance between what can be tenuously inferred and conjectures regarding

what is unknown. This exploration lies at the heart of Qualitative Comparative Analysis.

Boolean logic and qualitative comparative analysis

Qualitative comparative analysis (QCA) proposes a middle path between generality and complexity. This middle path emphasizes the use of a configurational approach to cases and thus retains some of the holism of the case-study approach in the analysis of cross-case patterns.⁵ The approach we describe was specifically designed as a formalization of the logic of comparative case-oriented approach.⁶ QCA provides analytic tools for conducting holistic comparisons of cases as configurations and for elucidating their patterned similarities and differences. This approach to cross-case research, based on a configurational understanding of social phenomena, is the foundation of 'diversity-oriented research,' which is distinct from case-oriented and variable-oriented research.

Most of the discussion is devoted to describing the application of QCA to dichotomous social data on the memberships of cases in categories and sets. In contrast to statistical methodology, which is based on linear algebra, QCA is based on Boolean algebra, the algebra of logic and sets. QCA treats social scientific categories as sets and views cases in terms of their multiple memberships. In Boolean algebra a case is either 'in' or 'out' of a set; that is, memberships in sets are 'crisp'.⁷ Each case is viewed as a member of multiple sets, and membership combinations are compared and contrasted to identify decisive patterns of similarity and difference, which, in turn, provide the basis for constructing causal arguments. With QCA it is possible to view cases as configurations, examine causal complexity (defined as patterns of multiple conjunctural causation – where no single cause may be either necessary or sufficient), and identify types of cases based on the different patterns of causal conditions they exhibit. Thus, social scientists can free themselves from some of the restrictive, homogenizing assumptions of variable-oriented social science without giving up the possibility of formulating statements about broad, cross-case patterns.

In QCA, cases are examined in terms of their multiple memberships in sets, viewed as configurations. This interest in how different aspects or features combine in each case is consistent with an emphasis on understanding aspects of cases in the context of the wholes they form. For example, having many small- to medium-sized political parties ('fractionalization') signifies different things about a country's political stability, depending on the nature of its electoral system, its social diversity, the age of its political institutions, and so on. Another example: having many debts can signal different things about a person's financial situation, depending on his or her other attributes – age, income, employment status, assets, and so on. By looking at combinations of aspects, it is possible to get a sense of a case as a whole, especially how its different aspects fit together. This emphasis on how characteristics combine contrasts sharply with the tendency of the variable-oriented approach to view aspects of cases as analytically independent features.

In every social scientific investigation, the selection of cases and attributes to study is dependent on the

substantive and theoretical interests of the researcher and his or her intended audiences. Sometimes a research literature is especially well developed, and the selection of cases and attributes is relatively unproblematic. In other situations, however, the researcher can formulate a worthwhile selection of attributes only through in-depth analysis of cases. Sometimes it is necessary to constitute relevant cases and their key aspects through a systematic dialogue of ideas and evidence. Researchers progressively refine their understanding of relevant cases and their key aspects as they sharpen the concepts appropriate for studying them.⁸

Once a set of relevant aspects has been identified, the researcher constructs a table listing the different logically possible combinations of attributes ('configurations') along with the cases that conform to each configuration. This table can be seen as a 'property space;' each location within a property space, in turn, can be seen, potentially at least, as a different kind or type of case.⁹ In QCA, attributes are represented with presence/absence dichotomies, with 0 indicating absence (the case is not in the set in question) and 1 indicating presence (the case is in the set in question). Multichotomies (e.g., race/ethnicity at the individual level) are represented with sets of dichotomies, which can be arranged in a variety of ways, depending on the interests of the investigator.

By examining the cases that conform to each configuration, represented as a row of a truth table, it is possible for the investigator to evaluate the attributes he has identified. The researcher asks for each configuration: Do these cases go together? Are they comparable instances, in the context of this investigation? Thus, the configurational understanding of cases treats the comparability of cases at the level of the configuration, not simply at the more global level of the population.

The analysis of configurations confronts the difficulty of trying to understand configurations whose elements share an unspecified and unknown relationship among themselves in reference to an observed outcome. In Boolean logic, these elements are coded 0 or 1, and their observed effect is also coded as 0 or 1. Each configuration indicates, consequently, a truth statement that pairs a particular configuration of elements to a binary outcome.

QCA uses Boolean logic to identify the minimal list of configurations that determine the truth condition of the observed cases (Ragin, 1987). It proceeds by inductively coding the configuration and truth condition of each case, and then applying an algorithm developed for electronic circuit design to find core causal (or functional) relationships, reducing the observed truth table to a minimal number of logical statements. These statements represent the configurations of elements that are jointly sufficient for an outcome.

In some instances, the logical reduction can also determine whether an element is necessary or sufficient. The logic of necessary and sufficiency conditions is a claim regarding the set-theoretic relationships between cause (X) and effect (Y). A necessary condition always subsumes the set of outcomes. There may be cases in which a necessary cause is present but there is no effect, but there is never a case in which the effect is present but the necessary cause is not. In other words, there is no case in which Y but not X .

(This statement can be relaxed to hold true probabilistically, see Ragin, 2000.)

Of course, causes need not be individually sufficient or necessary, and the logical reduction of cases may result in a complex array of causal configurations. Boolean comparative analysis essentially is an inductive logic to find the minimal set of configurations that explains the truth condition. A configuration is itself the intersection of factors whose conjunction causes an outcome. To say that the combination of lean buffers and new work practices cause high performance through their joint presence is logically equivalent to stating that their intersection is causally associated with a particular truth condition. By intersection, we mean that lean buffers 'AND' new work practices causes high performance, where logical 'AND' indicates intersection.

For social science, it is common to find that a given effect is associated with multiple configurations. Multiple conjunctural causation is characterized by the condition of an effect being produced by different combinations of factors. A listing of these causal combinations is expressed logically as the union of the configurations. Union means, for example, that lean buffers 'OR' new work practices causes high performance. (In this example, we would conclude that either condition is sufficient.)

Boolean minimization relies upon two principal operations:

$$\text{Absorption : } A + AB = A$$

$$\text{Reduction : } AB + Ab = A(B + b) = A(1) = A$$

The second operation is derived directly from the distributive and complement laws of Boolean algebra. The first operation derives from the laws of subset. If AB is the intersection of the sets A and B , then this intersection must be equal to, or be a subset of, A .

For every case, there is an associated outcome or truth value. In statistical analysis, the concept of error captures the departure of the actual observation from the predicted value of the outcome. The interpretation attached to an error changes with the number of cases, since the calculation of statistical significance divides by sample size. Boolean logic has a corresponding notion of error through the concept of contradiction. Contradiction arises when the same configuration reveals cases that differ in their truth values. Such contradictions flag potential problems with the theoretical specification, especially regarding potential contamination by neglecting other causal factors. Or such contradictions might reflect error arising through misclassifying the Boolean values of a variable or through unknown random disturbance (which, depending on one's view of science, might also reflect underspecification).

A final issue is the simple fact that that some of the logically possible combinations of conditions will not be observed. This problem of *limited diversity* is distinct from the issue of specification error through omitted variables. Of the possible interpretations, two are particularly important. The first is that limited diversity reflects a weakness in the research design to sample cases for all experimental combinations. An analogue would be a study of the effects of smoking on mortality of men and women

that failed to include any observations on smoking women. But another possibility is that nature rarely runs all experiments. This possibility raises the question of what should be the inference from missing configurations. The Boolean approach, unlike the central tendency of statistical analyses, forces the researcher to analyze the implications of unobserved logical combinations.

To summarize: There are three distinct phases to the application of QCA to cross-case evidence: (1) selecting cases and constructing the property space that defines kinds of cases (configurations), (2) testing the sufficiency of causal conditions, and (3) evaluating and interpreting the results. As already noted, the summary equations that result from the application of QCA should be viewed as part of the larger dialogue of ideas and evidence.¹⁰ The real test of any representation of evidence is how well it helps the researcher and his or her audiences understand specific cases or sets of cases. Broad representations of cross-case patterns provide maps that guide and facilitate in-depth investigation; they are not substitutes for this type of investigation. Thus, QCA has an implicit fourth phase involving the application of the results to specific cases, but this phase is not of QCA proper.

In many respects the first phase of QCA is the most difficult. The dimensions of the property space (i.e., relevant aspects of cases) must be clarified and refined to see if the resulting scheme sorts cases into kinds that make sense. At the same time, the researcher must study the cases initially chosen for investigation and evaluate whether or not the set as a whole has integrity. Dropping or adding cases may help the researcher refine the property space while at the same time increase the comparability of the cases in the study. Simultaneously, the researcher also examines cases conforming to each configuration defined by the property space with respect to the outcome under investigation, with an eye toward their concordance. If outcomes differ too greatly on the outcome, then either the property space must be reformulated, the population must be reconstituted, or both.

Once the researcher successfully stabilizes the relevant cases and the property space that sorts them into kinds, then the assessment of causal sufficiency can proceed. It is probably best to work with several definitions of sufficiency, and conduct tests favoring competing criteria (Ragin, 2000). Once these tests are complete, algorithms implemented in the program QCA can be used to analyze and simplify the patterns. The causal process may iteration in order to address two important issues: (1) the different ways of analyzing logically possible combinations of causes for which there are no empirical instances and (2) how to use theory to evaluate and enrich the results of any logical minimization. These two issues are illustrated below. (See also addressed in Ragin, 1987: 103–113, 142–147.)

In the following, we apply QCA to two different data sets. The first analysis uses data on laws and equity market development to demonstrate QCA in a relatively simple application. Here we just want to reject the claim of ‘one best way’ (what we call ‘silver bullet causality’¹¹) and to establish evidence for multiple configurations. The second analysis used data on ‘varieties of capitalism’ to illustrate the utility of QCA in exploring limited diversity.

The new institutionalism and silver bullet causality

Comparative institutional research is enjoying a renaissance in economics and finance. As the implication of borders for the costs of trade fall and as the national powers of fiscal and monetary stimulus become more dependent on other nations, sovereignty no longer has the classic economic assumption that prices (of inputs and outputs) change discretely by a border. The field of international economics becomes regional economics.¹² Yet, the diminution of sovereignty provokes a thought experiment: what importance is the nation if economic sovereignty is minimal?

As international economics has abandoned borders, there has been a uniting of many streams into a tidal wave of thinking that sees the nation as defining a body of institutions. Nation is no longer coterminous with factor prices but with a body of institutions. This transition poses, at first glance, an uninteresting problem of determining the boundaries of the nation as a collection of institutions. The nation as institutions preserves the spatial perimeter and hence the territorial claim to sovereignty. Institutions as ‘formal’ law retain the state as the answer: the state enacts and enforces laws.

From this premise, one current school of thought in finance and law concludes that these sovereign national legal systems consist of formal institutions with the powers of monitoring and sanction (La Porta *et al.*, 1997). Sovereignty matters, but mediated by the sanctity of good law. Laws in some countries fail to provide sufficient protection for minority investors. As a consequence, equity markets do not develop. They support this logic by classifying countries into legal systems (such as British, French, German) and showing empirically that British (common law) legal institutions develop financial markets better than other countries. This is a silver bullet theory of causation: legal systems determine financial market development.

There is, though, an odd aspect to this literature: the legal systems are all Western. In a more recent paper, La Porta *et al.* (2002) describe liberties as American or British, concluding that American liberties empirically are more correlated with successful outcomes. Whereas the British may feel bad, the rest of the world belongs to the category of ‘not at liberty’. It is possible to travel down this road of criticism longer, but we need not to: recent articles by Berkowitz *et al.* (2002, 2003) provide innovative empirical evidence that institutions are not easily adopted and are causally complex.¹³ They trace the origins of legal systems to the innovating nations and show that transplanted legal systems generally do worse than indigenous ones and some transplants performed better than others. These are exciting papers because they are among the few in this tradition that take as a starting point that institutions are learned, not functional tools to be adopted and applied at will.

In Table 1, we provide their data and list their dependent and independent variables. The dependent variables are GNP per capita and financial market development (which is a measure of the securitization of investments through secondary financial markets). Because we are, in effect, evaluating findings from a conventional statistical analysis, we dichotomize variables on the mean and score above the

Table 1 Data from Berkowitz, Pistor, and Richards

Country	Gnp	pper	Financial	Common	Civil	Transp	Legality
			market				
Argentina	0	0	0	1	1	0	
Australia	1	1	1	0	1	1	
Austria	1	0	0	1	0	1	
Belgium	1	0	0	1	1	1	
Brazil	0	0	0	1	1	0	
Canada	1	1	1	0	1	1	
Switzerland	1	1	0	1	0	1	
Chile	0	1	0	1	1	0	
Colombia	0	0	0	1	1	0	
Germany	1	0	0	1	0	1	
Denmark	1	0	0	1	0	1	
Ecuador	0	0	0	1	1	0	
Egypt	0	0	0	1	1	0	
Spain	1	0	0	1	1	1	
Finland	1	0	0	1	0	1	
France	1	0	0	1	0	1	
UK	1	1	1	0	0	1	
Greece	0	0	0	1	1	0	
Hong Kong	1	1	1	0	1	1	
Indonesia	0	0	0	1	1	0	
India	0	0	1	0	1	0	
Ireland	1	0	1	0	1	1	
Israel	1	0	1	0	1	1	
Italy	1	0	0	1	1	1	
Jordan	0	1	0	1	1	0	
Japan	1	1	0	1	1	1	
Kenya	0	0	1	0	1	0	
Sri Lanka	0	0	1	0	1	0	
Mexico	0	0	0	1	1	0	
Malaysia	0	1	1	0	1	1	
Nigeria	0	0	1	0	1	0	
Netherlands	1	1	0	1	1	1	
Norway	1	0	0	1	0	1	
N. Zealand	1	0	1	0	1	1	
Pakistan	0	0	1	0	1	0	
Peru	0	0	0	1	1	0	
Philippines	0	1	0	1	1	0	
South Korea	0	0	0	1	1	0	
Portugal	0	0	0	1	1	1	
Singapore	1	1	1	0	1	1	
Sweden	1	1	0	1	0	1	
Thailand	0	1	1	0	1	0	
Turkey	0	0	0	1	1	0	
Taiwan	0	0	0	1	1	1	
Uruguay	0	0	0	1	1	0	
US	1	1	1	0	0	1	
Venezuela	0	0	0	1	1	0	
S. Africa	0	1	1	0	1	0	
Zimbabwe	0	0	1	0	1	0	

The above variables are those used in the studies by Berkowitz, Pistor, and Richards. We have dichotomized their values. The abbreviations stand for:

Independent Variables:

Legal System: common or civil law.

Transp: transplanted law.

Legality: factor score measuring rule of law based on judicial efficiency, corruption (inverted scale), rule of law, contract respect, expropriation (inverted scale).

Dependent Variables:

GNPPER: GNP per capita.

Market development: size of capital markets.

mean as 1, below the mean as 0. (More commonly, substantive and theoretical knowledge are used to identify meaningful breakpoints; our goal in dichotomizing at the mean is to conform roughly to the standards implicitly invoked by Berkowitz *et al.* More detailed analysis of these cases is beyond the scope of this demonstration of method.) The independent variables are whether a country has common or civil law, whether the law is transplanted or indigenous, and a measure of legality (also converted to a dichotomous measure by a mean split). There are 49 countries in the data, including all the OECD countries plus middle and low income countries.

In Table 2, we report the results of a Boolean analysis of the data. Upper-case letters indicate that a factor is causally important when present; lower case indicates that the factor is causally important when absent. The first results (panel A) indicate only one configuration is *uniformly* linked to high income: legal systems that are not transplanted, in countries with strong rule of law. This result restates the principal finding of the Berkowitz, Pistor, and Richards. Given the importance of the rule of law, the next analysis looks at the determinants of legality (panel B). The only condition that is *uniformly* linked to legality is the absence of transported law. Countries with better rules of law rely upon indigenous law. However, this condition captures only a small subset of the cases coded positively on the outcome.

The final analysis reports the results of the determinants of financial market development. The dominant belief has been that laws must protect minority investors and thus in countries with strong rule of law, financial markets will be better developed. The results in Table 2, panel C replicate the finding that common law is causally important to financial market development *but* only in conjunction with legality and indigenous law. This is the only configuration *uniformly* linked to strong financial markets. In other words, transplanting common law to other countries does not causally lead to more financial market development.

The Boolean analysis presents a more radical set of findings than those presented in the quantitative analysis of Berkowitz, Pistor, and Richards. Transplanted law is bad for growth, that is to say, *colonial legal legacies inhibit growth*. What matters is the quality of the rule of law and indigenous law. Any claim to the superior properties of common or British law (except for financial market development) is undermined by this analysis. And it also undermines recent claims that colonialism established better institutions in those countries fortunate to be colonized (Acemoglu *et al.*, 2001). The more subtle implication is that legal institutions cannot be measured by 'laws on the books'. Laws and institutions are learned in particular cultural contexts; even transplanted institutions are culturally re-interpreted as Westney (1987) showed for Meiji Japan. There is no silver bullet or prototypical configuration, but only a complex causality.

Limited diversity and the varieties of capitalism

Contrary to silver bullet theories, many studies recognize that economic systems are varied and that there is more than one path to wealth. The research question is to determine the different categories of nations that exhibit

Table 2 Configurational analysis of causal determinants of GNP per capita and market development

-
- A. Effects of Legal System, Legality, and Transplanted on GNP Per Capita
transp*LEGALITY
- B. Effects of Legal System and Transplanted on Legality
transp
- C. Effects of Legality, Legal System and Transplanted on Financial Market Development
LEGALITY*COMMON*transp
-

These results indicate that Anglo-Saxon law (i.e. common) has no effect on per capita income or on legal development; there is an effect on financial development but only in 'conjunction' with other factors: there is no silver bullet.

wealth. The hypothesis is that nations that fit these categories best should have better performance; those that deviate from their category assignment should experience worse performance. The methodological implication is then to find the right categorization (which should be substantially less than the number of wealthy nations) and then correlate degree of membership in that category to performance (e.g., income per capita). Implicitly, then, this research strategy relies upon a *prototype* analysis, in which members that best approximate the prototype do better.

The theoretical origins of this analysis are many, but an important line of reference has been the work that has tried to understand why poor countries just do not become rich given that technology and capital can be imported if a country chooses. It would seem obvious that a critical explanation concerns the political and social institutions of a country. However, institutions are hard to measure. The financial economics literature just assumes that institutions are the same as legal tradition, but we have seen that law is learned. While we do not want to dismiss measures such as the degree of formal legal guarantees, we raise the caution that ideas and institutions diffuse, but rarely in their original forms.

An intermediate solution is to equate institutions with organized interests that engage in strategic bargaining, such as unions, firms, and even central banks. This equivalence diverts attention away from how beliefs become diffused towards what constitutes an institutional equilibrium. It is easy to conclude that not all institutions can be compatible for the achievement of desirable and stable outcomes, such as low inflation and unemployment, growth, and innovation. Some societies can be stuck in a low-level equilibrium. The inquiry into which institutions are 'complements' leads to a kind of John Kenneth Galbraith (1956) logic that if you have monopolistic competition, you should have monopsonistic unions. Equilibria can be explained essentially by a conventional theory of distributive bargaining.

'Varieties of Capitalism' is in fact a theory of distributive bargaining, with equal primacy given to non-statal actors. While this inclusion of private actors is an important shift in political economics, it is consistent with the broader treatment of institutional configurations found in other disciplines. A number of studies have proposed institutional complements as a way to understand national configurations. Boyer (1996), in particular, classifies countries into several types, representing various complements among macroeconomic systems (e.g. Keynesian macroinstitutions) and work practices (e.g. mass production). Amable (1999) also proposes that labor markets and macroeconomic policies reveal complementarity. Their approach implies that configurations are 'complements' in

terms of 'logics'. Logics imply that institutions have an ideological coherence, but they also have a national specificity.

The broader and more ambitious claim is that these bargaining institutions guide the formation of country capabilities that define a country's comparative advantage. Berger and Dore (1996) aptly name this a theory of 'institutional advantage.' These claims are broadly held across many literatures. The claim that is not broadly held is the following: these complementarities consist of two defined sets, one called 'coordinated market economies', the other 'liberal market economies' (Hall and Soskice, 2001). This claim, associated with the label 'Varieties of Capitalism', has a distinctive methodological implication: because common institutions produce common outcomes, the nation is no longer the theoretical unit of interest, but rather institutions and their complementarities that define the two modal cases. We thus no longer have a silver bullet theory, but a multi-bullet theory: you can get the rabbit of high per capita income by one or the other institutional configurations.

The perspective of institutional complementarities has an attractive trait. It looks at the compatibility of institutions and markets, and hence opens the policy question of whether 'cookbook' recommendations are independent of national conditions. In the great rush to advise the transition economies, papers proposed the idea of 'policy complementarities' and indeed the IMF has a menu of 'best practices for corporate governance' that must be enacted in toto. But the issue of policy complementarities not only is an ancient echo, it reveals a stunning blindness: countries already have existing institutions. It is not enough that policies be complements with each other; they also have to be complements with existing institutions.

Configurational analysis provides the important caveat that imported pieces confront an indigenous system of institutions. But then have we not fallen into the trap that there are as many theoretical configurations as countries if indigenous conditions matter? The claim of Hall and Soskice is that countries fall along a continuum between two polar categories, where 'coordinated market economies' anchor one and 'not-coordinated market economies' (to use Boolean logic) anchor the other. Indigenous conditions may matter, but if a country cannot conform to one of the two prototypes (i.e., coordinated or market), then it will suffer in economic performance. This hypothesis of the 'weak middle' is a theoretical claim that deserves empirical testing.

It is important to state explicitly that different methods produce different results; hence, the issue is not so much whether one method is right or wrong – though this may be

a reasonable determination in some cases – as whether the analysis and results permit an appropriate reduction of the data to allow testing and understanding. We will argue that QCA is particularly useful in permitting a richer assessment of the causal reasoning and permits an exploration of causal *possibilities*. This exploration is particularly useful when not all interactions can be observed.

Hall and Gingerich (2001) focus on testing the theoretical claim of the weak middle by looking at the institutional complements and their relationship to growth for 20 rich OECD countries in the period 1971–1997. Using factor analysis, they construct scales designed to assess the degree to which coordination is market-oriented or strategic in two spheres of the political economy, those of labor relations and corporate governance. Countries that score high on these scales in both spheres are ‘coordinated market economies’; those that score low on both are ‘liberal market economies’ and both are expected to display superior rates of growth. Countries that score high on the relevant scale in one sphere but low in the other (or vice versa) constitute mixed cases in which economic performance, controlling for other variables, is expected to be relatively poorer. These control variables are changes in the terms of trade, the rate of inflation, international growth conditions (weighted according to trade openness), dependency ratio (a measure of demographic structure), and the log of a country’s per capita income in 1971. Using a sophisticated panel analysis, they find that countries located in the middle of these two institutional configurations do less well than those that adhere to them.¹⁴ Thus, they find evidence that deviations from these two theoretical prototypes decay performance.

The advantage of a panel analysis is that the number of observations is $N \times T$, such that a data set of 20 countries over 27 years becomes quite large for statistical testing of a few parameter values. The data consist of economic observations that vary by year, plus country fixed effects captured by time-invariant measures of the degree to which a country is a coordinated market economy or a liberal market economy. Because other country effects would be captured by these time invariant measures, they apply a battery of statistical refinements to correct for the problem.

Our interest is not the effectiveness of these refinements (which appear to us as reasonable decisions given this standard problem caused by time-invariant variables in a panel analysis). Rather, we make the following observations. The first observation concerns the research design and the implications for confirming the hypothesis. The study proposes the type of economy is given as fixed over the 27 years; in other words, institutions are seen as relatively time invariant over a period of some duration. Now, if being in-between the two types (liberal and corporatist) is a handicap, as it is presumably for Switzerland in their analysis, then how did these in-between countries become rich in the first place? To be fair, this question is not posed or tested by Hall and Gingerich. This attribution of low performance to institutions that characterize rich countries is found in many studies, including the financial economic studies reviewed above that claim non-Anglo law countries perform worse.

Since their analysis focuses on annual growth rates (rather than wealth, *per se*), we are essentially asking: what

is the effect of institutional complements on growth among countries that have a high initial level of wealth. The precise hypothesis of Hall and Gingerich is that there is a curvilinear relationship between the degree of adherence to coordination and income among countries that are already wealthy. We return to this question after explaining how we converted their data to a format appropriate for QCA.

To translate Hall and Gingerich’s interval-scale variables to crisp sets, we first converted their pooled time-series data set to a more conventional cross-sectional set by averaging the values for each case over the entire time period. For example, instead of receiving a score on economic growth rate for each year, each country received a single score – its average rate of growth over the entire period.¹⁵ To create conventional binary sets from these variables, we dichotomized them at or near their median values. The resulting binary scores for growth and the six measures of corporate governance (shareholder power, dispersion of control, size of stock market, level of wage coordination, labor turnover, and degree of wage coordination) are reported in Table 3.

Before proceeding to the analysis of these scores, it is important to point out that our analysis is very different in character from Hall and Gingerich’s, not only because of the difference in technique, but also because of the difference in structure – pooled cross-sectional time series analysis *vs* cross-sectional analysis. For example, after computing averages over time for each case, we found that the correlation between the log of initial GDP per capita (which is constant across time in their analysis) and average growth rates is very strong, $r = -0.816$. The scatterplot of these two variables reveals a near-perfect inverse relationship. It is clear, therefore, that explaining average growth rates over the entire period is not the same as addressing year-to-year fluctuations in growth rates. In fact, the relationship between average rate of growth and log of initial GDP per capita demonstrates that most economic growth over this period involved a convergence among the rich countries. The less rich of the rich countries grew faster than the richer rich countries, indicating a trend toward the equalization of levels of wealth among the richest countries of the world. There is little variability in growth rates to explain after assessing the effect of initial GDP per capita.¹⁶ Given that the coordination (i.e. institutional) variables are time-invariant as well, there is arguably little loss moving from a panel to a cross-sectional analysis. QCA is well suited to this type of analysis, while over time data pose more difficulties.

In our application of QCA to these data, we focus on the six time-invariant coordination variables in our analysis of average growth rates, dichotomized into faster growing *vs* slower growing. As already mentioned, there is no point in looking at the impact of initial GNP per capita, because of its near-perfect negative relationship with average growth rates. In effect, our analysis of average growth rates (faster *vs* slower growth) is also an analysis of initial levels of wealth, in reverse (lower *vs* higher initial wealth). We present an analysis of the links between the six coordination variables, all dichotomized, and average growth, also dichotomized. We do not examine Hall and Gingerich’s four control variables (international demand conditions,

Table 3 Hall and Gingerich's data converted to Boolean values

Country	Growth	Degree of wage coordination	Level of wage coordination	Labor turnover	Shareholder power	Stock market size	Dispersion of control
Austria	1	1	1	1	1	1	1
Germany	1	1	1	1	1	1	1
Italy	1	1	0	1	1	1	1
Belgium	1	0	1	1	1	1	1
Norway	1	1	1	1	0	1	1
Finland	1	1	1	0	1	1	1
Portugal	1	0	1	1	1	1	1
Sweden	0	0	1	1	1	0	1
France	0	0	1	1	1	1	1
Denmark	1	1	1	0	1	1	0
Japan	1	1	1	1	0	0	0
Netherlands	0	0	1	1	1	0	1
Switzerland	0	1	1	1	1	0	0
Spain	1	0	0	0	0	1	1
Ireland	1	0	0	0	0	1	0
Australia	0	0	0	0	0	0	0
New Zealand	0	0	0	0	0	0	0
Canada	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	0
United States	0	0	0	0	0	0	0

The coordination dichotomies are all coded in the same direction, with a score of 1 signaling conformity with 'coordinated' market economies and a score of 0 signaling conformity with 'liberal' market economies. After growth, the next three columns concern labor market coordination; the last three are measures of 'corporate' coordination (though scored inversely to intuition). There are only 12 unique combinations among the 20 countries.

change in the terms of trade, the rate of inflation, and change in the dependency ratio). For the most part, these control variables make sense in their context of an analysis that has an explicit longitudinal component, focusing on variation in growth rates over time. We have noted already that the control variables do not appear to add much to the explanation for changes in income levels (as opposed to growth rate variability) in any event.

We begin by noting that with six causal conditions – the six coordination variables – a saturated experimental design would require the examination of 64 unique combinations. Obviously, with an N of 20 it is impossible to cover all 64 combinations. It is worth noting that 12 different combinations are evident among the 20 cases in Table 3, indicating considerable diversity among the cases with respect to institutional configurations. The only uniform clustering is the five liberal countries with market coordination: Australia, Canada, New Zealand, United Kingdom, and the United States. While only two countries, Germany and Austria, have the full complement of corporatist institutions, an additional six countries have five of the six features. If we also count Ireland as a 'near-miss' in the liberal category (with five out of six liberal features), then the total number of mostly-to-fully consistent cases is 14 (out of 20 total).

Coding the data as binary exposes the possibility that some countries are assigned values that do not correspond to common beliefs. The researcher may decide this coding is wrong, or that the item itself is not useful. By making the categorical assignments explicit, QCA renders more explicit the choice of items and the coding.

Consider the data from Hall and Gingerich used to calculate the dichotomy as given in Table 3. As you can see, Sweden has the same score as France, Belgium, Netherlands, Spain and Portugal. Table 4 presents the averaged scores for labor market coordination.¹⁷ We dichotomized the ranking such that labor market coordination in Sweden and the Netherlands is coded at 0, the same level as the US. This coding contradicts the widely-held finding that Swedish labor institutions are highly coordinated. What should a researcher do in this case?

One argument would be to recode Sweden. However, if we recode Sweden, then technically we also have to recode the several other cases that have the same score on this variable (2), which means that 70% of the cases will have a 1 (present) on this variable.

In order to keep the following analysis relatively simple, we will preserve our assignments. Recoding Sweden does not change the broad results we will give and we encourage readers to try out different coding to check for robustness. Exploration of complex and high-dimensional space is, we would like to underline, one of the advantages of QCA.

Viewing Table 4 configuration by configuration, only one of the 12 existing combinations of the six coordination dichotomies is causally 'contradictory' – linked empirically to both slower and faster growth rates. The combination in question involves all but one of the six elements of corporatist coordination – the three cases with this combination have a low degree of wage coordination, despite having all the other corporatist elements. Two cases with this combination, Belgium and Portugal, had higher growth rates, while France had a lower growth rate. In the

Table 4 Averaged labor market coordination variables

Austria	3
Germany	3
Japan	3
Italy	2.5
Norway	2.5
Finland	2.2
Denmark	2.2
Switzerland	2.2
Belgium	2
Portugal	2
Sweden	2
France	2
Netherlands	2
Spain	2
Ireland	1.5
Australia	1.5
New Zealand	1
Canada	1
United Kingdom	1
United States	1

These scores are the averages of the labor market variables given in Table 3. As we can see, Sweden and Netherlands are tied with several other countries, and yet both countries, especially Sweden, are known for their coordinated labor practices. The research can use qualitative information to recode them and can also try out different codings to explore their causal implications.

analysis that follows, we treat France as an unexplained outlier, in line with the thrust of Hall and Gingerich's theory.

Exploring limited diversity

The first stage of our analysis has consisted of taking the inventory of how saturated is the dimensional space. This exercise alone provides considerable insight into what the data provides and what are the historical limitations of the full theoretical diversity. Stage 2 then consists of a reduction of the observed configurations to causal elements. Given limited diversity, we would like also to explore the implications of what history has not generated as an observed configuration.

We rely upon two procedures to explore the causal relationships and limited diversity. One makes the maximum use of the evidence, allowing the use of simplifying assumptions; the other avoids simplifying assumptions altogether. Consider first the maximum use of the evidence. For every logically possible combination (64), there is an associated truth value. With Hall and Gingerich's data, the truth value is 1 if linked to faster growth (nine combinations, embracing 11 cases) and 0 if linked to slower growth (three combinations, embracing eight cases).¹⁸ The remaining 52 combinations (those lacking empirical cases) are coded as 'either 1 or 0,' and the minimization algorithm is free to use them to simplify the results (see Ragin, 1987). The resulting equation is not 'obligated' to cover all the configurations lacking cases; it covers only those that help produce more parsimonious results.

For example, assume that configurations ABC and aBc both lead to high growth. (As before, upper-letters indicate the presence of a causal condition; lower-case letters indicate its absence; multiplication indicates combined conditions; and addition indicates alternate causal combinations.) These two cannot be reduced because neither of the two minimization rules, absorption and reduction, can be applied. Assume configurations ABc and aBC lack cases and the analysis permits simplifying assumptions. These two configurations could be used as assumptions to simplify 'ABC + aBc' to 'B', as follows:

$$\begin{aligned}
 Y &= ABC + aBc + ABc + aBC \\
 &= (ABC + aBC) + (aBc + ABc) \\
 &= (BC) + (Bc) \\
 &= B
 \end{aligned}$$

When the number of existing configurations is small relative to the number of logically possible configurations, the impact of simplifying assumptions is substantial. Generally, researchers should check the plausibility of each simplifying assumption that is made. However, the analysis of plausibility of the simplifying assumptions made in the subsequent reanalysis of Hall and Gingerich's data is far beyond the scope of this brief discussion of method. However, we do sketch the nature of this analysis. Table 4 shows our coding of each country's configuration of institutional structures.

The results of our analysis of these data are presented in Table 5. Panel A shows the solution for high growth, without simplifying assumptions. There is one mixed liberal configuration, the first, with four liberal elements and one corporatist. This mixed combination is specific to Ireland and Spain. The next one is also mixed, with four corporatist elements and one liberal. It is specific to Denmark and Finland. The next three configurations, all uniformly involving five of the six corporatists elements and no liberal elements, embrace Austria, Germany, Italy, Belgium, Norway, Finland, and Portugal. These three configurations provide the strongest support for Hall and Gingerich with respect to the importance of corporatist coordination for economic growth. The final configuration is specific to Japan and is inconsistent from Hall and Gingerich's perspective. It combines all the corporatist labor relations elements and all the liberal corporate governance elements. According to Hall and Gingerich's theory, Japan should have suffered very poor economic performance over this period.

The finding that less developed equity markets is associated with higher growth contradicts some theories of economic growth, such as those reviewed earlier. Of course, some have hypothesized that banking systems do better: they are useful for 'catching up' or they are more 'patient'. It is also possible that the relationship is spurious. Since corporatists countries did well in this period and since they have smaller equity markets, the causal inference is assured.

Given that so much of the causal space is not occupied, it is useful to check the simplifying assumptions that enter into these inferences. Panel B of Table 5 shows the results of this same analysis, permitting simplifying assumptions. Because there are so many combinations of conditions

Table 5 Configurational analysis of causal determinants of growth for Hall and Gingerich data

<p>A. Solution for High Growth/Low Initial GDP per capita, <i>without</i> simplifying assumptions: degreewc levelwc turnover sharehld STOCKMKT+DEGREEWC LEVELWC turnover SHAREHLD STOCKMKT+DEGREEWC LEVELWC TURNOVER STOCKMKT DISPERSN+DEGREEWC TURNOVER SHAREHLD STOCKMKT DISPERSN+LEVELWC TURNOVER SHAREHLD STOCKMKT DISPERSN+DEGREEWC LEVELWC TURNOVER sharehld stockmkt dispersn</p>
<p>B. Solution for High Growth/Low Initial GDP per capita, <i>with</i> simplifying assumptions: STOCKMKT+One of the following: DEGREEWC sharehld+LEVELWC sharehld+TURNOVER sharehld</p>
<p>C. Solution for Low Growth/High Initial GDP per capita, <i>without</i> simplifying assumptions: degreewc levelwc turnover sharehld stockmkt dispersn+DEGREEWC LEVELWC TURNOVER SHAREHLD stockmkt dispersn+degreewc LEVELWC TURNOVER SHAREHLD stockmkt DISPERSN</p>
<p>D. Solution for Low Growth/High Initial GDP per capita, <i>with</i> simplifying assumptions: degreewc stockmkt+SHAREHLD stockmkt Where: DEGREEWC = degree of wage coordination (upper case indicates a high degree) LEVELWC = level of wage coordination (upper case indicates a high level) TURNOVER = labor turnover (upper case indicates a low level) SHAREHLD = shareholder power (upper case indicates a low level) STOCKMKT = stock market size (upper case indicates a smaller stock market) DISPERSN = dispersion of control (upper case indicates a low level)</p>

Variable names in upper case indicate conformity to corporatist coordination; lower-case indicates conformity to liberal coordination. These results illustrate the high complexity in the causal relationships among institutions and economic growth. By simplifying assumptions, we look at the 'pathways of causality' for which we have data and we add in some assumptions about those missing in order to arrive at a more simple set of relationships.

lacking cases, the reduction from panel A to panel B is substantial. In essence, this analysis constitutes an attempt to pinpoint the decisive differences between the high-growth and the low-growth countries, based upon information about their economic institutions. The first term is simply smaller stock market size, a characteristic shared by all the high-growth countries except Japan. (As noted in the table, upper case indicates values consistent with corporatist coordination.) For the second term, there is a choice among three configurations, each with two conditions. Essentially, these are three different ways to capture Japan's distinctiveness from the low-growth countries, given that it has a larger stock market (a feature not shared by the other high-growth countries). Japan can be seen as different from the low-growth countries in its combination of lower shareholder power with any of the three elements of corporatist labor institutions.

Overall, the results in panel B indicate that the most decisive single difference between low growth and high growth countries is stock market size, with smaller stock markets linked to superior economic performance. One possible interpretation of this finding is that smaller stock market size is a defining feature of economies with corporatist institutions, which in turn are strongly linked to superior economic performance over the period studied by Hall and Gingerich.

Panel C of Table 5 shows the results of the analysis of the low-growth countries. There are three configurations linked to slower relative growth. The first is perfectly consistent with liberal labor relations and liberal corporate governance, an institutional configuration that should be *high-*

growth according to Hall and Gingerich. This configuration embraces Australia, New Zealand, Canada, the United Kingdom, and the United States. The second, which covers only Switzerland, combines elements of corporatist labor relations with two out of the three elements of liberal corporate governance. It thus resembles Japan in five of six aspects. However, this case, unlike Japan, experienced low growth over this period. The third low-growth configuration, which embraces Sweden and the Netherlands, is also mixed with four corporatist elements and two liberal elements. While the low-growth experience of these three countries with mixed configurations supports Hall and Gingerich's theory, the most striking finding from the analysis of the low-growth countries is the cluster of five countries with uniformly liberal characteristics. This pattern directly contradicts the strong version of their theory. However, the weaker version that looks at both institutional configurations is not contradicted: consistent coordinated economies are not slow growers.

Finally, panel D of Table 5 shows the results of this same analysis using simplifying assumptions. Once again, the results are parsimonious because of the very large number of simplifying assumptions that have been made, which again reflects the fact that only 12 of the 64 logically possible combinations are found among these 20 countries. There are two configurations linked to slower relative growth: lower degree of wage coordination combined with larger stock market and less shareholder power combined with larger stock market. The first configuration embraces the five liberal countries; the second embraces three countries: Sweden, the Netherlands, and Switzerland.

Exploration of the logical space by De Morgan's law

It is important to point out that the results reported in panel D are a perfect negation of one version of the results of panel B. We can do better by the use of De Morgan's Law. This law imposes a logical *mirror* on observed causal relationships in order to populate more fully the empirical occupation rate of the causal space. Specifically, it is possible to completely reverse (negate) the results in panel D by applying De Morgan's Law to this equation, as follows. First, state the equation for low growth:

$$\text{low_growth} = \text{degreewc} * \text{stockmkt} + \text{SHAREHLD} * \text{stockmkt}$$

Next, apply De Morgan's Law by reversing the outcome, changing all upper-case to lower-case, and vice versa, and then also changing intersection to union, and *vice versa*:

$$\text{high_growth} = (\text{DEGREEWC} + \text{STOCKMKT}) * (\text{sharehld} + \text{STOCKMKT})$$

Finally, simplify the terms using Boolean algebra:

$$\text{high_growth} = \text{STOCKMKT} + \text{DEGREEWC} * \text{sharehld}$$

This application of De Morgan's Law indicates that the most logically consistent result in panel B given the findings of panel D is the first of the three alternatives listed. This choice makes the results for high growth the perfect inverse of the results for low growth, when simplifying assumptions are used. Of course, if all 64 possible configurations were present and there were no contradictions, then the logical inferences derivable from the high-growth configurations would be the same as those derivable from the low-growth configurations. However, given limited diversity, this is unlikely to be the case. Hence, the finding of a perfect inverse provides indirect evidence in support of the simplifying assumptions that have been made in panels B and D.

As noted previously, it is important to assess simplifying assumptions and not to make them mechanistically. Table 6 offers a guide to this assessment. It cross-tabulates the eight logically possible combinations of labor institutions against the eight logically possible combinations of corporate institutions. The cells of this table report the number of empirical instances of each of the 64 logically possible combinations. Of course, most cells are empty. The only cell with a substantial number of cases is the combination of consistently liberal labor institutions with consistently liberal corporate institutions (which we have shown to be a low-growth configuration).

The shaded portion of Table 6 shows the cells that are consistent with our equation for high growth:

$$\text{high_growth} = \text{STOCKMKT} + \text{DEGREEWC} * \text{sharehld}$$

(i.e., small stock market size or the combination of a high degree of wage coordination and greater shareholder power). It is clear that most of the shaded cells, those embraced by the equation for high growth lack cases. Thus, this table makes the dependence of parsimonious statements on simplifying assumptions in situations of limited diversity quite transparent. To assess the impact of limited diversity, it would be necessary to evaluate the plausibility of the inference that cases in these shaded cells, if they in fact existed, would experience high growth. Generally, it is

Table 6 Mapping limited diversity and assessing simplifying assumptions^a

Configurations of corporate institutions	Configurations of labor institutions							
	dlt	DlT	dLt	DlT	dLT	DlT	DLt	DLT
psc	5	0	0	0	0	0	0	1
psC	0	0	0	0	0	0	0	0
pSc	1	0	0	0	0	0	0	0
Psc	0	0	0	0	0	0	0	1
pSC	1	0	0	0	0	0	0	1
PsC	0	0	0	0	2	0	0	0
PSc	0	0	0	0	0	0	1	0
PSC	0	0	0	0	3	1	1	2

Corporate Institutions (upper case denotes corporatist elements): P = low shareholder power; p = high shareholder power; S = small stock market; s = large stock market; C = low dispersion of control; c = high dispersion of control.

Labor Institutions (upper case denotes corporatist elements): D = high degree of wage coordination; d = low degree of wage coordination; L = high level of wage coordination; l = low level of wage coordination; T = low level of labor turnover; t = high level of labor turnover.

^aShaded portion of the table shows cells covered by the equation for high growth.

best to make these assessments cell by cell. Note that all the unshaded cells are covered by the equation for low growth reported in panel D of Table 5. To assess the plausibility of the simplifying assumptions for low growth, it would be necessary to follow the same procedure – examine the unshaded empty cells one at a time and evaluate the empirical plausibility of the assumption that cases in these cells would be low growth – if they existed.

While it might be tempting to divine some sort of silver bullet out of the results in panels B and D in Table 5 (focusing on stock market size, shareholder power and degree of wage control), it would be a mistake to do so. The goal of the analyses presented in panels B and D is to provide maximum logical parsimony, based on key differences between positive and negative cases. However, the larger goal of this reanalysis of Hall and Gingerich's data is to focus on configurations of institutions and to make configurational comparisons of empirical patterns. For these interpretive purposes, the results in panels A and C are clearly more useful.

Overall, our findings provide a configurational assessment of Hall and Gingerich's argument. High growth is linked to consistently corporatist configurations, but it is linked to several mixed configurations as well, including one that is completely discordant (Japan, with corporatist labor relations and liberal corporate governance). In sharp contrast to their reasoning, low growth is clearly linked to consistently liberal configurations. Even the reduced equations reported in panels B and D reveal that mixed (inconsistent) configurations are linked to both high growth and low growth.

Given these results, it may seem puzzling that Hall and Gingerich were able to produce findings indicating that consistently liberal and consistently corporatist institutions promote growth. It is important to restate that our two

approaches are not perfectly comparable. It is possible that *statistically* their findings are correct. We also note that QCA has itself limitations, though we have also pointed out that these limitations are largely explicit and flag areas requiring further exploration.

However, the statistical advantage of a panel analysis has itself particular cautions, especially when the actual 'case number' is small. Panel analysis inflates the 'N' provided by pooled cross-sectional time-series analysis; in the case of Hall and Gingerich, a country N of 20 is inflated to 540. This inflation is very common and can surely be defended. It is still useful to recall that an essential and often the main ingredient for statistical significance is large sample size. Applying conventional regression techniques to data averaged over the whole period (i.e., a cross-sectional N of 20), we are able to produce findings that are marginally consistent with the patterns they report. However, the pattern is (a) weak, (b) lacks statistical significance, and (c) sensitive to model specification. Given that many of the most critical variables are time-invariant (thus such techniques as differencing cannot be used), the statistical results would appear sensitive to the choice of time-varying control variables. This conclusion is troubling only insofar that these control variables are theoretically well-specified, which they may well be in their study.

The advantage of QCA is to provide the opportunity to assess how individual countries are assigned to causal configurations. Whether other configurations that are theoretically grounded can be identified is open to investigation, but the configurational inferences from the analyses presented in Table 5 suggest principally one: Anglo-Saxon (i.e., liberal) stock markets are bad for growth for the time period under study. It can well be that certain configurations are *statistically* more important. Thus, there can well be a complementarity between statistical and QCA analyses. Nevertheless, these preliminary investigations indicate that the relationship between institutional configurations and changes in income levels is more complicated than hypothesized by the varieties of capitalism.

Conclusion

It is humbling to acknowledge that our understanding of the relationship between institutions and system (sometimes captured by the notion of the nation) outcomes is complex. Such complexity is an invitation for exploration of what history has revealed and has not revealed and how our inferences are contingent upon the assumptions we need to impose on this limited diversity of experimentation. Ultimately, the verification of this exploration turns back to deep knowledge of the cases themselves and the interpretation to which we attach to the studies of nations and institutions.

The ambition of this article has been, thus, not to suggest other prototypical configurations of best institutions, but to propose a method of inquiry that takes seriously causal complexity and limited diversity. Through the empirical investigations, we have illustrated a few ideas: (1) it is useful to analyze categories as 'present' and 'not-present', as in the relationship of growth to 'not-colonized', (2) causal inference should take explicit account of the 'pathways' not observed due to limited diversity and

simulate what might be the relations given our best 'theory', and (3) inference can be improved by logically projecting the mirror evidence (what we called here De Morgan's law) to populate more fully the empirical realizations in an abstract causal space.

This dialectic between case and logic that recognizes limits on what we can know is a reinterpretation of the 18th century enterprise to classify and to ascertain scientific laws. But such humility has a particular moral honesty as well, as we look back upon a half century of misguided attempts to advise the developing world on best models for emulation. An approach that respects both logic and pragmatic knowledge of the field has not only a methodological merit for research, but also provides a more diverse framing for policy formulation as a contingent exploration, open to revision.

QCA represents one method by which this exploration of complexity can be conducted. Based upon an inferential logic, it identifies interactions that can test the causal claims that particular categorical prototypes (e.g. rule of law nations or coordinated market economies) are associated with particular outcomes. However, the analysis also provides the opportunity to understand the limits of the observed diversity generated by history and to formulate more clearly the logical assumptions that permit inferences to be proposed. It permits as well a transparent investigation of counterfactual claims that allows for an interaction of hypothesis and available data (see Ragin, 2004).

QCA, like any method, is indifferent to the data to which it is applied. However, the interaction of explored diversity and causal claims sensitizes the researcher to the historical situatedness of any investigation. The analysis given in this article shows that the concept of the nation has proven historically useful by which to understand the importance of indigenous institutions for the efficacy of adopted foreign practices on economic growth and financial development. Yet, at the same time, the study of the varieties of capitalism suggests that nations are useful units of analysis, as long as they remain the proper arenas by which to understand the context of the micro-beliefs of actors. In the course of history, many other units besides national geography provide more relevant descriptions of interpretative context. It is telling in fact that nations often have no geography, such as the use of 'nation' to describe the linguistic affiliations of students in medieval universities, or the relevance of ethnic diasporas (such as Armenians, Jews, or Gujarati) to understand the institutional foundations of foreign trade.

The crispness of *nation* as a fact in comparative research will be increasingly challenged in light of the polarization of identity toward ethnic and regional associations on the one hand and the integration of nations into larger political units (such as the European Union) on the other. There are new methodologies, for example fuzzy-set approaches, that can account for the blurred ontological status of *nation*, and for the fact that individuals may hold national memberships that are both multiple and partial (see Ragin, 2000.) This new approach avoids the problem faced in the studies examined above of trying to define legal systems or national economies in terms of crisp categorizations. Our reanalysis of Pistor, Berkowitz, and Richards' data returns attention not to national aggregates, but to the behaviors of

individuals and their deference to changing institutions situated spatially but in the context of a communicating world economy. Institutions matter but as instances of models of fuzzy cultural interpretation that prevail at distinct historical junctures.

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Notes

- 1 See Rosch (1978) and the discussion in Lakoff (1987). Prototypes and complements are discussed in Kogut *et al.* (2004).
- 2 Super-additivity as a defining property of complementarity is well explained in Milgrom and Roberts (1990).
- 3 See Curchod (2003), for a discussion of Bernard and the comparative method.
- 4 See Easterly (2002) for an insider's naïve critique of these theories. For a particularly interesting analysis of over-confidence in formal knowledge, see Scott (1998).
- 5 The rationale for this approach is presented in Ragin (1987: 121–123, 164–171).
- 6 See Drass and Ragin (1992).
- 7 See Ragin (2000), for how to work with grades of memberships in sets, using fuzzy algebra.
- 8 Ragin (1987).
- 9 See Lazarsfeld (1937: 119–139).
- 10 Ragin (1987: 164–171).
- 11 The expression derives from the tale of the necessity of using a silver bullet to kill Dracula.
- 12 In the new economic geography, regions are the undulations of economic activity powered by population, transport costs, and technology. Comparative differences are due to accidents and sustained by technical parameters, not institutional rules of exchange.
- 13 These studies are summarized in Pistor and Berkowitz (2003).
- 14 This relationship is detected by building the construct called 'coordinated market economy' and then taking its square. The quadratic estimation shows negative and positive signs on the two respective constructs, suggesting a U-shaped relationship between conformity to ideal types and growth.
- 15 This averaging of the data, which are then analyzed as a cross-section, is standard fare in the studies of the accounting of economic growth.
- 16 It is an implicit claim of the varieties of capitalism approach that endowments and capital investments are endogenous; institutions determine the attractiveness of investment in equipment and in education.
- 17 We thank Peter Hall for his incisive comments on this coding.
- 18 Recall that we are treating France as an outlier, so the total number of cases is 19.

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