Article

Should Social Science and Jurisprudence Imitate Natural Science?

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Abstract

Scientism—the belief that social science and jurisprudence can discover universal and deterministic laws about the human world in the same way as natural science has about the physical world—carries enormous influence today. It is most evident in the "formalist" traditions of social science and jurisprudence, which have managed to occupy "mainstream" positions, despite an abundance of contrary evidence and "alternative" theoretical challenges. They have done so mainly by resort to deductive, even mathematicized, logic modeled after the axiomatic system of Euclidean geometry, which many consider the unique resource of Western civilization, absent in non-Western civilizations. In natural science, there has been a close and organic working together of deduction and induction, but that has not been possible in the much more complex and paradoxical social world, in which the subjective and the objective, the contingent and the necessary, the particular and the universal coexist and interact. The stubborn attempt to impose universal laws on the social world is what has driven formalist theories' reliance one-sidedly on deduction over induction. To correct that tendency, this article argues for a social science that begins instead from induction based on empirical evidence, thence to apply deduction to draw out the logical implications and hypotheses, and then to return to the practical world to test the formulations, in an unending process, thereby to

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construct not universal and absolute theories, but theories and insights with delimited empirical conditions and boundaries. That, we argue, would be the genuine application of a truly "scientific method"—the essence of which is mutually propelling deduction and induction, not the insistence on defining deterministic universal laws to the disregard of contrary evidence.

Keywords
formalist theory, Weber and Langdell, history, deduction and induction, abduction, new institutional economics, value choice

Natural science has most certainly played a crucial role in global modernization and, in a China that is striving wholeheartedly for modernization, the idea that everything must look to the lead of natural science has become an article of faith. That kind of attitude can be seen in the very term "social *science*"—although there have been efforts to distinguish social, economic, and political studies from the natural sciences, over time most people have come to adopt the term "social *science*" (rather than "social studies," for example) and almost habitually equate the social sciences and jurisprudence with "science," even more so in China than elsewhere. That kind of inclination is perhaps most evident among education administrators, but is of course also found among academic practitioners themselves.

This article will first seek to spell out the differences between social science–jurisprudence, and natural science. This of course does not mean that we advocate complete segmentation between social science and natural science and reject any efforts at learning from the other, but rather that, given the overwhelming influence of "scientism"—that is, the belief that social science and jurisprudence, which pertain to the human world, should seek universally applicable laws in the same way as natural science—what needs to be emphasized are the differences between the two. What this article calls "scientism" refers not just to the powerfully influential schools of "naturalism," "positivism," and such in the history of philosophical thought but rather more to the fact that, on account of the tremendous role that science and technology have played in the modern world, something apparent to all, they have come to enjoy such overwhelming prestige that people naturally tend to think that their methods are broadly applicable not only to the physical world but also to the human world. What this article argues, however, is that only if we grasp the differences between the two worlds can we effectively borrow, in a delimited way, the true methods of natural science to study the human world.

Differences between Social Science and Natural Science

Differences in Subject Matter

First, we need to spell out the crucial differences between the two in subject matter. Human beings possess will, reason, emotions and are not material objects, and human society is comprised of interactions among such human entities. Therefore, especially in the realm of actual practice (distinguished from theoretical constructions), human society clearly comprises subjectivity in addition to objectivity, particularity in addition to universality, and chance and ambiguity in addition to deterministic certainty, whereas the study of matter needs only consider its objectivity and universal regularity. To be sure, the natural sciences, during the course of their modern development, have come to finer and finer distinctions of sub-disciplines, each of which has its own particular object of study and its own set of laws and methods. But, generally speaking, natural science still leans strongly toward universalism and objectivism, something which is particularly evident in the first systematic modern paradigm of natural science, Newtonian mechanics. Its core beliefs are: (1) the objects of scientific inquiry are immutable, independent of the researchers, and impervious to subjective factors; (2) the natural world is governed by a few universally valid laws; (3) propositions and predications about the natural world can be obtained through logical deduction starting from the combination and application of a few basic axioms, just like in Euclidean geometry (Bohm, 1971 [1957]: 130-32; Cohen, 2002: 57-58).

Many people think that the highest goal of social science research should be to imitate and pursue such universalism. However, the simultaneous presence of the universal with the particular, and the objective with the subjective, makes for a human world that is very different from the physical world. The key to understanding the human world is not to disregard the particular and seek only universal laws, but rather to see their coexistence and interaction; abstractions about the real human world need to attend to both, not to reduce them simply to just one or the other. This is one reason why existing academic disciplines form something of a continuum from universalism to particularism, with natural science at the pole of universalism, humanities at the pole of particularism, and social science occupying the middle.

Differences in Fundamental Relationships

Natural science has demarcated for itself natural reality outside the human mind as its field of study, and presupposes that the fundamental relationship

among the entities of the natural world is that of deterministic cause and effect. Since the Renaissance and the Enlightenment, the main concern of natural science has been to seek to define those deterministic causal relationships, considered the most important capacity of human Reason (von Wright, 1971: 2-3). This characteristic is especially evident in physics, which may be seen as the core of natural science. Newtonian mechanics was the first area of physics to receive systematic formalization and mathematicization. That is largely because the motion of objects, which is the main subject of Newtonian mechanics, is especially amenable to one-to-one causal analysis that can be determined with absolute certainty (Bohm, 1971 [1957]: 5-6, 12, 34).

There are of course also one-to-one causal relationships in human society but major historical phenomena (e.g., the English industrial revolution, the Chinese Revolution, the "hidden agricultural revolution" in China of the past twenty years—see Huang Zongzhi [Philip C. C. Huang], 2014b, vol. 3: chap. 2; Huang, 1995; Huang Zongzhi, 2014b, vol. 3: chap. 5) often originate instead from the confluence or intersection of multiple historical tendencies of different and semi-independent origins, and evince not just structural social-economic influences but also the agency of choices made by subjective human will. In addition to deterministic cause-effect relationships, there are also the coincidences and accidents of practice. What is more, long-term cumulative tendencies born of contingent actions can in themselves become historical trends of major import. Which is to say, to understand human society, we must not opt for just deterministic laws to the disregard of human choices, for the objective to the disregard of the subjective, for the necessary and predictable to the disregard of the contingent, and for the universal to the disregard of the particular. What we need to do is not to select simply one or the other of such dualities, but rather to grasp their simultaneity and interactive relationship.

A related difference is that between "laws" of the physical world and of the human world. The former comes with certainty and universality that can be verified by recreating the same conditions in the laboratory and that can be proven (or disproven) without exceptions. But the same thing is not possible for the human world. In the process of generalizing or abstracting from empirical evidence, we can only hope to arrive at a kind of partial, limited law, and not universal or absolutely certain laws. Even our most highly "scientific" social science disciplines like (formalist) economics and jurisprudence will admit that economic principles and legal rules cannot be unconditionally applied universally, such as, for example, applying American economic doctrines to China indiscriminately or applying American laws to China indiscriminately.

Among the social sciences, history is the most inclined to particularism. The discipline of history in China today leans strongly in that direction, its mainstream rejecting almost any kind of abstraction (generalization) and demanding that researchers be faithful only to historical facts, seeking only to "reflect" or reconstruct those accurately and truthfully. That has resulted in what critics have termed the "fragmentization 碎片化" of historical scholarship (now that Marxist theory has been almost completely set aside). But that trend is very different from what has happened to the discipline of history in the developed Western nations, where historical study has come to draw widely from the methods and theories of the social sciences. The trend is particularly evident in such sub-fields as economic history, social history, family history, demographic history, and so on, and it has led to important breakthroughs in understanding. But that is not the same as simply accepting scientism, pursuing absolute laws, and simplistically imitating physics, but is rather a matter of abstraction, generalization, and theorizing within delimited boundaries.

As a matter of fact, major phenomena in history, like the Chinese Revolution, can be captured neither just by narrating events nor just by social-economic structural analyses, but rather we must attend to both, in order to grasp not only long-term structural change but also the important roles played by the will and choices of key actors. Which is to say, by attending to both structure and agency, the general and the particular, regularities and contingencies. One needs, moreover, to attend to the interactions between the two. The Chinese Revolution saw deep tensions, contradictions, and adaptations between human choice and social-economic structure (see, e.g., Huang, 1995 on these issues from the Land Reform to the Cultural Revolution). Appropriate combining of particularistic narratives with more generalized social science analyses can explain the revolution better than either dimension alone.

Unified Paradigms and Multilateral Theories

Natural science tends more to a unified paradigm. Even so, it has exhibited paradigmatic crises that lead to "paradigmatic revolutions." As Thomas Kuhn has pointed out, scientific communities tend under normal circumstances to accept a shared paradigm; only when a great deal of anomalous empirical evidence running counter to the paradigm has been accumulated will the community then undergo a paradigmatic crisis, leading in the end to revisions or reconfigurations of the original paradigm (Kuhn, 1970 [1962]).

We can illustrate Kuhn's point with the following example: in the seventeenth and eighteenth centuries, the paradigm of physics was based on

Newton's laws of motion. They hold that the motion of an object can be strictly described by a group of differential equations. Given proper initial conditions, we can calculate exactly the position and momentum, the two key variables describing motion, of the object at any later point in time. According to this paradigm, all physical phenomena can finally be reduced to the motion of objects, governed by a few deterministic laws.[1] Pursuing such deterministic, predictable, and one-to-one causal relationships of general validity has remained the central concern of scientistic social science to this day.

However, at the turn of the nineteenth and twentieth centuries, along with the development of micro-physical experiments, scientists gradually realized that, at the micro-physical level of atoms, the motion of objects (particles) carries intrinsic uncertainty. The theories of physics thus can only describe the motion of particles in terms of probabilities. A well-known expression of such non-deterministic laws of motion is the "uncertainty principle," which states that the position and the momentum of a particle cannot be determined at the same time, and that this uncertainty can be expressed mathematically by means of "inequality" relations.[2] By the 1930s, the main framework of quantum mechanics, for analyzing micro-level physical phenomena, had been built up, rejecting the paradigm of Newtonian mechanics. The transformation from Newtonian mechanics to quantum mechanics is a typical case of "paradigm shift" in the history of science, in which an old paradigm is revised because of more and more new experimental discoveries, and a new paradigm stimulated by the interaction of new theoretical and empirical studies gradually emerges.[3] Today, the worldview based on Newtonian mechanics is even criticized as a kind of mechanical determinism (Bohm, 1971 [1957]: 64). However, the later scientific paradigm based on uncertainty and probability still has little influence in social science, the mainstream of which remains strongly predisposed toward the earlier view of Newtonian mechanics.

We need to draw out here the point that the normal state of natural science is a unified paradigm, but social science, precisely because of its very different nature and subject matter, does not similarly incline toward a unified normal state. Social science cannot test theories by controlled and repeatable laboratory experiments, and maintain thereby a unified paradigm in the manner of natural science. Nor can it count on mathematical calculations to make deterministic predictions that can be verified. Instead, it has long operated as a world divided among multiple contending theoretical outlooks. Outside of mainstream formalist theory, there has been a host of other oppositional non-mainstream theoretical traditions (such as postmodernism and substantivism that are more inclined toward particularism, as well as Marxism that is directly opposed to neoliberalism, though with similar tendencies toward

universalism). Such a condition speaks to the point we wish to make about the substantive differences between social and natural science. The divided condition of social science attests not to its inadequacy, but rather to the substantive differences between the social and natural worlds.

Most people actually can intuit quite directly that among human pursuits for "the true, the good, and the beautiful," only "the true" should perhaps be governed by science, but "the good" and "the beautiful" are clearly particularistic and cannot be universalized by deterministic laws. In fact, even within the realm of "the true," as has been seen, there are great differences between the social and natural worlds. Part of the reason for that is that "the good" and "the beautiful" are also "causal factors" that make up the human world. This is one reason why formalist theory that seeks to erect scientistic knowledge tends to reject moral values about "the good" and "the beautiful," while the alternative traditions of substantivism and postmodernism tend instead to emphasize the role played by moral values in human society (more below).

For those of us who reject scientism, the multilateral normal state of social science is a positive and not a negative characteristic. It in fact provides us with alternative theoretical resources and insights outside of mainstream formalism.

The Role of Ideology

We can also approach the question of the differences between social and natural science from the point of view of "ideology"—that is, theories that are adopted and propagated by political power. There is rarely a division between the "left" and the "right" in natural science, which may be seen as largely above politics and ideology. This is of course related to its subject matter: politics matters little in the study of the natural world to search for its laws. But social science is very different. Almost all social science theories are closely connected to and overlap with ideology. This is why the "Marxism-Leninism and Mao Zedong thought" of the Mao era almost completely controlled all scholarship in social science and history. It is also why "neoliberalism" (neo-conservatism) has in the past several decades almost completely (once again) occupied the mainstream position in social science. Marxism-Leninism and neoliberalism are in fact alike in being highly ideologized theories and alike in their efforts to encompass all social science (including history). Precisely because of that, we see in social science multiple theoretical traditions that aim to resist such domination. Reform China, because of the coexistence of Marxism-Leninism with newly imported neoliberalism, has reached a degree of theoretical pluralism almost like that in the West—though of course numerous "forbidden areas" still remain.

The differences discussed above make clear that we cannot, and should not, equate social science with natural science, and engage in simplistic attempts to use the theories and methods of natural science to study the social world.

Method

This is not to say that we wish simply to reject natural science and its methods completely. Natural science has been able to develop highly systematic methods of research, precisely because it can attain deterministic certainty and unify understanding, can employ mathematical logic and calculations to make exact predictions/hypotheses, can rely on repeatable experiments to validate theories, and can better bring together the methods of deduction and induction. Its precision and respect for evidence are things that we social scientists should emulate, though certainly not by the kind of unconditional and blind imitation that some educational administrators demand. Simplistic imitation merely leads social science to divorce itself from social reality, to reduce human social phenomena to just material phenomena and to one-sided understanding of dualistic phenomena, and to fall into the fallacies of scientism, or even of ideologized understanding.

Deduction and Induction

Of the epistemological methods of natural science, the most commonly used are two: one is by way of induction from empirical evidence, or in other words, of empirically based abstraction; the other is by way of deduction, a method employed for building axiomatic systems to construct universal and deterministic truths. The former is to generalize and analyze on the basis of empirical evidence, and is something that should be common to both social and natural science (more below). The latter, however, is a path full of traps.

The classical model of deductive logic is the Euclidean geometry of ancient Greece. It is, first of all, one of the great sources of pride for Western civilization, widely considered to be a unique civilizational resource of the West. Today, the logical system it represents is generally considered to be the very core of the discipline of philosophy. For example, the major American university departments of philosophy almost all take formal, even mathematicized logic, to be their core method and reject on that basis philosophies of other major civilizations (including China, Islam, and India), insisting that those do not constitute genuine modern philosophy. The top-ranked departments of philosophy in the United States, in fact, almost all teach only Western philosophy, to the exclusion of other civilizations' philosophical

thought, relegating those to the departments of "East Asian Civilization," "Near Eastern Civilization," "South Asian Civilization," and the like.[4]

Today deductive logic is commonly used in economics and jurisprudence (which consider themselves the "hardest"—that is, most like natural science—of the social sciences). Economics demands that one proceed from defined axioms and then deduce theorems with mathematical reasoning, while jurisprudence demands, à la Max Weber, that all laws be unified by deductive/legal logic into a coherent system. In the American mainstream "classical orthodoxy" tradition started by Christopher Columbus Langdell (who was Dean of Harvard Law School from 1870 to 1895), legal study was very deliberately equated with Euclidean geometry, insisting that law too should begin with a few axioms and then logically deduce a host of theorems. Langdell's method was to proceed from case examples (as is consistent with the Anglo-American common law tradition), but not in order to engage in induction about varieties of legal practice from a large number of cases, but rather, by means of deductive logic, to construct from select case examples a theoretical system of legal principles that are logically consistent and universally applicable (see, e.g., Langdell, 1880: 1-20 on contract law).[5] That was how mainstream U.S. jurisprudence was built, and it set the foundation for the teaching and training method that many law schools still employ. Its intent to make jurisprudence "scientific" is evident, for example, in the continued use today by major U.S. law schools of the degree of "doctor of juridical *science*," the highest law degree the schools confer.

In China today, formalism has come to occupy unquestionably the mainstream position in the discipline of economics. Within it, the "new institutional economics," which has taken the general framework of neoclassical economics and singled out from it the crucial importance of secure private property rights (more below), wields the greatest influence. As for formalist jurisprudence, in part because Chinese scholars tend to resist or are unfamiliar with formal logic, and are more accustomed to engaging in a "practical moralism"[6] mode of thinking, it has not yet attained hegemony in the manner of formalism in economics. However, given the tide of massive importation of formalist Western laws into China, the spread of the influence of the formal logic that lies behind those laws is only a matter of time. Beyond that, we might also point out that, regardless of whether one agrees with formalism or not, Chinese legal scholars need very much to acquire full grasp of the formal logic that lies behind the "classical orthodoxy" of American jurisprudence and the "formalist rational" theoretical tradition of German jurisprudence, if only in order to have good clear reasons for choosing a different path. That is the reason why this article focuses so much on Langdell and Weber.

There is nothing wrong with combining the use of induction with deduction in social science, since knowledge in social science also requires that one abstract/generalize from empirical evidence, and then employ logical reasoning to draw out inferences. However, at the level of actual practice, the use of deductive logic in social science frequently becomes a conceptual leap from empirically-based abstraction to idealized "theory." Profound as Weber's theories are, they too evince such a tendency. He first abstracted from Western legal history the concept of the development of "formal rationality," spotlighting the crucial role that deductive logic played. That is an abstraction with a substantial empirical basis (Weber, 1978 [1968]: 753-879 [sections iv to vii]). But then, he went further to make formal rationality one of the four major types of law in the world (pp. 655-58), and then further argued that that tradition was unique to the West, and that it evolved toward ever greater perfection (rationality). Finally, impelled by the very formal logic that he so privileged, Weber came to characterize formal-rational law as a system entirely unified by legal logic, making up a system in an either/or opposition to other historical legal systems. From there, he came to emphasize again and again that the formal rational is the only type of law that fully evinces "rationality," the only truly ideal type of law, whereas the legal systems of the other civilizations of the world are uniformly "irrational"—making up, in other words, "the other" to the West. (For his observations on China, see especially pp. 818, 845; see also Huang Zongzhi, 2014a, vol. 1: general preface, and Huang, 2015; see also Lai, 2015.) In the process, he leapt from the original empirically-based induction/abstraction to a universalized theory/law. Such an analysis, it should be apparent, is in fact a kind of idealization that is removed from reality, becoming truly an "ideal[ized] type." What we need to do here is to separate out clearly abstraction from idealization—the former is a necessary step for knowledge; the latter, however, is a conceptual leap from the real to the ideal.

Here, we can use Nobel economist Theodore Schultz as another illustration. He started from the neoclassical axioms that "man is economic man" and "purely competitive markets lead to the optimal allocation of resources" (the market for farm products being supposedly one of the best illustrations), and on that basis argued that "surplus labor" could not possibly exist. Such a point of departure, it should be pointed out, was the direct opposite to that of W. Arthur Lewis, who shared the Nobel Prize in economics with Schultz that same year; Lewis' point of departure was instead the reality of an "unlimited supply of labor" (mostly in third world countries) in agriculture. Of course, Schultz also drew on the "empirical evidence" that he garnered from a trip to India: namely, that in 1918-1919 there was an influenza epidemic that afflicted 8% of the population and caused a substantial decline in agricultural

output. From that, he drew the "logical" inference that there could not have been surplus labor because, if there had been, a decline of 8% in the labor force would have not significantly affected output (Schultz, 1964: chap. 4). From the point of view of logic, such an argument seems quite persuasive. But the fact is that an influenza epidemic would not affect all farm households to the same degree of 8%—some families would all be infected while others not, thereby impacting farm output. But Schultz was not interested in such empirical reality because in his mode of thinking what was truly crucial were the given axioms and the deductions therefrom: if competitive markets necessarily lead to the optimal allocation of resources, then no "surplus" labor could possibly exist; if man is "rational economic man," then he would certainly not labor for zero returns. The reader will discern here that Schultz's very definition of "surplus labor" was something arrived at deductively: most scholars who talk about surplus labor in fact refer to relative surplus labor and not to absolute surplus labor of zero value. The latter was just a straw man that Schultz set up from his axioms, much as in the manner of Euclidean geometry, the key to which is that, if the given axioms are true and valid, so too will be the theorems logically deduced therefrom. For Schultz, his so-called "empirical evidence" was finally just window dressing; deductive logic was the true key to his work (for a detailed discussion, see Huang Zongzhi, 2014b, vol. 3: chap. 9). Compared to Schultz, Weber was much broader, and did substantial historical research, but the two were alike in their strong inclinations toward constructing idealized formalist theory.

But real human society cannot be reduced to a few axioms like geometry. Its empirical evidence cannot reach the kind of deterministic certainty that natural science can, and even less can it recreate repeatable experiments under controlled conditions and then by logical inference attain a universally valid deterministic knowledge. Given such limitations, to attempt to construct absolute and universal theories can only be either, like Weber, to make conceptual leaps from abstraction to idealization, or, like Schultz, to start with given "axioms" that are detached from empirical reality, and then deduce therefrom "theorems" that in fact run counter to empirical reality.

The model for deductive logic is Euclidean geometry. Its formalized system starts from a group of "definitions" of the elementary objects that geometry is to deal with, such as points, lines, planes, and so on. The definitions are immediately followed by five "postulates" (the first postulate being "a straight line can be drawn from any given point to another point") and five "common notions" (the first common notion being "things that are equal to the same thing are also equal to one another").[7] Together, these "postulates" and "common notions" form a group of axioms, which are considered to be self-evident and can be used as the premises for further deduction. Any

consequent propositions concerning more concrete geometrical problems can be deduced from the combined application of definitions, axioms, and other previously deduced propositions (Lindberg, 1992: 87-88). An example is the famous Pythagorean theorem, which states that "the square of the hypotenuse of the right triangle equals the sum of the squares of the two legs"—it is something that can be deduced from the basic axioms.[8] This is a system that works in a mathematical-logical world under given and defined conditions, with considerable applicability to the physical world. But, if used on the human world, it can only become a set of artificial constructions that are far removed from reality.

It was in order to imitate such a model that highly formalized neoclassical economics set up from the outset similar axioms such as "rational economic man" and "purely competitive market," whereas formalist jurisprudence employs as its axiomatic premise individual (human) rights. Both then proceed therefrom to draw out universalistic theorems by way of deductive inferences. Langdell's work on theorems applicable to contracts was a very deliberate effort to imitate this method. It was precisely the attempt, on the powerful tide of scientism, to apply deductive logic drawn from the mathematical world to social phenomena that drove the formalist "mainstream" of those disciplines to adopt such a method for constructing their theories.

And then, with the establishment (like Harvard Law School under Langdell and the University of Chicago's economics department under neoliberalism) of requirements that all who pursue the discipline undergo such training, an institutionalized power base was built up, driving all those specializing in the discipline to accept the premises adopted. In that way, the system further caused the majority of specialists in the discipline to accept the pre-established axioms and theorems as universal truths, either equating them with what the real world must come to be like, or else simply equating the idealized condition with actual reality.

But the theoretical premises discussed above are in fact just idealized constructs, most certainly not universal laws that are valid across time and space. If we begin instead with what is real about people, we would not be able to postulate that people are simply rational economic beings but rather, as discussed above, see that they are also emotional beings and moral beings. In real life and in human relations, people do not generally follow just one single logic, but rather behave under mixed, and often fuzzy, logics. To postulate that every person is completely rational, without emotions or morals or unexpected impulses, and then to set that up as an "axiom" that is "self-evident," is just an idealization divorced from reality, not something that accords with supposed universal truth or laws in the real human world.

If we start instead from the real human world, we need to begin with the multifaceted and complex nature of humans as our premise, and to start from their real "practice" or behavior and not from an idealized theoretical construction. That way, we could not possibly set up formalized/idealized axioms, nor deduce therefrom supposedly true and valid theorems. For example, historically there has never existed a perfectly competitive market; all markets have been subject to different degrees of government construction, maintenance, interference, control. If we start with markets as they really exist, we would not be able to arrive at the construct of a perfectly competitive market (devoid of government interference). And, if we postulate in accordance with observed reality that man is both a rational and an emotional being, we would actually be able to explain far better than the simplistic construct of "rational economic man" the economic crises that have occurred in the history of capitalism, which have stemmed more from blind belief in market appreciation and greedy pursuit of gain than from rational economic choice. The same applies to the sphere of jurisprudence: if we begin from observed reality, we would be able to see that imported laws must undergo reinterpretation before they can be adapted to Chinese social realities. For example, in the sphere of property rights, family rights had historically long taken precedence over individual rights and, in the modern and contemporary periods, have coexisted with imported individual rights. What is more, "familism" in property rights is not necessarily intrinsically inferior to "individualism"—the difference is in any case not a matter of truth or falsehood, but rather of moral choice (for a more detailed discussion, see Huang, 2015; Huang Zongzhi, 2014a: vol. 3, appendix 2, pp. 285-97).

Here we must point out further that, in the sphere of social science, deductive logic should be seen as only a method for developing insights within delimited boundaries, not a way to arrive at ultimate truth(s). For example, we can deliberately construct a partial model of just certain stated empirical realities in order then to draw logical inferences about them, and search out within the delimited empirical conditions/factors certain logical relationships that had hitherto gone unnoticed. This is actually a method that theorists often employ, but is something that is often misconstrued by later followers or others who try to turn the limited theories into universal laws.

In economic history, we can use agricultural economist Ester Boserup's model about the relationship between population increase and agricultural production as an illustration. Boserup points out: the agricultural history of mankind is one that saw increasing labor intensification, from the 25 years per cropping of forest slash and burn agriculture, to the five years per cropping of bush slash and burn agriculture, to the two crops in three years short fallow system, and finally to annual cropping or multiple cropping. By

starting with such an abstraction (modelling) of basic empirical reality, and then engaging in logical analysis to draw inferences, she explained how the key in such change was the changing relationship between man and land: if there is sufficient land, slash and burn requires the least labor; the other methods would be adopted only when there is pressure in the man-land relationship. Which is to say, population pressure on land is what drove agricultural change (Boserup, 1965; see also Huang Zongzhi, 2014b, vol. 1: general preface). In China research, Boserup's theory received excellent confirmation from Dwight Perkins' study (Perkins, 1969), albeit probably quite coincidentally. Here, we need to grasp clearly the limited nature of such theory and its use of logical inference only as a method, in order to grasp appropriately the insight it contains, and not to mistakenly equate the work with a universal law beyond time and space.

For another example, we can turn to economic historian-theorist E. Anthony Wrigley. He pointed out that traditional agriculture and modern industry differ crucially in their respective sources of energy: one is "organic," based on human (and animal) power; the other is inorganic, "mineral-based energy" (like coal). The change from one to the other was that a single labor unit could produce many, many times the energy of its own labor power (one miner could mine 200 tons of coal a year—Wrigley, 1988: 77; see also Huang Zongzhi, 2014b, vol. 1: general preface). This is an empirically-based generalization, whose insight consists in clearly and powerfully pointing out the crucial difference between agricultural and industrial economy. In these days when theories based on industrial economies are widely employed for the study of agriculture, this is a particularly important (delimited) theory. For China, where peasants continue to constitute the majority of the population, and small farms using family labor the main type of farms, all the more so. This is not to say that Wrigley had advanced a definitive law, for he did not consider at all the issue of the limited productive power of land, also an organic entity like humans. But there can no denying the insight and power of his theoretical observations, within the boundaries he defined. (Huang Zongzhi, 2014b, vol. 1; general preface).

As a further example of effective theorizing within delimited boundaries, A. V. Chayanov, on the basis of the fact that the basic production unit in traditional agriculture was the family, employed mathematical reasoning to show how its behavior is very different from an enterprise using hired labor, and then returned once more to empirical evidence to examine his theoretical inferences. What he accomplished was a series of insights about the different behaviors of the two kinds of entities under a variety of external conditions. For example, under population pressures on land, the two behaved by a very different economic logic, one oriented mainly toward consumption needs, the

other toward profit. This is also an example of good use of the method of going from empirical generalization to theoretical abstraction and back to empirical evidence. In a China where small-scale family farms remain the principal production unit in agriculture, these insights are particularly important. As with Wrigley, this is not to say that Chayanov's observations constituted some kind of immutable law, for he did not, for example, consider the crucial role that the family production unit played in the commercialization of agriculture. It is only to point out the insight of his theory and its usefulness for understanding Chinese realities (Chayanov, 1986 [1925]; see also Huang Zongzhi, 2014b: general preface).

In jurisprudence, we can learn from non-mainstream Western theoretical traditions like legal sociology, legal pragmatism, critical legal studies, postmodernism, theories of practice, and so on, but at present we cannot easily find theories that are directly applicable to Chinese realities. Even so, we can still discern from legal practices (distinguished from imported codified laws) in China's past century many examples of innovations in adapting the laws to Chinese social realities, although, at present, given the discursive hegemony of Western jurisprudential theory, we would be hard put to find much in the way of systematic theoretical conceptualizations and development of new jurisprudential principles. The first author's research of the past 25 years into the legal practices of traditional, modern, and contemporary China has focused especially on concrete examples of such jurisprudential innovations in practice, including innovations in the traditional mediation system (especially in court mediation), the rather distinctive contemporary marriage and divorce law, re-interpreted property rights law that takes into account parental old-age maintenance, distinctive use of wrongful acts law, and so on. What the author has discovered in the practices of traditional and modern Chinese law is a mode of legal thinking that is very different from that of the modern West, one that combines moral ideals with practical concerns, the abstract with the concrete, and the universal with the particular. It is in fact a mode of thinking that can well serve as the guide to present-day Chinese lawmaking (Huang Zongzhi, 2014a, vol. 3).

As a matter of fact, whether in the legal or economic sphere, Chinese practice has long moved well past its theorizing, with many innovations that have yet to receive theoretical expression from Chinese scholars themselves, much less from Western theorists. That is obviously true of the stunningly rapid economic development of China in the Reform period. In the legal sphere, at the present stage, an important project that awaits more attention is to undertake appropriate theoretical abstraction and generalization of those practical innovations. Such an endeavor can, on the one hand, clarify how very paradoxical Chinese realities are from the perspective of Weberian theory and, on

the other hand, outline a path for building a legal system that accords with Chinese realities. Weber's theories, it should be clear, are simply not adequate for conceptualizing Chinese realities (Huang Zongzhi, 2014a: esp. vol. 1, general preface).

Even so, if we take Weber's typologies as a method for understanding (and not as universal theory), we can still see the insights they contain. By inducing from empirical reality the "formal-rational" model, Weber enables us to grasp neglected logical relationships among its delimited conditions: for example, that a highly formalized and specialized legal system can (though not necessarily will) become a force for resisting interference from outside authority. Such a theoretical concept/insight is very different from equating formal-rational law with the one and only "modern," "rational" legal system that is universally applicable, and set apart from all other legal traditions, all deemed to be "irrational" "others." We need to distinguish clearly between appreciating Weber's typologies as an analytical method and the fallacy of seeing it as a description of or prescription for the real world regardless of time and space.

As Nobel economist Friedrich Hayek pointed out years ago from the standpoint of an insider, economists often make the mistake of equating the formalized constructions of neoclassical economic theory with reality, of equating mathematicized and simplified models with truth, and of equating idealized theory with the real world (Hayek, 1980 [1948]: esp. chap. 2; also chaps. 3 and 4). Actually, these theories are not what many economists imagine them to be, absolute and objective reconstructions of an external world, but are rather the concentrated expression of "knowledge" that is artificially constructed within the system of the discipline of economics. The reason they are taken to be "true" is because they accord with the standardized training method of the discipline. Schultz is one good example. In the same way, many legal scholars have undergone similarly formalist training, believing therefore that formal-rational law is the only "genuinely" "modern" law.

If we compare Boserup and Schultz, we can see that Boserup's starting premise is taken from historical experience: continuous population increase on a finite amount of land; her conclusions are also limited to those defined historical conditions, and come from real historical experience. What her model contributes is to point out the logical relationship (that had not been clearly grasped) among those delimited historical circumstances, appropriately applying deductive reasoning to abstractions from empirical evidence. Schultz, however, is very different: his point of departure is a theoretical axiom, adding to it some empirical decorations that are supposedly in accord with his premises, to arrive deductively at a conclusion that is already contained in his axiomatic premises. It is actually a circular type of

reasoning. The difference between the two kinds of theories is that one comes from theorizing that proceeds from experience to abstraction and back to experience, whereas the other comes from theorizing/idealizing that proceeds from premise to experience and back to the premise. That is a critical difference.

If we start from China's legal practice, we can see that China's traditional legal system was not simply the "irrational" "*kadi* justice" that Weber spotlighted in his typology, but rather evinced a logic of "practical moralism" that Weber completely overlooked. As for modern and contemporary Chinese law, the three traditions of imperial Chinese law, modern revolutionary law, and imported Western law of necessity coexist as a matter of given practical reality, but the formalist-rational ideal-type that Weber constructed dictates instead a one-sided either/or dichotomy and choice between Western and Chinese law. Weber's theory, therefore, can at best only be a useful foil for understanding contemporary Chinese law, certainly not an accurate description of it nor a prescription of a necessary direction for it.

Formalized theory, for the very reason that it is highly simplified and absolutized, is especially appealing to rulers as something that can be adopted as an ideology for domination. And, once fixed, propagated, and enforced as the governing ideology, it necessarily becomes even more simplified and vulgarized. In history, we can see that nineteenth-century imperialism rationalized its smuggling of opium into China in terms of the lofty (classical liberal) principles of "free trade" and "equal" international relations, and constructed the Opium War as a war to bring Western "civilization" to a "barbaric" China. Today, the similar (neoliberal) doctrine is being used as the weapon of "soft power" in contending for global hegemony, and serves also as the rationalization and self-justification for profit-seeking by multinational corporations. (To be sure, the fully independent China of today can set its own terms for taking advantage of global capital and markets.) In the nineteenth century, international law (for which China, because of its own moralistic predilections, willingly adopted the high-sounding translation of "just laws for all nations" 万国公法), similarly, limited its applicability to the "civilized" 文明 nations, employing for "barbaric" 野蛮 China instead "unequal treaties" imposed by war (Lai, 2014). As another example, the so-called "green revolution" of the 1960s and 1970s was in fact an ideology exploited by multinational agricultural companies and the developed countries, with their theoretical basis in Schultz's theory. Of course, in China's own history, one can also find ready examples where constructed theoretical discourse and representations ran counter to social and political realities—the nearest example being "class struggle" in the Cultural Revolution (for a detailed analysis, see Huang, 1995).

In short, to remain close to reality and truth, we need to use our historical knowledge and consciousness to guard against such theoretical and discursive constructions. To borrow from the methods of natural science, we need the same kind of awareness as well as understanding of the differences between social and natural science. Only thus can we hope to understand the substantive reality of human society, and not just its formalized/idealized construction. Only then would we be able to employ appropriately the methods of natural science, without being misled by them into oversimplified and ideologized assumptions.

The Third Method Outside of Induction and Deduction

The founder of American pragmatism Charles Sanders Peirce[9] (1839-1914) pointed out that human beings habitually employ in their lives inferential reasoning that is actually neither deduction nor induction, but rather a kind of reasoned guess on the basis of empirical evidence, something that he terms "abduction." For example, if we know that all the balls come from the same urn and that all the balls in that urn are red, we know that if a ball is taken from the urn, it will be red. That is deduction about which, given the preset conditions/definitions, there can be deterministic certainty. On the other hand, if we do not know that the balls in the urn are all red but, after taking (sampling) a number of balls from the urn, we see that they are all red, we infer that the balls in the urn are likely to be all red. That is induction, about which we can have probabilistic certainty, which can be verified by repeated "experiments." However, if we see a red ball near the urn, and know that all the balls in the urn are red, we guess that that ball probably comes from the urn. That is abduction, which we cannot be certain of, because the ball may well have come from another source.[10] In natural science, such guesswork can use deductive logic to formulate an initial hypothesis, and then test that by experiment. What Peirce meant by "abduction" is guesswork yet to be made deterministic: it is different from probabilistic "induction" and also different from deterministic "deduction." This is the kind of reasoning commonly employed, for example, in medical diagnoses. Such reasoning, Peirce argued, is the third scientific method in addition to deduction and induction, in fact often the first stage in the development of scientific knowledge, only later to enter into the stages of deductive inference and inductive experimental proof. The so-called scientific method, he argued, in fact uses all three of these methods, not just deduction and induction.[11]

Peirce did not distinguish between natural and social science. In our view, theories about cause and effect in the social sciences closely resemble this third kind of reasoned guessing. It is rather like the search for a murderer;

what we need to do is to be as rigorous as possible in finding auxiliary evidence (e.g., there are no other possible sources nearby for the red ball), and do all we can to arrive at a high degree of persuasiveness and plausibility. But, at the same time, different from natural science, we need to acknowledge the fact that we cannot attain deterministic certainty and can be, very simply, wrong in our guesswork. We can employ deductive logic and all available evidence to raise the probability of being correct, but what is critical is that we acknowledge that we cannot attain absolute certainty, for we cannot, as in natural science, engage in repeatable experiments to prove our guesswork. Even less should we, like formalist theorizing, turn our guesswork into a "self-evident" axiom, and then resort to deduction to construct theorems and an entire system of universalistic theory. To do that is surely to misconstrue the real world.[12]

Quantification

Closely related to the above is the use of quantification. In and of itself, quantification cannot be faulted. First, because quantification can render our empirical evidence more precise: concrete numbers are more exact than descriptions like "many" or "few." Even with research on a particular community or locale, we often need to know to what extent the phenomenon we have observed applies to the community as a whole. Moreover, quantification can help us to clarify to what extent generalizations/abstractions we have obtained through empirical evidence apply. For example, a generalization obtained from qualitative evidence gathered in field research in a particular community (like a village) at a particular time can be shown to be of wider applicability by means of quantification: is it something that applies only to communities with certain similar conditions, or does it have still wider applicability? Quantification can thus be an effective way to extend the scope of applicability of our empirically based abstraction. It is a way to combine particularism with (delimited) wider applicability. Quantification can be a method to both extend and delimit our generalizations.

In another kind of quantification, after acquiring good qualitative understanding of our subject, we go on to uncover problems that had not hitherto been examined, either by means of our qualitative understanding or by uncovering data that had been neglected (or by using old data in new ways). To use Thomas Piketty's recent *Capital in the Twenty-First Century* as an example: he employed hitherto little-used income and estate tax records and data to construct cross-generational time series data (whereas earlier studies had relied mainly on cross-sectional survey data) to demonstrate that, in the decades from 1970 to 2010, the share of wealth owned by the richest 1% of

the people of the United States and the major Western European countries has been rising steadily, from 30% to 34% in the United States and 20% to 24% in Europe. Earlier, from 1810 to 1910, there had been sharp increases in such inequality, with the same ratio rising from 25% to 45% in the United States and from 51% to 63% in Europe. After that, however, from 1910 to 1970, the distribution of wealth tended toward greater equality, until after 1970, when (progressive) tax rates declined sharply, leading once more to a rapid rise in inequality (Piketty, 2014: Figure 10.6, p. 349).

Focusing on the top 10% compared with the rest yields the same pattern: in the United States, less than 60% in 1810, up to 80% in 1910, thereafter down to about 64% in 1970, and then rising again to about 70% by 2010. In Europe, from 81% in 1810 up to 90% in 1910, then down to 60% in 1970, and then rising to 63% by 2010.

Piketty explains that such changes resulted from the fact that the rate of return to capital was/is higher than the rate of economic growth. In economies that were mainly agricultural, economic growth was generally less than 1% per annum, whereas the return to capital was 4% to 5%. That way, over a period of time, those who inherited wealth tended to get richer and richer, possessing a larger and larger proportion of total wealth. However, in the period spanning the two World Wars, the rate of economic growth rose sharply, to 3% to 4%, and, at the same time, there was widespread increases in the (progressive) income and estate tax rate (with the top bracket exceeding 70% in the United States), with the result that the distribution of wealth therefore tended toward greater equality. But afterward, tax rates declined widely, as did the rate of economic growth. Unequal distribution therefore rose once again, leading to the steady rise in the 40 years between 1970 and 2010.

On that basis, Piketty calls for the reintroduction of higher rates of (progressive) taxation, even a "tax on capital." Otherwise, society will fall once more into the rising inequality of an earlier age (Piketty, 2014: 347-58; see also Cui Zhiyuan, 2014).

This book has drawn a great deal of attention, mainly on account of the detailed and persuasive quantitative research summarized above, challenging directly the commonly held assumptions of neoliberal economics. It may be said to have demonstrated the power that quantitative research can have. The well-known American economist (and former president of Harvard University) Lawrence H. Summers actually writes that, in demonstrating the fact of rising inequality, Piketty has made a "Nobel Prize–worthy contribution" (Summers, 2014). As a matter of fact, what is crucially important about Piketty's work is not just its detailed quantification but also its innovative, independent thinking, rather than just blindly accepting mainstream "authoritative" theory.

What we usually see today, however, is not this kind of quantification and generalization that are closely linked to empirical evidence, but a different kind: namely, to start with formalist theory and the fashionable "problems" derived therefrom to set up a "hypothesis" and then to search for quantitative data that demonstrate the "hypothesis." The Schultz example discussed above is one illustration. Another example is research that starts from the theory that privatization and marketization would necessarily result in greater efficiency, from there to set up the "problem" of comparing the factor productivity (or total factor productivity) of private versus state-owned enterprises and then to seek quantitative data to demonstrate what is already assumed by the premise. Where the data do not quite conform to expectations, to then "conclude" that it is because things have not yet been privatized or marketized enough and, on that basis, to advocate that there must be more reform in the direction of more privatization— what was already assumed to be true by idealized theory. The recent research by the Unirule Institute of Economics 天则经济研究所 on "The Nature, Performance and Reform of State-Owned Enterprises" is such an example (Tianze jingji yanjiusuo, 2011). What is overlooked by that research is the fact that the Chinese state (including local governments) has in fact played a crucial role in China's reform-period economic development, and also that, in the fiercely competitive global environment, Chinese enterprises as latecomers can only hope to compete with the well-developed giant multinational corporations with the help of the resources and capital commanded by the state apparatus (Huang, 2011, 2012). Formalist quantitative research is in fact often teleological, in which the inferences are already contained in the premises of its axiomatic system. Such research is finally just a numbers game, and is often highly ideological, unrelated to the real world, but it is what we commonly see passed off as "scientific" "research" today. The roots for such research lie in the blind acceptance of formalist theory, equating it with universal law, coupled with the pretense of "scientific" quantitative data. It is research that does not come with a genuine search for truth and that will not lead to any new understanding. It is also often a kind of managerial research that can use or employ others—like graduate students—to do the legwork without any critical reflection.

Another kind of quantitative research we often see comes with no conscious theoretical awareness but is simply motivated by a simplistic belief in numbers and a supposedly scientific method. Applied to the study of history, it often comes without basic qualitative knowledge, asking questions and seeking answers that strike knowledgeable specialists as either utterly senseless or completely obvious. Nevertheless, the organizers of such research are often able to obtain funding for their "projects" to enable them to hire students to do the legwork.

The two kinds of research outlined above are often taken by (Chinese) educational administrators to be "scientific" research, and directly impacts their granting of funding for "projects" 项目 (on "project grants" as a method of governance, see Huang Zongzhi, Gong Weigang, and Gao Yuan, 2014). The root of the problem lies in misguided belief in scientism and the mistaken equation of human society with the physical world.

A Social Science That Attends to Both Universalism and Particularism

Why Has Formalist Theory Become the "Mainstream"?

In physics, deduction and induction reinforce and help to drive one another forward. This is in part because the physical world that it studies comes itself with deterministic laws. Regularities that are abstracted through induction, and theoretical systems built therefrom, are constantly subjected to verification by repeatable laboratory experiments. Newton's mechanics was such a system of natural laws, and remains applicable today to the material world of our everyday existence. Later, quantum mechanics was established similarly through the mutual stimulus of induction and deduction, leading to a so-called "paradigmatic revolution."

We can illustrate the mutually reinforcing relationship in physics between theory and experiment, and deduction and induction, with the example of the formation of Einstein's photon theory of light, which was a crucial step toward the theory of quantum mechanics. Before Einstein proposed the photon theory of light in 1905, mainstream physicists tended to think of light as a kind of electromagnetic wave whose energy was infinitely divisible into small parts. This was very different from the way ordinary substances (such as water, metal, or gas) were conceptualized: they were thought to be made up of a large number of atoms, whose energy was the sum of those atoms, which did not make up a continuous wave and could not be divided infinitely into small parts. This wave theory of light could (and can) well explain optical phenomena occurring in the everyday living environment, such as the scattering and diffraction of light (Einstein, 1998 [1905]: 177-78).

However, in the second half of the nineteenth century, some experimental discoveries, especially "black-body" radiation[13] and the photoelectric effect,[14] clearly contradicted the wave theory of light. Experimental data of black-body radiation showed that the energy of light emitted from the radiation source is discontinuous. Experimental data of the photoelectric effect showed that the energy exchange between light and the electrons on a metal surface is also discontinuous (Dear, 2006: 142-43). Those experiments and data were

what inspired Einstein to propose his new photon theory of light, suggesting that light should be understood as constituted of discrete light quanta (photons) rather than as continuous waves.[15] From that new conception one can deduce that the energy of light is discontinuously distributed in space during the emission and transformation of light. That photon theory of light, along with its mathematical calculations, was able perfectly to explain the empirical data on black-body radiation and the photoelectric effect. Subsequently, the theory was proven to be valid by many experiments, and became the theoretical basis for major industrial applications like lasers, semiconductors, and optical fibers for transmission of data. This discovery of photons illustrates well what we discussed above about the basic characteristics of natural science: abduction (the initial reasoned guess) plus mutually reinforcing deduction (including mathematical calculations based thereon) and induction. It also illustrates well what might be considered a governing law in natural science.

Because of the great influence of scientism, social science has never given up the pursuit of major governing universal laws such as those in natural science. However, the human world, because of its fundamental differences from the natural world, is in fact comprised of a host of dualities (and "multialities") that coexist and interact, both what are logical and deterministic, and also what are illogical, contingent, and particular. Deductive logic, however, requires that we proceed from given axioms to arrive at valid theorems by way of rigorous logical inferences. It is a method that demands logical coherence in the manner of Euclidean geometry, requiring all theorems to be consistent with the given definitions, postulates, and axioms. It does not allow exceptions, paradoxes, fuzziness, or contingencies. When it comes to the human world, such deductive axioms and theorems can in fact only be in continual tension, disjunction, or contradiction with empirically derived inductions. The two, in fact, simply cannot be completely mutually reinforcing in the manner of natural science. This is one reason why formalist economics in search of universal laws has developed a strong tendency to dispense with induction and rely one-sidedly on deduction, and to attempt to imitate Euclidean geometry to arrive at universal laws by logical inference alone. This is also why formalist theory has always been powerfully challenged by alternative theories, especially theories more inclined toward particularism—like substantivism and postmodernism.

But such challenges have not led to "paradigmatic revolutions" like those in natural science. Part of the reason is that inductions from the human world cannot reach the deterministic certainty that is possible in the material world, because it is not possible to create repeatable laboratory experiments or mathematical predictions to prove deterministic laws. The challenges to formalist

axioms and theorems therefore do not carry quite the same force. And formalist theory, even in the face of contrary evidence, still has room to insist that its formalized theory is correct and true. If the theory does not accord with empirically based inductions, that is either because the induction is wrong or because experiential reality has not yet arrived at the ideal state predicted by theory. Counter-factual reasoning is a frequent resort of formalist theory: if a certain economy were to attain a higher degree of marketization, it would certainly come to exhibit the phenomena predicted by theory; if property rights were more completely privatized and secure, the economy would certainly attain the higher degree of development predicted by theory. (For a fuller discussion of such counter-factual reasoning, see Huang, 1991.)

The fact is, however, that the major crises of the recent capitalist economic world—such as the Great Depression of 1929-1933 and the "Financial Tsunami" of 2008—were not at all foreseen by economists, since their occurrence ran entirely contrary to the projections of established mainstream theory. This fact in itself is clear evidence of the utter failure of formalist economics in its pursuit of universal laws and scientific predictability as in natural science. Even so, however, after facing a period of criticism and by making minor adjustments and additions, formalist economics has been able to return, with its garb of formally logical theory and mathematical packaging, to reestablish itself once more as the mainstream of the economics discipline. In jurisprudence, Weber-Langdell's formalism, similarly, even after protracted criticisms and powerful challenges from non-mainstream theoretical traditions—such as historical jurisprudence, legal sociology, legal pragmatism and realism, critical legal studies, theories of practice, and postmodernism—has been able, by dint of the tremendous influence of scientism and deductive logic, to reassert itself as the mainstream of the discipline (for a more detailed discussion, see Huang, 2014).

A Social Science That Proceeds from Practice

This article argues that social science research should not take formalist theory as its point of departure, because formalized axiomatic premises can only be oversimplifications, one-sided conceptualizations, or idealizations of the real human world, and also because formal logic comes with its intrinsic demand for absolutism and universalism, and can only drive any theorizing toward the rejection of paradoxical and contrary reality. We need therefore to set aside the epistemological method of starting with formalist theory, and employ instead the method of starting with the practical world and remaining close to the empirical evidence to derive abstractions and generalizations therefrom, then use reasoned inference to analyze the logical relationship

among given empirical conditions, and then return once more to empirical evidence to examine the validity of our reasoned guesses. The process needs to be repeated over and over again to make sure that we refrain from being impelled by deductive logic to make a conceptual leap from reasoned guesses to idealizations. Thus and only thus can we attend at once to particularity as well as to wider (delimited) applicability. That is why this article has urged several times that research should start from empirical evidence/practice and not formalist theory—to free ourselves from the built-in drive toward universalism of formalist theorizing (for a more detailed discussion, see Huang Zongzhi, n.d.).

Of course, we need also to avoid falling into simple particularism. "Fragmentized" historical narratives can certainly help to clarify the truth or falsity of certain historical facts, but they cannot in themselves generate knowledge at the level of abstraction. In our search for knowledge, we should not just stop at the collection of facts in the manner of a stamp collector. Truly persuasive scholarship requires both empirical evidence and appropriate conceptualization.

But that alone is not sufficient. We need to try to extend our research discoveries toward wider applicability, even to attempt to generate reasonable guesses about causal relationships ("abduction"). That is to say, to engage in limited extension and theorizing, not in absolutizing and universalizing. In the process, we need to attend at once to the delimited wider applicability that may be contained in particularity, as well as to the particularity within wider applicability. Only thus might we be able to discover genuine insights from accumulated empirical evidence.

In such an endeavor, one especially critical problem is how to deal with coexistent dualities in the human world: such as the objective and the subjective, the universal and the particular, theory and practice, abstraction and experience, modern and traditional, the West and China, and so on. We believe that we need to attend at once to both sides of such dualities and to pay attention especially to intermediating between them and connecting them. Deductivism, however, pushes us toward dispensing with particularities and contingencies and making either/or choices between such dualities. As we have seen above, Weber is one illustrative example of such. But the real world is one in which dualities 二元 (and "multi-alities" 多元) coexist and interact. For that reason, we need to adopt a research and epistemological approach that can attend to both (for a more detailed discussion, see Huang Zongzhi, n.d.: esp. "introduction").

What is more, we must not abandon theorizing and leave it entirely to the dictates of formalists. History informs us that formalist theory, especially when adopted by those in power as a ruling ideology, can come to wield

immense (nuclear) power. Precisely because scientistic/formalistic theories are highly simplified, rulers tend to adopt them as governing ideologies, which enhances their influence even more. What we need to do is to proceed instead from the real world to dialogue with and question such theories/ideologies, and to propose alternative, delimited theories that are more closely linked to the real world. For historians and area studies specialists who are accustomed to regarding themselves as engaged mainly in particularist research, this point seems to us especially crucial. We need to see that those who begin their research with empirical evidence are actually the best qualified to generate fresh theoretical insights. We must not abandon our right to a voice in the world of theorizing.

Delimited Theory versus Universalized Theory

We have already given several examples of effective theorizing with delimited empirical conditions and boundaries that attend to both particularity and wider applicability. The human world, to be sure, is composed of limitless particular facts; nevertheless, we can, through solidly grounded and penetrating research, discern the logical and causal relationships among selected empirical phenomena and, through limited use of deduction, specify precisely those relationships and the conditions for them, thereby to demonstrate the wider applicability of what had originally been merely an abstraction from particularistic evidence. The result can be delimited theories with powerful insights. We should then return to the empirical world with those delimited theories to examine their validity, and so on in an unending process. The purpose of such theorizing is not universal laws/totalistic theory, but rather partial and delimited abstraction and its extension. Its power consists in its applicability to similar historical phenomena/realities, not in its universality.

That is to say, the social science that proceeds from practice is one that combines practice-based research inclined toward particularism with theoretical abstraction inclined toward wider applicability. With respect to qualitative vs. quantitative research, we advocate a similar combined use of the two. Of course, this is not to say that all research must be done in such a way, for every researcher should do what he or she enjoys doing and is best at. But, in the face of the "multi-ality," infinite complexity, and indeterminacy of the real human world, our best approach is to combine multiple resources and disciplines to arrive at truth and the logical relationships contained therein, but not to attempt to reduce the real world to formalized universal theory/laws. In our view, this is the genuinely "scientific method" that should be employed in our study of the human world.

Here, some readers may think of what sociologist Robert K. Merton has termed "middle range theory." That idea has had tremendous influence on specialists in the field, and describes what many try to do. Merton argued that grand theories (of entire social systems) have actually become obstacles to advances in social science, because they cannot be demonstrated and can only lead to pointless arguments, whereas what he terms "middle range theory" is theory that can be verified and is cumulative (Merton, 1968: esp. chap. 2). This is clearly an idea that overlaps considerably with the combining of empirical evidence with theoretical generalization advocated in this article.

We need to point out, however, that the difference between Merton and us is first of all that he did not explicitly advocate the method that we suggest here of starting from empirical evidence, thence to conceptualization, and then back to empirical evidence/practice. Nor did he examine critically the crucial role that deductive logic has played in formalist theorizing and the need for us to set those aside. At the same time, his vision seems to us in the end a scientistic and positivist one, holding that social scientists can, through the accumulation and "consolidation" of many middle range theories, reach the point of an encompassing grand theory—something that would resemble the universal laws of natural science (Merton, 1968: esp. chap. 2). We believe, however, that such an ideal is itself a misguided one. What we advocate instead is to begin from the "multi-ality" and paradoxical and fuzzy nature of the real human world, and acknowledge the impossibility of universal theory/laws, but, at the same time, not reject completely universalistic deductivism, but dispense with its absolutizing and universalizing tendencies, so as to be able to use it appropriately as a method to help to discern logical relationships among delimited conditions of the real world and thereby to build insightful theories of wider but delimited applicability.

Furthermore, our intent is not to reject completely grand formalist theory. Most of those, before their formalization and universalization, contained important insights that we would be able to grasp once we set aside their exaggerated packaging. So long as we do not take them to be all-encompassing truths, we can actually derive important inspiration from them. And, if we use them in conjunction with non-mainstream theories that challenge them, we can sharpen our own sense of problem: for example, by framing our investigations at the focal points of contention between their challengers and them. Finally, when it comes to grand theories like those of Marx and Weber, dialoguing with them can help to expand the scope of our own vision.

The crux of the method being advocated here is to seek to build theories with defined empirical conditions and delimited boundaries of applicability. In point of fact, the method of natural science in use today is already to a

considerable degree no longer that of seeking to discover a few crucial governing universal laws to explain everything. Along with the discovery of more and more laws of limited scope and applicability, what is becoming an even more important task is to delineate precisely the scope and boundaries of the applicability of laws. What had been termed "paradigmatic revolutions" by Kuhn are in truth not a matter of one paradigm overturning and replacing another, but rather of adding paradigms that are applicable to newly discovered phenomena: Newtonian mechanics are still applicable to a great deal of everyday life's concerns, such as construction and engineering design. When matter reaches a speed close to that of light, or with phenomena of immense scope (in time and space) in the universe, then Newtonian mechanics need to be replaced by relativity. And with tiny particles at the atomic and subatomic levels, then quantum mechanics is what is needed. The natural world is more and more regarded, in the view of modern science, as something with infinitely variegated aspects. Scientists at their best can construct limited theories or laws to capture the characteristics of some aspects of nature, but they can never reduce the infinite complexity of nature to a few universal laws (Bohm, 1971 [1957]: 31). Perhaps, searching for limited laws of delimited applicability is where social science should properly look to natural science for guidance.

We have already given some examples above of such theorizing; here we might add the transaction theory of Ronald H. Coase. He pointed out incisively that earlier (micro) economic theory had not focused in on the behavioral logics of the firm, only on prices and supply and demand. In a highly marketized and legalized environment with a multitude of firms like that of the United States in the twentieth century, what is particularly important to the firm, as an entity in pursuit of profit, is its "transaction costs"—namely, for information, negotiations, contracting, implementation, examination of goods, dispute settlement, enforcement, and so on, all of which entail costs. Such transactions require an institutional system of laws and regulations; otherwise, the transaction costs would be impossibly high. From those observations, Coase inferred, a firm will continue to enlarge to minimize its transaction costs, until such time when the marginal cost for further expansion comes to exceed the cost for doing the same thing by contracting with others. This package of theoretical ideas (which, according to Coase himself, he first articulated when he was just 21 years old), clearly came with defined empirical conditions and empirical evidence, also logical inference (Coase, 1988; 1991).

Like Coase, the point of departure for Douglass C. North was the fundamental premises of neoclassical economics (about markets and their role in optimizing the allocation of resources), from which he singled out

one particular factor: in a marketized environment, the key to economic development is innovation, and secure private property rights is the main source of incentive for innovation. Only under those conditions would there then be other requisite institutional changes to reduce transaction costs and thereby drive economic development; earlier neoclassical theory had neglected the crucial importance of the legal system of private property rights (North, 1981: see esp. chaps. 1, 2; see also North, 1990: esp. chap. 13). This was also an analysis that came with delimited conditions (market economy, private property rights, legal system) and empirical bases.

In 1997, North and Coase joined together to organize the International Society for the New Institutional Economics (North, 1993: addendum), which, with the force of the symbolic capital from the two men's Nobel prizes in economics, plus a definite degree of scientism, sought to establish (that only secure private) property rights (can drive economic development) as *the* universal law that can explain all developmental and non-developmental phenomena. As North himself explains, he had begun in the (often rather particularistic) study of economic history (of the United States), but throughout his academic career, had always sought to explain why economies develop or do not develop (i.e., to search out a universally applicable economic law). It was that kind of deep-seated drive that caused him to try to turn his own earlier well-delimited insight into a universal law which, joined with the neoclassical constructions about market economy, is intended to explain all related historical phenomena. He argues that, historically, the most "efficient" property rights system was private property which, under conditions of free market competition, would come to replace less efficient property systems (even though such development could be thwarted by dictatorial or authoritarian governments), thereby causing the high degree of economic development of most of the Western countries (North, 1993; 1981: see esp. chap. 3). In his discussions of actual economic history, though often so complex and multidimensional as to be indecipherable, the core idea was to employ this universal law (though represented as just a hypothesis yet to be proven) to explain the development of the Western countries and the non-development of non-Western countries. In the end, like Theodore Schultz, his empirical discussions are really nothing more than decorations for his already given universal law; he and Schultz are alike in that their analyses are finally predicated on predetermined theoretical premises.

The result is a theoretical system that combines formalist economics with formalist jurisprudence, relying on the two together to construct the universal axiom of the "new institutional economics." In the end, it is similar to Weber's typological schema in becoming a self-legitimizing, universalizing theory, in effect a scheme to explain why the superiority of the modern West is the

necessary outcome of history. The theory was then adopted by neoliberalism (neo-conservatism) as its ideology and made even more absolute and even more simplistic. In China, it has further been adopted and upheld by its believers as absolute truth, *the* singular "heavenly principle" 天则 (or "unirule"—by the translation of the organizers of the institute themselves), on the basis of which they advocate complete privatization and reject any and all forms of mixed state and private ownership and any kind of state intervention in the economy—in other words, wholesale importation of the idealized political-economic system of Western capitalist countries, that is, wholesale Westernization (Americanization).

In our opinion, to grasp the real insights of Coase and North, we need to return them to their original, empirically based and delimited theoretical formulations and to get rid of their subsequent oversimplification, absolutization, universalization, and ideologization. The latter can only give rise to spurious scholarship and spurious science devoid of independent thinking. We need instead to grasp clearly the difference between social and natural science and, with our historical and theoretical knowledge, be on guard against universalized social science theory. What we object to is research that is predetermined by theory. What we advocate is scholarly research that starts with real problems and not given answers. Only thus will we be able to gain real knowledge of the real world.

Predetermined Axioms or Choices of Moral Values?

Finally, we need to explain that what we wish to advocate is not a purely retrospective scholarship, for we believe that scholarship should come with a prospective concern to help to make our world better. But we should distinguish clearly between two kinds of prospective visions and methods, one predicated on supposed universally valid axioms and the other on moral choice. We have seen above how formalist theory customarily employs the method of setting up (what are actually) its chosen values as supposedly value-free scientific axioms: for example, the "rational economic man" of formalist economic theory and the rights of individuals in formalist jurisprudence. The former at its bottom is the idealization of REASON traceable to the West's Enlightenment, not something that is a "self-evident" universal axiom. As for the latter, it is traceable to Christianity's belief in the immortality of the individual human soul, also not something that can be considered absolute truth. In the Confucian core of Chinese civilization, by contrast, there has not been a similarly strong impulse to set up such axioms; its ideals come mainly from moral principles concerned with human society, neither from imitation of laws of the natural world nor from religious beliefs about an afterlife.

These are differences with important implications. If one sets up a moral ideal as a universal axiom of truth, it means that what had originally been a value choice is turned into a universalized truth or law. The result is to lend that value choice the representation of being a scientific and absolute truth, even to proceed therefrom (as in Weber's formal-rational ideal type) to reject moral choices as "irrational" "substantivism." That in turn results in an exclusivity toward other civilizations, a tendency to make Western civilization the universal and the absolute and other civilizations the irrational "other."

The choice of moral principles in Chinese tradition is very different. Its point of departure is moral choice about what is good, about what ought to be, not scientistic or naturalistic propositions about axioms and laws; it does not come with the predilection for absolute, universal truth that deductive logic impels. It quite explicitly acknowledges the difference between what is and what ought to be. It was precisely because of such a system of thought that Chinese civilization tended to be more tolerant of different ideals and value choices, and did not tend as strongly as Western civilization toward exclusivity and universalism, toward equating itself with the only real truth. It did not carry the same strong leanings toward scientism and formalized, scientistic theorizing.

The difference between the two civilizations in this respect has finally to do with the relationship between "what is true" and "what is good." We have seen how modern Western scientific civilization tends strongly toward excluding "the good" from "the true," holding that "the true" belongs exclusively to science and, along with the tide of secularization, to relegate "the good" mainly to religion. And social science has come to favor strongly the ideal of (moral) value-free neutrality in scholarship, just like natural science, a tendency that is in fact part and parcel of what this article has termed scientism. But Chinese civilization has always been a highly moralized one, and has consistently placed the good alongside the true in human society, holding that there cannot be one without the other (even evincing a tendency toward equating "what is good" with "what is true"). This is very different from modern Western civilization, as exemplified by Weber's thinking, which pushes truth and morality into an either/or juxtaposition.

Actually, the issue here had been dealt with long ago by Immanuel Kant, the towering figure of the (Western) Enlightenment, who proposed the category of "practical reason" as the pivotal mediator between pure reason and actual practice. That is where the "categorical imperative comes in—Act only according to that maxim whereby you can, at the same time, will that it should become a universal law"—to serve as the standard by which one can make a reasoned selection from among multiple particularistic moral values that guide actions.[16] We believe that the Confucian "golden rule"—"do not

unto others what you would not have them do unto you"—shares much in common with Kant's categorical imperative. That maxim is still widely employed today in the mediation of disputes in China, and can well serve as the guiding standard for reasoned choices among different moral values. (For a more detailed discussion, see Huang, 2015.)

Our own choice of a moral maxim for scholarship may be expressed as seeking the well-being of the common people, but not to the exclusion of other values such as seeking truth and reality or finding pleasure in scholarship. In our view, forthright acknowledgement of one's own moral choices, and not the pretense of value-neutrality, is what makes for sincere scholarship; it is also a form of respect both for one's readers and for one's subject of study. Such value choices can certainly influence one's selection of topic and sense of problem, but should not affect the commitment to seek what is true and real 真实. In our view, complete value-neutrality is not only an impossibility, but also a misguided ideal, in fact part and parcel of what we have criticized as scientism. We believe that scholarship not only necessarily comes with choice of values, but indeed should deliberately do so. What we seek to accomplish is not just to understand the "what is" in the human world, but also ways to change the world toward "what ought to be."

In our view, then, a genuinely scientific method is one that employs at once deduction and induction, whereas formalist theory in both economics and jurisprudence tends to rely mainly on deduction. At bottom, this is because the real human world comes with dualities and "multi-alities," paradoxes and contradictions, and predictability and contingency, such that its empirical evidence of necessity runs (at least partly) counter to the internal unity and consistency demanded by deductive logic. That is part of the reason why formalist theory seeking to imitate natural science can only turn to deduction, to infer theorems from given axioms, as its final resort in attempting to construct universally applicable laws. That means the theories can only be constructions that are one-sided or opposed to reality. For this reason, what we suggest is to start with induction from empirical evidence of the real world, then employ reasoned guesses and inferences to uncover logical relationships among specified phenomena, thence to develop insights and construct theories with delimited conditions and boundaries, and then to return once more to the empirical world to re-examine those. That seems to us the truly appropriate use of the scientific method. At the same time, in selecting a subject, the researcher should be forthright and open about his or her chosen values and not pretend to a value-neutral science in the manner of formalist theory. Value choices will not affect our effort to seek the truth and the real; in fact, it is scientistic pretensions that are more likely to mislead both reader and researcher alike. A genuinely scientific method is one that appropriately

combines induction, abduction, deduction, and value choice to seek to understand the real world.

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Authors' Note

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Notes

1. For a concise summary of Newtonian mechanics, see Bohm, 1971 [1957]: 34-35.
2. On the uncertainty principle and related experiments, and the mathematical description of the principle, see Braginsky and Khalili, 1992: 2-11.
3. On the formation of the new paradigm of quantum mechanics, see Dear, 2006: 142-48, which summarizes the main experimental findings and relevant theoretical inquiries.
4. This was the personal experience of author Philip Huang when he served as the Director of the Center for Chinese Studies at UCLA and attempted to negotiate for the appointment of a specialist in Chinese philosophy in that department.
5. Langdell actually published very little, his influence being based mainly on the method of teaching he initiated at Harvard Law School. Nevertheless, the introduction he wrote for this volume of selected contract cases shows well his point of view and his method. For a detailed analysis of Langdell, see Grey, 2014: chap. 3.
6. This is author Philip Huang's phrase for encapsulating the Chinese mode of legal thinking. See Huang, 1996: chap. 8.
7. For the detailed content of the definitions, postulates, and common notions of Euclidean geometry, see Heath, 1908: 153-55.
8. This theorem is no. 47 in Vol. I of Euclidean geometry. Its actual proof is shown in Heath, 1908: 349-50.

9. Peirce, William James, and John Dewey are generally considered the three main thinkers of American pragmatism. James was Peirce's classmate, while Dewey had studied with Peirce. The best short introduction to Peirce's life and work is Burch, 2014.
10. This is the illustrative example used by Burch, 2014.
11. See, for example, Peirce, 1998: chap. 16 (the seventh of the series of lectures he gave in 1903 at Harvard on pragmatism). Peirce was a most prolific writer whose published work totals 12,000 pages, with another 80,000 pages of unpublished manuscripts. His writings touched on a wide range of subjects, including mathematics, logic, language, history, and economy. (His collected works are still in the process of being published.) Perhaps because of that, some of his writings come with a heavy flavor of first drafts: the writing is sometimes rather difficult to follow and the thoughts sometimes unclear. The fact that he was not employed by a university but rather worked as an applied scientist (in geodetic surveying) may account in part for his practical orientation. Today, he is quite widely seen as the most creative of the pragmatist thinkers.
12. In recent years, some philosophy specialists on Peirce have attempted to apply deductive logic to his concept of abduction, in an effort to formalize the transition from abductive hypothesis to deductive certainty, by employing the theorem that the best explanation is the simplest one. They have actually begun to speak of Peirce's abduction rather as "inference to the best explanation" (Douven, 2011). In our view, for the purposes of social science, such an endeavor seems of little practical import, amounting in effect to the pursuit of a formalism that runs counter to the basic nature of the true human world that ought to be the subject of social science.
13. A black body is an object that absorbs all incidental electromagnetic waves without reflection, this while it can also emit electromagnetic waves to the outside. That electromagnetic radiation, or "black-body radiation," enabled researchers to exclude from their experimental data the influence of reflected electromagnetic waves not emitted by the black body itself, thus providing an ideal starting point for studying the mechanics of pure electromagnetic radiation.
14. The photoelectric effect refers to the phenomenon of electrons emitted by a metal surface when light is shone on it.
15. The inspiration from the related experiments is evident in Einstein's original article proposing the photon theory, especially in its opening part. See Einstein, 1998 [1905]:177-78.
16. Onora O'Neill, 1996 seems to us a particularly cogent reading of this aspect of Kant's thought.

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Author Biographies

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