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CRITICAL THOUGHTS ABOUT CRITICAL REALISM

ABSTRACT: *As microeconomic calculus and macroeconomic estimation superseded earlier approaches to political economy, broad questions about how things are (ontology), how things might be known (epistemology), and how science should proceed (methodology) were neglected. As a corrective, Critical Realism (CR) has been proposed as an alternative to the orthodox deductive-nomological (ODN) tradition; i.e., to mathematical deduction and statistical induction. In their place, retroduction—the use of analogy, metaphor, intuition and ordinary language—is supposed to illuminate root causes by identifying the deep mechanisms that govern events. CR offers guidelines for social science that are of a most general kind: from initial "premises," retroduction proceeds to hypotheses about deep structures and mechanisms. The initial premises are determined by a desire to understand events that surprise us. However, nothing is thereby excluded, including ODN. And since historical processes are revealed neither by assumption nor by the net effects of whatever initial conditions hold, it might be apposite to drop the search for (deep) socio-economic laws and to use whatever evidence is at hand to see whether, and the extent to which, ideal types apply to any given historical sequence.*

Adam Smith's *Wealth of Nations* has a philosophical dimension (liberalism), an organizational dimension (the pursuit of self-interest), and a

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technical dimension (the division of labor). It initiated a "classical" theory of political economy that, in all three dimensions, held center-stage for a hundred years until, in the late nineteenth century, economists disengaged from the ethics of liberalism and attached themselves to rational economic man as an optimizer *in extremis*. Under the label of "neoclassical" economics, constrained optimization became the dominant paradigm of mainstream microeconomics.

The neoclassical paradigm makes assumptions about resources, techniques, and goals from which deduction reveals conditions that define economic efficiency. Yet these assumptions have no necessary relevance to social processes, where "the decisions of many individuals influence one another and necessarily succeed one another in time" (Hayek 1949, 93). The problem is that *causal* relationships can only properly be inferred once *empirical* investigation has identified relevant causes. The use of pure logic in economics simply derives implications from assumptions made about the socio-economic mechanisms that support "economic" patterns of human interaction. Although deductive reasoning may be pertinent in explaining the decisions of a single agent, empirical propositions are essential for explanations of socio-economic coordination between individuals.

Mathematical (deductive) formulations are never scientific. They deliver propositions that are neither true nor false. Now, according to the usual assumptions used in the neoclassical theory of the firm, an optimal outcome ("equilibrium") is achieved when the marginal cost of production is equal to the marginal revenue from sales. That statement is a tautological derivative: a logical deduction from a stated goal (maximum profit) and its constituent elements (cost and revenue functions). Such a tautology is scientific only if its assumptions (such as that profit maximization is the objective of a firm) are asserted as true; and if their truth, and/or that of the deduced propositions, is falsifiable. If neither assumptions nor propositions are falsifiable, the statement is unscientific.

Critical Realism and Austrian-School Economics

So much is foundational and unobjectionable in the orthodox deductive-nomological[1] (ODN) tradition. On this foundation, however, ODN neoclassical economists try to erect a matched set of statistical correlations and inferences that purport to deliver robust estimates of parameters suggested[2] by the mathematics of neoclassical models. The problem is that statistical inference is often inappropriate to the study of economics.

Statistics deals with the problem of large numbers by eliminating *complexity*. The citation of numerical frequencies of different classes of individual elements relies upon the implicit assumption that the *interrelationships* between those elements are unimportant. For example, since competitiveness cannot exist without many diverse elements, each exhibiting a distinct pattern of behavior, scientific understanding of the role of competition in the economy is unlikely to be inferred from statistical analysis.

Critical Realism (CR) has been put forward as a philosophy of science that offers a better understanding of causal forces in social affairs than does ODN. The seminal CR ideas (see Bhaskar 1975 and 1979) are that causality within *natural* science rests in structured "generative mechanisms," and that similarly deep social structures underpin all *social* activity. In this respect, CR has obvious affinities with the Austrian school of economics.

One similarity is CR's recognition that the inherent complexity of socioeconomic relationships limits the use of scientific methods that have proven worth in investigating the simple phenomena that are generally relevant to physical science. Second, like Austrian-school economists, proponents of CR argue that no statement of physical properties is ever likely to convey the meaning of social phenomena. Legal agreements, obligations, rituals, community associations, etc., are unlikely to be identified by the material properties (including the outward behavior) of their associated elements. Similarly, gifts, punishments, and prizes are defined, not by their physical properties, but by subjective values and beliefs about them that are held in individual minds. While those values and beliefs are determined by cultural structures that remain relatively unchanged across successive generations of individuals, statistically analyzing the quantifiable (visible) elements of a snapshot of human social interaction at a given moment is likely to prove superficial in any examination of underlying social causes.

A third similarity between CR and Austrian-school economics is an unfortunate tendency toward extreme apriorism, which is, in part, a reaction to the misuse of statistics in neoclassical economics and, more generally, in positivist social science.

Ontology, Epistemology, Methodology . . . Astronomy, Astrology

CR takes a particular view of why quantitative methods are inappropriate to social science, emphasizing the need for a correct ontology of causal structures prior to deciding upon appropriate scientific procedures. It argues that meaningful event regularities exist only within "closed" systems that are shielded from outside disturbance. Since the social world is "open," CR asserts that closed-system modelling and/or the analysis of behavioral event regularities are spurious methods in social science.

The challenge, then, is for CR to identify what *is* methodologically legitimate. Defining social phenomena as conceptualizations "of the experience of social agents," CR argues that deep causal forces are revealed through the application of the very devices that social agents use in the thinking that underlies their actions: "analogy, metaphor, intuition and rhetoric" (Bhaskar 1979, 32). In practice, this means that CR proponents (who are often quasi-Marxist) recognize only their kind of rhetoric and their kind of ontology as legitimate; and they jealously protect that ontology from any kind of testing by means of the observed phenomena that it is supposed to explain.

Reality, knowledge, and scientific method are close associates. Ontology is concerned with the ultimate characteristics of reality that are sometimes termed *noumena*; epistemology, with the basis of our knowledge about reality; methodology, with the procedures appropriate for obtaining knowledge about reality.

Noumena are not directly accessible to us. When our sensory organs fail to account for irregular properties of identical sensory phenomena, our minds make or revise mere inferences about the noumena standing behind—indeed, causing—those sensory experiences.

For example, the ontology of a white granule may by inference be described as a sweetener, an explosive, or a deadly poison, even though these descriptions go beyond the phenomena perceptible by our eyes. Such inferences may be drawn upon the basis of logic, mathematics, sophisticated experimental design, raw experience, or intuition. While the ever-more-abstract interpretations of sensory experience derived from such inferences drive scientific understanding, however, the broadest of ontological presumptions (whether explicit or tacit) precede epistemology and methodology and, as a corollary, precede logic, mathematics, and experience.

Thus, there is nothing in science that *logically* refutes, say, astrology. Astrology is epistemologically invalid only if human events are presumed in advance to have no ontological grounding in planetary alignments. Alternatively, consider which ontological presumptions would define a world where human fate is determined by planetary alignments. Such matters are often described as "transcendental." To establish an ontology that legitimizes astrology requires an argument that transcends observable phenomena. Although many astronomers find astrology epistemologically indefensible to the point of being offensive, astronomy and astrology are mutually compatible at the transcendental level. The ontology in regard to the one does not compromise that in regard to the other.

Empirical and mathematical work within closed theoretical systems proceeds *on the assumption* that certain ontological prerequisites have been met, but these prerequisites are not directly tested by such work. Whether the astronomer or the astrologer realizes it or not (more likely not), the "implications" of their theoretical paradigms are tautological, in that they "work" only within the boundaries of the respective ontological assumptions that astronomers and astrologers routinely make. At the ontological level, astronomy does not prove that gravity is the primary force that affects the motion of stars and planets; astronomers merely define gravity—a concept that Newton found unsatisfactory—as the relevant force. Gravity does not "cause" the Earth's rotation around the sun except at the ontological level; but, if we assume that there is such a force as gravity, empirically established parameters—the laws of gravity—describe how that force operates. Within this theoretical system, formulae determining the position of planets are simply descriptions of what are, in the end, regular conjunctions of phenomena such as those observed and hypothesized about by Galileo, Newton, and their successors.

CR draws heavily upon the ontological difference between open and closed theoretical systems, so it is important to be clear about the distinction. By definition, only an "open" system allows cause and effect. Within a closed system, there are mere conjunctions of phenomena; i.e., "event regularities" of the sort that, as Hume pointed out, are ultimately all that can ever be observed.

In the ultimate, all-embracing closed system, precise magnitudes for the universal set of phenomena and all of their interactive relationships could be hypothesized. At a lower level, the ideal-gas law serves to illustrate. For a gas with the properties of initial and final pressure

P_1 and P_2, respectively, initial and final volume V_1 and V_2, respectively, and initial and final temperature T_1 and T_2, respectively, the law states that $(P_1V_1)/T_1 = (P_2V_2)/T_2$. Although the actual magnitudes of the variables might be inferred from event regularities, *causation* has no meaning here. In order to "introduce" causation into an otherwise closed theoretical system, at least one variable within it must be exogenously determined. So if an experimental scientist were to apply an external force to raise the temperature from T_1 to T_2, while volume is held constant ($V_1 = V_2$), the increase in temperature would *cause* pressure to increase from P_1 to P_2. However, there is no theoretical presumption that change is more likely to be initiated from source T (with V, rather than P, or neither, held constant), rather than from source V (with either P, or T, or neither held constant) or from source P (with either V, or T, or neither held constant).

These characteristics of closed and open systems are general throughout physics. A closed system exists only as a theoretical device. There is no practical illustration of one: the universe is too complex for any of the variables isolated by scientific theories to interrelate with complete predictability in any localized segment of reality, although it is the goal of controlled experimentation to approach this ideal as much as possible.

Thus, most energy sources (and life forms) on Earth owe their existence to (i.e., have been caused by) the exogenous force of the sun,[3] which, in turn, is part of an open galactic system that is an interdependent part of the wider cosmos. Although causal forces might appear to be present—for example, a closed theoretical model might be used to gauge the direction and intensity of a supernova gamma-ray burst that would be sufficient to *cause* a mass extinction of life on Earth—it is unnecessary to invoke an exogenous force. Rather, the complementary theory of thermodynamics is at work: by its second law, there is a one-sided, irreversible, continuous natural tendency towards greater entropy (i.e., towards greater molecular disorder). Within the theoretically closed system of the cosmos, erosion, decay, demise, deterioration, and death are the inevitable consequences of an initial unexplained state of disentropy.

Even in regard to open theoretical systems, the notion of cause has been questioned. Bertrand Russell (1929, 391) uses as an example the event of a stone breaking a pane of glass: "It may be that there will never be an exception to the rule that when a stone of more than a certain mass, moving with more than certain velocity, comes in contact with a pane of glass of less than a certain thickness, the glass breaks." In this example, such details as mass, velocity, thickness, and all other contributing circumstances form an infinite number of potential configurations. If those antecedents were sufficiently well defined in a complex world (defined, that is, beyond the vagueness of "panes of glass usually break when hit by stones"), every encounter between a stone and a pane of glass would be unique and, therefore, would offer no basis upon which to generalize about cause and effect. Conversely, where an event presupposes only one potential cause, the definition of the event entails its "cause"; or, rather, tautology displaces causation. An event must therefore be somewhat vaguely defined for it to have a causal explanation. The upshot of Russell's elucidations is that, in the context of a rigorous definition of causality ("Given any event e_1, there is an event e_2 and a time interval such that, whenever e_1 occurs, e_2 follows after an interval") (Russell 1929, 389), an event-cause must deliver its event-effect with a probability of less than 1.

The closed systems of theoretical physics are methodological contrivances whose application has delivered general physical laws and great technological advances. Within those closed systems, event regularities have interrelational meaning without causal implications. Events are tautologically (rather than sequentially) correlated. In Russell's illustration, however, vagueness opens the system to exogenous forces (stones moving in space-time), *from* which a causal *sequence* arises, such that a particular outcome is expected, but with a probability of less than 1.

In the social realm, CR *defines* a closed system "as one in which a constant conjunction of events obtains; i.e. in which an event of type a is invariably accompanied by an event of type b" (Bhaskar 1978, 70); and it *defines* an open system as one "where no constant conjunction of events prevail [*sic*]" (ibid., 13). Although CR acknowledges the existence of *sequential* event regularities, it denies their *ontological* relevance: "The real basis of causal laws cannot be sequences of events" (ibid., 33). This contrasts with mainstream economics, where—as with Russell—it is only by the assumption that the system is "open" (because certain variables are treated as exogenous) that a cause is defined: "From the point of view of theory, an exogenous element cannot be an effect. It can only be a cause" (Hicks 1979, 22). So, for example, Keynesian macroeconomics sets government expenditure as an exogenous variable, in a context where, if that expenditure is increased, production rises and unemployment falls: *ergo*, government is responsible for the level of unemployment.

CR's main target is orthodox deductive-nomological (ODN) method, especially the widespread practice of setting event regularities against hypothetical counterfactual possibilities. This practice, according to CR, opens the door to ODN's reliance on deductive mathematics and inductive statistics. The "essential error" of ODN is alleged to rest with its "closed systems modelling," according to which complex interrelationships are excluded by means of the *ceteris paribus* clause. In practice, neoclassical economics defines vagueness out of existence through the *ceteris paribus* clause, with the effect of potentially excluding from consideration what is actually, ontologically, causal.

Autistic Economics

The first-order condition for optimality (maximum profit) in the neoclassical theory of the firm—the condition that marginal production costs equal marginal sales revenue—is a tautological derivative of posited initial conditions, including the assumed goal of the firm. Mathematical economics comprises patterns of such interrelational truisms. *If* the initial conditions were to hold, then certain event regularities would follow, not as a matter of empirical science but as a matter of mathematical certainty.

Because of this detachment from causally related sequential social forces (i.e., from multidimensional causal linkages of actions, consequences, and reactions), neoclassical economics has been described as "autistic," meaning that it has no necessary relationship with (ontologically) real social interrelationships. Its value rests in establishing tautological equivalents to the well-defined and mathematically tractable goals of agents within the imagined system.

Reality enters the picture through statistical induction, which subsumes real-world events under laws that are presumed to apply generally and (given the unexplained "noise" within localities of the real world) probabilistically. This allows comparisons to be made between historical events and hypothetical events that derive from counterfactual models. Thus, to say that event x causes event y implies a hypothetical state in which x is not present (while other events contemporaneous with x are present). A hypothetical state is such that either (1) y *could not* happen (a universal law); or (2) y is *unlikely* to happen (a statistical law). Thereby ODN allows (1) sequential explanations (i.e., counterfactual statements) such that "if x had happened, y would have happened";

and (2) sequential predictions (i.e., subjunctive conditionals) such that "if x happens, then y will happen."

The "symmetry thesis" follows as a corollary: *explanation* and *prediction* have the same form. So, for example, while historians may be certain that particular events have happened, they must hypothesize about their likely causes; uncertainty allows rival causal explanations. Similarly, while forecasters may be certain about how particular events (in a closed theoretical system) would be conjoined, uncertainty about which events are likely to present themselves in (open) reality allows rival causal predictions. Notwithstanding this symmetry, *predictions* (for example, when they are founded entirely upon statistical extrapolation) need not offer *explanations* that are an attempt to reach beyond the repetition of contingently related events in order to build theoretical structures.

Is It Possible to Avoid the Problem of Induction?

In applying transcendental arguments to the social realm, CR divides the latter into three domains: the real, the actual, and the empirical. The "real" consists of noumenal objects, structures, mechanisms, and causal powers. The "actual" consists of activity or change caused by real (noumenal) mechanisms. The "empirical" consists of phenomenal experience. For example, the real structural mechanism of a road network gives rise to actual activity (transportation, congestion, pollution, carnage) and empirical phenomena (satisfaction, stress, asthma, horror).

The well-known problem of induction in epistemology is the circularity of presuming that event patterns (among phenomena) are likely to be repeated, based solely upon the knowledge that patterns have been repeated in the past; i.e., the problem is that induction is invoked in support of induction. By its focus upon noumena, as opposed to methods for interpreting phenomena, CR purports to avoid the problem of induction by bypassing epistemology in favor of ontology: "Nature's uniformity . . . derives not from the 'accidental' regularities of sequences of contingently related things but from the internal relations, structures and ways-of-acting of things themselves" (Sayer 1999, 158). Instead of regarding "events" as occurring in (observable) "conjunctions" whose lawlike repetition is epistemologically problematic, CR regards events as expressions of noumenal essences.

But to assert the ontological grounding of "nature's uniformities" as "internal," "noumenal," or characteristic of "things themselves" simply moves the problem of induction to the ontological level, because—as with event regularities among phenomena—there can be no guarantee that noumema are interrelated in any immutable law-like fashion.

No Ontology without Epistemology

Through its use of essentialist language, CR insists that it is possible to establish a priori the nature of underlying causal forces (even while it denies the legitimacy of a priori mathematical modelling). Explanations for phenomena are alleged to rest in causal mechanisms that can, potentially, be identified indirectly, not through induction (the a posteriori identification of phenomenal event conjunctions), but through retroduction; i.e., through "a logic of analogy and metaphor" (Lawson 1999, 10). By such methods, it is possible to move "from the level of events to the mechanisms governing them . . . which are then in need of verification, further investigation, etc. There is no obvious end to this explanatory behavior" (ibid., 54–56). So, in place of ODN mathematical formulation and statistical inference, CR espouses analogy, metaphor, intuition, and rhetoric as appropriate methods "to move from the manifest phenomena of social life, as conceptualized in the experience of the social agents concerned, to the essential relations that necessitate them" (Bhaskar 1979, 32).

There is no novelty in the CR espousal of analogy, metaphor, intuition, and rhetoric as elements of scientific method. Such methods generally lend themselves to sciences in which complex phenomena are under scrutiny; in medicine, for example:

> Since finding out what something *is* is largely a matter of discovering what *it is like,* the most impressive contribution to the growth of intelligibility has been made by the application of suggestive *metaphors*. . . . It is impossible to imagine how anyone could have made sense of the heart before we knew what a pump was. Before the invention of automatic gun-turrets, there was no model to explain the finesse of voluntary muscular movement. . . . The subjective experience of the body is usually incoherent and perplexing, and when we want it put right, we refer to people who have learnt to think about it with the help of

technical metaphors: experts whose use of analogy has enabled them to visualize the body not merely as an intelligible system, but as an organized system of systems—which does not mean that man is an engine or that his humanity is a delusion. (Miller 1978, 9–10.)

However, while the relevance of analogy, metaphor, intuition, and rhetoric is well established, CR's dismissal of event regularities per se must be challenged. Consider, for example, the CR assertion that "one can predict the onset of measles following the emergence of Koplic spots, but the latter does not explain measles" (Fleetwood 2003, 50). A counterargument might begin with the observation that Koplic spots are a relevant symptomatic feature of the onset of Rubeola, such that, in avoiding individuals with Koplic spots, one reduces the risk of Rubeola. A more tenuous (but non-spurious) correlation between, say, the sale of wedding rings and the birth of infants would not support an equivalent expectation. The purchase of a wedding ring is not fundamental to the risk of maternity. Some alternative, structurally deeper (to use CR terminology) explanation would be required for more prescient expectations of human births. By contrast, even before deep structural explanations of measles were achieved, the event regularity of Koplic spots and other symptoms of what is now called Rubeola still gave sound behavioral guidance.

In a different context, the simplistic (but usefully informative) event regularity of "dark clouds, thunder, and then rain" may be less impressive than a sophisticated (transfactual) meteorological thesis that draws upon a rhetorically "convincing" ontology of convection, precipitation, and the electrical characteristics of storms. Indeed, the mathematical modelling of theorized interconnections between such factors, combined with sufficient empirical investigation of initial conditions, might allow the conjunctions of such events as clouds, thunder, and rain to be predicted accurately enough to indicate even when exceptions to simplistic regularities are to be expected. Nevertheless, science is a matter of degree, which means that there is no sharp division between casually observed correlations and sophisticated theoretical explanations:

The scientific way of forming concepts differs from that which we use in our daily life, not basically, but merely in the more precise definition of concepts and conclusions; more painstaking and systematic choice of experimental material; and greater logical economy. (Einstein [1940] 1953, 253.)

All words are theory-laden and their use implies inferences, which is why dark clouds and a report of thunder have long caused men to avoid hilltops and to seek shelter. In respect to every mundane decision, a layman is an historian drawing inferences from events of the past, and a forecaster anticipating events of the future; the rudimentary understanding of weather systems that he possesses is generally sufficient to keep him safe and dry.[4] He is a scientist of theoretical event regularities, even when the theory in question concerns the mere conjunction, not the underlying explanation, of events.

Moreover, even when we turn from phenomena to noumena, our theories are intended to explain phenomena: events (especially regular ones). If harvests are enhanced when fish are planted along with seeds, rival explanations might hold that there are deities who are pleased by the gift of fish, or that fish enhance soil fertility. Each explanation is ontologically grounded; but irrespective of which (if either) explanation is adopted, the scattering of fish is associated with (and allows the prediction of) good harvests. In removing a degree of ignorance about how to farm, the recognition that fish cause an increase in crop yields constitutes practical scientific progress.

CR is erroneously emphatic in rejecting the scientific relevance of event regularities. Even contingently (not ontologically) related events might afford the most immediate practical direction to human action in problem solving: "The event of the short circuit in the electric system caused the fire. . . . The event of frost over a number of nights caused the failure of the Brazilian coffee crop, or the event of the snow blizzard was a genuine causal factor for the absenteeism on that day" (Boylan and Gorman 1999, 143). Contingent event conjunctions such as these incite meaningful precautions against electrical short circuits, frost, and absenteeism; and they present no impediment to those who would seek out deeper, non-contingent structural causes. The latter may show the conjunction of events to be spurious (as with nesting storks and child births), or mildly informative (as with wedding rings and child births), or moderately informative (as with Koptic spots and Rubeola), or strongly informative (as with the paramyxovirus and Rubeola). Whatever awaits deeper understanding, event conjunctions are potentially informative. Thus, "a difficulty with the 'standard' account of Humean empiricism is that it confines causality to events. [But] critical realism appears to go to the other extreme by failing to give due recognition to events as indispensable constituents of real causal webs in the economy" (ibid.). The underlying causal structures are, after all, intended to explain what happens in the "visible" world.

Adaptation to Event Regularities

All purposeful social interaction is governed by beliefs that are uniquely determined by the genetic and psychological predispositions of individual agents, together with their learned (cultural) and learning experiences (which are both partial and are potentially misleading).

Every organism is affected by innate predispositions, as evidenced by the kitten that recoils from a mock painted abyss even when it is the first thing it has ever seen. According to CR, "If laws are sequences of events and if men, being causal agents, can bring about and prevent such sequences, there can be no rationale for according one rather than another the status of law" (Bhaskar 1978, 65). Consider this claim in light of a thought experiment. Pushed from the tenth floor, an individual is caught by another individual on the ninth floor. Those who are genetically predisposed to "derive a law" from the catch rather than from the fall are destined for a shortened lifespan, with an associated tendency for that predisposition to be eradicated from the gene pool. In addition to the natural protection afforded by genetic predisposition (by which the kitten avoids the abyss and an individual avoids the fall), closed-system experimentation delivers a second, cultural line of protection. Genetic selection and intelligent learning are inductive processes with proven worth; and both are processes of learning about regularities among phenomena, not among noumena.

Fatal-fall event regularities over successive generations nurture the instinctive developments whereby animals draw back from a precipice. All surviving organisms discovered causality in those (and analogous) regularities (whether through genetic selection or conscious thoughtfulness) long before the emergence of deep scientific "structures" that explained the regularities by way of the causal force of gravity (or space-time curvature). Although citing the "cause" of an event regularity implies a scientific explanation of a deep causal force, enough might be inferred from the regularity itself to stay alive. A regularity is thus informative (and useful) as a proxy for what is not yet known.

Although often spurious and potentially misleading, statistical correlations can likewise teach, improving upon genetic predisposition. In the provision of motor-vehicle insurance, for example, correlations between traffic accidents, location, engine size, driver's age and past speeding convictions, etc., determine commercial premiums. Actuaries rely upon statistical tables, heedless of the essential causes of the underlying regularities. In their absolute denial of the value of statistical inference, it remains for CR theorists to demonstrate how the insurance industry might benefit from replacing their proven (i.e., competitively profitable) inductive techniques with methods of retroduction.

On the other hand, the persistence of general patterns does not necessarily mean that fine-grained forecasts can be made. For instance, modern economies bring into relation with each other a multitude of individuals with mixed motives and having independent effects upon each other. While broad patterns are generated (such as those that feature as unemployment rates), the complexity of large-scale interaction precludes accurate economic forecasting.

Throwing Out the Baby with the Bathwater

By its insistence that closed-system models have no place in social science, CR is forced to the extreme of finding no value in statistical analysis. For example, the Quantity Theory linkage between money and prices has no value because it requires all other causal influences either to be held constant in an algebraic model, or to be subsumed within an inconsequential error term in an econometric model. In both cases, the contrivance of a closed system (and its regularities) is made possible by assuming away the question of whether the initial conditions of the model hold true and are not counteracted: the model works only because "other things" are "held equal."

In light of its reliance on the *ceteris paribus* clause, it counts for nothing, however, in the CR view, that there is evidence for the Quantity Theory from diverse epochs, cultures, and political regimes;[5] nor that the regularity was commented upon long before neoclassical economics went to work (whether appropriately or not) with its econometric estimations; nor that the theory has given practical guidance to the reform of monetary policy (reform that delivered, as it was predicted to do, a post-Keynesian epoch of low inflation). The pervasive relevance to price inflation of the Quantity Theory of Money is acknowledged even by F. A. Hayek (1935, 5), who otherwise unremittingly disparaged the "pseudo-scientific" economics of averages and aggregates: "It would be one of the worst things which would befall us if the general public should ever again cease to believe the elementary propositions of the Quantity Theory."

Although the broad features of the Quantity Theory draw empirical support from the most robust of economic event regularities, this is not to deny the problem of translating a theoretical concept into an empirical unit (which shows in the correspondence between the concept of "money" and a variety of statistical "money aggregates"); nor is it to deny the unique characteristic of every historical series. However, while a multitude of partial influences is testimony to the "openness" of socioeconomic systems, it is usual even in open systems that theory and/or evidence will suggest that special weight can be assigned to a narrower range of factors.

In the particular example of the Quantity Theory, explanation (and prediction) draw from the most general of economic propositions: namely, that (unless demand increases *pro rata*) the more there is of something, the less valued it becomes. This is not to claim that there are no exceptions; if that were so, the regularities would be tautological and thus provide no explanation. Following Russell, we may say that, in an open system, an event-cause must deliver its event-effect with a probability of less than 1; and that, as a corollary, if inflation is defined as monetary debasement, the event-cause and the event-effect would be inseparably combined and the Quantity Theory would become a tautology.

Closely related to the Quantity Theory of money is the Friedman-Phelps expectations-augmented Phillips curve, which delivers an ontologically structured explanation of the causal forces that underpin nonlinear negative correlations between wage increases and unemployment. The rudimentary event regularities that were first identified by A. W. Phillips misled the authorities into believing that full employment could be sustained at the expense of moderate wage inflation. The ontological structures that were later independently elucidated by Milton Friedman and Edmund Phelps suggested that the regularities would collapse if they were used to give direction to policy. They were, and they did.[6]

The Quantity Theory predicts price increases as events that are regularly conjoined with increases in the money supply *when other things*—"exogenous variables"—*are held equal*. But while it is true that this "closes" the theory off from greater economic complexities, it does not detract from its scientific validity, as experience has shown. On the other hand, because economic systems are indeed open to an endless succession of unique historical forces, statistical regularities do not serve as a credible basis for detailed forecasts and economic policy interventions. ODN practitioners are therefore deservedly criticized for their bogus statistical estimations of (for example) the central concept of the natural rate of unemployment. Event regularities can certainly mislead; but there is nothing in principle to suggest that they cannot point the direction to ontologically sound causal explanations.

Counterfactuals vs. Transfactuals

In dismissing the event regularities of ODN, CR offers transfactual statements, elsewhere termed "tendency statements" (see Pratten 1999, 33), as a meaningful alternative: "A transfactual statement is not a counter-factual, i.e. it does not express what would happen if conditions were different. Rather it refers to something that is going on, that is having an effect, even if the actual (possibly observable) outcome is jointly co-determined by (possibly numerous) other influences" (Lawson 1997, 5).

The fall of a leaf is cited as an illustration: "Not only is the path of the leaf governed by gravitational pull, but also by aerodynamic, thermal, inertial and other mechanisms" (Lawson 1997, 5). This *is* a revealing illustration: *ceteris paribus*, gravitational pull is certain to bring the leaf to the ground; but the absence of gravitational pull would affect "aerodynamic, thermal, inertial and other mechanisms" enormously. To invoke *ceteris paribus* (which is legitimate only where determinants are *independent*) would be drastically misleading. A transfactual (or tendency) statement attempts to accommodate the *interdependence* of determining factors by recognizing that the impact of a determining factor is unlikely to be revealed by any constant conjunction of events: "A tendency statement can be true even if the tendency referred to is never actualized at the level of events because of off-setting tendencies. It does not merely (and possibly does not at all) stipulate what would have happened had the situation been different" (Pratten 1999, 33).

In this respect, however, CR introduces no epistemological novelty. The problems that arise when determinants are interdependent are well recognized within the ODN tradition. Interdependencies do not exclude the possibility of event regularities; they only make them more intricate, less obvious, and, in many instances, empirically rare outside of experimental control.

Event regularities are, however, more likely when the potential for interdependence between determining factors is constrained by social structures and when agents' goals, circumstances, and well-informed behavior may be established with a high degree of certainty. Event regularities (constrained by such parameters) may then afford—as an investigative beginning, rather than as a definitive end—important insights into social structures. What can be admitted is that such conditions are more rare than the application of ODN methods would suggest. But given that event regularities are ubiquitous, even if mostly spurious, it is imperative to argue their theoretical relevance. CR categorically disallows their relevance, which goes too far.

The Artificial Nature of Economic Theory

By its nature, science inevitably creates artificial closures from, and thus inconsistencies with, complex reality. In cartography, for example, two-dimensional maps that detail a three-dimensional spherical surface are inconsistent where their boundaries meet. In theoretical physics, the prospect of a grand unifying theory is countered by the expectation only of overlapping inconsistent theories. Similarly, in the wave-particle duality of quantum theory, matter is represented sometimes as waves and sometimes as particles to accommodate different properties, depending on the experiment undertaken.

In social science, the archetype of holism (or in the alternative, individualism) asserts that the properties of the whole (or, respectively, of the parts) are determined exclusively by the properties of the parts (or those of the whole). Extreme holism reifies the social forces whose vitality determines the fate of individuals. Atomistic individualism asserts the existence only of those forces that can be discovered at the level of the individual. Each affords is own insight and, between them, presents serious methodological and empirical issues for discussion. Likewise, in economics, orthodox market-equilibrium theory shows that, if rational choices *have been guided by* equilibrium prices, there is allocative efficiency; but Austrian market-process theory shows that if rational decisions *are to be guided by* market prices, there must be some initial allocative inefficiency. In the former theory, arbitrage is assumed to have already take place; in the latter, opportunities for arbitrage create profit openings for entrepreneurs. In addressing this mutual inconsistency, market prices may be said to reflect information only incompletely, so that those who expend resources to obtain better information may expect a reward.

Surprises

In recognizing that *any* set of determining variables is *necessarily* only a subset of the influences on the outcome of complex events, we are saying no more than that every explanation and every prediction is a partial and rudimentary sketch, because every omitted detail has relevance. In general, then, social science may aspire to identify tendencies, such that only what Hayek called pattern predictions are plausible. Even where the course of events might be compared with counterfactual derivations drawn from a theoretical model, surprises (news) are ever-present in open systems. The path of actual events is essentially different from that of any theorist's hypothetical counterfactual sequence.

The essence of surprise is that it cuts across expectations. Yet while the orderly patterns arising from hypothetical causal sequences contain no surprises, they are historically (and rationally) relevant.

The historian's skill is to incorporate surprise events into general event patterns in a plausible (though inevitably *ad hoc*) manner. The forecaster is less well placed by his greater reliance upon a closed theoretical system. In using closed-system event conjunctions to make a forecast, important surprising details are unavoidably neglected. It is because an *ex post* explanation can incorporate surprises that an historical narrative can be uniquely structured to greater advantage. Upon that basis, disingenuous forecasters may construct an illusion of prescience: smart punsters are adroit in dressing *ex post* rationalizations of the recent past in the guise of forecasts of the near future.

Plausible "explanations" certainly appear to be more readily provided than accurate forecasts. But this appearance is deceptive. The deception would be uncovered by an experimental reconstruction whereby *n* historical data series are provided, together with a remit to construct (from theory) a missing $(n+1)^{th}$ data series. The smart money would be against success, because the missing series would incorporate surprises that would not be reflected in the theoretical interconnection between the *n* other series. Accurate social-science forecasts are compromised by such surprises, not least those that emanate from intentional acts. While this limits the usefulness of ODN, the methods of retroduction (if such exist) are no better placed; "the practical problem with transcendental realism . . . is that it . . . is an ontology, a theory of the nature of being, and not a theory that provides any practical guide to determining what the nature of being actually is" (Hands 1999, 181).

It is not enough for advocates of CR to assert that the causal characteristics of the social world are not revealed by event regularities, when the CR alternative is solely to rely on "plausible" ontological mechanisms. A practical methodology to examine the usefulness of retroductive methods is also required. (Although it may be "impossible to imagine how anyone could have made sense of the heart before we knew what a pump was," that intuitive understanding would provide a poor basis for open-heart surgery.)

Critical Realist Apriorism and a Sounder Alternative

There is an easy assurance to repudiating fallible methods and falsifiable conclusions in favor of irrefutable a priori ontology:

> Firmly rejecting constant conjunctions of events as most unlikely features of social reality and, thereby, abandoning the notion of causality as mere regularity, the critical realist is free to seek the cause of an event elsewhere in the ontological spectrum. Attention turns away from the flux of events (constant or otherwise) and towards the *causal mechanisms, social structures, powers and relations* that govern them. (Fleetwood 2003, 53, emph. original.)

One aspect of CR's apriorism is the assumption that such structures are not themselves mutually adapted with, and thus dependent upon, the intentional human actions and interactions that the structures are supposed to explain. Another is the conviction that knowledge of underlying causal structures cannot be inferred from the events they are supposed to explain (or, at least, not from those events that exhibit any regularity!). Given this latter assumption, CR is left in a position similar, in effect, to that of extreme apriorist Austrian-school economists such as Ludwig von Mises, who were so impressed by the complexity of social phenomena that they insisted that economic principles, despite being "laws," have aggregate interactive effects so unpredictable that there is no value in observing event conjunctions at all. By which procedures, after all, does retroduction achieve for CR the required "verification, further investigation, etc."? It turns out that an answer is postponed in favor of a seemingly modest emphasis on the need for a great deal of pre-preparation.

> Critical realism in economics is a project oriented to underlabouring for a more fruitful science of economics. It can provide a perspective on the nature of science and society, but it cannot do the work of science. . . . The aim accepted in critical realism is to encourage economists to accept in their researches the broad perspective elaborated under the critical realist head. (Lawson 1999, 14.)

Since it is bereft of methodological precepts, CR in practice amounts to little more than the exclusive reliance on a particular ontology that, because of its (asserted) transcendental nature—such that if it were false, experience itself would be impossible—renders CR arguments irrefutable. Strong beliefs substitute for sound knowledge:

> In the case of spurious relationships, such as the strong correlation between the incidence of Scottish dysentery and the rate of inflation, we would not risk inductively inferring that the association will continue—not because such an inference would fall foul of the *logical* (big) problem of induction but because we feel confident from our knowledge of the objects concerned that they are not causally related. (Sayer 1992, 158–59.)

On the other hand, the general CR maximum for good practice—the use of metaphor, intuition, and ordinary language to "draw upon everything we know" (Sayer 1992, 238)—is not exclusive to CR, any more than is its recognition of interdependence issues. Consider the comments of Milton Friedman and Anna Schwartz (1991, 49), foremost practitioners of ODN:

> Regression analysis is a good tool for deriving hypotheses. But any hypothesis must be tested with data or non-quantitative evidence other than that used in deriving the regression or available when the regression was derived. Low standard errors of estimate, high values, and the like are often tributes to the ingenuity and tenacity of the statistician rather than reliable evidence of the ability of the regression to predict data not used in constructing it.

There is no clash between ODN and the CR objection to statistical economic "laws." It is simply that statisticians often misuse ODN, failing to realize that the role of historical social science is to identify the causal mechanisms/initial conditions (ideal types) that are present, and the degree to which they are counteracted by different causal mechanisms. Historical processes are revealed neither by a priori assumption, nor by the a posteriori measurable net effects of whatever initial conditions have occurred at a given time and place. If the relevance and the degree of the initial conditions are treated as open questions, there is no requirement for essentialist ontology to remedy statistical naïveté. It is only necessary to realize that treating statistics about net effects as if they bespeak universal laws is an implausible scientific method.

Indeed, it might be apposite to drop the search for socio-economic laws altogether, and to use whatever evidence is at hand, including that from statistical analysis, to see whether and to what extent ideal types such as those presented by economic theory apply to any given historical sequence.

In that regard, CR offers a warning both general and specific. In general, scientific methods should be appropriate to their field of application. And specifically, quantitative rigor is not rigor per se.

NOTES

1. "Nomology": the study and discovery of general physical and logical laws.
2. The "suggestion" is tenuous where static models are associated with time-series statistics.
3. The exceptions are *archaea*, microbes that draw energy from the Earth's core via hydrothermal vents on mid-ocean ridges (see Parkes et al. 1994).
4. Even so, "science to our ordinary everyday knowledge is like a cathedral to working men's cottages" (Watkins 1999, 5).
5. "There is perhaps no other empirical relation in economics that has been observed to recur so uniformly under so wide a variety of circumstances as the relation between substantial changes over short periods in the stock of money and prices" (Friedman 1956, 20–21).
6. An illustration of Goodhart's Law: "That any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes" (Goodhart 1984, 96).

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