
Concept of Law in Social Sciences

The Idea of Economic Laws. Some Considerations on Rationality, Historicity, and Objectivity in Economics

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The debate on the existence of laws in individual and social behaviour dates back to the very beginnings of economics as a modern science. In adopting the concept of natural laws from classical mechanics, economics originally evolved as ‘social physics.’ But is it really appropriate to transfer the idea of precise and accurate laws to social life and social science? We attempt to answer this question by scrutinizing the methodological foundations of the discipline. In particular, this paper addresses the concepts of rationality, historicity, and objectivity – all located at the very heart of economics and all essential in developing a viable, empirically corroborated theory to face and embrace economic complexity.

1. Two Cultures? John Maynard Keynes and Max Planck

Economics is not physics. In his influential essay and obituary for Alfred Marshall, John Maynard Keynes draws attention to the differences between the two disciplines and to the specific difficulties in uncovering and describing laws in social science. Therein he remembers a conversation he had with Max Planck on the relationship between physics and economics, which leads to the core issues to be discussed in our paper:

Professor Planck of Berlin, the famous originator of the Quantum Theory, once remarked to me that in early life he had thought of studying economics, but had found it too difficult! Professor Planck could easily master the whole corpus of mathematical economics in a few days. He did not mean that! But the amalgam of logic and intuition and the wide knowledge of facts, most of which are not precise, which is required for economic interpretation in its highest form, is, quite truly, overwhelmingly difficult for

those whose gift mainly consists in the power to imagine and pursue to their furthest points the implications and prior conditions of comparatively simple facts which are known with a high degree of precision.¹

Undoubtedly, economics has evolved into a much more sophisticated science since that time. However, economics is still far from its ambitious goal of understanding, explaining and maybe even designing and predicting the simultaneous outcomes that arise from decisions of independent and heterogeneous economic agents interacting through complex relationships and markets. In the eyes of many observers both inside and outside of the economic profession, these shortcomings have been revealed by the recent financial crisis and its enormous economic, social and political disruptions.

It is hardly surprising that many economists have begun to challenge the status quo of economics and – once again – to raise methodological issues concerning the nature of economic explanations and knowledge. From a philosophical point of view, approaches and methods may differ across disciplines. Yet, any scientific approach ultimately relies on the existence of regularities which are to be observed, analysed and tested. In the field of the social sciences, the identification of these regularities and thus the generation of knowledge are particularly difficult for obvious reasons.

In contrast to the natural sciences, there is little opportunity to gain insights from experimental data in the social sciences. Natural experiments are rare, and laboratories with controlled experimental conditions are still in their infancy. But even if we can produce some artificial laboratory experiments, the results may be flawed for various reasons so that they do not necessarily provide reliable inferences to real-world problems.² Moreover, the use of artificial experiments is sort of constrained to microeconomic settings. Problems at the aggregated macro level, however, have to be appropriately addressed by alternative methodologies. For the most part, empirically-oriented economists try to analyse real-world data *ex post* – i.e. they test existing theories by confronting their implications with the past behaviour of observable economic variables. Undeniably, econometricians have made huge progress in advancing the statistical methodology to deal with economic data. The multiplicity, complexity, and interdependence of simultaneous economic decisions, however, still make it very difficult for researchers to distinguish between causality and correlation. Additionally, even if we are able to identify causal relations in retrospective studies, we have to be very cautious in employing these findings in forecasts as causalities and their respective quantifications may well change over time. Thus, economics cannot achieve the desired clear-cut theoretical successes of the natural sciences.

Nevertheless, to ask for laws in social science, and in economics in particular, means dealing with questions that are as old as the discipline itself.^{3,4} In fact, these were already the crucial questions on the threshold of modern science. These issues have not lost their relevance until today and are still decisive when we think about the future of economics.

To start with a definition, if by ‘laws’ we mean well-corroborated, universal relations between events or classes of events deduced from independently tested initial conditions,⁵ it becomes perfectly clear why economics sought close proximity to physics right from its inception. Modern economics actually evolved as an adapted concept of ‘social physics’.⁶ In his ‘Mathematical Investigations in the Theory of Value and Prices’ (1892),

one of the milestones of classical economic thought, Irving Fisher even provided an explicit translation of all economic terminology from the corresponding concepts in classical mechanics. But can social laws actually be described in an equally precise and universal way as Newton, for example, formulated his laws of gravitation? Can human behaviour be adequately understood from a deductive, statistical or empirical point of view? Is it possible to transfer the concept of natural laws to social life?

Our paper addresses the difficulties in analysing, developing or constructing laws in economics, although – by contrast to its classical predecessors – it replaces the notion of natural laws by terms such as ‘social laws,’ ‘patterns,’ or ‘regularities.’ In order to examine the basic issues of economic methodology, it is also helpful to shed light on some landmarks in the history of economic thought over the last century. In this regard, we discuss the concepts of rationality, historicity, and objectivity in economics. The paper is therefore organized as follows. The next section re-examines neoclassical economics and its assumption of rationality. The third section is concerned with the aura of precision evolving from ahistorical and formalized settings. The fourth section discusses epistemological issues while a fifth and final section concludes.

2. A Look into History – From Classical to Neoclassical Economics

It is no coincidence that classical economics emerged during the Industrial Revolution in England. Due to its roots in the moral philosophy of the Scottish Enlightenment and its kinship with natural law theories, economics also drew attention to ‘laws’ in human or social behaviour right from the beginning. In this context, the analysis of the relationship between quantity and price with regard to supply and demand played an important role in classical economics. Concepts such as Say’s law, the law of diminishing returns, market equilibrium, and consumer and producer surpluses were introduced to economic theory. Based on personal liberty, private property, and the pursuit of self-interest, free competition within self-regulating markets was thought to be desirable not least because it tended to expand the area of the market by bringing about an improved division of labour.⁷

Over time, the focus of economics broadened from a market economy to the study of man and human behaviour in general. Individuals were mainly considered as members of a social organism, embedded in a cultural and historical setting. In their quest for fundamental principles and regularities, classical economists were perfectly aware that individual and social behaviour is too varied and uncertain to formulate strict behavioural laws. On the threshold from classical to neoclassical economics, Alfred Marshall, to mention just one, defined ‘a law of social science, or a Social Law’ as ‘a statement of social tendencies; that is, a statement that a certain course of action may be expected under certain conditions from the members of a social group.’⁸

2.1. The Axiom of Rationality and the Utopia of Natural Laws

The transition from classical to neoclassical economics is characterized by a number of paradigm changes. In particular, the so-called marginal revolution turns economics into an almost entirely deductive approach with general premises and thus abstraction. Economics becomes a mere mechanics of utility and self-interest. The analytical method of modelling

human behaviour is widely adopted and methods of mathematical formalization, especially marginal analysis, come to the fore. While the founders of marginal analysis in the wake of Cournot and von Thünen predominantly dealt with problems of production and accumulation, neoclassical economists subsequently extended the use of their methods to utility and consumption issues. Additionally, the microeconomic approach to economic research, following Walras's total analysis and Marshallian partial analysis, soon prevailed over alternative approaches within the economic discipline.⁹

Overall, there are four elements forming neoclassical economics: methodological individualism, stating that social theories must be grounded on the attitudes and behaviour of individuals;¹⁰ the principle of maximization or optimization, formalizing all motives in an aggregated utility function that is then to be maximized under constraints; the concept of a social welfare function and its optimum, transmitting the maximization principle also to societal and governmental issues; and finally the concept of a system equilibrium, which combines all elements into a unifying framework.

The fathers of neoclassical economics, especially Jevons, Menger, Edgeworth and Walras, stressed the methodological advantages that result from neglecting historical and institutional factors. By introducing the concept of *homo oeconomicus* – an economic agent endowed with unlimited rationality and foresight – economists became capable of designing a world bare of any information problems and uncertainty. Owing to his perfect rationality, the *homo oeconomicus* behaves in a comprehensible and even predictable way by strictly maximizing his utility function. Of course, disputes about the nature of human rationality are as old as the concept of rationality itself. It enabled economists, however, to endogenize and operationalize agents' behaviour, ultimately leading to a precise and quantitative formulation in analytical terms.¹¹

Yet, the fascination that one can derive general results – 'natural laws' – from a minimal number of assumptions led, despite its success, to some exaggerations. There is no doubt that neoclassical economics and general equilibrium theory have provided eminent insights into the logical properties of economic models. Additionally, a lot of revisionary work has already been done by institutional, experimental, and behavioural economics. Yet, many scholars still devote themselves to seemingly self-generated problems instead of increasing the prognostic power of economics by developing refutable and thus testable predictions. One can even get the impression that mathematical elegance is the underlying motive of some 'hard core' theorists: deriving more and more general results from weaker and weaker assumptions is apparently more highly appreciated than developing satisfactory criteria of scientific falsifiability. Finally, these models' results sometimes lead to a sphere of irrefutability lacking any implications and relevance to empirical reality. Whether in such a context the excuse of fundamental research can be accepted is an obviously open question.

Of course, there is no science without abstraction; in fact, science is only possible because man is able to abstract. As Einstein put it: everything should be made as simple as possible, but not simpler. However, the line between simplifying and oversimplifying is often far from clear. When modelling and abstraction disregard highly relevant contexts, reduction of complexity in model design provokes the criticism that economics is transformed to a kind of glass bead game. It would be degraded to a mere subdiscipline

of logic, indeed able to derive laws from behaviour deductively, but neither providing nor explaining the necessary psychological, socio-cultural, and historical contexts, let alone passing the reality check that should be considered most important.

Nevertheless, the criticism put forward against neoclassical economics is rather that its research must be expanded and not that its efforts are futile. The crucial question, however, remains whether – and if so, to what extent – the whole approach of behavioural laws akin to natural laws is appropriate at all. One thing must be remembered: the understanding of human behaviour and decisions is not the primary objective of the neoclassical research program. If any agent is considered to be a self-interested and fully rational *homo oeconomicus* with unlimited material needs, neoclassical microeconomics runs the risk of being reduced to a caricature of human behaviour, often without discussing, modifying, or contextualizing its results in the aftermath. None of us, however, maximizes his or her well-being by calculating complex utility functions, no one has the assumed perfect foresight and nobody always acts perfectly rationally. Typically, agents already have difficulties in planning and evaluating more than one step at a time, as various findings in empirical behavioural economics show.¹²

Neglecting social, legal, and institutional aspects, today's neoclassical economics is not just in danger of losing touch with reality, but also of becoming a theory that is methodologically too narrow. Since political implications derived from microeconomic models crucially depend on the assumed institutional framework, one cannot talk, for example, about 'optimal fiscal policy' without explicitly discussing the applicability of the underlying assumptions and the feasibility under institutional as well as political constraints. But since dealing with problems of practical implementation is not within the realm of analytical reasoning, structural problems are unavoidable. Governmental tax policy, for instance, is not necessarily of long-term nature. Practical difficulties – such as changing political constellations, the influence of powerful interest groups, or bureaucratic barriers – undermine the relevance of neoclassical insights, which usually focus on long-term optimality. From all this follows that only a fraction of neoclassical theory is also applicable to real-world issues. The neoclassical economists' quest for consistent mathematical models and 'natural laws' in human behaviour sacrifices the crucial link to reality, which, as mentioned above, should be the most important criterion for the relevance of any theory.

Moreover, neoclassical research is typically narrowed to questions that are accessible to mathematical modelling; content and context are unduly subordinated to the available technique. Since institutions and their complex and interdependent settings are hard to formalize, they are usually ignored in standard models. Instead of applying mathematical methods to economic structures derived from empirical findings, many economists in the neoclassical tradition tend to go in the wrong direction by adapting economic phenomena to mathematical methods and mathematical structures.

2.2. *A Contemporary Approach – The Concept of Bounded Rationality*

Neoclassical orthodoxy and its successors in micro and macroeconomics got used to modelling human behaviour according to 'natural laws.' Yet, economists have to confess that setting up precise laws in a world beyond models and full of complexity turns out to

be a chimera. To model poorly understood or even incomprehensible relationships between various modes of behaviour is a more ambitious task than economists might initially have thought. A possible core of all problems lies in the concept of rationality, which reaches back to the very foundations of the discipline. Of course, a prudent neoclassical economist would never assume that everybody behaves perfectly rationally or that this is even necessary. At least on an aggregate level, rationality and the 'as if' assumption work rather well, and thus neoclassical economics is still quite successful in describing and explaining human behaviour empirically. Until recently, corporate finance, for example, resorted to psychology and behavioural finance to explain aberrations and anomalies in financial markets. Nonetheless, for quite a large number of phenomena, neoclassical theory and its rationality assumption still provides a simple and rich explanation that resolves many of the puzzles.¹³

And yet, the predictive power of neoclassical economics is not as clear as it might seem. The further the focus is shifted towards individual behaviour or unexpected situations the weaker its explanatory power becomes. Even though economists have been desperately looking for ways to handle these problems, the development of alternative concepts is still in its infancy.

The concept of bounded rationality, originally introduced by Herbert A. Simon,¹⁴ and the role of heuristics^{15,16} are among the most prominent ideas to answer these difficulties and to understand how important, for example, the institutional setting is in explaining human behavior.¹⁷ The *homo oeconomicus*, as mentioned above, is not only fully informed but can also effortlessly put this information to use in any decision-making situation. Such a framework enables one to identify optimal behaviour, to make forecasts by implementing the optimal strategies in deductive models, and finally to derive quasi-precise laws for the behaviour of economic variables. But do people actually make rational decisions in everyday life, in politics, and in business? Moreover, does 'rational' only mean conformity to the classical expected-utility model, postulating detailed knowledge of all the relevant alternatives, calculating their precise consequences and probabilities and relying on a totally predictable world?

The rhetorical nature of these questions is quite obvious: results from both laboratory and real-world experiments attest to the limitations of rational choice and rational expected utility as a descriptive model of human behaviour. Even if perfect knowledge about all relevant alternatives is provided within an experimental setting, agents' behaviour is often inconsistent with the predictions of expected-utility theory. To expect everyone to behave according to complex utility maximizing strategies is an all-too-bold assumption. It is therefore not surprising that economists have developed alternatives to the rationality paradigm.

One of these is the theory of bounded rationality, which paradoxically exists in three distinct and partially contradicting interpretations.¹⁸ Some proponents of economics want to immunize neoclassical theory against criticism by introducing the concept of bounded rationality as optimization under constraints. Here, the omniscience of unbounded rationality is no longer taken for granted. It is rather assumed that people optimize their behaviour under informational and computational constraints. Agents stop looking for the optimal alternative exactly when the marginal benefit of search equals its marginal

cost or when they have found a somewhat satisfactory solution. Nevertheless, this optimization approach again misses the crucial point: all-knowing and perfect information processing is not a very realistic description of human behavior.¹⁹ In a different interpretation, behavioural economists tend to think of bounded rationality as the study of cognitive illusions, since human cognitive abilities are not infinite but have strongly limited computational skills and seriously flawed memories. In this context, heuristics gains an important role, but mainly as a problem of mental biases: people often rely on heuristics, but they would be better off in terms of accuracy if they did not.²⁰ In a third view, heuristics turns out to be part of the solution rather than the problem. Two dimensions are integral in understanding human behaviour: the structure of task environments and the computational capabilities of the actor.²¹ In so doing, an allegedly irrational behaviour might turn out to be a quite smart and intelligent choice by also considering its social environment, the specific institutional setting, or the situational embeddedness of the choice.

As a consequence, the idea of natural laws erodes as soon as the concept of rationality is confronted with real-world human behaviour. In a world of bounded rationality, universal rules and laws are abandoned, and economists have to look for more appropriate theories to explain the intricate relation between the uncertainty of information, the subsets of decision-making strategies, human behaviour, and the social and cultural context in which all this happens. There are promising results in discovering behavioural patterns that help to describe human conduct in a more realistic way. Step by step, we get a better knowledge of how the so-called *homo heuristicus* uses approximations, how relevant gut feelings are for our decisions, and how institutional mechanisms have to be designed in order to achieve desired results and improved outcomes. But it is still a long road to identify these contextual patterns of behaviour and hence to properly establish the concept of heuristics.

Even though these ‘regularities’ might be less precise than the ‘laws’ of the rational neoclassical conception, a more realistic approach is obtained. What is still missing and what should be the primary goal of this research agenda is the development of a consolidated theory combining cognitive heuristics and all social and physical structures in which human behaviour is anchored.²²

3. Potentials and Limitations of Status-Quo Economics

Questions concerning the interplay between methodology, theoretical foundations, and empirical data testing are among the most basic, yet least satisfactorily resolved, questions in economics. Disagreement concerns two notable issues: whether an abstract and ahistorical setting is appropriate to match real-world requisites, and whether formalization can sufficiently capture the richness and complexity of economic phenomena. Discussing the existence of ‘laws’ in economics, these questions must be the focus of attention.

3.1. On Historicity and Formalization – The Aura of Precision

Refusing all historicity in human behaviour, economics is of extreme radicalism and methodological rigor. Indeed, it claims that any transaction and any form of interaction

between agents can be described in economic terms. From this point of view, it would even be wrong to believe that economic principles did not shape the world prior to the formation of modern market economies. The institutions of modern market economies may raise specific questions; however, they do not constitute modern economics. In its universal claim, economics rather understands itself as an ahistorical discipline, modelling an abstract man who is basically open to any economic constellation, no matter whether it concerns Neanderthals, Wall Street managers, French monarchs or Kantian devils.

Prima facie, there are plenty of objections put forward by legions of sociologists, anthropologists, and historians complaining about the structural ignorance of economics with regard to any specific conditions – be they cultural, historical, societal, or individual. And yet, the ahistorical conception allows eminent insights, which have made it possible to derive some general economic laws akin to those of nature, for example, the law of supply and demand. Of course, one cannot expect the same accurate and valid statements to be applicable to any concrete historical or time-bound social reality, but an initial idea of economic laws has been established, no matter whether one calls them ‘laws of economic tendencies’ (Alfred Marshall), ‘first approximations’ (Lionel Robbins), or ‘utopias’ in the sense of abstract ideal types (Max Weber).

The pursuit of accuracy is closely related to mathematization. In fact, formalizing utility maximization and equilibrium helped to establish the prominence of mathematical methodology so that economics – in accordance with the so-called exact sciences and by adopting many of their methods – jettisoned all historical and situational constraints.²³ The construction of a model requires abstraction from all relationships and qualities bound in time and space. Gradually, a new type of economic thinking developed: ahistorical, idealized, and abstract in a radical sense.

Of course, economics had to deal with the consequences this entailed. Apart from the manifold problems already mentioned, this new type of economic thinking had a number of advantages: because of the ahistorical setting, models became open to changing preferences, constraints and all sorts of shifts we can think of, for instance, when innovation and the process of ‘creative destruction’ (Joseph Schumpeter) alters the available set of opportunities. Additionally, the idea that any human action and individual choice can be evaluated in terms of cost and benefit prepared the ground for a general theory of human behaviour. By taking alternative options into account in the process of decision making, which is commonly referred to as the concept of opportunity costs, economics becomes an abstract and formalized analysis of possible allocations of scarce resources. All alternatives have to be weighed against each other in order to identify optimal allocations and the use of resources, i.e. minimal input for a given level of outcome or maximal outcome for a given level of input.

At this point, we have to refer to the concept of equilibrium as the central concept of economic modelling, which is indeed used more than any other to demonstrate the theoretical extravagance of economics. At first it is frankly to be confessed that economics – in its attempt to model human behaviour in neoclassical terms – actually moved far from a theoretical conception that wants to describe concrete constellations and circumstances. Nevertheless, the concept of equilibrium remains a powerful analytical

tool to describe a mechanism for the coordination of an arbitrarily large number of individual actions taking place independently from each other, i.e. without central planning or enforcement. Of course, the theoretical concept of equilibrium – just like the tale of the ‘invisible hand’ – sounds too good to be true. Theoretically and practically, there are numerous problems linked to it. What is more, the closely related theory of efficient markets has also to deal with major real-world problems: market failures, bubbles or distributive issues, to name but a few. We have to admit that the coordination of markets, of supply and demand, and of individual and collective action is an overwhelmingly complex task.

In this context, economic intuition proves helpful to interpret formalized results, but cannot replace mathematical derivations as such. Yet in many cases intuitive reasoning turns out to be a quite unreliable guide. It is one of the strengths of formal analysis that it is able to question the economic intuition by its conceptual and methodological precision. On the other hand, generalization, abstraction, and formalization of human behaviour in mathematical models require enormous simplification of reality with often highly controversial prerequisites and assumptions. This is why we also have to be aware of the danger of reductionism in any modelling. Tracing back human behaviour to a very limited number of factors or even a single cause bears the risk of overgeneralizing in ‘if/then’ logic or ‘the more/the more’ sentences – just as if a principle ‘condition’ or some sort of ‘law’ had been found.

Although reductive modelling often leads to partial solutions of superb clarity and simplicity and can therefore be very conducive to theoretical insights, models cannot represent social and economic relationships in their full complexity. The unavoidable simplification of models may lead to methodological difficulties. Severe problems, however, arise when modellers in neoclassical economics and rational choice theory guilelessly and naively apply their theoretical framework to real-life phenomena: all too often they confuse the ‘as if’ modus of the model with an ‘is’ in positive analysis or even with an ‘ought to’ in normative analysis.²⁴

3.2. Reality Check? Economics and the Pretence of Knowledge

By considering problems of rationality, the concept of *homo oeconomicus*, and the accuracy of models, our focus so far has essentially been on microeconomic issues. However, the recent wave of criticism against economics predominantly attacked its macroeconomic branch. The inability of mainstream macroeconomists to foresee the financial crisis has caused much more damage to the reputation of macroeconomics than to microeconomics. At this point, we do not wish to raise questions of guilt or innocence of a whole discipline. A severe crisis is probably never foreseeable; otherwise it would not have come thus far. In any case, it is important to separate this discussion from regular methodological issues. Although different in detail, the problems macroeconomists face are quite similar to the aforementioned problems of microeconomists.

Macroeconomics, and mainly the so-called dynamic stochastic general equilibrium approach, has become so elaborate in its methodological complexity, internal logic and mathematical beauty, if you will, that economists tend to expect accurate and precise results and even predictions. This cult of precision created the illusion that real-world

problems could be solved if only politics would shape markets according to state-of-the-art macroeconomics. But the interplay between economic models and reality is fragile, risky and occasionally even dangerous. In his Nobel lecture of 1974, Friedrich August von Hayek warned of the pretence of knowledge from which many economists suffer in their blind belief in the accuracy of their findings:

Of course, compared with the precise predictions we have learnt to expect in the physical sciences, this sort of mere pattern predictions is a second best with which one does not like to have to be content. Yet the danger of which I want to warn is precisely the belief that in order to have a claim to be accepted as scientific it is necessary to achieve more. This way lies charlatanism and worse. To act on the belief that we possess the knowledge and the power which enable us to shape the processes of society entirely to our liking, knowledge which in fact we do *not* possess, is likely to make us do much harm.²⁵

It is undeniable that the formalization of macroeconomics has made enormous progress and gained eminent insights over the last decades. But economists, once again, have to distinguish sharply and vigilantly between model and reality and must prevent formalizations from gaining a life of their own. Modelling must not distract economics from its ultimate goal, namely to understand the mechanisms that drive the real economy and to identify the missing links between agents and their decisions, markets, institutions and the aggregated outcome of all this.

The main cause of the poor state of economics lies in the cult of precision, which is not compatible with the enormous complexity of its subject. The old institutional school and related narrative approaches concluded that the task to capture the richness of economic phenomena was impossible and hence not worth formalizing in mathematical terms. Modern economics swung the pendulum to the other extreme, specializing in quantitative mathematical formalizations of a precise but largely irrelevant world. So we are left with the tension between both the precise and general findings to which the core of contemporary macroeconomics aspires and the more sensible but incomplete answers of the periphery. While the core of the discipline has more or less sacrificed connection with reality for the sake of scientific accuracy, the periphery describes real-world phenomena such as bubbles, crises, panics, or risk-shifting without being able to give full and accurate theoretical explanations. What we need is an integration of core and periphery, a kind of synthesis of the dynamic stochastic general equilibrium approach with fields such as finance, corporate finance, and industrial organization. Economists should rethink academic models with their sharply-defined structures, states, and mechanisms, and replace them with less precise, yet more robust ones. Owing to the enormous uncertainties and confusion that policymakers face in realistic scenarios, it is indispensable to design policy frameworks that are robust enough to adapt to real-world conditions. In dealing with the enormous range of poorly understood mechanisms and relations of economic structures and behaviour, the implications when some – or most – assumptions of the underlying theoretical model do not hold have to be carefully considered. Thoughtful policy advice also has to take such implications into account in order to provide the best possible basis for decision-making. And yet, this kind of robustness analysis is nearly absent in today's economics.²⁶

To sum up, it remains difficult, if not impossible, to find ‘laws’ or ‘regularities’, i.e. phenomena that appear repeatedly in similar environments at different points in time and at different locations in human or social behaviour and interaction. In his Presidential Address to the Econometric Society in 2004, Ariel Rubinstein identified various dilemmas economic theorists face when they try to find regularities. Overall, he concludes:

that as economic theorists, we hope that regularities will miraculously emerge from the formulas we write leisurely at our desks. Applied economists often feel the need for a model before they mine data for a pattern or regularity. Do we really need economic theory to find these regularities? Would it not be better to go in the opposite direction by observing the real world, whether through empirical or experimental data, to find unexpected regularities? Personally I doubt that we need pre conceived theories to find regularities.²⁷

4. Epistemological Considerations on Objectivity

As we have seen so far, the question of scientifically valid statements in economics is hotly debated. In his influential work ‘The Logic of Scientific Discovery’, the philosopher Karl Popper²⁸ suggests abandoning all positivistic conceptions and turning scientific work into a strict process of selection. Rather than getting into trouble with the so-called problem of induction, or dealing with all the difficulties of deductive approaches, scientists should propose theories without any limitations. Scientific work, then, does not consist of formulating these theories but rather of testing them by using empirical data, experimental settings, or laboratory work. If experimental results do not confirm theoretical expectations, theories get falsified and have to be altered or abolished. In this quasi-evolutionary selection process, only theories that cannot be falsified survive. By reversing the classical experiment, which is usually set up to prove theories, researchers should instead try to disprove them. Hence, weeding out theories by crucial experiments seems more promising in obtaining scientific truth than any other approach.

Recent work on the philosophy of science, however, points out that such a theory of competing theories is not without flaws either. Historians of science, sociologists, and psychologists have tried to reconstruct how scientific thinking evolves, for instance by showing that even fundamental concepts such as objectivity have gradually been altered throughout the history of science. Daston and Galison,²⁹ for example, disclose how the emergence of ‘objectivity’ in the mid-nineteenth century is related to the scientific community’s use of symbols, images, and language in general, which also reflects contemporary society’s use of the latter. Thus, the constitution of knowledge is always embedded in a specific socio-historical context – and considering these contexts is therefore fundamental to any epistemological setting.

Interestingly, the status and nature of economic knowledge is not just being questioned by philosophers, but also by economists themselves, who increasingly reflect upon the discipline’s epistemology and practice. The so-called rhetoric approach or new economic criticism pays closer attention to the ways economic researchers actually reason and seek to persuade each other of their views.³⁰ By analysing the metaphorical and even poetical aspects in economic language – and this particularly concerns the use of mathematics and statistics – the rhetorical mechanisms of economics are made explicit. In so doing, it

becomes apparent how economists – consciously or unconsciously – disguise theoretical errors or practical interests by using quasi-literary techniques. Even in its most advanced mathematical models, economics is nothing more than a specific type of rhetoric and imagery. The importance of opinions, expectations, emotions, and irrational behaviour becomes abundantly clear through the way people act: they are no utility-maximizing agents, but are often driven by ‘animal spirits’. Herd behaviour and panic in the financial markets are just a case in point.³¹

The rhetoric approach radically questions the one and only truth of exact models, which leave no scope for interpretation within their own logic. By dissolving and leaving behind the concept of accuracy and ‘natural laws’ in social sciences, economics now opens up to the contingencies of real-world complexity. Thus, the frequent use of intuitions, analogies, and metaphors in economics appears in a new light. Of course, Adam Smith’s ‘invisible hand’ only exists as an economic metaphor – and yet it has the power to transform private vices into public benefits under certain idealized conditions. In a less perfect world, however, there is interpretational ambiguity. The pursuit of accuracy beyond models and equations is therefore always doomed to failure, just as the idea of universal and permanent ‘laws’ in human behaviour and a mathematical description of social reality proves to be no more than wishful thinking.

5. Conclusion – Embracing Economic Complexity

The history of economics is a history of the reception of other disciplines and their integration into economic theory: departing from moral philosophy and state theory (cameralistics) in the eighteenth century, borrowing concepts from utilitarian philosophy and physics in the nineteenth century, adopting methods from mathematics and statistics in the twentieth century, and finally opening up to psychology at the dawn of the twenty-first century. And yet the desideratum of a valid and reliable general theory of human behaviour – based on anthropology, operationalized theoretically, and tested empirically – has hitherto not been accomplished.

Thus, what is needed is a pluralistic approach and an ongoing effort with much more diversification of research and methodology than economics currently accepts. Since there is a tendency in mainstream economics to ignore unformalized approaches – sometimes even dismissing them as unscientific due to their inaccuracy – we would be better off combining all available forces to obtain a better understanding of the highly complex interrelation of economic phenomena. This concerns the man in the street and society as a whole. There is little doubt that the next paradigm shift, which is certain to come, will enrich neoclassical, institutional, and behavioural economics in the same way as the previous ones did. Perhaps it will be referred to as the ‘cultural turn’ in economics. In any case, it will be essential to open or reopen economics to the other social and historical sciences: a shift from *homo oeconomicus* to *zoon politikon*, so to speak.

Economics has always faced criticism, not only for its findings, but also for methodological or even ideological issues. Some critics called for a more empirical and inductive approach, others for a more theoretical and deductive one; some for more history, others for more abstraction. Critics have even called for all these things at the

same time. Undeniably, the critics have identified weak points in economic theory. It is essential to realize that the complexity of economics and human behaviour limits the knowledge we can ever attain. Evaluating different methodologies and approaches, we are well advised to prefer robust ones with regard to the enormous uncertainty to which we are exposed. The ultimate goal must be to supply policymakers with thoughtful academic insights and cautious advice to help form a better world.

Whether mathematics is really the adequate language to describe social phenomena in microeconomics or even in macroeconomics, and whether or not the idea of economic laws has to be abandoned, remains to be seen. In fact, it is quite conceivable that all efforts in economics may eventually lead to a further, now ironic, analogy to physics. David Gross³² once pointed out in a lecture that the main challenge in dealing with all the complexity in our universe lies in the cognitive limits of the human brain. He was wondering if our situation was not in a way similar to that of his dogs. For 20 years he had been trying hard to explain modern string theory to them, but somehow all his efforts were in vain – ‘they just did not get it.’ At the end of the day, scientists in physics and economics could suffer the same fate. But in spite of all the problems of our economic theories and models, our considerations on ‘laws in economics’ must not be understood as a call for resignation, but rather for more modesty and humble scrutiny in our discipline.

Notes and References

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2. S. D. Levitt and J. A. List (2007) What do laboratory experiments measuring social preferences reveal about the real world? *Journal of Economic Perspectives*, **21**(2), pp. 153–174.
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4. F. J. Neumann (1892) Naturgesetz und Wirtschaftsgesetz. *Zeitschrift für die gesamte Staatswissenschaft*, **48**(3), pp. 405–475.
5. M. Blaug (1992) *The Methodology of Economics, or, How Economists Explain*, 2nd edn (Cambridge, New York: Cambridge University Press).
6. Ph. Mirowski (1989) *More Heat than Light. Economics as Social Physics, Physics as Nature's Economics* (Cambridge, New York: Cambridge University Press).
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8. A. Marshall (1890) *Principles of Economics. An Introductory Volume* (London: Macmillan).
9. The paradigm shift from classical to neoclassical economics becomes most evident by comparing the definitions of economics given by Alfred Marshall and his student Lionel Robbins. Marshall described the endeavour of economics as ‘a study of wealth; and on the other, and more important side, a part of the study of man’ – see A. Marshall (1890) *Principles of Economics. An Introductory Volume* (London: Macmillan). In contrast, Robbins stated that economics is a ‘science which studies human behavior as a relationship between ends and scarce means which have alternative uses.’ – see L. Robbins (1932) *An Essay On the Nature and Significance of Economic Science* (New York: New York University Press).

10. The analytical operation of explaining social phenomena by drawing on individual action and individual cost-benefit calculations is as follows: the complexity of a phenomenon is to be reduced so far that it can be divided into its individual components. Afterwards, the basic elements have to be recombined and recontextualized. This so-called resolutive-compositive method was introduced to political theory by Thomas Hobbes.
11. G. S. Becker (1976) *The Economic Approach to Human Behavior* (Chicago: University of Chicago Press).
12. For further contextualization cf., for example, V. L. Smith (2009) *Rationality in Economics. Constructivist and Ecological Forms* (Cambridge, New York: Cambridge University Press).
13. S. A. Ross (2005) *Neoclassical Finance* (Princeton, NJ: Princeton University Press).
14. H. A. Simon (1955) A behavioral model of rational choice. *Quarterly Journal of Economics*, **69**(1), pp. 99–118.
15. G. Gigerenzer and P. M. Todd (1999) *Simple Heuristics that Make us Smart* (New York: Oxford University Press).
16. G. Gigerenzer, R. Hertwig and T. Pachur (2011) *Heuristics. The Foundations of Adaptive Behavior* (Oxford, New York: Oxford University Press).
17. Significantly, Simon formulates the question he wants to answer as follows: ‘How do human beings reason when the conditions for rationality postulated by the model of neoclassical economics are not met?’ (H. A. Simon (1989) The scientist as problem solver. In: D. Klahr (ed.) *Complex Information Processing. The Impact of Herbert A. Simon* (Hillsdale, NJ: Erlbaum), p. 377).
18. G. Gigerenzer (2006) Heuristics. In: G. Gigerenzer and C. Engel (eds) *Heuristics and the Law* (Cambridge, MA: MIT Press), pp. 17–44.
19. Such a conception of bounded rationality once again results in ‘a research program to build models populated by agents who behave like working economists or econometricians’, as Sargent points out – see T. J. Sargent (1993) *Bounded Rationality in Macroeconomics* (Oxford, New York: Oxford University Press).
20. As Daniel Kahneman states in his Nobel lecture, ‘Our research attempted to obtain a map of bounded rationality, by exploring the systematic biases that separate the beliefs that people have and the choices they make from the optimal beliefs and choices assumed in rational-agent models.’ See D. Kahneman (2003) Maps of bounded rationality. Psychology for behavioral economics. *American Economic Review*, **93**(5), pp. 1449–1475.
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24. M. Zafirovski (2003) The question of mathematical social theory revisited. Some methodological considerations. *The American Sociologist*, **34**(4), pp. 59–80.
25. F. A. von Hayek (1989) The pretence of knowledge. Nobel Prize Lecture 1974. *American Economic Review*, **79**(6), pp. 3–7.
26. See in particular R. J. Caballero (2010) Macroeconomics after the crisis. Time to deal with the pretense-of-knowledge syndrome. *Journal of Economic Perspectives*, **24**(4), pp. 85–102.
27. A. Rubinstein (2006) Dilemmas of an economic theorist. *Econometrica*, **74**(4), pp. 865–883.

28. K. R. Popper (1935) *Logik der Forschung*. (= *The Logic of Scientific Discovery*) (Wien: Julius Springer).
29. L. Daston and P. Galison (2007) *Objectivity* (New York: Zone Books).
30. The most important contributor to the rhetoric approach is Deirdre McCloskey – D. N. McCloskey (1983) The rhetoric of economics. *Journal of Economic Literature*, **21**(2), pp. 481–517; D. N. McCloskey (1986) *The Rhetoric of Economics* (Brighton: Wheatsheaf Books); D. N. McCloskey (1990) *If You're So Smart. The Narrative of Economic Expertise* (Chicago: University of Chicago Press); D. N. McCloskey (1994) *Knowledge and Persuasion in Economics* (Cambridge: Cambridge University Press). For further information see, for example, M. Boumans and J. B. Davis (2010) *Economic Methodology. Understanding Economics as a Science* (Basingstoke, New York: Palgrave Macmillan); for a critical discussion see C. A. Sims (1996) Macroeconomics and methodology. *Journal of Economic Perspectives*, **10**(1), 105–120.
31. R. J. Shiller (2000) *Irrational Exuberance* (Princeton: Princeton University Press).
32. Nobel laureate in physics in 2004.

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