The Foundations of Non-Equilibrium Economics

The principle of circular and cumulative causation

Edited by
Sebastian Berger

Routledge Advances in Heterodox Economics

The Foundations of Non-Equilibrium Economics

This thought-provoking volume presents essays on the foundations of non-equilibrium economics, i.e. the principle of circular cumulative causation (CCC). This work presents empirical research on how the interplay of technology's increasing returns to scale, institutions, resources, and economic policy leads to virtuous circles of economic growth and development, but also to vicious circles of social and ecological degradation. In particular, evidence is provided for the important role of the "development state" and strategic trade policy, economies of large-scale production in manufacturing, the regional level of development and community-based resource management regimes. While demonstrating CCC's strength in generating empirical research, the book also provides insights into its philosophical foundations and intellectual history. Several essays trace the roots of this full-fledged theoretical framework back to Adam Smith, Classical Political Economy, Thorstein Veblen, Gunnar Myrdal, K. William Kapp and Nicholas Kaldor.

As the most comprehensive collection of the growing body of CCC research to date, this book also reflects the emergence of an economic paradigm for understanding economic dynamics and for crafting viable development strategies for the 21st century. The volume will be of great interest to scholars of growth and development economics, institutional and evolutionary economics, political economy, and Post Keynesian economics from undergraduate to postgraduate research levels.

Sebastian Berger is Assistant Professor at Roanoke College and was awarded the 2008 Helen Potter Award by the Association for Social Services.

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Foreword

Geoffrey M. Hodgson

"Do not adjust your theory – reality is at fault." This could be the slogan of much of mainstream economics since the Second World War. The slogan fits because since the rise of neoclassical theory at the end of the nineteenth century, mainstream economics has regarded the determination of equilibrium conditions as the Holy Grail of theoretical discovery. But in order to demonstrate the existence of equilibria within models, economists have typically had to assume diminishing returns and negative feedback. Once we enter a real world with increasing returns and positive feedback – a world where deviations can be amplified rather than suppressed – then the conventional demonstrations of equilibria are no longer viable.

A major theme in the history of modern economics is the attempts of a minority within the profession to remind the equilibrium theorists of the importance of positive feedback mechanisms, even before that term was invented by Norbert Wiener in 1948. Alfred Marshall noted in Appendix H of his *Principles* (1890) that increasing returns could undermine the conditions for an equilibrium of supply and demand. In his *Interest and Prices* (1898) Knut Wicksell wrote of a "cumulative process" of interaction between prices, the rate of interest and investment. Wicksell influenced fellow Swede Gunnar Myrdal, who formulated a model of cumulative causation in his *Monetary Equilibrium* (1931) and used the core idea in his later studies of racial discrimination, uneven regional growth and underdevelopment. Previously Allyn Young published a seminal article in the *Economic Journal* in 1928, emphasizing that economic change "propagates itself in a cumulative way". In turn, Young taught Cambridge economist Nicholas Kaldor, who was a staunch critic of equilibrium economics and also influenced by Myrdal. Later W. Brian Arthur had to remind the profession of the importance of positive feedback in a series of articles dating from the 1980s. Nobel Laureate Paul Krugman has also written on these themes, but only with limited acknowledgement of the pioneers in this area.

The term "cumulative causation" dates from Thorstein Veblen's famous article "Why is economics not an evolutionary science?", published in the *Quarterly Journal of Economics* in 1898. But he used it in a different way. Instead of positive feedback, Veblen used "cumulative causation" to describe an extended sequence of causal links, without beginning or end. Inspired by Darwinism, he

understood that phenomena could not be adequately explained in terms of their presumed purposes or destinations. Explanation had to be in terms of the causal sequence, showing how each stage led to the next. But (again without using the term explicitly) there are cases where Veblen discusses processes of positive feedback, and he was highly critical of equilibrium approaches.

Young was one of Veblen's admirers, and they were both together in Stanford University in the early 1900s. Young eventually moved to the London School of Economics in the 1920s, where he met an untimely death from pneumonia. Yet he is a key link between the institutionalism of Veblen and European Keynesians such as Kaldor and Myrdal.

Modern economic systems contain multiple processes among heterogeneous agents with positive and negative feedbacks. Consider the dynamics of boom and bust. Just as a boom in stocks or house prices encourages more buyers, who push up prices further, a downturn encourages selling, which drags down prices still more. These are processes of positive feedback. But eventually negative feedback kicks in. Some investors observing the protracted boom may become wary that it may end, and some observing a slump may perceive an opportunity to buy bargains. This counter-cyclical behaviour may eventually become more widespread, overcome the positive feedback and turn the market around. Other examples of negative feedback are the operation of "automatic stabilisers" such as lower taxes and higher unemployment benefits as the economy enters a recession. These income enhancements increase effective demand and help to counter the downward forces.

Instead of being driven by the search for equilibria within models, which leads to the rejection of positive feedbacks that make the mathematical search more complicated or even intractable, economists should start from the real world. The relative importance of positive or negative feedbacks cannot be settled a priori. It is an empirical matter. But it is necessarily aided by heuristic models of the type established by some of the aforementioned authors. Reality should drive the theory – not the other way round.

Such a realist spirit pervades the present volume. It is a highly appropriate reminder not only of the importance of cumulative causation, but also that economists are under an obligation to understand the messy world around them, rather than to retreat into the aesthetic technicalities of their models. I welcome the chapters here as further contributions to ongoing research in this area.

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1 Introduction

Sebastian Berger

This introduction provides the reader with an explanation for publishing a book on theories of circular cumulative causation (CCC) at this moment in time. In other words, it explains how the CCC theories offered, for example, by Nicholas Kaldor, Gunnar Myrdal, Thorstein Veblen and K. William Kapp are relevant for economic science. Consider, for instance, that the Bank of Sweden Prize in Economics in Memory of Alfred Nobel (2008) was awarded to Paul Krugman for his contributions to economic geography and trade theory. Both contributions include increasing returns as a key concept (Prize Committee of the Royal Swedish Academy of Sciences 2008: 3), that has been an integral part of CCC theories. Krugman's prize-winning core–periphery model works with a mechanism of self-reinforcing causation to explain migration from agricultural to industrialized regions and, thus, reflects what Gunnar Myrdal – himself a winner of the Bank of Sweden Prize – had discussed much earlier in his analysis of circular cumulative causation:

> The model is driven by the location choices of firms and individuals. […] there is an element of circular causality […] [setting] in motion a cumulative process […] Krugman was able to build a strict model of the process of circular causation discussed much earlier by Myrdal (1957).
>
> (ibid.: 14)

In addition, there are further significant developments within economics that attest to CCC's increasing importance. The major revitalization of non-equilibrium economics, for instance, demonstrates the growing popularity of approaches that can grasp the real dynamic and self-reinforcing aspects of economic phenomena. In this, CCC has been acknowledged as a key concept of evolutionary-institutional economics (Berger 2007) and a "common denominator" concept for many non-equilibrium research areas (O'Hara 2007). The important signal coming from these major developments is that CCC theories and their intellectual traditions have become increasingly important. Given this situation, one would expect to find a well-established consensus in the literature on what CCC exactly is and what it can do.

Indeed a good way to start is to present the existing consensus of CCC theories. One of the defining characteristics of all CCC theories is that they fruitfully

capture important dynamic aspects of economic reality that are not reflected by the mechanistic metaphor of a (stable) equilibrium in the neoclassical standard model. Such aspects include economic growth, technological change, business cycles, socio-economic and ecological change and so on. CCC theorists, furthermore, reject the abstract formalism of the neoclassical method for its lack of empirical grounding. Consequently, CCC approaches also discard the a priori notion of optimal economic outcomes that are inherent in the neoclassical standard model. Instead, several CCC theories emphasize that such notions are the result of implicit value judgements made by neoclassical researchers that have to be exposed and opened up for discussion. Several currents in CCC theory exhibit a strong empirical research interest in economic disparities, social costs and economic crises that are not perceived as minor accidental deviations from the "normal" optimal case but as major and systemic patterns worthy of research in their own right.

However, a glance at the relevant literature also raises several fundamental questions: What makes CCC a principle rather than a theory, a hypothesis, a concept, a methodology or even a paradigm? If there are different meanings of CCC, are these already fully understood and their potentials for economics fully exploited? What are the methodological and normative implications of different CCC approaches and are they compatible? A survey of CCC theories makes clear that a consensus on these questions has yet to emerge. This is largely due to the fact that there are different currents in CCC theory with unique perspectives that lead to different answers regarding the questions above. Of course, this diversity has been the source of CCC's large body of fruitful research. Yet this diversity of perspectives has also been the reason for the lack of a more unified and perhaps more influential approach. One underlying cause may be that not all economists agree with the political economy of Myrdal, Veblen and Kapp that is intertwined with their CCC theories. Thus, their influence seems confined to certain groups of, for example, evolutionary-institutional and ecological economists but also to other disciplines, such as sociology. Whatever the case may be, the increasing interest in CCC theories demands a response to the existing open questions and perhaps an answer as to what the next step in the development of CCC could be. Taking stock of the status quo of CCC theories in the context of current developments in economics contributes to such a clarification and possibly also to building a framework for analysis that coherently integrates the diverse CCC currents.

Consequently, this book has set itself two main goals. First, by presenting new research on its diverse intellectual origins, as well as new applications of CCC, it brings diverse currents of CCC approaches into conversation with one another. The book provides a comprehensive account of CCC's origin, philosophical foundations, applications, and implications for economic theory. Several essays point out the differences as well as similarities within the different strands of CCC theory. Second, and closely interrelated with the first goal, the volume aims to promote the use of CCC in economic analysis by demonstrating the fruitfulness of CCC research. The reader is provided with a collection of essays covering research areas such as growth and development economics, economic policy, ecological economics, economic geography, trade

theory, classical political economy, Post Keynesian economics as well as evolutionary-institutional economics. The chapters are arranged in such a way that broadly speaking the Kaldorian current is presented first, leading up to the tradition of Myrdal and Kapp, which is finally followed by classical political economy and Veblenian contributions. The following introduction highlights some of the implications of the research presented in this book.

Continuity, openness and self-reinforcing causation

Chapter 2 (McCombie and Roberts) focuses on the cumulative causation of increasing returns as one of the main sources of economic growth. In addition to providing empirical evidence for the existence of returns to scale, the authors introduce the reader to the important debate between Walrasian general equilibrium theorists and Kaldor's theory of increasing returns. The chapter also includes a comparison with more recent approaches, such as Krugman's new economic geography and path-dependence. This evidences CCC's enormous potential for developments in economics surrounding self-reinforcing causation. Indeed, a look at recent developments in economics shows that self-reinforcing dynamics are the focus of many approaches, such as self-organization (Foster 2005; Witt 1997), system dynamics (Radzicki 2003) path dependence (Arthur 1994) and evolutionary game theory (Gintis 2000), and are often referred to as "non-linearities" or "positive feedbacks".

Chapter 10 (Forstater and Murray) links CCC to Post Keynesian contributions by Nell and Passinetti. Yet, further links to post-Keynesian economics can be pointed out, namely Minsky's financial instability hypothesis that embodies self-reinforcing causation of expectations in economic boom and decline (Minsky [1978] 1985: 37–8, 45–6). This research theme can be traced back to Keynes's *General Theory* (1936) but also to Myrdal's earlier cumulative causation theory in *Monetary Equilibrium* (1933), which underlined the crucial role of expectations in macro-economic instability, preceding Keynes's theory in important respects. Kaldor admitted that it was his reading of the German version of Myrdal's work that made him an easy convert to Keynes's general theory three years later (Barber 2008: 27, 30). Minsky was also an institutional economist, so it is not surprising that Veblen's *Theory of Business Enterprise* (Veblen 1904: 113) had already described accounting of business capital in an expansion as a self-reinforcing inflationary "system of make-believe" that gives rise to a further extension of credit with the purpose of further expanding production and sales. This leads to the interesting question as to what makes CCC unique other than being the first concept to capture self-reinforcing causation for socio-economic analysis (Myrdal 1944; Richardson 1991).

Several chapters in this volume provide answers to what makes CCC so unique. They may be grouped under the notions of openness or continuity (Hall and Whybrow, Chapter 11). In essence, this means the systematic incorporation of a broader set of factors that have to be considered as endogenous (Forstater and Murray, Chapter 10) because of their circular interdependency with the open

economic system (Berger, Chapter 7): for example, the state (Toner and Butler, Chapter 3), socio-cultural factors (O'Hara, Chapter 6), ecological variables (Berger and Glavin, Chapter 9), history and the substantive economy (Semenova, Chapter 12). These complex interactions also require tools for policymaking (Hayden, Chapter 8; Holt and Pressman, Chapter 5) that do not only look at market interactions. Thus, CCC is crucially important because it is very flexible and more generally applicable than other approaches in evolutionary economics. The importance of the notion of openness for evolutionary economics has been defended by Geoffrey Hodgson in a recent debate against Ulrich Witt's narrowly defined endogenous market causation (Hodgson 2004: 365). It is noteworthy that Myrdal's contribution to CCC theory was awarded the Bank of Sweden Prize (jointly with Friedrich von Hayek) for the "penetrating analysis of the interdependence of economic, social and institutional phenomena" and for successfully carrying out interdisciplinary research (Sandelin 1991: 216; Barber 2008: 164–7). CCC's holistic view truly improves the quality of economic research and offers a unique potential for analysing self-reinforcing causation that goes far beyond narrow technology adoption in markets. The notion of circular causation economics "comes to be characterized […] as an inquiry into the bearing which all facts have upon men's economic activity" (Veblen 1900: 262); or, in cumulative causation terminology:

> [An] inquiry into the cultural or institutional development as affected by economic exigencies or by the economic interests of the men whose activities are analyzed and portrayed […] a cumulatively unfolding process or an institutional adaptation to cumulatively unfolding exigencies.
>
> (Veblen 1900: 263–4)

Economic growth and development: trends and the taboo of teleology

Chapter 4 (Argyrous and Bamberry) focuses on stages of growth related to increasing returns. The authors provide empirical evidence for the existence of stages in industrial development that are, however, not inevitable. The authors build on Kaldor's contribution that considered stages as junctures where the self-reinforcing virtuous circle could break down unless government policy was favourable to the transition. This approach avoids much of the teleological implications that were the reason for Myrdal's roundabout rejection of standard stage theories and their conservative political implications.

Rejecting teleology and finding ways to conceptualize trends of change is a central concern within evolutionary economics, and CCC's self-reinforcing causation also implies the notion of a trend. The notion of a trend is, for example, one of the reasons for Hodgson's critique of Marxian economics and his alternative of universal Darwinism. The latter seems to be inspired by Darwinian evolutionary biology and its principle of "undirected" biological evolution (Mongiovi 2008). So, should economics reject trends along with teleology based on Darwinian evolutionary biology? It seems noteworthy that even in the evolu-

tion of biological systems trends exist, and there is a variety of scientific hypotheses to explain them. In addition, there is something unique about the principle underlying social dynamics because the societal level of organization is not identical to the natural.

Against this background the reader will find it of interest that Myrdal did not resort to the notion of evolution or Darwin but instead used the term "dynamics". The term "dynamic" was, according to Tillich (1933), traditionally used by progressive political orientations and revolutionary romanticism. It denotes being that is in the movement from its potential to its reality/actuality, or a being that is not yet completely formed, but embodies the potential and the power of a form. The term "dynamic" is often misused to denote the opposite of "static" or "resting", thus destroying its original meaning. Its origin is "dynamis", i.e. a productive potentiality that urges to its own actualization. This is the meaning that Aristotle attached to the term and "dynamis" denotes a system imbued with an inherent propelling force. This fits into the Aristotelian tradition of explaining events in terms of the actualization of inherent powers by the triggering action of external circumstances.

However, modern physics and Darwinian biology usually impose a taboo against teleology and final causality. In economics, the taboo of teleology was most prominently introduced by Veblen's concept of "blind cumulative causation". Despite their non-teleological character biological and social researchers have had to deal with evidence of existing real tendencies (Fernández 2008: 6). This is where CCC offers a way to conceptualize trends for the purpose of social inquiry. Self-reinforcing causation may be used as a tool for building hypotheses about dynamics:

> Where Darwin's theory of natural selection is based on the principle of evolution, the theory of human development, which presupposes Darwin's theory, is based on the vicious-circle principle. And where the principle of evolution came to constitute the core of biology, the vicious-circle principle is intended to constitute the core of human ecology.
>
> (Dilworth 2002: 78)

CCC can serve as a hypothesis about trends that are individuated by spacio-temporal circumstances and that do not last forever. The vicious or virtuous circles embodied in CCC theory are not considered inevitable and the hypothetical character of the CCC approach prevents dogmatic teleology. Importantly, CCC does not aim at establishing a specific kind of causation (e.g. self-reinforcement) as the normal case of all systems and does not aim at a delimitation of a range of facts via taxonomy or uniformities.

Values and the trend to naturalize the social sciences

Toner and Butler's (Chapter 3) research results highlight the role of the state and economic policy for initiating and furthering trends of industrialized growth.

Their chapter implies that the discussion is brought back to Myrdal and Kapp who both considered the state (i.e. democratic public action) as crucial for a virtuous circle of development. This raises important normative questions: What role should industrial growth have in the development effort? What kind of industrial growth should be pursued? Who benefits and what are the limits and side-effects of growth? What constitutes wealth? Addressing these questions in the tradition of Adam Smith's "Wealth of Nations", Myrdal and Kapp pointed to the importance of value judgements and substantive (normative) rationality in the development process, particularly with regard to economic disparities and ecological disruption that persist despite and due to industrial growth. Since the late 1950s Kapp contributed to what became the so-called "eco-development" movement in the 1970s, nowadays known as "sustainable development". In this the evaluation of cumulative changes in the quality of life is holistic and normative, encompassing social costs as important wealth-diminishing aspects of growth and development. And Myrdal chose "The Equality Issue in World Development" as a topic for his Nobel Memorial Prize speech. In this he argued for countering the self-reinforcing cumulative increase of wealth disparities by redistributing resources from the rich industrialized countries to the poor countries mainly via "a much more frugal life style so far as growth in consumption, and production for home consumption, of many material products is concerned" (Myrdal in Barber 2008: 166). Thus, normative considerations are at the core of CCC theories.

Myrdal's CCC operates with a "normative" research hypothesis of a vicious circle, i.e. "social waste" and inefficiencies as a result of self-reinforcing causation (Berger 2007). This approach makes CCC a veritable alternative to recent developments to "naturalize" economics either by verbal or formal analogies to processes that take place on the organic level of organization, e.g. self-organization (Foster 2005; Witt 1997), Universal Darwinism (Hodgson 2002), evolutionary game theory (Gintis 2000) and genetic algorithms (Axelrod 1997). Essentially these approaches argue that ontologically the notions of non-equilibrium, self-organization and evolution span the social and the natural level. This allegedly makes social theory compatible with insights from the natural sciences, i.e. evolutionary biology (Darwin) and physico-chemistry (Prigogine). Mirowski identifies this as the "separate but equal doctrine" as one out of four states of minds on the natural–social relationship (Mirowski 1994: 12). Several economists consider this trend to "naturalize" economics via formal models, verbal analogies or metaphors derived from the natural sciences as a "multilayered power game" in the "furtherance of particular human interests", i.e. shoring up legitimacy, trying to disenfranchise political economists (Mirowski 1994: 13). The application of natural science analogies and ontologies in economics often obscures underlying value premises and purposes, i.e. the political elements that guided the choice of the analogy (Geisendorf 2001; Kubon-Gilke 1996; Vromen 1997). As Myrdal emphasized throughout his work, the social scientist cannot escape the political element so that value premises have to be made explicit to avoid implicit and hidden manipulation

(Myrdal 1929). Also, consider that Kapp argued that applying CCC as a hypothesis about increasing economic disparities and ecological disruption satisfies the conditions of scientific method, as defined by John Dewey's instrumentalism, because it grows out of actual social tensions or needs that are related to ends-in-view, i.e. a plan or policy for the resolution of the conflicting situation (Dewey 1938: 499). In conclusion the advantage of CCC is that it does not resort to the natural sciences to analyse social phenomena and that it does not avoid explicit reference to ends and values, i.e. the political element in the analysis of social causation.

In addition, there is another fundamental problem with the trend to naturalize economics. Even critics from within evolutionary economics have recently recognized that social organization and its mechanisms of change are far more complex and not constant through time so that analogies taken from natural sciences contribute practically no additional insights into socio-economic relations (Nelson 2001, Rosenberg 1994). Sceptics also argue that analogies from natural sciences lead to futile "checklist approaches", i.e. the search for similarities between the organic and the socio-economic units of analysis and mechanisms of change (Vromen 2004). Kapp saw this danger of reasoning by analogies as early as 1961, arguing that reasoning by analogies makes it possible to dispense with the need to formulate clear notions of the characteristics of the social units of analysis. By imposing analogical reasoning upon the material studied, the collections of data, testing and so on tend to lose their specificity. In addition, events which are not captured by the analogy may even be neglected and withdrawn from investigation: "Once the intellectual operation based upon the analogy is in full swing, it is usually too late to remind oneself of the imperfect character of the original analogy upon which the whole enterprise rests" (Kapp 1961: 58). Instead, Kapp applied Myrdal's CCC to analyse the dynamic interrelation between humans and society in his important book *Towards a Science of Man in Society* (1961). The advantage of CCC is that it offers a way to analyse dynamic social phenomena without prematurely resorting to analogies taken from natural sciences where there is no urgent necessity to do so.

This is not to say, however, that loose heuristic metaphors cannot be useful as a first step in the creative stage of associative thinking and understanding. Mirowski is right in pointing to the healthy side effects from "spiral narratives" that bring nature and society into interplay (Mirowski 1994: 15–16). This concerns, for example, the application of CCC in the context of biotic resources (salmon fisheries) (see Berger and Glavin, Chapter 9, this volume). This application is not to be understood as a reversed "separate but equal doctrine" that tries to anthropomorphize nature but as an attempt to illustrate CCC's strength in holistic causal analysis for understanding the complex dynamics of natural resources, technology and economic institutions. While it can be useful to point out instances of circular cumulative causation in the natural as well as in the social systems, CCC theorists realize that the higher level of complexity of human society is not governed by purely functional relationships but is subject to volition and deliberation. Nevertheless, CCC's focus on continuousness (see