

# WHITHER ECONOMICS? A CHECKLIST FOR CHANGE

## V katero smer, ekonomija? Opomnik za prenavo

Robert G. Dyck

Virginia Tech  
bobdyck@vt.edu

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### Abstract

This paper provides an overview of the failure of market-based economics and offers a checklist for change, starting with a revised scientific approach based on complexity, fractal geometry, and systems theory. The paper argues that rationality is defined as much—if not more than—by caring and collaboration as by self-interest. It also argues for greater economic democracy, community based-entrepreneurship, scale neutrality, and greater adaptive resilience to perturbations. In conclusion, the paper urges a cautious but persistent approach to the problem of cultural adaptation to a changed system.

Keywords: Caring, collaboration, complexity, cultural change, economic theory, democracy, entrepreneurship, fractal geometry, market failure, resilience, scale neutrality, and systems theory.

### Povzetek

Članek predstavlja pregled neuspeha tržne ekonomije in ponuja opomnik za potrebne prenavo; začetni kaže z na novo zasnovanim znanstvenim pristopom, ki temelji na kompleksnosti, fraktalni geometriji in teoriji sistemov. Članek zagovarja tezo, da je razumnost odvisna v enaki meri, če ne celo bolj, od skrbnosti in sodelovanja, kot od sebičnosti. Zavzema se za več gospodarske demokracije, družbeno odgovorno podjetništvo, uravnoteženost velikosti podjetij ter večjo prilagodljivost in odpornost na pretrese. V zaključku avtor priporoča previden, a hkrati vztrajen pristop k problemom prilagajanja kulture družbe na spremenjeni sistem.

Ključne besede: nesebičnost, sodelovanje, kompleksnost, družbene spremembe, ekonomska teorija, demokracija, podjetništvo, fraktalna geometrija, neuspeh tržnega gospodarstva, odpornost, uravnoteženost velikosti podjetij, teorija sistemov

## 1 Introduction

Existing economic systems are either market based or government based, but the current circumstances and conditions require a revisionist approach. This paper provides an overview of the failure of market-based economics and offers a checklist for change, starting with a revised scientific approach based on complexity, fractal geometry, and systems theory. The paper argues that rationality is defined as much—if not more than—by caring and collaboration as by self-interest. It also argues for greater economic democracy, community based-entrepreneurship, scale neutrality, and greater adaptive resilience to perturbations. In conclusion, the paper urges a cautious but persistent approach to the problem of cultural adaptation to a changed socio-economic system.

## 2 Overview of the Recent Literature

A number of books have been published in the wake of the 2007-2009 market crash to help explain what happened and why the market failed. Andrew Ross Sorkin (2009), the award-winning chief mergers and acquisitions reporter and columnist for the *New York Times*, provided a journalist's detailed account of



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how Wall Street and Washington fought to save the financial system from crisis, although he did not provide an explicit analysis of the underlying systemic causes or resulting implications for policy.

John Cassidy (2009), an economics journalist at the *New Yorker* and a frequent contributor to the *New York Review of Books*, characterized the underlying cause of the failure as utopian economics (i.e., free market economics), offering what he calls reality-based economics as a remedy. His reality-based economics incorporates the economics of failure, the economics of incomplete or hidden information, behavioural economics, etc., but does not include a new unifying theoretical perspective. Cassidy focused particular attention on the cumulative effect of self-serving individual behaviours that lead to counterproductive macroeconomic phenomena such as price spikes, boom and bust waves, and CEO greed cycles. He termed this effect “rational irrationality.” The three illusions promulgated by free market theory and practice, as discussed in Cassidy’s book, are the illusions of harmony, stability, and predictability. These illusions provide an appropriate starting point for the current article.

**Harmony.** Neo-classicists claim that the free market, under the rule of the invisible hand and equilibrium theory, generates harmony. In actuality, the market tends to generate disharmonious, unacceptable outcomes, including not only stock bubbles, glaring inequality, polluted rivers, real estate crashes, and credit crunches, but also oligarchic control, addiction to war, unfair and inequitable wealth distribution, cataclysmic boom and bust cycles, unsustainable global warming, and huge public-funded government bailouts (Goerner, Dyck, and Lagerroos 2008; Sorkin 2009).

**Stability.** Cassidy asserted that the idea of a market as a stable and self-correcting mechanism cannot be supported scientifically, based on the analysis of Kenneth Arrow, Joseph Stiglitz, and others. Arrow (1986), in his salient article reviewing general equilibrium theory, wrote: “In the aggregate, the hypothesis of rational behavior has no implications.” In other words, it is not possible to derive the behaviour of the market as a whole from the behaviour of individual consumers and firms, as each of them follows a simple set of rules. This finding is well established in mathematical economics, but has not yet made its way into teaching curricula, although many bright young scholars have switched from general equilibrium theory to game theory (Cassidy 2009: 70-71).

Stiglitz (2001), in his Nobel-prize lecture, said that economies with imperfect information are, in general, never (Pareto) efficient. In addition, he stated that information is, in general, never fully revealed by market prices, and information issues are key to many types of market failure, including unemployment, credit rationing, and financial blowups (Cassidy 2009: 163-164).

**Predictability.** Regular patterns in the market are not predictable (Mandelbrot and Hudson 2004; Nassim Taleb

2007). Mandelbrot’s plots of cotton and cotton futures prices—going back more than a century—demonstrated that they did not fit the smooth bell-curve asserted by prevailing theory. In fact, they showed wild and unpredictable discrepancies. Similar discrepancies were subsequently found in the price behaviour of other speculative assets, including stocks, bonds, and currencies. These findings raised serious questions about the random-walk (“coin-tossing”) view of finance, including the efficient market hypothesis (based on the notions that prices of speculative assets move independently of each other and are random). However, the coin-tossing view of finance remains prevalent in textbooks, and students continue to be taught that the efficient market hypothesis is an accurate description of reality (Cassidy 2009: 94-96).

However, Taleb’s book (2007), dedicated to Benoit Mandelbrot, shows that highly improbable events (called “black swans”) have three important but little recognized characteristics: They are not predictable, carry massive impact, and subsequently generate explanations to make them appear less random and more predictable than they actually are. Taleb, himself a former options trader and now a dean’s professor of the “sciences of uncertainty” at the University of Massachusetts at Amherst, endorsed fractals as the brand of uncertainty that should bear Mandelbrot’s name: Mandelbrotian randomness (253-273). Taleb endorsed fractals as a good representation of much of the randomness, without necessarily accepting their precise use. Although fractals do not solve the black swan problem and do not turn black swans into predictable events, they significantly mitigate the problem by making such events conceivable (262). Cassidy reported on Taleb’s highly sceptical view of value-at-risk (VAR) statistical models that have been used by large financial institutions and regulators since the late 1980s to avoid market crashes by specifying how much capital must be kept in reserve, based on the assumption that future risk will resemble recent history (274-279). However, Cassidy did not consider the greater implications of fractal analysis for the unification of economic theory and practice. (Note: For a full discussion of fractal theory and its applications in economics systems, please see Dyck 2006).

As a result of the three illusions discussed herein, prevailing economic theory and practice do not tell us all we need to know about how markets really work or why they fail. Consequently, economic theory also fails as a reliable guide to social policy. Therefore, the following sections discuss what is required of economics, if it is to become a more helpful guide to social organization and public policy, as well as strategies designed to assist in the evolution of economic theory and practice in the interest of long-term socio-economic sustainability.

### 3 A Checklist of What We Need From Economics

Atul Gawande’s *The Checklist Manifesto* (2010) discussed the importance of organization and pre-planning in both medicine and the larger world. The checklist

approach to ensuring collaborative teamwork and advance preparedness in surgical operations may seem simplistic, but its success rate in improving patient outcomes and reducing the number of accidental and inadvertent deaths resulting from surgical interventions is impressive. The fact is that even the most highly trained people working in stressful complex systems make mistakes that can be prevented with foresight and preparedness. This explains why deep-sea divers and airplane pilots always use detailed checklists.

Therefore, this discussion will construct a checklist to ensure that economic theory, policy, and practice work for everyone as a means of mitigating or avoiding times of stress, such as the 2007-2009 economic meltdown in the United States. This proposed checklist is suggestive and illustrative rather than exhaustive and is intended to stimulate complementary ideas. It differs significantly from Cassidy's checklist in its emphasis on the need for a new, overarching theoretical perspective based on emerging research in complex systems. Accordingly, it includes the items summarized in the following sections.

### 3.1 New Scientific Basis

The scientific approach should take advantage of new developments in complex systems and network theory to provide better ways of linking all parts of socio-economic systems, from the smallest to the largest, as well as provide better methods of monitoring and influencing the dynamics of unfolding systems. The focus must be on healthy flows of energy, information, and money through all parts of the socio-economic system. In other words, the approach should be more systemically inclusive and more dynamic, yet attuned to all its individual actors. Fractal theory, as pioneered by Benoit Mandelbrot, will almost certainly prove to be essential, as it has been in analysis of complex ecosystems.

The reason for this is that open economic systems are defined more by complexity and unanticipated change (which tend to be nonlinear) than by Newtonian equilibrium theory (Dyck 2006; Taleb 2007; Ramo 2009). Calculus, which encompasses linear, incremental change, is more appropriate for equilibrium theory than open systems theory, which requires fractal and other non-linear mathematics. Although some mathematical economists have embraced non-linear mathematical approaches, the field as a whole lags in its employment of the more systemic approaches.

### 3.2 Links to Related Systems

Economic systems must include inter-linkages with related systems: politics, governance, the environment, etc. Economics, in the real world of open systems, cannot be practiced in a disciplinary vacuum, in the manner of neo-classicism, neo-liberalism, and neo-conservatism still taught by most schools of economics, including the leading ones. The old approaches reflect the dominance

of simplified assumptions. The new methodologies must more fully encompass the complexities of the real world. Systemic thinking across fields in complementary synergy is necessary for the solution of interlinked global crises in economics, resource consumption, democratic political organization and governance, and world law (Mulej, 2010).

### 3.3 Policy Guidance

As a consequence of a new scientific orientation to complex dynamic economic systems that include related systems, it has become possible to shift the orientation of economics from rather simplistic analyses of how markets have performed in the past, under management regimes that have historically been oligarchical, to a more forward-looking, proactive approach that allows for the inclusion of important parameters heretofore largely neglected. These parameters can and should include caring (in addition to competition), collaboration, full employment, scale considerations, resilience as well as efficiency, civic education, economic democracy, and the like, as will be outlined below. This outlook will foster a fresh, more participative approach to many of society's most intractable problems and is applicable by both public and private sector entities at all levels of scale.

### 3.4 Caring

Rationality is defined by caring at least as much as by self-interest; new behavioural evidence indicates that people everywhere are "hard-wired" for caring (Keltner 2009). People enjoy collaborating with others and expect to be treated as equals. However, prevailing economic theory assumes that rationality means selfishness, which inevitably leads to hierarchical divisions of power and wealth. Consequently, we all have to be wary of institutions and people who are greedy, venal, and controlling, although these ugly parameters do not have to be enshrined as the basis of our economic system unless we choose to define them in that way. The continuing linkage of rationality with selfishness suggests that many economists, business leaders, and elected politicians enjoy a special vested interest in the status quo based on their individual advantage rather than the superior rationality of social advantage.

### 3.5 Collaboration, Income Distribution, and Output

Collaboration is humanity's best survival strategy (Eisler 1995; Goerner, Dyck, and Lagerroos 2008). The reason collaboration constitutes the best pathway to broadly based success in all forms of social management, including economics, is because it is the principal basis of social learning and innovation. True collaboration results in much larger total economic output as well as more equitable sharing of income earned and wealth accumulated. Far too large of a proportion of the world's people are both under-employed and under-productive (Dyck, Mulej, and co-authors 1998). Oligarchical control (the opposite of collaboration) is anathema to social learning and greater

social productivity. Elinor Ostrom's (1990) work on collaborative commons governance is consistent with this perspective, developing the beneficial alternatives to traditional top-down governmental or private sector governance. Ostrom was named co-recipient of the 2009 Nobel Prize in economics for her work in this area. Not incidentally, Ostrom is a political scientist, the first woman, and only the second non-economist to win the Nobel Prize in economics.

### 3.6 Full Employment and Associated Economic Rights

President Franklin D. Roosevelt proposed his Second Bill of Rights during his last State of the Union address on January 11, 1944. The United States could have joined the world's more egalitarian national economic systems by adopting the proposed economic Bill of Rights, but the proposal failed to be enacted. The proposal embraced economic rights that paralleled the political rights guaranteed by the Constitution and the Bill of Rights. These universal economic rights included full employment with a living wage, a home, medical care, education, recreation, and freedom from unfair competition and monopolies (Roosevelt 1944).

Comparing what might have been to the outcomes of our current economic system offers the opportunity to glean significant insights. In respect to two key indicators of where we stand today, the United States faces nearly 10 percent unemployment (in reality, at least 20 percent), and ranks 37<sup>th</sup> in the world in the quality of its health-care. The United States is becoming increasingly like a "developing country", with extremes of wealth and poverty. Of course, most developing countries are even worse off than American citizens in terms of employment and adequacy of income to meet human needs (Dyck, Mulej, and co-authors 1998). This uncomfortable reality constitutes the truly abject failure of the global market economy. It must be redressed in the interest of long-term human sustainability.

### 3.7 Scale

Economic systems should treat their different scales of activity comprehensively and interactively, from a perspective of scale neutrality, which is very different from the present pattern based on the oligarchic control of large-scale units. Economic systems should follow the rule that indicates the optimal number of economic units at different levels of scale in order to foster resilience, as demonstrated by fractal principles (Dyck 2006; Salingaros 2003). Humankind needs more productive interactions from economic players of all sizes. In practice, this means a much larger contingent of vitally important small and medium-sized players. There is no place for units "too big to fail". Prevailing neo-liberal equilibrium theory essentially ignores this fundamental operating principle of all resilient systems.

### 3.8 Resilience vs. Efficiency

The success of an economic system should be measurable quantitatively in terms of both resilience and efficiency (Ulanowicz 1986, 1997; Zorach and Ulanowitz 2003). GDP is not a particularly useful measure of either economic efficiency or performance (it ignores both the labour-force participation and distribution effects) and is certainly not a specific measure of resilience. Resilience must be measured by excess capacity available for adaptation to unexpected perturbations, including crises of all kinds. Resilience can help to prevent market failures, but it is not cost-free. It is thus in tension with efficiency.

### 3.9 Social Responsibility

Online measurement of operational efficiency and resilience makes it possible to teach social responsibility and collaborative relations in terms of market behaviour as required for sustainability (Dyck, 2009). In other words, measurable efficiency and resilience outcomes can be used to calibrate responsible social policy.

### 3.10 Economic Democracy

Just economic systems require democratic management responsive to everyone. We must consider the Mondragon industrial cooperatives, originally located in the Basque area of northern Spain, and the recent agreement of the United Steelworkers and Mondragon Internacionale, S.A. to collaborate in establishing manufacturing cooperatives based on the one worker, one vote principle (Alperovitz, Howard, and Williamson 2010). Historically, Mondragon workers have also served as co-owners of their enterprises.

### 3.11 Templates

The most successful (i.e., just, mutually supportive, productive) national economic systems, including those of the Scandinavian countries, are based on many of the previously discussed premises. We need to learn more about how these premises work in successful economies at all scales so that we can emulate the most successful policies and practices.

### 3.12 Harmony, Stability, and Predictability

Coming "full circle" to the dimensions with which this discussion began the checklist supports more harmony in socioeconomic outcomes, because it addresses the full range of systemic issues more collaboratively and comprehensively than the prevailing market economics. Greater economic stability and predictability will result from this new emphasis on caring, collaboration, democracy, and resilience. However, complex systems are characterized by emergent, punctuated change, rather than predictability, so it is vital to emphasize the importance of contingency planning as well in order to facilitate adaptation to both positive and negative change.

### 3.13 Cultural Change

Economic systems organized by people and their cultures can be changed by people and their cultures. However, organized, sustained leadership and widespread citizen involvement are necessary for success. Failed neo-classical, neo-liberal, and neo-classical equilibrium theory and practice should be supplanted as soon as feasible as the old approach is socially, environmentally, and economically counterproductive and unsustainable.

## 4 Actionable Remedies

### 4.1 Theory Building

The interrelated concepts of fractal geometry and systemic intricacy provide powerful new ways of conceptualizing and planning for the complexity of socioeconomic development and can help measure it more sensitively. Healthy development must follow the natural laws of developmental growth that apply to all ecosystems, with sufficient fractal intricacy to support the size and mass of the system, together with sufficient fractal connectivity to keep energy (equivalent to information and money) flowing freely throughout the system. The huge advantage of fractal geometries for economic theory is that—because of inherent self-similarity of structures at all levels of scale—they facilitate energy transfers between all level of scale. One of the benefits would be the seamless integration of the prevailing artificial division between micro and macro economics (Dyck 2006).

Fractals exist in the real world because they link complex systems, make energy flow efficient, and are the natural result of energy's tendency to make and break structure. For example, the bifurcation of a fractal tree structure occurs because energy build-up leads to stress on the initial conduit. After bifurcation, the two new channels increase the efficiency of flow.

A collaborative effort by specialists in fractal mathematics and related fields is necessary to advance successful applications in economic theory and practice. For example, new developments in complex network theory, pioneered by Barabasi (2002), should be included. His work is in part the inspiration of applicable work on creativity by Ogle (2007).

### 4.2 Entrepreneurship

American schools of business, almost without exception, have only recently begun to offer programmes of study and research in entrepreneurship. They need encouragement and incentives to conduct academic programmes and related research reflective of the approaches included in the proposed checklist to generate the building blocks for more productive and sustainable economies.

It is especially important to foster real-world entrepreneurial ventures that capitalize on the emergent theory. Individuals and groups interested in cooperative entrepreneurial ventures can do no better than study the organiza-

tional principles that led to the successful development of Mondragon Internacional, S.A. The Cleveland cooperative model is a significant prototype (Alperovitz, Howard, and Williamson 2010). Birmingham, Alabama, is currently in the initial stages of developing prototype cooperative enterprises in collaboration with the Birmingham Change Agency, the Birmingham Coalition of the Homeless, and others.

### 4.3 Evaluation

In neoclassical economics, efficiency is the only real criterion of success, while adaptability (resilience) and stability are for the most part ignored. Measures of efficiency and fractal connectivity within a “window of vitality,” pioneered by Zorach and Ulanowicz (2003), enable the evaluation of adaptability and stability in self-organizing natural systems. Analysis by Matutinovic (2002) utilizes Ulanowicz's approach for the evaluation of economic systems.

The window of vitality approach merits further empirical exploration in both large and small economic systems so that standard procedures can be developed to measure the adaptability and stability of innovative development strategies. Connectivity evaluation of this sort can in turn provide the basis of social learning for planners and citizens as they seek to improve the relative health and vitality of social, economic, and environmental systems. This will enable policy evaluation at a much finer grain than is possible with GDP, for example, as an overly simplistic measure of aggregate growth.

### 4.4 Funding and Ownership

Financial support from a variety of sources is necessary to ensure unbiased freedom of inquiry and operational integrity for the development of new system approaches. Contributions from a healthy mix of foundations, non-profit organizations, for-profit organizations, unions, and government agencies are desirable and necessary to demonstrate that the approach is broadly supported across institutional and political lines. When it comes to financing new cooperative enterprises, sources should be encouraged to contribute the necessary start-up monies to revolving funds, with the provision that the funding is temporary (to be used on a revolving basis for subsequent start-up ventures) and will be fully replaced by community-based worker ownership. Management control will also be vested in the worker community.

### 4.5 Cultural Change

Replacement of the long-established neo-classical, neo-liberal, and neo-conservative regime of economic theory and practice will be difficult because it extends into practically every academic discipline, every institution of business practice, every union, every government organization, every political organization, nearly every non-profit organization, and the media. In short, the existing economic

regime is culturally pervasive. For this reason, it is necessary to pursue the necessary changes with ample financial support, persistence, a degree of caution, and wariness of hostile external influences in whatever venues are available. The organization of new systemic economics and business education programmes, new collaborative business enterprises, and government regulatory involvement will require high priority attention, consistent with their importance as building blocks of adaptive new learning cultures oriented to long-term socio-environmental sustainability.

## 5 Concluding Observations

The scientific basis of economics is seriously flawed and out of date. Free market theory and practice are based on a mechanistic, Newtonian approach to an expectation of market equilibrium. This approach looks backwards in time in an effort to determine relatively simple cause-and-effect patterns, using simplifying but misleading assumptions rather than building on the dynamics of complex interactive systems as they unfold in the present and future time. A new proactive theoretical approach, oriented to collaboration and more broadly defined social benefit, is long overdue.

This paper combines an effort to embrace the new science of complexity, including fractal and other non-linear systems, with the real-world support of entrepreneurship, the organization of cooperative enterprises that can expand the widely successful Mondragon model, a tough-minded evaluation of the resilience and adaptability of new enterprises, broad social support of innovative financing mechanisms, and long-term commitment to a process of systemic cultural renewal that can lead to mature socioeconomic sustainability.

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**Dr. Robert G. Dyck** is Emeritus Professor of Public and International Affairs at Virginia Tech. His career and publications have focused on the problems of disenfranchisement and poverty in America and throughout the world. In *The New Science of Sustainability* (2008), he developed new systems approaches for sustainable politics, economics, and the environment, based on evolution and fractal geometries, to advance democracy, economic equity, and social justice. Dr. Dyck holds degrees from Oberlin College, MIT, University of Pennsylvania, and University of Pittsburgh. He also holds the Document of Honour, University of Maribor, Slovenia, awarded in 1999 in recognition of his collaborative work and publications over many years between Virginia Tech and University of Maribor.

**Dr. Robert G. Dyck** je zaslužni profesor za področje javnih in mednarodnih zadev na Virginia Tech, Blacksburg, Virginia, ZDA. Njegova kariera in objavljena dela se osredotočajo na težave, povezane z razvrednotenjem in zapostavljanjem ljudi ter z revščino v Ameriki in drugod po svetu. V delu *The New Science of Sustainability* (2008) je razvil nov sistem pristopov k trajnostni politiki, ekonomiji in okolju, ki temelji na evoluciji in fraktalni geometriji in ima za cilj napredek demokracije, gospodarsko enakost in socialno pravičnost. Dr. Dyck se je izobraževal na Oberlin College, MIT, University of Pennsylvania in University of Pittsburgh. Leta 1999 je prejel svečano listino Univerze v Mariboru kot priznanje za dolgoletno sodelovanje Univerze Virginia Tech in Univerze v Mariboru pri raziskovalnem delu in objavah znanstvenih del.