1 From growth to sustainability

Brett Dolter and Peter A. Victor

OVERVIEW

In Paris, on 14 December 1960, the member governments of the Organisation for Economic Co-operation and Development signed a convention which opened with the commitment “to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries” (OECD 1960, Article 1a). In the mid-twentieth century this prioritization of economic growth was still novel for governments but has since become the norm, not just for members of the OECD, but for virtually all governments around the world. The dominant belief is that ever-expanding economic output can provide the means to tackle most if not all of the problems confronting society, such as unemployment, poverty, and environmental degradation, and provide funding for transit, education, health, the arts and more. Indeed, without growth, the concern is that these problems and funding requirements will only get worse. So the pursuit of economic growth provides a compelling narrative for all those interested in economic policy and the future direction of society.

About a quarter of a century after the OECD Convention, the World Commission on Environment and Development (1987) questioned whether and under what conditions economic growth could be sustained. The Commission envisaged a future characterized by sustainable development rather than unrestrained economic growth. While sustainability has not replaced growth as the order of the day, at least as far as governments are concerned, it has entered the vocabulary of public discourse where a key division exists between those who think that growth and sustainability are perfectly compatible and those who think that a choice must be made between them.

Nourishing this ongoing debate is rich intellectual discussion around the relationship between economic growth and sustainability dating back at least as far as Mill (1848 [1970]). In 1972 the discussion entered public and political discourse with the publication of *The Limits to Growth* (Meadows et al. 1972) which posited a conflict between growth and sustainability. Their simulations of the world system suggested that if trends continued, economic growth would seriously deplete the world’s

resources, undermine industrial production and food supply, and overwhelm ecosystems with pollution, leading to the collapse of human civilization. Economists such as Robert Solow (1974) responded with optimism that, at least for many natural resources, market signals would encourage substitution of scarce resources for plentiful resources, and technological innovation and human ingenuity would avert a crisis.

Following from the limits to growth perspective, ecological economists such as Herman Daly (1991) outlined policies that would cap resource use and allow for continued qualitative economic development, without a quantitative increase in the material and energy throughput required for economic production. Meanwhile, following Solow, most economists and politicians have continued to promote economic growth as a primary policy objective. By convention, economic growth is measured as the rate of increase in real (that is, inflation adjusted) gross domestic product (GDP). Gross domestic product measures the value of the output of an economy. Meadows, Daly and others concerned about limits to growth focus on the material, energy, land and water resources used to produce this output. The question arises of whether growth in the value of output can increase indefinitely while the use of resources stays constant or declines, as long-term ecological and economic sustainability would seem to require.

Variants of the growth and sustainability discussion have continued to emerge in the past four decades. Ecological modernists have argued that economic growth can continue as long as environmentally benign technologies are adopted (Mol and Spaargaren 2000). Proponents of the environmental Kuznets curve hypothesis posit that economic growth would entail more efficient technologies and would enrich citizens, increase their environmental concern, and facilitate regulation of environmental pollutants (Grossman and Krueger 1995). Stern (2004) challenged the environmental Kuznets curve hypothesis for carbon dioxide (CO₂) by showing that CO₂ emissions do not appear to be abating as economies grow and citizens become wealthier. The environmental Kuznets hypothesis has generally been found to work best for environmental flows that have obvious local impacts. New terms such as green growth and the circular economy have been introduced to describe conditions under which economic growth can be “decoupled” from resource inputs and waste and sustained indefinitely.

In recent years, Victor (2008) has argued that economic growth is not necessary for the stability and well-being of a developed economy. Jackson (2009) showed that a growing economy makes the reduction of greenhouse gas emissions increasingly difficult. Degrowth activists have argued that the scale of economic activity must shrink in order to achieve sustainability (Martinez-Alier 2010), while van den Bergh (2011; and Chapter 9 in

this volume) argues that degrowth may cause more harm than good and advocates an “agrowth” perspective, wherein economists are agnostic as to the desirability of economic growth.

Continuing the limits discussion, Rockstrom et al. (2009) have argued that the world economy has already passed safe “operating boundaries” in key areas such as the nitrogen cycle, biodiversity loss and greenhouse gas emission concentrations in the atmosphere. The planetary boundary hypothesis has been critiqued by Nordhaus et al. (2012) who believe that most earth systems (with the important exception of the climate) are ill-characterized by boundary conditions and limits. Their arguments echo Davidson’s (2000) point that a spectrum of environmental degradation is possible, and trade-offs between economic production and environmental degradation create continual tensions between those affected by the costs of growth and those who benefit from economic growth.

In this handbook we continue the growth and sustainability discussion. To do so we invited scholars from a variety of fields including economics, sociology, and ecology to provide their insights. Contributions come from scholars who have been participants in this discussion in the past including Herman Daly, Paul Ekins, Jeroen van den Bergh, and William E. Rees. Contributions also come from scholars with new methods of approaching the issue, including Filka Sekulova, Peter Timmerman, and Tom Green. We also invited contributions from authors outside of the academy. Andrea Levy is a freelance writer and editor and writes on the role that a shorter workweek might play in transitioning to a more sustainable society. The range of views in this handbook reflects a diverse and eclectic group of contributors. As co-editors of the handbook, we invited the authors, suggested the topics, provided comments on drafts, and gave guidance on chapter length, but the chapters are very much their views, their analysis and their prescriptions for growth and sustainability.

Before describing the contents of the book in detail it is useful to offer clarifying definitions of the concepts of growth and sustainability. As noted, economic growth is typically defined and measured by changes in real GDP and sometimes real GDP per capita. But whether such growth is economic, in the sense that its benefits outweigh its costs, was raised by McKean (1973) and independently by Daly (1999). As well as growth in GDP, growth may also refer to growth of the capital stock, growth of consumption, and growth of the material and energy throughput required to provide market goods and services. Readers should be alert to the different ways the term growth is used by the various authors.

Sustainability is an even more contested concept (Robinson 2004), but the general thrust is that humans have an ethical obligation to maintain quality of life for future generations of humans and other species. This

requires maintaining an adequate level of environmental quality and ecosystem functioning. Sustainability can also imply the use of the precautionary principle in decision-making: risk aversion in the face of incomplete information when considering the potential harms caused by resource use, pollution, and the proliferation of new technologies. Many of the chapters in this handbook focus on climate change and the challenge of reducing greenhouse gas emissions. Sustainability in this context means working to stay within a safe level of atmospheric greenhouse gas concentration. However, sustainability is not limited to greenhouse gases; it also includes issues such as inequality, social justice, food production, land quality, material use, and energy scarcity. “Growth and sustainability of what and for whom?” are important questions to ask when reading the handbook.

We have organized the book into five parts and grouped chapters accordingly. The handbook begins in Part I with a discussion of the roots of the concepts of growth and sustainability. Part II provides a range of views on the question of whether growth is, or can be made, compatible with sustainability. Part III explores some of the resource, pollution, and technology constraints that may limit the prospects for future growth. In Part IV our contributors offer thoughts on whether a non-growing or low-growing steady-state economy can address the social imperatives of providing employment, equity, a stable monetary system, and opportunities for bringing countries out of poverty. Part V concludes with contributions that ask whether it is possible to shift growth dependent cultures away from growth and towards sustainability. We now outline each section in detail.

PART I: WHAT IS GROWTH? WHAT IS SUSTAINABILITY?

What do growth and sustainability mean and how have these meanings evolved over time? In Chapter 2, Timmerman explains that growth was not always associated with progress. In pre-modern times, “growth outside of ‘natural’ bounds was considered to be dangerous and to be avoided”. Through a process of slow cultural evolution, influenced by scientific discoveries in biology and especially embryology, western society began to see growth and development as a sign of positive evolution. If we are to move away from growth, it will be necessary to shift deeply held cultural beliefs that equate growth and progress, and reimagine what a flourishing human looks like in a finite, resource-limited world. As Timmerman writes, “The assumption of the infinitely desiring consumer is co-dependent today on

the assumption of an infinitely available planet". The challenge today is to define a flourishing life compatible with a finite world.

Meadowcroft discusses, in Chapter 3, the concept of sustainable development, what it means and the challenges it presents. The often stated goal of sustainable development is to meet the needs of present and future generations, while living within ecological limits. The concept has been popular because it promises to put an end to the economy and environment zero-sum game, where benefit to the economy means an environmental cost and vice-versa. It has, however, also caused confusion. Ecological limits are slippery, difficult to define, and normative; "there can be no purely scientific procedure to determine 'safe climate change' or an 'acceptable rate of species loss'". Development is not equal to growth of GDP, but is sometimes interpreted as such. Meadowcroft asks whether humanity is up to the task of decoupling economic activity from environmental impact to reduce (rather than just contain) human insults to the environment when "there is no green 'invisible hand' that ensures increased affluence automatically leads to reduced ecological impacts". Can we shift our political, social and cultural institutions to achieve sustainable development?

As we begin an examination of growth and sustainability, it is useful to ask, how do we know if we are becoming more or less sustainable? One answer: we must measure. In Chapter 4, Bartelmus explains that this is complicated by the multi-faceted nature of sustainability. It is difficult to aggregate disparate measures; for example, how do we aggregate atmospheric concentrations of carbon dioxide with measures of biodiversity? Also, should either be monetized to create a monetary index? Despite the difficulties with aggregation, there is reason to want a compound sustainability measure. As Bartelmus argues, "Piecemeal information can only bring about piecemeal policy". In his chapter Bartelmus explores how we might achieve a compound sustainability metric, and the work that lies ahead to improve our accounting of sustainability.

PART II: CAN GROWTH BE SUSTAINABLE?

Central to a discussion of growth and sustainability is the question, "Can growth be sustainable?" Herman Daly has done more than any other economist to argue that the answer to this question is no, stating on Chapter 5 that "More human economy (more people and commodities) means less natural ecosystem . . . There is an obvious physical conflict between the growth of the economy and the preservation of the environment". Daly also points out that growth must be carefully defined:

Ecological economists advocate development without growth – qualitative improvement without quantitative increase in resource throughput beyond an ecologically sustainable scale. Given this distinction, we could indeed say that there is no necessary conflict between qualitative development and the environment, and that would be true. But there is certainly a conflict between quantitative growth and the environment. Calling different things (quantitative increase and qualitative improvement) by the same name (GDP growth) is a recipe for confusion. It is better to call different things by different names. Gross domestic product accounting mixes together both growth and development, as well as costs and benefits. It is a number that confuses more than it clarifies.

Paul Ekins, in Chapter 6, makes the case that we can increase GDP (grow the economy in traditional GDP terms) while lowering economic impact and he begins his chapter by accepting Daly's terms:

As economic activity has expanded, so has the throughput of energy and materials, which may be described as the physical growth of the economy. Clearly such physical expansion cannot continue indefinitely in a biosphere and lithosphere of finite size subject to the laws of thermodynamics. If this was all there was to the growth/environment conundrum, then it would be easily solved. Indefinite physical growth is impossible in a finite physical system.

After accepting this starting point Ekins then argues that we can have green growth if we can decouple economic activity (measured by GDP) from resource use and environmental impact. Relative decoupling occurs when GDP grows faster than an environmental pressure like pollution or depletion. Absolute decoupling occurs when GDP grows, but environmental pressures decline. Ekins offers empirical evidence that decoupling has been occurring and modelling results that show more is possible. He recognizes that the physical economy cannot grow forever, but argues that it may be possible for economic value to continue to increase without limit.

Hayden is skeptical of the promise of green growth. Focusing on climate change, in Chapter 7 Hayden argues that decoupling has been insufficient to achieve significant reductions in greenhouse gas emissions. Demand-based greenhouse gas emissions accounting reveals apparent decoupling in some nations (for example, the UK) to be a reallocation of emissions, rather than a reduction. Emission-intensive products and inputs consumed in the UK are now imported rather than produced domestically. If we are to keep climate warming within the 2-degree threshold (or better yet the 1.5 degree threshold) Hayden suggests we need to move past growth as a social priority.

In Chapter 8, Sekulova et al. make the case that a focus on degrowth can help shift our social priorities. Degrowth, or *decroissance* as it was originally called in France, does not mean shrinking GDP. That may

be a consequence of degrowth, but could in itself be disastrous: “there is nothing worse than a growth society that does not grow”. Instead, degrowth is a call to shift away from growth culture and “create the necessary political, social and economic conditions for managing and living well without growth”. In this shift, the drive for ever-greater consumption is replaced by a culture of “caring for the commons, voluntary simplicity, and conviviality”.

Van den Bergh points out in Chapter 9 that degrowth (measured as lower GDP) is itself no guarantee of sustainability. We may shrink the size of low-impact sectors even while increasing the size of high-impact sectors. If this were to occur, degrowth may cause more environmental harm than well-planned green growth. Instead of focusing on green growth or degrowth, van den Bergh suggests an agrowth approach. In this approach we become agnostic about economic growth, not fearing contraction, not cheering expansion, and not focusing on an end to growth to solve environmental problems. By shifting the focus away from growth we may lessen its social power.

These contributors offer contrasting perspectives on how we should treat economic growth in order to achieve sustainability. They include arguments in favor of green growth (Ekins), degrowth (Sekulova et al.), and agrowth (van den Bergh). Each position is well described and convincingly argued. It is left to the reader to decide, “Can growth be sustainable?”

PART III: IS THE END OF GROWTH NIGH? SUSTAINABILITY CONSTRAINTS ON GROWTH

No matter how the question posed in the Part II is answered, there are headwinds that constrain the possibility of future growth and will have to be overcome if growth is to be sustained. These headwinds include: the uncertain future of technology and its ability to respond to environmental change; energy scarcity and the climate imperative to transition to low-carbon energy sources; and land scarcity and the environmental consequences of a growth-based food system. In this part, contributions explore factors that may constrain economic growth in the future.

For the past two centuries or so technological innovation has been a key driver of economic growth. The process began with the invention of the steam engine, which according to Ruth in Chapter 10 created “A self-reinforcing process of resource extraction, technology development and deployment, structural changes in society, growth in scope and scale of

the economy, and accelerated resource use and emissions". This process also led to the sustainability crisis we face today, "Because of fundamental physical principles, most notably the second law of thermodynamics, extraction, conversion and use of resources – be those materials or energy – unavoidably result in irreversible changes in the environment". With this history in mind Ruth explores whether we can rely on technology to help us achieve sustainability. He suggests there may be limits to this potential. The future is defined by uncertain risks. We are approaching multiple potential tipping points where non-linear shifts may occur that negatively affect human well-being. Even if we can direct technology's evolution to greener pathways, the rate of technological change may not be fast enough to adapt to the change that is underway. In this situation it is necessary to "revise the rules by which society engages in changes of its environment". Social innovation may become as important as technological innovation in allowing us to reach our sustainability goals.

In Chapter 11, Hall explains that energy is fundamental to economic activity. Concern that the fossil fuels on which economic growth relies are being depleted and that there are inadequate substitutes to replace them has a long history and is the subject of considerable debate. There is more agreement on the need to move away from fossil fuels to prevent catastrophic climate change. The prospects for alternative energy sources and technologies on a sufficient scale are highly debated. Moving forward there is more to learn before we understand whether renewable energy technologies such as hydroelectricity, wind and solar can support an economic system in which energy demand grows exponentially, or whether energy scarcity will require a transition to a low-growth economic system.

If we manage to address the challenge of a renewable energy transition, we are faced with still other challenges. The global food system is based on growth. In wealthy countries, growth in income has been accompanied by growth in waistlines. In Chapter 12, Hadjikakou and Wiedmann outline the negative health and environmental impacts created by the food system, and offer some ideas on how to transition to a food system that increases well-being.

Without major adjustments to the food system we can expect continued pressures on the land base. Human food production uses "one-third of terrestrial net primary production (NPP)" (Haberl et al. 2007, cited by Haberl and Erb in Chapter 13 of this volume). Haberl and Erb explore how land may qualify as a limiting factor for human economic activity. Land can be used more intensively, but doing so "usually involves trade-offs and costs such as higher environmental impacts that may increase the risk of transgressing other boundaries such as those of nitrogen, phosphorous, water or biodiversity".

These biophysical realities define the future prospects for economic growth and possible transition to sustainability. The Earth has a finite supply of land, a finite supply of non-renewable energy, and a finite capacity to absorb pollutants from burning fossil fuels that has been exceeded and is now leading to climate change. In a world characterized by uncertainty and non-linear change can technology be expected to come to the rescue? Or, facing these constraints, is the end of growth nigh?

PART IV: ARE THERE IMPERATIVES FOR GROWTH?

Though there are biophysical reasons why economic growth may not continue indefinitely, there are also social pressures that create an imperative for economic growth. Four important growth imperatives are unemployment, the money system, inequality, and development for poorer nations. In this part contributors explore the significance of these growth imperatives and whether they can be overcome.

One concern about a low-growth economy is that unemployment will increase; when economic activity slows, unemployment often results. Jackson and Victor (2011) refer to this as the “productivity trap” – as labor productivity improves fewer workers are needed to produce the same level of output. In Chapter 14, Andrea Levy shows that reduced working hours can alleviate this problem. Work sharing and shorter workweeks help to spread wage-work in the economy; jobs are shared instead of lost. Reduced working hours also improve worker quality of life by increasing leisure time. By reducing pressures to grow the economy in order to create jobs (a goal repeated by politicians almost daily), reduced work hours offer a way to weaken the employment growth imperative, while improving well-being (Victor 2008).

There are also concerns that a system in which money is created as interest-bearing debt by commercial banks imposes a requirement for economic growth. A typical argument is that the economy must grow in real terms so that debtors can expand production and pay interest to creditors. Strunz et al. argue in Chapter 15 that this “monetary growth imperative” is overstated. They note that interest payments have existed in “stationary societies” throughout history and are simply “a zero-sum-game where one’s gain is another one’s loss”. Strunz et al. also argue that the economy does not have to grow in order to satisfy the need to pay interest on debt – payment of interest is merely a redistribution or transfer of wealth. While we may have a “cultural habit of linking monetary interest to growth”

this habit “persists only as long as the features of our economy enable this habit”.

There may be another reason to worry about a debt-based money system. In Chapter 16, Pressman and Scott explore the work of economist Thomas Piketty. Piketty has argued that the current economic system systematically generates inequality. This is so because the economy generally grows at a slower rate than the average returns to savings. Those who hold savings accumulate wealth, and those who are indebted fall further and further behind. In stark terms, this inequality “implies that the past tends to devour the future: wealth originating in the past automatically grows more rapidly, even without labor, than wealth stemming from work” (Piketty 2014, p. 378, cited in Chapter 16 in this volume). Caution must be taken to ensure that slower growth does not exacerbate inequality by making paupers out of debtors and kings out of creditors. Wealth taxes, inheritance taxes, a progressive income tax system, and increased ownership of capital by workers could all help to level the playing field and prevent “a return of the rentiers”, according to Pressman and Scott.

Fischer-Kowalski and Steinberger (Chapter 17) take a broad systems approach to the relationships among human, economic and material growth and the positive feedback links between these macro elements. They argue that the feedback loops that have encouraged growth in the past may be weakening. Most notably, fertility rates are declining in wealthy countries. The well-being of citizens in poorer, developing countries will depend on whether they can become rich faster than their growing populations age and require care.

These contributions provide us with a sense of the challenges of a transition from growth to sustainability and how they might be addressed. They also suggest that “growth imperatives” can be overcome. The challenge, however, is to shift the growth culture.

PART V: IS IT POSSIBLE TO MOVE BEYOND GROWTH CULTURE?

As Timmerman argues in this handbook’s opening chapter, growth has become equated with progress. Is it possible to shift the narrative? Is it possible for modern, western, industrialized, consumer cultures to move away from a dependency on economic growth? This last set of chapters provides some answers.

Green, in Chapter 18, investigates the treatment of sustainability concerns in economic textbooks. He finds that the limits discourse – sustainability through low growth – is typically dismissed. A textbook

by Samuelson and Nordhaus (2005) calls the authors of *Limits to Growth* “an ominous-sounding group” and optimistically predicts that technology will solve environmental problems, “if the growth pessimists of today prove wrong, it will be largely because new environmentally friendly and resource-saving capital replaces today’s resource-intensive, polluting technologies” (Samuelson and Nordhaus 2005, p. 563). Through messages like these in economics textbooks, students are inoculated against environmental concern. A revised approach to teaching economics is needed to shift the discipline away from “growthmanship”.

In Chapter 19, Brown and Vergragt argue that cultural change is possible; consumer culture was created after World War II. Millennials are now happy to live in lower-footprint, smaller living spaces, in dense cities. Does this lifestyle offer a path that others can follow?

Quilley argues, in Chapter 20, that economic growth is driven by innovation and creativity. He does not believe that a steady-state economy can be achieved because innovation will continue to burst forth and disrupt the steady-state; the dynamism of human creativity is not compatible with a static economy. He argues that we can harness this creativity and shift from being consumers to becoming producers of culture. The techno-focused “maker culture” may offer a glimpse of what this life offers. Will others choose to be makers instead of consumers?

Victor asks us, in Chapter 21, to look to Latin America for a model of sustainability. In Latin America there is a recognition that social justice and sustainability go hand in hand. In recent decades, redistribution and sustainability have allowed evermore citizens to experience “Buen Vivre”: the good life. Can other countries follow Latin America’s lead?

Rees takes a more pessimistic view, in Chapter 22, of the potential to shift away from growth culture. He argues that we are hardwired for *unsustainability* owing to the workings of our “triune brain”. Unconscious urges often overwhelm the best efforts of rational thought – and that may overwhelm our efforts to create a culture of cooperation and low consumption. Rees leaves us with an uncomfortable question, are we predisposed to *unsustainability*? “Were the ill-fated Greenland Norse merely treading a well-worn path that global society is doomed to follow?”

Jackson does not believe that humanity is destined for failure. Instead he sees the potential to chart a path towards sustainable prosperity. Starting from the premise that “the economy is not an end in itself but a means towards prosperity”, in Chapter 23 Jackson outlines four domains in which the economy must shift, “the nature of enterprise, the value of work, the structure of investment and the role of money”. For Jackson, there is hope that humanity can rise to the challenge of sustainability, reform the consumer capitalist economy, and learn to live well on a finite

planet. We close with Jackson's call for sustainable prosperity with the hope that it will inspire the work and commitment of you, our readers.

FROM GROWTH TO SUSTAINABILITY

The chapters in this handbook display many dimensions of the ongoing discussion and debate about growth and sustainability. All of the authors, including ourselves, are deeply concerned about the increasing burden that human economic activity is placing on the biosphere. Whether this burden can be contained and reduced without curtailing economic growth still remains an open question, though our inclination and that of most of the authors in the handbook, is to doubt that it can. The transition to an era of sustainability in which social and environmental justice prevail, where economies function without undermining the resources and life support systems on which they depend, and where all of Earth's inhabitants can expect to live long and fulfilling lives, will not be easy. We hope and intend is that this handbook provides inspiration for the work of achieving the transition from growth to sustainability.

REFERENCES

- Daly, H. (1991), *Steady-State Economics*, 2nd edn, Washington, DC: Island Press.
- Daly, H. (1999), 'Uneconomic growth in theory and in fact. The First Annual Feasta Lecture', *Feasta Review*, 26 April, the First Annual Feasta Lecture, Trinity College, Dublin.
- Davidson, C. (2000), 'Economic growth and the environment: alternatives to the limits paradigm', *BioScience*, **50** (5), 433–40.
- Grossman, G.M. and A.B. Krueger (1995), 'Economic growth and the environment', *Quarterly Journal of Economics*, **110** (2), 353–77.
- Jackson, T. (2009), *Prosperity without Growth: Economics for a Finite Planet*, London and New York: Earthscan.
- Jackson, T. and P.A. Victor (2011), 'Productivity and work in the "green economy": some theoretical reflections and empirical tests', *Environmental Innovations and Societal Transitions*, **1** (1), 101–8.
- Martinez-Alier, J., U. Pascual, F.-D. Vivien and E. Zaccai (2010), 'Sustainable de-growth: napping the context, criticisms and future prospects of an emergent paradigm', *Ecological Economics*, **69** (9), 1741–7.
- McKean, R. (1973), 'Growth vs. no growth: an evaluation', *Deadalus, the No-Growth Society*, **102** (4), 207–27.
- Meadows, D., D. Meadows, J. Randers and W. Behrens (1972), *The Limits to Growth*, New York: Potomac Associates.
- Mill, J.S. (1848), *Principles of Political Economy: With Some of their Applications to Social Philosophy*, bk iv, ch. VII, reprinted 1970, London: John W. Parker.
- Mol, A.P.J. and G. Spaargaren (2000), 'Ecological modernization theory in debate: a review', *Environmental Politics*, **9** (1), 17–49.
- Nordhaus, T., M. Shellenberger and L. Blomqvist (2012), *The Planetary Boundaries Hypothesis: A Review of the Evidence*, Oakland, CA: Breakthrough Institute.

- Organisation for Economic Co-operation and Development (OECD) (1960), *Convention on the Organisation for Economic Co-operation and Development*, Article 1(a), accessed December 2015 at <https://www.oecd.org/general/conventionontheorganisationforeconom> [icco-operationanddevelopment.htm](https://www.oecd.org/general/conventionontheorganisationforeconom).
- Robinson, J. (2004), 'Squaring the circle? Some thoughts on the idea of sustainable development', *Ecological Economics*, **48** (4), 369–84.
- Rockstrom, J., W. Steffen, K. Noone, Å. Persson, F.S. Chapin III, E. Lambin et al. (2009), 'Planetary boundaries: exploring the safe operating space for humanity', *Ecology and Society*, **14** (2), 32–64.
- Samuelson, P.A. and W.D. Nordhaus (2005), *Economics*, 18th edn, New York: McGraw Hill.
- Solow, R.M. (1974), 'The economics of resources or the resources of economics', *American Economic Review*, **64** (2), 1–14.
- Stern, D. (2004), 'The rise and fall of the environmental Kuznets curve', *World Development*, **32** (8), 1419–39.
- Van den Bergh, J. (2011), 'Environment versus growth – a criticism of “degrowth” and a plea for “a-growth”', *Ecological Economics*, **70** (5), 881–90.
- Victor, P.A. (2008), *Managing without Growth: Slower by Design not Disaster*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- World Commission on Environment and Development (WCED) (1987), *Our Common Future*, Oxford and New York: Oxford University Press.