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Teaching Climate Complacency: Mainstream economics textbooks and the need for transformation in economics education

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Abstract: In this paper we ask, what is mainstream economics education conveying to its students? Standard mainstream economics textbooks treat the environment as a specialist issue *in addition* to standard concerns and based on solutions that conform to those standard concerns. When viewed as socialisation for students this is a major problem. To illustrate the problems we set out key aspects of the standard format, and draw attention to the structure and contents from two well-known textbooks. Standard textbooks convey the impression that the 'environmental issue' is appropriately incorporated and exhibit two complacency-creating features. First, fundamental problems (acute global ecological breakdown, biodiversity loss, climate change crisis etc), issues and urgency cannot be adequately conveyed to students within this way of framing economics. Second, specific theory and policy solutions suggest that the problem is well in hand. We illustrate using the theory of negative externalities.

Key words: economics education, ideology, climate emergency, negative externalities, degrowth.

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Introduction

As we suggested in the Editorial Introduction to this special forum, delay in responding to the global ecological and climate emergency has been endemic (see also Amen et al 2008; Gills and Morgan 2020; Newell and Taylor 2020). A key question is how did we get here, and an important frame of reference, as ecological economists and critical social scientists have argued for years, is that mainstream economic theory of the environment is falsely posed and fosters dangerous complacency (e.g. Daly 2015, 1997, 1974; Hickel 2018; Keen 2020). It is important to note that economics is not just a theory that directly shapes policy. It is also socially significant on a broader scale through its contribution to educational curricula. Economics is 'socialisation via education' (Daly and Morgan 2019). It has what the cognitive linguist George Lakoff terms 'framing' effects (e.g. Lakoff 2010).[1]

In this paper we want to draw attention to the systematic failure of mainstream economics to adequately incorporate the real consequences of economic activity. Economic activity involves material processes that affect the world on which our existence depends, and yet mainstream economics does not take this reality as its fundamental point of departure. For students, mainstream foundational focus, concepts, and policy arguments form the basis of an economics education, and key to this is the role of the mainstream economics textbook. Mainstream economics, and by extension environmental economics, (in contrast to ecological economics), are deeply problematic and as things stand a mainstream economics education is a significant impediment to grasping the reality and urgency of our present situation. This must change radically and quickly if economics is to play a future positive role in the needed transformation of the human relationship with the web of life (Gills 2020; Gills 2008).

Where did this delay and complacency come from?

Though there are alternative sources (Stevenson 2020; Bacevic 2020; Oreskes and Conway 2010 and, for degrowth, Kallis et al 2020; Hickel and Kallis 2020; Koch and Buch-Hansen 2020; Spash 2018; Morgan 2017), mainstream economic theory has been one of the main sources of authority responsible for climate action delay and environmental complacency, and this has been the case across the whole array of possible environmental problems, not just on emissions and climate change. Whilst acknowledging that there are different positions within ecological economics (e.g. Spash 2020b), to an ecological economist an economy is a set of material processes, it involves thermodynamic consequences, entropy, waste creation, and basic bio-physical modification of the world around us (see

[1] Lakoff is not a material reductionist or behavioral determinist regarding the brain-mind, but he does argue that we develop a set of neural circuitry that is triggered by situations and language use and which shapes how we think about given subjects: 'we think in terms of typically unconscious structures called 'frames' [which] include semantic roles, relations between roles and relations to other frames… All our knowledge makes use of frames, and every word is defined through the frames it neurally activates. All thinking and talking involves 'framing'.' (Lakoff 2010, 71-72). Lakoff's work has been influential across the social sciences (notably his *Philosophy in the Flesh*). Our focus here is economics education, and Lakoff's work (2010) on environmental issues is not specifically about this, though it is relevant in so far as education is part of socialisation. Lakoff's subject was public understanding of environmental issues and his point was that activists need more than facts (based on the implicit Enlightenment assumption that people will simply respond positively to the evidence, once conveyed to them). According to Lakoff activists need a more effective communication strategy leading to an alternative framing, which can compete with a conservative 'let the market' decide framing. That strategy needs to form institutions, highlight spokespeople and develop characteristic modes of unifying argument and language use that each specific issue and event can trigger in the public. For a different perspective on new materialist framing see Fox and Alldred (2020).

Spash 2017).[2] Climate and ecosystems are highly complex, and change can be irreversible, for example, inducing system state transitions and positive feedback loops (Steffen et al 2018). Fundamentally, to an ecological economist, the economy is embedded (as is society more broadly) in the material world, and the economy evolves as a sub-system in mutual relation with the material world on which it (and thus we) *depend*.

In mainstream economics, by contrast, the focus is determination of *exchange values* in an economic system of measured wealth creation (O'Neill 2007). In mainstream economics, organizations provide goods and services according to production costs of labour and capital and in relation to the subjective preferences of customers or consumers. Supply and demand are expressed in marginal relations and the two are resolved through convergence on prices some will pay and profits others will earn, based on what some will pay. This occurs in one market and generalises to all markets. According to such theory, when left to run unimpeded, the result is a system where 'price signals' and profit motives provide an engine of economic development and economic growth (presumably) to the benefit of all. This is the foundational premise, or ideological framing, by mainstream economics of the 'system'. The 'system' is focused on meeting subjective preferences and earning further profits in a competitive process that induces organizations to innovate, reduce costs, struggle for market share, and to identify new unexploited or currently non-existent markets, leading to technological progress and 'dynamic efficiency' (doing more in aggregate, but more with 'less' and meeting more needs or wants: in a utilitarian virtuous circle). At a macro-level this 'system' is represented through a 'circular flow of income' with a focus on national income accounts and a set of standard metrics that measure how well a (national) economy is doing in terms of economic growth, according to the dictates of exchange values.

The important point, however, is that the 'environment' in this schema is reduced to resources used in solving problems of *relative scarcity* and allocation as an economy evolves (and this is mainly about valuations, costs, and 'substitution' choices between resources).[3] The significance of material processes in general is tacitly assumed to be adequately accounted for through the exchange valuation system (essentially what we will pay). For this reason, 'environmental issues' as such are not fundamental to the theorization of an economy, but are rather merely an additional specialist sub-discipline for self-designated 'environmental economists'. Their job has been to theorise 'the environment', but crucially by adapting their concepts from *within* the framework of mainstream economics. So the context in which problems are recognized and policy solutions are formulated flow *from* this mainstream framework, focusing on resource choice, substitution decisions, distortions to and failures in otherwise (presumably) 'efficient' processes of exchange valuation. We provided a long list in the forum Editorial Introduction of different forms this has taken, whilst acknowledging there has been some development of more sophisticated forms over the years. The issue remains, however, that ecological science is marginal to the foundations of mainstream economics, whereas it could and should constitute an indispensable basis upon which economic theory is constructed.

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[2] Increasing frustration with mainstream economics during the 1980s led to formation in 1989 of the International Society for Ecological Economics and the journal *Ecological Economics* (and there have been many notable figures besides Daly, for example, Robert Costanza). Over the years, ecological economics has become a parallel discipline to mainstream economics and environmental economics. Like many movements that find themselves seeking to influence or displace a dominant approach, it has faced challenges regarding the concessions and compromises that might be involved (and criticisms range from the claim that some working on 'ecological economics' are methodologically little different than mainstream economists, to the claim that there needs to be a more urgent focus on policy activism that squarely confronts the need for both degrowth and a transition away from capitalism). Since the purpose of this paper is to highlight the socialising effects of mainstream economics rather than the relative merits of different strands of ecological theory and activism, we merely acknowledge that there are important differences (and that Clive Spash provides extensive discussion of the issues in his various writings e.g. Spash 2018). Julie Nelson, for example, looks at the issues differently than Spash (Nelson and Morgan 2020).

[3] There are many critiques of the ideological role of scarcity in economics in systems of abundance predicated on the creation of superfluous need (perhaps the best known in the mainstream is Galbraith 1958, but there are numerous works with more ecological focus e.g. Schumacher, E. 1973 [1993]).

The key point to take from the above is that despite an economy being fundamentally a *material process*, material processes and consequences are *not* what mainstream economics directly orients on. Moreover, there is no acknowledgement that economic expansion has *inherent* material limits dictated by the material world or actual existing planetary system. Instead, because there is no measured foundation for material processes within the way the economic system is theorised, and because the engine of this theorised system is inherently expansionary, there is a tacit assumption that the economic system is *without* absolute limits.[4] That is, there are no biophysical boundary states in mainstream economics, only price signals that tell us whether we want to do things in relation to pecuniary choices.[5] As ecological economists argue, the lack of real biophysical planetary limits might have seemed like less of an omission when the world's population was small and there were only a few industrialized countries, and relatively few people living high consumption lives (though classical political economy did speculate on limits to growth (e.g. J. S. Mill), and Marxists' critique of 'vulgar political economy' has always had a strand questioning the ideology of capitalist expansion, see: Dale 2020 for both sides of this). Today, however, when pointed out to them, it seems genuinely weird to non-economists that economics lacks *primary and universal* attention to the materiality of the economy and the actual material consequences of growth. This is the equivalent of finding out that cosmologists are not interested in gravity! (Daly and Morgan 2019). In any case, material consequences and limits are conceptually problematic in mainstream economics, and this transfers to environmental economics. As we shall see, this has basic consequences for the teaching of economics .

Many standard mainstream economics textbooks include little or no recognition of 'environmental' issues (let alone ecological science, or earth system dynamics) and those that do tend to treat the environment as a specialist issue *in addition* to standard concerns and based on solutions that conform to those standard concerns. When viewed as socialisation for students this is a major problem. In effect, mainstream economics conveys a worldview, a profound and lasting 'framing' of the world, one conditioning thought and behaviour in the future (for some well-known work on issues of context see Frank et al 1993; Callon 2007; Çalişkan, and Callon 2009).

Mainstream economics, however, self-identifies as a social *science* with the accent on the latter. It places great emphasis on its quantifications and its status as a science, so to an external observer it must surely seem odd that *thinking like a* mainstream economist creates a blind spot regarding the basic material consequences of something as fundamentally material as an economy. Given that it is mainstream economists and a subset of the mainstream (environmental economists for our purposes) who then write the textbooks and teach most of the courses on how an economy operates and with what consequences, this is a significant issue of education as socialisation. What is mainstream economics education conveying to its students (who then as citizens affect policy…)?

An economics education and the textbook format

Until relatively recently many standard introductory mainstream economics textbooks (and bear in mind these are supposed to articulate what is *fundamental* to economics) have included little or no recognition of 'environmental' issues. And as we have suggested, those that have incorporated them have tended to treat the environment as merely a specialist issue *in addition* to standard concerns, and based on solutions that conform to those standard concerns. To illustrate how this has evolved and what it has meant, we first set out key aspects of the standard format, and then in the next section we briefly draw attention to the structure and contents from two well-known textbooks.

Standard introductory undergraduate economics textbooks tend to conform to the template pioneered and popularised by Paul Samuelson in his 1948 book *Economics* (see Samuelson 1998). As critics and

[4] To be clear, data exist on 'material flows', the point is that this is *not* what economics is founded on (see Wiedmann et al 2015).

[5] To be clear, one can distinguish between *material* growth and *valuation* growth; GDP measures valuation growth, but the basis of an economy remains material process.

authors of heterodox alternatives often note, mainstream economics textbooks are unusual in the social sciences (e.g. Komlos 2019; Söderbaum 2018; Reardon et al 2018; Earle et al 2017; Birks 2016; Madi and Reardon 2014; Zuidhof 2014).[6] Most social science textbooks set out a series of issue areas and emphasise that there are enduring disputes and competing theories and perspectives. In other words, they recognise an open field of studies, characterised by contestation and debate, rather than a received framework presumably representing a scientific consensus regarding underlying law-like conditions. The impression conveyed is of legitimate diversity and pluralism in the pursuit of knowledge (though we by no means wish to suggest this is unproblematic, merely subtly different than a mainstream economics textbook format). Though most mainstream economists would probably dispute this (see Morgan 2015), economics textbooks, by contrast, are set out more as 'training manuals' to learn a set of designated key concepts. There is typically an initial chapter entitled something along the lines of 'the economic problem' or 'thinking like an economist'. Here, the distinction between positive and normative economics is introduced, though in recent years the terminology for this has sometimes been modified (substituting the term 'quantified science' for 'positive science', but without significant change in claims and implications). The claim is made that economics deals predominantly with payments and prices and rewards, and other transactional behaviours with observable quantity components or consequences. Moreover, attention is often drawn to the abundance of publicly recorded economic 'data' from which to study patterns, and the further claim is made (or implication given) that this allows the economist to infer and test (presumably) law-like regularities. As such, mainstream economists claim their discipline can be an applied science of economic behaviour, one that bears greater similarity to the natural sciences than to the other social sciences – hence 'quantified' carries a host of legitimation claims. Indeed, some critics note that the aspiration and self-representation to reproduce the 'rigour' of the natural sciences is one of the defining characteristics as well as fundamental flaws characterising mainstream economics.[7] As regards normativity, at this point in the initial chapter(s), some recognition is usually given to the general notion that economists often disagree over policy because of their different values, but this is overridden by the claim that they share an analytical framework or key concepts and first principles, and these ground the collective capacity to 'think like an economist'. There is generally a silence over the question of the 'instrumentality' of the economics discipline in relation to reproduction of the capitalist economy, reigning business practices, and the pursuit of capital accumulation, that may however be the hidden driving force behind this particular approach to understanding economics.

In the standard textbook format the process then begins of introducing students to first principles and fundamental concepts. These include scarcity, rationally preferring more to less, (profit or growth) maximisation, (investment and consumer) choice and allocation, marginal analysis, preferences and factor costs, equilibrium, efficiency and optimisation, opportunity cost, cost-benefits, economic surplus, elasticity, and so forth. These form a conceptual 'toolkit' and this is typically first introduced to demonstrate the mechanics of demand and supply in a single 'market'. *Demonstration*, moreover, also involves a standardised format: a statement of founding assumptions (i.e. foundational axioms), which in combination lead to definite consequences (such as convergence on equilibrium). As such, students are taught both a mode of thought and a basic idea of what constitutes theory and proof (a deductive logical form, where consequences *must* follow). This readily translates into graphs (geometric illustrations) and simple sets of formal mathematical proofs (typically using calculus). Once the student has been introduced to the founding principles and some initial concepts and a way of demonstrating the adequacy of a theory, this way of 'thinking' is then successively developed and extended to different subject areas and scales (e.g. microeconomics and market structures, macroeconomics and the state, fiscal policy and the scale and scope of the public sector, international trade, balance of payments and exchange rates, monetary policy, banking and finance and so forth). These elements are normally

[6] To be clear, however, this is not to suggest alternatives are necessarily ecological in focus (this varies), merely that they note a set of standard characteristics in mainstream economic textbooks (most commonly a monistic unified and analytical framework, heavy initial focus on market competition and general absence of real pluralism and encouragement of critical thinking – despite that mainstream economists think that their work is diverse, plural and critical).

[7] The best known 'ontological' version of this critique derives from the work of Tony Lawson (e.g. Lawson 2015).

presented as if they are transhistorically and universally valid (and ultimately based upon assumptions about natural or universal propensities in 'human nature'). Indeed, it appears to now be the norm that teaching long term and global economic history, as well as teaching the history of economic thought itself and all its principal schools of thought, is regarded as either supplementary or even unnecessary. Critical and radical accounts of both economic history and economic thought have been eschewed in favour of an acceptable conservative canon of classics. For example, Samuelson dismissively referred to Karl Marx as 'a minor neo-Ricardian'.

The point we want to emphasise here is what the textbook format conveys to a student: there is a fundamental analytical framework, or way of thinking like an economist, this can be applied successively to different subjects or issue areas. The world may change but economics is *comprehensive*. And not only this, it is a consistent, coherent and unified body of applied knowledge, providing the social science equivalent of an engineering manual. Economic theory may involve some policy disagreement, but this is mainly restricted to values, built into different choices or assumptions in the 'normative' part of economics. Mainstream Economics is overwhelmingly presented to the student as a 'positive' science through its quantifications.[8]

Moreover, as anyone who has been taught mainstream economics will also realise, there is a subtle socialisation of perspective built into both the deductive method used for theory demonstration and the specific assumptions and axioms that tend to dominate. Students are invited to think that people are (and so it is natural and morally appropriate to be) individualistic, self-interested, calculative instrumental optimisers. This will later influence how economists view the natural world (as objectified instrumentally positioned exploitable resources). Moreover, since the general mode of demonstration is overwhelmingly of one kind (and this is heavily emphasised as what it means to *think* like an economist), students are invited to think that reasoning in general reduces to deductive method and calculative rationality i.e. this is what 'good argument' looks like (i.e. it is clear, logical, precise and rigorous – even if this is more assertion than reality, since it is often premised on spurious precision and can include numerous axiomatic sleights of hand).[9] Since textbooks typically start by establishing a market situation of equilibrium, the idea of what good argument looks like is also subliminally being associated with market logics – this is not just where rigour and clarity (*sic*) are demonstrated, the very idea of a 'market' is positioned as, implicitly or explicitly, a morally desirable construct, even in positive economics (for context see Fourcade and Healy, 2007; Amadae 2005). Case studies or examples may be used, but the concept of 'the market' is still overwhelmingly presented as apolitical and ahistorical; an impersonal domain of 'free' conduct and choice, in which multiple self-interests converge, leading to benefits (of different types and degree) to all. This, of course, is a distorted version of Adam Smith's argument in *The Wealth of Nations*. The important point, however, is that the association of 'the market' with good reasoning and mutual benefit means students are being pre-persuaded that 'markets' are foundational to policy prescription. This provides another way in which economic thinking influences an economists view of the natural world: if a problem exists but no market exists, solve the problem by creating a market. Recognition of the multiplicity of possible forms of 'market' and knowledge about the immense variety of historical forms of markets is normally excluded from the curriculum, rendering the concept of 'the market' not only ahistorical but also ideological (in sharp contrast to, say, Karl Polanyi's work).

Concomitantly, even when it is not formally stated, a series of associations for the student are being set in motion by the standard textbook format: market competition is primary in the logic of economics, *every* social context is presented as if it involves something like market competitive behaviour (we are universally rational, calculative, instrumental, acquisitive and self-interested *individuals*), markets are

[8] This remains the case even when mainstream economists are more reticent regarding use of the term 'positive', since they simply substitute the phrase quantified science and make equivalent claims.

[9] Note, the point is that deduction is basic to demonstration of mainstream theory via axiomatic constructs and mathematical proofs; the mainstream also recognizes induction, but has problems with abduction and other approaches.

basic to growth, growth means progress, progress means growth through markets.[10] Moreover, the very idea of 'progress', developed primarily in Western thought over the past two centuries or more, is foundational to the worldview underlying mainstream economics, and a subtle source of its social legitimation and acceptance. Clearly, none of these points follow *necessarily* in mainstream economics and none of what we have just suggested is about the specifics or technicalities of theory, but rather the associations created by the characteristics of theory and how it is presented. One might be sceptical that any of this is the case. But we would suggest the whole will be familiar to anyone who has taken some equivalent to 'Econ 101' and been taught using a standard introductory economics textbook.

It is in the context of the associations set out, that the general point we began with has its greatest force. We began by noting that mainstream economics does not take as its point of departure the materiality of an economy and its embedded consequences. So, if students are told that there is a unified analytical framework and toolkit, and that they are being taught how to think like economists, and that this is successively applicable to *all* aspects of an economy and possibly to all aspects of society, then the overwhelming effect is to suggest *nothing is missing* and all possible questions or doubts will be subsequently answered as and when the analytical framework is applied to those problems – whatever they are.[11] In broader social science contexts, this type of idea would be called a 'totalizing concept'. For example, 'Globalization' was presented as such a totalizing concept early in its intellectual 'career'; and moreover as a received theory based on some type of presumed social scientific 'consensus', which however did *not* exist (see Amoore et al 1997). In any case, the mainstream economics textbook combination of associations has socialising effects that work like misdirection in a magic trick: the glaring omission of materiality is masked. Hence, mainstream economics is an impediment (to alternatives) through its socialising effects.

Not only is the crucial omission masked, the capacity to fundamentally question what is being learned (including exposing the omission) is masked by the kind of institutionalised teaching practices that tend to go hand in hand with the mainstream economics textbook format. To be clear, this does not require mainstream economists to be uncaring or idiotic, it does not require them to be climate change deniers, and the point is not personal (ad hominem). A singular analytical framework, deductive method, the use of mathematical proofs etc. tend to invite a didactic teaching style where lecturers exhort students to simply accept the logic ('*get it* and all will become clear'). Ironically, but revealing a profound historical amnesia in the mainstream circles of economics, it was an early progenitor of the modern mainstream, Alfred Marshall, who suggested economists ought to 'use the mathematics…then burn it': i.e. he was keen to highlight mathematisation as both path and obstacle to adequate understanding of economics.

So, we contend that there is a basic pedagogy that is typical in mainstream economics, and it too seems more like an engineering manual approach than that which is typical in other social sciences: teaching tends to focus on setting out the mechanics of a concept or theory and providing worked examples, and students are often invited to go through the steps and *confirm* their understanding by emulation. Even if lecturers want to do something different (and sometimes they do) they find themselves working *against* the evolved characteristics of the economics textbook format and expectations in the profession. In any case, the overwhelming focus is on demonstrating a facility with the technical aspects of theory and applications. There are 'problems' to solve, but 'problem solving' is about demonstrating capability with what is taught. Any critique students are invited to make – for which they will be credited rather than treated as 'difficult' students - tends also to be limited to discussion of the relative merits of a range

[10] Our purpose here is to emphasize that mainstream economics focuses on the individual; it is also the case that mainstream economic theory presupposes structural conditions (even though it usually adopts methodological individualism) and one should note that the focus on the individual is itself a consequence of structured social relations. One might also note that it is increasingly common in economics to recognize limits to the rationality of economic agents; however, this still takes as its point of departure or benchmark the ideal rational calculative type. Referring to more realistic behavior as irrational speaks volumes.

[11] There is, as readers may be aware, a longstanding project in economics of 'imperialism' set in motion by the Chicago School economists George Stigler and Gary Becker in the last century.

of basically similar technical alternatives. As such, pedagogically the economic textbook format and typical practice subtly suppresses critical thinking, even though academic economists are just as likely as any other group who work in education to formally recognize that critical thinking is of value (it is after all a basic academic norm in many countries and, somewhat contradictorily, is increasingly likely to be formally stated as a desirable curriculum component - because of a general instrumental turn in education systems - since critical thinking enhances 'employability'). In any case, for both students and lecturers the focus on technical demonstration and confirmation, leading to active suppression of critical thinking, has self-reproducing effects: successive generations of economists are selected and socialised through this form of education, and so these students thus trained go on to contribute to perpetuating its form and the reproduction of mainstream economics.[12]

Two textbooks

Gregory Mankiw is one of the most prominent mainstream economists of the twenty-first century and his and Mark Taylor's *Economics* is one of the more popular introductory textbooks in the UK.[13] It is currently (Mankiw and Taylor 2020) in its fifth edition and all five editions closely follow the format we have set out: a Part 1, what is economics, thinking like an economist, how economists disagree; a Part 2 consisting of several chapters setting out the theory of competitive markets, demand, supply, equilibrium and efficiency; a Part 3 introducing the scope of the state and policy intervention into a market economy, and then a series of other parts introducing additional subjects and issues. Notably, it is not until Chapter 9 that environmental issues start to be *substantively* introduced, but in the form of 'externalities'. In the third edition this occurs in Chapter 11. Interestingly, the fifth edition includes a later section Part 8 (with fewest chapters in the book) introducing 'heterodox economics' and this is a notable change. It is also notable that the authors overtly think of their textbook as encouraging critical thinking and as facilitating open minds. Students are, for example, reminded 'not to forget the real world', and each chapter has case studies and a set of follow up self-study questions (though most of these involve a calculation and/or reiteration of a concept or theory and thus confirmation of a concept or theory). What has not changed, however, is that reference to the environment is scattered through the text rather than being primary to the construction of economics. Production and growth appear as Chapter 21. The question, of course, is whether a critical 'real world' thinker can have an adequate sense of an economy if the economy is theorised as an exchange value process of mutual benefit, subject to failures and with some specific issue areas that require more or less state intervention as it grows and as industrial-consumption economies spread.

Gregory Mankiw is part of the New-Keynesian-New-Classical Economics synthesis movement of the economics mainstream and is a well-known and controversial conservative voice in economics in the USA, so selecting a textbook he has authored may seem self-serving. And it is worth acknowledging that Mankiw's textbook's worldview is quite US-centric, but it is also worth noting an American view of economics is global in reach via the influence of its main academic institutions and journals and via the American Economic Association (see Fourcade 2006). Whilst cases and some issues included in textbooks may be local, the economics textbook format is framed as being universal. Still, it is worth making some brief reference to another textbook to highlight their family resemblance. (The role of US 'hegemony' in the world economy and world order more generally, and its influence on shaping mainstream economics is another subject worthy of discussion, but is outside the scope of the present article).

John Sloman's *Economics* is also amongst the more popular standard introductory undergraduate textbooks in the UK. It was first published in 1991 and (with contributions from various subsequent

[12] So, the textbook format is just one component of a complex process of socialisation that has made mainstream economics quite different than other social sciences. Besides heterodox critics, the sociologist Marion Fourcade is perhaps best known for exploring this subject (Fourcade et al 2015; Fourcade 2009).

[13] Mankiw's textbooks, like those of many prominent mainstream economists, have a global reach and extend beyond the English speaking world.

collaborators) is now in its tenth edition and has over the years been substantially revised to reflect changes in the kinds of problems recognised in the world. For example, the tenth edition begins by bulleting a whole series of 'challenges', including Brexit, populism, financialisation, rapid development of some countries – e.g. China, and critique of market liberalism. As the list indicates, *Economics* is amongst the more 'progressive' mainstream textbooks, but framing is still a significant issue. To a non-economist Sloman et als' list would suggest the rest of the book will introduce economics as a multi-disciplinary, complex account of the world that recognises how deeply integrated real economies are with politics at every scale. This, however, is not what follows. The first part of the book parallels Mankiw, the student is reminded that 'critical thinking' will render them highly employable and that it is analysis and problem solving that form the basis of critical thinking. However, the authors then state that the textbook will introduce them to how to analyse by 'thinking like an economist' and it is that which will be basic to critical thinking. By way of adding some humour, the authors then suggest that a 'word of warning' is required: 'Once you are thinking like an economist there's no turning back. It's a skill that will be with you for your life. Just bear in mind that the non-economists around you may need convincing of the beauty of the subject.' (Sloman et al 2018, 5).[14]

For critics of the mainstream approach, Sloman et al's humorous 'warning' is very necessary, but carries opposite connotations to those intended by the authors: intentions notwithstanding, the educational effect is more in the form of indoctrination than 'critical thinking' and that is why non-economists are so hard to convince. In any case, the authors then set out the structure and purpose of the textbook, highlighting that to develop the skillset of 'thinking like an economist' students will be introduced to 15 key concepts and 40 ideas that comprise a 'toolkit' that can be applied to ANY situation. The book then proceeds much like Mankiw and Taylor by first setting out demand and supply, moves on to microeconomic market constructions, and then starts to open out to various issue areas. It is not until Chapter 13 that we are introduced to a substantive 'environmental policy' chapter. Here, students are introduced to market failure, and how to solve a problem of 'externalities' through such means as taxes, before moving onward to address the problem of how to respond when no market exists (which is how the problem of carbon emissions is typically posed: i.e. create a market, with property rights, to 'trade' the problem away). Chapter 13 is just 27 pages out of more than 800 pages which comprise the whole textbook. Growth theory, meanwhile, is introduced as Chapter 23 and focuses on factors, productivity and technology, and unemployment in the context of supply-side policy. Chapter 26 brings the textbook to a close with a focus on an 'interdependent world'. The subject matter of Chapter 26 is globalization, instability, debt, trade and issues of inequality – important issues, clearly, but not in isolation from the basic relationship between economies, scale and intensity and the material world. The basic problem here is clear as early as the third edition.

In the third edition, in introducing theories of growth, Sloman poses the core question of 'the costs of economic growth, is more necessarily better?' but suggests this as an issue of 'opportunity cost' and thus choice and preferences within the context of cost-benefits, and this is a 'constrained optimisation' problem. He concludes: 'the question of the desirability of economic growth is a normative one. It involves judgement about what a desirable society should look like.' (Sloman 1997, 410). This makes our point eloquently, i.e. that it is only by being educated to think like an economist that one would be persuaded that we can simply choose more or less 'environment' and that the problem reduces to whether we have more or less of a rate of growth. The third edition was 1997, the year of Kyoto, and

[14] The reader may see that the subtext here is that 'beauty' is a much valued virtue in mathematics. At the time of the early phase of the Global Financial Crisis, Paul Krugman wrote an open letter to his fellow economists (though we note that Krugman is also a mainstream New Keynesian economist who has continued to support axiomatic theory forms) and in that letter (which eventually over a thousand others signed, including one of the authors of this article) he made the argument that Economics as a discipline should not be criticised for not predicting the great financial crisis of 2008 (though some economists, notably Steve Keen, had in fact anticipated the crisis), but rather for having taken 'the beauty of their equations' to represent 'truth' about the Real Economy.)

after decades of *learned* complacency we are finally approaching a situation where we will not be asking is more 'desirable' but rather 'is more going to be suicidal?'[15]

To be clear, the point of these textbook illustrations is not to single out the authors. The purpose has been to focus on sociology of knowledge effects. Sloman and his colleagues did not invent mainstream economics. Our underlying point is that textbook socialisation works against fundamentally questioning a mainstream economics framework from *within* and that framework has a glaring *foundational absence*. As we suggested in the Editorial Introduction, this way of thinking has been basic to 'business as usual' perspectives, and though it is increasingly coming under pressure, remains problematic. Environmental issues are not entirely omitted from textbooks and it is notable that environmental 'challenges' are being increasingly recognised, but the subject is still treated as an additional specialist sub-disciplinary issue in one or two specific chapters that apply the analytical framework, its toolkit and concepts. As such, the context in which the 'environmental problem' is recognized and policy solutions are formulated flow *from* the mainstream framework and again this is important from a socialization point of view. (In other words, the only 'critical thinking' encouraged in this perspective is a type that functions to reproduce the very framework that critical thinking might purport to criticise: thus obstructing the possibility of any real critical thinking much less introduction of any radical alternative paradigm).

Significantly, the socialising effect of the economic textbook is to convey the impression that the 'environmental issue' is already appropriately incorporated into mainstream economics. This has two complacency-creating features worth highlighting. First, the generalised effect invites complacency, since the actually existing fundamental problems (including an acute global ecological breakdown, biodiversity loss, and climate change crisis), issues and urgency cannot be adequately conveyed to students within this way of framing economics. Second, the specific forms of theory and policy solutions also invite complacency, since they seem to suggest that the problem is well in hand (or will ultimately be solved in the future). The consequences of this can be multiple for students, extending to a kind of cognitive dissonance, based on a split between the complacency or confidence induced by economics and the concern and fear induced by attention to other sources of knowledge and information. At worst mainstream economics socialisation militates against taking urgent action to address present day fundamental issues: immediate social redesign, a halt and reversal to expansion in scale and intensity of economies, etc. (Kallis et al 2020; Galbraith 2020).

Of course, one might respond that it is unfair to highlight introductory economics rather than focus on 'state of the art' sophistication at the forefront of mainstream economics. But both share the fundamental absence highlighted by ecological economics and arguably it is introductory economics textbooks that have the most significant educational influence. Whilst environmental economics now includes many different kinds of theory and policy foci, few economics students will come across these unless they take an elective in environmental economics. Most students will, therefore, only be familiar with what is conveyed in introductory textbooks, and this is also true for the many social science students required to take some version of 'Econ 101'. As the above also indicates, it is two policies in particular regarding the present climate change and ecological breakdown crisis that economics students are likely to be familiar with: taxing negative externalities, and creating property rights through issuing permits for carbon trading. That is, fixing a market failure and creating a market where none previously existed in order to trade a problem of externalities away. In order to underscore the problem of socialized complacency we now briefly establish that these kinds of policy ideas are entirely inadequate, and we will use the externality argument to demonstrate this.

[15] And to illustrate how pervasive this reasoning has been, (noting again the list we made in the Editorial Introduction) William Nordhaus calculated an 'optimum' increase in global temperature of plus 4 degrees centigrade, based on a similar perspective, while however ignoring the mounting scientific consensus that such a level of global temperature increase over pre-industrial levels would at the very least cause vast ecological and social damage and perhaps produce runaway and irreversible warming, leading to the extinction of the human species.

Market failure and negative externalities

We set out right at the beginning that the focus of mainstream economics is determination of *exchange values* in an economic system of measured wealth creation. Moreover, the significance of material processes in general is tacitly assumed to be adequately accounted for through the exchange valuation system (essentially what we will pay). As such, one of the main ways material processes become an issue is when this exchange valuation system is deemed to not be working adequately, and this is one of the chief ways in which 'environmental issues' arise in mainstream economics. This is where sub-disciplinary expertise is called upon. A 'negative externality' occurs when the full (including environmental) 'social' costs of the production of a product or provision of a service are *not* included in the pricing. This means that there are some costs that are not paid by either the producer or consumer, but instead those costs fall on others in society. The archetypal environmental example is the social costs of vehicle emissions i.e. the costs of acid rain and environmental damage, pollution and healthcare provision and so on. Since 'social' costs are higher than 'private' costs, the costs currently incorporated into the supply schedule are lower at every possible output level than would otherwise be the case. In marginal analysis this means that supply is currently higher than it would otherwise be at every price level. As such, for any given standard demand curve the 'equilibrium' will be at a lower price and greater output than would otherwise be the case i.e. the good or service is systematically oversupplied and over-consumed. 'Price signaling' is not working 'properly' and hence a 'market failure'.

According to mainstream theory, since the problem is a pricing 'error' in the exchange valuation system, the solution to this failure is to 'fix' the pricing error i.e. 'internalize' the external cost by applying a tax or some other strategy that makes the social cost part of the pricing decision. In theory this reduces supply at every price level and leads to a new equilibrium between demand and supply at a higher market price and lower output i.e. the good or service is no longer systematically over-supplied and over-consumed and *market allocation* is now 'efficient'. When first presented, the negative externality argument seems reasonable and elegant, a clear development from the general framework of price signaling. But what has this achieved in practice and in what context? In textbooks the focus via case studies is how to calculate and price a tax, who to levy it on, and with what differential effects on market equilibrium. For example, environmental harm in the form of acid rain flows over national borders, so those causing specific harms may be outside of the legal jurisdiction of the taxing authority. One may also face decisions regarding how to calculate costs in any given jurisdiction (what are the *sources* of a measurable cost-based harm, such as an increase in the national incidence of asthma?) and how to apportion taxes across a supply chain (oil producers, petrol refiners, car drivers etc.). Furthermore, since different market participants may have different price and income 'elasticities' there is also a further problem of how to distribute the internalization of external costs in any given equilibrium situation.

The focus then is typically technical and quasi-practical. But significantly the whole works with and assumes the general efficacy and adequacy of the price signaling approach. But consider the whole again. The intent of internalizing a negative externality is to moderate behavior, not to prevent it. This is an indirect way of enabling the continuation of an activity. The initial implication is that the harmful activity is *reduced*. But this is a sleight of hand. At best the theory indicates the activity is reduced per person per unit of income they have that can be used to afford the activity, and even this does not follow. Consider driving a car, for example. A larger population with higher incomes or more access to affordable financing (debt) in a transport system which invests in road infrastructure (making cars convenient or necessary) and a corporate system that invests in marketing cars to make them desirable status goods, is one where numbers of cars and miles driven can increase even as the negative externality is successively 'internalized'. And this has been our observed experience all around the world (see Morgan 2020). From a mainstream economic theory point of view this still looks like more 'efficient allocation' because in theory it incorporates 'costs' and represents production decisions and preference choices (what we will pay).[16]

[16] In a price signaling market system, 'sustainable' means no more than 'is profitable'. A production process or the use of a resource can remain 'sustainable' in this sense for a lot longer than 'sustainable' might mean in terms of the effects of the market process on the environment. Cars may be market 'sustainable' as long as we can afford

It is also worth noting that even when an action such as buying an internal combustion engine car has characteristics that may be 'individually rational' as a choice within conventional parameters of economic understanding, such behaviour may be 'collectively irrational' when practised on societal scale by large numbers of individuals. Here, the standard methodological individualism of mainstream economics supports a 'fallacy of composition' by producing climate change consequences after purchase of millions of privately owned cars. This may also be termed a 'rationality paradox' embedded in the mainstream economics approach to understanding 'negative externalities'. That is, the very form of presumably normal and rational behavior advocated by the perspective itself produces collective problems which were unintended by individuals, but for which they will be forced to bear significant social consequences and costs.

Moreover, recall that the point of internalizing the externality is to solve a problem. The underlying problem created by our industrialized and consumer-based economies is, in combination, environmental destruction and dangerous climate change. These are consequences of the scale and intensity of material processes and they are exacerbated as economies grow (so the problem to solve is constantly expanding). Moreover, many of the consequences are ingrained based on what we do now that affects natural systems later, and they are cumulative, complexly emergent, and subject to tipping points and fundamental uncertainty. An externalities solution is supposed to make prices reflect *all* costs to shift a market in the direction of efficient allocation. This, of course, is never in practice really achieved, but this is not just a practical issue, it is a theoretical incoherence. Why would uncoordinated 'blind' human inventions (conventions) such as pricing signaling be able to adequately reflect our cumulative ingrained and baked-in *future* impacts on the material world, based on what we are prepared to 'pay' now and in relation to what we can try to calculate as 'the cost' on a market by market basis? Clearly, a moment's reflection indicates that this is impossible.

Many ecological economists have pointed out the theoretical impossibility of mainstream negative externality approaches: no truly representative price can be calculated for any given market and so no 'true price' from an ecological point of view exists in any market – as such there is no genuinely 'efficient' allocation possible in this *theoretical* system. The very existence of a policy stance that claims to fix the failure in the theoretical system serves the ideological purpose of marginalizing the otherwise obvious case to simply STOP or prohibit doing harmful things based on what the biophysical sciences are telling us NOW will be the eventual consequences. Concomitantly, ecological economists also highlight from a political economy perspective that an approach that claims to 'fix' market failures inadvertently misrepresents the activity of firms and depoliticizes the political. For example, deliberate 'cost shifting' by firms easily become constituents in 'external social costs', but only because firms have influenced the legal and institutional context and lobbied to shift responsibility in the first place. Yet for a student engaging with a textbook, the theory of negative externalities seems very much an empirically grounded solution to a recognized problem, subject mainly to technical problems of measurement. And fundamentally, from the point of view of socialization of students, given the lack of due attention to a material growth system, the textbook conveys the impression that we can continue to do what we are already doing.

To be clear, our intent here is not to denigrate any and all attempts to intervene in and address problems of our economies. The point is to highlight the issue of proper context, points of departure, sufficiency and adequacy. Taxes on environmentally harmful activity, for example, are not pointless. But we must start to take seriously the real nature and consequences of our economies and the absolute limits the material world imposes. Mainstream economics is problematic in general and problematic as a mode of socialization for students via what textbooks convey to students. We could go on, and there are other debates that could be had (e.g. the status and significance of the 'circular economy' concept, the scope

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petrol – but the effects may not be objectively sustainable long before we run out of oil and long before we are individually prepared to give cars up or society has provided us with alternatives. In any case, what people want doesn't necessarily equal what is sustainable or socially desirable from a price signaling point of view (bottled water and chewing gum?).

for ‘green growth’, new innovations and movements in the economics curriculum such as the ‘CORE’ project, and whether it is better or merely different – arguably merely different etc.), but the arguments set out should be sufficient to establish that there is a major issue to address in terms of the role of mainstream economics as a source of (mis)education, complacency and continuing dangerous delay.

Conclusion: Transforming economics education

Economics is a field of knowledge with immense social power and influence. We are living in an era of intense systemic crises and system failure, of which the ongoing global climate change crisis and ecological breakdown are central aspects (e.g. Morgan 2016). The study of the ‘failure of civilizations’ has become widespread recently, and this is symptomatic of a growing awareness that our current form of civilization is in deep historical crisis and cannot continue (Gills 2020). Civilization itself must be radically transformed in the future. Given the power and influence of mainstream economics, in order to transform society in response to these deep crises, the field of economics must also be radically transformed and Covid-19 has only served to reinforce this point (Alves and Kvangraven 2020). We need a revolution in economics education, placing biophysical processes at the heart of the study of economy (e.g. Røpke 2020; Spash 2017). The analysis of Earth System dynamics; planetary boundaries, feedback loops, thresholds and tipping points in the planetary biophysical system(s) should be core and compulsory knowledge in the field of economics. But given the nature of the influence mainstream economics has already wielded and the delay and complacency it has fostered, an economics education also needs to involve *unlearning* what it has previously enabled.

Economics as a mainstream discipline is characterized by three ‘separations’: the separation of economics from politics; the separation of economic theory from socio-economic reality; and the separation of economics from ecology. Each of these three separations and their consequences can usefully be critiqued as part of a new economics education and then ought to be profoundly resolved into a new form of unity where ‘the economy’:

- is no longer presented (explicitly or implicitly) as a sphere unto itself separated from the state, society and nature.
- is no longer understood on the analogy of a machine, operating on objective ‘laws’ where abstract economic models are presented as reality.

Instead economics ought to be taught in an integrated way that includes economic history and the history of economic thought, as well as bio-physical science. And real historical processes should be studied and understood, including global environmental history. There are several aspects to this: the pursuit of growth has been intrinsic to capitalism and this has had some obviously beneficial features in terms of science, medicine, technology, and (if we recognize that surplus and division of labour create scope) arts and so forth, but it has not been an anodyne tale of ‘progress’. Rather real history has been a complex process of struggle, difference and exploitation of peoples, places and species that has also produced specific harms and ills and more fundamentally has come at a cost to the planet we live on. An economics education ought to convey that crises are intrinsic to rather than accidents of the kind of economies we have created, beginning in the Global North, but it ought also to convey that a basic crisis is built into our economies as growth systems that push against planetary boundaries. The danger here, however, is that education becomes an exercise in fear-inducing apocalypse-aversion, as though we were being asked to simply sacrifice and suffer in a new era of unavoidable austerity (Kallis 2019). This is not necessarily our future and this too should be made part of economics textbooks.

The overwhelming evidence suggests that we need to reduce the scale and intensity of our economies and live differently. We need to be realistic about this and choose our futures rather than resist the obvious, since it is by resisting the obvious that worst-case scenarios may become our future. The future will have to be radically different, but this can be achieved by constructive design rather than through civilizational collapse. This is the domain of degrowth, and this too ought to become a component of

future economics textbooks (Kallis et al 2020; Spash 2020a; Fullbrook and Morgan 2019).[17] Whilst by no means ignoring the huge challenge that such transformation represents (and the problems we are already increasingly starting to experience in terms of ecological damage and climate change), advocates of degrowth make the case that alternative ways of living do not imply second best societies, but ones in which we stop doing superfluous things, shift resources to socially constructive activities, and focus on what matters to well-being (in societies that can still be technologically and socially progressive based on different criteria than those that currently determine the system we live in). If this suggestion seems absurd to you then chances are you have already been influenced by the dominant economic worldview. We humbly suggest that you should consider whether your 'hard-headed realism' is simply a form of cynicism, built on fantasy, or more disturbingly perhaps, your surrender to the 'logic' of mainstream economics?

References

Alves, C. and Kvangraven, I. (2020). Changing the narrative: Economics after Covid-19. *Review of Agrarian Studies,* 10(1): http://ras.org.in/77067f7af922c604062edadadc5b3bd8

Amadae, S. (2005). *Prisoners of Reason.* Cambridge: Cambridge University Press.

Amen, M., Bosman, M. M., & Gills, B. K. (2008). Editorial: The urgent need for global action to combat climate change. *Globalizations*, 5(1), 49–52.

Amoore, L. Dodgson, R. Gills, B. Langley, P. Marshall, D. and Watson, I. (1997) Overturning 'Globalization': Resisting Teleology, Reclaiming Politics, *New Political Economy*, 2(1) 179-195.

Bacevic, J. (2020). Unthinking knowledge production: from post-Covid to post-carbon futures. *Globalizations*, this issue.

Birks, S. (2016). *40 Critical Pointers for Students of Economics*. London: WEA Books.

Çalişkan, K. & Callon, M. (2009). Economization, Part 1: Shifting Attention from the Economy towards Processes of Economization. *Economy and Society* 38 (3) 369– 398.

Callon, M. (2007). What does it mean to say that economics is performative? In: MacKenzie, D., Muniesa, F., & Siu, L. (eds), *Do economists make markets?,* 311–357. Princeton University Press.

Dale, G. (2020). Rule of nature or rule of Capital? Physiocracy, ecological economics, and ideology. *Globalizations,* this issue.

Daly, H. (2015). *Essays Against Growthism.* London: WEA/College Books.

Daly, H. (1997). Forum, Georgescu-Roegen vs. Solow/Stiglitz. *Ecological Economics,* 22, 261-266.

Daly, H. (1974). The economics of the steady-state. *American Economic Review* 64(2), 15-20.

Daly, H. and Morgan, J. (2019). The importance of ecological economics: An interview with Herman Daly. *Real-World Economics Review*, 90, 137-154.

Earle, J. Moran, C. and Ward-Perkins, Z. (2017). *The Econocracy*. London: Penguin.

Frank, R. Gilovich, T. and Regan, D. (1993). Does studying economics inhibit cooperation? *Journal of Economic Perspectives,* 17(2), 159-171.

Fourcade, M. (2009) *Economists and Societies.* Princeton: Princeton University Press.

Fourcade, M. (2006). The construction of a global profession: The transnationalization of economics 1. *American Journal of Sociology,* 112(1): 145-194.

Fourcade, M. and Healy, K. (2007). Moral views of market society. *Annual Review of Sociology,* 33, 285-311.

Fourcade, M. Ollion, E. and Algan, Y. (2015). The superiority of economists. *Journal of Economic Perspectives,* 29(1), 89-114.

Fox, N. and Alldred, P. (2020) Economics, the climate change policy-assemblage and the new materialisms: towards a comprehensive policy. *Globalizations,* this issue.

Fullbrook, E. and Morgan, J. (eds.) (2019). *Economics and the Ecosystem.* Bristol: World Economic Association Books.

[17] To be clear, degrowth is being used loosely here to refer to advocacy of reduced scale, rather than to refer only to the social movement, which is just one project among many with this goal.

Galbraith, J. K. (1958) *The Affluent Society.* London: Hamish Hamilton.
Galbraith, J. K. (2020) Economics and the Climate Catastrophe. *Globalizations,* this issue
Gills, B. K. (2020). Deep Restoration: From the Great Implosion to the Great Awakening. *Globalizations. 17*(4), 577-579.
Gills, B. K. (2008). Climate Change: A Global Call to Action. *Globalizations,* 5(1), 83-87.
Gills, B. K. and Morgan, J. (2020). Global Climate Emergency: After COP24, climate science, urgency, and the threat to humanity. *Globalizations,* 17(6): 885-902.
Hickel, J. (2018). The Nobel prize for climate catastrophe. *Foreign Policy,* December 6th.
Hickel, J. and Kallis, G. (2020). Is Green Growth Possible? *New Political Economy,* 25(4), 469-486.
Kallis, G. (2019). *Limits: Why Malthus was wrong and why environmentalists should care.* Stanford: Standford University Press.
Kallis, G. Paulson, S. D'Alisa, G. and Demaria, F. (2020) *The Case For Degrowth.* Cambridge: Polity Press.
Keen, S. (2020) The appallingly bad Neoclassical Economics of climate change. *Globalizations*, this issue.
Koch, M. and Buch-Hansen, H. (2020). In search of a political economy of the postgrowth era, *Globalizations*, this issue.
Komlos, J. (2019). *Foundations of Real-World Economics.* London: Routledge.
Lakoff, G. (2010). Why it matters how we frame the environment. *Environmental Communication* 4(1), 70-81.
Lawson, T. (2015). *Essays on The Nature and State of Modern Economics.* London: Routledge.
Madi, M. and Reardon, J. (eds) (2014). *The Economics Curriculum.* London: WEA Books.
Mankiw, G. and Taylor, M. (2020) *Economics*. Andover: Cemgage Learning EMEA.
Morgan, J. (2020). Electric Vehicles: The future we made and the problem of unmaking it. *Cambridge Journal of Economics,* 44(4): 953-977.
Morgan, J. (2017). Piketty and the growth dilemma revisited in the context of ecological economics. *Ecological Economics*, 136, 169–177.
Morgan, J. (2016). Paris COP21: Power that speaks the truth? *Globalizations*, *13*(6), 943–951.
Morgan. J. (2015). Is economics responding to critique? What do the UK QAA 2015 Subject Benchmarks for Economics indicate? *Review of Political Economy, 27*(4), 518-538.
Nelson, J. A. and Morgan, J. (2020). Ecological and feminist economics: An interview with Julie A. Nelson. *Real-World Economics Review,* 91: 146-153.
Newell, P. and Taylor, O. (2020) 'Fiddling while the planet burns? COP 25 in perspective', *Globalizations, 17*(4), 580-592.
O'Neill, J. (2007). *Markets, Deliberation and Environment.* London: Routledge.
Oreskes and Conway (2010). *Merchants of Doubt.* New York: Bloomsbury.
Reardon, J. Madi, M. and Scot-Cato, M. (2018). *Introducing a New Economics.* London: Pluto Press.
Røpke, I. (2020). Econ 101—In need of a sustainability transition. *Ecological Economics,* 169: article 106515.
Samuelson, P. (1998). How Foundations Came to Be. *Journal of Economic Literature* 36(3), 1375–1386.
Schumacher, E. (1973 [1993]). *Small is Beautiful: A Study of Economics as if People Mattered.* London: Vintage.
Sloman, J. (1997) *Economics*. London: Prentice Hall. Third edition.
Sloman, J. Guest, J. and Garratt, D. (2018). *Economics.* London: Pearson. Tenth edition.
Söderbaum, P. (2018). *Economics, ideological orientation and democracy for sustainable development.* London: WEA Books.
Spash, C. (2020a). The economy as if people mattered: Revisiting critiques of economic growth in a time of crisis. *Globalizations,* this issue. *https://www.tandfonline.com/doi/full/10.1080/14747731.2020.1761612*
Spash, C. (2020b). A tale of three paradigms: Realising the revolutionary potential of ecological economics. *Ecological Economics,* 169, article 106518 https://doi.org/10.1016/j.ecolecon.2019.106518
Spash, C. (2018). Facing the truth or living a lie: Conformity, radicalism and activism. *Environmental Values*, 27, 215–222.

Spash, C. (ed.) (2017). *Routledge Handbook of Ecological Economics: Nature and Society.* New York: Routledge.

Steffen, W., Rockström, J., Richardson, K., Lenton, T. M., Folke, C., Liverman, D., ... Schellnhuber, H. J. (2018). Trajectories of the Earth System in the Anthropocene. *Proceedings of the National Academy of Sciences of the USA*, 115, 8252–8259.

Stevenson, H. (2020). Reforming global climate governance in an age of bullshit. *Globalizations*, online first.

Wiedmann, T. Schandl, H. Lenzen, M. Moran, D. Suh, D. West, J. and Kanemoto, K. (2015) The Material Footprint of Nations. *Proceedings of the National Academy of Sciences* 112(20): 6271–6.

Zuidhof, P. (2014). Thinking like an economist: The neoliberal politics of the economics textbook. *Review of Social Economy*, 72 (2), 157-185.