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What are we teaching and why it matters: A survey of the Australian and New Zealand university macroeconomics curriculum in a post-GFC, ecologically stressed world

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Abstract

The Global Financial Crisis appears to have brought a period of reflection, and some uncharacteristic humility, on the part of the economics profession. The calls for changes to what is taught now come from within the ranks of the mainstream. Encouraged by this, we have examined first year macroeconomics courses taught in 2013 in Australia, New Zealand and some United States universities. We wanted to know whether it is still true, as Herman Daly said in 1996, that economics textbook writers (and teachers) still think that macroeconomics has nothing to do with the environment.

We found that roughly one quarter of introductory macroeconomics courses appear to include at least one aspect of environmental sustainability. No university in our survey yet teaches an introductory macroeconomics course that would delight ecological economists. By contrast, it became clear that at least three quarters of courses and textbooks now include discussion of the Global Financial Crisis. We think the disparity matters. Wide coverage of the Crisis introduces students to the notion of the fragility of the financial system. However, for our policymakers and business leaders of tomorrow, the increasing fragility of the natural environment appears to remain a blind spot. Both are important, especially since escaping recession and paying down high global debt levels will inevitably mean renewed efforts to achieve high rates of economic growth. Unless an understanding of sustainability is taught, we will have addressed one crisis, while hastening the next.

Keywords

economics teaching, sustainability; Global Financial Crisis

Introduction

How the economics curriculum should be revised has become a question of great interest in the aftermath of the Global Financial Crisis (GFC). This is not to say that critiques of mainstream economics teaching are something new. Indeed, as ecological economists are well aware, the validity and relevance of neoclassical economics came under the spotlight long before the drama of 2007-08. What is different this time is that, uncharacteristically, there now appears to be an atmosphere of openness and humility within the mainstream economics fraternity that has not been in evidence previously¹. As a result, the calls for change now come from within the ranks of the mainstream community itself and not solely from those in the wings.

Apart from the numerous websites and blogs discussing the state of economics and economics teaching, influential economists of many persuasions are generating a substantial literature including, for example, those economists affiliated to the newly established Institute for New Economic Thinking (INET).

In October 2013, INET established a new project with the specific purpose of designing a new approach to teaching undergraduate economics. The contributors to the project will be spread across nine countries including India, Chile, Columbia and Russia (*The Economist*, November 23, 2013 'Keynes' new heirs'). Parallel developments include a conference sponsored by the Bank of England and the UK Government Economic Service discussing the teaching of economics, and the subsequent establishment of a Steering Group to recommend reforms to economics teaching in the UK (Royal Economics Society, 2013). United States based contributors to the debate on economics curriculum reform include, among many others, Schiller (2010), Blinder (2010), Gertler (2013), Reardon (2013), Hemenway (2013) Krugman (2012), Friedman (2012), and Lo (2012). Schiller (2010) and Blinder (2010) are currently listed as the 'Most Read' articles in the *Journal of Economic Education*.

¹ Nobel prize winning economist Paul Krugman says, for example, 'a little bit of humility is a very powerful thing...(it acknowledges) that we don't have the truth and that maybe those beautiful models we've been teaching are not the only way to see the world.' (Paul Krugman and Joseph Stiglitz 'What is the future of economic thinking?' INET economics, Youtube, published November 1, 2013, statement at 3mins, 39 seconds.)

Leading textbook writer David Colander echoes these sentiments when writing: 'humility, in my view, is the missing element in economics teaching. Humility leads us to teach our students to become scholars other than disciples. Humility begins with the recognition that no single approach is sufficient.' (Colander in Coyle 2012, Chapter 2, Loc. 510). Seabright and Carlin, also in Coyle (2012, Chapters 11 and 13, resp.) express similar views .

Encouraged by the momentum on the issue, and the presence of ecological economists at INET, we have conducted a survey of economics university curricula in Australia, New Zealand and the United States. This paper reports on our preliminary findings, specifically in relation to introductory economics courses and the textbooks used by universities. Our focus is on the extent to which any of the central ideas of ecological economics, or an understanding of sustainability, might be appearing in courses or textbooks. A larger research project is looking beyond Australasia and the US, and involves a broader, and more in depth critique of the economics curriculum post-Crisis. These findings will be reported in a future paper.

Our broad goal in this paper is to establish whether it is still the case, as Daly noted (1996: 46), that modern textbook writers think that macroeconomics has nothing to do with the environment. Among the key ideas we looked for were the following: (i) the notion that the circular flow of an economy is contained within a biosphere that is finite, non-growing and materially closed; (ii) recognition that the capacity for economic growth might be limited in the long run by planetary boundaries (Rockstrom 2009); (iii) the idea that the environment, as natural capital, provides vital ecosystem services to the economy, some of which go through markets whilst others do not; and (iv) that Gross Domestic Product (GDP) counts the consumption of natural capital as contributing to current income, amongst other shortcomings.

We also investigated how climate change is being treated. In Australia, respected economist Ross Garnaut was commissioned by state and territory governments in 2007 to conduct an independent study of the impacts of climate change on the economy – the *Garnaut Climate Change Review* – updated in 2011 (Garnaut 2008, 2011). Climate change is described by Garnaut as a 'diabolical' and 'insidious' economic policy challenge, 'harder than any other issue of high importance that has come before our polity in living memory' (Garnaut 2008: xviii). One might reasonably expect the subject to rate a mention in introductory macroeconomic courses.

The paper is structured as follows: Section 2 provides an overview of the literature that has urged changes to the way economics is taught in the pre- and post-Crisis era and distils some of the key messages. This leads to a broader discussion on the extent to which economics courses and textbooks are including these changes. Section 3 presents the results of our investigations into the courses and texts. Our rationale for seeking ecological economics concepts introduced at an *introductory* level is then elaborated upon in Section 4, which also draws some conclusions on the implications of our findings.

The calls for change

The lack of reality in, and narrowness of, standard economics principles texts has long troubled ecological economists. A good deal of Daly and Farley's (2011, 2004) textbook includes either explicit or implicit criticism of the narrowness of mainstream theory and its unrealistic but 'canonical' assumptions of insatiable wants and infinite

resources (e.g. text draws attention drawn to contrasting ideas such as 'optimal scale', 'non-market goods', 'neglect of the biophysical system', 'GNP as cost', and a need to 're-define efficiency towards a more comprehensive indicator'). Similarly, the sheer breadth of subject matter in Common and Stagl (2005) highlights the limited range and focus of conventional economics texts. Gowdy (2010) points directly to many flaws in conventional economic thinking in his more advanced text. Not least of these shortcomings is the absence of nature and society in the Walrasian economy, and its view of a circular flow of economic activity that does not require energy or other inputs from nature, or is the flow in any way limited by the laws of thermodynamics. Furthermore, as the Walrasian circular flow does not model energy inputs from nature, it is inherently incapable of recognizing the impact of the discovery of fossil fuels. The ability of successive forms of fossil fuel to increase the amount of useful work done (wood to coal, to oil, for example) has underpinned astonishing increases in the living standards of developed countries during the Twentieth Century. This remarkable feat, which also poses a great challenge from a sustainability perspective, is a view of the world that is hidden in models that do not link to nature or have a concept of the 'useful work' of energy.²

In one of the first edited volumes of the new field of ecological economics (Costanza, 1991), Clark (1991) and Zucchetto (1991) both addressed the problem of the education of economists. Zucchetto (1991:416-427) stressed the importance of developing a consciousness about the environment and an understanding of how human actions need to be traded off against impacts on the natural world. Clark (1991:400-415) analysed the attitudinal shift necessary to move students from conventional economic thinking to that required for a more sustainable world. Removing conventional economics from centre stage, Clark said, requires attention to: the distribution of income as a priority; and the abandonment of linear thinking, competitive individualism, 'neat mathematical models which, in fact, model nothing in reality'; notions that economies can only run on private greed and that planetary costs can be validly counted as benefits (Clark 1991: 412).

Ten years later, when little had apparently changed, a significant event in the pre-GFC economics teaching narrative occurred when a group of Parisian students petitioned their professors against 'the imaginary worlds' of their lectures. To fully appreciate economic phenomena, the students asked that alternate critical approaches be taught, rather than a purely axiomatic approach treated as *the* economic truth (Fullbrook 2004: 3). This protest gathered momentum around the world, and similar petitions were made in the UK and US. A new society and journal were started, the Post-Autistic Economics Society, later renamed the Real World Economic Society. Members of the Society, students and economics teachers, contributed to a volume of writings entitled 'What's wrong with economics?'

² See Ayres and Warr, 2005 and Hall et al. 1986, as cited in Gowdy, 2010, Chapter 9.

(Fullbrook, 2004) Some of the main points from various chapters can be paraphrased into a list of pleas for how to improve the teaching of economics:

- stop banishing economic history and history of economic thought from curricula, because these are where students are exposed to non-neoclassical ideas (Fullbrook: 1).
- recognise that one may need to look outside the boundary of economics for some of the forces that drive economic behaviour (Stretton, 2004: 10).
- rely less on methods of mathematical-deductive modelling in the desire to appear scientific (Lawson, 2004: 26).
- abandon the notion that there is a settled body of knowledge that students simply need to absorb (Ormerod, 2004: 43).
- adopt a more realistic version of the circular flow of an economy by depicting it within, and reliant upon, the natural environment. In doing so, recognise that the human economy has moved from an 'empty world' era in which human-made capital was the limiting factor in economic development to a 'full world' era in which natural capital has become the limiting factor (Costanza, 2004: 237-8).
- open students' minds to the contested meaning of 'progress' and discuss the need for alternative indicators of wellbeing other than GDP growth (Gadrey, 2004: 262); and
- teach economics as if ethics mattered (Wilber, 2004: 147ff).

Many of these pleas with respect to the teaching of economics are still being repeated as the issue is discussed in the post-Crisis literature.

Soderbaum (2009), for example, repeats a request to open students' minds to alternative approaches. He suggests that neoclassical economics and its monopoly position in economics departments is the reason the 'mental maps' of people in positions of power are faulty. Seeing individuals only as utility maximisers, firms only as profit maximisers, and economic growth as the only objective in progress is a problem because this pre-occupation with the monetary dimension, as Soderbaum terms it, means that non-monetary factors such as ecosystems, natural resources and human resources are seen only from their 'economic' perspective. Impacts on ecosystems, land-use, water resources and fish stocks raise issues of inertia, path-dependence, irreversibility and connected uncertainties. These are obscured by the monetary focus of the neoclassical view. The assumed universality of neoclassical economics serves to legitimise it which, according to Soderbaum, means that 'thousands of students, now in professional positions, have learnt neoclassical

micro- and macroeconomics over the years and have supported each other, and been supported by, their professors to further strengthen the neoclassical perspective' (Soderbaum 2009: 16). For Soderbaum (2009) therefore, the neoclassical perspective is therefore doubly condemned. Not only did it fail to predict the Financial Crisis, but various ecological crises are unfolding that are obscured from view.

Otsch and Kapeller (2010) argue that despite the overwhelming impact of the Financial Crisis on the global economy, the effect on the education of economists and economics as an academic discipline has been negligible. Noting Joseph Stiglitz and Paul Krugman as exceptions, Otsch and Kapeller (2010:22) argue that most economists find it 'very hard if not impossible to get distance to their own thinking and detect a crisis of their paradigm.' They suggest that in the neoclassical ahistorical worldview, where markets are stable and self-regulating, it is hardly surprising that macroeconomists were unable to predict the Crisis. They argue that students will still be left illiterate with respect to such events if economic education remains unchanged, as it appears to them it might. They suggest a pluralist approach, whereby students are encouraged to debate the relative merits of a variety of different theoretical perspectives, thereby getting an appreciation of the inherent complexity of economic issues. They also argue for a problem-centred approach to the teaching of economics and a return to the 'big-think' questions – those that make economics interesting.

Like Soderbaum (2009), Reardon (2013) argues that the current generation is beset by many problems including climate change, a Global Financial Crisis, a palpable disparity in income and wealth, and a healthcare crisis. At the centre of this is the discipline of economics itself and economics education, which 'obfuscates the interrelationship of our problems, inures its students to human suffering and abnegates thoughtful discussion of the human predicament' (Reardon 2013:1). Despite a collective failure of neoclassical economics to either predict or understand one of the worst recessions in recent history, Reardon argues that little has changed. The education of economists has at least three problems, according to Reardon: (i) a failure to construct a workable model that reflects the real world; (ii) ignorance of chaos theory, complexity analysis and evolutionary theory which have had profound impacts in other social sciences; and (iii) the presentation of only one perspective, denying the legitimacy of others.

Reardon (2013) writes: 'I am inspired by William Lloyd Garrison, who began publishing *The Liberator* in 1831 and vowed to continue until the abominable injustice of slavery was outlawed. Our generation is also enslaved by an outdated and unrealistic neoclassical economics that ignores pressing environmental realities and inures its practitioners to our generation's many problems.' Not least of our possible problems, Reardon says, citing Shearman and Smith (2007), is our inexorable slide toward cataclysmic climate change which will require wise 'warriors',

well rounded in disciplines such as economic history, literature, physics and political science.

Nelson (2009, 2013) makes an equally impassioned plea for action on climate change and a change in the way economics is taught: '(W)e are, if we are honest about it, facing the possibility that all the skills and knowledge we've gained through our physical and social evolution and scientific investigations to date may not be adequate, or the right kind, to save the human race from catastrophic dislocating changes.' (Nelson 2013: 145).

She argues that in economics textbooks, we should be willing to take an ethical stance on climate change; query with students whether pursuing self-interest and accumulating more goods equates with wellbeing; explore how people come together to take action; and add resource maintenance to our teaching of consumption, production and distribution.

The contributions to Diane Coyle's book, *What's the use of economics: Teaching the dismal science after the crisis* (2012), comprise a substantial literature on how economics teaching should be improved, post-Crisis. The chapters, written by prominent commentators, teachers and textbook authors make similar pleas for reform. Some of these are reproduced in Table 1 as examples of the many ways in which reform is urged.

What we are teaching

Course coordinators from 30 Australian and 7 New Zealand universities kindly supplied detailed information on their introductory macroeconomics courses and the textbooks used, often in the form of the full course guides. For comparison purposes we also obtained from the Internet, publicly available information (often in the form of a course syllabus) on introductory macroeconomics courses and textbooks used in 27 of the largest universities in the United States. For the Australian and New Zealand universities, the 37 universities comprise more than 90% of those that teach introductory macroeconomics.

Course content and relevant textbook chapters were examined for material in two main areas: 1) evidence of an acknowledgement of sustainability concerns or use of key concepts and ideas from ecological economics; and 2) content updating texts and courses to include the 2007 GFC and its aftermath.

With regard to sustainability or ecological economics concepts, we looked for mention of anything that links the economy to the environment as described in the ecological economics literature in Section 2. Any discussion of ecological crises or planetary boundaries also qualified as sustainability. For example, courses that received a 'yes' for sustainability in Table 2 included material on one or more of the following: (i) definition or discussions on sustainability; topics on global warming or

climate change; (ii) a depiction of the circular flow of an economy having links to the natural environment for sources and sinks, preferably by showing the circular flow as embedded within the environment; (iii) specific recognition that GDP does not take into account destruction or deterioration in the stock of natural capital; (iv) other problems with GDP as the only measure of the well-being of citizens; (v) mention of natural capital or raw materials as one of the factors of production or recognition that

Table 1. Post-crisis suggestions for reform of economics teaching: Messages distilled from Coyle (2012)

| | |
|---|---|
| <p>Teach the Crisis; economic history; history of economic thought; and institutional context</p> | <p>Reintroduce economic history into the curriculum because history teaches three important insights: the existence of patterns, the importance of uncertainty, and the prevalence of multiple possible outcomes.</p> <p>Integrate the history of economic thought and its relationship to events in economic history when explaining current macroeconomic models.</p> <p>Teach the economic history of the 1929 crash, the Great Depression and the 2007 crash. Emphasise the social and political forces that lead to economic booms and busts.</p> <p>First, to those schools that no longer teach economic history: reverse course. Integrate the teaching of history with the teaching of theory and use history to explain why theories were developed in the first place.</p> <p>Teach economic history in a way that includes an appreciation of how economic thinking about macroeconomics has evolved.</p> <p>Link the macroeconomic theories to past events so as to show their weaknesses.</p> <p>Ensure that the next generation of economists not only understand some of the causes of the Crisis, but also that crises, recessions and crashes are part of the subject and not its death knell.</p> <p>Economic history is our data, and it is as essential to economics as is knowledge of the constellations to an astronomer.</p> <p>There is a pressing need to reintroduce economic history into the teaching of economics at all levels. It was awareness of economic history rather than of dynamic stochastic general equilibrium models that enabled the authorities to muddle through the latest crisis.</p> <p>Teach a greater institutional and historical context.</p> <p>Teach the history of markets.</p> |
|---|---|

| | |
|-----------------------------------|--|
| Teach a plurality of perspectives | <p>No single approach is sufficient. There is more to economics than one approach.</p> <p>Incorporate a better understanding of behavioural economics.</p> <p>Teach that macroeconomics is more than just forecasting the economy.</p> <p>Broaden the extremely restrictive assumptions on individual motivations and opportunities.</p> <p>Abandon <i>homo economicus</i>. Acknowledge that agents may not behave with the sort of extreme intertemporal consistency often attributed to them.</p> <p>Study current issues from a range of disciplinary perspectives (economics, history, international relations, anthropology, economic history).</p> |
| Teach real world economics | <p>Teach a broader knowledge of institutions.</p> <p>Incorporate a significant element of project work and case studies into university programs.</p> <p>Shift to a more policy focused approach.</p> <p>Engage with the issues that confront real businesses and actual households.</p> <p>Allow the students to get their 'hands dirty' early on by actually collecting and analysing data about some empirical phenomenon.</p> |
| Humility | <p>Teach passionately, but with humility. Open students eyes to the difficulties and challenges of economic models – to their usefulness, but also their potential fallibility.</p> |

an economy wide production function has raw materials or energy as factors of production; and (vi) any recognition of the importance of the role of energy - as useful work - in economic development, and the challenge of finding substitutes for fossil fuels.

We examined for sustainability in macroeconomics rather than microeconomics courses because we were primarily looking for recognition of the central idea of ecological economics that the economy is contained within the biosphere, so that optimal macroeconomic scale becomes an important macroeconomic policy issue. Environmental externalities are almost universally discussed in modern microeconomics textbooks within the topic of market failure. Whilst it is pleasing to see any type of environmental impact acknowledged, the texts rarely go beyond saying that the problem can be addressed just by correcting the price of the good or service producing the externality to take into account the costs it is imposing on others. The instruction to correct prices is one that fits easily within traditional neoclassical economics and in that sense is nothing new. It underplays the fact that where an environmental externality is widespread, or lasts for a long time, it is impossible to know the 'right' price. It ignores the fact that in practice, the transactions costs of securing agreement for the many parties involved in non-rival, non-excludable environmental externalities like global warming are likely to be prohibitive, as the real world is proving. It neglects that many of the parties likely to be affected have yet to be born and the fact that even if it were possible to get prices right, and secure *allocative* efficiency for the current generation, this does not guarantee the goal of *sustainability* because sustainability includes equity, including intertemporal equity (Daly and Farley, 2011:193; Common and Stagl, 2005:350).

Our criteria for inclusion of sustainability issues fall well short of the coherent narrative sought by Daly (2004) or Costanza (2004). As far as we can tell, no course teaches optimal macroeconomic scale and our results are disappointing in that respect. However, rather than ending the story here, we adopted less demanding criteria and can, at least, report some positive results in Table 2 below. For Australian and New Zealand, approximately 30% of undergraduate introductory macroeconomics courses appear to discuss at least one or more aspects of sustainability (as described above), whilst 44% of Australian postgraduate courses satisfy this criterion. The position for the United States is similar, with 26% of the universities sampled mentioning at least one aspect of sustainability in introductory undergraduate macroeconomics courses.

Whilst we will be exploring this material at a greater depth in a second paper, one example of the way sustainability issues were raised is in the seven courses that use the textbook Case, Fair and Oster (2012) as their introductory macroeconomics text. While not presenting the expanded circular flow model that embeds the economic system within a finite natural resource system, Chapter 17 ('Long run growth') includes a two-page section entitled 'Growth and the environment and the issue of

sustainability'. That section mentions, *inter alia*, the trade-offs between growth and environmental quality; the relationship between economic growth and increasing carbon emissions; and the question of how developing countries should use the dividends from the exploitation of non-renewable natural resources. While this does not represent the sort of fundamental revision of macroeconomic theory that ecological economics might be looking for, it is evidence of genuine engagement with some of the key dilemmas.

For teaching on the Global Financial Crisis, the nature of the material included varies widely, and is far from 'settled', but revision of textbooks and courses for this purpose appears to be much more widespread than it is for sustainability issues (Table 2).

Table 2: Coverage of sustainability and the Financial Crisis in macroeconomic courses at responding Universities, by country (percentage of courses incorporating each topic)

| Country | Sustainability | GFC | <i>n</i> |
|--|----------------|--------|----------|
| <i>Undergraduate introductory macroeconomics</i> | | | |
| Australia | 31.0% | 75.9% | 29 |
| New Zealand | 28.6% | 85.7% | 7 |
| United States | 25.9% | 92.6% | 27 |
| <i>Postgraduate introductory macroeconomics</i> | | | |
| Australia | 44.4% | 61.1% | 18 |
| New Zealand | 0.0% | 100.0% | 2 |

Why it matters

Our investigations reveal that a number of economics teachers are keen to convey an understanding of current sustainability issues when introducing economics to students. That said, it is clear that the priority to change course content and texts to explain the Global Financial Crisis has tended to overshadow the perceived need to include concepts of sustainability.

Perhaps, given the immediacy of the GFC, this is not surprising. The economic impacts of the crisis have been felt globally. Indeed, in some countries they have been severe and the crisis has certainly drawn attention to clear gaps in mainstream teaching and in the prevailing neoclassical theory.

By contrast, encroachments on planetary boundaries through global warming or biodiversity loss, for instance, appear to have fewer immediate impacts that can be

unambiguously attributed to cause. They are also subject to 'denialist' campaigns, the influence of which would appear plain. Sustainability thinking asks us to consider the future. Climate change, for example, asks us to imagine a future of frightening, but unspecified economic impacts, and to ponder the big questions of designing an economy and society that could be resilient, given the inevitability of these impacts.

On a more mundane level, it may be that amending courses and textbooks to incorporate material on the Global Financial Crisis is perceived to be easier. To some extent, it involves using existing theoretical building blocks (the liquidity trap, for example) that had been dropped earlier.

From a purely practical point of view, however, our contention here is that changing a textbook or course to include key sustainability concepts is not difficult either. The simple act of drawing the circular flow contained within the environment, and depicting the use of natural resources from that environment and wastes being absorbed back into it (see, for example, Goodwin et. al. 2014, Figure 3.8, p.81.), would go a long way to prompting discussions on sustainability issues that might otherwise stay as 'blind spots'. The essence of economic logic, that we economise on, and invest in, improving the productivity of scarce factors of production, would be retained. Stimulating questions could then immediately be raised. For example: Is it natural capital or is it sink capacity that is becoming scarce? How do we invest in this? What would a more comprehensive notion of efficiency entail if it included environmental impacts? How could an economy be restructured towards one that had more benign environmental impacts? What are the best policies to encourage renewable energy?

Removing the blind spots and addressing such issues at an introductory level is becoming critically important for several reasons. Firstly, it can often be difficult to redirect young minds once they have been introduced to the primacy of efficiency, narrowly defined, to economic growth as the sole goal, and to 'the economists (only) way of thinking'. The very similarity of textbook material seems to encourage a conservative and unquestioning culture among both students and teachers, as Soderbaum (2009) has claimed.

Specialist courses in sustainability for second or later year students can challenge this thinking, and there did appear to be good courses at several universities. However, unless such courses are included within a generalist MBA program for example, few business leaders and policy-makers of the future are likely to proceed to the more advanced electives.

The wide coverage of the GFC in revised textbooks and courses will have invoked in students the notion of the fragility of the financial system. The levels of public debt generated in avoiding the collapse of the system, and during the subsequent economic downturn, were astonishing by post-war standards. In the United States, for example, the level of public debt as a percentage of GDP is approaching the

wartime levels of 50 years ago (Congressional Budget Office, 2013). It took very high economic growth rates by today's standards to bring war debt levels down over subsequent decades. The largest economy in the world, and indeed much of Europe since it is in a similar position, will be striving for economic growth with a renewed desperation. Economic growth will be seen, quite validly, as a means of paying the debt down without worsening unemployment.

New students will become acquainted with these ideas and priorities, but not with the threats to the fragile natural environment that the efforts to achieve these high rates of growth will pose. At the very least, it is important that business leaders and policymakers appreciate that the drive for growth must strive for higher resource productivity and fewer harmful emissions.

To sum up, in a survey of 30 Australian, 7 New Zealand and 27 United States introductory macroeconomics courses at universities, very few of the key concepts of ecological economics have made their way in any depth into the courses. About one quarter of texts do mention at least one, seldom more, of five ecological economics ideas for which we searched. This falls well short of a coherent narrative that sees natural capital and ecosystem services as vitally important to the economy, and climate change as a serious threat. By contrast a much higher proportion of texts included new material to attempt to explain aspects of the GFC. The textbooks introduce the notion of a fragile financial system into introductory macroeconomics courses, but do not include the notion of the fragile environment on which the economy is inextricably dependent. This poses a serious risk in our view. That risk is that the policies chosen by policy makers and future business leaders to address the first crisis (the GFC) may well hasten the next crisis (environmental).

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