

Greening Economics: It is time

by Carlo Carraro, Marianne Fay and Marzio Galeotti

The concept of environmental capital is thoroughly entrenched in policy discussions but largely missing from mainstream economic curriculums. This column argues environmental externalities, climate change, and constraints on natural resources will constantly and deeply affect humankind's future. The teaching of economics, especially growth economics, should stop ignoring them.

Shortly after the inception of the financial crisis, The Economist published an article on the split the crisis had brought about among macroeconomists and on the self-criticism some of the most renowned names of academia were applying to the discipline they have been teaching. Economists such as Robert Barro, Bradford DeLong, Paul Krugman, and Willem Buiter questioned the 'economic model' they had long used as a reference tool to initiate crowds of students to the dismal science. Thus, in Robert Barro's view, the last 30 years of apprenticeship in American and English universities have been 'a costly waste of time'. According to Nobel laureate Paul Krugman, most macroeconomics of the last 30 years runs the risk of having been 'spectacularly useless at best, and positively harmful at worst'. In many countries a debate broke out among university macroeconomics professors concerning the way the functioning of the economic system is presented to students and how economic problems are discussed in terms of causes and possible remedies.

Environmental crisis and macroeconomics

It took the deepest economic and financial crisis since the Great Depression to provoke an open debate amongst macroeconomists as to whether the 'economic model' taught in economics programmes is adequate. We do hope it will not take the full realisation of the adverse consequences of climate change for the profession to come to its senses regarding environmental economics and the way natural capital is ignored in most macroeconomic work. How many superstorm Sandys will it take? By how much does the sea level have to rise? How many severe droughts and floods (and where) will it take before we come to the realisation that ignoring natural capital and its many externalities is simply bad economics?

The difference between the financial and environmental crisis is that we actually do have a good body of work that incorporates natural capital in models of growth. The problem is that it has remained to a large extent the restricted domain of environmental economists. The vast majority of us were able to get degrees in economics without ever reading a single paper on environmental economics or encountering natural capital as an argument in the production functions we studied. We did hear about Pigouvian taxes of course – and so figured the problem had been solved...

Environmental economists have long modified growth models to account for the role of the environment, thus revisiting the conditions that ensure growth, whether sustainable or sustained. Classical references are three 1974 articles by Partha Dasgupta and Geoffrey Heal, by William Nordhaus, and by Robert Solow (though Solow could be hardly defined an environmental economist). More generally, existing work is summarised in the survey chapters by Tasos Xepapadeas and by William Brock and Scott Taylor, both published in 2005. A more recent example that compares 'traditional' (brown?) and 'green' models of growth is a 2011 World Bank working paper by Stephane Hallegatte, Geoffrey Heal, Marianne Fay, and David Treguer.

As a result, environmental economists tend not to talk about economic growth per se, but about sustainable economic growth. When macroeconomists refer to sustainable growth, however, they usually mean sustained growth. When growth economists study the role of externalities in the growth process they almost exclusively refer to technological and knowledge externalities, and generally ignore environmental ones, even though the latter are likely to become largely more

relevant in the coming decades. Even social capital, a relative newcomer in economics, appears better integrated into the growth literature.

Why such disregard for an issue that epitomises market failures from externalities, common property issues, and whose importance in both growth processes and human well-being is well documented? Sheer ignorance, likely – or a vague notion that innovation will come to the rescue. But why would markets generate the technology to solve a problem that combines both knowledge and environmental externalities?

The teaching of economics

Here is a plea then for an urgent change in the economics curriculum, at both introductory and advanced levels. Growth chapters in today's macroeconomics textbooks make no reference to the environment – whether as an input into the production function or as a limiting factor affecting the productivity of human or physical capital. This is the case, for example, of David Romer's textbook, in its fourth edition in 2011; of Jean-Pascal Benassy's 2011 volume; or those of the Chicago School economists, such as Nancy Stokey, Robert Lucas and Edward Prescott's (1989) and of Lars Ljungqvist and Thomas Sargent (third edition, 2012); or even that of Neo-Keynesian economists such as Olivier Blanchard and Stanley Fischer (1989); or, finally, the very recent example of Michael Wickens (2012).

What is needed is not simply that more environmental economics be offered, but rather that the macroeconomics courses teach that natural capital is a key input into production processes, and that the environment – through massive mismanagement and a chronic failure to apply the basic principles of economics – has now become a serious macroeconomic problem, one that requires a profound and dramatic change in our model of growth. The development model of the industrial revolution ('grow now and clean up later') partly worked for a world of 1.5 billion people; it simply won't do for a global population approaching 9 billion.

If introducing the notion and role of the environment is necessary in macroeconomics teaching, it is a fortiori necessary when the student is presented with the theory and models of economic growth. There are a few economic growth textbooks written by well-known growth economists who are very active in that area. Going through the tables of contents, however, one is quickly disappointed. Neither the volume by Robert Barro and Xavier Sala-i-Martin (2003) nor the one by Daron Acemoglu (2008), for instance, consider explicitly the role of the environment in the process and in the perspectives of economic growth of a country. The same holds for the textbook by Olivier de la Grandville (2009), while Charles Jones and Dietrich Vollrath (2013) include a chapter on economic growth and natural resources, which is only a component of natural capital. Only the book by Philippe Aghion and Peter Howitt (2008) includes a chapter – the sixteenth – where the authors study 'how new growth theories can integrate the environmental dimension, and in particular how endogenous innovation and directed technical change make it possible to reconcile the sustained growth objective with the constraints imposed by exhaustible resources or the need to maintain the environment' (p.377).

It is remarkable that all textbooks on which undergraduate and graduate students learn the fundamentals of economic growth invariably include a chapter on the role of human capital and of technological change, but always miss addressing the issue of the environment and natural capital.

As we believe that it is time to stop teaching that economic growth is uniquely measured by the growth of the production of all goods and services, we also firmly believe that the time has come to teach – from the first steps – that economic growth cannot abstract from the explicit consideration of the constraints and opportunities imposed by the environment and natural exhaustible resources. It is clear from many recent assessments (including the recently released IPCC Fifth Assessment Report) that environmental externalities, constraints on natural resources, and climate change –

largely a macro problem – will constantly and deeply affect mankind's future. The teaching of economics can no longer ignore it.

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