

Towards New Thinking in Economics

Terry Barker on structural macroeconomics, climate change mitigation, the relevance of empirical evidence and the need for a revised economics discipline

An interview with introduction by Șerban Scriciu

Terry Barker is a leading British economist in macroeconomics and policies mitigating man-made greenhouse gas emissions. For over 45 years, he has been involved in research at Cambridge related to economic theory in areas such as trade theory and space and time economics; structural macroeconomics; and the macroeconometric modelling of energy–environment–economy interactions. He is a leading advocate of new thinking on economic behaviour, ecological properties, and social and technical responses. Most of his research in the last two decades has focused on economics applied to climate change mitigation issues. His work has made important contributions, particularly by empirically demonstrating that stringent climate change mitigation policies may bring, in fact, long-term economic benefits for those pursuing them. During the conference on *new economics as ‘mainstream’ economics* that he initiated and organised on 28–29 January 2010 in Cambridge, UK, I had the opportunity to discuss with him at length his work and views on past, current and future developments in the economics discipline. This interview takes the reader through the



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intellectual history, and the theoretical and applied research work of an ambitious and determined man, who has been struggling constantly over the past few decades to encourage new ideas and push forward fresh economic thinking for the benefit of societal progress.

Background

SCRIECIU: What made you decide to take up economics?

BARKER: When I started as an undergraduate at Edinburgh University in 1959, I was greatly enthused by lectures in economics and policy by Alan Peacock, then Professor of Economics. I attended the university as a

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one-year gap student as a component of my course to become a Chartered Accountant in Scotland, but I was so stimulated by economics, the challenge of understanding the behaviour of economics, and the responses to tax and

expenditure changes, that I applied to take the full four-year university course. I wanted to understand the effects of economic policies on the macroeconomy, rather than work on the tax problems of businesses. I did not go back to accountancy as a business profession, but used my accountancy skills in national accounting and the Social Accounting Matrix work of Richard Stone.

SCRIECIU: How was it to work under the guidance of Sir Richard Stone?¹ Tell us a bit about the man, a Nobel-Prize laureate in Economics.

BARKER: Richard Stone was very hands-off, very much an English gentleman of the old school. He hated the acrimonious debates that took place between neoclassical economists and Keynesians in the Cambridge Faculty of Economics. He wouldn't take part in them at all. He was very encouraging of new ideas, helping to develop aspects of creative work. He wasn't rigorous in saying we shouldn't do this or do that; he was much

¹ Janus Catalogues (2003): *The Papers of John Richard Nicholas Stone*, reference GBR/0272/PP/JRNS, covering dates 1936-1998, repository: King's College Archive Centre, Cambridge

more open to ideas. He was very much an applied economist, stressing the essential mix of theory and data in economics. This was an inspiration to me and others.

SCRIECIU: What led you to Cambridge? And what did your doctoral thesis explore?

BARKER: My undergraduate work involved the study of the British economy and the work of the Cambridge Growth Project (CGP),² which had been formed in 1960. It was the cutting edge in developments of structural macroeconomic modelling with an ambitious programme of modelling the British economy. I applied for a job with the CGP in 1965 and was accepted to work on international trade with Richard Lecomber. I combined my job with writing a PhD thesis. My thesis developed the theory of international trade, particularly applied to British imports.

SCRIECIU: Could you summarise the main theoretical developments you refer to?

BARKER: That was the variety hypothesis. I rejected the idea of continuity in the available selection of goods for any particular purchaser. Typically, consumers couldn't get what they wanted; they had to modify what they wanted in relation to what was available. That led on to considering goods and services being available in terms not of the goods and services but the characteristics of them, which were then themselves the characteristics of what the consumers wanted, those characteristics being available in discrete sets so the consumer always had to compromise. That also meant that new goods could come along and I give the example today of the iPad, which will fill a gap in the market that would allow the whole system to grow.

In standard theory, with reproducible goods, we are in a market society where everyone can satisfy what they are given by the supply of goods. But that is not the nature of goods or the nature of human desires – always searching for something new or something different. Supply will always come in the form of discrete goods and to some extent discrete services in order to capitalise on economies of scale and economies of specialisation. So you have these two tendencies: on one hand, the desire of variety

² : Cambridge Growth Project website, University of Cambridge, the Faculty of Economics: www.econ.cam.ac.uk/research/cgp/

on the consumption side, and on the other hand, the economics leading to specialisation in skills on the production side. The market then brings these together, and the resulting effect is to bring about growth as production becomes more specialised in some parts of the world, and consumption becomes more generalised across the world. International trade comes into the picture in that, if you are in a small open economy, the available varieties are much larger outside the economy than within the economy, and more expensive because of transport and other costs. Prices are one of the characteristics in choice. What this means is that, as income grows, economies become more open from the consumption side as consumers import more varieties from abroad.

SCRICCIU: What would be the two most formative research projects you have participated in?

BARKER: During my first few years in the CGP, I was struggling to understand the relationship between the steady-state, static (equilibrium) model, which most of us were working on and the dynamic model, which was largely theoretical and which was intended to complement the static model. One problem was that the data and input–output (I–O) tables associated with the equilibrium economy could not be established. Another problem was that the equilibrium solution could not be separated from the dynamic solution because of path dependency. After we had published the book on the economics and application of the static model in 1976, we moved on to the development of the full dynamic model. We decided to merge the two models into one, a dynamic model that projected the economy year by year rather than for one year, say, five to ten years ahead. This would allow us to explore the pathways into the future, and the required tax and expenditures over the pathways to achieve policy targets. This was the first formative research project, which started with the paper ‘Making the Cambridge Growth Project model dynamic’, published in a collection in 1977,³ followed by another, applying the model ‘Towards strategic paths in economic planning’, published in 1978.⁴ The project culminated in the book describing the dynamic model published in 1987.⁵

3 Barker, T. (1977) Making the Cambridge Growth Project model dynamic. In: Gossling, W.F. (ed.) *Medium-term Dynamic Forecasting*. London: Input–Output Publishing Company.

4 Barker, T. (1978) Towards strategic paths in economic planning. In: Stone, R. & Peterson, A.W.A. (eds) *Econometric Contributions to Public Policy*. London: Macmillan, pp. 84–105.

5 Barker, T. (1987) *The Cambridge Multisectoral Dynamic Model of the British Economy* (ed. with Peterson, W. and (co-)author of four chapters). Cambridge: Cambridge University Press.

The other project I would pick out was the development of the UK model around 1990 to become a regional model. The challenge here was to add a spatial dimension to the national model, the Cambridge Multi-sectoral Dynamic Model (MDM), when data on interregional trade did not exist. This work set the stage for the development of the European model E3ME in an EU-funded project in the 1990s. Here data on interregional trade did exist, so we could focus on the integration of the energy system with the economy.

SCRIECIU: Could you please elaborate on what you mean by saying that the data and I–O tables associated with the equilibrium economy could not be established?

BARKER: I–O tables, of course, just render a snapshot of an economy in a particular year. The problem was that you couldn't say that that year was in equilibrium as, obviously, in any year there is some market not in equilibrium because they are in a transition from one state to another. So the idea that you could then adjust this I–O table to get an equilibrium I–O table seemed to me incredible. I wouldn't know where to start. This means that if you are starting with a general equilibrium model and trying to estimate it using statistics on economies, which are not in equilibrium, you just do not know where you are. That is the problem. By implication, this also means you are extrapolating whatever imbalances there are in your base year throughout the forecast or projection period when using such equilibrium models.

SCRIECIU: How was this challenge addressed?

BARKER: I do not think that it is good practice to adjust the data to fit the model, so our approach was to develop a non-equilibrium simulation model and use the I–O tables without adjustment, assuming that they show economies in transition. Of course, it is more difficult than this because it is usual that I–O tables are prepared periodically, maybe every five years, and there may not be an I–O table available for the year of the price base. Tables had to be interpolated and extrapolated into the future. However it is possible to construct annual time series of imbalances and model the development of the imbalances.

SCRIECIU: So, your academic research started with international trade theory and macroeconomic structural modelling. When did you become interested in energy and environmental issues, and why?

BARKER: My research has always been concerned with economic structure and has involved applications to actual economies and problems of the time. The two oil price shocks of the 1970s had a substantial effect on the UK economy and we used the MDM model to explore reactions and policy responses. Then there was the issue of the effects of the discovery and exploitation of North Sea oil. We used the model to explore alternative uses of the oil and gas revenues when the first Thatcher government was experimenting with monetarism. The development of the energy modelling was associated with the great structural changes in the British economy's use of energy following the introduction of natural gas as a fuel for households in the 1970s and 1980s. The CGP came to an end in 1987, at a time when global warming became identified as a threat. It was an obvious development of my energy work on the UK economy to explore greenhouse gas (GHG) mitigation policies using the structural model we had constructed. At this time I began my collaboration with Paul Ekins and we managed several projects together.

SCRIECIU: How was collaboration with Paul Ekins, a prominent green academic in the field of sustainable economics?

BARKER: Paul Ekins came to Cambridge to work on the issue of whether economic growth can be combined with improvements in environmental quality (I think this was what his thesis was on). We worked together on several UK Economic and Social Research Council (ESRC) projects basically concerned with mitigation of climate change and how economic policy could respond to climate change, and what the effects would be on equity, competitiveness and whether the policies could be effective. So Paul was attracted to the modelling work we did and the opportunities we had to look at mitigation policies in a more comprehensive way. We have been working together, on and off, on different projects.

SCRIECIU: Any particular project that you found most interesting?

BARKER: The work on fiscal policy and equity was very interesting because we basically picked up on the fact that households in the lower expenditure categories tend to spend much more on fuel, therefore there

were strong adverse impacts of certain climate policies on equity which would have to be offset by compensation, say a lump-sum payment or subsidies in the form of housing improvements so that those on lower incomes would not be made worse off.

SCRIECIU: You have been working for more than 40 years on economic modelling and perhaps more than 20 years on modelling energy–environment–economy (E3) interactions with application to the climate change problem. What have been the motivations and convictions behind your interest in formal modelling?

BARKER: The use of formal modelling techniques, such as input–output tables and regression analysis, allows us to produce models that are reproducible and testable, both features that are essential to the scientific method. In principle, we can move beyond unquantified expert opinion in developing policies to an informed use of models. Moreover the modelling allows us to construct scenarios in which most conditions remain the same

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so that the understanding of the policies and their effects can be separated out and can become much richer. We can also develop and study policy portfolios, which allow the policies to become more effective in meeting a range of policy objectives. This makes it easier to compare strategies and different approaches to policy by political parties and governments. I have always considered that the job of economists is to inform rather than promote or advocate policy targets. However, the existence of information may support a wider range of policies than may have been considered otherwise. I have repeatedly sought to develop alternative scenarios and analysis when policy or non-policy appears to be leading to economic or social hardship across the population. This was the case at the beginning of the 1980s and I worked on a Keynesian alternative to the monetarist policies, which had come into fashion. More recently I have been concerned that the traditional neoclassical understanding of the costs of mitigating climate change was simply wrong, being driven by the uncritical use of equilibrium models, and only allowing for technological change in a very stylised and limited way, if at all.

SCRIECIU: Could you expand on the Keynesian alternative to the then fashionable monetarist policies?

BARKER: This was a response to the policies of the first Thatcher government in 1981. The monetarist policies were used to control the money supply to push up interest rates, and this had the effect of raising exchange rates causing a major reduction in manufacturing exports. In fact this was what the revenues from North Sea oil were used for. They allowed the sterling exchange rates to be much higher than they otherwise would have been. The alternative policy to monetarism was what the Norwegians actually did, which was to insulate the oil revenues into some kind of oil fund to be used when the oil runs out, essentially in the longer term, and to have a steady stream of income. So, the Keynesian alternative policies were a combination of incomes policy and reductions in taxes and increases in spending to offset the falls in spending that led to the enormous increase in unemployment that took place. I think unemployment went up to 4 million in the space of three to four years at the beginning of 1980s.

SCRIECIU: Who are the thinkers or scholars in economics or other areas you believe have most influenced your work and why?

BARKER: I have been much influenced by Richard Stone, in his attitude to theory and data in economics. His approach also gave an insight into how microeconomics fits with macro – by the use of consistent disaggregation in building up the economic picture for the whole economy – for example, GDP being the sum of its industrial components. Of course I was also influenced by the other Keynesians, Joan Robinson, Nicky Kaldor, and non-traditional thinkers including Kenneth Boulding and Herman Daly. In studying institutional economics and altruism, I was much struck with the writing of Elinor Ostrom, so I was delighted that she shared a Nobel Prize in 2009.

SCRIECIU: You have held a fellowship with Downing College at the University of Cambridge for more than ten years. What is your experience of being part of the college system in Cambridge?

BARKER: I found the period I was with a college from 1966 to 1977 very demanding in terms of attention, actual time spent on committees and meetings, and emotional involvement. These were the years of student

rebellion and I found myself heavily involved, being the Senior Treasurer of the 'Amal. Club' (in those days a college Fellow was chosen as the representative of the students on the college governing body). The plus points were the many very bright and committed students of economics and the conversations with academics in other disciplines facilitated by the social life of the college.

SCRIECIU: You have helped with the founding of the Cambridge Econometrics company,⁶ for which you have acted as a chairman since 1978. Tell us a bit about the history of Cambridge Econometrics and why you took this step [towards setting up the company]?

BARKER: We have produced a history of the company and of the CGP.⁷ The reason for setting up the company was straightforward: the company was founded as a requirement of the continued funding by the UK Treasury in the 1970s. It proved to be essential in providing a continuing source of expertise on our approach and up-to-date projections of the economy so that the academic work could focus more on innovation and methods.

SCRIECIU: Where does the Cambridge Trust for New Thinking in Economics (founded in 2005),⁸ for which you also act as founder, fit into this picture?

BARKER: I founded the trust to safeguard the continuing work of the company. This form of ownership means that the company is more insulated from takeover than otherwise, so it gives more security to the members of the company.

SCRIECIU: After your lengthy stay with the Department of Applied Economics, in 2005 you moved to the Department of Land Economy (DLE). What were the reasons behind this move?

BARKER: The main reason was the closure of the Department of Applied Economics, and the shift of the interests of the Faculty of Economics towards less interdisciplinary work and a narrower interpretation of eco-

6 See the Cambridge Econometrics website for the suite of three macro-econometric energy-environment-economy models, MDM, E3ME and E3MG: www.camecon.com

7 Barker, T. (2003) Software Developments in the Cambridge Growth Project 1960–1976: the origins of software for space–time economics. *Journal of Economic and Social Measurement*, 26 (with Wagner Dada and William Peterson).

8 See the Cambridge Trust for New Thinking in Economics website: www.neweconomicthinking.org/

nomics – for example, PhD students were required to have a mathematical expertise for economics. I had become much more involved with climate change mitigation and global modelling, and energy specialists were important to have in the research team. I investigated the best place in the university to locate an interdisciplinary centre and address a problem rather than promote a discipline, and clearly DLE stood out as a centre both for the economics of the environment and interdisciplinary work. The fact that it housed and continued a post-Keynesian⁹ tradition, in the persons of Philip Arestis and John McCombie and colleagues, was an added bonus.

SCRICCIU: At the same time, in January 2006 you opened the Cambridge Centre for Climate Change Mitigation Research (4CMR, hosted in DLE),¹⁰ which you have directed since then. What were the driving forces behind setting up 4CMR?

BARKER: I see the Centre as a way of bringing together expertise in different disciplines to address the problem of modelling climate change mitigation. My understanding is that the complexities of the problem and solution require interdisciplinary research, and an approach which recognises that the evidence is overwhelming that a long-run stable equilibrium is unlikely for the climate or the economy. The focus of our research should be the intersection of economics and engineering concerned with climate change mitigation – particularly by economic policies inducing low-carbon technological change.

SCRICCIU: What about the intersection of economics with other social sciences, including development studies and systems theory applied to sociology?

BARKER: This is important, too, and now we do have a sociologist working in 4CMR.

SCRICCIU: I am particularly thinking of deforestation and behavioural change as a mitigation option strategy, which is not covered yet under 4CMR's research agenda.

⁹ Despite an apparent intellectual dispute on the semantics of the term (i.e. whether or not to use a hyphen between post and Keynesian), we have chosen the hyphenated format of the term, since this tends to comprise a wider definition of the corresponding school of economic thought, and it is not our intention here to get bogged down into theoretical detail.

¹⁰ See the Cambridge Trust for New Thinking in Economics website: www.neweconomicthinking.org/

BARKER: This partly depends on how big the Centre can be. Now I regret that I did not put a much bigger focus on economics. We are now in the position of having many from other disciplines, but not having a core set of economists. That is obviously very important. I suspect it was easier to appoint people in other disciplines than it was in economics, basically because economics offered a much stronger market for jobs, much stronger than other disciplines. But I always thought the other social sciences were important to understand climate change mitigation, partly because it is fairly obvious that it is a development issue given that such a large proportion of the world's population is in a much lower income group and does not have access to conventional fuel resources at present, and will increasingly want access in the future. With reference to the future development of 4CMR, if the Centre does not continue to focus on the modelling strength that it has, its work will become much diffused. The Centre's strength is to bring different aspects of the problem into quantitative modelling. In fact the Centre is very small in relation to comparable centres doing the same sort of work in other countries, which are often supported by government to a much greater extent.

SCRIECIU: How do you envisage the future strategic development of 4CMR in order to maintain its leading edge of international climate economics research?

BARKER: I hope we can continue with the exploration of the feasibility of rapid decarbonisation of the global economy. I think the problem of climate change will become more obvious and the solutions more pressing, so advances in modelling could help identify new strategies in mitigation, and also give a better grounding in understanding how the economy might respond to more cooperation in policies and more involvement by business.

SCRIECIU: What about the role of users' associations and collective action in responding to climate change and affecting the economy?

BARKER: Collective action tends to be neglected by a focus at the policy or business/private level. Yet it is evident in the social management of many externalities, as highlighted in the work of Elinor Ostrom, so it also has a place in managing climate change. The role of economy modelling is to capture the effects of collective action in simulating macroeconomic

behaviour and in informing policy makers and the public in general as to what action may be most effective and with what consequences.

SCRIECIU: What are your current research interests?

BARKER: I have always been interested in the relationship between air pollution and the economy. We have started work on climate change mitigation–economy–air pollution interactions by linking our global macroeconomic model with the atmospheric chemistry models at the University of Cambridge; this can be seen as an example of interdisciplinary integrated work. This is my current project, alongside the work on continuing the development of our Energy-Environment-Economy Modelling at the Global level (E3MG) model estimates over the past and improving this model for understanding economic change.

On schools of economic thought and new economics

SCRIECIU: As we mentioned before, your mentor during your studies and work at Cambridge has been Sir Richard Stone, who was a student of Keynes. Would you consider yourself a Keynesian or a post-Keynesian?

BARKER: Both: I am a post-Keynesian in downplaying equilibrium as a way of understanding and modelling the macroeconomy, but nevertheless using formal methods to construct models and make projections. I am a Keynesian in emphasising and considering active policy intervention as essential to offset shocks and move the economy towards full employment.

SCRIECIU: Keynesians and more recently post-Keynesians have not linked much of their research to environmental problems or the work of ecological economists. For instance, the natural environment was not even mentioned in a recent post-Keynesian all-day meeting in November 2009 in Paris, which is surprising given the huge ecological problems our world is currently facing. I asked Marc Levine, present at the conference-meeting, why post-Keynesians have not yet extended their research to environmental issues (though only recently a book, edited by Richard Holt and Clive Spash, on linking Post Keynesianism with ecological economics has been published in 2009). He just shrugged his shoulders and

acknowledged this gap in their thinking. What is your view on this, having in mind that your work has been in fact creating hard links between climate change mitigation and post-Keynesian economic thinking?

BARKER: Looking at the literature, I found that the Keynesian schools tend to be very much talking to each other, and there is tremendous development of particular themes and infighting over particular issues. OK, some of it may be theoretically important, but this is at the expense of treating the economy as an open system, and essentially in the long term subordinate to the natural environment. The economy is definitely embedded in the natural environment, and uses environmental resources and then creates waste that goes back into the environment. The economy is a subsystem and, in the long-term business-as-usual projections, it looks completely out of balance. Especially if you look at the potential of burning fossil fuels very rapidly in geological time, reversing millions and millions of years' fossil fuel formation. The question is whether the building up of greenhouse gases from the burning will undermine the favourable climatic conditions that we have had over the last 10,000 years. That's the basic problem. And it seems to me that the post-Keynesian school as it is now is very similar to others in that it is not treating the economy as an open system.

SCRIECIU: I presume that your work cannot be classified as post-Keynesian or within a particular school of economic thought, as it tends to touch on a series of so-called strands of heterodox economic thinking. Is this correct?

BARKER: Yes, you are right. My work at the macro level can be classed as drawing on post-Keynesian macro theory, but then the emphasis on structure is basically input–output analysis linked with time-series data and made more general by using econometric techniques. And there isn't very much of that done. There are the large macro-models but they are all single equation models. So my work has been this combination of formal econometric techniques and the use of input–output tables. This is close to the approach of some large general equilibrium models but without the assumption of equilibrium. So my work has basically addressed particular problems by understanding structural change in the economy and then, of course, there are various policy issues that are intimately connected with structural change, and climate change mitigation is one of them.

SCRIECIU: So would you classify yourself as a structural economist?

BARKER: I am certainly not post-Keynesian in its emphasis of aggregates, but then that is why we are now developing new economics and bringing other aspects of complexity into the picture.

SCRIECIU: Is there a particular lacuna in Keynesian economics that you believe needs highlighting? For instance, can the recent bank bailouts and state interventionism as a response to the global financial crisis be regarded as being legitimised by (a resurge in) Keynesian thinking and approach?

BARKER: I have long believed that ‘history matters’; that economics stripped of time and place loses both credibility and testability. I have also thought that the macroeconomy evolves in fits and starts; that institutional inertia is the prevailing way of behaving; and rules are mainly changed in response to crises, which can build up over many years.

SCRIECIU: This is the path dependency and hysteresis phenomenon highlighted as well in the work of both post-Keynesians and institutional economists, and also supported by evolutionary economists. If rules are changed only once a crisis occurs, would this not be a serious reason for concern in the case of climate change? How can we ensure that the current institutional inertia is overcome and the structure of the macroeconomy is radically reshaped in time?

BARKER: Yes, I think this is what causes people to despair of action on climate change – that it takes massive crises for people to respond and for policy response. The problem is that there is always some chance that the crisis is not due to man-made climate change, but to some intrinsic variability of the weather, and there will always be arguments on this because climate change is an underlying long-term phenomenon that is very difficult to identify with particular events. But the problem has been identified and governments have spent quite a lot of time working together and looking for solutions. I think that the costs of action on climate change have been greatly exaggerated, so one way of encouraging action is by showing how economies can benefit from climate policies, not just through the primary benefit of reducing climate change.

SCRIECIU: Traditional neoclassical economic thinking relies on key words that drive their work and body of theory in explaining economic behav-

ious: ‘equilibrium’, ‘optimisation’, ‘utility maximisation’, and on methodological individualism and ‘rational preferences’ that can be ‘revealed’ and valued exclusively through pricing. In a nutshell, what is your take on these concepts and what would the alternatives be? Should such terms be completely discarded or could they still provide meaningful insights?

BARKER: I don’t think ‘equilibrium’ is a helpful way of describing the outcome of either micro- or macroeconomic behaviour. As a description of a solution to a set of equations, then the meaning is clear, but as an operational description of the state

of an economy in a particular year, it detracts from the analysis of the actual imbalances and how they may be resolved over time. Optimisation is fine as a mathematical technique or

I don’t think ‘equilibrium’ is a helpful way of describing the outcome of either micro- or macroeconomic behaviour.

assumption, but when it comes to economic behaviour, when the future is uncertain and information is lacking on alternative strategies, then it can be misleading. I see the concepts as intrinsic to the neoclassical use of mathematics, in choosing assumptions not for their description of behaviour, but in order to make the mathematics tractable and provide deterministic solutions. So the terms are useful in the context of specific models, but not necessarily of the economies they purport to describe. Complexity theory can provide some terms that give a better way of linking to the underlying processes, such as ‘attractors’.

SCRIECIU: Turning to the term of ‘new economics’ you extensively refer to in your recent work and papers: where does this term originate from, when did you first apply it in your work and why?

BARKER: The problem was that there are many schools of economics that have elements opposed to traditional theory – heterodox, evolutionary, institutionalist, post-Keynesian, complexity, Green, ecological, feminist. We wanted an umbrella term that would allow us to bring together the common elements in these schools, one that many of those in these different groups could identify with, and that would have a resonance in the literature. ‘New economics’ seems a good label, having been used since the 1920s to describe alternatives to the neoclassical orthodoxy, starting with Keynes’ own theories and later becoming typically Keynesian economics.

SCRIECIU: Developing such common ground might take the time of at least a generation's work. How could one ensure the continuity of such efforts? Would the Cambridge Trust for New Thinking in Economics be an example in this sense?

BARKER: My answer to that is that the way schools of economic thought do develop, expand and spread is to do with particular universities and research centres that have adopted this set of thinking and ways. You can see this with UK universities – for example, Leeds University – suggesting that the academics there are thinking more in this direction than other universities. I think it spreads this way. It will be successful by demonstration, by having conferences like this, by having these different schools recognising that they do have something in common. But they obviously would want to continue their own special ways of thinking because that's how institutions, people and social groups work. Also, take for instance, the conference on 'The New Economics as "Mainstream" Economics' that the Cambridge Trust for New Thinking in Economics is now organising as we speak. I have been impressed and surprised at how welcome it has been. If you look at the literature there is not very much interaction between the different strands of the new economics. People are in their own silos, in their own schools. Just putting together a conference like this and bringing together people from different schools is a good start. Participants are coming to me and saying, yes, this is good, we want to do this. They recognise that new economics is not like traditional economics in that traditional economics has this sink, computable general equilibrium, whereas new economics is a mixed bag of different schools, different approaches with a common theme. This common theme is not just that general equilibrium is a simplifying misleading concept, but also has common elements associated with the importance and interpretation of specific issues.

SCRIECIU: How would you define 'new economics'? What would be the most important principles that underline it?

BARKER: My definition: economics is the study of social activity undertaken with its primary purpose the expectation of reward, which usually involves money, the motivations of such activity and its consequences being both good and bad – for example, for equity and the environment. New economics emphasises systemic risks, uncertainty, expectations, the

importance of the social context of behaviour and the conditioning of time and place.

SCRIECIU: What would the critical issues be that differentiate ‘new economics’ from existing schools of heterodox economics (for example, ecological economics, institutional economics or evolutionary economics)?

BARKER: It is a more general and embracing term. The idea is not to create another school, but to bring together existing schools.

SCRIECIU: In your opinion, why have alternative/heterodox economic theories not been successful as neoclassical traditional economics? For example, despite the crucial contributions of post-Keynesianism to monetarist theory and monetary policymaking, this school continues to be marginalised.

BARKER: The use of the calculus in economics has enabled the profession to build barriers to entry that have fostered restrictive practices and promoted self-interest.

SCRIECIU: Your work argues for the inclusion of new developments in economic thinking (providing alternatives to traditional neoclassical economics) into mainstream economics (as a matter of fact even today’s conference that you are organising in Cambridge is entitled ‘The New Economics as “Mainstream” Economics’). David Dequech associates the term ‘mainstream’ with prestige and influence, and argues that ‘different schools of thought, as well as sets of ideas that have not yet developed into a school of thought, may belong to mainstream economics at the same time’.¹¹ Could you give us examples of such ideas now part of the mainstream but not attributed to the orthodox neoclassical school?

BARKER: Interventionist fiscal, monetary and regulatory policies have all become legitimised by the need to respond to the collapse of effective demand following the banking crisis. The responses across many countries have been recognised as Keynesian and the most relevant analysis of the underlying causes of the crises has been that of Minsky, a post-Keynesian and institutional economist.

¹¹ Dequech, D. (2008) “Neoclassical, mainstream, orthodox, and heterodox economics”, *Journal of Post Keynesian Economics* 30(2): 279–302

SCRICCIU: Would you not see some overlap between what you regard as new economics and development studies? The latter is bringing together different disciplines from the social sciences to explain development processes.

BARKER: The very concept of development is concerned with transition and dynamics. Equilibrium does not help with this because equilibrium is telling you a final hypothetical state. In development discourses and analyses, the transition concept is not at all clear in the context of the current world. What is the end purpose of a transition? If it is to be a global transition to the United States' type of lifestyle, particularly in terms of consumption patterns, this seems entirely impossible to achieve given the world's limited resources and physical boundaries. So, that very notion of transition is undermined and has its contradictions in it, which then makes development studies as part of new economics, by its very nature, as there is no fixed target for development that is coherent. Economic behaviour needs to be treated as one of the aspects of human behaviour that is a legitimate study of its own as a sub-discipline of social sciences, in which money, I believe, has clearly a very large part. The concept of money drives capitalist behaviour.

SCRICCIU: Maybe there is also an issue of funding if only applied research is being funded and fundamental research is left behind?

BARKER: I suspect it won't work if there is just a journal of new economics and it just sets itself up as a rival to the existing ones. It will only work as an idea that people will accept or drop, as a unifying idea. People are much more likely to accept that they are doing new economics than to say they are doing 'critical realism' or 'post-Keynesian economics'. The whole point is to allow people to identify themselves with the concept, even though they are coming from extremely different backgrounds: from people studying work in care or job satisfaction to people critically exploring interventionist monetary policies. I am reluctant to call it a meta-theory, because it is not a meta-theory, it is much more an umbrella term bringing together dissatisfaction with traditional economics and wanting to identify with others doing the same thing, but without subscribing to the theories and positions of all the others that might also share that dissatisfaction.

SCRIECIU: Eric Beinhocker, in his recent book *The Origin of Wealth: Evolution, Complexity and the Radical Remaking of Economics*,¹² summarises with clarity new thinking developments particularly from complexity/systems theory and evolutionary economics that could gradually replace the orthodox school currently being dominated by neoclassical economics. However, in my opinion, the book fails to deliver on the ‘radical remaking of economics’ as claimed in the title, in the sense of not providing a coherent alternative to the prevailing economic paradigm. Would you see ‘new economics’ as systematically developing shared conceptual, theoretical and methodological features across alternative economic thinking strands?

BARKER: Exactly; I was greatly taken with Beinhocker’s book and his thesis, but felt that he had not recognised the importance of money in the economy. The book undermines traditional economics but falls short in its remaking. I can’t see ‘new economics’ replacing the traditional – it is too formless and eclectic. It seems more likely that the discredited orthodoxy – Computable General Equilibrium (CGE) models, for example – will be questioned more and not so accepted as before.

SCRIECIU: I would also add that he had also not emphasised sufficiently the role of the natural environment for the functioning of societies. Perhaps ‘money’ and ‘nature’ should be part of any thinking aimed at bringing together non-traditional schools?

BARKER: Yes, I felt the same as you when I got to the heart of the book. What he is saying is that the key aspect of economic activity is fitness and his emphasis is on energy, the requirement that we need energy and that we are moving towards entropy, by using up concentrated resources. That seemed unsatisfactory, and I felt that he didn’t bring money as a central aspect of economic behaviour in the context of the economy being a subsystem within the natural environment. He treats money as just one of many institutional, social constructs. I think that money is much more important than that, in terms of the development of the concept of money allowing the enormous and incredibly successful rise in average standards of living. I think that the role of money in separating production and consumption over space and time is essential to understanding economic

¹² Beinhocker, E.D. (2006) *The Origin of Wealth: Evolution, Complexity and the Radical Remaking of Economics*. Boston, MA: Harvard Business School Press.

development. Looking at history, the early development of money and banking was very important in the Industrial Revolution.

SCRIECIU: Further on complexity: in reality everything relates to everything, but it is impossible to investigate all the complex interconnections of the energy–environment–economy–society nexus. Limits of investigation must be clearly established. How would you tackle complexity? How would you set such limits?

BARKER: I advocate setting up a general framework for the analysis of a class of problems, then addressing specific problems using the most appropriate tools available. Obviously it is important to collect data on the operation of a complex system, then aim to understand how the system responds to shocks.

SCRIECIU: What is the likelihood and time horizon in which elements of new economics will be widely taught in prestigious schools? In other words, what are the chances of alternative economic conceptual and theoretical features being increasingly adopted in the future (bearing in mind that neoclassical economics has been around since its marginal revolution in the 1870s)?

BARKER: I see the likely development being that new economics will become increasingly taught in business schools and as an isolated alternative approach in economics departments.

SCRIECIU: This is a rather pessimistic view. Is this because economics departments are more conservative and less keen to embrace change and new ideas?

BARKER: History shows emphatically that economics has followed a very orthodox path, and it has proved very strong. I think it is the attraction of mathematics and its yielding of investments in human capital by those doing it. So that economics has become, mostly in academia but less in business, a mathematical science with an overuse of mathematics, which acts as a barrier to entry. This is rather shocking, because human beings do not follow mathematical rules. It is a much more complex system.

SCRIECIU: A likely traditional proverb says: ‘If all you have is a hammer, everything looks like a nail’ (also used by the great psychologist Abraham

Maslow,¹³ considered the founder of humanist psychology, in his book *The Psychology of Science*, published in 1966). In economics and economic policy, the only tool that most researchers, analysts and policymakers have had for more than a century were those of the neoclassical school (for example, optimisation and general equilibrium models).

BARKER: Policymakers have also supported other tools – econometric models, input–output analysis, agent-based modelling and simulation models.

SCRIECIU: Yes, however, the tools of the traditional neoclassical school continue to dominate policy advice. How can a greater plurality of tools and frameworks for supporting policy decision making be achieved?

BARKER: Perhaps one could start by policymakers recognising that the economic methods or models offered by orthodox economics are just not fit for the objective at looking at the policies in most part, simply because they cannot explain certain aspects of the economy, not without ad hoc explanations, which are patently grafted on to an underlining theory that cannot explain the phenomenon under investigation.

SCRIECIU: Related to the above question, should a ‘new economics’ aim towards a unified framework at the theoretical level or more at the conceptual level allowing for alternative theories to coexist?

BARKER: The ethos of new economics is that of allowing and encouraging different theories, given our uncertainty as to how the economy behaves.

SCRIECIU: Turning to the interdisciplinary feature of a ‘new economics’: you mention in your work that economic behaviour needs to be seen as grounded in social behaviour (traditional economics tends to ignore this). What would be the implications for economics as a stand-alone discipline and its links to other social sciences? Should one aim towards a unified social science, as envisaged by Kenneth Boulding in his book *Toward a General Social Science*, published in 1974?¹⁴

BARKER: There is a core subject area in economics, macroeconomics, which tackles big themes such as inflation, employment, interest rates, money and prices, production and consumption, trade. These are the

13 Maslow, A.H. (1966) *The Psychology of Science: A Reconnaissance*. New York: Harper & Row.

14 Boulding, K.E. (1974) *Toward a General Social Science*. Boulder, CO: Colorado Associated University Press.

outcomes of social activities, although other disciplines can give insights. So although there is a role for a comprehensive social science approach, including power as a motivator, the study of the extraordinary development and complexity of the monetary economy, with its division of consumption and production over place and time, is a discipline in itself.

On climate economics and empiricism

SCRIECIU: I will now turn to applied economics and focus particularly on the economy–environment nexus and your work on the economics of climate change mitigation. Where would you position yourself in the debate on the economy and the environment? Do you see economic growth and maintaining or enhancing environmental quality as conflicting objectives? Which should be pursued first?

BARKER: Unregulated market activity can lead to economic growth and environmental destruction. However, governments can pursue policies that simultaneously promote environmental quality and support higher employment and growth. The outcomes depend on the specific circumstances and the policies being adopted. I do not see the objectives of growth and environment as conflicting. This answer depends on my definition of growth – I am allowing for growth to include quality as well as quantity of output, so that material use could decline. Personally, I think governments should promote environmental and employment goals, but not growth per se.

SCRIECIU: How would one differentiate between more qualitative and more quantitative growth in national accounting and the measurement of GDP?

BARKER: It is very clear that, as economies grow over time, the quality of what is being produced usually improves; measures of that quality elasticity for commodities show how it has increased with income increases over time. Quality is an inherent part of economic growth in that sense. This seems to be fairly clear when you look at cross-section data on spending of those with high incomes and those with low incomes – one sees a definite increase in quality. In terms of national accounting it is almost impossible to separate the two, because it is inbuilt in the system. You

find that what looks the same in terms of quantity for one economy is very different for another because of the quality associated with it. This is multidimensional: quality in one culture is quite different from quality in another culture. What the question is really getting at is the feasibility of economic wellbeing measurements being coupled or added to those of environmental or social wellbeing. For such an exercise, it is important to clearly say what the mechanism is that will achieve such evaluation and aggregation. It needs consensus building institutions to place social values on the various elements that go into environmental and social wellbeing. In different economies you find different types of such institutions, which involve the law as well as politics and economics. These can then be used to construct an aggregate index of wellbeing. But it is more informative to present a set of measures or aggregates and let users judge for themselves.

SCRIECIU: Your views on how the economics of climate change has been evolving are very clearly and boldly expressed in your article published in *Climatic Change* in 2008.¹⁵ You mention that ‘mainstream economic thinking about the [climate change] problem has shifted with the Stern Review from a single-discipline focus on cost–benefit analysis to a new interdisciplinary and multidisciplinary risk analysis’. You have been supportive of the Stern Review especially for its focus on risk and uncertainty instead of return. However, are there any major limitations (for example, in terms of not sufficiently stirring economic thinking) that you would attribute to the Stern Review and the follow-up work?

BARKER: One of the main weaknesses of the Stern Review was in its assessment of the costs of stringent mitigation. The assumption, without evidence except from traditional models embodying the assumption, was that the costs would go up rapidly as the CO₂ emissions reductions moved towards 100%. I think this view does not fully take into account technological responses to system changes.

SCRIECIU: You have been working for many years now on economics applied to the environment, and more specifically on the economic modelling of climate change mitigation. Which type of model or tool would you see the most relevant to understanding the dynamics of energy–environ-

¹⁵ Barker, T. (2008) The economics of avoiding dangerous climate change. *Climatic Change*, 89, 3–4, pp. 173–194.

ment–economy–society interactions and advancing knowledge in the area of effective climate change mitigation?

BARKER: We need an integrated approach to energy systems and the economy at a global level to assess the effects of different mixes of policies leading to substantial reductions in GHGs. I think these should be simulation models, estimated and tested on past behaviour to give them realistic dynamics.

SCRICCIU: How would you define simulation models?

BARKER: Simulation economic models are intended to provide an explanation for the observed dynamic processes in an economy. Then it is a question of how detailed one becomes, and that depends on the question to be answered. If one looks at climate change and mitigation, then clearly the energy system and energy behaviour have to be treated in some detail. It is important to simulate the behaviour of energy systems subject to policies and shocks, and to look at past responses to, say, oil price shocks. Then, a simulation model in the area of climate mitigation investigates how that economy would respond to a carbon price that does not come as a shock but as a planned policy with time for adjustment. But the same mechanisms are going to go on with response to higher energy prices, and one can learn from past responses to look at which parts of the economy are the most responsive and also how far one can go to decarbonise different parts of the economy.

SCRICCIU: Where would agent-based models fit into this picture?

BARKER: Agent-based models are suitable for particular issues where it is relatively easy to identify a subproblem within the overall problem, where you can say ‘this agent influences this other agent, and this is how they interact’. In other words, it is highly specific to a particular problem. However, when we are talking about climate change, which is a global problem, I think it is important to bring in the past much more than is normally done in agent-based models, which tend to entail a set of computer equations and are not much related to historical use of fossil fuels. I think one needs to first have the data and then to interpret those data in order to formulate practical policies.

SCRIECIU: What needs to be done in order to develop such models at a wider scale across the globe, and how would one ensure they appeal to policymakers?

BARKER: I support different approaches, development of new methods and studies comparing models and their results. They appeal to policymakers and others because they provide a reasoned explanation of outcomes of policy.

SCRIECIU: Developing macroeconometric simulation models such as your suite of three models (MDM, E3ME and E3MG) requires building an overwhelming database and a considerable amount of research effort and time spanning at least several years. There are not many such models readily available to policymakers. How can one promote the development of such models in the future?

BARKER: Well, our current efforts are geared towards having our global model much more available to different users. This is turning into a task that is probably beyond the capabilities of the project that 4CMR is engaged at present, but that is the aim. These types of models would be more successful if the software and the projections within the models do become freely available; I think this is key in the end.

SCRIECIU: Kenneth Boulding stated ‘I describe econometrics as the attempt to find the celestial mechanics of non-existent universes’.¹⁶ He was referring to the observation that the parameters of social systems are continuously changing and evolving (never in equilibrium) and that one ‘cannot predict the future without changing it’.¹⁷ What would your reaction be to this statement? What is your view on the usefulness of econometrics in explaining the past and forecasting (how should it be used)?

BARKER: I see econometrics more widely as providing a consistent and coherent quantification for analysis, allowing for models to be tested on past data and maintaining accounting relationships, as well as providing information and a framework for analysis.

¹⁶ Boulding, K.E. (1991) What is evolutionary economics? *Journal of Evolutionary Economics*, 1, 1, pp. 9–17.

¹⁷ Boulding, K.E. (1981) *Evolutionary Economics*. Beverly Hills, CA: Sage Publications.

SCRIECIU: However, when forecasting into the future there is no certainty that past behaviour (captured via estimated parameters) will continue into the future. How could econometrics address this issue?

BARKER: The first point I would make is that inertia can be very long term, and I quote ‘rights of way’, which have lasted for thousands of years. So, institutional inertia can be extremely powerful. We could capture that, and then of course, we do not know how far this institutional inertia goes, and when and how it might be shocked into change because of a new technology, such as railways or other new transport technologies that could completely transform the existing systems. Typically the new one gets superimposed on to the old ones, so that the latter do not entirely disappear. So econometrics allows us to pick up that inertia. But it is also quite clear that technological change and changing people’s behaviour and motivations will also affect outcomes and that also needs to be allowed for in the use of econometric techniques. So these can only be a guide to the future. However, I am maintaining that econometric techniques could be a better guide than what is available in the literature on unquantified collective memory.

SCRIECIU: You argue in your work that climate change mitigation may lead to accelerated economic growth and overall benefits if policy is well designed, contrary to the widely held traditional view that tends to automatically link mitigation with economic costs.¹⁸ Could you please briefly summarise the arguments behind such findings? What would be in your view a ‘well-designed’ climate policy?

BARKER: I would not want to exaggerate the acceleration in growth that may come out of mitigation policies. The overall effect is likely to be so small as to be imperceptible. The point of the argument is that economies are evolving and dynamic, and an intervention that is effective in reducing GHGs using market instruments, and that also aims to promote or maintain full employment, seems likely to accelerate growth through technological change. A ‘well designed’ policy package would bring together different policies to ensure that unwanted side-effects were reduced or

18 See for instance Barker’s recent paper on ‘Modeling low stabilization with E3MG: towards a “New Economics” approach to simulating Energy–Environment–Economy system dynamics’, *Energy Journal* Vol.31 Special Issue 1 on “The Economics of Low Stabilisation”, January 2010, pp.137–164 (with Şerban Scricciu)

removed; it would also be tested for robustness in the face of different assumptions and interpretations of the evidence.

SCRIECIU: You have been mentioning in your work that analysing explicitly the risks associated with climate change (or with the financial system for that matter) instead of simply monetising likely impacts as in a CBA (cost–benefit analysis) approach is crucial for addressing such global problems, potentially leading to catastrophic systemic collapse. How would this be achieved?

BARKER: A risk assessment should be done alongside the CBA or as part of an MCA (multi-criteria analysis) approach. The traditional CBA approach has been seriously misleading by converting the risks of irreversible climate catastrophe into modest monetary costs, once the long-term damages have been discounted. The risks have been acknowledged, but underestimated.

SCRIECIU: Would you see a shift in mainstream thinking in other areas of economic research along the lines described in the case of climate economics? What are the main contributing factors that would see such shifts occur?

BARKER: Clearly finance economics will begin to assess system risk and uncertainty. The financial crisis is also affecting mainstream thinking in macroeconomics generally.

SCRIECIU: The CBA tool dearly embraced by neoclassical economists has also been under criticism when applied to other socio-environmental problems. For example, UK’s Department for Environment, Food and Rural Affairs also uses multi-criteria analysis approaches in addition to CBA when designing air quality policies. Would you see the CBA tool as increasingly failing to provide answers to contemporary problems? Should the CBA tool be marginalised and which other methodologies would you recommend in its place?”

BARKER: CBA is only one tool among many – it can be useful if the assumptions are made clear and the application is limited. I suspect that in many applications it can readily be replaced by MCA, with CBA as a special case.

SCRICCIU: You have been extensively involved with the work of the Intergovernmental Panel on Climate Change (IPCC, which received the Nobel Peace Prize in 2007), contributing to its Third and Fourth Assessment Reports, Working Group III (as a lead author and coordinating lead author). What would be the main lessons you would take from your experience and collaboration with IPCC?

BARKER: It was a tremendous learning experience for me, especially developing text and resolving differences in interpretation with climate and impact scientists in the Synthesis reports. The requirement for consistency in the use of terms, such as ‘mitigation potential’ or the ‘carbon price’, across chapters in the report was a challenge that led to much greater clarity in my own thinking about the concepts, and as a way of improving my understanding of the energy and economic literature. It is to be hoped that this consistent treatment will be an enduring legacy for the fifth report, since it cuts across disciplines, and allows for integration across models and comparisons across countries and over time. Although traditional economics dominated the literature, the IPCC procedures allowed for and encouraged the development of new approaches – witness the greatly extended treatment of endogenous technological change in AR4 as opposed to AR3.

SCRICCIU: The next IPCC Fifth Assessment Report (AR5) is scheduled for publication in 2014. What would your recommendations be in terms of key issues that the future work of IPCC should focus on in the area of climate change economics?

BARKER: First, shift the focus of AR5 even more to a risk assessment of climate change, adaptation and mitigation, bringing in energy security, food security and human health. Second, stimulate WG3 literature on accelerated decarbonisation; this was a marked and serious gap in the AR4 literature. Third, focus the WG1 review of literature on the benefits of stabilisation, especially the change in risks associated with interactions between climate change and air pollution; the climate models have a long way to go in modelling interactions between soot, particulates, SO₂ and GHGs, both from natural and anthropogenic sources. And, fourth, cover biofuels and biomass. Obviously AR5 needs to cover much more on biomass/biofuels/land use/deforestation in terms of economic drivers and policy-relevant information. AR4 is woefully deficient in this critical area.

Food-energy crop competition needs to be covered in detail, both in economic, agricultural and energy-engineering terms. Consider consolidating the agriculture and forestry chapters, and bringing in food security and more on air pollution effects on yields. There has been a huge effort to model land-use change. This can be brought in here, too.

SCRIECIU: You advocate in your work on climate change mitigation for a closer link between moral philosophy and economics. How would such interactions be best translated into practice to ensure a better representation of values when formulating climate (and in more general development) policies?

BARKER: A literature has developed on the ethics of climate change, but it has not been represented in the IPCC so far and the crude utilitarianism of neoclassical economics has persisted by default. Proposals have been made for AR5 to cover this literature, so a start has been made in this direction in making government policymakers aware of the link. The most important practical development would be, as stressed already, a shift from CBA in assessing policies to a more general treatment allowing for non-monetary damages being made explicitly, including risks to human life and health and to ecosystems in general.

SCRIECIU: Any final words of wisdom for young researchers?

BARKER: Climate change mitigation is an interdisciplinary issue. Make yourself the disciplinary specialist in a topic that engages you, and maintain your knowledge in the wider context of the topic, so you are also a generalist. Before accepting conclusions about costs of mitigation, check for hidden assumptions, such as the representative agent or the absence of endogenous technological change.

SCRIECIU: Thank you for a fascinating discussion. Let's hope that mainstream economics soon becomes infused at a more rapid pace with elements of new economics, along the lines you have just narrated.

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