PKES 2019 workshop

The contribution of post-Keynesian economics to climate policy and meeting global decarbonisation targets

Hector Pollitt
hp@camecon.com, @HectorPollitt

29/05/2019

cambridge econometrics
clarity from complexity

Overview

- The three policy phases
  - Nordhaus, etc
  - the Integrated Assessment Models
  - analysis of specific policies
- Key issues and limitations in existing modelling approaches
- Why we need more post-Keynesian engagement

cambridge econometrics

The early days

- Economists asked the question about whether we should do anything about climate change
- The DICE ‘Integrated Assessment Model’ was designed to assess the trade-off between the costs of reducing GHG emissions and the costs of a changing climate
- Other similar models followed

cambridge econometrics

The early days (cont)

- These models are based on simple cost-optimisation functions
- They essentially say that climate change should be prevented until the marginal cost exceeds the marginal benefit

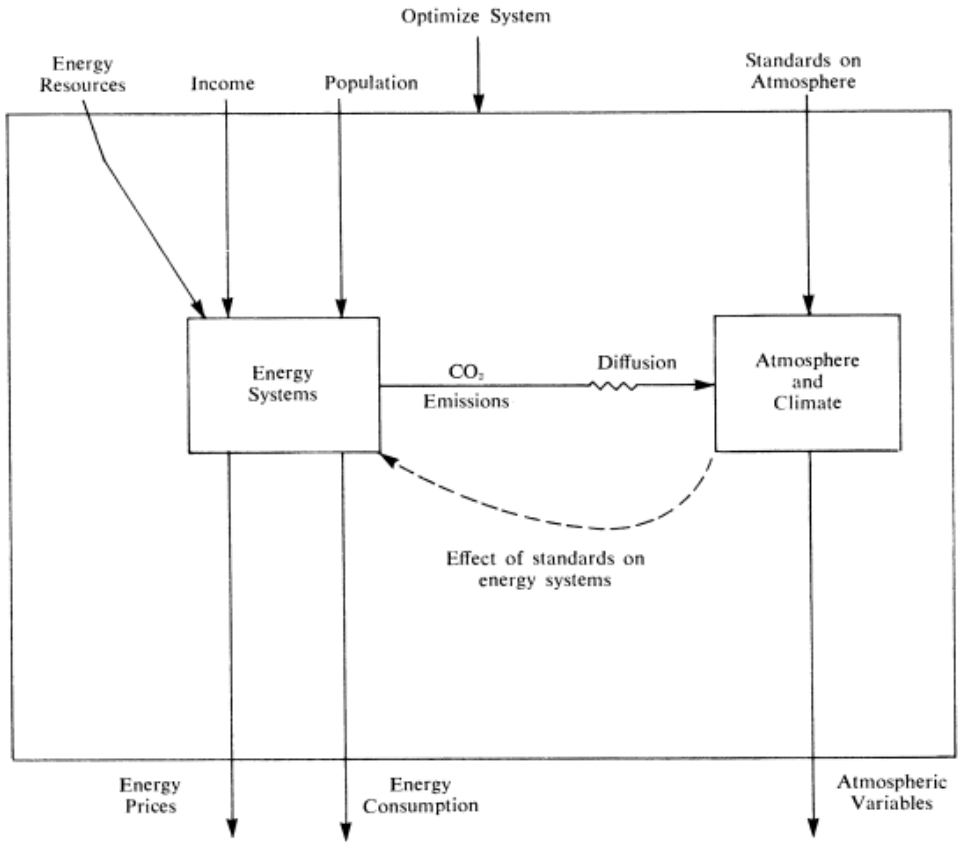


FIGURE 2. OVERVIEW OF MODEL OPTIMIZING THE ENERGY-ENVIRONMENT SYSTEM

Source: Nordhaus (1977)

cambridge econometrics

The early days (cont)

- Are these models consistent with post-Keynesian economics? No!
  - they assume perfect information and are based on assumptions about rational behaviour
- They suffer from other shortcomings too:
  - sensitivity to choice of discount rates
  - sensitivity over damage functions, especially in high-carbon scenarios
  - treating irreversible changes as reversible
- The latest DICE model runs suggest that 3.5°C of warming is optimal, highly at odds with climate science

cambridge econometrics

The early days (cont)

- Weitzman's 2009 'dismal theorem' argued against using these models because they neglected uncertainty
  - the probability of catastrophic change was assumed to be zero
- Natural scientists pushed for limits on temperature change, in part based on the 'precautionary principle'

cambridge econometrics

Finding achievable targets

- The next question was to understand what targets for temperature change are feasible
- A new generation of ‘Integrated Assessment Models’ was applied to assess different temperature targets
- These models are much larger in scale, for example with substantial detail on energy technologies and land use patterns
- However, they do not generally include climate damages

cambridge econometrics

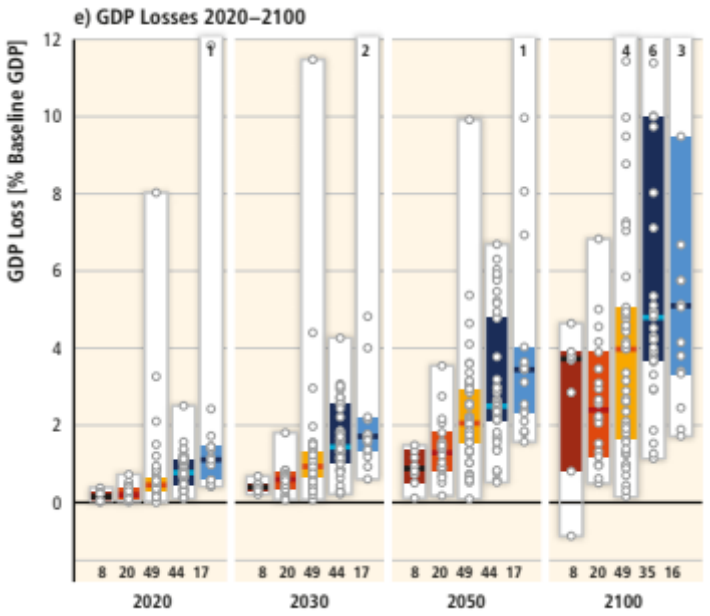
Finding achievable targets (cont)

- Are these models consistent with post-Keynesian economics? Again, no!
  - in general, they are cost-optimising tools that rely on fully rational behaviour, perfect information and sometimes perfect foresight
  - they are used to assess whether an outcome is technologically feasible, not whether it will happen
  - low-carbon scenarios are modelled as constraints on the technologies that may be chosen
- But, they do provide economic estimates of ‘costs’…

cambridge econometrics

Finding achievable targets (cont)

- This chart is taken from the IPCC's 5th Assessment Report
- The models almost exclusively show GDP losses (sometimes large) of decarbonising
- A narrative that 'climate policy always costs' has been developed



Source: Clarke et al (2014)

cambridge econometrics

The present day situation

- The Paris Agreement has set targets of 2°C, ideally 1.5°C for limiting temperature change
  - the early models like DICE are now redundant
- National targets for reducing GHG emissions have been set – although they need to be scaled up to be consistent with global targets
- Policy makers need to know:
  - the impacts of policies to meet these targets
  - how they might increase the ambition of these targets
- Is there a role for post-Keynesian economics here? Yes!

cambridge econometrics

Why we need P-K economics (1)

- The political economy of climate change is immensely important
- There are trade-offs between population groups, countries and generations; and also between social and environmental outcomes
- These issues are highly complex and cannot be reduced to cost-benefit analyses

cambridge econometrics

Why we need P-K economics (2)

- A diverse range of policies is required to decarbonise
- Models must be able to incorporate regulatory as well as price-based instruments
- Policy makers are not interested in ‘a global carbon price’

cambridge econometrics

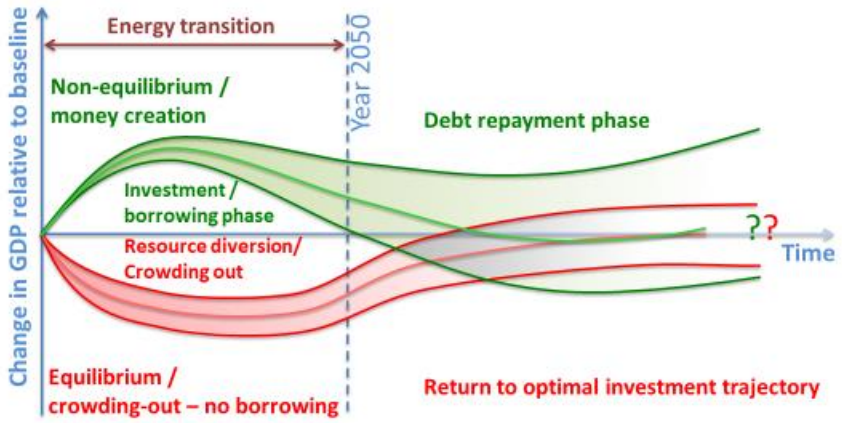
Why we need P-K economics (3)

- Analyses must be able to account for uncertainty and non-fully rational behaviour
- For example, there are many cost-efficient energy efficiency options that are not taken up
- We do not know the future path of technology – investors base decisions on current (incomplete) knowledge

cambridge econometrics

Why we need P-K economics (4)

- A low-carbon transition is investment-intensive, it needs finance!
- Models with an exogenous money supply show spurious ‘crowding out’ impacts, i.e. suggest that more investment is bad for the economy



Source: Mercure et al (2019)

cambridge econometrics

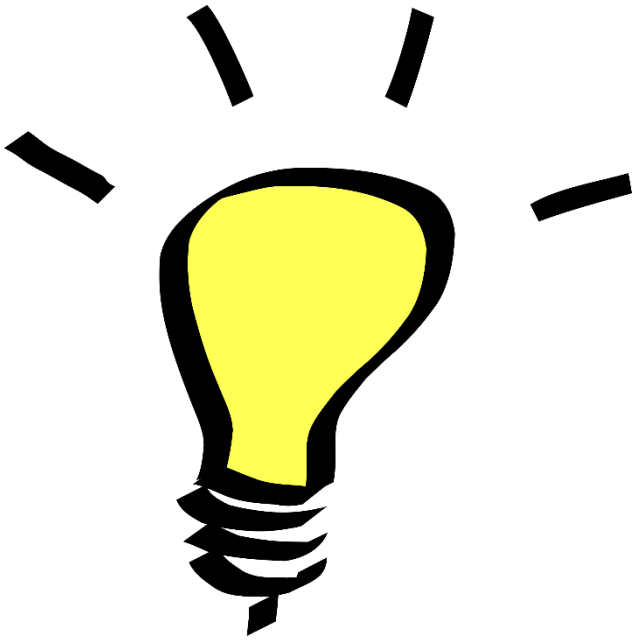
Why we need P-K economics (4b)

- Conversely, only post-Keynesian models can show stranded assets because they accept both uncertainty and that capital cannot be instantly reallocated
  - the financial community is now highly interested in this topic
  - our own results suggest that $1-4trn are at stake

cambridge econometrics

Why we need P-K economics (5)

- Technology is central to any low-carbon transition
- Models of a low-carbon transition must allow the pace and direction of technology to be influenced by policy



cambridge econometrics

Our work at Cambridge Econometrics

- The E3ME macro-econometric model:
  - 61 world regions
  - 43 sectors in each region

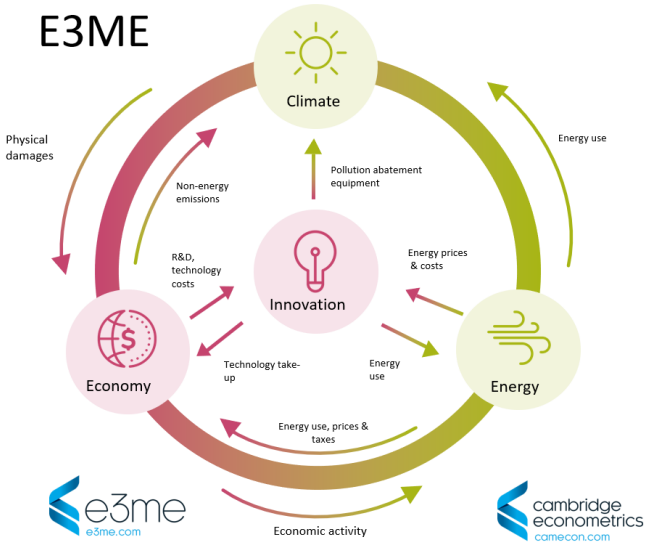


Table 14: GDP impacts in EU28 in 2030[107]

More ambitious →

% change from EUCO27	Ref2016[108] (bn €2013)	EUCO27 (bn €2013)	EUCO30	EUCO+33	EUCO+35	EUCO+40
E3ME (no crowding out)	17,928	18,045	0,39	1.45	2.08	4.08
E3ME (partial crowding out)	17,928	18,045	0.39	1.30	1.58	2.21
GEM-E3 (loan-based)	16,955	16,962	0.26	0.21	0.16	0.06
GEM-E3 (self-financing)	16,955	16,907	-0.22	-0.79	-1.35	-2.12

Source: E3ME, Cambridge Econometrics and GEM-E3, National Technical University of Athens

Source: Energy Efficiency Directive Impact Assessment, p52

Concluding remarks (1)

- Neoclassical economics suggests that a single EU carbon price would reduce emissions in the ‘optimal’ way
- The EU has three targets for decarbonisation:
  - targets for energy efficiency, mainly met through regulation
  - a GHG reduction target, for which carbon pricing is important
  - targets for the use of renewables, to help new technologies mature
- Other countries are now asking what their policy mix should be

cambridge econometrics

Concluding remarks (2)

- Current policy is hampered by a view that investment in low-carbon technologies always has an economic cost
- We need modelling that does not result in costs by assumption if necessary policies are to be implemented

The Political Climate

The environment could be a vote loser if it is associated only with economic cost

In the Australian election what happened to Tony ... tional economic message of getting on seems to ... There is no question that climate change is a

Source: The Times, 20 May, 2019

cambridge econometrics

Final slide

- Historically, post-Keynesian economics has only provided a limited input to climate policy analysis
- If this does not change, then:
  - it will not be possible to assess some policies
  - policy makers could be given misleading results

cambridge econometrics

Resources

- My contact details:
  - hp@camecon.com
  - @HectorPollitt
- E3ME website: www.e3me.com
- References:

  - Mercure, J-F, H Pollitt, L Paroussos, R Lewney and S Scrieciu (2019) 'Modelling innovation and the macroeconomics of low-carbon transitions: theory, perspectives and practical use', Climate Policy, in press.
  - Nordhaus, WD (1977) 'Economic Growth and Climate: The Carbon Dioxide Problem', American Economic Review, Vol. 67, No. 1, pp 341–346.
  - Weitzman, ML (2009) 'On modeling and interpreting the economics of catastrophic climate change', Review of Economics and Statistics, Volume 91(1), pp 1-19.

cambridge econometrics

PKES 2019 workshop

The contribution of post-Keynesian economics to climate policy and meeting global decarbonisation targets

Hector Pollitt
hp@camecon.com, @HectorPollitt

29/05/2019

cambridge econometrics
clarity from complexity