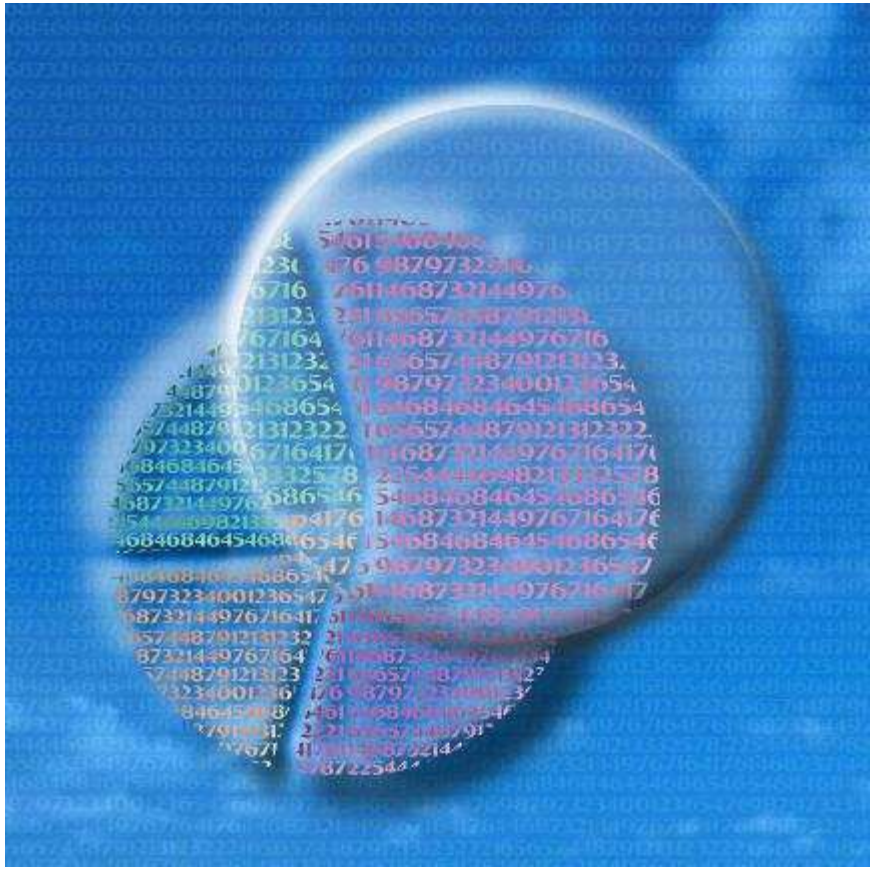

Tuesday 14: Climate blues and climate wars

Andrea Saltelli
Centre for the Study of the Sciences and the Humanities (SVT) - University of Bergen (UIB)
Institut de Ciència i Tecnologia Ambientals (ICTA) -Universitat Autonoma de Barcelona (UAB)

PhD-course

Numbers for policy: Practical problems in quantification

Bergen, March 13-17, 2017

Where to find this talk: www.andreasaltelli.eu

sensitivity analysis, sensitivity auditing, science for policy, impact assessment

= more material on my web site

= discussion time

ELSEVIER

Ecological Economics 10 (1994) 197–207

ECOLOGICAL ECONOMICS

The worth of a songbird: ecological economics as a post-normal science

Silvio O. Funtowicz [a], Jerome R. Ravetz [b,*]

[a] *CEC-Joint Research Centre, Institute for Systems Engineering and Informatics, I-21020 Ispra (Va), Italy*
[b] *The Research Methods Consultancy Ltd., Gresham House, 144 High Street, Edgware, Middx HA8 7EZ, UK*

(Received 21 December 1992; accepted 30 July 1993)

An old paper, a PNS 'classic'

ELSEVIER

Ecological Economics 10 (1994) 197–207

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(Received 21 December 1992; accepted 30 July 1993)

Cited by 317 (Scopus) or by 715 (Google Scholar)

March 2016

Funtowicz and Ravetz pick a paper on the economics of the greenhouse effect "since the paper displays considerable sophistication in the handling of uncertainties in data."

They note:
"the paper by Nordhaus is liberally sprinkled with caveats..."

Nordhaus, W.D., 1991. To slow or not to slow: the economics of the greenhouse effect. Econ. J., 101: 920-937.

One such caveat is – in the words of William Nordhaus – the difficulty to move from the "terra infirma of climate change to the terra incognita of the social and economic impacts of climate change" … but:

Having duly acknowledged Nordhaus' careful wording on uncertainty F&R proceed to deconstruct his work using the freshly minted NUSAP.

ELSEVIER

Ecological Economics 10 (1994) 197–207

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"[Although] in his rhetoric at least, the author shows a clear awareness of the presence of the various sorts of uncertainty, […he] does not successfully manage the problems of uncertainty."

Table 1
Impact estimates for different sectors, for doubling of CO_2, U.S. (positive number indicates gain; negative number loss) (Nordhaus, 1991, Table 6, p. 932)

Sectors	Billions (1981 $)
Severely impacted sectors	
Farms	
Impact of greenhouse warming and CO_2 fertilisation	−10.6 to +9.7
Forestry, fisheries, other	Small + or −
Moderately impacted sectors	
Construction	+
Water transportation	?
Energy and utilities	
Energy (electric, gas, oil)	
Energy demand	−1.65
Non-electric space heating	1.16
Water and sanitary	−?
Real estate	
Land-rent component	
Estimate of damage from sea-level rise	
Loss of land	−1.55
Protection of sheltered areas	−0.90
Protection of open coasts	−2.84
Hotels, lodging, recreation	?
Total	
Central estimate	
Billions, 1981 level of national income	−6.23
Percentage of national income	−0.26

Sources for Table 6: Underlying data on impacts are summarised in EPA (1988). Translation into national-income accounts by author. Details are available on request.

"The hyper-precision in the expression of the key number -0.26% […] shows that this is one of those 'magic numbers' designed to produce confidence in the existence of a hard core of objective fact deep inside the mass of intuitive fuzz."

For Nordhaus - based on a 'hunch' this -0.26% could become -2% …

Table 1
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Global Environmental Change 20 (2010) 298–302

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

Sensitivity analysis didn't help. A practitioner's critique of the Stern review

Andrea Saltelli *, Beatrice D'Hombres

Joint Research Centre, Institute for the Protection and Security of the Citizen, Ispra, Italy

A more recent paper …

… but only 13 citations in Scopus & 29 in Google Scholar ☹

The case of Stern's Review – Technical Annex to postscript

Nicholas Stern,
London School of Economics

William Nordhaus,
University of Yale

Stern, N., Stern Review on the Economics of Climate Change. UK Government Economic Service, London, www.sternreview.org.uk.
Nordhaus W., Critical Assumptions in the Stern Review on Climate Change, SCIENCE, 317, 201-202, (2007).

What follows is a sensitivity analysis based on a reverse engineering of Stern's results

Also invoked one of the rules of 'sensitivity auditing'

Rule 4: Find sensitive assumptions before these find you; do not publish the result of a modelling study before having done your sensitivity analysis

RULE FOUR: find sensitivities before sensitivities find you; Stern is in violation of this rule as he did his sensitivity analysis <u>after</u> being criticized by Nordhaus

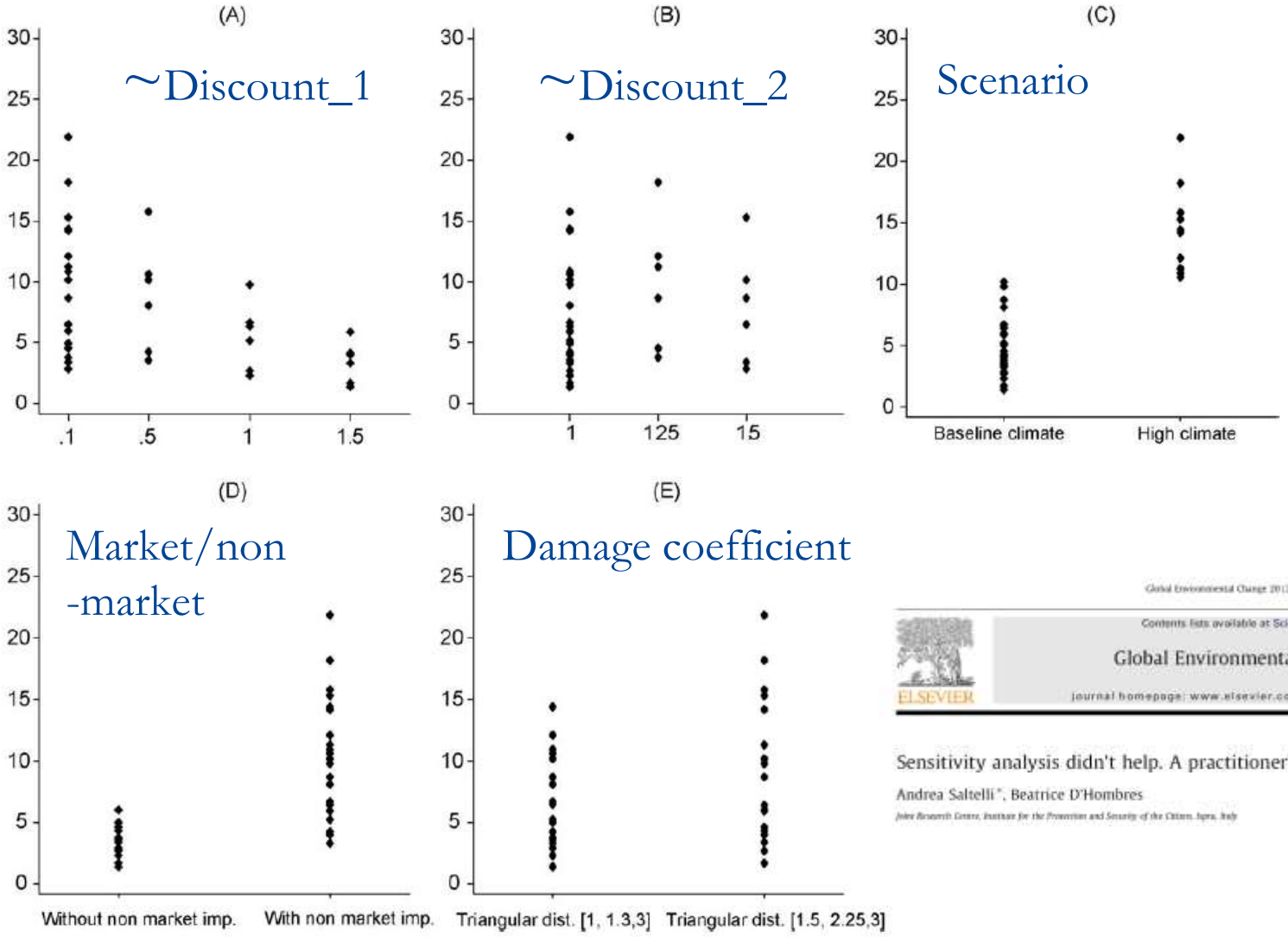
The terms of the dispute

Falsifies Stern based on ‘wrong’ range of discount rate

Prepares a postscript to his eponymous review: a sensitivity analysis of his own cost benefit analysis and claims: ‘my analysis shows robustness’

STERN review

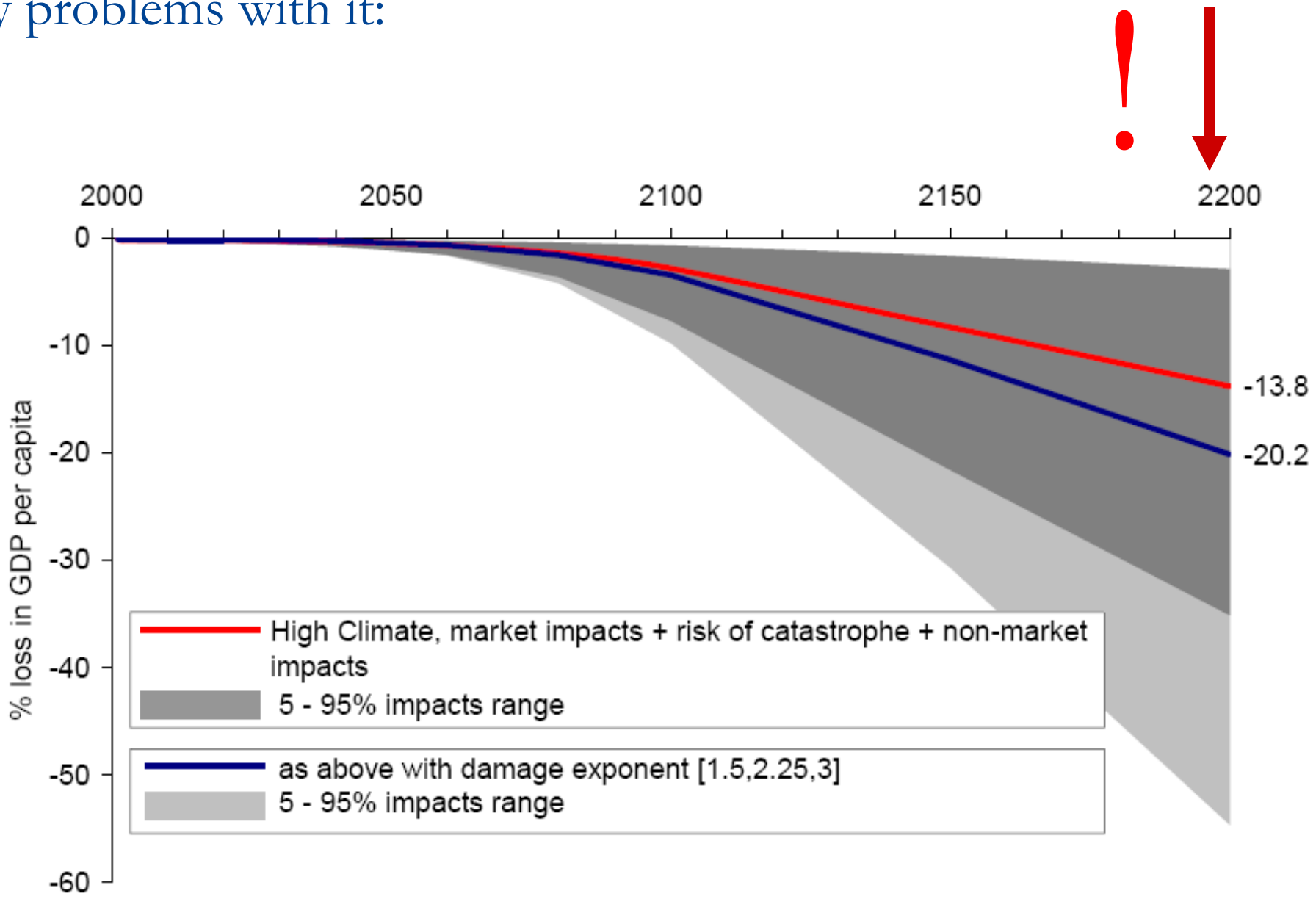
Sensitivity analysis



Sensitivity analysis didn't help. A practitioner's critique of the Stern review

Andrea Saltelli*, Beatrice D'Hombres

My problems with it:

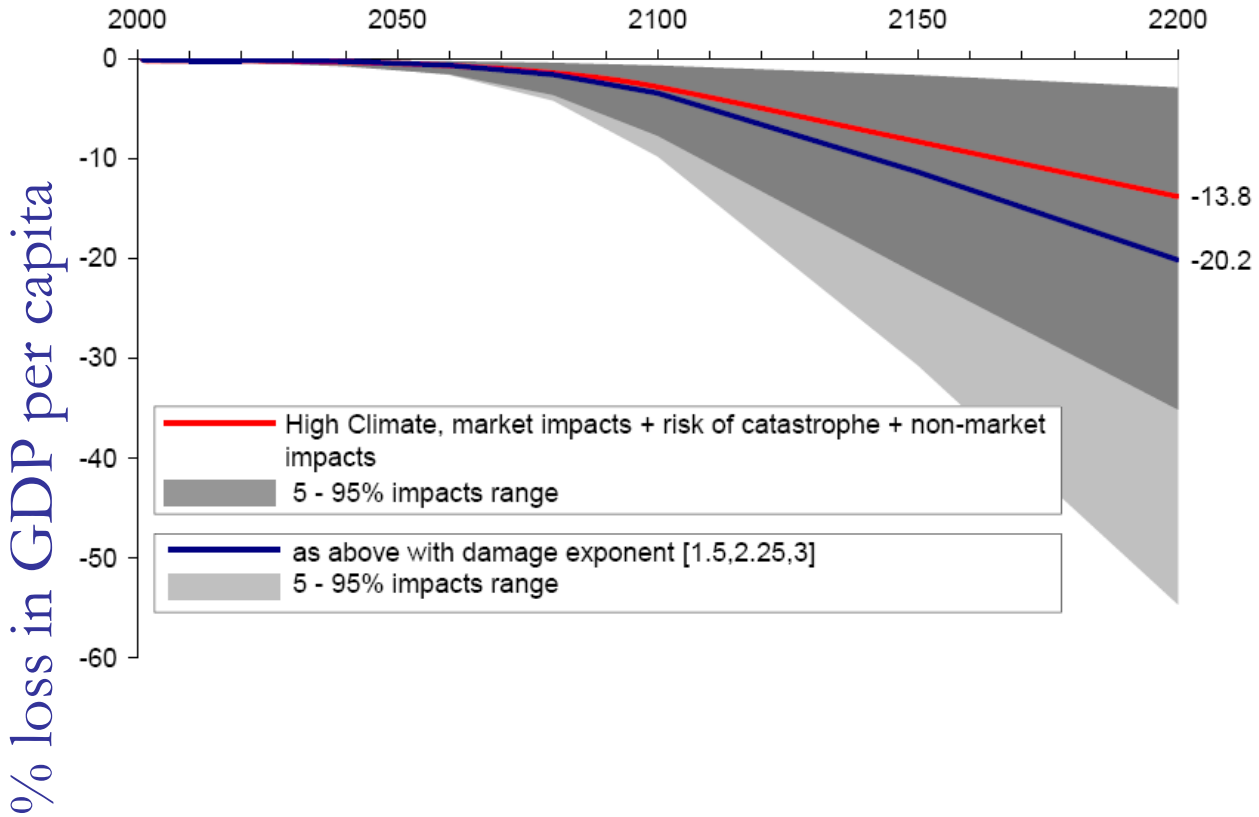


… but foremost Stern says:

Even changing assumptions → still important effect

when instead he should admit that:

Changing assumptions → results change a lot



Why do we say so? A reverse engineering of Stern's analysis

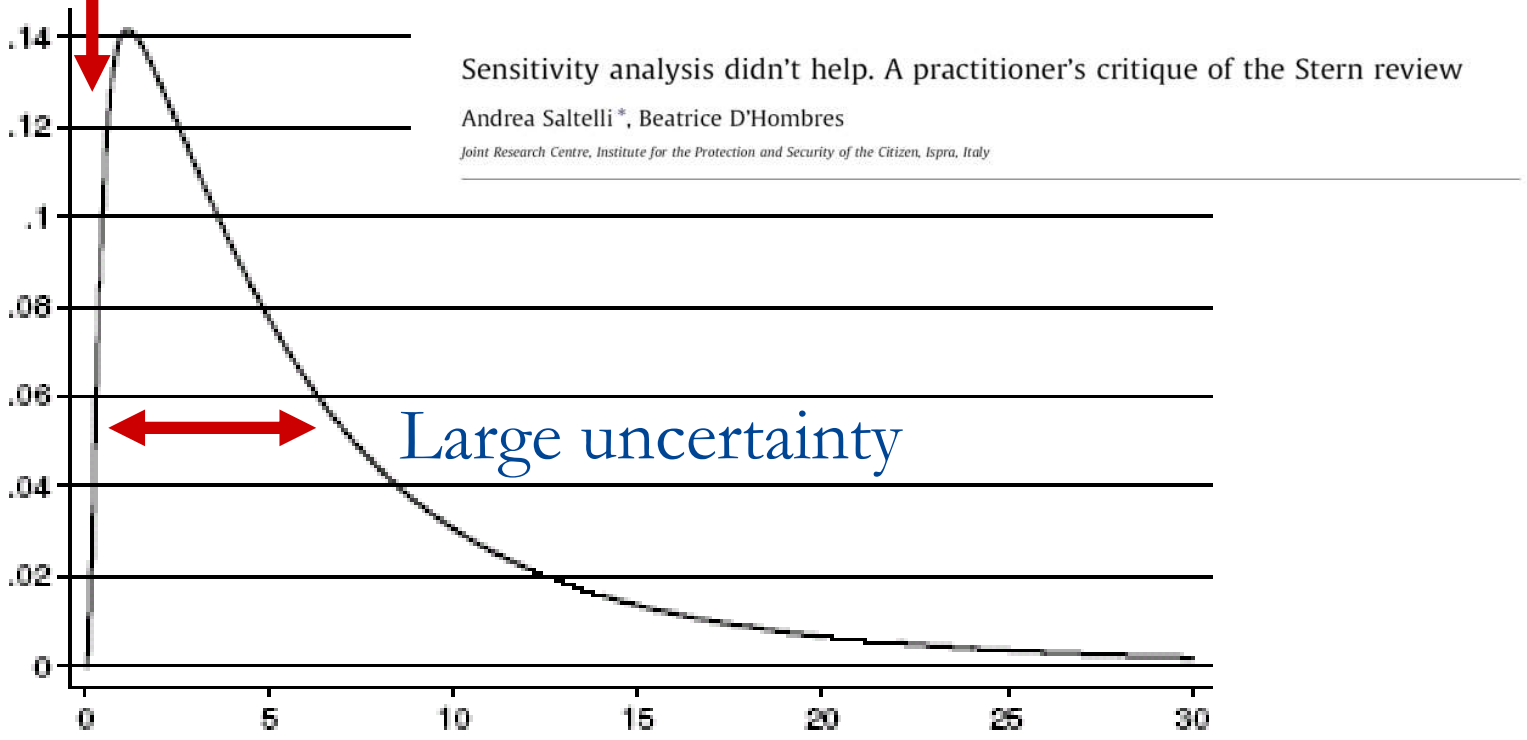
Missing points

Global Environmental Change 20 (2010) 298–302

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha



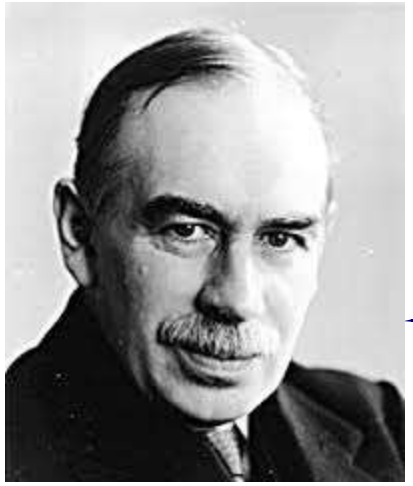
% loss in GDP per capita

Sensitivity analysis didn't help. A practitioner's critique of the Stern review

Andrea Saltelli *, Beatrice D'Hombres

Joint Research Centre, Institute for the Protection and Security of the Citizen, Ispra, Italy

Not to say that Stern is wrong while Nordhaus is right, as both authors frame the debate around numbers which are …



… precisely wrong

More on this paper:

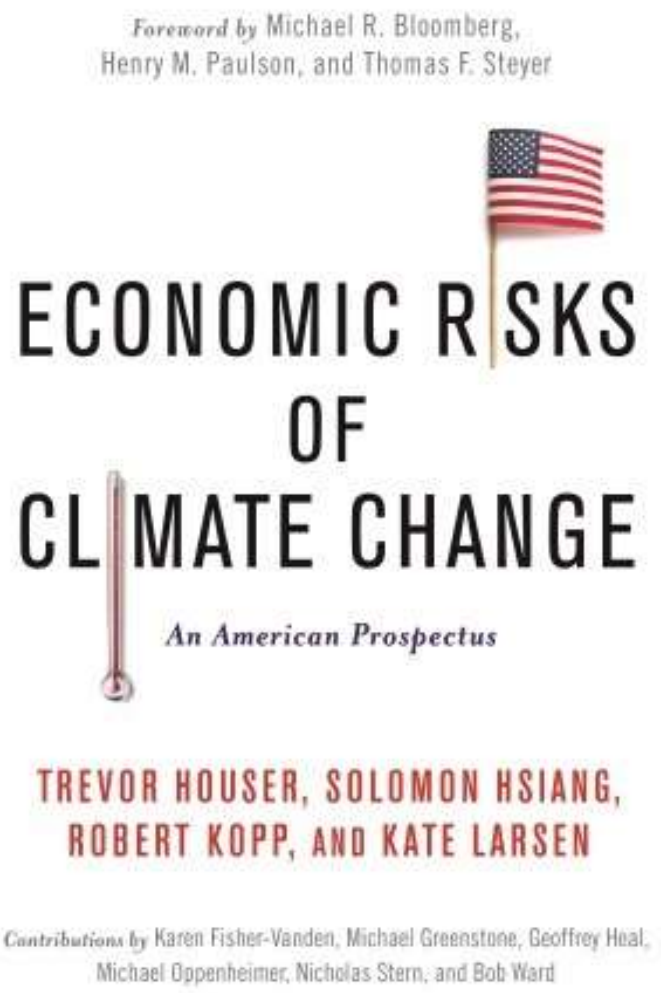
ANDREA SALTELLI
PHILIP B. STARK
WILLIAM BECKER
PAWEL STANO

Climate Models as Economic Guides

Scientific Challenge or Quixotic Quest?

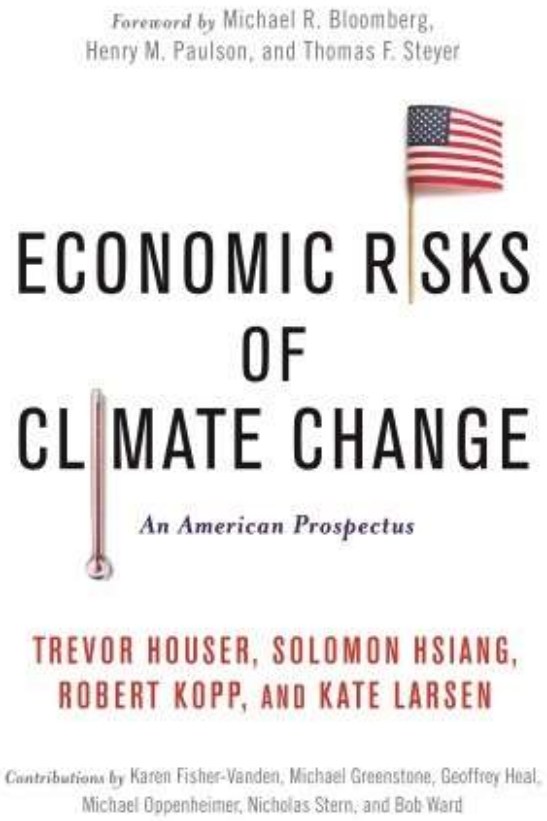
The uncertainties associated with mathematical models that assess the costs and benefits of climate change policy options are unknowable. Such models can be valuable guides to scientific inquiry, but they should not be used to guide climate policy decisions.

… targeting an audacious study:



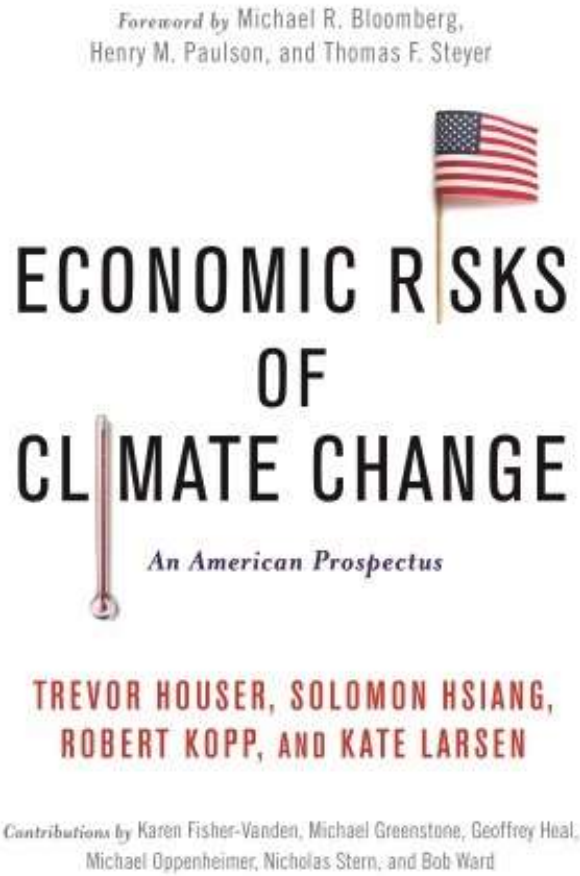
"[…] the report forecasts—at the level of individual counties in the U.S.—energy costs and demand, labor supply, mortality, violent crime rates, and real estate property prices up to the year 2100 […]"

Climate Models
as
Economic Guides
Scientific Challenge
or
Quixotic Quest?

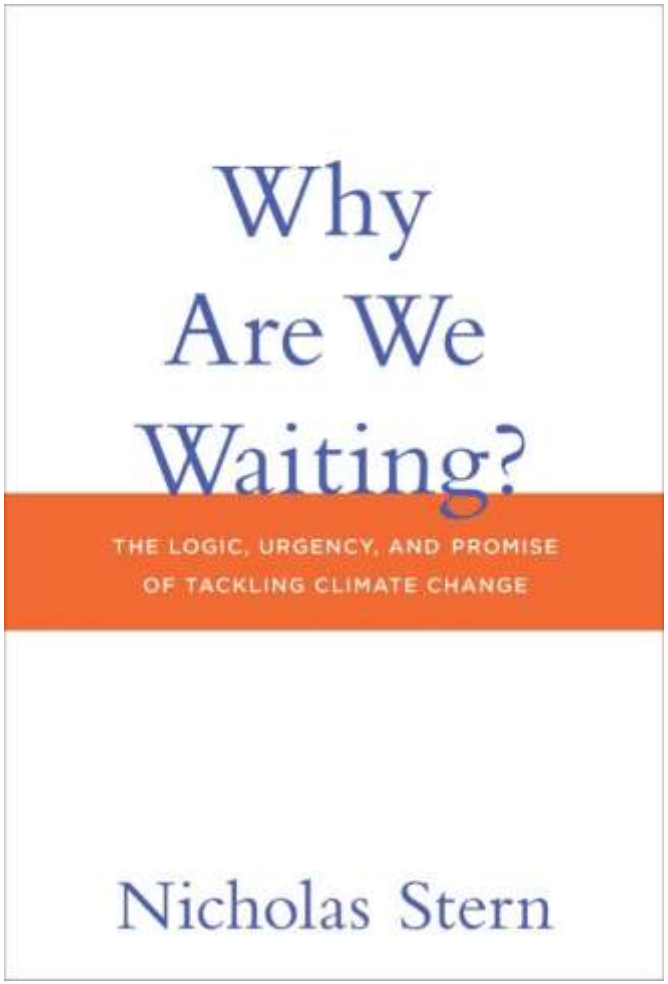


"The report presents the amount of computer power and data generated as evidence of the scientific legitimacy of the enterprise. The authors note, however, that out of an abundance of caution they did not model deterioration in cognitive performance as temperatures rise"

Climate Models
as
Economic Guides
Scientific Challenge
or
Quixotic Quest?



Next comes the latest (2015) book of Nicholas Stern …



… advocating for better integrated assessment models (IAM)

THE LOGIC, URGENCY, AND PROMISE OF TACKLING CLIMATE CHANGE

Excerpts

"Integrated assessment models have produced valuable insights" p. 139

"In Chapter six of the Stern review we made use of the PAGE model" p. 345

THE LOGIC, URGENCY, AND PROMISE OF TACKLING CLIMATE CHANGE

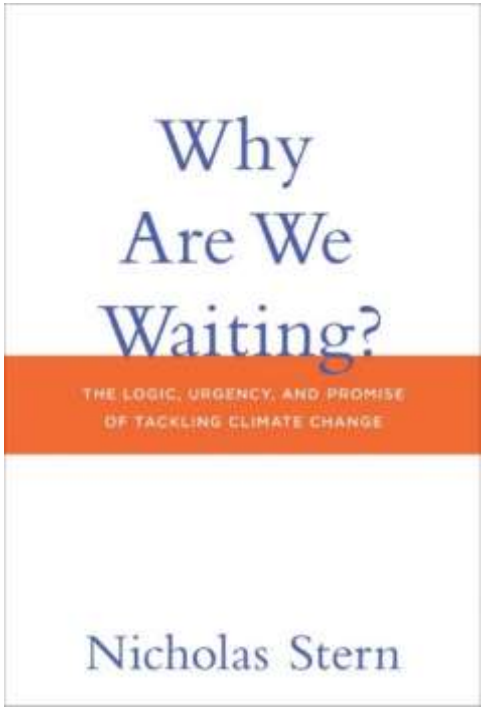
… After a list of criticism moved to the realism of Integrated Assessment Models:

"[…] the point is that estimates based on these models are very sensitive to assumptions and are likely to lead to gross underestimation" p.139

Things to be incorporated in ‘formal modelling’ [sic]

“Damage to social, organizational or environmental capital […]
Damage to stock of capitals and land […]
Damage to overall factor productivity […]
Damage to learning and endogenous growth”, p. 145

‘formal modelling’ as to produce ‘numbers’?



The book of N. Stern suggests using different mathematical models, including dynamic stochastic general equilibrium models.

Philip Mirowski

See Philip Mirowski's book for a critique of DSGE as used in economics … inquiries by the US senate and the Queen of the England about their failure to predict the crisis …

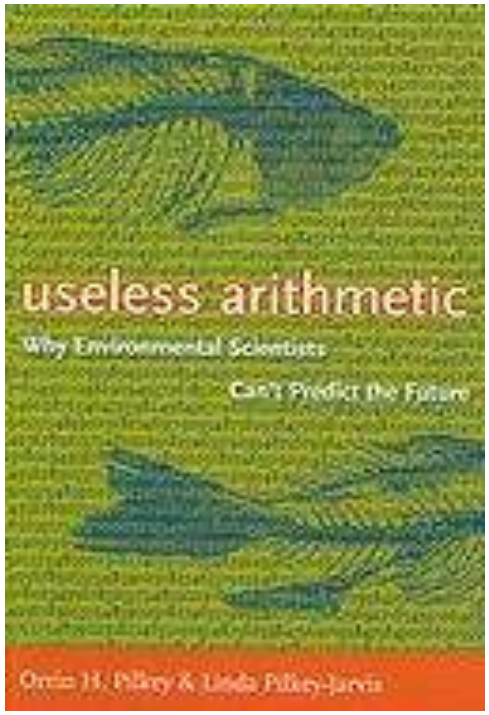
Everybody in the profession knows that DSGE work under the economists' standard 'caeteris paribus' hypothesis (=all the rest being equal)

Caeteris are never paribus

Mathematical modelling of climatic change (terra infirma) versus its cost to society (terra incognita):

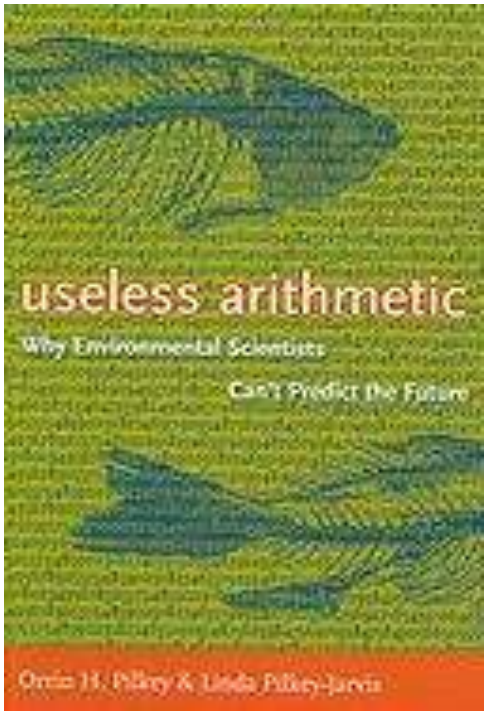
Pilkey and Pilkey-Jarvis (2007:86) climate-sceptics' work would be harder if:

"[…] the global change modeling community would firmly and publicly recognize that its efforts to truly quantify the future are an academic exercise and that existing field data on atmospheric temperatures, melting glaciers, […] and other evidence should be relied on to a much greater degree to convince politicians that we have a problem."



Pilkey, O.H. and Pilkey-Jarvis, L., 2007. Useless Arithmetic. Why Environmental Scientists Can't Predict the Future, Columbia University Press, New York.

"[…] A serious societal debate about 'solutions' can never occur as long as modellers hold out the probability, just around the corner, of accurate projections of future climates and seal-level position."



How about indicators of man's pressure on the planet?

The case of the Ecological Footprint


In 2016, Earth Overshoot Day
fell on August 8.


We use the resources of 1.6 planets.
#pledgefortheplanet

1.6 planets?

16?

16 hundred?

16 thousand?

...

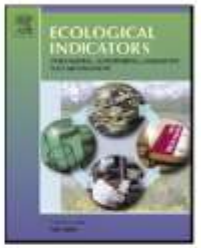
Infinity?

Ecological Indicators 46 (2014) 610–621

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind



Footprints to nowhere

Mario Giampietro[a,c], Andrea Saltelli[b,*]

[a] Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain
[b] Institute for the Protection and Security of the Citizen (IPSC), The European Commission, Joint Research Centre, TP 361, 21027 Ispra, VA, Italy
[c] Catalan Institution for Research and Advanced Studies (ICREA), Passeig Lluís Companys, 23, 08010 Barcelona, Spain

Highlights

- The EF is inconsistent with its stated purpose of measuring demand on ecosystems.
- The EF depends mostly from a dimensionally flawed energy emissions assessment.
- The EF is optimistic at the global scale and policy-misleading at the local one.
- One cannot accept EF's flaws on the ground that the EF has normative virtues.
- EF's rhetoric trivializes bio-economics and muddles the sustainability debate.

Ecological Indicators 46 (2014) 622–632

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

Letter to the Editor

Footprint facts and fallacies: A response to Giampietro and Saltelli (2014) "Footprints to Nowhere"

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Mathis Wackernagel *
Alessandro Galli
Elias Lazarus
David Lin
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9 April 2014

10 April 2014

Ecological Indicators 46 (2014) 260–263

Contents lists available at ScienceDirect

Ecological Indicators

journal homepage: www.elsevier.com/locate/ecolind

Letter to the Editor

Footworking in circles

Reply to Goldfinger et al. (2014) "Footprint Facts and Fallacies: A Response to Giampietro and Saltelli (2014) Footprints to nowhere"

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Questioning the Ecological Footprint

Alessandro Galli[a,1], Mario Giampietro[b,c], Steve Goldfinger[d], Elias Lazarus[d,2], David Lin[d,2], Andrea Saltelli[e,c], Mathis Wackernagel[d,2], Felix Müller[f,*]

[a] Global Footprint Network, 7-9 Chemin de Balexert, 1219 Geneva, Switzerland
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[c] Institut de Ciència i Tecnologia Ambientals (ICTA), Universitat Autònoma de Barcelona (UAB), 08193 Bellaterra, Spain
[d] Global Footprint Network, 312 Clay Street, Suite 300, Oakland, CA 94607-3510, USA
[e] Centre for the Study of the Sciences and the Humanities (SVT) – University of Bergen (UIB) Norway
[f] Institute for Natural Resource Conservation, University of Kiel, Olshausenstrasse 75, D 24118 Kiel, Germany

2. How is the research question underlying the Ecological Footprint relevant or irrelevant to policy concerns?[5]

Giampietro and Saltelli	Lin, Wackernagel, Galli, Goldfinger and Lazarus
When it comes to policy concern, one should bear in mind: (i) "make	If we are to live within the ecological constraints of our planet,

One cannot accept EF's flaws on the ground that the EF has normative virtues

EF's rhetoric trivializes bio-economics and muddles the sustainability debate

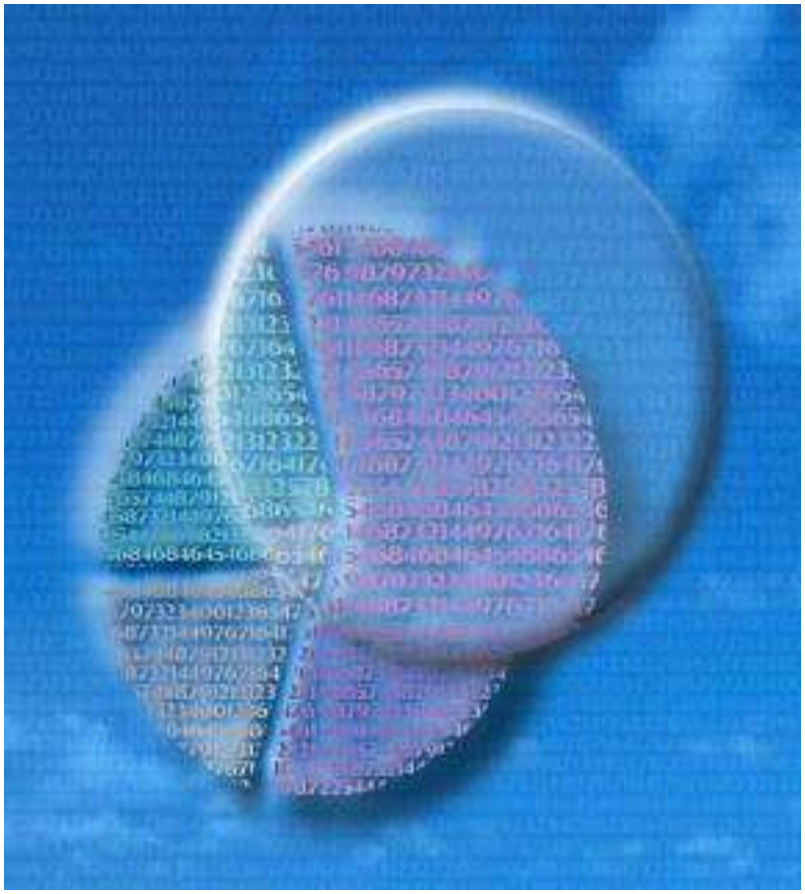
Chapter 8, On Not Hitting the Tar-Baby, p. 138, of Winner, L., 1986. The Whale and the Reactor: a Search for Limits in an Age of High Technology. The University of Chicago Press.

Funtowicz, S.O. and Ravetz, J.R. (1994). The worth of a songbird: Ecological economics as a post-normal science. Ecological Economics 10(3), 197-207.

Saltelli, A., D'Hombres, B., Sensitivity analysis didn't help. A practitioner's critique of the Stern review, 2010, Global Environmental Change, 20, 298-302.

Saltelli, A., Stark, P.B., Becker, W., and Stano, P. , 2015, Climate Models as Economic Guides. Scientific Challenge or Quixotic Quest? Issues in Science and Technology (IST), Volume XXXI Issue 3, Spring 2015.

Pieces on The Conversation, see https://theconversation.com/uk/search?utf8=%E2%9C%93&q=saltelli



END

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