

Ethics of quantification

Andrea Saltelli
University of Bergen



Webinar series “Responsible modelling in uncertain times: ethics of quantification in action”, CEST-INET events @UCL-IIPP, October 20, 2021



www.andreasaltelli.eu

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Tweets by @AndreaSaltelli



andrea saltelli
@AndreaSaltelli

Impressive asymmetry of power in the ongoing battle on social and environmental sustainability... 🤔🤔 <https://twitter.com/marpinoir/status/1409405623725400065>



Jun 28, 2021



andrea saltelli
@AndreaSaltelli

Replying to @AndreaSaltelli

Should we come to term with the fact that the internet - at the end of the day - proved to be an instrument of oppression and domination rather than one of freedom and emancipation? 🤔



Jun 27, 2021

[Embed](#)

[View on Twitter](#)

Do we live immersed in
fantastic numbers?

‘The Most Important Number You’ve Never Heard Of’

Sept. 17, 2021

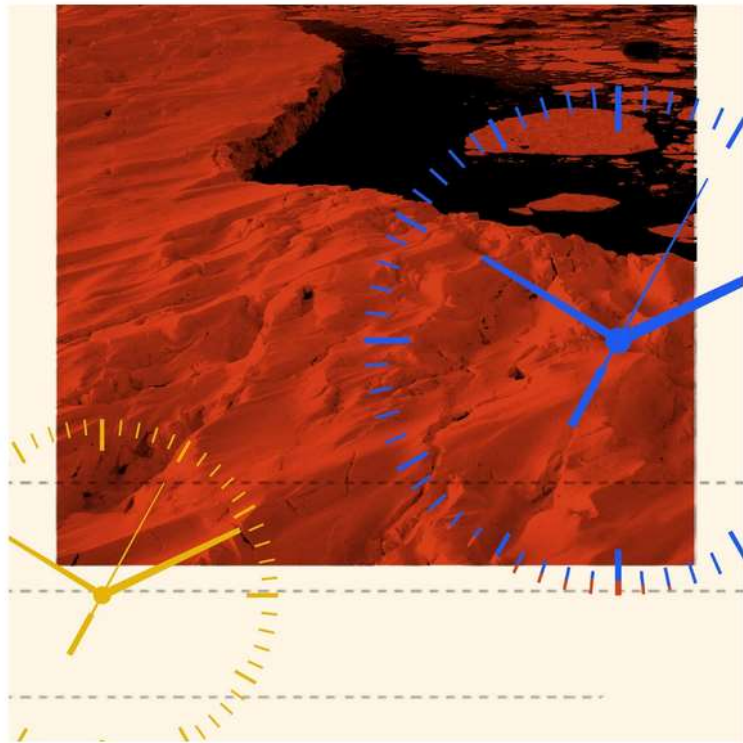


Illustration by Arsh Raziuddin, The New York Times

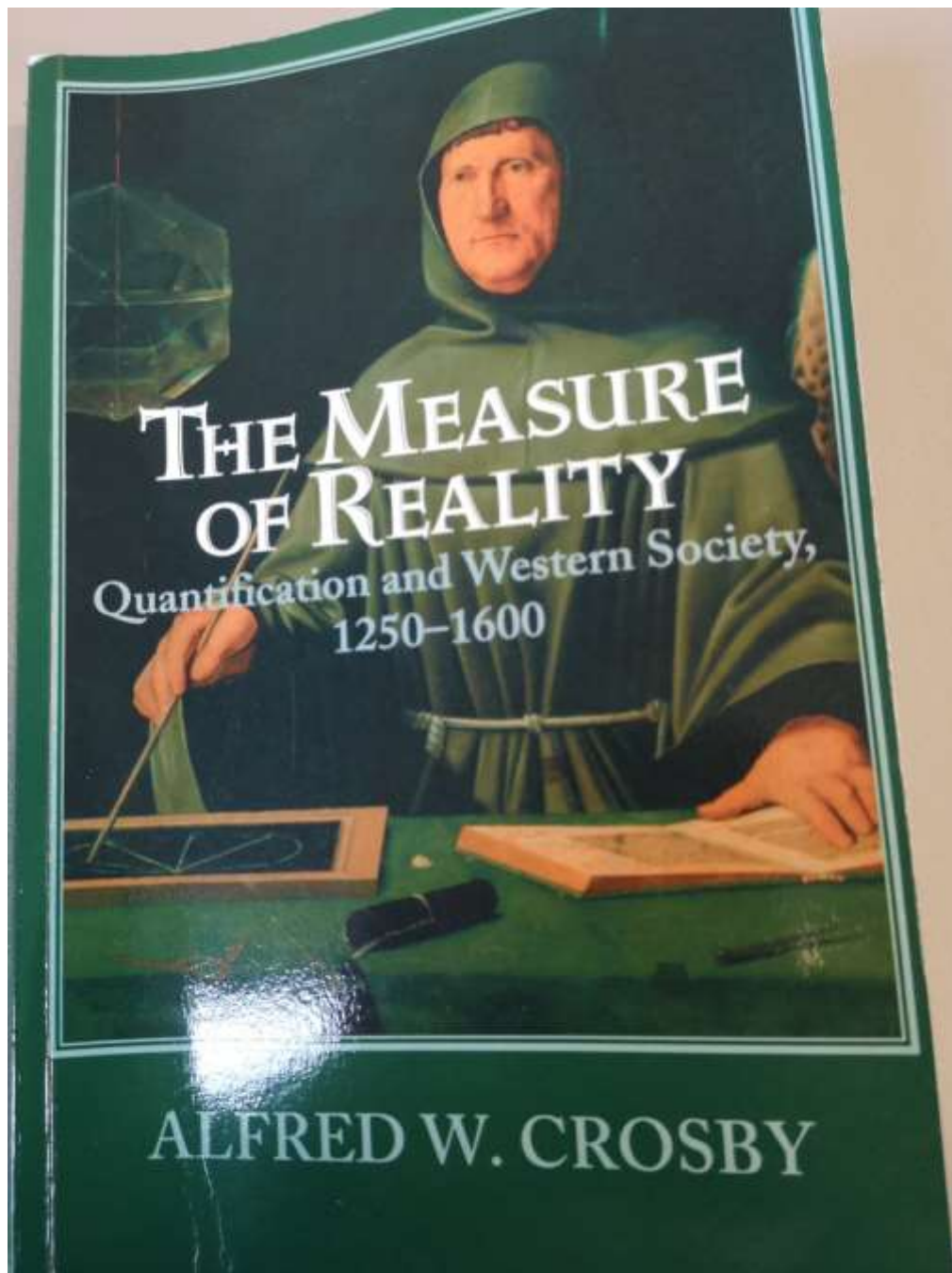
“social cost of carbon:

=\$56 a ton on average at a 3 percent discount rate

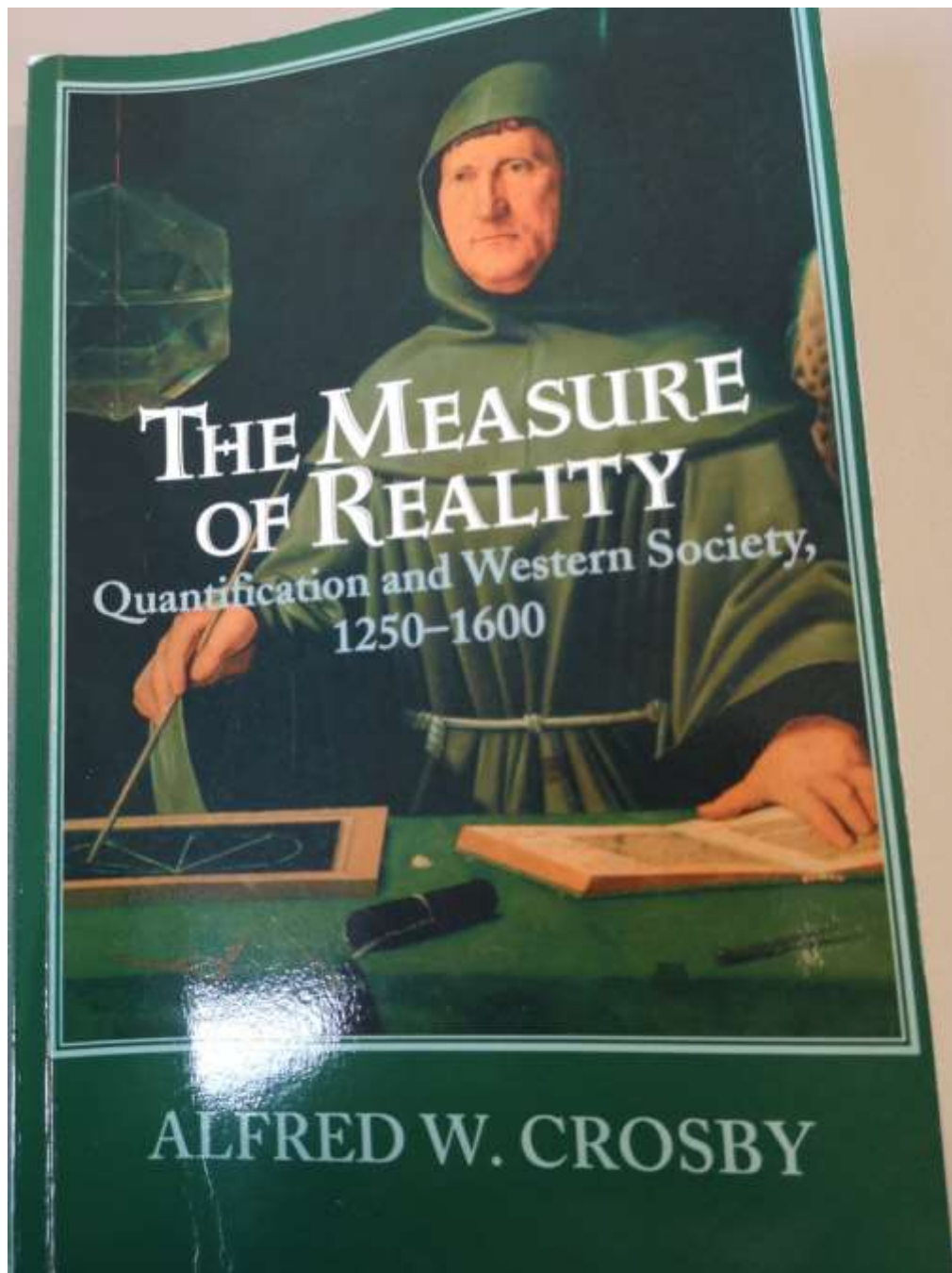
=\$171 a ton on average at a 2 percent discount rate”

The New York Times

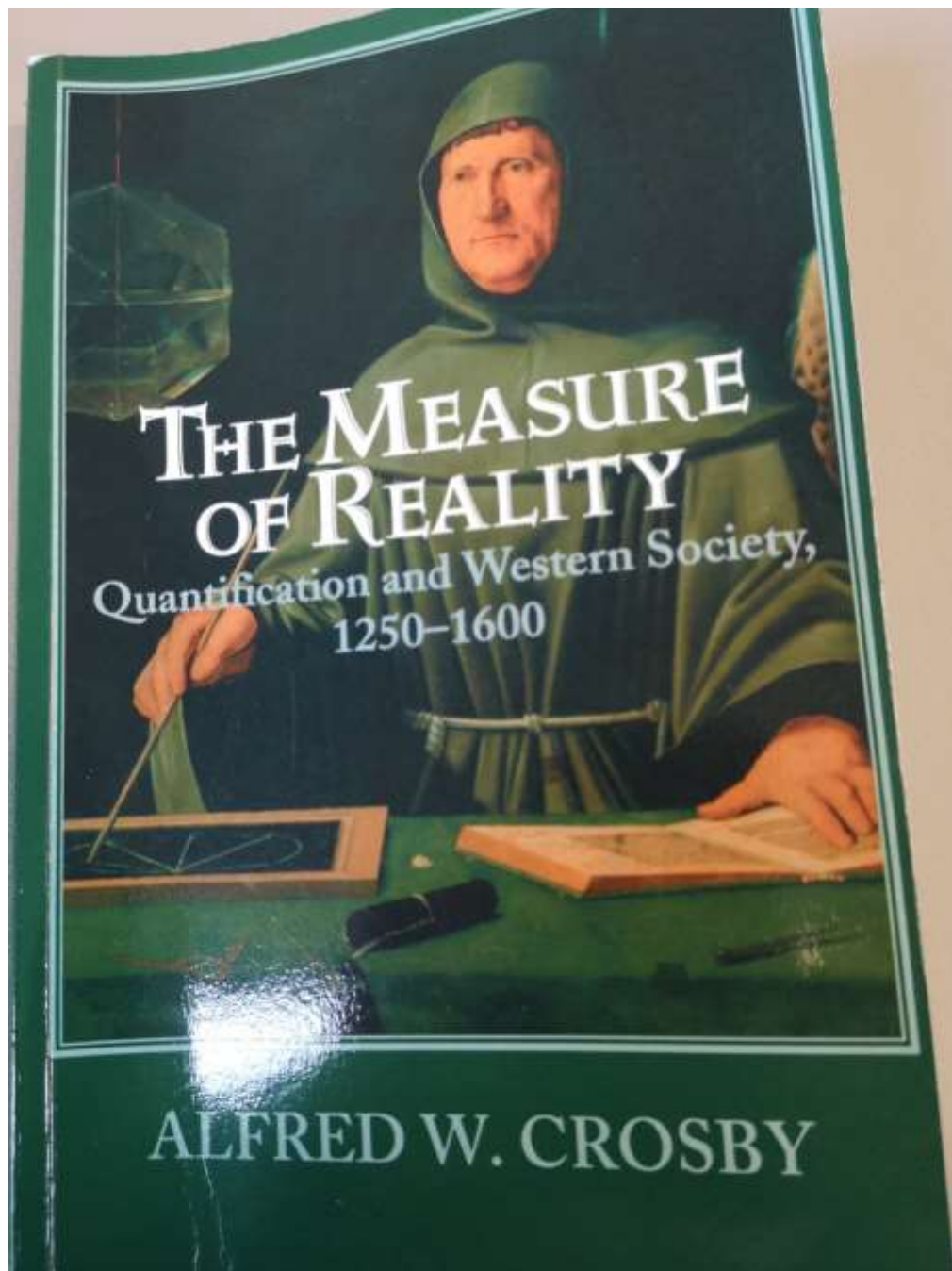
How did we get there?



Were quantification and visualization the engine inside the engine of western success and domination?



Quantification and visualization of space and time gave rise in the XIV century to a true revolution, in music, painting, accounting, cartography, astronomy ...



... a revolution that in the following two centuries XV–XVI ensured the epochal success of the West and its domination over the rest of the world

Pieter Bruegel the Elder, Temperance, 1560

Measuring, military
technology (math),
dispute on a printed
bible, learning,
accounting,
perspective,
polyphonic music, the
windmill, the watch ...

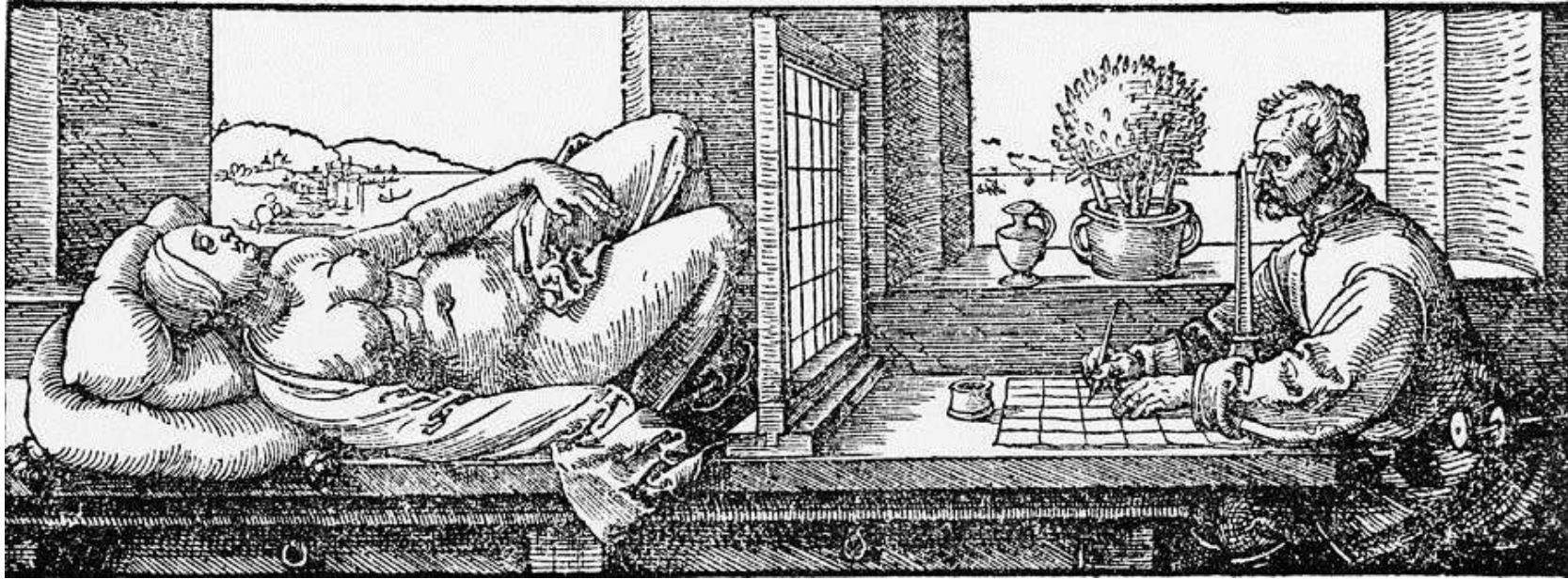




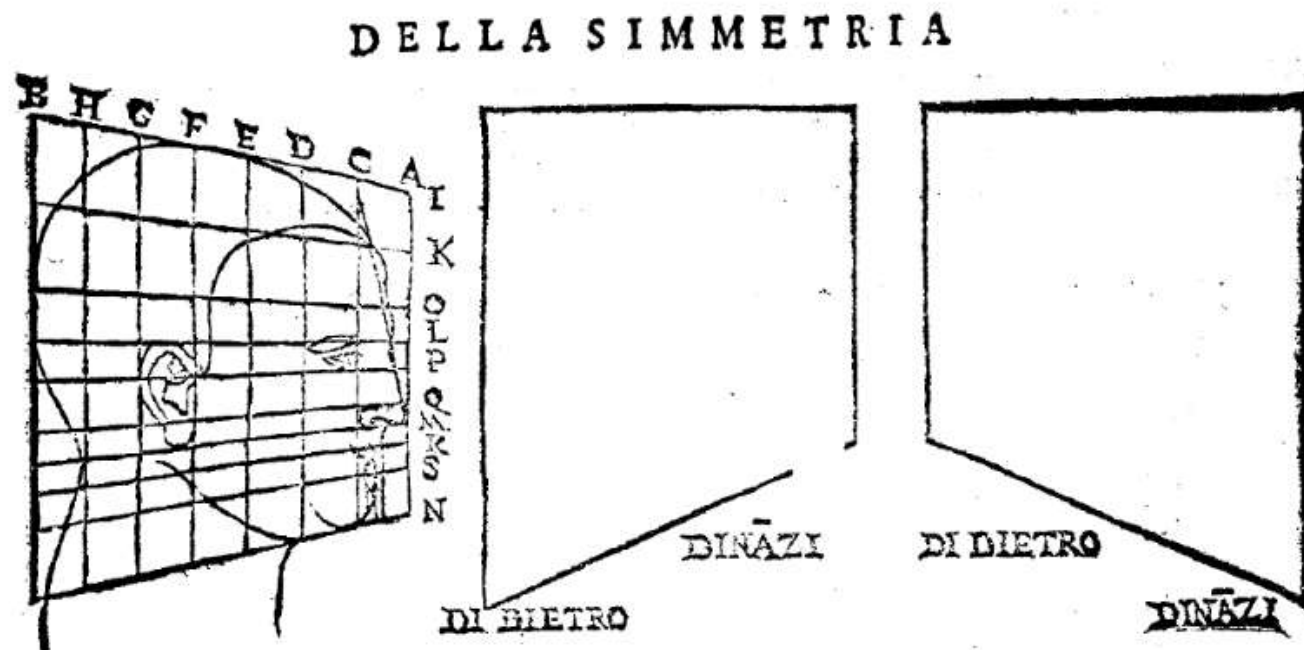
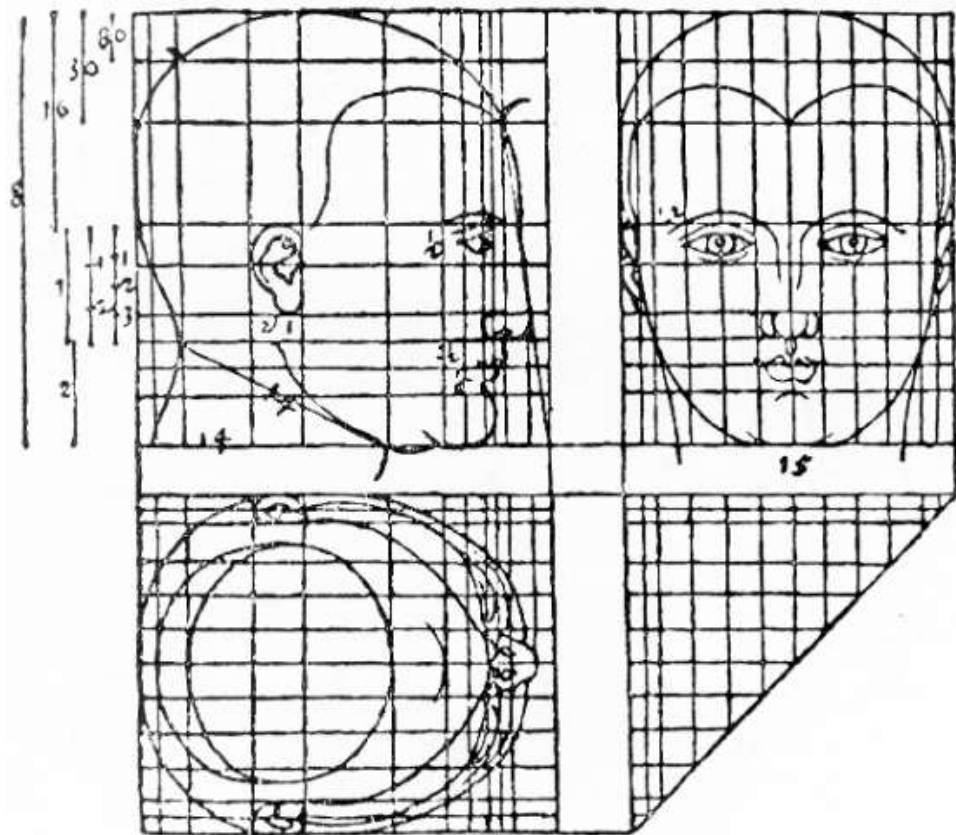
From the abacus
to Arabic
numerals
(Pythagoras vs
Boethius)



The Annunciation,
Carlo Crivelli
(1435, 1495)



Draftsman Drawing a Reclining Nude
Albrecht Dürer (1471–1528)



From “De Varietate figurarum”
Albrecht Dürer (1471–1528)

Many voices of
alarm as to misuse
of quantification

Numbers, visible and invisible...

Blurring lines:

“what qualities are specific to rankings, or indicators, or models, or algorithms?”

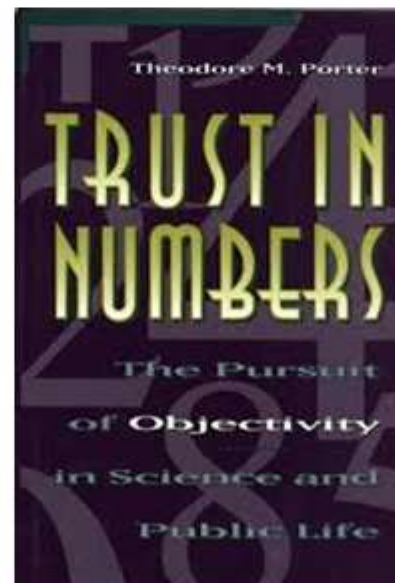
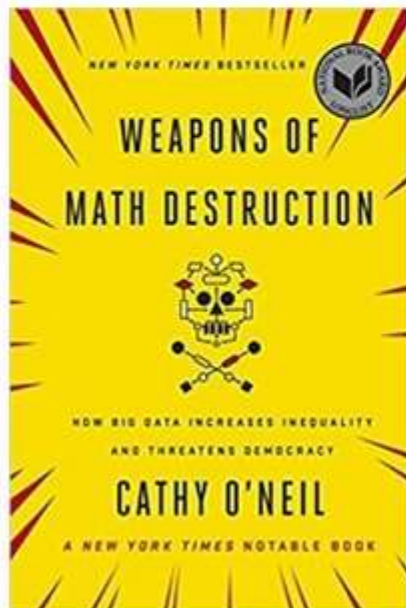
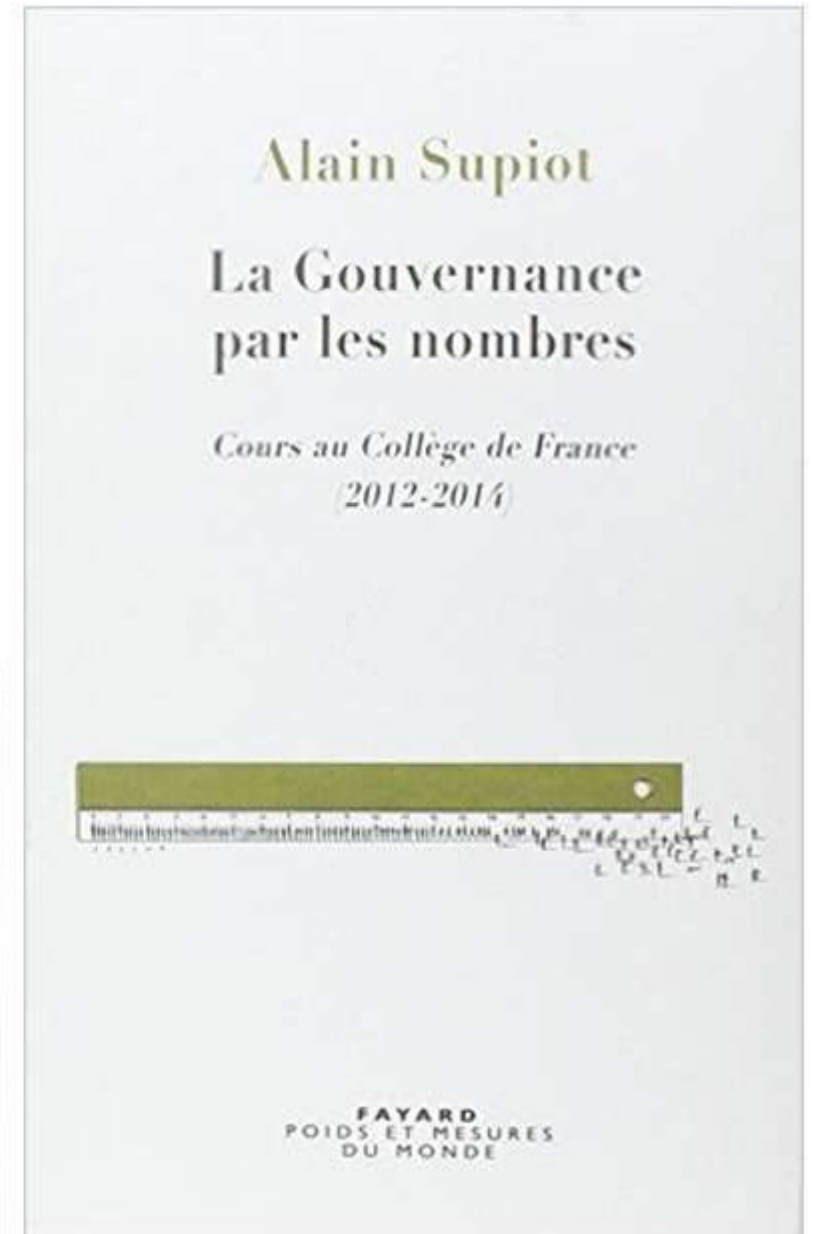
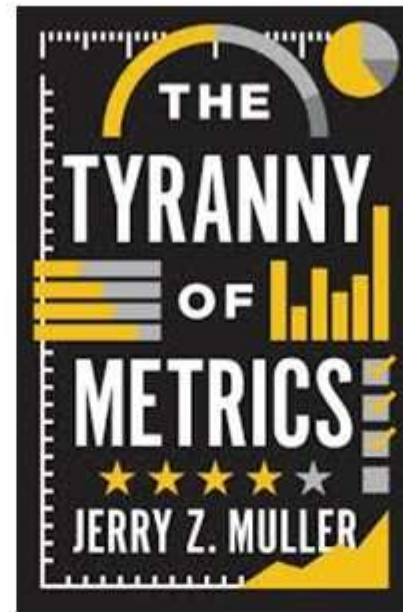
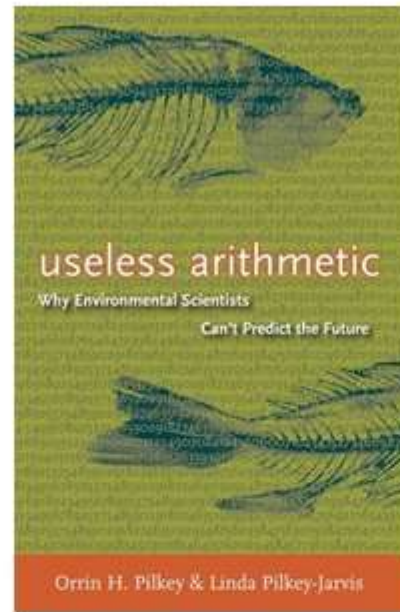
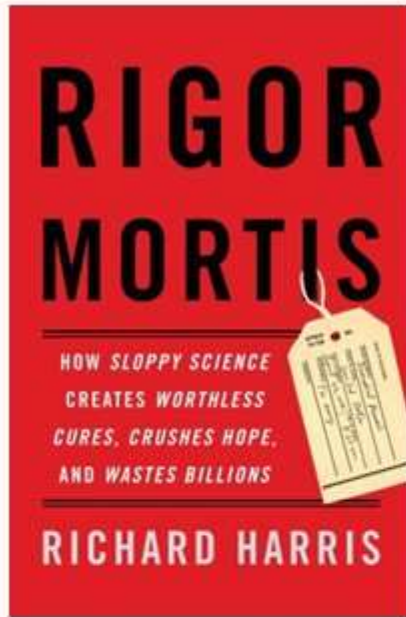


Elizabeth
Popp Berman

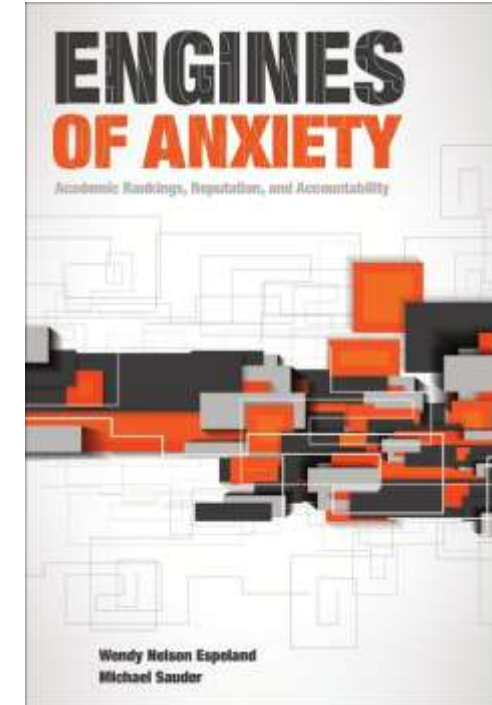
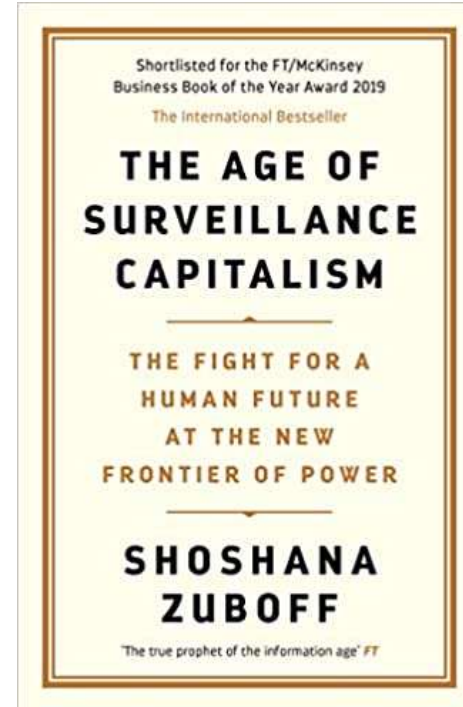
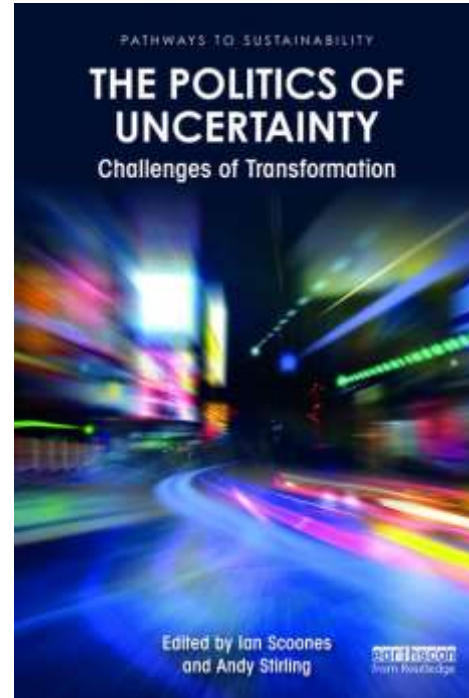
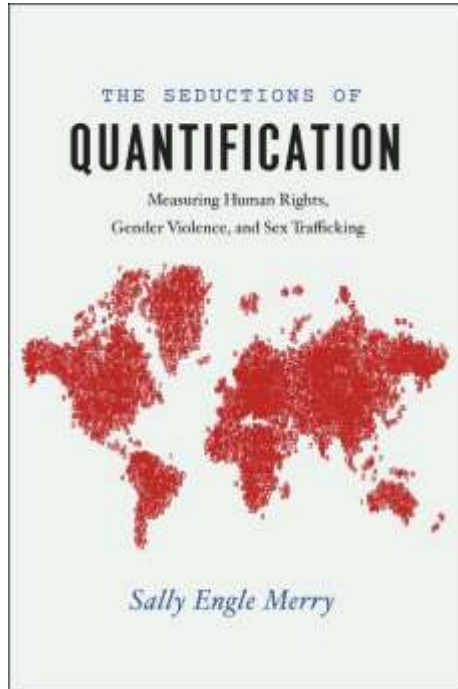
E. Popp Berman and D. Hirschman, *The Sociology of Quantification*: Where Are We Now?, *Contemp. Sociol.*, vol. in press, 2017.

And an explosion of works, from
within and without, from many
disciplines

Algorithms, models, metrics, statistics...



Algorithms, models, metrics, statistics...

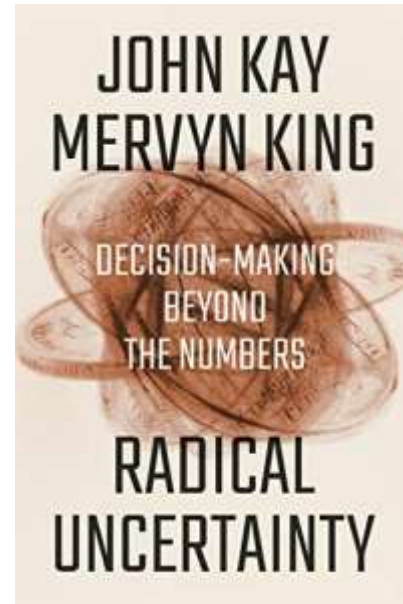


Numbers and their ‘reactivity’
(Espeland and Sauder, 2016)

Incumbent numbers affect what society will
measure in the future (Merry 2016)

Numbers “create the environment that
justifies their assumptions”
(O’Neil, 2016)

... how many of these numbers
are plainly bogus? How many of these
models?



Blog Admin

April 11th, 2012

Bogus modelling discredits evidence based policy **John Kay**

My own trajectory



From sensitivity analysis
in the 80's to ethics of
quantification today

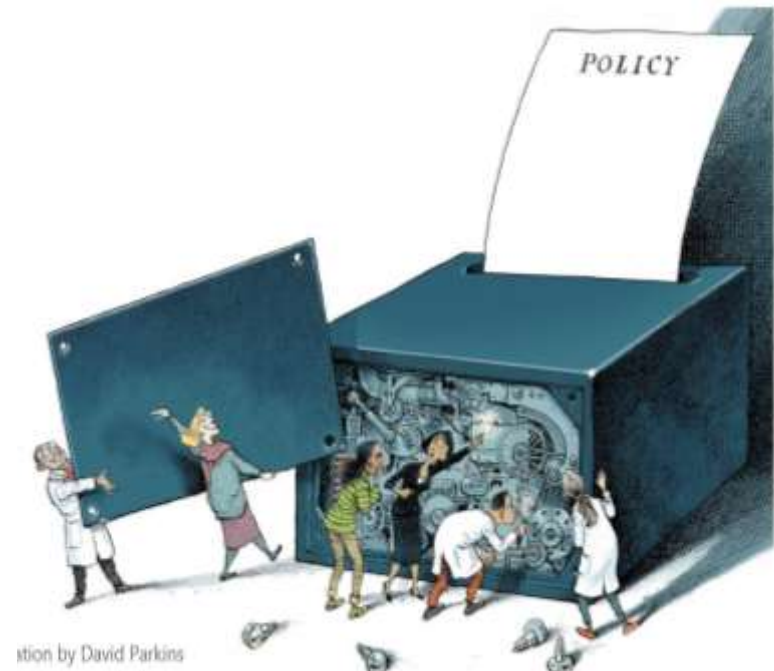


nature

COMMENT • 24 JUNE 2020

Five ways to ensure that models serve society: a manifesto

Pandemic politics highlight how predictions need to be transparent and humble to invite insight, not blame.





nature

Andrea Saltelli , Gabriele Bammer, Isabelle Bruno, Erica Charters, Monica Di Fiore, Emmanuel Didier, Wendy Nelson Espeland, John Kay, Samuele Lo Piano, Deborah Mayo, Roger Pielke Jr, Tommaso Portaluri, Theodore M. Porter, Arnald Puy, Ismael Rafols, Jerome R. Ravetz, Erik Reinert, Daniel Sarewitz, Philip B. Stark, Andrew Stirling, Jeroen van der Sluijs & Paolo Vineis

3 modellers Lo Piano, Puy, Saltelli

2 experts models and society Pielke, van der Sluijs

3 statisticians Mayo, Stark, Portaluri

2 statactivistes Bruno, Didier

2 economists Kay, Raynert

1 epidemiologist Vineis

2 sociologists of quantification

Espeland, Porter

3 STS scholars Bammer, Sarewitz, Stirling

1 philosopher Ravetz

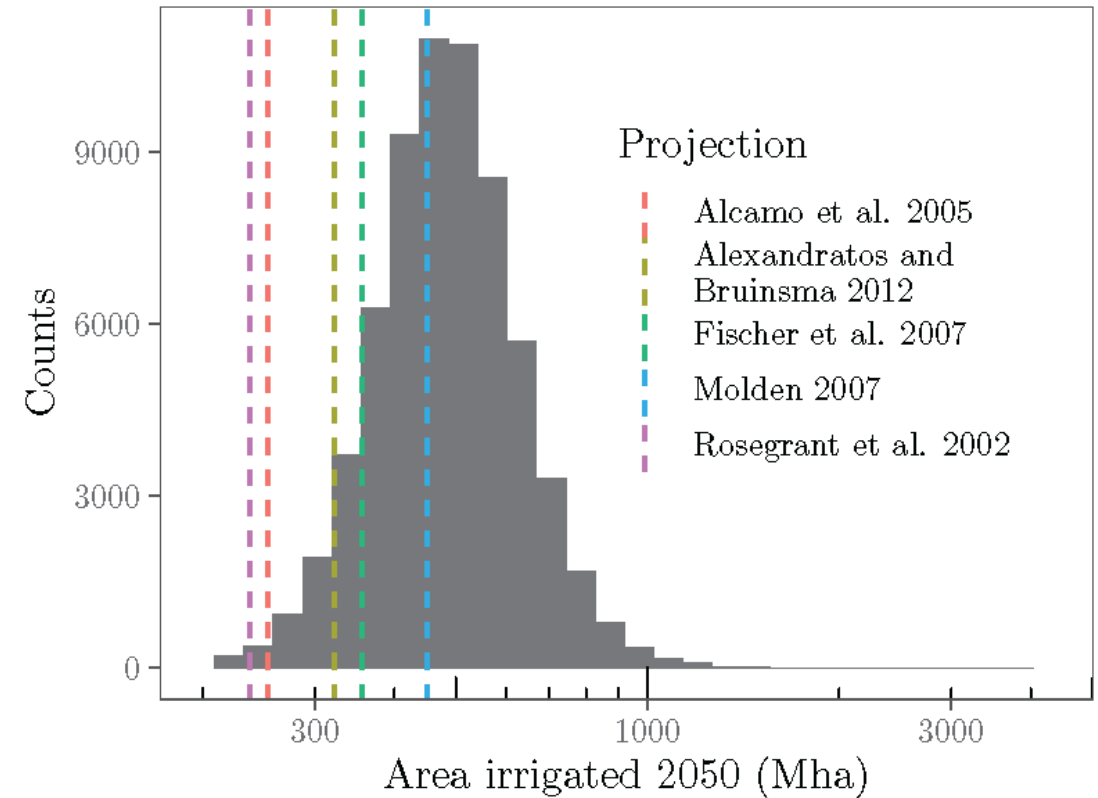
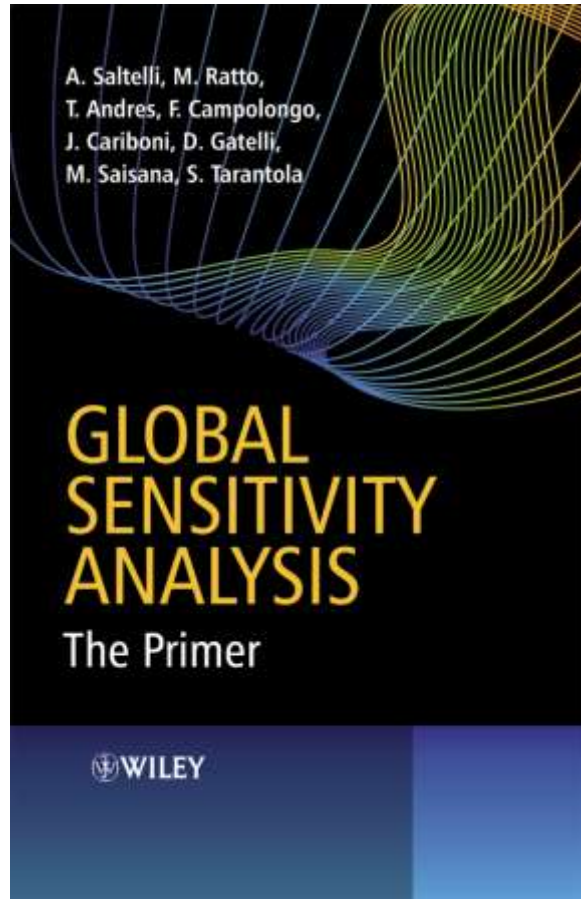
1 historian Charters

1 political scientists Di Fiore

1 expert RRI - Open Science Rafols



Wrong in many senses, methodological, ...

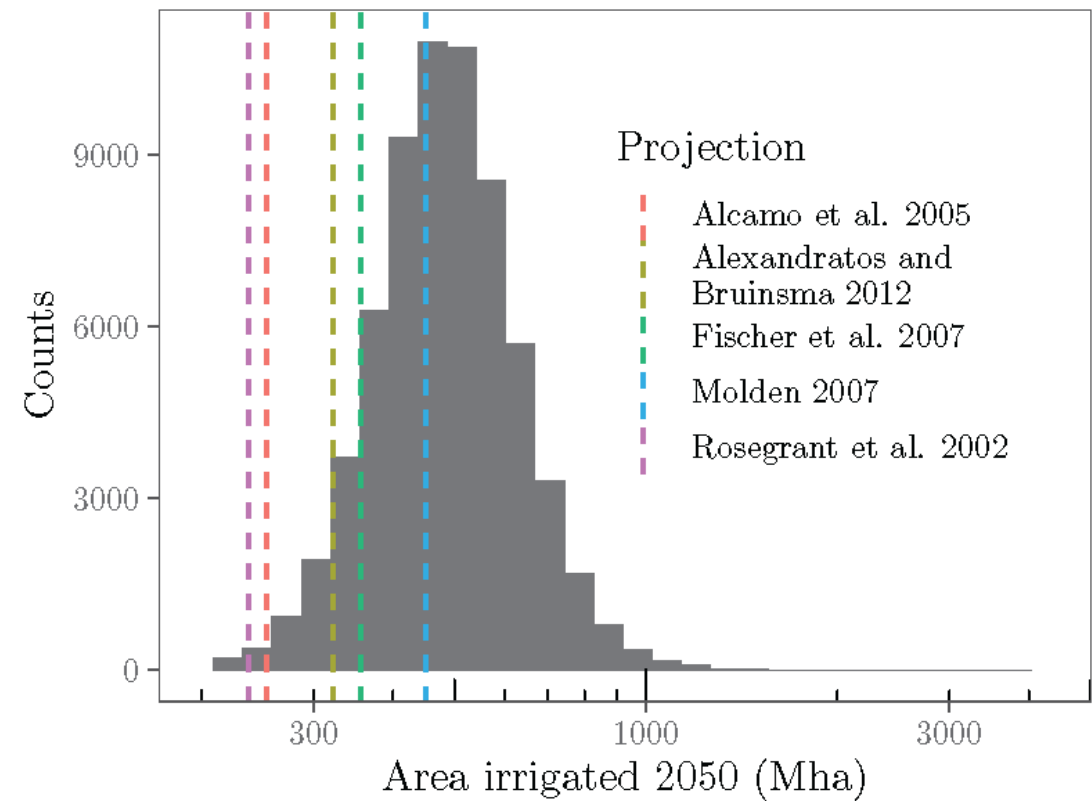


Sensitivity analysis permits interesting discoveries ...
models producing point estimates are bad

Current Models Underestimate Future Irrigated Areas

A. Puy , S. Lo Piano, A. Saltelli

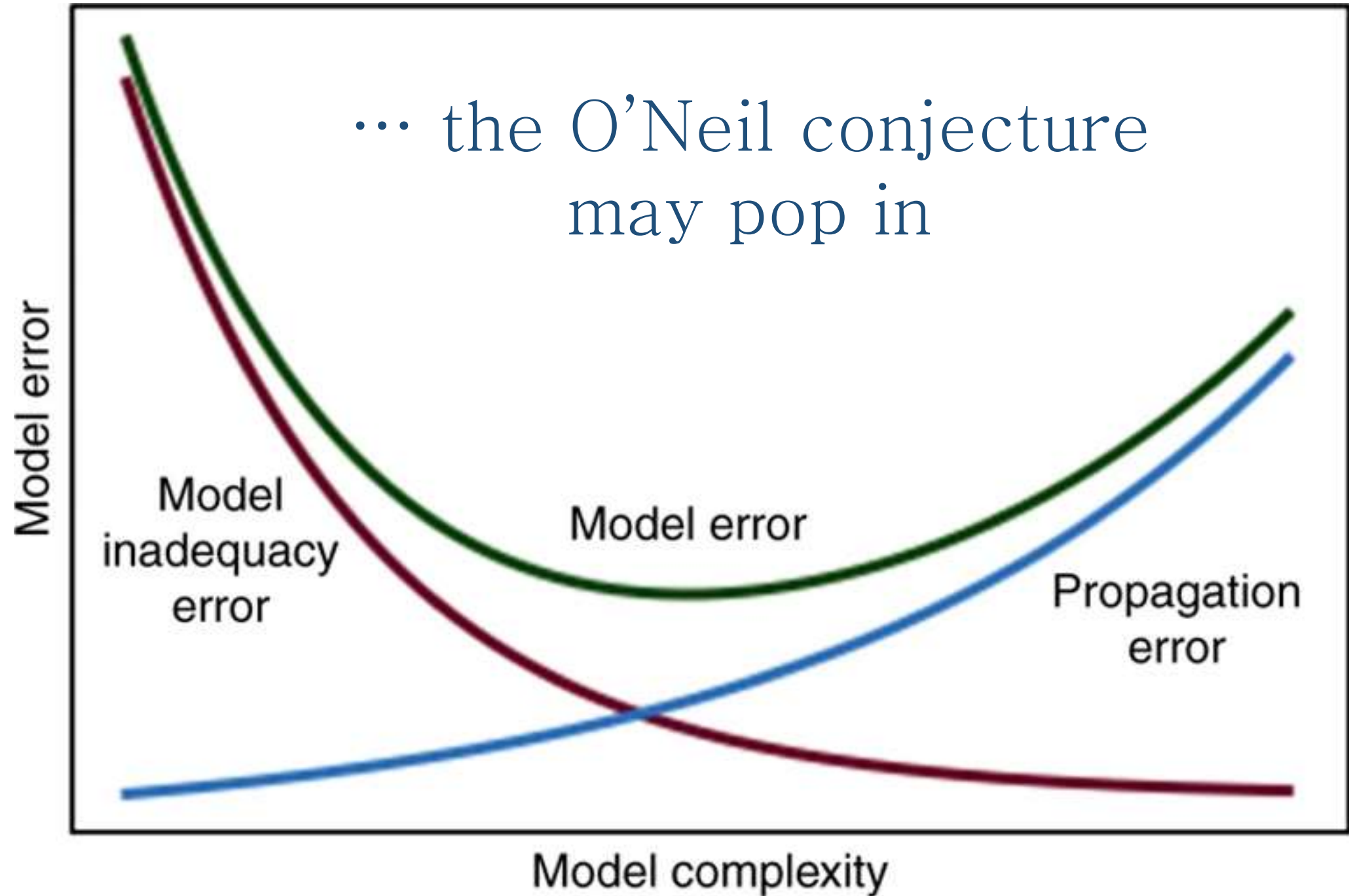
First published: 17 April 2020 | <https://doi.org/10.1029/2020GL087360> | Citations: 5



Point estimates are not conservative – more irrigated land may be needed that computed by FAO

Handling uncertainty is a delicate task as ...

... the O'Neil conjecture
may pop in



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

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



William Nordhaus,
University of Yale
Nobel 'Economics'
2018



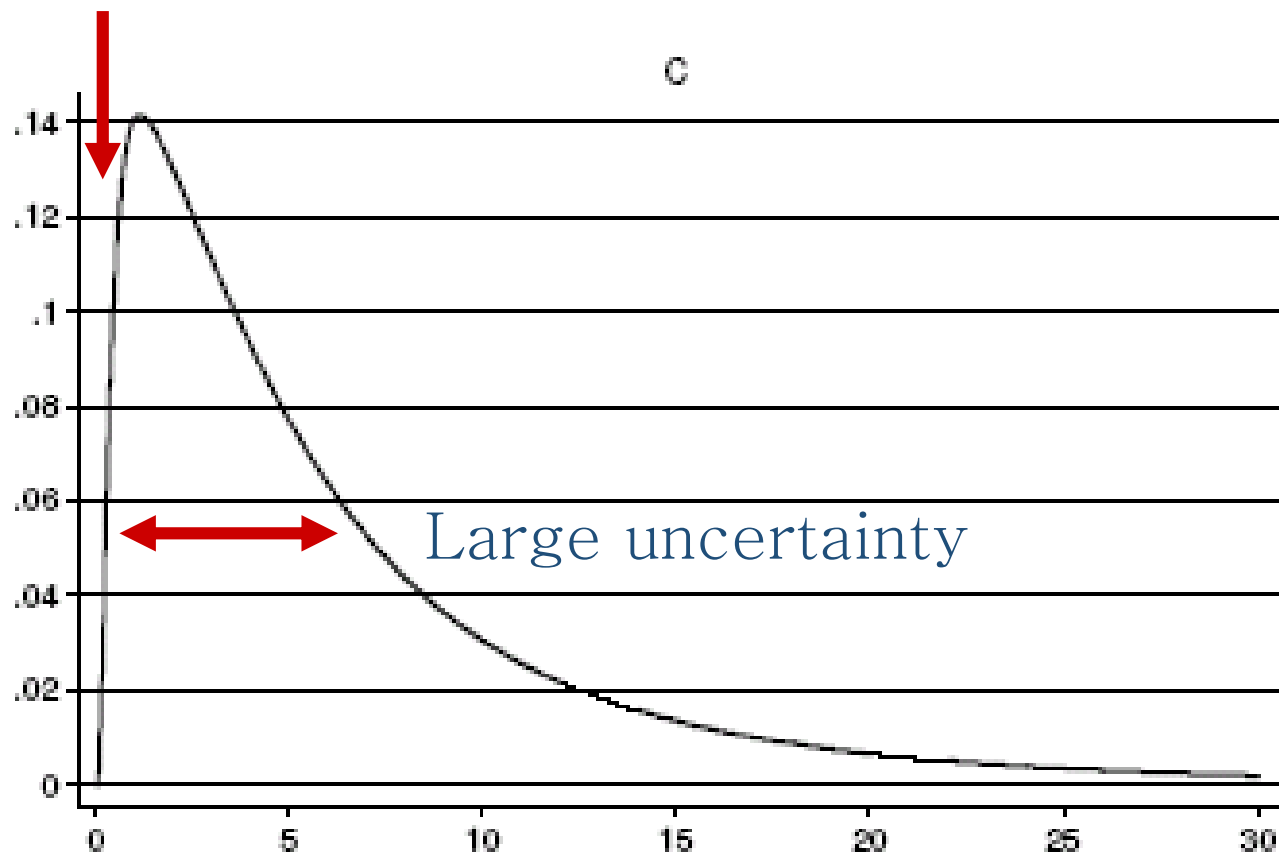
Nicholas Stern, London School
of Economics

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).

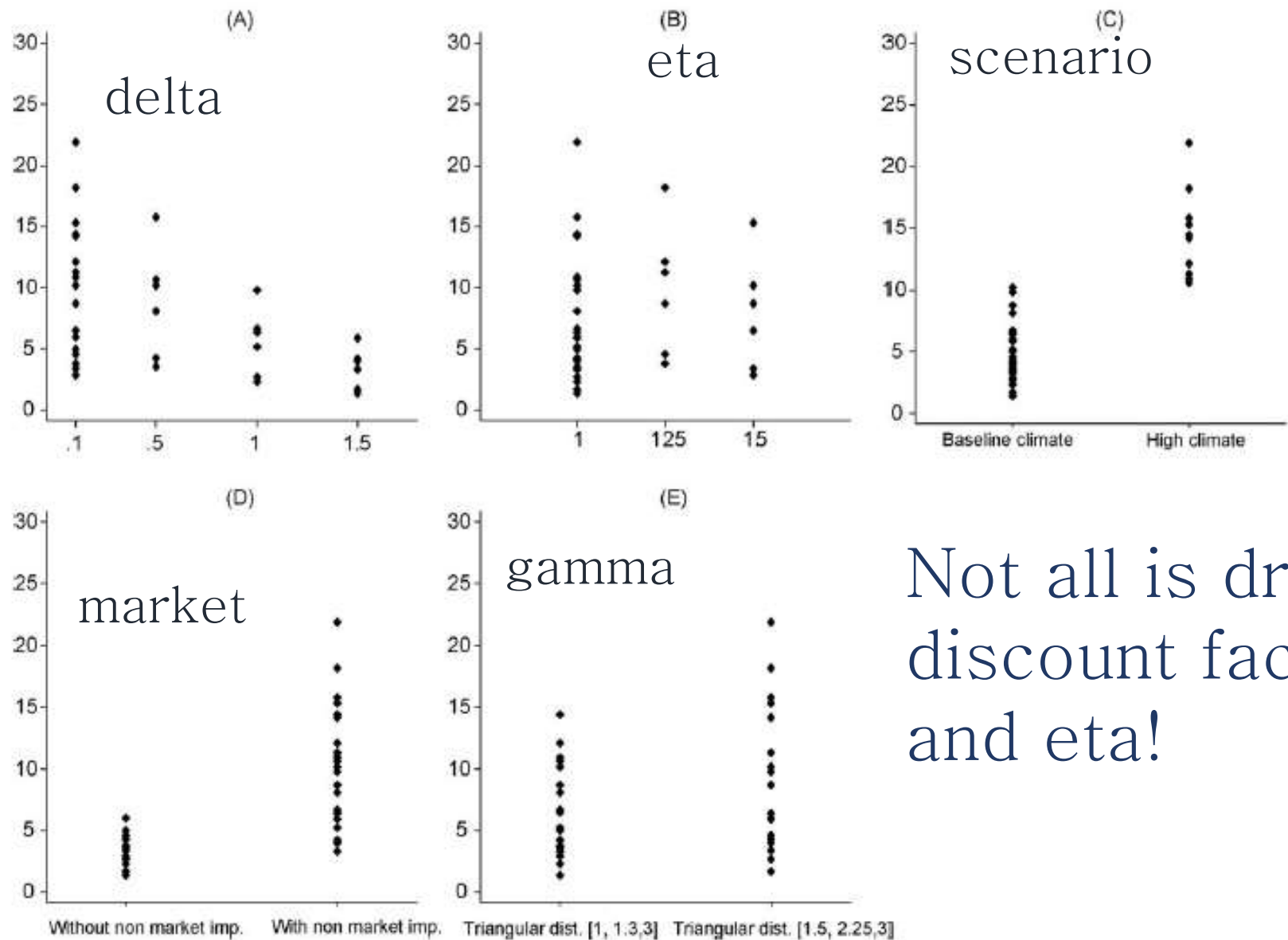
How was it done? A reverse engineering of the analysis

Missing points



% loss in GDP per capita

Sensitivity analysis here (also by reverse engineering)



Not all is driven by discount factors delta and eta!

J. R. Statist. Soc. A (2013)
176, Part 3, pp. 609–634

Ratings and rankings: voodoo or science?

Paolo Paruolo

University of Insubria, Varese, Italy

and Michaela Saisana and Andrea Saltelli

European Commission, Ispra, Italy

Why sensitivity
analysis

University rankings such as ARWU and THES are volatile and technically unsound

Ratings and rankings: voodoo or science?

Paolo Paruolo

University of Insubria, Varese, Italy

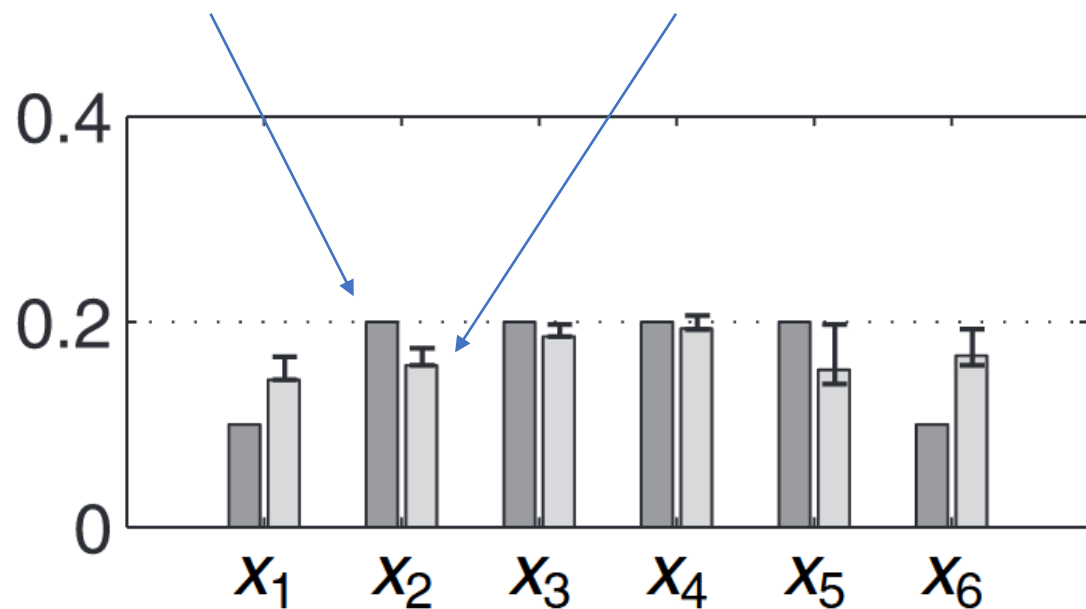
and Michaela Saisana and Andrea Saltelli

European Commission, Ispra, Italy



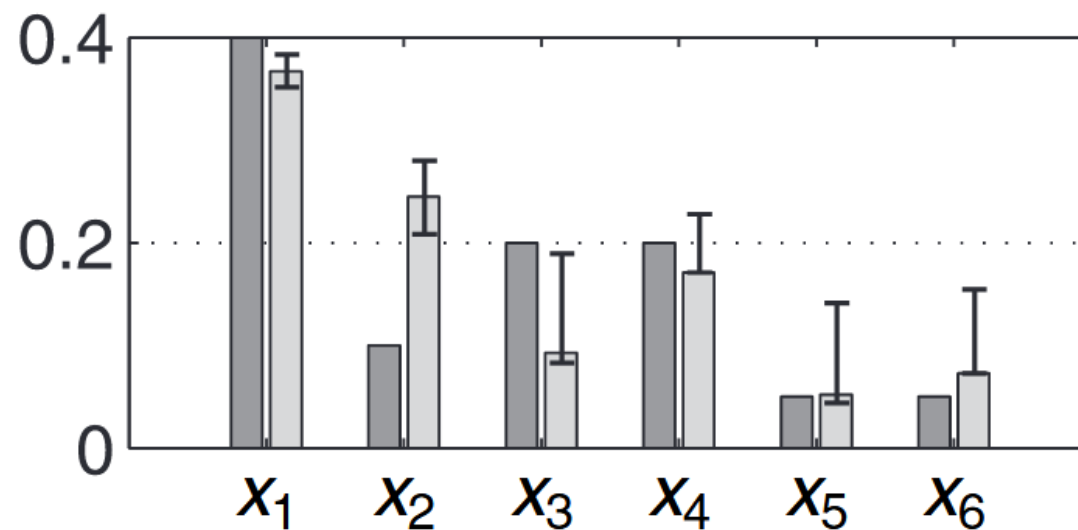
Developers' weight

Sensitivity analysis' weight



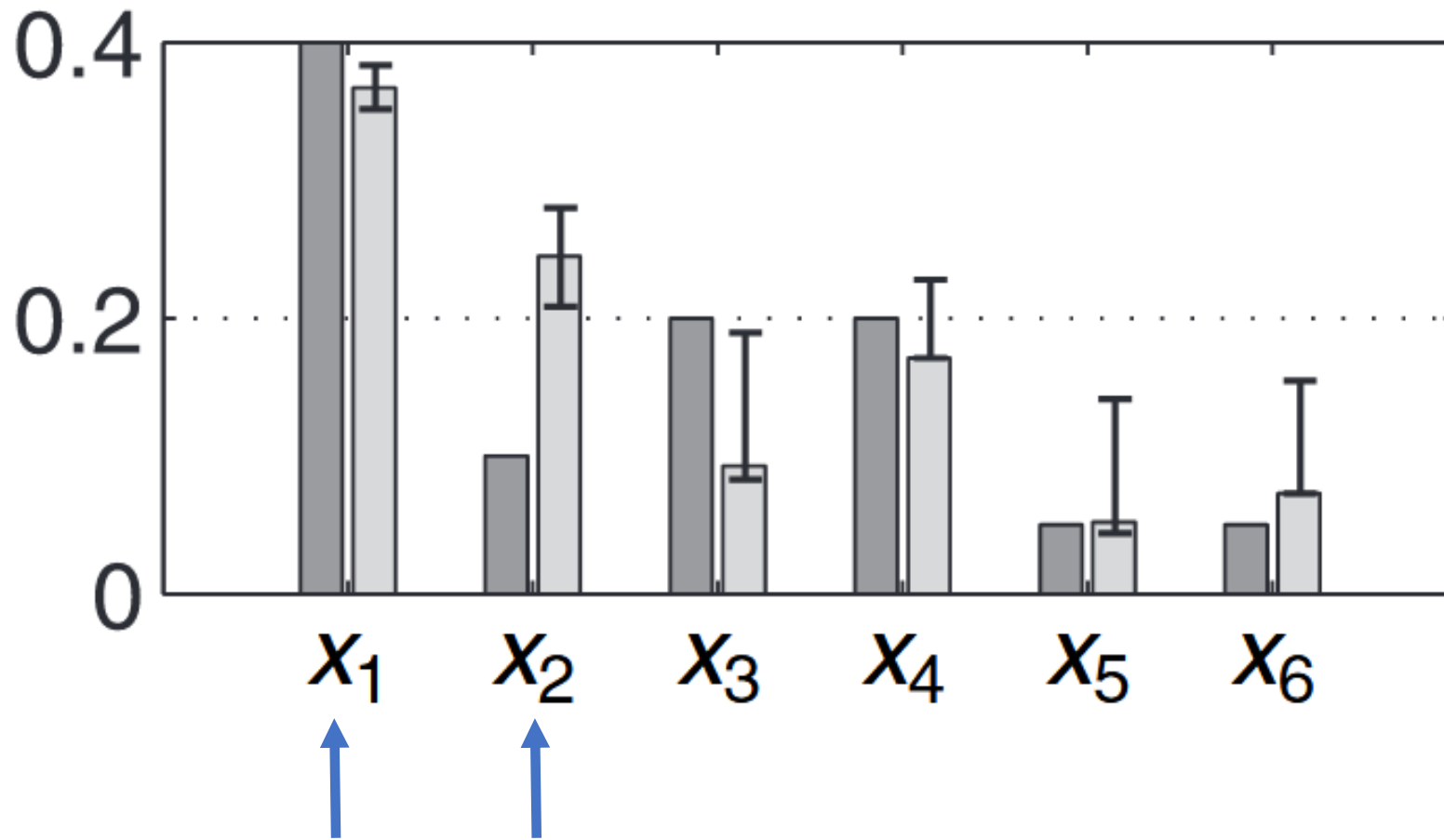
2008 ARWU

Alumni winning Nobel Prize
 Staff winning Nobel Prize
 Highly cited researchers
 Articles in *Nature* and *Science*
 Articles in *Science* and *Social Sciences Citation Index*
 Academic performance (size adjusted)



2008 THES

Academic review
 Recruiter review
 Teacher/student ratio
 Citations per faculty
 International staff
 International students



2008 THES

Academic review

Recruiter review

Teacher/student ratio

Citations per faculty

International staff

International students

The two 'soft' variables (reviews) all >> important

From damages of
higher education
ranking to those of
OECD-PISA



Do PISA data justify PISA-based education policy?

Luisa Araujo , Andrea Saltelli , Sylke V. Schnepf ▾

International Journal of Comparative Education and
Development

ISSN: 2396-7404

Article publication date: 13 February 2017

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ALTMETRICS



School tables

**OECD and Pisa tests are damaging
education worldwide - academics**

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edition ▾

“the error on the scores provided by the OECD is underestimated” and the ranking of countries questionable. OECD should provide structured sensitivity analysis that takes all the variables into account”

Do PISA data justify PISA-based education policy?

Luisa Araujo , Andrea Saltelli , Sylke V. Schnepf ▼

International Journal of Comparative Education and Development

ISSN: 2396-7404

Article publication date: 13 February 2017

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ALTMETRICS



31

Most works don't report uncertainty and sensitivity analysis, and when they do ...

Environmental Modelling & Software 25 (2010) 1508–1517



ELSEVIER

Contents lists available at ScienceDirect

Environmental Modelling & Software

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



How to avoid a perfunctory sensitivity analysis

Andrea Saltelli*, Paola Annoni

Joint Research Center, Institute for the Protection and Security of the Citizen, via E.Fermi, 2749, Ispra VA 21027, Italy





Environmental Modelling & Software

Volume 114, April 2019, Pages 29-39



Why so many published sensitivity analyses are false: A systematic review of sensitivity analysis practices

Andrea Saltelli ^{a, b}  , Ksenia Aleksankina ^c, William Becker ^d, Pamela Fennell ^e, Federico Ferretti ^d, Niels Holst ^f, Sushan Li ^g, Qiongli Wu ^h

How about statistics?



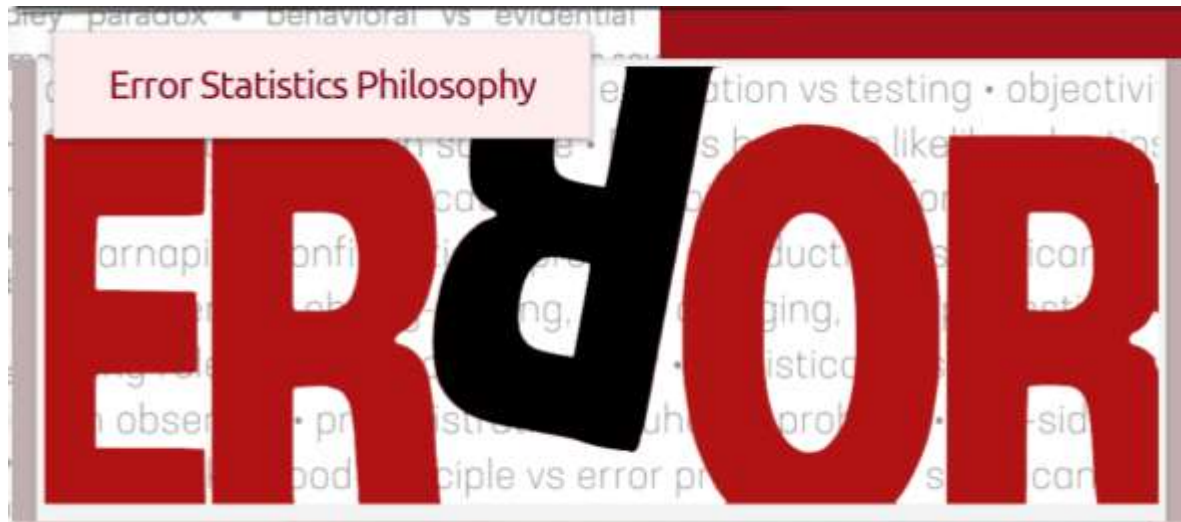
Comment

Open Access

Published: 27 August 2019

A short comment on statistical versus mathematical modelling

Andrea Saltelli 





A. Saltelli (Guest post): What can we learn from the debate on statistical significance?

Posted on November 22, 2019 by Mayo



Professor Andrea Saltelli
Centre for the Study of the Sciences and the Humanities (SVT), University of Bergen (UIB, Norway),
&
Open Evidence Research, Universitat Oberta de Catalunya (UOC), Barcelona

What can we learn from the debate on statistical significance?

Recent Comments:



Cargo-cult statistics and scientific crisis

Written by Philip B. Stark and Andrea Saltelli on 05 July 2018. Posted in [Science](#)



Statistics in the
wake of the
reproducibility
crisis

Statistical wars?



Futures

Volume 91, August 2017, Pages 5-11

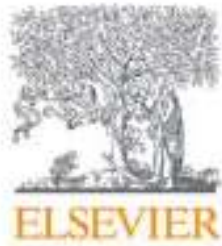


What is science's crisis really about?

Andrea Saltelli ^{a, b}  , Silvio Funtowicz ^a

Science's crisis,
ethics and
metaphysics

Science's crisis and
regulation



Futures

Volume 104, December 2018, Pages 85-90



Why science's crisis should not become a political battling ground

Andrea Saltelli 



Int. J. Foresight and Innovation Policy, Vol. 9, Nos. 2/3/4, 2013

What do I make of your latinorum? Sensitivity auditing of mathematical modelling

Andrea Saltelli
Ângela Guimarães Pereira
Jeroen P. Van der Sluijs
Silvio Funtowicz

When All Models Are Wrong

ANDREA SALTELLI
SILVIO FUNTOWICZ



Ângela Guimarães Pereira



Jeroen P. Van der Sluijs

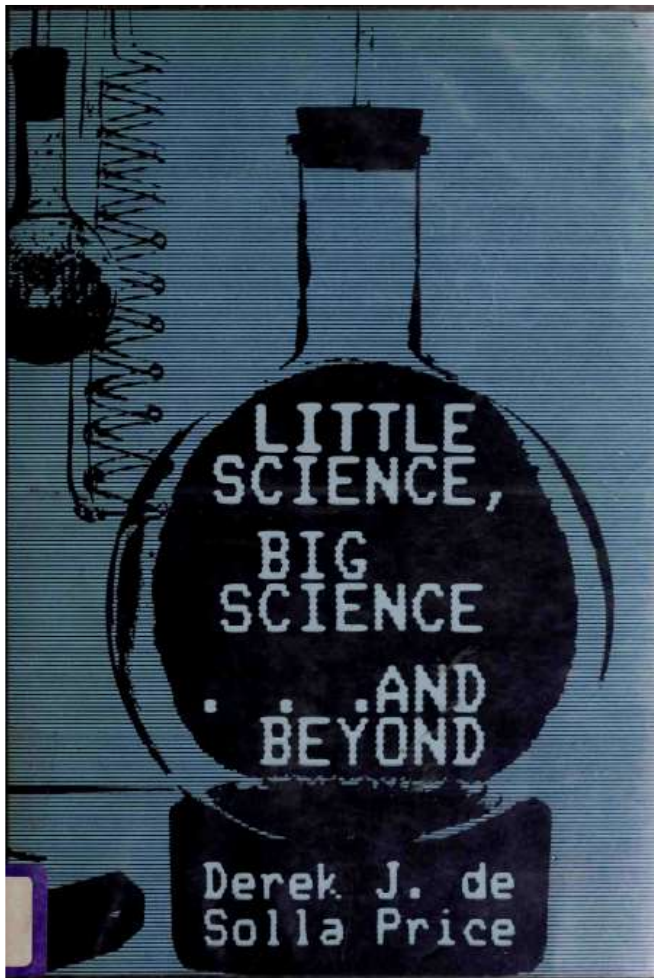


THE RIGHTFUL PLACE OF SCIENCE: SCIENCE ON THE VERGE

CONTRIBUTORS

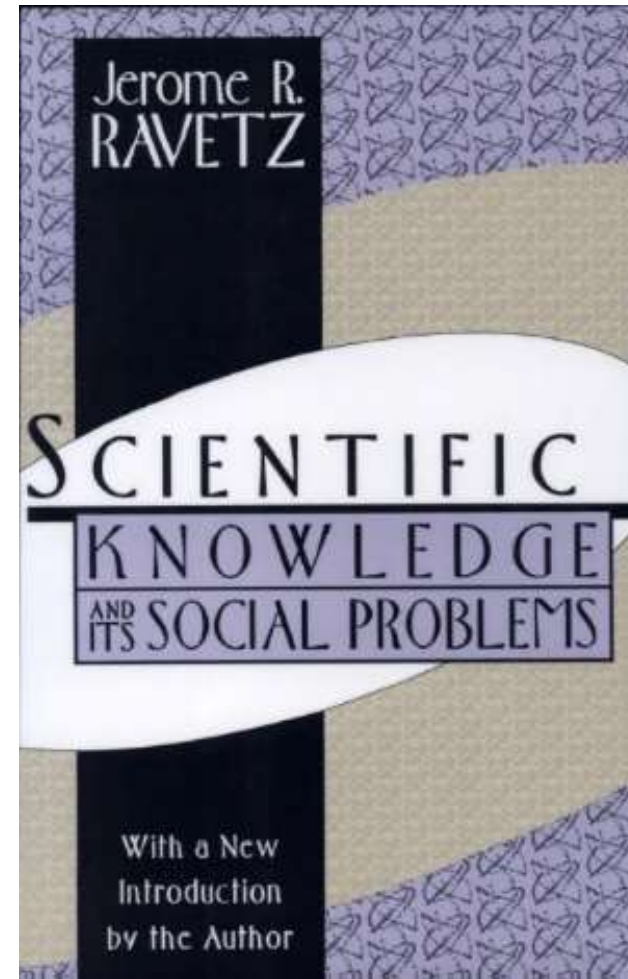
Alice Benessia	Jerome R. Ravetz
Silvio Funtowicz	Andrea Saltelli
Mario Giampietro	Roger Strand
Ângela Guimarães Pereira	Jeroen P. van der Sluijs





Derek J. de
Solla Price

←1963



Jerome R.
Ravetz

←1971

A crisis in the quality control of
science was predicted

Dangers of mathematization of economics



Wolfgang Drechsler



Erik S. Reinert



Paul Romer



Philip Mirowski

W. Drechsler, "On the possibility of quantitative-mathematical social science, chiefly economics," *J. Econ. Stud.*, vol. 27, no. 4/5, pp. 246–259, 2000.

E. S. Reinert, "Full circle: economics from scholasticism through innovation and back into mathematical scholasticism," *J. Econ. Stud.*, vol. 27, no. 4/5, pp. 364–376, Aug. 2000.

P. Romer, "Mathiness in the Theory of Economic Growth," *Am. Econ. Rev.*, vol. 105, no. 5, pp. 89–93, May 2015.

Mirowski, Philip. 2013. *Never Let a Serious Crisis Go to Waste: How Neoliberalism Survived the Financial Meltdown*. Verso.



The opening of Central and Eastern European countries to free trade: A critical assessment

Marta Kuc-Czarnecka ^a  , Andrea Saltelli ^b , Magdalena Olczyk ^c , Erik Reinert ^d 

- With accession, 'Old' Europe managed a profit at the expense of the new one
- This was caused by trade asymmetries and by deindustrialisation of new member states
- Migration from accession countries became a source of cheap labour

Comparing official narratives with what the data say ...



The opening of Central and Eastern European countries to free trade: A critical assessment

Marta Kuc-Czarnecka ^a  , Andrea Saltelli ^b , Magdalena Olczyk ^c , Erik Reinert ^d 

- The Euro has not helped accession countries or the EU Southern periphery
- The EU enlargement has many losers – in both the old and the new EU

Comparing official narratives with what the data say ...



UCL Institute for
Innovation and
Public Purpose



WORKING PAPER
WP 2021/07

Altered States: Cartesian and Ricardian dreams

Erik S. Reinert

Tallinn University of Technology

UCL Institute for Innovation and Public Purpose

Monica di Fiore

Institute for Cognitive Sciences and Technologies, Consiglio Nazionale delle Ricerche

Andrea Saltelli

Open Evidence Research, Universitat Oberta de Catalunya (UOC)

Jerome R. Ravetz

Institute for Science, Innovation and Society, University of Oxford



[14 apr 2021] Webinar: Altered States: Cartesian and Ricardian dreams

Chief Editor / 6 April 2021 / [Events](#)

LIVE WEBINAR



14 APR 2021

17:00 (CET) | 11:00 (EST)

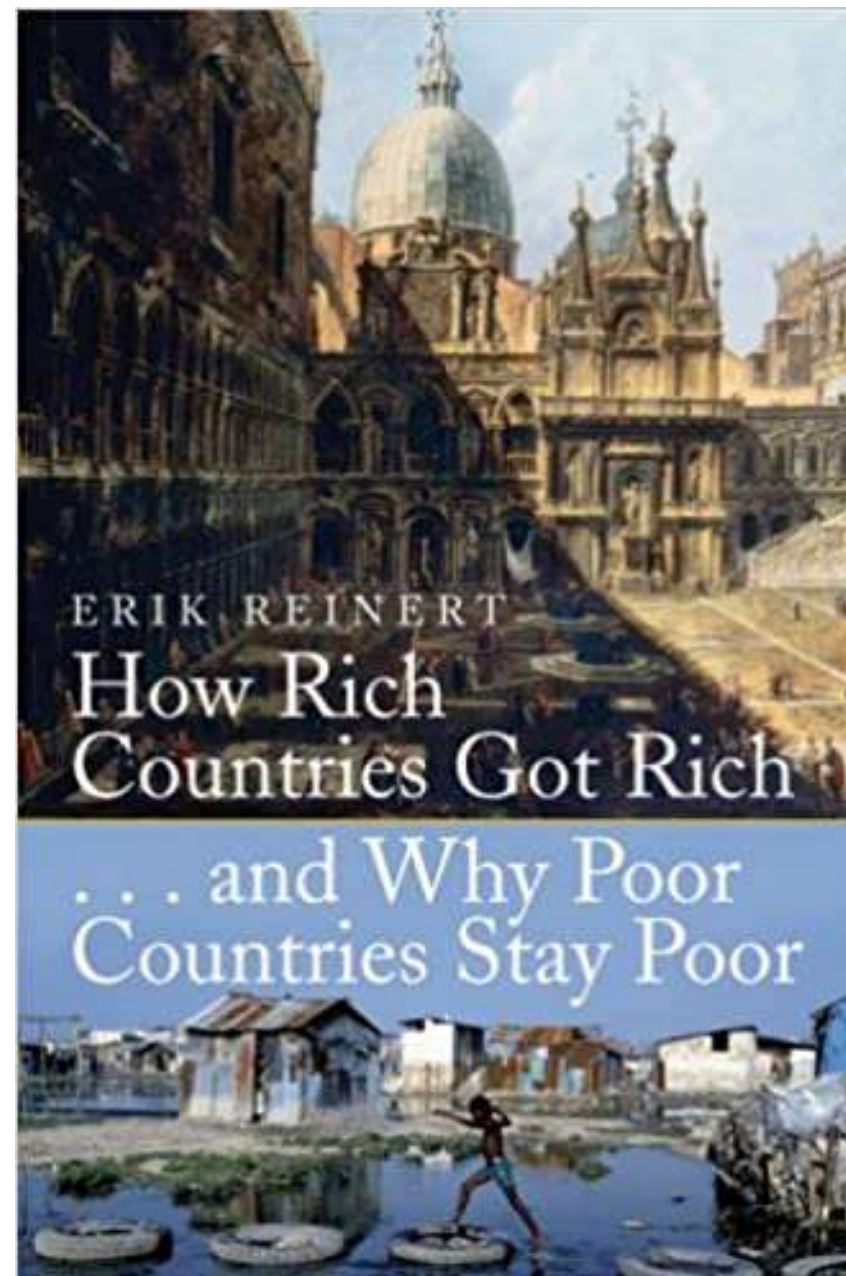


WEBINAR

ft. Erik Reinert and Andrea Saltelli



@MAGIC_NEXUS
@ICTA_UAB





Condorcet's
algorithms and
Descartes'
Geometry: the
dream always had a
quantification
agenda



‘Mathématique sociale’: We still use today terms such as ‘Condorcet method’, ‘Condorcet winner’, ‘Condorcet–ranking procedure’



Nicolas de Caritat,
marquis de Condorcet
(1743– 1794)
,

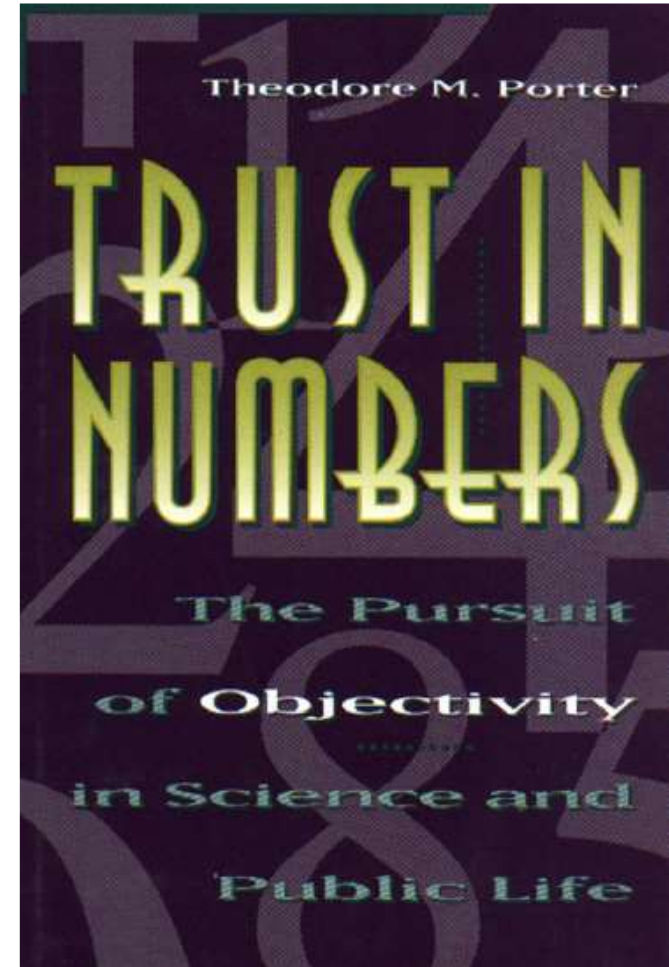
Feldman, J., 2005, Condorcet et la mathématique sociale: enthousiasmes et bemols, Mathematics and Social Sciences, 172(4), 7–41, <http://www.ehess.fr/revue-msh/pdf/N172R955.pdf>

Munda G. (2007) – Social multi-criteria evaluation, Springer-Verlag, Heidelberg, New York, Economics Series

Numbers and trust

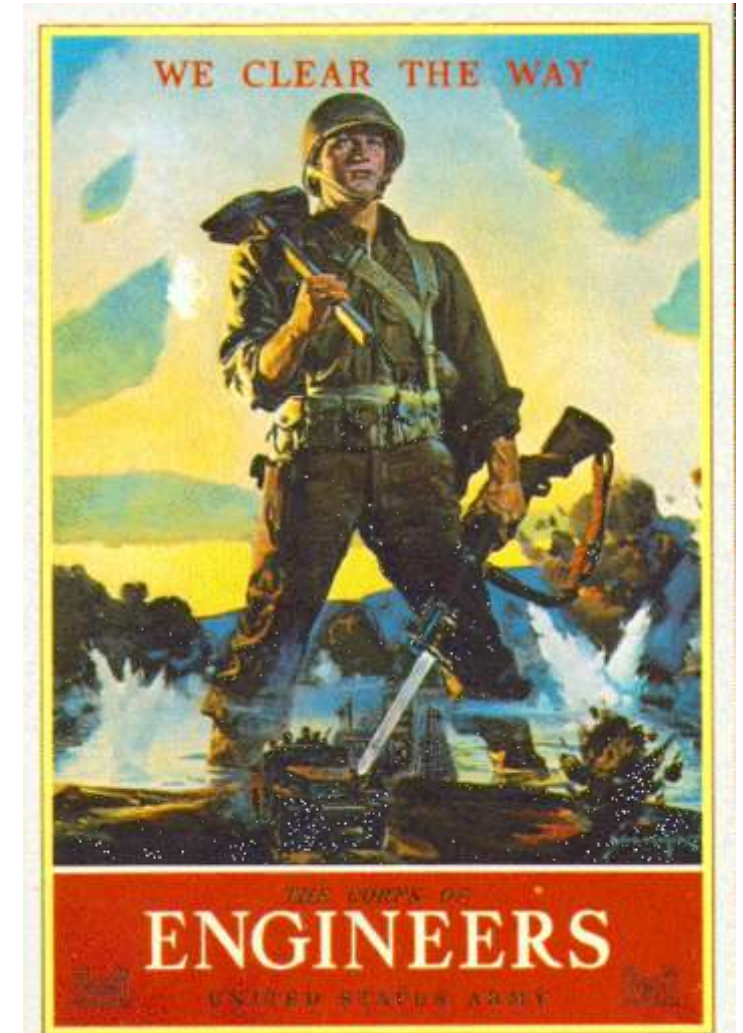


Theodor
M. Porter



Theodore M. Porter, *Trust in Numbers,
The Pursuit of Objectivity in Science and Public Life*, Princeton 1995

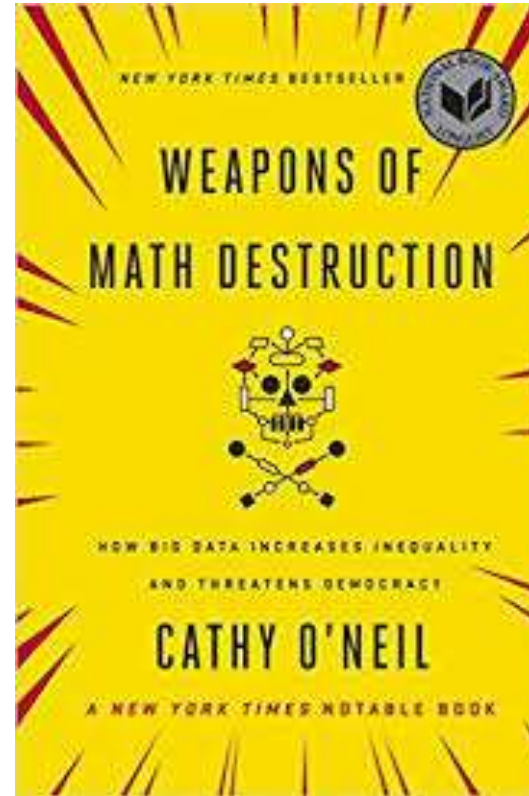
Porter's story: Quantification needs judgment which in turn needs trust ...without trust quantification becomes mechanical, a system, and 'systems can be played'.



Alarm for Weapons of Math Destruction



Cathy O'Neil

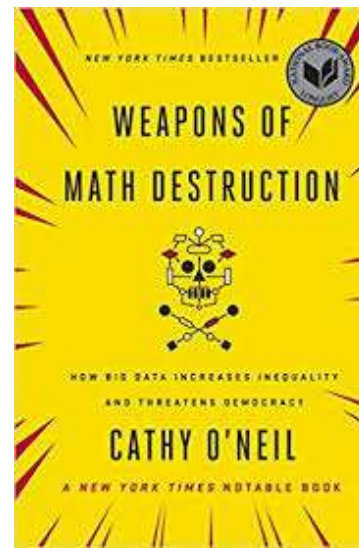


O'Neil, C. (2016). Weapons of math destruction : how big data increases inequality and threatens democracy. Random House Publishing Group.

Opacity (also because of trade secrecy) of algorithms used to decide on recruiting, carriers (including of researchers), prison sentencing, paroling, custody of minors, political campaigns...

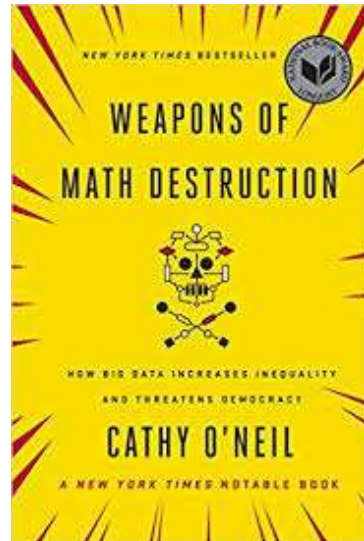
O'Neil, C. (2016). Weapons of math destruction : how big data increases inequality and threatens democracy. Random House Publishing Group.

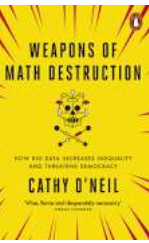
Brauneis, R., & Goodman, E. P. (2018). Algorithmic Transparency for the Smart City. Yale Journal of Law & Technology, 20, 103–176. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3012499



Opacity coupled with opportunity for scale and damage and with non-appealability make them an instrument of oppression & inequality

Cathy O'Neil Google talk <https://www.youtube.com/watch?v=TQHs8SA1qpk>





NETFLIX

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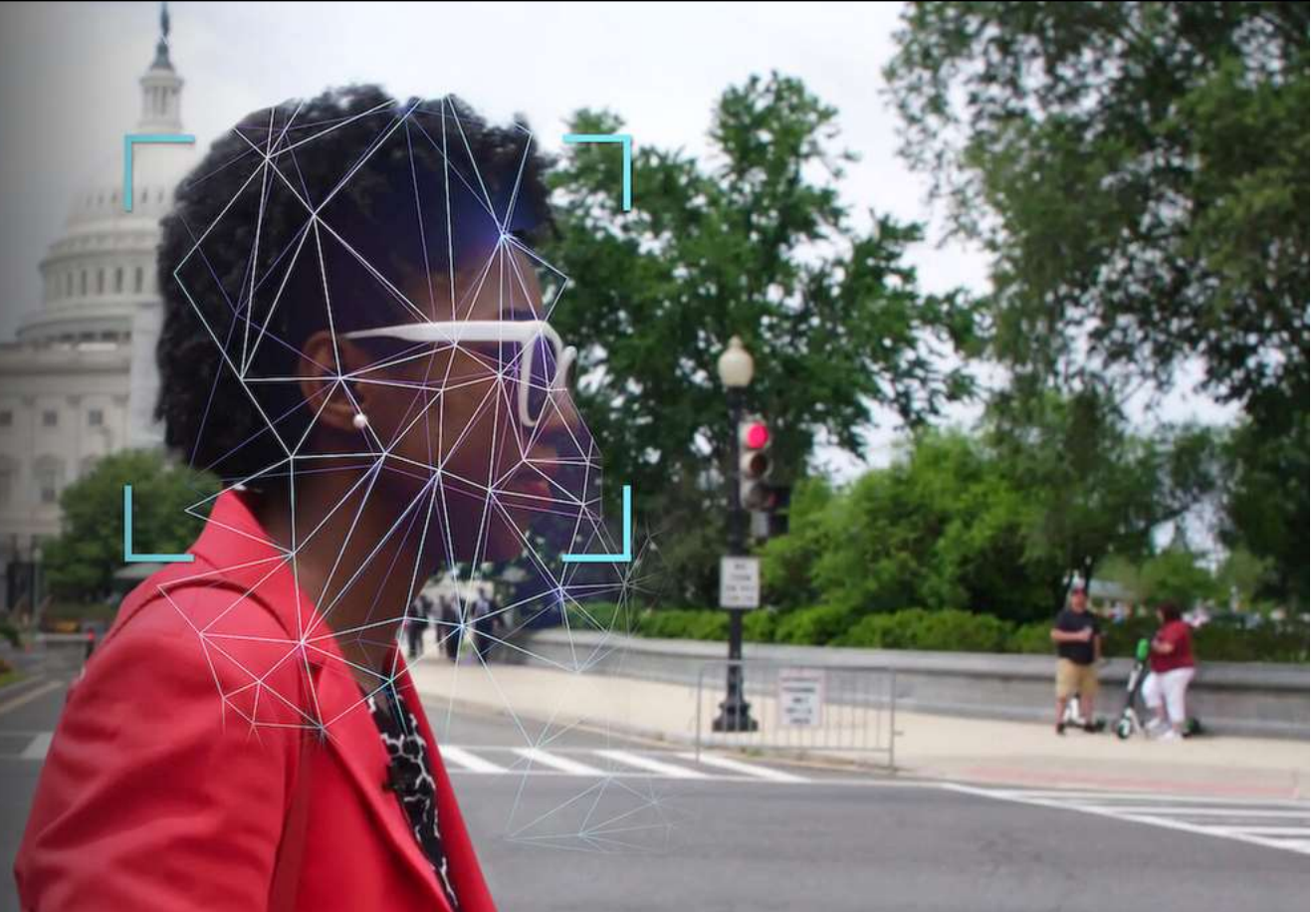
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C O D E D B I A S

Coded Bias

2020 | 12+ | 1h 25m | Science & Nature Docs

This documentary investigates the bias in algorithms after M.I.T. Media Lab researcher Joy Buolamwini uncovered flaws in facial recognition technology.





Algorithmic Justice
League

<https://www.ajl.org/>

The New York Times

Bloomberg
Business

Forbes

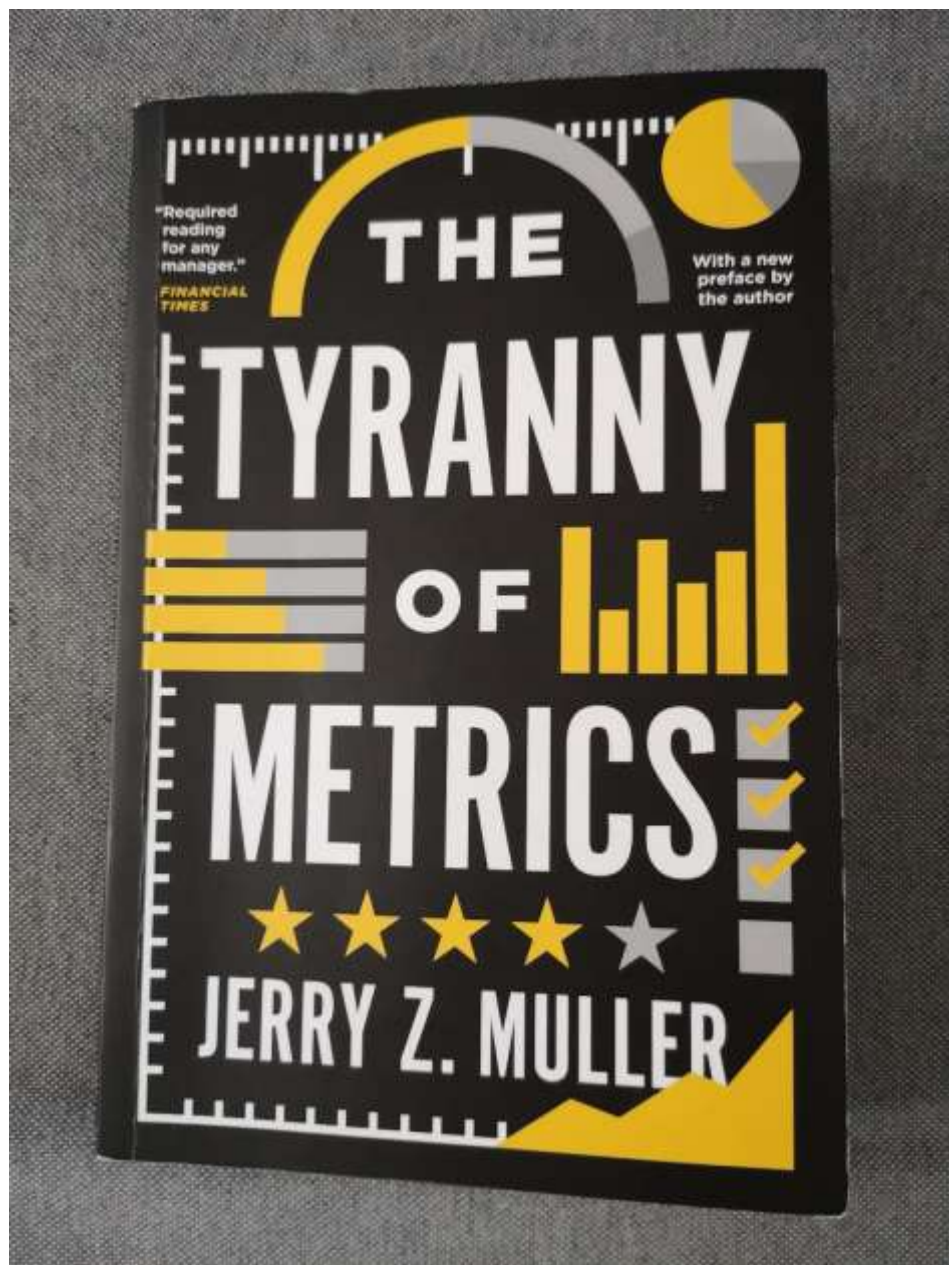
TIME

FORTUNE

TED

WIRED

The Telegraph



J. Z. Muller, The tyranny of metrics. Princeton University Press , 2018.



Charles Goodhart

p. 44 “Any ... measures necessarily involve a loss of information ... [and distorts behavior]” (Porter, 1995)

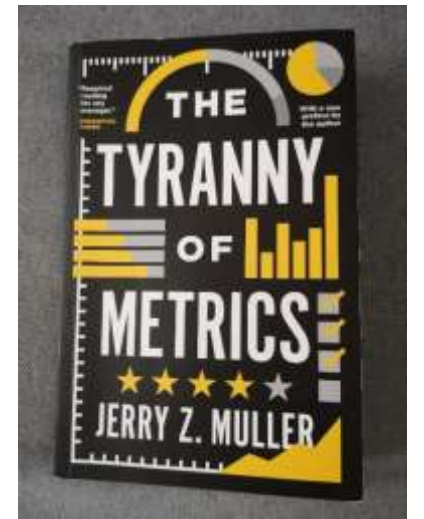
"When a measure becomes a target, it ceases to be a good measure."

Also known as Campbell's law (1976);
https://en.wikipedia.org/wiki/Goodhart%27s_law

Metric fixation, or the irresistible pressure to measure performance

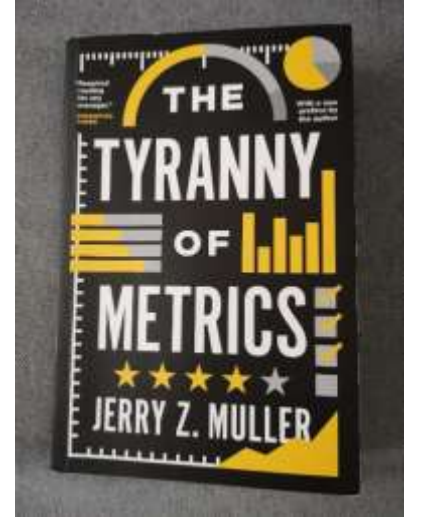
Gaming of metrics (recall Goodhart law)

A wealth of case studies from education to war to medicine to foreign aid..



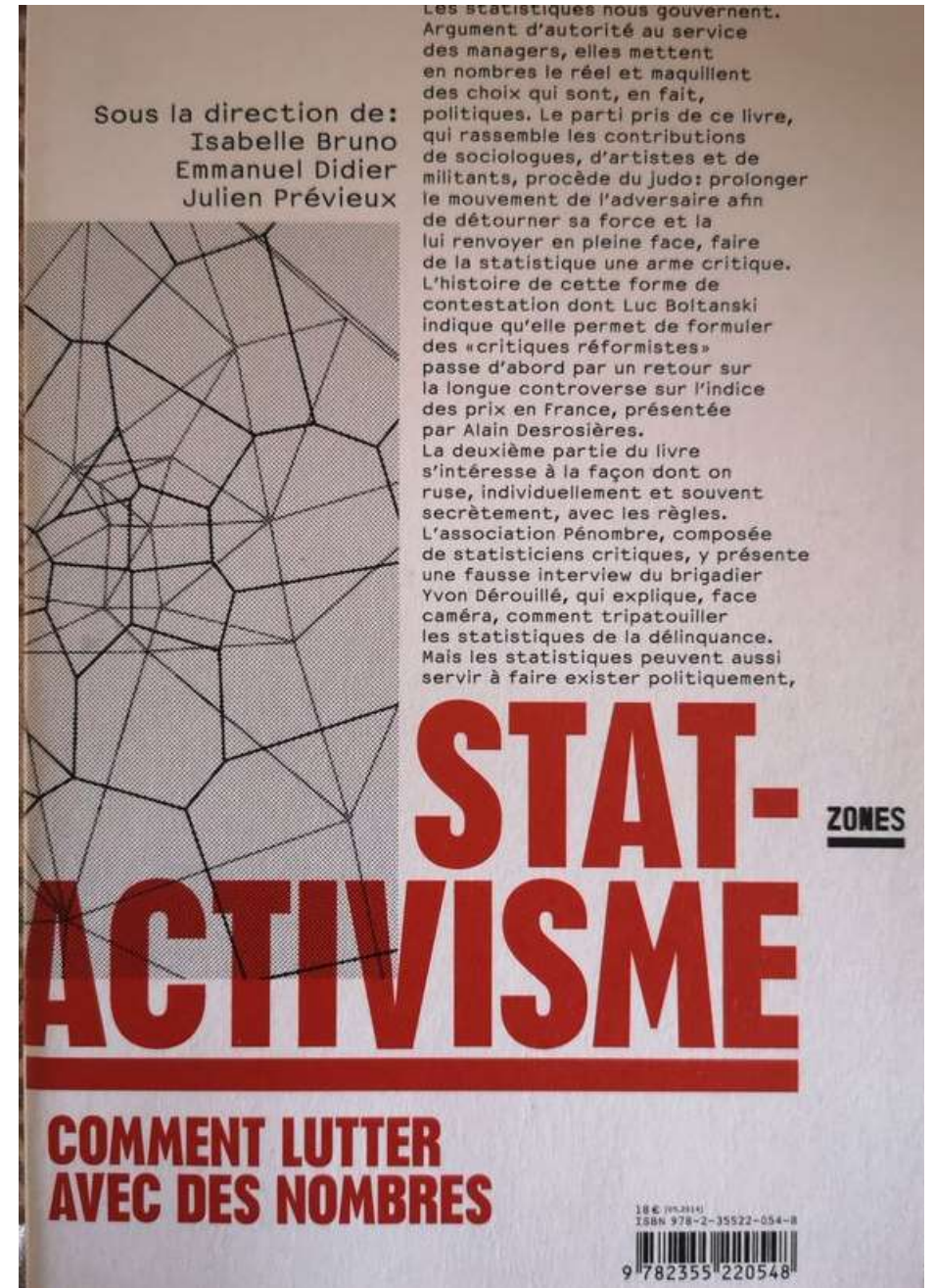
A concluding remark of Muller

Considering all of the above keep in mind at every step that “the best use of metrics **may** be not to use it at all”



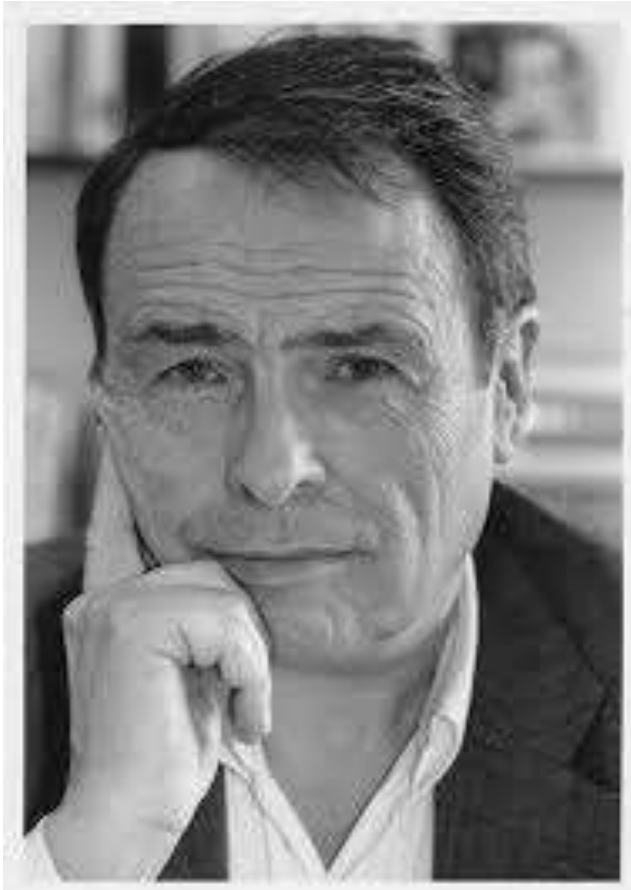
Do we need a movement of resistance?

I. Bruno, E. Didier, and J. Prévieux, Stat-activisme. Comment lutter avec des nombres. Paris: Zones, La Découverte, 2014



How to be a "statactiviste"?

1. Deconstruct existing metrics, including using irony (Pierre Bourdieu, *Les héritiers*).



La sociologie,
ça doit être
rigolo

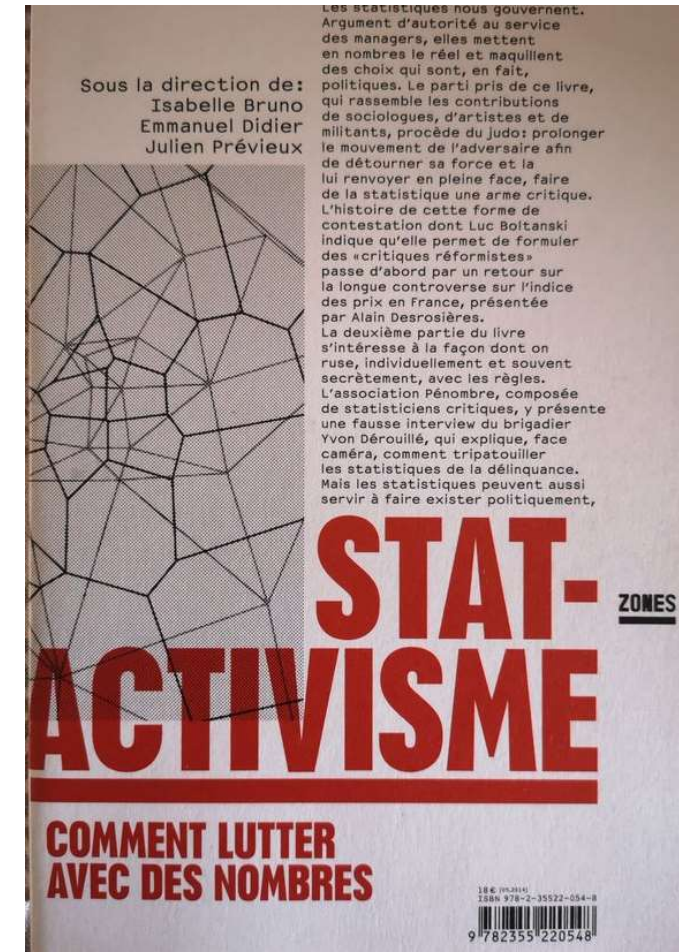
(Sociology must be fun)



How to be a "statactiviste"?

2. Gaming metrics (statistical judo) – use Goodhart's law to your advantage – or make the ruse public.

- Police statistics in NY



How to be a "statactiviste"?

3. Bring to the surface what is hidden / unsaid/ excluded – new social classes, marginalization, minorities:

- ‘Creative class’ or ‘precarious intellectuals’?



How to be a "statactiviste"?

4. Measure something different.

- Suicides at France Telecom;
- BIP 40, a new French measure of poverty/inequality



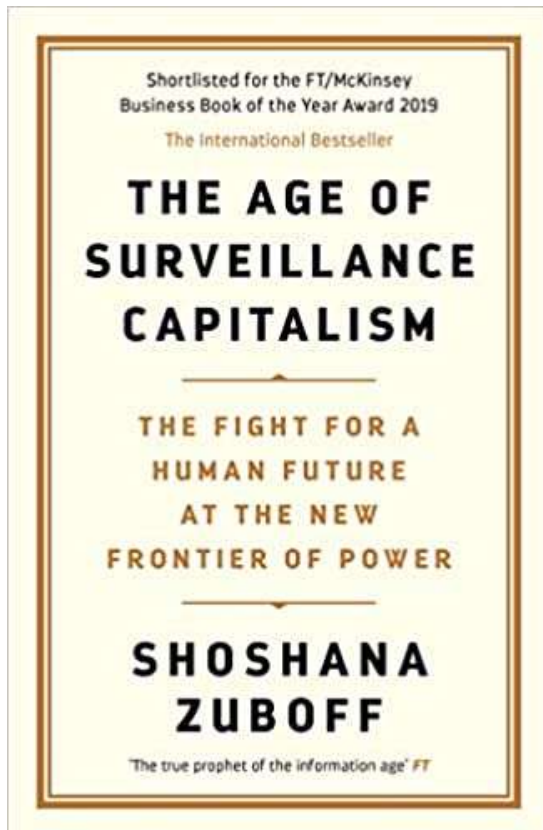
Important:

“Quantification should not be abandoned to the advantage of exalting qualities, singularities, and the incommensurable. Such an abandon would be a tactical error”

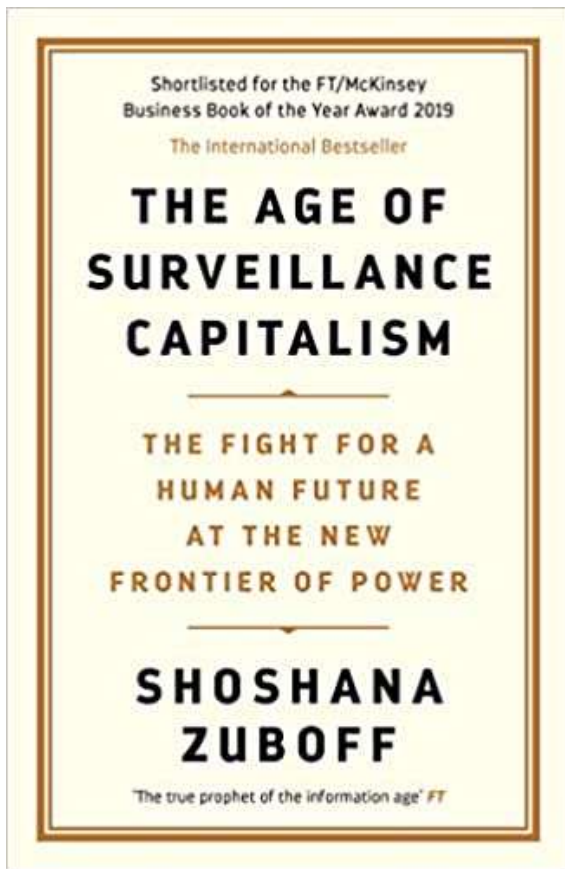




A project of domination of consumers and voters is made possible by artificial intelligence, big data & cognitive psychology



Inequality, power asymmetries and the world of surveillance capitalism



Chapters 11 & 12

Instrumentarian
power



Chapter 10

Néorationalism d'importation

*La trollisation de l'espace
public*

Cognitive psychology
and evolutionary
psychology

A project of domination?



Making algorithms
'good' or 'transparent'
is beyond the point.
Algorithms create new
norms of good or bad

Algorithm =
ethicopolitical
arrangement of
values, assumptions,
and propositions about
the world



Louise Amoore



THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE ■

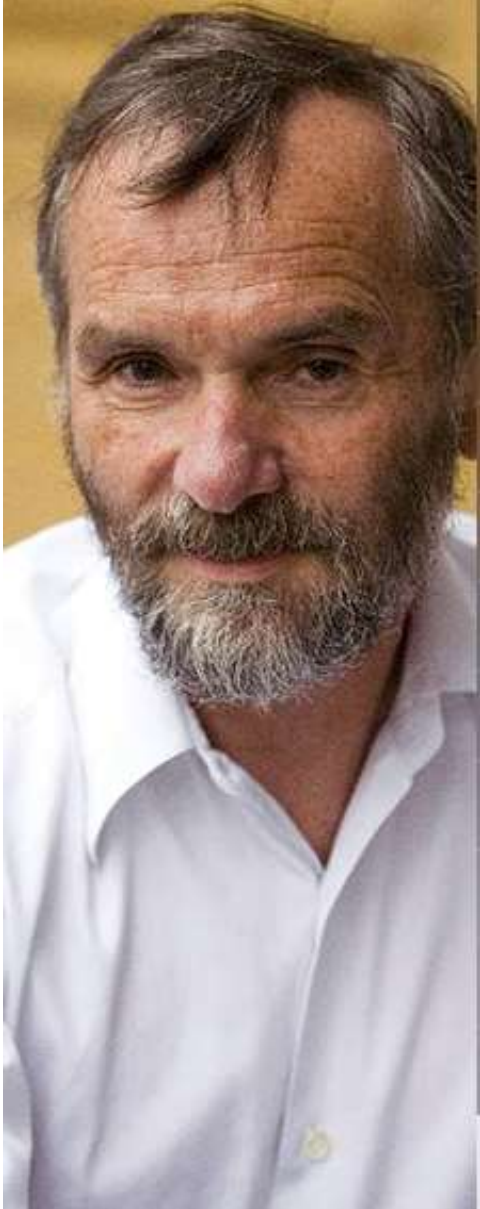
LSE Research Online

[Nick Couldry](#) and Ulises Mejias

Data colonialism: rethinking big data's relation to the contemporary subject

Couldry, Nick and Mejias, Ulises (2018) Data colonialism: rethinking big data's relation to the contemporary subject. *Television and New Media*, vol. 20, 4: pp. 336-349.

Alain Supiot

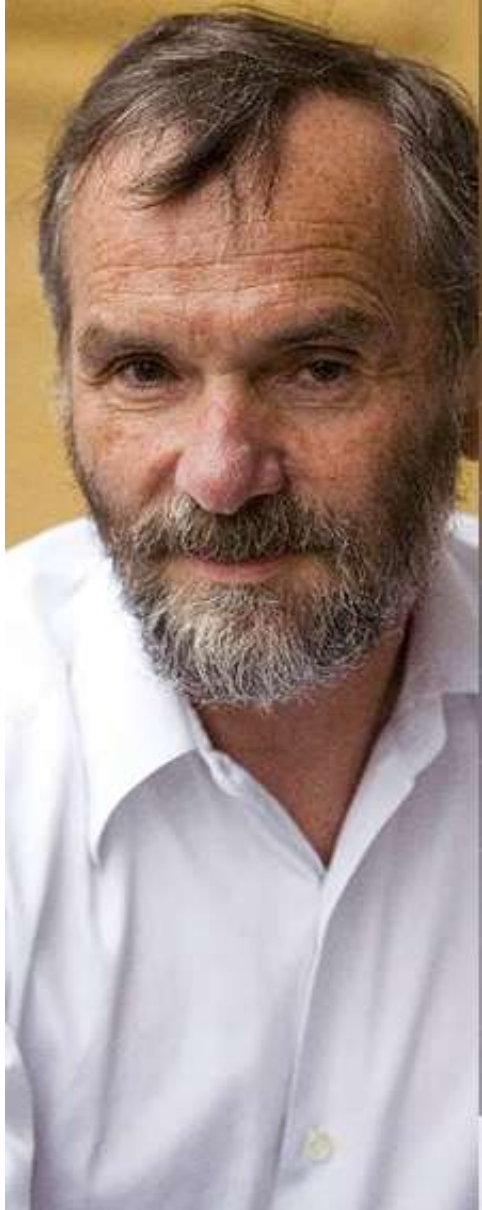


An indictment of the
Total Market and the
normative uses of
economic quantification

<https://www.college-de-france.fr/site/en-alain-supiot/Governance-by-Numbers-Introduction.htm>



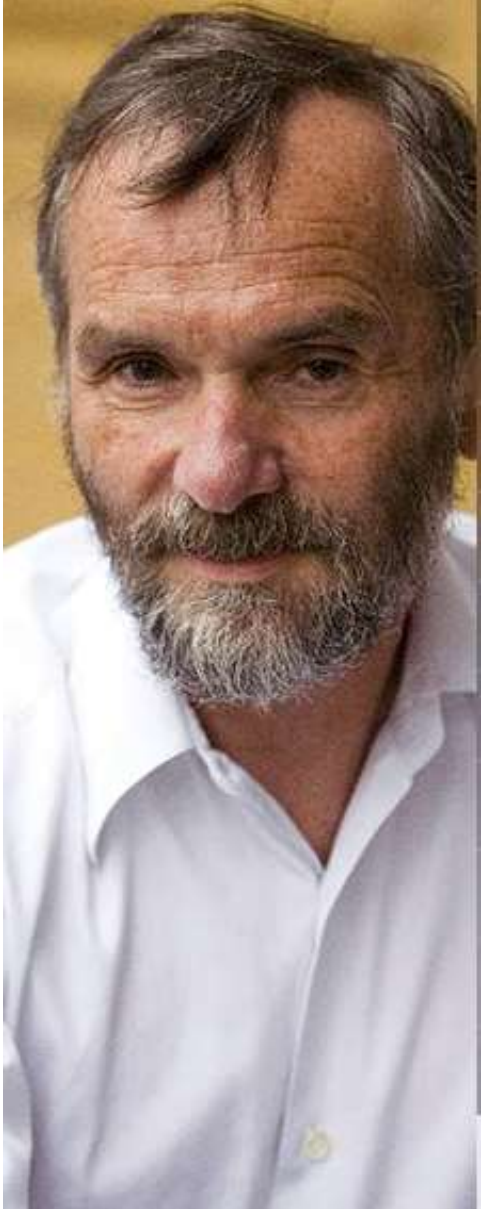
Alain Supiot



...we have entered the era of the cybernetic imaginary, which revives the West's age-old dream of grounding social harmony in calculations.

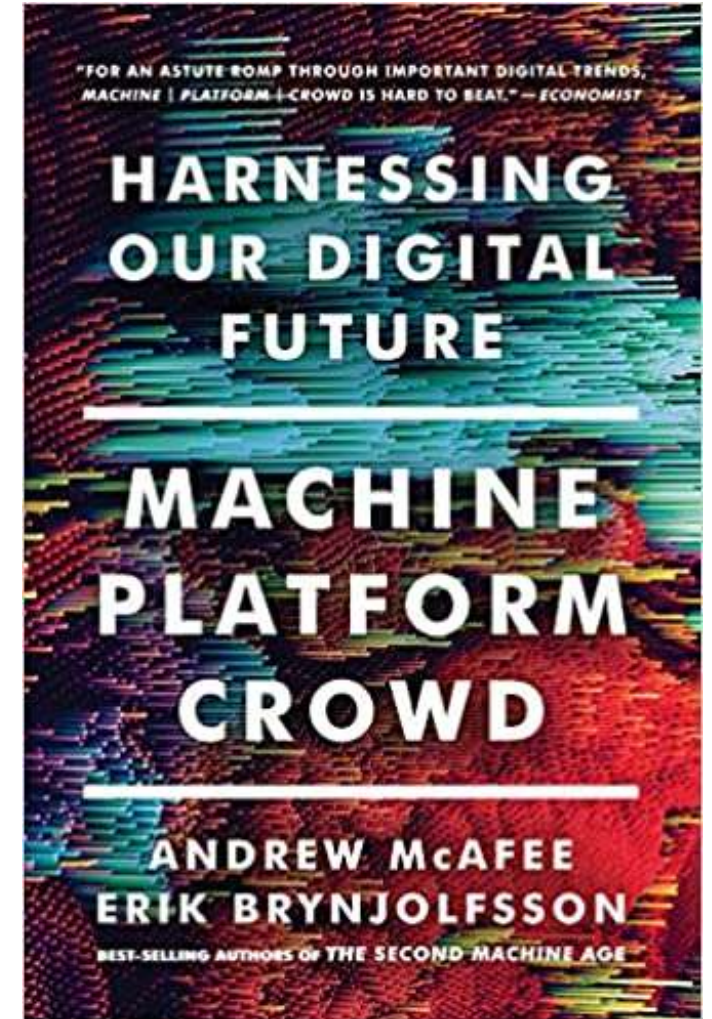
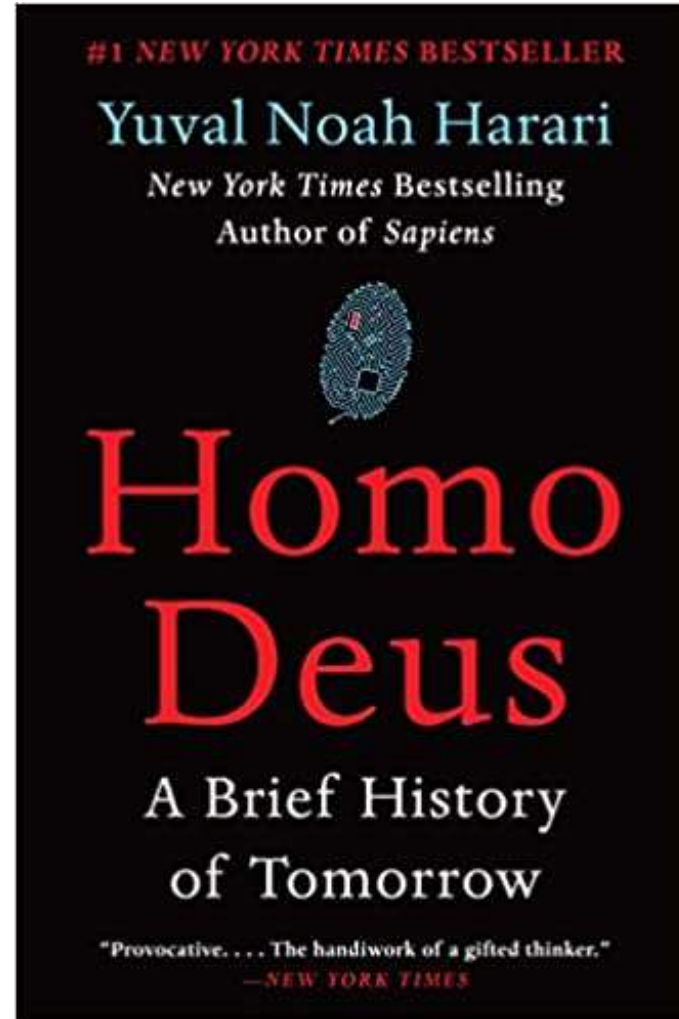
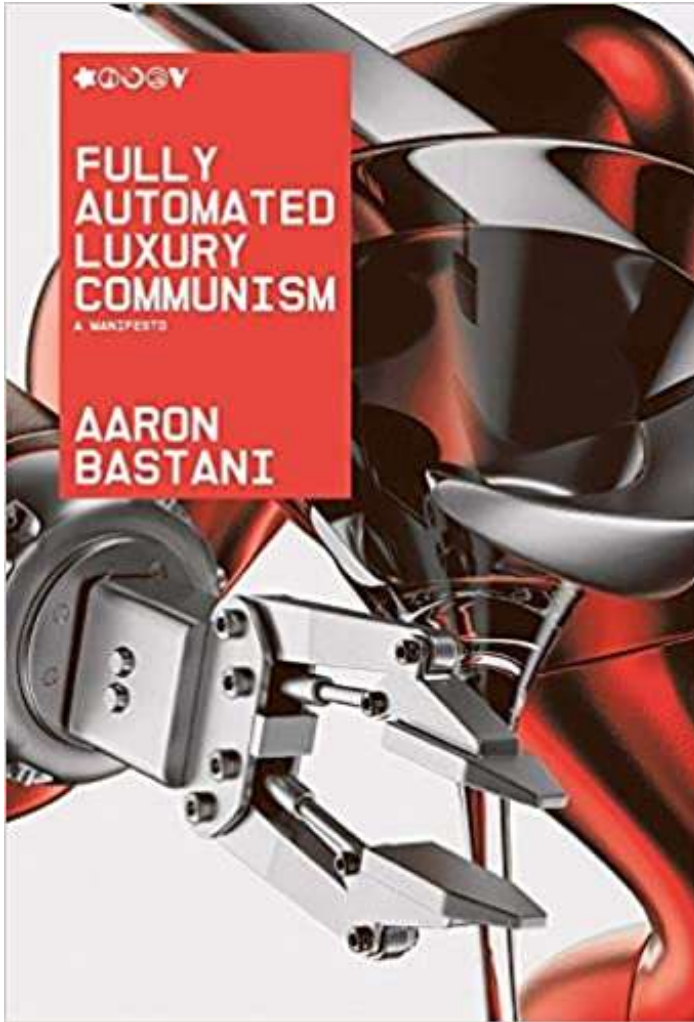
Repudiating the goal of governing by just laws, this new discourse advocates in its stead the attainment of measurable objectives efficiently

Alain Supiot



... This leaves no option open to populations or countries than to ride roughshod over social legislation, and pledge allegiance to those stronger than they are

And yet ...which is the
prevailing sociotechnical
imaginary ?



Good news!

“Often, immersion in the facts makes value disagreements feel much less relevant” (C. Sunstein)



Cass Sunstein, winner of
the 2018 Holberg Prize



Mind the assumptions

Assess uncertainty and sensitivity

Mind the hubris

Complexity can be the enemy of relevance



Mind the framing

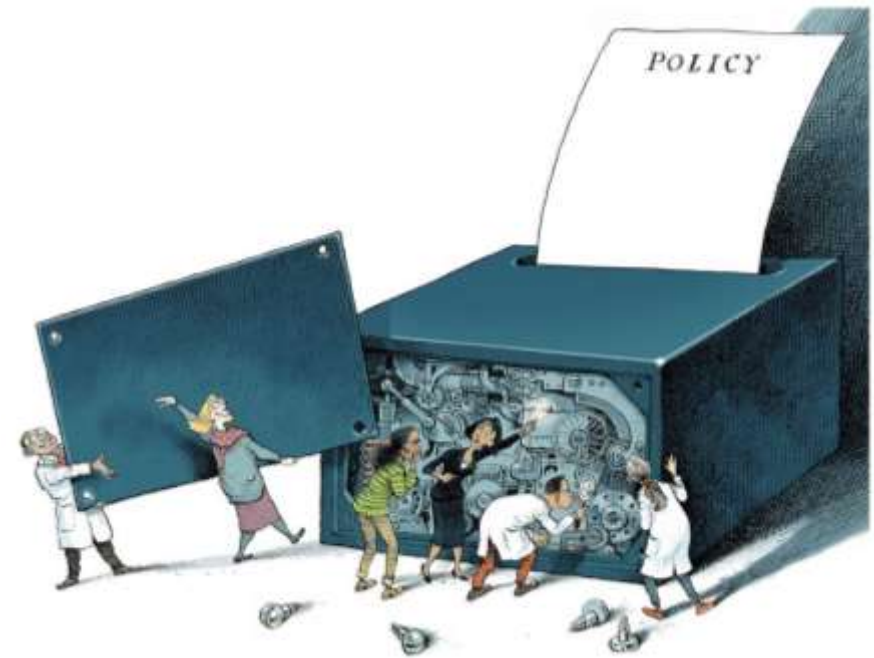
Match purpose and context

Mind the consequences

Quantification can backfire.

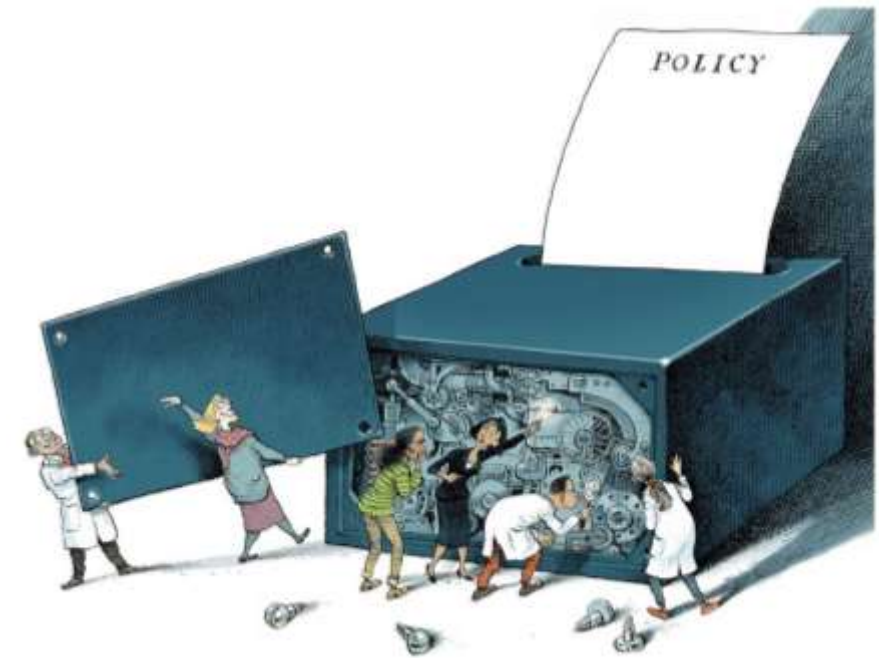
Mind the unknowns

Acknowledge ignorance



Mind the framing

Match purpose and context



… models will reflect the interests, disciplinary orientations and biases of the developers…

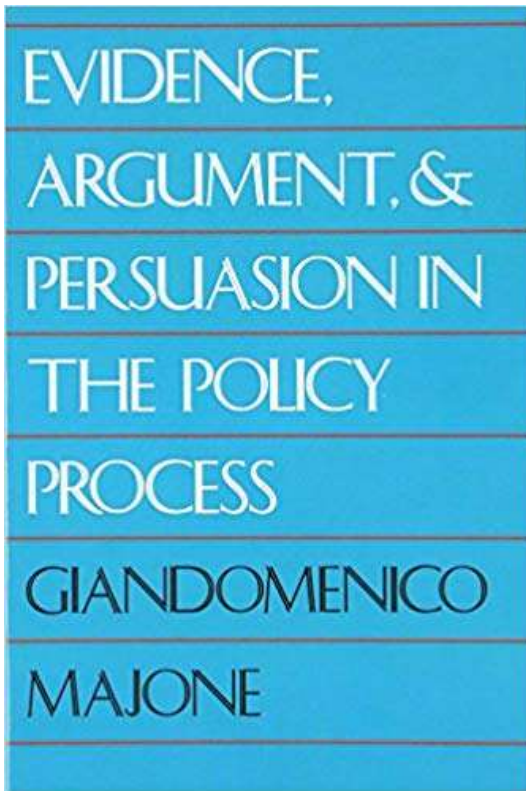
SUPPLEMENTARY INFORMATION

1. Additional information and references >260 references

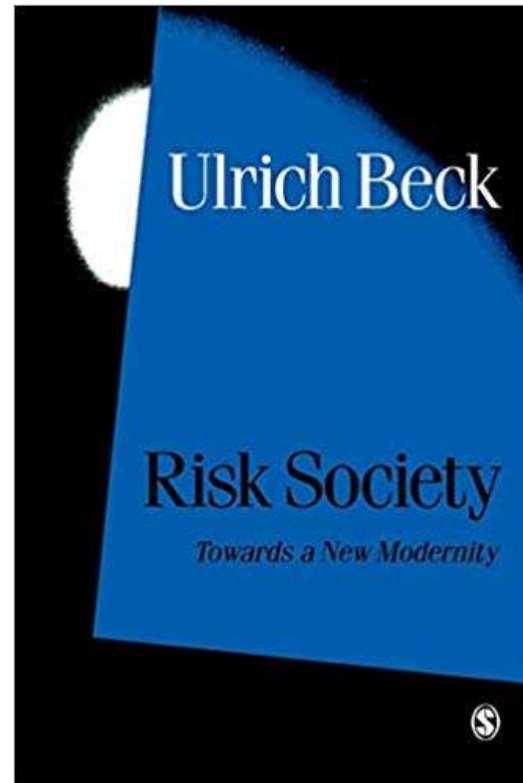
From Ulrich Beck to Giandomenico Majone: the technique is never neutral



Ulrich Beck
(1944 –2015)



1989



1992 (1986)



Environmental Science & Policy

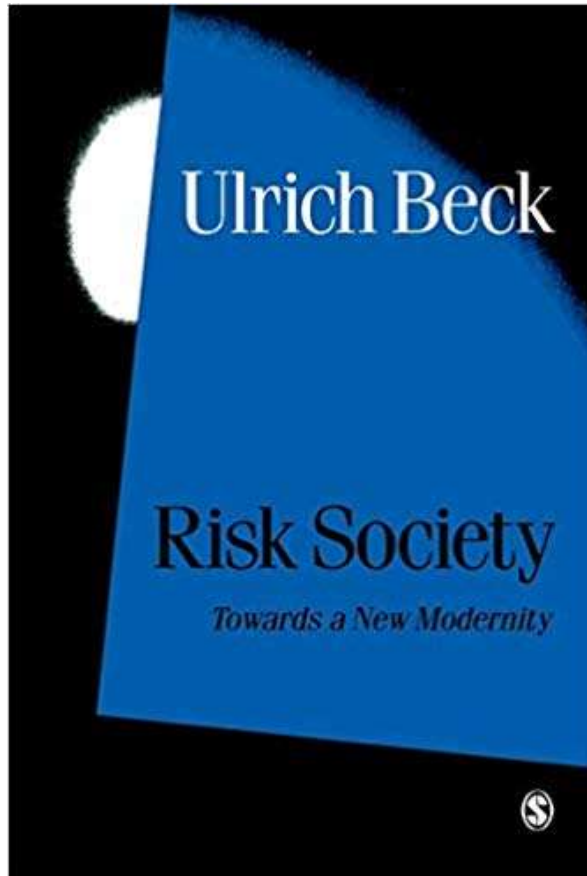
Volume 106, April 2020, Pages 87-98



The technique is never neutral. How
methodological choices condition the
generation of narratives for sustainability

Andrea Saltelli ^{a, b} , Lorenzo Benini ^c, Silvio Funtowicz ^a, Mario Giampietro ^{d, e}, Matthias Kaiser ^a,
Erik Reinert ^{a, f}, Jeroen P. van der Sluijs ^{a, g, h}

“It is not uncommon for political programs to be decided in advance simply by the choice of what expert representatives are included in the circle of advisers.”



1992 (1986)



Ulrich Beck
(1944 –2015)

The technique is never neutral. How methodological choices condition the generation of narratives for sustainability



Environmental Science & Policy
Volume 106, April 2020, Pages 87–98



Andrea Saltelli ^{a, b}  , Lorenzo Benini ^c, Silvio Funtowicz ^a, Mario Giampietro ^{d, e}, Matthias Kaiser ^a, Erik Reinert ^{a, f}, Jeroen P. van der Sluijs ^{a, g, h}

Combine more lenses, including Post-normal science (PNS), Bioeconomics, and Non-Ricardian economics

Why ethics of quantification is needed now

Andrea Saltelli

Open Evidence Research, Universitat Oberta de Catalunya, Barcelona, Spain

Antonio Andreoni

UCL Institute for Innovation and Public Purpose;
South African Research Chair in Industrial
Development, University of Johannesburg, South
Africa

Wolfgang Drechsler

Tallinn University of Technology, Estonia;
UCL Institute for Innovation and Public Purpose;
Davis Center at Harvard University, United States

Jayati Ghosh

University of Massachusetts Amherst, United
States;
UCL Institute for Innovation and Public Purpose

Rainer Kattel

UCL Institute for Innovation and Public Purpose

Ingrid H. Kvangraven

Department of Politics, University of York

Ismael Rafols

Centre for Science and Technology Studies,
Leiden University, the Netherlands

Erik S. Reinert

Tallinn University of Technology, Estonia;
UCL Institute for Innovation and Public Purpose

Andy Stirling

Science Policy Research Unit, University of
Sussex

Ting Xu

School of Law at the University of Essex



**UCL Institute for
Innovation and
Public Purpose**

WORKING PAPER
WP 2021/05



... our world is structured by numbers, visible and invisible, where truth is conveyed and reality constructed

Numbers are seductive, performative, confer to their masters' epistemic power and legitimacy

Governing the modern state, or even contesting it, without numbers is impossible

Numbers are the prevalent means to express value in our societies
... Access & production of numbers reflect and reinforce power imbalances



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Innovation and
Public Purpose**

WORKING PAPER
WP 2021/05

Numbers capture our attention; they illuminate the part of reality which is being numerified, and fatally push those parts into the background which come without the clothing of ...

... numbers are so deeply entrenched in our existence that we barely reflect on them critically them anymore — too close to us, they have become part of the very lens through which we attend to and comprehend the world.



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Public Purpose**

WORKING PAPER
WP 2021/05

Scope for harm from ‘wrong numbers’ e.g. in :

- Medical research
- Higher education
- Governance of science
- Finance
- Numbers from international organizations
 - Food and Agriculture Organization
 - The World Bank
 - OECD
 - ...
- ...



**UCL Institute for
Innovation and
Public Purpose**

WORKING PAPER
WP 2021/05

‘Trendy’ methods may also harm

- Randomized control trials) may be misused to suggest more general conclusions that may not be valid
- Sophisticated statistical/econometric techniques that can be designed in ways that promote particular policy conclusions reflecting researchers’ biases

A global observatory for gene editing

Sheila Jasanoff and J. Benjamin Hurlbut call for an international network of scholars and organizations to support a new kind of conversation.

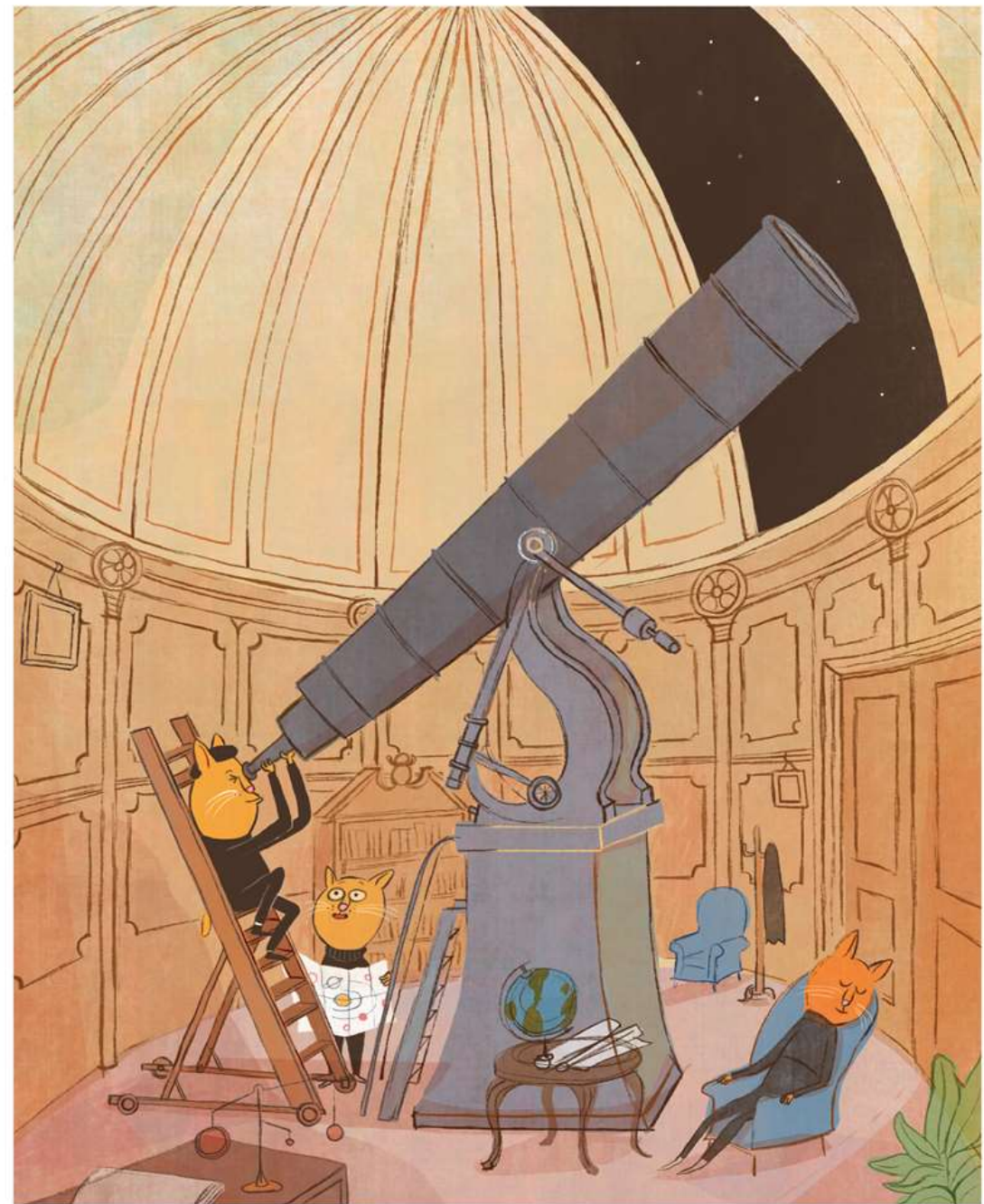
Sheila Jasanoff & J. Benjamin Hurlbut



Illustration by Marina Muun

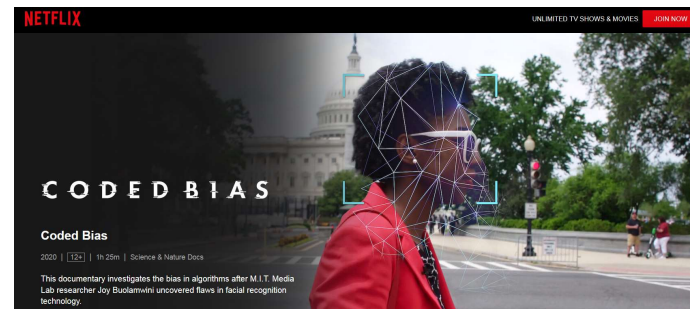
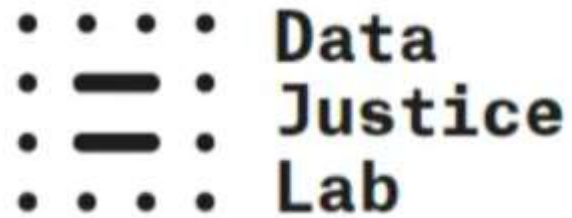
... the potential of numbers to inflict harm is on par or superior to those of biotechnologies

... then how about an observatory for visible and invisible numbers ?



Source: Tor Freeman, <http://tormalore.blogspot.com/>

Existing initiatives looking at quantification



Radical Statistics Group

Using statistics to support progressive social change



THE ALGORITHMIC JUSTICE LEAGUE



eurodad
european network
on debt and development

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[AREAS OF WORK](#)

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It's just the tip of the iceberg: Civil society organisations call for an overhaul of the World Bank following the Doing Business Report scandal

12 October 2021

By Julia Ravenscroft

Winning is not impossible; taking on the
'centres of calculations'

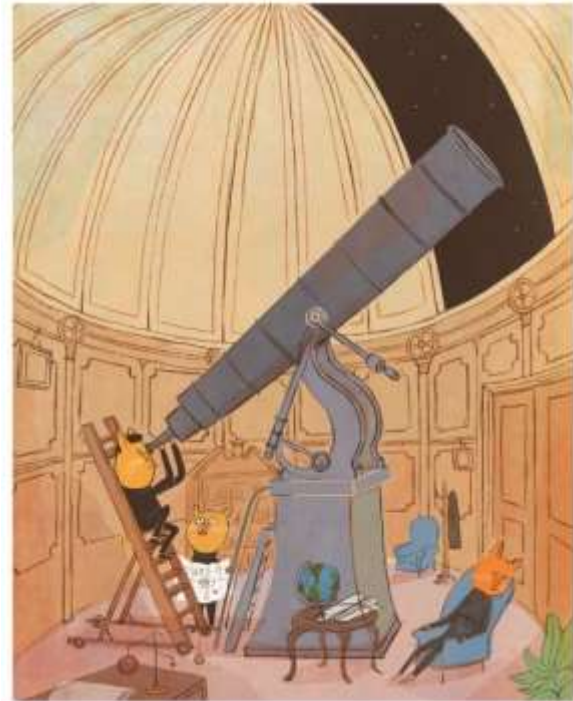
Latour's Centres of Calculation

“Inside the centres ...mobilisation of the largest number of elements ... tallies, totals, graphs, tables, lists”

➔ “A better number is possible” (*statactivistes*)

“... people inside the centres are busy building elements with such properties that when you hold the final elements you also, in some way, hold the others, building, in effect, centres inside the centres.”

➔ dismantle centres inside the centres or/and create new centres



The End



@andreasaltelli