

The Joys of Disagreeing

Culture, Uncertainty, Modelling

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Acknowledgments

- IFoA Working Party on Model Risk (Phase 1)
 - A Aggarwal, MB Beck, M Cann, T Ford, D Georgescu, N
 Morjaria, AD Smith, Y Taylor, AT, L Witts, I Ye
 - M Thompson, IIASA
- Model Risk: Daring to Open the Black Box
 - Winner of the 2015 Peter Clark Prize
 - Taming Uncertainty: The Limits of Quantification
- Literature (starting points)
 - Thompson et al (1990), Cultural Theory
 - Verwej (2011), Clumsy Solutions for a Wicked World

Structure

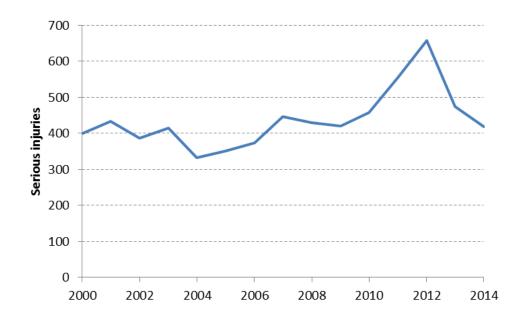
- 1. Risk & culture
 - Cycling helmets
 - Party politics
 - Climate change
- 2. Models
 - Uncertainty
 - Governance
 - Regulation

London



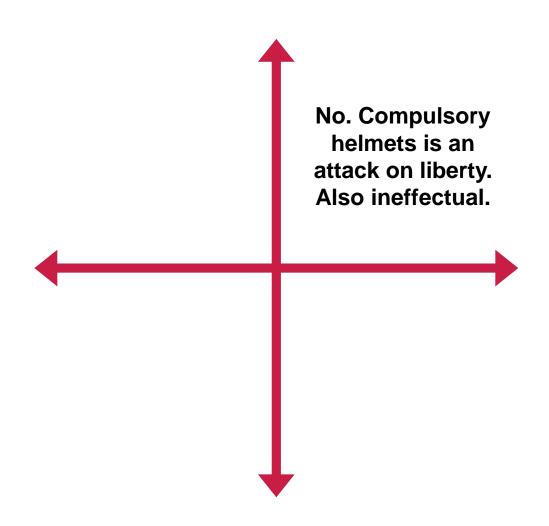
London

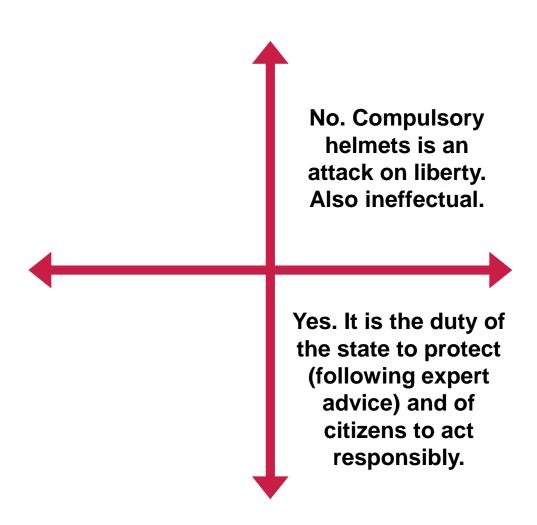
- Nr of London cycling journeys approximately doubled over the last 15 years
- 10-20 cyclists killed each year



A question

- Studies have shown that, in the case of a fall, cycling wearing a helmet reduces the risk of serious head injury to the cyclist
- Should wearing a cycling helmet be compulsory?





No. Compulsory helmets is an attack on liberty. Also ineffectual.

No. Just a
distraction from
big issues of
infrastructure and
driver behaviour.
Will discourage
cycling.

Yes. It is the duty of the state to protect (following expert advice) and of citizens to act responsibly.

Copenhagen



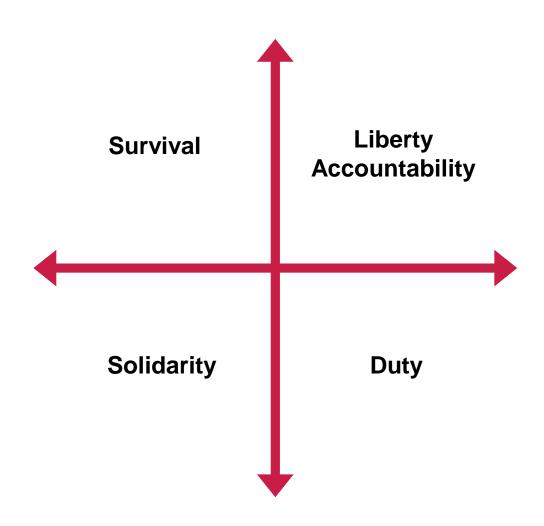
Doesn't matter. If it happens it happens.

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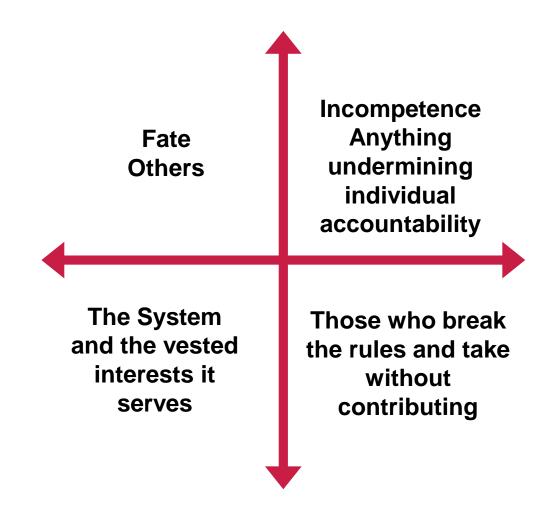
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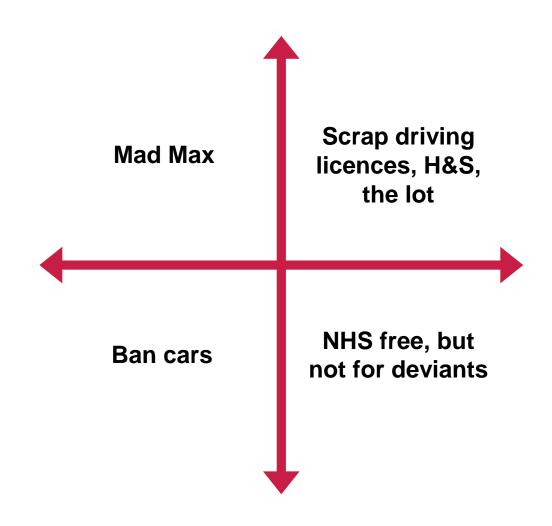
Values



Blame



Dystopias



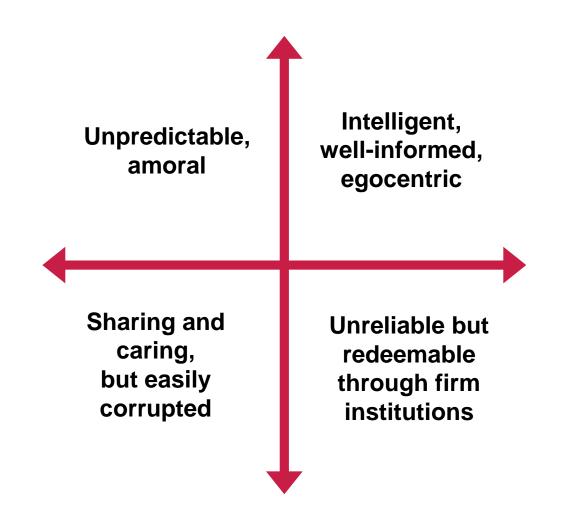
Questions

- What values underlie different responses?
- Who do we blame when something goes wrong?
- How do we view human nature?
- How do we want to organise society?
- How should we deal with big risks?

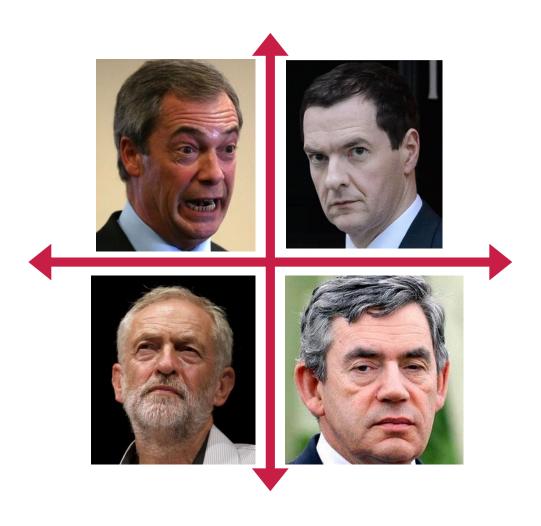
Plural Rationality Theory

- Four distinct rationalities and ways of life
 - Each tied to ways of organising
 - Each with a supporting cast of beliefs
 - Each rational in its own terms
- Viability
 - Dominance of a single rationality is unviable
 - Organisations (people!) are complex
 - Consensus is impossible
 - Elegant failures & clumsy solutions

Human nature

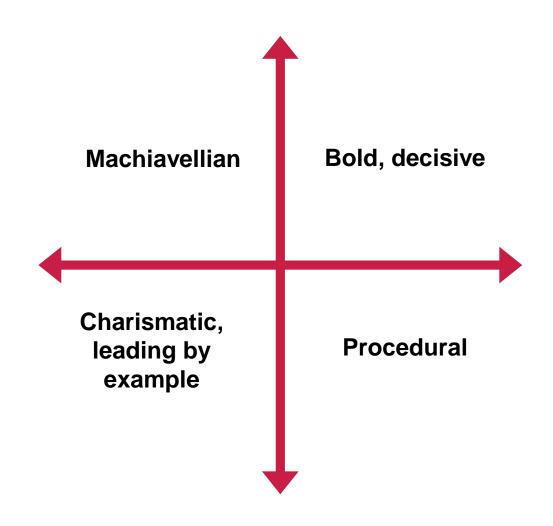


Party politics



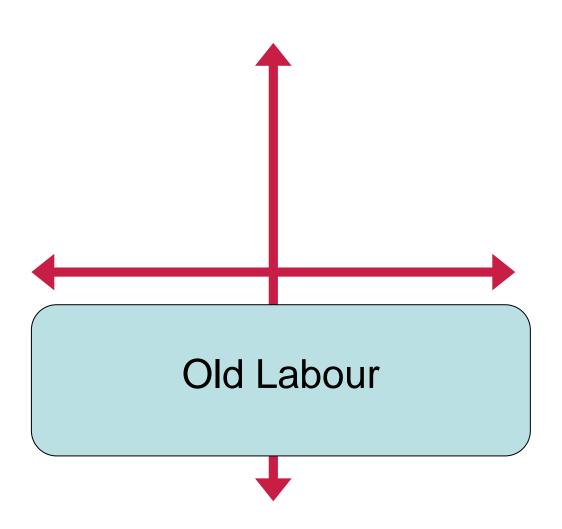
Leadership style

Verwej (2011)

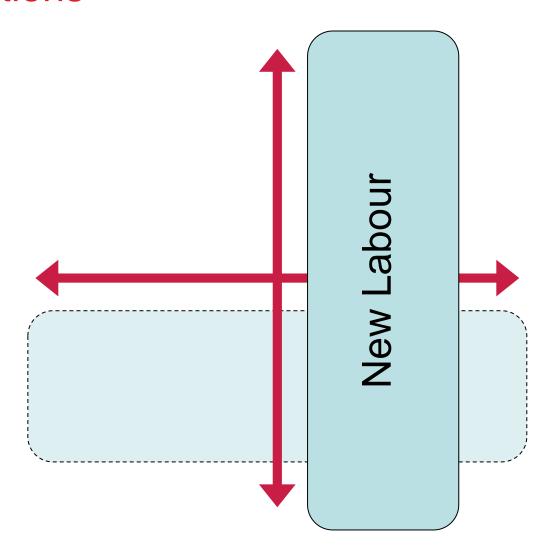




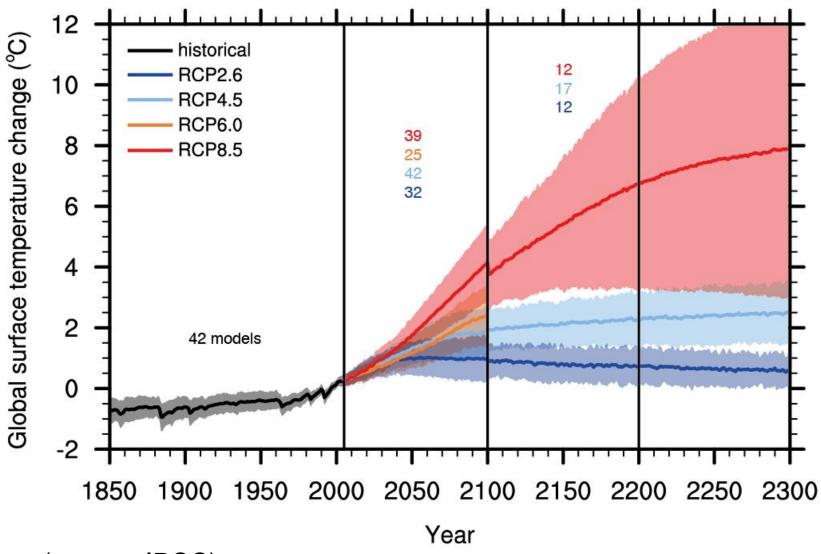
Coalitions



Coalitions



What to do about climate change?



(source: IPCC)

What to do about climate change?

Verwej (2011)

Can't know if it is happening or do much about it. Let others fuss, exploit situation.

Is it real? If so, markets and technological innovation will take care of it!

Drastic action and radical change are needed now – time's running out! Coordinated action and binding international agreements to manage and contain.

Blame

Verwej (2011)

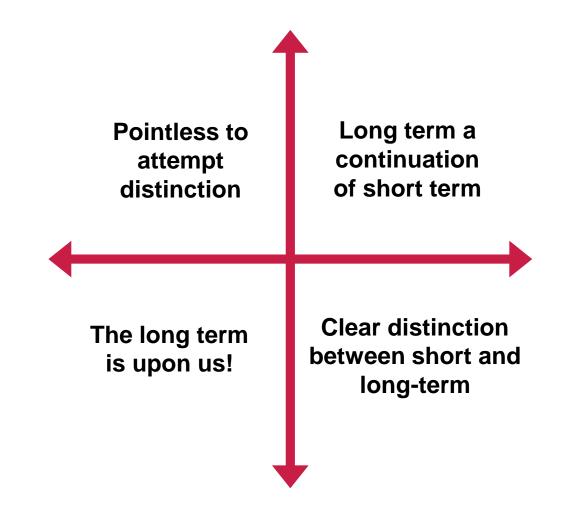
Nobody all are striving to gain at expense of others Bureaucratic outfits out to increase their own clout

Profligacy and obsession with consumption and growth

Lack of global planning, "politically motivated" sceptics "in pocket of oil industry"

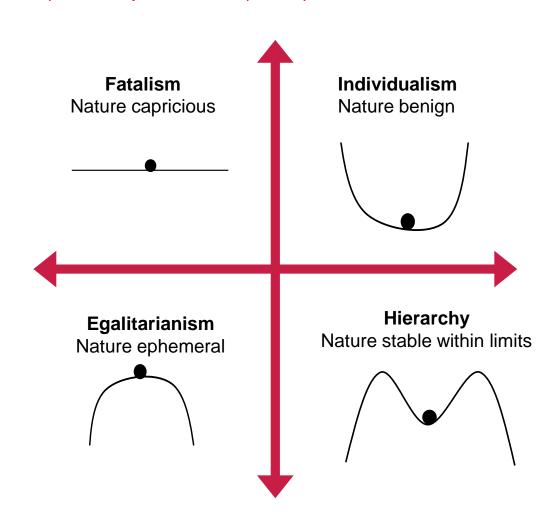
Time

Douglas et al. (2003)



Myths of nature

Holling (1973), Thompson et al (1990)



Who is right?

Verwej (2011)

- We don't know uncertainty!
- What we do know is that Kyoto hasn't delivered
 - Elegant failure
- Implicit assumptions
 - Leave it to the experts
 - International governance and binding agreements
 - Measures will be costly
 - Sceptics are morally compromised
- A hard sell for some...

Sensitivity of annuity value to model choice (Richards et al, 2013)

14 ▲ 99.5th percentile Mean 13.5 **1**3 12.5 12 11.5 LC(S) LC DDE CBD CBD P-APC 2DAP Gompertz spline

What is model risk?

(Federal Reserve, SR Letter 11-7, 2011)

[T]he potential for adverse consequences from decisions based on incorrect or misused model outputs and reports.

- Implicit assumptions
 - Models drive decisions
 - Decision criteria agreed upon
 - "All risk is model risk"

From nature to models

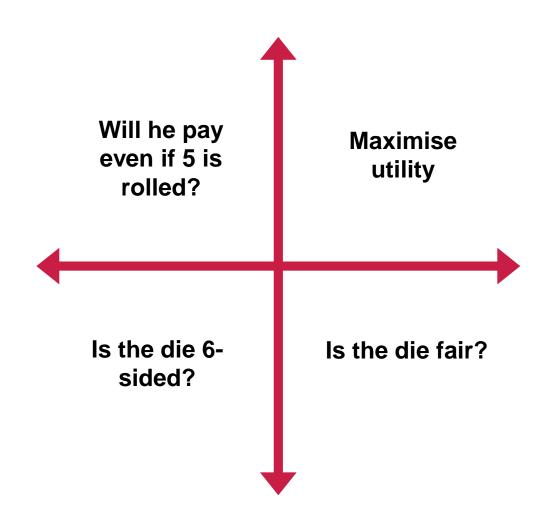
- Contesting nature
 - Disagreement about how the world is
 - Simple representations of nature
- Contesting models
 - Disagreement about whether/how nature can be known
 - Complex representations of nature
- What survives of plural rationality theory?

A game of dice

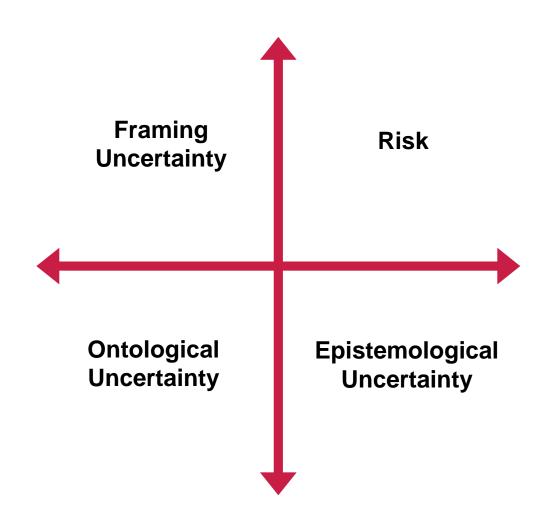
- If I roll a 5, I give you £10m
- Otherwise you give me £1m
- Should you take the bet?
 - Output Description
 Output Descript



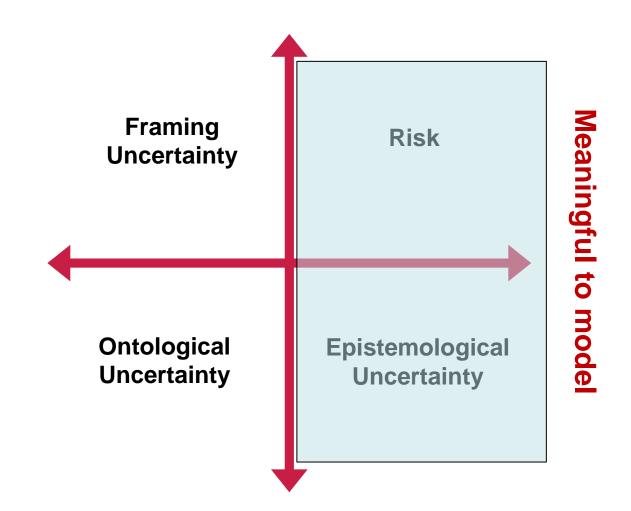
How to respond



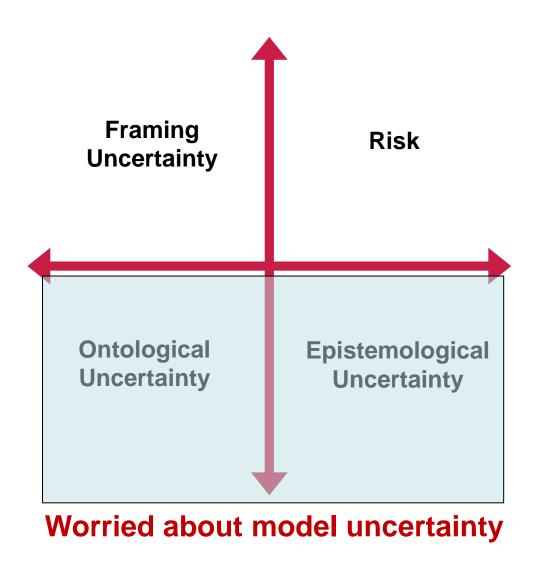
Uncertainties



Uncertainties

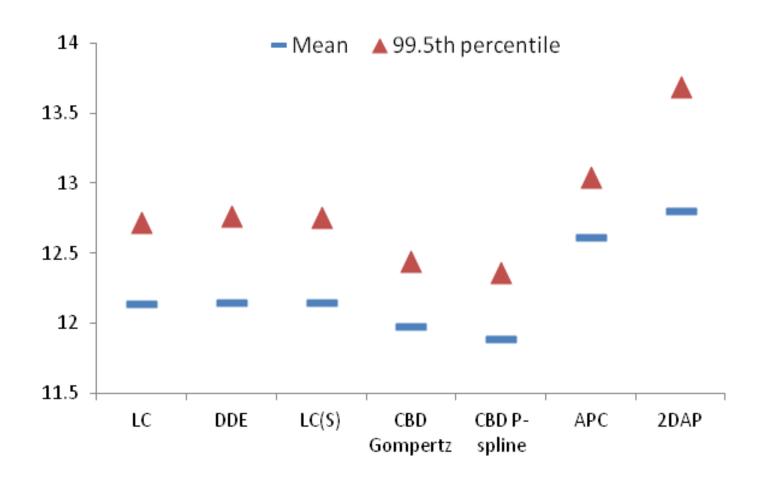


Uncertainties

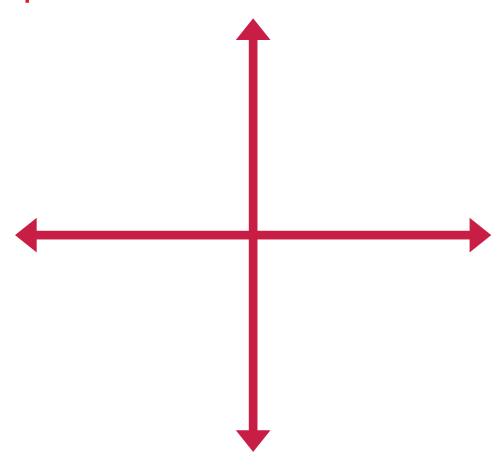


Sensitivity of annuity value to model choice

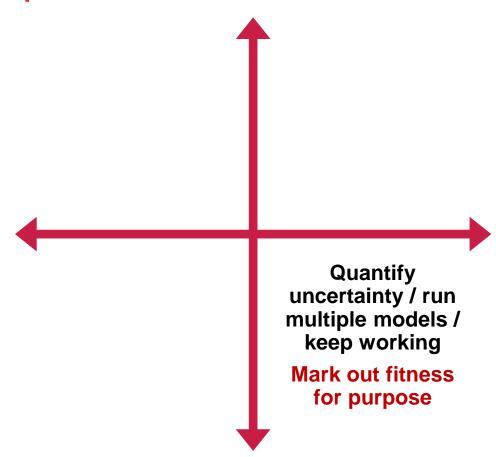
(70 year old male, discount at 3%; Richards et al, 2013)



How to respond?



How to respond?



How to respond?

Pick whichever model gives convenient outputs / conform

Manipulate, survive

Pick whichever model fits best / is most useful

Use the model, today

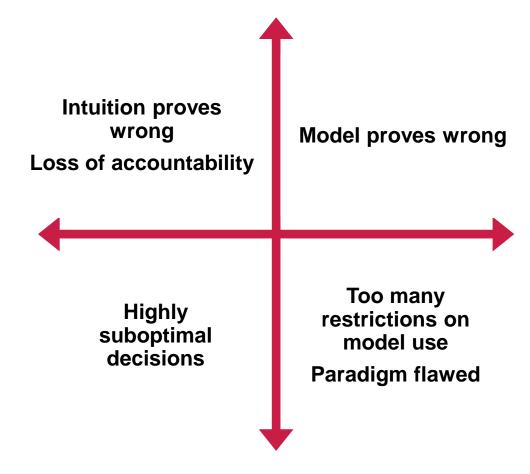
Too hard to model / should have never taken on this risk

Prepare for radically different futures

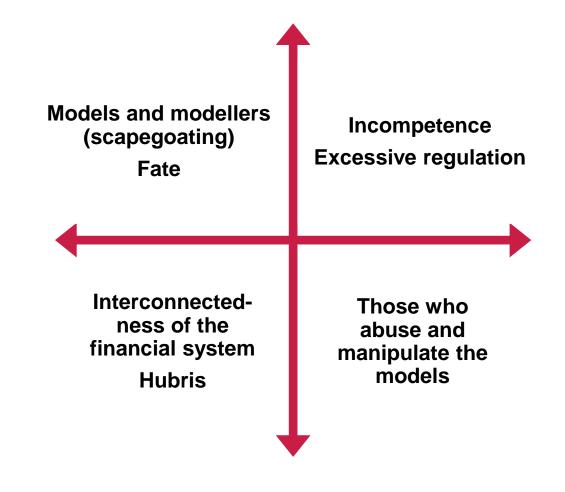
Quantify uncertainty / run multiple models / keep working

Mark out fitness for purpose

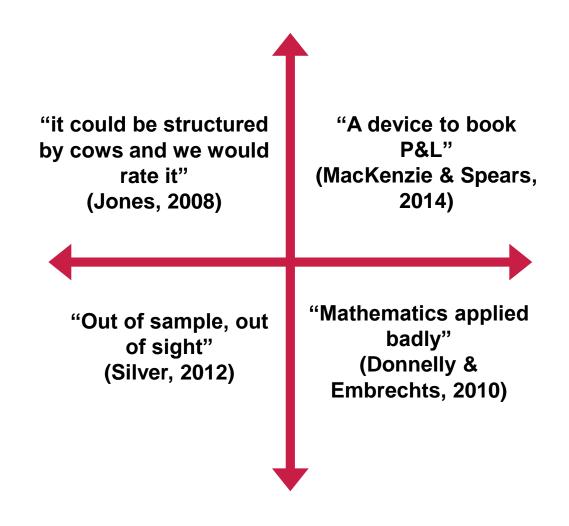
(Non-)Model Risks



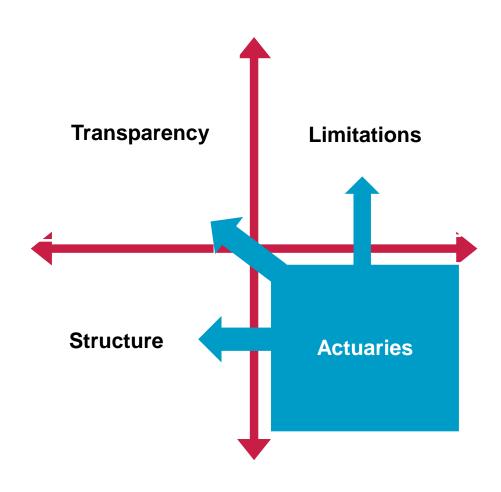
Blame



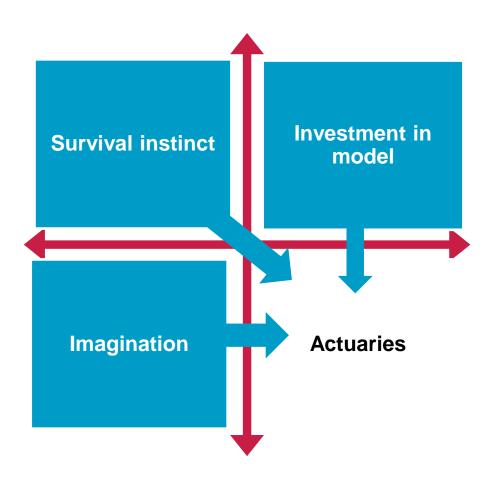
Echoes of the credit crisis



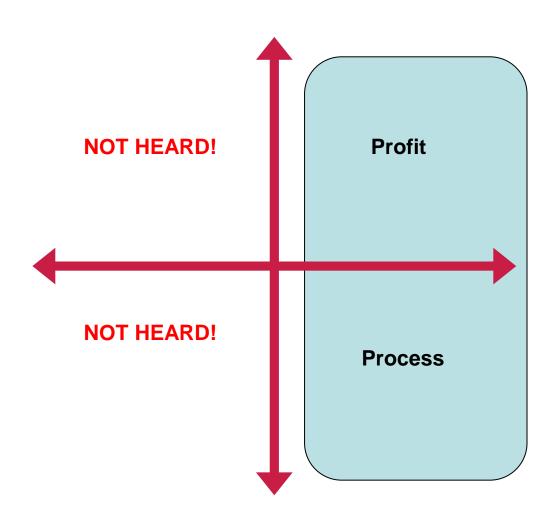
Governance: "us and them"



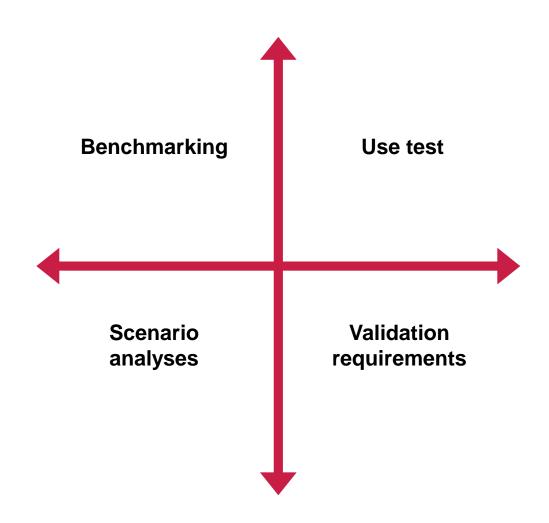
Governance: "us and them"



ERM is incomplete



Regulatory tools



The upside of uncertainty

- Uncertainty is a resource
 - Good people can disagree
 - ... while keeping honest

• What if we were deprived of this resource?

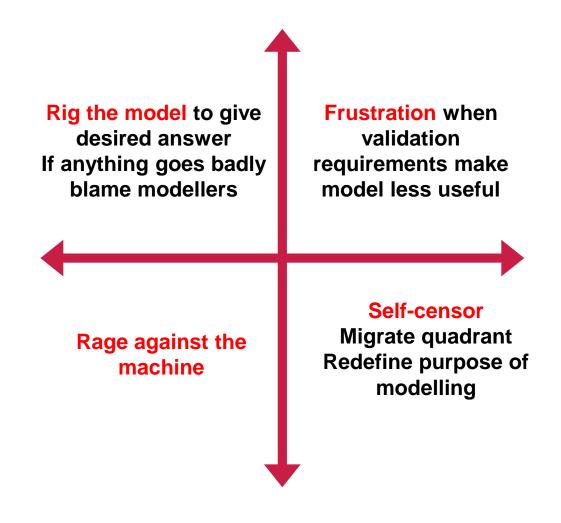
What if...

• ... we had to follow those two commands

Thou shalt use your model

Thy model shalt not be wrong

Accountability is the victim



Questions

How should we (not) regulate road safety?

How should we (not) regulate internal models?