



# The TRansit Project

Tim Jackson, Florian Botte, Tommaso Ciarli, Tim Foxon, Andrew Jackson and Marco Valente

19th Sept 2019

Rebuilding Macroeconomics – Annual Conference





# Modelling Transition Risk

## An agent-based, stock-flow consistent, input-output approach

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# The TRansit Project

- **Timing:** July 2019 – Oct 2020
- **Partners:** CUSP, University of Surrey; SPRU, University of Sussex; University of L'Aquila
- **Aim:** to develop a macro-economic framework to model carbon transition risk;



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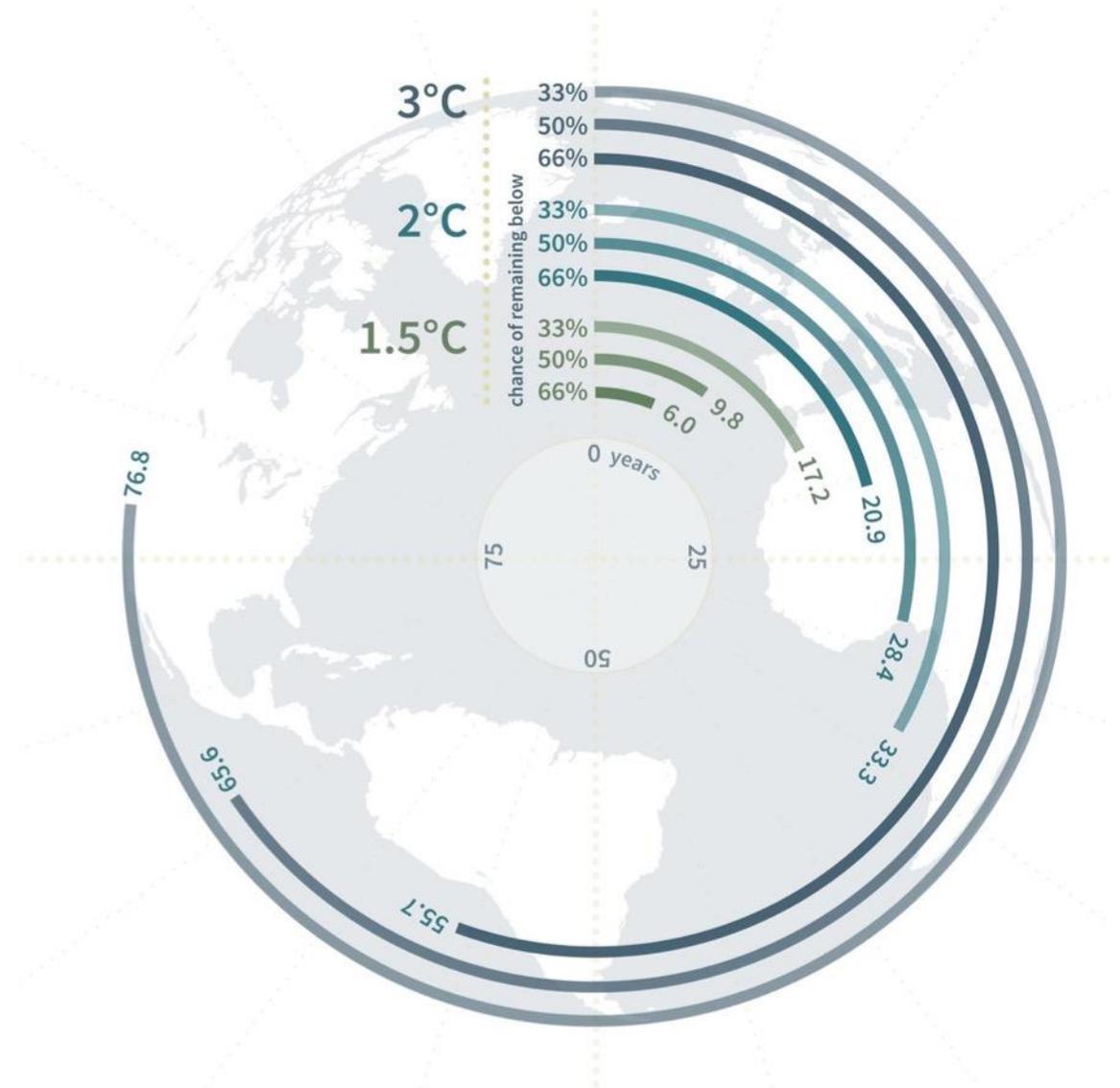
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*“The nature of climate risks means that the biggest challenge is in assessing the resilience of firms’ strategies to transition risks.”*

Mark Carney, Bank of England, June 2019

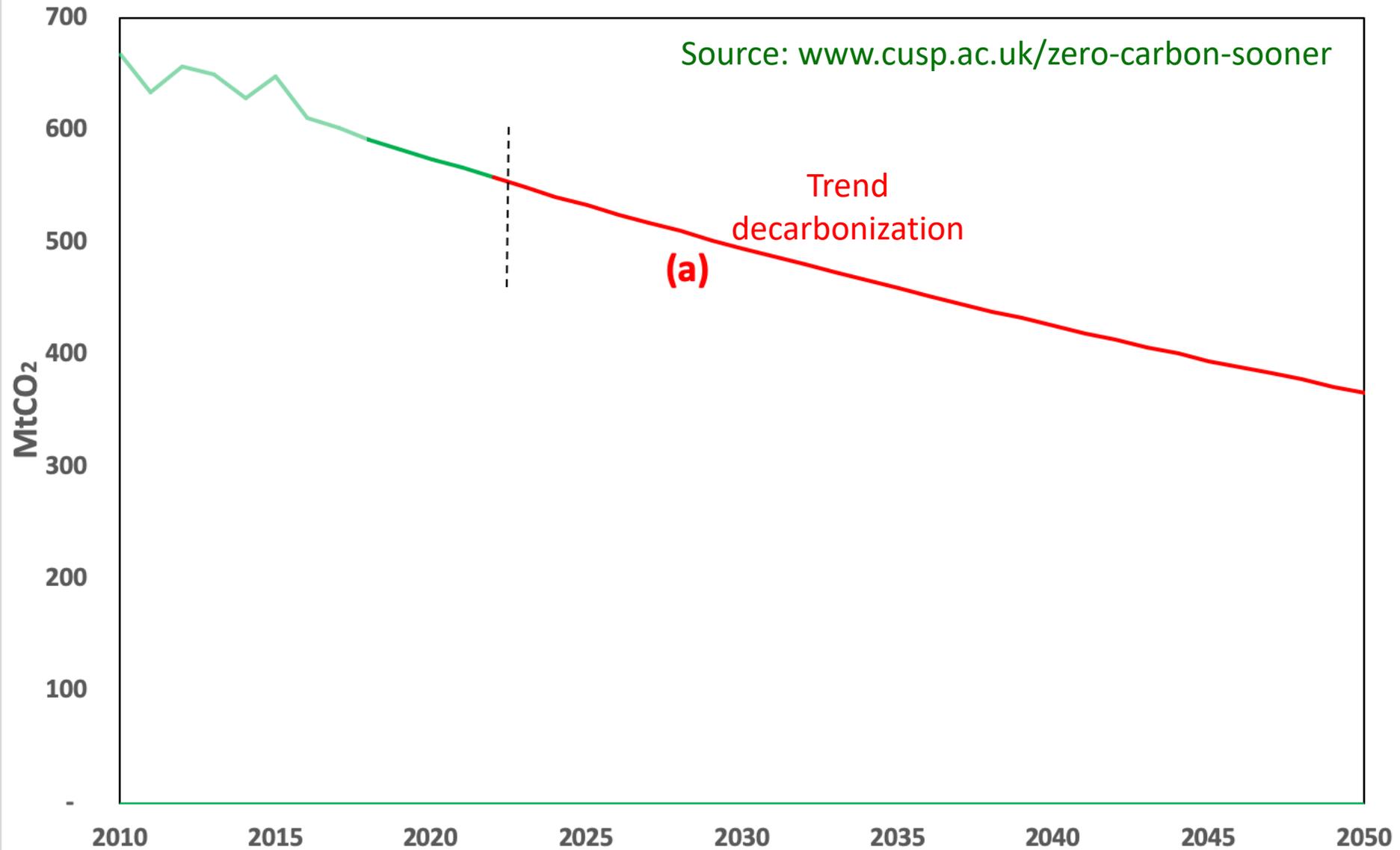
# The Net Zero Challenge

- IPCC 1.5 report: global carbon budget (2018-2100) for 66% chance of reaching 1.5°C target: 420 Gt CO<sub>2</sub>;
- A 'fair carbon budget' for the UK (2018-2100): 2.5 GtCO<sub>2</sub>;
- Annual consumption based carbon emissions: 590 MtCO<sub>2</sub>;
- Fair carbon budget exhausted within 5 years.

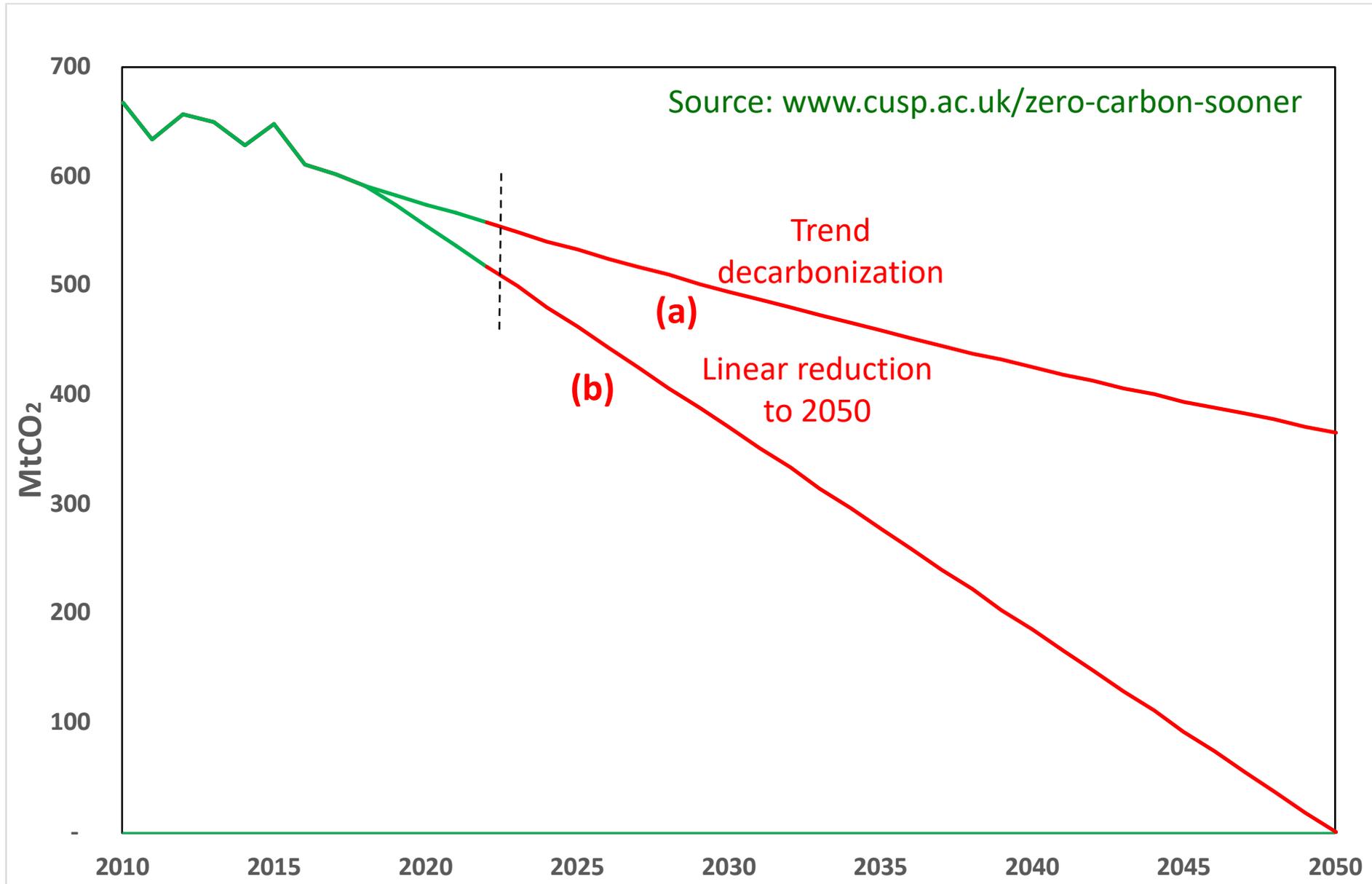


Graphic: CarbonBrief 2015

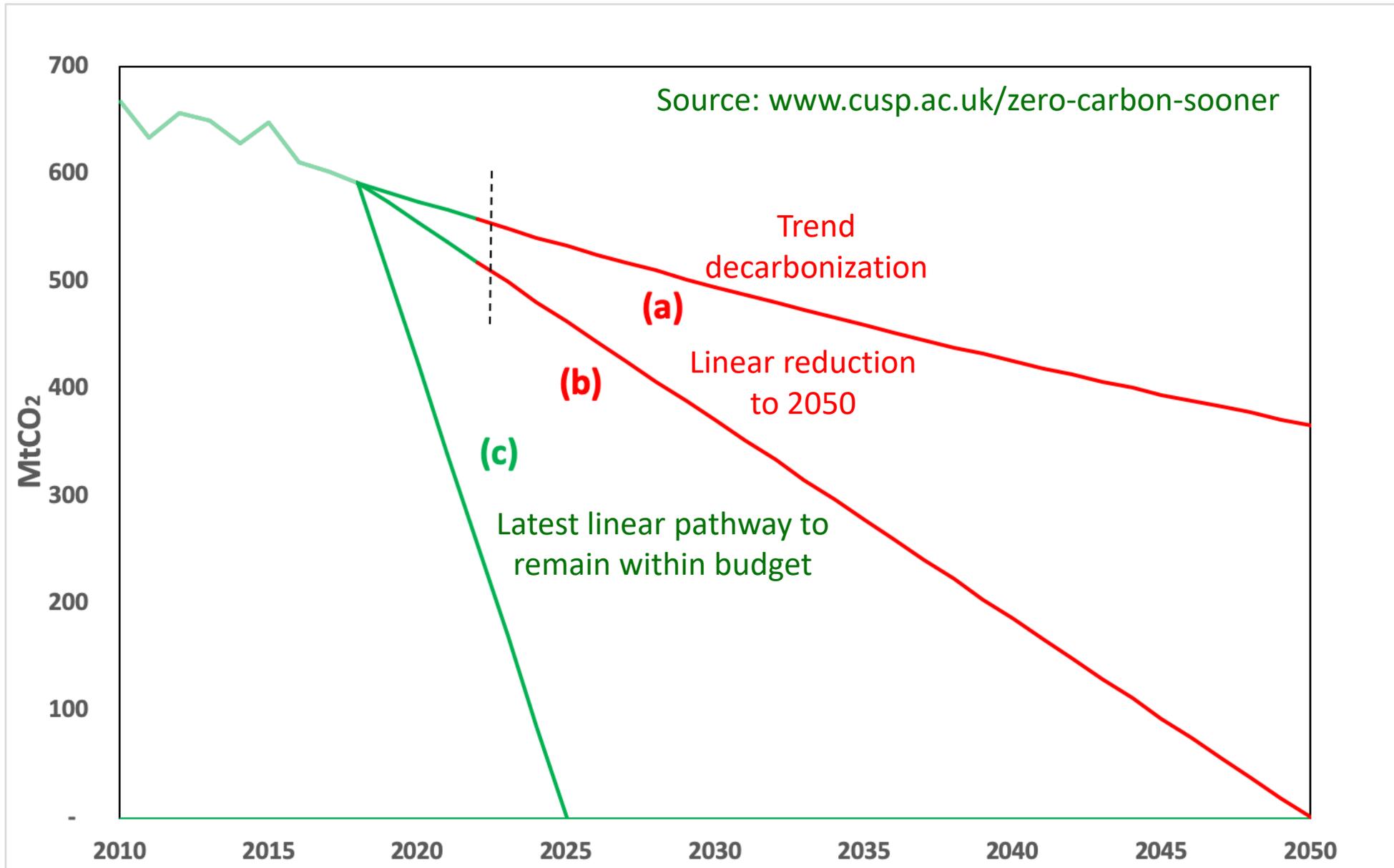
# UK Transitions to Net Zero



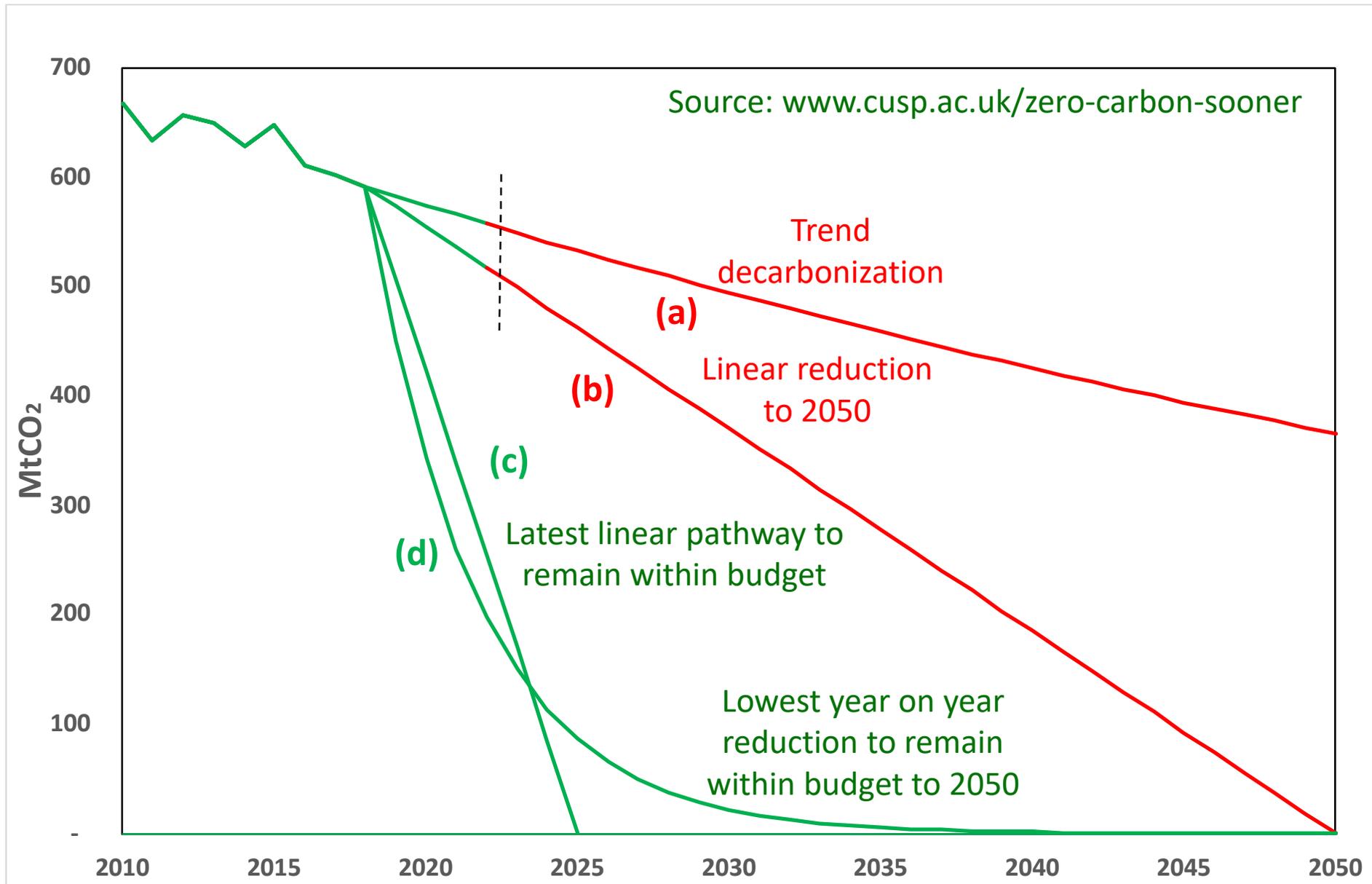
# UK Transitions to Net Zero



# UK Transitions to Net Zero



# UK Transitions to Net Zero



*“I would argue that the horizon at which climate change impacts the economy has [already] shortened.”*

Benoît Cœuré, ECB January 2019

# Features of the Net Zero Transition

- Rapid structural change  
replacement of entire infrastructures of provision within timescales shorter than average asset life;
- Massive shifts in investment  
directed (or incentivised) investment at a scale atypical of mature, post-industrial economies;
- ‘Post-normal’ behaviours  
disruptive (contagious) changes in the behaviours of consumers, producers, shareholders, savers...

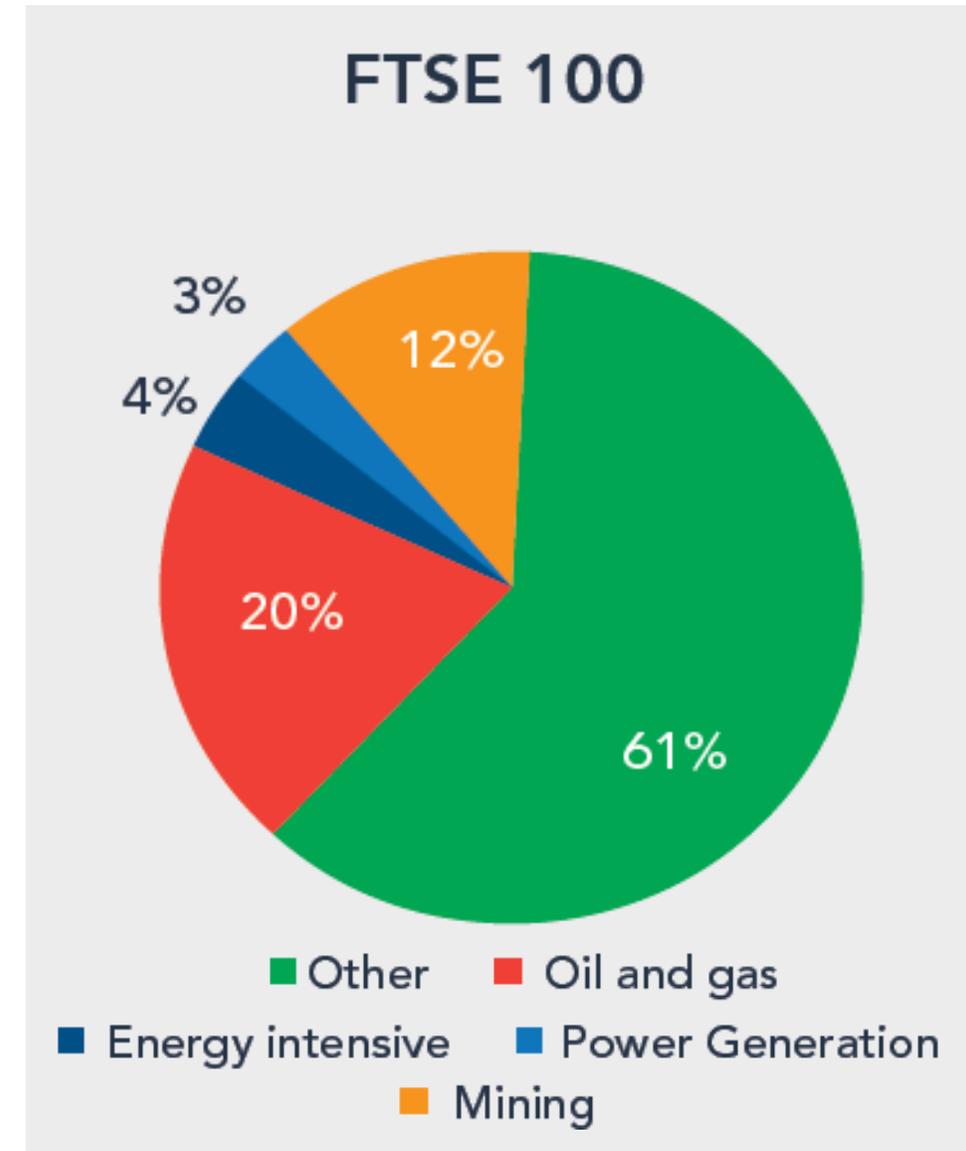


*“The longer meaningful adjustment is delayed, the more transition risks will rise.”*

Mark Carney, June 2019

# Potential Impacts of Transition

- **Asset stranding**  
Potential direct exposure of almost 40% of the value of the FTSE 100 (Ansar et al 2013)
- **Loan defaults and equity market collapse**  
Weaker firms default on loans and high-carbon equities lose their value;
- **Second round effects**  
Exposure of banks leads to successive defaults and financial instability (Battiston et al 2017)
- **Real economy impacts**  
Energy price rises and falling household net worth suppress real demand (eg);
- **Social impacts**  
Rising unemployment and falling wage share lead to rising inequality, suppressing demand further.



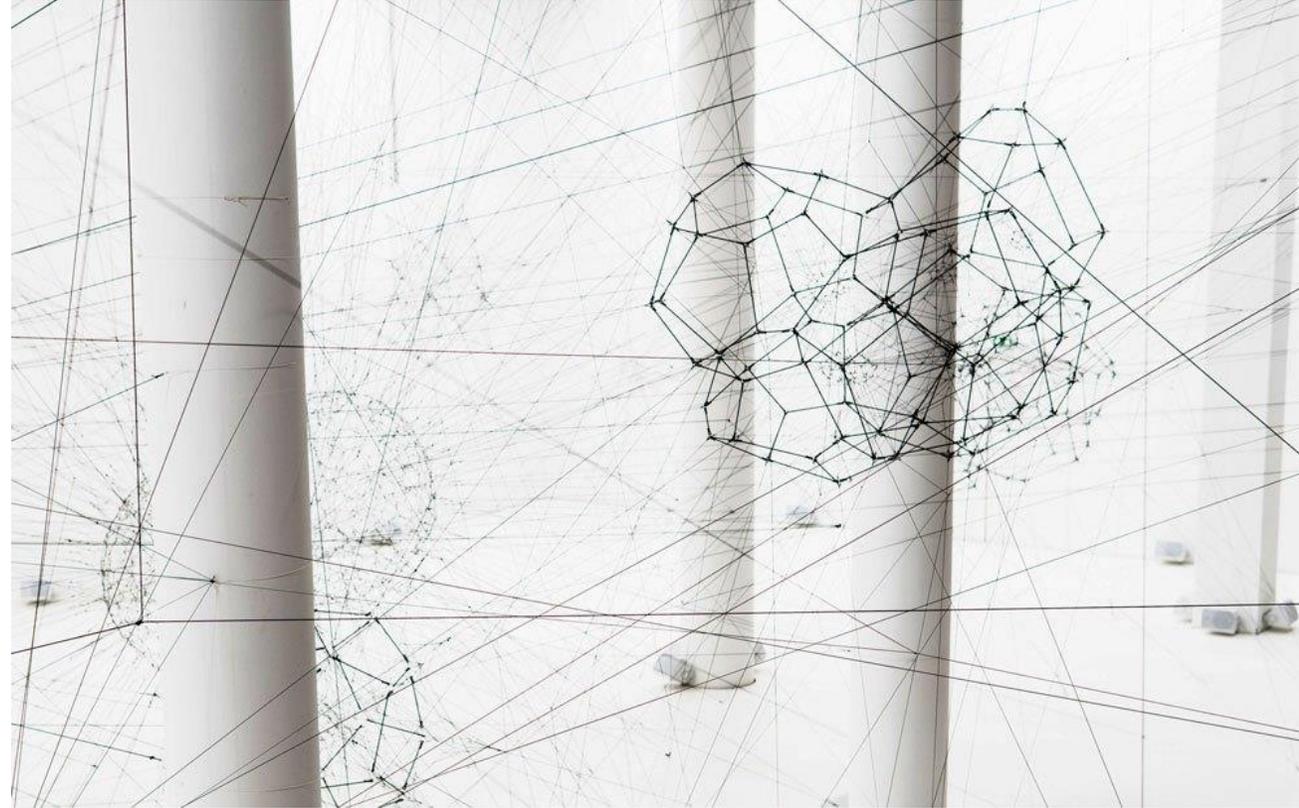
*“From a monetary perspective, climate change and climate policy are both supply side shocks.”*

Warwick McKibben, ANU

# Modelling Transition Risk

Aim: to develop a model of transition risk (TRansit) to explore the risks and opportunities in a zero carbon transition, building on:

- 1) **agent-based modelling**, drawing from insights from evolutionary economics;
- 2) **stock-flow consistent macroeconomics** as developed in the post-Keynesian tradition;
- 3) **input-output modelling** drawn from ecological economics.



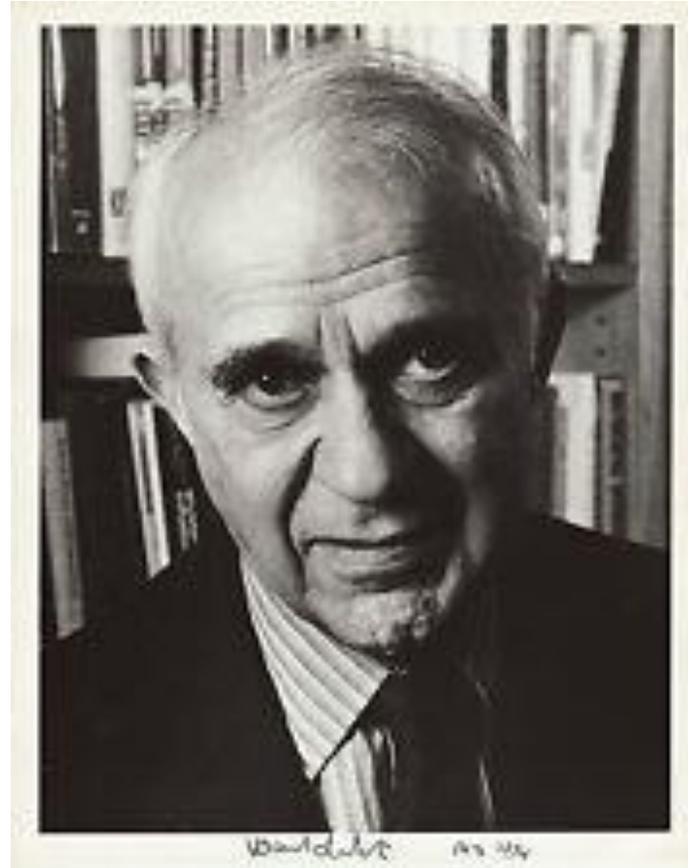
*“Firms that align their business models to the transition to a carbon-neutral world will be rewarded handsomely; those that fail to adapt will cease to exist.”*

Mark Carney

# Modelling Transition Risk



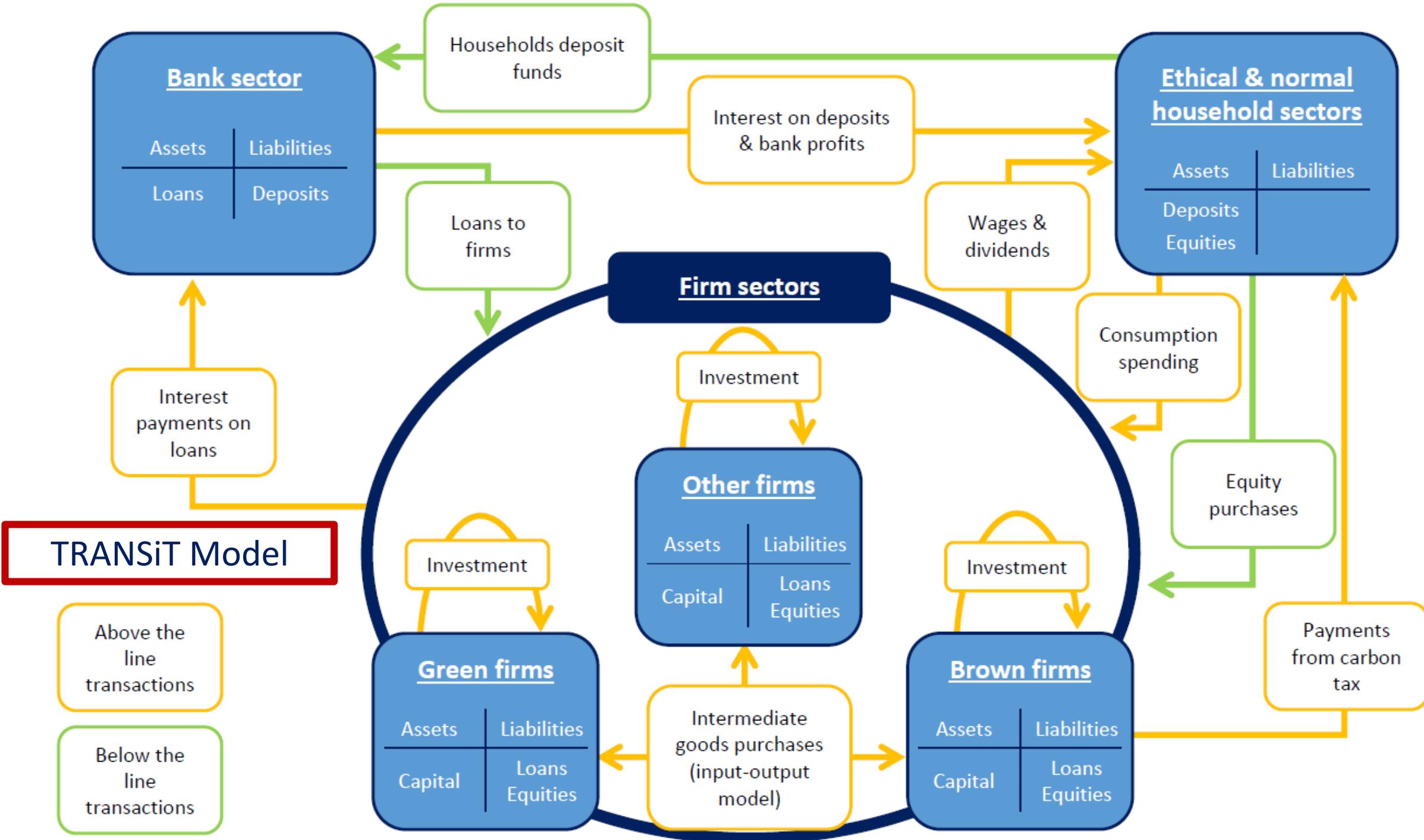
John von Neumann



Wassily Leontief



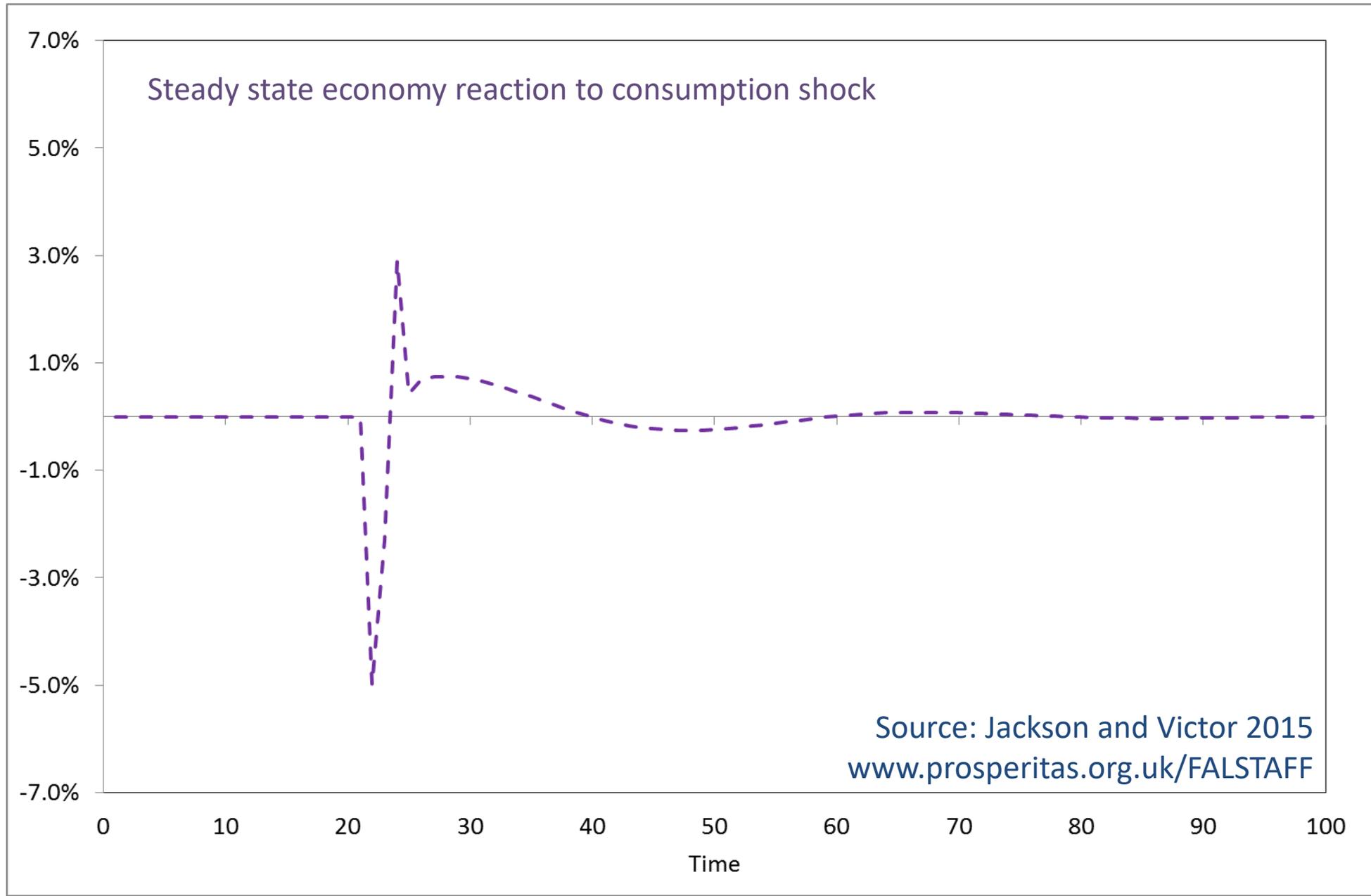
Wynne Godley



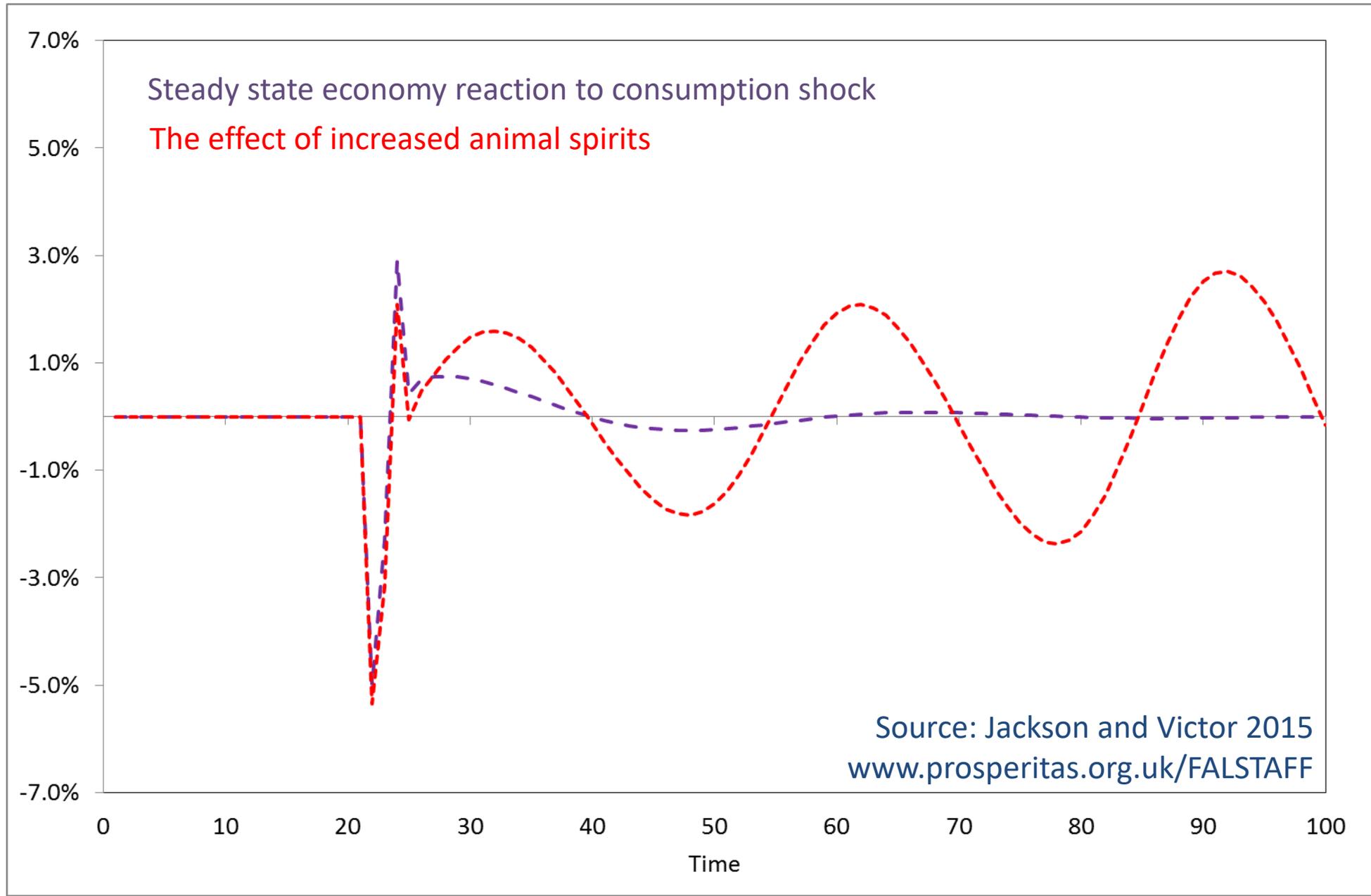




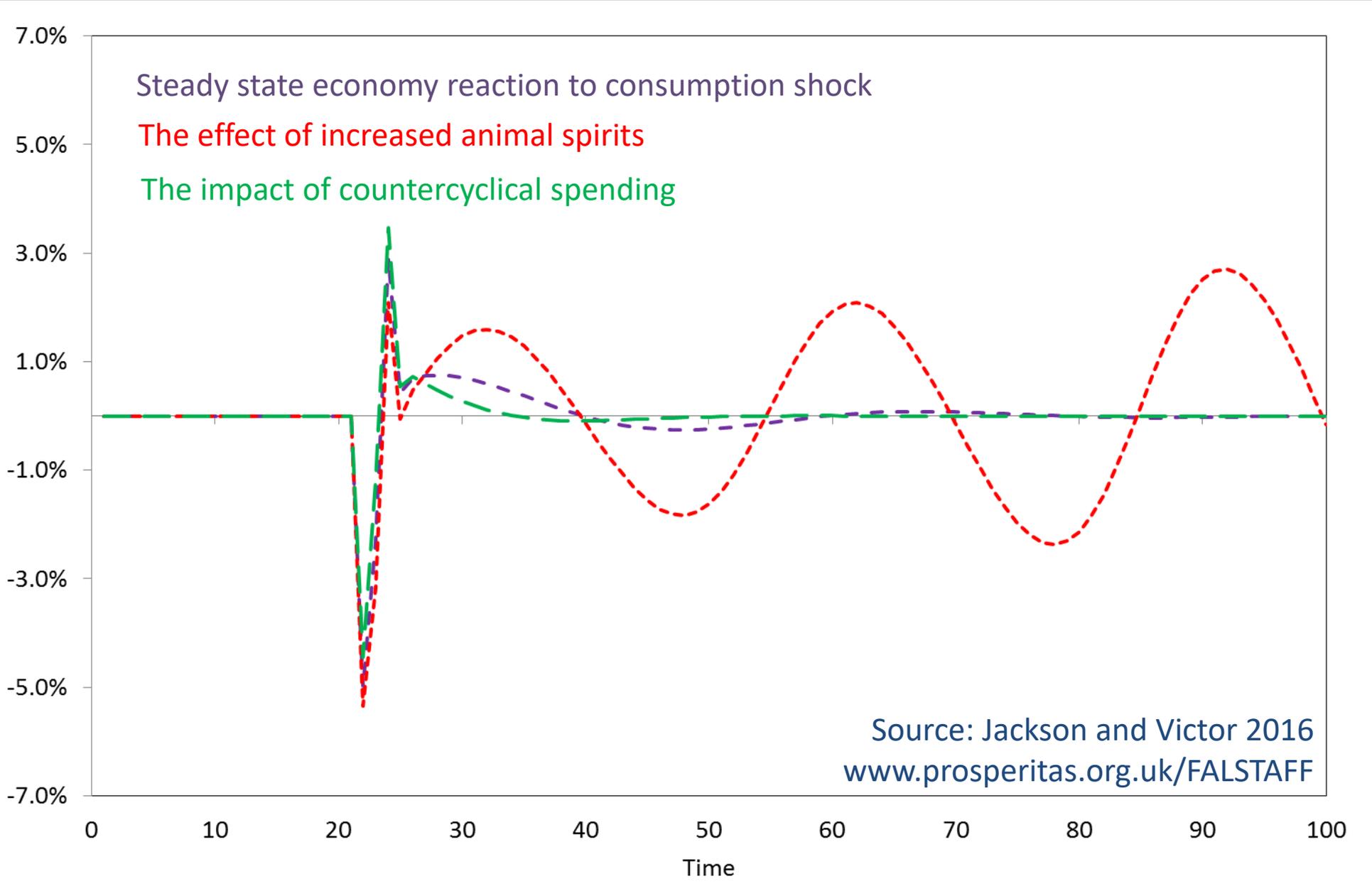
# Does Credit Create a Growth Imperative?



# Does Credit Create a Growth Imperative?



# Does Credit Create a Growth Imperative?



# What we intend to explore...

- What kinds of risks are posed by different kinds of transition to a net zero carbon economy?
- Where and how might agents' behaviours (eg contagion) exacerbate or mitigate these risks?
- What are the channels of transmission from transition risk to financial instability and from financial instability to the 'real economy'?
- Which fiscal or monetary policies can mitigate financial instability and other transition risks?

*“The Bank of England is... today announcing a stress test [that] will reveal the UK financial system’s ability to withstand the financial risks from climate change that arise from the increased frequency of weather events and from the transition to a carbon-neutral emission economy.”*

Mark Carney, 20<sup>th</sup> June 2019



# The TRansit Project

Thanks for listening....

[www.cusp.ac.uk/transit](http://www.cusp.ac.uk/transit)

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