



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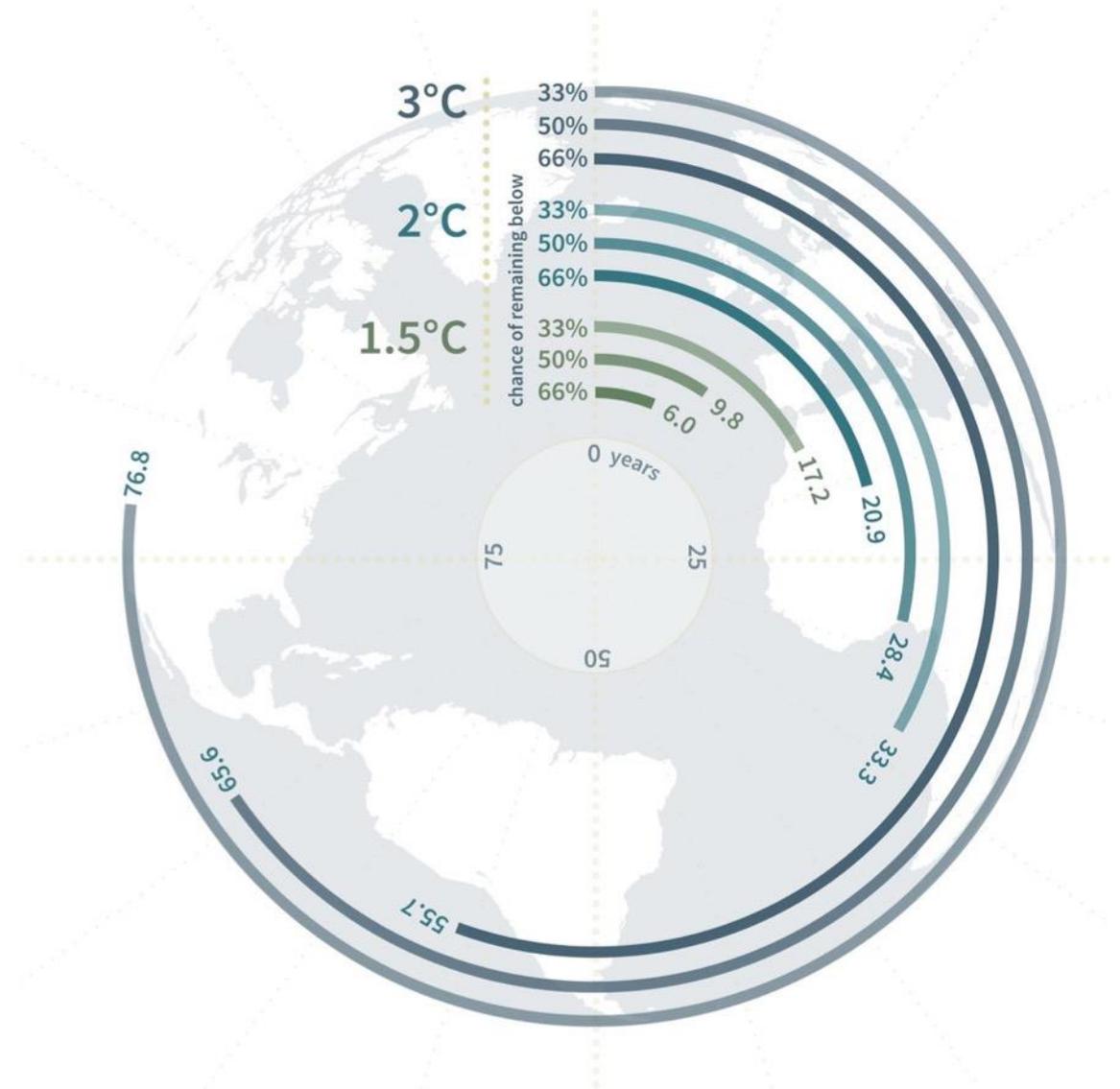
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“The nature of climate risks means that the biggest challenge is in assessing the resilience of firms’ strategies to transition risks.”

Mark Carney, Bank of England, June 2019

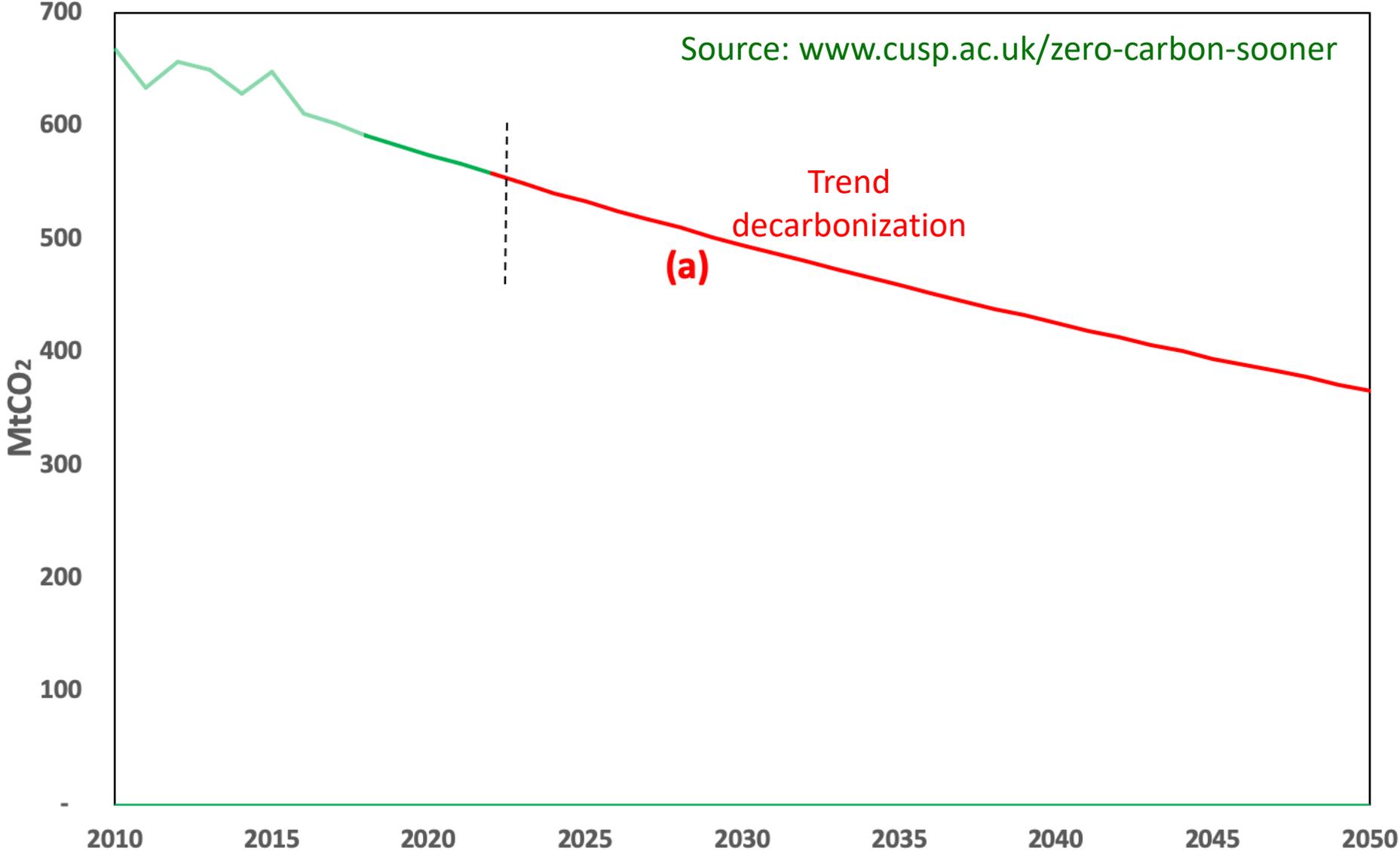
The Net Zero Challenge

- IPCC 1.5 report: global carbon budget (2018-2100) for 66% chance of reaching 1.5°C target: 420 Gt CO₂;
- A 'fair carbon budget' for the UK (2018-2100): 2.5 GtCO₂;
- Annual consumption based carbon emissions: 590 MtCO₂;
- Fair carbon budget exhausted within 5 years.

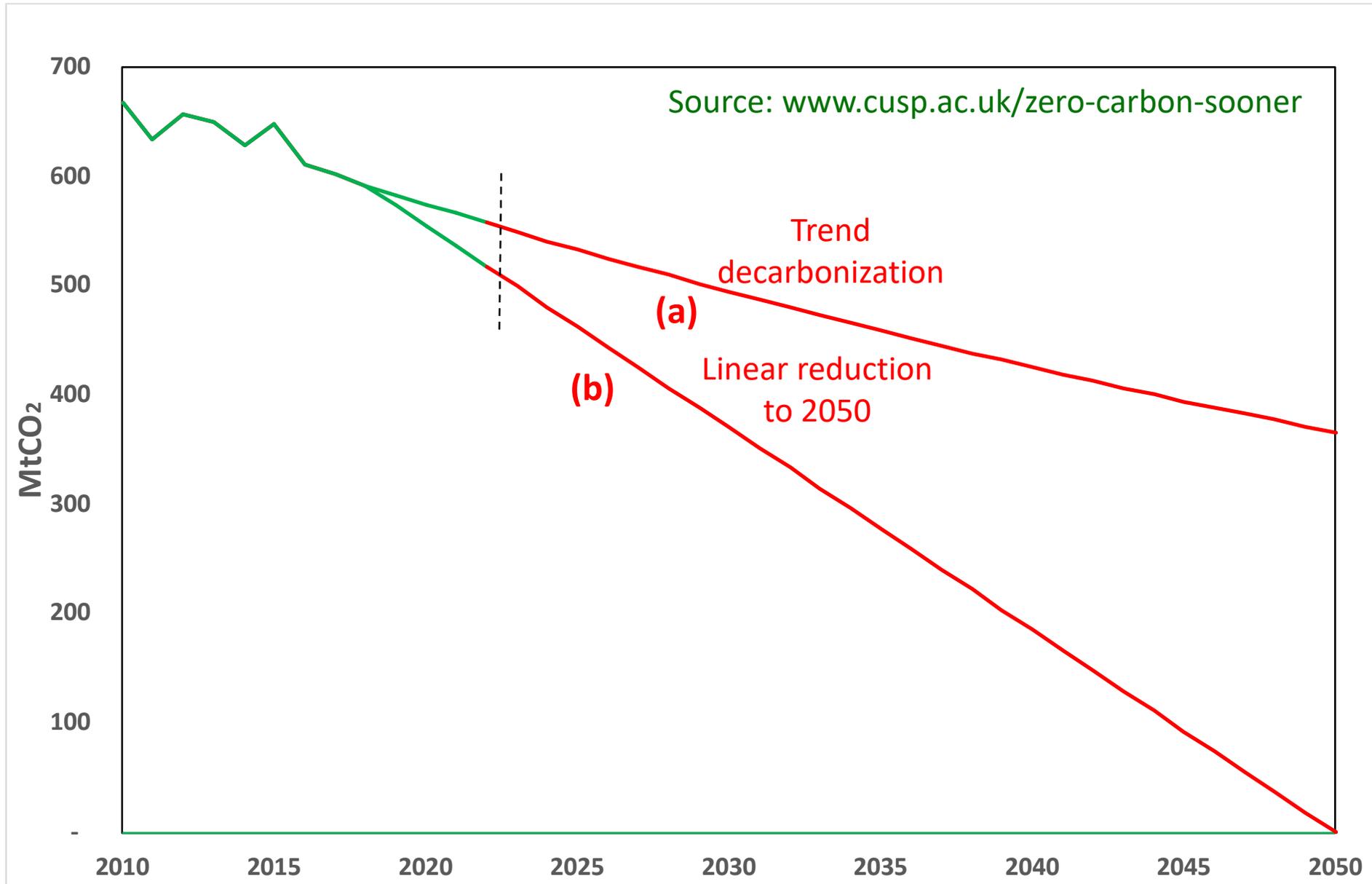


Graphic: CarbonBrief 2015

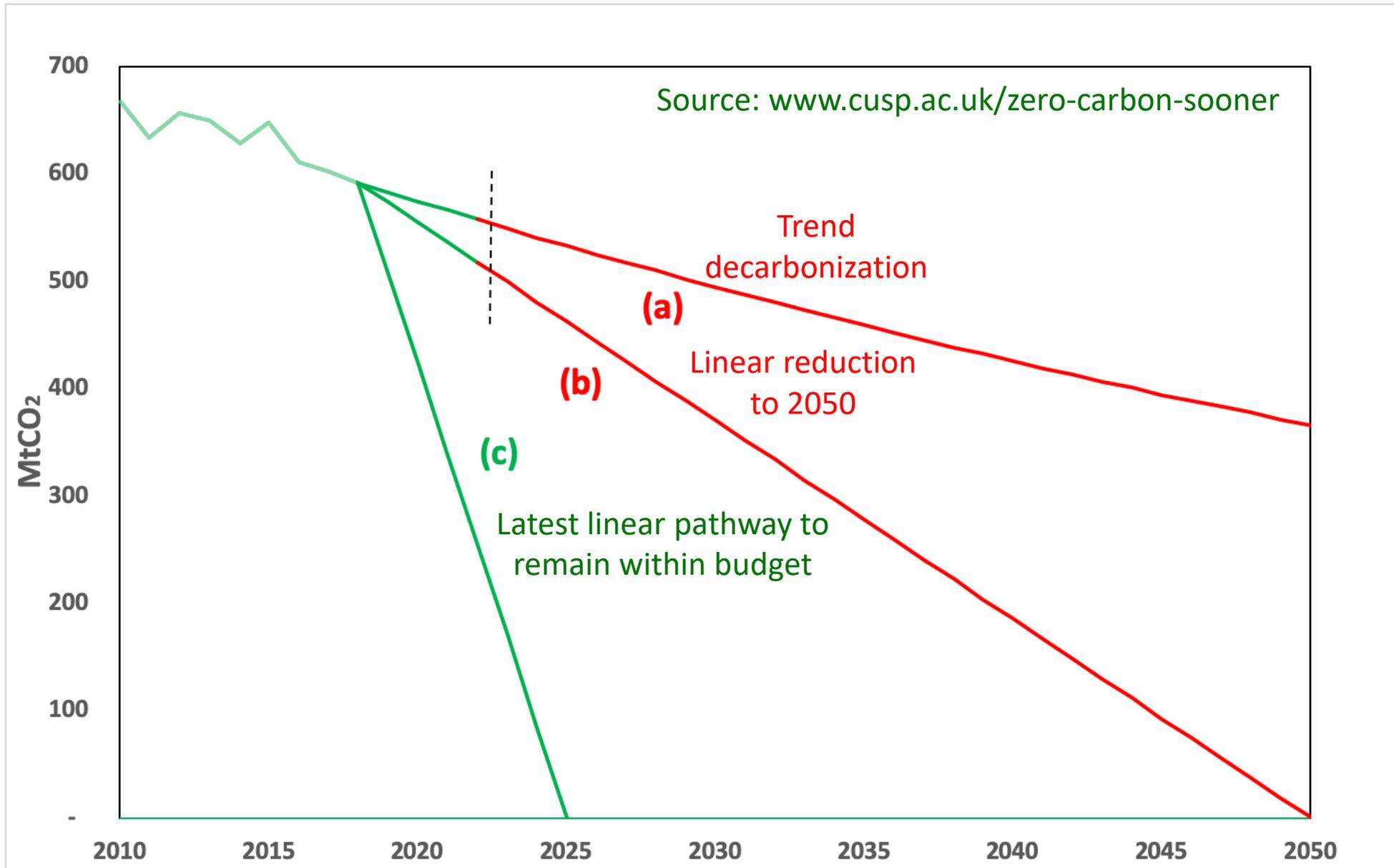
UK Transitions to Net Zero



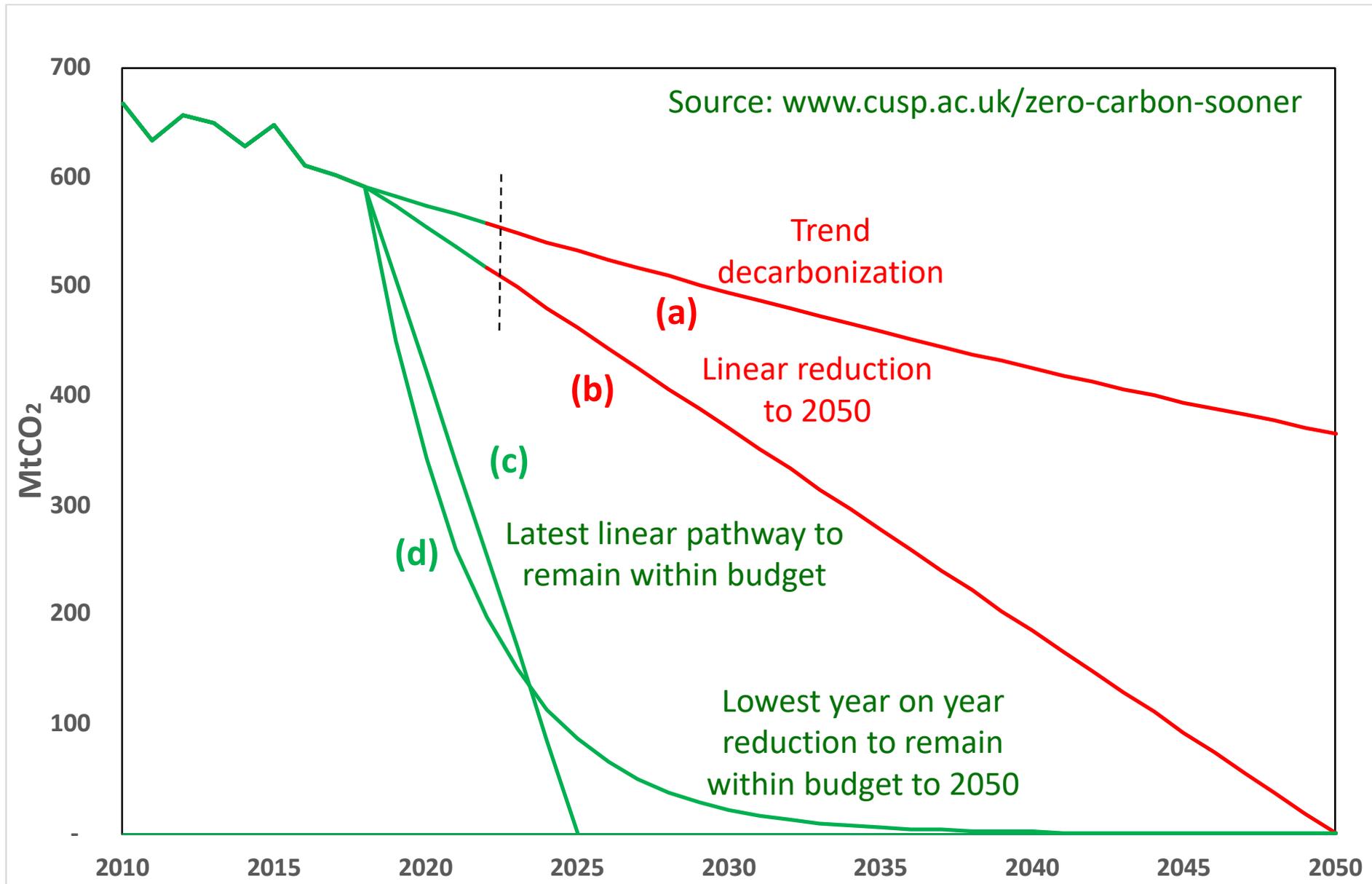
UK Transitions to Net Zero



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...

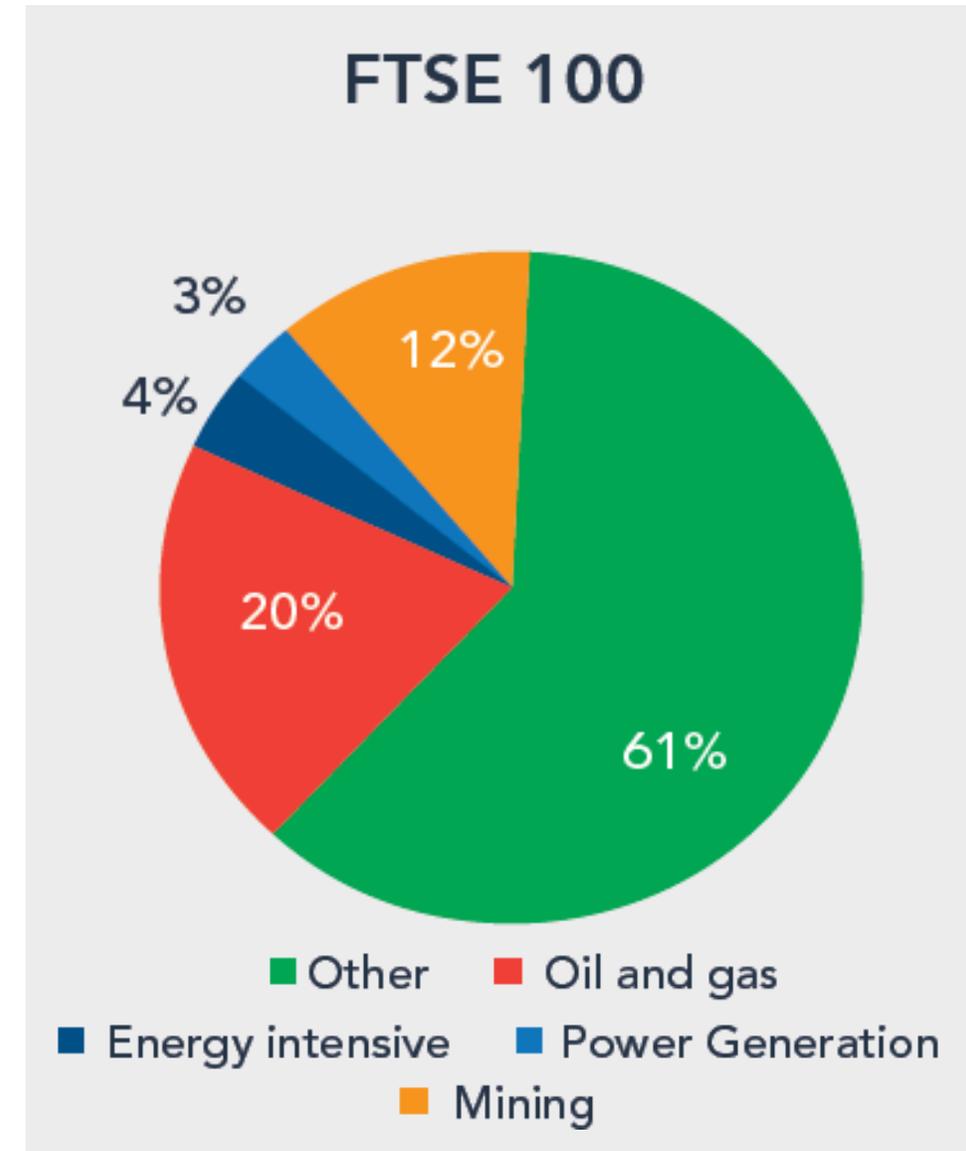


“The longer meaningful adjustment is delayed, the more transition risks will rise.”

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.



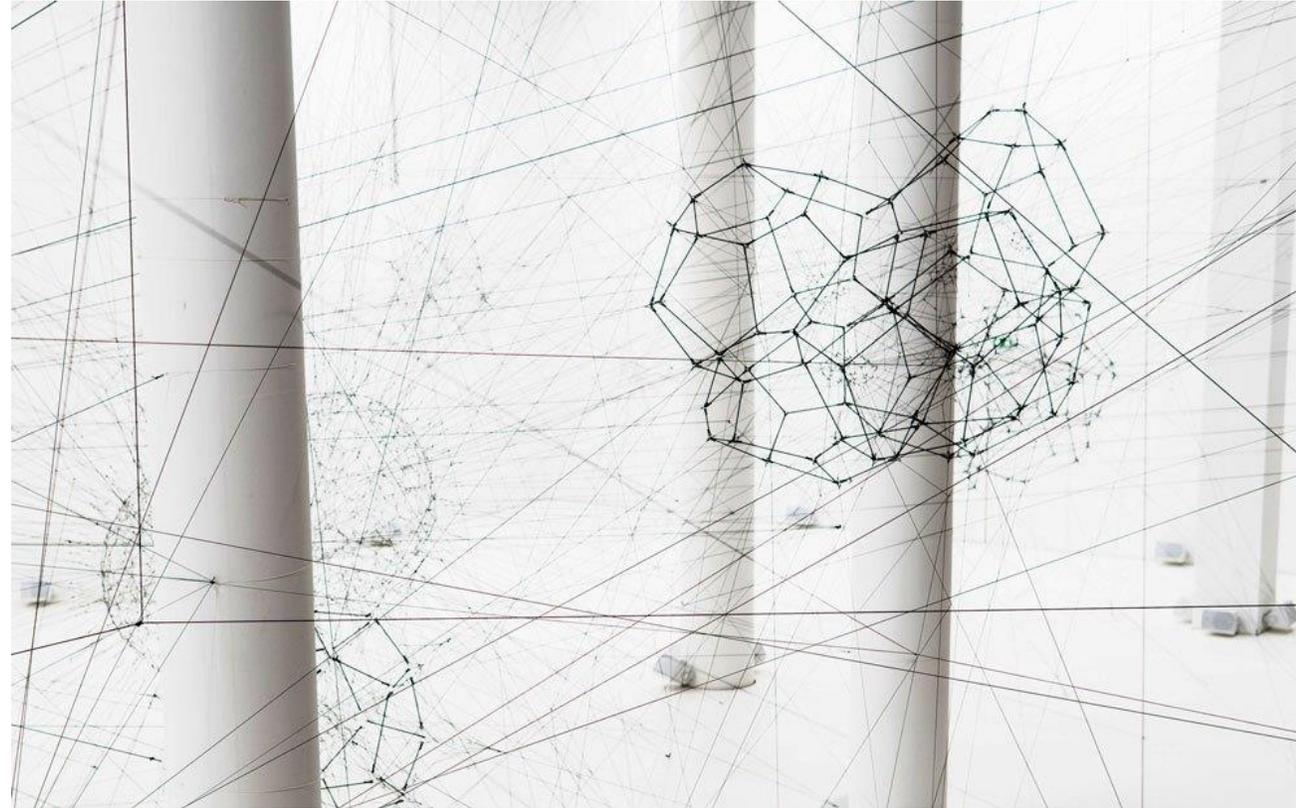
“From a monetary perspective, climate change and climate policy are both supply side shocks.”

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.



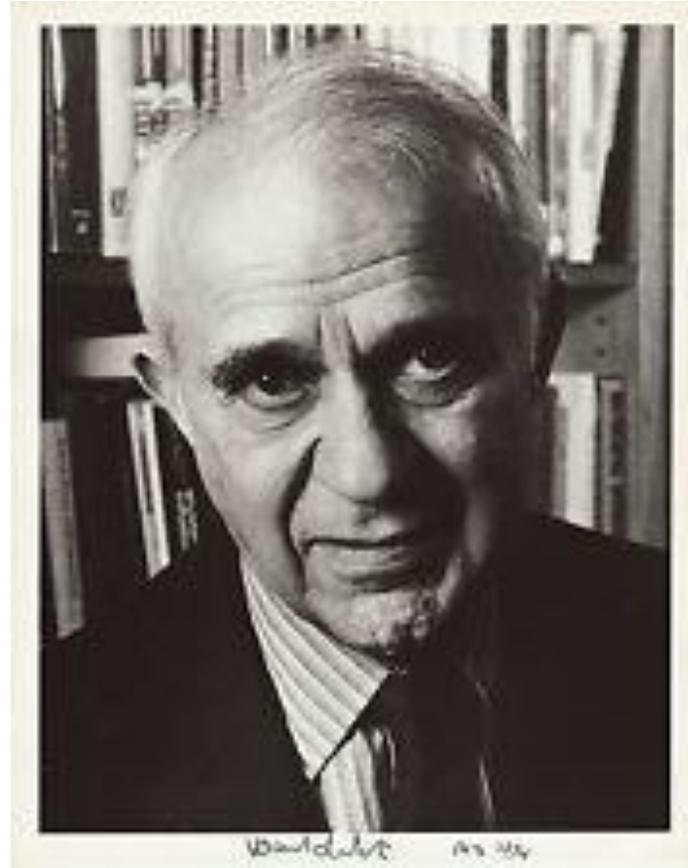
“Firms that align their business models to the transition to a carbon-neutral world will be rewarded handsomely; those that fail to adapt will cease to exist.”

Mark Carney

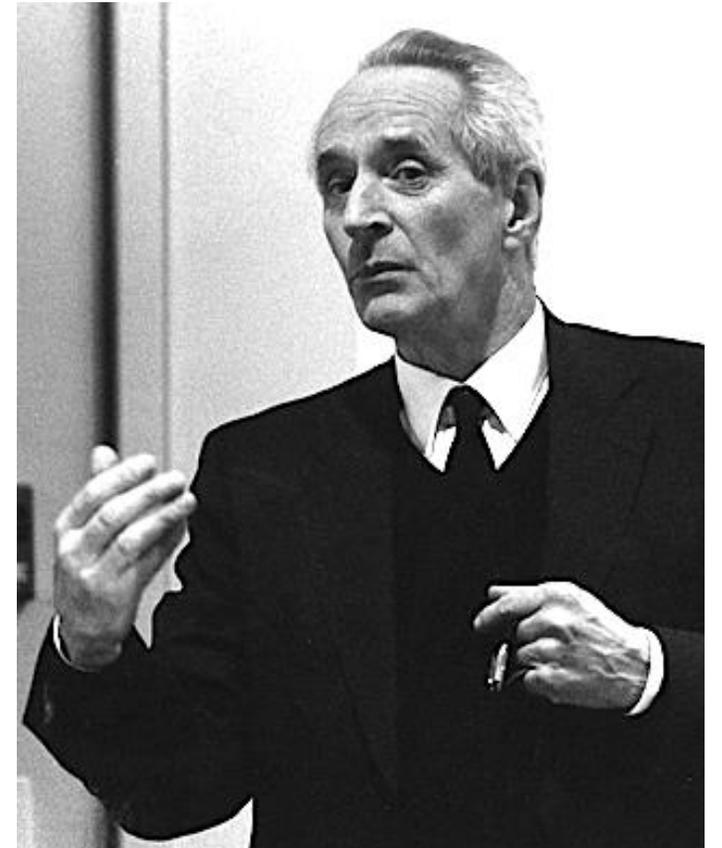
Modelling Transition Risk



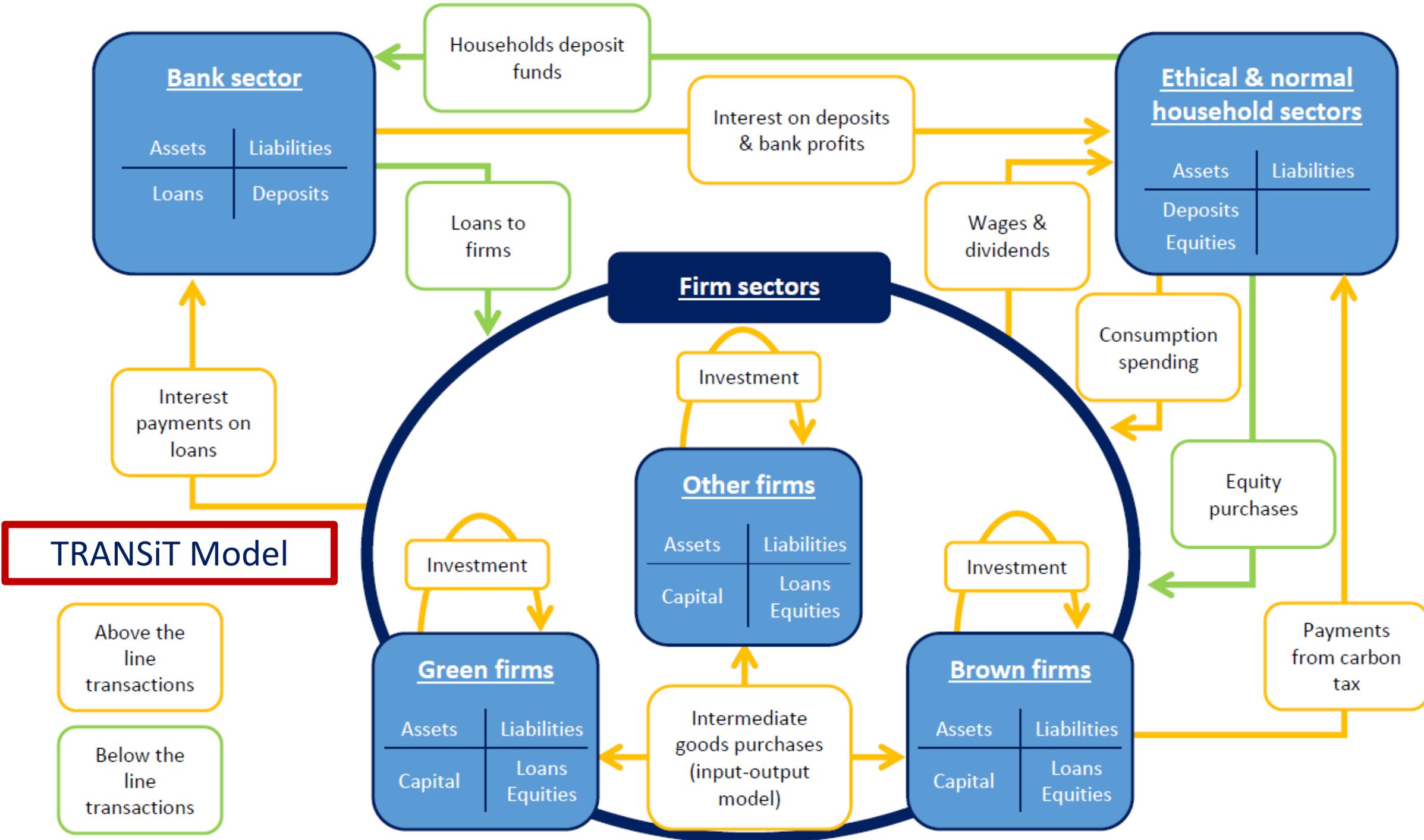
John von Neumann



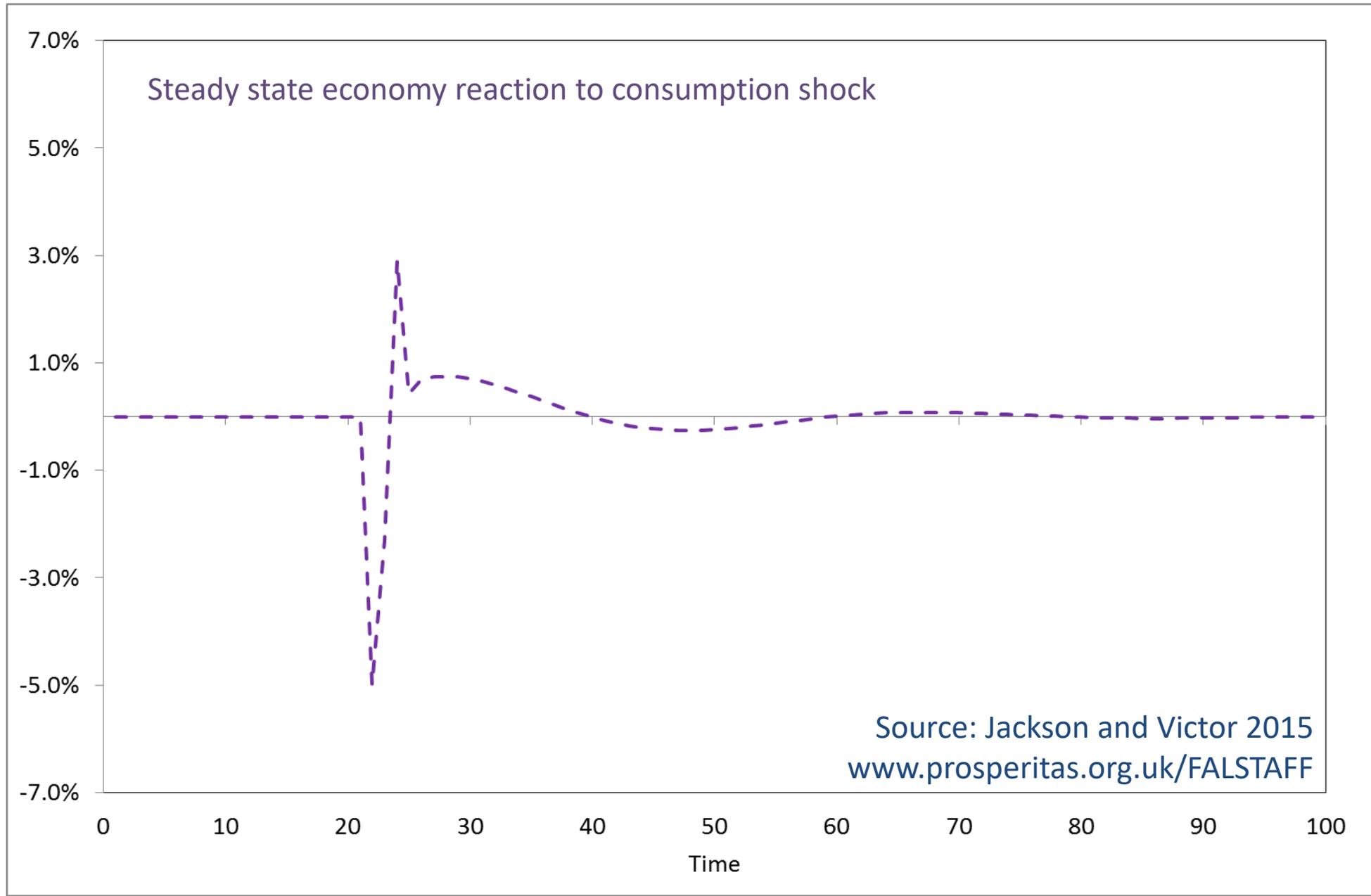
Wassily Leontief



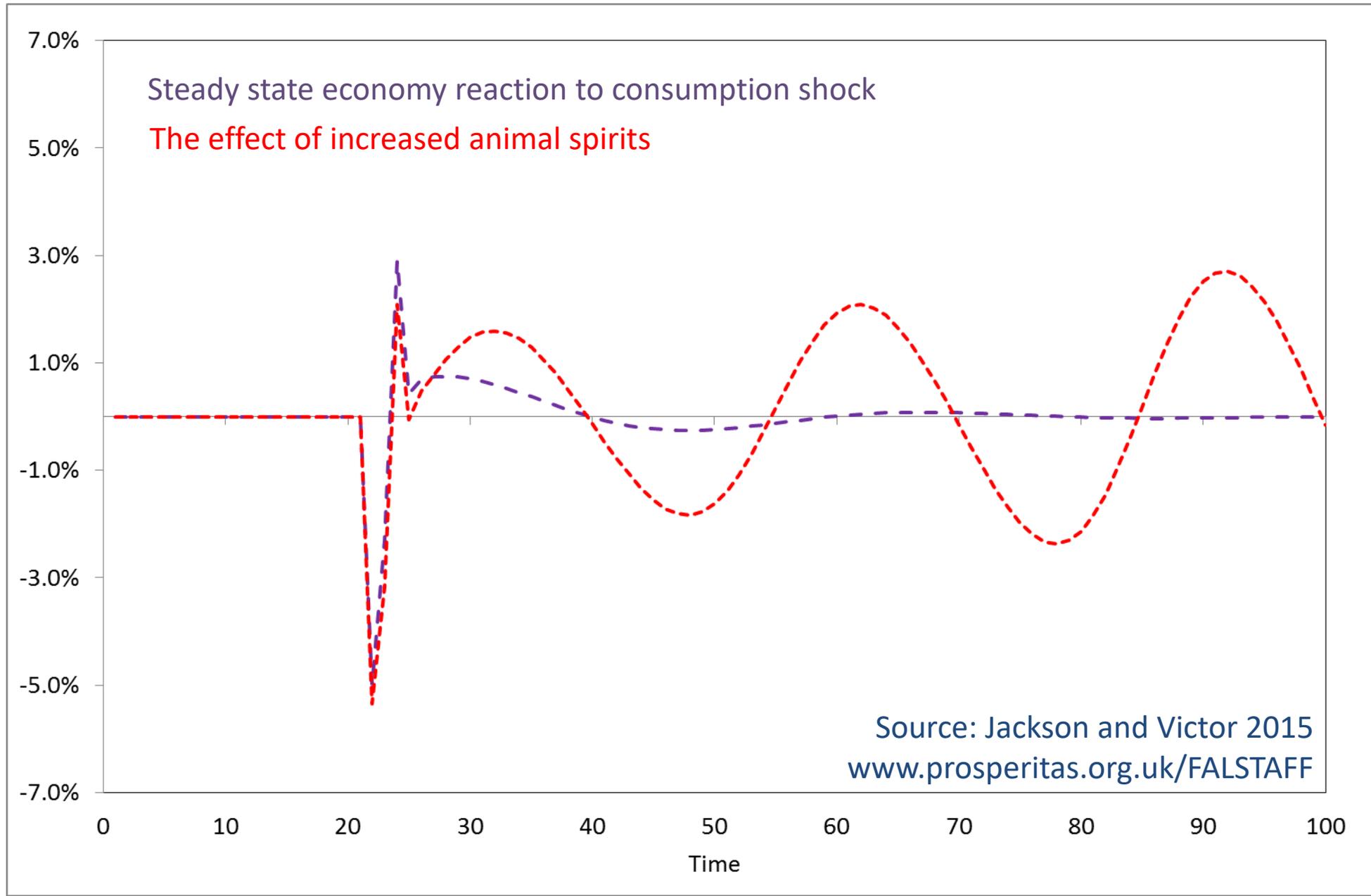
Wynne Godley



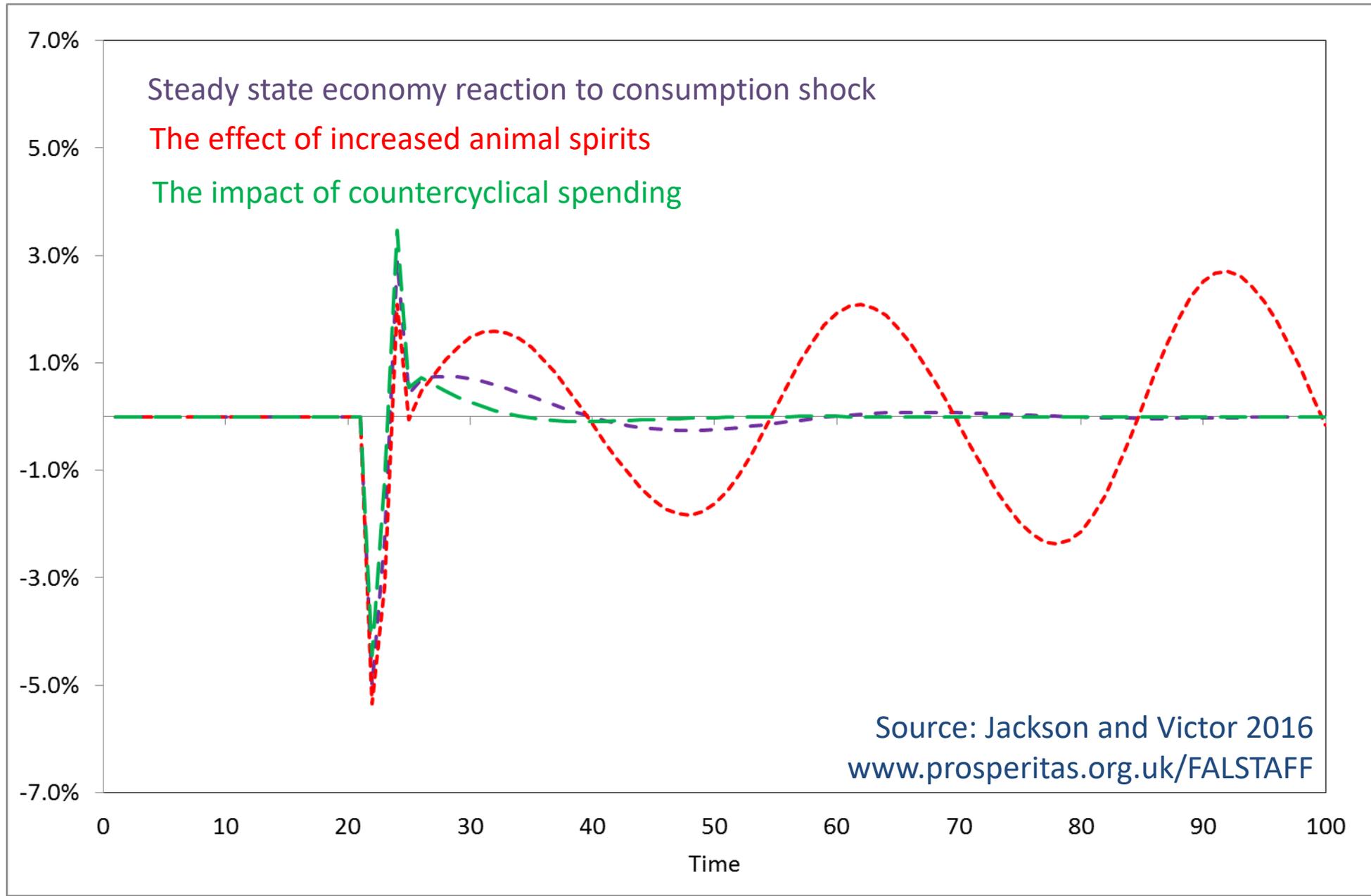
Does Credit Create a Growth Imperative?



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, 20th June 2019



The TRansit Project

Thanks for listening....

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