

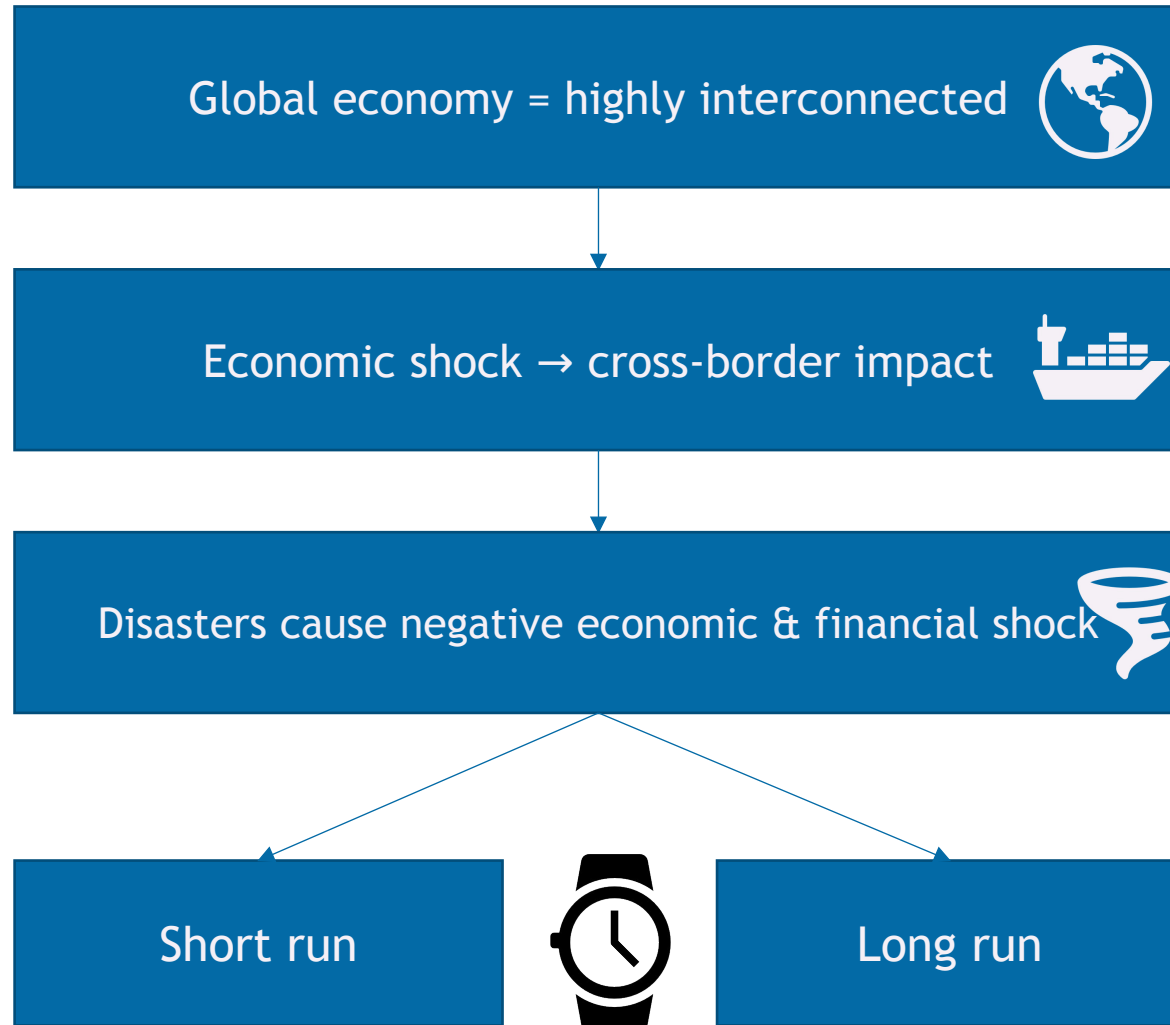
How vulnerable is Europe to severe climate-related disasters abroad?

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Well covered

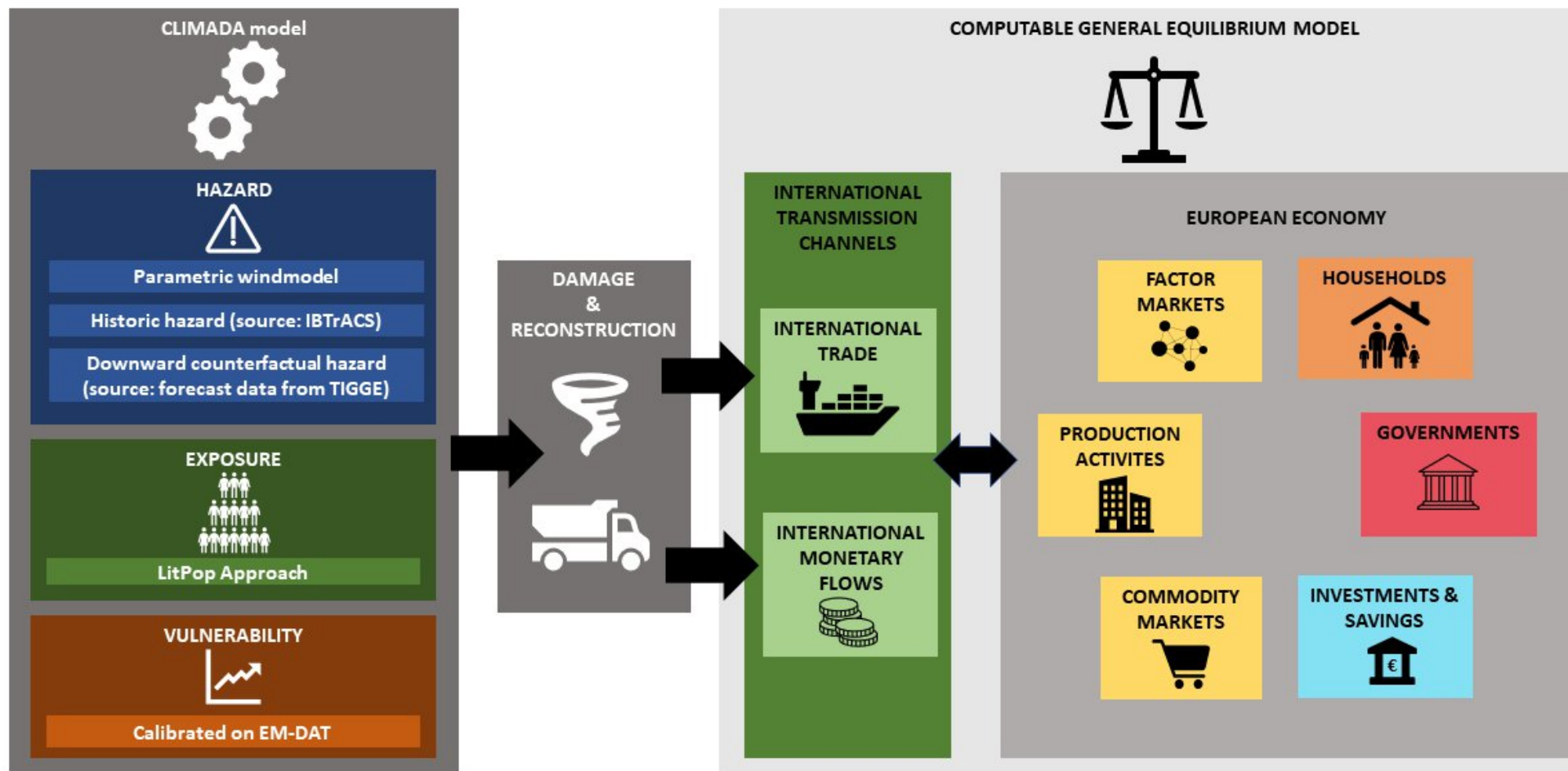
- Domestic/Regional impact of disasters
- Economic impact via trade

Less covered

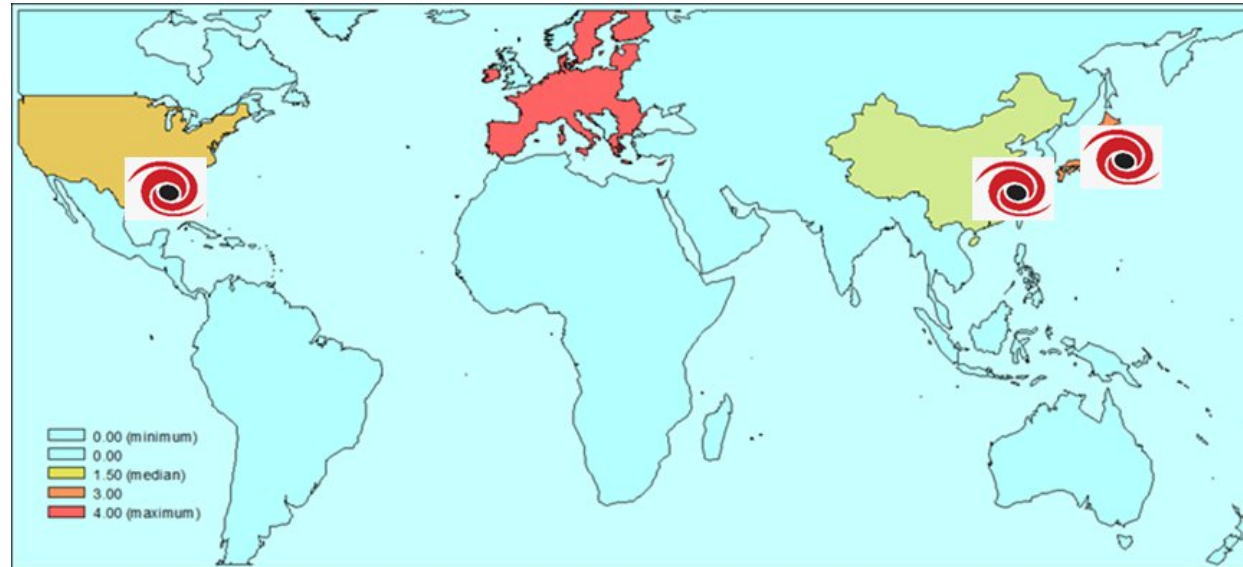
- Cross-border impacts
- Financial sector
- Europe

1. Couple Natural Disaster Models to CGE Models (GDyn-FS)

Model set-up



Extreme weather events considered

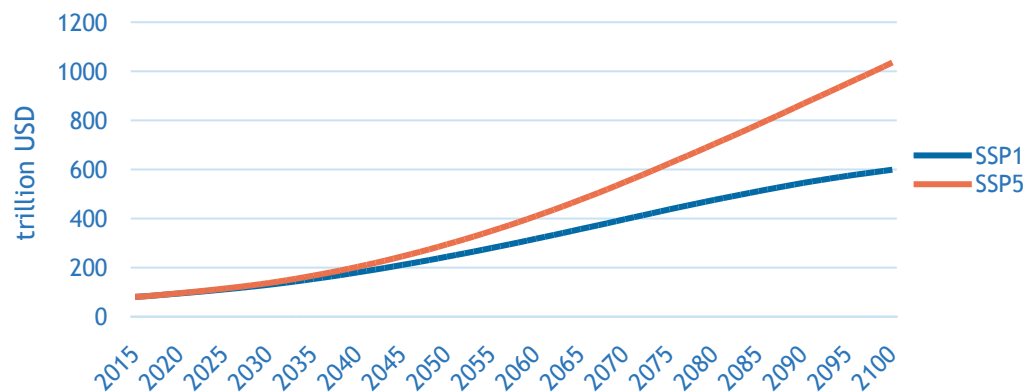


Past disasters	CLIMADA future projection
Hurricanes Harvey, Irma and Maria, United States 2017	2050
Typhoon Lekima, China , August 2019	2053
Typhoons Trami and Hagibis, Japan , September-October 2018 and October 2019	2053

Scenario assumptions

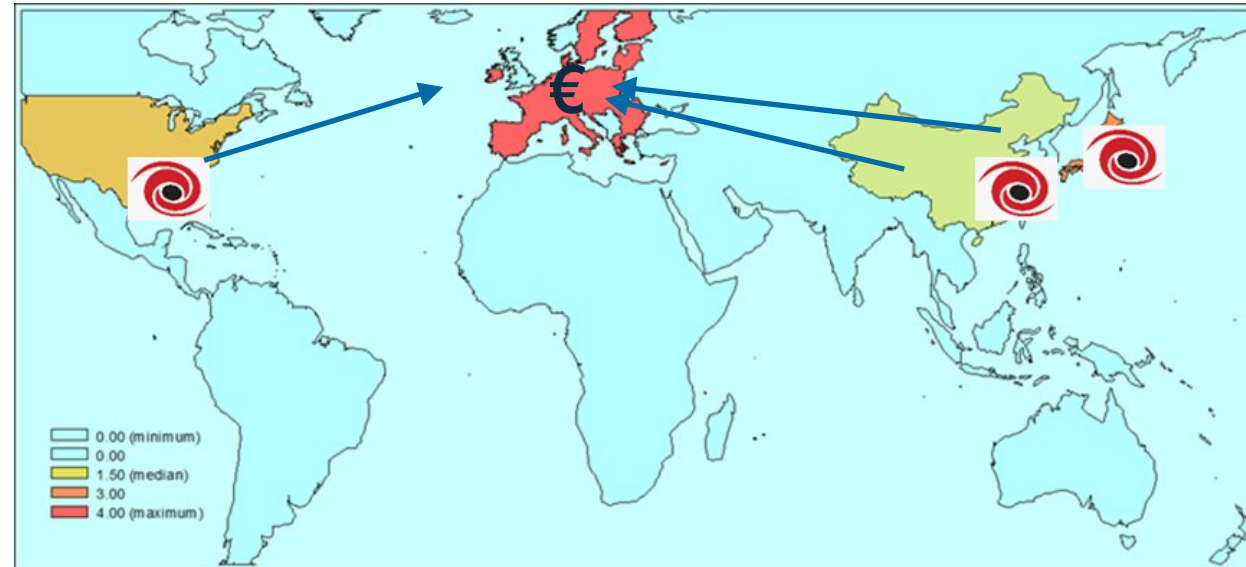
Paris goals for climate change are met	Paris goals for climate change are not met
Socio-economic scenario: SSP1 (Sustainability: “Taking the Green Road”)	Socio-economic scenario: SSP 2 (“Middle of the road”)
Frequency and intensity of Tropical Cyclones and Hurricanes remain stable*	Frequency and intensity of Tropical Cyclones and Hurricanes increase in the future +10%
Exposure increases in proportion to economic growth	Exposure increases in proportion to economic growth

Gross World Product (2014 USD)



* **Hurricanes** are tropical storms that form over the North Atlantic Ocean and Northeast Pacific. **Tropical Cyclones** are formed over the South Pacific and Indian Ocean.

Extreme weather events considered



- Assumed impact on European finance and the economy through changes in the flows of international trade and investment:
- European foreign investors and banks **lose equity** due to destroyed or damaged property and commercial disruption
 - + **New opportunities** for (recovery) investment.

1. Couple Natural Disaster Models to CGE Models (GDyn-FS)

Direct losses (€)

Economic &
Financial spill
over

2. Assess impact on financial markets

- International capital-finance mobility
- Composite financial asset

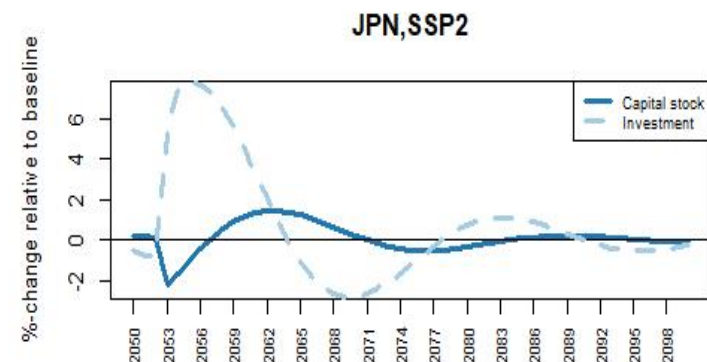
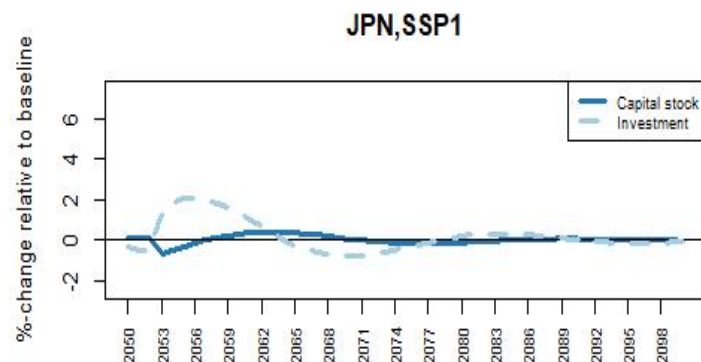
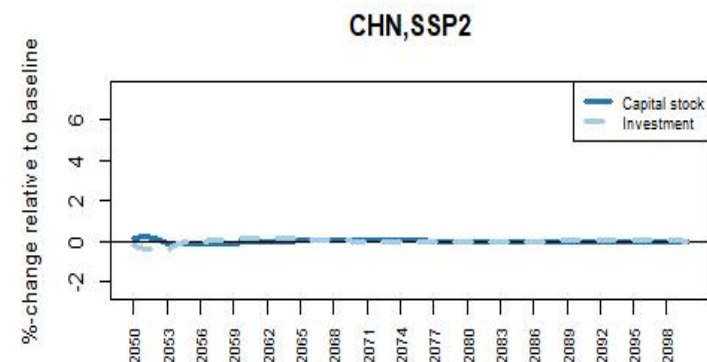
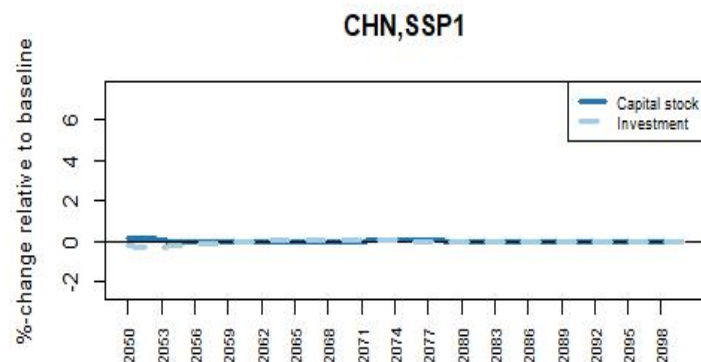
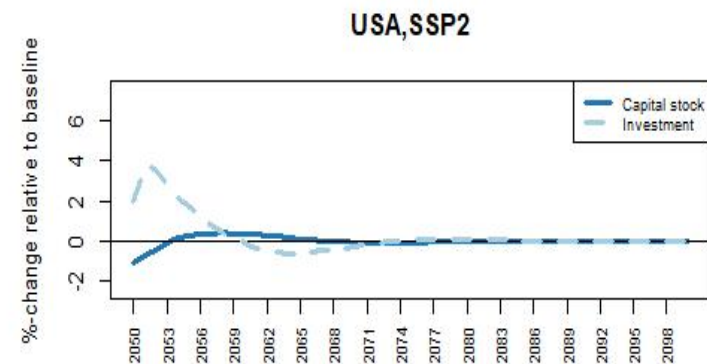
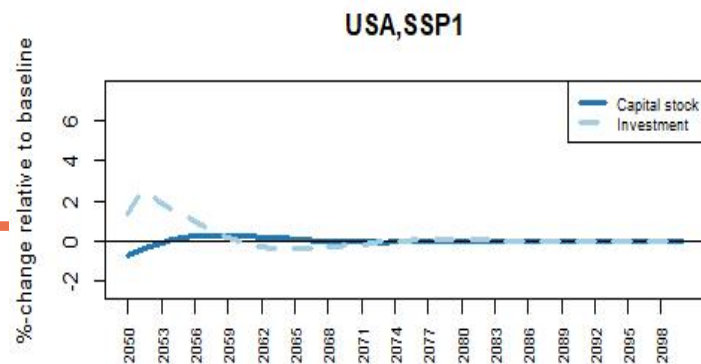
3. Combine remote & compound extreme weather events

Results

1. Investment & Capital stock in affected countries

Ambitious Paris = SSP1, intensity 0

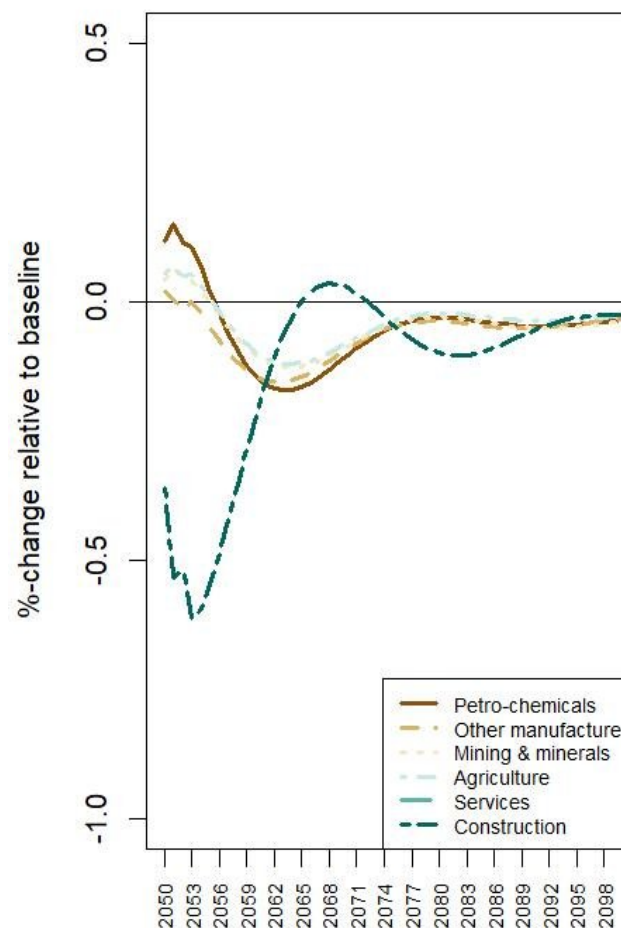
Failed Paris = SSP2, intensity 10



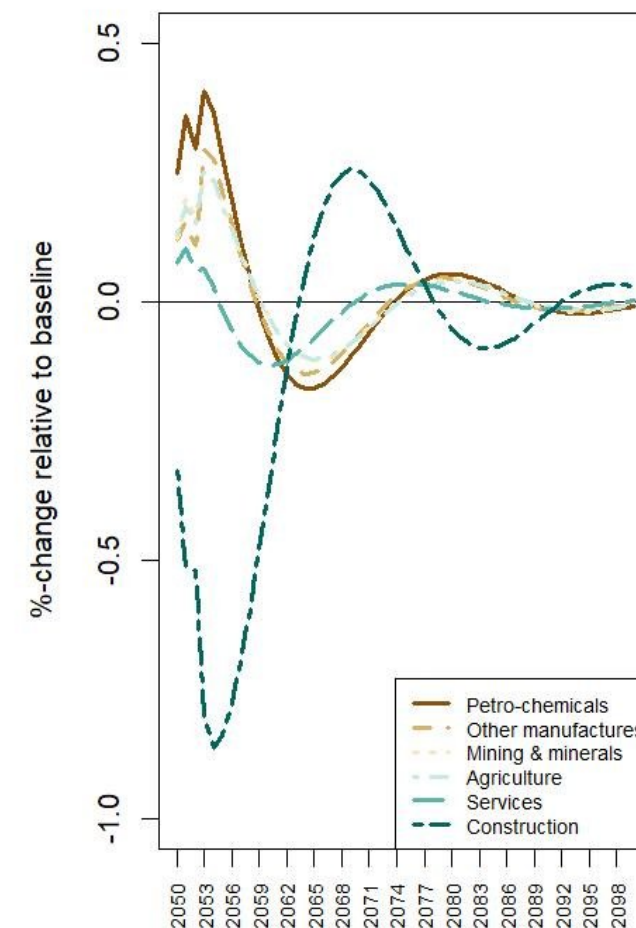
2. Sectoral impact in EU

Ambitious Paris = SSP1, intensity 0
Failed Paris = SSP2, intensity 10
Combined occurrence of events

Sector output, SSP1



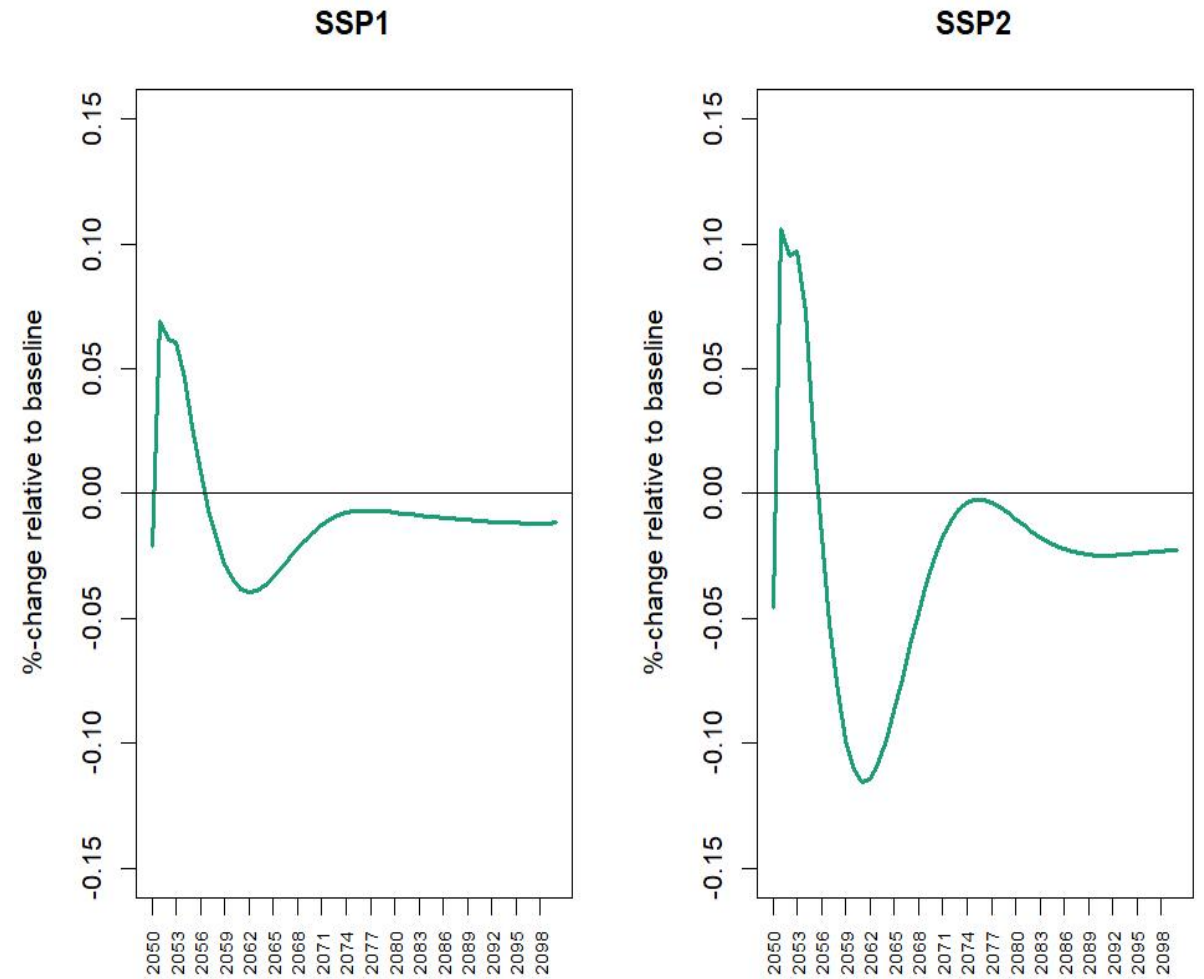
Sector output, SSP2



3. Wealth European investors holding assets abroad

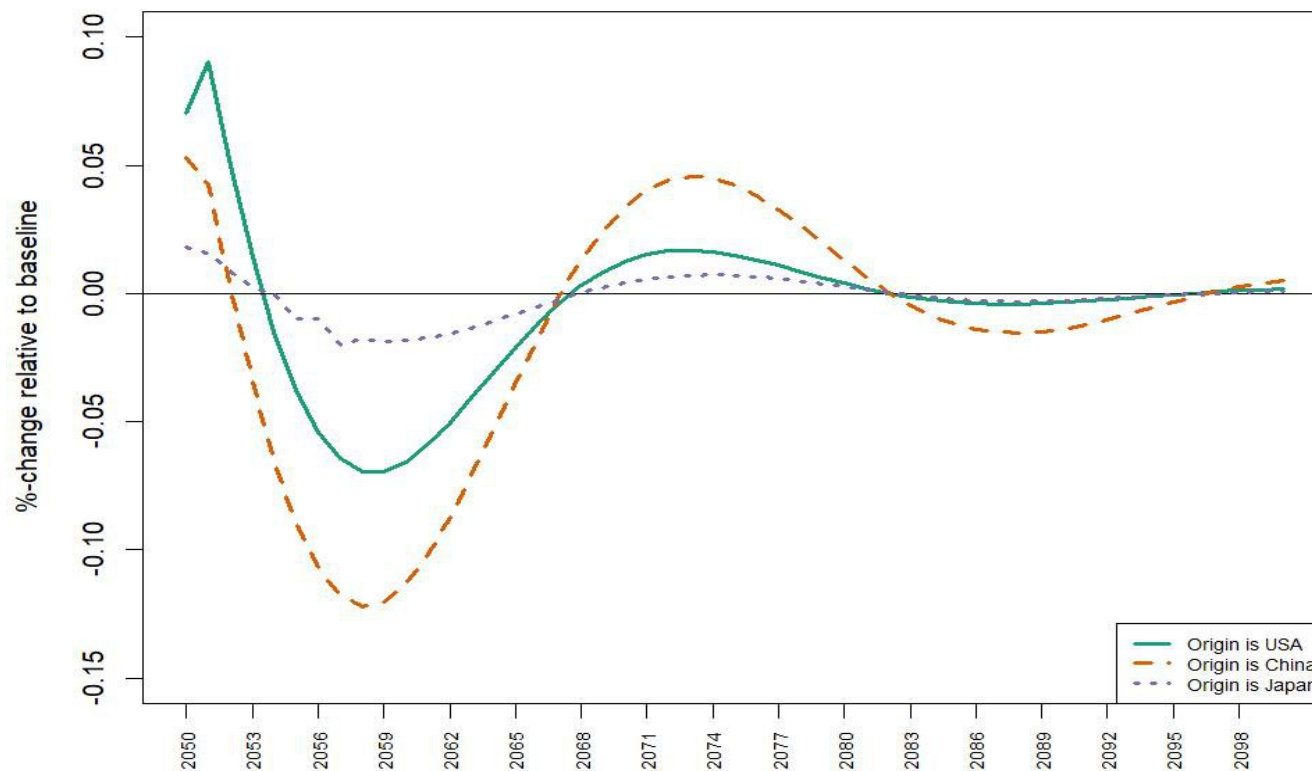
Ambitious Paris = SSP1, intensity 0

Failed Paris = SSP2, intensity 10



4. Geographical origin

Individual (country) analysis of identical shocks on EU GDP



- Short run ↔ long run impact
- Higher frequency and intensity (Paris not met) → Increases magnitude positive/negative impact.
- Finance:
 - Short run: higher valuation due to scarcity
 - Long run: money drain towards reconstruction → negative impact EU economy in subsequent years.

EU foreign investor lose wealth and this loss is not rapidly recovered, especially if Paris goals are not met.

Thank you - jan.brusselaers@vu.nl

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