What next for r^*?

A capital market equilibrium perspective on the natural rate of interest

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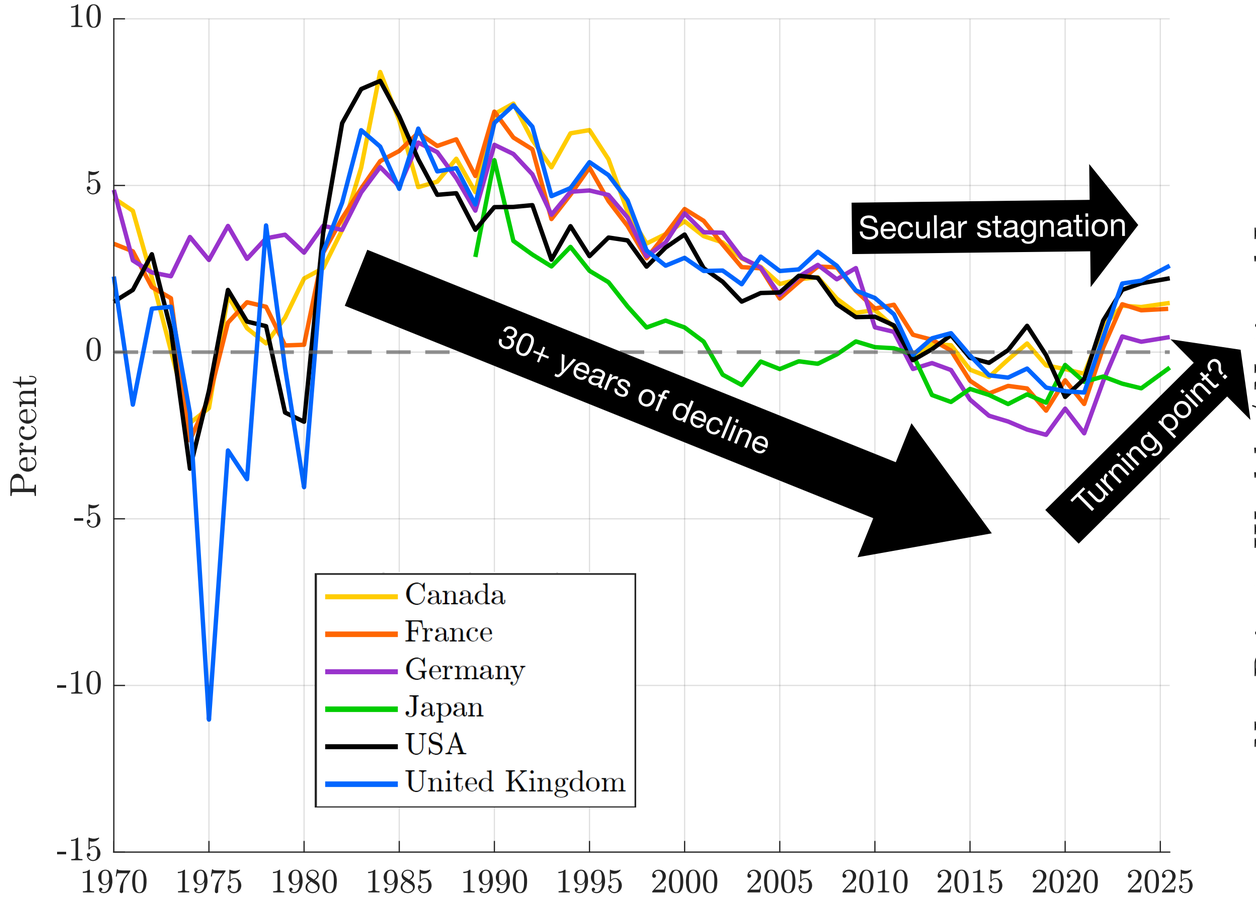
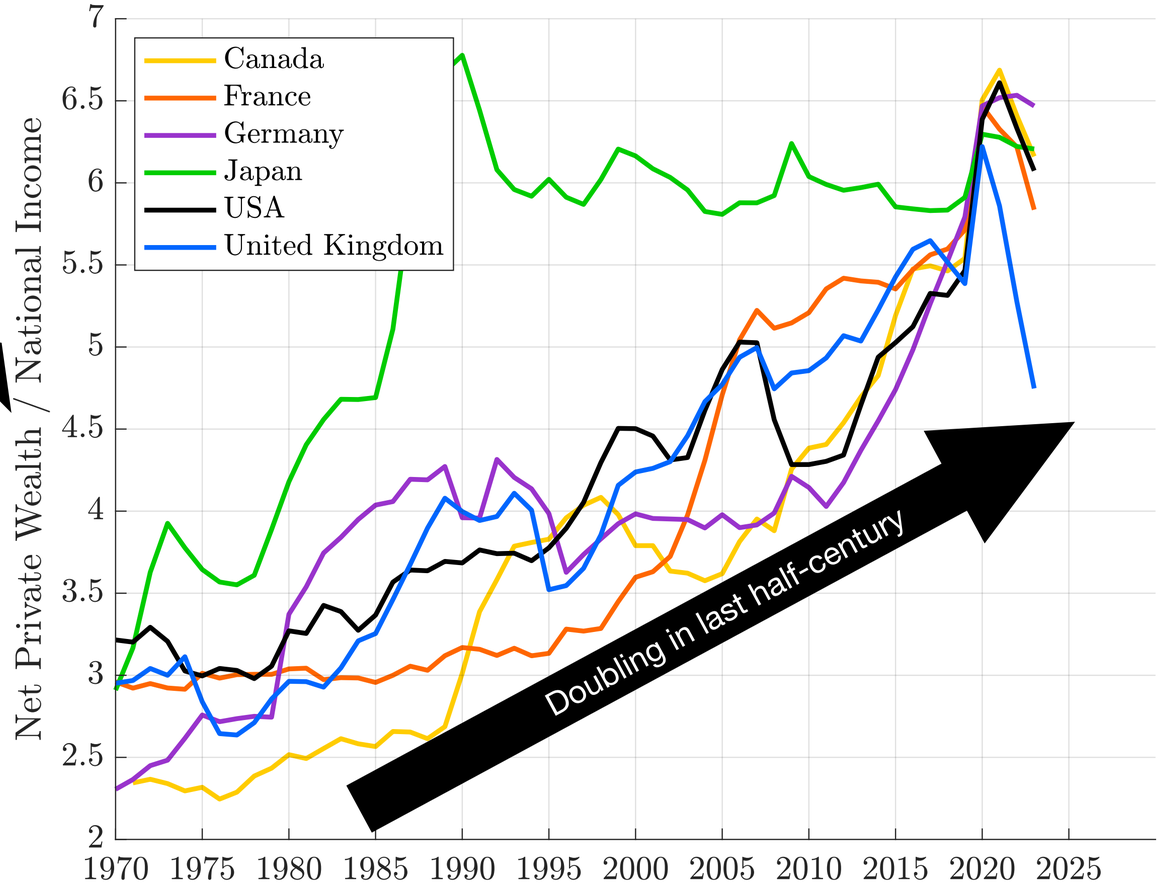
Lukasz Rachel, University College London

The two crucial macro trends

Real 10-year government bond yields



Wealth-to-GDP



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- **Geography:** Advanced Economy (AE) bloc
- **Roadmap:**
    * The past: interpret the two trends through the lens of the framework
    * Business-as-usual: path of r^* based on forces of the past 50 years
    * Turning point? Sensitivities and scenarios

Framework

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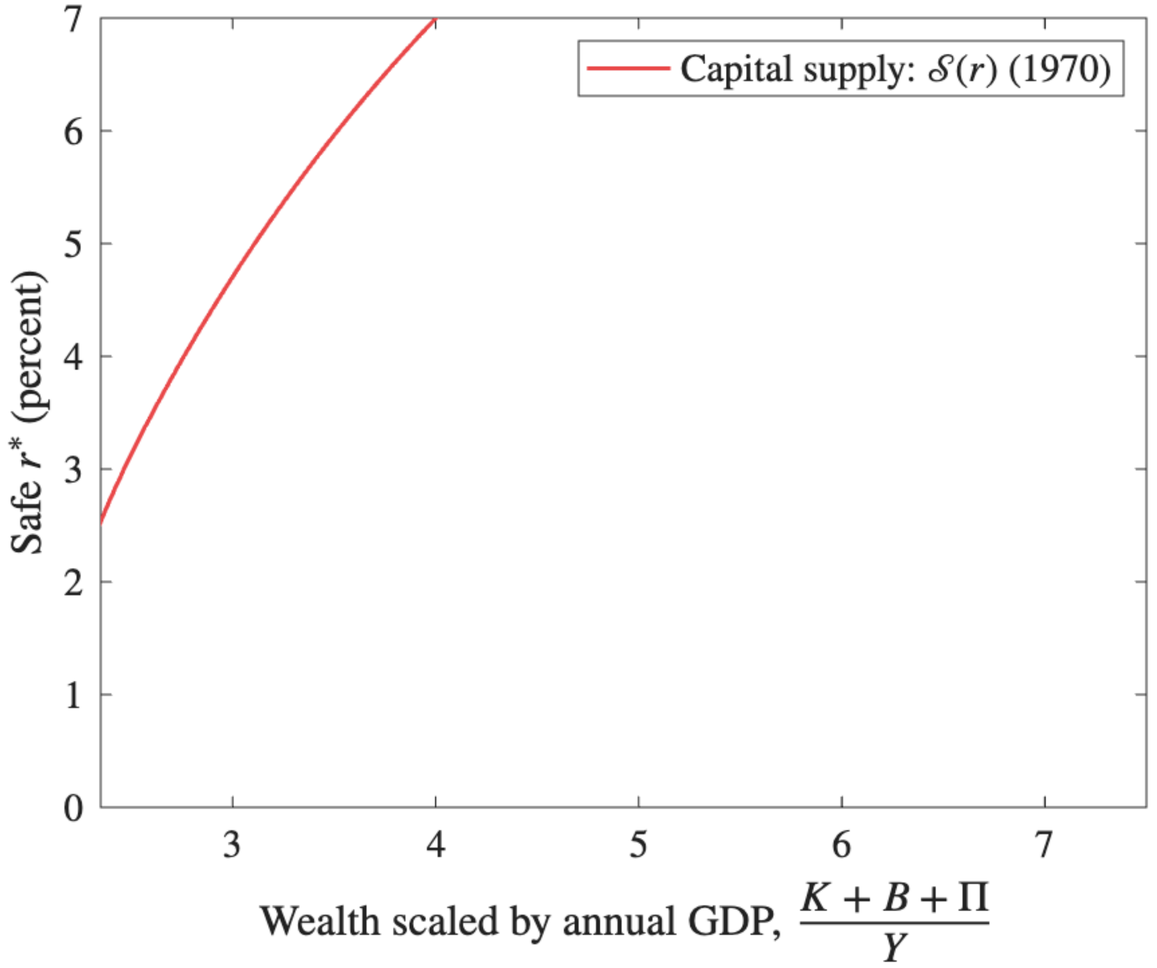

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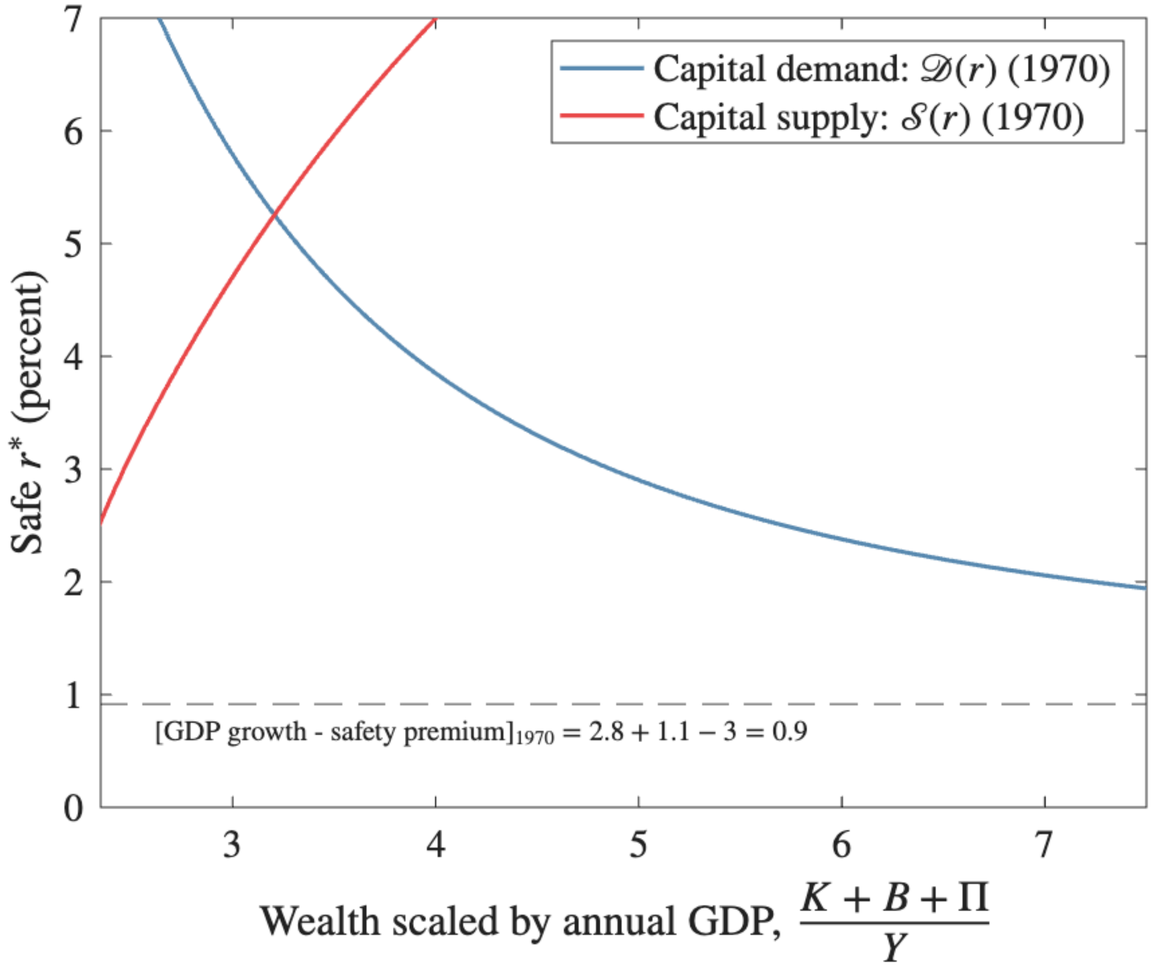

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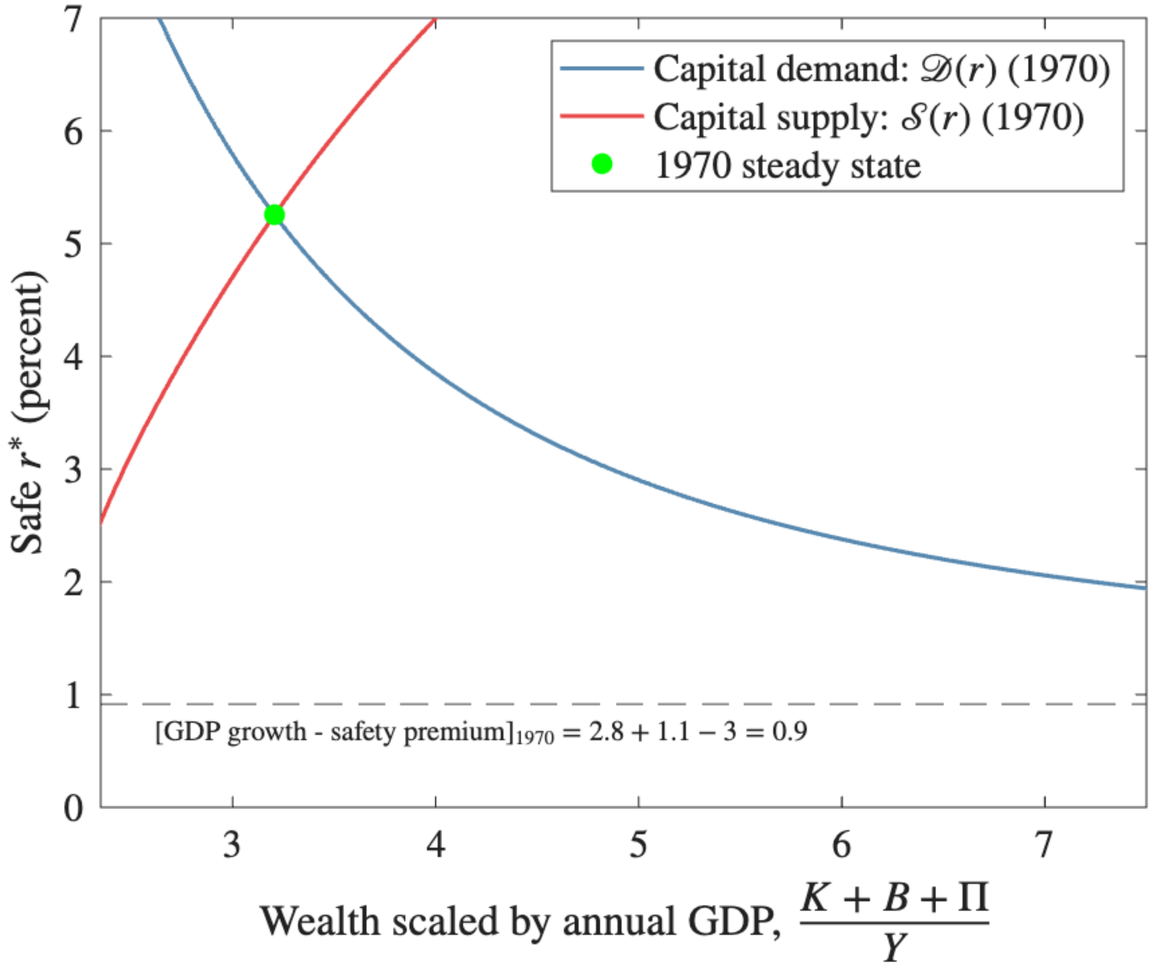

Half a century ago...

Driver	1970
Government debt / GDP	0.28
Civilian government spending / GDP	0.15
Military spending / GDP	0.05
Social Security / GDP	0.04
Capital tax (percent)	36
Productivity growth (percent/year)	2.8
Population growth (percent/year)	1.1
Expected length of working life (years)	46
Expected length of retirement (years)	7
Depreciation rate	0.03
Capital intensity of production	0.31
Gross markup	1.08
Safety premium (pp)	3.00
Global savings glut / GDP	0

Back to the future...

Driver	1970	2050+
Government debt / GDP	0.28	0.90
Civilian government spending / GDP	0.15	0.15
Military spending / GDP	0.05	0.02
Social Security / GDP	0.04	0.08
Capital tax (percent)	36	30
Productivity growth (percent/year)	2.8	1.4
Population growth (percent/year)	1.1	-0.1
Expected length of working life (years)	46	46
Expected length of retirement (years)	7	23
Depreciation rate	0.03	0.05
Capital intensity of production	0.31	0.33
Gross markup	1.08	1.17
Safety premium (pp)	3.00	4.50
Global savings glut / GDP	0	-0.15

Govt debt and social security spending ↑

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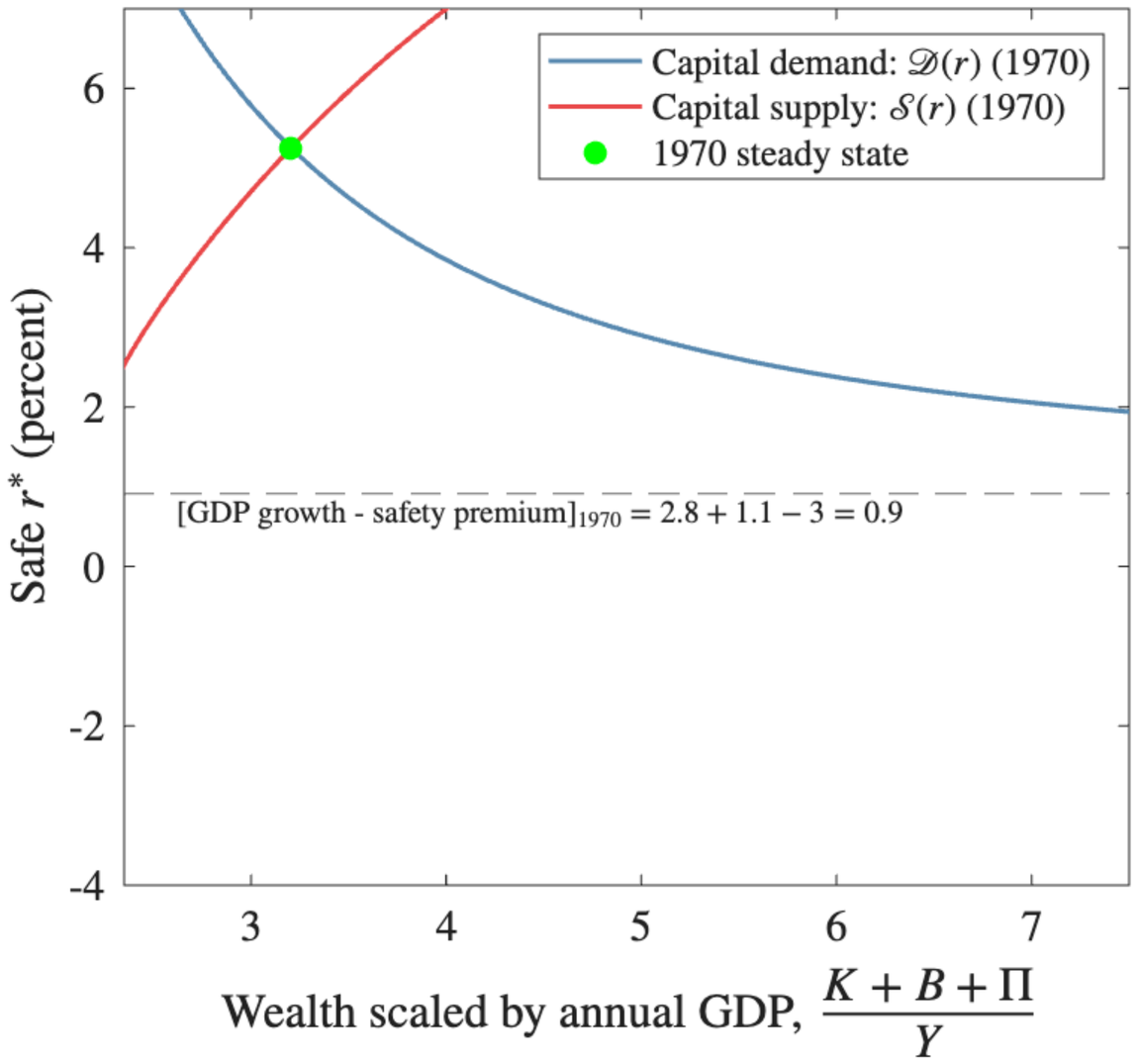
Capital market equilibrium: 2050+ steady state



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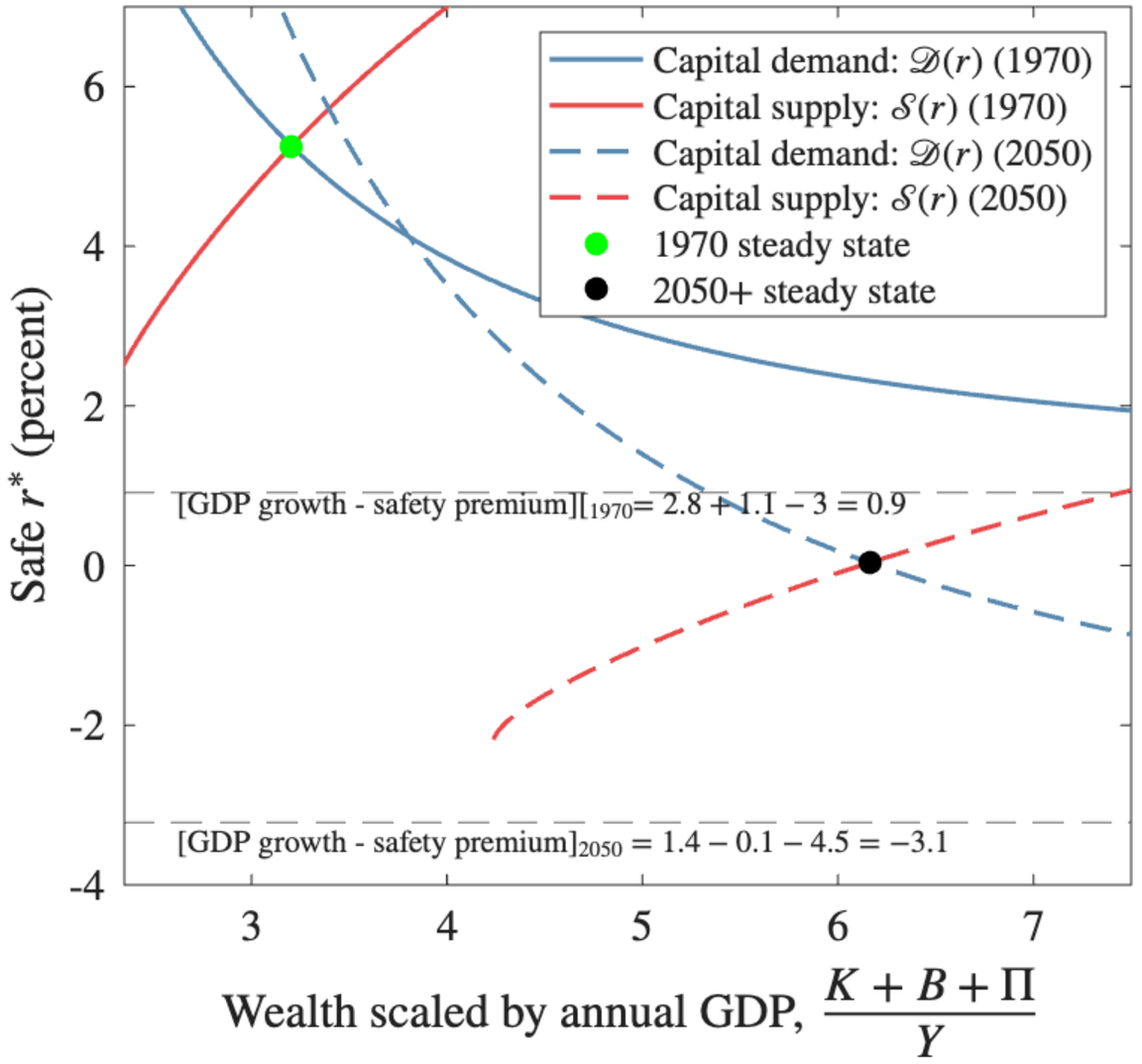

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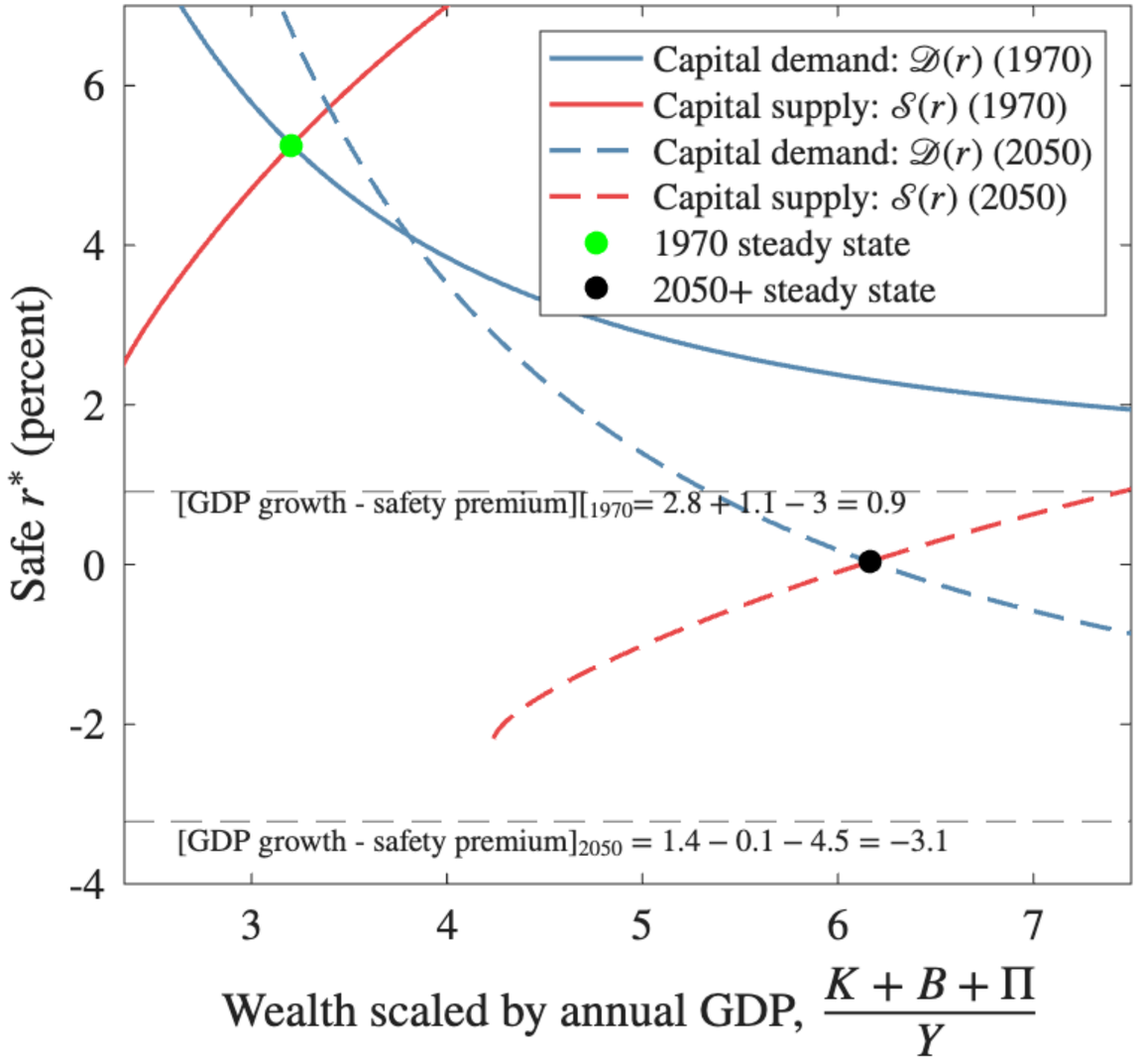
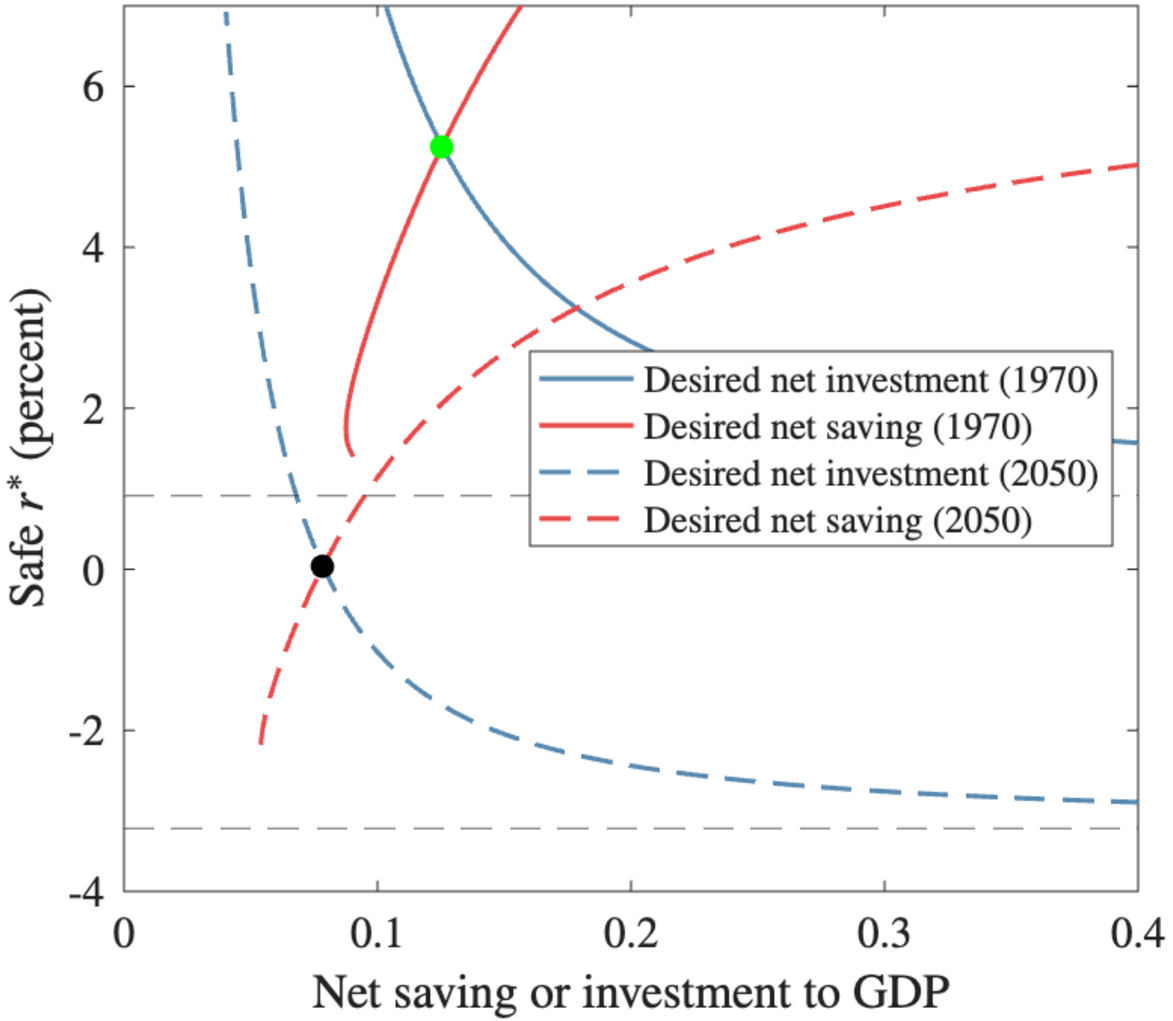
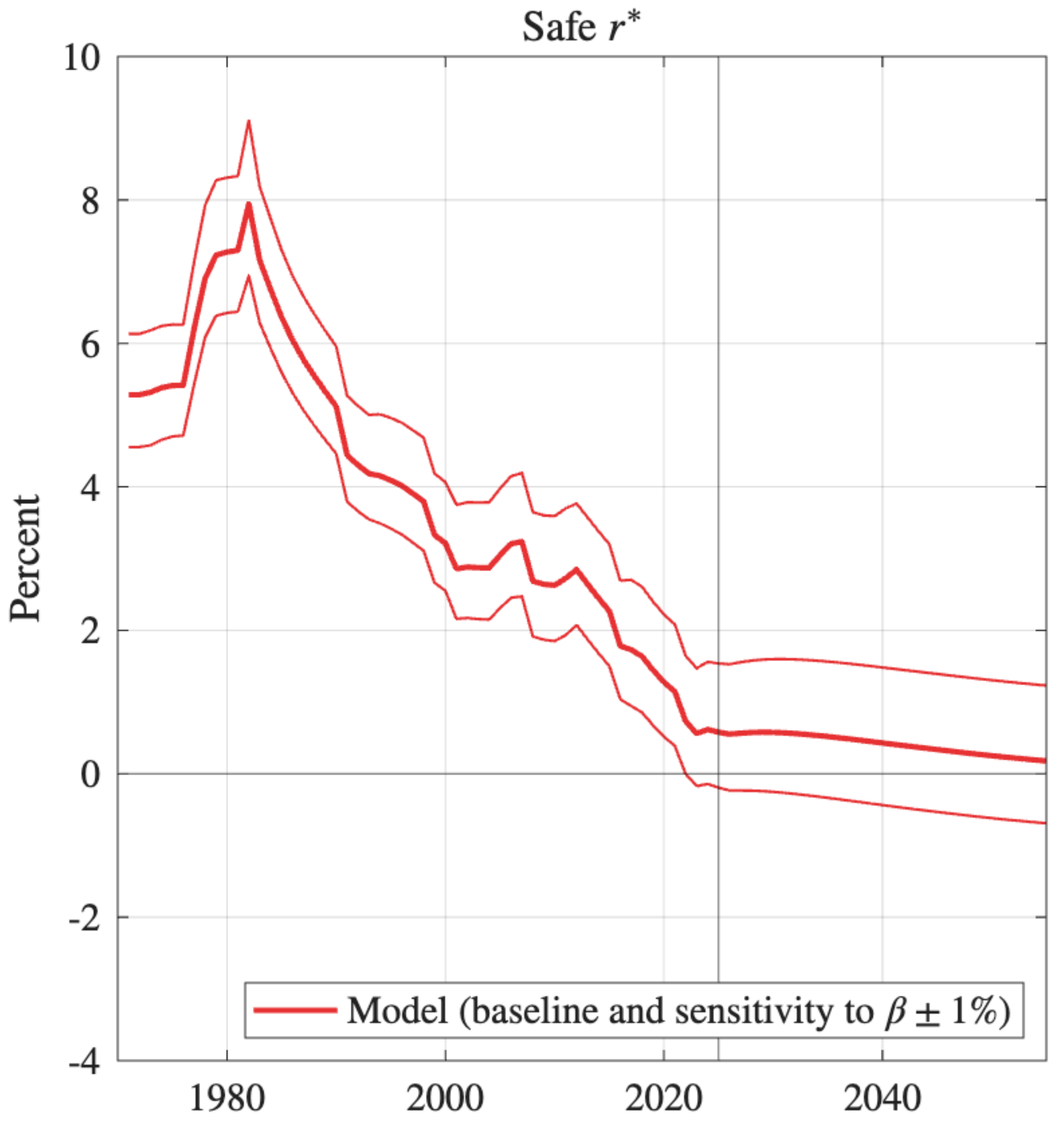
Stocks

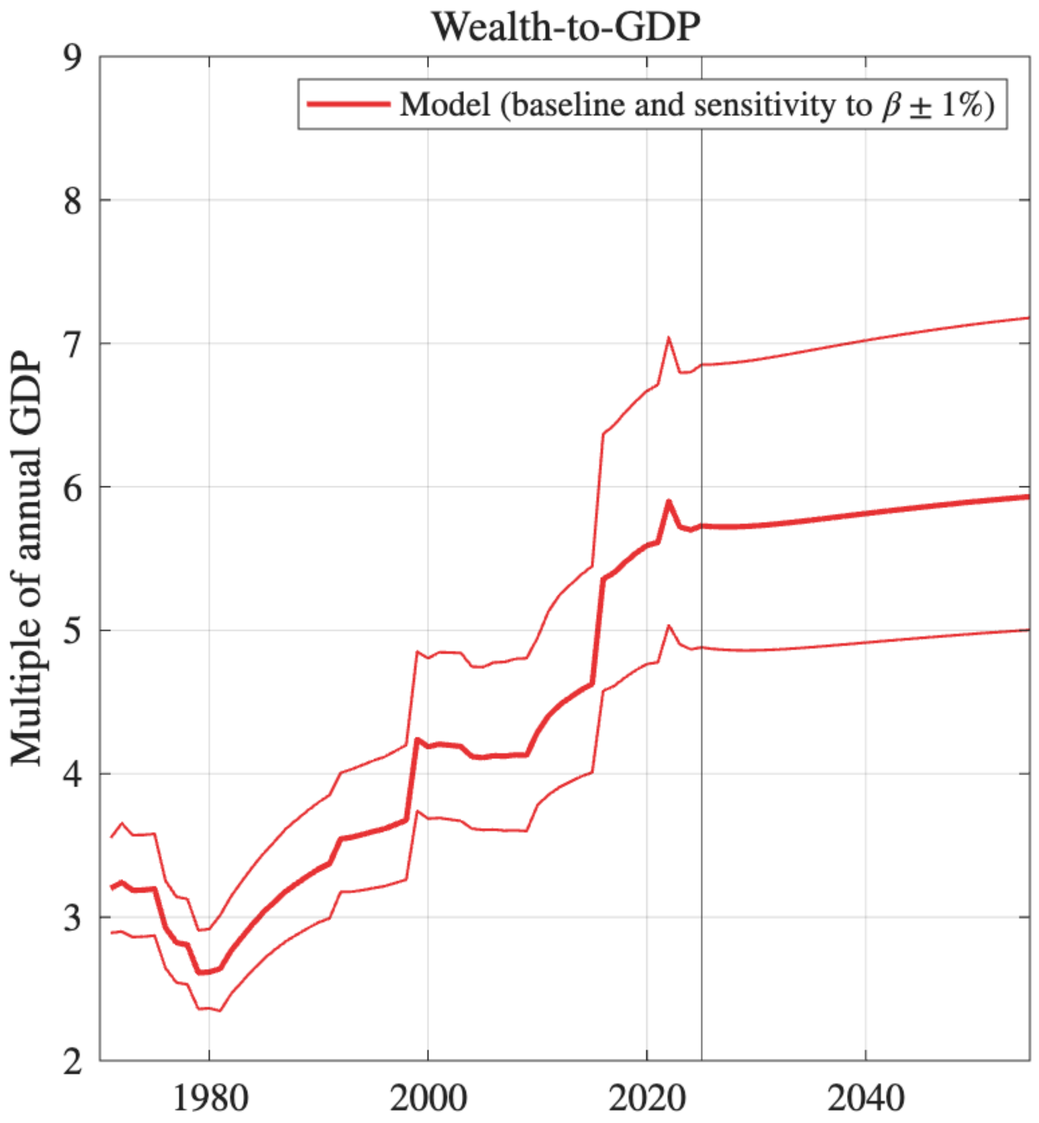


Flows



r^* transition: the past + "business-as-usual" projection





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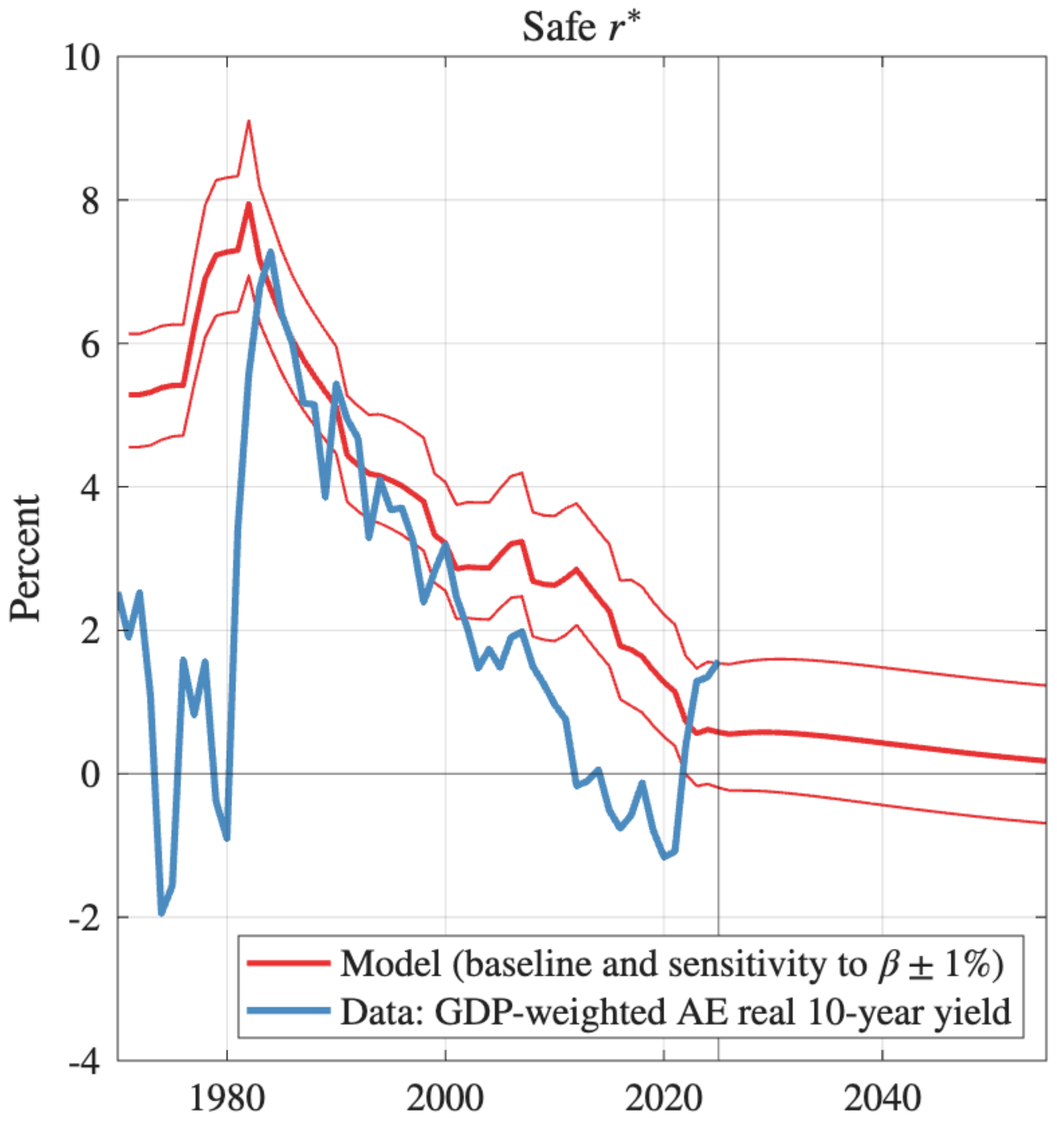
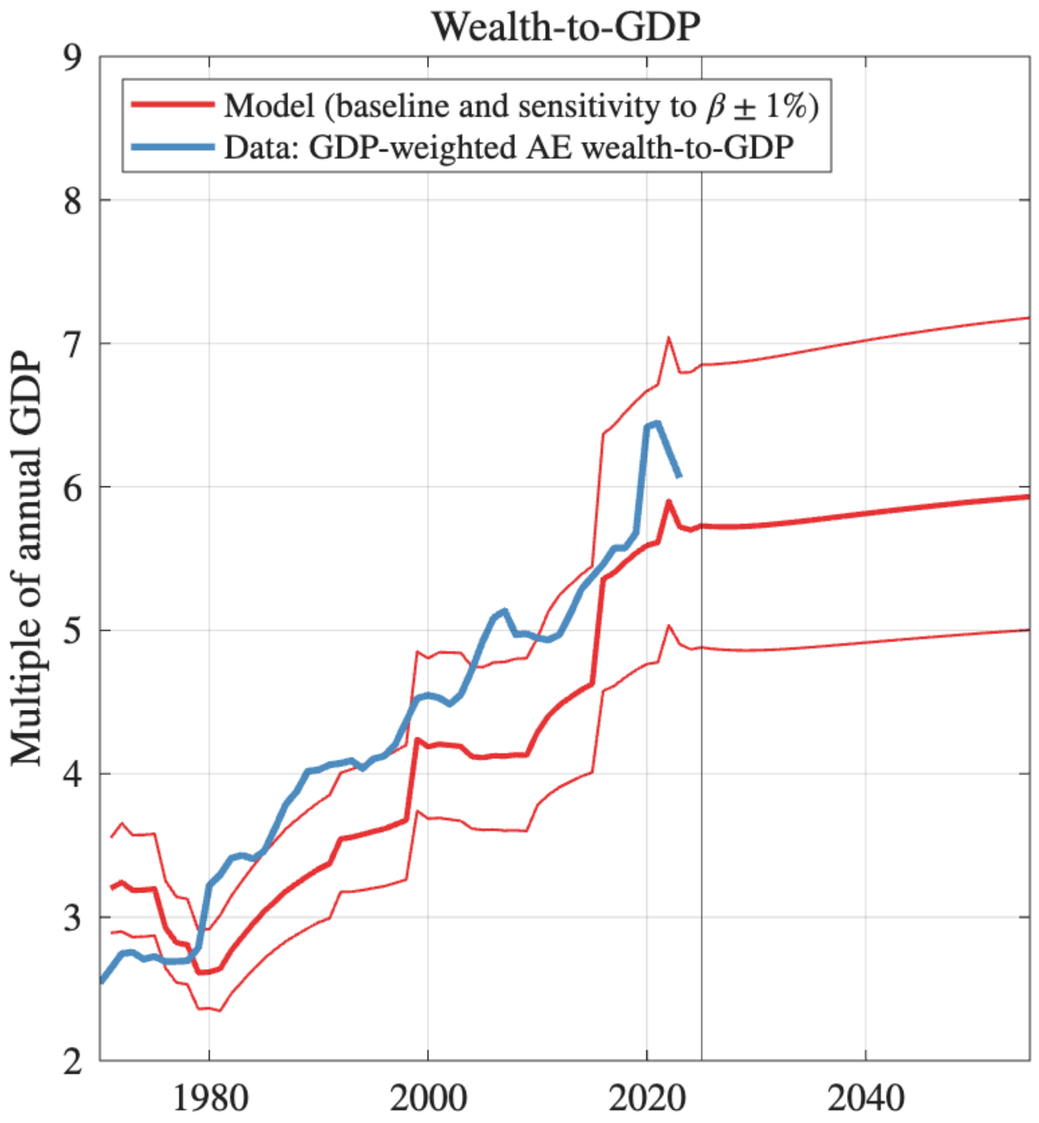
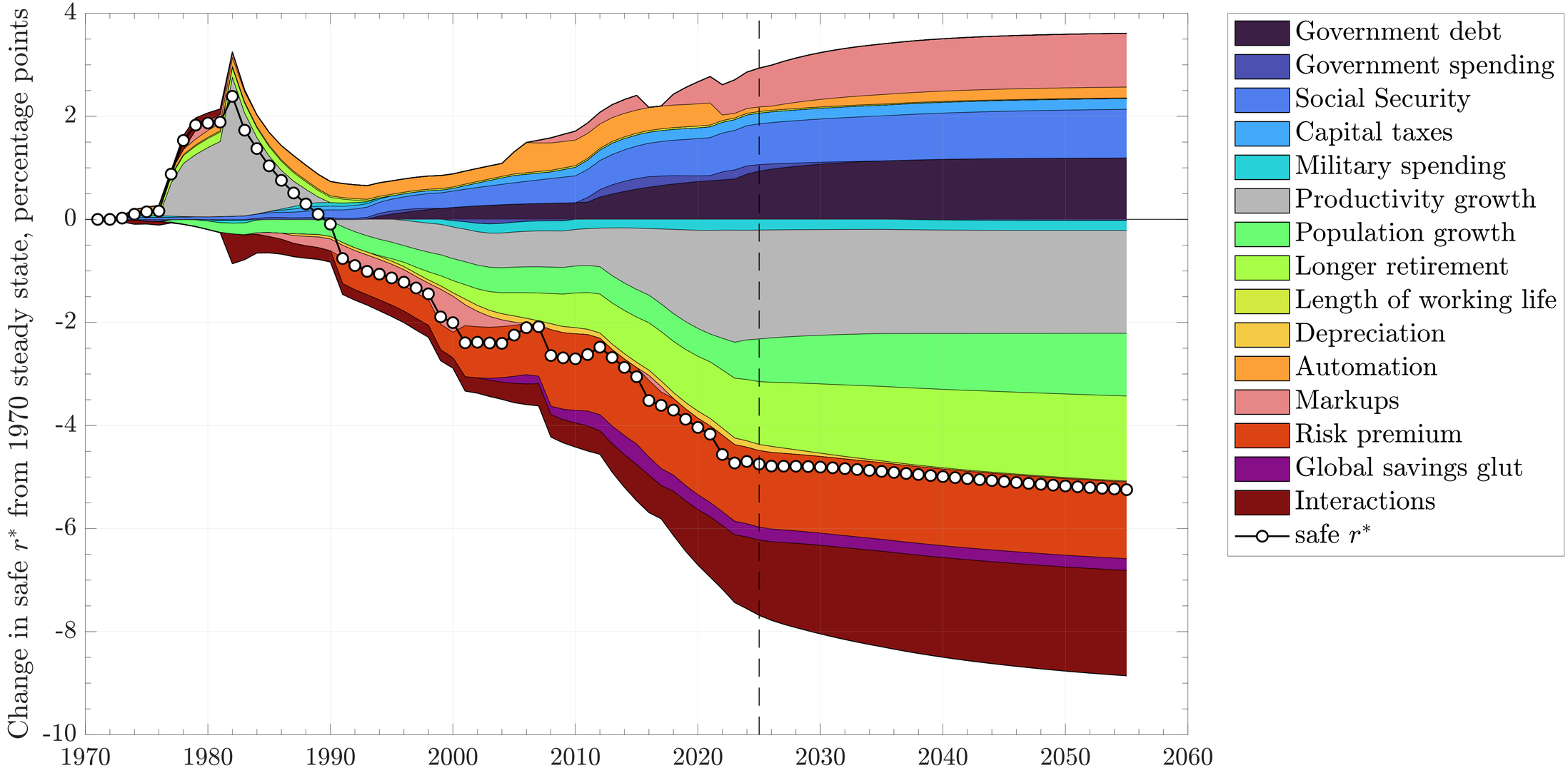
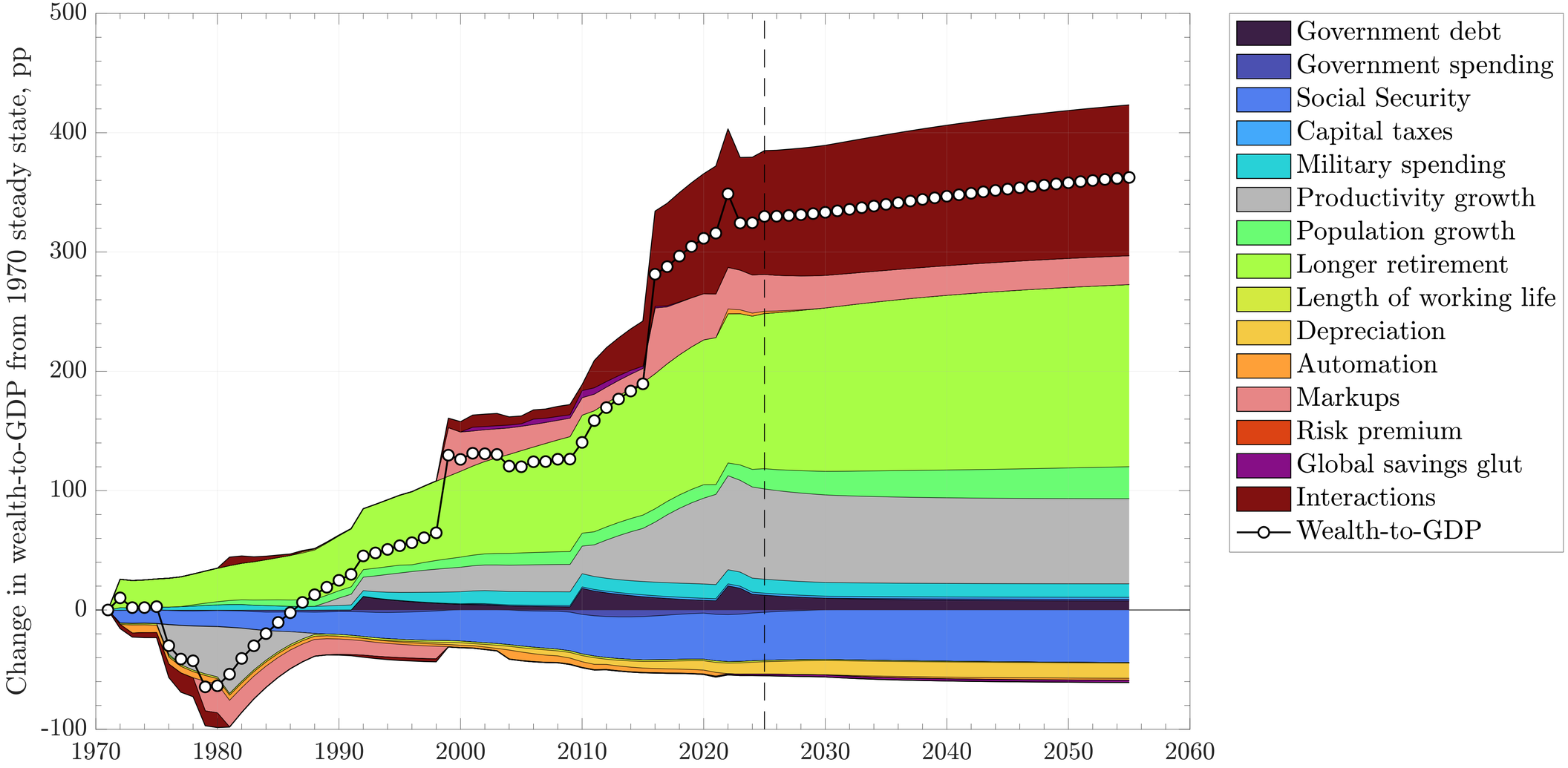




Why has r^* declined?



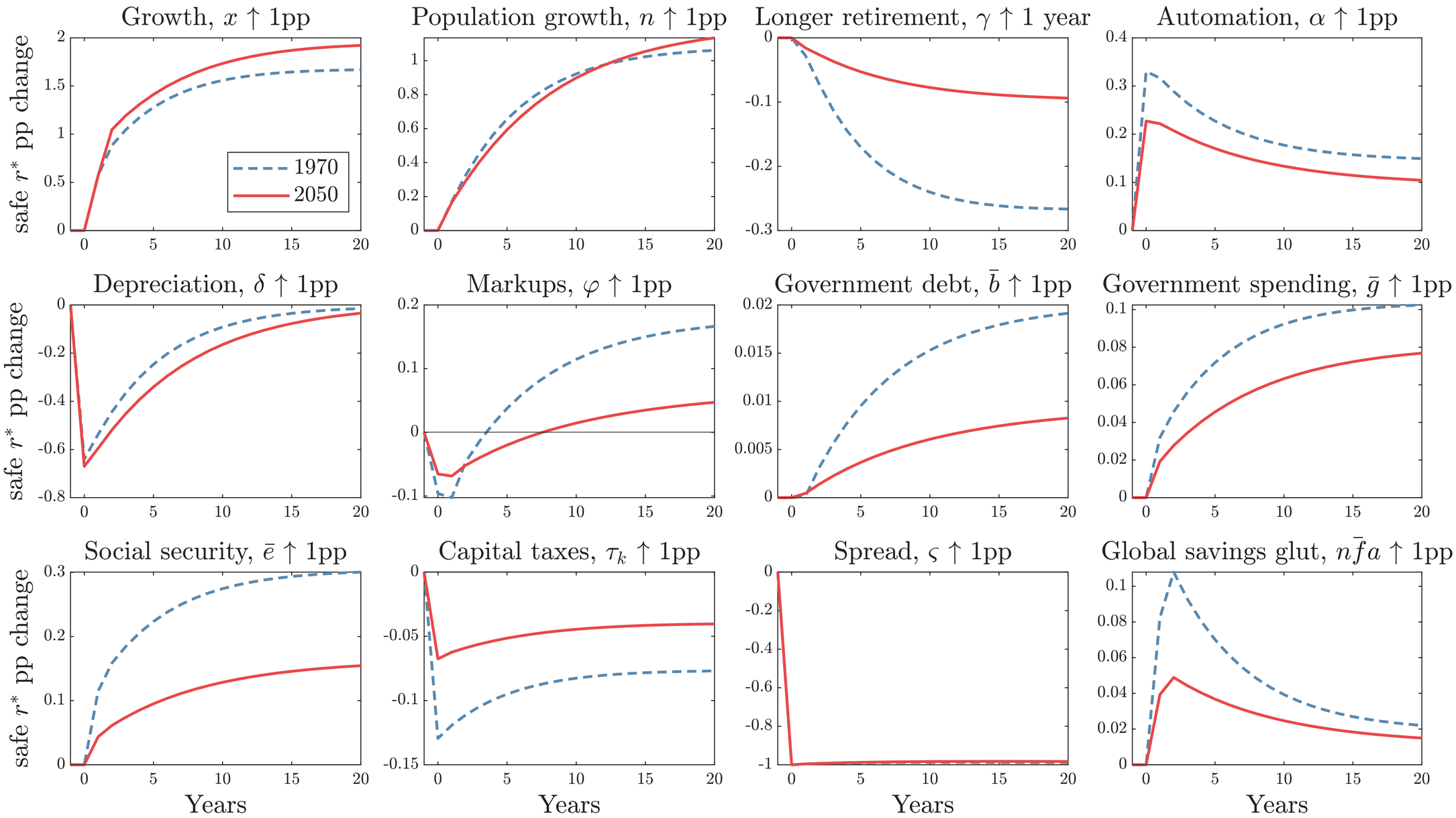
Why has wealth risen?



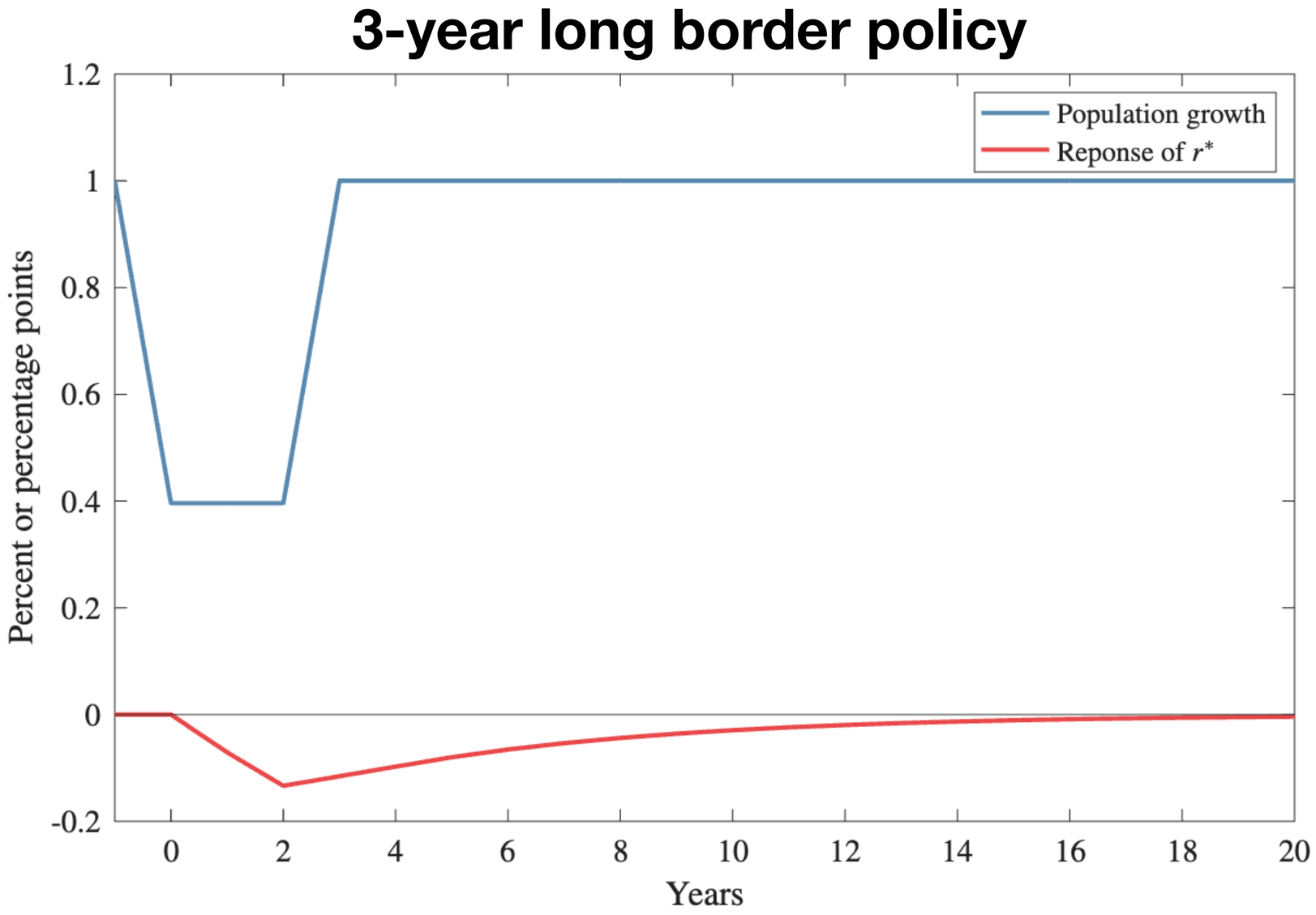
How can this help you?

- Sensitivities
- Scenarios

Sensitivity of r^* to underlying drivers



Temporary shocks possible too



Beyond “business-as-usual”: 6 scenarios

1. De-globalization

- 2/3 unwind of the global saving glut
- Reshoring and friendshoring: less efficient (growth 0.1pp lower) but also safer (risk premium 0.25pp lower)

2. Re-militarization

- rise in military spending (from 2.6% to 3.9% of GDP) funded partially by debt (additional 10pp of GDP)

3. AI

- Growth boost of 0.75pp per annum over next decade — large but in the pack of guesstimates
- Heightened concentration and market power: markup up by 2pp, from 14% to 16%
- Higher capital intensity (data centres, energy investment, automation): +1pp, from 34% to 35%.

4. Intangibles

- Higher fixed costs and entry costs stifle innovation and competition, offsetting some productivity gains

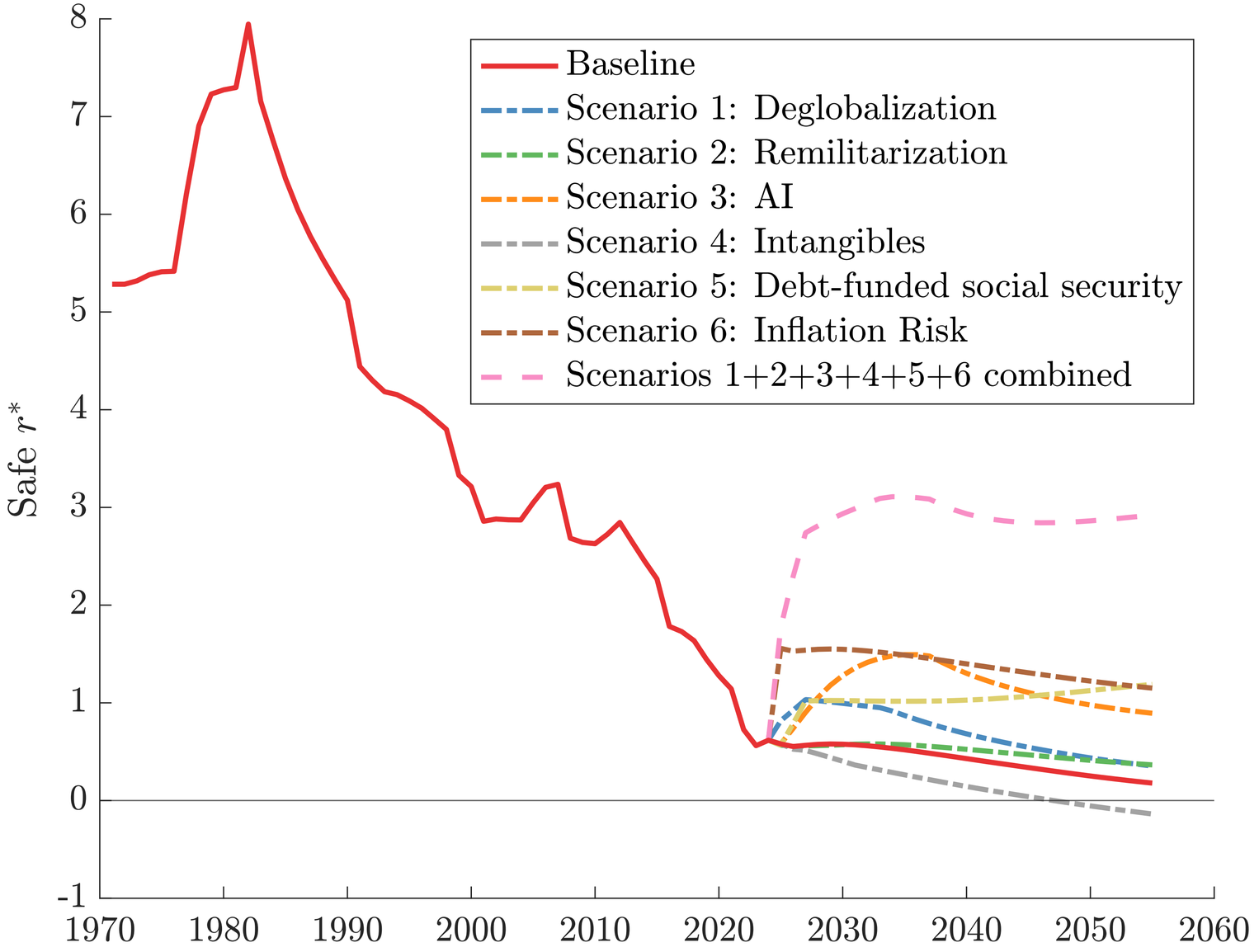
5. Debt financed social security

- Benign flattening out of the social security spending replaced by continued rise (from 7.5% to 11% of GDP by 2050) that is debt funded (55pp)

6. Inflation risk

- Scarring of investors following recent episode of large losses on portfolio of safe assets, 2/3 of the increase in risk premium unwound (1pp)

r^* — upside scenarios



Concluding remarks

* Massive shifts in capital demand and, especially, capital supply in the last 50 years
* Current AE r^*: 0.6%, or between 0-1.2% (“central band”, true uncertainty much wider)
* The business-as-usual projection is for a small and gentle continued decline in r^*
* This prediction easily overturned by several scenarios
* But for r^* to increase substantially, several of the risks need to materialize at once
* **Useful toolkit:** capital market equilibrium + limited foresight transition + sensitivities

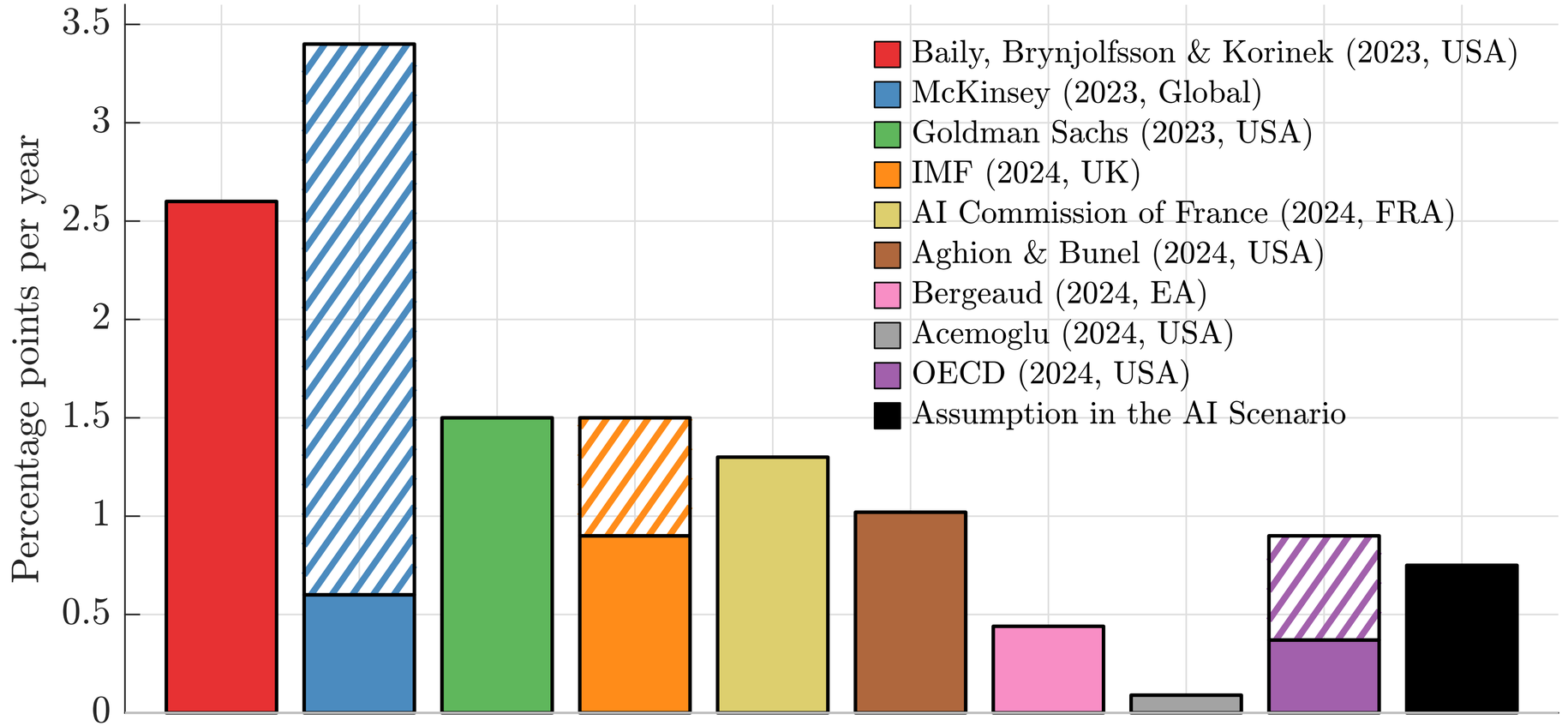
Appendix

What is r^*?

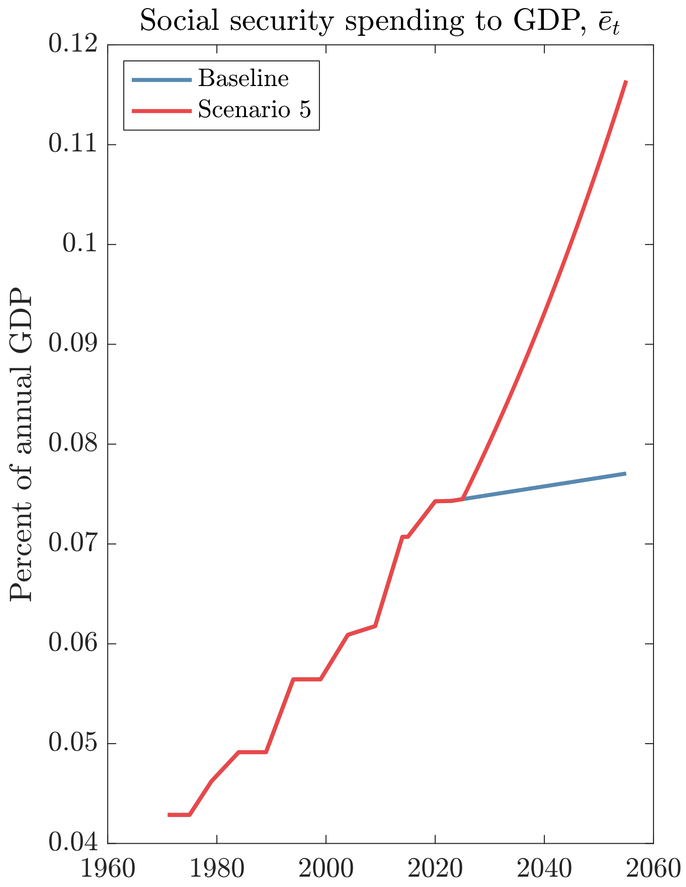
- **The natural rate of interest** — the **real**, **safe** interest rate that brings **the economy** into **balance** in the **medium-to-long term**

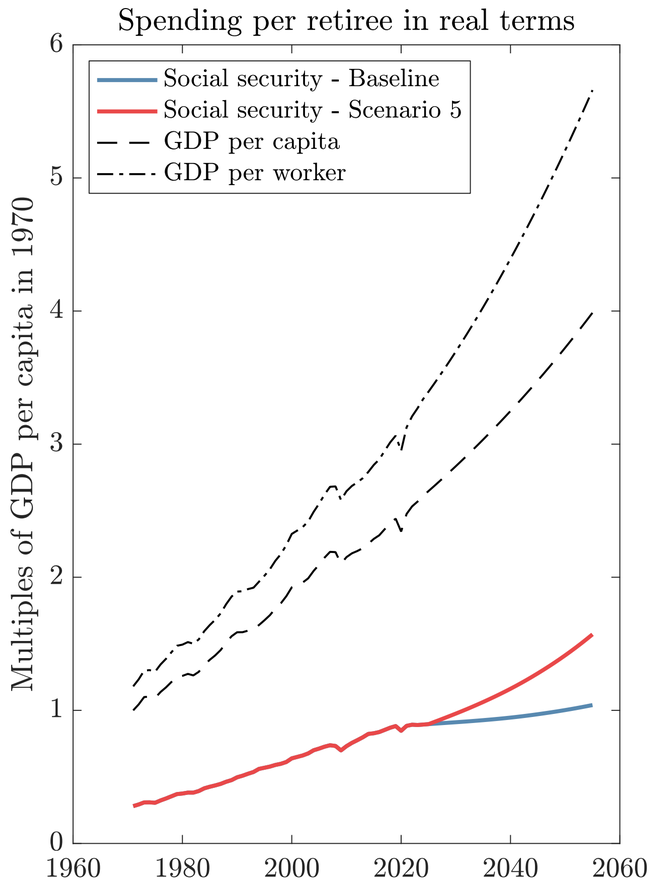
  - **real:** nominal rate - expected inflation
  - **safe:** rate on safe & liquid assets. Anchor for central bank policy rates
  - **the economy:** advanced economy bloc: US, Western Europe, Japan, OECD
  - **balance:** inflation at target, growth at potential, equilibrium in the capital market
  - **medium-to-long term:** driven by structural forces, looks through transitory business-cycle shocks

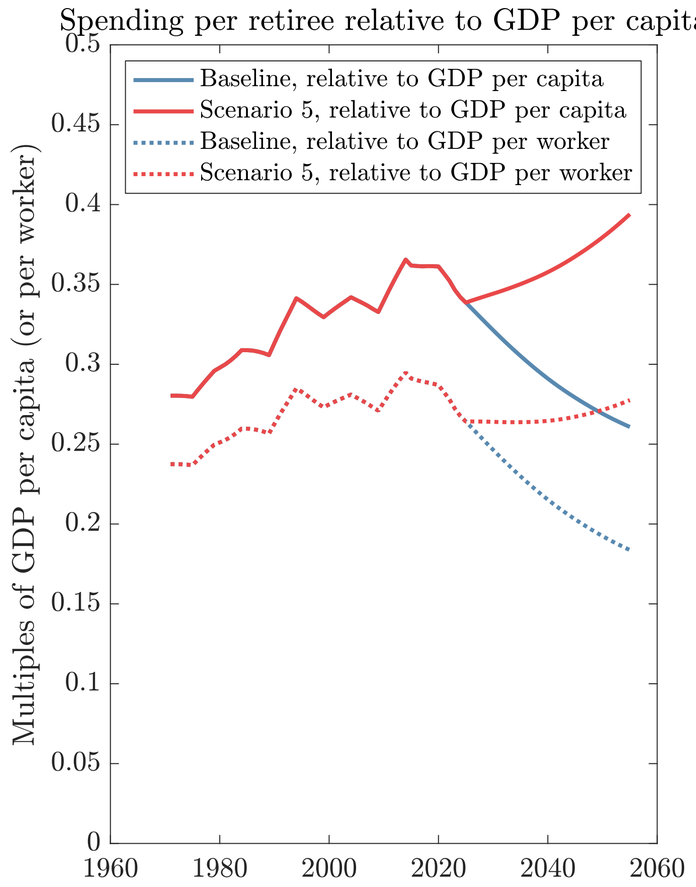
Scenario 3: AI boost to productivity growth



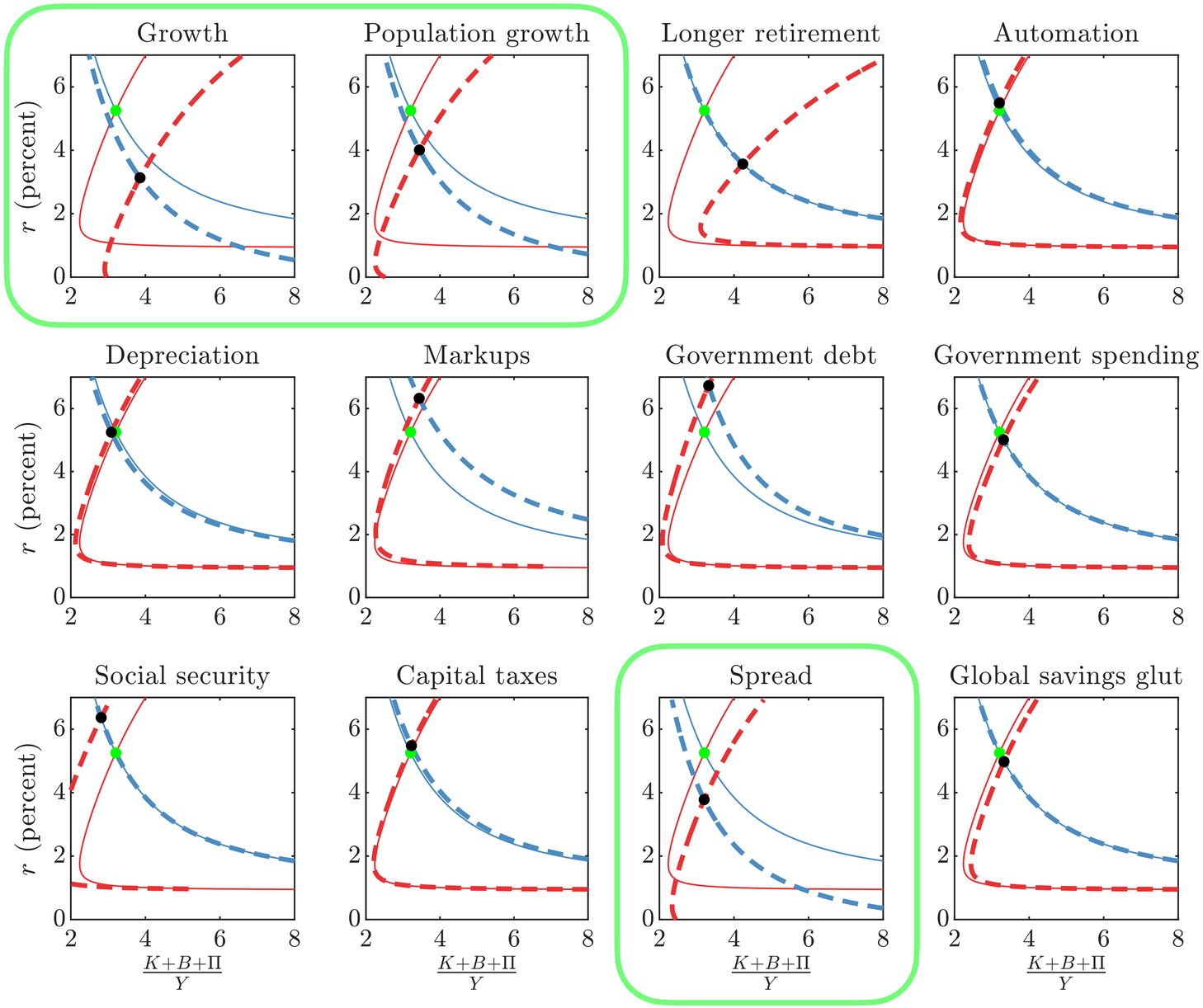
Scenario 5: social security



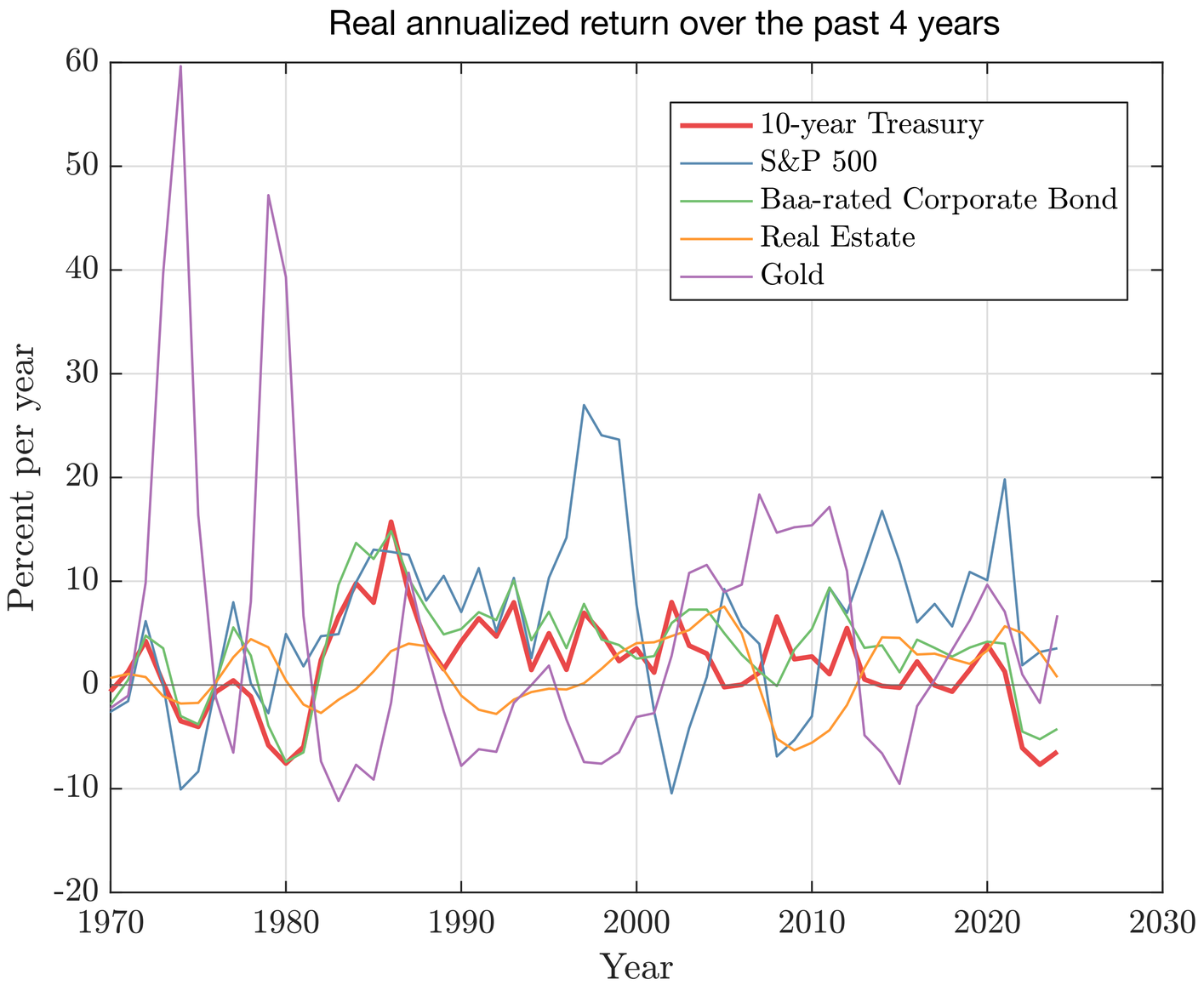




Individual shifts



Scenario 6: safe asset premia



Flow- and valuation effects

- Value of wealth in the long-run depends on:
  - flows (of saving, profits)
  - valuation effects

$$\Pi_0 = \sum_{t=0}^{\infty} \frac{\pi_0(1+x+n)^t}{(1+r+\varsigma)^t} = \frac{\pi_0(r;x,n,\varsigma;...)}{r-(x+n-\varsigma)}$$

- **All forces shift the schedules horizontally (flow effects)**
- **In addition, productivity and population growth rates x and n, and the safety premium ς, shift the schedules vertically (valuation effects)**