

Global Financial Systems

Chapter 22

The global financial system in 2026: Opportunities and threats

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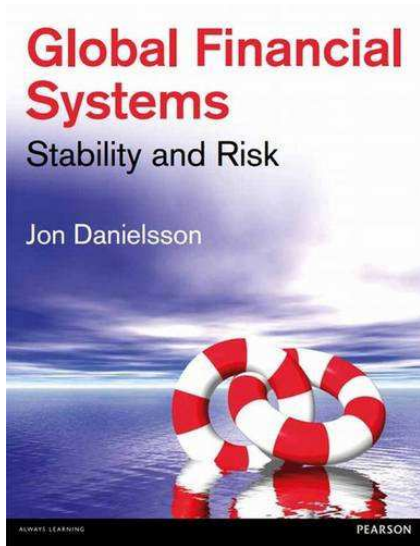
To accompany

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“All happy families are alike; each
unhappy family is unhappy in its own
way.”

Tolstoy (1878)

Main financial system threats

- To be systemic under the Chapter 1 definition, an event must be materially important
- Systemic threats (Danielsson and Macrae 2025)
 1. Debt death spirals and fiscal heart attacks
 2. Populism, credibility and political capital
 3. Geopolitics — manufactured tensions
 4. Artificial intelligence — “rational maximising agent” (last chapter — it returns here when we discuss crisis speed)
- Systemic describes the scale and propagation of the outcome, not a fixed property of the event — a non-systemic loss can become systemic through insurers, collateral or the sovereign
- Some events are non-systemic but still very disruptive and costly
 5. Demographics
 6. Climate

On crises

- When we discuss crises, we are not asking what is most likely to happen
- We are aiming to identify what might happen in a worst-case scenario
- The objective of policy is threefold
 1. Reduce the probability of crisis
 2. Reduce the severity of the eventual crisis
 3. Be ready to respond if and when they transpire

Financial and fiscal crises

Financial crises surprise — it is almost axiomatic that they happen where nobody is looking, since otherwise we would prevent them

Fiscal crises are slow-moving — we know they are coming, but not exactly when

- Debt is the central fundamental — the more of it, the smaller the shock needed to trigger a crisis
- Gradually, then suddenly — the fundamentals build gradually, and the trigger is the suddenly

Fundamentals and triggers

It is pointless to ask which snowflake triggered an avalanche

- A crisis needs weak fundamentals and a trigger — there are only a few fundamentals but an almost infinite number of triggers
- The threats of this chapter are the fundamentals
- Scenario planning — “horizon scanning” — produces a large number of scenarios that could end in disaster
- That is of limited use on its own, since all of them map onto a small set of fundamentals
- And the scenarios can interact viciously

Catalysts — but they do not meet the systemic bar

- Shadow banking, private credit, asset bubbles, weak oversight, financial innovation, technological disruptions, (de)globalisation, ...
- Each could be the trigger, but none is the fundamental — and none alone meets the systemic bar

Politics often gets in the way of sensible policy

- Politics can allow risks to build and delay solutions
- Short-term gains dominate
- Warnings are cast as elitist or anti-growth — particularly when they are real
- Any effective action imposes costs on some group, who lobby against it
- Pretending there is no problem is by far the most popular strategy

Systemic risk increases along with rising populism, politicisation of central banks and the diversion of resources to non-systemic stress

“I used to think that if there was reincarnation, I wanted to come back as the president or the pope. But now I would like to come back as the bond market. You can intimidate everybody.”

James Carville, Clinton's political adviser,
1993

The debt-dynamics framework

- Two standard references underpin the framework in this section
 - Escolano (2010) — the debt law of motion, rollover and sustainability accounting
 - Blanchard (2019) — debt sustainability when r_t and g_t are close

Crises are all about debt

- Most often sovereign or real estate debt
- But safeguards usually keep things in check — no need to worry
- Until they do not
- One day all looks fine and the next we are in a debt crisis — and the timing catches (almost) everybody by surprise
- The trigger is usually a sharp reappraisal of risk

Notation

Symbol	Meaning
d_t	Debt-to-GDP ratio
r_t	Effective real interest rate on debt
r^*	Natural rate of interest — neither stimulates nor restrains the economy
g_t	Real GDP growth
pb_t	Primary balance to GDP — revenues minus non-interest spending, surplus positive

The debt-to-GDP ratio

- The debt-to-GDP ratio evolves according to

$$\Delta d_t \approx (r_t - g_t) d_{t-1} - pb_t$$

- Interest grows the debt, growth shrinks the ratio and the primary balance pays it down
- This is an approximation — it leaves out valuation changes, privatisation receipts, bank recapitalisations and other stock-flow adjustments
- Everything in this chapter works through these three terms

How private losses become public debt

- A shock hits leveraged balance sheets, and forced sales turn it into realised losses
- Banks and non-banks stop lending, output falls and the tax take falls with it — g_t and pb_t weaken
- The government pays — guarantees called, banks recapitalised, recession support — so d_t rises
- Investors reprice the sovereign and r_t rises as well
- Those same banks hold the sovereign's debt, and the loop closes

None of this is automatic — a liquidity backstop that is repaid costs nothing, while doing nothing can cost far more

Risk premia and the interest rate gap

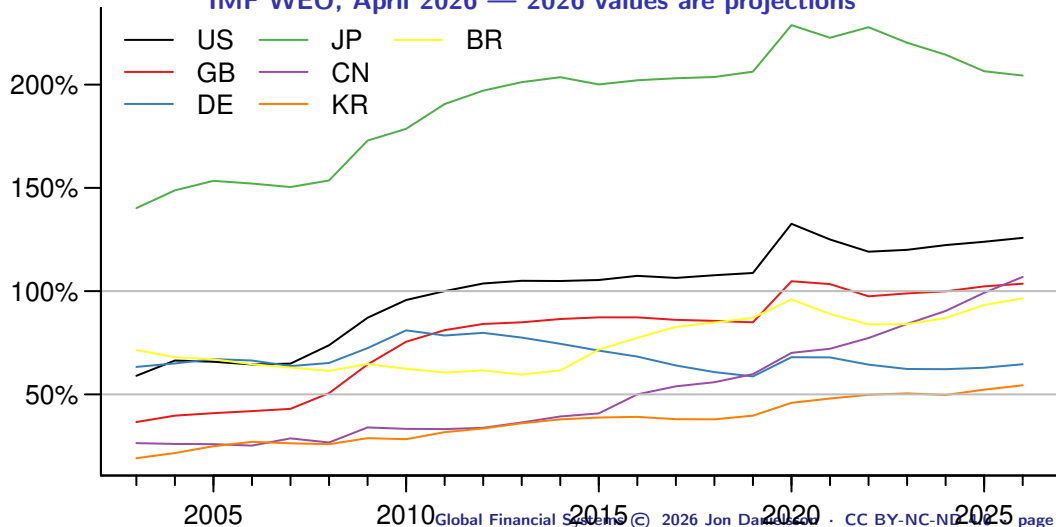
- Risk premia are the extra return demanded for bearing uncertainty
 - Credit — the probability of default
 - Term — compensation for duration risk
 - Liquidity — the cost of potential illiquidity
- The real market rate on *new* borrowing is

$$\text{real market rate} = r^* + \text{risk premia}$$

- A quoted nominal yield also embeds expected inflation and the expected path of short rates, so compare like with like before putting a number into the identity
- The *effective* rate r_t is what the whole debt stock actually pays — market rates feed in only as debt matures and rolls over
- The longer the average maturity, the slower the pass-through (we return to this)

Government debt to GDP (IMF)

IMF WEO, April 2026 — 2026 values are projections



Japan

- Do the numbers for Japan suggest that we can continue accumulating debt for a long time before we have a problem?
- Recall Chapter 19 — Japan borrowed at $r \approx 0$ for decades, so debt above 200% of GDP was sustainable
- The ratio has fallen from around 250% — GDP rebasing and inflation swelling the denominator, not repayment
- That era is ending — the 10-year JGB yield is above 2% and the 2026 budget assumes a 3% estimation rate for new 10-year issuance
- Both are nominal marginal rates — they reach the effective rate on the stock only as debt rolls over, at Japan's 9.4-year average maturity, and must be deflated before entering the real identity
- Japan is the regime change happening live — $(r_t - g_t)$ turning at very high d_t

Why maturity matters

OECD Global Debt Report 2026 — central government marketable debt, 2025, years

- Only maturing debt reprices — the average maturity sets how fast higher rates reach the interest bill, and how well surprise inflation works (below)
- Short maturity means rollover risk

Korea	13.7	Netherlands	9.2	Germany	7.6
UK	13.5	Mexico	9.1	Italy	6.9
Austria	11.4	Ireland	8.9	Canada	6.8
Switzerland	10.9	France	8.5	US	5.9
Greece	9.7	<i>OECD average</i>	<i>8.1</i>	Sweden	5.0
Japan	9.4	Spain	7.9	Türkiye	4.2

Can governments inflate the debt away?

- Only under certain conditions
 - The debt is in your own currency and not indexed
 - Maturities are long — surprise inflation erodes the stock before rollover reprices it
 - Investors do not see it coming — expected inflation goes straight into yields
- The key channel is sustained *negative real rates*, not inflation itself — which usually takes *financial repression* (the fiscal section)
- The post-war playbook — the US and the UK melted their wartime debt this way between 1945 and the 1970s
- Japan has just run it — inflation arrived while the BoJ held yields near zero, driving much of the fall in the ratio
- A tax on savers that works while inflation expectations stay low — once they de-anchor, it risks markets demanding compensation and a death spiral (below)

What moves g_t and r_t ?

g_t demographics and labour-force growth, and total factor productivity — technology, efficiency and institutional quality

r_t global savings and investment, monetary policy and inflation expectations, and credibility — risk and term premia, where QT and heavy issuance can raise premia without policy hikes

- Who sets r_t — the government, domestic investors or global investors?
- How much power does the government really have over it?

Risk premia in stress

- In normal times the premia are small — the market rate stays close to r^*
- In stress they can widen together — credit, term and liquidity
- The market rate jumps at once, and rollover carries it into r_t
- The result is $r_t \gg r^*$ — the gap is the market's verdict on the debt
- Rising risk premia can make sustainable debt unsustainable overnight

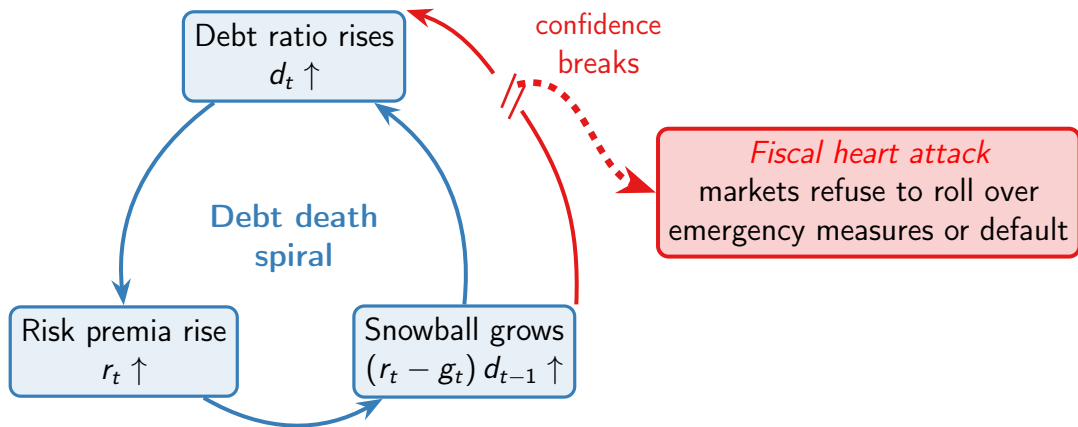
Sustainable debt

- Stabilising the debt ratio means $\Delta d_t = 0$, so the primary balance must offset the interest-growth gap

$$pb_t = (r_t - g_t) d_{t-1}$$

- The term $(r_t - g_t) d_{t-1}$ is the *snowball* — the existing stock compounding by itself, with no new borrowing
- Two regimes
 - $r_t < g_t$ the ratio falls with a balanced primary budget, and a primary deficit up to $(g_t - r_t) d_{t-1}$ is consistent with stability
 - $r_t > g_t$ stabilisation requires a primary surplus, and the required surplus rises with the debt stock
- Vulnerability comes not from $r_t > g_t$ itself but from the required surplus being economically or politically unattainable

Debt death spirals and fiscal heart attacks



Fiscal dominance

- Monetary policy follows the government's financing needs, not the inflation target
- The debt stock gets large enough that the interest bill binds before inflation does
- The central bank then holds rates below what price stability requires, or keeps buying the debt
- It does so because the alternative is a funding crisis
- A legally independent central bank can still be dominated

Monetary dominance — the treasury adjusts pb_t to whatever the debt requires
 Fiscal dominance — the central bank adjusts r_t to whatever the debt requires

Fiscal dominance in the debt identity

- Stabilisation requires $pb_t = (r_t - g_t) d_{t-1}$
- If that surplus cannot be delivered, the adjustment has to fall on r_t instead
- Hold the nominal rate down, let inflation run, and the real value of the stock erodes
- Bondholders pay for it — this is a transfer, not a fiscal adjustment
- It works only while expectations hold, and once they move, inflation and term premia push r_t back up

Recognising fiscal dominance, and leaving it

- Signs to watch
 - The central bank is a large and persistent buyer of new issuance
 - Rate decisions track the debt service burden rather than the inflation outlook
 - The debate turns to what it costs to remunerate reserves
 - Maturity shortens, so policy rates reach the interest bill faster
- Leaving is the hard part — the rate rise that restores price stability lands on the whole stock
- Every year of delay adds to the stock and shortens its maturity

“Whatever the future holds, it will be
nothing like the past.”

“The Great Demographic Reversal”

Goodhart and Pradhan (2020, 2026)

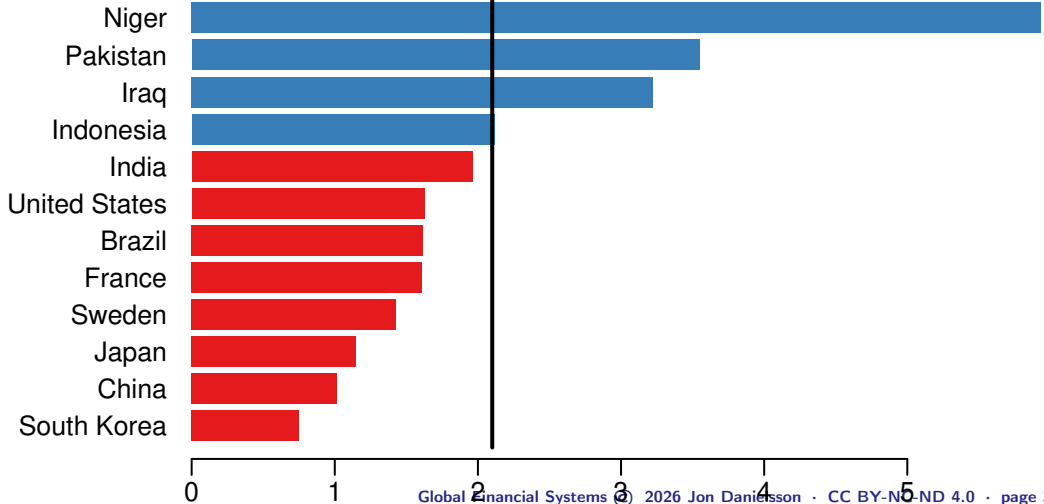
- The focus here is demographics alone — other forces, such as technological change, can push in different directions
- A stable population and labour force imply a particular equilibrium rate of inflation and of interest
- The entry of women into the labour force and of China into world trade were both *deflationary* — allowing lower inflation and lower interest rates
- They make the forceful point that the fall in inflation from the 1990s to 2020 was thanks to these forces, *not* to the central banks
- That has now come to a stop — the labour force is shrinking
- So the forces reverse — *higher inflation and higher interest rates*

How population growth shapes economic pressures

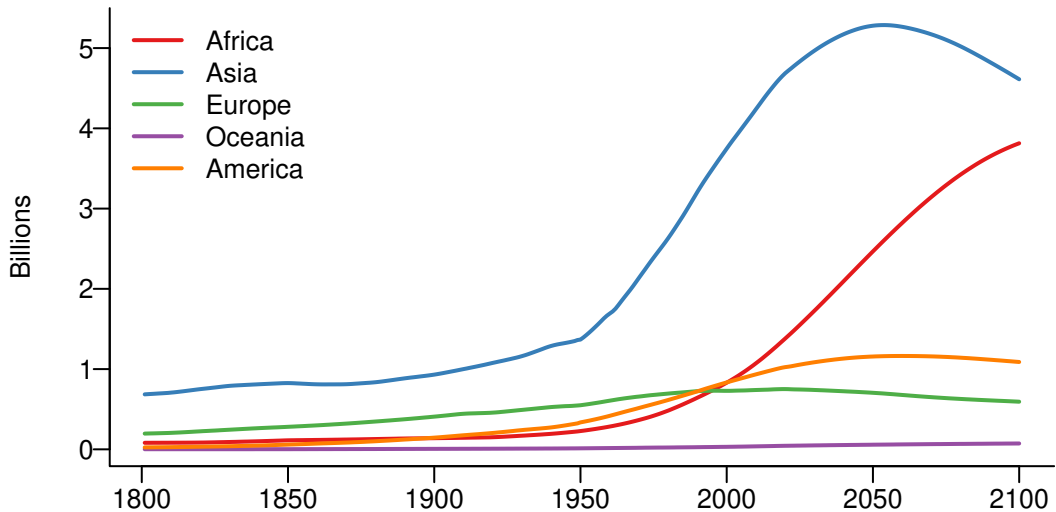
- The total fertility rate (TFR) — births per woman — holds a low-mortality population stable at about 2.1, the *replacement rate*, absent migration
- Sustained TFR below 2.1 leads to an ageing population — rising old-age dependency, higher pension and healthcare costs, headwinds to growth
- TFR above 2.1 means a youthful population — jobs, education and infrastructure must absorb the entrants
 - A demographic dividend with good institutions — political instability without
- Population dynamics move slowly — today's TFR is the labour force of 2050

Births per woman

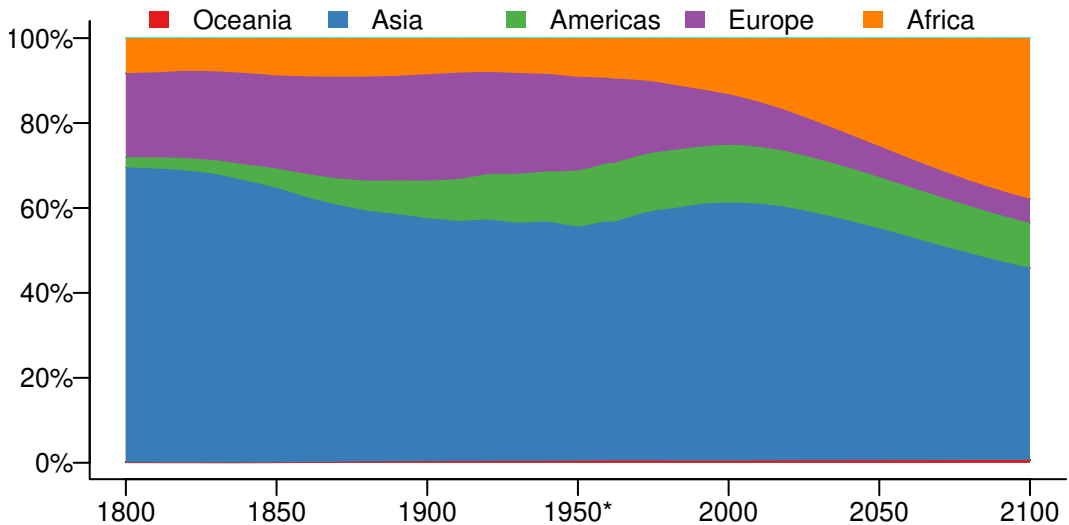
World Bank, 2024



Population projections



Population distribution



The fertility decline is structural, not cyclical

Goldin (2025)

- Fertility is below replacement in most of the world — more than half of all countries and about two-thirds of the world's population — and it is not coming back
- The mechanism is a *mismatch* — women's education, careers and agency advanced, while men's share of childcare and the household lagged
- Births are delayed, and delayed births become foregone births
- Subsidising births without fixing the mismatch has disappointed everywhere — Korea and Hungary spend heavily for little effect
- If fertility will not rebound, the labour force shrinks permanently — only productivity and immigration remain (below)

Case of Japan

- The demographic frontrunner — the population has been falling since about 2010, and deaths now outnumber births roughly two to one
- Fertility is around 1.2
- Around 50% of women are in regular employment, against 80% of men
- The immigration margin — foreign workers are only 3% of the workforce, contribute more than half of labour force growth
- Japan is simply first

Addressing labour constraints

Immigration helps g , but politically constrained

Productivity increased productivity from technology

Education increase productivity from redirecting training towards the jobs in demand — perhaps less university and more vocational training

Do nothing accept a smaller labour force

- Sustainable if debt and expectations for public services are managed down, and/or productivity keeps up
- Otherwise it ends in a major crisis

Where growth comes from

The Cobb–Douglas model

- Under this simple model, output is produced by technology (A), capital (K) and labour (L)

$$Y = A K^{\alpha} L^{1-\alpha}$$

- So growth decomposes into the growth rates of technology, capital and labour

$$g \approx g_A + \alpha g_K + (1 - \alpha) g_L$$

- For decades g_L was positive almost everywhere — it is now turning negative
- The choices on the previous slide are these terms — immigration and education work on L , automation and AI on A and K
- Productivity and capital must now outrun a shrinking labour force just to stand still

Baumol's cost disease

Baumol and Bowen (1966)

- A string quartet needs four players today, exactly as in 1790 — some activities see no productivity growth
- The modern cases — nursing, elderly care, teaching, childcare — labour-intensive and hard to automate
- Other jobs see relentless productivity growth — manufacturing, agriculture, software
- But wages everywhere must keep up with the whole economy, or the workers leave
- So the relative cost of low-productivity services rises without end — the *cost disease*

More demand, less capacity

- Ageing raises the demand for public services — pensions, health and long-term care — and for longer, as lifespans stretch
- Providing them gets harder at the same time
 - Care is labour-intensive and hard to automate (previous slide), and the carers must come from a shrinking labour force
 - The money must come from a tax base that is shrinking with it
- Demand rises exactly as the capacity to supply falls

Demographics and debt dynamics —

$$\Delta d_t \approx (r_t - g_t) d_{t-1} - pb_t$$

g_t falls — the labour force shrinks faster than productivity and capital can offset

r_t can rise — in the Goodhart–Pradhan mechanism retirees run down their savings while care absorbs them, and pension burdens add risk premia

pb_t weakens — pensions, health and care grow dearer (Baumol) as demand outruns capacity

Δd_t worse on every margin — demographic pressures push the arithmetic into the snowball regime, and the anchor central bankers relied on, $g_t > r_t$, is gone

“The future depends on what you do today.”

Environmental externalities remain inadequately priced in financial decisions

How the environment affects the financial system

Physical risks damage from the climate itself

- Acute — storms, floods and fires
- Chronic — sea level, temperature and precipitation shifts hitting real estate, infrastructure and agriculture
- Transmission — insurers reprice or withdraw, as in California and Florida, with knock-ons for mortgages, house prices and local public finances

Transition risks damage from the move away from carbon

- Policy, technology and market shifts strand assets
- The main damage comes when investment in the old ways has to be written off

Systemic or non-systemic?

Non-systemic under the Chapter 1 crisis-based test — long horizons and broad awareness give portfolios time to adjust, so even large and widely distributed losses need not produce an acute crisis

Systemic under broader frameworks — the NGFS and the ECB count chronic impairment of system functioning, with no acute crisis required

- The disagreement is about the definition, not the danger
- It is politically charged — the 2007–2008 crisis built regulatory tools for systemic risk, and some European regulators would like to turn them to environmental ends

How the financial system impacts the environment

Brown investment increases environmental damage

Transition finance enables decarbonisation

Green investment reduces damage

- The externalities are unpriced, so markets fund too much brown and too little green

The information problem

- The impact of climate on finance is easy to conceptualise but hard to quantify
- And actionable policy demands numbers — capital charges, stress tests and disclosure all need quantified risk
- Multiple disclosure frameworks and ESG ratings coexist, with differing methodologies
- The ratings disagree — correlations across providers are low
- Greenwashing is prevalent

Regulatory and supervisory responses

- In theory the first-best response is to price the externality — a carbon tax or emissions trading
- Politics blocks pricing at the level required almost everywhere, so financial regulation is pressed into service as a second-best
- Pricing is widespread but shallow — 87 instruments cover about 30% of global emissions, most at prices far below the level required
- Supervisory climate stress tests, using NGFS scenarios, assess resilience and transmission
- Prudential capital should reflect identified risk — with debate over brown-penalising versus green-supporting factors
- Disclosure mandates for financial institutions

Regulatory responses — the reality

- No population appears to be prepared to pay for environmental policies that substantially cut living standards
- Governments will avoid any regulatory action that might actually restrict growth
- Better to give the appearance of doing something — carbon trading?
- The US has reversed course — the Fed left the NGFS in 2025 and supervisory climate work is being rolled back, while the ECB continues

Private sector responses

- Pension funds and insurers face pressure to divest from brown
- Against fiduciary duty — returns versus sustainability
- Plenty of investors remain willing to hold brown assets
- While customers want brown goods, funding for their manufacturers can always be found
- The net-zero investor alliances lost their largest US members in 2025 under political and legal pressure
- Policy initiatives and investor activism may accomplish little

Transition challenges and unintended consequences

- Any rapid transition to a carbon-neutral economy would cause massive disruption
- It is unclear whether even a 25-year transition is politically feasible
- Without credible real-economy policy, financial measures merely leak — brown activity moves to private owners, offshore entities and less regulated jurisdictions
- Restricting finance for mining tightens supply — with inelastic demand, prices and rents rise for the incumbents who remain
- The losers are the public owners who sell cheap and the consumers who pay higher input costs

Distributional impacts and political economy

- The costs of climate policy fall disproportionately on poorer citizens and regions
- Developing countries argue the developed world should pay — it caused the damage and banked the growth
- Uneven costs trigger backlash and reversals — and the reversals are themselves a transition risk for investors and banks

Political and legal pushback

France fuel tax rises brought out the Yellow Vests

Netherlands nitrogen rules sparked the farmer protests and a new farmers' party

UK the ULEZ expansion met sustained local opposition

US state anti-ESG laws and litigation target climate finance

Central banks and climate

- A few years ago some central banks sounded enthusiastic about climate risk — stress tests, collateral adjustments, green tilts, with the ECB in the lead
- There has since been a retrenchment, for three reasons
 1. When the problem was first mooted it was poorly understood — research has since provided clarity
 2. The political pressure for doing something about climate has often receded and even reversed
 3. A growing realisation that climate work makes central banks increasingly politicised, undermining the primary mandate of monetary policy

Climate and debt dynamics — $\Delta d_t \approx (r_t - g_t) d_{t-1} - pb_t$

g_t cuts both ways, if we act

- Short term — growth slows from reallocation, supply bottlenecks and critical-minerals constraints
- Acting now helps long-term growth

r_t rises — policy uncertainty and fragmentation lift risk and term premia, heavy transition issuance adds to it and higher investment needs lift r^*

pb_t weakens — subsidies, adaptation and industrial policy widen deficits, and the public share of transition investment lands on the budget

Δd_t the arithmetic worsens either way — acting brings transition costs onto the budget now, not acting brings physical damage, reconstruction and impaired collateral later, on top of the demographic strain

“There is always a well-known solution to every human problem — neat, plausible, and wrong.”

Mencken (1920)

Populism

Mudde (2004)

- A thin ideology that pits “the pure people” against “the corrupt elite”
- Anti-institutional (national and supranational) — this is key for how it affects systemic risk
- Often fuelled by perceived exclusion or unfairness
- Can include identity politics — strong in-group identification and mistrust of out-groups (immigrants, ethnic minorities, urban elites)
- Mistrust of mainstream parties
- Preference for simple solutions to complex problems

The financial roots of populism

There is much more to populism than economics, but here we focus on that

- The 1920s credit boom led to agricultural overproduction and farm failures — US farmers demanded protection and got Smoot–Hawley (1930)
- After 2008, job losses were blamed on globalisation
- Asset purchases supported asset prices more than wages
- The political backlash gave us Brexit, Trump and tariffs
- The pattern recurs — financial stress, inequality, populism, protectionism
- Crisis responses have distributional consequences, and those shape the political constraints on the next crisis response

Distribution, fairness and the wealth effect

Chwieroth and Walter (2019)

- Rising middle-class asset ownership — housing and pensions — increases sensitivity to losses
- When household balance sheets are exposed, voters demand protection and tolerate costly rescues
- But the bailouts then feed the backlash — perceived unfairness over who was rescued drives coalition shifts

Bailouts are a middle-class good

Legitimacy constraints and political risk

Tucker (2018), Danielsson and Macrae (2016)

- Delegation to unelected agencies works only with narrow remits and clear accountability
- Technocrats lack a democratic mandate to counteract elected leaders' excesses — overreach erodes legitimacy
- Overloading central banks with non-core objectives blurs accountability and invites politicisation
- Mandates rarely extend to disciplining political behaviour — central bank tools cannot fix distributional choices made by politicians
- When politics drives risk, the authorities face a bind
 1. Act and risk illegitimacy
 2. Abstain and risk ineffectiveness

Why populism drives systemic risk

- Effective crisis response requires trusted, predictable authorities with clear mandates
- Populism undermines exactly that, as populist leaders frame the authorities as hurting “the people”, eroding trust and compliance
- Lower credibility slows and blunts crisis interventions
- Political capital is finite — repeated interventions and politicised mandates spend the credibility needed for the next crisis

Demographics–populism feedback loop

- Populists promise to protect benefits without raising retirement ages
- Native workers fear wage competition, so immigration faces the strongest opposition
- But ageing needs exactly these unpopular fixes — later retirement, trimmed benefits, immigration
- Without them g_t falls and the pension arithmetic worsens
- That closes the loop — politically constrained fixes worsen sustainability, and the deterioration feeds more discontent

Climate and populism

- Climate policies trigger populist backlash — the examples in the climate section, from the Yellow Vests to the Dutch farmers
- Transition costs fall on particular regions and sectors, green policies read as elite impositions and energy prices become political flashpoints
- Fear of that backlash delays the transition, which raises its ultimate cost
- Unilateral European action moves brown industry elsewhere — free-riding, and the global consensus needed is lacking
- That makes it easy for populists to argue — why bother?

Protecting credibility and political capital

- Keep remits narrow and accountability clear — resist pressure to take on non-core objectives
- Better regulation and a reduction of the SIFI problem make large bailouts less likely
- Credible fiscal frameworks and independent fiscal councils bolster pb_t credibility
- Transparent communication on limits and objectives preserves capacity for truly systemic events

Populism and debt dynamics —

$$\Delta d_t \approx (r_t - g_t) d_{t-1} - pb_t$$

g_t falls — protectionism, reduced immigration and investment uncertainty

r_t rises — risk premia on policy uncertainty and term premia on fiscal fears

- Liz Truss's 2022 mini-budget — unfunded tax cuts triggered a gilt sell-off and a spike in yields

pb_t deteriorates — unfunded spending promises and tax cuts

Δd_t the required pb_t to stabilise debt rises just as delivering it gets harder — and the worsening arithmetic feeds more discontent and more populism

“In economics, things take longer to happen than you think they will, and then they happen faster than you thought they could.”

Rudi Dornbusch

Geopolitics

- Geopolitical events frequently trigger systemic crises
 - In 1914 the major exchanges closed for months and cross-border payments and trade finance were severely disrupted
- Impact of rising tensions and weaker adherence to global rules on systemic financial risk
 1. They can act as a trigger for a crisis
 2. They can reduce it by shrinking the network of cross-border linkages
 3. They can reduce it by increasing fear, which breeds conservatism
- Two channels concern us — manufactured tensions and trade as a weapon

Governments often manufacture tensions to meet other objectives

- Spanish–American War (1898)
- Mukden/Manchurian Incident (1931, Japan–China)
- Gleiwitz and Mainila incidents (1939, Germany–Poland and USSR–Finland)
- Gulf of Tonkin (1964, US–North Vietnam)
- Falklands War (1982)
- Russia — “little green men” in Crimea (2014)
- China–Taiwan grey-zone pressure — escalation can rally domestic support
- North Korean missile tests — leverage abroad and consolidation at home
- US–Iran war (2026)

Why manufacture tensions?

- An external enemy shifts attention from domestic problems such as slow growth, unemployment and inequality
- The leadership weighs the economic costs against the political gains — and the calculation often favours tension
- Framing hardship as sacrifice for the nation makes economic pain politically survivable
- But the strategy risks losing control — escalation, international backlash, sanctions and lost policy flexibility

Tariffs as geopolitical weapons

The economics of tariffs is in Chapter 2

- Trade policy is foreign policy by other means
- Tariffs signal alliance shifts and project power without military action
- Market access becomes a bargaining chip for political concessions
- Preferential access rewards allies and punishes adversaries
- Cutting dependence on rivals — chips, energy, critical minerals — becomes a security objective
- The escalation ladder can run from tariffs to sanctions to blockades to conflict — the trade wars of the 1930s preceded the shooting war

Geopolitical triggers for financial crisis

- A Taiwan conflict — semiconductor supply stops, shipping insurance is withdrawn and trade finance freezes, SWIFT exclusions fragment payments
- Trade war escalation — supply chains break, currency wars disrupt FX markets and capital controls cause sudden stops
- The record cuts both ways — as at mid-2026 the Russia–Ukraine and US–Iran wars had shaken markets without triggering a financial crisis

The bigger danger is self-inflicted

- The real threat is not any single trigger but the steady cost of making everything harder for ourselves
- Fragmentation, tariffs and sanctions raise prices, misallocate production and deter investment
- Year after year that means lower growth, and so less income and wealth
- A poorer economy has less capacity to absorb shocks and respond to the next crisis

Geopolitics and debt dynamics —

$$\Delta d_t \approx (r_t - g_t) d_{t-1} - pb_t$$

g_t falls — tariffs and fragmentation shrink trade and force production into less efficient locations, and uncertainty deters investment

r_t rises — tariff-driven inflation keeps policy rates higher, and protectionism, sanctions and defence outlays lift risk and term premia

pb_t weakens — defence spending and subsidies widen deficits, and guarantees add contingent liabilities

Δd_t geopolitics worsens the arithmetic on every margin

European Union case study

Europe

Europe exemplifies the debt challenges

- Ageing populations pressure g_t and pb_t
- Fiscal policy is fragmented across member states
- Common monetary policy constrains individual r_t adjustments
- Political pressure from populism affects credibility

Pension designs and interest-rate sensitivity

- PAYG** pay-as-you-go — current workers finance retirees, unfunded by assets
- Funded** assets back the liabilities — returns and interest rates drive outcomes, and the risks sit on pension and insurer balance sheets
- DB** defined benefit — benefits promised by formula, either public PAYG or funded occupational
- DC** defined contribution — contributions fixed, benefits depend on investment returns, typically funded

Pay-as-you-go versus funded pensions

- PAYG is highly sensitive to the old-age dependency ratio, funded to investment returns and interest rates
- PAYG adjusts via contribution rates or benefits — funded via funding ratios, asset returns and longevity risk management
- Governments can and do renege on their pay-as-you-go obligations, as Greece did
- We can expect most European governments to do the same in future

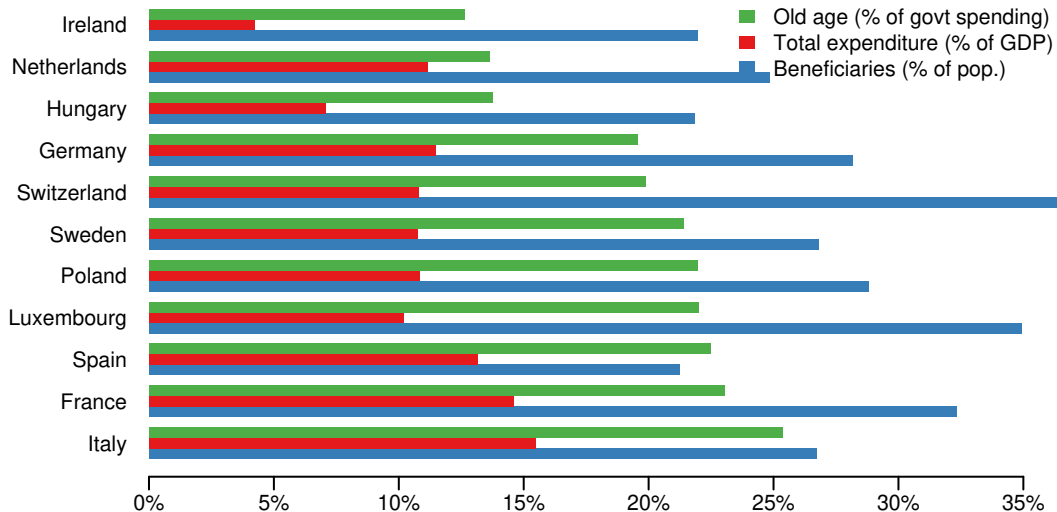
Two views of European pensions

Spending Eurostat ESSPROS (2023) — who draws a pension and what it costs each year

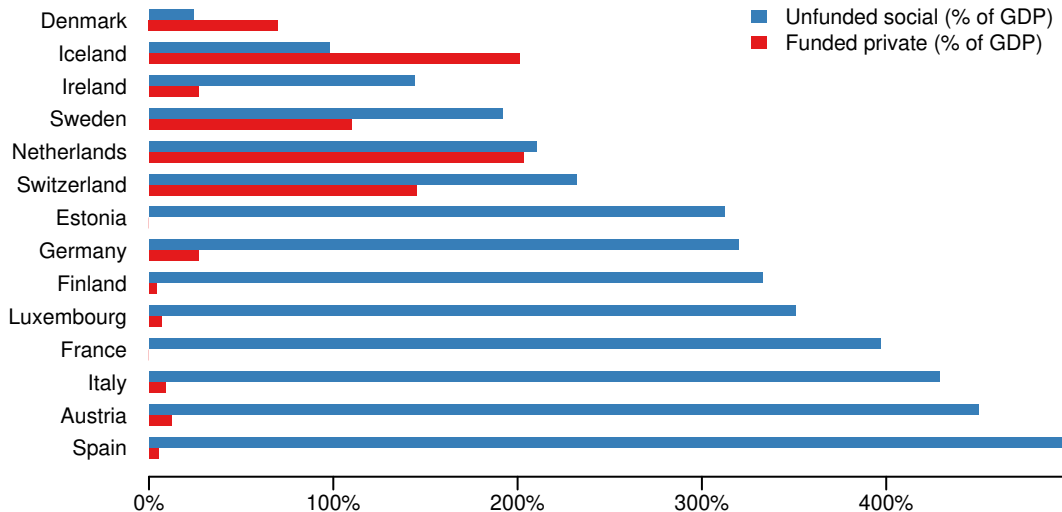
- 27.5% of the EU population drew a pension, costing 12.3% of GDP
- That covers public and private schemes and all pension types — old age, survivors, disability
- Government old-age spending alone was 10.7% of GDP in 2024 (COFOG) — over a fifth of total government expenditure of 49.1% of GDP

Promises Eurostat ESA table 29 (2021, compiled every three years) — accrued pension entitlements as % of GDP, split into funded private and unfunded social

Pensions in Europe (2023)



Funded and unfunded pensions in Europe

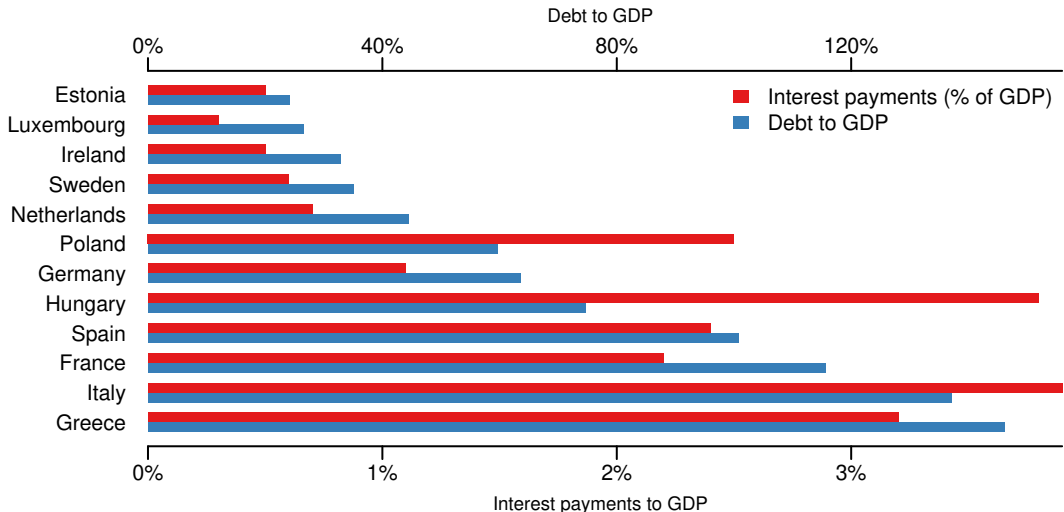


Macroeconomic channels of pension design

- PAYG can depress private saving, lowering capital formation — funded pensions instead support capital deepening, so the design choice moves g_t
- The fiscal risk of PAYG sits on the sovereign — funded shifts cash flows off-budget but leaves implicit and contingent risks on pb_t
- Moving from PAYG to funded imposes a temporary double burden — continued PAYG outlays plus the new funded contributions
- The sovereign–bank–pension nexus can amplify systemic risk

It is unlikely that European states will be able to honour all current pension commitments a quarter century hence. I do not expect a 20-year-old European today to receive promised benefits without reform.

Government debt and interest payments (2025)



Europe and debt dynamics — $\Delta d_t \approx (r_t - g_t) d_{t-1} - pb_t$

g_t weak — demographic headwinds and productivity stagnation keep growth below 2% in much of the EU

r_t rising — interest payments reach 4% of GDP in the most indebted members, and fragmentation risk adds term premia — Greece pays concessional rates despite its debt while Italy faces the market

pb_t constrained — little room for counter-cyclical policy

- Pension spending of about 12% of GDP is politically hard to touch
- Defence spending likely to rise

Δd_t Italy is the most vulnerable — high r_t , a large debt stock and market-dependent funding

Europe-specific options

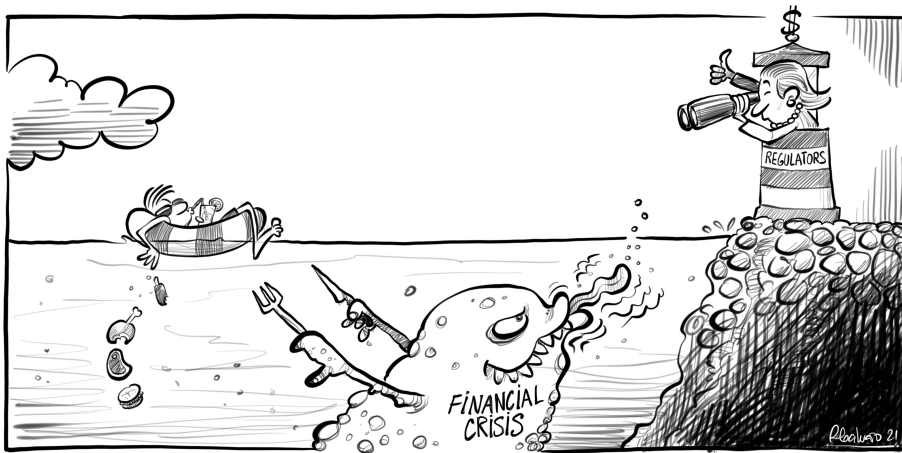
- The most effective response is to raise growth
 - Deregulation to lift productivity and investment
 - Deeper integration — banking union and a single market in services
- Pension reform
 - Raise the retirement age
 - Shift from defined benefit to defined contribution — this moves investment and longevity risk to the individual
 - Neither funds the accrued promises, which needs higher contributions or smaller benefits

“How did you go bankrupt? Two ways.
Gradually and then suddenly.”

Hemingway (1926)

Crises surprise us

illusionofcontrol.org



Debt snowball and endogenous risk

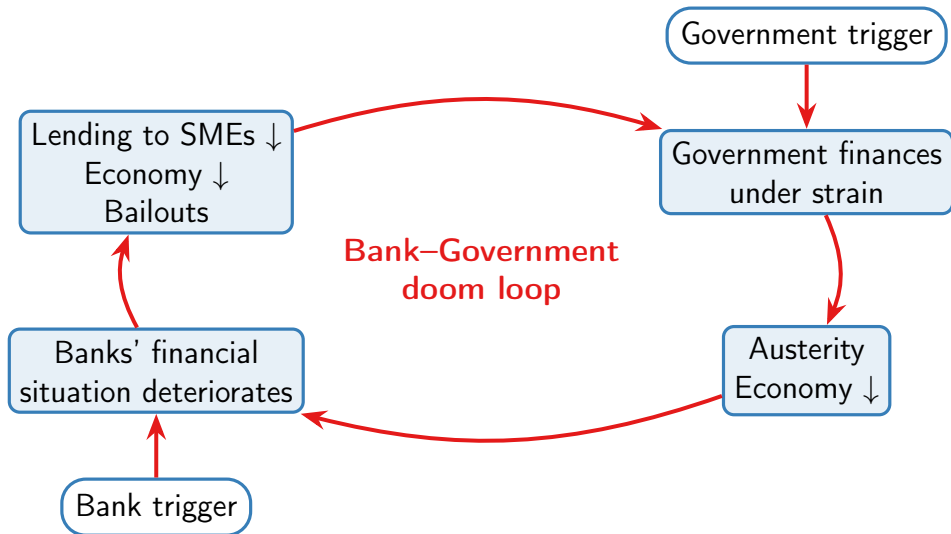
Danielsson and Shin (2002)

- Low measured risk encourages leverage and duration exposure
- Small shocks tighten constraints — forced sales cause illiquidity, and the price impact grows
- The stress raises r_t beyond what fundamentals justify, and $(r_t - g_t) d_{t-1}$ accelerates the spiral
- As fragility builds, ever smaller shocks can trigger a break — spreads spike, market access vanishes and the fiscal heart attack arrives

When the arithmetic stops being manageable

- With $(r_t - g_t) > 0$ the snowball builds pressure slowly, and current stability masks it
- The regime holds as long as the required primary surplus stays attainable
- Once it does not, the choices narrow to consolidation, fiscal dominance or default
- Consolidation restores sustainability but risks reducing g_t , which raises the surplus required

Bank–Government doom loop



The policy trilemma

Danielsson and Goodhart (2023)

Growth easier financial conditions support g but risk higher inflation and r — the snowball risk rises if pb weakens

Inflation tighter policy anchors prices but slows g and can reveal fragilities — pb may deteriorate via the stabilisers

Stability higher capital and tighter standards improve resilience but can raise lending costs and slow g

What a systemic crisis costs

- The most severe financial crises cost tens of per cent of GDP in cumulative lost output (Barnichon, Matthes, and Ziegenbein 2022) — for the EU that would run to trillions of euros
- A large number of people are materially affected, with considerable political consequences
- Society demands that the authorities do what it takes — bailouts are a middle-class good (Chwierothe and Walter 2019)
- And the resources come from the sovereign balance sheet

Crisis response capacity

- Fighting crises consumes *fiscal and monetary capacity* — spending, QE or lower rates
- We marshalled vast resources in 2008 and again in 2020 — means can be found again, but each time at rising cost to debt and credibility
 - The state might raise them by taxing wealth and assets, as it has often done in similar circumstances
- Not every response adds to d_t — facilities get repaid and guarantees go uncalled
- What shrinks is the room to act next time, and the credibility that makes acting work
- When “whatever it takes” is no longer credible, the eroded capacity itself makes crises *more likely*
- So prioritise truly systemic shocks

Faster crises, less ammunition

AI and stability — last chapter

- AI speeds up private-sector reactions — crises that took days or weeks compress into minutes or hours
- Central bank liquidity interventions may simply come too late
- If the private AI engines collectively conclude the authorities are not engaged, that alone makes crises more likely
- The next crisis will be faster than 2008 — and fought with less space

“The curious task of economics is to demonstrate to men how little they really know about what they imagine they can design.” F. A. Hayek (1988)

Debt management

When $(r_t - g_t) > 0$, the options narrow

Maturity extend it — lock in rates before the crisis, trading higher cost today against rollover risk tomorrow

pb_t raise revenue through compliance, base broadening and wealth taxes, and trim spending — both create backlash

g_t productivity through education, R&D and infrastructure, and labour supply through immigration and participation

- The nuclear options are financial repression (next slide) and inflating the debt away (the debt section)

Financial repression

- Financial repression channels funds to the state at below-market rates
- The mechanisms
 - Interest rate caps below inflation, directed credit and capital controls
 - Preferential capital treatment of sovereign debt, including the national discretion to zero-weight a bank's own sovereign in domestic currency
 - Captive domestic investors such as pension funds required to hold government bonds
- It reduces the debt burden by eroding its real value
- It did much of the post-war work — alongside primary surpluses, growth and inflation, debt fell steadily from 1945 into the 1970s
- Tempting for heavily indebted governments today, but it carries serious risks
 - Combined with monetary financing it can tip into very high inflation
 - Markets often push interest rates sharply higher, worsening the situation — as has so often happened in the past

Pension and labour options

- Raise retirement ages, admit more immigrants and reform the pension system — all three are needed simultaneously and none is politically popular
- The PAYG-to-funded transition carries the double-payment burden (the Europe section)
- Reneging on the promises is increasingly likely — means-testing and benefit cuts are that by another name

Doing nothing seems the most likely

Sequencing and political capital

- Reforms are easier in good times, but the urgency is only felt in bad times — and waiting until the crisis makes populist capture more likely
- The solutions conflict
 - Immigration helps demographics but fuels populism
 - Climate action is needed but creates populist backlash
 - Financial repression is tempting but undermines institutions
- Sequencing priorities
 1. Maintain institutional credibility above all — it is the hardest thing to restore
 2. Address distributional concerns early — regional development and adjustment assistance defuse populism before it hardens
 3. Above all, do no harm — avoid unfunded giveaways and vanity projects
 4. Keep powder dry for true systemic shocks

Resilience

Friedrich August von Hayek

F. v. Hayek (1945)

Writing about central planning, but could just as easily have been discussing risk

“*If* we possess all the relevant information, *if* we can start out from a given system of preferences, and *if* we command complete knowledge of available means, the problem which remains is purely one of logic. . . This, however, is emphatically *not* the economic problem which society faces.”

Limits of prediction

- The financial system is endogenously complex
- Supervisors can only patrol a small part of it
- We measure known-unknown risks while unknown-unknowns drive the most damaging crises
- Preventing every small loss can raise tail risk — crises emerge where oversight is light

Forest fires

- For most of the twentieth century, US policy was to fight every forest fire
- Partly because people increasingly live in or near forests
- That encourages small flammable vegetation that would have burnt off in small forest fires
- So, when the authorities are unable to extinguish a fire, it can become very big
- The forest authorities have traded volatility for tail risk
- The same happens in financial and economic crises

Fighting crises

- Do we fight all relatively serious crises?
- Or do we let most events sort themselves out?
- Fighting everything is the forest-fire policy — each intervention leaves less capacity for the one that matters
- SVB (2023) suggests we have chosen to fight all crises
- Even a non-SIFI got systemic depositor protection — though its shareholders were wiped out and its management removed

The fallacy of composition in financial regulations

The fallacy of composition infers that something must be true of the whole because it is true of the parts

Hydrogen (H) is not wet. Oxygen (O) is not wet. Therefore, water (H_2O) is not wet.

Doubling my financial wealth makes me wealthier. Universal doubling of financial wealth merely doubles prices

- If all the banks are prudent, keeping all their individual micro risks under control, the entire financial system is safe
- That is the same fallacy — prudent banks selling the same assets at the same time is what makes the system unsafe

How much regulation?

- Macropuru should keep the incidence and severity of crises down while letting the financial system support growth
- The only way to prevent all crises is not to have a private financial system — Cuba or North Korea
- Regulation is like Goldilocks's porridge — too little and crises arrive frequent and severe, too much and we smother the growth that keeps the system stable
- An optimum exists conceptually but is very difficult to find — few on either side of the debate even try

Deregulation and financial stability

modelsandrisk.org

- The regulatory cycle turned up after 2008, and now growth is lacking, so simplification is back
- The conventional view is that more regulation means more stability — asserted far more often than it is demonstrated
- Europe has lagged the US since 2008 — and regulation raising the cost of capital cannot be dismissed as one of the causes
- The lack of opportunity feeds populism, and populism undermines the credibility the authorities need
- We need growth to get stability and deregulation to get growth — so deregulation meets the macroprudential objectives

Robustness with buffers or resilience with shock-absorption?

Daniélsson (2022), Daniélsson (2024)

- Basel combines risk-weighted requirements with a leverage backstop, liquidity standards and supervision
- The risk-weighted part is calculated from risk estimates, and that is where the problem lies
- This is very costly
- No buffer can protect against large shocks
- It increases systemic risk by driving harmonisation
 - Banks make similar risk estimates
 - Banks take similar actions simultaneously
 - This amplifies market movements
- Instead, work with the inherent shock-absorption capacity of the system

Diversification, not uniformity

The more diversified the portfolio of financial institutions:

1. The higher the system's shock-absorption capacity, since institutions no longer all fail the same way at the same time
2. The better financial services are tailored to users, since a wider range of business models can specialise rather than converge on one template
3. The lower the cost of regulation, since rules can be tailored to each institution rather than holding all to the same high standard

More growth, better deals for savers/investors and more stability

How the authorities can encourage this

- Tailor regulations to the types of financial institutions — one-size-fits-all imposes high fixed costs and hence increasing returns to scale
- Eliminate barriers to new entrants, most importantly for those with new business models
- Embrace FinTech and DeFi
- Accept that shadow banking is usually a friend, not an enemy
- Discourage large, highly integrated entities, especially too-big-to-fail institutions
- Separate highly systemic utility functions, such as clearing, from other activities, and house them in simple, low-profit, easy-to-resolve entities

Why does this not happen?

- Conservatism — prefer what we know over the new
- Local maximisation — collective failure covers individual failure
- Lobbying — the incumbents prefer what we have
- The precautionary principle taken to extremes — any innovation that could potentially cause harm is rejected

Growth, deregulation and diversification

- The threats in this chapter come mostly from outside the financial system, while macropru has spent the years since 2008 preventing a repeat of it
- The authorities cannot predict where the next crisis will erupt — but they can build a system that absorbs it
- Growth eases every threat — the debt arithmetic, the demand for public services and the grievances that feed populism
- Growth, deregulation and institutional diversification are also the best way to meet the macroprudential objectives

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