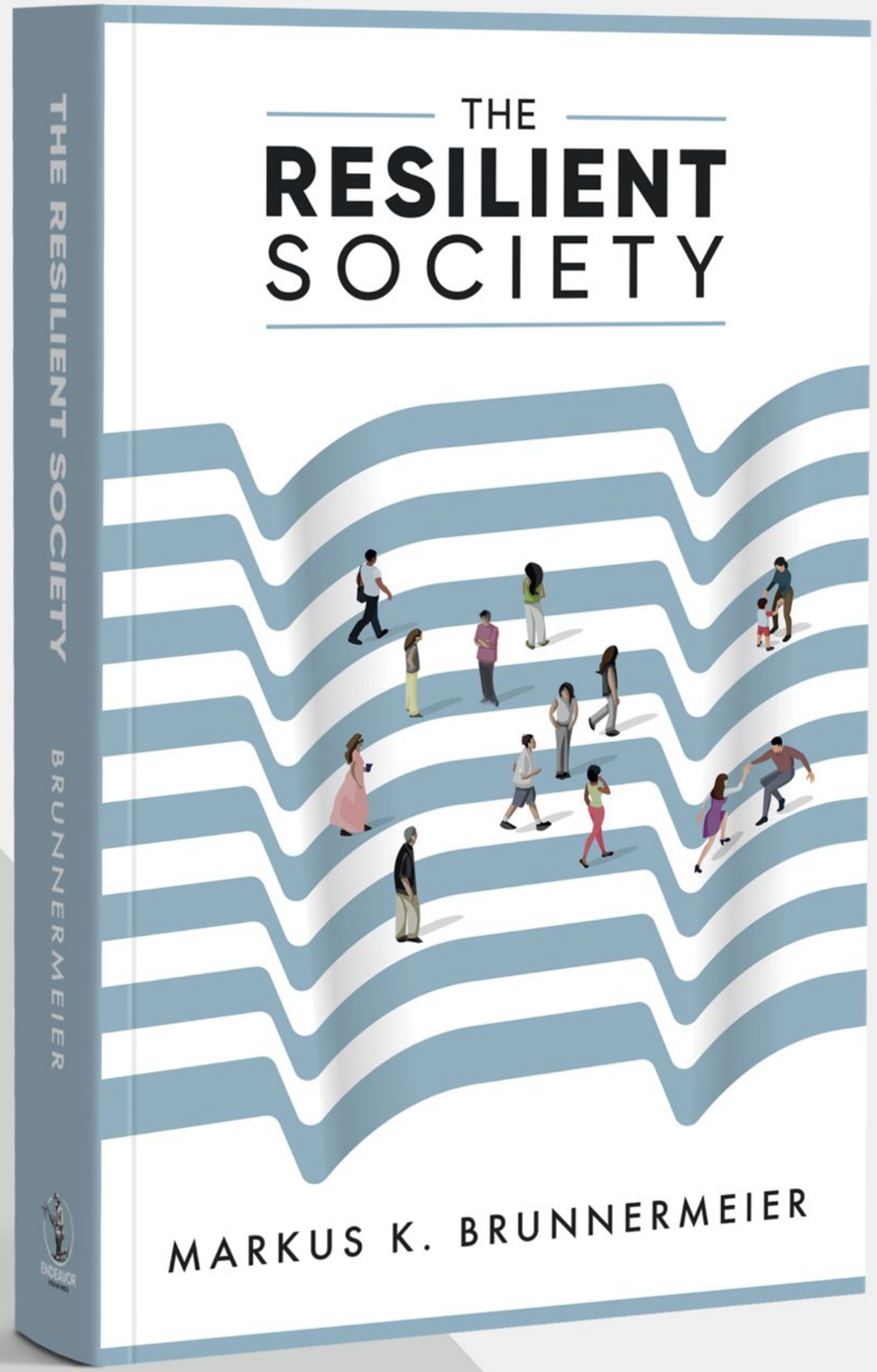


Resilience and Monetary Policy

Österreichische Nationalbank

Vienna, 2023-05-22

Monetary Policy: Risk and Resilience

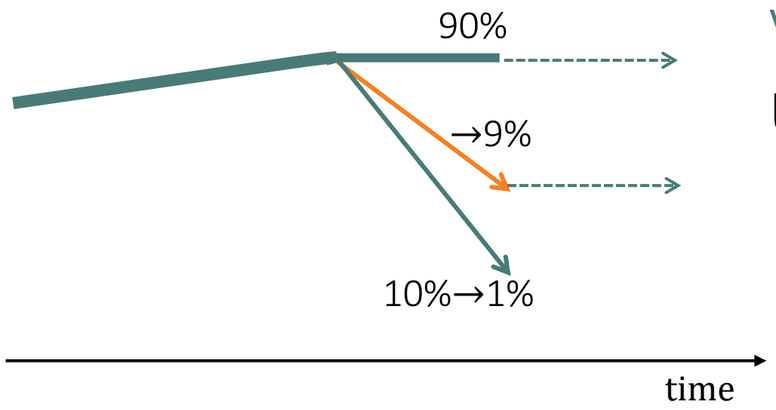
- Deterministic thinking (outdated)

- **Risk** management approach
  - probability
  - + impact (disutility)
    of contingency events

- **Resilience** management approach
  - Inflation bounced back (is “anchored”)
  - Avoid traps

Risk avoidance ≠ **Resilience**

- **Risk** management

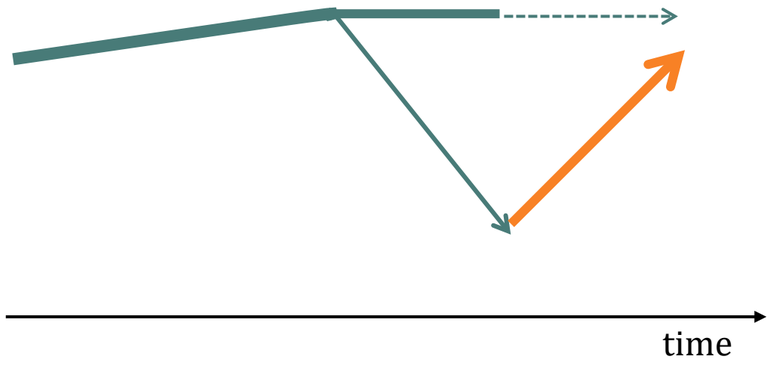


static

Variance, Value-at-Risk, CoVaR

Uncertainty/ ambiguity (robustness)

- **Resilience** management

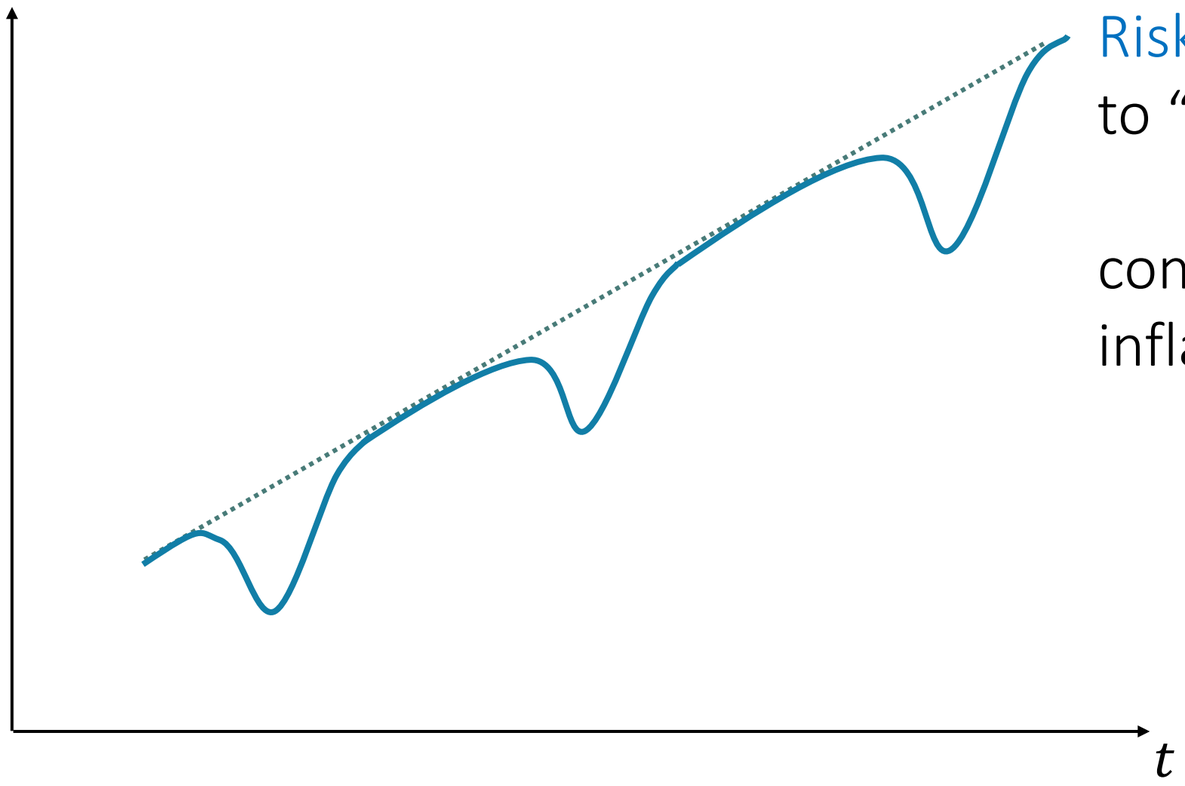


dynamic

Mean-reversion, half-life

bounce “back” to new normal

Resilient **Path**

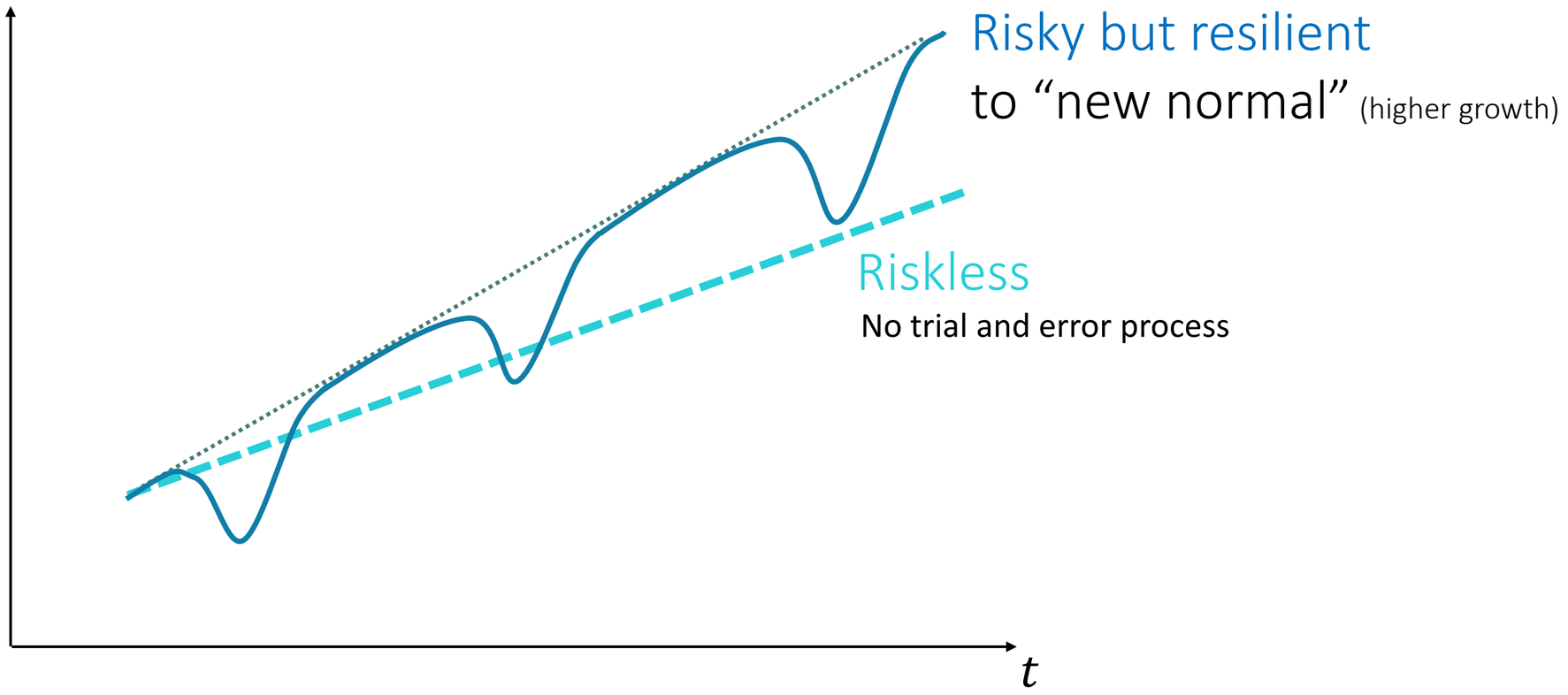


Risky but resilient
to “new normal” (higher growth)

constant **average**
inflation rate

Ability to Rebound Allows to Take Risk/Experiment ⇒ **Growth**

- Resilient path vs. risk avoidance path



Robustness ≠ Resilience

- **Robustness** vs. **Resilience**
  - withstand, fault tolerant
    - block most (also unknown) shocks
  - Impact, but bounce back "to new normal"
    - React to shocks

the oak

the reed

- Robustness barrier
  Tipping point

"I bend, I bow, but I do not break"
La Fontaine

- Volatility Paradox
  - Learning to be resilient via small risk exposure (human immune system)
- **Redundancies:** many fewer, but adaptive capacity (re-deployable)

~~Risk~~ Resilience management

- Risk management - *static*
  - Variance, Value-at-Risk, CoVaR

- **Resilience** management – *dynamic*
  - Mean-reversion half-life
    - Diversification
      - over random “bounce back dynamics”
      - Easier to adjust of groundwork is set over many alternatives

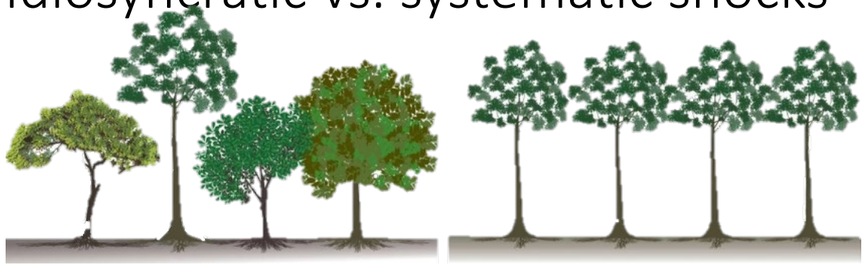
  - **Resilience enhancers** adopt and strengthen

  - **Resilience destroyers** avoid and weaken

  - **Uber-Resilience**

Resilience Enhancers

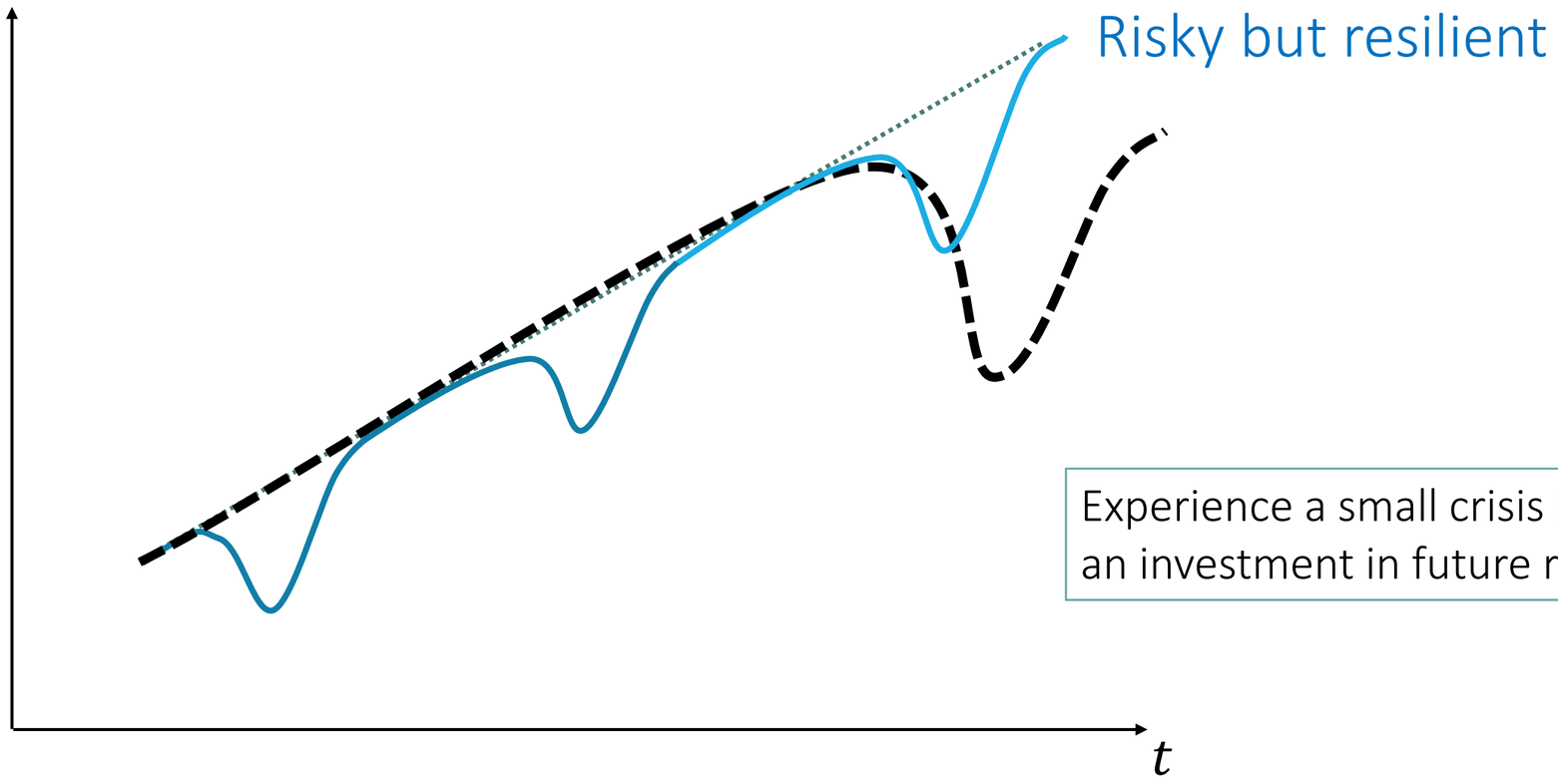
- Redundancies/buffers
  - Inventories
- Flexibility/liquidity/adaptability via
  - Substitutability = reduce switching costs over time: Le Chatelier Principle
    - Instead of specialized chip use generic chip (lego principle)
    - Infrastructure, digitalization
    - Standardization
- Diversity
  - Idiosyncratic vs. systematic shocks



  - Diversification over random “bound back” + readjust more easily if starting point
- Maverick thinking
- Social cohesion
- Learning from smaller previous crises

Resilience Enhances: Mastering smaller crises

1. Dynamic trade-off: when to use buffers (term structure of resilience)
2. Learning to be resilient via small risk exposure (human immune system)
3. Avoid build-up of imbalances ("push can down the road")

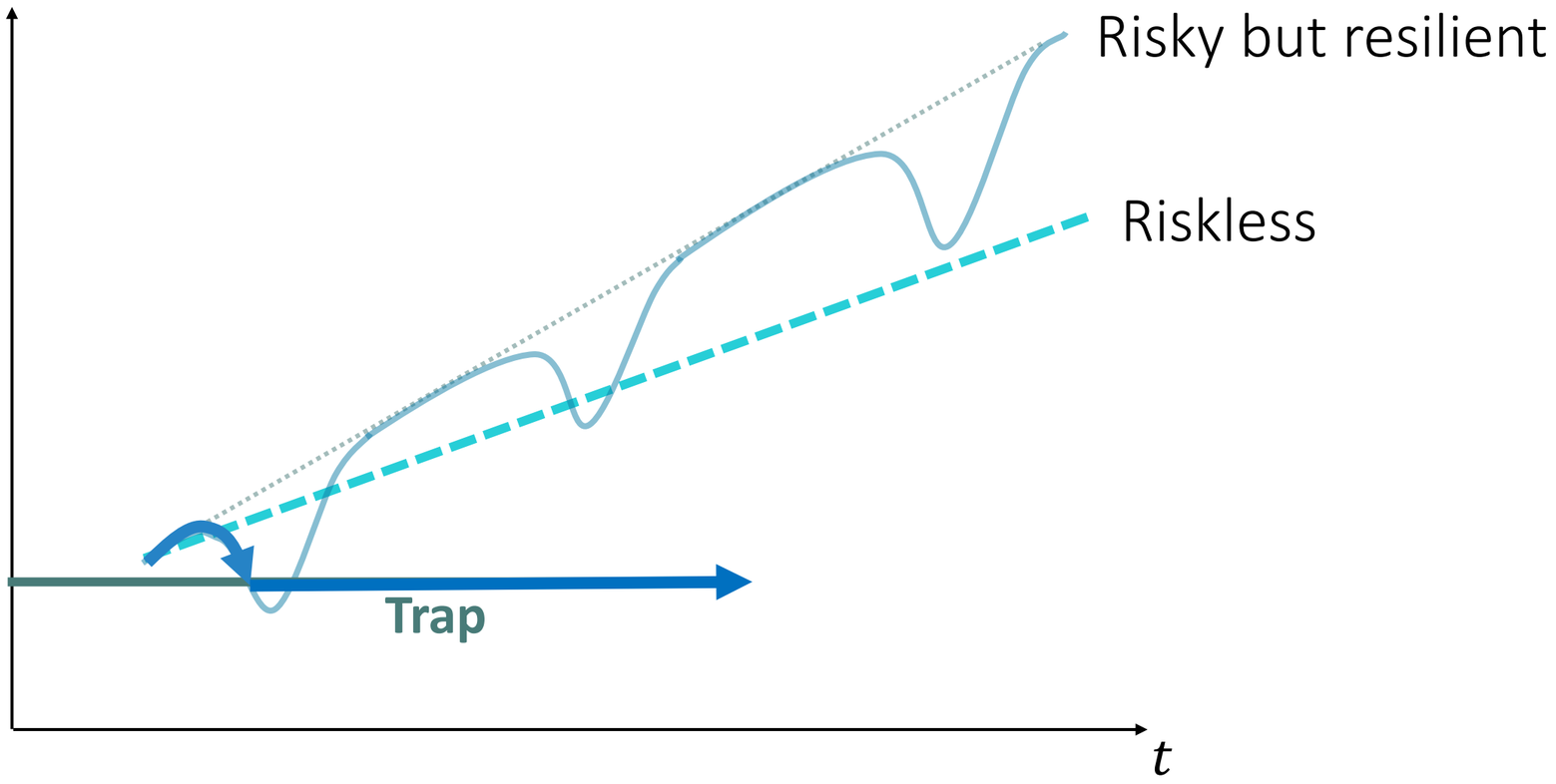


Experience a small crisis is
an investment in future resilience

Resilience Destroyers

path dependencies, “points of no return”

- **Traps**
- Feedbacks
- Tipping Points



Resilience Destroyers

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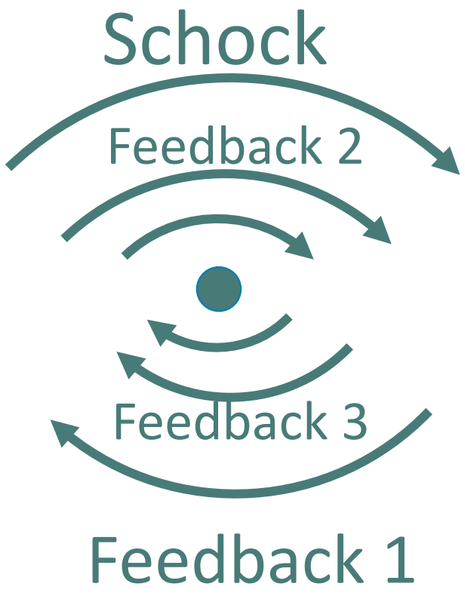
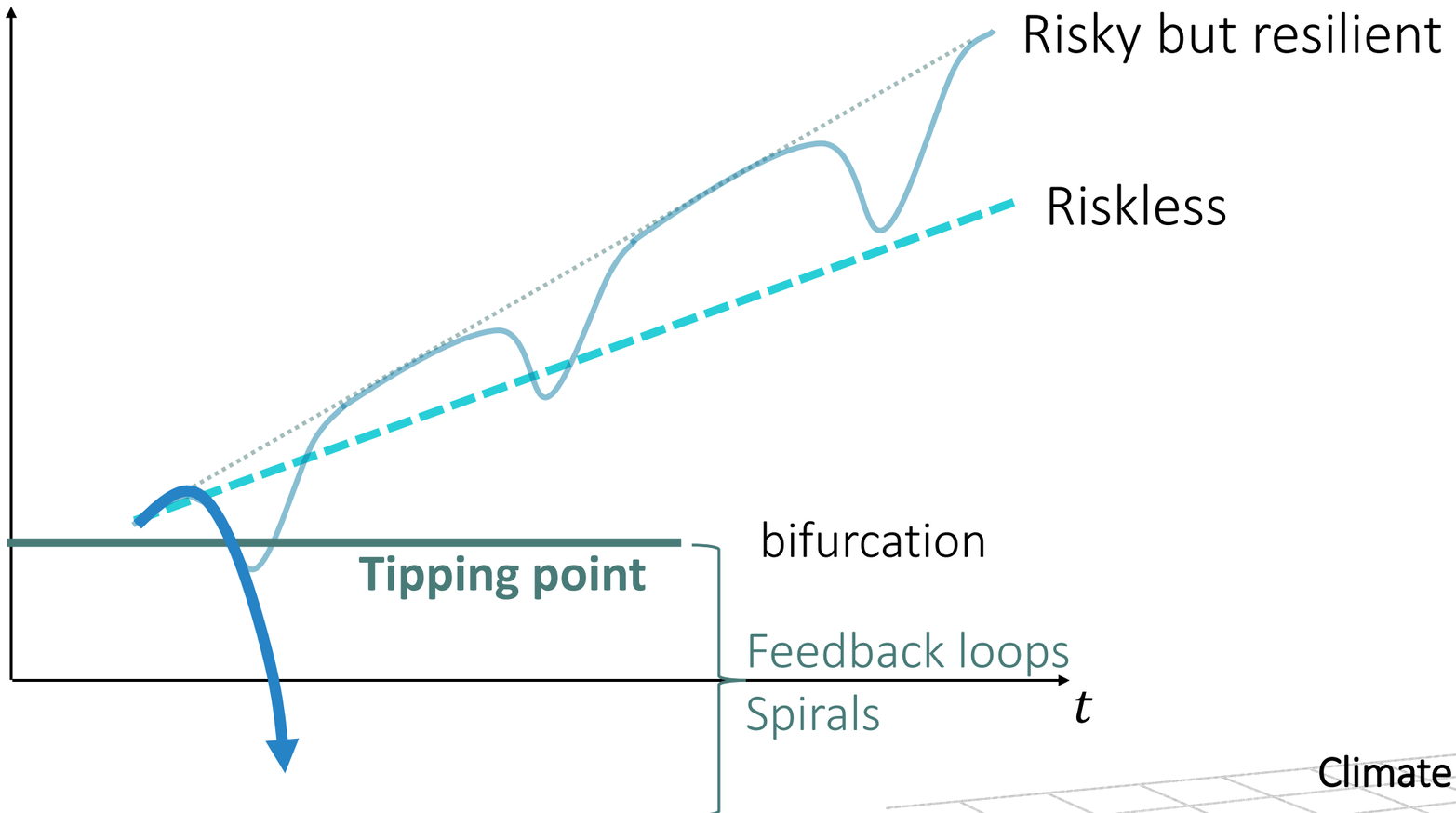


Resilience Destroyers

path dependencies, “points of no return”

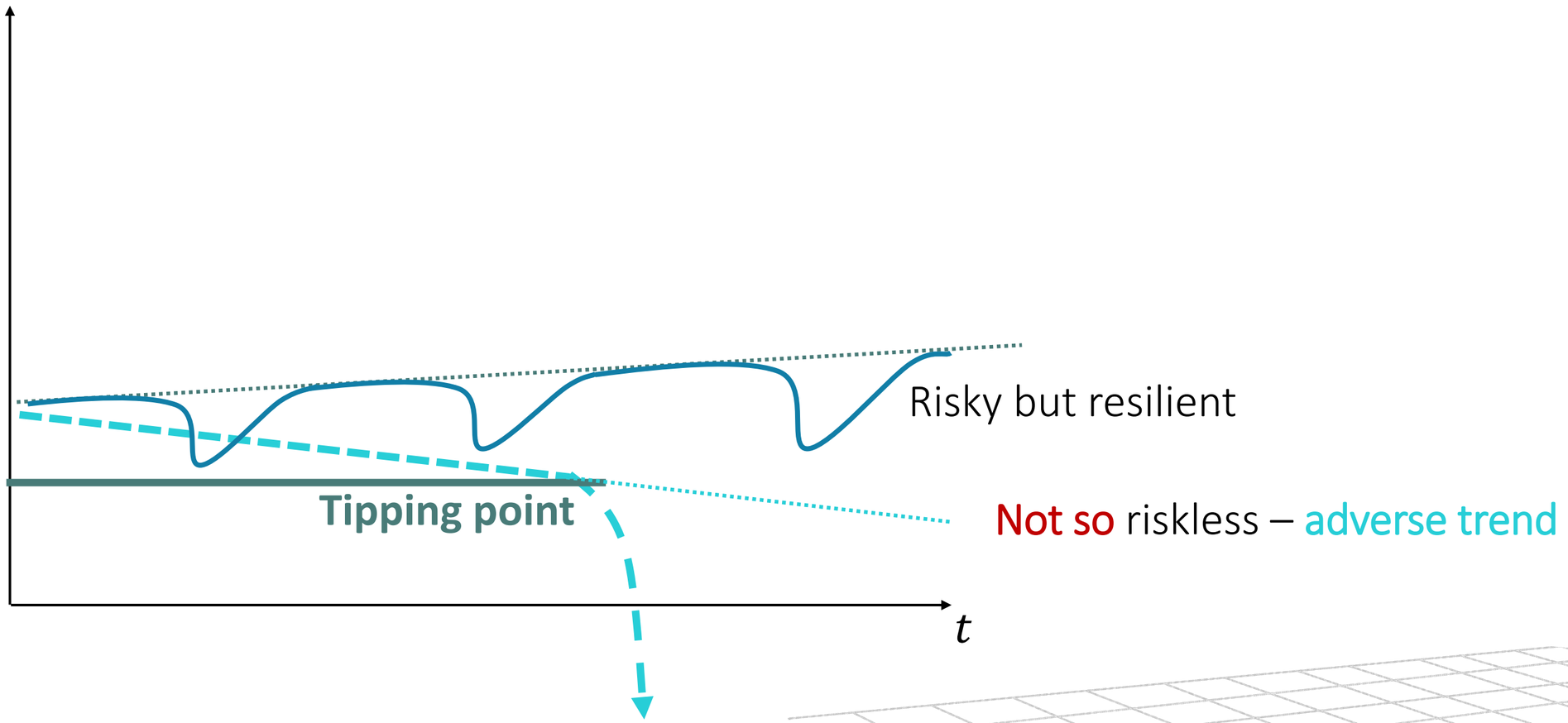
- Traps
- **Feedbacks**
- **Tipping Points**



Climate change: Turning off the Gulf stream

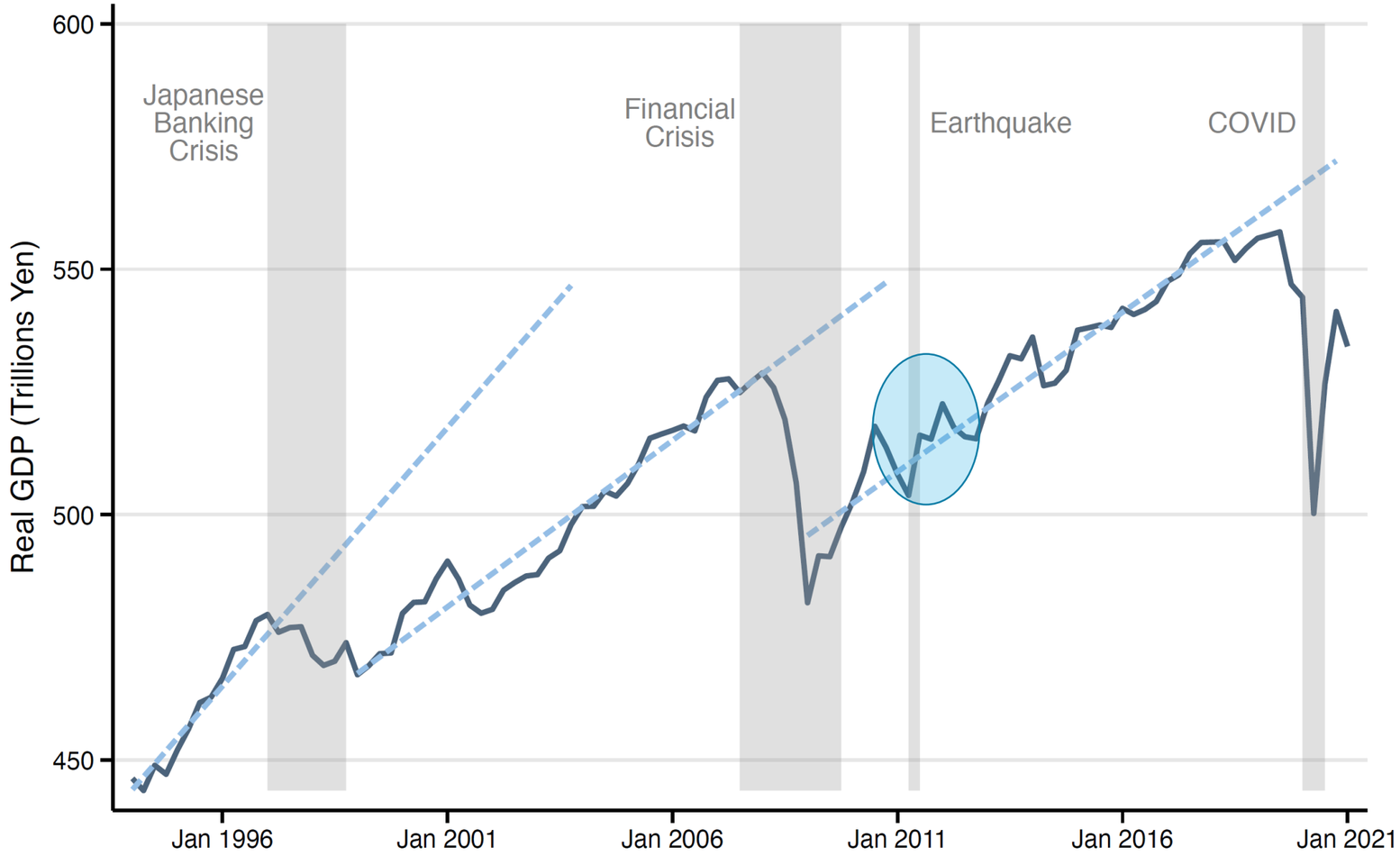
Escaping Tipping Points with Resilient Growth Path

- Seemingly riskless part with adverse trend subject to catastrophe risk
  - Resilience path is only hope



Resilience Destroyer: Financial Crises after Bubbles

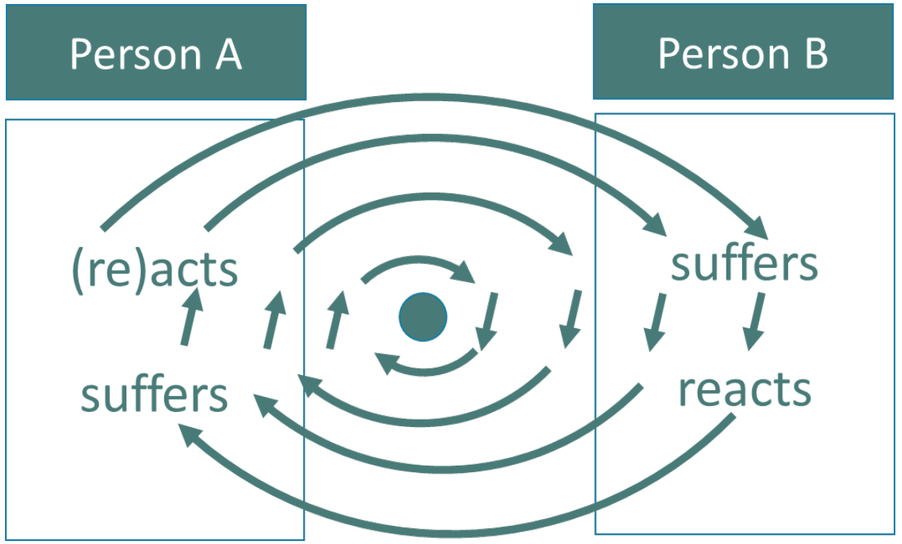
- Japanese GDP
  - Lack of resilience after financial crisis, resilience after Fukoshima



Resilience: Individual, System, Society

Resilience: Individual, System, Society

- Individual: Personal wellbeing, mental health
- System: Networks: electric grid, interbank market, GVC
  Systemic risk due to spillover, domino effects
  - *Feedbacks: Externalities* and endogenous *responses*



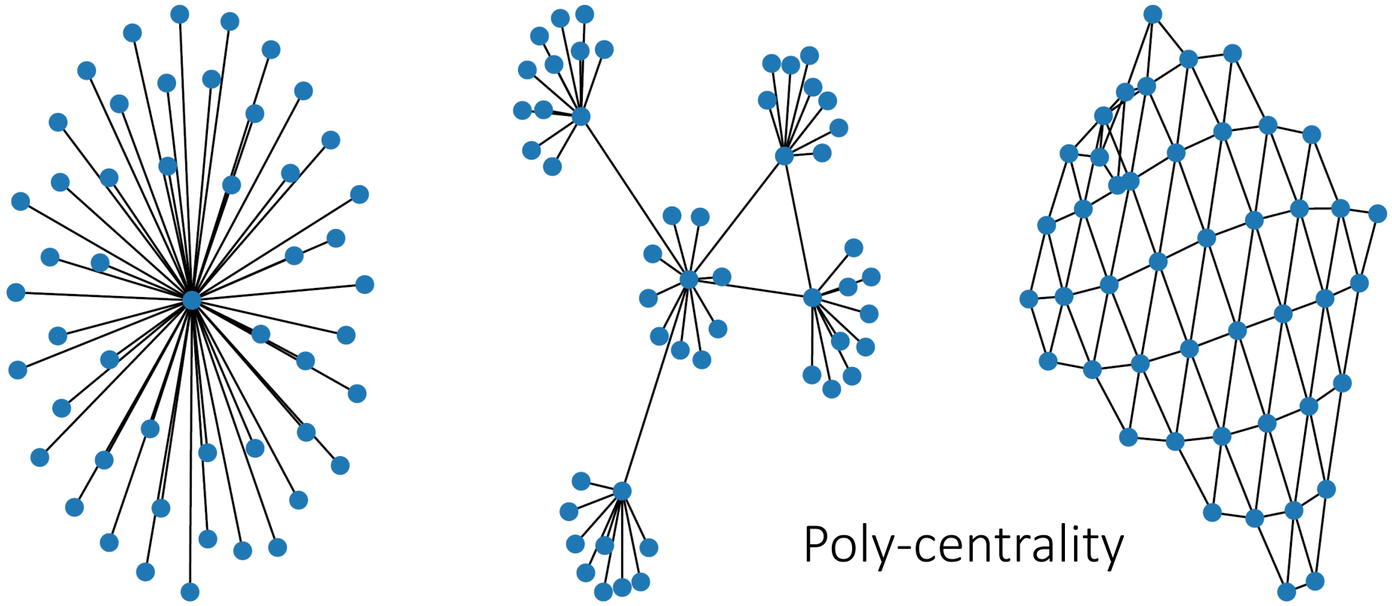
"we have met the enemy and he is us"

"Feedback Externalities"

General Equilibrium Perspective

Resilience: Individual, System, Society

- Individual: Personal wellbeing, mental health
- System: Networks: electric grid, interbank market, GVC
  Systemic risk due to spillover, domino effects
  subsystems do not need to be resilient if replaced
  (relative prices can change forever)



Resilience: Individual, System, Society

- Individual: Personal wellbeing, mental health
- System: Networks: electric grid, interbank market, GVC
  Systemic risk due to spillover, domino effects (CoVaR)
- Society: Interaction among humans
  - Selection is problematic: *inclusions vs. replacing*
  - Human actions are driven by expectations

Resilience and **Speed of Change**

- Transition phases

- Speed of shocks
  - **“Slow” shock** - sequence of small shocks
  - **Rapid Shock/Jump**
    - Reaction time is too slow

- Reaction time
  - Reaction is leaning against shock ⇒ shorter is better
  - Reaction is amplifying (feedback loops) ⇒ longer is better

Inflation and Resilience

Chapter 9

1. Power of Monetary Policy → Resilience

- Bounce back after a shock via monetary stimulus

- Depends on strength of inflation anchor
  - Credibility
  - Resilience barrier: rubber bank breaks/snaps

  - Higher order **beliefs coordination** (convention, common knowledge (David Lewis))
    - *Uncertainty* what others' belief (about others' beliefs …)
    - *Disagreement*
    - *Opaqueness whether wage increase is compensation for*
      - *past price increase*
      - *expected future price increase*
  - Strengthening the inflation anchor:
    - **Focal point** on anchor
    - **+ no other focal point:** creates confusion/uncertainty about alternative beliefs

  - Re-anchoring at 3%
    - How to create common knowledge at different level?

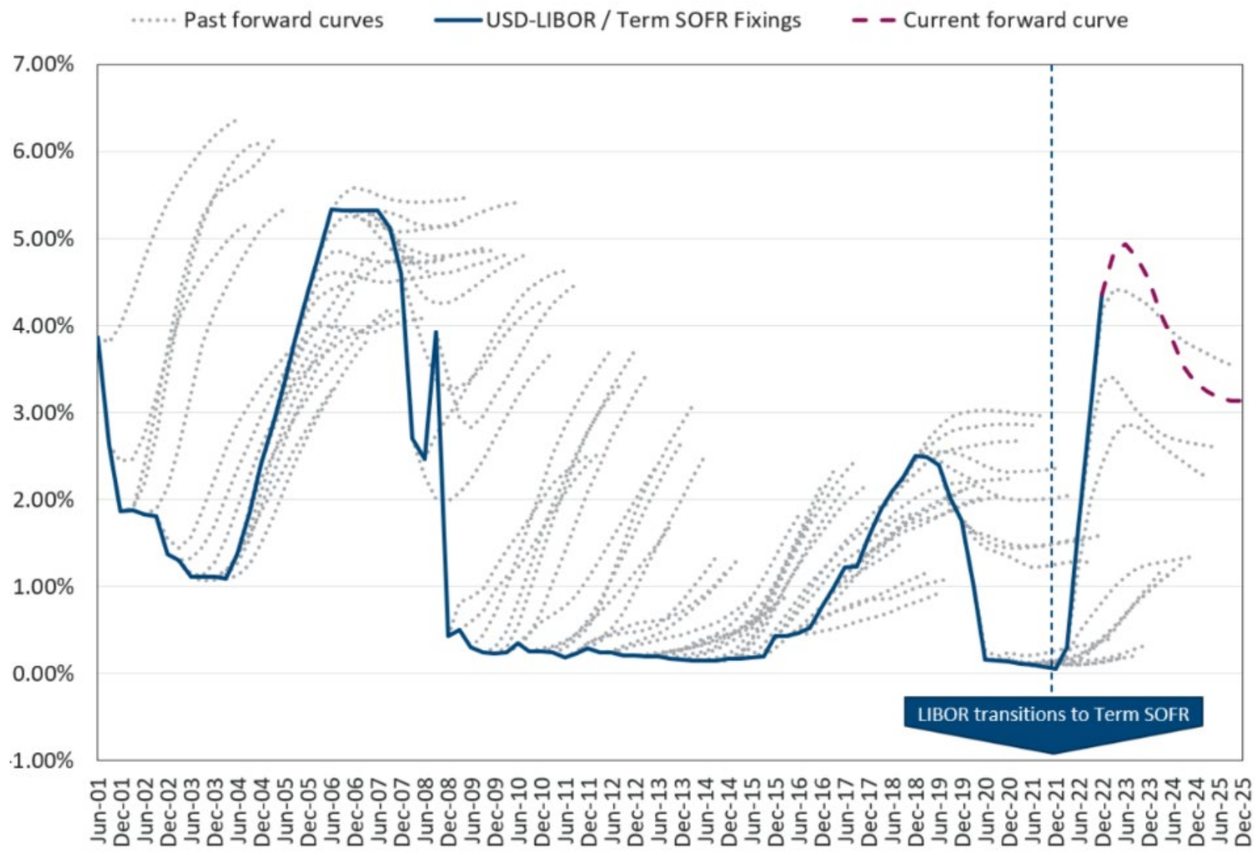
Taming Inflation Now or Later?

- Monetary policy acts with lags
  - Less pronounced than earlier
- Reveals central bank's "true type" (of anti-inflation commitment)
- De-anchoring of expectations – loss of focal point (resilience barrier)
  - Costs depend on expectations formation
    - Adaptive
    - Extrapolative
    - Rational
  - Expectations confusion/disagreement
  - Uncertainty/risk creation

  - Policy Lesson: Narrative is key
    - Narrative not only for failure – danger of a blame game
    - "Clear Guidance Narrative" – going forward

Anchor, Inflation Expectations, CB Credibility/Reputation

- Inflation **predictability** ↓ but MoPo lag ⇒ "behind the curve"
- Mean reversion/**inflation anchor** implicitly assumed (VAR, stationary DSGE)
  - ⇒ transitory bias

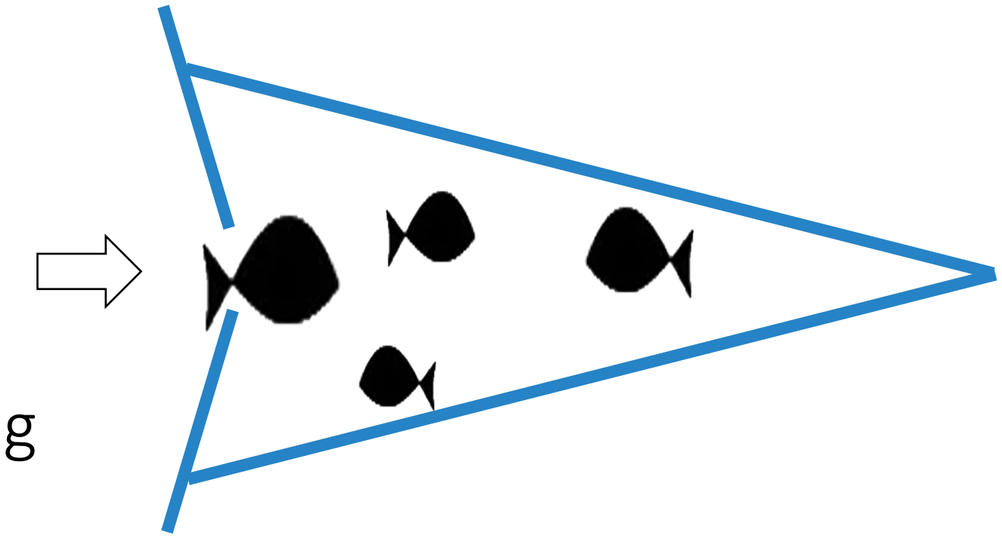


Lesson: <u>More responsiveness</u> to data (higher Taylor coefficient)
<u>preserve inflation anchor</u>

- "Data-driven MoPo" is forward guidance in disguise

2. Trap thinking

- Trap = “no bouncing back” = no resilience



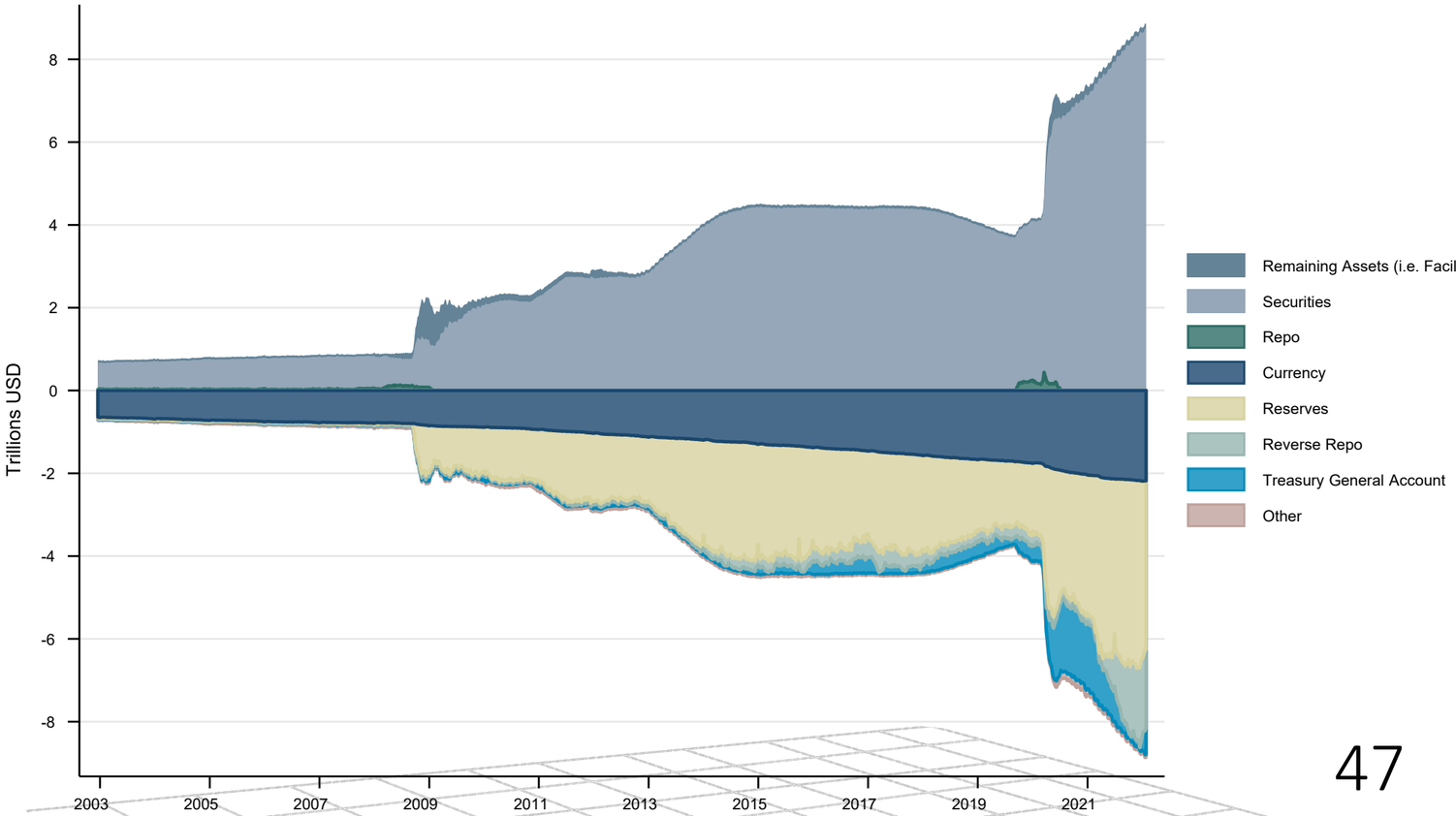
- Avoiding traps requires ex-ante thinking

- How to avoid “**financial dominance trap**”?
  - **Macro-pru**dential regulation
    - Ensure that financial sector does not constrain monetary policy room

- How to avoid “**fiscal dominance trap**”?
  - Central Bank **Independence**
  - Communication and backing by general public
    - Political pressure

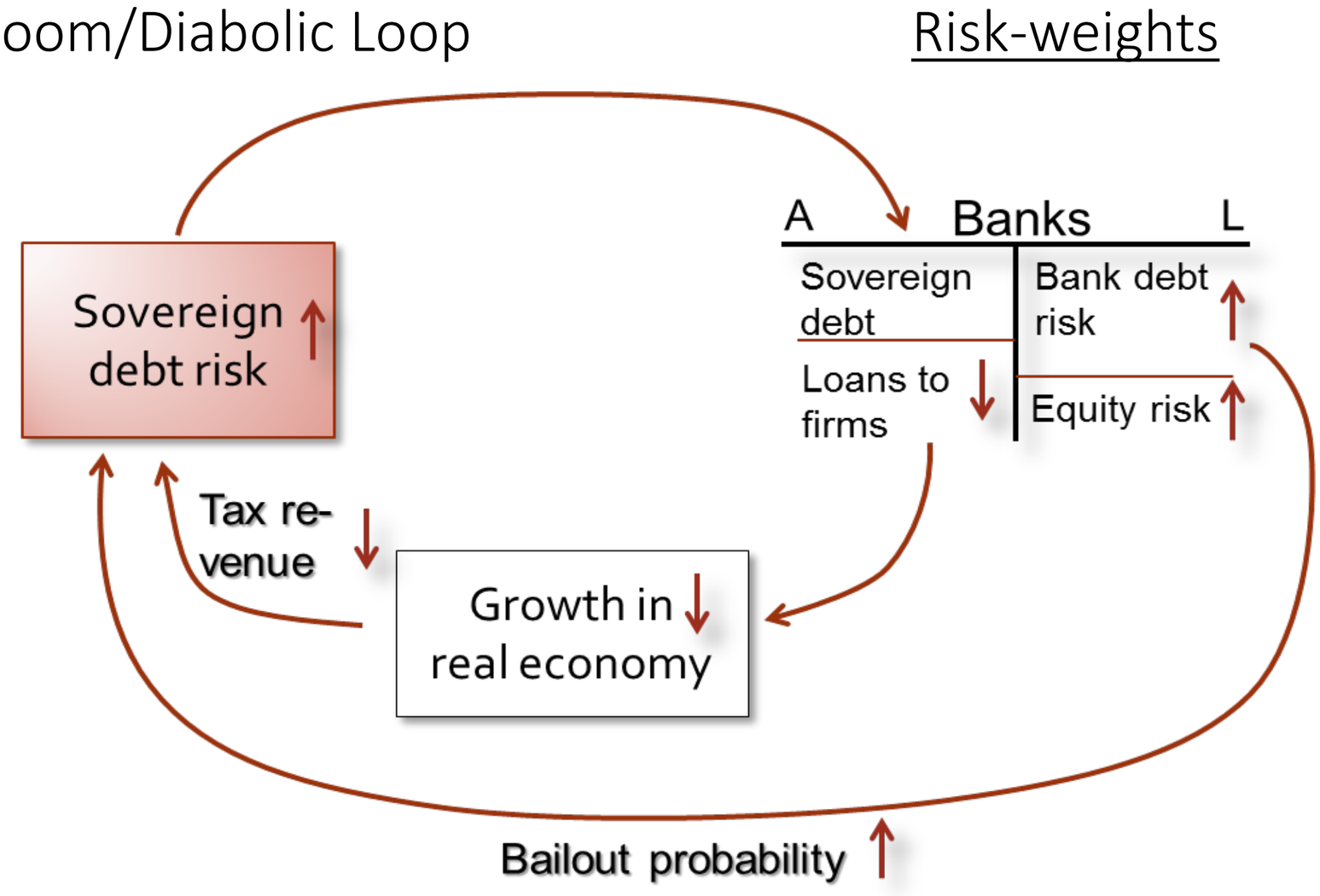
2a. Monetary vs. Financial Dominance

- Low inflation environment: **concurrence** btw price and financial stability
  - Monetary loosening boosts demand and financial stability
  - "Whatever it takes" approach is feasible
- High inflation environment: **trade-off**
  - Price vs. financial stability
  - Expect less intervention
    ⇒ higher inflation expectations
- CB distorted asset price signals
  - <u>Short</u> vs. pro-longed <u>intervention</u>



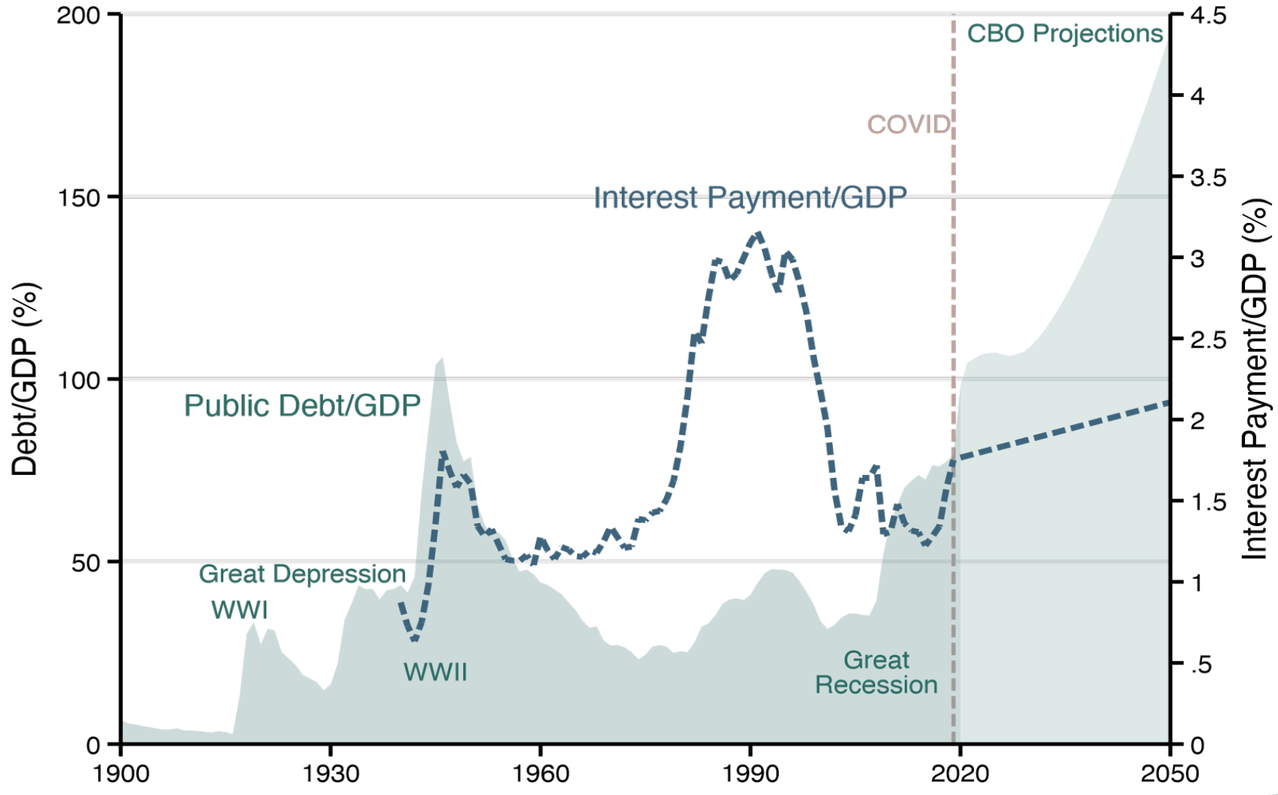
2a. Monetary vs. Financial Dominance

- Doom/Diabolic Loop



2b. Monetary-Fiscal Interaction

- Fiscal policy impacts on inflation (demand/FTPL)
- Monetary tightening has much large fiscal implications
  - Due to high debt level
- Central Bank-Government tensions/political pressure



2b. Monetary vs. Fiscal Dominance – "Game of Chicken"

Lessons

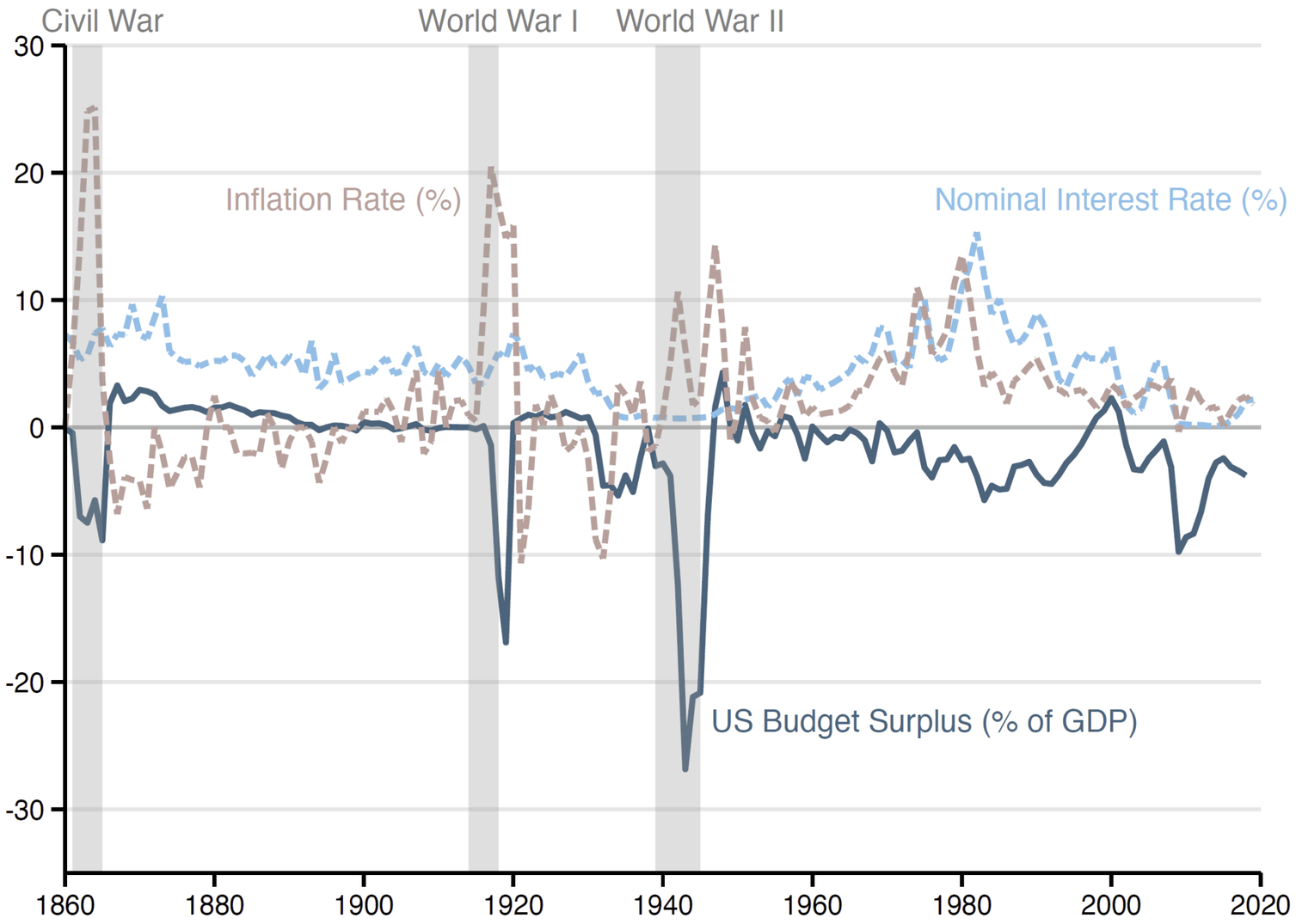
- Central Bank Independence
  - Legal, international treaty
  - Capitalization of CB's balance sheet
    - Interest rate payments on reserves to private banks
      - Loss on long-dated assets due to QE
      - CB funding cost has doubled (BIS bulletin)
    - Headline risk

Fiscal Implications

- Monetary Dominance & Sovereign debt restructuring costs
  - Ultimate subgame as shifter of bargaining power in game of chicken

- Monetary Dominance and CB communication
  - Narrative + blame game

2b. Fiscal Inflation Link



Policies in a High Stag-inflationary Environment

- Supply chain disruptions
  - Energy – elasticities of substitutions
    (micro vs. macro, ST vs. LT)
  - Food shortages (starvation)
  - Cyber attacks
  - Covid outbreak in China (vaccine)

Expand supply

- Energy transition
- EU agricultural policy

- Share mRNA vaccines

- Demand/investment boost
  - Rearmament
  - Green transition

Estimate increase in r^*
$\Rightarrow$ instability

Precautionary savings

- Redistribution: oil importers to oil exporters (windfall gains)

Petro dollar recycling
(analog of 1970s Kissinger idea to create a "buy-in")

Changes and Challenges

- *What's new?*

	Implications for Central Banks
1. High **gov. debt level**, Fiscal policy impacts inflation	**Monetary-Fiscal Interaction** - from coexistence to rivalry/blame game - Central Bank independence
2. High **private debt level + inflation** High asset prices, depressed risk premia	**Monetary-Financial Stability Interaction** - from congruence to trade-off - Demand management vs. Fin stability
3. Limited inflation **predictability**	**MoPo lags and behind the curve**
4. **Polycrisis** ▪ Supply/ demand, idio/systematic risk, temporary …	**Humbleness of Central Banks** - Fallacy to "look-through" supply shocks
5. **Transition phase** due to Structural Changes ▪ Green transition, WfH, De-globalization, Demographics ▪ Digital Money/ CBDC etc.	$\boldsymbol{r^*}$ **and risk premium transition**

Structural Changes and their Transitions

- MoPo is not designed for structural changes, but can accommodate transition
- Impacts r^* and risk premia

1. **Green transition**
   - Reduced investment in dirty technology
   - Destruction of dirty and increase in green technology r^* increases
2. **Work from home**
   - More leisure, lower labor income
   - Productive loss/gain?
3. **Demographic change**
   - More saving followed by more dissaving
4. **De-globalization**
   - Efficiency loss (via trade barriers)
   - For export nations also negative demand
5. **Digital Money**

Conclusion: Resilience and Monetary Policy

- **Risk** management approach
  - probability
  - + impact (disutility)
    of contingency events

- **Resilience** management approach
  - Inflation bounced back
    - Temporary adjustment helps to manage shocks/transition phases
    - Maintaining “inflation anchor” is key (Common knowlegde)
  - Avoid traps
    - Financial dominance
    - Fiscal dominance

Resilience and Global Order

Chapter 9

Resilience and Global Order

- Geopolitics
  - Geography
  - Zero-sum game
- Global Common and Public Goods
- Global Trade
- Global Finance
- Emerging and Developing countries

Global Resilience Paradox

- *“Global resilience is undermined by local resilience”*

- Global resilience as global common good
  - Underinvestment in buffers, substitutability, infrastructure

- Local resilience (self-sufficiency)
  - Investment in local resilience lowers investment in global resilience
    - Lower mutual interdependence

  - … even though global resilience is much more cost-efficient

Competition of Systems - Fragmentation

- Cold War
  - Capitalism (Neoliberalism) vs. Communism (autocratic)

- Now
  - “The West” “autocratic system” (Neodirigrism)
    - Focus on individuals (human rights, …)
    - Not geographic
      - (Japan, Korea, but not Russia)

A Personal Conjecture

- In an increasingly complex society

- Autocratic societies
  - Seek **robustness** – attractive feature after crises
  - Suppression, minimize movements/disruptions
  - Surveillance
  - Tighten with each crisis … no rebound

Good in

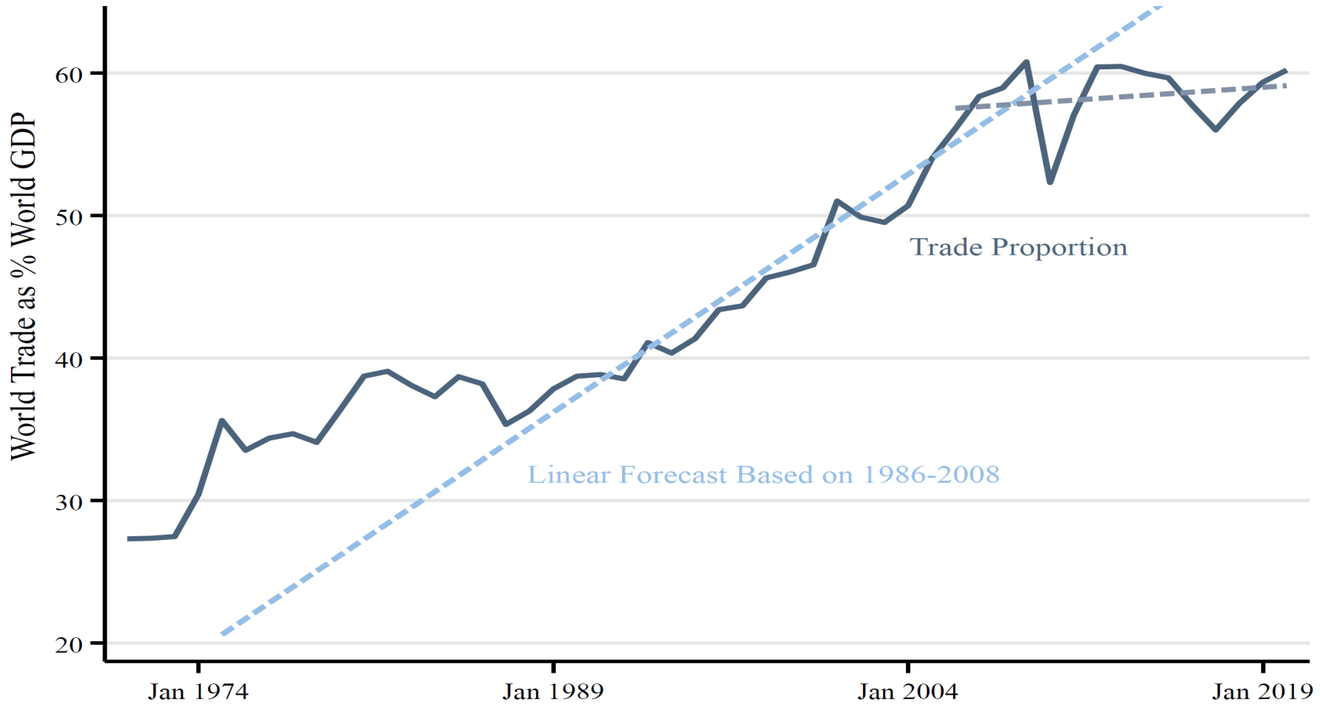
- *Enforcing rules*

- Open/democratic society
  - More **resilient**
  - May appear wobbly when shock hits but internal mechanism allow for rebound
  - Open to mavericks
  - Transparency and more information flow/aggregation

- *Invented universally accepted vaccines*

Global Trade and Geopolitics

- **Pre:** <u>Mutual interdependencies</u> ⇒ to ensure peace/international stability
  - "Just-in-time", Global Value Chains
    Wandel durch Handel
  - … but slowabilization (in goods only)



Global Trade and Geopolitics

- **Pre:** <u>Mutual interdependencies</u> ⇒ to ensure peace/international stability
  - "Just-in-time", Global Value Chains
    Wandel durch Handel
  - … but slowabilization (in goods only)

- **Post:** country <u>Resilience</u> ⇒ less global stability
  - "Just-in-case", autarky, self-reliance ⇒ higher inflation, real interest

    Stress tests for global value chains

  - "Fork in the road": Fragmentation?
    1. Reshoring,
    2. Friend-shoring or
    3. Multi-sourcing

Global Finance

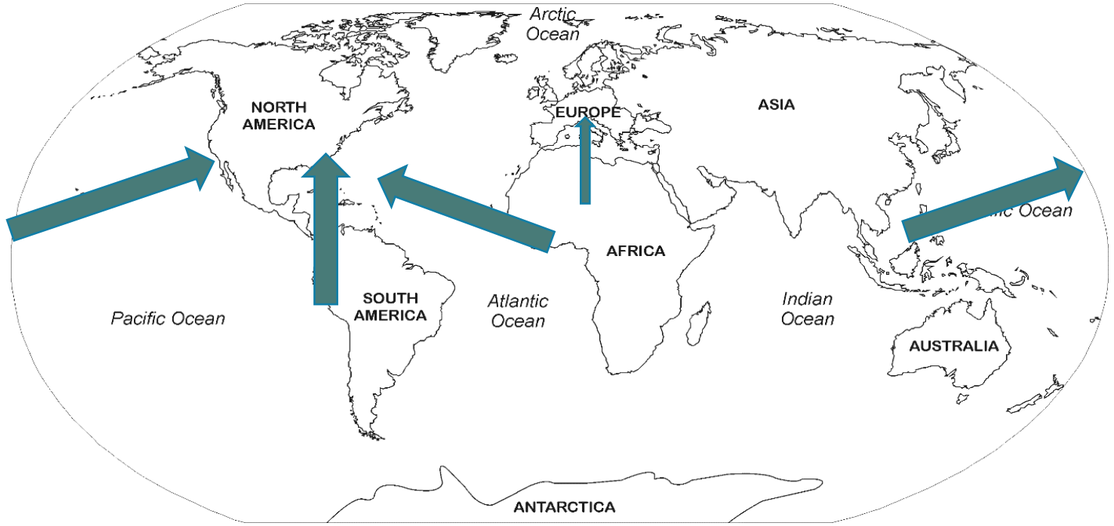
- Resilience via **flexible exchange rates**
  - Shock: Devalue currency ⇒ export boom, import shrinks
  - Mutual resilience insurance across countries: common good
    … but
- 1930: Beggar-Thy-Neighbor – exploit with intent
- 1944: Bretton-Woods-System
  - Fixed exchange rates US$ in the center (US$ linked to gold)
- 1971: Nixon Shock
  - **Flexible exchange rates** ERM "snake" for Europe
  - Open current accounts
  - US$ became more dominant due to eurodollar market
  - Fed Swaplines
- 1998: South-East Asia crisis ⇒ EME reserves accumulation

Global Financial Architecture

- Flight-to-safe asset
  - Tightening of US Monetary Policy
  - Risk-on, Risk-off

International: Flight to Safety

- Risk-on, Risk-off Flight-to-safe asset



- Problem: Safe asset is *asymmetrically supplied* by AE

  Flight-to-safety ➡ cross-border capital flows
- Debt issues at times of global crisis
  - For AE at inflated prices eases conditions
  - For EME at depressed prices worsens conditions
- *Paradox: "Poor insure rich Paradox"*

Two Approaches

- Approach 1: "Buffer Approach" *(traditional)*
  - Lean against sudden stop (flight-to-safety) capital outflows

  - Precautionary Reserves
  - IMF liquidity lines
  - Central Banks Swap line arrangements

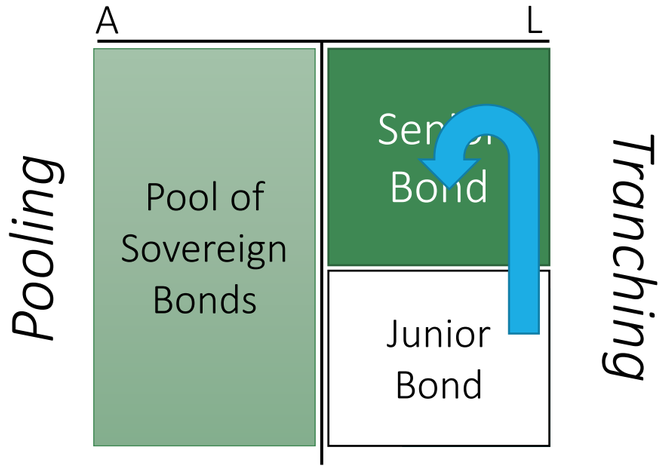
  } Official sector

- Approach 2: "Rechanneling Approach" *(new proposal)*
  - *"Global Safe Asset from & for Emerging Economies"*

A Safe Asset for Emerging Economies: Rechanneling Approach

- Address root cause: Safe asset is supplied asymmetrically

- Create globally supplied safe asset for EME via pooling & tranching



Rechannel:
Instead of cross-border
Across asset classes

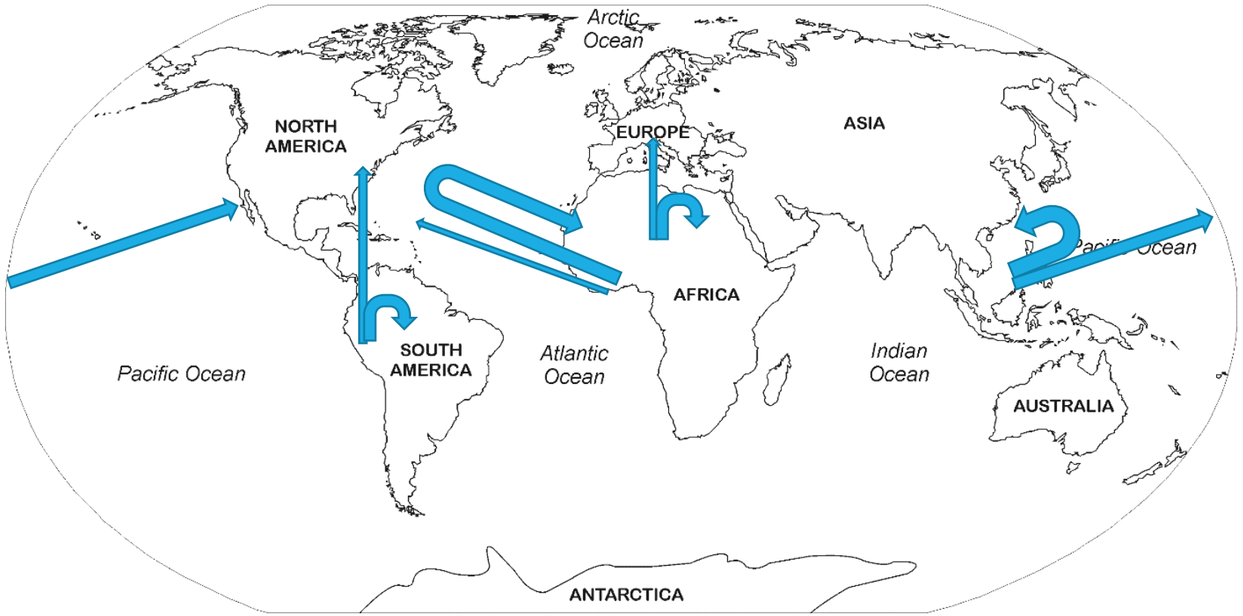
- Expand ESBies idea for euro area to EME:
  "SBBS (Sovereign-Bond Backed Securities) for the world"
  Euro-nomics group 2011, 2016, 2017

International: Flight to Safety

- Risk-on, Risk-off ➡ Flight to safe asset

- Channels back some of flight-to-safety capital flows

  fewer cross-border capital flows



“Digital Currency Areas” - Global Fragmentation

Positive (not normative)

Shaped by privacy regulation

- US: **Stablecoins** in US $
  - programmable tokens of social networks/industry 4.0
  - Challenge: regulating stablecoins, platform interoperability
- Europe: **Digital Euro** (CBDC)
  - Consumer (not industry 4.0 focused)
  - Challenges:
    - Programmable/Smart contract integration is limited
    - CBDC as legal tender undermines smart contracts further
- China: **AliPay** and **WechatPay** + Digital Yuan
  - Consumer (convenience) + medium of exchange focused

Rent seeking by Stablecoin companies

offensive

- EMDE: Domestic CBDCs to fend off **digital dollarization**
  - Challenges: loss of monetary sovereignty and cheap funding

defensive

Climate Change Challenge

- Global Public Good with
  - Double-externality: R&D and pollution
  - + network externalities: Chicken-Egg problem (QWERTY)
  - “Climate Clubs”

- De-growth strategy vs. innovation
  - Covid CO2 emission reduction was minimal

- Three-prong strategy
  - Mitigation - electric vehicles
  - Adaptation – high-tech dikes
  - Amelioration – geoengineering

Climate change
understanding counterfactual

Resilience strategy is more likely: Let climate change show up

- 2 Reaction to Ukraine war: speed up vs. turn around?

Inequality: Resilience with Inclusion

- Income inequality static measure

- Wealth inequality
  - Discount rate effects

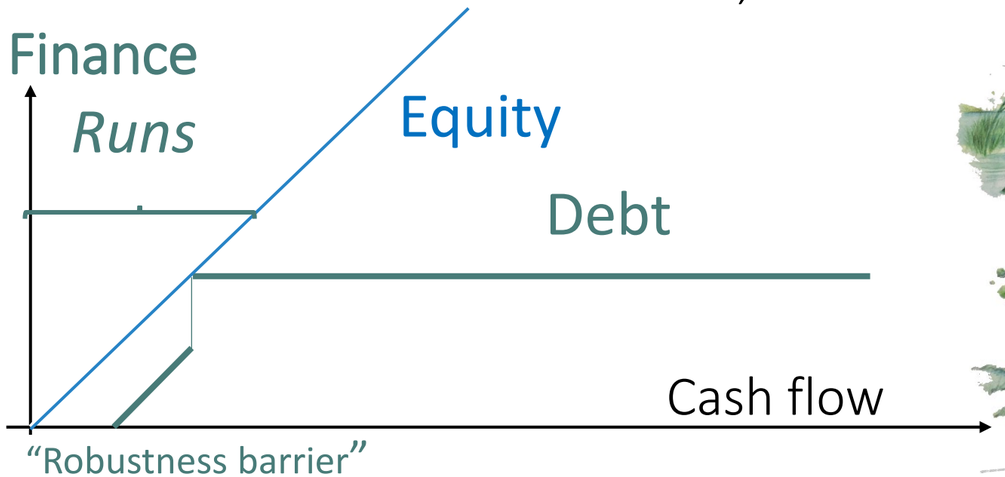
- Social mobility dynamic measure
  - How many generation does it take to move to the top?
  - Stylized Example: 2 groups switching rank repeatedly
  - Elephant curve – The Great Gatsby Curve

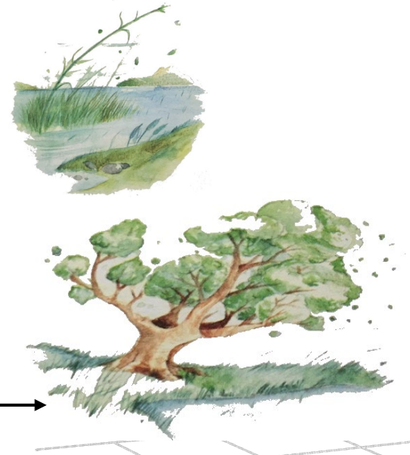
- Resilience inequality (new concept)
  - Some people bounce back more easily than others
    … and hence can take more risk (earn higher risk premia)

  - Insecurity
    - Moving comparative advantage

Resilience and Policy Implications

- International Trade: Global value chains
  - From “just in time” to “just in case” -- stress tests for GVC (resilience lessons from GFC)
- International Macro-Finance
  - Flexible exchange rate – Foreign exchange reserves (buffers) + MacroPru (limited $-debt)
  - Poor insuring the rich: “GloSBies” and Global Role of the US dollar as safe asset
- Global geopolitics – cyber warfare
- Emerging Economies – poverty and middle-income traps
- Climate change – Sustainability = resilience + no adverse trend
- Macro
  - Low interest rate ⇒ more fiscal, less monetary resilience
- Finance





Resilience and Policy Implications

- International Trade: Global value chains
  - From "just in time" to "just in case" -- stress tests for GVC (resilience lessons from GFC)
- International Macro-Finance
  - Flexible exchange rate – Foreign exchange reserves (buffers)
    + MacroPru (limited $-debt)
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- Climate change – Sustainability = resilience + no adverse trend
- Macro
  - Low interest rate ⇒ more fiscal, less monetary resilience
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- Education: Foster taking initiatives, general and life-long education, no comparisons to others

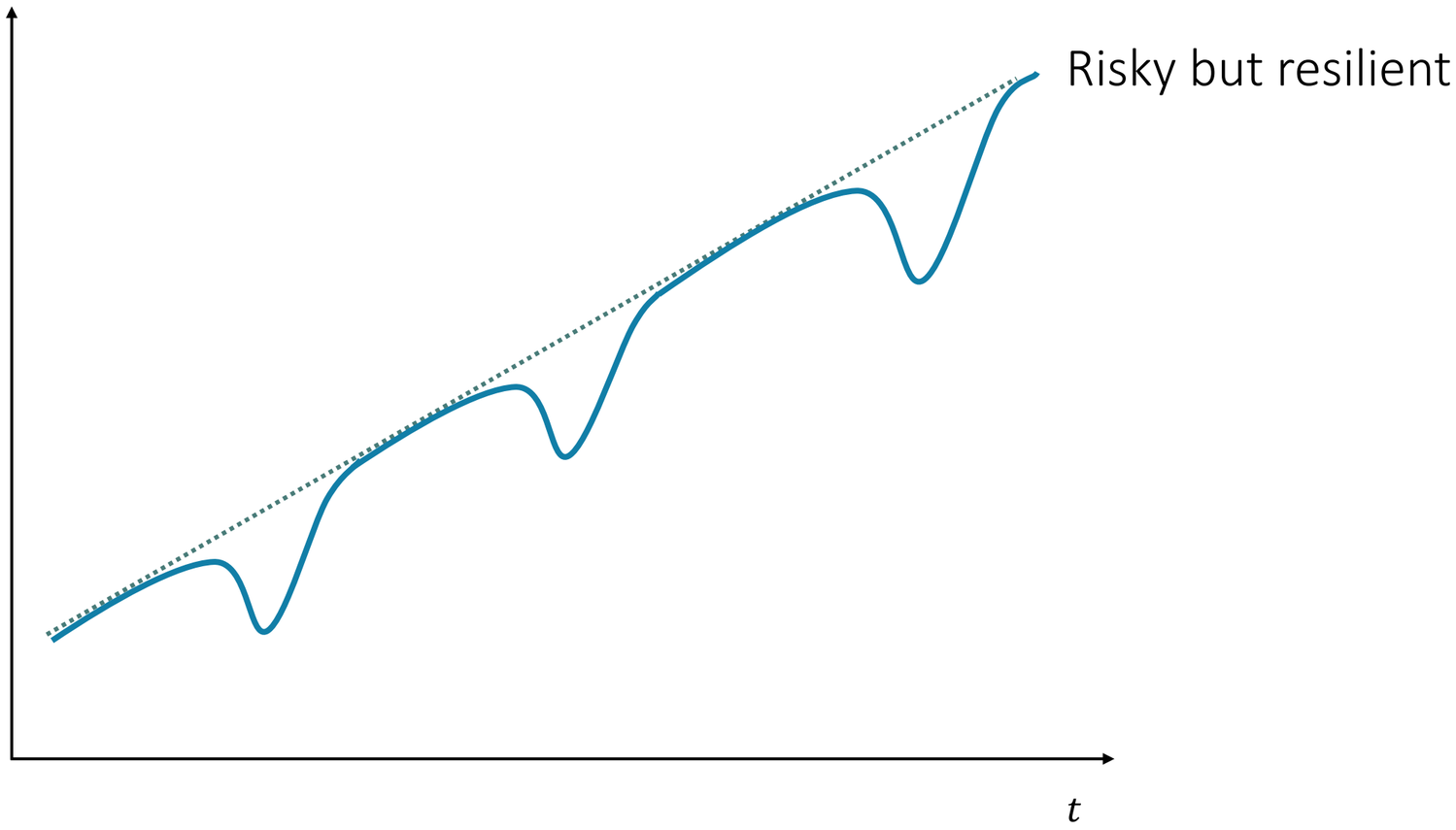
Thank You

Finance and Resilience

Chapter 9

Resilience and the Slope of the Yield Curve

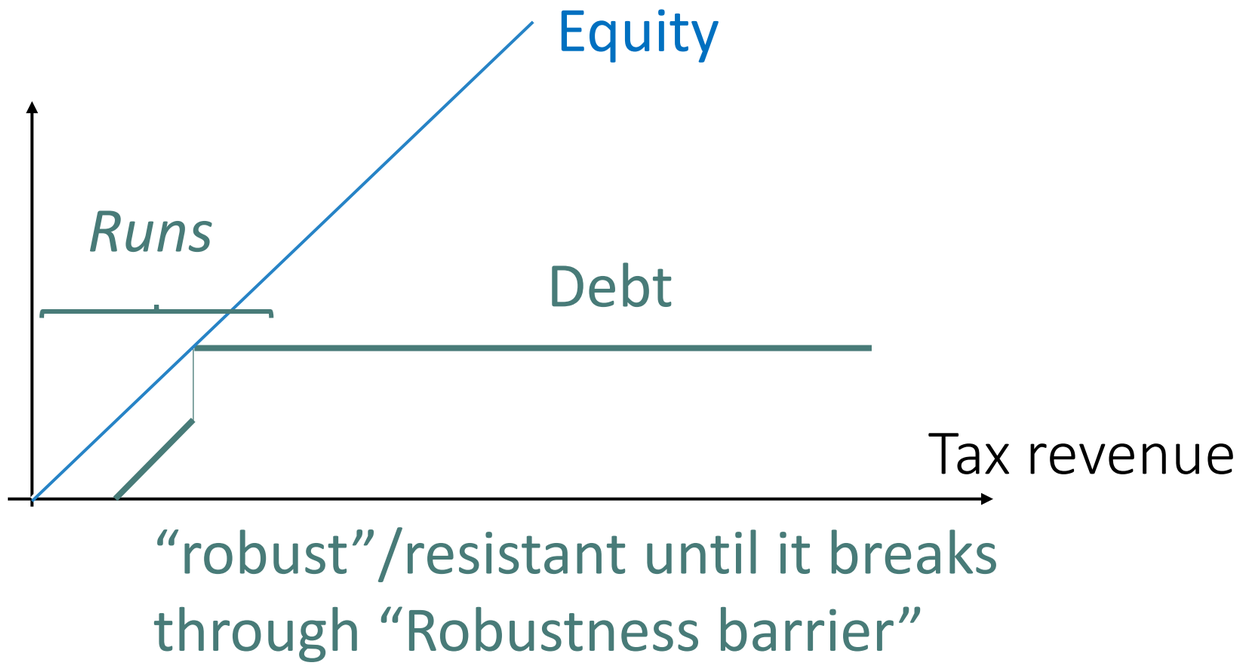
- Resilient path



Resilience and the slope of the yield curve

- Increasing ⇒ resilience (V recessions)
- Flat ⇒ random walk (permanent)

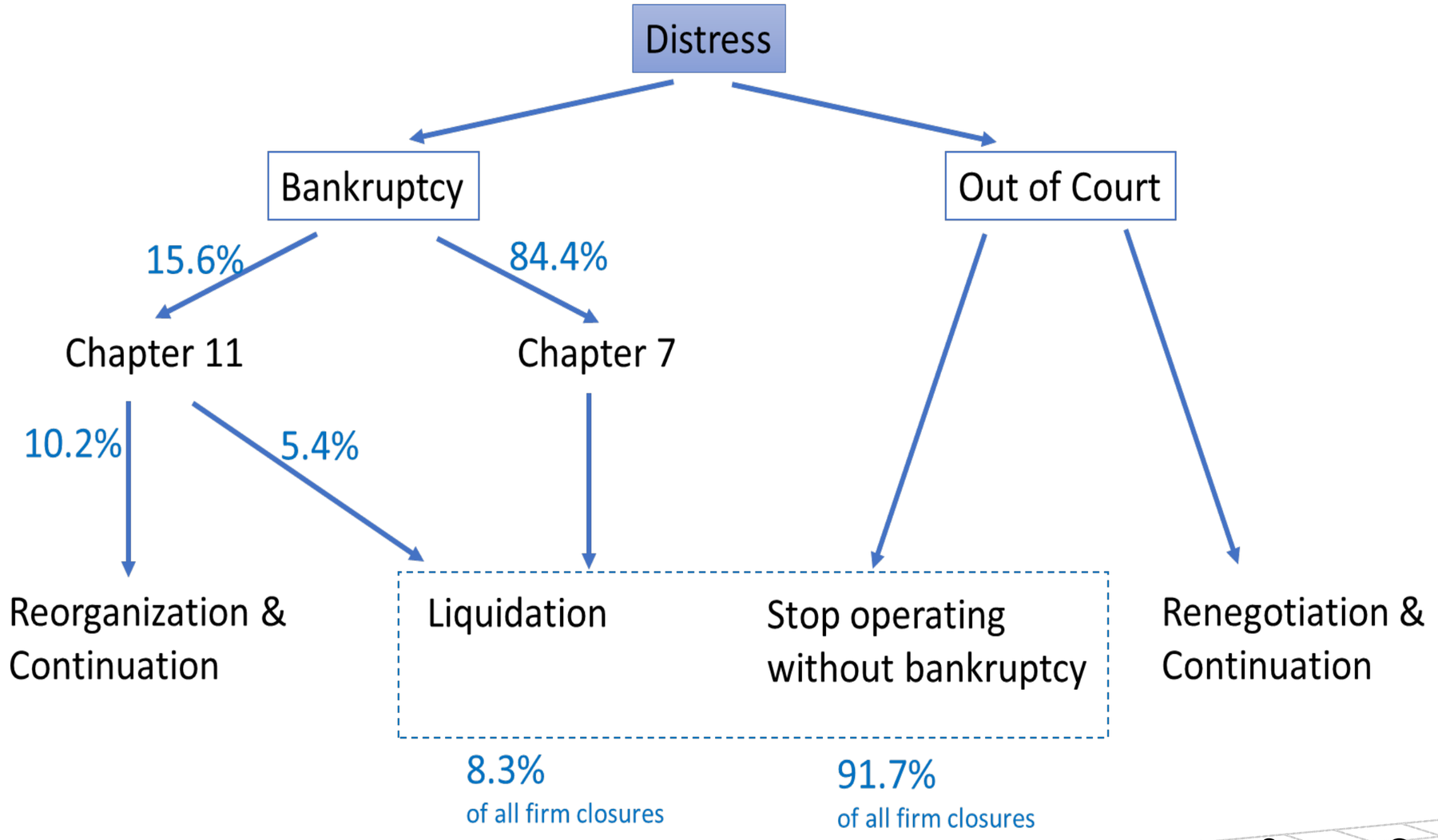
Resilience: Debt vs. Equity



Equity

Resilience enhancer: Bankruptcy Protection

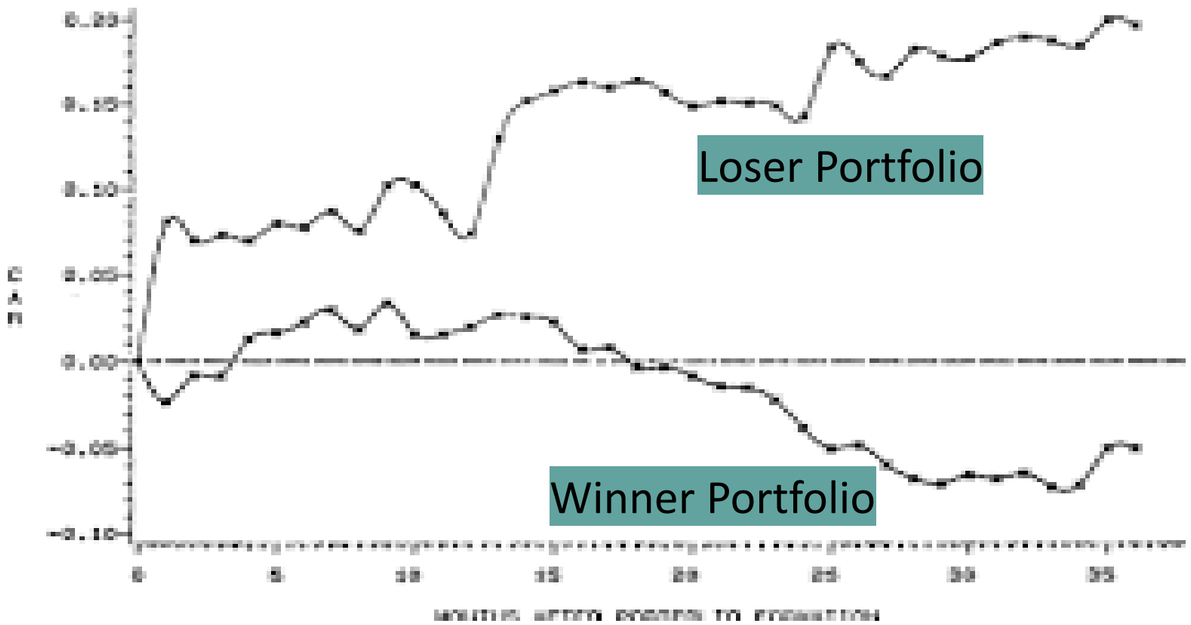
- Bankruptcy in US:



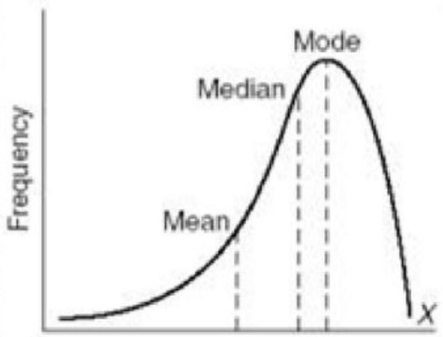
Source: Greenwood, Iverson, Thesmar 2020

Stock Market Resilience - Cross-section

- Resilience = price reversals
  - Long-run Price Reversal: 4 years
    DeBondt and Thaler (1985)
  - Medium-run Momentum: 6 months
  - Very short-run Reversal: daily



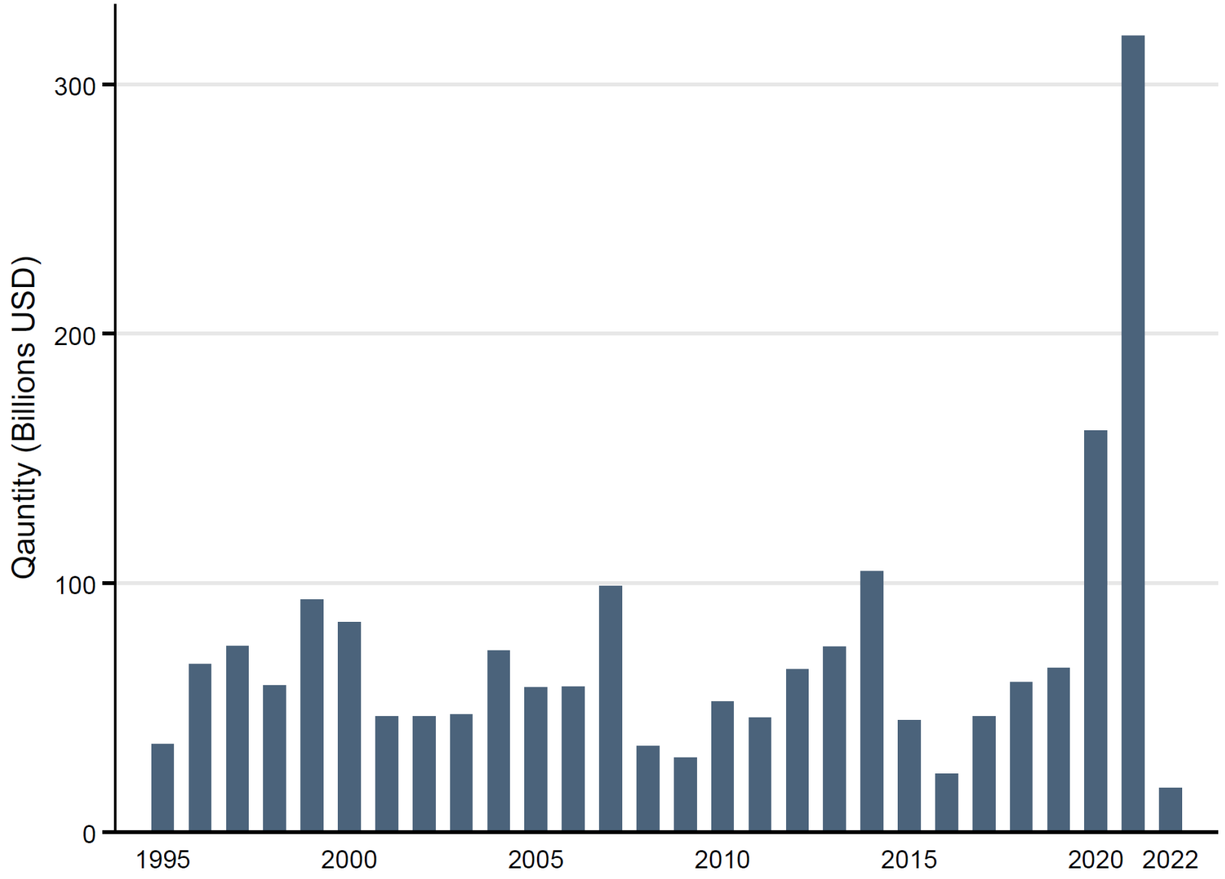
- … more after downside-shocks?
  - Negative skewness (asymmetric distribution)
    (of whole market vs. individual stocks)



“Financial Markets Whipsaw”: Stocks and Corporate Bonds

- March 2020 shivers followed by strong recovery
  - **Stock market** record heights – IPOs like during NASDAQ bubble

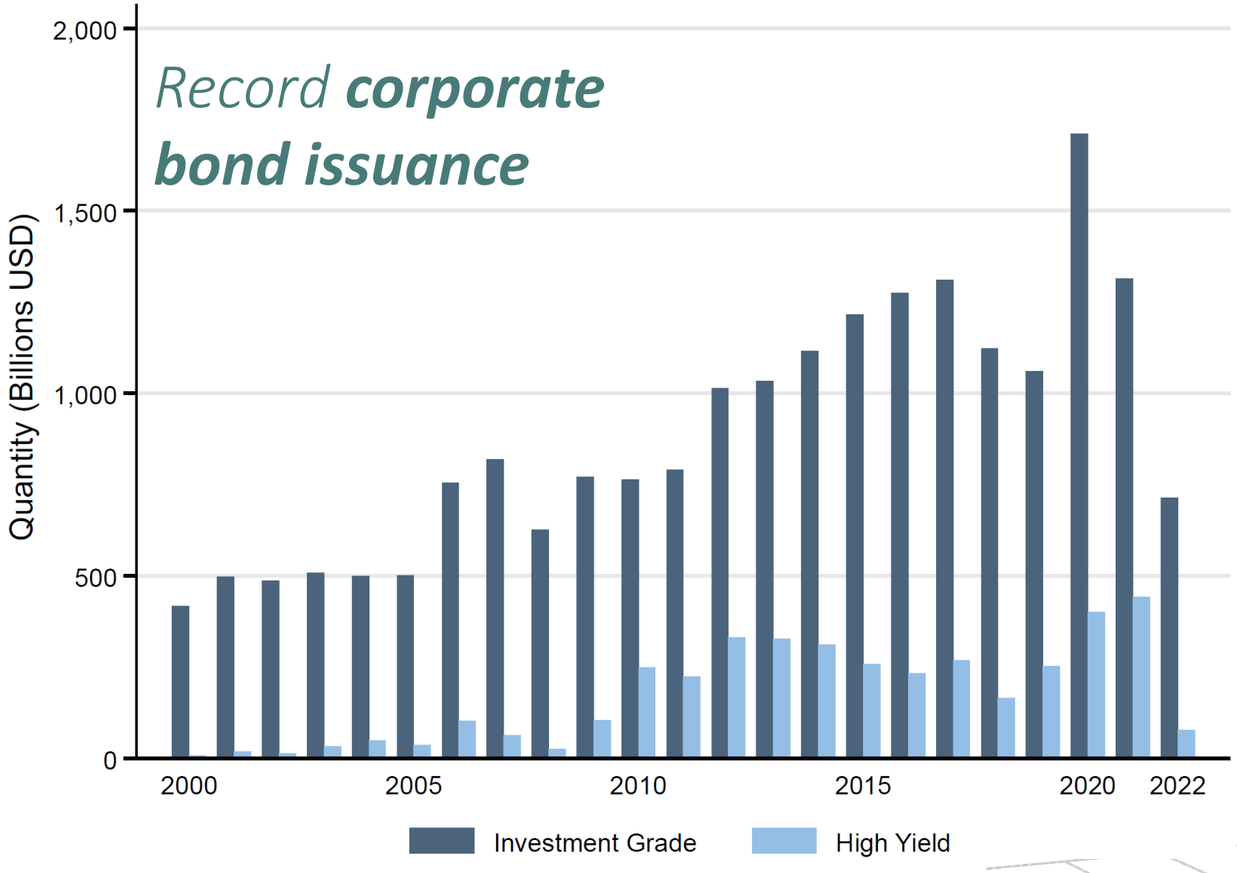
*Record **IPOs** due to SPACs*



“Financial Markets Whipsaw”: Stocks and Corporate Bonds

- March 2020 shivers followed by strong recovery
  - **Stock market** record heights – IPOs like during NASDAQ bubble
  - **Corporate bond market**

CB: Tail risk removal

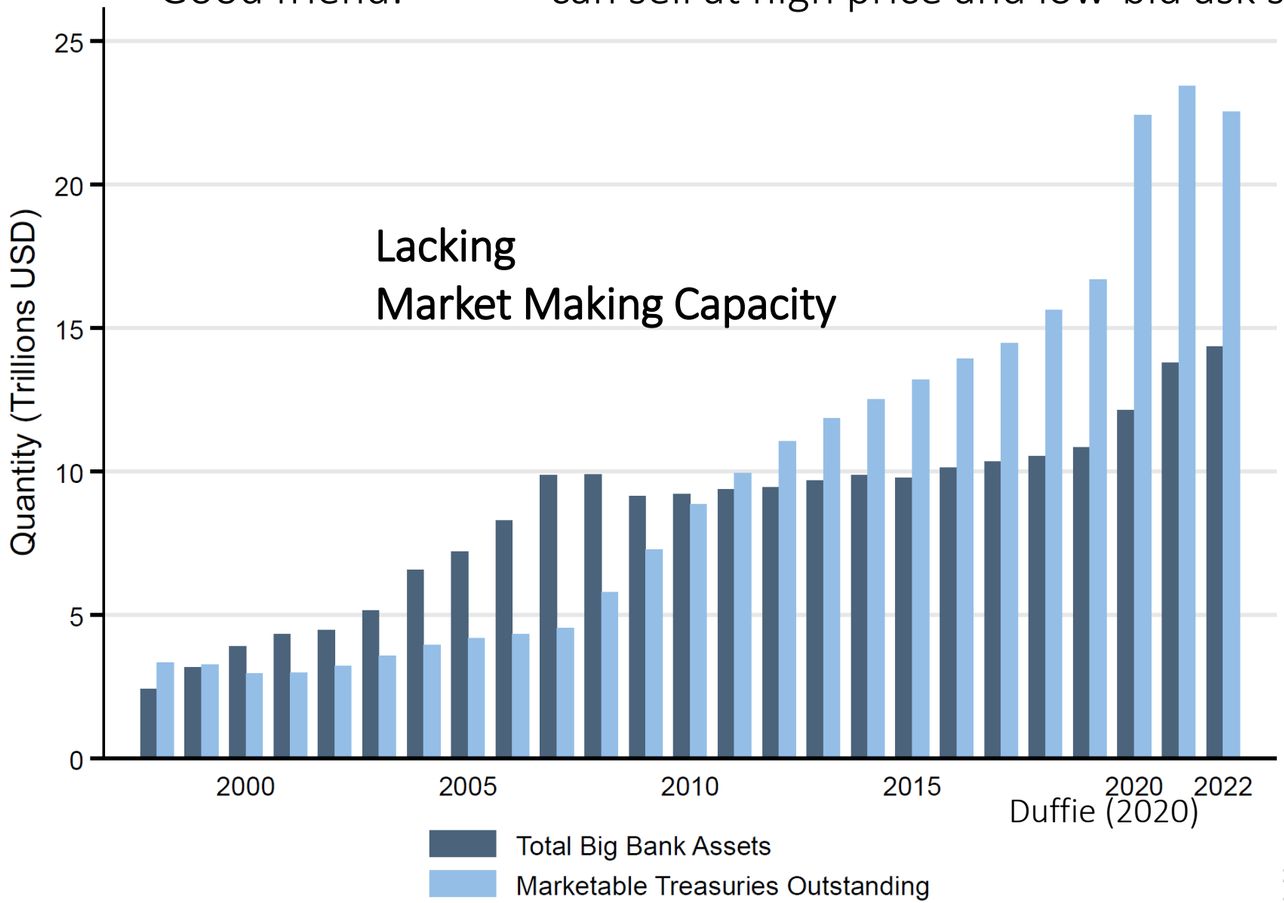


Large corporation paid back bank loans (from drawn credit lines)

Freed up risk-bearing bank capital by banks for lending to SMEs

“Financial Markets Whipsaw”: US Treasury

- March 2020 shivers followed by strong recovery
  - **Gov. bond market shivers** CB: Market maker of last resort to preserve safe asset status
    - What’s a safe asset? Precautionary savings: Asset Price = E[PV(cash flows)] + E[PV(service flows)]
      - Good friend: can sell at high price and low-bid ask spread in crisis times



Duffie (2020)

Resilience and Policy Implications

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- Part I: Society and Resilience

- Part II: 4 Elements of Resilience Management: COVID

- Part III: Macro Resilience
  - Innovation boost vs. Scarring
  - Financial whipsaw
  - Public Debt
  - Inflation whipsaw

- Part IV: Global Resilience
  - EMDE
  - Geopolitics, World order, Global finance, Value chains, Climate

Thank You

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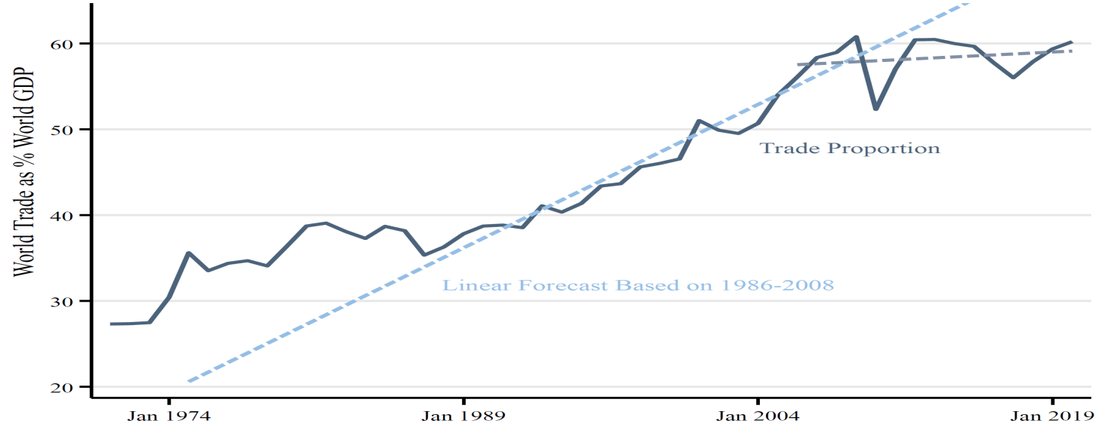
02/24/22 Watershed Moment on Global Economic Order

- **Pre:** <u>mutual interdependencies</u> to ensure peace
  make wars expensive
  - **Trade:** Global Value Chains, "just-in-time" $\Rightarrow$ low π
    Trade bring (political) change – "Wandel durch Handel"

- **Post:** <u>Resilience</u>: "just-in-case", autarky, self-reliance
  - More than **slowbalization** (?) - sanctions

The Future of Globalization (Slowabilization)

- "Slowbalization" (in trade), Deglobalization (in services, technology transfers)



- From **cost minimization** to ⇨ **Resilience**
  - **Just-in-Time** ⇨ **Just-in-Case**
- Cheap — Reliable/sustainable
- Cheapest supplier/country — 3 different suppliers (multi-sourcing) from 3 different continents

Fragmentation via "Friend-shoring"

GVC Stresstests

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  - **Finance:** Cross-border investments – open capital account
    EM $-reserve holdings to offset capital outflows $\Rightarrow$ low r

- **Post:** <u>Resilience</u>:
  - Trade: "just-in-case", autarky, self-reliance
  - Finance: capital controls, fewer EM $-reserves $\Rightarrow$ higher π, r^*
    - + **green transition**
    - + **Covid shock in China**

- Fork in the road": Reshoring, friend-shoring or multi-sourcing

Working from Home and city design

- Working from home: shift – stigma removal

- Donut effect due to Covid for metropolitan areas
  - City centers are struggling, suburbs thriving

- Smart cities
  - Digitalization – New form of hygiene management
    (like sewage in 19th century)

International Economics and Resilience

Chapters 13, 14

Global Resilience

- Emerging Economies
  - Poverty trap
    - Resilience to bounce back after a shock
  - Middle-income trap

- Floating exchange rate as resilience enhancer
  - If debt in domestic denominated currency

- Capital flows and US monetary policy

- Global safe asset – resilience for advanced economies

- Sovereign Debt Restructuring, IMF's SDR, ...

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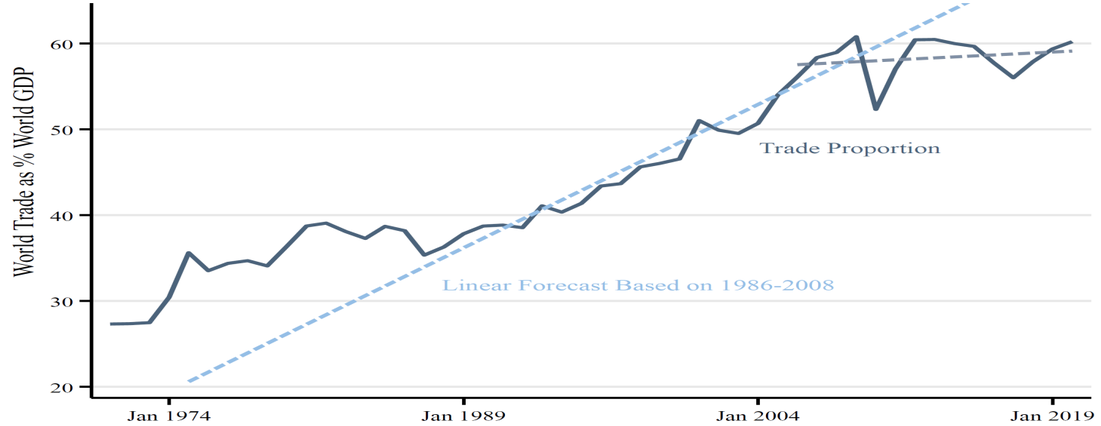

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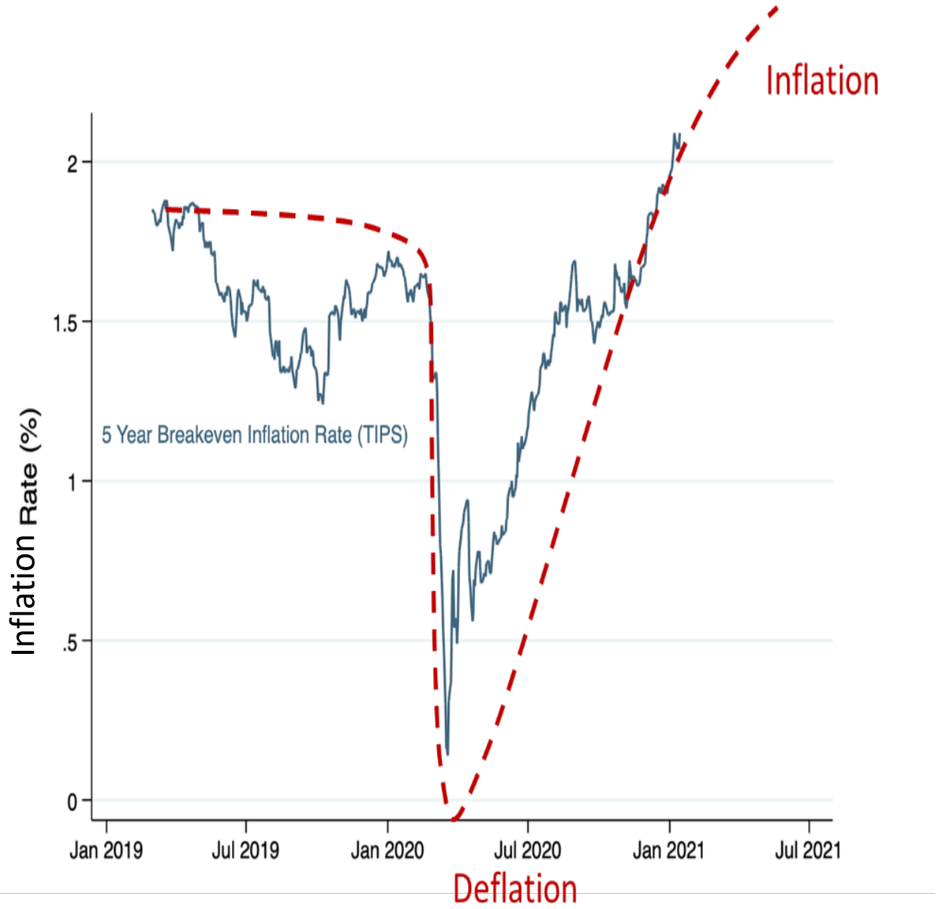
- **Post:** <u>Resilience</u>: "just-in-case", autarky, self-reliance
  - More than **slowbalization** (?) - sanctions
  - End of "peace dividend", **rearmament**
  - + **green transition** $\Rightarrow$ higher π, r^*
  - + **Covid shock in China**
  - More capital control (?) … **fewer $-reserves**

“Inflation Whipsaw”

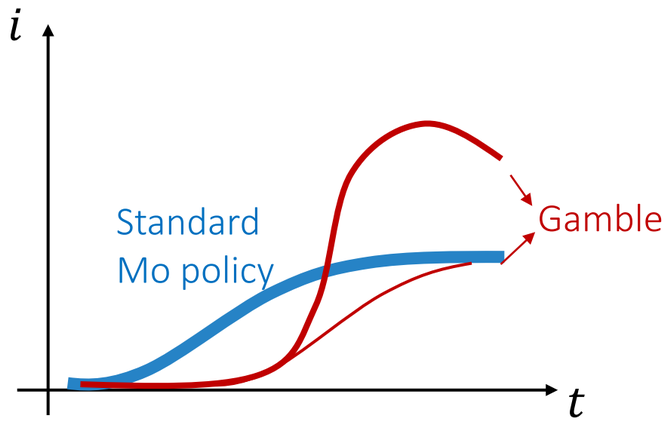
5 Year Breakeven Inflation Rate (TIPS)



- **2 traps** (“resilience destroyers”)
  - Deflation trap
  - Inflation trap (fiscal + financial dominance)

- **Independence** central bank
  + MacroPru
  - Accelerator and breaks

US Monetary Policy: "Transitory" Gamble for US, Downside for EMDC



for social cohesion within US
backward-looking MoPo

- Supply shortages relative to demand excesses
  - Record imports from China + now: inflation in "core services"
- To bring inflation down – avoid **de-anchoring** of inflation expectations
  Taylor Principle $\phi_\pi > 1$, i.e. real rate $r^\$$ increase
  - High debt level: debt sustainability ⇒ financial instability
    MoPo more sensitive/error prone
  - MoPo spillovers to EMDC ⇒ Flight-to-Safety - SS (loss of (local) safe-asset status)

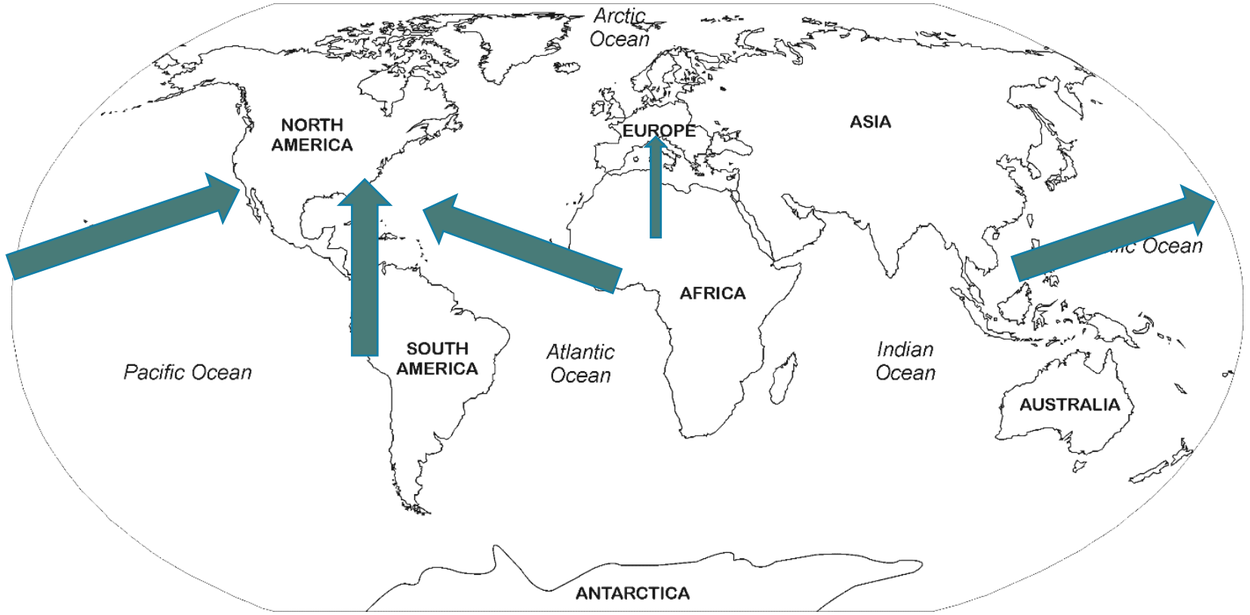
$r^{EM} < g^{EM}\Downarrow$ to sustain local EMDC safe asset
$r^{EM}\Uparrow \geq r^\$ \Uparrow$ to be attractive relative to US Treasury

International: Flight to Safety

- Risk-on, Risk-off Flight-to-safe asset

- Problem: Safe asset is *asymmetrically supplied* by AE

  Flight-to-safety ➡ cross-border capital flows



International: Flight to Safety

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  Flight-to-safety ➡ cross-border capital flows

- At times of global crisis, issuance of new debt
  - For AE at inflated prices eases conditions
  - For EME at depressed prices worsens conditions

- Question: Who insures whom? *"Poor insure rich Paradox"*
  - Correct insurance only if
    buffer is large and debt long-term enough
    so that no new debt issuance needed &
    sell safe asset/reserves instead

Two Approaches

- Approach 1: "Buffer Approach" *(traditional)*
  - Lean against sudden stop (flight-to-safety) capital outflows

  - Precautionary Reserves
  - IMF liquidity lines
  - Central Banks Swap line arrangements

  } Official sector

- Approach 2: "Rechanneling Approach" *(new proposal)*
  - *"Global Safe Asset from & for Emerging Economies"*
    with Lunyang Huang

1. “Buffer Approach” via Reserves Holdings

- South East Asia crisis 97/98: Sudden Stop/Flight-to-Safety
  ⇒ precautionary reserves
- Negative carry due to low yield of safe asset
  (exorbitant privilege)
  - As EME grows faster, they have to
    keep acquire foreign safe assets (export surplus required)
- Distorts exchange rates
- Subsidizes private carry trades
  - Carry traders undermine/undo official reserve holding
  - EME corporate sector $-borrowing
    - Bruno & Shin 2016
  - Hungarian/Polish household €-borrowing
    - Verner 2017

Two Approaches

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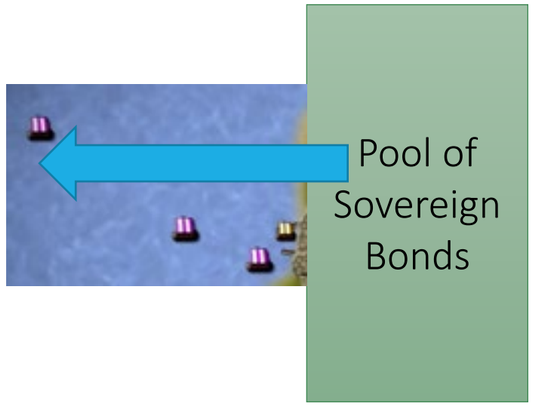
    with Lunyang Huang
    (Central Bank of Chile Conference 2017)
    formal analysis

2. Approach: “Rechanneling”

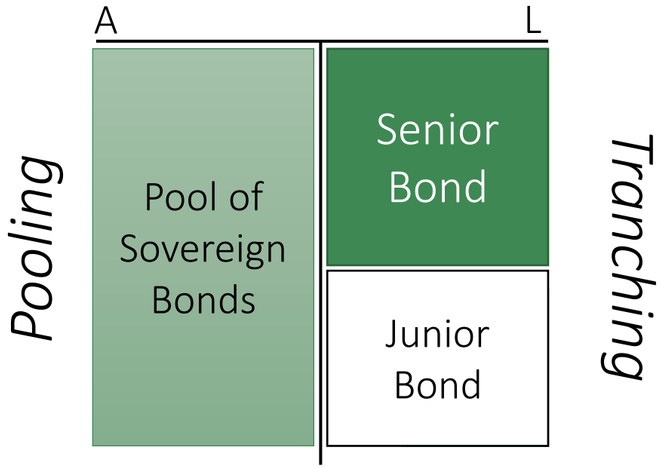
- Address root cause: Safe asset is supplied asymmetrically



2. Approach: “Rechanneling” with GloSBies

- Address root cause: Safe asset is supplied asymmetrically

- Create globally supplied safe asset via pooling & tranching



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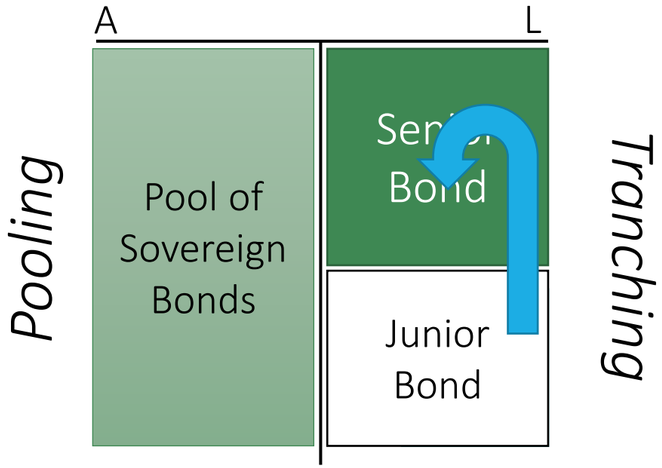


Rechannel:
Instead of cross-border
Across asset classes

- Expand ESBies idea for euro area to EME:
  “SBBS (Sovereign-Bond Backed Securities) for the world”

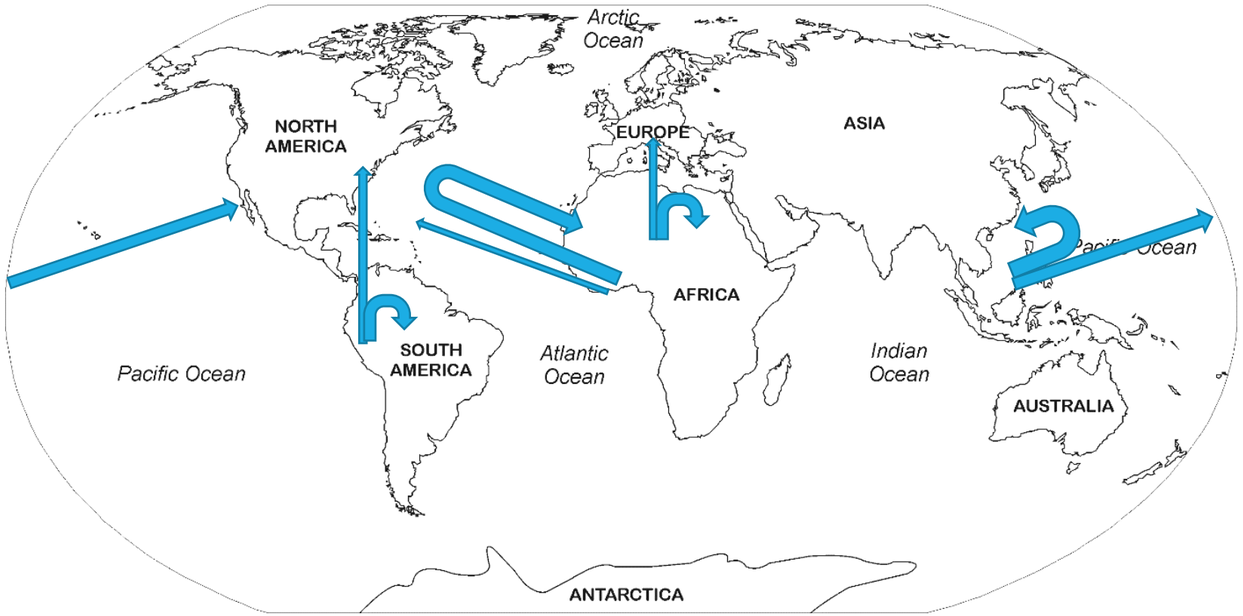
  Euro-nomics group 2011, 2016, 2017

International: Flight to Safety

- Risk-on, Risk-off ➡ Flight to safe asset

- Channels back some of flight-to-safety capital flows

  fewer cross-border capital flows



Self-stabilizing Global Financial Architecture

- High Debt Level
  - Domestic Challenge: Central Bank independence
  - International Challenge: Flight-to-Safety

- Global Financial Architecture
  - Buffer approach interventionistic
    - Reserve holding costly due to cost of carry & distortionary
    - IMF support very limited
    - Swap lines Limited (not all IMF member countries)
  - Rechanneling approach self-stabilizing (autonomous)

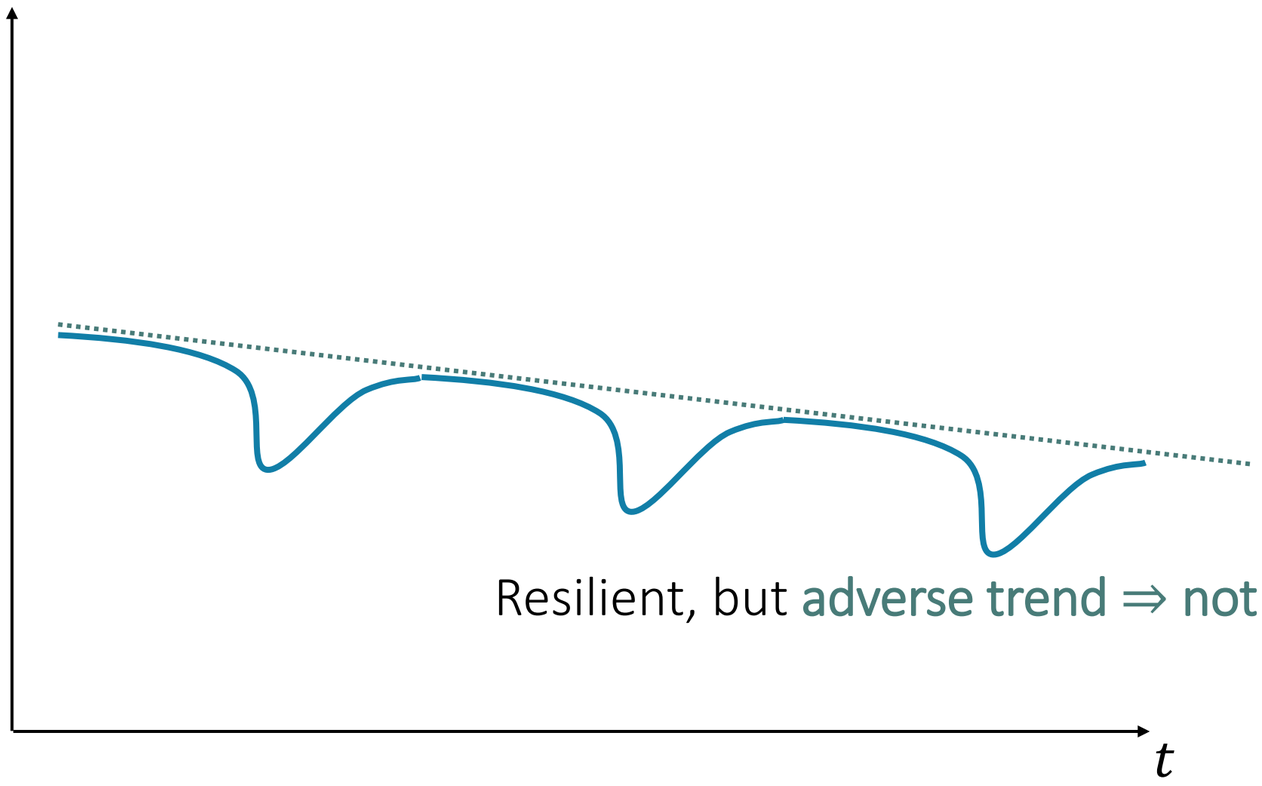
- Tranching completes the market
  - Allows catering to investors groups with different risk attitudes
  - Makes EME less crisis prone

- International pooling and tranching
  - SBBS/ESBies for the world
  - Expands WorldBank/IMF's fire power

Climate Change
Sustainability and Resilience

Sustainability

- **Resilience +** is not enough
- **No adverse trend**



Resilient, but adverse trend ⇒ not sustainable

Climate Change Challenge

- Global Lockdown in 2020
  - Reduction of CO2 emission was minimal

- Three-prong strategy
  - Mitigation - electric vehicles
  - Adaptation – high-tech dikes
  - Amelioration – geoengineering

- Double-externality: R&D and pollution
  - “Climate Clubs”

- Chicken-Egg problem (QWERTY)

Climate change
understanding counterfactual

Resilience strategy is more likely: Let climate change show up

Risks and Climate Change

- Types of risks
  - Directly from climate events
  - Uncertainties of existing climate policies
  - Uncertainties of future climate policies

  } "stranded assets"

- Incorporated in
  - Stress tests
  - Internal Capital Adequacy Assessment Process (ICAAP)
  - Portfolio of insurance companies, institutional investors, asset managers
  - Parallel and integrated climate and macro scenarios

See Brunnermeier and Landau (2021). "Finance, Money, and Climate Change" (Economic Policy)

Risks and Climate Change: Stranded Assets

- Types of risks
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  - Uncertainties of future climate policies

  } "stranded assets"

- "Climate risk dominance" analogous to "financial dominance"

Green finance: Conceptual issues

- Distorting wrong adjustment margin
  - Y = A F(Labor, Capital, Pollution)
    - Distort labor capital ratio -> tilt towards less capital intensive production
    - Risky firms: distort more

- Price on resource vs. price on risk

- Policy uncertainty "tax" (legislation risk premium)
  - Can be Pigouvian – steering towards green
  - No tax revenue – socially waisted in risk premia
    (goes to capital investors to compensate their disutility)

Resilience and Time Inconsistency

- **Fix**, clear policy path that removes policy uncertainties — Ex-ante
  - Pre-specified price of CO2/carbon
  - Removing uncertainty - stirs private investments (given low i)

    Reduces risk premium
  - Pre-specified quantity of CO2 emissions
    - Implemented with fixed tradable permits
  - Interim solution: (Delpla)
    - Tradable permit which can be adjusted to stabilize CO2 price
- **Flexibility** – resilience (adapt, react, re-optimize, …) — Ex-post
  - Esp. when tipping points become apparent

Time Inconsistency

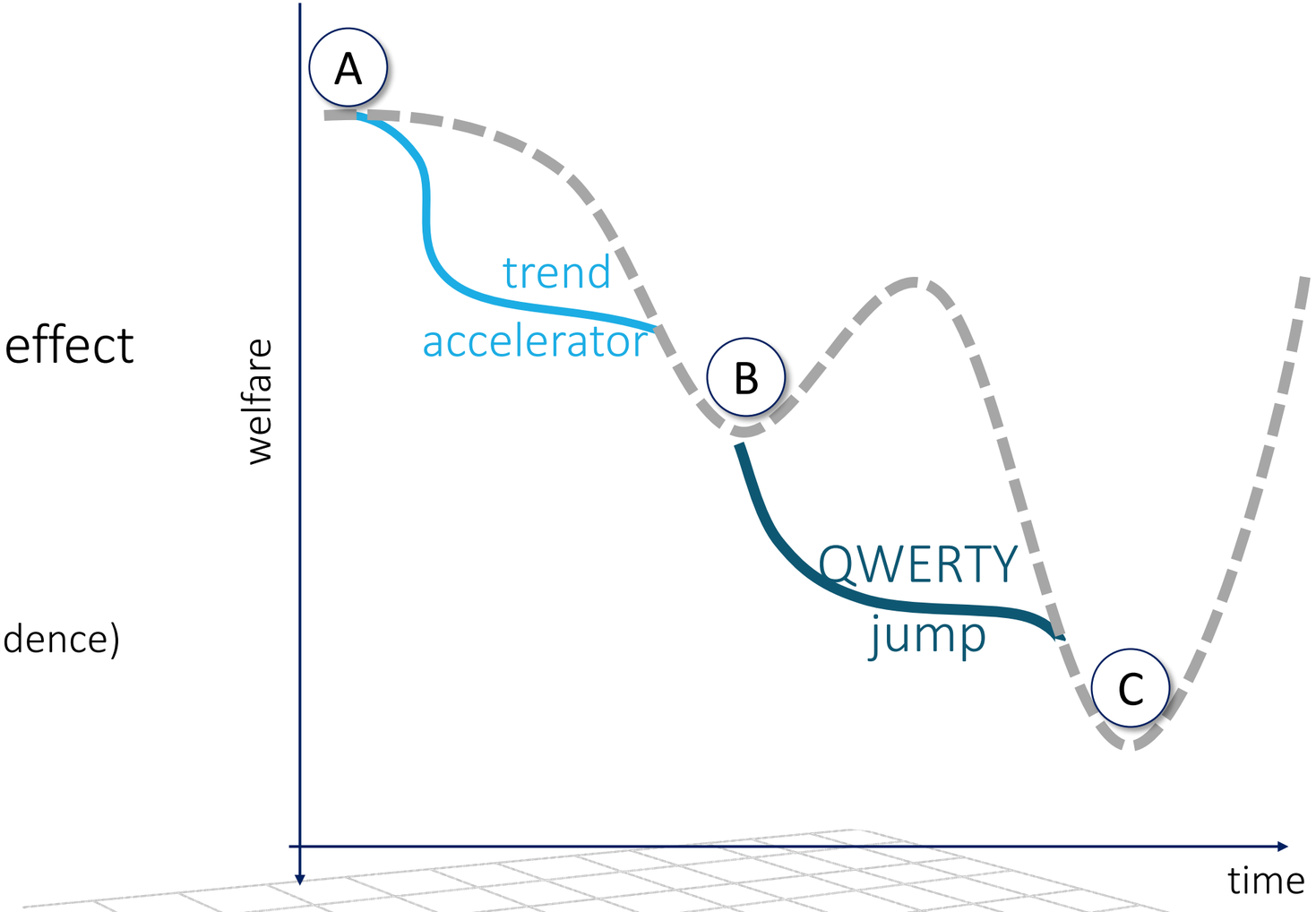
Innovation and Scarring

Digitalization – Life Sciences

Econ New Normal: Innovation and Scarring

- Innovation: Overcoming cannibalization, QWERTY problem, regulatory shackles

  - Tele medicine/Life sciences
  - Home office and real estate donut effect
  - Online learning/conferencing
  - Digital Money
- Scarring:
  - Belief and preference scarring (confidence)
  - Labor market scarring
  - Debt overhang



Covid and **city design**

- Fewer high rise buildings (lift fear)
  - From sky scrapers to office parks
  - Spread out cities ⇒ traffic
- Donut effect due to Covid for metropolitan areas
  - City centers are struggling, suburbs thriving

- Smart cities
  - Digitalization – New form of hygiene management
    (like sewage in 19th century)

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  - Vaccines to return to “new normal”
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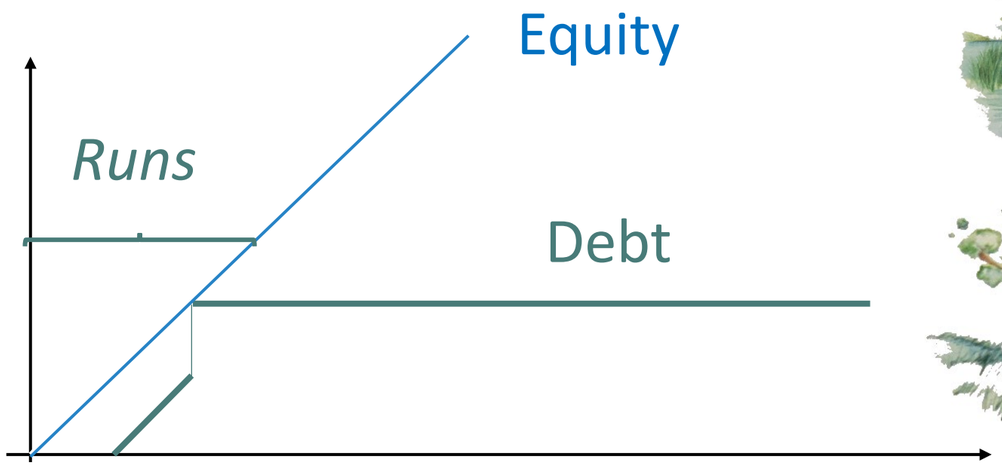

Tax revenue

“robust”/resistant until it breaks through “Robustness barrier”

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A Personal Conjecture

- In an increasingly complex society

- Autocratic societies
  - Seek **robustness** – attractive feature after crises
  - Suppression, minimize movements/disruptions
  - Surveillance
  - Tighten with each crisis … no rebound

Good in

- *Enforcing rules*

- Open/democratic society
  - More **resilient**
  - May appear wobbly when shock hits but internal mechanism allow for rebound
  - Open to mavericks
  - Transparency and more information flow/aggregation

- *Invented universally accepted vaccines*

Outline of Book

- Part I: Society and Resilience

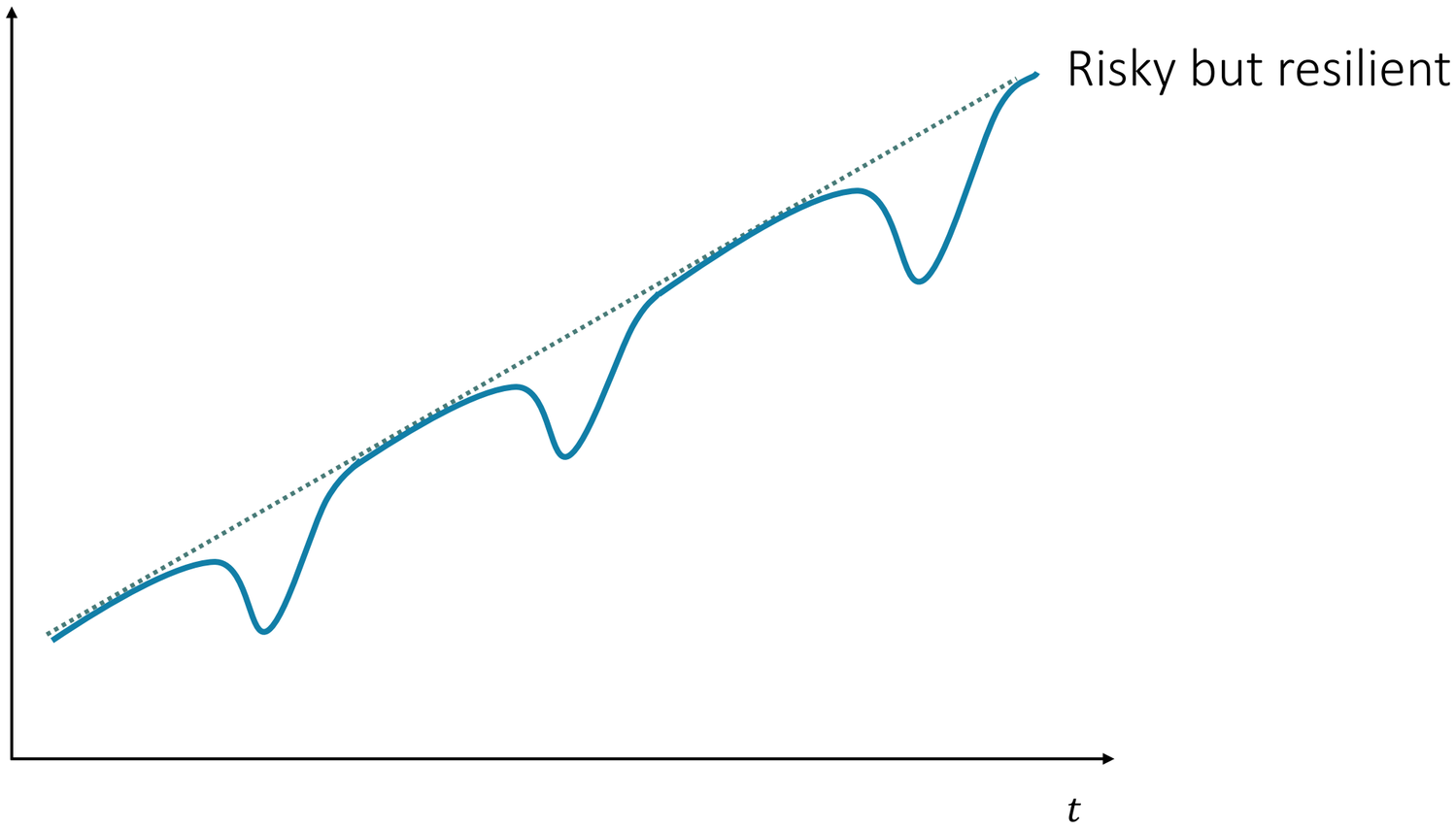
- Part II: 4 Elements of Resilience Management: COVID

- Part III: Macro Resilience
  - Innovation boost vs. Scarring
  - Financial whipsaw
  - Public Debt
  - Inflation whipsaw

- Part IV: Global Resilience
  - EMDE
  - Geopolitics, World order, Global finance, Value chains, Climate

Resilience and the Slope of the Yield Curve

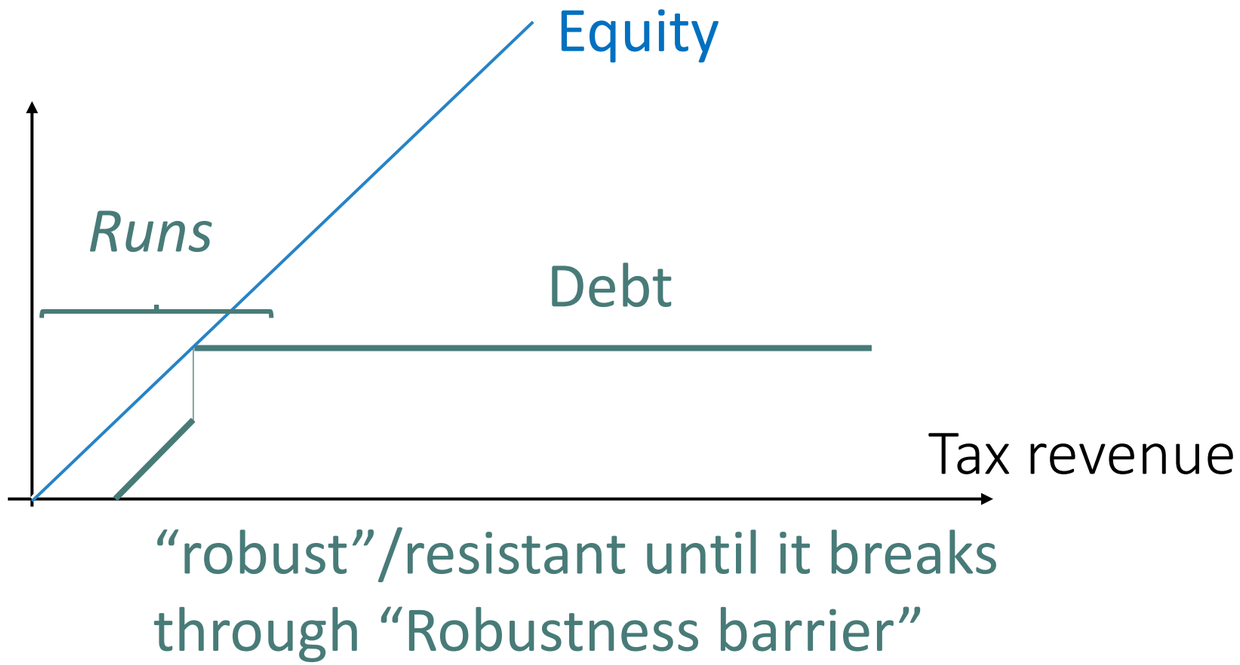
- Resilient path



Resilience and the slope of the yield curve

- Increasing ⇒ resilience (V recessions)
- Flat ⇒ random walk (permanent)

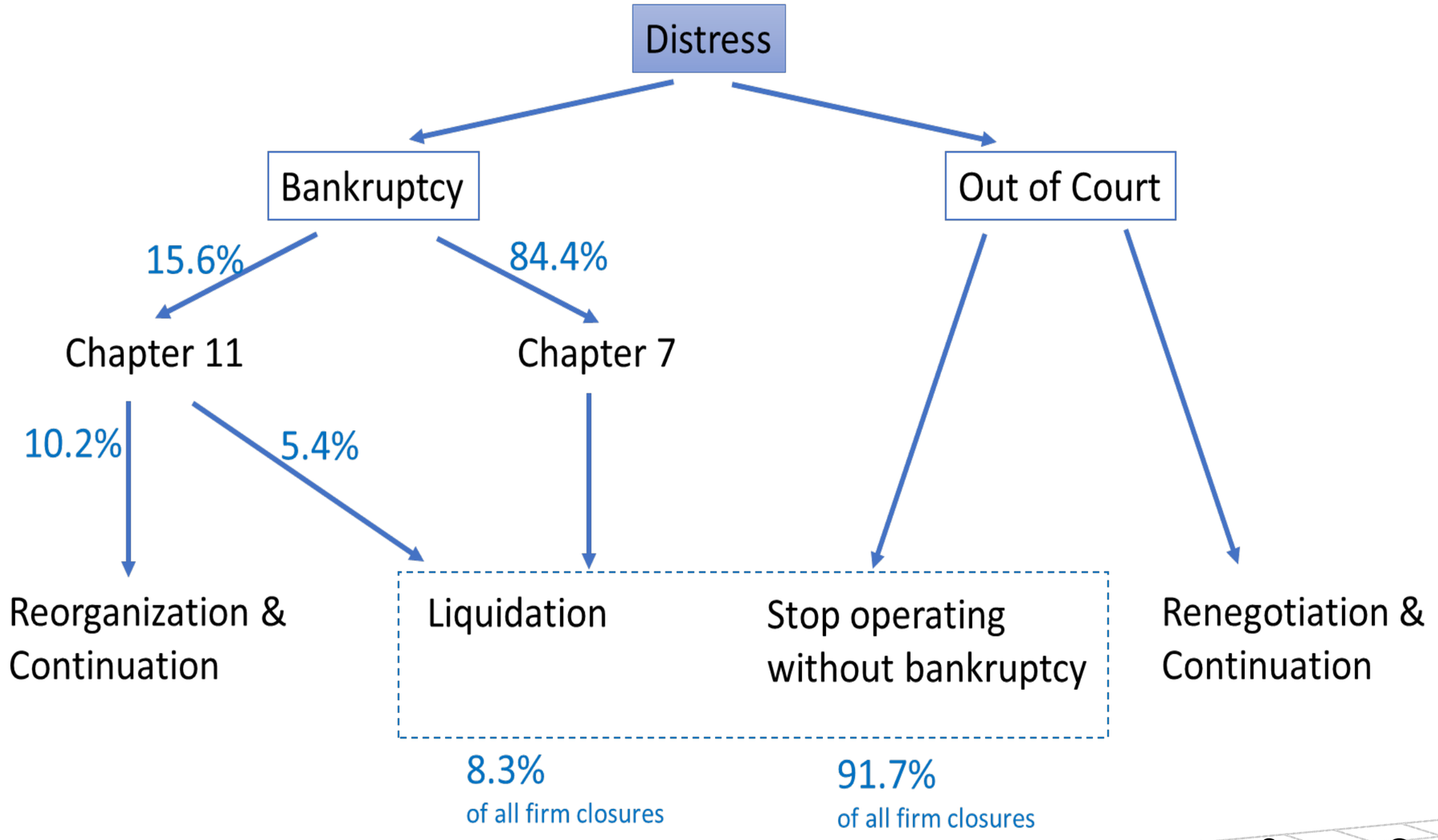
Resilience: Debt vs. Equity



Equity

Resilience enhancer: Bankruptcy Protection

- Bankruptcy in US:



Source: Greenwood, Iverson, Thesmar 2020

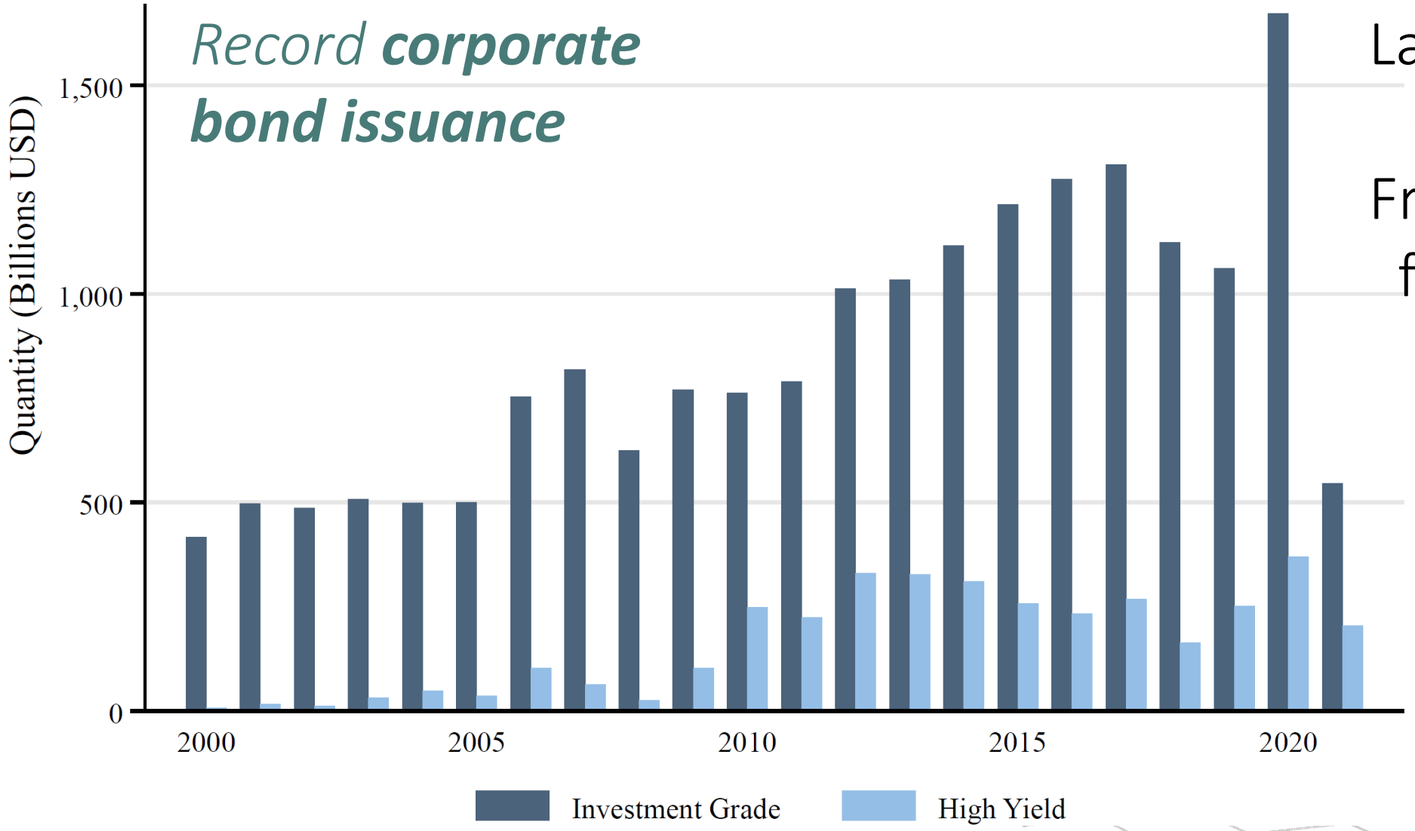
“Financial Markets Whipsaw”

- Robustness — Equity capital = buffer/redundancies
- Resilience: — Efficient Debt Restructuring
  Lender of last resort by central banks

“Financial Markets Whipsaw”: Stocks and Corporate Bonds

- March 2020 shivers followed by strong recovery
  - **Stock market** record heights – IPOs like during NASDAQ bubble
  - **Corporate bond market**

CB: Tail risk removal

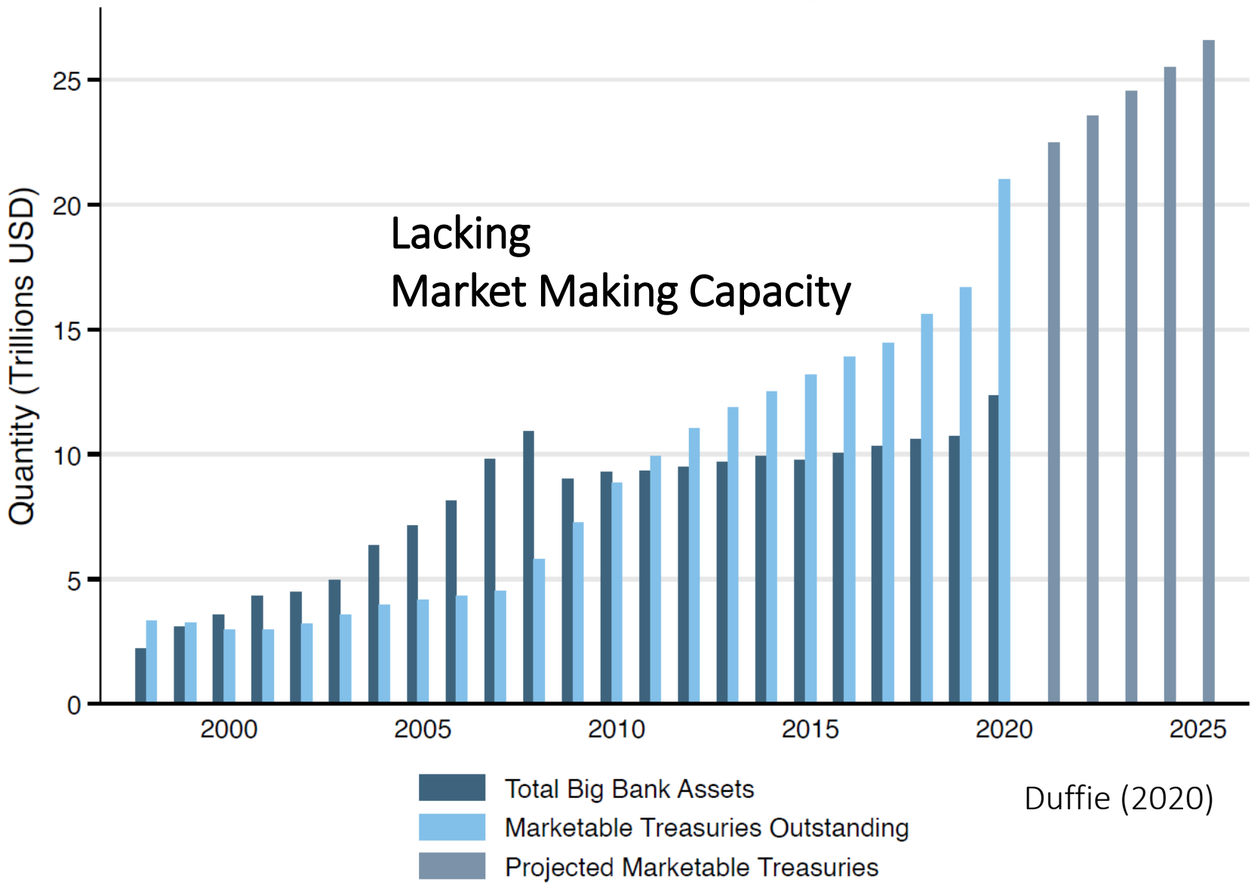


Large corporation paid back bank loans (from drawn credit lines)

Freed up risk-bearing bank capital by banks for lending to SMEs

“Financial Markets Whipsaw”: US Treasury

- March 2020 shivers followed by strong recovery
  - **Gov. bond market shivers** CB: Market maker of last resort to preserve safe asset status
    - What’s a safe asset? Precautionary savings: Asset Price = E[PV(cash flows)] + E[PV(service flows)]
      - Good friend: can sell at high price and low-bid ask spread in crisis times



Duffie (2020)

Fiscal Inflation Link