

# Amplification: conceptual and empirical frameworks

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Macroprudential Stress Test and Policies: A Framework

# Stress testing and crisis frequency

- The average OECD country suffers a systemic crisis once every 42 years (Laeven and Valencia database)
  - The UK once every 17 years, the next one is due in 2024
- This is an overestimate
  - includes relatively non-extreme events, like October 1987 and August/September 1998
- A more reasonable frequency is once every 78 years (2007-1929)
- A stress test scenario should be calibrated to that frequency

# Risk is endogenous

Danielsson–Shin (2002)

- We have classified risk as *exogenous* or *endogenous*
  - exogenous** Shocks to the financial system arrive from outside the system, like with an asteroid
  - endogenous** Financial risk is created by the interaction of market participants

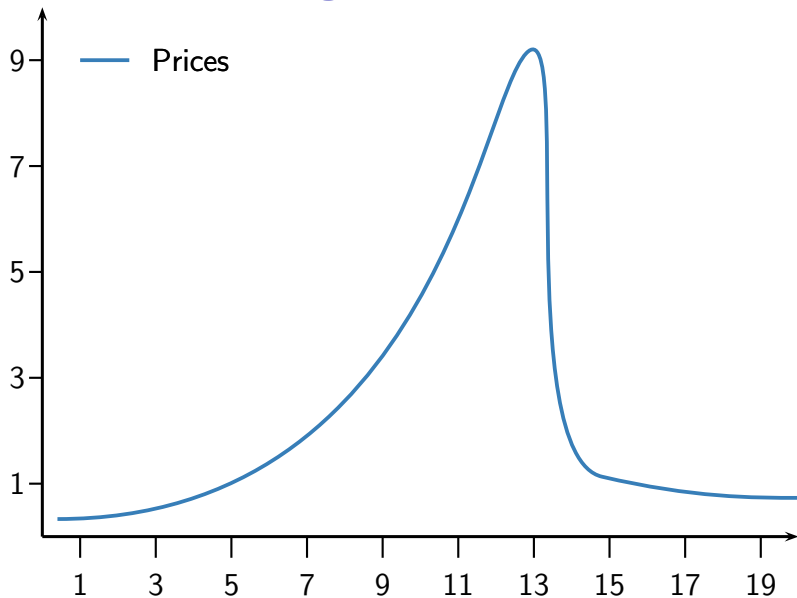
“The received wisdom is that risk increases in recessions and falls in booms. In contrast, it may be more helpful to think of risk as increasing during upswings, as financial imbalances build up, and materialising in recessions.”

Andrew Crockett, then head of the BIS, 2000

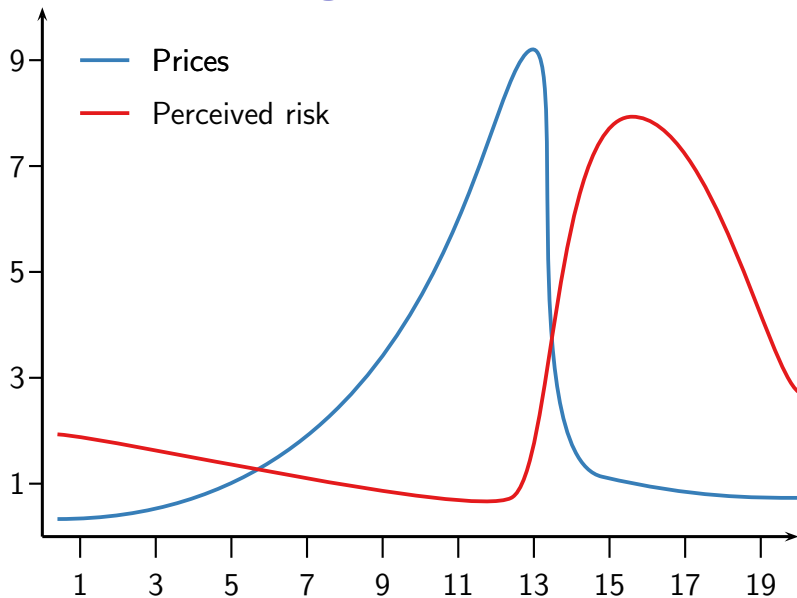
# The two faces of risk

- Market participants are guided by a myriad of models and rules
  - e.g. capital, mark-to-market, leverage, many dictate short-termism
- Prices don't follow random walks in adverse states of nature — They become partially predictable
- Financial system is not invariant under observation
- We cycle between virtuous and vicious feedbacks
  - risk reported by most risk forecast models — *perceived risk*
  - *actual risk* that is hidden but ever present

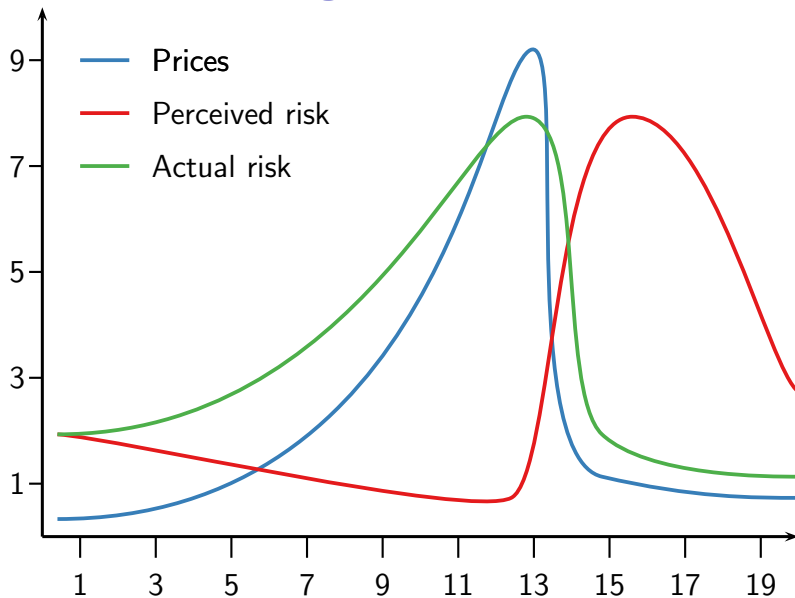
# Endogenous bubble



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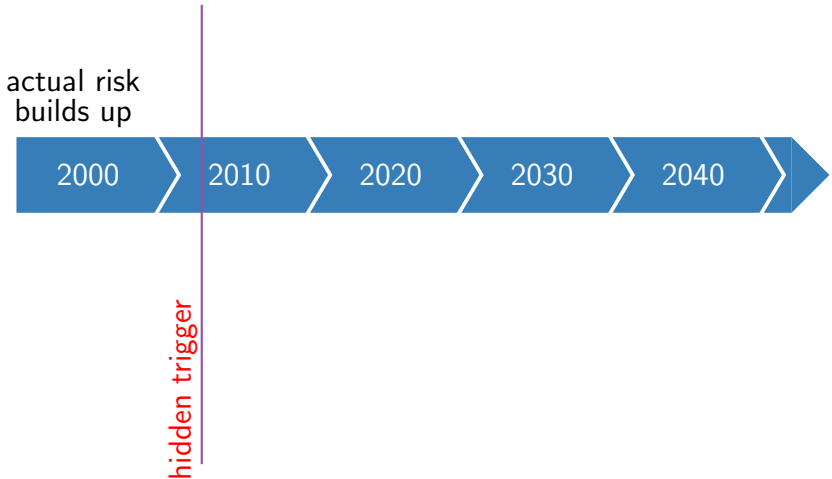
# The 42 year cycle of systemic risk

actual risk  
builds up

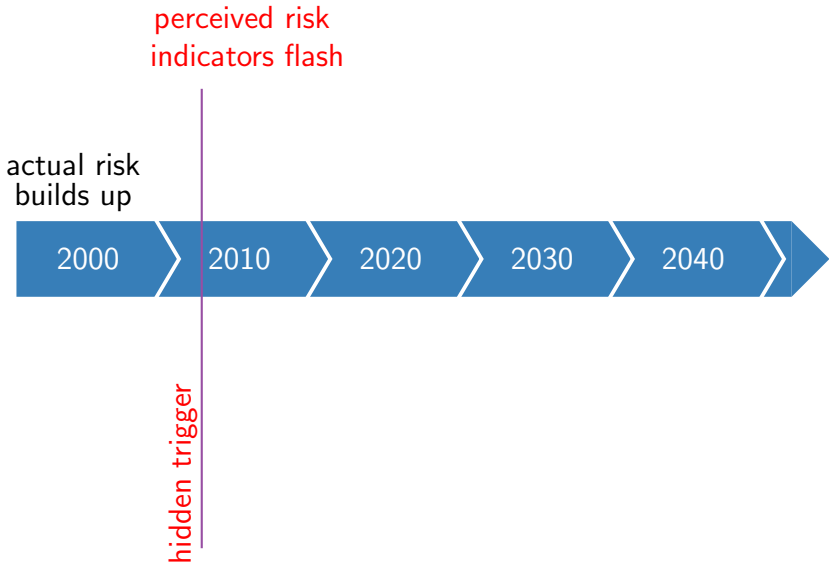




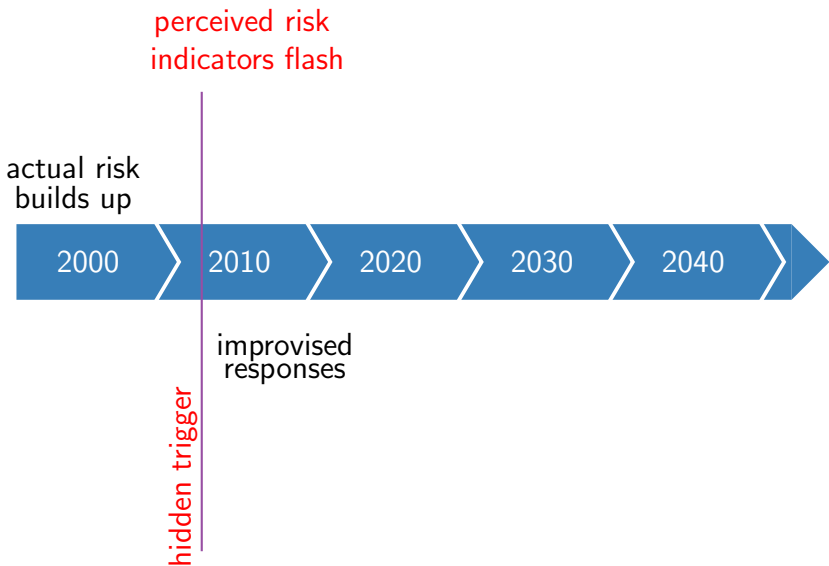
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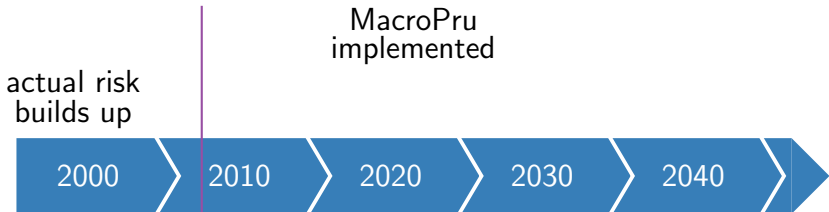


# The 42 year cycle of systemic risk



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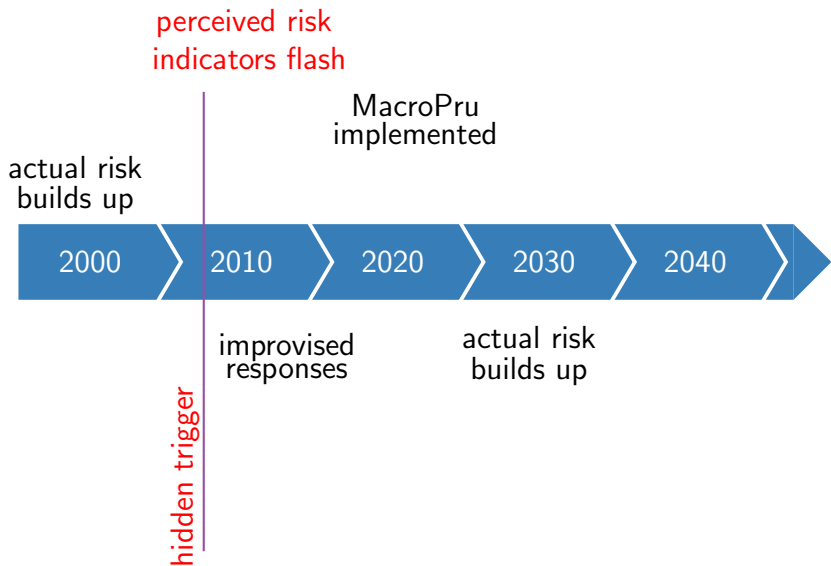
perceived risk  
indicators flash



hidden trigger

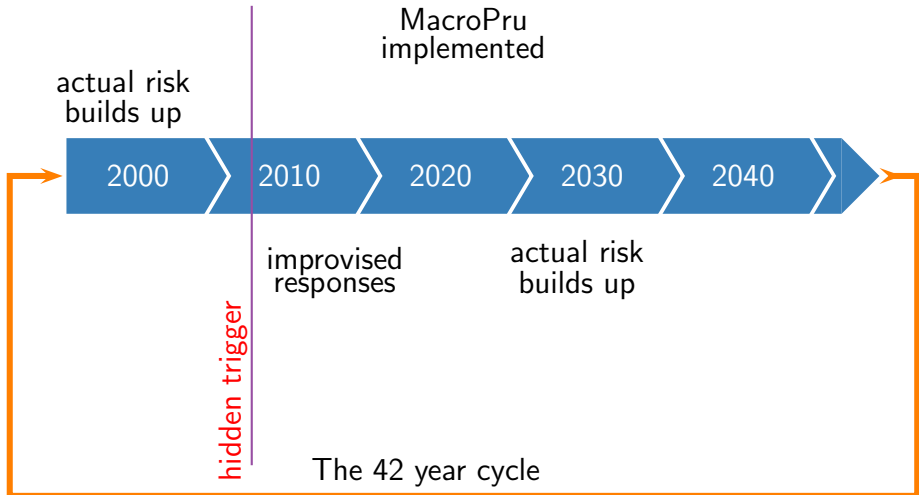
improvised  
responses

# The 42 year cycle of systemic risk

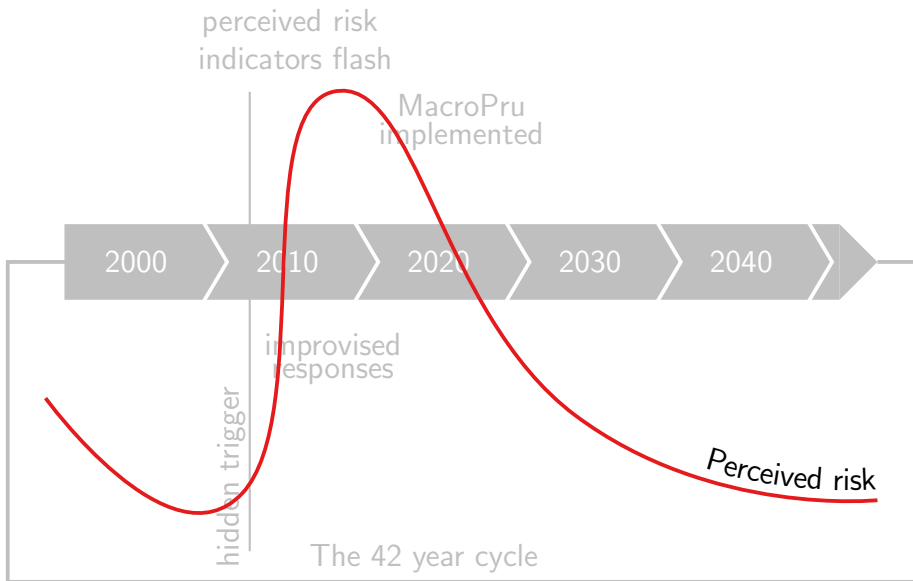


# The 42 year cycle of systemic risk

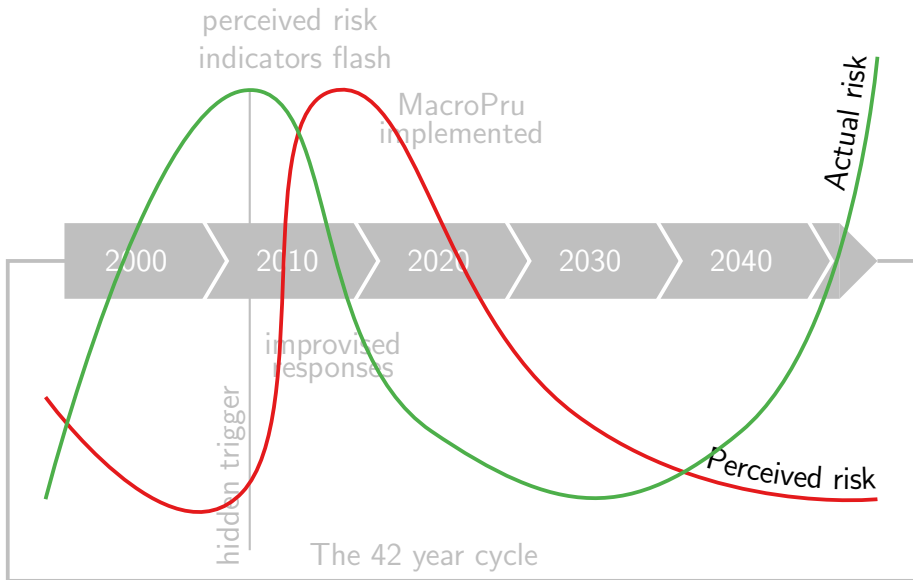
perceived risk  
indicators flash



# The 42 year cycle of systemic risk



# The 42 year cycle of systemic risk





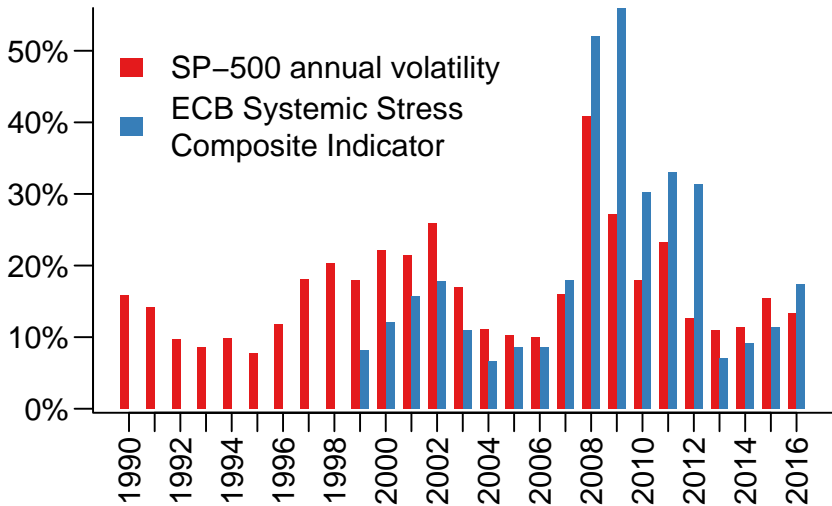
# Implications for stress test design

## Triggers and amplifiers

- There is an infinite number of triggers and a very small number of amplification mechanisms
- What matters is the *unknown unknowns*
- We prepare for known risk
  - The US stock market suffers a \$200 billion loss and nobody is concerned
  - The US has a \$200 billion loss in subprime mortgages, and a global crisis ensues
- Stress test designs needs to be based the hidden amplification mechanisms

# Implications for stress test design

When decisions are made



# How volatility affects risk-taking and crises

Danielsson, Valenzuela and Zer (2016) “Learning from History: Volatility and Financial Crises”

- Economic agents perceive a low risk environment as a signal to increase risk-taking
- Which eventually may lead to a crisis
- Volatility *does not* predict crises
- Volatility below its trend significantly increases both
  - future risk-taking (credit-to-GDP)
  - and the probability of banking crises *half a decade or longer* into the future

# Government accounting

- Gandrud and Hallerberg (2016) *“Keeping Costs in the Shadows: The Resolution of Financial Crisis and the Rules of the Game”*
- Government accounting rules vary considerably
- A particular intervention might be classified as an expense on the central bank balance sheet in one country but not another
- This means that a particular action might be called a bailout in one country but not in another
- Consequently, government accounting rules determine how governments choose to intervene
- A stress test should take this into account

# The potential for procyclical macropru

VoxEU.org (2016) Jon Danielsson, Robert Macrae, Dimitri Tsomocos, Jean-Pierre Zigrand

- Minsky argument;
- Homogenization of the financial system;
- Most current indicators of systemic risk, only identify perceived risk;
- Danger of reacting with some time lag to the postulated indicators that are themselves measured with a time lag;
- When macropru policy is known to the market, banks will schedule risk-taking around indicators, stress tests and expected policy reaction;
- The authorities should be willing to reduce aggregate risk-taking and leverage during booms and increase it in times of stress.

# All of these objections call for a procyclical policy response

- “Banks are failing because they already extended too much credit”
- “Surely bank capital needs injections rather than allowing the banks capital to absorb losses”
- “Helping the City to increase lending now leads to even bigger moral hazard”
- “Macropru is discredited because it was supposed to have prevented this credit event in the first place, why should it do better this time?”

# Types of data

- Accounting data
  - Infrequent, backward looking, measurement errors
- Market data
  - Reflects ex-post outcomes, not the ex-ante environment when decisions were taken years earlier
- Flow data
  - Highly aggregate and measured with lags
  - Efforts to measure asset manager flows between asset classes and regions
- Supervisory level data
  - Probably contain most needed information
  - But may not be processed, or inconsistently recorded
  - Often not available for macropru modeling
  - Even then geographically restricted