

STRESS TESTING

ECB JMCB 50 Conference on Financial intermediation,
regulation and economic policy

MARCH 28-29, 2019

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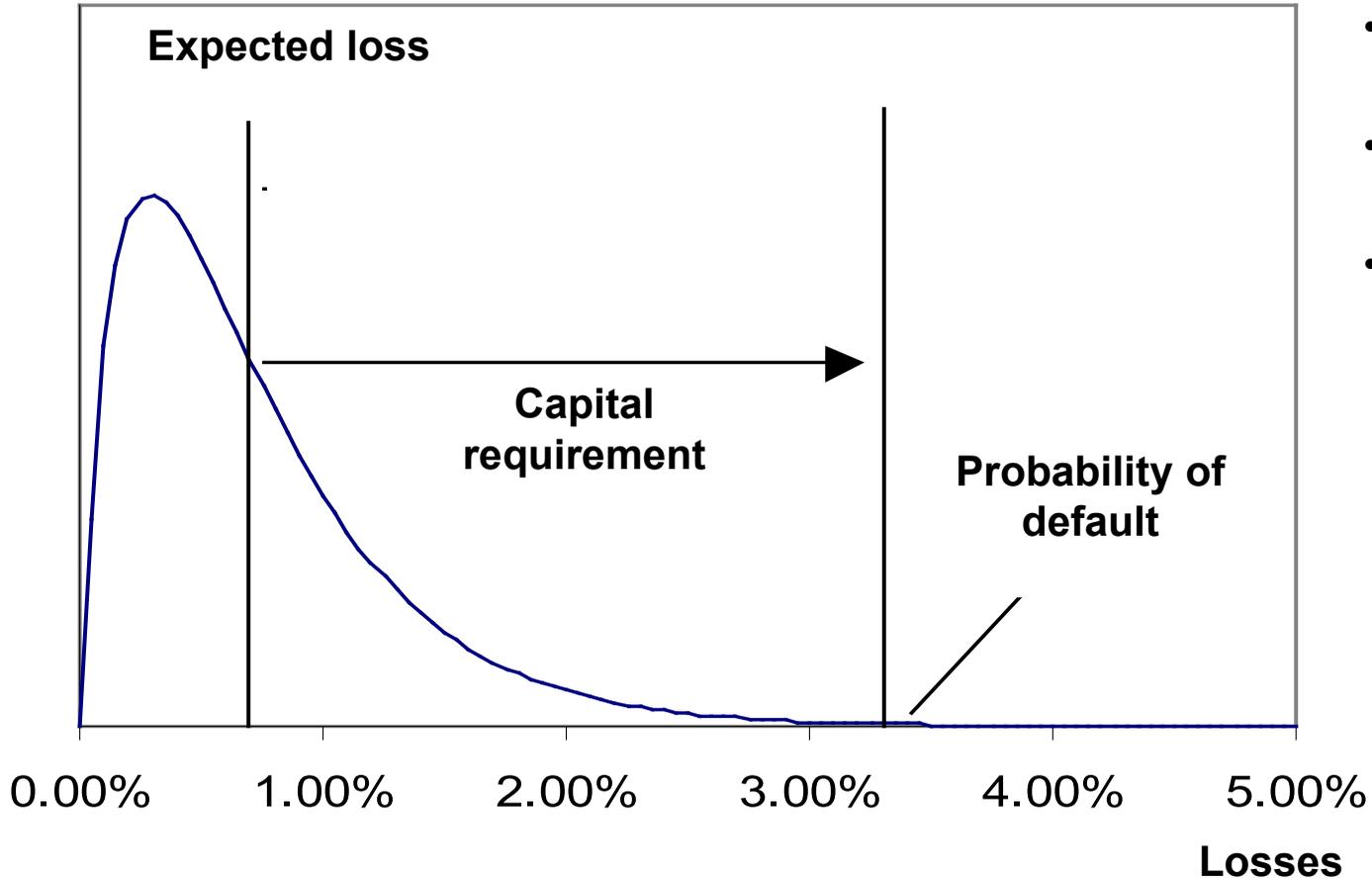
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Overview

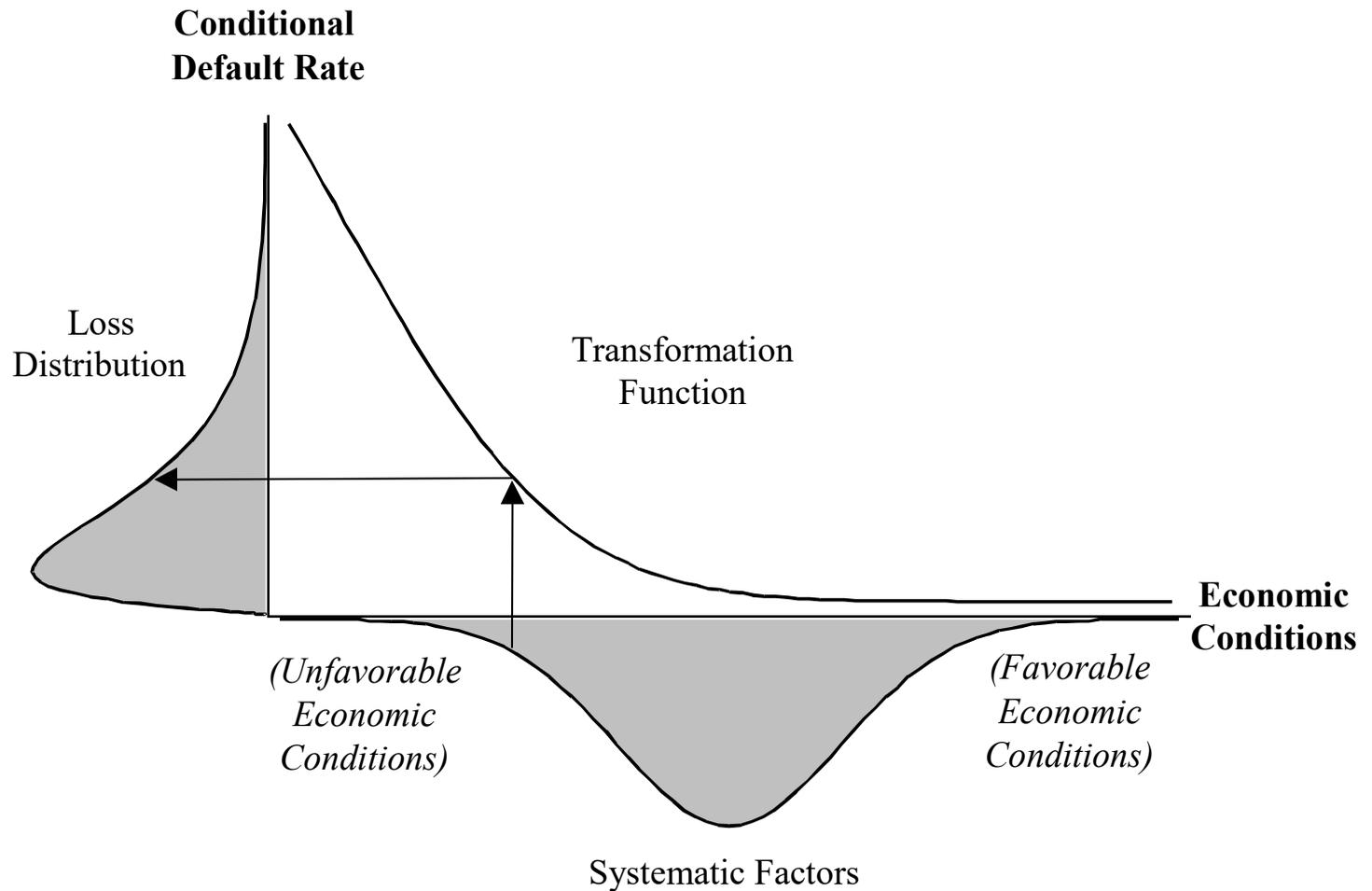
- Pre-crisis approach to capital adequacy
- The financial crisis and how I learned to love stress testing
- What makes a good stress scenario?
- Post-crisis approach to capital adequacy
- Where do we go from here?

Pre-crisis approach to capital adequacy



- What is the desired survival probability?
- What is the evaluation horizon?
- What are the portfolio characteristics?

Mapping general economic conditions to bank losses



Source: Koyluoglu and Hickman (1998)

Macro-prudential stress testing started as a crisis response tool



Failure of old regime

- US and UK banks that failed during the crisis were considered “well capitalized” based on the existing standards
- Problems weren’t limited to poor risk assessment (RWA), but also weak capital
- Regulators needed to do something different and big – then show the results and how they got there – to regain the market’s and the public’s trust

Enter stress testing

- Exercises sought trust and transparency
- Scenarios had to be easy to understand and credibly severe
- Needed government capital backstop in case private sector capital was not enough
- Importantly, regulators developed their own models to project losses and profits (extremely important ability to form your own view)

New world

- Stress tests are becoming the primary tool in regulators’ macro-prudential armory
- Results have produced new information about bank health and asset quality
- Information in US was new and credible
 - 10 banks needed a total of \$75 BN in capital
 - Transformed “uncertainty” into “risk”
 - Succeeded as capital holes were credibly and quickly filled

Why do we like stress testing?

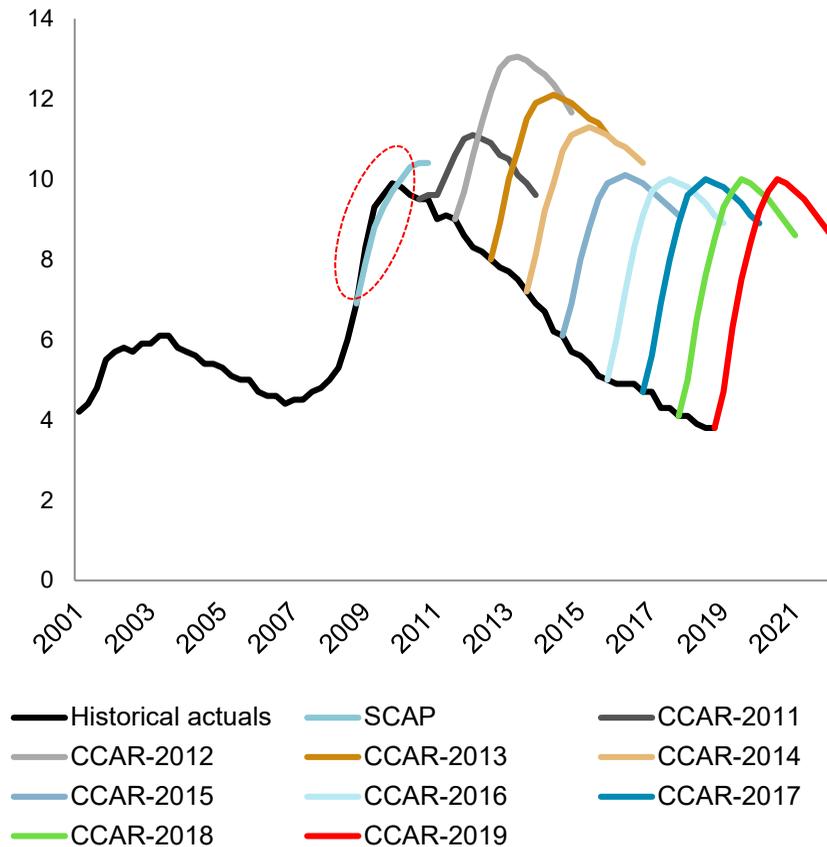
- Tangible: economic downturns and financial market shocks are something everyone can understand and imagine
- It forces important and constructive discussions among bankers as well as policymakers and regulators
 - What are my risks and vulnerabilities?
 - Bank: products, markets, clients, segments, countries, ...
 - Regulator: which banks or type of banks should I target?
 - What states of the world would expose those risks and probe those vulnerabilities?
 - How severe should I make the scenario?
- What is your risk appetite? How severe should the storm be that the bank or banking system should survive?
 - A bad recession, a stock market crash?
 - 2008 Financial Crisis?
 - Great Depression?
- How much capital should they have post stress? How strong do I want my bank (or my banking system) to be coming out of the financial storm?
- Loss and profitability dynamics

Comprehensive: all exposures, all risks

Comparing U.S. stress testing scenarios: SCAP (2009), CCAR (2011-2019) Unemployment Rate, Real GDP Growth

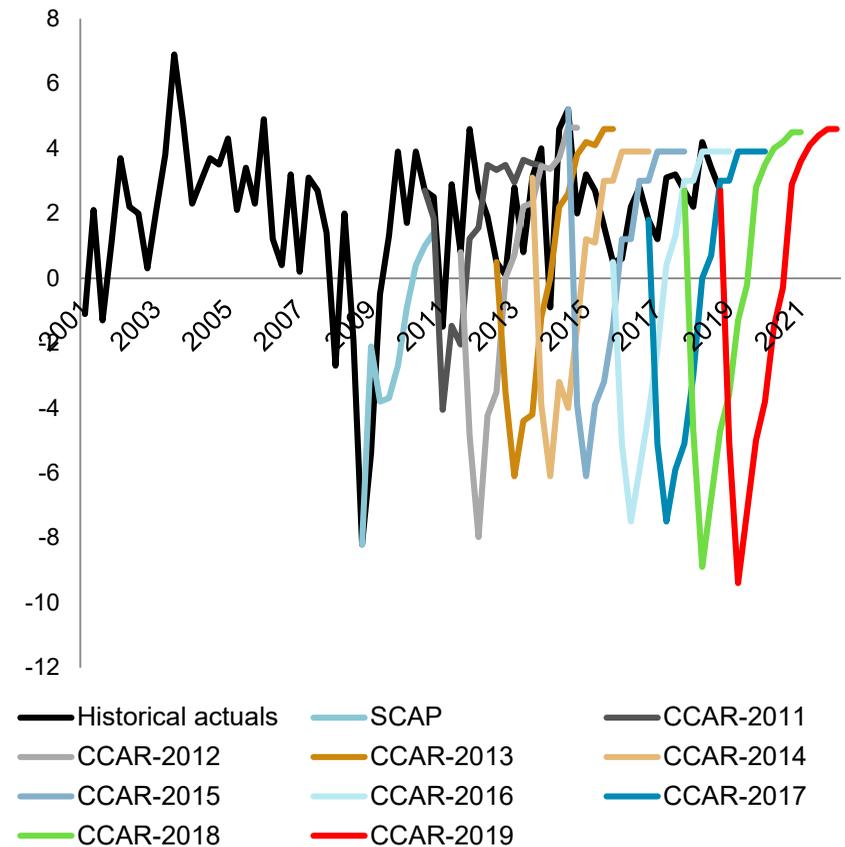
Unemployment Rate (%)

Severely Adverse scenarios vs. historical observations



Real GDP Growth (%)

Severely Adverse scenarios vs. historical observations

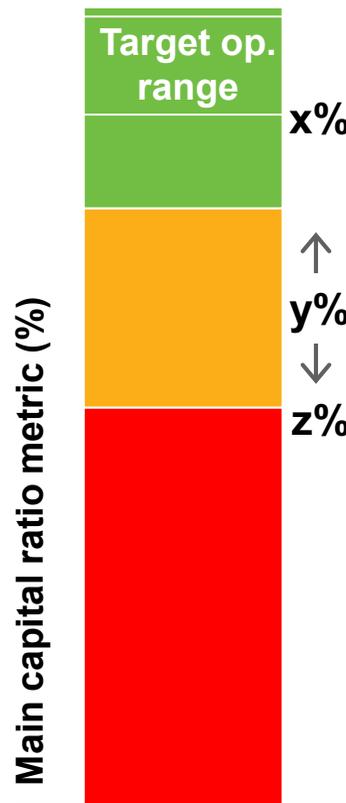


Source: Fed SCAP and CCAR-2011-2019 scenario disclosures

Note: For SCAP-2009, CCAR-2011 and CCAR-2012, only baseline and adverse scenarios were released. Therefore, adverse scenario data for these years is shown on the right-hand side graph for comparison to severely adverse scenario data for CCAR-2013-2019

Post crisis capital adequacy is a minimum and a series of buffers – available for consumption under stress

Deconstruction of a capital ratio



Target operating range

- Not too much capital – not shareholder friendly
- Not too little capital - as to be operating beyond risk appetite

Buffers: stress loss, GSIB, etc.

- What you are comfortable to consume during a period of stress for a range of scenarios

Post-stress min

- Minimum amount needed to convince the market to fund you after a stress event

Where do we go from here?

- Stress testing as a mostly microprudential supervisory tool in peacetime
 - Supervisors are at an informational disadvantage vis à vis the banks they supervise
 - Concurrent stress testing leverages their 1 advantage: ability to compare across banks
 - Obviously useful quantitatively, but also very useful qualitatively
 - Risk management practices
 - Modeling capabilities and model risk management
- What does the current risk picture look like, and what does it tell us about scenario design?
 - Top-10 lists from bank CROs is dominated by nonfinancial risks
 - Cyber, technology, vendor or third-party, political, climate
 - After prolonged financial peace, banks should be well capitalized and more resilient than before – makes scenario design harder
 - Supervisors can harm but they can help – a lot!
 - Harm: good intention of promulgating better practices results in very few practices
 - Help: aggregate risks identified by banks to find common vulnerabilities
 - aggregating microprudential risk information paints macroprudential picture!

Thank you!

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