Foundations of System-Wide Stress Testing

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Introduction

Stress tests:

- Evaluate resilience against financial shocks
- Key post-crisis regulatory innovation

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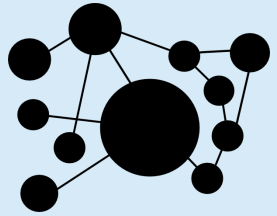
Single-Institution
“Microprudential”



System-Wide
“Macroprudential”

✅ Initial shock

❌ Endogenous shock amplification

“Need a robust and [easily] implementable framework”

A “robust and implementable framework” for system-wide stress tests

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- Existing **frameworks** and **models** fail to meet the challenge:

Framework shortcomings

- ❌ Highly tailored to **specific settings**
- ❌ **Not flexible** to new implementations
- ❌ ‘**Reinventing** the wheel’

Modelling issues

- ❌ Multiple, simultaneously operating **amplification mechanisms**
- ❌ **Heterogeneity** in institutions, contracts, (regulatory) constraints, behaviours…

Objectives & Contributions

<u>Framework</u> for system-wide financial stability analysis

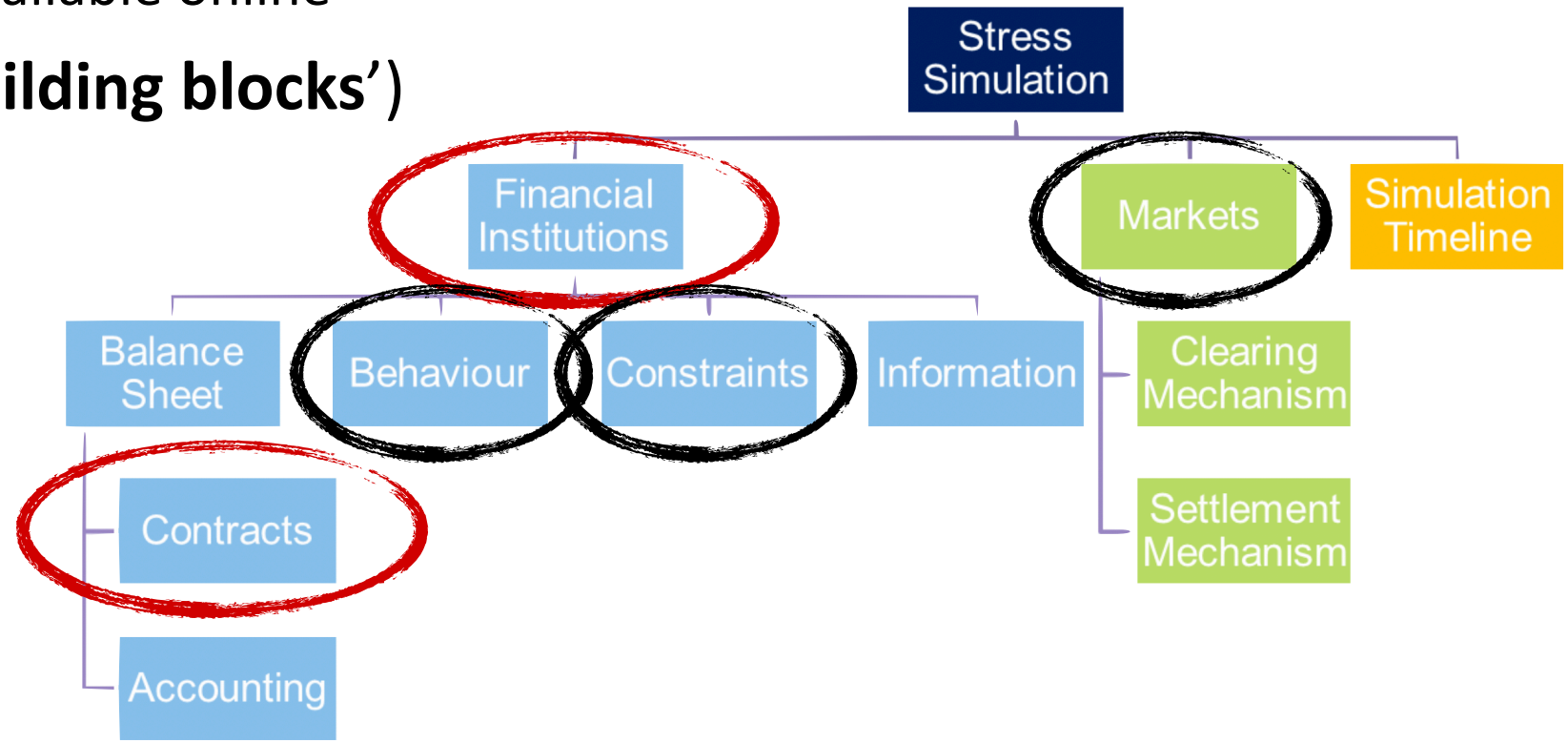
- A **generic method** to model:
  - Interacting **contagion** mechanisms
  - Banks and **non-banks**
  - Multiple interacting **constraints**
- A **flexible**, **modular**, **scalable** framework

EU <u>implementation</u> of a system-wide stress test and policy experiments

- **System-wide analysis** and **calibration**
- Centrality of **“usable capital”**

Generic System-Wide Stress Testing

- **Python**-based **system-wide simulation engine**
  - Simulation engine also available in **C++**
  - Open-source **library** available online
- Flexible ‘ontology’ (‘**building blocks**’)



Implementation: EU Financial System

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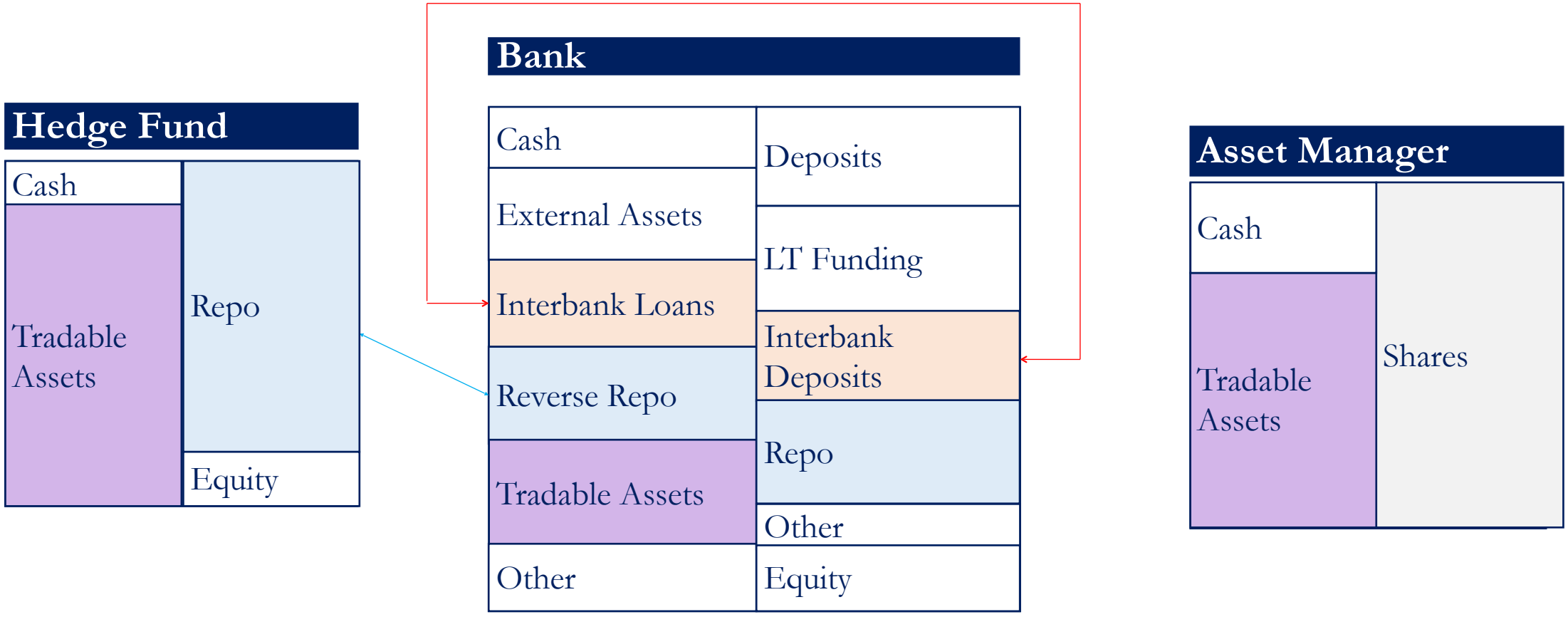
Initial adverse shock

- **European Banking Authority** 2018 Stress Test Scenario
- Used as a **microprudential benchmark**

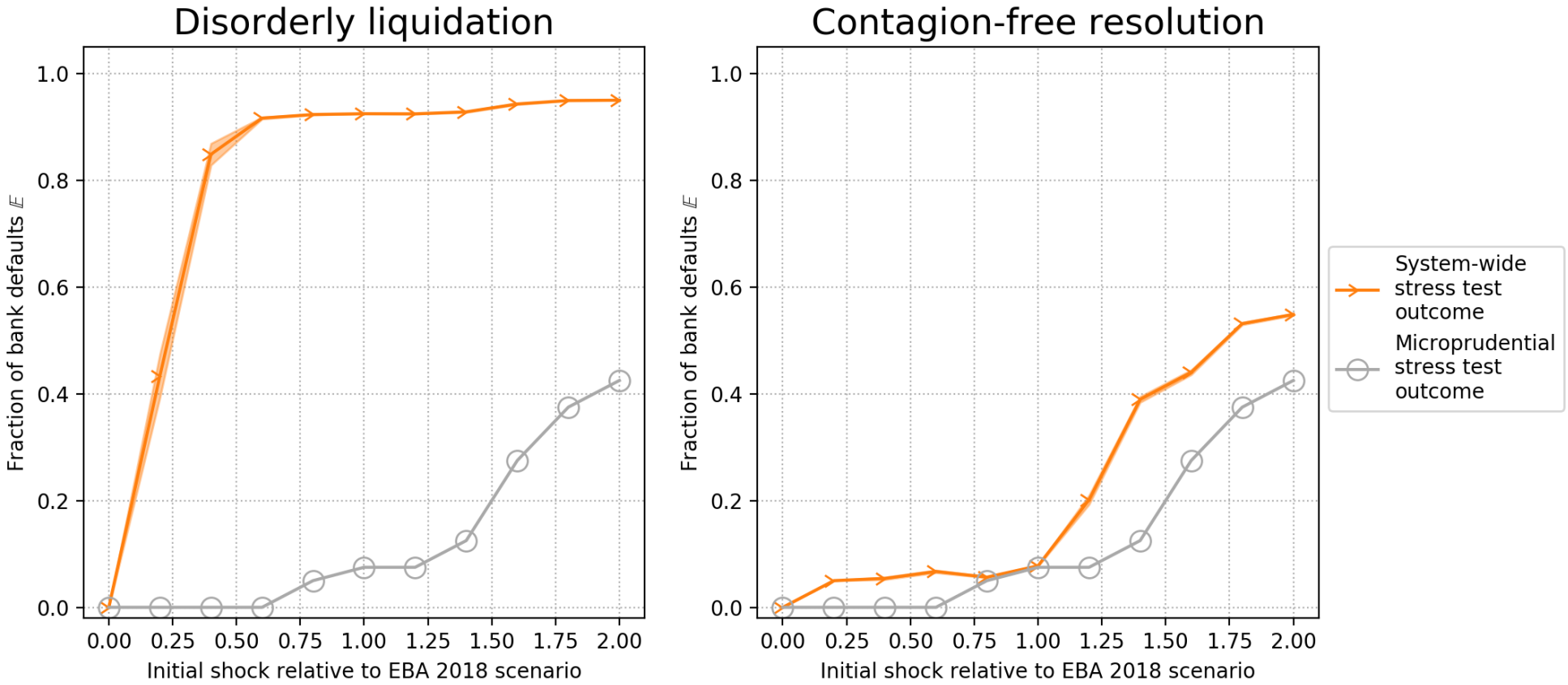
Five building blocks

- **Financial institutions:** banks (42), hedge funds, asset managers
- **Contracts:** tradable assets, interbank contracts, repo, other
- **Markets:** price formation via price impact function
- **Constraints:** risk-weighted capital ratio, leverage ratio, liquidity coverage ratio, margin call, repayment obligations
- **Behaviours:** contractual and regulatory obligations

Implementation: Institutions and Interconnections

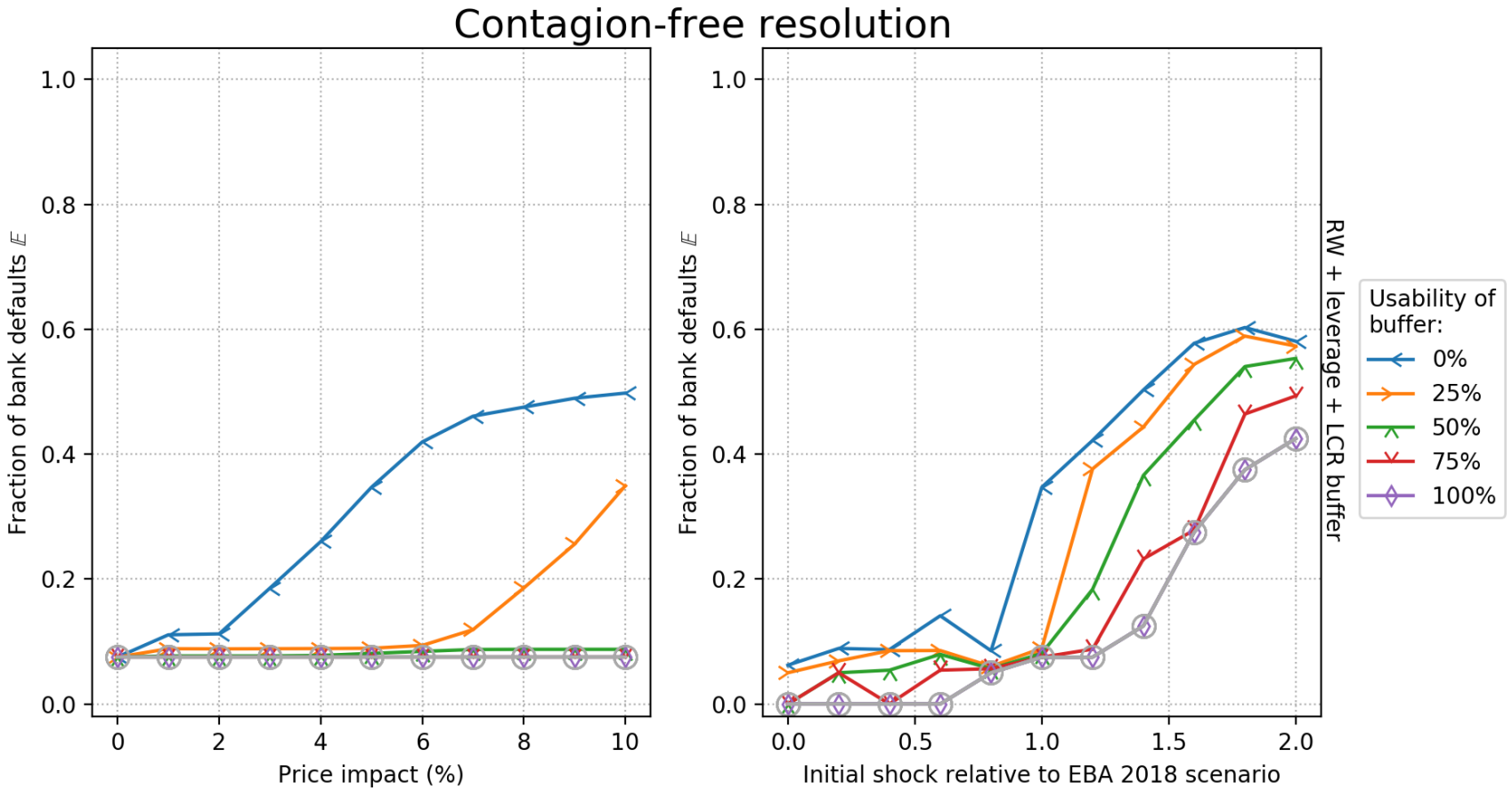


Policy experiment 1: From Micro to Macro: A Macroprudential Overlay to the EBA 2018 Stress Test



- Key finding: The financial system may be stable or unstable given a microprudential stress test outcome, depending on its shock-amplifying tendency. Therefore, microprudential stress tests are poor predictors of stability and system-wide stress test are necessary.

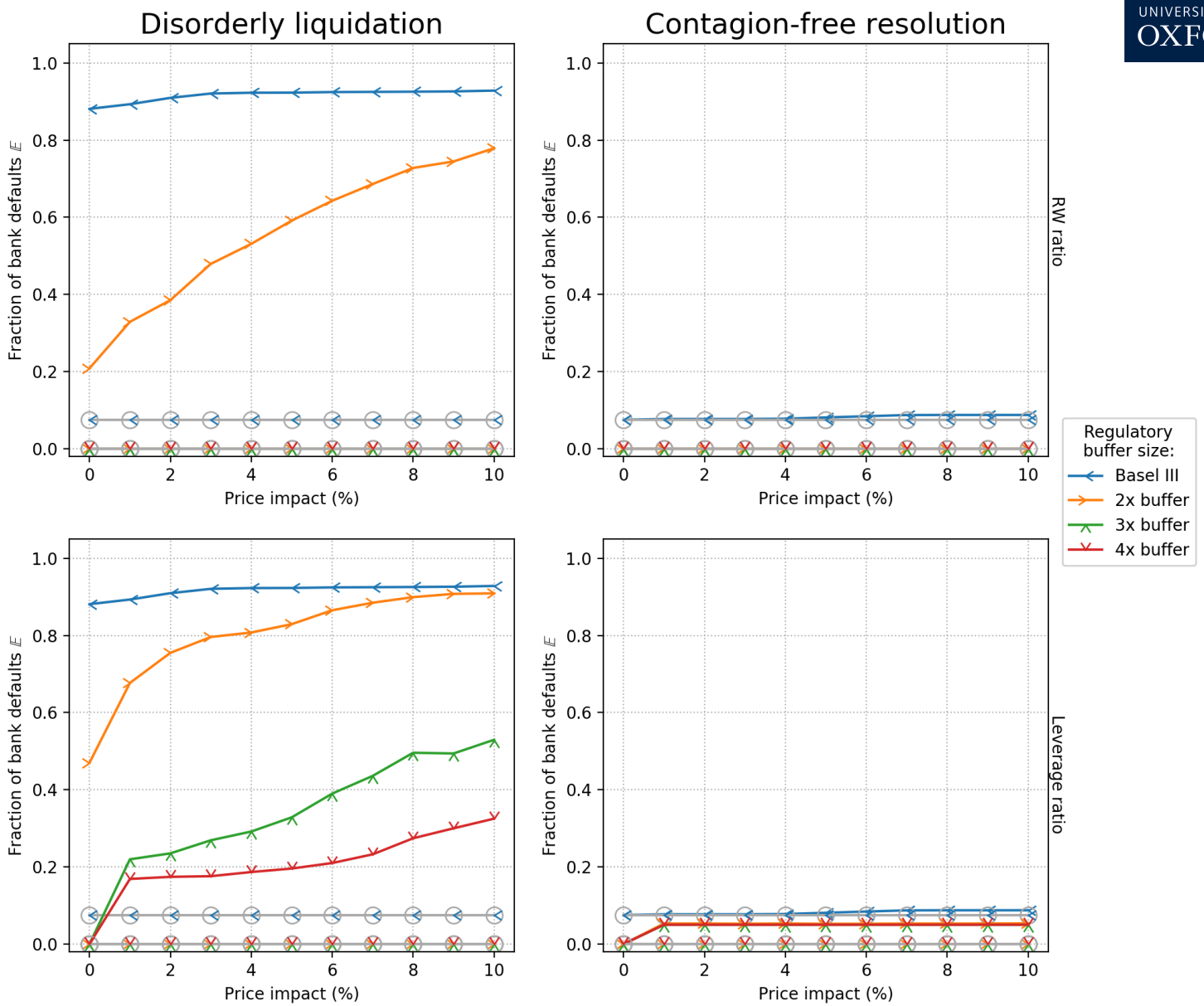
Policy Experiment 2: `Usability' of Buffers and Contagion



- Key finding: Systemic risk decreases in an increasing `usability' of regulatory capital buffers.

Policy Experiment 3: Calibration of Buffers with System-Wide Stress Tests

Key finding: The size of regulatory buffers needed to confine systemic risk may be underestimated if calibrated with microprudential stress tests, which do not capture system-wide amplifications, rather than with system-wide stress tests.



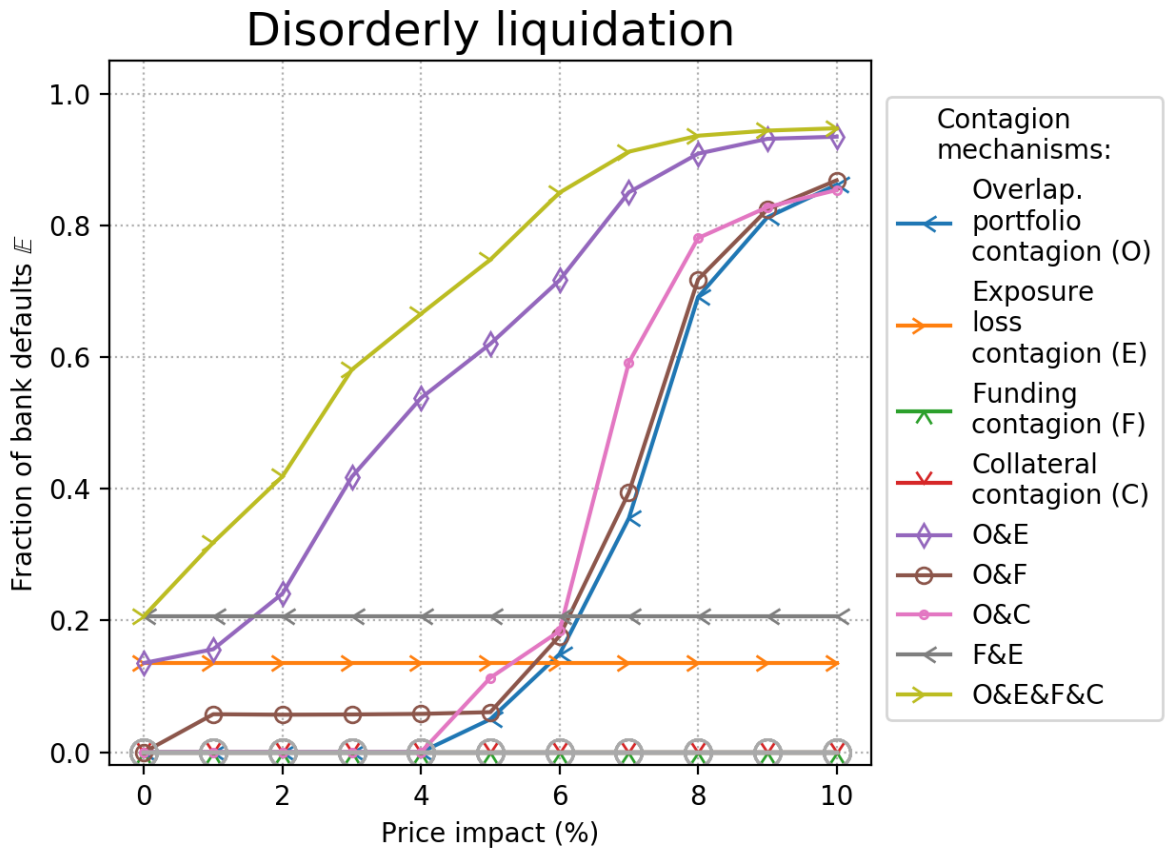
Policy Implications and Discussion

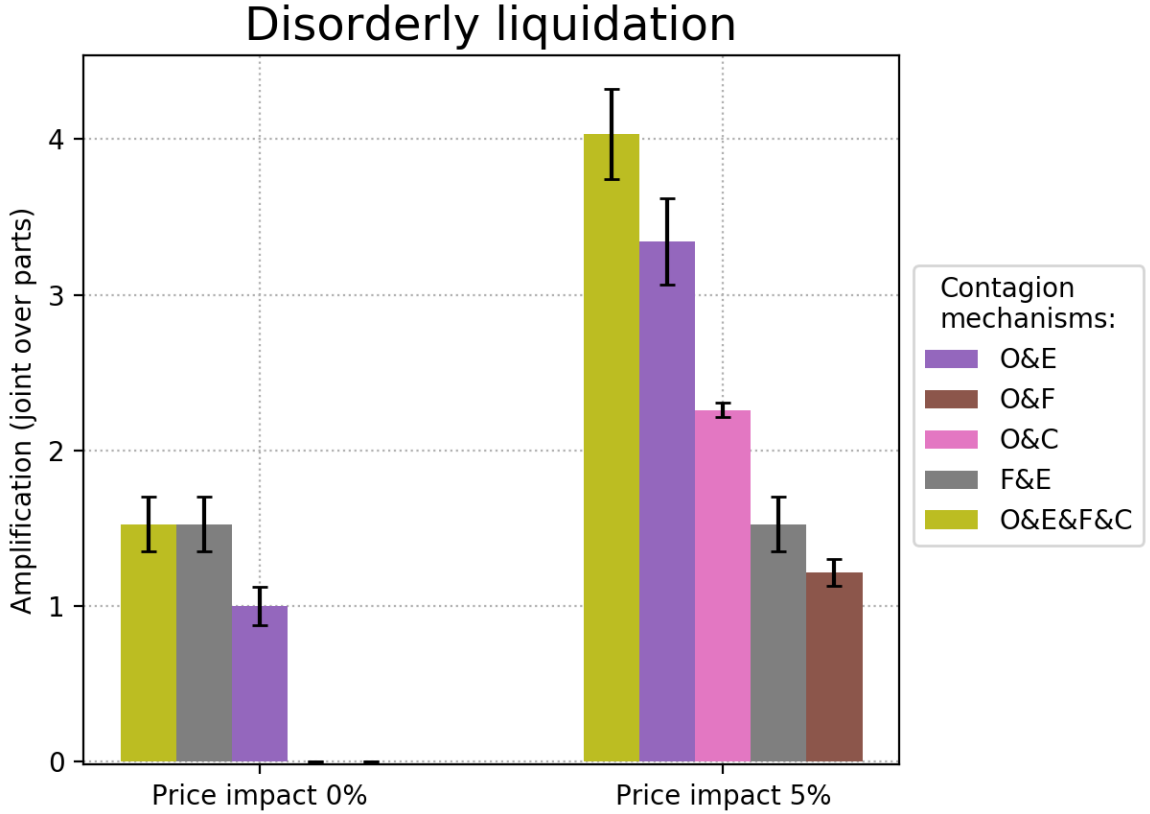
1. System-wide stress tests are **necessary** complements to microprudential stress tests to assess systemic risk – and further research in this area continues to be critical.

2. The **usability** of capital is key to systemic resilience.

3. The **calibration** of capital buffers should explicitly take into account system-wide dynamics.

More in the paper…
Amplification of Contagion Mechanisms





- Key finding: Contagion mechanisms may mutually amplify systemic risk. The degree of amplification is heterogeneous in the market liquidity and differs among contagion mechanisms.

Thank you for your attention.

Any questions?