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IDENTIFICATION AND ASSESSMENT OF SYSTEMIC RISKS IN FINANCIAL NETWORKS: MODELLING FIRE SALES FROM REGULATORY CLIFF EFFECTS

Andreas Brøgger & Graeme Cokayne

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Identification and assessment of systemic risks in financial networks: Modelling fire sales from regulatory cliff effects

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Systemic Risk Analysis and Policy
Financial Stability
Danmarks Nationalbank

28 May, 2018

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Overview

- CRR-compliant covered bonds (SDO) are a large part of the Danish covered bond market
- We investigate fire sale effects if SDOs lose their preferred status
- Solvency reduction
- Capital losses

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Outline

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Systemic Risk
Channels

Two broad channels of Systemic Risk

1. Direct interconnectivity
   - Banks loan money to each other
   - If a bank gets in trouble this affects banks from whom it has borrowed money
   - Spreads to other banks
2. Indirect interconnectivity
   - Banks invest in similar securities
   - If those securities lose value this hits a number of banks at once
   - Particularly a problem if securities used as collateral

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Systemic Risk
Fire Sales and Cliff Effects

Fire Sales

The forced sale of an asset at a dislocated price

Regulatory Cliff Effect

Breaches of a regulatory threshold leads to out-sized effects on the financial system

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Greenwood et al (2015)

'Vulnerable banks'

Greenwood et al

- Fall in equity price $\rightarrow$ increase in leverage
- Banks sell assets to return to previous leverage
- Asset prices fall leading to further increases in leverage
- Aggregate Vulnerability = Sum of all 2nd round spillover losses as a share of total equity capital in the system

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Danmarks Nationalbank (2017)

'Modelling fire sales from regulatory cliff effects'

Our paper

- Based on Greenwood et al (2015) model
- But:
  - uses regulatory cliff effect as initial shock rather than fall in asset price
  - bases the reaction on solvency rather than leverage
  - allows the rounds of fire sales to go to completion rather than stopping after one round

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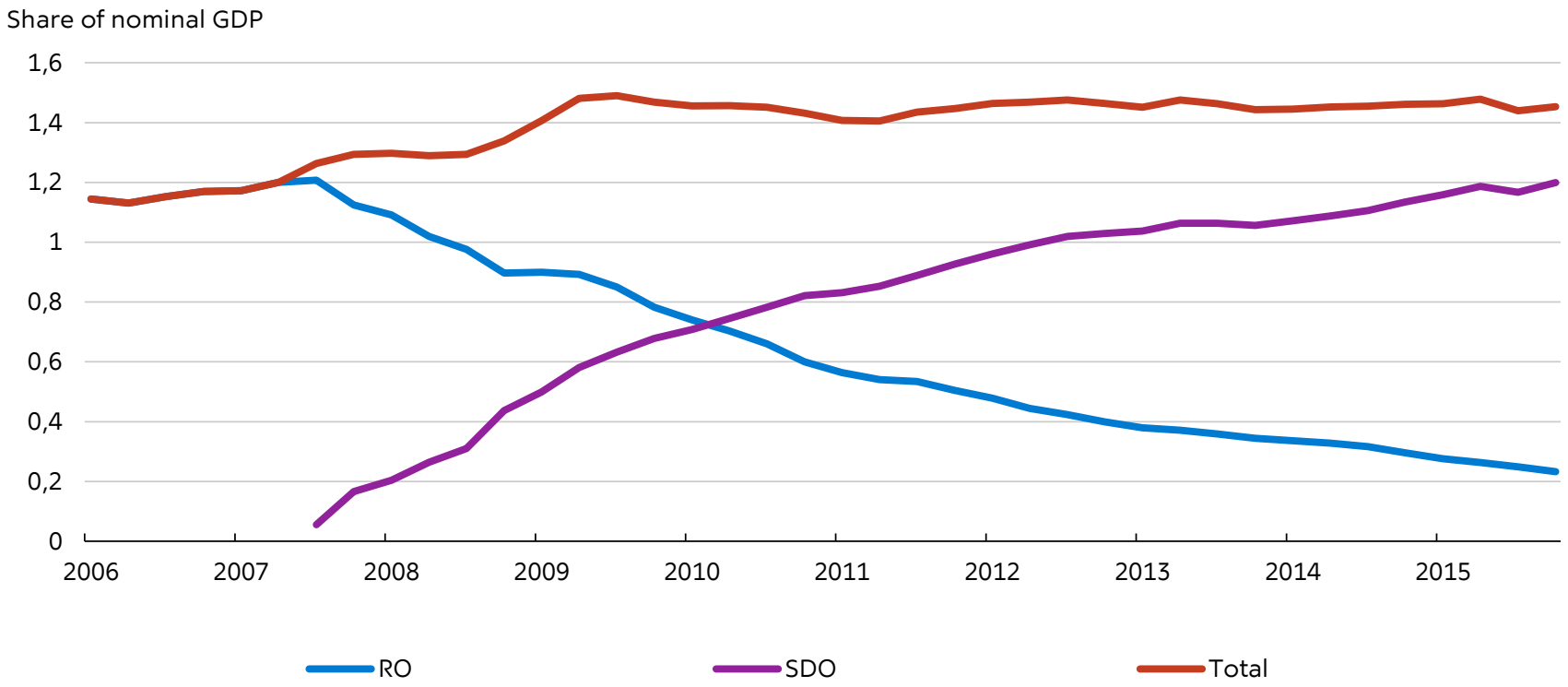
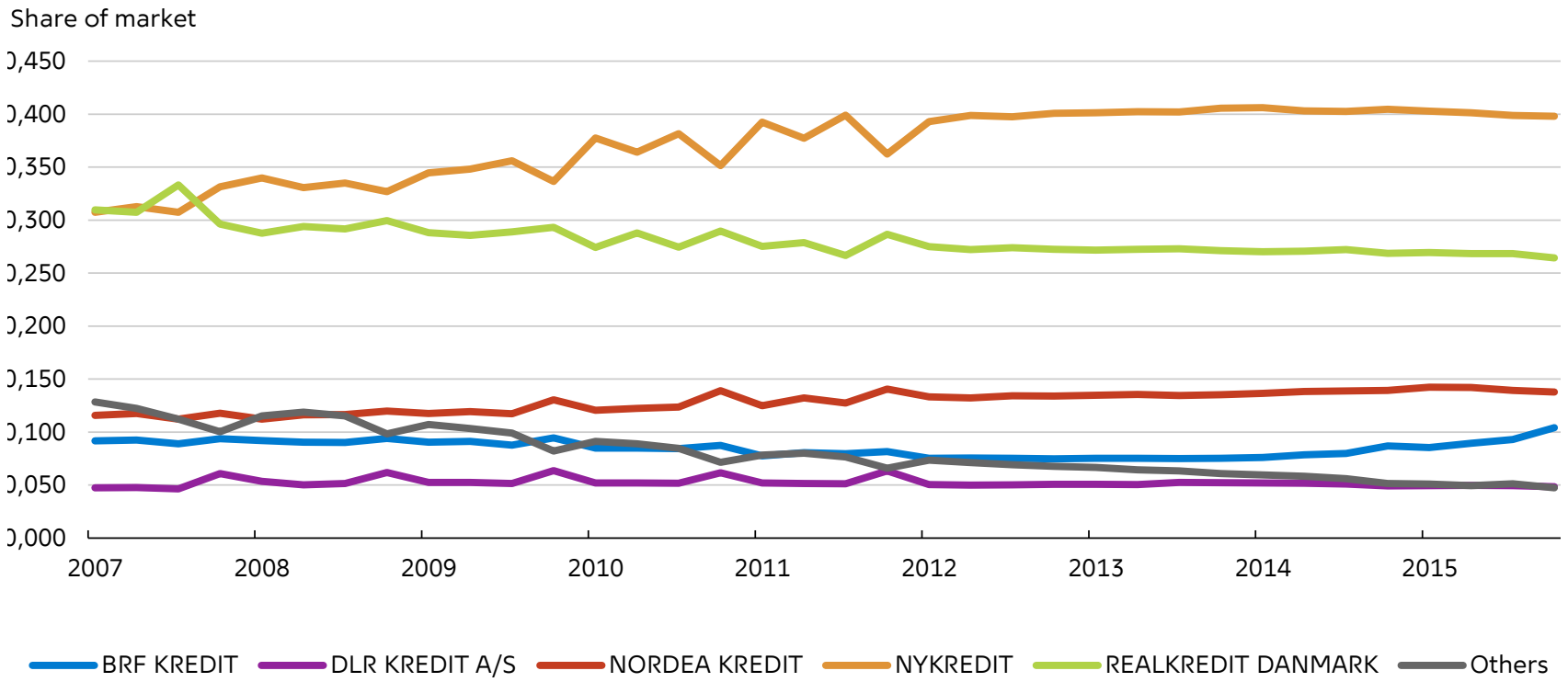
The Market is Large...



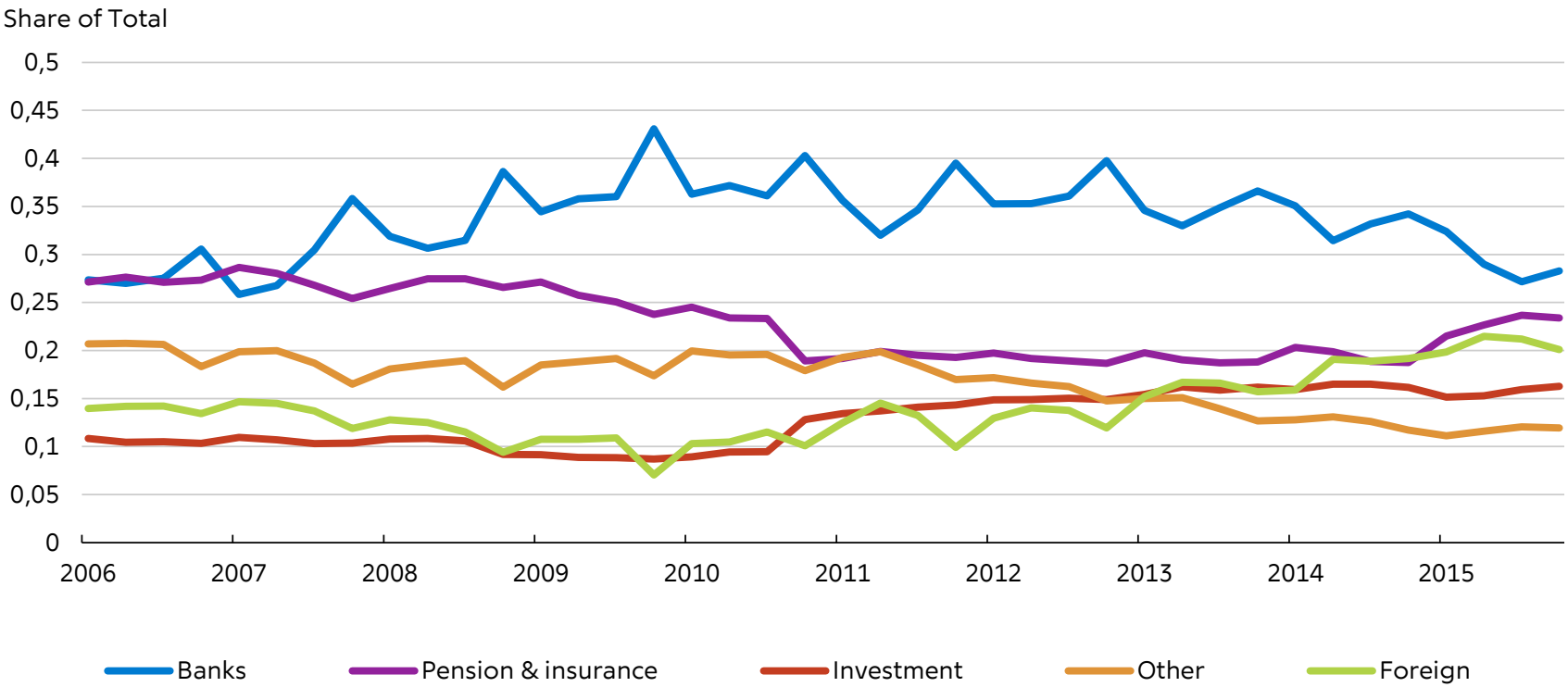
...and Concentrated

5 main issuers of Danish covered bonds represent 95% of the market



...and Concentrated

Holders of Danish covered bonds are mostly large institutions



SDOs have Regulatory Benefits

- SDOs considered safer than normal covered bonds
  - Loan limit requirements
  - Collateral requirements
  - Continuous requirements
- Regulatory benefits
  - Lower risk weights in solvency calculations
  - Not included in large exposure calculations

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Our Model

Regulatory cliff effect

- (Some) SDOs lose SDO-status $\rightarrow$
  - Fall in solvency of banks due to increase in risk weights and hence in risk-weighted assets
  - Increase in calculated large exposures, possibly breaching large-exposures regulation
  - (Possible) Fall in liquidity ratings, breaching liquidity requirements
- We focus on the first of these channels

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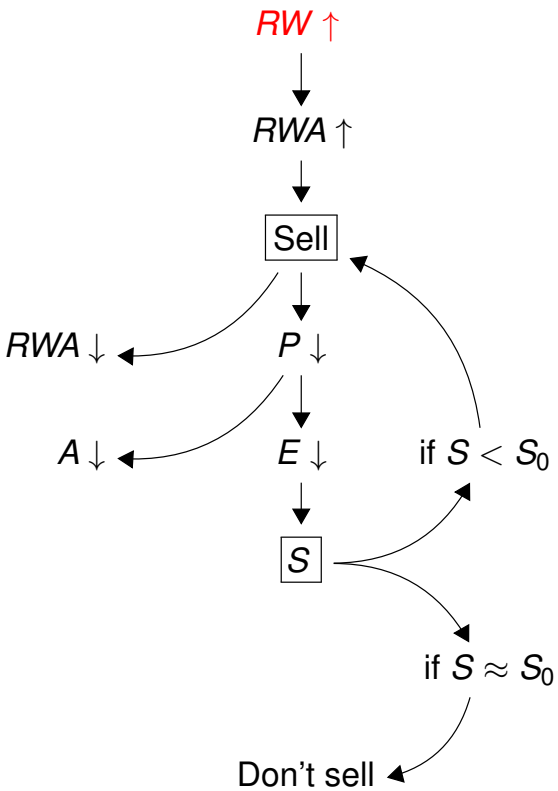

- Risk-weight shock
- React to get back to solvency
- Several rounds of fire-sales

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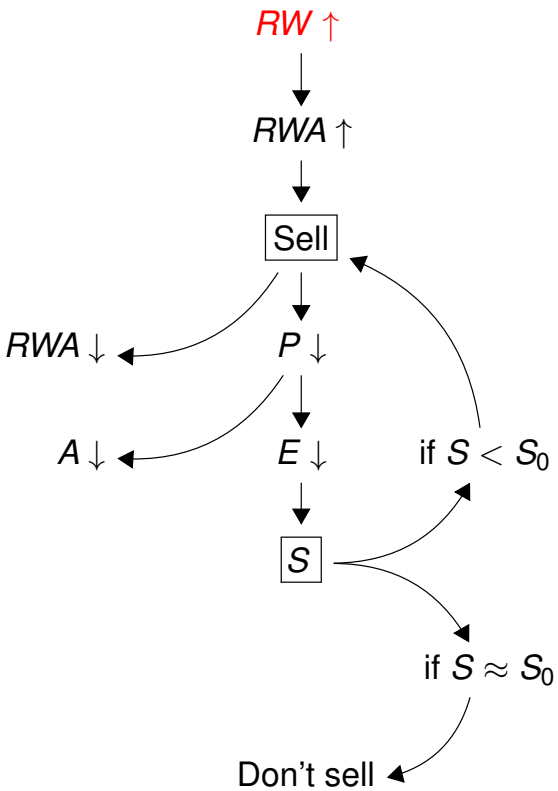

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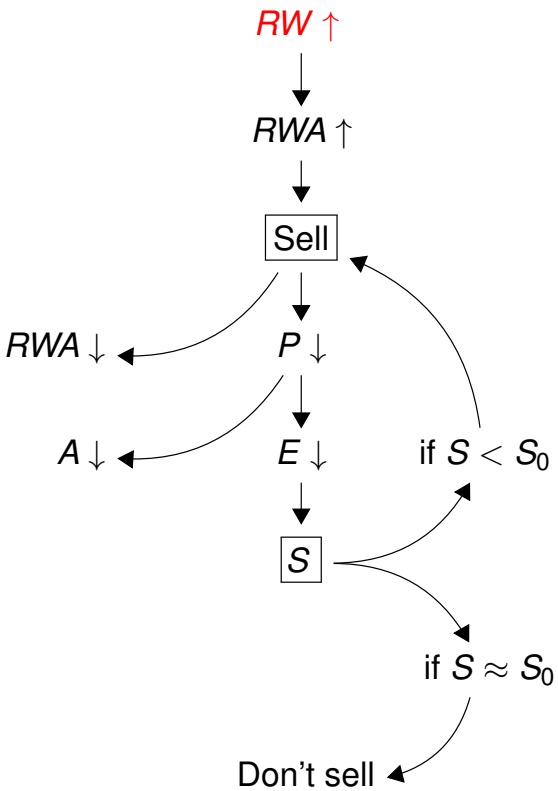

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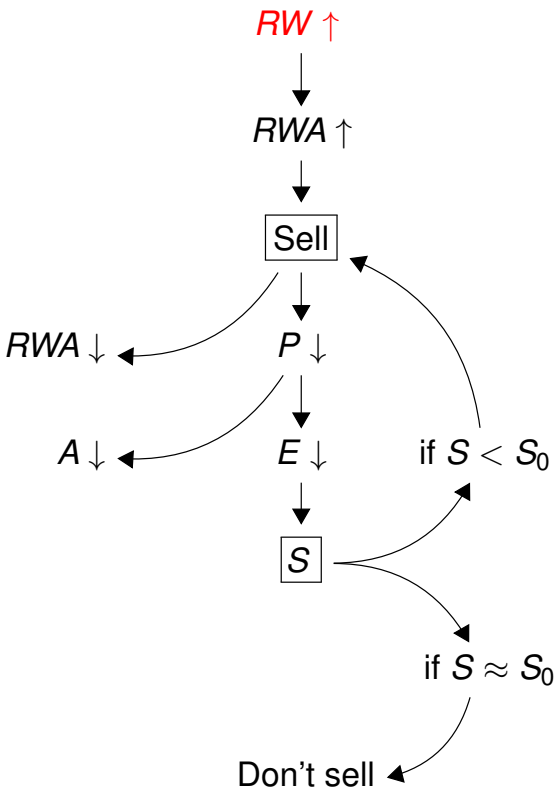

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Modeling Decisions

- Institutions
  - Only banks
  - Other institutions not covered by same regulations
- How do they react?
  - Sell covered bonds
    - Raising equity takes too long
    - Selling other assets not as effective
- Time Horizon
  - Not explicitly modeled but probably fairly short
- Who is buying?
  - Not sure

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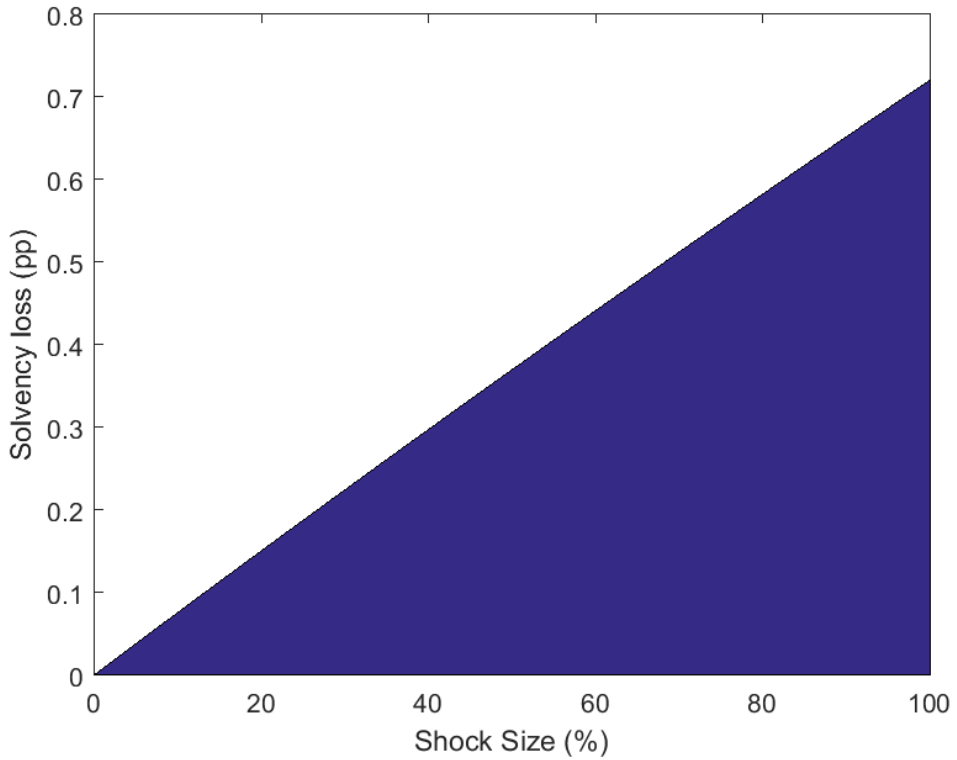
Direct Effect



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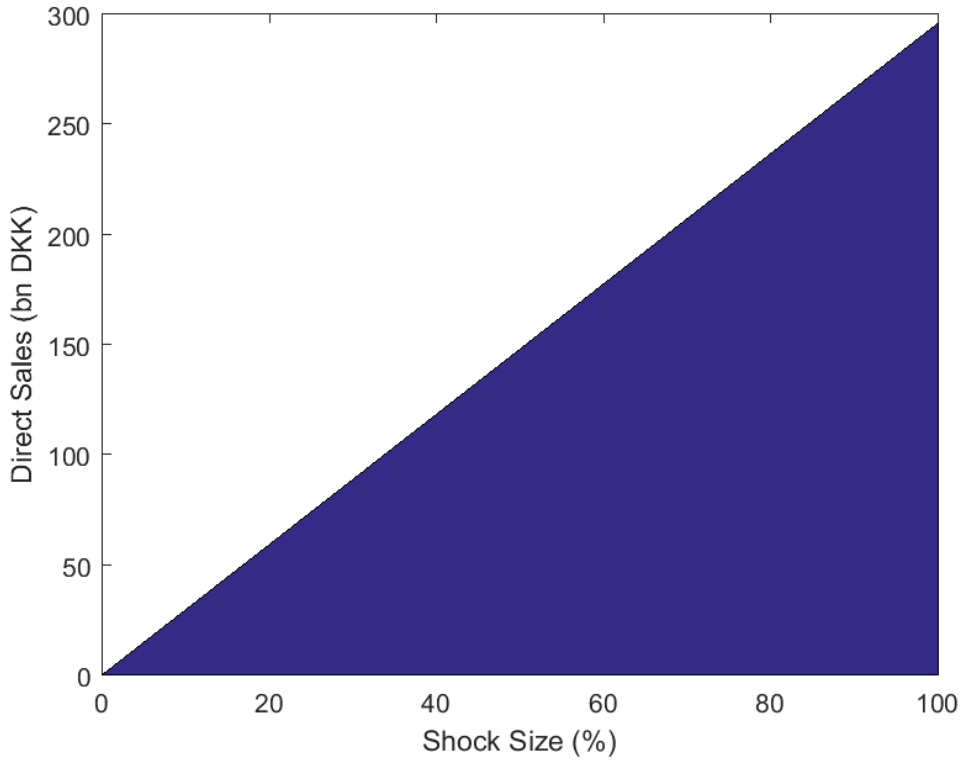
Initial Sales



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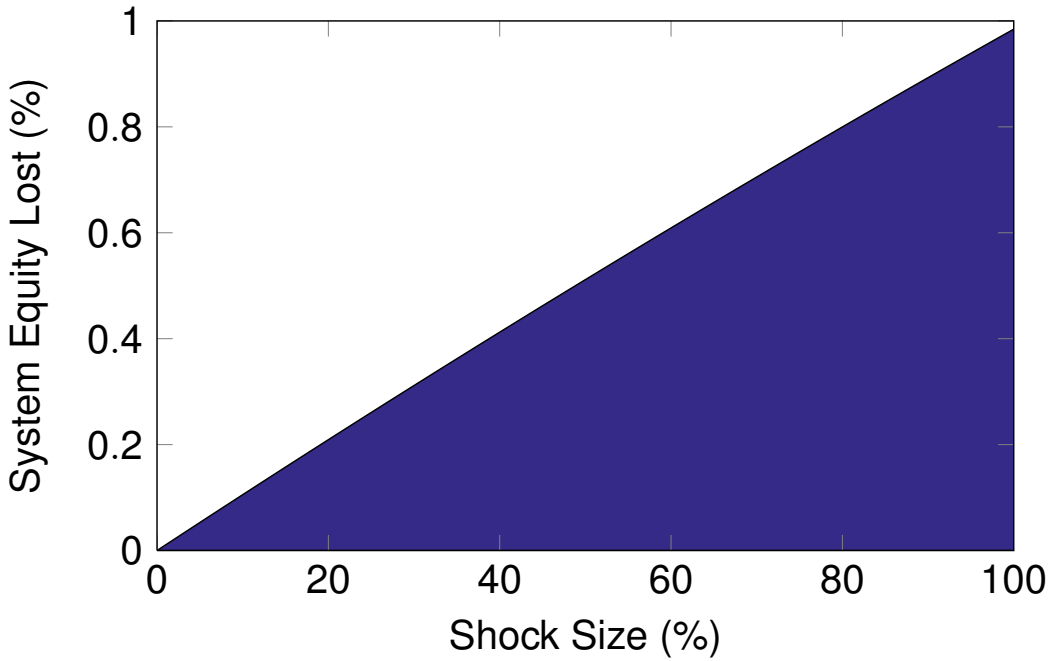
System equity lost as a result of fire sales



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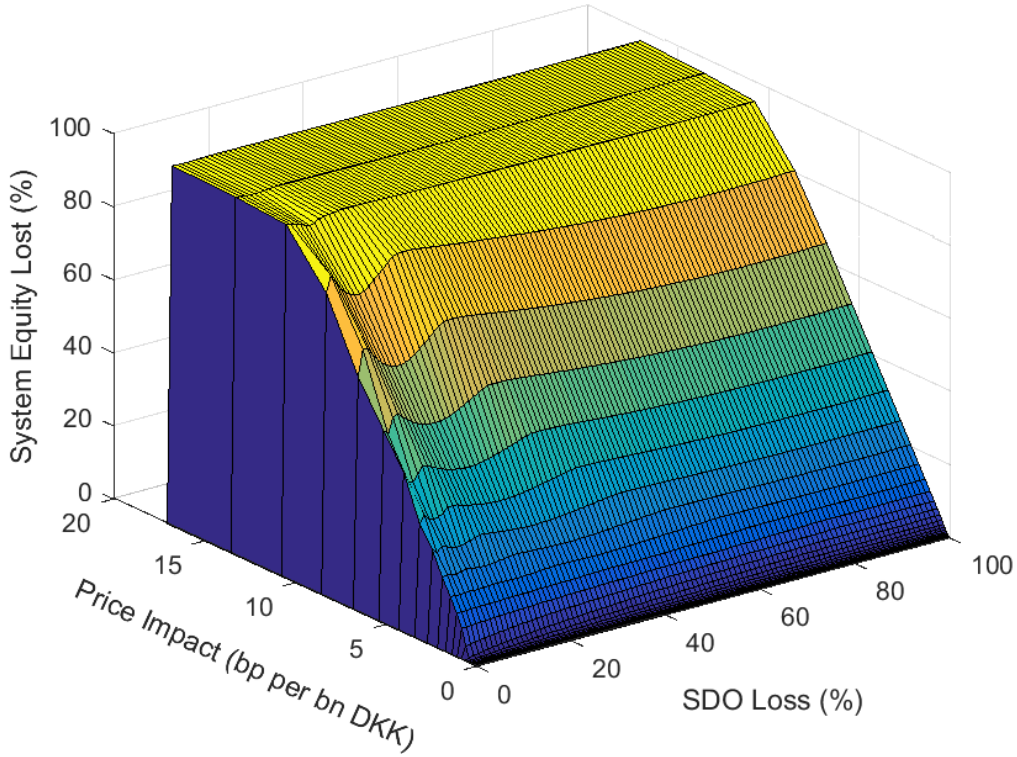
Stronger price impact scenarios



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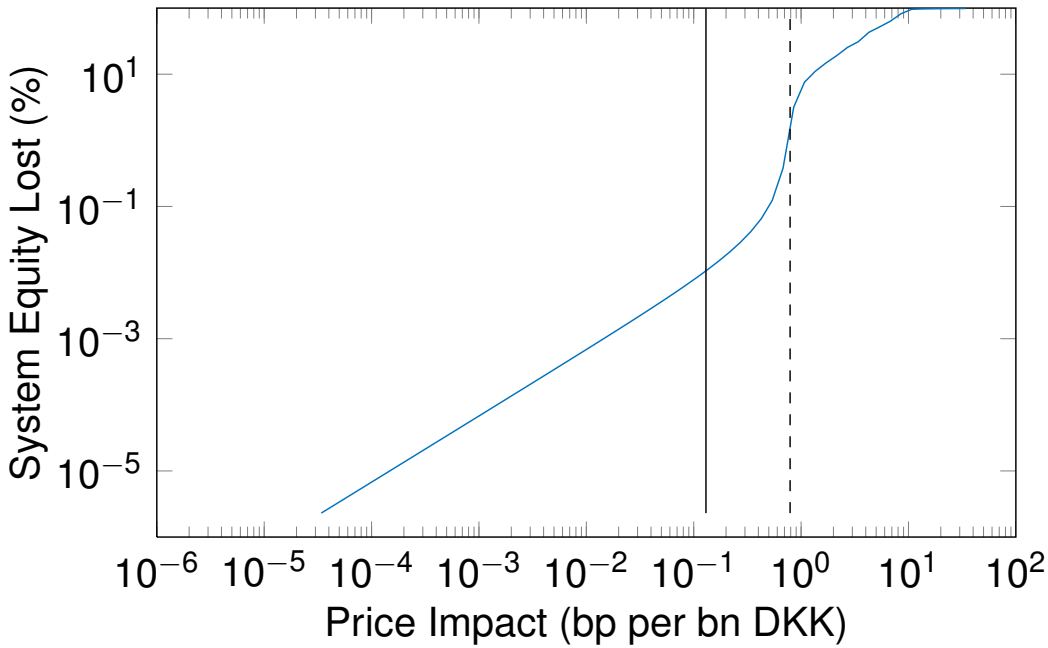

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The shock

- We only consider the shock to be the loss in solvency from the change in risk-weights
- If SDOs lost their SDO status there would likely also be an immediate price impact
- We ignored this as we wanted to focus on the regulatory effect

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Calibration of the price impact

- In the baseline model we use estimates of Greenwood et al (2015)
- Using Nykredit data for yield spreads during the financial crisis, price impact could be 10 times as large as baseline
- Dick-Nielsen et al (2012) and Buchholst et al (2012) suggest it could be even larger than this

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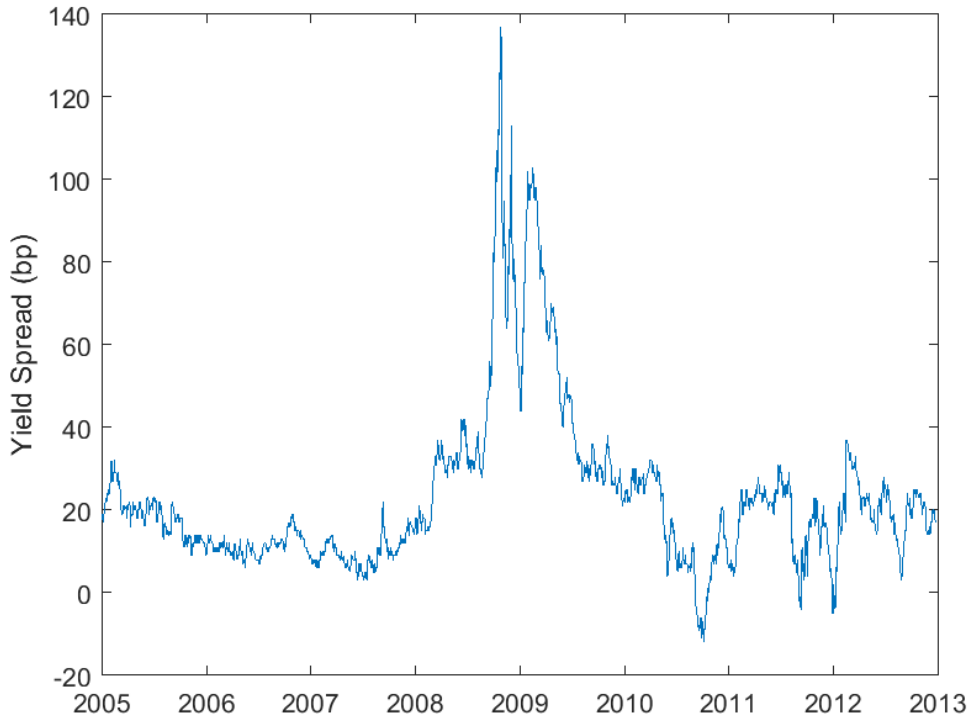

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Return to solvency

- We assumed banks attempt to return to solvency after the shock
- Most banks have greater solvency than the minimum required so have some flexibility to reduce solvency levels
- If banks could use a solvency buffer they might avoid fire sales
- However, might still need to sell assets as large-exposures regulations begin to bind

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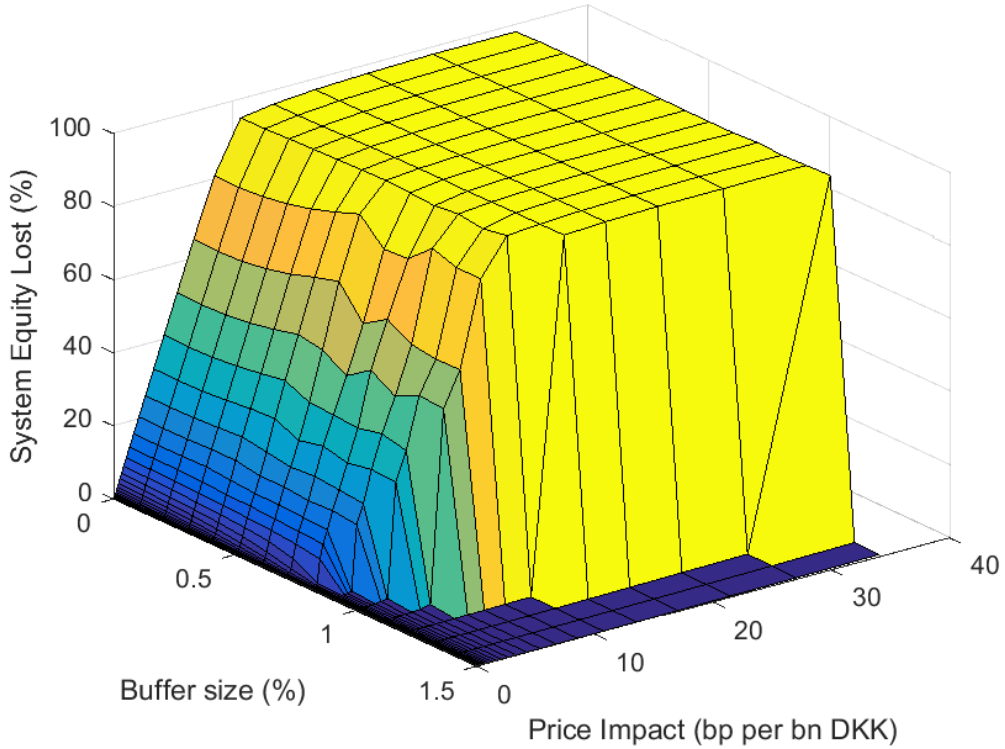

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- Loss of solvency could lead to fire sales of covered bonds
- Solvency buffers might help but other regulations might bind

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