EUROPEAN CENTRAL BANK
EUROSYSTEM

Reverse Stress Testing

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2020 ECB Macroprudential Stress Test Conference

Frankfurt, 5 and 6 February 2020
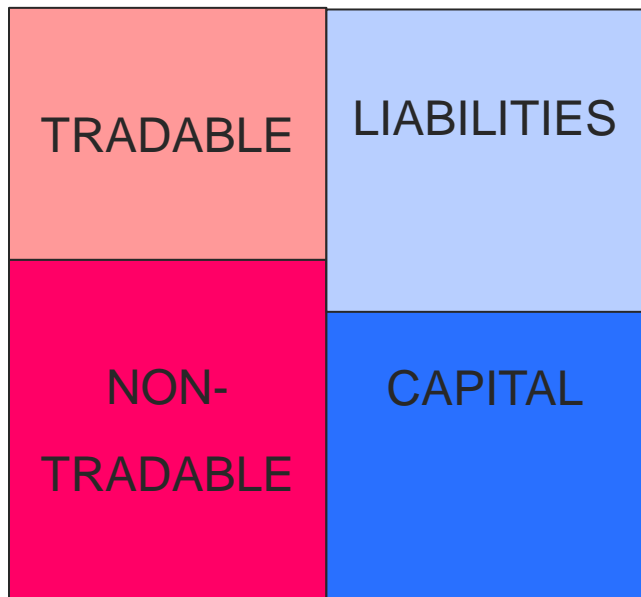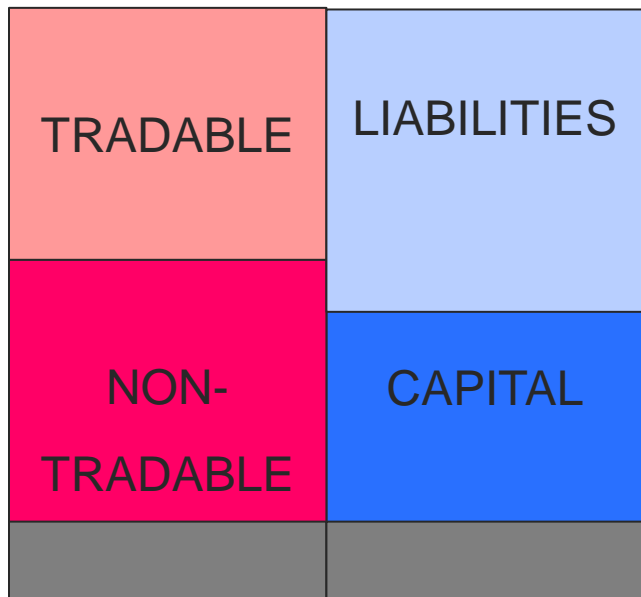
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Research question

Which stress scenarios lead to maximal contagion from fire-sales losses, assuming that banks, when forced to liquidate, will do so optimally?
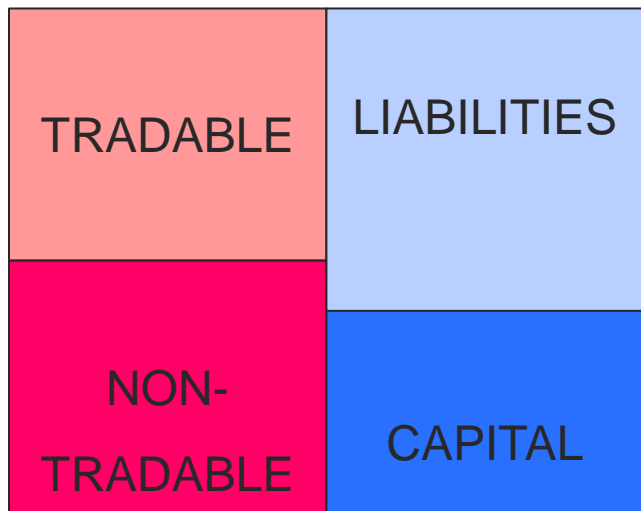
Model

TRADABLE	LIABILITIES
NON-TRADABLE	CAPITAL

Model

Model

TRADABLE	LIABILITIES
NON-TRADABLE	CAPITAL

$$\frac{TRADABLE + NON-TRADABLE}{CAPITAL} \leq \lambda$$

Model

General Equilibrium effect on prices
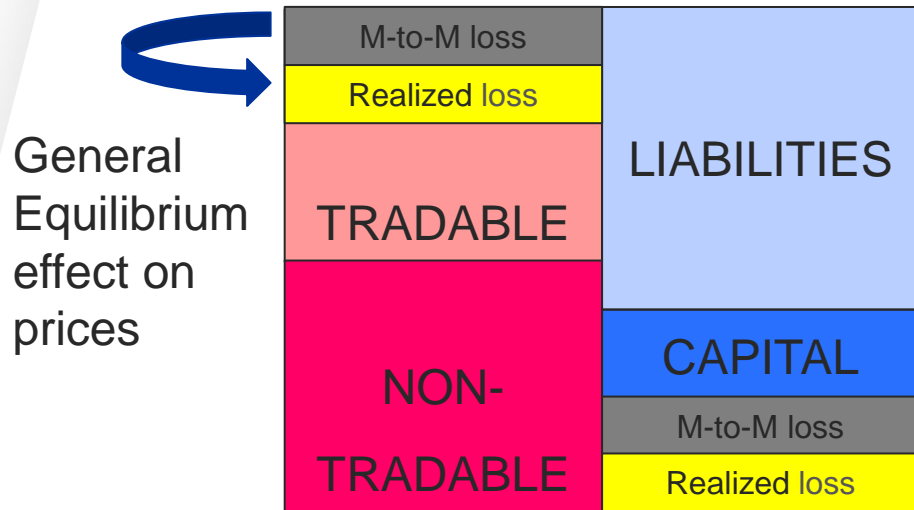
$$\min\{MtoM\ loss + Realized\ loss\}$$

$$\frac{TRADABLE + NON-TRADABLE}{CAPITAL} \leq \lambda$$

Main contribution to the literature

The optimal fire-sale deleveraging satisfies the leverage ratio with the equality (also when the price impact is non-linear)

➤ Strictly decreasing loss function

$$\min\{MtoM\ loss + Realized\ loss\}$$

➤ On a convex set
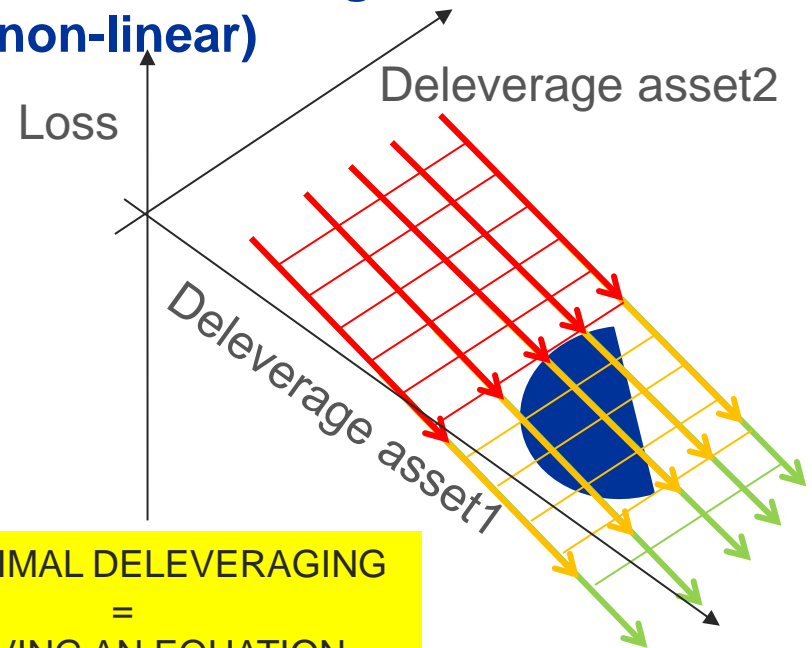
$$\frac{TRADABLE + NON-TRADABLE}{CAPITAL} \leq \lambda$$

$$\frac{TRADABLE + NON-TRADABLE}{CAPITAL} = \lambda$$

Loss

Deleverage asset2

Deleverage asset1

OPTIMAL DELEVERAGING
=
SOLVING AN EQUATION

Comment 1

The paper would benefit from more clarity on the objective and main findings. Can you simulate scenarios which you could not simulate before?

1. **Show the contribution in terms of algorithm**
    - Underline the main findings
    - Comparison with previous methods (e.g. Cont & Schaanning (2016))

2. **Show the contribution in terms of scenario**
    - Work on scenarios with macro variables
    - Spell out clear examples
    - Compare them with history/EBA results

Comment 2

Scenario assumptions could be improved:

1. **Scenario impact on the banking sector.** Current set-up: Shocks to real estate prices affect directly the value of loan book.
   - ➤ Suggestion: Impact via provisions

2. **Scenario generation.** Current set-up: covariance matrix of real estate prices used to infer correlation of shocks across banks/exposures
   - ➤ Suggestion: Use unemployment rate/macro variables (current datasets has very few commercial property price series)

Comment 3

Exposures of CR used in the datasets

➤ Total Corporates exposure in T; breakdown in NT

➤ Loans to public sector are T. How liquid are loans to the general government?

➤ Loans to financial corporations (channel would be different, vial liabilities of other banks)

T = Tradable, NT = Non-Tradable

	(STA/IRB) Loan book exposures definitions in EBA 2016
T	Central banks and central governments
T	Regional governments or local authorities
T	Public sector entities
T	Multilateral Development Banks
T	International Organisations
	Central banks
T	General governments
	Institutions
T	Credit institutions
T	Other financial corporations
T	Corporates
NT	Corporates - Specialised Lending
NT	Corporates - SME
	Retail
NT	Retail - Secured by real estate property
NT	Retail - Secured by real estate property - SME
NT	Retail - Secured by real estate property - Non SME
NT	Retail - Qualifying Revolving
	Retail - Other
NT	Retail - Other - SME
NT	Retail - Other - Non SME
NT	Retail - SME
NT	Households
NT	Secured by mortgages on immovable property
	Secured by mortgages on immovable property - SME
T	Equity
T	Securitisation
	Other non-credit obligation assets
	Items associated with particularly high risk
T	Covered bonds
NT	Claims on institutions and corporates with a ST credit assessment
	Collective investments undertakings (CIU)

Comment 4

Across scenarios the average initial loss is very close to the increase of provisions under the adverse scenario 2016.

Is this a finding or something linked to boundary conditions of the algorithm?
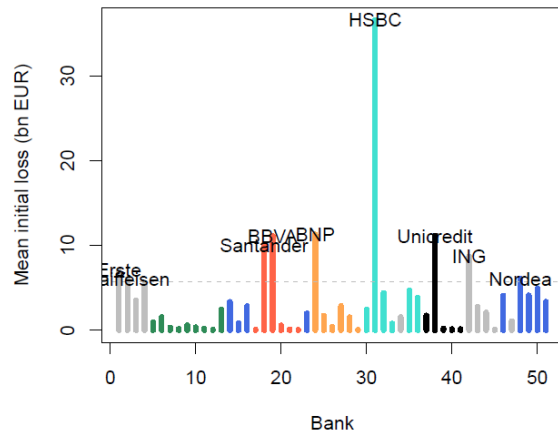
Comment 5

- **Covariance of asset prices determined only by deleveraging of banks:** no further spillovers due to other factors. E.g. fire sales of loans to Tesla might have an impact on Panasonic.

- **Regulatory requirements are an additional binding constraint only, do not affect portfolio reallocation**. The only risk measure factor affecting the deleveraging order is the volatility of prices: deleveraging order depends on

$$\frac{Average\ daily\ volumes}{volatility\ of\ asset\ class * \sqrt{liquidation\ period}}$$

- **Assumption of efficient allocation at t0**