BSLoss: a comprehensive measure for interconnectedness

Fink, Krüger, Meller and Wong

EBA London *25-26 November 2014*

Discussion Iman van Lelyveld

DeNederlandscheBank

EUROSYSTEEM

The views expressed do not necessarily reflect the views of De Nederlandsche Bank or European System of Central Banks.

Introduction

1. Putting the paper in perspective
   - Analysis
   - Literature
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   - How does it compare?

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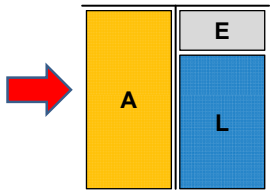
3. Advertorial: networks with limited data

Analysis

30 second summary

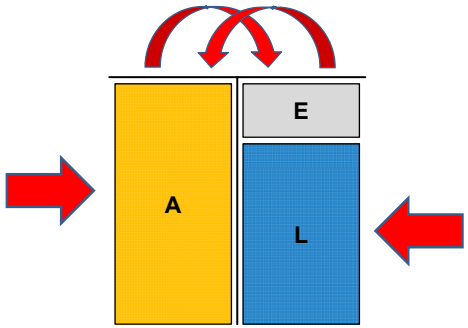
- Exogenous shocks affect bank(s) PD
- Counterparty PD affects a banks expected loss (EL)
- EL reduces value assets
- Once asset value $<$ critical value $=$ default

A completely incomplete historical overview



- Focus on *asset* side
- Domino mechanics

  Upper (2011), van Lelyveld and Liedorp (2006)



- Supersize: RAMSI

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- Overview Stress Testing

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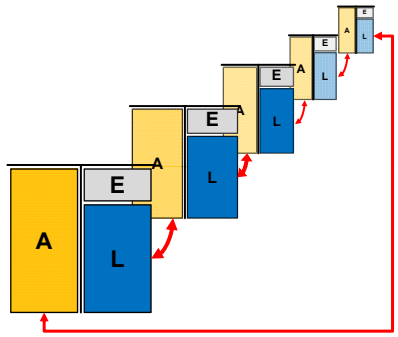

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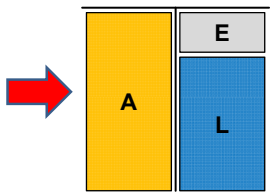

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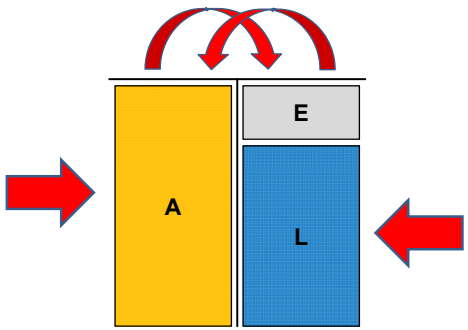

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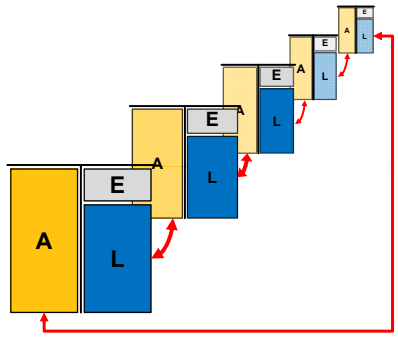

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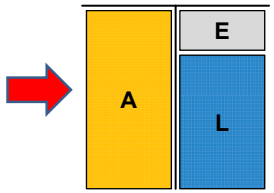

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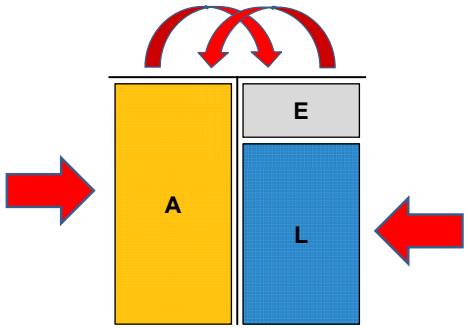

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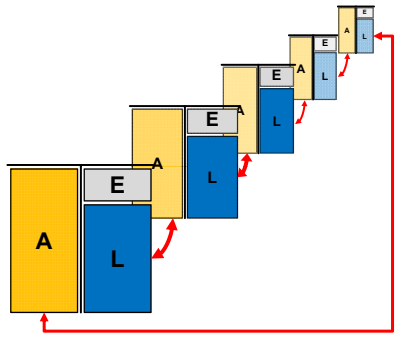

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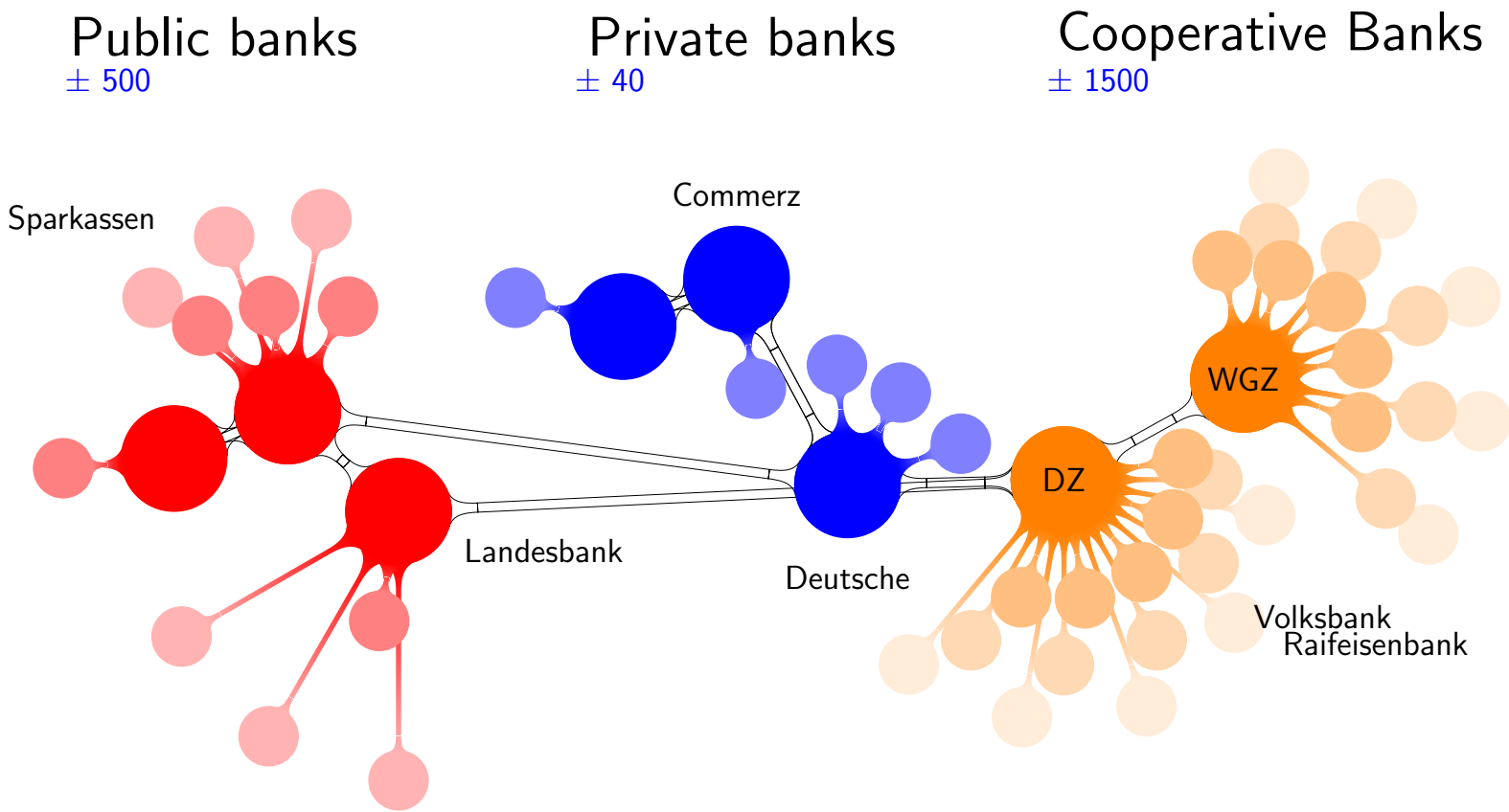
German Banking Sector



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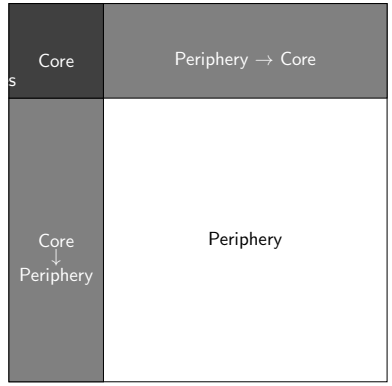
Network structure



		Netherlands	Germany	Italy	UK
Description	Total number of banks	100	1800	±120	176
	Network density	8%	0.4%	±15%	3.2%
	Average number of core banks	± 15	± 45	± 30	16
	Average core size	± 15%	± 2.5%	± 25%	9.1%
Fit	Error frequency, as % of links	29%	12%	42%	47%
	Transition prob. core→core	83%	94%	83%	NA*

Netherlands (in 't Veld and van Lelyveld, 2014), Germany (Craig and von Peter, 2014), Italy (Fricke and Lux, 2012), and the UK (Langfield et al., 2012).

Points to ponder

1. Loss *realisation* and shock transmission
   - $PD_j \uparrow \rightarrow LLA_i \uparrow \rightarrow TA_i \downarrow \rightarrow Tier1_i/RWA_i \downarrow \rightarrow PD_i \uparrow$
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     - Where is 1) sector and 2) (government) intervention or - more generally - (market) stress

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   - Agent based models
3. How does it compare?
   - Doesn't old style domino contagion give the same results?
     cf Upper and Worms (2004)

Advertorial: Networks with limited data

- BCBS Research Task Force (RTF) on Liquidity Stress Testing
- Networks
  - As many jurisdictions as possible.
  - Now 12 jurisdictions: BIS, Brazil, Canada, Denmark, France, Germany, Hungary, Korea, Mexico, Netherlands, UK, US
- 17 networks: payments, interbank, repo, CDS
- 6 algorithms: Anand et al. (2013), Baral and Fique (2012), Battiston et al. (2012), Drehmann and Tarashev (2013), Mastrandrea et al. (2014)

Thank you for your attention

References I

Adrian, T. and H. S. Shin (2010): "The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-09," *New York Fed Working Paper*, 439.

Aikman, D., P. G. Alessandri, B. Eklund, P. Gai, S. Kapadia, E. Martin, N. Mora, G. Sterne, and M. Willison (2009): "Funding Liquidity Risk in a Quantitative Model of Systemic Stability," *Bank of England Working Paper*.

Anand, K., B. Craig, and G. von Peter (2013): "Filling in the Blanks : Interbank Linkages and Systemic Risk," *Bundesbank Working Paper*, 2/2014.

Baral, P. and J. P. Fique (2012): "Estimation of Bilateral Exposures - A Copula Approach," *Mimeo*.

Battiston, S., M. Puliga, R. Kaushik, P. Tasca, and G. Caldarelli (2012): "Debtrank: Too Central to Fail? Financial Networks, the Fed and Systemic Risk," *Scientific Reports*, 2.

BCBS (2013a): "Liquidity stress testing: a survey of theory, empirics and current industry and supervisory practices," *BCBS Working Paper*, 24.

——— (2013b): "Literature review of factors relating to liquidity stress: extended version," *BCBS Working Paper*, 25.

Berger, A. and C. Bouwman (2009): "Bank Liquidity Creation," *Review of Financial Studies*, 22, 3779–3837.

Bräuning, F., F. Blasques, and I. van Lelyveld (2014): "A Dynamic Stochastic Network Model of the Unsecured Interbank Lending Market," *DNB Working Paper*.

Craig, B. and G. von Peter (2014): "Interbank Tiering and Money Center Banks," *Journal of Financial Intermediation*.

Drehmann, M. and N. Tarashev (2013): "Measuring the Systemic Importance of Interconnected Banks," *Journal of Financial Intermediation*, 22, 586–607.

Fricke, D. and T. Lux (2012): "Core-Periphery Structure in the Overnight Money Market : Evidence from the e-MID Trading Platform," *Kiel Working Paper*, 1759.

Halaj, G. and C. Kok (2014): "Modeling Emergence of the Interbank Networks," *Quantitative Finance*, 00,

References II

IN 'T VELD, D. AND I. VAN LELYVELD (2014): "Finding the Core: Network Structure in Interbank Markets," *Journal of Banking and Finance*.

LANGFIELD, S., Z. LIU, AND T. OTA (2012): "Mapping the UK interbank system," *Mimeo*.

MASTRANDREA, R., T. SQUARTINI, G. FAGIOLO, AND D. GARLASCHELLI (2014): "Enhanced Reconstruction of Weighted Networks from Strengths and Degrees," *New Journal of Physics*, 16, 043022.

SQUARTINI, T., I. VAN LELYVELD, AND D. GARLASCHELLI (2013): "Early-Warning Signals of Topological Collapse in Interbank Networks," *Scientific Reports*, 3, 3357.

UPPER, C. (2011): "Simulation methods to assess the danger of contagion in interbank markets," *Journal of Financial Stability*, 7, 111–125.

UPPER, C. AND A. WORMS (2004): "Estimating Bilateral Exposures in the German Interbank Market: Is there a Danger of Contagion?" *European Economic Review*, 48, 827–849.

VAN DEN END, J. W. (2008): "Liquidity Stress-Tester: A macro model for stress-testing banks liquidity risk," *DNB Working Paper*.

VAN DER LEIJ, M., C. HOMMES, AND D. IN 'T VELD (2014): "The formation of a core-periphery structure in financial networks," *Working Paper*.

VAN LELYVELD, I. AND F. LIEDORP (2006): "Interbank Contagion in the Dutch Banking Sector: A Sensitivity Analysis," *International Journal of Central Banking*, 31, 99–133.