

CONTAGION AND INTERBANK NETWORKS

Discussion by

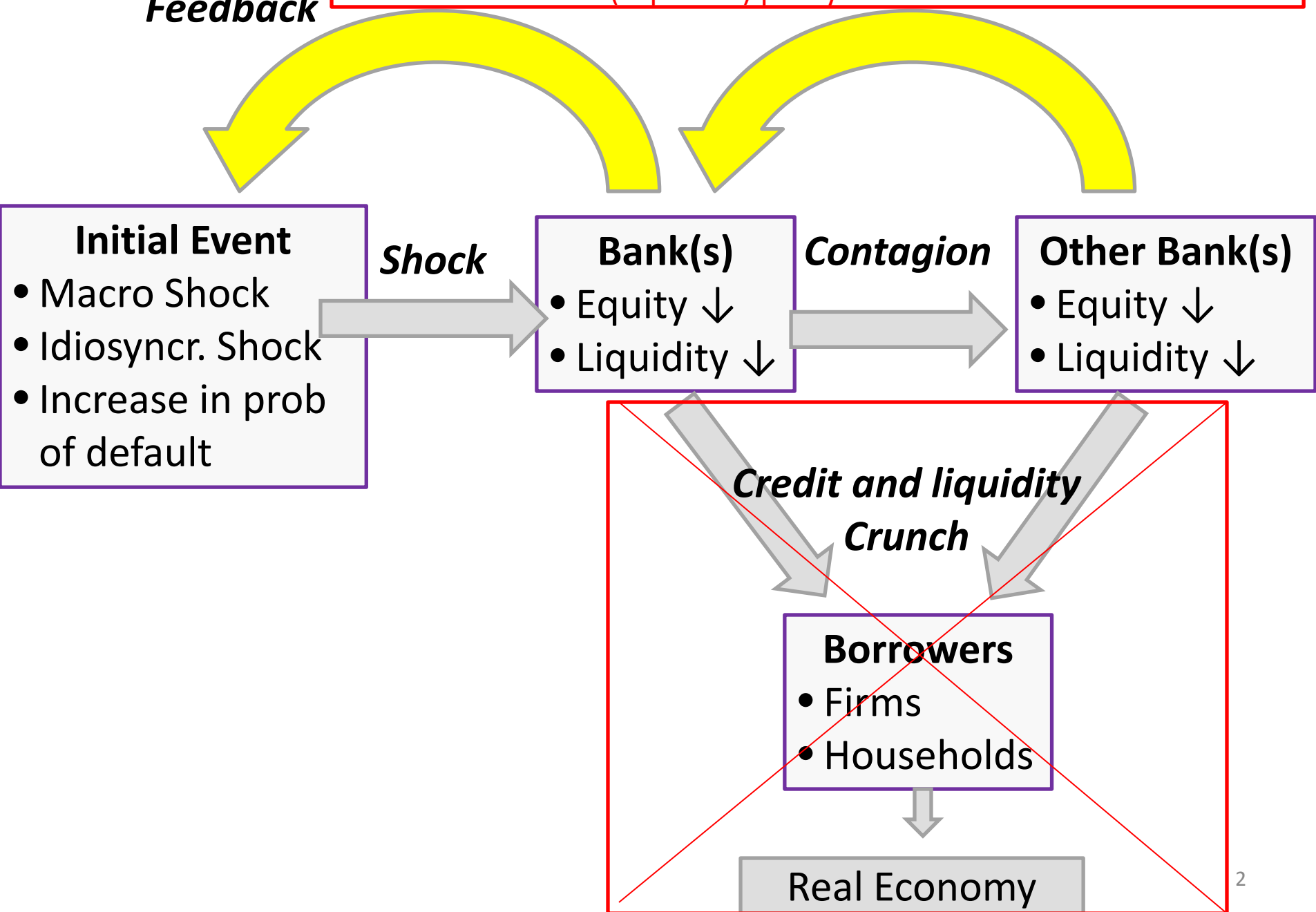
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Role of policy interventions: joint test of shock transmission and (expected) policy interventions

Feedback



Three Papers

1. Marginal Contagion: A New Approach to Systemic Credit Risk

Initial event: Credit event; increases probability of default

Contagion: bank → bank

2. Cross-border Interbank Contagion in the European Banking Sector

Initial event: common shock and idiosyncratic shock to European bank

Contagion: bank → bank

3. Financial Firm Bankruptcy and Contagion

Initial event: bankruptcy or distress event

Contagion: bank → bank (counterparties or information)

Outline

- General topic:
 - commonality across papers, common findings and position in literature
 - Common comments
- Summary and some comments on each paper:
 - PAPER 1: ‘Marginal Contagion: A New Approach to Systemic Credit Risk’
 - PAPER 2: ‘Cross-border Interbank Contagion in the European Banking Sector’
 - PAPER 3: ‘Financial Firm Bankruptcy and Contagion’

General topic

- Interbank markets: banks with excess funds lend money to banks with lack of funds
- Exposures on each other imply risks
 - Credit risk: counterparty may not be able to repay at maturity
 - Liquidity risk: bank may not be able to roll over loans and not find alternatives
- Common exposures:
 - Informational risks: behavior from similar institutions may lead to updates about them
 - Sovereign risks
 - Strategic complementarities leading to “run type” behavior (versus substitutes which may be stabilizing)

Common findings

- Contagion from interbank counterparty exposures on average is mild in
 - US – joint test of policy intervention and contagion
 - Europe – joint test of policy intervention and contagion
- Tail risk is more important but still quite mild
 - US
 - Europe
- Network structure of interbank links matters

Marginal Contagion: A New Approach to Systemic Credit Risk

- Develops a credit risk model that incorporates credit risk through balance sheet exposures -> 'chained Merton model'
- Brings macro-prudential aspects into micro credit risk model
- Analytical solution is tractable (making some (innocuous?) linear approximation)

$$\Sigma^{sys} = \sum_{i=0}^{\infty} \Delta IA^{(i)} = (\mathbf{I} - \mathbf{E}\Phi)^{-1} \cdot \Delta IA^{(0)}$$

- Assumption: equal seniority for retail and interbank (can this be relaxed; bail-in; You may underestimate the effects?)

Multiplier:
-importance of interbank funding φ
-PD
-adjacency matrix E (network structure)

Marginal Contagion: A New Approach to Systemic Credit Risk

- Impact of network density:
 - Neutral \leftrightarrow Allen and Gale (2000)
- Comparison of “star/money centre” network with “complete” network
 - Systemic risk multiplier lower for “star network”
 - marginal aggregate shocks are assumed removing non-linearities -> do we fully capture systemic risk?
- Capital injections: impacts are intuitive: e.g. benefit is higher for the money centre bank.
- Model with cross-share holdings
 - Bail-outs financed by government through issuance of sovereign bonds may increase systemic risk – feedback loops

Marginal Contagion: A New Approach to Systemic Credit Risk

- Some comments:
 - What's special about banks? Applies equally well to firms through trade credit
 - Include more bank-specific aspects
 - Deposit insurance (bail in, bail out)
 - Liquidity
 - Non-linearities
 - But I realize that this may be outside the scope of this paper

Cross-border Interbank Contagion in the European Banking Sector

- Method
 - Simulation method as in Halaj and Kok (2013) to study domestic and cross-border contagion, using 'solvency' and 'liquidity hoarding'
- Data
 - Balance sheet data on 73 European banks over 2008:12-2012:12
 - Use of true exposures taken from TARGET2 data to
 - Construct a realistic probability map of long term bank-to-bank exposures (why not use actual exposures?)
- Results
 - Average losses are mild – in line with literature
 - Solvency and liquidity contagion are tail risks
 - Interbank market structure matters: 5 to 6 times larger with one structure than another
 - Banking system has increased its capacity to withstand contagion
 - Fewer long-term loans, higher capital
 - Role of ECB with LTRO? What would results be in normal period? Is this good or bad news?

Cross-border Interbank Contagion in the European Banking Sector

- Contribution **and comments**
 - (Cross-border) real bank-to-bank data time series in EU-wide setting (important as entropy maximization may overestimate cross-border links)
 - Real probability maps employing TARGET2
 - Drivers of bank-level contagion, system wide contagion, cross-border contagion
 - Degryse and Nguyen (2007IJCB): also focus on (1) time series, (2) cross-border (3) interbank market structure, using large exposure data and aggregate exposure data
 - You have complete picture whereas we had only “partial picture”
 - May tell us and the many “national studies” more about magnitude of biases – important for many central banks
 - Shocks from outside Europe? Can you study this?

Cross-border Interbank Contagion in the European Banking Sector

- Contribution
 - Econometric analysis of bank fragility, bank systemicity
 - Bank fragility:
 - Own financial ratios matter
 - higher closeness decreases frequency of default but increases magnitude of capital losses
 - Being connected with weak banks increases bank fragility
 - Network structure does not seem to matter – which is surprising
 - Bank systemicity: how important is i for other banks
 - Own financial ratio's matter
 - Closeness increases bank's systemicity
 - Exploit within border and cross-border impacts
 - Include country fixed effects and study them, or country system characteristics
 - System wide determinants – not discussed yet in the paper

Cross-border Interbank Contagion in the European Banking Sector

- Comments:

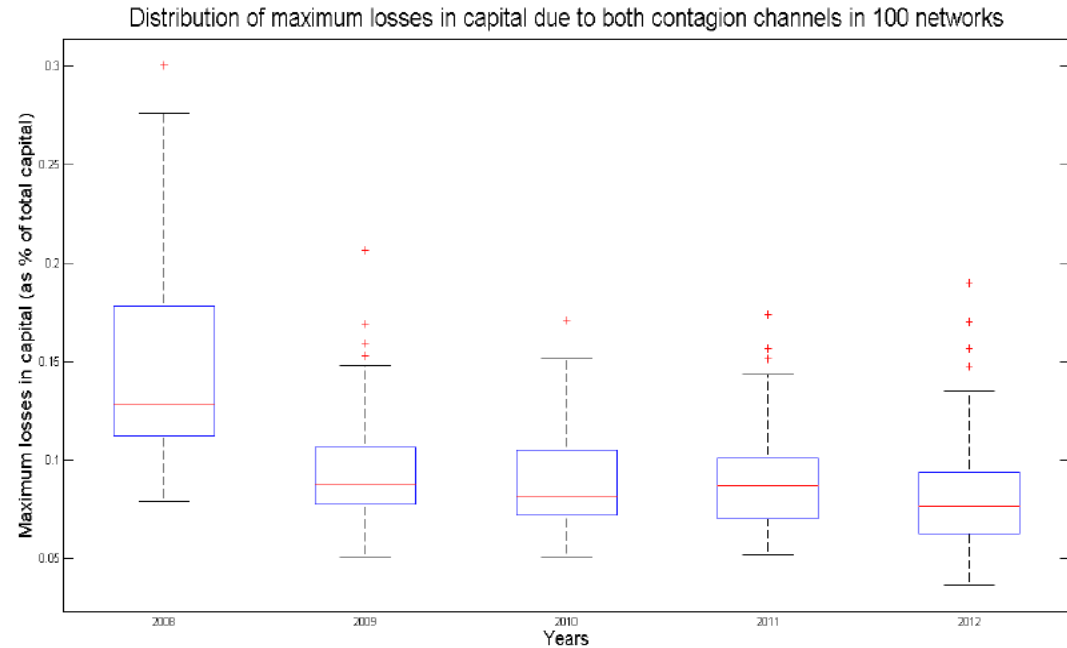
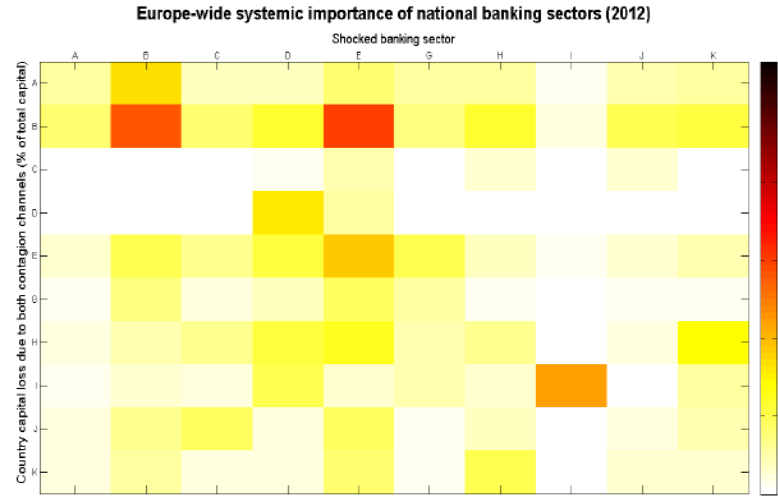


Figure 5: Distribution of losses due to both solvency and liquidity contagion (as % of total system capital)

- Which structures mitigate solvency and liquidity contagion?
- Are those structures chosen? Structures do not fall out of the sky. Are banks choosing a different structure to benefit from bail-out? Does it depend on debt/GDP, bank resolution regime, ...?
- Plot actual structure versus simulated structures

Cross-border Interbank Contagion in the European Banking Sector

- Comments:



- Comparison with Degryse, Elahi, and Penas (IRoF 2010)?

Table 3 Contagion effect when all banks are internationally exposed

Year 2006 (all rounds) LGD=100%	Recipient countries																Total	
	DK	FI	SE	AT	BE	FR	DE	IE	IT	NL	PT	ES	CH	GB	JP	CA		US
Triggering countries																		
Denmark (DK)																		2
Finland (FI)																		2
Sweden (SE)																		2
Italy (IT)																		14
The Netherlands (NL)																		1
Germany (DE)																		13
United Kingdom (GB)																		13
United States (US)																		15
Total	6	6	6	4	5	4	3	4	0	4	4	4	4	3	1	4	0	62

The table shows the extent of contagion in 2006 taking into account all round effects when all banks are internationally exposed. For each triggering country (left column), the (defaulting) recipient countries are marked with a gray box. The total on the right column gives total number of recipient countries for each triggering country. Whereas the total number of times a country defaults is mentioned at the bottom.

International Review of Finance

- Compare direct effects and contagion effects

Financial Firm Bankruptcy and Contagion

- Empirical question: how does a negative shock to a financial firm transit to other financial firms, in particular counterparties
 - Information flows: bankruptcy filing or distress of firm i reveals information about similar firms
 - Counterparty contagion: impacts stemming from actual counterparties
- Aim to isolate information effects from contagion effects
 - by focussing on subset of firms with similar geographic exposures or in real estate
 - Impact of bankruptcy filing on creditors

Financial Firm Bankruptcy and Contagion

- Data: US, period 1980-2010
 - Bankruptcies
 - 142 bankruptcies, 88 with top 20 unsecured creditors available
 - distressed firms
 - Larger firms with left tail underperformance in a 3-year window
 - “event”: day with worst performance in 3 year window – Lexis-Nexis
 - 149 events
 - Lehman, American Home Mortgage and AIG – all creditors
 - Information effects: same geographic area or real estate
- Findings:
 - Bankruptcy:
 - Counterparty claims are small – average 0.25% of MV equity, and max of 12.5% of equity (in line with the “large exposures” regulation)
 - **Big selection issue due to TBTF: only observe small banks failing -- joint test**
 - No cascades of failure
 - Small negative CARs
 - but larger exposures lead to more negative CARs
 - Exposures to derivatives leads to more negative CARs: **how are they settled (centralized or not)? On which counterparties?**
 - Less contagion effects for commercial banks
 - Information contagion: non-creditors impacted when in same business or state
 - **Is this informational contagion? May still capture indirect counterparty effects**

Financial Firm Bankruptcy and Contagion

- Findings (cont'd):
 - Distressed firms: negative CARs
 - Information effects: same state and same business line most negative CARs
 - Case studies: Lehman and AIG: negative impacts are more pronounced – larger than direct counterparty effects suggest – **issue of strategic complementarities versus substitutes**
- Comments:
 - **Difficult to separate information from counterparty effects**
 - With bankruptcy you find only “counterparty effects” and no “information effects”
 - Counterparty contagion can also be indirect (as in two other papers of this session) – may be correlated with information effects

Wrap Up

- Three interesting papers; each has potential and its specific contribution
- We should keep in mind that we are interested in the ultimate effects on the real economy – 3 papers do not consider this
- The findings in the three papers highlight role of
 - Capital
 - Liquidity
 - Network structure
- While some tail effects, very little understanding where these come from

Contagion and interbank networks

Discussion from the floor