

From Sovereigns to Banks: Evidence on Cross-border Contagion (2006-2011)

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Paper Overview

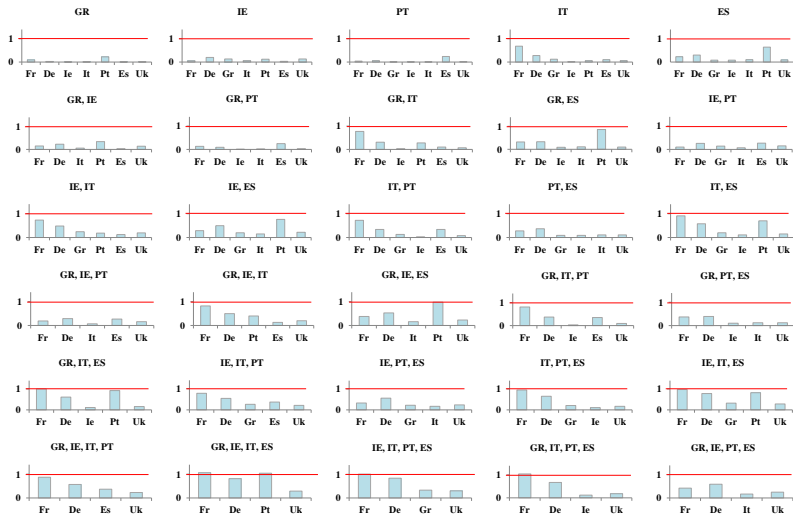
- Relatively little discussion on the potential spread of turbulence in sovereigns in the recent European debt crisis to the banking systems of other countries through banks' foreign exposures to sovereign debt.
- Aim: to analyze the evolution of the banking system sensitivity to cross-border contagion over the period of 2006-2011.

- 1 Stylized facts on cross-border activities of Portugal, Ireland, Italy, Greece, Spain (PIIGS), France, Germany and the UK.
- 2 Simulate contagion and amplification mechanisms affecting banks' capital levels for Australia, Austria, Belgium, Canada, Finland, France, Germany, Greece, India, Ireland, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, Switzerland, Turkey, the UK and the US.

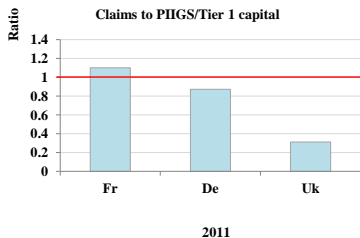
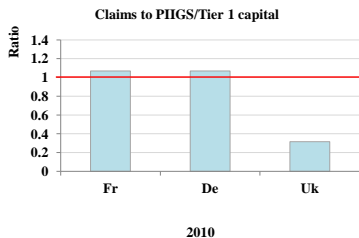
Data

- BIS Consolidated Banking Statistics on an ultimate risk basis → cross-border exposures of a banking system in one country to all sectors (bank, non-bank and public sector) in another country.
- Bankscope data → aggregate Tier 1 capital of all financial institutions in the country (apart from the Central Bank) at the end of each year.

Ratio of Claims to Tier 1 Capital (up to four PIIGS default)

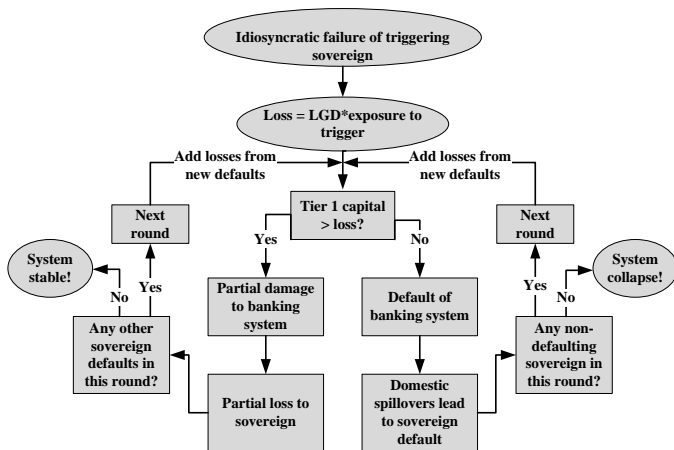


Ratio of Claims to Tier 1 Capital (all PIIGS default)



- In 2010 French and German banks are equally vulnerable to a default of all PIIGS.
- In 2011 the French banking system is more fragile.
- The UK banking system is completely immune to cross-border contagion from PIIGS.

Furfine Algorithm

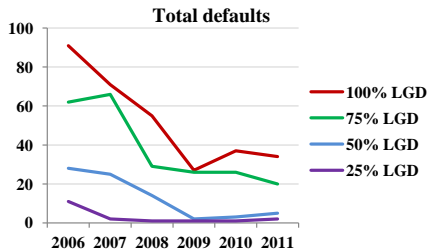
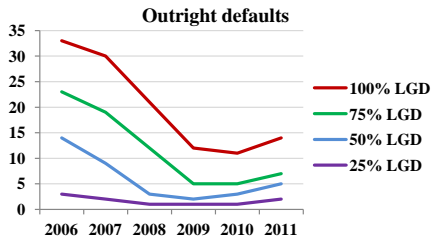


Contagion occurs and banks of country i fail if: $C_i - \sum_{j=1}^N \lambda_j \theta_{ij} < 0$

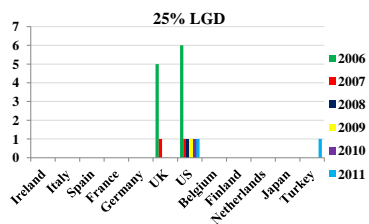
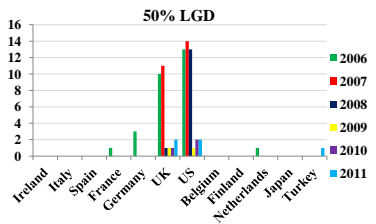
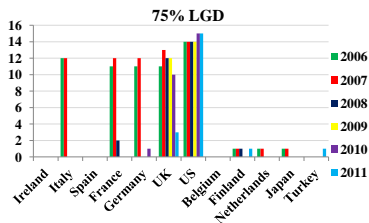
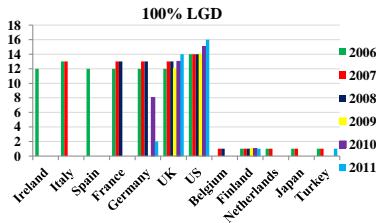
Assumptions

- Each banking system is treated as a single institution.
- Initial shock is taken as given (the probability of the initial failure is the same for all countries).
- Failure of the banking system will eventually lead to the failure of the country through domestic spillovers.
- LGD is defined exogenously and kept constant over time, during all rounds of contagion and across all countries (100%, 75%, 50%, 25%).

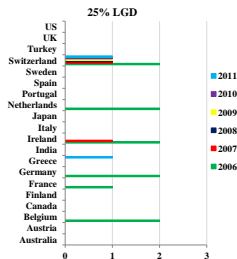
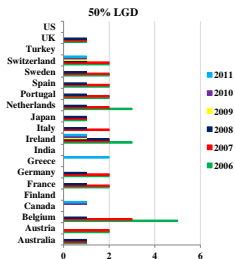
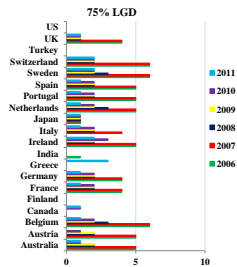
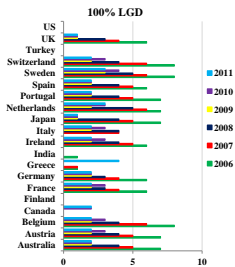
Outright and Total Defaults



Induced Failures by Triggering Countries



Vulnerability of Banking Systems



First-round and All-round Defaults in 2006 and 2011

2006 First round LGD=100%		Triggering countries										Total	
		IE	IT	ES	FR	DE	UK	US	FI	NL	JP		TR
AU													1
AT													0
BE		■	■								■		7
CA					■	■	■	■	■			■	0
FI													0
FR		■					■	■					3
DE				■				■					3
GR												■	1
IN													0
IE		■					■	■	■				4
IT													0
JP									■				1
NL		■			■	■	■	■	■				5
PT													0
ES							■						1
SE									■				2
CH					■	■	■	■	■			■	4
TR												■	0
UK								■					1
US									■				0
Total		1	4	1	2	5	8	8	1	1	1	1	33

2006 All rounds LGD=100%		Triggering countries										Total	
		IE	IT	ES	FR	DE	UK	US	FI	NL	JP		TR
AU													7
AT		■	■	■	■	■	■	■	■				7
BE		■	■	■	■	■	■	■	■			■	8
CA												■	0
FI													0
FR		■	■	■	■	■	■	■	■				6
DE		■	■	■	■	■	■	■	■				6
GR												■	1
IN												■	1
IE		■	■	■	■	■	■	■	■				6
IT													0
JP													7
NL		■	■	■	■	■	■	■	■				7
PT													7
ES					■								6
SE										■			8
CH												■	8
TR												■	0
UK		■	■	■	■	■	■	■	■				6
US									■				0
Total		12	13	12	12	12	12	14	1	1	1	1	91

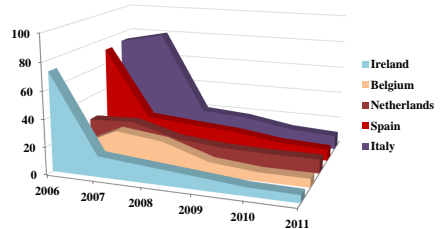
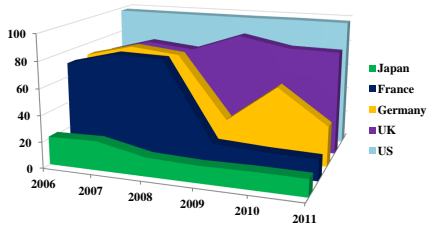
2011 First round LGD=100%		Triggering countries					Total
		DE	UK	US	FI	TR	
AU							0
AT							0
BE							0
CA					■		1
FI							0
FR					■		1
DE					■		1
GR			■	■		■	2
IN							0
IE			■				1
IT							0
JP					■		1
NL		■			■		2
PT							0
ES			■				1
SE						■	1
CH			■	■	■		2
TR							0
UK					■		1
US							0
Total		1	4	7	1	1	14

2011 All rounds LGD=100%		Triggering countries					Total
		DE	UK	US	FI	TR	
AU							2
AT							2
BE							2
CA							2
FI							0
FR							2
DE							2
GR		■	■	■		■	4
IN							0
IE							2
IT							2
JP							1
NL		■					3
PT							2
ES							2
SE						■	3
CH							2
TR							0
UK						■	1
US							0
Total		2	14	16	1	1	34

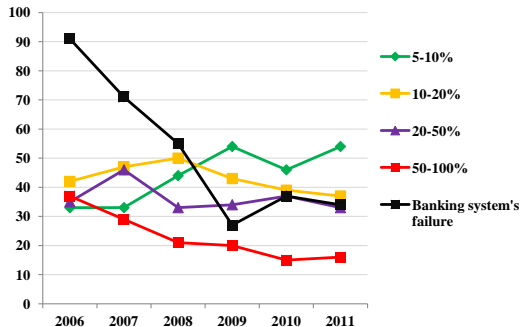
Capital Losses with 100% LGD in 2011

		DEFAULT OF A COUNTRY								
		FR	DE	GR	IE	IT	PT	ES	UK	US
BANKS' LOSSES	FR	-	75.4	9.0	5.6	67.7	4.4	23.4	100	100
	DE	36.4	-	2.8	19.8	27.8	6.3	30.4	100	100
	GR	53.5	100	-	12.6	11.8	1.4	7.7	100	100
	IE	9.3	9.8	0.3	-	2.2	1.0	8.3	100	100
	IT	15.4	92.1	0.8	5.5	-	1.1	9.9	100	100
	PT	18.4	54.0	22.4	12.0	6.1	-	63.8	100	100
	ES	8.8	23.6	0.3	2.5	9.9	24.3	-	100	100
	UK	30.8	36.2	1.1	13.2	6.1	2.2	8.6	-	100
	US	7.9	11.9	0.2	1.9	1.6	0.2	2.0	68.0	-

Share of Failed Total Capital with 100% LGD

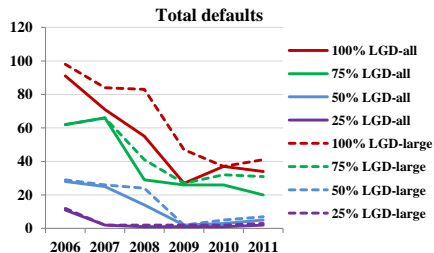
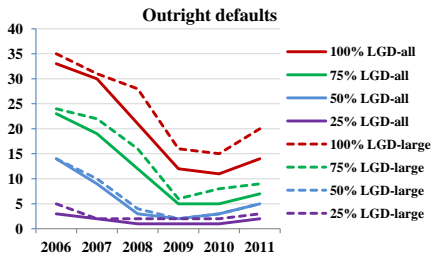


Number of Banking Systems Grouped by Level of Capital Losses



Large Banks as a Cushion

- A large bank is defined as a bank with at least \$20 billion of total assets.



Concluding Summary

- A single failure among PIIGS is not sufficient to trigger the default of the banking system of another country, but multiple failures could be more dangerous.
- Resilience to contagion tends to improve over the years.
- The systemic importance of the US, the UK, France and Germany.
- Banks of the US, Turkey and Finland are completely immune.
- Considerable risks for Switzerland and Ireland as their banking systems default even with 25% of LGD.
- Stress tests for large banks revealed similar patterns, but higher speed of contagion, larger number of first-round and total defaults and even more extensive capital losses.
- The applied approach allows to find systemically important and vulnerable players, track both direct and knock-on effects and calculate potential systemic losses \Rightarrow analysis is significant for policy.

Thank you!