Implicit Government Guarantees in European Financial Institutions

Lei Zhao

ESCP Europe, Labex Refi

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Implicit Guarantees

Implicit government guarantees (IGG) stem from the expectation that the government will rescue troubled financial firms even if there is no explicit, ex ante commitment to do so.

It matters

"Financial Crises involve a shock whose origins lie in the realm of macro-economic policy error, often magnified by the toxic combination of poorly designed financial deregulation and an overly generous financial safety net."

-------Timothy Geithner, 2004
President of the FRB of NY

"If the crisis has taught a single lesson, it is that the too-big-to-fail problem must be resolved…"

-------Ben Bernanke, 2010
Federal Reserve Chairman

"…, the moral hazard problems associated with implicit public support may amplify risk taking, reduce market discipline, create competitive distortions, and further increase the probability of distress."

-------Mark Carney, 2012
Governor of the Bank of Canada and Chairman of the FSB

Moral Hazard: "…when someone takes your money and isn't responsible for it…."

-------Gordon Gekko, 2010
Wall Street: Money Never Sleeps

Motivation

- IGG and moral hazard
- Can we eliminate IGG? Perhaps Not
  - ✓ Bailouts may be necessary to avoid spillovers to the rest of the economy.
  - ✓ Government bailouts can generated net economic benefit (Veronesi and Zingales 2010 JFE).

  Possible Solutions:

  - "Constructive ambiguity"
  - Constraints on bank size
  - Ring fencing of commercial banking activities
  - Levy Pigovian tax (Morris and Shin 2008, Brookings Papers)
  - Extra capital buffers
  - Bail-in arrangements
- Measure IGG & better understand it

Contributions

In this study I want to address the following questions:

- What is the size of the IGG?
- Too-Big-To-Fail effect?
- Are banks different from insurance companies?

Contributions (Cont.)

- Has the Basel III solved the IGG problem?
- Does “Eurozone” make a difference?
- Feedback effects between IGG and home country’s sovereign risk?

Senior vs Subordinated Debt

- The magnitude of IGG can be extracted from the price differential of the two CDS contracts (Black et al., 2013 WP).

- Two liquid CDS contracts for financial firms: senior and subordinated CDS.

- Assumption:

  Senior CDS prices include an IGG discount while Subordinated CDS prices do not.

- Subordinated debt has been recommended by academics and policy makers to cope with moral hazard issue within banks (Calomiris, 1999 JBF and Kwast et al., 1999 FRS Staff Study).

Historical Default Events

The working assumption is supported by default event analyses:

- Historically investors in banks' senior debt, rather than subordinated debt, have been bailed out by governments in Europe (Moody's 2009).

- "Holders of unsecured bank debt other than subordinated bonds have typically been exempted from the loss-sharing" (Schich and Kim, 2012 OECD Journal).

- A recent example: the nationalisation of SNS in 2013, where only subordinated debt was seized by the government in exchange for a bailout package.

Market Discipline

In general, the literature supports the assumption, at least after 1990s:

Early empirical studies	Later empirical studies	Most recent empirical studies
Fraser and McCormack,1978 JFQA Avery, Belton and Goldberg, 1988 JMCB Gorton and Santomero, 1990 JMCB	Flannery and Sorescu, 1996 JF Sironi, 2003 JMCB Goyal, 2005 JFI	Demirguc-Kunt and Huizinga, 2013 JBF Nguyen, 2013 JEF Beyhaghi et al., 2013 JBF
No market discipline exists for subordinated debt	*Market discipline exists for subordinated debt*	*Market discipline exists for subordinated debt, but not for senior debt* Different voice: Balasubramnian and Cyree, 2011 JBF

Quantifying IGG

- Ratings-based approach (Ueda and di Mauro, 2013 JBF)
- Basket-index put spread (Kelly, Lustig and Nieuwerburgh, 2011 Fama-Miller WP)
- Contingent claims analysis (Jobst and Gray 2013 IMF WP, Tsesmelidakis and Merton, 2012 WP)
- Bond spread differential (Acharya, Anginer and Warburton, 2013 WP)

- None focuses on Europe and none investigates the two segments of CDS market.
- Ratings-based approach reflects only long-run effect.
- CCA approach may underestimate the implicit subsidy.
- Bond spread differential: too many variables to control.
- Basket-index put spread and Bond spread differential methods can only be applied at an aggregate level, not at firm level.

Decomposing CDS spread

- Approximately $S=PD^{Q}*LGD^{Q}$
- We argue that, without IGG, PD^{Q} extracted from the two types of CDS spread should be identical

  (see Norden and Weber, 2012 WP and Longstaff and Schwartz, 1995 JF).

Why?... $PD^{Q}=PD^{P}$ + **Risk Premium**, physical PD is the same due to cross-default provisions.

Default risk premium and liquidity premium

Compensate for the cyclical **variation** in PD^{P}

How about liquidity premium? Almost equal liquidity for the two types of CDS during the financial crises.

Conclusion: If PD^{Q} derived from the two types of CDS differ from each other, the difference comes from IGG. In short, *PD^{SUB} is the real (fair-value) PD and PD^{SEN} is the subsidized PD.*

PD or LGD?

- One could argue that the implicit support is captured by different LGDs. However the results of the paper will not be altered:

$$Credit\ spread^{SEN} = D * PD^{Fair-value} * LGD^{Fair-value}$$

- Government bailouts that reduce LGD for senior debt is effectively equivalent to reducing the PD for senior debt, keeping LGD unchanged.

PD and Correlation

- Calculating PD^{Q} for both CDS:

$PD_{i,t}^{j} = \frac{a_t s_{i,t}^{j}}{a_t LGD_j + b_t s_{i,t}^{j}}$, Where $a_t = \int_t^T e^{-r_t \tau} d\tau$ and $b_t = \int_t^T \tau e^{-r_t \tau} d\tau$, j indicates CDS types (e.g. senior and subordinated). LGD_{SEN}=0.6 and LGD_{SUB}=0.7

- In order to price IGG fairly and accurately, asset correlation of financial firms needs to be taken into consideration directly. We proxy asset return correlation with equity return correlation and employ the Factor-DCC model to estimate the correlation:

$$r_t = \beta r_{m.t} + D_t \varepsilon_t \, , \, r_{m,t} = \sqrt{h_{m,t}} \varepsilon_{m,t} \, , \, \begin{pmatrix} \varepsilon_t \\ \varepsilon_{m,t} \end{pmatrix} \sim N(0, R_t)$$

$$V_{t-1}(r_t) = \beta\beta' h_{m,t} + D_t R_{I,I,t} D_t + \sqrt{h_{m,t}} \left(\beta R_{m,I,t} D_t + D_t R_{I,m,t} \beta' \right)$$

Static co-movement with the market

Correlation among idiosyncrasies

Correlation between idiosyncrasies and market shocks (changing beta effect)

Measuring IGG

- IGG, which represents the subsidy from the public to senior debt holders, is measured as:

approximately $IGG = EL^{Real} - EL^{Subsidized}$

$$L_{i,t+1}^{Real,k} = LGD_{SEN} * 1_{default,PD_{i,t}^{SUB}}^{k}, \quad L_{i,t+1}^{Subsidized,k} = LGD_{SEN} * 1_{default,PD_{i,t}^{SEN}}^{k}$$

$$IGG_{i,t} = E\left[\left(L_{i,t+1}^{Real,k} - L_{i,t+1}^{Subsidized,k}\right) * 1_{distress}^{k}\right], \quad IGG_{agg,t} = \sum_{1}^{N} w_{i,t} IGG_{i,t}$$

$$1_{default}^{k} = \begin{cases} 1, & \text{if default} \\ 0, & \text{otherwise} \end{cases} \qquad 1_{distress}^{k} = \begin{cases} 1, & \text{if financial system is in distress} \\ 0, & \text{otherwise} \end{cases}$$

* k represents the k-th scenario in our Monte Carlo simulations and $w_{i,t}$ represents uninsured liability weights.

To summarize

- We observe difference between the spreads of senior CDS and subordinated CDS.
- The difference comes from both different seniorities and also the implicit guarantees.
- Controlling for seniority (by assuming different LGDs), the implicit guarantees are captured by the different PDs calculated with the two types of CDS.
- For a single financial firm at a particular date:

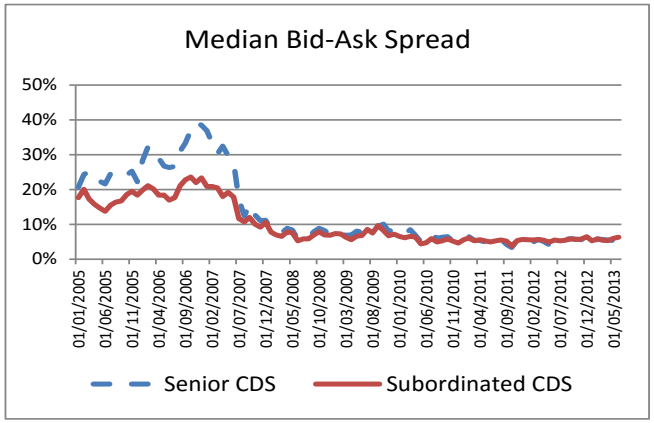
  $PD^{Fair-value}$ is derived from its subordinated CDS spread

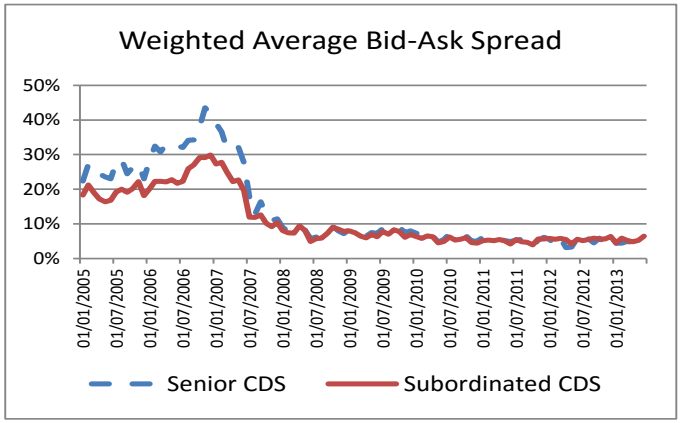
  $PD^{Subsidized}$ is derived from its senior CDS spread

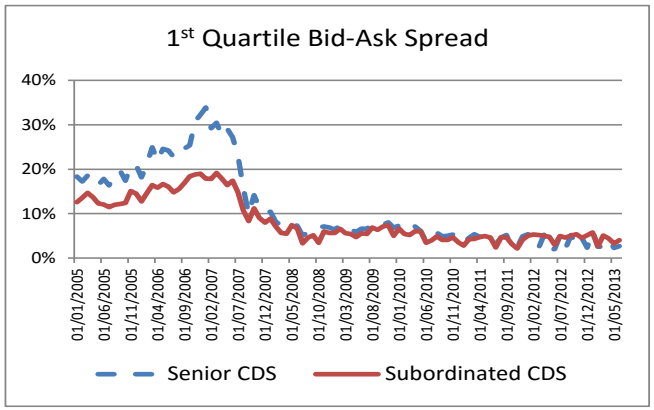
Sample selection

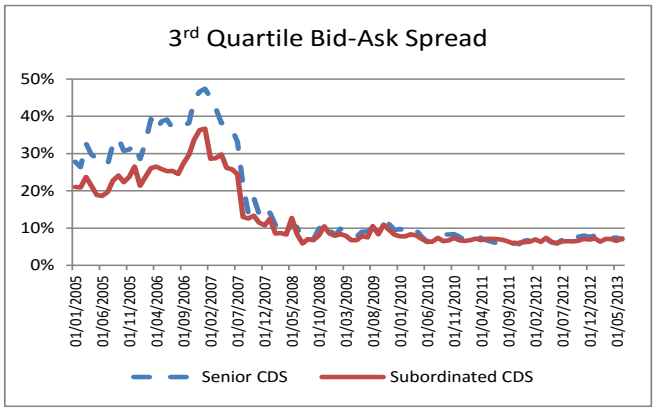
- Start with 100 largest financial firms in Europe.
  - A minimum number of 24 valid observations of monthly CDS spread for both subordinated and senior debt.
  - Publicly available daily equity returns since Jan. 2005.
- End up with 35 banks and 11 insurance companies
- Sample period from Jan. 2005 until Jun. 2013 (Bloomberg).

CDS Liquidity





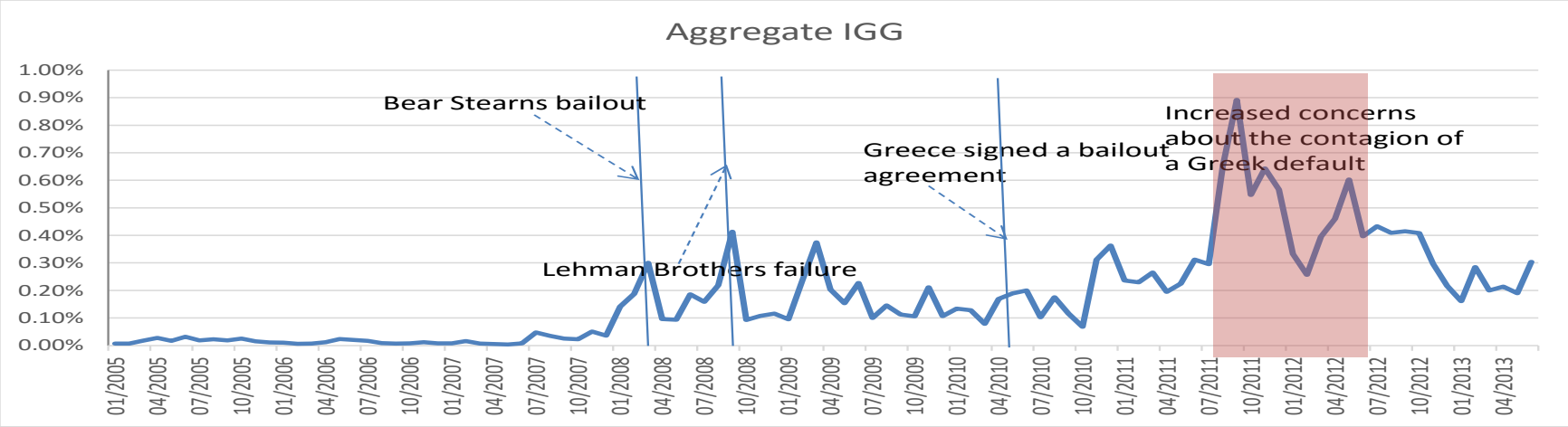




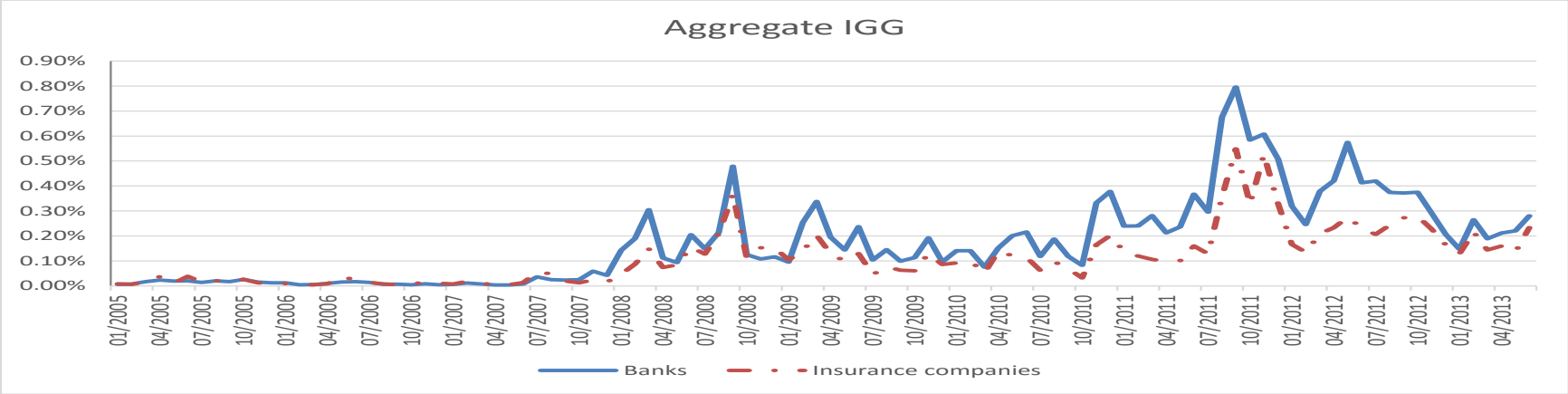
* Relative bid-ask spread is calculated as the difference between the ask and bid quote over the mid spread for both senior and subordinated CDS.

Aggregate IGG

- Weighted average IGG



- Banks vs. Insurance companies

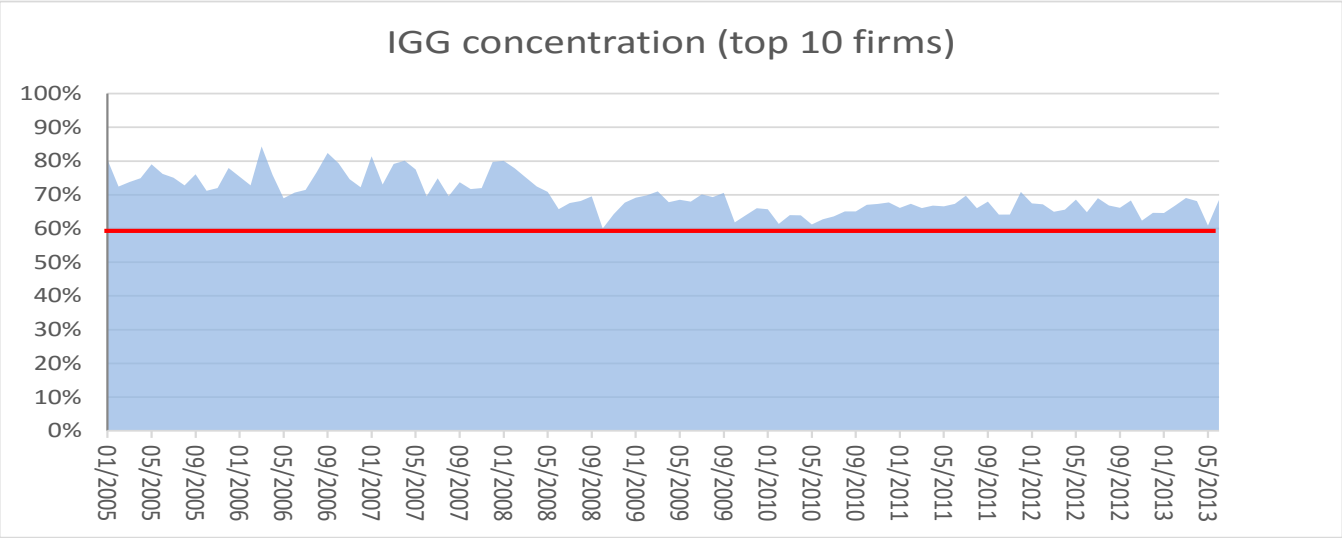


Individual IGG

- Summary statistics of individual IGG (in basis points)

	Mean	Max	Min	1st Quartile	3rd Quartile	Std. dev.	Observations
Pre-Crises	1.27	9.84	0.00	0.48	1.68	0.55	860
Subprime Crisis	13.43	80.16	0.00	5.04	18.72	6.00	1202
Sovereign Debt Crisis	26.38	216.00	0.00	11.04	34.56	10.93	1590

- Individual IGG concentration



IGG rankings

Top 15 firms as of June 2013

Financial firms	Jun. 2013	Dec. 2012	Dec. 2011	Dec. 2010
SOC GENERALE	**1**	**1**	**5**	**8**
CREDIT AGRICOLE	**2**	**3**	**3**	**10**
BNP PARIBAS	**3**	**7**	**2**	**6**
BANCO SABADELL	**4**	**15**	**--**	**12**
UNIPOL GRUPPO FI	5	24	26	--
COMMERZBANK	**6**	**2**	**1**	**1**
BARCLAYS PLC	**7**	**4**	**6**	**13**
LLOYDS BANKING	**8**	**5**	**10**	**4**
ING GROEP NV*	9	11	8	19
STANDARD CHARTER	10	26	39	31
SWEDBANK AB-A	**11**	--	--	--
DEUTSCHE BANK-RG	12	18	9	20
MUENCHENER RUECKVER*	13	31	24	35
ERSTE GROUP BANK AG	14	17	21	22
NATIXIS	15	14	16	33

* Firms with an asterisk are insurance companies.

Distressed IGG

IGG vs. d-IGG

Dec. 2007			Dec. 2011		
Financial institutions	**IGG**	**d-IGG**	**Financial institutions**	**IGG**	**d-IGG**
Commerzbank	2.10	426.83	Commerzbank	26.04	682.39
Credit Agricole	1.86	378.05	BNP Paribas	23.94	627.36
Banco Santander	1.86	378.05	Credit Agricole	22.62	592.77
Unicredit Spa	1.8	365.85	RBS	21.54	564.47
Standard Chartered	1.68	341.46	Soc Generale	21.54	564.47
Banca Monte dei	1.62	329.27	Barclays Plc	20.16	528.30
Deutsche Bank-RG	1.56	317.07	BBVA	19.86	520.44
BBVA	1.44	292.68	ING Groep NV*	19.86	520.44
Muenchener Rue*	1.26	256.10	Deutsche Bank-RG	17.58	460.69
BNP Paribas	1.26	256.10	Lloyds Banking	17.28	452.83
Soc Generale	1.26	256.10	Intesa Sanpaolo	16.08	421.38
Credit Suiss-Reg	1.08	219.51	Dexia SA	15.06	394.65
Barclays Plc	1.02	207.32	Bank of Ireland	14.52	380.50
UBS AG-Reg	0.96	195.12	Unicredit Spa	14.34	375.79
ING Groep NV*	0.96	195.12	Banco Santander	14.22	372.64

* Firms with an asterisk are insurance companies.

TBTF effect and Basel III

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	-32.67***	15.41***	-59.10***	-24.13***	-22.02***	-21.00***	-47.97***
PD^{SUB}_{t-1}			1.49***	1.36***	1.50***	1.29***	1.59***
$Interconnectedness_{t-1}$			0.19***	0.24***	0.21***	0.22***	0.24***
VIX_t			0.57***	0.59***	0.58***	0.54***	0.63***
Bank			4.15***	4.57***	4.59 ***	3.83***	
Basel III			19.47***	20.57***	20.04***	18.38***	18.25***
$Size_{t-1}$	3.81***		3.04***				2.15**
$Top10_{t-1}$		5.72**		5.10***	4.43***		
$Bottom10_{t-1}$					-4.68**		
$Top10_{t-1}*PD^{SUB}_{t-1}$						3.07***	
$Top10_{t-1}$*Basel III							10.57**
Adjusted R-squared	0.04	0.02	0.51	0.50	0.51	0.53	0.53
Observations	3708	3708	3708	3708	3708	3708	2747

Subsample of only banks

*The dependent variable in the regressions reported in the Table is IGG (in basis points), t-values have been computed with White period standard errors (clustering at the firm level).

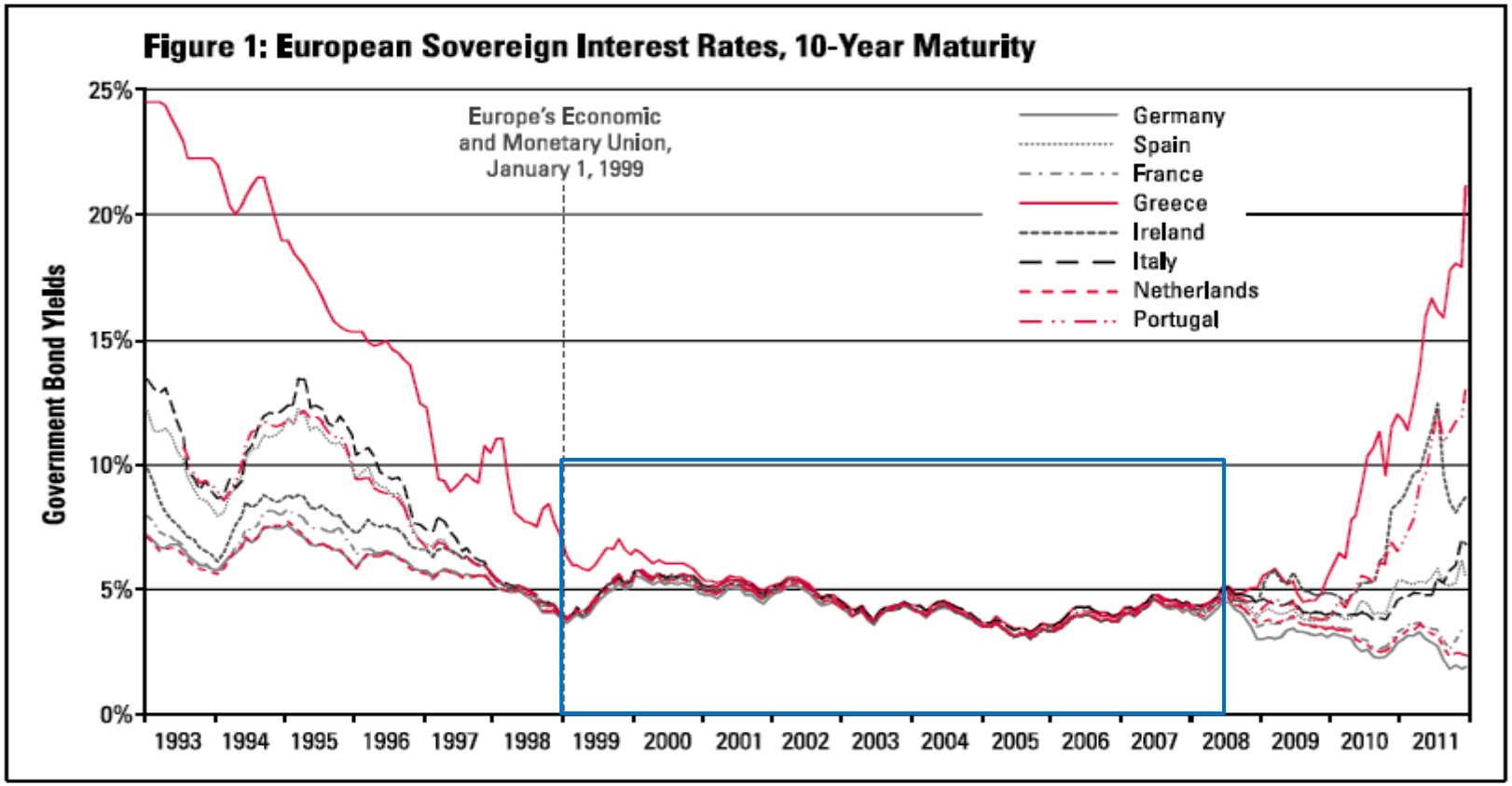
Robustness tests

- Drop the largest 5 firms.
- Fixed effects: both cross-sectional and time series.
- Two crisis periods: Subprime Crisis (Jun. 2007 to Dec. 2009) and Sovereign Debt Crisis (Jan. 2010 to Jun. 2013).

Conclusion: Our findings survive the robustness tests.

Eurozone effect

- Another form of implicit guarantee that benefits single countries



* Graph is taken from Chinn and Frieden (2012)

Eurozone effect (Cont.)

- Summary statistics of IGG for Eurozone and non-Eurozone firms

	Mean	Max	Min	Std. dev.	No. of Observations
			Whole sample period		
Non-Eurozone	15.60	153.12	0.00	8.84	1116
Eurozone	17.16	216.00	0.00	9.90	2659
			Pre-crises period		
Non-Eurozone	1.00	4.56	0.00	0.40	232
Eurozone	1.36	9.84	0.00	0.59	631
			Crises period		
Non-Eurozone	19.43	153.12	0.00	9.00	826
Eurozone	22.08	216	0.00	10.14	1867

Eurozone effect (Cont.)

	(1)	(2)	(3)
Constant	-62.25***	-62.86***	-20.81***
PD^{SUB}_{t-1}	1.39***	1.39***	1.29***
$Interconnectedness_{t-1}$	0.18***	0.18***	0.21***
VIX_t	0.58***	0.58***	0.54***
Bank	4.37***	4.40***	3.89***
Basel III	19.85***	19.83***	18.31***
$Size_{t-1}$	3.39***	3.44***	
NonEuro	-3.33**		
$Size_{t-1}$*NonEuro		-0.25**	
$Top10_{t-1}$*PD^{SUB}_{t-1}			3.36***
$Top10_{t-1}$*PD^{SUB}_{t-1}*NonEuro			-0.64
Adjusted R-squared	0.51	0.51	0.53
Observations	3708	3708	3708

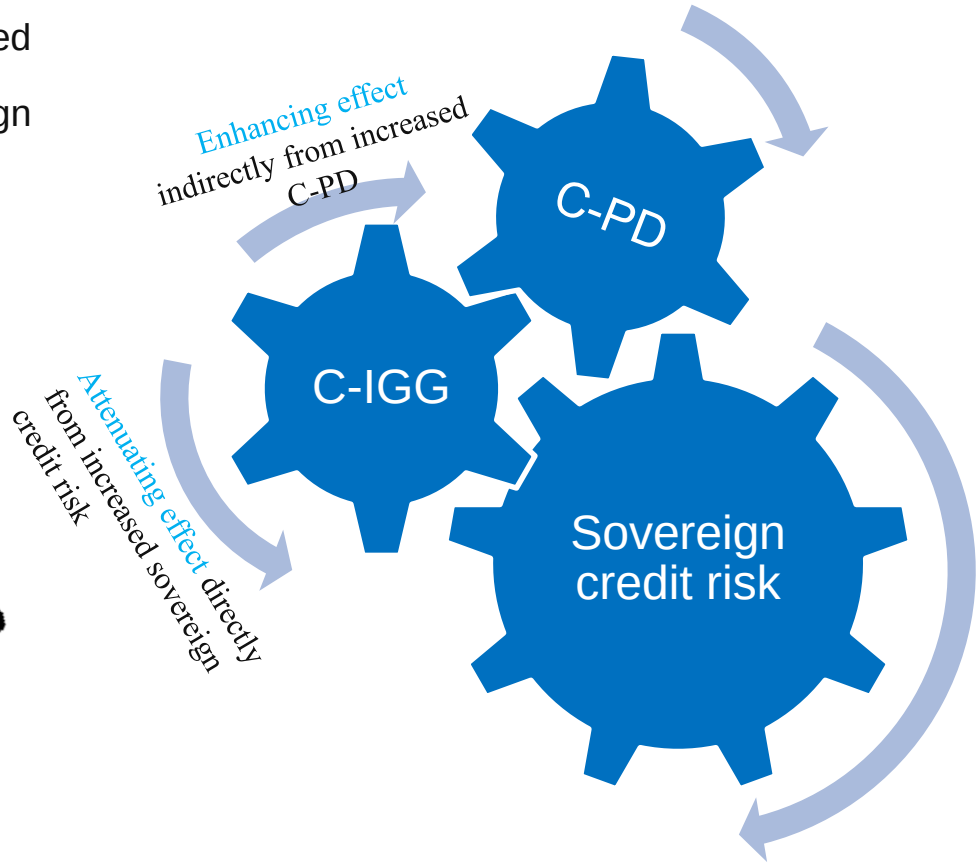
*The dependent variable in the regressions reported in the Table is IGG (in basis points), t-values have been computed with White period standard errors.

Feedback effect between IGG and sovereign credit strength

- Higher IGG leads to higher sovereign default risk.
- Higher sovereign risk results in lower IGG.
  - Since the authorities' ability to save distressed financial firms may be doubted when sovereign credit weakens.

Panel A

	Granger causality tests
Number of lags	5
	P-value
c-IGG does not Granger cause SovereignCDS	0.0510
SovereignCDS does not Granger cause c-IGG	0.3083
Number of observations	972



Feedback effect between IGG and sovereign credit strength (Cont.)

- In short, IGG increases sovereign credit risk.
- Two offsetting effects from sovereign credit risk to IGG should be disentangled.
- To isolate the enhancing effect (through increased PD), we use SovereignCDS$^{\perp}$ to redo the Granger causality tests.

*SovereignCDS$^{\perp}$ is the residual ε_t from the regression:

$$SovereignCDS_t = \alpha + \beta \text{C-PD}_t^{SUB} + \varepsilon_t$$

Panel B

	Vector autoregressive model (VAR)	
Number of lags	1	
	c-IGG$_t$	SovereignCDS$^{\perp}_t$
c-IGG$_{t-1}$	0.761***	0.581***
SovereignCDS$^{\perp}_{t-1}$	-0.003***	1.018***
	Granger causality tests	
		P-value
c-IGG does not Granger cause SovereignCDS$^{\perp}$		0.0000
SovereignCDS$^{\perp}$ does not Granger cause c-IGG		0.0037
Number of observations		1028

Take away points

- Implicit guarantees exist for both banks and insurance companies; banks benefit more.
- The aggregate guarantee increases substantially during the crises and peaks at an average of 89 basis points in Sep. 2011, equivalent to a subsidy of € 175 bn per year.
- IGG is concentrated in a small number of financial firms over time.
- Eurozone firms are perceived to be more implicitly protected than their non-Eurozone counterparts.
- IGG increases sovereign default risk, while I find two offsetting effects from sovereign default risk on the implicit guarantees.

Thank you!