

A Pyrrhic Victory? Bank Bailouts and Sovereign Credit Risk

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May 2011

Questions

- ❶ Did financial sector bailouts ignite sovereign credit risk in the developed economies?
 - were there important immediate costs to the bailouts (as opposed to just distortions of future incentives)

- ❷ What mechanisms underlie the relationship between financial sector and sovereign credit risk?
 - transmission of risks (spillover) between the sectors
 - trade-off between financial sector and sovereign credit risk

- ❸ Does sovereign credit risk also feedback onto financial sector credit risk?

Motivation: Bailout of Irish Banks

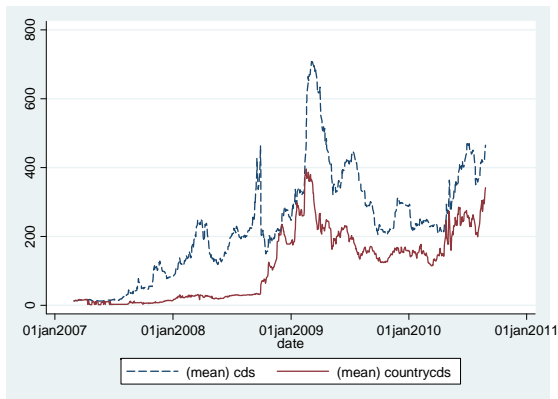
From Financial Sector Credit Risk to Sovereign Credit Risk

- On September 30, 2008 the government of Ireland announced a guarantee of all deposits of its six biggest banks
- Credit default swap (CDS) fee for buying protection on Irish banks fell from 400 bps to 150 bps
- From the standpoint of stabilizing the financial sector, the end goal of the guarantees appeared to have been met
- But at what cost?
- What impact would these provisions have on the credit risk of the government of Ireland?

Bailouts and Risk Transfer

- Just one of the Irish banks, Anglo Irish, had cost the government up to Euro 25 Billion or 11.26% of GDP by Aug'10
- Ireland received 85 Billion Euro rescue package by European Union and IMF in Nov'10 and now needs another 24 Billion Euro for lenders
- Total is approximately 70% of 2010 GDP
- Ireland CDS spread now above 600 bps

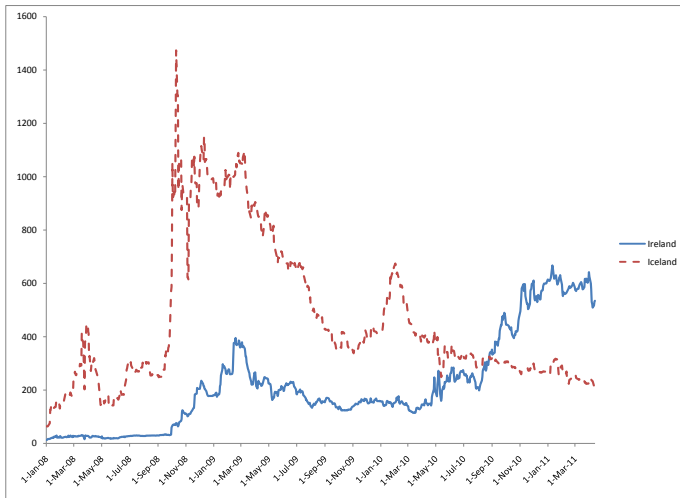
A Motivating Example: The Case of Ireland



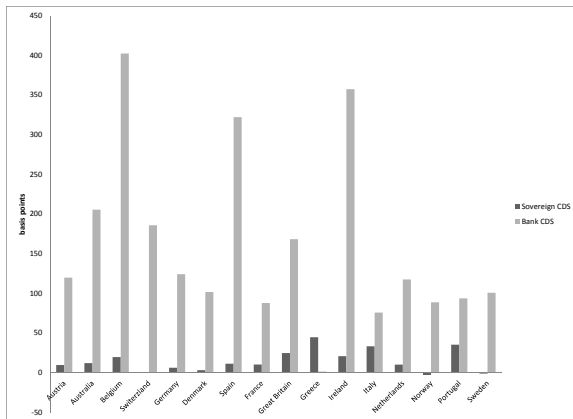
- Chart similar across many countries:

- 1 sovereign CDS close to 0 through first-half 2008
- 2 post bailout announcement (9/30/2008): sovereign CDS jumps up, bank CDS drops down
- 3 subsequent positive comovement

Did Ireland have a choice? – Iceland vs. Ireland CDS



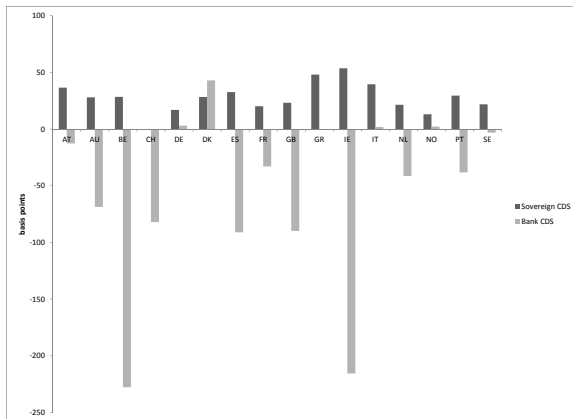
Pre-Bailouts: Europe



3/1/2007 – 8/31/2008

- bank CDS has increased substantially
- not much change in sovereign CDS

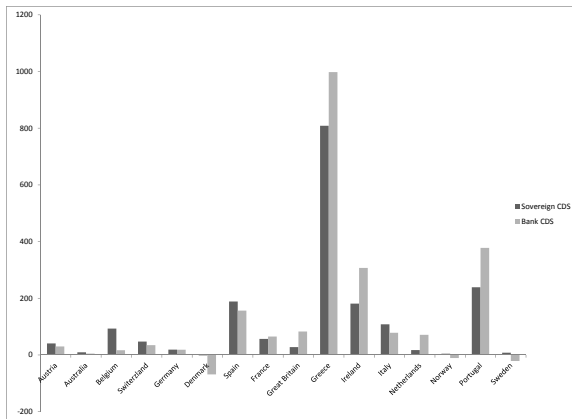
During the Bailout Period



9/26/2008 – 10/21/2008

- bank CDS decreases substantially
- strong increase in sovereign CDS

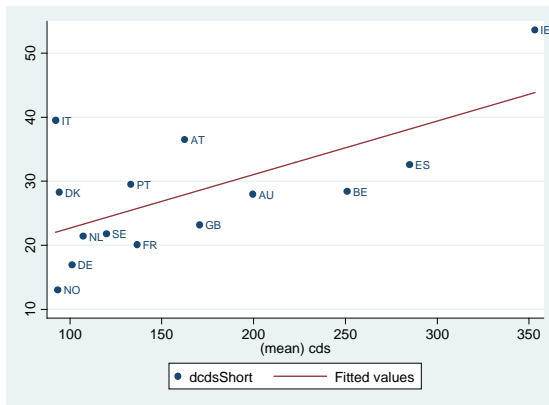
Post Bailout



10/22/2008 – 6/30/2010

- positive comovement
- a merger of financial sector and and sovereign?

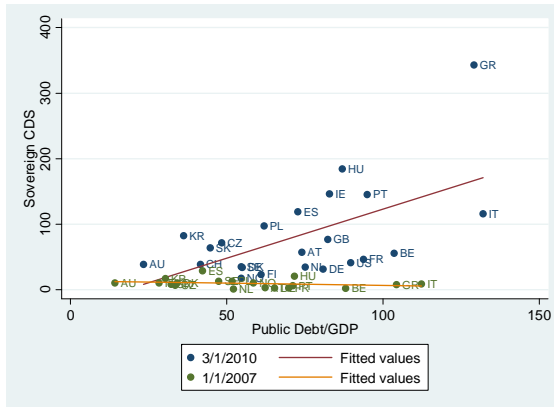
Correlation of Sovereign CDS change and Pre-bailout Bank CDS



Sov. CDS change vs. Pre-bailout Bank CDS

- Pre-bailout: 21 Sep 2008
- Sovereign CDS change: End of Sep 2008 to End of Sep 2009

Correlation of Sovereign CDS and Public Debt: Pre and Post-Crisis

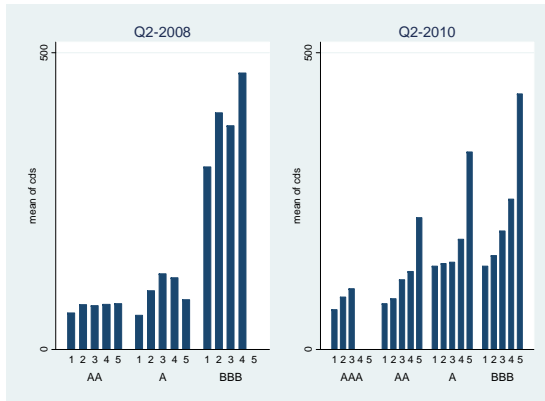


Sov. CDS vs. Debt/GDP

- Pre-Crisis: low- H region, not much relationship
- Post-Crisis: sovereigns increase H , relationship becomes apparent

	Log (Sovereign CDS)				% Public Debt	
	Pre-Bailout		Post-Bailout		Around Bailout	Post-Bailout
	1/1/2008		3/31/2010		Δ 2010-2008	3/31/2010
% Public Debt (June 2008)	0.006	0.005	0.015*	0.013+		1.107**
	(0.004)	(0.005)	(0.006)	(0.007)		(0.144)
Log (Average Bank CDS Sep 2008)		0.311		0.965*	20.118+	21.726+
		(0.208)		(0.357)	(10.168)	(11.555)
Constant	2.137**	0.601	3.112**	-1.593	-86.920	-101.548
	(0.320)	(1.154)	(0.401)	(2.019)	(49.456)	(60.923)
Observations	15	14	17	15	15	15
R-squared	0.134	0.171	0.261	0.488	0.364	0.843

Feedback Sovereign CDS → Bank CDS



- Spain: 247 bps, Germany: 43 bps (6/1/10)
- Santander (Spain): Rating AA, CDS: 207 bps (6/1/10)
 - Most profitable Euro bank 3yrs. end 2009 (26.9B Euro profit)
 - Mkt. cap 79B Euros (biggest in Europe)
 - Spain account for only 22% of profits
- WestLB (Germany): Rating BBB+, CDS: 158 bps (6/1/10)

Feedback Sovereign CDS → Financial Sector CDS (levels)

Period	Log(Bank CDS)								
	Pre-Bailout (Jan 07-Aug 08)			Around Bailout (Sep-Oct 08)			Post-Bailout (Nov 08-Sep 10)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log(Sovereign CDS)	0.061+ (0.037)	0.049 (0.048)	0.045 (0.053)	0.130 (0.111)	0.039 (0.196)	0.112 (0.202)	0.443** (0.060)	0.589** (0.075)	0.525** (0.070)
Log(CDS Market Index)	1.415** (0.073)			1.133** (0.094)			0.544** (0.069)		
Log(Volatility Index)	-0.148+ (0.076)			-0.435** (0.147)			-0.099 (0.060)		
Week Fixed Effects	N	Y	Y	N	Y	Y	N	Y	Y
Bank Fixed Effects	N	Y	Y	N	Y	Y	N	Y	Y
Bank Stock Return	N	N	Y	N	N	Y	N	N	Y
Observations	3,633	3,633	2,859	606	606	455	7,012	7,012	5,210
Banks	83	83	62	71	71	53	83	83	59
R-squared	0.916	0.944	0.960	0.834	0.866	0.864	0.858	0.885	0.880

Feedback Sovereign CDS → Financial Sector CDS (changes)

Period	$\Delta \text{ Log(Bank CDS)}$								
	Pre-Bailout (Jan 07-Aug 08)			Around Bailout (Sep-Oct 08)			Post-Bailout (Nov 08-Sep 10)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta \text{ Log(Sovereign CDS)}$	0.023*	0.015	0.019	0.026	-0.403+	-0.430	0.163**	0.079**	0.080**
	(0.010)	(0.014)	(0.015)	(0.082)	(0.232)	(0.287)	(0.019)	(0.030)	(0.027)
$\Delta \text{ Log(CDS Market Index)}$	0.860**			0.932**			0.689**		
	(0.041)			(0.094)			(0.027)		
$\Delta \text{ Volatility Index}$	0.214			-0.539**			0.122*		
	(0.155)			(0.081)			(0.050)		
Week FE	N	Y	Y	N	Y	Y	N	Y	Y
Interactions	N	N	Y	N	N	Y	N	N	Y
Observations	3,508	3,508	3,508	577	577	577	7,086	7,086	7,086
Banks	84	84	84	71	71	71	84	84	84
R-squared	0.171	0.253	0.387	0.134	0.308	0.504	0.316	0.384	0.441

- Sovereign credit risk is important, even after controlling for:

- 1 bank equity return (bank and asset quality)
- 2 volatility
- 3 CDS-market movements
- 4 bank/day fixed-effects

Feedback Sovereign CDS → Financial Sector Equity (changes)

Period	Bank Stock Return								
	Pre-Bailout (Jan 07-Aug 08)			Around Bailout (Sep-Oct 08)			Post-Bailout (Nov 08-Sep 10)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta \text{ Log(Sovereign CDS)}$	-0.011** (0.004)	-0.002 (0.002)	-0.002 (0.002)	-0.040 (0.035)	0.041 (0.075)	0.114 (0.114)	-0.177** (0.026)	-0.054* (0.026)	-0.068** (0.026)
$\Delta \text{ Log(CDS Market Index)}$	-0.106** (0.015)			-0.474** (0.078)			-0.243** (0.017)		
$\Delta \text{ Volatility Index}$	-0.368** (0.070)			-0.317** (0.082)			-0.761** (0.057)		
Week FE	N	Y	Y	N	Y	Y	N	Y	Y
Bank FE	N	N	Y	N	N	Y	N	N	Y
Interactions	N	N	Y	N	N	Y	N	N	Y
Observations	2,895	2,895	2,895	446	446	446	5,324	5,324	5,324
Banks	65	65	65	54	54	54	60	60	60
R-squared	0.070	0.240	0.311	0.118	0.212	0.564	0.285	0.488	0.533

Feedback Sovereign CDS → Financial Sector CDS (guarantee channel)

Period	$\Delta \text{ Log(Bank CDS)}$								
	Pre-Bailout (Jan 07-Aug 08)			Around Bailout (Sep-Oct 08)			Post-Bailout (Nov 08-Sep 10)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta \text{ Log(Sovereign CDS)}$	0.019*	0.008	0.014	-0.020	-0.236	-0.235	0.150**	0.100**	0.105**
	(0.009)	(0.013)	(0.015)	(0.096)	(0.153)	(0.200)	(0.025)	(0.034)	(0.030)
Bank Stock Return	-0.142	-0.062	0.716**	-0.255+	-0.295*	3.981*	-0.174**	-0.154**	-0.260**
	(0.118)	(0.106)	(0.205)	(0.132)	(0.147)	(1.769)	(0.034)	(0.036)	(0.042)
$\Delta \text{ Log(CDS Market Index)}$	0.929**			0.848**			0.662**		
	(0.043)			(0.123)			(0.032)		
$\Delta \text{ Volatility Index}$	0.043			-0.711**			0.030		
	(0.120)			(0.096)			(0.051)		
Week FE	N	Y	Y	N	Y	Y	N	Y	Y
Interactions	N	N	Y	N	N	Y	N	N	Y
Observations	2,745	2,745	2,745	437	437	437	5,278	5,278	5,278
Banks	63	63	63	53	53	53	60	60	60
R-squared	0.224	0.308	0.481	0.208	0.403	0.728	0.359	0.424	0.491

Feedback Sovereign CDS → Financial Sector CDS (bank capitalization)

Period	$\Delta \text{ Log(Bank CDS)}$								
	Pre-Bailout (Jan 07-Aug 08)			Around Bailout (Sep-Oct 08)			Post-Bailout (Nov 08-Sep 10)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta \text{ Log(Sovereign CDS)*Tier 1}$	0.726 (0.569)	0.208 (0.365)	0.520 (0.566)	-7.793* (3.152)	-8.666* (4.202)	-7.444 (7.930)	-2.117 (1.493)	-2.077 (1.418)	-3.407* (1.543)
$\Delta \text{ Log(Sovereign CDS)}$	-0.041 (0.043)	-0.009 (0.035)	-0.026 (0.053)	0.551+ (0.299)	0.404 (0.420)	0.290 (0.717)	0.355** (0.125)	0.300* (0.130)	0.411** (0.136)
Tier 1	-0.190 (0.243)	-0.097 (0.268)		0.333 (0.715)	0.624 (0.729)		-0.032 (0.083)	-0.023 (0.096)	
Other Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Week FE	N	Y	Y	N	Y	Y	N	Y	Y
Interactions	N	N	Y	N	N	Y	N	N	Y
Observations	2,160	2,160	2,160	336	336	336	4,224	4,224	4,224
Bank	49	49	49	41	41	41	48	48	48
R-squared	0.205	0.290	0.470	0.225	0.414	0.702	0.352	0.422	0.484

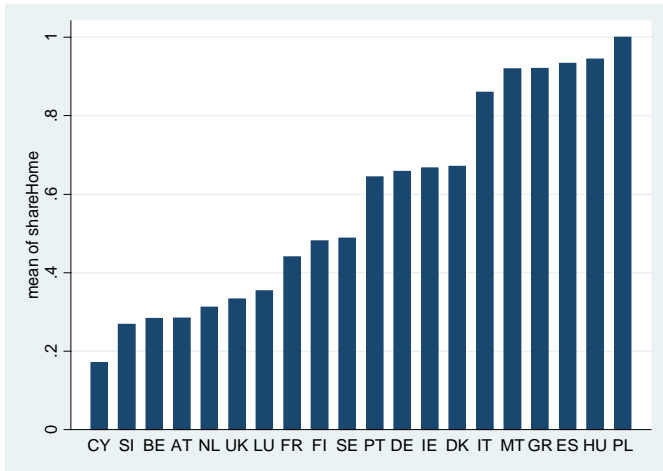
Feedback from Sovereign to Financial Sector: Stress Tests

- European Bank Stress Tests
 - Collect bank-level sovereign holdings data as of March 31st, 2010
- Shows banks have substantial sovereign debt holdings
 - Strong 'Home bias' in sovereign holdings : 69.4%
- Use reported positions to examine co-movement of sovereign and bank CDS
 - Compute sovereign exposure with holdings as weight
 - Exclude home-holdings to avoid bias from economic shocks in home country

Size of Sovereign Bond Holdings of Banks

Sovereign Holdings Euro Bank Stress Tests Sample, March 31, 2010						
	N	Mean	Std.Dev	50th Percentile	5th Percentile	95th Percentile
	(1)	(2)	(3)	(4)	(5)	(6)
Bank Characteristics						
Risk-weighted Assets (EUR million)	91	126,337	179,130	63,448	3,269	493,307
Tier 1 Capital Ratio (%)	91	10.2	2.4	9.8	7.2	14.4
Sovereign Exposure						
Sovereign Holdings (gross, EUR million)	91	20,668	27,948	7,930	105	81,765
Sovereign Holdings (net, EUR million)	91	19,719	27,329	6,960	105	78,959
Home Sovereign Holdings (gross, EUR million)	91	11,493	14,422	5,774	182	42,800
Home Sovereign Holdings (net, EUR million)	91	11,023	13,956	5,348	117	42,800
Home Share (%)	91	69.4	30.0	81.6	18.9	100
Greek Sovereign Holdings	91	669	2,844	0	0	5,601
Share Banking Book (%)	91	84.9	19.9	92.2	35.4	100.0

Home Bias in Sovereign Bond Holdings



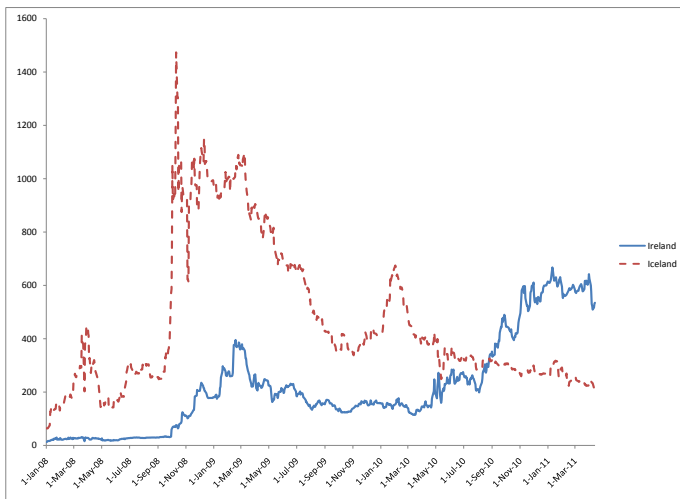
Co-movement of Bank CDS and Foreign Sovereign CDS

Sample	Change in Bank CDS					Excluding Germany
	All (1)	All (2)	All (3)	All (4)	All (5)	
Change in Sovereign Exposure	0.325** (0.027)	0.326** (0.028)	0.261** (0.027)	0.141** (0.049)	0.135** (0.046)	0.137** (0.046)
Bank FE	N	Y	N	N	Y	Y
Week FE	N	N	Y	N	N	N
Day FE	N	N	N	Y	Y	Y
Observations	2,317	2,317	2,317	2,317	2,317	2,317
Banks	51	51	51	51	51	0.357
R-squared	0.173	0.188	0.228	0.342	0.357	0.357
Adjusted R-Squared	0.173	0.170	0.224	0.329	0.329	0.329

Conclusion

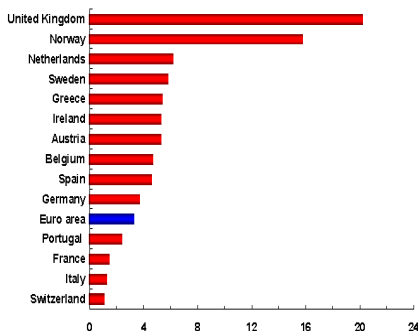
- Future costs of bailouts (e.g., moral hazard) are far from being the only important ones
- Costs are clear and present
 - Gov. Budget constraint has tightened (gov. pockets are finite)– the elimination of slack is priced by the markets
 - Given these costs, the restructuring of financial sector debt should be considered more seriously
 - Sovereign debt more sensitive to growth shocks, shocks feed back onto financial sector
 - Reinhart and Rogoff(2009a, b) – perverse growth dynamics beyond 90% debt/GDP Ratio
- Future Research:
 - 1 Additional empirical and theoretical research on dynamics of financial sector and sovereign credit risks
 - 2 Integrate with research on fiscal and monetary policy

Do the sovereigns have a choice? – Iceland vs. Ireland CDS



Up-Front Estimates of Bailout Costs

Figure 4. Up-front Government Financing Need to Shore Up the Financial Sector 1/
(Percent of 2008 GDP)



Source: IMF (2009a).

1/ Includes capital injections, purchase of assets, and lending by treasury that require up-front government outlays.