The End of Market Discipline?
Investor Expectations of Implicit State Guarantees

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- Federal Reserve Chairman Bernanke (2013):

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

- The too-big-to-fail (TBTF) doctrine postulates that the government will not allow large financial institutions to fail if their failure would cause significant disruption to the financial system and economic activity.

- The guarantee is implicit as the authorities do not have any explicit, ex ante commitment to intervene.

- The possibility of a bailout may exist in theory but not reliably in practice, and as a result, market participants do not price implicit guarantees.
  - The government's long-standing policy of "constructive ambiguity" (Freixas 1999; Mishkin 1999) is designed to encourage that uncertainty.
  - This has led authorities to take a seemingly random approach to intervention, for instance by saving AIG but not Lehman Brothers, in order to make it hard for investors to rely on a bailout

Federal Reserve Chairman Bernanke (2013):

- "The subsidy is coming because of market expectations that the government would bail out these firms if they failed….I think we should get rid of it."

American Bankers Association, The Clearing House, Financial Services Forum, Financial Services Roundtable, SIFMA (2013):

- Question the existence of a TBTF subsidy.
- "The markets may even be imposing a funding penalty on large banking institutions."

U.S. Senate:

- AMERICAN BANKER

  Senate Passes Bill to Require GAO Study on TBTF

  By Victoria Finkle
  Dec 22, 2012 10:14am ET

  WASHINGTON – The Senate has passed a bill that would direct the GAO to examine the economic benefits large banks receive for being "too big to fail."

Literature

- A line of literature examines whether the market can provide discipline against bank risk taking
  - DeYoung et al. 2001; Jagtiani, Kaufman and Lemieux 2002; Jagtiani and Lemieux 2001; Allen, Jagtiani and Moser 2001; Morgan and Stiroh 2000 and 2001; Calomiris 1999; Levonian 2000; Federal Reserve Board 1999; and Flannery 1998
  - These studies do not consider potential price distortions arising from conjectural government support.

- Flannery and Sorescu (1996) & Sironi (2003) examine yield spreads on subordinated debt focusing on the FDIC Improvement Act (FDICIA) in 1991 and the impact of EU budget constraint respectively
  - They find that as the implicit guarantee was diminished through policy and legislative changes, debt holders came to realize
  - They do not distinguish TBTF banks

- Morgan and Stiroh (2005) & Balasubramnian and Cyree (2011) focus on the banks declared “too big to fail” by the Comptroller of the Currency in 1984, in order to differentiate TBTF banks from non-TBTF banks

- O’Hara and Shaw (1990), Kane (2000), Brewer and Jagtiani (2007), Molyneux, Schaeck and Zhou (2010) examine equity prices and premiums paid in bank M&A activity

Motivation

Questions

- Do investors expect government support?
- How does it affect pricing of risk?
- Was Dodd-Frank successful in ending TBTF expectations?

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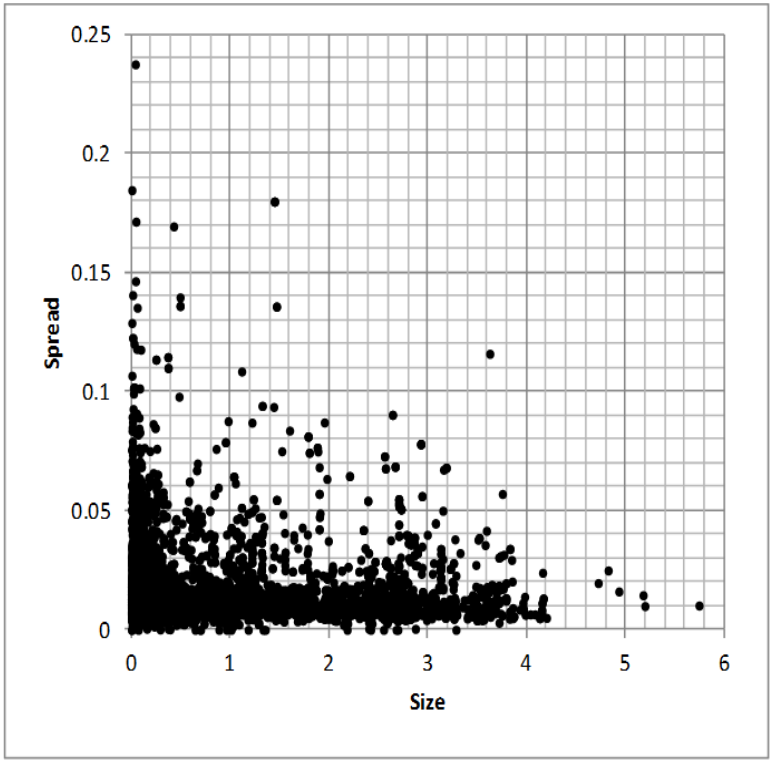
Findings

- Bondholders expect public support for major financial institutions
  - For most financial institutions, spreads are risk sensitive
  - For the largest financial institutions, spreads lack risk sensitivity
- Implicit support constitutes a subsidy for these institutions
  - Lowers funding costs by as much as 100 basis points.
- Passage of Dodd-Frank did not eliminate expectations of government support

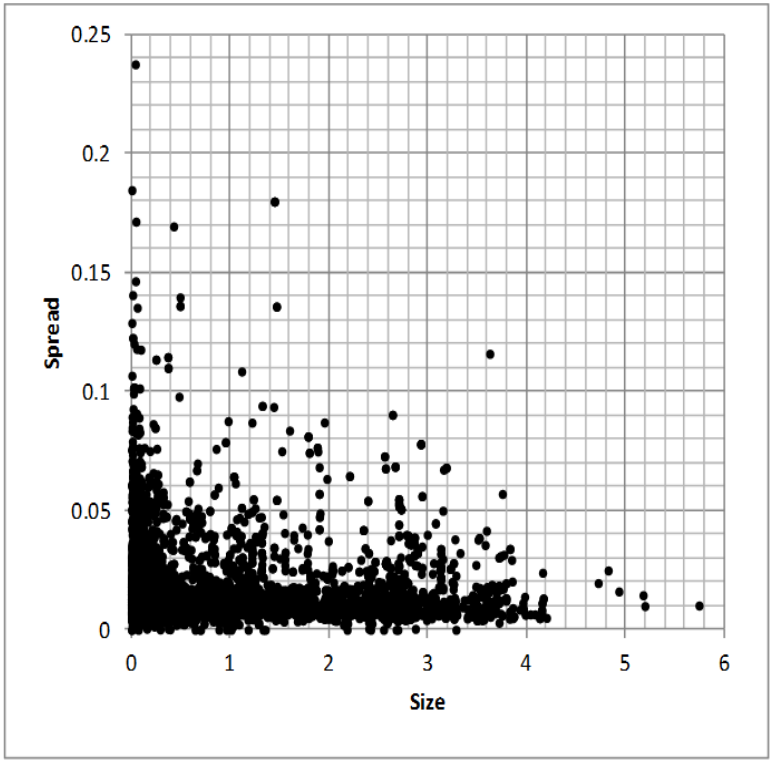
Size and Credit Spreads

Spread= Bond yield minus treasury yield
Measures borrowing cost



- Larger Institutions have lower spreads

Size and Credit Spreads



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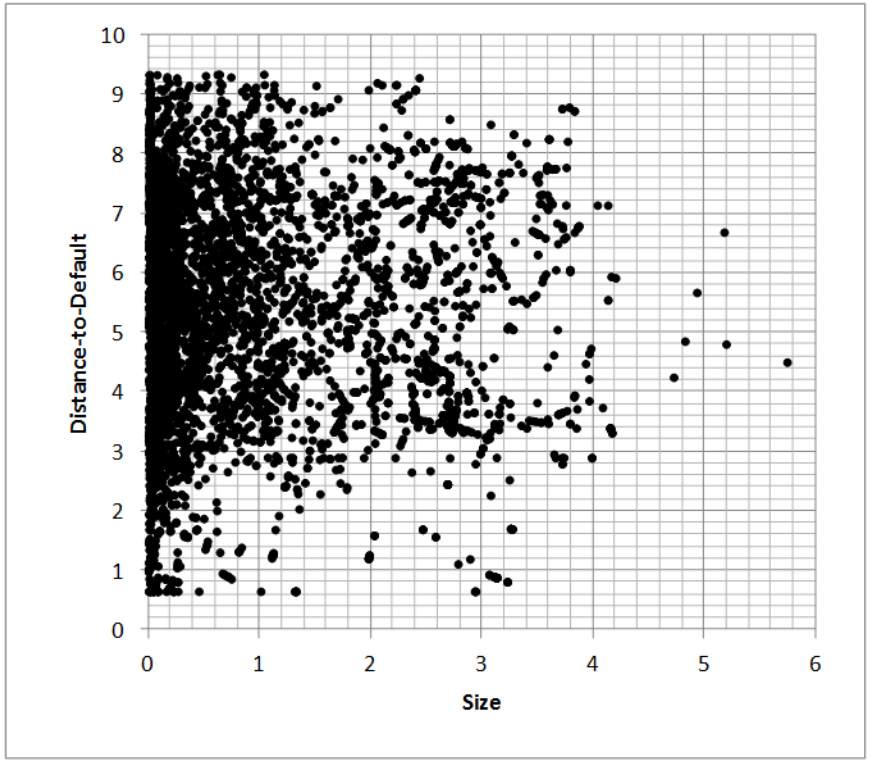
Size and Risk



- No relationship between size and risk

Methodology

Too Big To Fail

- Size: a significant driver of systemic importance (e.g., Adrian and Brunnermeier 2011; Dodd-Frank)
  - *Size*: Size (log assets) relative to industry
  - *Size90*: Top 90th percentile by size
  - *SizeTop10*: Top 10 institution by size
- Other measures of Systemic importance
  - *CoVaR*
  - *SRISK*

Yield Spreads

Controls: Risk Profile, Firm, Bond, Macro (e.g., Flannery and Sorescu 1996; Sironi 2003)

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Data & Sample

- US financial institutions over the period 1990-2010
- Bond data (monthly)
  - Lehman Fixed Income Database (1990 to 1998)
  - NAIC Database (1998 to 2006)
  - TRACE Database (2006 to 2010)
  - FISD (bond descriptions)
- Accounting and stock data: COMPUSTAT and CRSP
- 567 unique financial institutions and 84,057 observations

TBTF – Spread Regressions

VARIABLES	(2) spread
ttm	0.006
	(0.004)
seniority	-0.209***
	(0.063)
$leverage_{t-1}$	0.334
	(0.362)
roa_{t-1}	-18.415**
	(7.529)
mb_{t-1}	0.018
	(0.032)
$mismatch_{t-1}$	0.057
	(0.127)
def	1.668***
	(0.118)
term	0.097***
	(0.024)
mkt	0.398**
	(0.154)
$mertondd_{t-1}$	-0.031*
	(0.017)
$size_{t-1}$	**-0.160****
	(0.080)
Firm FE	Y
Year FE	Y
Rating Dummies	Y
Observations	46,308
R-squared	0.581

TBTF – Spread Regressions

VARIABLES	(2) spread	(3) spread
ttm	0.006	0.006
	(0.004)	(0.004)
seniority	-0.209***	-0.192***
	(0.063)	(0.062)
$leverage_{t-1}$	0.334	0.479
	(0.362)	(0.354)
roa_{t-1}	-18.415**	-17.793**
	(7.529)	(7.176)
mb_{t-1}	0.018	0.018
	(0.032)	(0.031)
$mismatch_{t-1}$	0.057	-0.060
	(0.127)	(0.124)
def	1.668***	1.663***
	(0.118)	(0.118)
term	0.097***	0.095***
	(0.024)	(0.024)
mkt	0.398**	0.404***
	(0.154)	(0.153)
$mertondd_{t-1}$	-0.031*	-0.035**
	(0.017)	(0.017)
$size_{t-1}$	**-0.160****	
	(0.080)	
size 90_{t-1}		**-0.317***
		(0.169)
Firm FE	Y	Y
Year FE	Y	Y
Rating Dummies	Y	Y
Observations	46,308	46,308
R-squared	0.581	0.582

TBTF – Spread Regressions

VARIABLES	(2) spread	(3) spread	(5) spread
ttm	0.006	0.006	0.006
	(0.004)	(0.004)	(0.004)
seniority	-0.209***	-0.192***	-0.193***
	(0.063)	(0.062)	(0.062)
$leverage_{t-1}$	0.334	0.479	0.450
	(0.362)	(0.354)	(0.359)
roa_{t-1}	-18.415**	-17.793**	-18.091**
	(7.529)	(7.176)	(7.326)
mb_{t-1}	0.018	0.018	0.018
	(0.032)	(0.031)	(0.031)
$mismatch_{t-1}$	0.057	-0.060	-0.023
	(0.127)	(0.124)	(0.133)
def	1.668***	1.663***	1.662***
	(0.118)	(0.118)	(0.118)
term	0.097***	0.095***	0.094***
	(0.024)	(0.024)	(0.024)
mkt	0.398**	0.404***	0.404***
	(0.154)	(0.153)	(0.153)
$mertondd_{t-1}$	-0.031*	-0.035**	-0.035**
	(0.017)	(0.017)	(0.017)
$size_{t-1}$	**-0.160****		
	(0.080)		
size 90_{t-1}		**-0.317***	**-0.519****
		(0.169)	**(0.222)**
size 60_{t-1}			**-0.203**
			(0.149)
size 30_{t-1}			**-0.151**
			(0.112)
Firm FE	Y	Y	Y
Year FE	Y	Y	Y
Rating Dummies	Y	Y	Y
Observations	46,308	46,308	46,308
R-squared	0.581	0.582	0.582

TBTF – Spread Regressions

VARIABLES	(2) spread	(3) spread	(5) spread	(6) spread
ttm	0.006	0.006	0.006	0.005
	(0.004)	(0.004)	(0.004)	(0.003)
seniority	-0.209***	-0.192***	-0.193***	-0.185***
	(0.063)	(0.062)	(0.062)	(0.059)
$leverage_{t-1}$	0.334	0.479	0.450	0.528***
	(0.362)	(0.354)	(0.359)	(0.202)
roa_{t-1}	-18.415**	-17.793**	-18.091**	-17.226***
	(7.529)	(7.176)	(7.326)	(4.758)
mb_{t-1}	0.018	0.018	0.018	0.019
	(0.032)	(0.031)	(0.031)	(0.025)
$mismatch_{t-1}$	0.057	-0.060	-0.023	-0.040
	(0.127)	(0.124)	(0.133)	(0.101)
def	1.668***	1.663***	1.662***	1.660***
	(0.118)	(0.118)	(0.118)	(0.074)
term	0.097***	0.095***	0.094***	0.098***
	(0.024)	(0.024)	(0.024)	(0.017)
mkt	0.398**	0.404***	0.404***	0.406***
	(0.154)	(0.153)	(0.153)	(0.139)
$mertondd_{t-1}$	-0.031*	-0.035**	-0.035**	-0.034***
	(0.017)	(0.017)	(0.017)	(0.011)
$size_{t-1}$	**-0.160****			
	(0.080)			
size 90_{t-1}		**-0.317***	**-0.519****	
		(0.169)	**(0.222)**	
size 60_{t-1}			**-0.203**	
			(0.149)	
size 30_{t-1}			**-0.151**	
			(0.112)	
size top 10_{t-1}				**-0.203*****
				(0.070)
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Rating Dummies	Y	Y	Y	Y
Observations	46,308	46,308	46,308	46,308
R-squared	0.581	0.582	0.582	0.580

TBTF – Spread Regressions

VARIABLES	(2) spread	(3) spread	(5) spread	(6) spread	(7) spread	(8) spread
ttm	0.006	0.006	0.006	0.005	0.006	0.005
	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)	(0.005)
seniority	-0.209***	-0.192***	-0.193***	-0.185***	-0.163**	-0.227***
	(0.063)	(0.062)	(0.062)	(0.059)	(0.069)	(0.056)
$leverage_{t-1}$	0.334	0.479	0.450	0.528***	0.462	-0.909*
	(0.362)	(0.354)	(0.359)	(0.202)	(0.416)	(0.546)
roa_{t-1}	-18.415**	-17.793**	-18.091**	-17.226***	-17.766**	-20.248*
	(7.529)	(7.176)	(7.326)	(4.758)	(8.957)	(10.679)
mb_{t-1}	0.018	0.018	0.018	0.019	-0.051	-0.178*
	(0.032)	(0.031)	(0.031)	(0.025)	(0.069)	(0.106)
$mismatch_{t-1}$	0.057	-0.060	-0.023	-0.040	-0.060	0.607
	(0.127)	(0.124)	(0.133)	(0.101)	(0.124)	(0.578)
def	1.668***	1.663***	1.662***	1.660***	1.706***	1.755***
	(0.118)	(0.118)	(0.118)	(0.074)	(0.127)	(0.125)
term	0.097***	0.095***	0.094***	0.098***	0.094***	0.137***
	(0.024)	(0.024)	(0.024)	(0.017)	(0.024)	(0.036)
mkt	0.398**	0.404***	0.404***	0.406***	0.460***	0.325
	(0.154)	(0.153)	(0.153)	(0.139)	(0.176)	(0.243)
$mertondd_{t-1}$	-0.031*	-0.035**	-0.035**	-0.034***	-0.031*	-0.033
	(0.017)	(0.017)	(0.017)	(0.011)	(0.018)	(0.025)
$size_{t-1}$	**-0.160****					
	(0.080)					
size 90_{t-1}		**-0.317***	**-0.519****			
		(0.169)	**(0.222)**			
size 60_{t-1}			**-0.203**			
			(0.149)			
size 30_{t-1}			**-0.151**			
			(0.112)			
size top 10_{t-1}				**-0.203*****		
				(0.070)		
covar $_{t-1}$					**2.625****	
					(1.320)	
srisk $_{t-1}$						**-0.936****
						(0.402)
Firm FE	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Rating Dummies	Y	Y	Y	Y	Y	Y
Observations	46,308	46,308	46,308	46,308	42,909	27,948
R-squared	0.581	0.582	0.582	0.580	0.576	0.576

TBTF – Risk Interaction

VARIABLES	(1) spread
ttm	0.007*
	(0.004)
sendum	-0.187***
	(0.052)
leverage $_{t-1}$	0.326
	(0.393)
roa $_{t-1}$	-17.311**
	(7.035)
mb $_{t-1}$	0.019
	(0.030)
mismatch $_{t-1}$	-0.150
	(0.356)
def	1.659***
	(0.122)
term	0.091***
	(0.022)
mkt	0.412***
	(0.157)
size 90$_{t-1}$	-0.763***
	(0.249)
mertondd $_{t-1}$	**-0.070*** **
	(0.024)
size90$_{t-1}$*mertondd$_{t-1}$	**0.081*** **
	(0.025)
Firm FE	Y
Year FE	Y
Rating Dummies	Y
Observations	46,308
R-squared	0.579

- For the largest FIs, spreads are less sensitive to risk

TBTF – Risk Interaction

	(2) spread		(3) spread		(4) spread
ttm	0.004	ttm	0.006	ttm	0.004
	(0.004)		(0.004)		(0.005)
sendum	-0.196***	sendum	-0.195***	sendum	-0.235***
	(0.058)		(0.056)		(0.069)
leverage $_{t-1}$	0.279	leverage $_{t-1}$	0.309	leverage $_{t-1}$	-0.874
	(0.254)		(0.322)		(0.633)
roa $_{t-1}$	-18.772***	roa $_{t-1}$	-12.842**	roa $_{t-1}$	-19.881*
	(4.888)		(5.183)		(10.528)
mb $_{t-1}$	0.018	mb $_{t-1}$	0.032	mb $_{t-1}$	-0.152
	(0.021)		(0.029)		(0.104)
mismatch $_{t-1}$	0.012	mismatch $_{t-1}$	0.138	mismatch $_{t-1}$	0.498
	(0.313)		(0.136)		(0.568)
def	1.630***	def	1.744***	def	1.598***
	(0.075)		(0.136)		(0.149)
term	0.114***	term	0.065**	term	0.132***
	(0.018)		(0.029)		(0.032)
mkt	0.333**	mkt	0.370**	mkt	0.421**
	(0.150)		(0.162)		(0.210)
size 90$_{t-1}$	-0.502*	size 90$_{t-1}$	0.148	size 90$_{t-1}$	0.069
	(0.258)		(0.173)		(0.404)
zscore $_{t-1}$	**-0.002*** **	**volatility$_{t-1}$**	**2.286*** **	**Beta $_{t-1}$**	**0.408*** **
	(0.001)		**(0.758)**		**(0.123)**
size90$_{t-1}$*zscore $_{t-1}$	**0.002***	**size90 $_{t-1}$*volatility $_{t-1}$**	**-1.641*** **	**size90 $_{t-1}$*Beta $_{t-1}$**	**-0.434** **
	(0.001)		**(0.612)**		**(0.216)**
Firm FE	Y		Y		Y
Year FE	Y		Y		Y
Rating Dummies	Y		Y		Y
Observations	42,240		46,279		27,948
R-squared	0.587		0.588		0.579

- For the largest FIs, spreads are less sensitive to risk

Summary

Main Findings

- TBTF institutions have lower spreads than other institutions
- TBTF institutions have spreads that are less sensitive to risk

Robustness

- Alternative proxies for TBTF status

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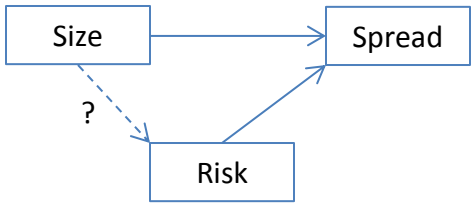
- Alternative proxies for TBTF status
- Size is not related to risk



Robustness: TBTF – Risk Relationship

VARIABLES	(1) mertondd	(2) mertondd	(3) zscore	(4) zscore
$leverage_{t-1}$	0.437	0.437	-8.414	-7.918
	-0.425	-0.426	-12.28	-12.214
roa_{t-1}	15.372***	15.345***	213.148***	213.255***
	-1.907	-1.905	-49.983	-49.792
mb_{t-1}	-0.044**	-0.044**	2.318**	2.310**
	-0.022	-0.022	-1.039	-1.037
$mismatch_{t-1}$	-0.086***	-0.086***	5.336***	4.944***
	-0.026	-0.026	-1.299	-1.33
$size_{t-1}$	0.155		2.264	
	-0.109		-2.314	
$size90_{t-1}$		-0.105*		1.599
		-0.055		-1.623
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	7,615	7,615	6,977	6,977
R-squared	0.725	0.724	0.549	0.549

- Large FIs are not less risky

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	-1.907	-1.905	-49.983	-49.792
mb_{t-1}	-0.044**	-0.044**	2.318**	2.310**
	-0.022	-0.022	-1.039	-1.037
$mismatch_{t-1}$	-0.086***	-0.086***	5.336***	4.944***
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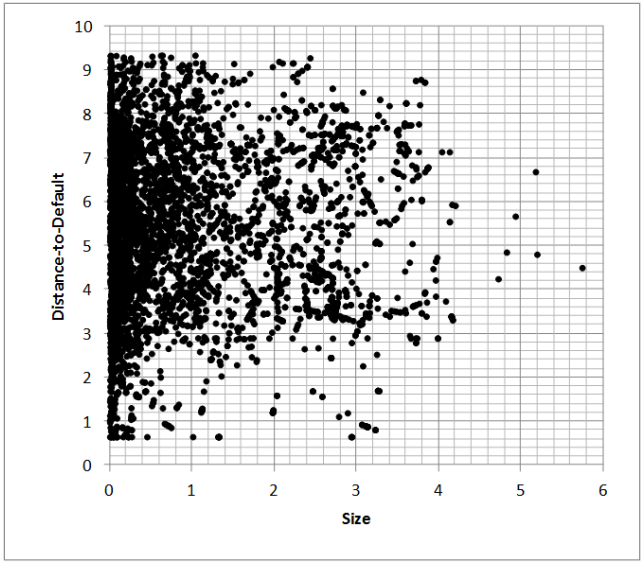
$size_{t-1}$	0.155		2.264	
	-0.109		-2.314	
$size90_{t-1}$		-0.105*		1.599
		-0.055		-1.623
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	7,615	7,615	6,977	6,977
R-squared	0.725	0.724	0.549	0.549



- Large FIs are not less risky

Summary

Main Findings

- TBTF institutions have lower spreads than other institutions
- TBTF institutions have spreads that are less sensitive to risk

Robustness

- Alternative proxies for TBTF status
- Size is not related to risk
- Ratings as exogenous measures of risk and implicit support

Robustness: Ratings

VARIABLES	(3) spread	(4) spread	(5) spread
ttm	0.004	0.002	0.004
	(0.004)	(0.005)	(0.004)
seniority	-0.334***	-0.320***	-0.305***
	(0.061)	(0.053)	(0.058)
leverage	0.431	0.521	0.098
	(0.598)	(0.690)	(0.509)
roa $_{t-1}$	-29.199***	-38.531***	-13.863
	(8.667)	(13.162)	(9.946)
mb $_{t-1}$	0.009	0.000	0.006
	(0.072)	(0.083)	(0.061)
mismatch $_{t-1}$	0.773	0.700	0.865
	(0.625)	(0.453)	(0.602)
def	1.428***	1.458***	1.471***
	(0.128)	(0.143)	(0.145)
term	0.113***	0.112**	0.130***
	(0.036)	(0.045)	(0.038)
mkt	0.137	0.086	0.067
	(0.181)	(0.195)	(0.218)
mertondd $_{t-1}$	0.021	0.054	0.349***
	(0.030)	(0.111)	(0.097)
stand-alone rating $_{t-1}$	-0.039	0.191	
	(0.114)	(0.157)	
issuer rating $_{t-1}$	0.370**		0.669***
	(0.171)		(0.149)
stand-alone rating $_{t-1}$ * mertondd $_{t-1}$		0.007	
		(0.031)	
issuer rating $_{t-1}$ * mertondd $_{t-1}$			-0.071***
			(0.020)
Firm FE	Y	Y	Y
Year FE	Y	Y	Y
Observations	16,107	16,127	16,120
R-squared	0.655	0.644	0.668

Excludes external support

Includes external support
Lower number indicates better rating

Robustness: Ratings

VARIABLES	(1) issuer rating	(2) issuer rating	(3) stand-alone	(4) stand-alone
leverage $_{t-1}$	-2.510**	-3.691***	-0.451	-0.706
	-1.126	-1.219	-0.89	-0.802
roa	-39.008	-49.355	-50.706*	-52.797*
	-36.231	-43.279	-26.317	-26.38
mb	-0.815***	-0.661***	-0.619***	-0.587***
	-0.174	-0.216	-0.147	-0.139
mismatch $_{t-1}$	1.01	2.03	-1.206	-1.025
	-1.323	-1.365	-1.236	-1.174
size $_{t-1}$	-0.728***		-0.103	
	-0.132		-0.073	
size 90 $_{t-1}$		-1.163***		-0.051
		-0.27		-0.109
constant	14.648***	7.048***	5.476***	4.402***
	-1.353	-0.659	-0.792	-0.347
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	16,120	16,120	16,127	16,127
R-squared	0.622	0.492	0.527	0.518

Size affects issuer but not stand alone ratings

Main Findings

- TBTF institutions have lower spreads than other institutions
- TBTF institutions have spreads that are less sensitive to risk

Robustness

- Alternative proxies for TBTF status
- Size is not related to risk
- Ratings as exogenous measures of risk and implicit support
  - Bondholders price risk based on expectations of government support, not ‘standalone’ credit rating

Summary

Main Findings

- TBTF institutions have lower spreads than other institutions
- TBTF institutions have spreads that are less sensitive to risk

Robustness

- Alternative proxies for TBTF status
- Size is not related to risk
- Ratings as exogenous measures of risk and implicit support
- Shocks to investor expectations of support
  - Event studies of contrasting shocks

5 day window around event

	Bear Stearns (post=1 if date>=3/17/2008)	
	(1)	(2)
VARIABLES	spread	spread
def	2.784***	2.785***
	-0.828	-0.829
term	0.310***	0.309***
	-0.086	-0.085
mktrf	-1.858***	-1.801***
	-0.581	-0.572
post	1.054***	0.651**
	-0.345	-0.271
mertondd $_{t-1}$* post	-0.119**	-0.063*
	-0.047	-0.038
size90 $_{t-1}$* post	-0.250***	2.682
	-0.094	-1.805
sizeg90 $_{t-1}$ mertondd $_{t-1}$* post		0.37
		-0.233
Issue FE	Y	Y
Observations	1301	1301
R-squared	0.948	0.949

After rescue of Bear Stearns, large FIs have greater **deceases** in spreads

	Bear Stearns (post=1 if date>=3/17/2008)		Lehman (post=1 if date>=9/15/2008)	
	(1)	(2)	(3)	(4)
VARIABLES	spread	spread	spread	spread
def	2.784***	2.785***	2.192	2.331
	-0.828	-0.829	-2.235	-2.273
term	0.310***	0.309***	1.856***	1.813***
	-0.086	-0.085	-0.262	-0.257
mktrf	-1.858***	-1.801***	0.714	0.51
	-0.581	-0.572	-2.491	-2.453
post	1.054***	0.651**	3.739***	0.901
	-0.345	-0.271	-1.05	-0.868
mertondd $_{t-1}$* post	-0.119**	-0.063*	-0.657***	-0.151
	-0.047	-0.038	-0.182	-0.144
size90 $_{t-1}$* post	-0.250***	2.682	2.174***	20.427***
	-0.094	-1.805	-0.817	-4.485
sizeg90 $_{t-1}$ mertondd $_{t-1}$* post		0.37		-2.820***
		-0.233		-0.6
Issue FE	Y	Y	Y	Y
Observations	1301	1301	1,382	1,382
R-squared	0.948	0.949	0.813	0.825

After collapse of Lehman, large FIs have greater **increases in spreads**

	Bear Stearns (post=1 if date>=3/17/2008)		Lehman (post=1 if date>=9/15/2008)		Dodd-Frank (post=1 if date>=6/29/2010)	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	spread	spread	spread	spread	spread	spread
def	2.784***	2.785***	2.192	2.331	1.328**	1.521***
	-0.828	-0.829	-2.235	-2.273	-0.545	-0.549
term	0.310***	0.309***	1.856***	1.813***	-0.389***	-0.377***
	-0.086	-0.085	-0.262	-0.257	-0.14	-0.14
mktrf	-1.858***	-1.801***	0.714	0.51	0.34	0.319
	-0.581	-0.572	-2.491	-2.453	-0.645	-0.644
post	1.054***	0.651**	3.739***	0.901	0.051	0.021
	-0.345	-0.271	-1.05	-0.868	-0.046	-0.05
$mertondd_{t-1}$* post	-0.119**	-0.063*	-0.657***	-0.151	-0.052**	-0.032
	-0.047	-0.038	-0.182	-0.144	-0.022	-0.026
$size90_{t-1}$* post	-0.250***	2.682	2.174***	20.427***	-0.074**	0.036
	-0.094	-1.805	-0.817	-4.485	-0.031	-0.059
$sizeg90_{t-1}$ $mertondd_{t-1}$* post		0.37		-2.820***		-0.088**
		-0.233		-0.6		-0.041
Issue FE	Y	Y	Y	Y	Y	Y
Observations	1301	1301	1,382	1,382	1,869	1,869
R-squared	0.948	0.949	0.813	0.825	0.983	0.983

Insignificant

VARIABLES	(1) spread	(2) spread
$mertondd_{t-1}$	-0.012	-0.266
	(0.111)	(0.179)
$sizeg90_{t-1}$	-0.722***	-0.499**
	(0.130)	(0.191)
post	-0.225**	-0.591***
	(0.102)	(0.217)
$sizeg90_{t-1}$* post	0.077	0.550*
	(0.094)	(0.276)
$mertondd_{t-1}$* post		0.237*
		(0.123)
$sizeg90_{t-1}$* $mertondd_{t-1}$ *post		-0.370*
		(0.187)
Constant	1.939**	2.130***
	(0.755)	(0.701)
Firm FE	Y	Y
Year FE	Y	Y
Rating Dummies	Y	Y
Observations	1,810	1,810
R-squared	0.547	0.548

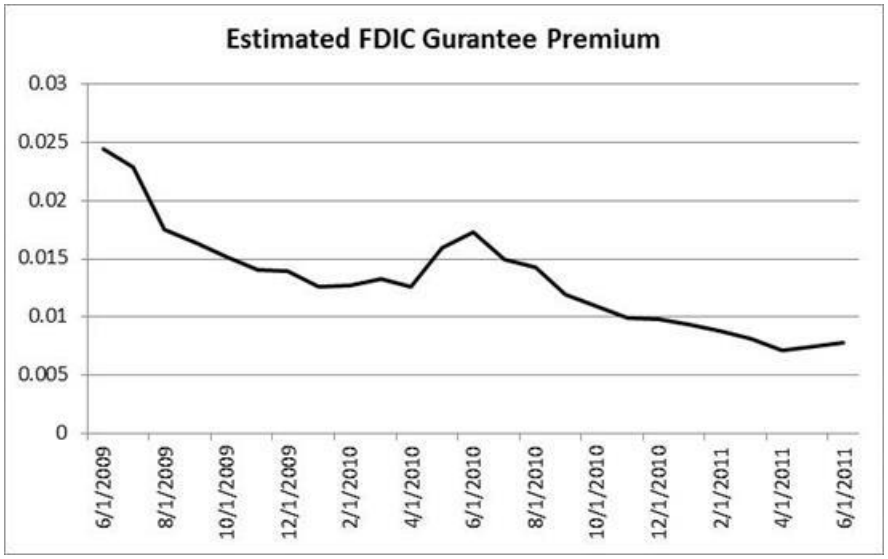
Main Findings

- TBTF institutions have lower spreads than other institutions
- TBTF institutions have spreads that are less sensitive to risk

Robustness

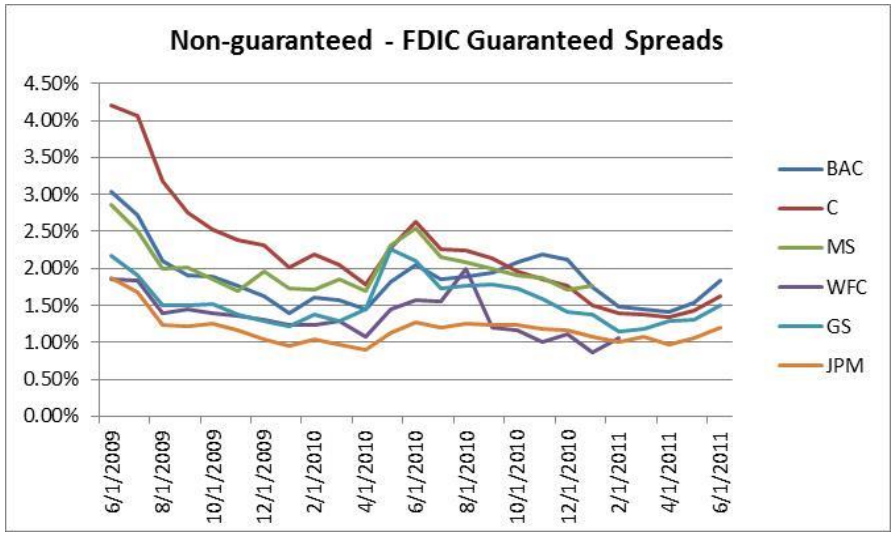
- Alternative proxies for TBTF status
- Size is not related to risk
- Ratings as exogenous measures of risk and implicit support
- Shocks to investor expectations of support
- Comparison to debt explicitly guaranteed under FDIC Temporary Liquidity Guarantee Prog.
  - FDIC-guaranteed bonds had lower spreads than similar non-guaranteed bonds issued by same firm
  - Spread differential reduced upon Dodd-Frank
    - → Implicitly-guaranteed debt became more like explicitly-guaranteed debt

FDIC Guarantee



Estimated FDIC guarantee premium:

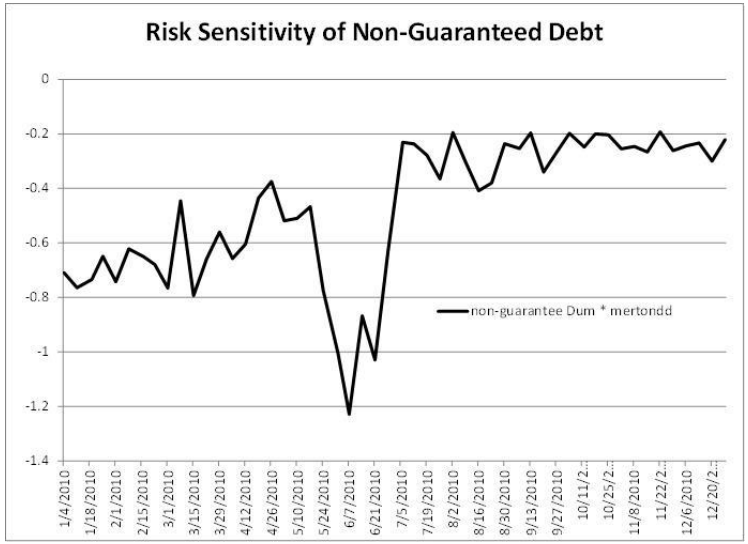
$$Spread_{i,b,t} = \propto + \beta^1 \times Bond\ Controls_{i,b,t} + \beta^2 \times Gurantee_{i,b,t} + Firm\ FE + \varepsilon_{i,b,t}.$$



FDIC guaranteed – non-guaranteed spread

FDIC Guarantee

VARIABLES	(1) spread	(2) spread	(3) spread	(4) spread
fixed rate	-1.410***	-1.417***	-0.828***	-0.720***
	(0.095)	(0.047)	(0.194)	(0.181)
seniority	-0.190*	-0.233*	-0.259**	-0.285**
	(0.099)	(0.103)	(0.099)	(0.104)
puttable	-0.366*	-0.320	-0.227	-0.232
	(0.187)	(0.198)	(0.151)	(0.141)
redeemable	0.106	0.160*	-0.005	-0.019
	(0.160)	(0.082)	(0.166)	(0.126)
ttm	0.090***	0.085***	0.087***	0.083***
	(0.015)	(0.018)	(0.012)	(0.012)
exchangeable			1.450***	1.431***
			(0.231)	(0.217)
non-guarantee	1.780***	2.712***	1.413***	2.190***
	(0.227)	(0.181)	(0.202)	(0.129)
non-guarantee * post	-0.134***	-0.700**	-0.001	-0.409**
	(0.022)	(0.259)	(0.065)	(0.129)
mertondd$_{t-1}$ * non-guarantee		-0.887***		-0.662***
		(0.220)		(0.181)
mertondd $_{t-1}$ * non-guarantee * post		0.604**		0.387**
		(0.206)		(0.124)
Constant	1.617***	1.675***	1.125***	1.062***
	(0.227)	(0.174)	(0.284)	(0.277)
Issue * Trading Day FE	Y	Y	Y	Y
Event days	10	10	132	132
Observations	2,537	2,090	31,338	30,011
R-squared	0.687	0.703	0.594	0.595



Main Findings

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- TBTF institutions have spreads that are less sensitive to risk

Robustness

- Alternative proxies for TBTF status
- Size is not related to risk
- Ratings as exogenous measures of risk and implicit support
- Shocks to investor expectations of support
- Comparison to debt explicitly guaranteed under FDIC Temporary Liquidity Guarantee Prog
- Non-Financial and Liquidity
  - Compute risk sensitivity for non-financials
  - Control for bond liquidity

	Corporate Sample			Corporate and Financial Sample	
	(1)	(2)	(3)	(4)	(5)
VARIABLES	spread	spread	spread	spread	spread
log market cap $_{t-1}$	-0.288**				
	(0.122)				
size 90 $_{t-1}$		-0.006	0.081	0.038	0.120
		(0.145)	(0.386)	(0.165)	(0.391)
size 90 $_{t-1}$ * mertondd $_{t-1}$			-0.009		-0.009
			(0.029)		(0.030)
size 90 $_{t-1}$ * financial $_{t-1}$				-0.353*	-0.784*
				(0.212)	(0.425)
size 90 $_{t-1}$ * financial $_{t-1}$ * mertondd $_{t-1}$					0.075**
					(0.033)
constant	4.699*	-0.227	-0.223	3.274***	3.401***
	(2.436)	(0.991)	(0.992)	(0.867)	(0.882)
Firm FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Observations	68,905	68,905	68,905	106,369	106,369
R-squared	0.711	0.709	0.709	0.662	0.663

Non-Financials and Liquidity

	Bear Stearns (post=1 if date>=3/17/2008)	Lehman (post=1 if date>=9/15/2008)	Dodd-Frank (post=1 if date>=6/29/2010)
VARIABLES	(1) spread	(2) spread	(3) spread
def	-2.074*	3.370**	1.255**
	(1.142)	(1.678)	(0.558)
term	0.692***	1.946***	-0.304**
	(0.201)	(0.232)	(0.126)
mkt	-2.211***	3.191**	0.546
	(0.572)	(1.444)	(0.604)
post	0.023	-1.181***	0.028
	(0.109)	(0.254)	(0.051)
size 90 $_{t-1}$ *post	-0.058	-0.222	-0.030
	(0.089)	(0.139)	(0.062)
financial $_{t-1}$ *post	0.879***	1.701***	-0.030
	(0.227)	(0.386)	(0.051)
size 90 $_{t-1}$* financial $_{t-1}$ * post	-1.077***	0.796**	-0.010
	(0.244)	(0.376)	(0.067)
Constant	5.254***	-4.739*	1.912**
	(1.891)	(2.791)	(0.923)
Issue FE	Y	Y	Y
Observations	2,236	2,019	2,192
R-squared	0.928	0.894	0.989

Non-Financials and Liquidity

	Bear Stearns (post=1 if date>=3/17/2008)	Lehman (post=1 if date>=9/15/2008)	Dodd-Frank (post=1 if date>=6/29/2010)
VARIABLES	(1) spread	(2) spread	(3) spread
def	-1.571	3.044*	1.164*
	(1.297)	(1.625)	(0.627)
term	0.778***	1.914***	-0.330**
	(0.236)	(0.232)	(0.143)
mktrf	-1.954***	2.912**	0.752
	(0.686)	(1.425)	(0.647)
post	0.396*	-0.729**	0.191
	(0.234)	(0.284)	(0.128)
$size90_{t-1}$ * post	-0.574**	0.039	-0.116
	(0.256)	(0.358)	(0.211)
$financial_{t-1}$ * post	2.744***	3.825***	-0.027
	(0.953)	(0.748)	(0.164)
$mertondd_{t-1}$* post	-0.067**	-0.090***	-0.035*
	(0.029)	(0.023)	(0.018)
$size90_{t-1}$ * $financial_{t-1}$ * post	-4.297***	3.035	-0.114
	(1.312)	(2.004)	(0.250)
$size90_{t-1}$ * $mertondd_{t-1}$ * post	0.065*	-0.000	0.022
	(0.035)	(0.045)	(0.026)
$financial_{t-1}$ * $mertondd_{t-1}$ * post	-0.521**	-1.026***	-0.008
	(0.205)	(0.240)	(0.034)
$size90_{t-1}$ * $mertondd_{t-1}$ * $financial_{t-1}$ * post	0.815***	-0.602*	0.025
	(0.267)	(0.332)	(0.044)
Constant	4.228*	-4.231	2.105**
	(2.152)	(2.717)	(1.043)
Issue FE	Y	Y	Y
Observations	2,236	2,019	2,192
R-squared	0.917	0.905	0.989

VARIABLES	(1) spread	(2) spread	(3) spread
size 90 $_{t-1}$	-0.130**	-0.334*	-0.948***
	-0.063	-0.17	(0.427)
liquidity $_{t-1}$		-0.090***	
		-0.02	
turnover$_{t-1}$			-0.038*
			-0.022
Firm FE	N	Y	Y
Issue FE	Y	N	N
Year FE	Y	Y	Y
Rating Dummies	Y	Y	Y
Observations	46,308	46,308	14,003
R-squared	0.705	0.582	0.624

After controlling for liquidity

Summary

Main Findings

- TBTF institutions have lower spreads than other institutions
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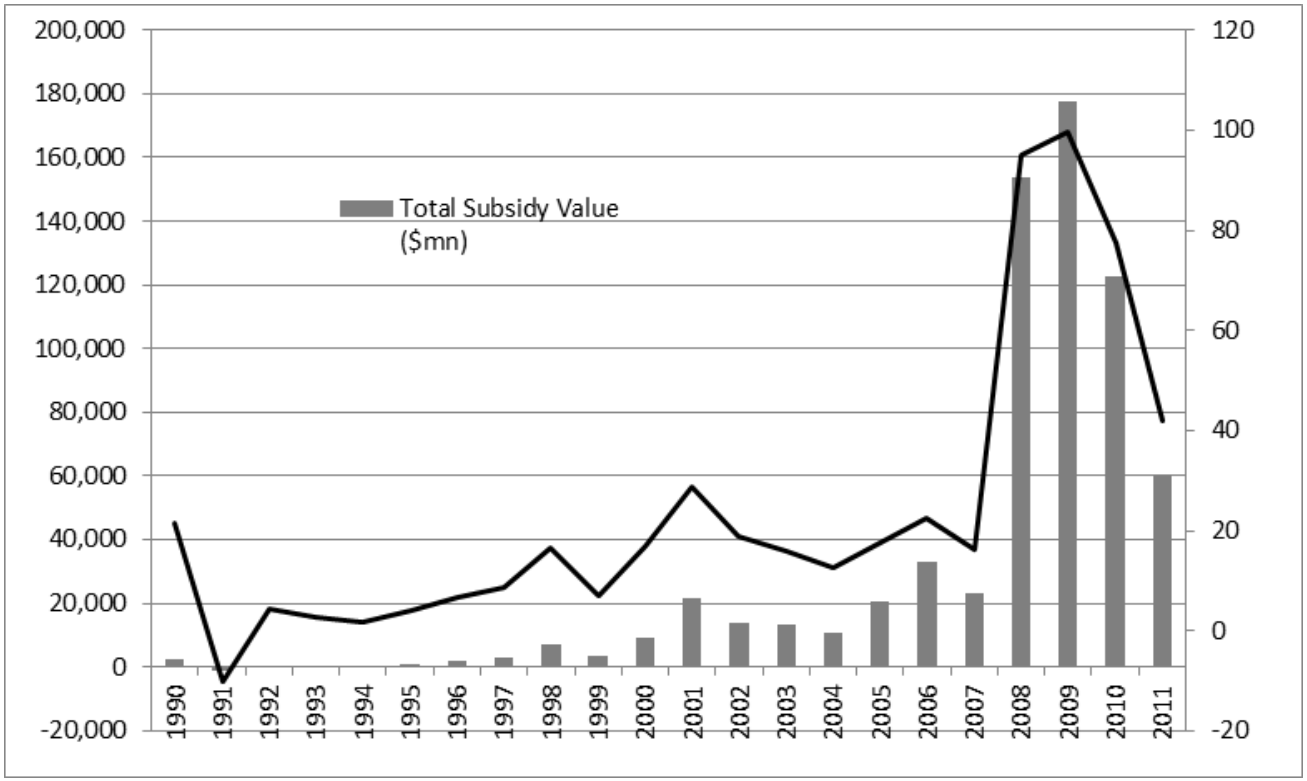
Robustness

- Alternative proxies for TBTF status
- Size is not related to risk
- Ratings as exogenous measures of risk and implicit support
- Shocks to investor expectations of support
- Comparison to debt explicitly guaranteed under FDIC Temporary Liquidity Guarantee Prog.
- Non-Financial and Liquidity controls

→ Quantification of the Implicit Subsidy

Value of the Implicit Subsidy



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Quantification of the Implicit Subsidy

→ ### Policy Implications

- Public accounting and disclosure
  - Feedback and pushback
- Internalize the subsidy by imposing a corrective tax or insurance premium
  - Creates a level playing field
  - Aligns risk and return
  - Promotes a stable and efficient financial system
  - Consistent with recommendations on systemic risk