

State-owned Banks in India

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Outline

1. Governance of state-owned banks
2. Governance through the market “TBTF”
3. Estimating bailout premiums – past work
4. India and TBTF premiums
5. Data
6. Results – pictures, results
7. PSBs
8. Traded CDs
9. Conclusions and broader implications
10. If there is time, other thoughts

Governance of state owned banks

- This is hardly a new problem. The arguments for the benefits or costs of state ownership go back decades.
- Laporta, Shleifer Vishny (LSV 2002) show that state ownership results in less development.
- Several papers attribute it to banks being used by governments for political ends.
- One source of discipline – the market, specially debt market, e.g.,uninsured deposits, subordinate debt, fails if the government bails out banks when there is trouble.

Literature on TBTF

- It has been a struggle to sharply quantify the TBTF “too big to fail” bailout promise.
- We could argue that large banks are TBTF and see if they have low credit spreads. Acharya et al. (2013).
 - Penas and Unal (2002) on M&As creating large banks
 - Morgan and Stiroh (2001) use OCC TBTF designation.
- We could look at times when bailout perceptions are low
 - Flannery and Sorescu (1996) use U.S. 1983-1991.
 - Sironi (2003) on EU from 1991-2001.

Literature on TBTF

- We could look at rating company scores of bailout probability. This alters rating, hence spread.
 - Morgan and Stiroh (2005); Ueda and di Mauro (2012);
- Our approach is simple.
 - In India, there is a sharp delineation between banks more supported by the state and those less supported by the state. We compare the spreads paid by the two.
 - We control for risk and other characteristics
 - Many interesting sub-results.

Indian Banking System

- Single national market.
 - 96 major banks with 125,672 branches
 - INR 89 trillion deposits, INR 65 trillion loans
 - State-owned PSBs (70% share) coexist with private banks
- Sharp distinctions in ownership
 - In PSBs, the state and its surrogates own ~89%
 - In private banks, the state is essentially absent.
- Both PSBs and private banks feature large institutions whose shares are traded and both issue debt. This lets us quantify the bailout promise a little better using modern credit risk models.

Governance of Indian state owned banks

- In India too, PSB governance remains a vexing issue, especially in view of a huge NPA problem.
- PSB governance can come from many stakeholders. E.g., boards, management, employees.
 - Our focus is on governance from capital markets.
- We focus on the state's implicit promise to bail out PSBs.
 - This disincentivizes discipline from PSB creditors.
- We try to quantify this effect.

Dataset

- All private placements between 1996.01 and 2016.12. SDC Platinum and Prime database
 - Issuer, date, maturity, coupon, credit rating, amount, call/put
- Focus on financials
 - FIs: 4,741 issues by 127 unique issuers
 - Banks: 1,533 issues, 948 PSB, 486 NPB, 99 OPB
- We define short, medium, and long issues. 5, 5-10, 10+. Well populated across spectrum. 41%, 38%, 21%

Dataset

- We match with G-Sec yields — 11.2002 to 05.2016
 - 846 issues, 53 banks
- We match with CMIE Prowess Bank financials dataset
 - Matching key = ISIN.
- We match with NUS RMI CRI using ISIN
 - DTD (or KMV), PD measures of credit risk

Debt Issuance Sample

Table 1
Bond Issuances by Fiscal Year

Year	Public Sector Banks			Private Sector Banks		
	#Issues	Amount	Value per issue	#Issues	Amount	Value per issue
2003	13	651	50	15	271	18
2004	90	27,169	302	21	246	12
2005	43	1,721	40	16	269	17
2006	58	4,110	71	34	1,928	57
2007	62	6,381	103	30	1,399	47
2008	36	4,327	120	14	478	34
2009	26	3,005	116	8	818	102
2010	33	2,940	89	15	2,556	170
2011	3	339	113	3	619	206
2012	8	762	95	8	963	120
2013	6	922	154	64	4,213	65
2014	14	2,268	162	15	547	36
2015	19	2,589	136	47	7,371	157
2016	16	2,282	143	27	3,237	120

Amounts in \$mm

Some Seasonality

Table 2
Bond Issuances by Fiscal Quarter

Year	Public Sector Banks			Private Sector Banks		
	#Issues	Amount Issued	Value per issue	#Issues	Amount Issued	Value per issue
Q1	92	28,554	310	57	3,903	68
Q2	94	8,344	89	74	4,167	56
Q3	86	9,895	115	64	6,709	105
Q4	155	12,676	82	122	10,135	83

Amounts in \$mm

Time period fixed effects seem appropriate

Sample Characteristics

Table 4
Sample Characteristics by Issuer Ownership

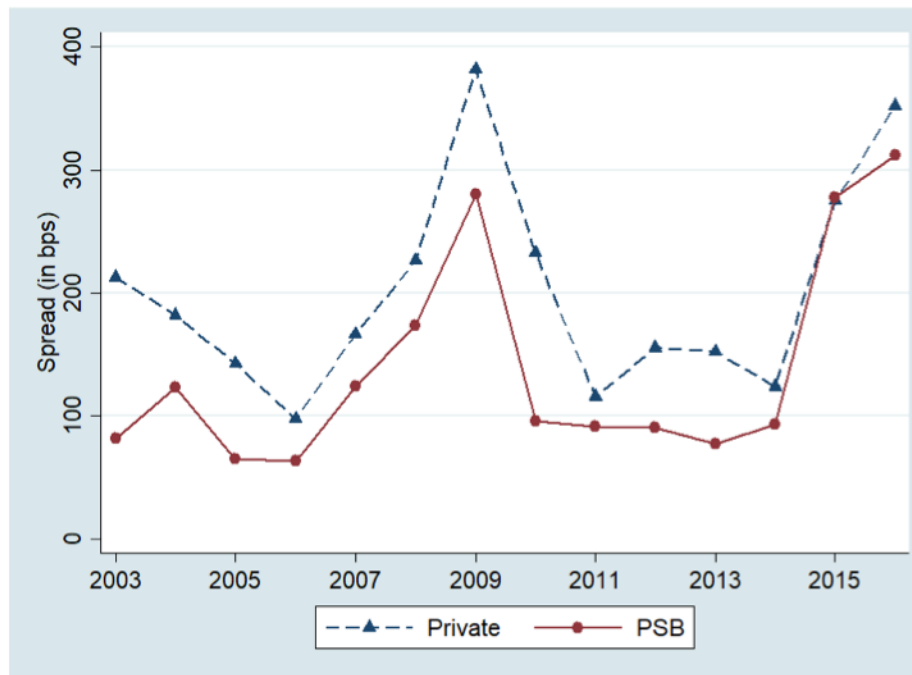
Panel A: Issue Specific Characteristics						
	PSB			Private		
	Median	Mean	SD	Median	Mean	SD
Spread (in bps)	110.73	133.42	84.64	172.49	195.00	108.19
LN(1+Amt)	10.71	10.4334	1.3493	9.7292	9.7965	1.4145
LN(1+TTM)	2.4109	2.2683	0.3896	2.1289	2.0319	0.4716
Secured (=1)		1.41%			40.06%	
Panel B: Issuer Specific Characteristics						
	PSB			Private		
	Median	Mean	SD	Median	Mean	SD
Prob (Default)	0.2267	0.2996	0.2481	0.0699	0.1546	0.1863
Distance to Default	0.7497	0.6731	0.8402	1.4764	1.6168	1.2624
Issuer Size	13.6850	13.7106	0.8840	12.2019	12.6123	1.7214
ROA	0.0073	0.0074	0.0034	0.0101	0.0083	0.0082
Capital/Assets	0.0050	0.0073	0.0087	0.0056	0.0087	0.0083

Time series of spreads

Figure 1

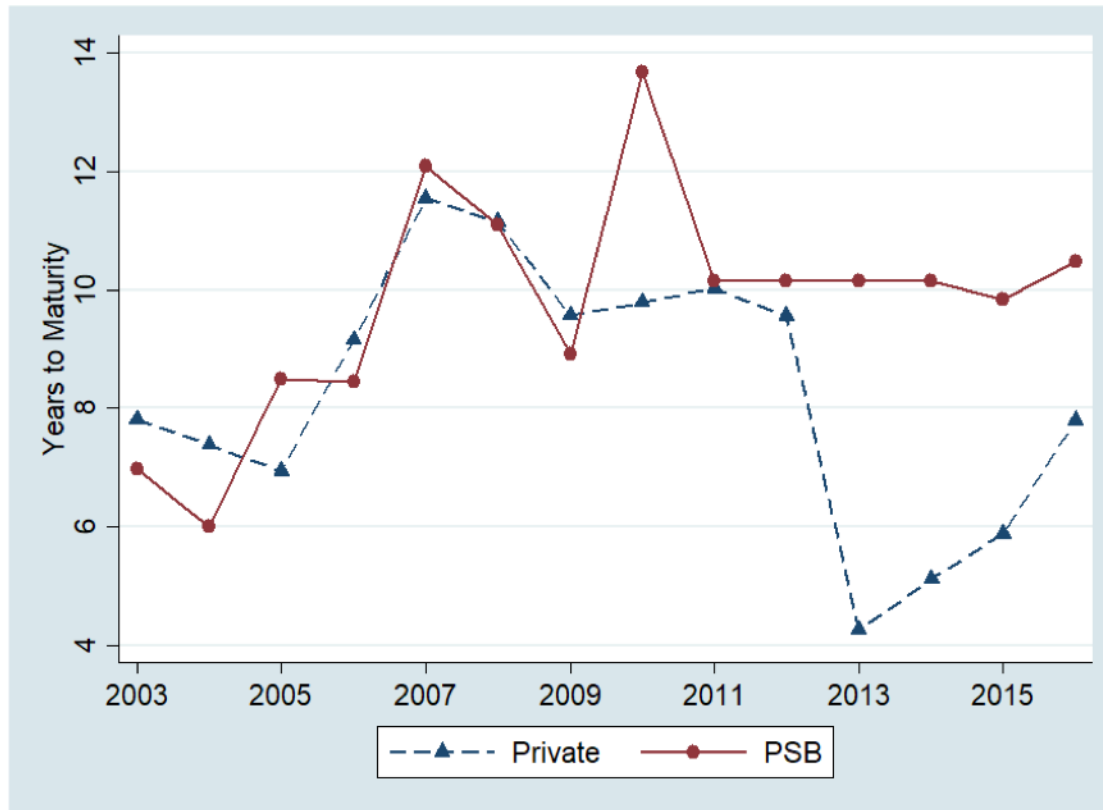
Characteristics of debt placements

Panel A: Mean Spread – PSB and Private Banks (dotted)



Maturity patterns

Panel B: Mean Time to maturity – PSB and Private Banks



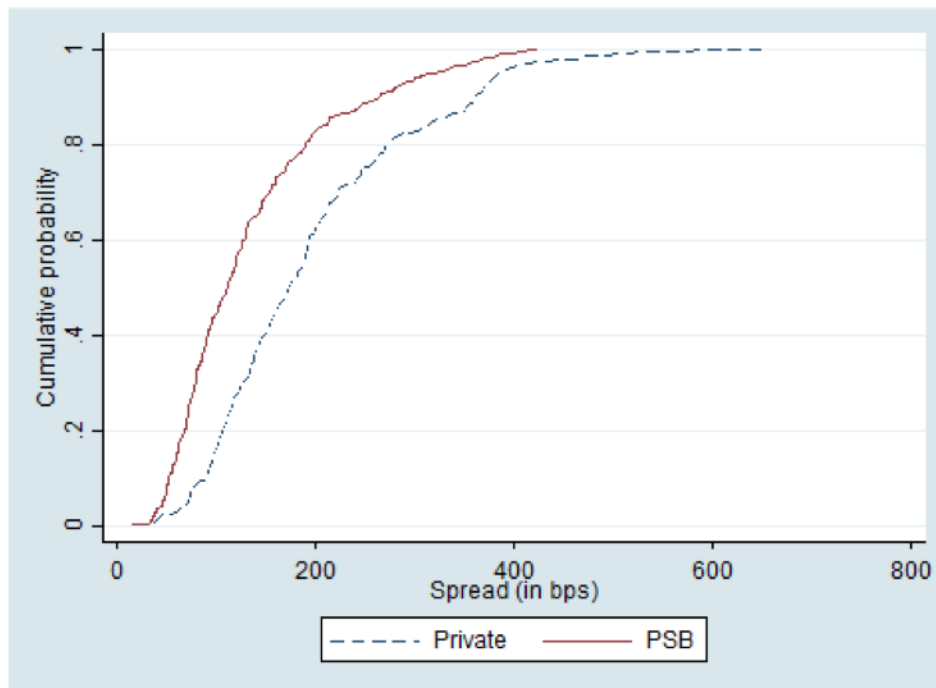
FOSD

Figure 2

Difference in Spread of PSB and private Debt Placements

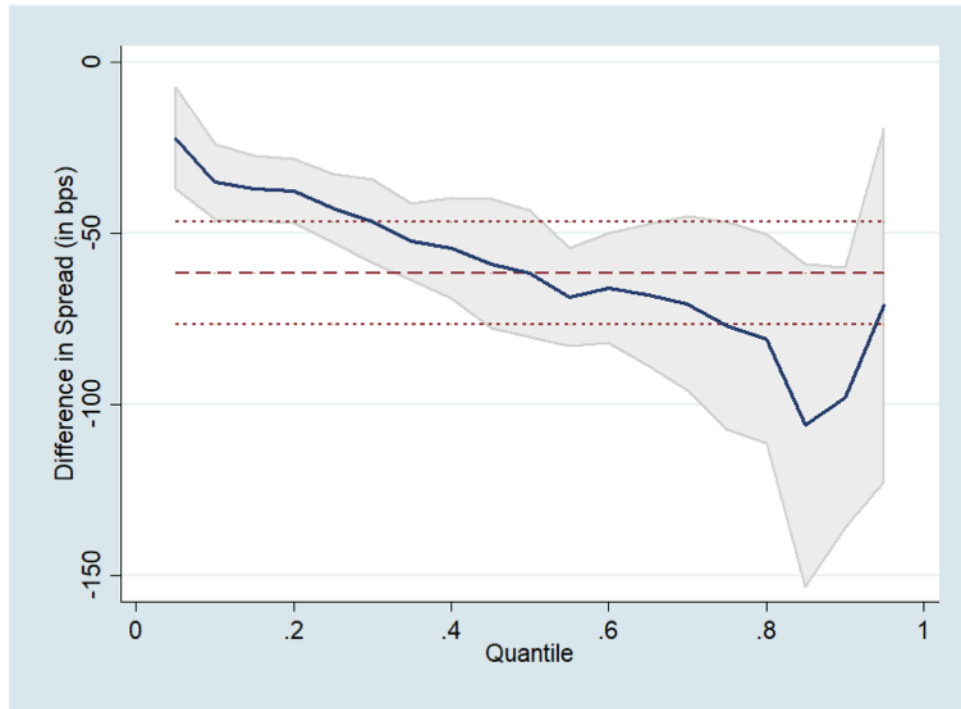
Panel A: CDF of Private and PSB Bond Spreads

Comment: FOSD of Private bond spread CDF over PSB Bond Spread CDF



Quintiles

(The red-dashed line denotes the mean difference between private and PSB bond spreads and the solid blue line denotes the difference in each quantile. 95% CI reported for each estimate)

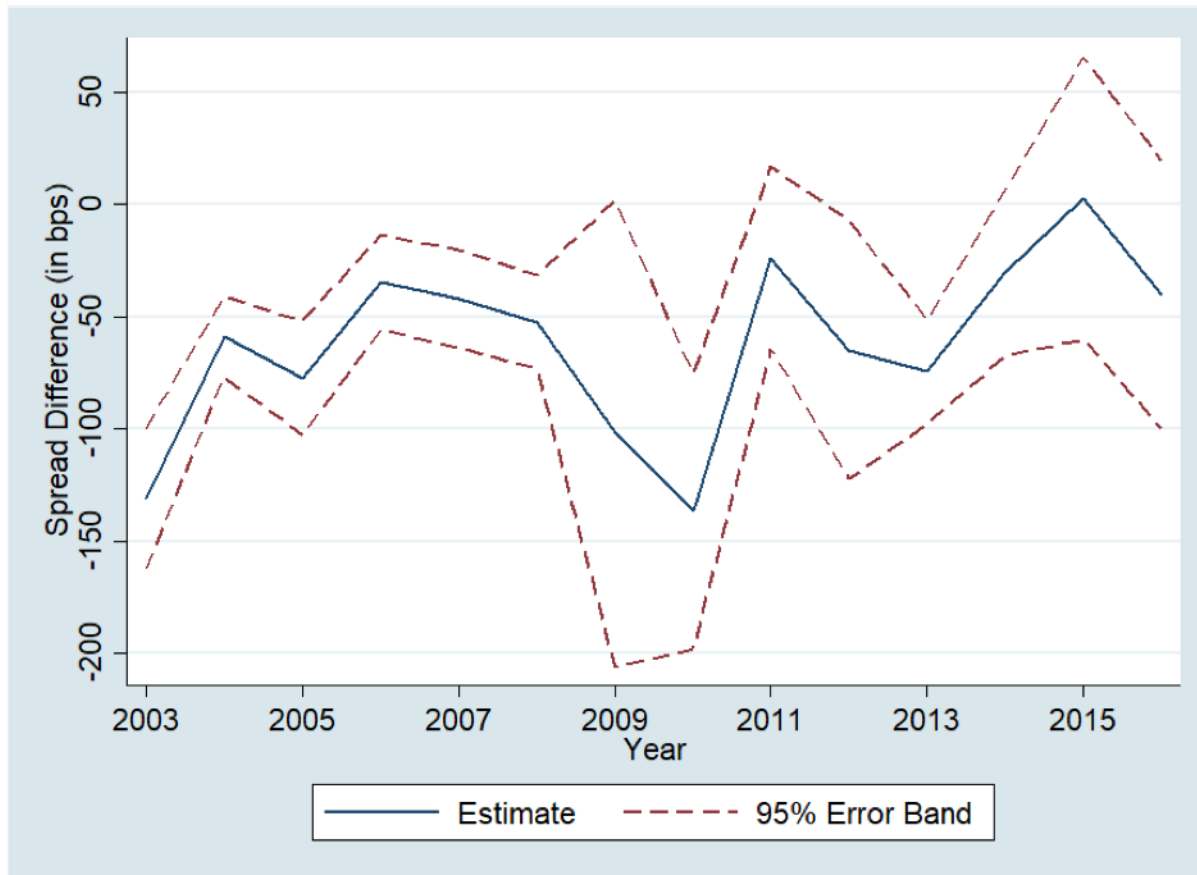


Regression Estimates

Figure 3

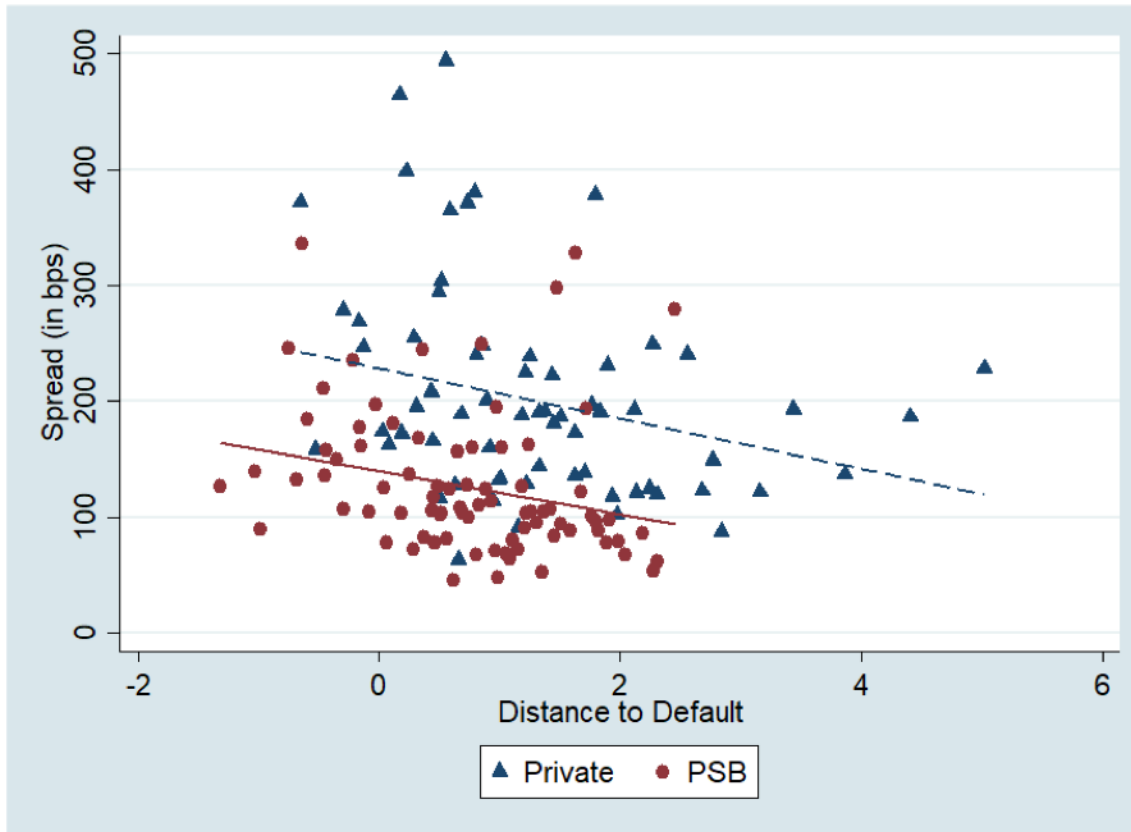
Spread Difference (Private – PSB) – Yearly

We regress Spread on Public=1 binary variable for each year



Spreads versus DTD

Panel B: Distance to Default



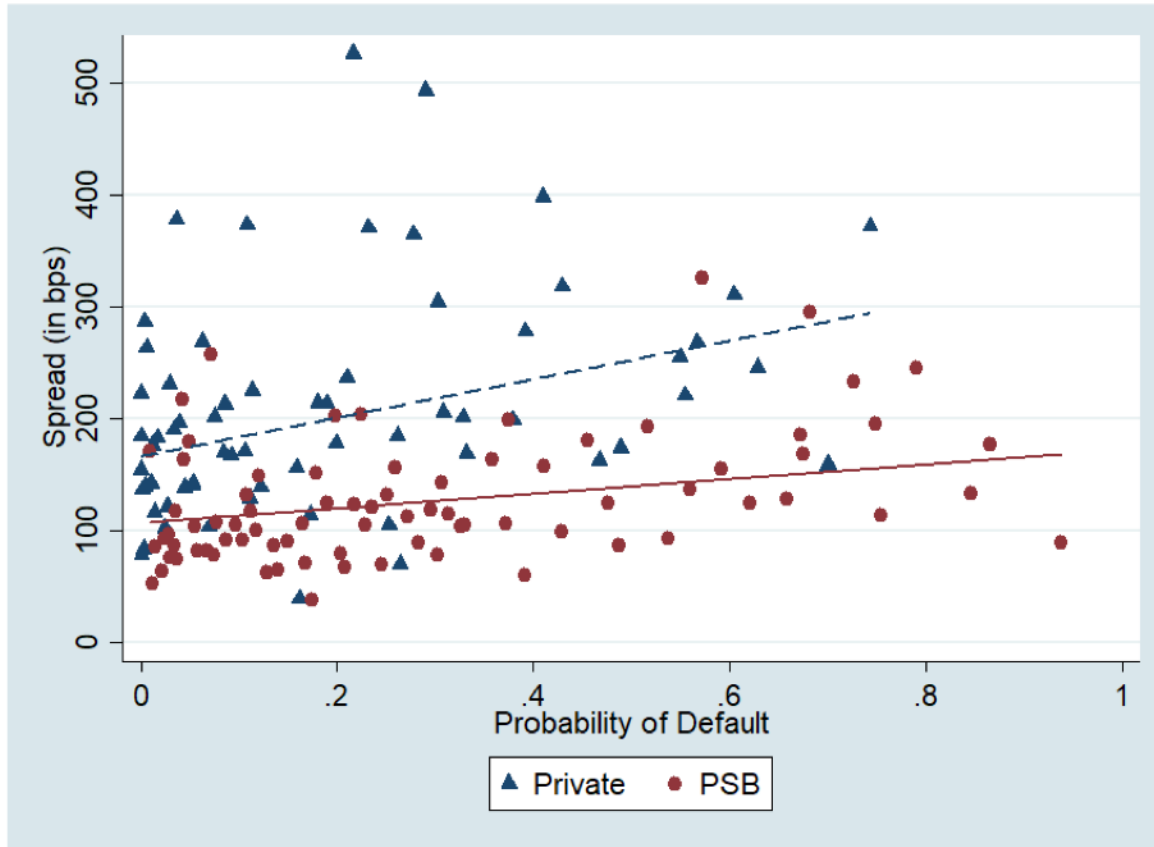
1. Downward slope
DTD matters
2. Flatter for PSB?

Spreads versus PD

Figure 4

Scatter Plot: Spread and Default

Panel A: Probability of Default



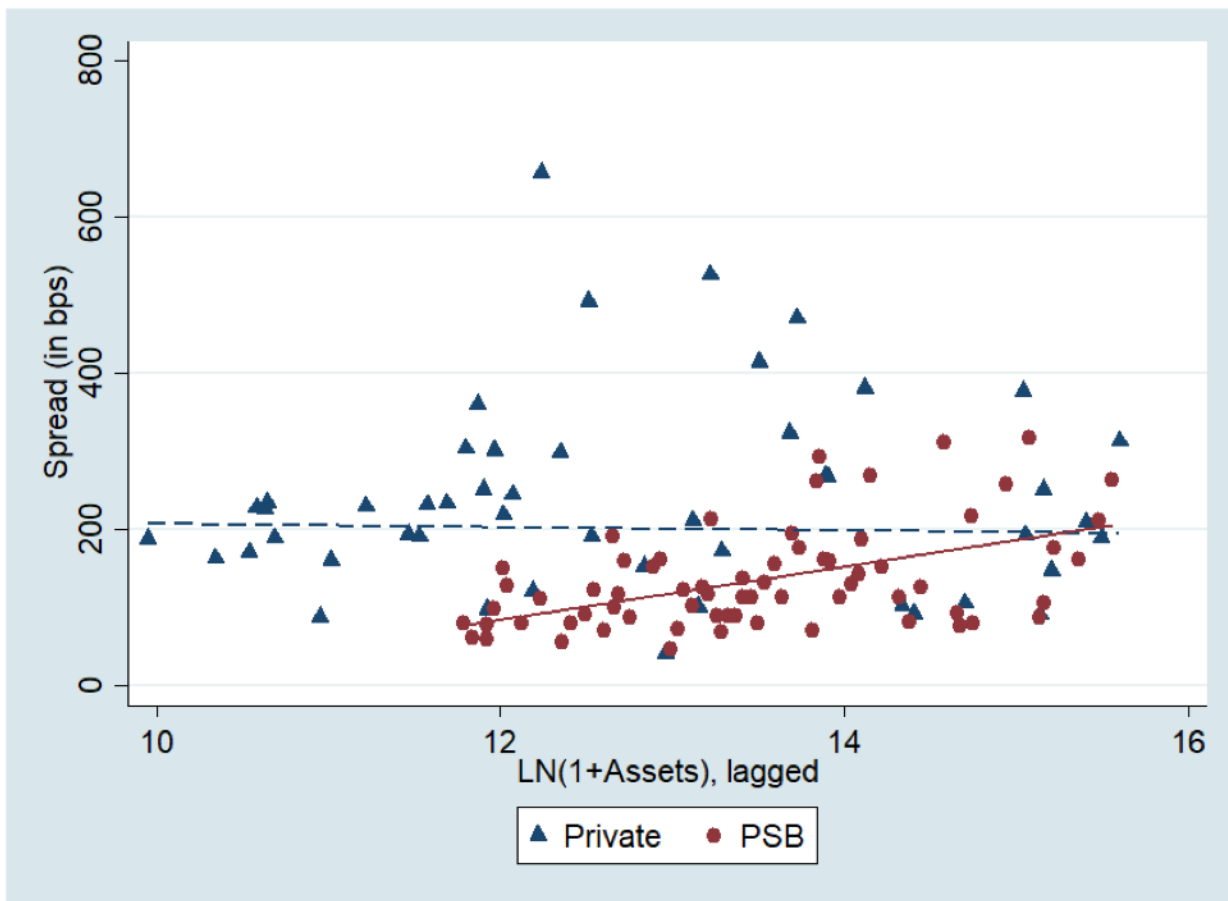
1. Upward slope
PD matters
2. Flatter for PSB?

Spread versus size

Scatter Plot: Spread and Size

Panel A: Full Sample

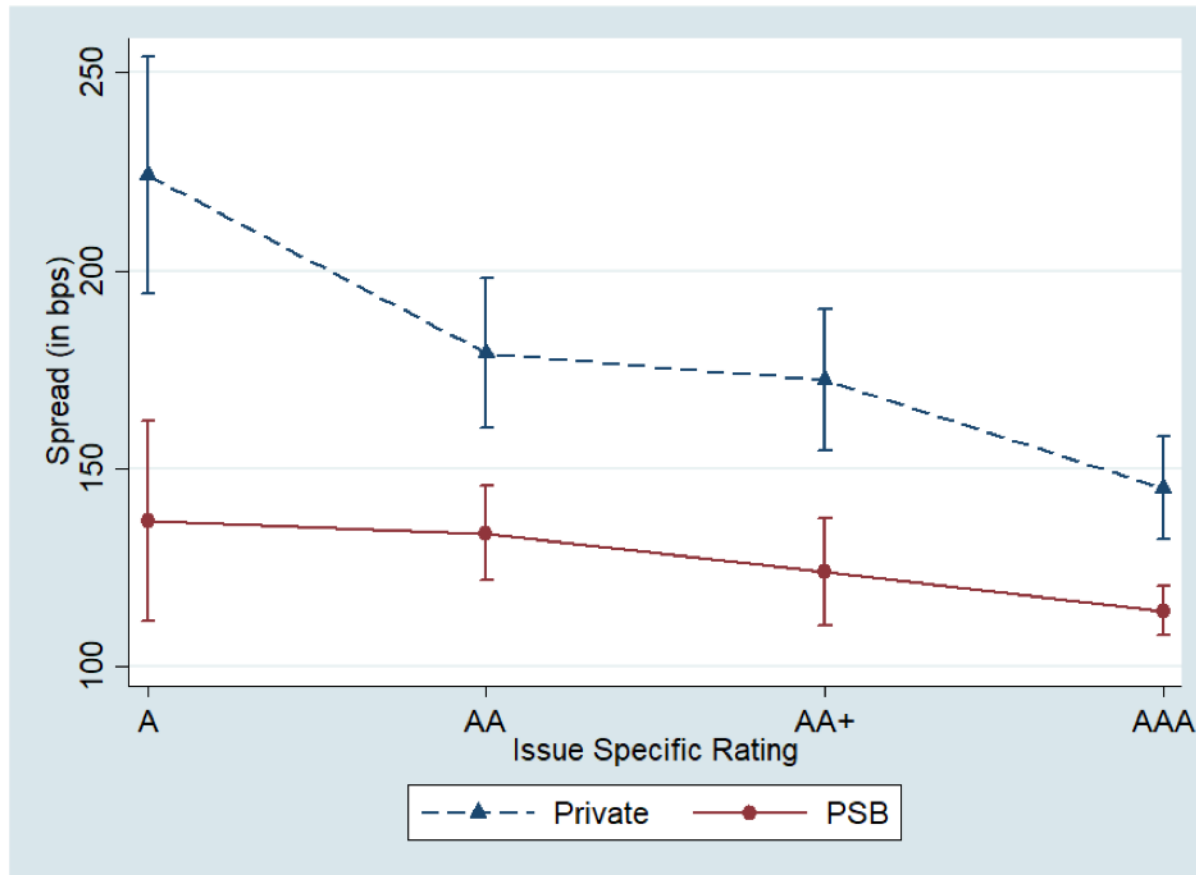
1. Large PSBs pay more
2. Private — flat?



Spreads and ratings

Figure 6

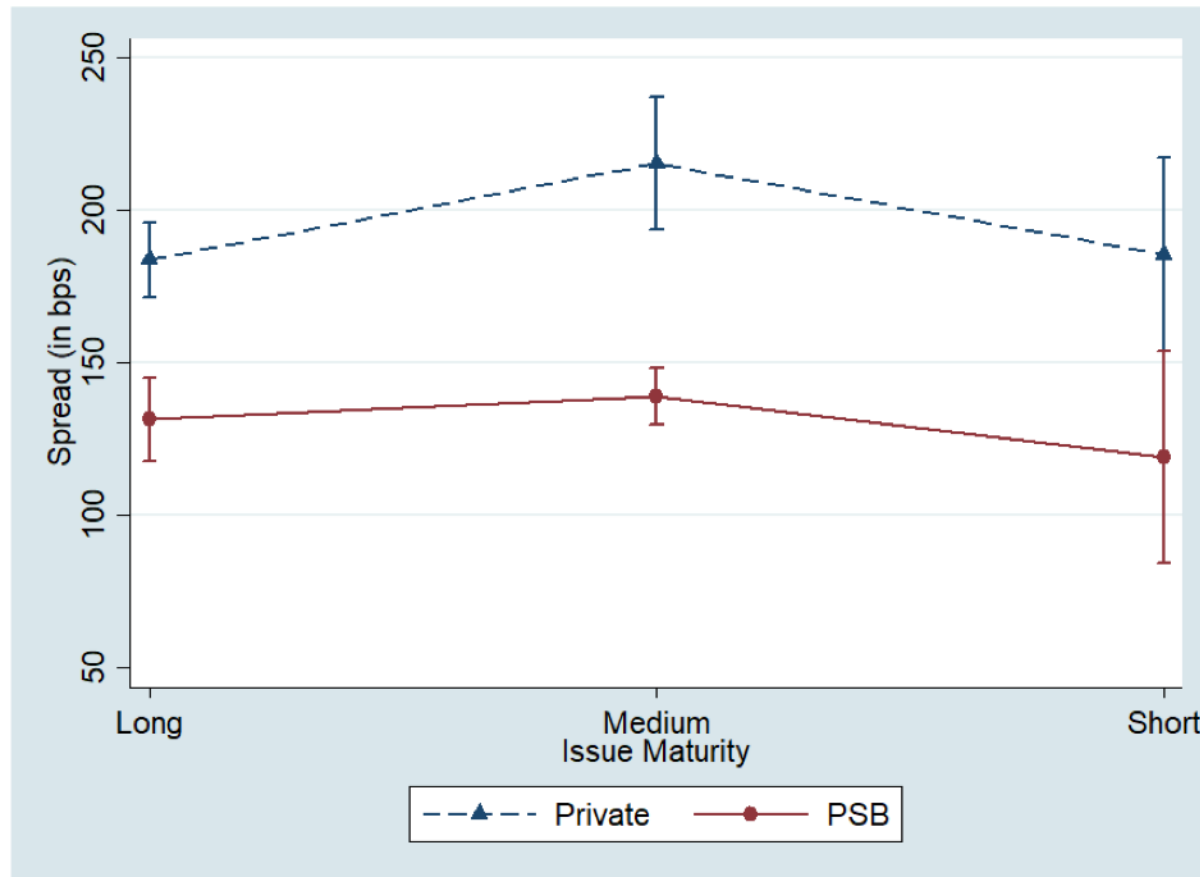
Spread and Issue Specific Credit Rating – By Bank Ownership



Spreads and maturity

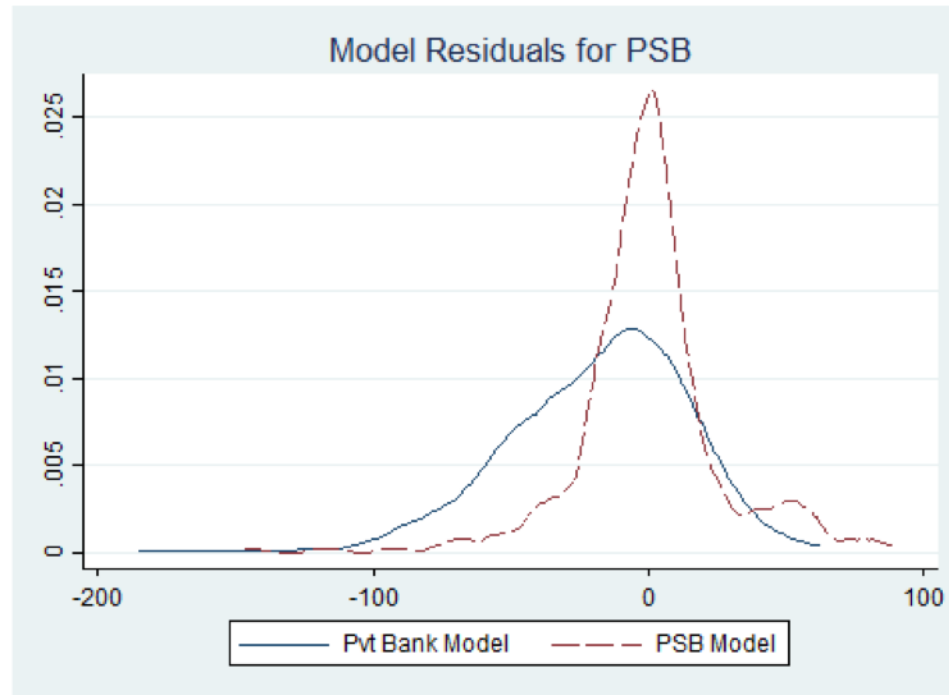
Figure 7

Spread and Issue Specific Maturity Bucket – By Bank Ownership



Short end
doesn't escape

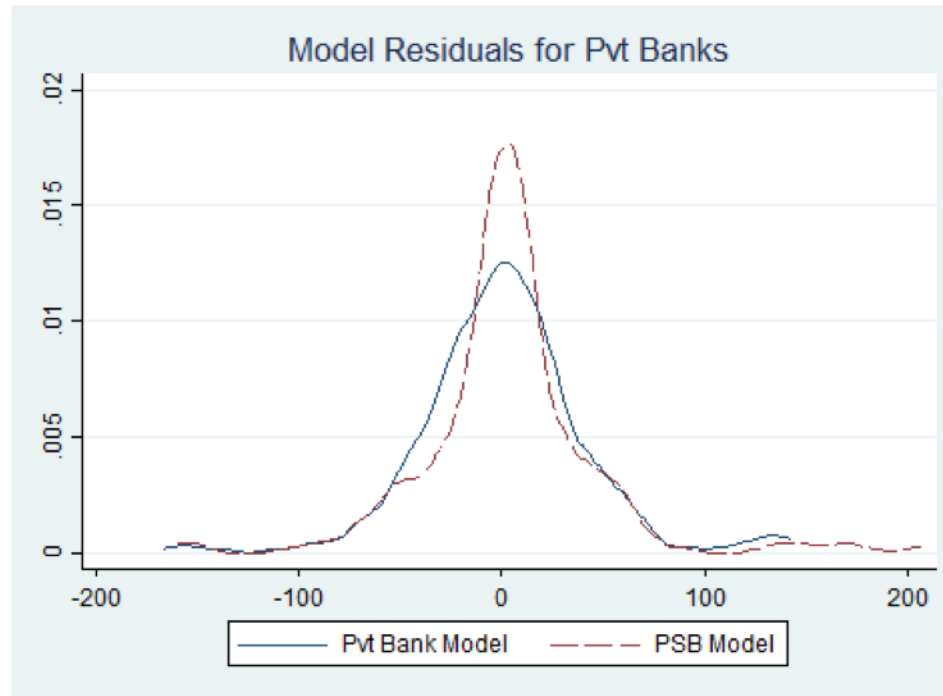
PSB Spread predicted using Private data



	# Obs	p1	p5	p25	p50	p75	p95	p99	Mean
Pvt Bank Model	274	-128.936	-76.540	-40.143	-14.666	4.664	28.209	48.968	-18.899
PSB Model	274	-92.096	-37.846	-11.586	-1.047	9.519	52.387	79.373	0.041

Spread = f (default risk) + controls incl amount, maturity, size

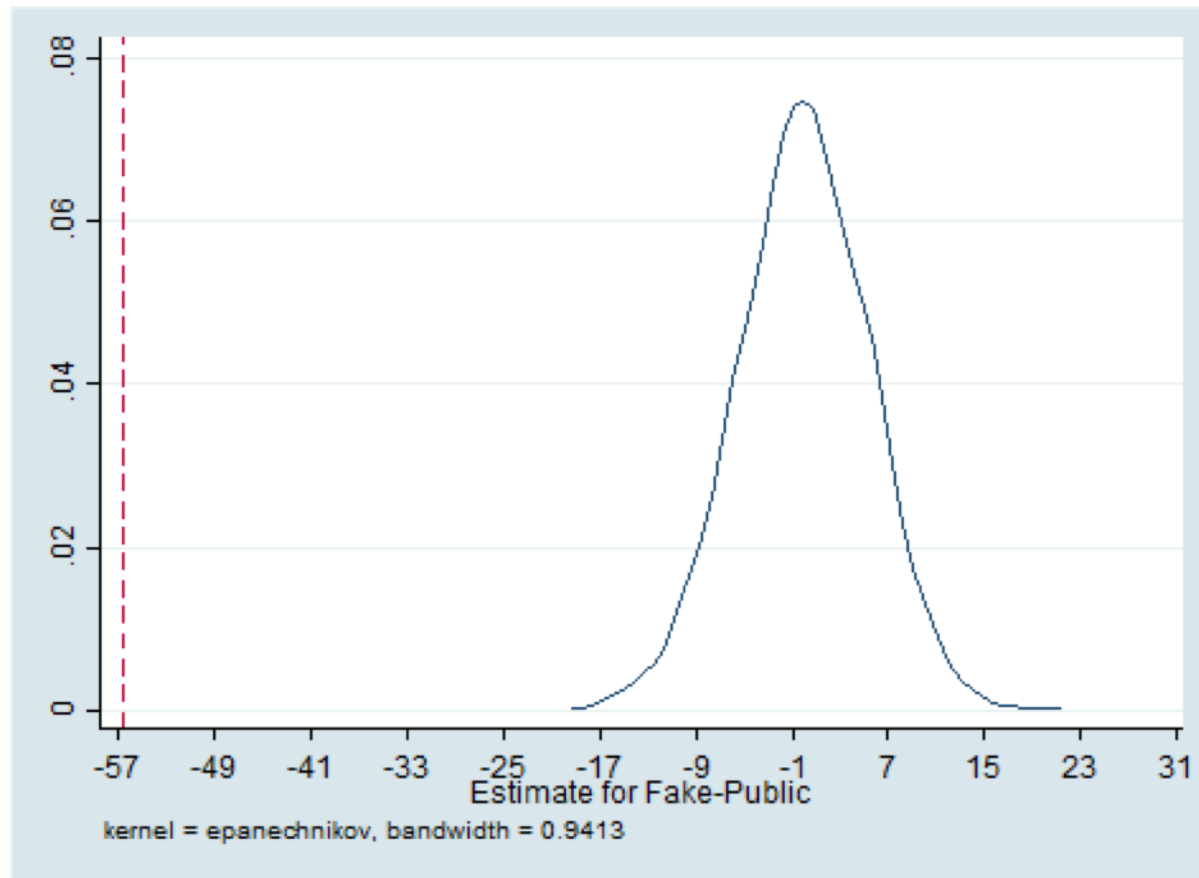
Private spread predicted using PSB data



	# Obs	p1	p5	p25	p50	p75	p95	p99	Mean
Pvt Bank Model	174	-146.389	-58.115	-20.628	0.370	18.671	60.385	134.441	0.751
PSB Model	174	-152.676	-62.141	-15.264	2.767	18.636	62.344	176.054	3.605

Spread = f (default risk) + controls incl amount, maturity, size

Placebo



Min	p1	p5	p25	p50	p75	p95	p99	Max	Mean	SD
-18.3123	-13.2840	-9.3116	-3.5609	-0.0083	3.6555	8.7572	12.4014	20.5266	-0.0459	5.4337

Fake public generated through simulation

Regression Results

Coefficient of interest

Table 5
Baseline Regression (Dependent Variable = Spread)

The sample comprises of non-callable and non-puttable private debt placements with fixed rate between 2003 and 2016 by private and public banks. PSB takes the value 1 if the issuer is a public sector banks. Amt is the total issue amount in USD million. TTM denotes time to maturity in years. Secured takes the value 1 if the bond is secured, 0 if unsecured. Size of issuer is denoted by 1 year lagged value of natural logarithm of one plus total assets (winsorized at 1% annually on both ends). Standard errors in parentheses double clustered at bank and month-year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PSB (=1)	-68.0157*** (11.0251)	-58.2634*** (8.7073)	-55.1076*** (7.9026)	-59.1699*** (9.1405)	-49.6624*** (6.2718)	-81.0228*** (13.5506)	-56.6305*** (8.0869)	-92.0938*** (13.2018)	-71.8620*** (8.0665)
LN(1+Amt)		-12.1538*** (4.4961)	-12.0240*** (4.3926)	-11.3231*** (4.0361)	-4.6025 (3.7840)		-3.4526 (4.5154)		-3.7489 (4.0790)
LN(1+TTM)			-15.6711 (11.4345)	-26.8807* (13.4660)	-15.2047 (15.1636)		-13.1811 (16.0200)		-9.5363 (15.8440)
Secured (=1)				-37.3978** (17.5943)	-41.0706* (21.6001)		-38.0220 (25.4138)		-39.8472 (25.3181)
Issuer Size					-19.1567*** (3.8426)		-18.8994*** (5.5947)		-15.6599*** (5.0429)
Prob (Default)						94.6176*** (19.2258)	43.4617* (23.1398)		
Distance to Default								-24.3956*** (3.8801)	-17.2118*** (3.2987)
Month-Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	613	613	613	613	492	412	384	412	384
R-squared	83.5%	84.6%	84.8%	85.3%	87.5%	82.7%	85.4%	84.0%	86.2%

Other bank characteristics

Table 7
Is it really Public Ownership? (Dependent Variable = Spread)

*The sample comprises of non-callable and non-puttable private debt placements with fixed rate between 2003 and 2016 by private and public banks. PSB takes the value 1 if the issuer is a public sector banks. Amt is the total issue amount in USD million. TTM denotes time to maturity in years. Secured takes the value 1 if the bond is secured, 0 if unsecured. High Profit (=1) takes a value of 1 if the PAT margin of the bank is greater than the average PAT margin of all banks in that year. Big Bank (=1) takes a value of 1 if the total assets of the bank are greater than the average total assets of all banks in that year. High Capitalization (=1) takes a value of 1 if the capital ratio of the bank is greater than the average capital ratio of all banks in that year. Standard errors in parentheses double clustered at bank and month-year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PSB (=1)	-55.0192*** (7.8367)	-58.9261*** (8.0453)	-61.0525*** (6.8822)	-60.5396*** (7.0413)	-31.3803*** (8.7009)	-38.9887*** (10.6567)	-36.7590*** (9.5159)	-36.9942*** (10.0047)
Prob (Default)	46.8775** (21.3091)	25.9093 (21.5327)	39.0507* (21.1713)	22.8992 (21.5353)	196.8463*** (64.5816)	176.6192** (65.9414)	203.5961*** (61.0464)	167.9863** (72.1560)
Big Bank (=1)	-7.6305 (11.4694)			-10.5971 (10.8919)	-13.0566 (12.9788)			-13.6774 (12.1813)
High Profit (=1)		-15.8897* (7.8922)		-10.5587 (6.6372)		-16.6104* (8.8653)		-9.9085 (7.1801)
High Cap (=1)			20.9449** (8.8249)	18.6991** (8.4744)			23.1139** (9.5319)	17.7080* (9.1993)
PSB*Prob (Default)					-208.0175*** (55.1445)	-178.3220*** (64.9481)	-206.5309*** (55.0670)	-218.3630*** (46.3774)
Big Bank*Prob (Default)					35.8947 (30.0984)			30.9074 (30.0719)
High Profit*Prob (Default)						25.7336 (22.4612)		30.5431 (23.4349)
High Cap*Prob (Default)							11.9075 (29.0955)	28.4533 (32.2570)
Month Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Issue Specific Controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	427	427	427	427	427	427	427	427
R-squared	84.9%	85.2%	85.4%	85.6%	86.6%	86.8%	87.4%	87.5%

PSB Risk (In)sensitivity

Table 8
Bank Attributes (Dependent Variable = Spread)

*The sample comprises of non-callable and non-puttable private debt placements with fixed rate between 2003 and 2016 by private and public banks. PSB takes the value 1 if the issuer is a public sector bank. Amt is the total issue amount in USD million. TTM denotes time to maturity in years. Secured takes the value 1 if the bond is secured, 0 if unsecured. High Profit (=1) takes a value of 1 if the PAT margin of the bank is greater than the average PAT margin of all banks in that year. Big Bank (=1) takes a value of 1 if the total assets of the bank are greater than the average total assets of all banks in that year. High Capitalization (=1) takes a value of 1 if the capital ratio of the bank is greater than the average capital ratio of all banks in that year. Standard errors in parentheses double clustered at bank and month-year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

	PSB (1)	Private banks (2)
Prob (Default)	23.5219* (11.9829)	253.7190*** (80.6861)
Big Bank (=1)	-8.8309 (6.7357)	-50.0882*** (11.0391)
High Profit (=1)	-5.7356 (4.8228)	-20.1213 (15.3014)
High Cap (=1)	17.8341*** (3.2156)	-8.9035 (15.7068)
LN(1+Amt)	0.5528 (2.5401)	-0.3942 (5.5005)
LN(1+TTM)	2.5655 (17.7349)	-1.9670 (11.8707)
Secured (=1)	-1.6301 (5.3899)	-59.8655** (28.0536)
Month-Year FE	Y	Y
Observations	261	143
R-squared	89.7%	92.1%

Breaking out Private Banks: OPB and NPB

Table 9
NPB v OPB (Dependent Variable = Spread)

*The sample comprises of non-callable and non-puttable private debt placements with fixed rate between 2003 and 2016 by private and public banks. NPB takes the value 1 if the issuer is a new private sector bank. OPB takes a value of 1 if the issuer is an old private sector bank. Amt is the total issue amount in USD million. TTM denotes time to maturity in years. Secured takes the value 1 if the bond is secured, 0 if unsecured. Size of issuer is denoted by 1 year lagged value of natural logarithm of one plus total assets (winsorized at 1% annually on both ends). Standard errors in parentheses double clustered at bank and month-year level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
NPB (=1)	46.0207*** (9.6570)	43.8658*** (8.8284)	39.9827*** (7.7053)	44.0671*** (8.6132)	41.9760*** (6.7187)	54.3013*** (11.4119)	49.3408*** (8.9139)	64.9491*** (11.4345)	61.9530*** (8.9376)
OPB (=1)	117.5302*** (14.8965)	104.9052*** (14.3302)	102.2511*** (13.9348)	101.1419*** (13.6186)	84.4891*** (14.0064)	130.0725*** (18.0294)	104.6698*** (19.5980)	129.8392*** (17.7485)	106.0544*** (19.2711)
LN(1+Amt)		-6.6990* (3.5052)	-6.4414* (3.4085)	-6.4200* (3.2946)	-2.6249 (3.2512)		-0.6207 (3.8244)		-1.7213 (3.5154)
LN(1+TTM)			-17.8427 (11.5296)	-25.4511* (13.3734)	-15.9416 (15.4524)		-13.7138 (16.2126)		-10.8493 (16.1024)
Secured (=1)				-25.9876 (16.9128)	-32.0219 (20.1940)		-27.2803 (23.1859)		-31.5493 (23.3493)
Issuer Size					-14.5794*** (4.0787)		-12.9688** (5.2961)		-11.7093** (5.0324)
Prob (Default)						61.7659*** (19.7939)	44.0400** (21.4453)		
Distance to Default								-16.1997*** (3.7880)	-14.4730*** (3.5974)
Month-Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	613	613	613	613	492	412	384	412	384
R-squared	85.7%	86.0%	86.2%	86.4%	88.1%	85.1%	86.3%	85.6%	86.8%

Robustness

Robustness Analysis						
<i>Prob(Default) analysis</i>				<i>Distance to Default analysis</i>		
	PSB	PD	PSB * PD	PSB	Dtd	PSB * Dtd
<i>Analysis (1)</i>						
1 Exclude IDBI (top public issuer)	-	+	-	-	-	+
2 Exclude IDFC (top private issuer)	-	+	-	-	-	+
3 Exclude ICICI	- (at 5%)	+	-	-	-	+
4 Exclude SBI and allied State Banks	-	+	-	-	-	+
5 Exclude 1,2,3,4	0	+	-	-	-	+
<i>Analysis (2)</i>						
1 Pre-crisis period (2002-07, CY)	- (at 5%)	+	-	-	-	+ (at 5%)
2 Post-crisis period (2010-16, CY)	-	+ (at 5%)	- (at 10%)	-	-	+ (at 10%)
<i>Level of significance is 1% unless otherwise specified</i>						

PSUs not PSBs. That is, non-financial SOEs

Non-financial Firms (Dependent Variable = Spread)

*The sample comprises of non-callable and non-puttable private debt placements between 2003 and 2016 by private and public sector non-financial firms. Amt is the total issue amount in USD million. TTM denotes time to maturity in years. Bank (=1) takes a value of 1 if the firm is a bank, and 0 if the firm is a non-financial firm. Secured takes the value 1 if the bond is secured, 0 if unsecured. Size of issuer is denoted by 1 year lagged value of natural logarithm of one plus total assets (winsorized at 1% annually on both ends). Robust standard errors in parentheses clustered at firm level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Public (=1)	-393.190*** (37.832)	-303.180*** (28.602)	-297.995*** (31.125)	-307.719*** (34.619)	-180.153*** (31.456)	-229.618*** (25.245)	-123.942*** (26.239)
LN(1+Amt)		-84.099*** (8.551)	-83.583*** (8.747)	-76.538*** (8.749)	-40.797*** (9.791)		-26.405*** (7.048)
LN(1+TTM)			-7.466 (22.275)	-1.652 (22.510)	24.787 (18.267)		27.470 (19.661)
Secured (=1)				112.086*** (28.895)	52.456** (25.117)		59.443*** (18.550)
Issuer Size					-13.071 (10.584)		-47.210*** (11.262)
Prob (Default)						526.341 (635.375)	1648.682*** (424.491)
Constant	489.334*** (22.431)	1,215.655*** (80.449)	1,221.867*** (82.054)	1,058.268*** (85.845)	734.286*** (121.639)	295.485*** (22.213)	955.560*** (133.394)
Month-Year FE	Y	Y	Y	Y	Y	Y	Y
Observations	1,586	1,586	1,586	1,586	1,059	662	644
R-squared	0.299	0.394	0.394	0.404	0.389	0.529	0.668
Adjusted R ²	0.251	0.352	0.352	0.362	0.322	0.452	0.609
Log likelihood	-11333	-11217	-11217	-11204	-7033	-4113	-3881

CD results {not shown here}

- Really short-term uninsured liabilities of banks,
 - Both PSBs and Private banks
 - Traded in the market
- Here, one can do *within-day* analysis.
- One complication: remaining time to maturity varies a lot
 - Fit cubic splines, include log maturity
- We find 9-20 basis points PSB-NPB spread, more in the longer end out to 1 year, and relatively insensitive to risk.

Conclusions

- India offers a unique setting to study implicit bailout promises. State-owned PSBs NPBs, OPBs, and markets for instruments with reliable price data. We quantify TBTF and present other results.
- Collateral findings
 - Modern DTD and PD risk estimates explain spreads. They seem like useful tools even in India.
 - For PSBs, it may be useful to look at credit risk in models with recapitalization frictions from maintaining state ownership.
 - PSUs spreads > PSB spreads. How do we think of this? Is it the value of PSB regulation and supervision by the RBI, while PSUs are less checked?

Broader implications

- In India, the NSSF has bought INR 360,000 crores (\$52 billion) of PSU debt (FCI, NHAI, Power Finance, REC). This is 21% of its assets.
- This year China has issued \$330 billion of debt for its state-owned agencies, some in USD, and is repaying about \$300 billion a year.
- Shadow debt backed implicitly by the state, but not disclosed sufficiently, appears to be a far broader problem, even without getting into munis, pension obligations, and the like.

Thank you!

Questions?

Bank Governance Issues

Policy thoughts

- Should the state own banks?
- The LSV answer is no because history and evidence shows that political pressures dominate developmental motives.
- Banerjee argues that majority ownership is inappropriate. It subjects banks to vigilance oversight and creates risk aversion incompatible with risk-taking needed for lending.

Policy thoughts

- Should the state own banks? A different channel might suggest yes.
- If the state is going to bail out banks, should it not own the upside? An easy implementation is state ownership.
- If so, the narrative is less about *ownership* than about the *control* of PSBs? Should the mechanism be to leave the state with sufficient ownership but less control?
 - Curiously, this would be the opposite of dual class shares.

Implementation

- The Bank Boards Bureau is such a step. It lessens state control by outsourcing CEO and director appointments away from the state, but does not dilute ownership.
 - Has it worked? Good question
- Large minority blockholders can, in principle, work, by providing checks on the dominant shareholder. Plenty of research on this. But it needs appropriate investors.
 - Powerful enough to be independent-minded
 - With relevant long-haul governance expertise.
- Employee ownership of PSBs may work. The state's incentive to go against shareholder interests decreases when ~800K employees are paid or have pensions through PSB shares.