

Information Quality and Credit Spreads



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Credit Spread Defined

- The spread between corporate bond or bank loan yields, and comparable risk-free yields.
- More recently, credit default swap spreads.
- The literature on “cost of debt” uses offering yields.
- However, market participants are perhaps more interested in pricing in the secondary market.

Credit Spread Puzzle Defined

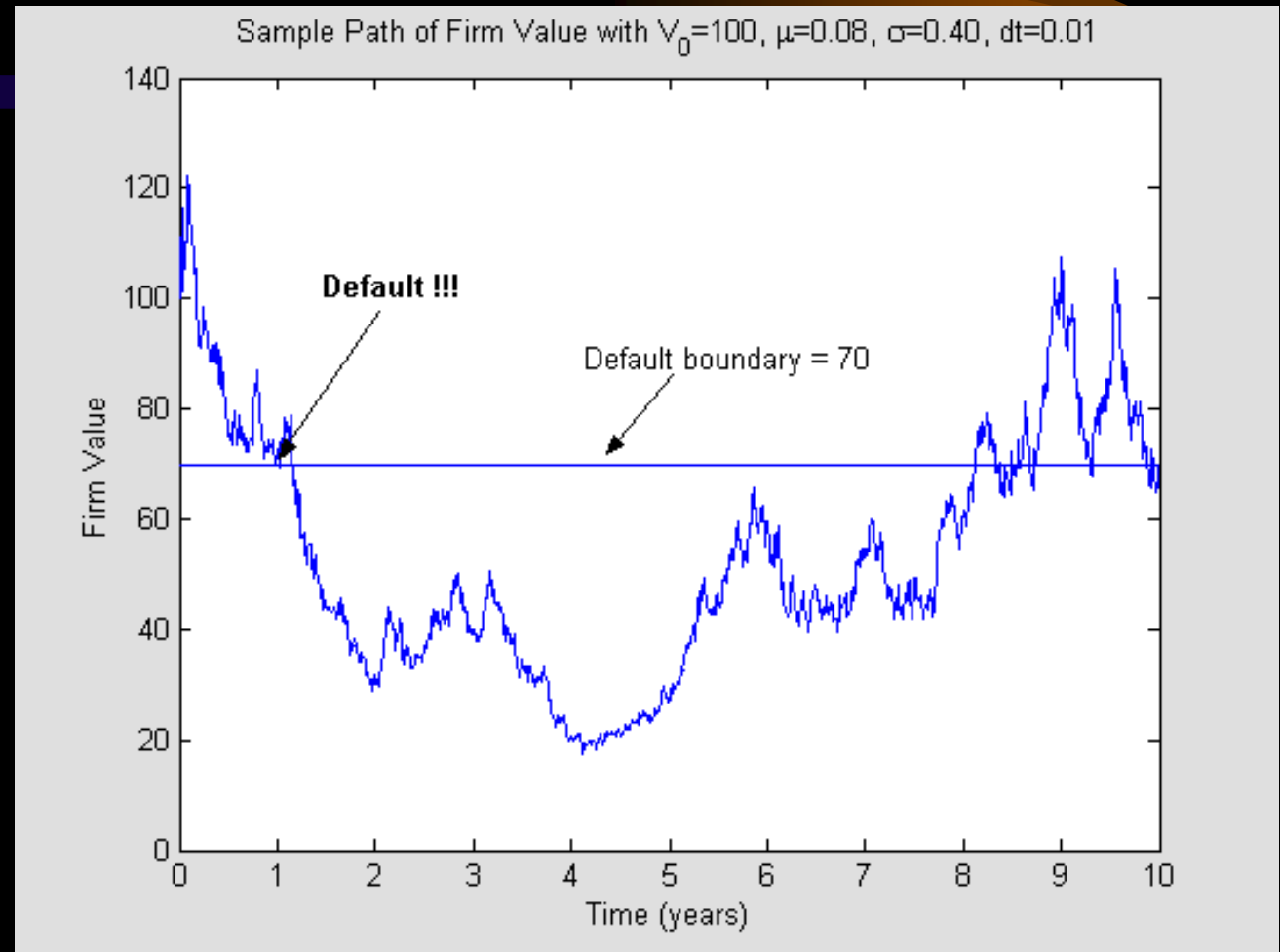
- Structural credit risk models have great difficulties in explaining the term structure of credit spreads.
- Under-prediction of spreads if model calibrated to historical default rates and equity premiums: Jones, Mason, and Rosenfeld (1984), Huang and Huang (2003).
- Under-prediction for investment-grade, short maturity bonds across a range of models: Eom, Helwege, and Huang (2004).

One Potential Resolution

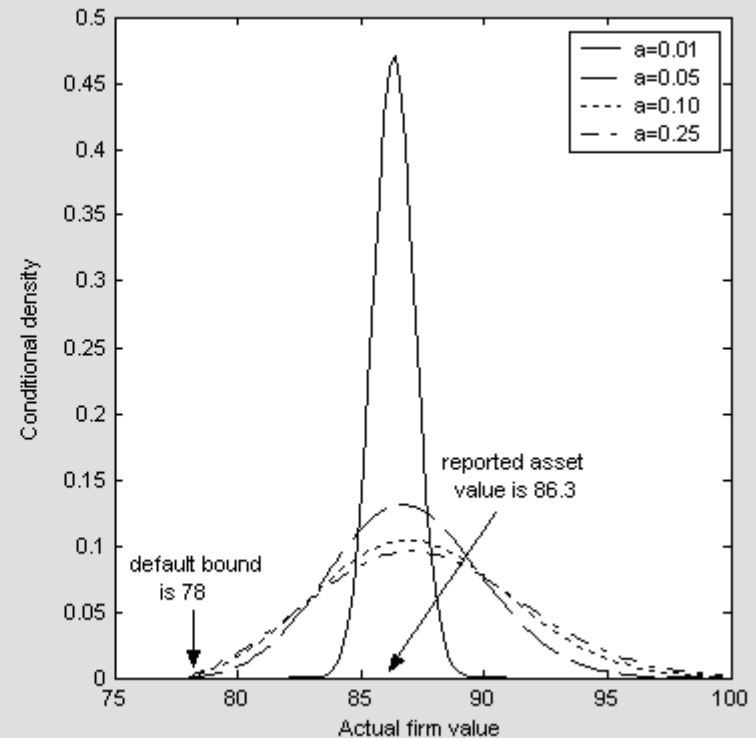
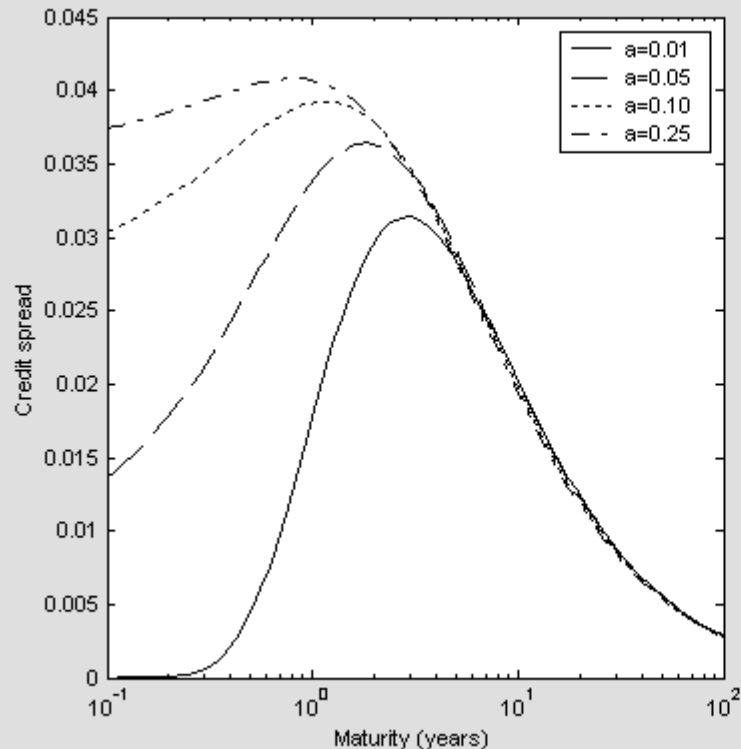
- Structural models assume assets and default boundaries are observed precisely.
 - Leverage ratio is 100% accurate and is a sufficient statistic for capital structure.
 - No SPV concealing debt somewhere.
- But this is quite far from reality.
 - Look no further than Enron, Worldcom, Adelphia, Global Crossing, Tyco, Xerox ...
 - A 2002 WSJ study shows of the 228 publicly traded companies that filed for Chapter 11 bankruptcy protection since 2001, 42 percent were given a clean bill of health by auditors within a year of the filing.

The Standard Structural Model

- Assumes perfectly observed asset values and default boundaries.
- Credit spread approaches zero as maturity shrinks to zero.



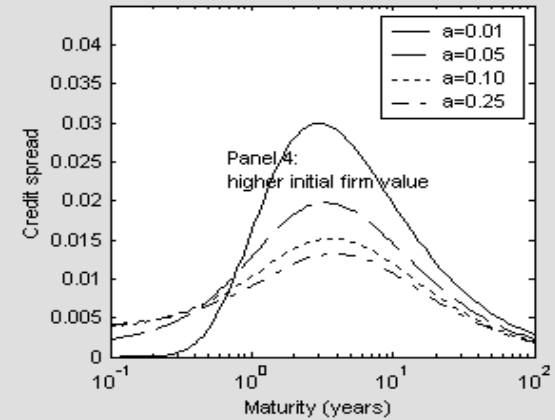
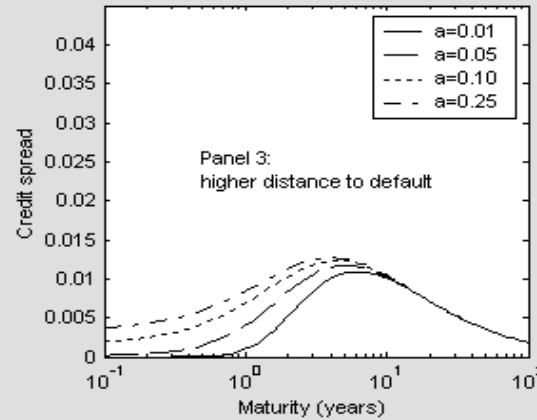
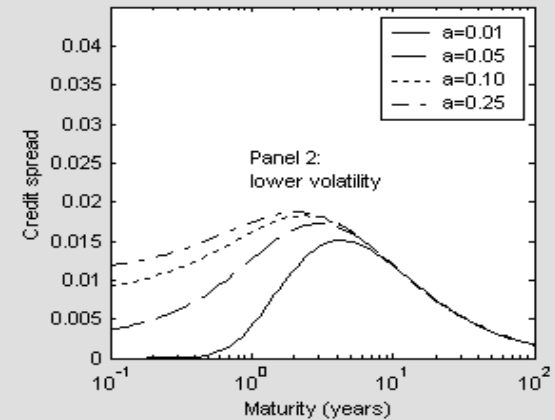
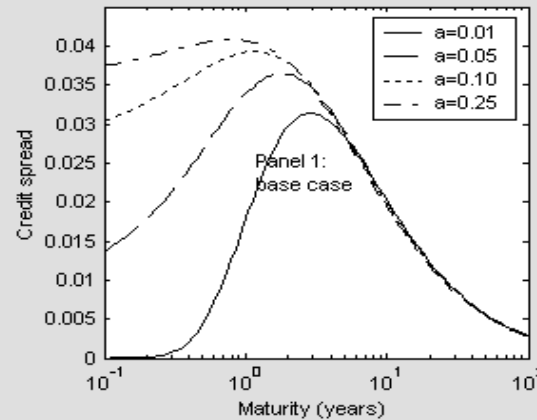
Incomplete Accounting Information



- With imperfectly reported assets, there is always some chance that the firm is actually close to bankruptcy.
- Duffie and Lando (2001) show that this causes short-term credit spread to become positive.

More Predictions

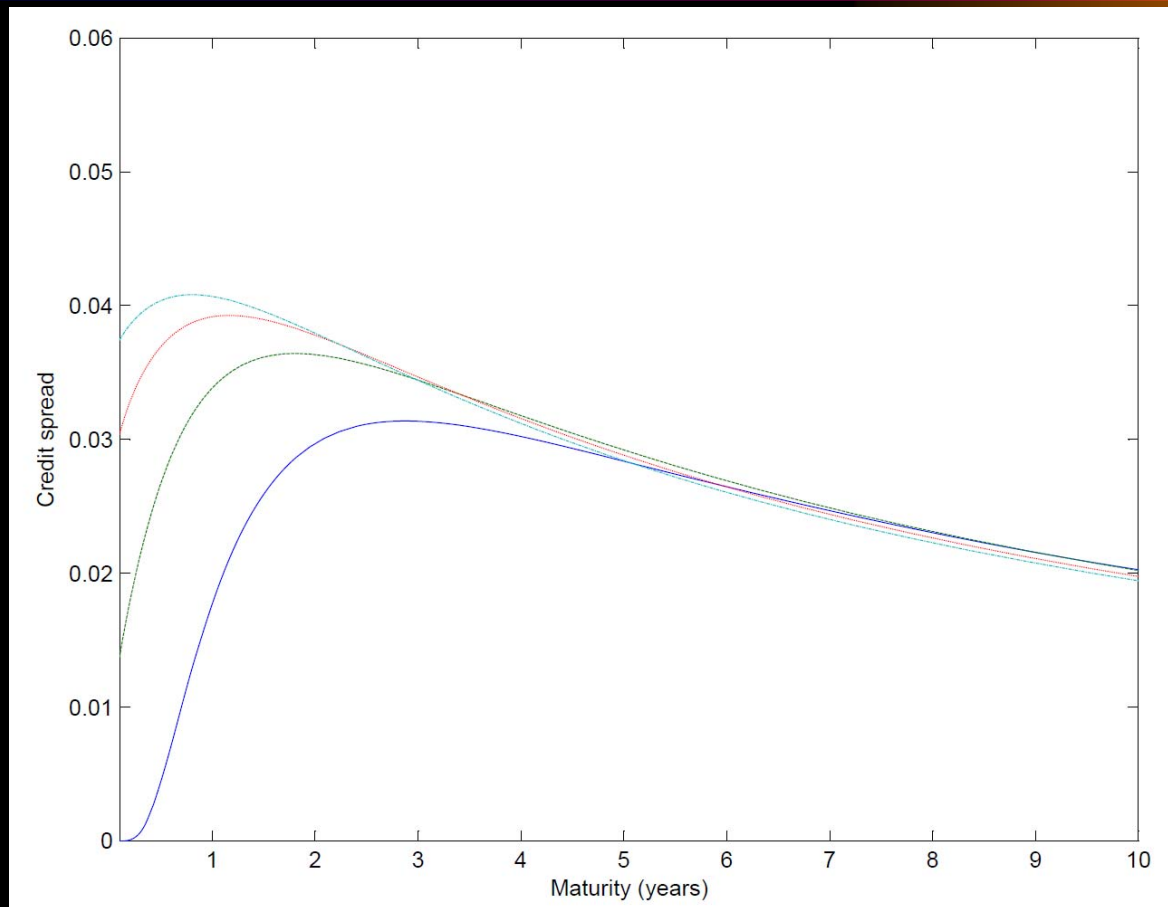
- The effect is nonlinear: larger for higher risk firms.



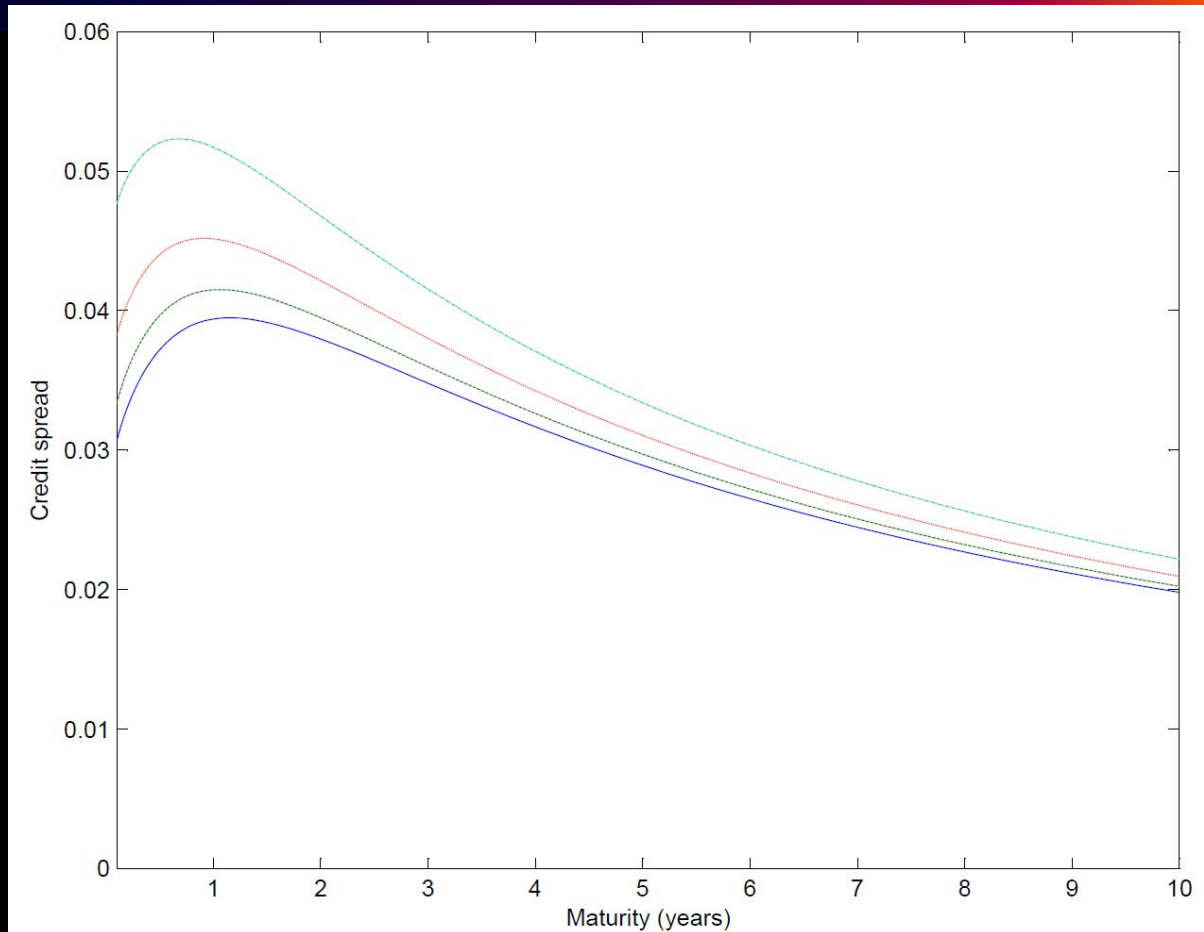
Information Quality Defined

- Management will withhold information if it is costly to disclose.
 - Verrecchia (1983), Darrough and Stoughton (1990), Feltham and Xie (1992), Shin (2003), and others.
- This results in disclosure being:
 - noisy (incomplete information),
 - and biased (asymmetric information or lemon's premium).

How Incomplete Information Affects the Term Structure of Credit Spreads



How Information Asymmetry Affects the Term Structure of Credit Spreads



How Information Risk Affects the Term Structure of Credit Spreads

- The models used can be made more realistic and the predicted term structure shape can be different.
- How the term structure of credit spreads depends on different information risk measures becomes an empirical issue.

Measuring Information Quality

- Information quality can be measured in different ways.
- AIMR disclosure scores: Lang and Lundholm (1993, 1996), Welker (1995), Sengupta (1998), and so on.
- Whether negative cash flow and return news are quickly recognized in accruals and earnings: Wittenberg-Moerman (2005).
- Inferred from output of analysts – consensus forecast errors and analyst forecast dispersions: BKLS (1998), Botosan, Plumlee, and Xie (2004).
- Using market data to infer information asymmetry.
 - Equity market data quality are probably best, so take equity PINs (Easley, Hvidkjaer, and O’Hara (2002)) or effective bid-ask spreads.
 - Lead-lag across debt/equity/option markets: Acharya and Johnson (2005), Cao, Chen, and Griffin (2005), Pan and Poteshman (2006), Cao, Yu, and Zhong (2007).

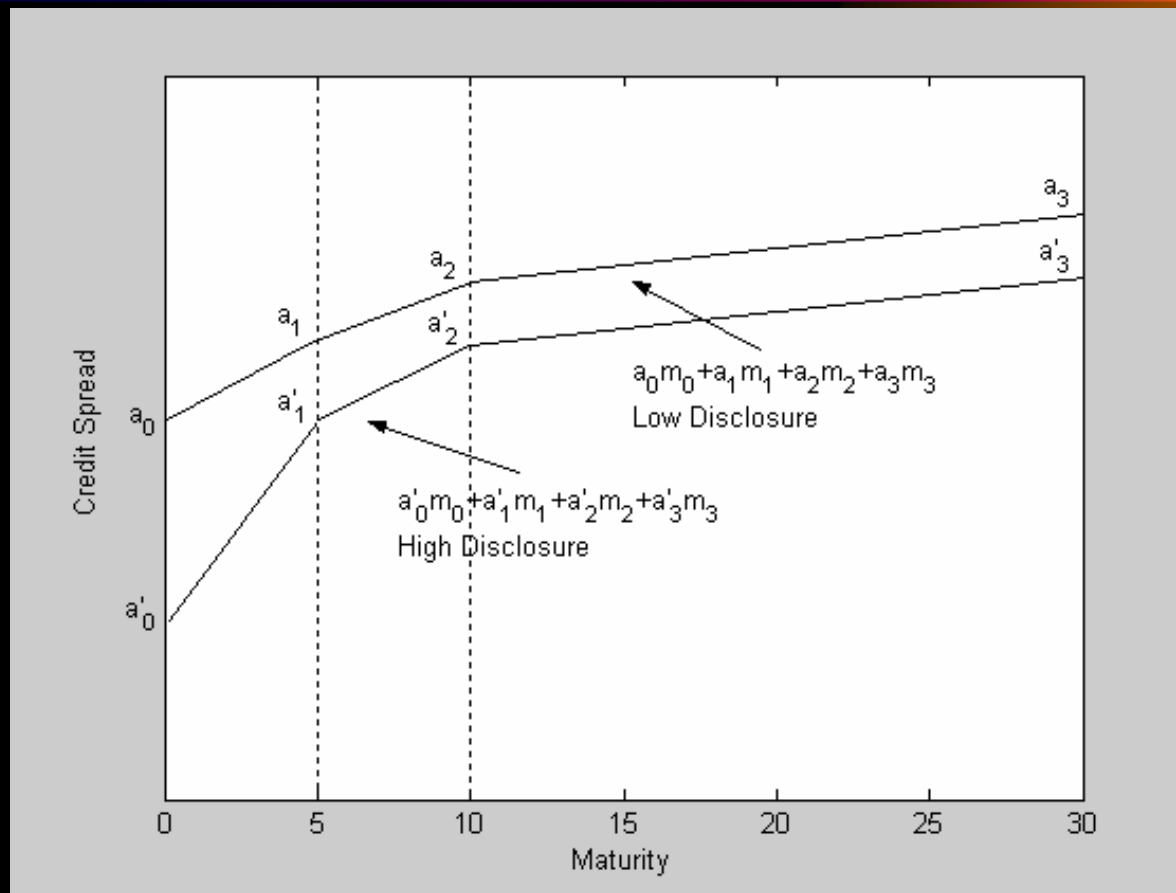
AIMR Disclosure Scores and Spreads

- Monthly cross-sectional regressions of corporate yield spread on AIMR disclosure scores, controlling for:

- Firm leverage,
- Equity volatility,
- Issue size,
- Age of bonds,
- Bond maturity,

allowing for interaction between disclosure dummy and bond maturity.

Specifying Term Structure Effects



Bond Sample

	1991	1992	1993	1994	1995	1996
Total	109	179	212	207	247	238
Aa or above	2	15	24	35	42	34
A	73	102	113	109	126	103
Baa	16	40	43	39	32	58
Non-investment-grade	0	0	0	0	4	15
Short-term	33	43	51	54	76	73
Medium-term	34	62	79	71	79	79
Long-term	26	55	74	76	89	81

- Mostly top quality, investment-grade, bonds.

Correlations

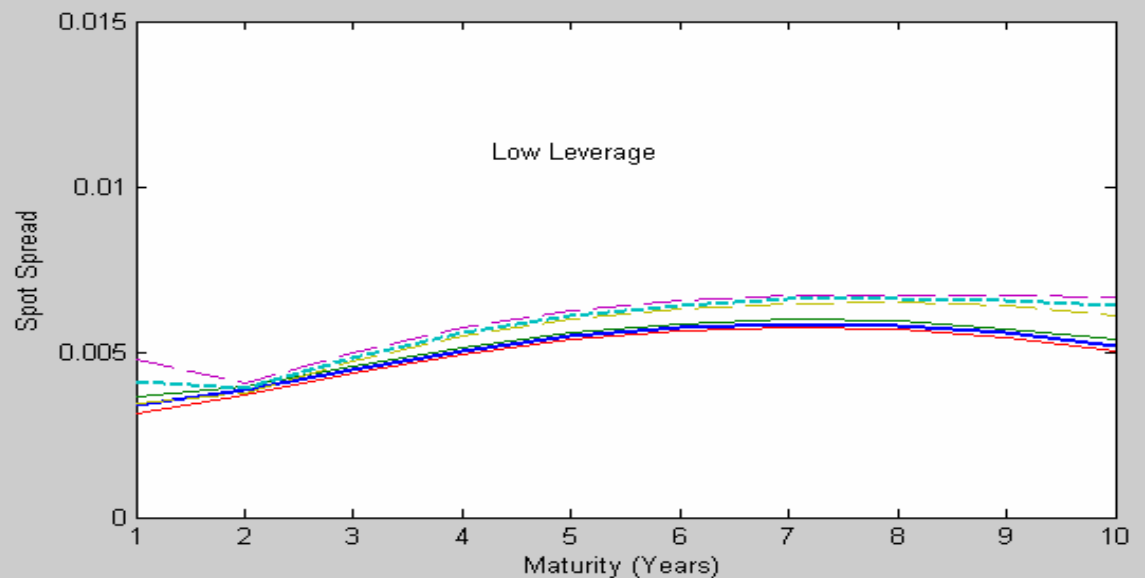
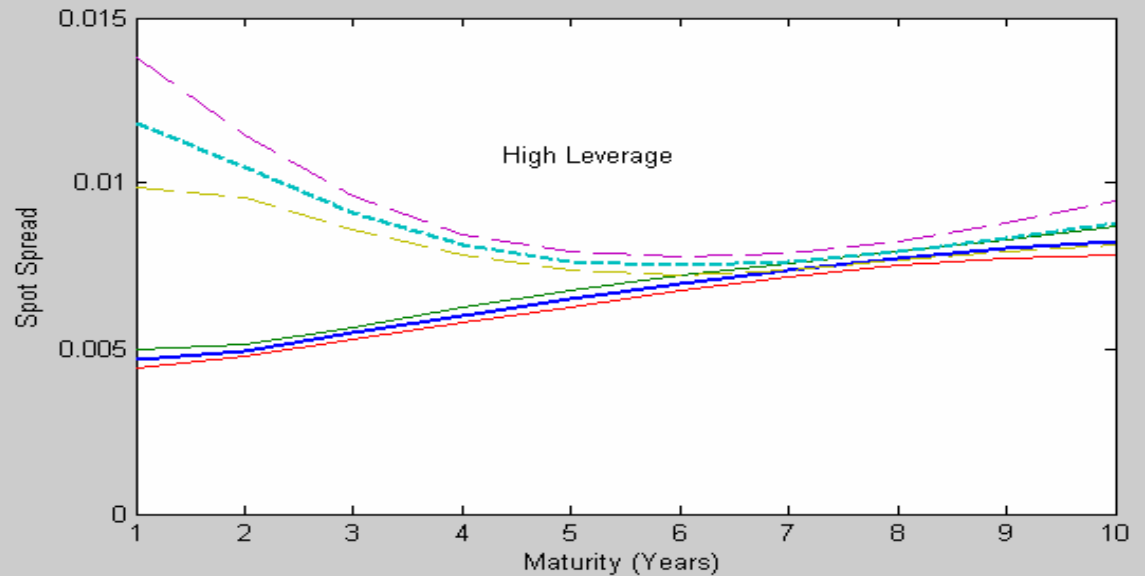
	CS	DISC	MAT	LEV	VOL	AGE	LSIZE
DISC	-0.24						
MAT	0.27	-0.10					
LEV	0.48	-0.22	0.04				
VOL	0.34	-0.08	-0.07	0.25			
AGE	0.04	0.06	-0.19	0.05	-0.06		
LSIZE	-0.12	0.23	-0.01	0.05	-0.19	-0.09	
RTNG	0.69	-0.26	0.07	0.57	0.32	0.07	-0.15

- Firms with high disclosure scores have lower spreads, but are also associated with lower leverage and equity vol.

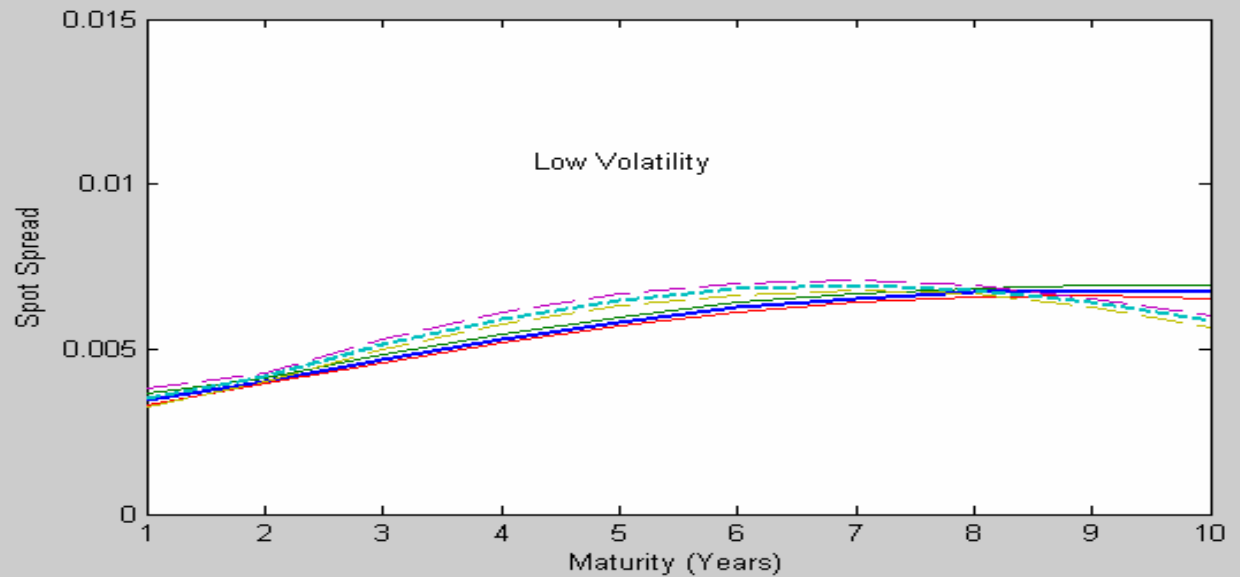
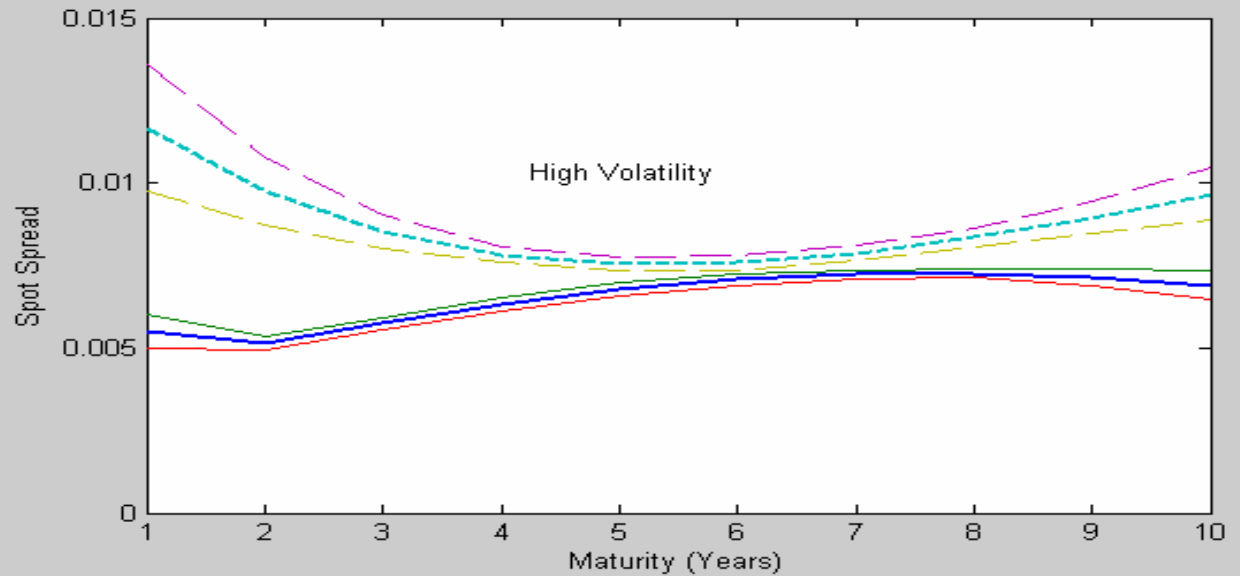
Estimated Term Structure Effects

	Leverage		Volatility	
	Low	High	Low	High
m_0	0.10	0.076	-0.40	-0.82
	1.56	0.37	-5.79	-2.55
m_1	0.37	-0.50	-0.22	-1.07
	4.76	-1.86	-3.39	-2.96
m_2	0.50	-0.21	-0.076	-0.72
	7.03	-1.06	-1.27	-2.08
m_3	0.65	0.21	0.26	-0.46
	8.91	1.05	4.13	-1.35
dm_0	0.050	-1.02	-0.0059	-0.60
	2.68	-5.49	-0.36	-3.97
dm_1	-0.055	-0.28	-0.045	-0.089
	-2.98	-5.53	-2.61	-3.11
dm_2	-0.059	-0.25	0.030	-0.19
	-2.36	-7.67	2.34	-3.89
dm_3	-0.022	-0.63	-0.15	-0.39
	-1.16	-13.52	-9.62	-7.28
LEV	0.99	0.89	0.72	1.36
	14.40	7.43	13.86	9.73
VOL	1.41	3.46	1.54	3.69
	9.41	6.85	7.03	4.51
AGE	0.021	0.020	0.014	0.030
	8.97	4.83	6.89	6.36
LSIZE	-0.061	0.016	0.048	0.046
	-6.62	1.04	5.57	2.18

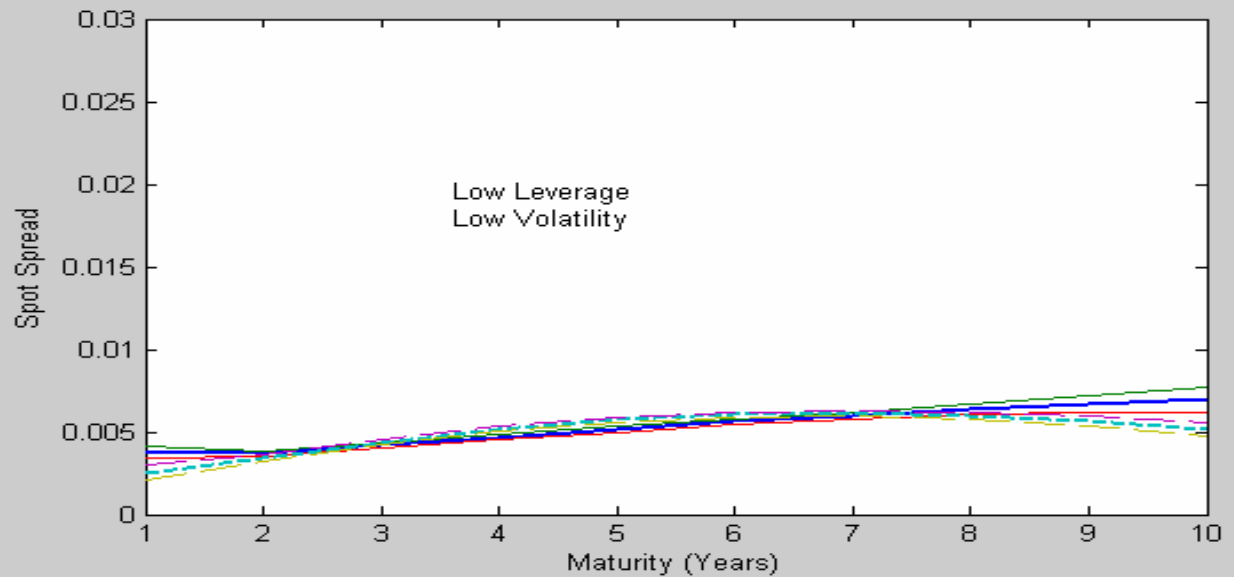
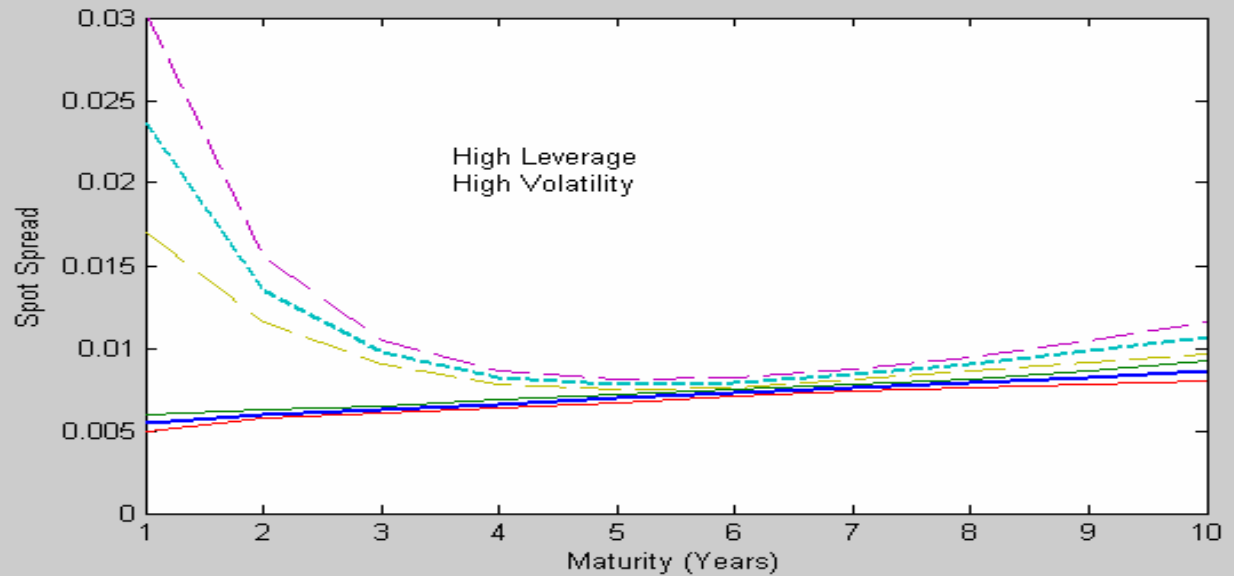
Nelson-Siegel: By Firm Leverage



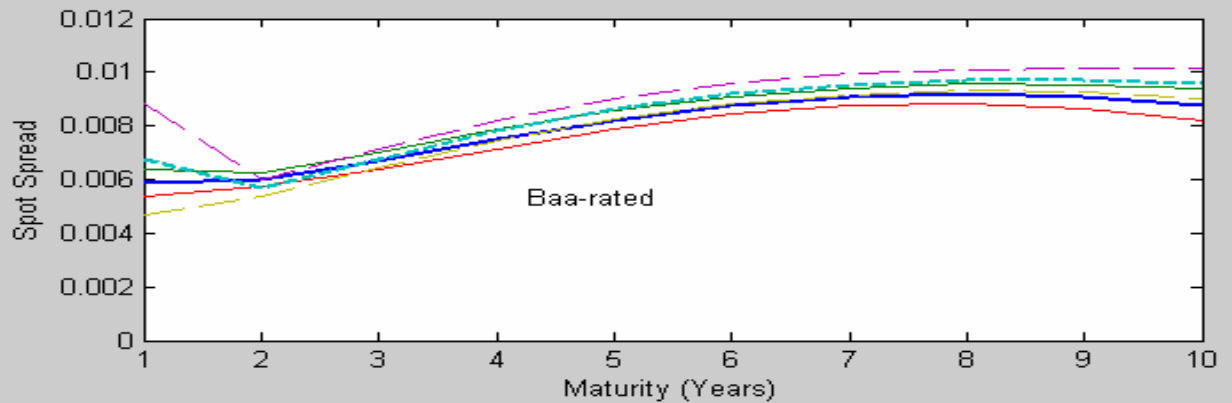
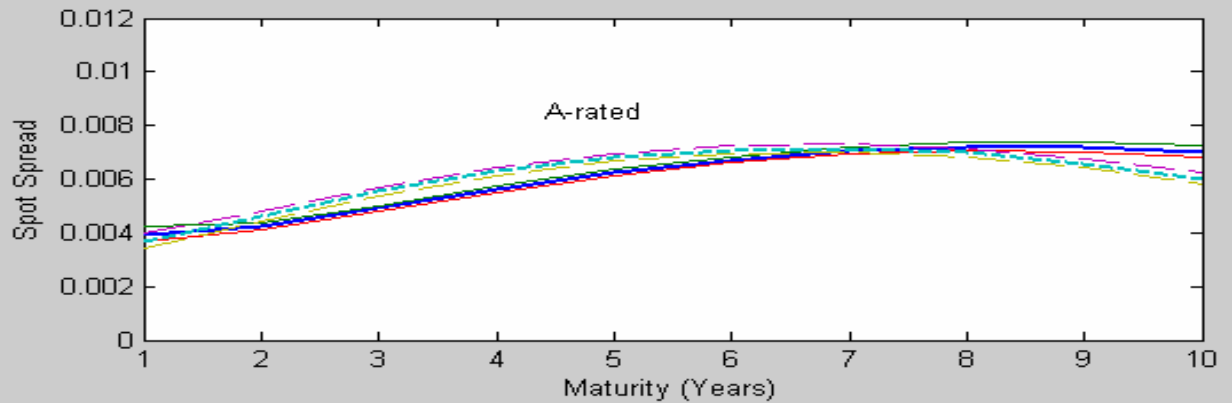
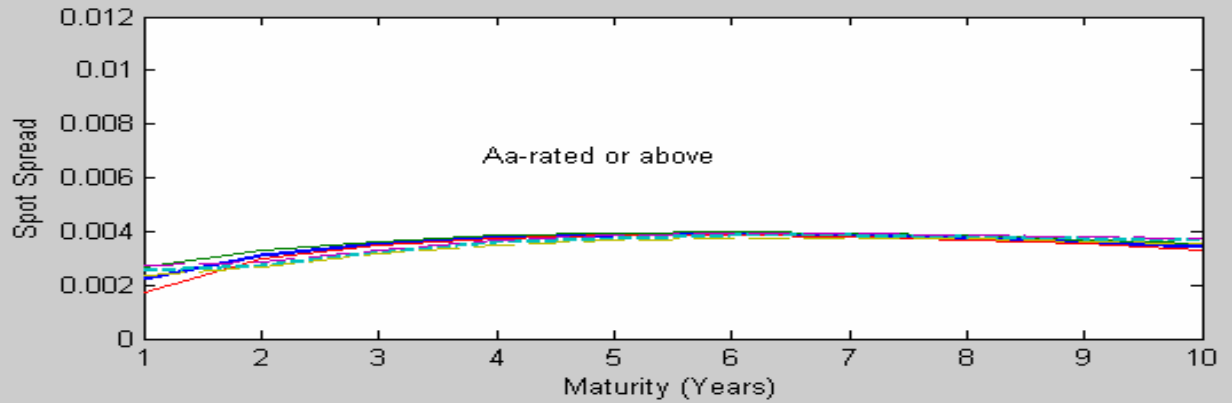
Nelson-Siegel: By Firm Volatility



Nelson- Siegel: By Both



Nelson-Siegel: By Credit Rating



Ongoing Work

- Advantages of using CDS spreads:
 - No need for benchmark risk-free yield or Nelson-Siegel.
 - Directly observable from 6-months to 30-years in maturity.
 - Secondary market more liquid than corporate bonds.
 - Has become the standard credit risk measure.
- Allegations of insider trading by banks in the CDS market is all the rage in the last couple of years.
- There is evidence of informed trading in both CDS and option markets before information diffuses into equities.
 - Most prominent among low-rated firms with volatile spreads.

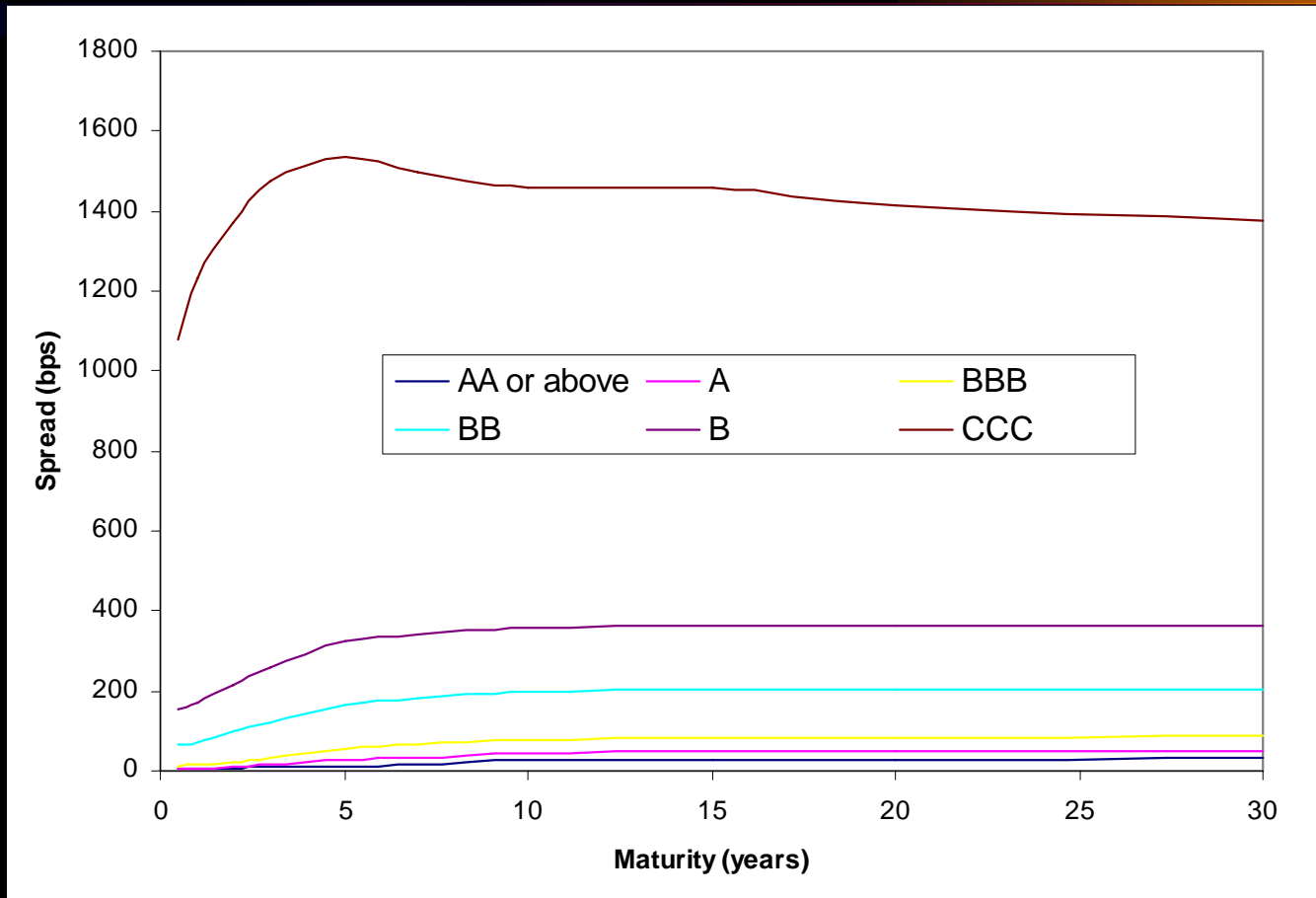
Sample

- CDS term structures in 2005.
 - To be expanded to 2001 to 2006.
- 10 points on the term structure (6m, 1y, 2y, 3y, 5y, 7y, 10y, 15y, 20y, 30y) – daily composite spreads.
- USD-denominated contract on senior unsecured obligations of North American obligors, with modified restructuring.
- About 270 firms each month after merging with other databases.

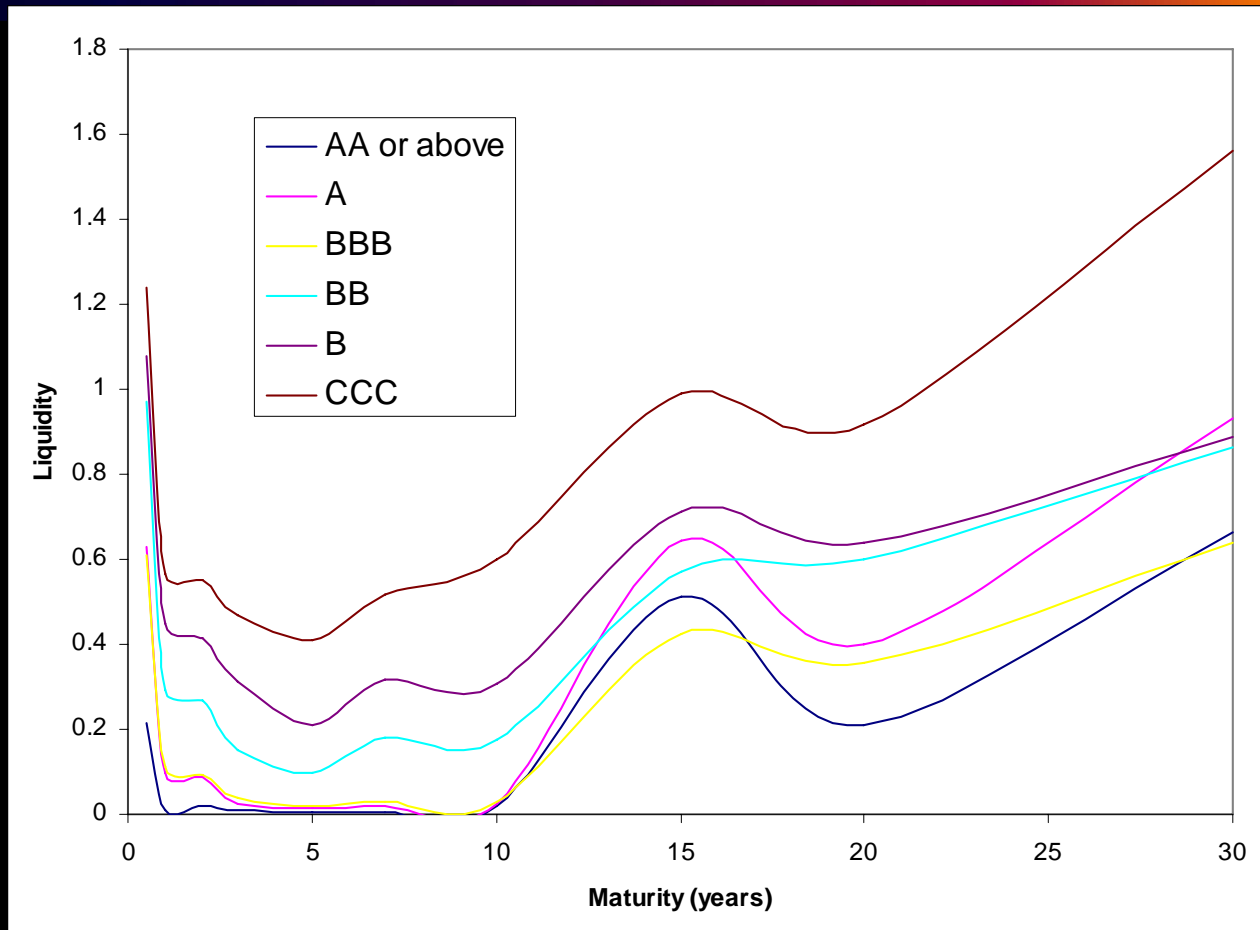
Explanatory Variables

- The usual suspects – LEV and VOL.
- CDS liquidity variables – market depth for 5yr contracts, and measures based on how composite spreads are aggregated at each maturity.
- Information risk variables.
 - Stock PINs.
 - Effective spreads.
 - Consensus forecast error.
 - Forecast dispersion.
- Governance variables – the G- and E-indexes.

Spread Curve by Ratings



Liquidity by Rating and Maturity



Correlations

	spd5y	lev	vol	forecast error	forecast dispersion	effective spread	pin	g-index	e-index	liquidity	composite depth 5y
spd5y	1										
lev	0.51	1									
vol	0.62	0.34	1								
forecast error	0.58	0.39	0.46	1							
forecast dispersion	0.68	0.37	0.45	0.66	1						
effective spread	0.32	0.31	0.33	0.21	0.2	1					
pin	0.29	0.36	0.39	0.26	0.21	0.34	1				
g-index	-0.1	-0.04	-0.13	-0.07	-0.09	-0.03	-0.02	1			
e-index	-0.05	0.08	-0.01	0	-0.03	0.08	0.1	0.7	1		
liquidity 5y	0.39	0.2	0.3	0.24	0.22	0.16	0.31	0	0.05	1	
composite depth 5y	-0.2	0.03	-0.24	-0.09	-0.1	-0.19	-0.36	0.09	0	-0.3	1

- Poorly governed firms (high G-index) have lower credit risk and higher information quality.
- This is consistent with Core, Guay, and Rusticus (2006) who argue that poor governance does not cause low returns, but is likely correlated with firm risk factors.

Preliminary Results

maturity	intercept	lev	vol	forecast error	forecast dispersion	effective spread	composite depth 5y	g-index	liquidity	adjusted rsquare
6m	-72.45	47.49	280.08	7497.00	34734.31	-209.01	-2.19	-0.97	1.95	0.77
	-2.01	1.61	4.11	6.05	15.66	0.10	-2.08	-0.49	0.15	.
1y	-75.73	53.42	281.99	6235.44	42005.02	699.18	-2.26	-1.14	13.01	0.78
	-2.10	1.59	3.85	5.01	19.54	0.51	-2.19	-0.51	0.79	.
2y	-110.63	103.54	403.19	5567.38	42917.54	1909.79	-2.34	-1.65	26.45	0.79
	-2.80	2.63	4.96	4.62	18.39	0.85	-2.07	-0.63	1.32	.
3y	-140.17	141.86	492.77	5219.37	43458.03	3369.02	-2.30	-1.65	70.80	0.78
	-3.18	3.20	5.36	3.86	16.39	1.34	-1.90	-0.55	2.14	.
5y	-170.64	193.58	604.11	4610.97	39984.03	6020.70	-1.91	-2.08	197.20	0.78
	-3.71	4.23	6.29	3.12	14.22	2.00	-1.53	-0.68	4.06	.
7y	-172.38	207.12	631.49	5191.98	38166.46	6287.89	-1.94	-1.85	92.78	0.78
	-3.67	4.43	6.41	3.41	13.01	2.01	-1.48	-0.59	2.49	.
10y	-172.03	217.99	649.13	5350.70	35558.46	6652.85	-1.65	-1.81	93.38	0.78
	-3.75	4.81	6.78	3.57	12.27	2.12	-1.29	-0.59	2.52	.
15y	-157.27	232.25	684.31	5484.03	35022.00	6811.12	-3.08	-1.72	-4.18	0.77
	-3.11	5.10	7.14	4.13	11.59	2.04	-2.07	-0.57	-0.44	.
20y	-152.70	231.39	691.64	5708.58	32260.29	7310.71	-3.33	-1.47	-11.01	0.77
	-3.26	5.28	7.39	4.22	11.19	2.25	-2.32	-0.51	-0.99	.
30y	-171.36	233.92	670.43	5380.98	32413.63	6980.95	-1.74	-1.94	8.34	0.78
	-3.55	5.45	7.38	3.88	11.28	2.26	-1.19	-0.69	0.81	.

Summary

- Noisy but unbiased accounting information seems to have a disproportionate effect on short-term spreads.
- The lemon's premium is more evenly distributed across debt maturities.
- Better quality data coverage from the credit derivatives market makes it possible to pin down these term structure effects more precisely.
- Information quality as risk measures can help settle other debates, such as whether governance is priced in debt markets.