Online-Appendix zu

„Does Subordinated Debt Discipline Banks? Empirical Evidence of Market Discipline in Europe“

Daniel Schürk

Johann Wolfgang Goethe Universität

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Appendix

Table IV

Variables and description

Table IV explains independent and dependent variables.

Variables	Variable Description
SPREAD	The spread-to benchmark as difference in yield to maturity of the specific bond to the yield of a corresponding risk-free bond of similar maturity.
ΔSPREAD	The continuous annual change of the spread level.
ROA	The %-proportion of annual net income to assets.
LEV	The ratio of total (book) liabilities to the (book) value of equity.
EQ	The %-proportion of (book) value of equity to total capital.
LLR	The %-proportion of loan loss reserves to total loans.
LLC	The ratio of loan loss reserves to total non-accrual assets (coverage).
PROVLL	The %-proportion of provision for loan losses to total loans.
LLtoLLR	The %-proportion of actual loan losses to loan loss reserves.
NETLL	The %-proportion of net loan losses to total loans.
ROALEV	The product of ROA and LEV.
LLRLEV	The product of LLR and LEV.
RE	The %-proportion of real estate mortgage loans to total loans.
NPA	The %-proportion of non-performing assets to total assets.
NPLtoTLO	The %-proportion of non-performing loans to total loans.
NPLtoE	The %-proportion of non-performing loans to total equity.
NPLtoLLR	The %-proportion of non-performing loans to loan loss reserves.
CASHtoCL	The %-proportion of cash and securities loans to short-term debt.
CASHtoTDEPO	The %-proportion of cash and securities to total deposits.
TLOtoTDEPO	The %-proportion of total loans to total deposits.
TLOtoTCAP	The %-proportion of total loans to total capital.
TLOtoTA	The %-proportion of total loans to total assets.
INTCOV	The ratio of net-interest margin to interest expense (interest cover).

Table V
Expected sign of variables

Table V shows the expected sign of the effects of explanatory variables on spreads. These risk indicators from accounting measures could possibly affect investor's perception and explain spread levels, either increasing or decreasing spread levels. Some variable's effect might be ambiguous.

Variables	Exp. Sign	Explanation/Hypothesis
ROA	+/-	(+) High efficiency compensates higher risk (-) High efficiency mitigates risk
LEV	+	Debt overhang increases default risk
EQ	+/-	(+) Equity is riskier than other capital (-) Equity works as a cushion for bank's risk
LLR	+/-	(+) Investors could be anticipating losses and react to higher risk (-) Investors perceiving as a cushion against loan losses
LLC	+/-	
PROVLL	+	Investors are anticipating losses
LLtoLLR	+/-	Unclear predictive power of already realized losses (overcome vs. more to expect?)
NETLL	+/-	
ROALEV	-	Profitability more important for leveraged banks
LLRLEV	+	Higher credit risk more relevant for leveraged banks
RE	+/-	Unclear
NPA	+	Non-performing loans/assets entailing potential losses
NPLtoTLO	+	
NPLtoE	+	
NPLtoLLR	+	
CASHtoCL	+/-	(+) Excess cash as inefficient use of cash (-) Higher liquidity acting as a buffer to losses
CASHtoTDEPO	+/-	
TLOtoTDEPO	+/-	(+) More loans increasing risk exposure (-) Diversification reducing specific risk
TLOtoTCAP	+/-	
TLOtoTA	+/-	
INTCOV	+/-	See LLC

Table VI

Sample summary statistics

Table VI shows the sample descriptive statistics for the period from 2007 to 2016. SPREAD (prim) is the primary market benchmark spread at issuance from Bloomberg and Thomson One SDC, SPREAD (sec) is the spread-to-benchmark on secondary markets obtained from daily spreads from Bloomberg. ΔSPREAD (sec) is the annual percentage change of secondary market spreads calculated assuming continuous spreads. All spreads are measured in basis points. The other variables are percentage values, except for the (absolute) ratios LEV, LLC, ROALEV, LLRLEV and INTCOV.

Variables	N	Mean	SD	Min	Max	Median
SPREAD (prim)	119	325.4	170.5	66.50	912.4	278.9
SPREAD (sec)	265	403.4	327.7	26.00	2,539	320.6
ΔSPREAD (sec)	236	0.125	0.643	-1.626	2.027	0.137
ROA	268	0.685	0.740	-6.040	2.470	0.690
LEV	310	6.741	4.184	-22.39	24.32	5.855
EQ	310	30.27	14.48	-5.400	78.71	27.12
LLR	286	2.793	2.248	0.150	10.52	2.370
LLC	228	10.76	167.2	-529.4	2,196	4.610
PROVLL	292	0.793	0.940	-0.380	12.29	0.600
LLtoLLR	221	18.59	25.12	-52.99	123.5	14.93
NETLL	224	0.294	0.561	-1.400	2.800	0.145
ROALEV	268	5.918	10.22	-7.675	135.2	3.780
LLRLEV	286	15.93	17.64	-176.2	73.94	13.99
RE	151	38.37	16.80	4.293	80.61	39.16
NPA	270	2.843	3.510	0.0653	20.22	1.421
NPLtoTLO	263	4.866	4.826	0.130	27.03	3.380
NPLtoE	264	50.20	57.28	-313.0	299.6	36.11
NPLtoLLR	253	187.1	96.24	15.55	806.7	177.9
CASHtoCL	268	334.3	237.0	30.08	1,277	282.5
CASHtoTDEPO	287	130.7	141.1	26.45	1,151	86.13
TLOtoTDEPO	293	149.4	67.75	48.52	518.9	133.0
TLOtoTCAP	282	314.2	131.4	102	1,074	297.5
TLOtoTA	282	53.57	17.04	11.02	86.08	55.66
INTCOV	304	2.847	5.242	-11.01	37.86	1.785

Table VII

Correlation of explanatory variables

Table VII shows the sample correlation of all independent variables. Correlation coefficients with an absolute value greater than 0.50 are highlighted in bold. I conclude that correlation within the sample is reasonable and does not distort my regression to great extent.

	ROA	LEV	EQ	ROA-LEV	LLR-LEV	LLR	PROV-LL	LLtoLLR	NETLL	LLC	NPLtoE	NPLtoTLO	NPLtoLLR	TLOtoTCAP	REtoTLO	TLOtoTA	INT-COV	CASHtoTDEPO	CASHtoCL	TLOtoTDEPO
ROA	1.00																			
LEV	0.40	1.00																		
EQ	-0.10	-0.45	1.00																	
ROALEV	0.01	0.01	-0.38	1.00																
LLRLEV	-0.23	0.00	-0.14	0.10	1.00															
LLR	-0.40	-0.35	0.11	-0.16	0.48	1.00														
PROVLL	**-0.64**	-0.40	-0.05	0.41	0.37	**0.51**	1.00													
LLtoLLR	0.02	-0.05	0.14	0.04	-0.34	-0.35	-0.14	1.00												
NETLL	-0.16	-0.19	0.22	-0.17	-0.12	0.03	0.10	0.75	1.00											
LLC	-0.09	0.09	-0.07	-0.08	0.13	-0.02	0.04	-0.01	0.02	1.00										
NPLtoE	-0.07	-0.01	0.06	**-0.53**	0.28	0.74	0.03	-0.29	-0.05	-0.05	1.00									
NPLtoTLO	-0.38	-0.33	0.08	-0.18	0.39	**0.89**	0.40	-0.27	-0.03	-0.04	**0.85**	1.00								
NPLtoLLR	-0.09	0.04	-0.02	-0.04	-0.03	-0.06	-0.10	0.09	-0.08	-0.03	0.22	0.24	1.00							
TLOtoTCAP	-0.00	-0.20	**0.75**	-0.14	-0.06	0.02	0.00	0.09	0.13	-0.11	0.06	-0.00	-0.10	1.00						
REtoTLO	0.08	-0.10	-0.24	0.13	0.11	0.21	0.06	-0.13	-0.04	0.07	0.05	0.07	-0.23	-0.13	1.00					
TLOtoTA	0.28	-0.07	-0.24	0.19	0.16	0.32	0.16	-0.11	-0.06	-0.07	0.35	0.31	-0.13	0.00	0.50	1.00				
INTCOV	0.07	-0.09	0.28	-0.17	-0.11	-0.00	-0.21	-0.02	-0.06	-0.08	-0.00	-0.04	-0.04	0.11	-0.11	-0.07	1.00			
CASHtoTDEPO	-0.18	0.32	0.03	-0.07	0.10	-0.12	-0.09	-0.07	-0.05	0.19	-0.17	-0.15	0.10	-0.06	**-0.57**	**-0.63**	0.08	1.00		
CASHtoCL	-0.32	-0.50	0.36	-0.21	-0.17	0.01	-0.00	0.15	0.23	-0.00	-0.16	-0.04	0.10	0.04	-0.23	-0.46	0.05	0.03	1.00	
TLOtoTDEPO	0.20	0.47	-0.31	0.26	0.18	-0.03	-0.05	-0.12	-0.15	0.11	-0.02	-0.04	-0.04	-0.13	0.18	0.28	0.01	0.50	-0.49	1.00

Table VIII

Linear panel regressions of spreads on accounting variables

Table VIII reports the OLS regression results of my panel over the sample period from 2007 to 2016. Dependent variable is the mean of primary and secondary market SPREAD (measured in BPS) and change in SPREAD (ΔSPREAD, measured in percentage points) for each SD-issuing bank for each calendar year. Explanatory variables are reported in Table IV and summarized statistically in Table VI. Independent variables are standardized to their standard deviation. Estimation method is "fixed effects" for panel estimation. Standard errors are set to be robust. Observations with high significance at 5% level and high magnitude are highlighted in bold to facilitate overview. F-test statistic for common significance of coefficients is not reported, however, the test is significant for every specification at the 1% level.

Variables	SPREAD (sec)	SPREAD (prim)		ΔSPREAD (sec)	
	(1)	(2)	(3)	(4)	(5)
ROA	**-88.43****	-200.5*	**-200.9****	**22.77****	
	(42.46)	(105.3)	(72.38)	(8.885)	
LEV		**-288.0*****	**-224.9*****		
		(65.34)	(61.22)		
EQ		**-159.8****	-105.9	**13.70****	
		(63.48)	(63.84)	(6.520)	
LLR					**-85.38****
					(32.58)
LLC		**47.05*****	**41.36*****		
		(7.084)	(8.761)		
PROVLL	**156.9*****			**28.15*****	**29.81****
	(48.37)			(6.370)	(12.80)
LLtoLLR				-6.979	-30.39
				(8.748)	(19.19)
NETLL	-38.68				30.97*
	(30.85)				(15.55)
ROALEV		253.3*	209.0*		
		(127.8)	(114.0)		
LLRLEV	92.57				19.20**
	(61.11)				(8.187)
RE					-12.40*
					(6.511)
NPA					**151.3*****
					(43.02)
NPLtoTLO	**641.9*****			**-36.02*****	-100.6**
	(155.5)			(9.944)	(42.38)
NPLtoE	**-604.3*****	**335.6*****	**262.3****		
	(174.3)	(97.28)	(104.4)		
NPLtoLLR		**148.3*****	**170.9*****		
		(38.33)	(46.25)		
TLOtoTDEPO					58.28*
					(29.35)
TLOtoTA					**-104.9*****
					(29.51)
CASHtoTDEPO				**64.12*****	
				(14.55)	
CASHtoCL		**-169.7*****	**-92.04****		
		(18.37)	(41.40)		
Constant	481.7***	525.8***	536.8***	21.04***	17.02**
	(27.62)	(51.54)	(70.67)	(2.418)	(6.629)
N	158	65	65	144	84
R^2	0.185	0.104	0.207	0.063	0.043

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table IX

Sample banks

Table IX shows the sample banks for my panel data. Banks are chosen according to their size (total assets) and the amount of subordinated debt issued. Besides European banks, two large Swiss banks are included. Total Assets are in billions of local currencies as of 2016.

Bank	Total Assets (bn)	Local Currency	Country of Domicile
ABN Amro	394	EUR	NL
Banco BPM	114	EUR	IT
Banco Sabadell	206	EUR	ES
Banco Santander	1318	EUR	ES
Bank of Ireland	122	EUR	IR
Bankia	182	EUR	ES
Barclays	1208	GBP	GB
BBVA	715	EUR	ES
BNP Paribas	2071	EUR	FR
BPCE	1231	EUR	FR
CaixaBank	338	EUR	ES
Commerzbank	477	EUR	DE
Credit Agricole	1522	EUR	FR
Credit Suisse	814	CHF	CH
Danske Bank	3483	DKK	DK
Deutsche Bank	1582	EUR	DE
Erste Bank	208	EUR	AT
HSBC	1921	GBP	GB
ING	845	EUR	NL
Intesa Sanpaolo	714	EUR	IT
KBC	273	EUR	BE
Lloyds	815	GBP	GB
Natixis	526	EUR	FR
Nordea	5881	SEK	SE
Royal Bank of Scotland	797	GBP	GB
SEB	2619	SEK	SE
Société Générale	1377	EUR	FR
Standard Chartered	523	GBP	GB
Svenska Handelsbanken	2627	SEK	SE
Swedbank	2154	SEK	SE
UBS	922	CHF	CH
UniCredit	846	EUR	IT

Table X

Cardinalization of ratings

Table X illustrates how ratings are cardinalized and normalized on a scale from 1 to 10, based on own considerations. The dotted line indicates the cut between investment and non-investment grade.

Rating number	Rating Class	Standard&Poor's	Moody's
1	1	AAA	Aaa
2	1	AA+	Aa1
3	2	AA	Aa2
4	2	AA-	Aa3
5	3	A+	A1
6	3	A	A2
7	4	A-	A3
8	4	BBB+	Baa1
9	5	BBB	Baa2
10	5	BBB-	Baa3
11	6	BB+	Ba1
12	6	BB	Ba2
13	7	BB-	Ba3
14	7	B+	B1
15	8	B	B2
16	8	B-	B3
17	9	CCC+	Caa1
18	9	CCC	Caa2
19	10	CCC-	Caa3
20		CC+	
21		CC	
22		CC-	
23		C+	
24		C	
25		C-	