

The Information Advantage of Banks: Evidence From Their Private Credit Assessments

Deutsche Bundesbank

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- ... but extremely difficult to test

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- Banks as informed finance \implies asymmetric information between banks and markets
 - Notoriously difficult to test theories of asymmetric information
 - How can we test if banks are informed if we do not have access to their information?

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 - How do they use this information?
 - When does it matter?

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- Answers to these questions have vast policy implications
 - Bank reactions to policy changes, supply of capital to economy

Our Solution

- We use supervisory data which contains banks' private risk assessments
 - Banks report probability of default (PD) and loss given default (LGD) for each loan
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- Allows us to see if banks have an informational advantage over public markets
 - If changes in bank information already reflected in prices \implies no return predictability
- Not only can we see if banks have an information advantage but can also test:
 - ① Where this information is coming from?
 - ② When does it matter?
 - ③ Do banks allocate credit based on this information?

Findings

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- We identify sources of banks' information advantage
 - ① Receive valuable information earlier than public markets
 - ② Collect/produce more information when their incentives to do so are higher

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- Findings support banks as informed financiers even among publicly traded firms

1 Data

2 Empirical Results

2.1 The Information Advantage of Banks

2.2 Bank Information and Credit Allocation

2.3 Sources of Banks' Private Information

- Active Collection of Private Information
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- Federal Reserve Y-14Q data on corporate loans over \$1mm
 - Quarterly data on loan characteristics, loan performance and firm financials
 - Internal bank risk assessments (PD and LGD)

“Internal estimates of PD and LGD must incorporate all relevant, material and available data, information and methods. A bank may utilize internal data and data from external sources.”

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- Merge data with CRSP, Compustat, IBES and TRACE
 - Sample includes publicly traded firms with bank debt from ≥ 1 of these banks
 - 1,854 unique firms (compared to 3,296 CRSP/Compustat firms)
 - Quarterly bank/firm panel: 2014Q4 - 2019Q4

Measure of Banks' Information

- Key variable: Expected Loss (EL) = $PD \times LGD$
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 - Will also perform subsample analysis by firm size
- We will focus on whether EL increases or decreases, i.e., EL^+ , EL^-

Bank Information Summary Statistics - Estimates of Risk

	Mean	SD	10%	Median	90%	N
PD (pp)	1.013	2.789	0.070	0.300	1.910	136,279
LGD (pp)	38.941	13.208	20.000	41.000	51.000	136,279
Expected Loss (pp)	0.327	0.902	0.029	0.102	0.600	136,279
Δ PD (pp)	0.030	1.362	-0.020	0.000	0.010	123,731
PD ⁺	0.109	0.312	0.000	0.000	1.000	123,731
PD ⁻	0.120	0.325	0.000	0.000	1.000	123,731
Δ LGD (pp)	-0.078	4.373	-0.310	0.000	0.036	123,731
LGD ⁺	0.116	0.320	0.000	0.000	1.000	123,731
LGD ⁻	0.133	0.340	0.000	0.000	1.000	123,731
Δ EL (pp)	0.009	0.497	-0.018	0.000	0.015	123,731
EL ⁺	0.172	0.377	0.000	0.000	1.000	123,731
EL ⁻	0.193	0.395	0.000	0.000	1.000	123,731

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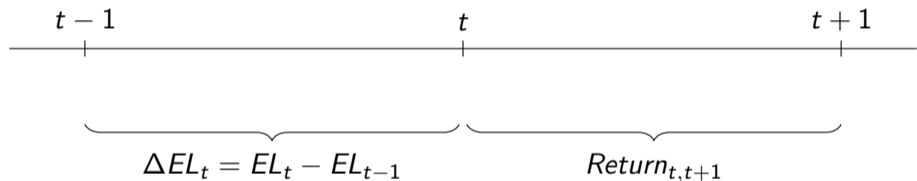
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Overview of Timing



Main Empirical Specification

- Do quarter t changes in expected losses predict quarter $t + 1$ financial market outcomes?

$$y_{i,t+1} = \beta_1 EL_{i,b,t}^+ + \beta_2 EL_{i,b,t}^- + \Gamma X_{i,t} + \delta_{b,t} + \gamma_{j,t} + \epsilon_{i,b,t},$$

- $EL_{i,b,t}^+$: dummy that equals one if the expected loss increases
 - $EL_{i,b,t}^-$: dummy that equals one if the expected loss decreases
 - $X_{i,t}$: firm characteristics
 - $\delta_{b,t}$: bank by time fixed effects
 - $\gamma_{j,t}$: industry by time fixed effects
 - Cluster standard errors by firm and bank/time
- Implicit assumption: banks' private information at least partially comes out next quarter
 - We confirm this is the case

Do Changes in Expected Losses Predict Financial Market Outcomes?

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
EL ⁺	-0.789*** (3.896)	-0.198** (2.024)	1.832*** (3.654)	-0.222*** (2.734)
EL ⁻	-0.233 (1.343)	0.088 (1.342)	0.266 (0.634)	0.073 (1.067)
Book-to-Market	-0.073 (0.118)	0.283 (0.737)	4.112** (2.326)	0.755*** (3.449)
ROA	0.709 (0.358)	0.790 (0.773)	-3.489 (0.526)	0.936 (1.048)
Leverage	-0.585 (0.766)	0.073 (0.223)	2.402 (1.052)	0.434 (1.528)
Log(Market Cap)	0.209* (1.819)	0.022 (0.407)	-3.711*** (10.564)	-0.055 (1.427)
Lagged Stock Return	-0.014 (1.093)		-0.163*** (6.215)	0.313*** (34.449)
Lagged Bond Return		-0.085** (1.999)		
Bank-Quarter FE	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES
Observations	118,901	54,741	109,051	116,340
R-squared	0.37	0.49	0.08	0.33

Cross-Sectional Differences in Predictability

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
EL ⁺	-5.988*** (2.728)	-2.005 (1.547)	13.896*** (2.727)	-1.080 (1.279)
EL ⁺ × Book/Market	1.522** (2.189)	-0.233 (0.471)	-3.605** (2.492)	-0.082 (0.321)
EL ⁺ × ROA	3.821 (1.292)	1.273 (0.709)	-4.924 (0.758)	-0.461 (0.374)
EL ⁺ × Leverage	0.361 (0.373)	-0.202 (0.370)	1.864 (0.908)	-0.105 (0.286)
EL ⁺ × Log(Market Cap)	0.254** (2.023)	0.108 (1.464)	-0.698** (2.264)	0.065 (1.327)
EL ⁺ × Lagged Stock Return	-0.005 (0.419)		-0.002 (0.091)	0.009 (1.066)
EL ⁺ × Lagged Bond Return		0.090** (2.031)		
Bank-Quarter FE	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES
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Stock Return Predictability by Size Quintiles

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
	(1)	(2)	(3)	(4)	(5)
EL ⁺	-1.870** (2.425)	-0.849** (2.076)	-0.856*** (3.039)	-0.599** (2.260)	0.090 (0.389)
Book-to-Market	3.342** (2.387)	-0.622 (0.481)	-0.666 (0.605)	-2.665*** (3.111)	-1.371 (1.148)
ROA	8.473 (1.158)	-1.268 (0.277)	-1.115 (0.230)	-4.808 (1.605)	-0.329 (0.122)
Leverage	4.246 (1.446)	-2.055 (1.209)	-2.261 (1.608)	-0.762 (0.720)	-0.191 (0.189)
Log(Market Cap)	1.185* (1.894)	0.418 (0.381)	-1.500 (1.462)	1.329** (2.246)	0.407** (2.191)
Lagged Stock Return	-0.039 (1.458)	-0.020 (0.965)	0.005 (0.264)	-0.025 (1.480)	-0.006 (0.329)
Bank-Quarter FE	YES	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES	YES
Observations	10,145	18,642	24,379	29,354	33,728
R-squared	0.38	0.48	0.49	0.53	0.51

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 - ① Hard to isolate changes in lending coming from purely private info
 - ② Firm credit quality could be correlated with loan demand
- We use variation in information/lending across banks within firm

$$Comm_{i,b,t} = \beta_k EL_{i,b,t} + \delta_{b,t} + \alpha_{i,t} + \epsilon_{i,b,t},$$

Banks Use Their Information to Allocate Credit to Firms

	Committed			
	(1)	(2)	(3)	(4)
Expected Loss	-17.968*** (9.234)	-17.453*** (8.938)	-6.414*** (5.705)	-4.342*** (4.290)
Bank-Quarter FE	NO	YES	NO	YES
Firm-Quarter FE	NO	NO	YES	YES
Observations	136,279	136,260	129,515	129,496
R-squared	0.02	0.11	0.51	0.62

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- One channel: actively process/collect more information based on their incentives
 - We analyze this channel by exploring when banks update their risk assessments
 - Use firm/time fixed-effects to control for firm-level unobservables

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Banks Adjust their Risk-Assessments Based on their Incentives

	PD ^Δ	LGD ^Δ	EL ^Δ
	(1)	(2)	(3)
Log(Committed)	0.021*** (5.072)	0.059*** (9.539)	0.060*** (10.694)
Months Since Financial Statement	-0.002*** (3.638)	-0.000 (0.374)	-0.001** (2.168)
Months Since Audit	-0.000 (1.576)	-0.000 (0.834)	-0.001* (1.884)
Maturity (months)	-0.000 (0.874)	-0.001*** (2.972)	-0.001** (2.505)
Term loan (% of Total)	0.020 (1.466)	0.047** (2.112)	0.037* (1.823)
Specialize	-0.005 (0.739)	-0.007 (0.636)	-0.008 (0.781)
New Loan	0.044*** (4.795)	0.103*** (9.778)	0.115*** (10.816)
Drawdown	0.025*** (3.337)	0.120*** (9.708)	0.120*** (9.813)
Paydown	0.025*** (3.721)	0.097*** (8.511)	0.098*** (8.871)
Bank-Quarter FE	YES	YES	YES
Firm-Quarter FE	YES	YES	YES
Observations	93,163	93,163	93,163
R-squared	0.48	0.54	0.49

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- Banks could also receive valuable information earlier than markets
- We use credit line drawdowns as a source of private information for the bank
 - Drawdowns reflect firms' prospects and are not immediately seen by other market participants
- We test if drawdowns affect banks' expected losses
 - Capture variation in drawdowns across banks within firm
 - Different banks receive different information depending on which loans the firm draws down

Drawdowns Lead to Increases in Expected Losses

	PD ⁺	LGD ⁺	EL ⁺	PD ⁺	LGD ⁺	EL ⁺
	(1)	(2)	(3)	(4)	(5)	(6)
Drawdown	0.000*** (2.983)	0.027*** (9.134)	0.040*** (11.208)	0.009 (1.615)	0.039*** (5.927)	0.033*** (4.779)
Firm-Quarter FE	YES	YES	YES	YES	YES	YES
Bank-Quarter FE	YES	YES	YES	YES	YES	YES
Firm-Quarter FE	NO	NO	NO	YES	YES	YES
Observations	115,814	115,814	115,814	110,446	110,446	110,446
R-squared	0.03	0.27	0.16	0.26	0.18	0.23

Do Drawdowns Predict Market Outcomes?

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
Drawdown	-1.881*** (7.453)	0.041 (0.318)	2.513*** (3.160)	-0.219* (1.884)
EL ⁺	-0.595*** (3.000)	-0.231** (2.253)	1.618*** (3.368)	-0.199** (2.529)
Book-to-Market	-0.075 (0.117)	0.266 (0.669)	4.651** (2.523)	0.715*** (3.116)
ROA	2.026 (0.974)	0.794 (0.756)	-0.898 (0.128)	0.897 (0.951)
Leverage	-0.380 (0.482)	0.056 (0.162)	2.481 (1.048)	0.437 (1.464)
Log(Market Cap)	0.151 (1.256)	0.028 (0.472)	-3.631*** (10.076)	-0.067* (1.656)
Lagged Stock Return	-0.017 (1.235)		-0.166*** (6.066)	0.314*** (32.573)
Lagged Bond Return		-0.089** (1.994)		
Bank-Quarter FE	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES
Observations	111,384	51,977	102,196	109,009
R-squared	0.39	0.49	0.09	0.33

- Changes in EL still predict financial market outcomes after controlling for drawdowns

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 - ① We only observe expected losses at quarter end
 - ② Dummy variables are crude measures of changes in banks' private information
 - We don't know the true relationship between expected losses and equity/bond returns
 - ③ Only publicly traded firms in our sample

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- Methodological contribution: Y-14Q risk measures contain banks' private information

Evidence of Nonlinear Relationship between EL and Returns (1)

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
Change in EL	-0.074 (0.364)	-0.060 (0.502)	-0.001 (0.002)	-0.108 (1.062)
Book-to-Market	-0.092 (0.150)	0.276 (0.720)	4.185** (2.365)	0.751*** (3.428)
ROA	0.838 (0.421)	0.804 (0.786)	-3.760 (0.567)	0.962 (1.077)
Leverage	-0.636 (0.830)	0.069 (0.211)	2.501 (1.095)	0.428 (1.505)
Log(Market Cap)	0.218* (1.889)	0.023 (0.419)	-3.730*** (10.602)	-0.054 (1.408)
Lagged Stock Return	-0.014 (1.071)		-0.164*** (6.253)	0.313*** (34.464)
Lagged Bond Return		-0.085** (1.990)		
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Evidence of Nonlinear Relationship between EL and Returns (2)

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
EL Change Percentile	-0.011** (2.290)	-0.006** (2.100)	0.031*** (3.121)	-0.007*** (4.006)
Book-to-Market	0.670 (0.920)	0.275 (0.654)	4.879** (2.556)	0.702** (2.444)
ROA	2.745 (1.117)	1.448 (0.969)	-2.691 (0.357)	-0.145 (0.121)
Leverage	0.314 (0.314)	0.084 (0.194)	3.647 (1.394)	0.625* (1.738)
Log(Market Cap)	0.266* (1.795)	0.029 (0.355)	-3.640*** (9.391)	-0.079* (1.669)
Lagged Stock Return	-0.028** (2.174)		-0.181*** (6.237)	0.316*** (30.993)
Lagged Bond Return		-0.099 (1.527)		
Bank-Quarter FE	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES
Observations	43,382	18,346	39,312	42,323
R-squared	0.40	0.53	0.10	0.35

Evidence of Nonlinear Relationship between EL and Returns (3)

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
Large EL Decrease	-0.345 (0.824)	0.477*** (3.277)	0.368 (0.409)	0.304* (1.862)
Small EL Decrease	-0.202 (1.045)	0.013 (0.172)	0.223 (0.501)	0.019 (0.267)
Small EL Increase	-0.707*** (3.982)	-0.141** (2.006)	1.345*** (2.627)	-0.132* (1.808)
Large EL Increase	-1.083** (2.147)	-0.491 (1.199)	3.749*** (3.399)	-0.568*** (2.591)
Book-to-Market	-0.063 (0.102)	0.294 (0.766)	4.043** (2.284)	0.767*** (3.520)
ROA	0.649 (0.329)	0.815 (0.796)	-3.234 (0.486)	0.927 (1.037)
Leverage	-0.563 (0.737)	0.072 (0.223)	2.301 (1.009)	0.442 (1.571)
Log(Market Cap)	0.203* (1.773)	0.023 (0.427)	-3.685*** (10.537)	-0.056 (1.486)
Lagged Stock Return	-0.014 (1.105)		-0.162*** (6.191)	0.313*** (34.411)
Lagged Bond Return		-0.086** (2.025)		
Bank-Quarter FE	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES
Observations	118,901	54,741	109,051	116,340
R-squared	0.37	0.49	0.08	0.33

Excluding New Loans

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
EL ⁺	-0.732*** (3.306)	-0.180* (1.661)	1.592*** (3.079)	-0.202** (2.330)
EL ⁻	-0.183 (1.040)	0.106 (1.557)	0.068 (0.162)	0.114* (1.661)
Book-to-Market	-0.150 (0.242)	0.314 (0.792)	4.000** (2.275)	0.764*** (3.523)
ROA	0.807 (0.402)	0.773 (0.731)	-2.832 (0.423)	0.925 (1.020)
Leverage	-0.634 (0.818)	0.130 (0.380)	2.585 (1.134)	0.409 (1.415)
Log(Market Cap)	0.197* (1.681)	0.020 (0.359)	-3.722*** (10.494)	-0.053 (1.352)
Lagged Stock Return	-0.015 (1.101)		-0.164*** (6.164)	0.311*** (34.031)
Lagged Bond Return		-0.089** (2.038)		
Bank-Quarter FE	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES
Observations	112,120	51,177	102,685	109,695
R-squared	0.37	0.49	0.08	0.33

Back

Unchanged Commitments

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
EL ⁺	-0.605** (2.550)	-0.145 (1.213)	1.692*** (2.922)	-0.271** (2.580)
EL ⁻	-0.178 (0.825)	0.018 (0.240)	0.191 (0.382)	0.074 (0.792)
Book-to-Market	-0.507 (0.726)	0.229 (0.535)	3.846** (2.098)	0.770*** (3.453)
ROA	-0.518 (0.237)	0.435 (0.443)	0.991 (0.139)	1.364 (1.431)
Leverage	-0.735 (0.896)	0.290 (0.918)	2.146 (0.903)	0.415 (1.306)
Log(Market Cap)	0.191 (1.588)	0.017 (0.307)	-3.831*** (10.233)	-0.085* (1.881)
Lagged Stock Return	-0.005 (0.222)		-0.156*** (5.070)	0.308*** (30.038)
Lagged Bond Return		-0.054 (1.012)		
Bank-Quarter FE	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES
Observations	84,134	39,336	77,426	82,356
R-squared	0.39	0.53	0.09	0.33

Back

Excluding Firms with Observable Loan Prices

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
EL ⁺	-0.661*** (3.218)	-0.168* (1.720)	1.866*** (3.647)	-0.203** (2.381)
EL ⁻	-0.216 (1.213)	0.075 (1.089)	0.455 (1.025)	0.047 (0.654)
Book-to-Market	-0.462 (0.721)	0.241 (0.589)	4.702** (2.495)	0.758*** (3.358)
ROA	-0.588 (0.280)	0.245 (0.230)	-3.292 (0.459)	1.048 (1.212)
Leverage	-0.630 (0.802)	-0.032 (0.094)	1.036 (0.413)	0.496* (1.682)
Log(Market Cap)	0.206* (1.788)	0.047 (0.822)	-3.505*** (9.444)	-0.062 (1.558)
Lagged Stock Return	-0.009 (0.627)		-0.158*** (5.584)	0.313*** (31.052)
Lagged Bond Return		-0.076* (1.683)		
Bank-Quarter FE	YES	YES	YES	YES
Industry-Quarter FE	YES	YES	YES	YES
Observations	106,869	50,916	97,712	104,705
R-squared	0.39	0.50	0.09	0.34

Back