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

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Motivation

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- Classic theories of financial intermediation predict that banks act as "informed inventors" relative to public markets
  - Banks play a fundamental role in screening borrowers before issuing loans and monitoring existing borrowers
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  - Banks are better able to economize on the cost of information production
- How banks extend credit matters to policymakers and regulators
  - Differences in information $\implies$ different responses to shocks or policy interventions
- Notoriously difficult to directly test theories of asymmetric information in markets! Requires:
  1. Observing private information
  2. Isolating the component of private info not known by markets
  3. Observing ex-post outcomes to evaluate the value of these differences in information

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  - Banks report probability of default (PD) and loss given default (LGD) for each loan
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- We can also test:
  1. Where this information is coming from?
  2. When is it useful?
  3. Do banks allocate credit based on this information?

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  1. Receive valuable information earlier than public markets via credit line drawdowns
  2. Collect/produce more information when their incentives to do so are higher

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- We identify sources of banks' information advantage
  1. Receive valuable information earlier than public markets via credit line drawdowns
  2. Collect/produce more information when their incentives to do so are higher
- These results validate banks' role as informed financiers *even for publicly traded firms*

Roadmap

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Data

- Federal Reserve Y-14Q data on corporate loans by large U.S. banks (all loans over $1mm)
  - Quarterly data on loan characteristics, loan performance and firm financials
  - Internal bank risk assessments (PD and LGD)

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  - Internal bank risk assessments (PD and LGD)
- Merge data with CRSP, Compustat, IBES, and TRACE
  - Quarterly bank/firm panel: 2014Q4 - 2019Q4

Measure of Banks' Information

- Key variable: Expected Loss (EL) = PD $\times$ LGD
  - PD is long-run average of one-year expected default rate
  - LGD is expected loss given default per dollar of principal

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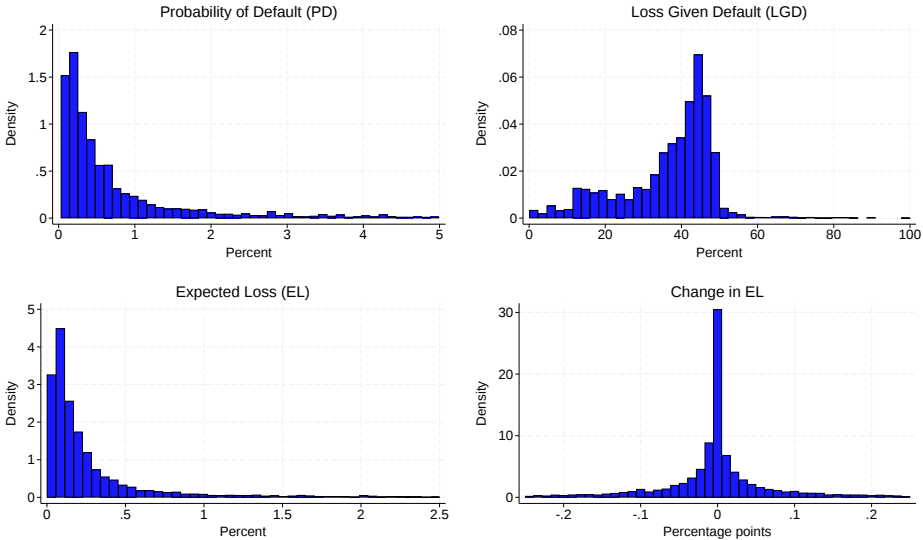
- Key variable: Expected Loss (EL) = PD $\times$ LGD
  - PD is long-run average of one-year expected default rate
  - LGD is expected loss given default per dollar of principal
- Baseline results use indicators for EL increases (EL^+) or decreases (EL^-)
  - Strong nonlinearities in relationship between EL and returns

Bank Information Summary Statistics

	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
ΔPD (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
ΔLGD (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
ΔEL (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

Bank Information Distributions



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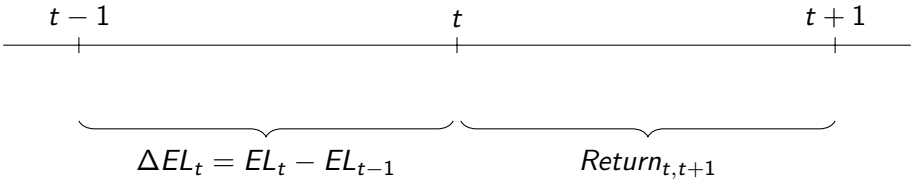
Overview of Timing



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 (firm gets worse)
  - $EL^{-}_{i,b,t}$: dummy that equals one if the expected loss decreases (firm gets better)
  - $X_{i,t}$: 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

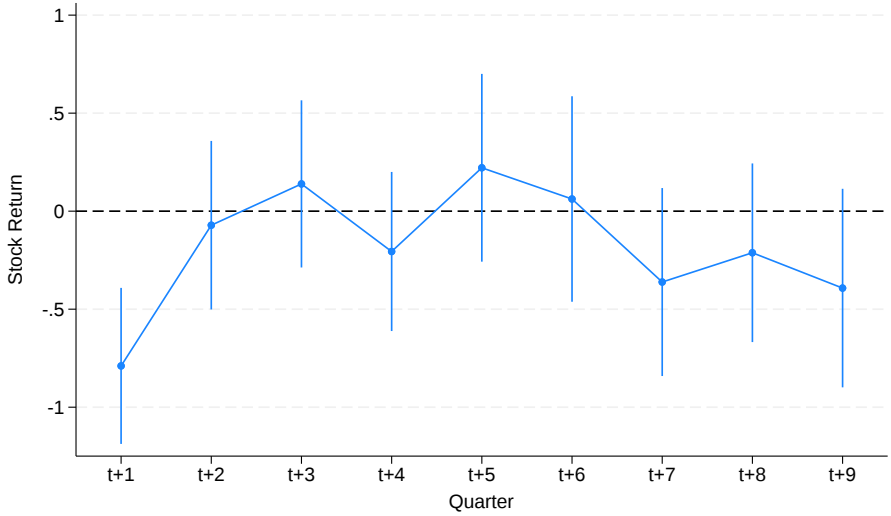
- If markets learn tomorrow what banks know today, we would expect $\beta_1 < 0$ and $\beta_2 > 0$

Changes in Expected Losses Predict Financial Market Outcomes

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
EL^+	−0.789***	−0.198**	1.832***	−0.222***
	(3.896)	(2.024)	(3.654)	(2.734)
EL^-	−0.233	0.088	0.266	0.073
	(1.343)	(1.342)	(0.634)	(1.067)
Book-to-Market	−0.073	0.283	4.112**	0.755***
	(0.118)	(0.737)	(2.326)	(3.449)
ROA	0.709	0.790	−3.489	0.936
	(0.358)	(0.773)	(0.526)	(1.048)
Leverage	−0.585	0.073	2.402	0.434
	(0.766)	(0.223)	(1.052)	(1.528)
Log(Market Cap)	0.209*	0.022	−3.711***	−0.055
	(1.819)	(0.407)	(10.564)	(1.427)
Lagged Stock Return	−0.014		−0.163***	0.313***
	(1.093)		(6.215)	(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

Other functional forms

Information Advantage Is Short-Lived



Larger Effects for Smaller Firms

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
	(1)	(2)	(3)	(4)	(5)
EL^+	−1.870**	−0.849**	−0.856***	−0.599**	0.090
	(2.425)	(2.076)	(3.039)	(2.260)	(0.389)
Book-to-Market	3.342**	−0.622	−0.666	−2.665***	−1.371
	(2.387)	(0.481)	(0.605)	(3.111)	(1.148)
ROA	8.473	−1.268	−1.115	−4.808	−0.329
	(1.158)	(0.277)	(0.230)	(1.605)	(0.122)
Leverage	4.246	−2.055	−2.261	−0.762	−0.191
	(1.446)	(1.209)	(1.608)	(0.720)	(0.189)
Log(Market Cap)	1.185*	0.418	−1.500	1.329**	0.407**
	(1.894)	(0.381)	(1.462)	(2.246)	(2.191)
Lagged Stock Return	−0.039	−0.020	0.005	−0.025	−0.006
	(1.458)	(0.965)	(0.264)	(1.480)	(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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Bank Information and Credit Allocation

- If banks really do have an info advantage, they should use it to allocate credit

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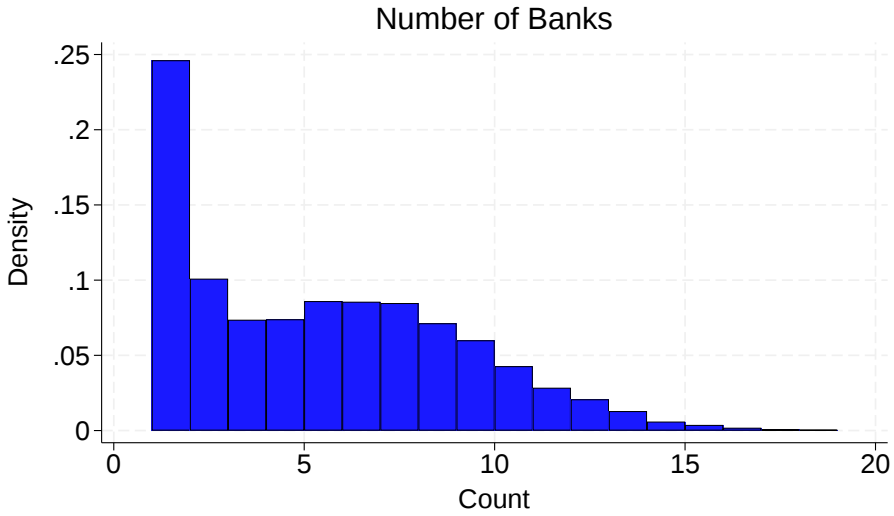
- If banks really do have an info advantage, they should use it to allocate credit
- Taking advantage of the fact that most borrowers are assessed by many banks at the same time

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

Most Firms Borrow from Multiple Banks



Banks Use Their Information to Allocate Credit to Firms

	Committed			
	(1)	(2)	(3)	(4)
Expected Loss	-17.968***	-17.453***	-6.414***	-4.342***
	(9.234)	(8.938)	(5.705)	(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

1 cross-sectional s.d. $\uparrow$ in EL $\implies$ 1 cross-sectional s.d. $\downarrow$ in lending

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Where Does Banks' Information Advantage Come From?

- One possibility: Banks actively process/collect information
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Both channels seem to matter

Banks Are More Likely to Update Assessments for New and Large Loans

	PD^{Δ}	LGD^{Δ}	EL^{Δ}
	(1)	(2)	(3)
Log(Committed)	0.021***	0.059***	0.060***
	(5.072)	(9.539)	(10.694)
Months Since Financial Statement	−0.002***	−0.000	−0.001**
	(3.638)	(0.374)	(2.168)
Months Since Audit	−0.000	−0.000	−0.001*
	(1.576)	(0.834)	(1.884)
Maturity (months)	−0.000	−0.001***	−0.001**
	(0.874)	(2.972)	(2.505)
Term loan (% of Total)	0.020	0.047**	0.037*
	(1.466)	(2.112)	(1.823)
Specialize	−0.005	−0.007	−0.008
	(0.739)	(0.636)	(0.781)
New Loan	0.044***	0.103***	0.115***
	(4.795)	(9.778)	(10.816)
Drawdown	0.025***	0.120***	0.120***
	(3.337)	(9.708)	(9.813)
Paydown	0.025***	0.097***	0.098***
	(3.721)	(8.511)	(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

Drawdowns Lead to Increases in Expected Losses

	PD^+	LGD^+	EL^+	PD^+	LGD^+	EL^+
	(1)	(2)	(3)	(4)	(5)	(6)
Drawdown	0.000***	0.027***	0.040***	0.009	0.039***	0.033***
	(2.983)	(9.134)	(11.208)	(1.615)	(5.927)	(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

Drawdowns and Market Outcomes

	Stock Return	Bond Return	Negative Surprise	Earnings Return
	(1)	(2)	(3)	(4)
Drawdown	-1.881***	0.041	2.513***	-0.219*
	(7.453)	(0.318)	(3.160)	(1.884)
EL^{+}	-0.595***	-0.231**	1.618***	-0.199**
	(3.000)	(2.253)	(3.368)	(2.529)
Book-to-Market	-0.075	0.266	4.651**	0.715***
	(0.117)	(0.669)	(2.523)	(3.116)
ROA	2.026	0.794	-0.898	0.897
	(0.974)	(0.756)	(0.128)	(0.951)
Leverage	-0.380	0.056	2.481	0.437
	(0.482)	(0.162)	(1.048)	(1.464)
Log(Market Cap)	0.151	0.028	-3.631***	-0.067*
	(1.256)	(0.472)	(10.076)	(1.656)
Lagged Stock Return	-0.017		-0.166***	0.314***
	(1.235)		(6.066)	(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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  - We only look at publicly traded firms
  - We only see the very largest banks, for whom relationship lending is less important

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  - Is concentrated in negative information
  - Directly affects banks' lending decisions
  - Arises in part (though not entirely) from observing credit line drawdowns

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  - Is concentrated in negative information
  - Directly affects banks' lending decisions
  - Arises in part (though not entirely) from observing credit line drawdowns
- Methodological contribution: Y-14Q risk measures contain banks' private information
  - Useful to explore a range of fundamental (and previously inaccessible) questions about how banks collect and use information

Thank you!

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	−0.060	−0.001	−0.108
	(0.364)	(0.502)	(0.002)	(1.062)
Book-to-Market	−0.092	0.276	4.185**	0.751***
	(0.150)	(0.720)	(2.365)	(3.428)
ROA	0.838	0.804	−3.760	0.962
	(0.421)	(0.786)	(0.567)	(1.077)
Leverage	−0.636	0.069	2.501	0.428
	(0.830)	(0.211)	(1.095)	(1.505)
Log(Market Cap)	0.218*	0.023	−3.730***	−0.054
	(1.889)	(0.419)	(10.602)	(1.408)
Lagged Stock Return	−0.014		−0.164***	0.313***
	(1.071)		(6.253)	(34.464)
Lagged Bond Return		−0.085**		
		(1.990)		
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

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**	−0.006**	0.031***	−0.007***
	(2.290)	(2.100)	(3.121)	(4.006)
Book-to-Market	0.670	0.275	4.879**	0.702**
	(0.920)	(0.654)	(2.556)	(2.444)
ROA	2.745	1.448	−2.691	−0.145
	(1.117)	(0.969)	(0.357)	(0.121)
Leverage	0.314	0.084	3.647	0.625*
	(0.314)	(0.194)	(1.394)	(1.738)
Log(Market Cap)	0.266*	0.029	−3.640***	−0.079*
	(1.795)	(0.355)	(9.391)	(1.669)
Lagged Stock Return	−0.028**		−0.181***	0.316***
	(2.174)		(6.237)	(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	0.477***	0.368	0.304*
	(0.824)	(3.277)	(0.409)	(1.862)
Small EL Decrease	−0.202	0.013	0.223	0.019
	(1.045)	(0.172)	(0.501)	(0.267)
Small EL Increase	−0.707***	−0.141**	1.345***	−0.132*
	(3.982)	(2.006)	(2.627)	(1.808)
Large EL Increase	−1.083**	−0.491	3.749***	−0.568***
	(2.147)	(1.199)	(3.399)	(2.591)
Book-to-Market	−0.063	0.294	4.043**	0.767***
	(0.102)	(0.766)	(2.284)	(3.520)
ROA	0.649	0.815	−3.234	0.927
	(0.329)	(0.796)	(0.486)	(1.037)
Leverage	−0.563	0.072	2.301	0.442
	(0.737)	(0.223)	(1.009)	(1.571)
Log(Market Cap)	0.203*	0.023	−3.685***	−0.056
	(1.773)	(0.427)	(10.537)	(1.486)
Lagged Stock Return	−0.014		−0.162***	0.313***
	(1.105)		(6.191)	(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

Back