Corporate Loan Spreads and Economic Activity

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Motivation

- Credit spreads widely used to forecast business cycle (e.g., Bernanke, 1990; Friedman and Kuttner, 1992, 1993; Gertler and Lown, 1999; Gilchrist and Zakrajšek, 2012; López-Salido, Stein, and Zakrajšek, 2017)

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- "*we have in mind that the pricing of credit risk in the bond market is [...] linked to the pricing of credit risk in the banking system. Although the former is easier for us to measure empirically, we suspect that the latter may be as or more important in terms of economic impact*"
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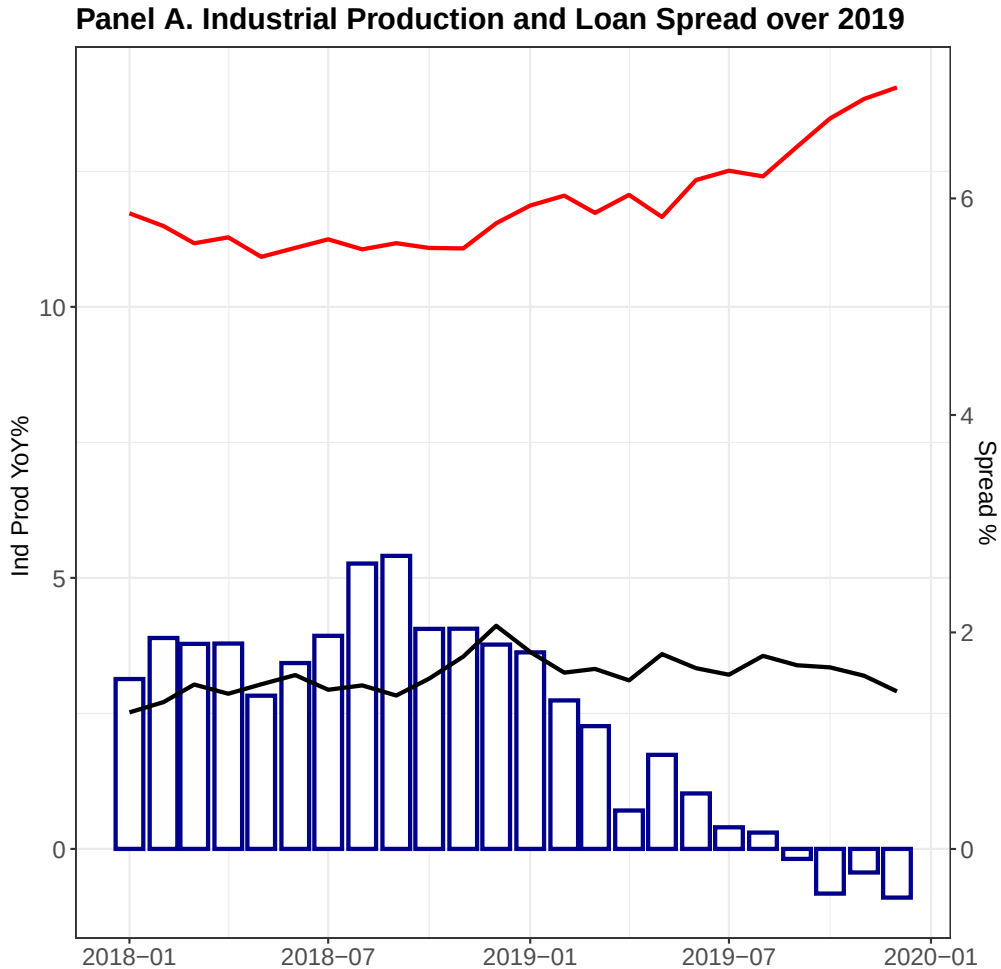
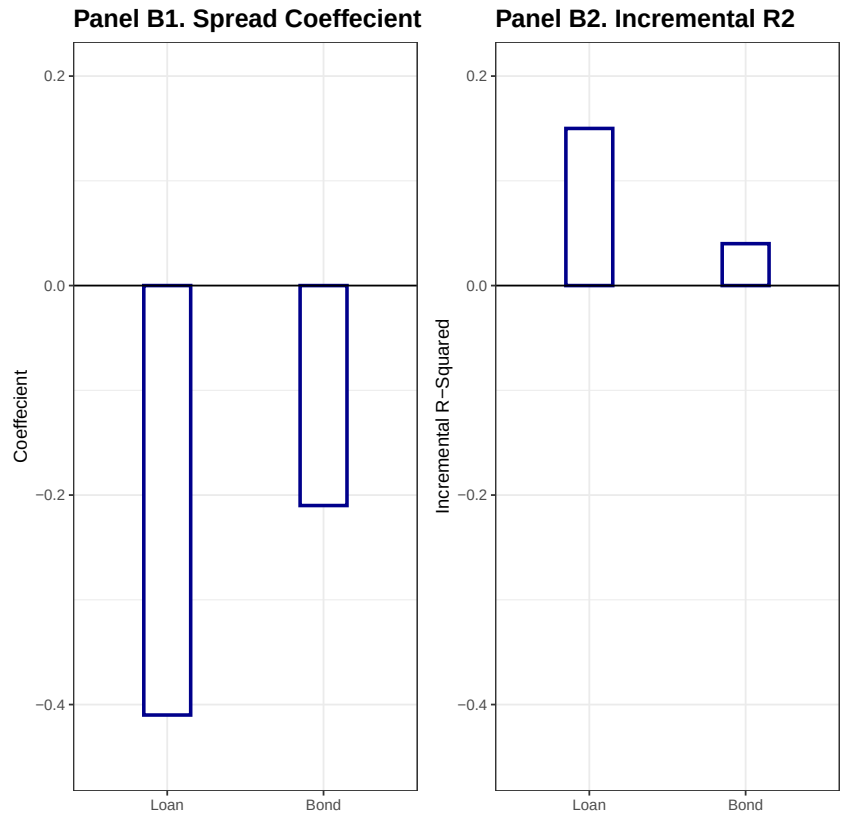
→ This paper: Novel dataset to explore the ability of corporate *loan* spreads to forecast economic developments

Motivation


Panel A. Industrial Production and Loan Spread over 2019
Ind Prod YoY%
Spread %
10
5
0
6
4
2
0
2018−01
2018−07
2019−01
2019−07
2020−01

RESULTS



- Predictive power for three-month ahead industrial production
  - Loan spread: sizable improvement in the in-sample fit, R^2 +15 pp
  - Bond spread: only R^2 +3.5 pp & coefficient 2/3 smaller

Results

- Main finding that loan spreads contain information about the future business cycle above and beyond other credit spread indicators is robust to
  - other economic aggregates
  - different time horizons
  - other benchmark measures
  - other countries
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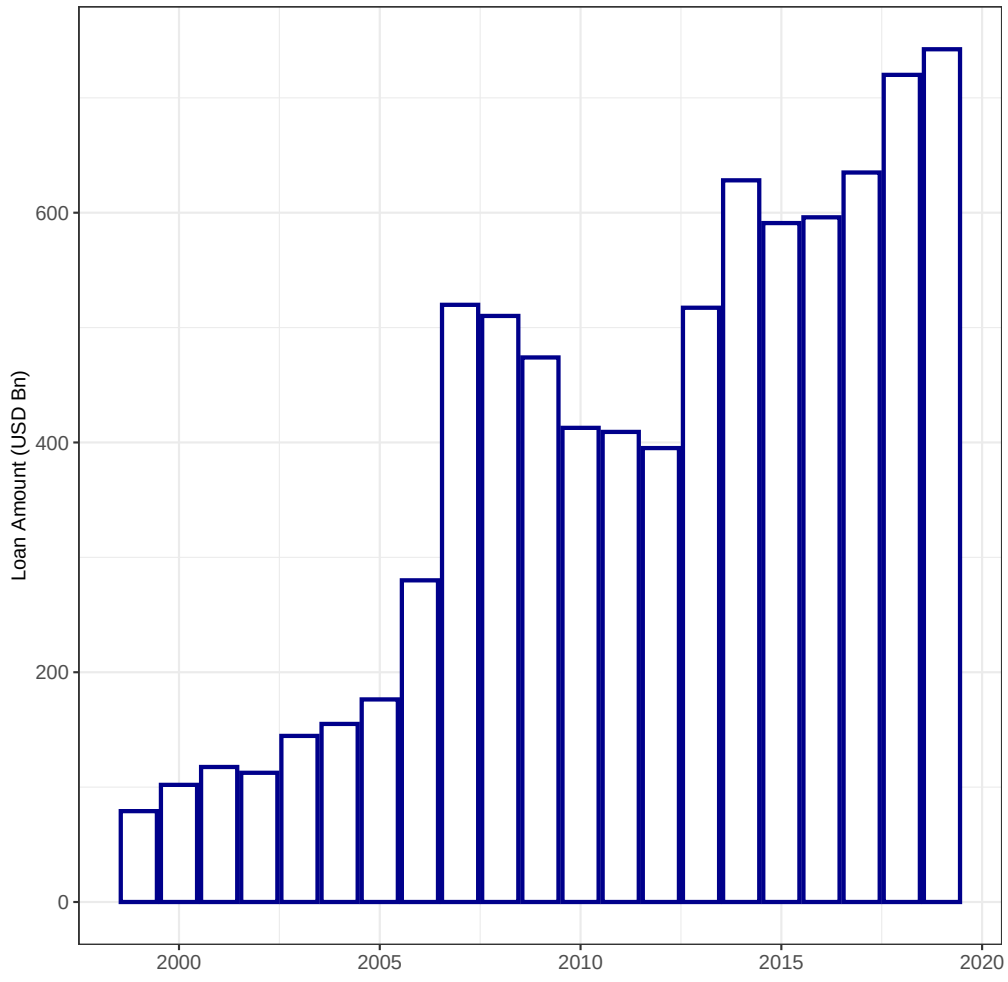
- Effects are stronger for smaller, younger, and private firms
- Consistent with compositional differences btw bond and loan market accounting for (part of) the differential predictive power
- Loan spreads more correlated w/ supply conditions in primary mkt than bond spreads
- (Extension: prediction at the industry-level)

Outline

1. Secondary market for syndicated loans
2. Bottom-up loan spread measure
3. Forecasting economic developments
4. Understanding the mechanism
5. Extension: Industry-level forecasting

Secondary loan market trading volume



Data

- Daily secondary market prices (mid quotes) of loans from the Loan Syndication and Trading Association (LSTA)
  - 1999 to Q1 2020 period, U.S. non-financial firms, TL, >200,000 loan-month observations ($\sim$ 1,200 loans outstanding per month)
- LPC Dealscan matched to LSTA using LIN
  - Loan amount/spread $->$ cash flows + contract terms
- Bond information
  - Gilchrist and Zakrajšek (2012), TRACE and Mergent FISD
- Macro variables: FRED, Bureau of Economic Analysis (BEA), Bureau of Labour Statistics

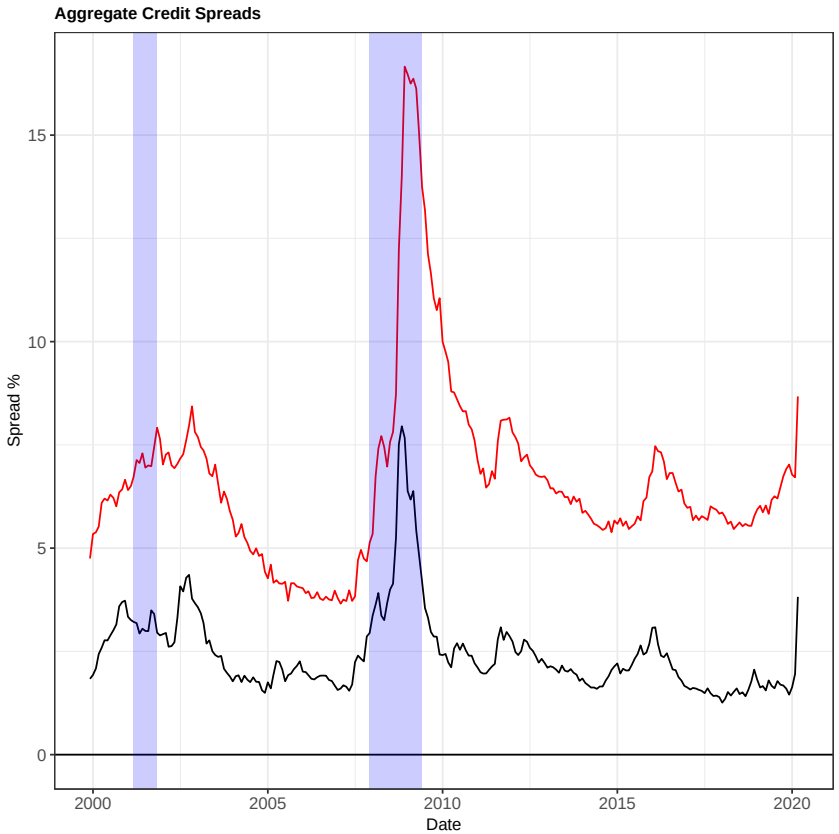
Constructing the aggregate loan spread

- "Bottom-up" spread (Gilchrist and Zakrajšek, 2012)
  - Qrt. cash flows: coupon using 3m forward LIBOR + AISD
    $\rightarrow$ yield-to-maturity $y_{it}[k]$
  - Synthetic risk-free loan w/ same cash-flow profile
    $\rightarrow$ yield-to-maturity $y^f_{it}[k]$
    - DCF using cont. comp. zero-coupon Treasury yields (Gürkaynak, Sack, and Wright, 2007)

$\rightarrow$ Loan spread (for each loan): $S_{it}[k] = y_{it}[k] - y^f_{it}[k]$

$\rightarrow$ Aggregate loan spread: $S^{Loan}_t = \frac{1}{N_t} \sum_i \sum_k S_{it}[k]$

Aggregate credit spreads (1999-2020)



- Aggregate loan and bond spreads.
- ρ=0.76 [ρ=0.65 ex '08-'09 financial crisis]
- Loan spreads are more volatile than bond spreads (σ=2.28% vs. σ=1.04%)
- Loan spreads an order of magnitude larger than bond spreads (different borrower types)

Forecasting economic developements

- Foreacasting regs (López-Salido, Stein, and Zakrajšek, 2017)

$$\Delta y_{t+h} = \alpha + \sum_{i=1}^{p} \beta_i \Delta y_{t-i} + \gamma_1 \Delta S_t + \lambda_2 TS + \lambda_3 RFF + \epsilon_{t+h},$$

- Δy is the log growth rate of industrial production (in this talk; various other macro variables in the paper)
- S_t is a credit spread indicator
- TS is the term spread and RFF real effective fed fund rate
- Estimated with OLS, p based on AIC, Newey-West s.e., coefficients are standardized

Baseline results

	Industrial Production; Forecast horizon: 3 months		
	(1)	(2)	(3)
ΔS_t^{Loan}	-0.410		-0.396
	(-5.727)		(-3.831)
ΔS_t^{Bond}		-0.198	-0.030
		(-2.257)	(-0.267)
Adjusted R^2	0.313	0.198	0.311
Incremental R^2	+0.150	+0.035	+0.148
Observations	241	241	241

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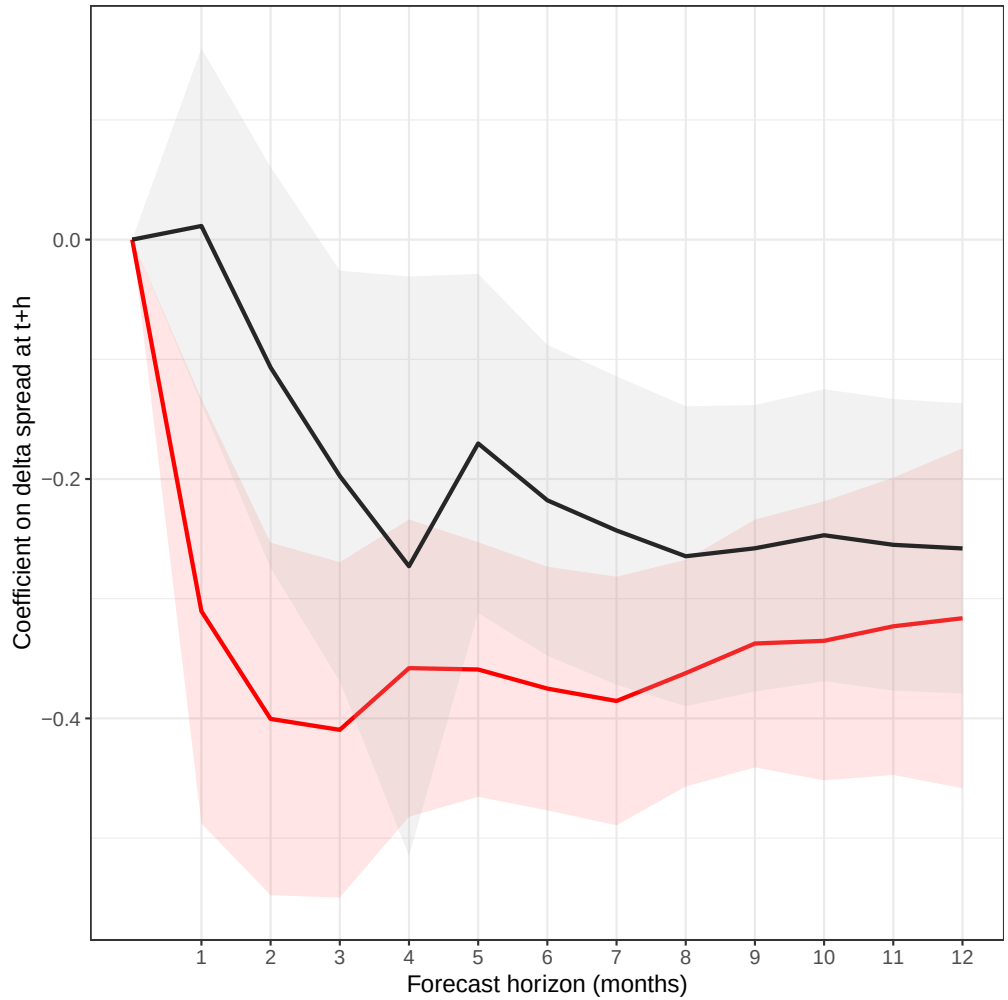
- 1 std dev $\uparrow$ in $S_t^{Loan} \rightarrow$ 0.410 std dev $\downarrow$ in industrial production in subsequent three months
- $R^2 \uparrow$ 15 pp relative to benchmark

Dynamics


0.0
−0.2
−0.4
Coefficient on delta spread at t+h
1
2
3
4
5
6
7
8
9
10
11
12
Forecast horizon (months)

Other credit spreads and robustness

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Δ Baa-Aaa spread	-0.277	+0.077
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Δ HY-Aaa spread	-0.248	+0.062
	(-4.013)	
Equity market		
S&P500 return	0.216	+0.041
	(2.921)	
Adj. for contract terms		
Residual ΔS_t^{Loan}	-0.405	+0.120
	(-5.646)	
Ex. financial crisis		
ΔS_t^{Loan}	-0.207	+0.034
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ΔS_t^{Bond}	-0.058	+0.001
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▸ Ratings bond vs loan

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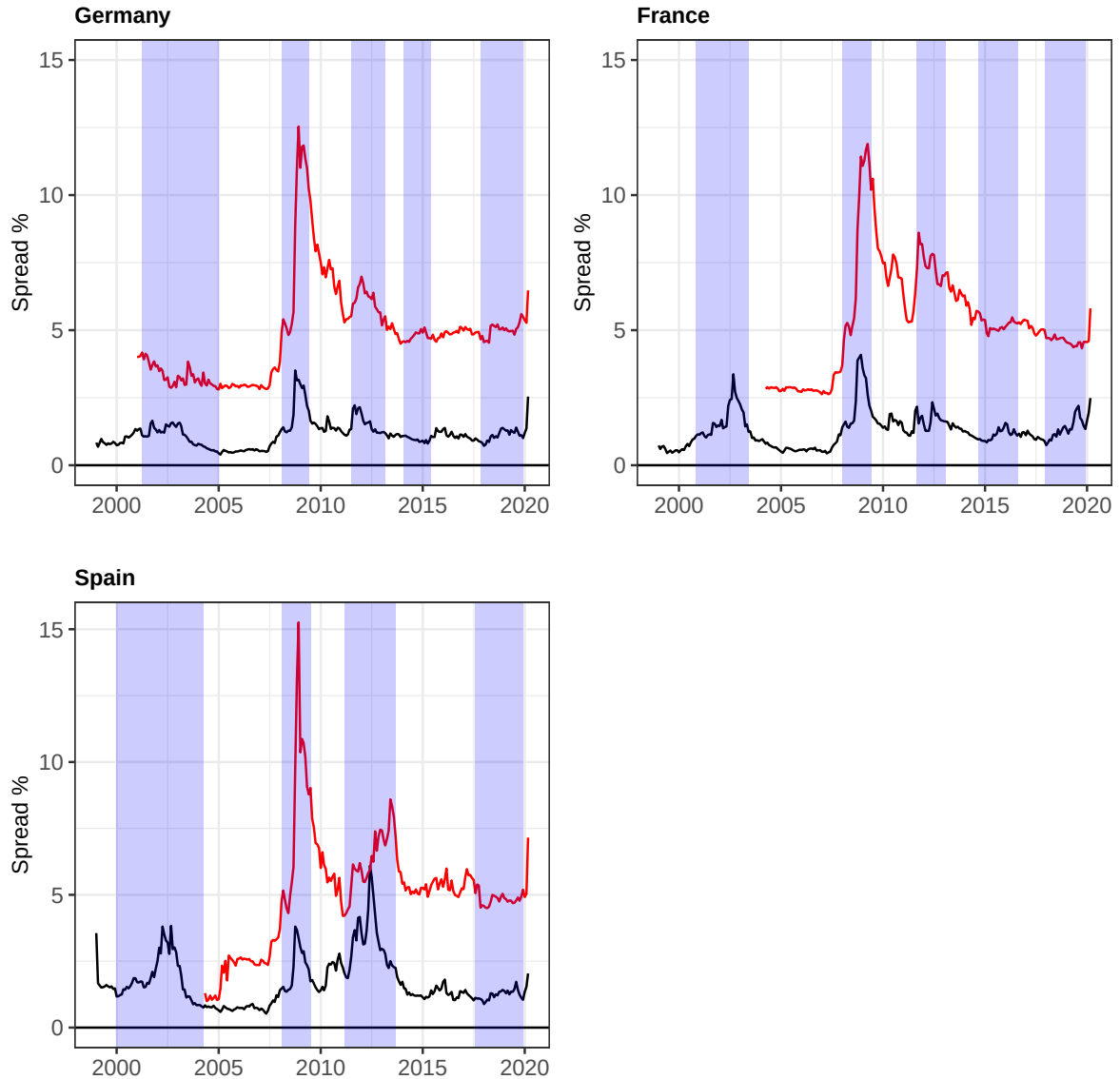

Evidence from Europe

	Manufacturing Index; Forecast horizon: h = 3 months		
	Germany (1)	France (2)	Spain (3)
ΔS_t^{Loan}	-0.360	-0.340	-0.200
	(-2.300)	(-2.100)	(-1.900)
ΔS_t^{Bond}	-0.048	-0.009	-0.130
	(-0.690)	(-0.100)	(-1.000)
Adjusted R^2	0.260	0.190	0.190
Incremental R^2	+0.111	+0.071	+0.058
% Contribution from ΔS_t^{Loan}	0.86	0.91	0.62
Observations	227	188	186

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- Does not seem to be (fully) explained by differences in risk btw bond and loan issuers
- Next: Which issuers (loans) account for most of the predictive power?
- Loan market populated w/ firms that may have limited access to alt funding sources & exhibit higher sensitivity to loan supply frictions

Effect by firm size

	Industrial Production; Forecast horizon: 3 months		
	(1)	(2)	(3)
ΔS_t^{Loan} [Small firms]	-0.377		
	(-4.177)		
ΔS_t^{Loan} [Large firms]		-0.263	
		(-3.411)	
ΔS_t^{Loan} [Private firms]			-0.429
			(-5.465)
Adjusted R^2	0.296	0.227	0.320
Incremental R^2	+0.133	+0.064	+0.157
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- Size based on total assets
- Private = issuer cannot be matched to Compustat

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Effect by firm age

	Industrial Production; Forecast horizon: 3 months		
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ΔS_t^{Loan} [Young firms]	-0.340		
	(-4.525)		
ΔS_t^{Loan} [Old firms]		-0.290	
		(-2.795)	
ΔS_t^{Loan} [Private firms]			-0.429
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ΔS_t^{Loan} [Large & old firms]		-0.212	
		(-1.762)	
ΔS_t^{Loan} [Private firms]			-0.429
			(-5.465)
Adjusted R^2	0.306	0.204	0.320
Incremental R^2	+0.143	+0.041	+0.157
Observations	241	241	241

Size and age double-sort

	Industrial Production; Forecast horizon: 3 months		
	(1)	(2)	(3)
ΔS_t^{Loan} [Small & young firms]	-0.391 (-4.479)		
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$\rightarrow$ Effect stronger for smaller, younger, and private firms

- Limited bond-loan market overlap in this segment (only 16% of smaller and younger firms also have a bond outstanding)
- Consistent with smaller, private firms being more sensitive to changes in economic conditions (Cloyne, Ferreira, Froemel, and Surico, 2020; Begenau and Salomao, 2019; Asker, Farre-Mensa, and Ljungqvist, 2015; Davis, Haltiwanger, Jarmin, and Miranda, 2006; Pflueger, Siriwardane, and Sunderam, 2020)

Credit conditions

	(1)	(2)
Credit conditions (loan officer surveys)		
ΔS_t^{Loan}	0.430	
	(3.810)	
ΔS_t^{Bond}		0.290
		(1.879)
Adjusted R^2	0.171	0.073
Observations	81	81

- Higher loan spreads might reflect a reduction in bank loan supply in the primary loan market.
- Measure 1: SLOOS - measure of (net) tightening of lending standards

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- Higher loan spreads might reflect a reduction in bank loan supply in the primary loan market.
- Measure 1: SLOOS - measure of (net) tightening of lending standards
- Measure 2 (not shown): Banks' unused commitments decrease with an increase in loan spreads

Credit conditions – Europe

	Credit conditions based on loan officer surveys	
	(1)	(2)
Germany		
ΔS_t^{Loan}	0.376	
	(3.748)	
ΔS_t^{Bond}		0.159
		(1.182)
Adjusted R^2	0.128	0.011
Observations	70	70
France		
ΔS_t^{Loan}	0.480	
	(3.545)	
ΔS_t^{Bond}		0.329
		(1.436)
Adjusted R^2	0.218	0.094
Observations	64	64
Spain		
ΔS_t^{Loan}	0.370	
	(2.018)	
ΔS_t^{Bond}		0.176
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Adjusted R^2	0.122	0.015
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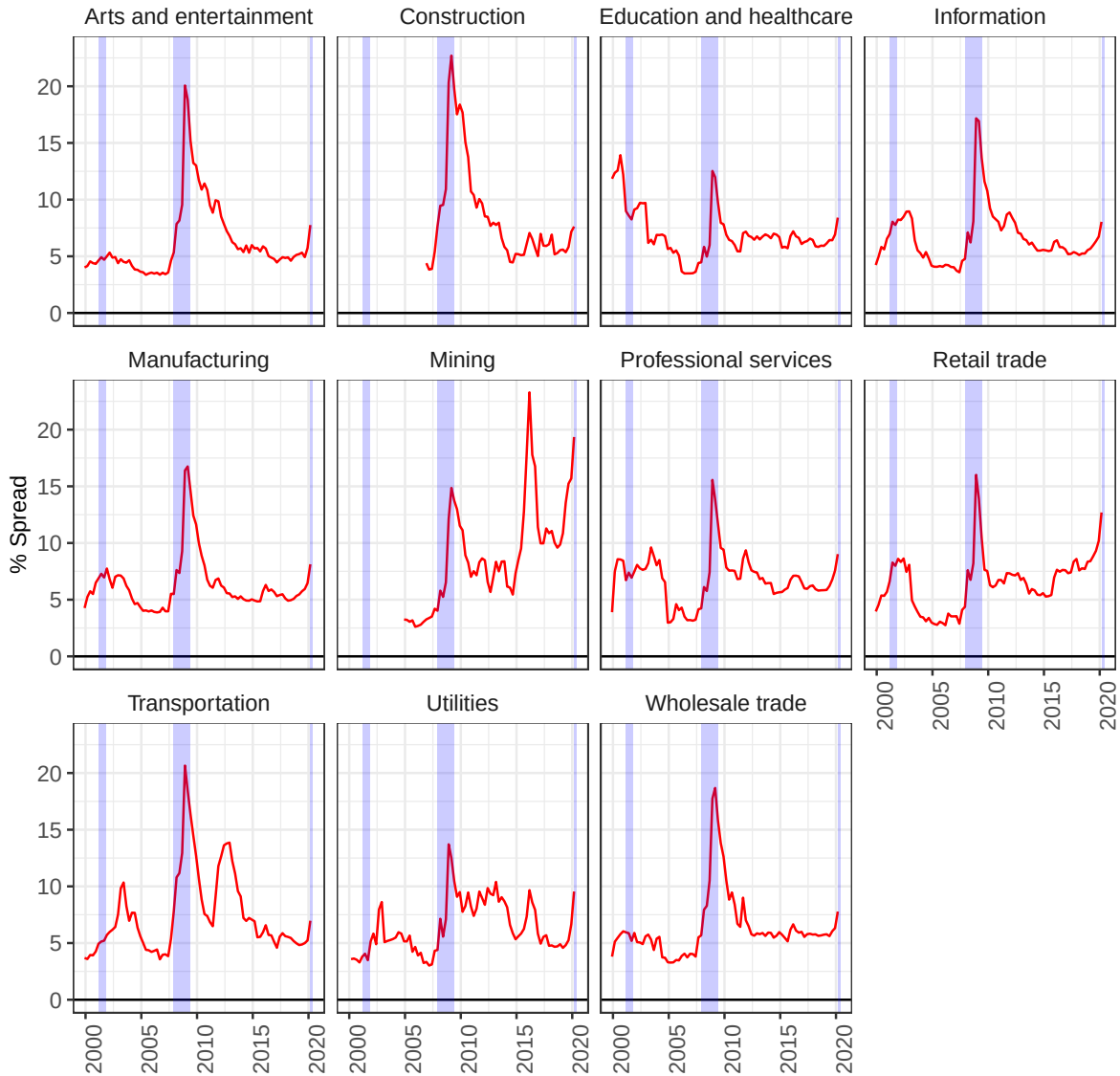
Extension: Industry-level loan spreads

- So far:
  - aggregate micro data into one aggregate time series
  - same weight on each observation
- Construct loan and bond spreads at the industry level
  - Examine credit spreads and economic development across different sectors of the economy (industry x time panel)
  - Industry cycles (e.g. mining, retail) appear to be dampened when aggregating
- Uncover cross-sectoral heterogeneity

INDUSTRY LOAN SPREADS



Industry forecasting results

	Industry employment; Forecast horizon: 3 months		
	(1)	(2)	(3)
S_{bt}^{Loan}	−0.130	−0.171	−0.292
	(−3.491)	(−3.534)	(−4.609)
S_{t}^{Loan}	−0.239		
	(−3.818)		
Year x quarter fixed effects	No	Yes	Yes
Industry fixed effects	No	No	Yes
Adjusted R^2	0.452	0.558	0.590
Incremental R^2	+ 0.086	+0.192	+0.224
Observations	803	803	803

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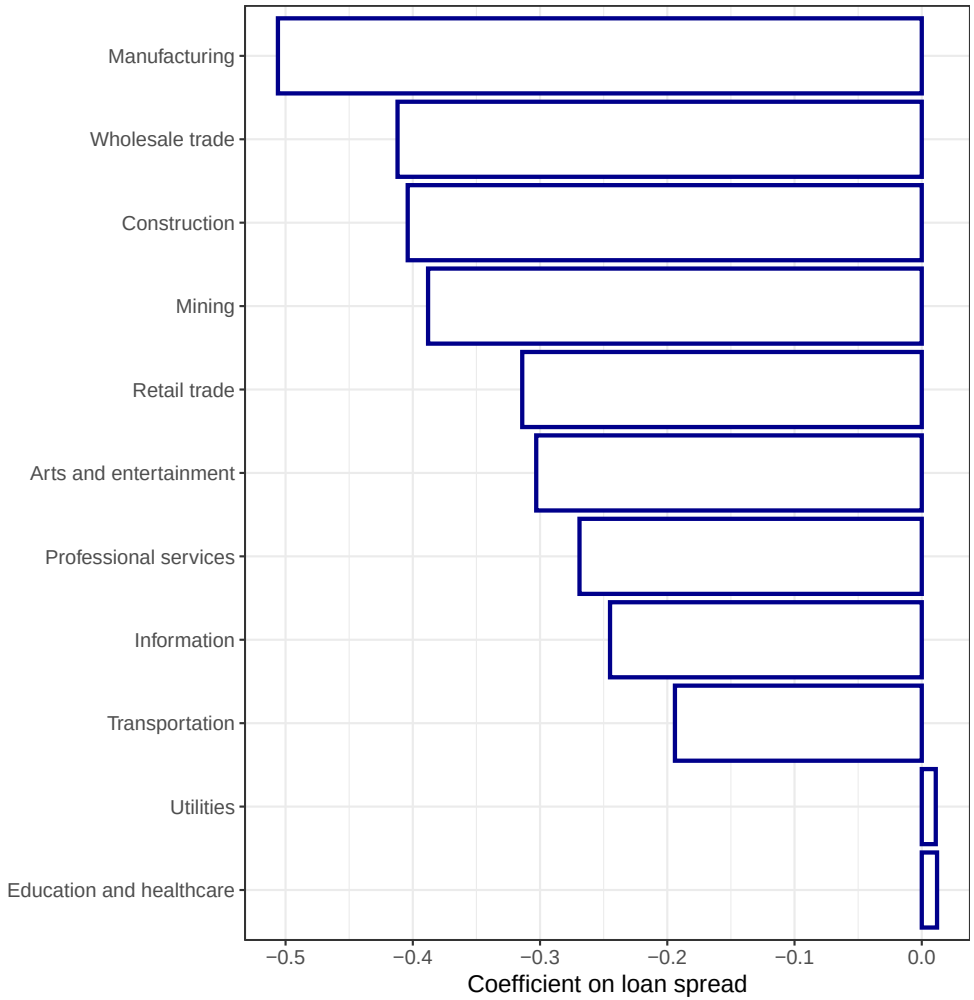
Industry heterogeneity



Industry heterogeneity - External finance dependence

Industry employment; Forecast horizon: 3 months	
$S_{bt}^{Loan} \times$ Top 3 EFD	−0.519
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$S_{bt}^{Loan} \times$ Middle 4 EFD	−0.269
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- EFD defined following Rajan and Zingales (1998)

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- EFD defined following Rajan and Zingales (1998)
- Use insight to improve aggregate level forecasting?

Aggregate forecasting - Alternative weighting schemes

	Industrial Production; Forecast horizon: 3 months			
	(1)	(2)	(3)	(4)
ΔS_t^{Loan} [Base]	-0.410			
	(-5.727)			
ΔS_t^{Loan} [Industry]		-0.445		
		(-6.236)		
ΔS_t^{Loan} [EFD]			-0.443	
			(-4.805)	
ΔS_t^{Loan} [ML]				-0.449
				(-5.162)
Adjusted R^2	0.313	0.343	0.337	0.339
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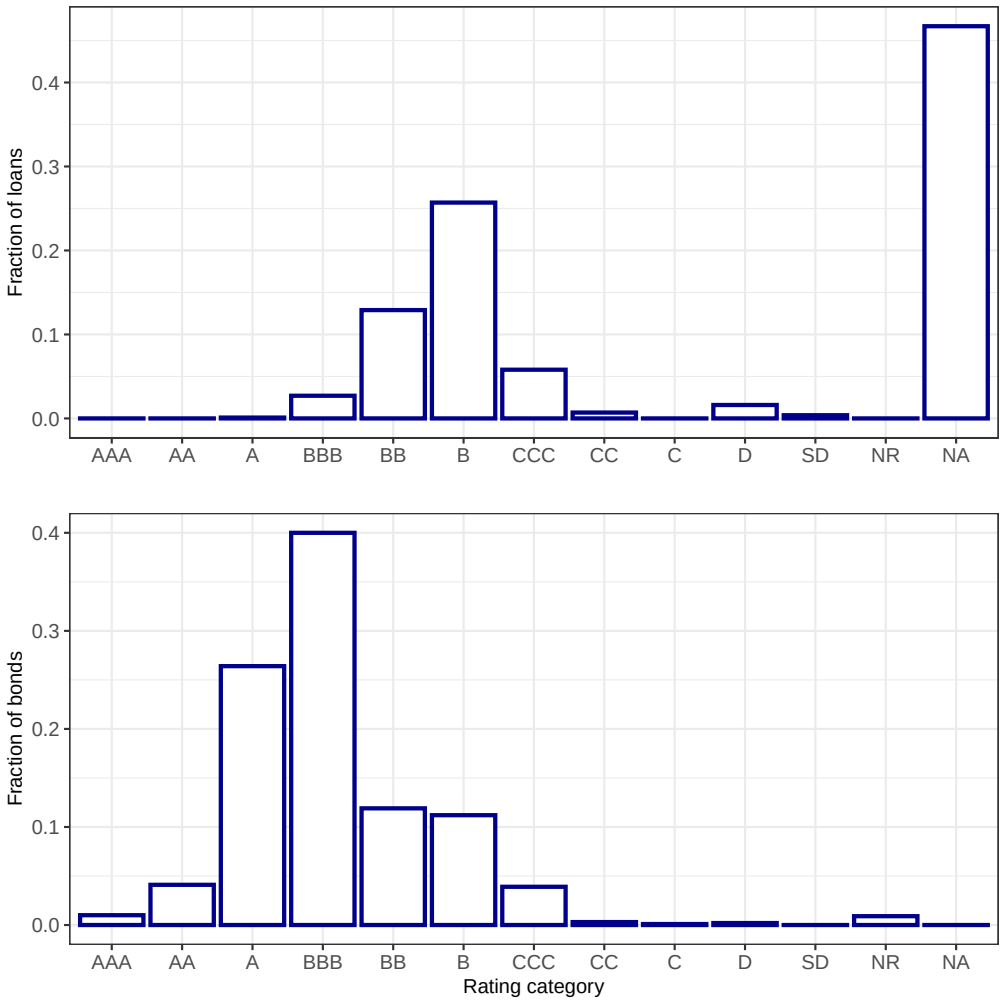
Conclusion

- Novel measure of credit spreads using secondary loan market prices
- Loan spreads contain information about the future business cycle above and beyond other credit spread indicators
- Evidence suggests that compositional differences btw loan and bond markets matter for the differential predictive power
- Industry-specific loan spreads have significant forecasting power for industry-level developments

Thanks!

RATING DISTRIBUTION – BOND VS LOAN MARKET



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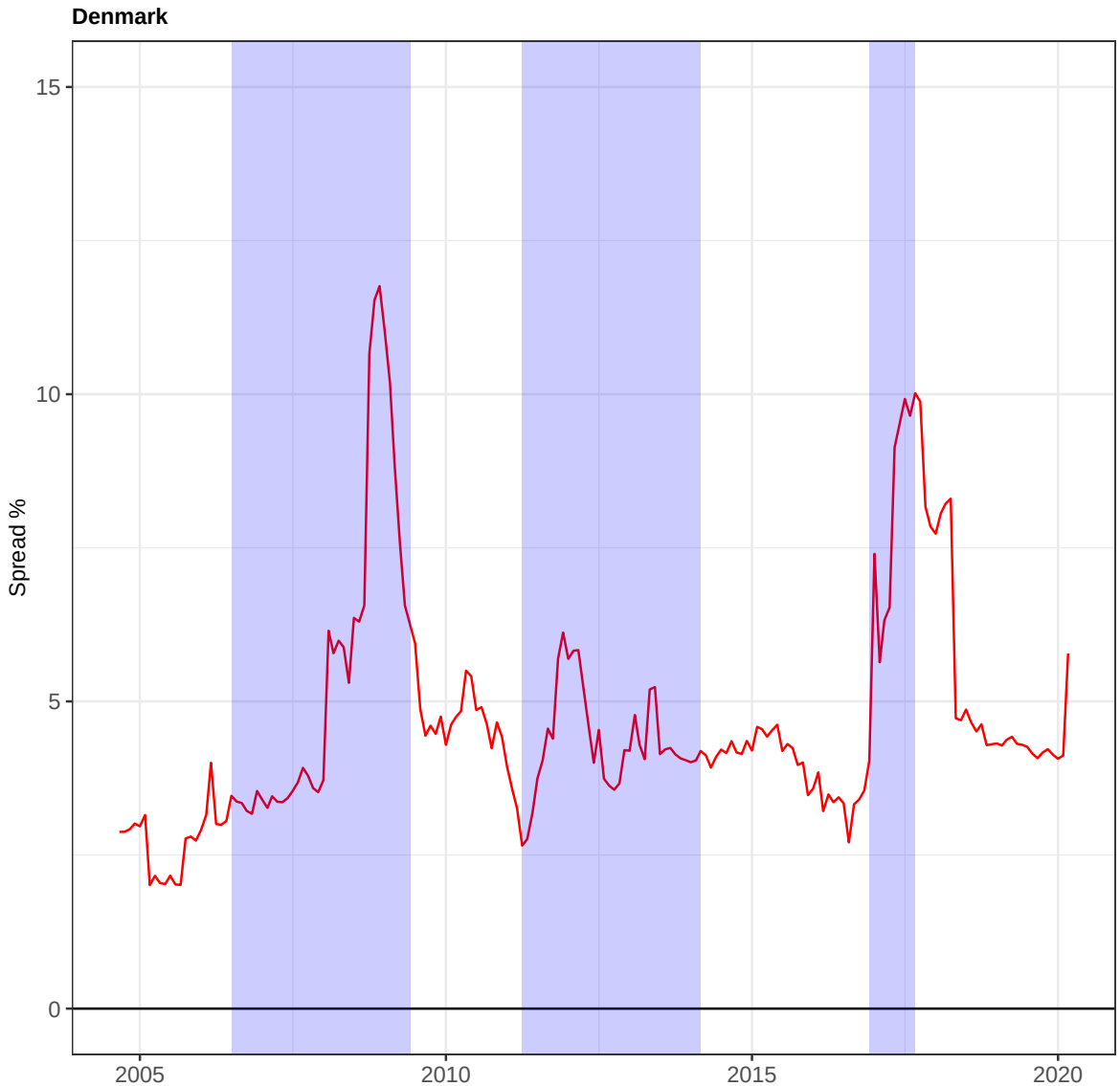
Evidence from Europe



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References I

Asker, Farre-Mensa, and Ljungqvist (2015): "Corporate Investment and Stock Market Listing: A Puzzle?," *Review of Financial Studies*, 28(2), 342–390.

Begenau, J., and J. Salomao (2019): "Firm Financing over the Busines Cycle," *Review of Financial Studies*, 32(4), 1235–1274.

Bernanke, B. S. (1990): "On the Predictive Power of Interest Rates and Interes Rate Spreads," *New England Economic Review*, pp. 51–68.

Bernanke, B. S., and M. Gertler (1989): "Agency Costs, Net Worth, and Business Fluctuations," *American Economic Review*, 79(1), 14–31.

Cloyne, J., C. Ferreira, M. Froemel, and P. Surico (2020): "Monetary Policy, Corporate Finance and Investment," *Working Paper, University of California Davis*.

References II

Davis, Haltiwanger, Jarmin, and Miranda (2006): "Volatility and Dispersion in Business Growth Rates: Publicly Traded versus Privately Held Firms," *NBER Macroeconomics Annual*, 21, 107–179.

Friedman, B. M., and K. N. Kuttner (1992): "Money, Income, Prices and Interest Rates," *American Economic Review*, 82, 472–492.

——— (1993): "Economic Activity and the Short-Term Credit Markets: An Analysis of Prices and Quantities," *Brookings Papers on Economic Activity*, 24, 192–283.

Gertler, M., and C. S. Lown (1999): "The Information in the High Yield Bond Spread for the Business Cycle: Evidence and Some Implications," *Oxford Review of Economic Policy*, 15(3), 132–150.

References III

Gilchrist, S., and E. Zakrajšek (2012): "Credit Spreads and Business Cycle Fluctuations," *American Economic Review*, 102(4), 1692–1720.

Gürkaynak, R. S., B. Sack, and J. H. Wright (2007): "The U.S. Treasury yield curve: 1961 to the present," *Journal of Monetary Economics*, 54(8), 2291–2304.

Kiyotaki, N., and J. Moore (1997): "Credit Cycles," *Journal of Political Economy*, 105(2), 211–248.

López-Salido, D., J. C. Stein, and E. Zakrajšek (2017): "Credit-market sentiment and the business cycle," *Quarterly Journal of Economics*, 132(3), 1373–1426.

Pflueger, C., E. Siriwardane, and A. Sunderam (2020): "Financial Market Risk Perceptions and the Macroeconomy," *Quarterly Journal of Economics*, 135(3), 1443 – 1491.

Rajan, R. G., and L. Zingales (1998): "Financial Dependence and Growth," *American Economic Review*, 88(3), 559–586.