

Online Appendix to
“Corporate Loan Spreads and Economic Activity”
(not intended for publication)

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A Additional institutional background

A.1 Loan market dealers

Table A.1 shows the loan market lead arranger (underwriter) market share in the primary market for the top 10 dealers in the secondary market for 2009.¹ The five largest dealer banks are Credit Suisse, Bank of America, Barclays, Citigroup, and JP Morgan which together account for 36.8% of quotes in the secondary loan market in 2009. The top 10 (25) dealers account for 58.4% (about 90%) of all quotes. These banks are also the largest underwriters in the primary loan market.

Table A.1: **Top 10 dealers in the secondary loan market in 2009**

This table shows the loan market lead arranger (underwriter) market share in the primary syndicated loan market as well as the dealer market share in the secondary market for syndicated loans for the top 10 dealers in 2009.

Name	Dealer Market Share (Secondary)	Underwriter Market Share (Primary)
Credit Suisse	9.0%	6.6%
Bank of America	8.3%	12.3%
Barclays	7.7%	7.7%
Citigroup	6.0%	7.3%
JP Morgan	5.8%	12.4%
Morgan Stanley	5.7%	6.4%
Deutsche Bank	5.2%	5.1%
BNP Paribas	3.9%	2.9%
Wells Fargo	3.5%	3.2%
Royal Bank of Canada	3.3%	1.8%

A.2 Loan market liquidity

Figure A.1 plots the median bid-ask spread (scaled by the mid-quote) over the 1999-2023 period as well as the interquartile range (grey area). The median bid-ask spread in the 1999 to 2023 period is 87 bps. For comparison, [Feldhütter and Poulsen \(2018\)](#) report an average bid-ask spread for the U.S. bond market of 34 bps over the 2002 to 2015 period.

¹ There is little public information about dealers who provide quotes collected by the LSTA. However, the data identifies dealer banks for a subsample of loans in 2009.

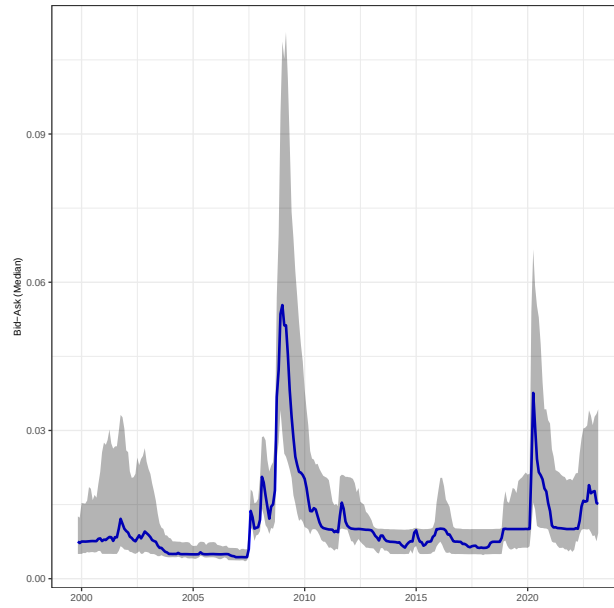


Figure A.1: **U.S. secondary loan market liquidity**

This figure plots the median bid-ask spread (scaled by the mid quote) over the 1999:11 to 2023:03 period as well as the interquartile range. The sample is restricted to term loans issued by U.S. firms. Source: LSTA.

B Variable definitions

This section outlines the key variables used in the main paper and their construction. Table [B.1](#) describes each variable. Column (1) indicates the country for which the data applies and the name of the variable used throughout the paper. Column (2) provides a brief description and the source of the data. Column (3) indicates the data frequency.

Table B.1: Description of variables

Economic Variables	Description	Frequency
USA - Industrial production	Total industrial production index (FRED)	M
USA - Total capacity utilization	Total capacity utilization (FRED)	M
USA - New orders	New orders for capital goods (ex. defense) (FRED)	M
USA - Business inventory	Total business inventories (FRED)	M
USA - ISM Manufacturing	ISM Manufacturing Employment Diffusion Index (ISM)	M
USA - ISM Non-Manufacturing	ISM Non-Manufacturing Employment Diffusion Index (ISM)	M
USA - FSLOSS	Fed senior loan officer survey (Federal Reserve)	Q
USA - NFIB	Credit conditions survey for small firms (NFIB)	Q
USA - NPL	Non performing Loans % - US banks (SNL)	Q
USA - Equity ratio	Equity ratio % - US banks (SNL)	Q
USA - Facility Amt	Total amount (\$Millions) of new term loan facilities issued (Dealscan)	M
USA - Facility Num	Total number of new term loan facilities issued (Dealscan)	M
USA - S&P500	S&P500 monthly return (CRSP)	M
USA - Bid-ask spread	Median loan bid-ask spread (Authors)	M
USA - VIX	VIX (monthly average)	M
USA - CLO Primary Issuance	Primary issuance new CLO	M
USA - Time on market	Time from syndication to completion (Authors)	M
USA - HY Loan share	Proportion of B and below new issuance (Authors)	M
USA - HY Bond share	Proportion of HY new issuance (Authors)	M
Interest rates		
USA - Real federal funds rate	Avg effective federal funds rate minus core PCE index (FRED)	M
USA - Baa-Aaa spread	10year Baa minus 10year Aaa corporate bond spread (FRED)	M
USA - Commercial spread	Paper/bill spread: 1 month A1/P1 commercial paper minus 3m UST (FRED)	M
USA - HY-AAA spread	High Yield minus AAA yield (FRED)	M
USA - $\Delta S_t^{Bond PC}$	First PC extracted from $\Delta S_t^{Baa-Aaa}$, $\Delta S_t^{CP-Bill}$, ΔS_t^{HY-AAA} , and ΔS_t^{Bond}	M
USA - ΔS_t^{Loan}	Monthly aggregate loan spread constructed from loan market (Authors)	M
USA - ΔS_t^{Bond}	Monthly aggregate bond spread Gilchrist and Zakrajšek (2012)	M

C Descriptive statistics

Table C.1 summarizes basic descriptive statistics for the main macro outcomes and credit spreads used in the paper for the U.S. sample.

Table C.1: Summary Statistics

This table summarizes key descriptive statistics for each credit spread and macroeconomic outcome variables used in the forecasting regressions for the U.S. The unit of observation is the monthly level t . The sample period is 1999:11 to 2023:03.

Variable	Mean	SD	Min	Median	Max
Credit spreads:					
$\Delta CP - billspread$ (bps)	-0.04	14.69	-74.0	0.0	104.0
$\Delta Baa - Aaaspread$ (bps)	0.14	12.27	-63.0	-1.0	94.0
$\Delta HY - aaaspread$ (bps)	-0.04	69.31	-324.0	-4.0	455.0
ΔS_t^{Bond} (bps)	-0.19	29.80	-129.09	-2.86	238.81
ΔS_t^{Loan} (bps)	1.04	46.50	-125.0	-4.37	361.51
$\Delta S_t^{Bond PC}$ (bps)	-0.02	74.16	-323.91	-4.66	521.70
Macro outcomes:					
Δy_{t+3} Industrial production (%)	0.17	2.58	-18.59	0.58	12.53
Δy_{t+3} ISM Manufacturing (Index)	-0.05	5.03	-17.90	-0.10	18.10
Δy_{t+3} ISM Non-Manufacturing (Index)	-0.01	4.23	-25.90	0.00	18.30
Δy_{t+3} Total Capacity Utilization (%)	-0.04	1.97	-13.25	0.19	8.87
Δy_{t+3} New orders (%)	0.36	10.43	-59.16	0.21	56.08
Δy_{t+3} Total business inventory (%)	0.86	1.70	-5.05	1.05	6.04

Table C.2 provides a comparison of the instrument level characteristics in the bond and loan market. Loan market data is a combination of LSTA data for secondary market quotes complemented with information about the underlying loans from the Dealscan database. Bond market data is a combination of monthly TRACE data for prices combined with Mergent FISD for information about the underlying bond.

Table C.2: Bond and loan market comparison

This table shows summary statistics for instrument level characteristics in the bond and loan market. Loan market data comes from LSTA and Dealscan. Bond market data comes from TRACE and Mergent FISD.

Panel A. Bond Market Characteristics						
Variable	Mean	SD	Min	Median	Max	N
Total No. of Bonds	-	-	-	-	-	14939
No. Bonds per month	4434	1613	214	4885	6378	
No. Bonds per firm/month	3.6	4.4	1.0	2.0	86.0	
Offering Amount (\$mill)	618.3	593	0.0	500.0	15000	
Maturity at issue (years)	11.6	8.7	0.52	9.8	41	
Term to Maturity (years)	9.7	8.7	0.0	6.4	30.0	
Duration (years)	6.0	4.1	0.0	5.0	19.2	
Coupon (%)	5.5	2.1	0.4	5.5	18.0	
Secured (%)	9.0	-	-	-	-	
Bond Spread (bps)	511	437.5	13.6	260.2	3495.6	
Panel B. Loan Market Characteristics						
Variable	Mean	SD	Min	Median	Max	N
Total No. of Loans	-	-	-	-	-	10044
No. Loans per month	1240	528.5	329	1409	2114.0	
No. Loans per firm/month	1.5	0.85	1.0	1.0	15.0	
Facility Amount (\$mill)	501.8	736.5	1.0	290.0	24000.0	
Maturity at issue (years)	6.2	1.3	0.7	6.5	12.2	
Term to Maturity (years)	4.1	1.9	0.0	4.3	11.8	
All In Spread Drawn (bps)	428.4	201.2	12.8	400.0	1600.0	
Secured (%)	89	-	-	-	-	
Senior (%)	95	-	-	-	-	
Loan Spread (bps)	600	458.7	5.3	460.2	3500.0	

D Additional results

D.1 Term loan B spread

The overwhelming part of term loans in our secondary market dataset are institutional term loans (term loan B). Only around 10% are term loan A. The table below compares our baseline results with results using a loan spread that is exclusively constructed based on institutional term loans. Consistent with the fact that term loan B make up for the largest part of the sample, results are virtually identical if we use a “term loan B only” spread

instead of our baseline loan spread measure.

Table D.1: **Term loan B spread**

Panel A mirrors Table 2, Panel B, in the main manuscript. Panel B reports the same specification but uses a loan spread that is exclusively constructed based on institutional “Term B” loans.

<i>Panel A.</i>	Forecast horizon: h = 3m					
	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
ΔS_t^{Loan}	-0.323 (-3.414)	-0.326 (-3.602)	-0.224 (-2.980)	-0.156 (-3.027)	-0.241 (-3.470)	-0.234 (-3.187)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond\ PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.173	0.208	0.174	0.602	0.244	0.231
Incremental R ²	+0.171	+0.173	+0.082	+0.045	+0.195	+0.151
Observations	281	281	281	281	281	281
<i>Panel B.</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta S_t^{Loan, \text{ Term loan B}}$	-0.330 (-3.414)	-0.333 (-3.592)	-0.220 (-2.836)	-0.166 (-3.297)	-0.236 (-3.278)	-0.239 (-3.148)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond\ PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.178	0.213	0.174	0.605	0.243	0.234
Incremental R ²	+0.176	+0.178	+0.082	+0.048	+0.194	+0.154
Observations	281	281	281	281	281	281

D.2 Payment frequency

Throughout the paper we assume that cash flows are paid quarterly as we do not have information on the payment frequency for most loans (payment frequency is available in DealScan for less than 15% of our loan sample). Hence, using loan-specific frequencies is not possible. However, for the small subset of loans for which information on payment frequency is available, the vast majority of loans have a quarterly payment schedule. This is consistent with, e.g., [Beyhaghi and Ehsani \(2017\)](#) who also assume loans have a quarterly payment schedule.

For robustness, we re-calculate the yield to maturity for all loans assuming semi-annual payments (the second most common payment frequency according to DealScan). The correlation between a loan spread assuming semi-annual payments and our baseline loan spread is 95%. Table [D.2](#) below compares our baseline results (assuming quarterly payments) in

Panel A, to a loan spread that assumes semi-annual payments in Panel B.

Table D.2: **Payment frequency**

Panel A mirrors Table 2, Panel B, in the main manuscript. Panel B reports the same specification but uses a loan spread that assumes semi-annual payments when calculating the yield to maturity.

Forecast horizon: h = 3m						
<i>Panel A.</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
ΔS_t^{Loan}	-0.323 (-3.414)	-0.326 (-3.602)	-0.224 (-2.980)	-0.156 (-3.027)	-0.241 (-3.470)	-0.234 (-3.187)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond\ PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.173	0.208	0.174	0.602	0.244	0.231
Incremental R ²	+0.171	+0.173	+0.082	+0.045	+0.195	+0.151
Observations	281	281	281	281	281	281

<i>Panel B.</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta S_t^{Loan, semi-annual}$	-0.383 (-4.988)	-0.378 (-5.064)	-0.246 (-3.488)	-0.201 (-3.390)	-0.238 (-3.648)	-0.220 (-3.576)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond\ PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.204	0.234	0.182	0.612	0.242	0.224
Incremental R ²	+0.201	+0.198	+0.089	+0.056	+0.193	+0.145
Observations	281	281	281	281	281	281

D.3 Prepayment of loans

Given that loans are typically prepayable at par, it is not possible to know the future payment profile of a loan at a given time. To test the sensitivity of our results to the maturity profile of loans, we reconstruct the loan spread assuming alternative maturities.

We first start by checking the average prepayment time of our loans. We define the last month in which we see a price for the loan as a proxy for the prepayment date. That is, for each loan (that contractually matures before the end of our sample period) we calculate (Last Date At Which Loan Price Is Observed - Issuance Date)/(Maturity Date - Issuance Date). This “fraction of loan’s lifespan” measures the ratio of effective loan lifespan, to the expected loan lifespan. Figure D.1 plots the distribution of this measure across all loans. On average, the typical loan only makes it 54% of the way to it’s expected maturity. Given the typical loan maturity is 5.8 years, this implies an “effective” maturity of 3 years.

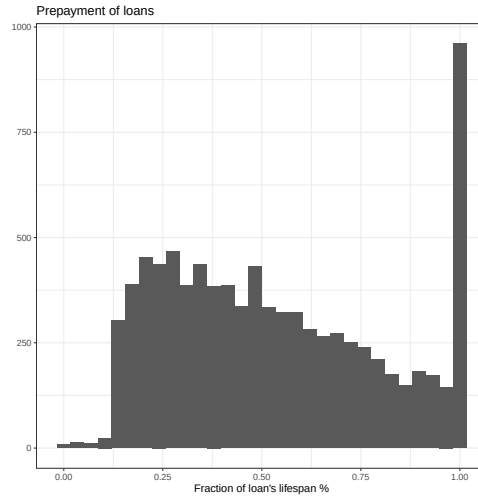


Figure D.1: **Prepayment of loans**

Table D.3 reports our baseline findings in Panel A (which are reported in Table 2, Panel B in the manuscript), and in Panel B we reconstruct the loan spread assuming the loan does not make it to stated maturity, but only 3 years. The results confirm that assuming a different maturity profile does not lead to different results.

Table D.3: **Assuming 3yr maturity**

Panel A reproduces Table 2, Panel B, in the main manuscript for comparison. Panel B reports the same specification but using a loan spread assuming only 3 years to maturity.

Forecast horizon: h = 3m						
<i>Panel A.</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
ΔS_t^{Loan}	-0.323 (-3.414)	-0.326 (-3.602)	-0.224 (-2.980)	-0.156 (-3.027)	-0.241 (-3.470)	-0.234 (-3.187)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond\ PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.173	0.208	0.174	0.602	0.244	0.231
Incremental R ²	+0.171	+0.173	+0.082	+0.045	+0.195	+0.151
Observations	281	281	281	281	281	281
<i>Panel B.</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta S_t^{Loan-3yrMat}$	-0.331 (-3.080)	-0.346 (-3.257)	-0.202 (-2.457)	-0.191 (-3.074)	-0.228 (-2.324)	-0.265 (-2.767)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond\ PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.164	0.204	0.161	0.607	0.233	0.235
Incremental R ²	+0.161	+0.168	+0.069	+0.050	+0.184	+0.155
Observations	281	281	281	281	281	281

D.4 Alternative timing conventions

Most forecasting regressions in the paper (unless indicated) adopt the same timing conventions as commonly adopted in the macro forecasting literature (including Gilchrist and Zakrajšek, 2012) in defining growth rates and lags of macro-outcomes. Fig D.2 summarizes visually the timings adopted for the baseline forecasting regressions. This setup is chosen in recognition of the fact that in period t , macro-outcomes are often not available due to reporting lags, whereas financial market variables are more readily available. In this section we consider the impact of alternative timing conventions on our main results.

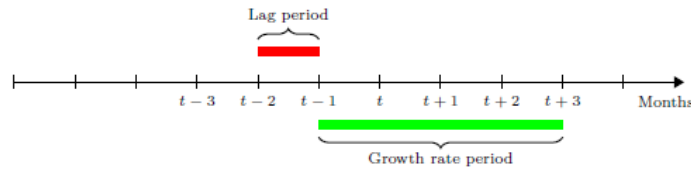


Figure D.2: **Baseline timing conventions**

This figure summarizes the timing conventions used throughout the paper.

The first alternative timing convention we try, defines the growth rate as the growth from t to $t+3$, as summarized in Fig D.3. Table D.4, Panel A summarizes the results of the forecasting regression using this alternative timing convention. Overall, the key results remain unchanged, with similar forecasting coefficients across all macro-outcomes.

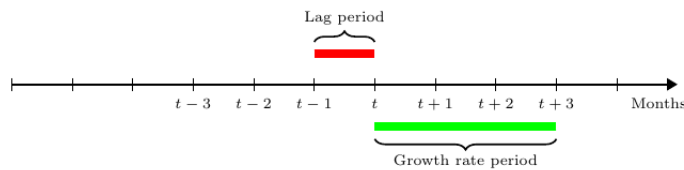


Figure D.3: **Alternative timing conventions - A**

This figure summarizes an alternative timing convention used in Table D.4. It defines the growth rate as the growth from t to $t+3$

The second alternative timing convention we try, adopts the same growth rate at Panel A, but uses a lagged dependent variable with a matching period, i.e., the lagged growth rate

from $t - 3$ to t , as summarized in Fig D.4. Table D.4, Panel B summarizes the results of the forecasting regression using this alternative timing convention.

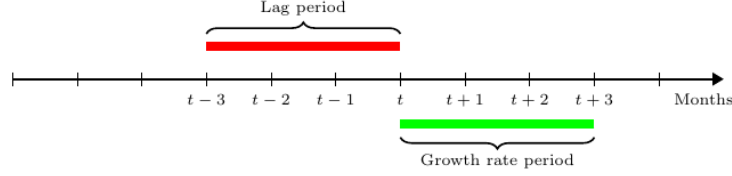


Figure D.4: **Alternative timing conventions - B**

This figure summarizes an alternative timing convention used Table D.4. It defines the lagged growth rate from $t - 3$ to t .

Table D.4: **Alternative timing**

Panel A mirrors Table 2, Panel B, in the main manuscript but adopts the timing conventions depicted in Figure D.3. Panel B mirrors Table 2, Panel B, in the main manuscript but adopts the timing conventions depicted in Figure D.4.

Forecast horizon: h = 3m						
<i>Panel A.</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
ΔS_t^{Loan}	-0.320 (-4.865)	-0.294 (-4.827)	-0.242 (-3.553)	-0.112 (-1.962)	-0.162 (-2.686)	-0.186 (-3.957)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.375	0.405	0.172	0.562	0.192	0.194
Incremental R ²	+0.221	+0.192	+0.078	+0.022	+0.126	+0.066
Observations	241	241	241	241	241	241
<i>Panel B.</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
ΔS_t^{Loan}	-0.261 (-3.666)	-0.234 (-3.665)	-0.268 (-3.739)	-0.197 (-3.786)	-0.236 (-2.538)	-0.352 (-6.350)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.463	0.499	0.153	0.600	0.203	0.216
Incremental R ²	+0.136	+0.113	+0.095	+0.062	0.137	+0.088
Observations	241	241	241	241	241	241

D.5 Pre-COVID period

Throughout the paper we use the sample period 1999:11 to 2023:03. In Table D.5 we limit the sample period up until Covid i.e 1999:11 to 2020:01. The coefficients and adjusted R-squared in Table D.5 are slightly stronger compared to the main sample reported in Table 2, Panel B. This is consistent given the large macroeconomic shock in the dependent variables around March 2020. Figure D.5 as an example, highlights the volatility introduced by extending the sample period past 2020.

Table D.5: **Pre-COVID sample**

Panel A mirrors Table 2, Panel B, in the main manuscript. Panel B reports the same specification but uses a sample period ending in January 2020.

<i>Panel A.</i>	Forecast horizon: h = 3m					
	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
ΔS_t^{Loan}	-0.356 (-4.528)	-0.327 (-4.598)	-0.242 (-3.553)	-0.112 (-1.962)	-0.278 (-5.383)	-0.304 (-7.362)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.343	0.671	0.283	0.383	0.138	0.577
Incremental R ²	+0.154	+0.245	+ 0.03	-0.022	+0.083	+0.139
Observations	241	241	241	241	241	241

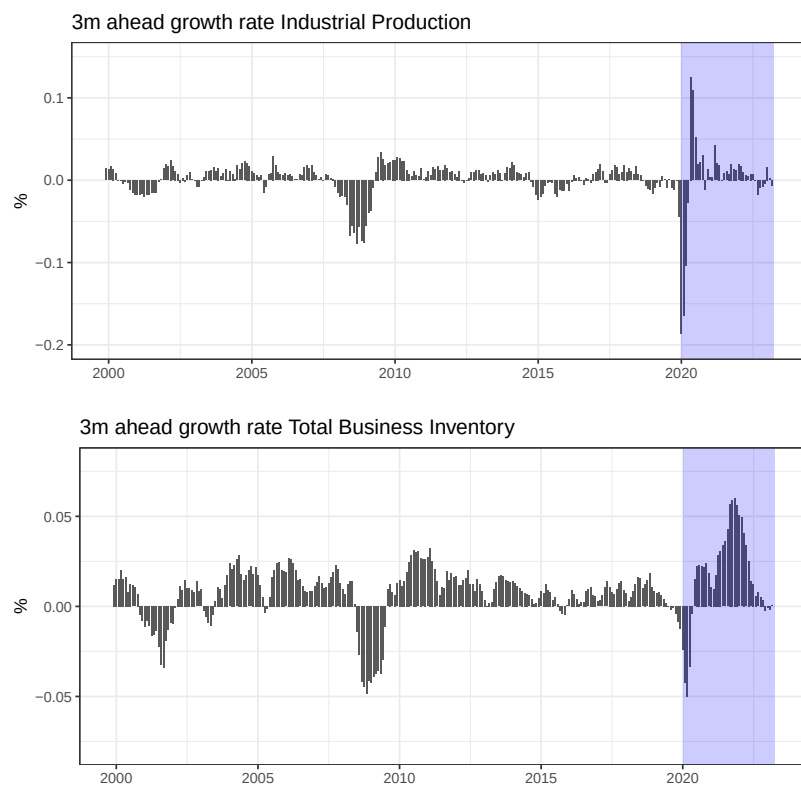


Figure D.5: **Dependent variable across the sample period**

D.6 Alternative variables

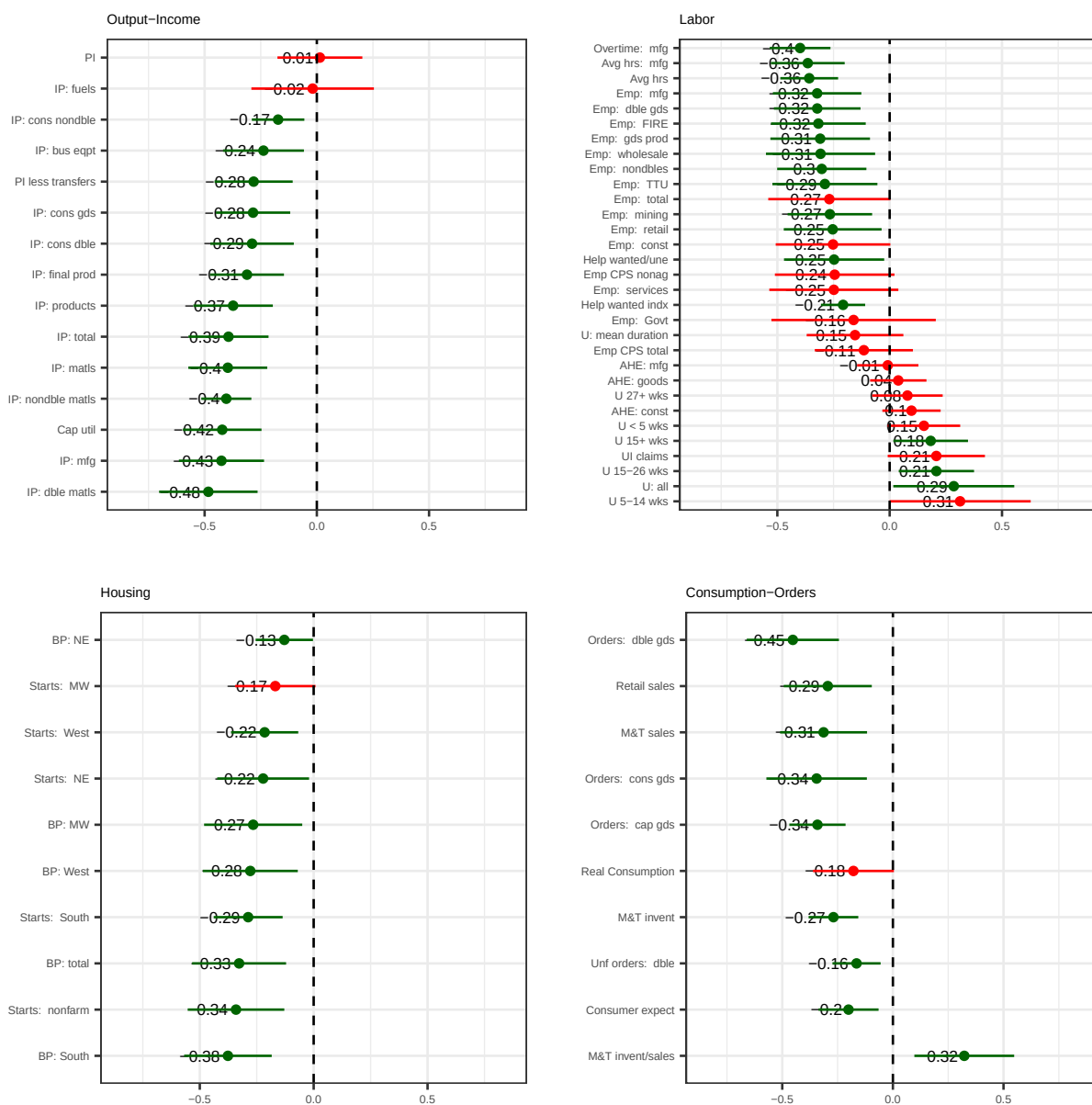


Figure D.6: **Other macroeconomic indicators**

This figure plots the coefficient on the loan spread across a range of macroeconomic variables from the FRED-MD dataset. The specification is the same as our baseline loan spread forecasting model (Table 2, Panel A, column 7). Variables colored green are statically significant at the 5% level. Variables are grouped by theme (Output-Income, Labor, Housing, and Consumption-Orders). The sample period is 1999:11 to 2023:03.

D.7 Robustness tests for all macroeconomic outcomes

Table D.6: **Robustness**

This table mirrors Table 3, Panel A, in the main manuscript but each panel shows robustness test for each of the six macro variables considered.

<i>Panel A.</i>	Forecast horizon: h = 3m					
	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Residual</i> ΔS_t^{Loan}	-0.393 (-4.401)	-0.390 (-4.442)	-0.286 (-3.794)	-0.194 (-2.931)	-0.364 (-4.494)	-0.359 (-5.756)
Adjusted R ²	0.150	0.180	0.169	0.592	0.173	0.200
Incremental R ²	+0.148	+0.145	+0.076	+0.035	+0.125	+0.120
<i>Panel B.</i>						
ΔS_t^{Loan}	-0.363 (-3.861)	-0.374 (-4.049)	-0.282 (-3.983)	-0.180 (-2.773)	-0.430 (-4.780)	-0.386 (-5.146)
<i>Bid-Ask</i>	-0.170 (-1.434)	-0.138 (-1.122)	0.016 (0.190)	-0.144 (-2.078)	0.281 (2.665)	0.196 (2.525)
Adjusted R ²	0.174	0.200	0.162	0.606	0.240	0.220
Incremental R ²	+0.171	+0.165	+0.070	+0.049	+0.192	+0.140
<i>Panel C.</i>						
ΔS_t^{Loan}	-0.357 (-4.458)	-0.360 (-4.634)	-0.237 (-3.432)	-0.175 (-3.043)	-0.325 (-4.497)	-0.289 (-4.533)
Δ S&P500	0.188 (2.333)	0.193 (2.502)	0.175 (3.387)	0.113 (2.370)	0.199 (3.094)	0.219 (3.878)
Adjusted R ²	0.184	0.221	0.191	0.606	0.208	0.232
Incremental R ²	+0.182	+0.185	+0.099	+0.049	+0.159	+0.152
<i>Panel D.</i>						
ΔS_t^{Loan}	-0.327 (-2.900)	-0.331 (-2.931)	-0.282 (-3.819)	-0.140 (-1.879)	-0.445 (-4.010)	-0.395 (-3.965)
Δ VIX	-0.150 (-1.304)	-0.149 (-1.292)	0.007 (0.076)	-0.140 (-2.048)	0.170 (1.338)	0.110 (1.129)
Adjusted R ²	0.166	0.201	0.162	0.606	0.192	0.195
Incremental R ²	+0.164	+0.166	+0.070	+0.049	+0.143	+0.115
<i>Panel E. Ex. 08-09</i>						
ΔS_t^{Loan}	-0.256 (-2.144)	-0.275 (-2.548)	-0.091 (-1.920)	-0.147 (-1.755)	-0.225 (-2.503)	-0.268 (-2.919)
Adjusted R ²	0.112	0.159	0.140	0.533	0.126	0.173
Incremental R ²	+0.110	+0.123	+0.047	-0.023	+0.077	+0.093
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
Observations	281	281	281	281	281	281

D.8 Impact of loan contract terms

Loan and bond contracts might be different with respect to, e.g., non-price contract terms (such as maturity, collateral and covenants and other characteristics such as size, age, and amount). To control for the impact of contract terms on loan spreads we orthogonalize loan spreads with respect to various characteristics, such as loan age, loan size, (log) loan amount, the loan’s initial all-in-drawn spread, remaining time to maturity, as well as indicators for secured loans, senior loans, and financial covenants. We run the following regression

$$\begin{aligned} \ln S_{it}[k] &= \alpha_b + \beta_1 \ln(Age) + \beta_2 \ln(Size) + \beta_3 \ln(Amt) + \beta_4 \ln(AISD) \\ &+ \beta_5 Secured(0/1) + \beta_6 Senior(0/1) + \beta_7 Covenants(0/1) + \epsilon_{it}[k]. \end{aligned} \quad (1)$$

Column 5 of Table [D.15](#) (in the ELP section below) summarizes the result of this regression. We take the residual and use it in place of our loan spread in Column (1), Panel A Table 3 of the main paper. We find that this “residual loan spread”, which controls for contract terms, has very little difference in predictive power relative to the baseline loan spread in Table 2 of the main paper.

D.9 Effects by maturity

Loans have shorter maturities (6 years) compared to bonds (11.6 years), on average. To examine if predictability varies by maturity we construct spreads for different maturity buckets. Table D.7, Panel A, below reports results for loan spreads by maturity quartile. (The table only reports results using industrial production as dependent variable, for brevity. Results using the other indicators for economic development are similar.) The predictive power is overall slightly lower for the loan spread across all maturity buckets compared to the baseline estimate. This is because the subsamples are somewhat noisier due to the reduced number of observations.

However, there is little variation in predictive power across maturity buckets. Panel B performs the same exercise for the bond market with similar conclusions.

Table D.7: **Effects by maturity**

Panel A of this table mirrors Table 2, Panel A, column 7, in the main manuscript. Columns 2 to 5 use the same specification but loan spreads are calculated separately for each loan maturity quartile. Table B of this table performs the same exercise for the bond spread (here, Table 2, Panel A, column 4, in the main manuscript is the baseline). Disaggregated bond spreads are only available from 2002 onwards, hence the shorter sample.

Forecast horizon: h = 3m					
Panel A.	IP	IP	IP	IP	IP
	Baseline	Mat. Q1	Mat. Q2	Mat. Q3	Mat. Q4
	(1)	(2)	(3)	(4)	(5)
ΔS_t^{Loan}	-0.323 (-3.414)	-0.277 (-3.298)	-0.296 (-2.836)	-0.297 (-3.513)	-0.303 (-2.828)
<i>Term Spread</i>	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓
$\Delta S_t^{Bond PC}$	✓	✓	✓	✓	✓
Adjusted R ²	0.173	0.150	0.163	0.165	0.170
Incremental R ²	+0.171	+0.147	+0.161	+0.162	+0.167
Observations	281	281	281	281	281
Panel B.	IP	IP	IP	IP	IP
	Baseline	Mat. Q1	Mat. Q2	Mat. Q3	Mat. Q4
	(1)	(2)	(3)	(4)	(5)
ΔS_t^{Bond}	-0.292 (-2.729)	-0.087 (-1.662)	-0.091 (-1.378)	-0.190 (-1.986)	-0.047 (-1.141)
<i>Term Spread</i>	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓
Adjusted R ²	0.085	-0.001	-0.0004	0.028	-0.006
Incremental R ²	+0.082	-0.004	-0.003	+0.025	-0.009
Observations	281	246	246	246	246

D.10 Economic uncertainty

Figure D.7 below shows the correlation between changes in the loan spread and various uncertainty proxies. The correlation is positive, in particular between the loan spread and the VIX. Table D.8, Panel B, reports a kitchen sink specification with all the uncertainty proxies simultaneously. The results show that even when we add in all the uncertainty proxies jointly the loan spread remains significant.

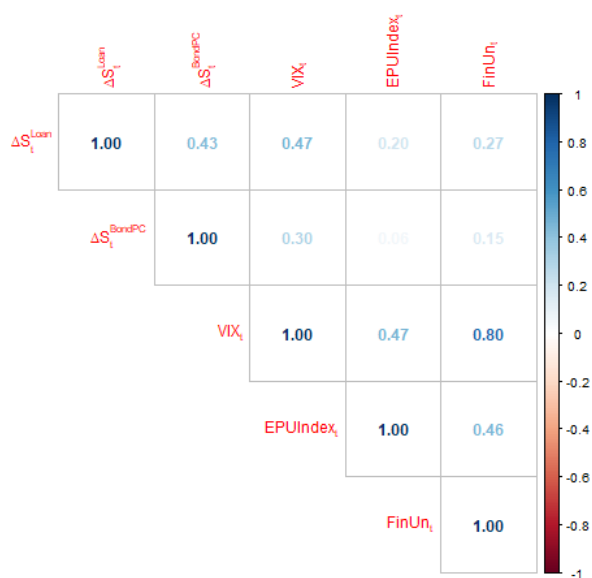


Figure D.7: **Correlation across credit spreads and uncertainty proxies**

The figure shows the cross correlations across the loan/bond spread and each proxy for uncertainty. VIX_t is the VIX (level) at time t , $EPUIndex_t$ is the Economic Policy Uncertainty (EPU) index of [Baker *et al.* \(2016\)](#), and $FinUn_t$ is the Financial Uncertainty index (3m ahead) of [Jurado *et al.* \(2015\)](#).

Table D.8: **Uncertainty proxies**

Panel A of this table mirrors Table 3, Panel A, column 4, in the main paper (but reports results for all six dependent variables). Panel B shows the same specification but includes additional uncertainty proxies in the model. VIX_t is the VIX (level) at time t , $EPUIndex_t$ is the Economic Policy Uncertainty (EPU) index of (Baker *et al.*, 2016), and $FinUn_t$ is the Financial Uncertainty index (3m ahead) of (Jurado *et al.*, 2015).

Forecast horizon: h = 3m						
<i>Panel A.</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
ΔS_t^{Loan}	-0.327 (-2.900)	-0.331 (-2.931)	-0.282 (-3.819)	-0.140 (-1.879)	-0.445 (-4.010)	-0.395 (-3.965)
VIX	-0.150 (-1.304)	-0.149 (-1.292)	0.007 (0.076)	-0.140 (-2.048)	0.170 (1.338)	0.110 (1.129)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.166	0.201	0.162	0.606	0.192	0.195
LR Test(χ^2)	25.9	27.6	19.2	10.4	31.5	37.5
Observations	281	281	281	281	281	281
<i>Panel B.</i>						
ΔS_t^{Loan}	-0.395 (-3.553)	-0.395 (-3.708)	-0.321 (-4.524)	-0.168 (-2.087)	-0.492 (-4.258)	-0.432 (-4.462)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
VIX_t	✓	✓	✓	✓	✓	✓
$EPUIndex_t$	✓	✓	✓	✓	✓	✓
$FinUn_t$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.254	0.304	0.196	0.614	0.239	0.238
Incremental R ²	+0.251	+0.269	+0.104	+0.057	+0.190	+0.159
Observations	281	281	281	281	281	281

D.11 Macro Shocks

In Table D.9 below, we use the shocks used by Boons, Ottonello and Valkanov (2023) in our baseline regression. We orthogonalize the loan spread w.r.t. each shock and use the residual. Note that, due to data availability, the sample size is smaller in Panel B and C (compared to A). Specifically, Boons *et al.* (2023) utilize three shocks; the oil supply shock from Baumeister and Hamilton (2019), the investment specific technology (IST) news shock from Zeev and Khan (2015), and the military spending shock from Ramey (2011). The oil shock is a monthly variable, with updated data available from the author's website, thus Panel A matches our sample period. The IST shock is a quarterly variable, with no updated data available. The effective sample period is 1999Q4:2012Q2. The defense spending shock is also a quarterly variable, with no updated data available. The effective sample period is 1999Q4:2015Q2. Because of the different frequencies and sample periods, we report separate

results for each shock. Despite these limitations, Table D.9 confirms that the coefficient on the (residualized) loan spread is largely unaffected, relative to the baseline results reported in Table 2 in the paper.

Table D.9: **Boons, Ottonello, and Valkanov (2023) Shocks**

Forecast horizon: h = 3m						
<i>Panel A. Oil Shock</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta S_t^{Loanresid}$	-0.289 (-2.864)	-0.292 (-3.048)	-0.239 (-2.674)	-0.161 (-2.645)	-0.310 (-3.211)	-0.282 (-4.151)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.087	0.123	0.160	0.576	0.137	0.149
Observations	280	280	280	280	280	280
<i>Panel B. IST News</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta S_t^{Loanresid}$	-0.469 (-3.911)	-0.469 (-3.327)	-0.527 (-3.931)	-0.216 (-2.971)	-0.417 (-3.779)	-0.395 (-2.932)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.500	0.529	0.221	0.628	0.205	0.381
Observations	49	49	49	49	49	49
<i>Panel C. Defense Spending News</i>	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta S_t^{Loanresid}$	-0.369 (-3.440)	-0.315 (-3.218)	-0.308 (-3.988)	0.011 (0.285)	-0.337 (-2.750)	-0.551 (-5.591)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
$\Delta S_t^{Bond PC}$	✓	✓	✓	✓	✓	✓
Adjusted R ²	0.430	0.492	0.284	0.661	0.144	0.247
Observations	57	57	57	57	57	57

D.12 Effects by rating category

Table D.10: **Robustness – bond spreads by rating category**

Forecast horizon: h = 3m					
<i>Panel A.</i>	IP	IP	IP	IP	IP
	(1)	(2)	(3)	(4)	(5)
ΔS_t^{Loan}	-0.397 (-4.585)	-0.422 (-4.540)	-0.418 (-4.337)	-0.399 (-4.685)	-0.415 (-4.327)
$\Delta S_t^{Bond-A's}$		0.045 (0.985)			0.031 (0.748)
$\Delta S_t^{Bond-BBB's}$			0.011 (0.294)		0.026 (0.747)
$\Delta S_t^{Bond-HY's}$				-0.080 (-2.032)	-0.082 (-2.084)
<i>Term Spread</i>	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓
Adjusted R ²	0.154	0.156	0.155	0.161	0.155
Observations	281	246	246	246	246
<i>Panel B.</i>	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)
ΔS_t^{Loan}	-0.425 (-4.446)	-0.288 (-3.279)	-0.233 (-3.461)	-0.385 (-4.224)	-0.318 (-4.205)
$\Delta S_t^{Bond-A's}$	0.034 (0.756)	0.015 (0.415)	0.044 (1.124)	0.021 (0.536)	0.026 (0.503)
$\Delta S_t^{Bond-BBB's}$	0.029 (0.851)	-0.016 (-0.348)	-0.004 (-0.078)	-0.027 (-0.473)	-0.056 (-1.294)
$\Delta S_t^{Bond-HY's}$	-0.082 (-2.063)	0.031 (0.626)	-0.052 (-1.523)	-0.002 (-0.042)	-0.059 (-1.499)
<i>Term Spread</i>	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓
Adjusted R ²	0.174	0.173	0.598	0.153	0.184
Observations	246	246	246	246	246

Table D.11: **Impact of loan rating**

This table mirrors Table 2, Panel B, in the main manuscript but creates a loan spread for different rating categories.

	Forecast horizon: h = 3 months					
	IP	TCU	NEW	INV	ISM-MAN	ISM-NMAN
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta S_t^{Loan}[\text{BBB}]$	-0.090 (-1.518)	-0.087 (-1.571)	-0.132 (-2.191)	-0.096 (-2.873)	-0.020 (-0.187)	-0.073 (-0.776)
Adjusted R ²	0.110	0.131	0.168	0.576	0.217	0.219
Incremental R ²	+0.107	+0.095	+0.076	+0.019	+0.169	+0.139
$\Delta S_t^{Loan}[\text{BB}]$	-0.153 (-1.608)	-0.149 (-1.589)	-0.179 (-2.937)	-0.096 (-1.885)	-0.192 (-2.275)	-0.170 (-2.432)
Adjusted R ²	0.110	0.143	0.161	0.591	0.228	0.213
Incremental R ²	+0.108	+0.107	+0.069	+0.034	+0.180	+0.133
$\Delta S_t^{Loan}[\text{B and below}]$	-0.285 (-2.695)	-0.284 (-2.718)	-0.197 (-2.415)	-0.123 (-2.048)	-0.223 (-2.675)	-0.218 (-2.935)
Adjusted R ²	0.157	0.189	0.167	0.595	0.238	0.227
Incremental R ²	+0.154	+0.154	+0.074	+0.038	+0.190	+0.147
$\Delta S_t^{Loan}[\text{Not Available}]$	-0.298 (-3.169)	-0.301 (-3.368)	-0.179 (-2.242)	-0.138 (-2.732)	-0.201 (-2.966)	-0.208 (-2.874)
Adjusted R ²	0.163	0.198	0.160	0.598	0.231	0.223
Incremental R ²	+0.161	+0.162	+0.068	+0.041	+0.182	+0.143
Controls:						
ΔS_t^{BondPC}	✓	✓	✓	✓	✓	✓
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
Observations	281	281	281	281	281	281

D.13 Europe and Industry level

Secondary market loan prices have only been available for about 20 years, which is a relatively short period for macroeconomic predictions. We therefore measure loan spreads in the cross-section of industries and countries, i.e., exploit the fact that industries and countries can have different economic cycles, for robustness.

Evidence from other countries: We start by extending our results across three of Europe’s largest economies: Germany, France, and Spain, for which we have sufficient loan-market data (coverage is too limited in other countries). We focus on manufacturing production as outcome variable. We report a baseline model, which includes only the country-specific loan spread and then add the country-specific bond spread from [Mojon and Gilchrist \(2016\)](#). Finally, we report “kitchen-sink” models that additionally include the country-specific stock market index, the European “VIX” (VSTOXX), and the loan market bid-ask spread (similar to Table 3, Panel C). Starting with Germany, we find that the loan spread adds 7.7 p.p. R^2 to a baseline model without credit spreads (see Table D.12, Panel A, column 1). The addition of the bond spread in column 2 adds only 2.7 p.p. to the R^2 . In column 3 we report the “kitchen-sink” model; the loan spread retains its predictive power. In columns 4 to 9 we find similar results for France and Spain.

Industry-level spreads: To construct a loan-spread measure at the industry level, we classify U.S. firms into industries using the Bureau of Economic Analysis (BEA) sector definitions, excluding financial and government-owned firms. Industry-level spreads, S_{bt}^{Loan} , are constructed following Section 2 of the main paper, but loan spreads are aggregated using an arithmetic average across all firms in a BEA sector b . To assess the relationship between industry-specific spreads and industry-specific macroeconomic outcomes, we use quarterly employment and establishment figures from the Bureau of Labor Statistic’s (BLS). In addition, we use quarterly industry gross output from the BEA.²

² BEA data is only available from Q1 2005 to 2021 Q4. The underlying macroeconomic data obtained from both BEA and BLS is not seasonally adjusted. We use a seasonal trend decomposition to remove any predictable monthly seasonal variation from the raw data. What remains in the de-seasonalized macroeconomic data is any underlying time trend and residual component.

The results are reported in Panel B. Column 1 starts with a model that includes the industry and aggregate loan spread in a pooled regression.³ Column 2 adds time fixed effects that absorb any common time trends. This captures variables such as aggregate credit spreads but also the stance of monetary policy, aggregate business-cycle fluctuations, or overall regulatory changes. Interestingly, industry-specific loan spreads remain highly statistically and economically significant. That is, there is significant information contained in loan spreads that is not captured by other aggregate economic factors. Column 3 includes industry fixed effects to absorb any time-invariant unobserved cross-industry differences. Again, the statistical significance and economic magnitude of industry loan spreads remains similar. In column 4, we include industry-level bond-spread measures, constructed using bond price data from TRACE, in the model. Controlling for the industry-specific bond spread has little impact on the predictive power of the industry loan-spread. In columns 5 to 8 we use establishments and output as outcome variables and find similar results.

Overall, our evidence from across U.S. industries and across Europe is consistent with the aggregate U.S. evidence. Loan spreads have significant predictive power for macroeconomic outcomes, above and beyond other credit spread measures.

³ In contrast to the aggregate forecasting regressions, we include the loan-spread level. This is because by later including industry fixed effects we effectively run a demeaned regression, i.e., we capture spread deviations from the industry mean.

Table D.12: Robustness across industries and countries

Panel A of this table relates credit spread measures to future economic outcomes across European countries. The unit of observation is the monthly level t . The sample period is 2002:03 to 2022:03 for Germany (columns 1 to 3), 2002:03 to 2022:09 for France (columns 4 to 6), and 2002:03 to 2023:03 for Spain (columns 7 to 9). The dependent variable is the three-month ahead percentage change in the country's manufacturing production index, i.e., growth from $t - 1$ to $t + 3$. Each specification includes (not shown) a one-period lag of the dependent variable, i.e., growth from $t - 2$ to $t - 1$, the term spread, i.e., the difference between 10-year Euro government bond (a GDP-weighted average of all Euro area government bonds) and three-month EURIBOR, and the real EONIA, i.e., the overnight rate minus realized inflation. Further included are the country-specific stock market index, the European "VIX" (VSTOXX), and the (country-specific) median bid-ask spread in the secondary loan market, when indicated. Incremental R^2 refers to the difference between the adjusted R^2 in the respective column and the adjusted R^2 of a baseline forecasting model with no credit spreads. S_t^{Loan} is our country-specific loan spread measure (see section 2 of the main paper for details). S_t^{Bond} is the country-specific bond spread from [Mojon and Gilchrist \(2016\)](#). Panel B of this table relates industry credit spread measures to future industry outcomes for the U.S. economy. The unit of observation is the industry-quarter level bt . The sample period is 1999:11 to 2021:12. The dependent variable in columns 1 to 4 is the one-quarter-ahead percentage change in employment for industry b , i.e., the growth from $t - 1$ to $t + 1$. The dependent variable in columns 5 and 6 is the one-quarter-ahead percentage change in establishments. The dependent variable in columns 7 and 8 is the one-quarter-ahead percentage change in gross output. Each specification includes (not reported) a one-period lag of the dependent variable, i.e., the growth from $t - 2$ to $t - 1$. The model reported in column (1) further includes the aggregate loan spread, term spread, and the real FFR (not shown). S_{bt}^{Loan} (S_{bt}^{Bond}) is an industry-specific loan (bond) spread measure (see section ?? for details). Year $\times$ quarter and industry fixed effects are included when indicated. Incremental R^2 refers to the difference between the adjusted R^2 in the respective column and the adjusted R^2 of a baseline forecasting model with no credit spread or fixed effects. Coefficients are standardized. Standard errors are clustered by industry. t-statistics are reported in parentheses.

<i>Panel A Across country</i>	Germany MAN	Germany MAN	Germany MAN	France MAN	France MAN	France MAN	Spain MAN	Spain MAN	Spain MAN
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ΔS_t^{Loan}	-0.293 (-2.226)	-0.230 (-1.827)	-0.185 (-1.575)	-0.155 (-1.518)	-0.118 (-1.627)	-0.121 (-1.775)	-0.219 (-1.730)	-0.194 (-1.704)	-0.174 (-1.525)
ΔS_t^{Bond}		-0.189 (-2.669)	-0.136 (-1.947)		-0.211 (-1.898)	-0.162 (-1.516)		-0.155 (-1.502)	-0.108 (-1.011)
<i>EU Term Spread</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>EONIA</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Bid-Ask</i>			✓			✓			✓
Δ Stock Index			✓			✓			✓
Δ VIX			✓			✓			✓
Adj R^2	0.139	0.167	0.193	0.062	0.099	0.105	0.059	0.078	0.081
Incremental R^2	+0.077	+0.104	+0.131	+0.014	+0.051	+0.056	+0.040	+0.059	+0.062
Observations	247	247	247	221	221	221	220	220	220
<i>Panel B. Across industry</i>	EMP	EMP	EMP	EMP	EST	EST	OUT	OUT	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
S_{bt}^{Loan}	-0.174 (-2.244)	-0.132 (-2.180)	-0.133 (-2.183)	-0.135 (-2.187)	-0.108 (-1.160)	-0.111 (-1.090)	-0.248 (-2.724)	-0.210 (-2.734)	
S_t^{Loan}	-0.267 (-2.737)								
S_{bt}^{Bond}				-0.057 (-2.449)		-0.104 (-2.120)		-0.085 (-2.081)	
Year $\times$ qtr fixed effects	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overall R^2	0.167	0.502	0.503	0.534	0.403	0.416	0.513	0.517	
Within R^2	-	0.049	0.048	0.081	0.115	0.130	0.044	0.053	
Incremental R^2	+0.156	+0.491	+0.492	+0.523	+0.320	+0.333	+0.510	+0.514	
Observations	1,001	1,001	1,001	880	1,001	880	744	744	

D.14 Orthogonalized spread

The correlation between the loan and bond spreads is high (0.74), albeit weaker in changes (0.47) which we use in the predictive regressions. We therefore carefully establish the loan spread’s predictive power first by comparing the predictive power across models that include different spreads instead of a joint forecasting model including all information (which might be plagued by multicollinearity issues). Further, when including loan and bond spreads jointly, we generally only use the first principal component across all bond spreads, as the different bond spreads are also highly correlated with each other.

An alternative approach is to orthogonalize the loan spread and use the residual component in the predictions. Table D.13 below, shows the results using 3-month ahead industrial production as dependent variable (results are similar for the other measures of economic development). Results using orthogonalized spreads are similar compared to the results obtained by the cross-model comparisons reported in the paper. For instance, adding the loan spread orthogonalized w.r.t. [Gilchrist and Zakrajšek \(2012\)](#)’s bond spread increases the model’s R^2 by approximately 8 p.p. (Table D.13, column 3). This is approximately equivalent to comparing the incremental R^2 of a model that just adds the loan spread to the baseline (Table D.13, column 1) and a model that just adds the bond spread (Table D.13, column 2). Here, the loan versus bond incremental R^2 difference amounts to 15.1 p.p. – 8.2 p.p. = 6.9 p.p.

Column 4 reports results that additionally include the bid-ask spread, the S&P 500 return, and the VIX in the model (i.e., the additional controls from Table 3, Panel B). While these factors add to the explanatory power of the model, the orthogonalized loan spread remains highly statistically and economically significant. Similar results can be obtained when orthogonalizing w.r.t. the Baa-Aaa spread (columns 5-6).

Table D.13: **Orthogonalized loan spread**

This table mirrors Table 2, Panel A, in the main manuscript. Column 1 (2) re-reports column 6 (5) from Table 2, Panel A, in the main manuscript, for comparison. In columns 3-4 (5-6) we report specifications that instead use the loan spread orthogonalized w.r.t. the bond spread (the Baa spread) in the forecasting regressions.

	Forecast horizon: h = 3m					
	IP	IP	IP	IP	IP	IP
	(1)	(2)	(3)	(4)	(5)	(6)
ΔS_t^{Loan}	-0.397 (-4.585)					
ΔS_t^{Bond}		-0.292 (-2.729)				
ΔS_t^{Loan} , orthog. w.r.t Bond			-0.291 (-2.618)	-0.252 (-2.342)		
ΔS_t^{Loan} , orthog. w.r.t Baa					-0.242 (-2.268)	-0.154 (-2.140)
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓
<i>Bid-Ask</i>				✓		✓
<i>SP500</i>				✓		✓
<i>VIX</i>				✓		✓
Adjusted R ²	0.154	0.085	0.081	0.171	0.056	0.141
Incremental R ²	+0.151	+0.082	+0.079	+0.168	+0.053	+0.139
Observations	281	281	281	281	281	281

D.15 Out of sample

Next, we provide indicative evidence that the loan spread's predictive power extends to out-of-sample forecasts. Out-of-sample performance is measured via an expanding window. Specifically, we start with 60 months of data and forecast the dependent variable one step ahead, i.e., over the next three-months. We then compare the forecast to the actual growth rate and calculate the forecast error. We repeat this procedure rolling forward one month at a time. This yields a vector of forecast errors across different training/testing windows that can be used for root mean squared error (RMSE) comparisons across models. We use a sample period from 1999:11 to 2020:01, due the to significant variation in dependent variables introduced by the COVID-19 shock as show in Figure D.5.

Table D.14 summarizes the results. In each panel (i.e., for each outcome) we compare three models: “Baseline” uses only TS , RFF , and a one-period lag of the dependent variable as predictors (mirroring the baseline in-sample model). “Baseline + $\Delta S_t^{Bond PC}$ ” adds the bond-spread PC. “Baseline + ΔS_t^{Loan} ” adds our loan-spread measure (but no bond spreads) to the baseline. Column (1) reports the base RMSE and column (2) the normalized RMSE

to facilitate comparisons across models with different outcome variables.

Consistently across all macro variables, the model with the loan spread returns the lowest RMSE. Column (3) reports a t-test for the difference in the mean RMSE between the model that uses the bond-spread PC and the loan spread model. Despite the relatively short sample period, for four out of the six dependent variables the RMSE is statistically lower for the loan-spread model compared to the bond-spread model at the 10% significance level or lower. Again, the evidence is consistent but somewhat weaker for the more-persistent employment measures. Overall, the results indicate that the loan spread adds predictive power above and beyond other credit-spread measures, in and out-of-sample.

Table D.14: **Out-of-sample**

This table computes the out of sample performance of each forecasting regression. The unit of observation is the monthly level t . The sample period is 1999:11 to 2020:01. The dependent variable in Panel A is the three-month-ahead percentage change in industrial production (IP) i.e., the growth from $t - 1$ to $t + 3$. Panel B uses total industrial capacity utilization (TCU), Panel C uses new orders for capital goods (ex. defence) (NEW), Panel D uses total business inventories (INV), Panel E uses ISM manufacturing (ISM-MAN) and Panel F uses ISM non-manufacturing (ISM-NMAN). Column (1) calculates the out of sample RMSE via cross validation using a rolling window and a one step ahead horizon. Within each panel we compare three models: “Baseline” contains only one-period lag of the dependent variable, i.e., growth from $t - 2$ to $t - 1$, the term spread, i.e., the difference between 10-year and three-month U.S. Treasury, and the real FFR, i.e., the effective federal funds rate minus realized inflation. “Baseline + PC Bond spreads” adds the first principal component extracted from $\Delta S_t^{Baa-Aaa}$, ΔS_t^{HY-AAA} , and ΔS_t^{Bond} , and “Baseline + S_t^{Loan} ” uses S_t^{Loan} . Normalized CV RMSE, scales the CV RMSE by the standard deviation of the dependent variable in order to compare across panels. Column (3) is a t-test of a difference in the mean RMSE between “Baseline + PC Bond spreads” and “Baseline + S_t^{Loan} ”

	OOS horizon: h = 3 month		
	CV RMSE	Normalized CV RMSE	$T - stat(p - value)$
	(1)	(2)	(3)
<i>Panel A. IP</i>			
Baseline	0.0125	0.7033	-
Baseline + $\Delta S_t^{Bond PC}$	0.0125	0.7027	-
Baseline + ΔS_t^{Loan}	0.0113	0.6359	-2.836(0.005)
<i>Panel B. TCU</i>			
Baseline	0.9751	0.6807	-
Baseline + $\Delta S_t^{Bond PC}$	0.9775	0.6823	-
Baseline + ΔS_t^{Loan}	0.9009	0.6289	2.482(0.014)
<i>Panel C. NEW</i>			
Baseline	0.1036	0.7878	-
Baseline + $\Delta S_t^{Bond PC}$	0.1031	0.7839	-
Baseline + ΔS_t^{Loan}	0.0985	0.7493	-1.773(0.085)
<i>Panel D. INV</i>			
Baseline	0.0098	0.5158	-
Baseline + $\Delta S_t^{Bond PC}$	0.0097	0.5142	-
Baseline + ΔS_t^{Loan}	0.0092	0.4838	-1.652(0.100)
<i>Panel E. ISM-MAN</i>			
Baseline	3.5860	0.7343	-
Baseline + $\Delta S_t^{Bond PC}$	3.3507	0.6861	-
Baseline + ΔS_t^{Loan}	3.3923	0.6946	-0.38(0.703)
<i>Panel F. ISM-NMAN</i>			
Baseline	2.7997	0.70853	-
Baseline + $\Delta S_t^{Bond PC}$	2.5973	0.6573	-
Baseline + ΔS_t^{Loan}	2.5542	0.6464	0.5479(0.583)

D.16 Loan vs bond spread dynamics

Section 4.3 of the main paper discusses the forecasting power at various forecast horizons in a local projection framework. Specifically, Figure 5 of the main paper plots the coefficient and 95% confidence intervals on the loan spread at various forecasting horizons (1 to 12 months ahead) using each of our dependent variables. In Figure D.8 we repeat this exercise, but add in the first bond PC, and again plot the coefficient on the loan spread. Therefore, Figure D.8 highlights the forecasting power of the loan spread at various forecasting horizons, above and beyond the bond market.

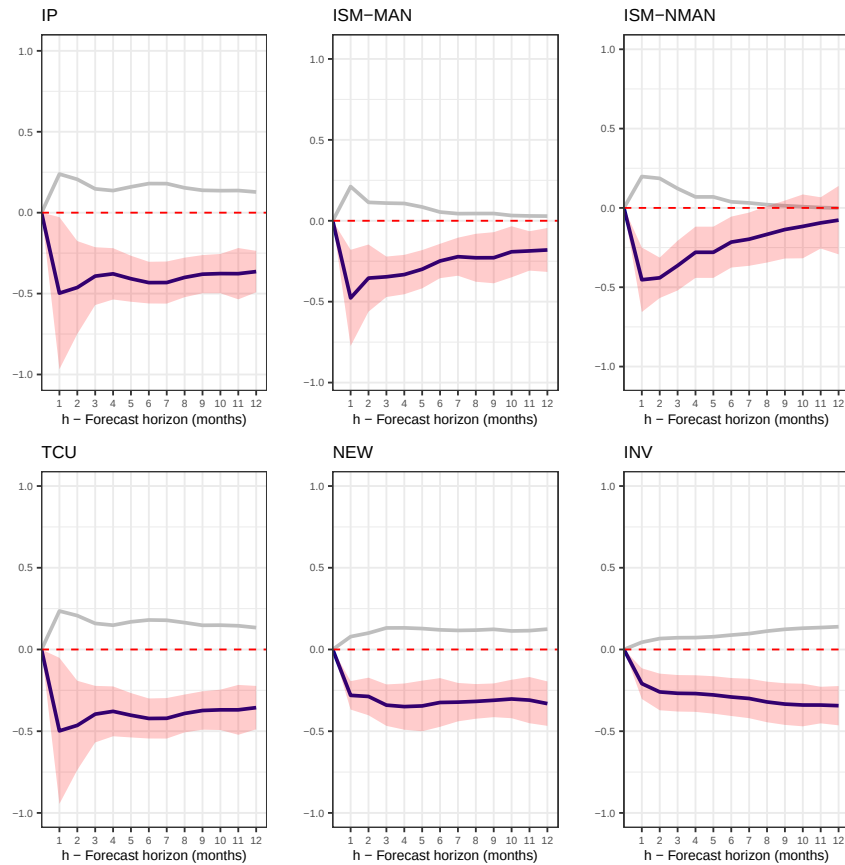


Figure D.8: **Local Projections and Incremental R-squared**

This figure plots the impulse response function using a [Jordà \(2005\)](#) local projections framework (blue line) and the incremental adjusted R^2 (black line). In each figure, the dependent variable is the h-month ahead growth in the macro variable. Each specification includes the bond spread PC. The x-axis indicates the forecast horizon (in months). The coefficient, at each forecast horizon, for the loan spread is in blue. Shaded areas indicate 95% confidence intervals. The gray line is the incremental adjusted R^2 at each forecast horizon, defined as the difference between a model with the loan spread and a baseline model with no credit spreads. The sample period is 1999:11 to 2023:03.

D.17 Excess loan premium

We follow [Gilchrist and Zakrajšek \(2012\)](#) and decompose the loan spread into two components: a component that captures changes in default risk based on the fundamentals of a firm or differences in contractual terms and a residual component that captures the price of risk above a default risk premium. We source estimates for firm level distance-to-default (DtD) from NUS-CRI, which estimates DtD based on an adjusted [Merton \(1974\)](#) model.⁴

Decomposition: To isolate the portion of the loan spread driven by variation in the expected default of the firm or contractual terms, we regress the natural logarithm of the loan spread of loan k on the firm level distance-to-default ($\overline{DD}_{it}$), if available, otherwise we use the average distance-to-default across all firms in the industry in the respective month ($\overline{DD}_{bt}$) in it's place. We further include a squared term ($\overline{DD}_{it/bt}^2$) to capture a possible non-linear effect of DD on loan spreads, as well as the volatility of DD across firms in the industry (σDD_{bt}). We run the following regression

$$\ln S_{it}[k] = \alpha_b + \beta_1 \overline{DD}_{it/bt} + \beta_2 \overline{DD}_{it/bt}^2 + \beta_3 \sigma DD_{bt}^2 + \gamma' Z_{it}[k] + \epsilon_{it}[k]. \quad (2)$$

Table [D.15](#) shows the results of these regressions. Column (1) begins by including only the DD regressors. As expected, a higher DD reduces loan spreads and the positive coefficient on $\overline{DD}_{it/bt}^2$ is consistent with a non-linear effect. Column (2) then adds a vector of loan-level control variables ($Z_{(it)}[k]$), including the (log) loan amount, the (log) age of the issue and (log) AISD. Column (3) further includes a dummy variable indicating whether the loan includes financial covenants, is a secured loan, and is senior. The signs of the coefficients are as expected: larger loans or those that are secured have lower loan spreads (although the secured effect is not statistically significant). Loans with a higher initial spread (AISD) also trade at higher spreads in the secondary market. The coefficients for the covenant and seniority indicators are insignificant. Loan terms have considerable explanatory power

⁴ The CRI database, the Credit Research Initiative of the National University of Singapore, available at: <http://nuscri.org>. See CRI documentation for details.

Table D.15: **Decomposing the loan spread**

This table shows the results of the loan spread decomposition based on [Gilchrist and Zakrajšek \(2012\)](#). The dependent variable is the loan spread for facility i at time t . $\overline{DD}_{bt}$ is the firm level distance-to-default (if available), otherwise we use the average distance-to-default across all firms in the industry in the respective month ($\overline{DD}_{bt}$) in it's place. $\overline{DD}_{bt}^2$ is the distance to default squared. σDD_{bt} is the volatility of DD_{bt} across firms in the same industry. $AISD$ is the all-in-spread-drawn measured in basis points. Age is measured as the time elapsed since the loan is first reported in Dealscan. $Amount$ is measured as the par amount of the loan at issuance. $Covenants$ is a dummy variable that equals 1 if the loan contract includes covenants. $Secured$ is a dummy variable that equals 1 if the loan is secured by collateral. $Senior$ is a dummy variable that equals 1 if the loan is senior. t-statistics, based on time and loan clustered standard errors, are reported in parentheses.

<i>Panel A. Decomposing loan spreads</i>					
	(1)	(2)	(3)	(4)	(5)
$\overline{DD}_{bt}$	-0.139 (-19.070)	-0.174 (-24.820)	-0.173 (-25.000)	-0.166 (-25.140)	
$\overline{DD}_{bt}^2$	0.004 (6.727)	0.007 (12.490)	0.007 (12.600)	0.007 (12.600)	
σDD_{bt}	-0.038 (-6.482)	-0.095 (-21.900)	-0.095 (-22.340)	-0.092 (-24.010)	
$Ln(AISD)$		0.709 (34.180)	0.715 (31.770)	0.579 (21.860)	0.665 (28.610)
$Ln(Age)$		0.070 (28.110)	0.070 (28.140)	0.060 (28.040)	0.078 (29.970)
$Ln(Amount)$		-0.107 (-14.970)	-0.107 (-14.820)	-0.107 (-16.250)	-0.102 (-13.790)
$Secured(0/1)$			-0.033 (-1.326)	-0.004 (-0.156)	0.030 (1.161)
$Covenants(0/1)$			0.013 (0.851)	0.016 (1.130)	0.044 (2.808)
$Senior(0/1)$			0.027 (0.320)	0.033 (0.791)	0.029 (0.640)
Loan type fixed effects	No	No	No	Yes	No
Industry fixed effects	No	No	No	Yes	No
Rating fixed effects	No	No	No	Yes	No
Adjusted R^2	0.054	0.396	0.396	0.457	0.314
Observations	258,496	256,965	256,965	256,965	256,965

for spreads increasing the adjusted R^2 to about 34%. Column (4) further includes fixed effects for loan type, borrower industry, and loan rating category. The main results remain unchanged. We use the results from column 4 to calculate the predicted loan spread as

$$\hat{S}_{bt}^{Loan} = \exp \left[\hat{\beta}_1 \overline{DD}_{it/bt} + \hat{\beta}_2 \overline{DD}_{it/bt}^2 + \hat{\beta}_3 \sigma DD_{bt}^2 + \hat{\gamma}' Z_{it}[k] + \frac{\hat{\sigma}^2}{2} \right] \quad (3)$$

The predicted component of the loan spread $\hat{S}_{it}[k]$ reflects the fundamental default risk of firm i . We also aggregate the predicted component across all firms and obtain an aggregate time series $\hat{S}_t^{Loan}$. The residual loan spread, in the spirit of [Gilchrist and Zakrajšek \(2012\)](#)'s *excess bond premium*, is then defined as the difference ($Residual\ Loan\ Spread_t = S_t^{Loan} - \hat{S}_t^{Loan}$), i.e., the part of the loan spread that cannot be explained by default risk or contract

terms.

To show the robustness of our ELP results w.r.t different spread decomposition models, we implement an alternative model. The key ingredient of the decomposition is the proxy for firm default risk. In the baseline specification we use the issuers' distance-to-default (DTD) following [Gilchrist and Zakrajšek \(2012\)](#). An alternative measure of firm default risk is the issuer's CDS spread. The CDS spread might be a more timely measure compared to DTD. Because entity level CDS are available for only a select number of borrowers, we again construct CDS spreads at the industry level and use CDS spreads in place of DTD in calculating our ELP. The correlation between ELP from CDS and ELP from DTD is 0.76. We repeat our baseline forecasting regressions using this alternative ELP definition. [Table D.16](#) reports our baseline result using DTD in Panel A, and the alternative decomposition using CDS in Panel B. Results are similar across both measures.

Table D.16: Alternative credit-spread decomposition

Panel A of this table mirrors Table 5, Panel A, in the main paper. Panel B reports the same model but uses issuer CDS spreads instead of DTD in the credit spread decomposition.

	Forecast horizon: h = 3 month					
	IP	PEMP	UE	TCU	NEW	INV
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A. Using DTD (baseline)</i>						
ΔELP_t	-0.251 (-2.892)	-0.254 (-3.104)	-0.191 (-2.523)	-0.113 (-2.118)	-0.248 (-3.501)	-0.213 (-3.215)
$\Delta \hat{S}_t^{Loan}$	-0.157 (-1.590)	-0.185 (-1.902)	-0.037 (-0.565)	-0.098 (-1.944)	-0.028 (-0.294)	-0.023 (-0.307)
Adjusted R ²	0.159	0.201	0.175	0.603	0.254	0.234
Observations	272	272	272	272	272	272
<i>Panel B. Using CDS</i>						
ΔELP_t	-0.324 (-3.375)	-0.319 (-3.410)	-0.224 (-2.967)	-0.164 (-3.138)	-0.267 (-3.857)	-0.238 (-3.587)
$\Delta \hat{S}_t^{Loan}$	0.016 (0.150)	-0.010 (-0.099)	0.051 (0.852)	0.027 (0.656)	-0.017 (-0.236)	0.066 (0.796)
Adjusted R ²	0.176	0.193	0.185	0.615	0.236	0.243
Observations	267	267	267	267	267	267
Controls in Panel A-B:						
<i>Term Spread</i>	✓	✓	✓	✓	✓	✓
<i>FFR</i>	✓	✓	✓	✓	✓	✓

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