Debt Flexibility

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Motivation and research question

Syndicated loans are highly state-contingent (”flexible”) securities
[Roberts, Sufi, 2009; Chodorow-Reich, Falato, 2022; Lee, 2024]

- Ex-ante (covenants, performance pricing)
- Ex-post (restructuring)

Do banks provide the same flexibility for single-lender loans?
[Boot, Thakor, 2000; Berger, Udell 2006]

- Traditional “relationship lending” view: yes
- But direct empirical evidence on flexibility in SME lending is limited
- Important for capital structure, investment

Contribution and findings

Contribution: Use new data source—the Y14—to study flexibility of syndicated and single-lender loans

Large banks lending to smaller businesses

Also covers on-balance sheet portion of syndicated loans

Loan $\times$ quarter data $\implies$ can measure changes in maturity, interest rate, commitments

Findings:

1. High loan modification rates overall
2. Relative to syndications, single-lender loans are less likely to be modified

$\therefore$ Lending is "arm's length" to smaller businesses, but "relationship" in syndicated market

3. Modification rates respond to distress, performance pricing, & covenant violations
   but most modifications occur outside of these events
4. Modifications involve monitoring costs that don't scale with loan size

Relation to the literature

Debt renegotiation

Bolton and Scharfstein (1996); Kiyotaki and Moore (1998); Diamond and Rajan (2001); Garleanu and Zwiebel (2009); Roberts and Sufi (2009); **Roberts (2015)**; Zhong (2021); Glode and Opp (2023)

Contribution: Creditor dispersion need not imply less flexibility

Covenants in debt contracts

Smith and Warner (1979); Beneish and Press (1993); Chava and Roberts (2008); Roberts and Sufi (2009); Nini, Smith and Sufi (2009, 2012); Murfin (2012); Bradley and Roberts (2015); Berlin, Nini and Yu (2019); Griffin, Nini, Smith (2023); **Chodorow-Reich and Falato (2022)**

Contribution: Loan modifications frequent even outside of covenant violations

Relationship lending

Leland and Pyle (1977); Diamond (1984, 1991); Boot and Thakor (2000); Berger and Udell (1995, 1998, 2002. 2006); Cole, Goldberg, and White (2004); **Berger, Miller, Petersen, Rajan, and Stein (2005)**; Bolton, Freixas, Gambacorta and Mistulli (2016); Papoutsi (2021); Li and Strahan (2021); **Faria-e-Castro, Paul, and Sánchez (2023)**

Contribution: Flexibility more prevalent in syndicated markets than in SME lending relationships

1. Sample construction

Summary statistics at origination

[Sources]

	# loans	# firms	Amount ($mn) Mean	Amount ($mn) p50	Spread (bps) Mean	Spread (bps) p50	Maturity (y) Mean	Maturity (y) p50	% fixed rate	% secured	% public
All loans	391k	152k	15.4	3.0	170	175	5.5	5.0	31%	86%	17%
Single-lender	287k	143k	7.1	2.0	162	175	5.8	5.0	40%	90%	8%
Syndicated	103k	16k	38.4	17.4	189	175	4.6	5.0	6%	72%	45 %

Note : "Spread" is the spread reported by the bank if floating-rate, or the spread over the three-month LIBOR if fixed rate.

Relative to syndications, single-lender loans are

- smaller
- more likely to be fixed rate
- more likely to be secured

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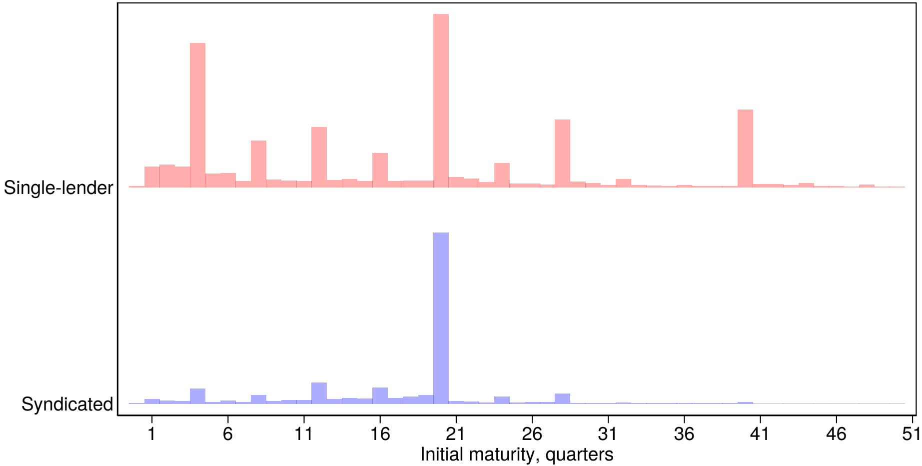
Maturity at origination



One-year maturity at origination is more frequent for single lender loans

because of prevalence of short-term credit lines

[Evidence]

2. Basic facts about debt flexibility

How frequent are modifications?

	# loans	# modifications					
		0	1+	1	2	3	4+
All loans	391k	58%	42%	17 %	8%	5%	12%
Single-lender	287k	63%	37%	16%	7%	4%	9%
Syndications	103k	44%	56%	18%	12%	8%	19%

Note : A modification is defined as a change in either maturity or spread. Modifications to amount committed or security without modifications to maturity dates or spreads are very infrequent in the sample (10 % and 15 %, respectively).

Loan modifications

- change in spread or maturity from t to $t+1$
- occur for $\sim$ 40% of loans
- are $\sim$ 50% more likely for syndications than for single-lender loans

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What happens during modifications?

	# loans	% modified	% with modification to:			
			spread	maturity	amount	security
At least 1 term modified	391k	42%	54%	53%	10%	5%
Loans with at least 1 term modified						
Single-lender	287k	37%	39%	70%	11%	5%
Syndications	103k	56%	82%	22%	9%	4%

Note : A modification is defined as a change in either maturity date or interest rate spread. % modified refers to the share of loans that experience at least one modification. Most (95%) maturity modifications in the sample are extensions.

Relative to syndications, modifications of single-lender loans are

- more likely to involve a maturity extension
- less likely to involve an interest rate change

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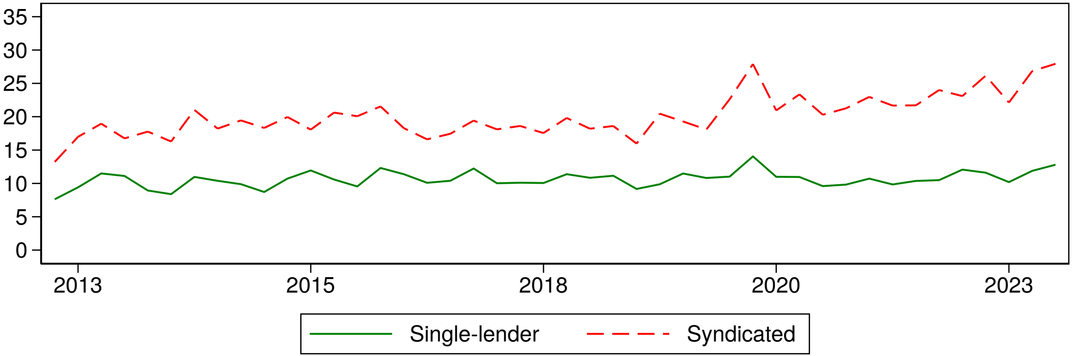
Loan modification rates over time, percent



Maturity extensions and interest rate changes by loan type

[Hazard functions]

	$\mathbf{1}\{\text{Modification}\}_{l,b,k,t}$			$\mathbf{1}\{\text{Maturity extension}\}_{l,b,k,t}$			$\mathbf{1}\{\text{Interest rate change}\}_{l,b,k,t}$		
$\mathbf{1}\{\text{Syndication}\}_l$	9.8	9.0	6.3	−3.6	−1.6	−2.1	13.4	10.3	8.0
	(0.23)	(0.29)	(0.35)	(0.10)	(0.17)	(0.21)	(0.23)	(0.26)	(0.31)
mean rate	13.2%	15.0%	17.6%	6.5%	7.2%	4.8%	7.9%	9.3%	14.3%
lender × quarter f.e.	✗	✓	✓	✗	✓	✓	✗	✓	✓
sector × quarter f.e.	✗	✓	✓	✗	✓	✓	✗	✓	✓
borrower × quarter f.e.	✗	✗	✓	✗	✗	✓	✗	✗	✓
maturity at orig. f.e.	✗	✓	✓	✗	✓	✓	✗	✓	✓
loan controls	✗	✓	✓	✗	✓	✓	✗	✓	✓
borrower controls	✗	✓	✗	✗	✓	✗	✗	✓	✗
bor. with SL & SD loans	✗	✗	✓	✗	✗	✓	✗	✗	✓
# obs	3927k	1791k	967k	3927k	1791k	967k	3927k	1791k	967k
# loans	391k	234k	112k	391k	234k	112k	391k	234k	112k
# borrowers	155k	83k	6k	155k	83k	6k	155k	83k	6k

Note : Loan-quarter sample. Standard errors clustered by loan and quarter in parentheses. [Controls]

Mechanisms

Flexibility and bankruptcy

	# borrowers	# loans	% no change	% change before	% change during	% change after
Full sample	147k	359k	58%			
Matched to bankruptcy data	1k	22k	61%	12%	14%	14%
Full sample						
Single-lender	135k	271k	63%			
Syndication	12k	88k	43%			
Matched to bankruptcy data						
Single-lender	1k	10k	72%	9%	10%	9%
Syndication	0k	12k	51%	15%	16%	18%

Note : 33647 firms have non-missing assets in the bankruptcy data; of these, 1503 can be matched to Y14 firms. Modification and renegotiation rates are expressed as a fraction of all loans outstanding for each group of firms.

For firms matched to the bankruptcy data

- modification rates are lower than average
- modifications occur before, during, and after the bankruptcy

∴ flexibility is exercised outside of bankruptcy *even* for firms that go through it

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Deteriorations in internal loan ratings

	$\mathbf{1}\{\text{Modification}\}_{l,b,k,t}$		$\mathbf{1}\{\text{Maturity extension}\}_{l,b,k,t}$		$\mathbf{1}\{\text{Interest rate change}\}_{l,b,k,t}$	
$D^{(-)}_{l,t}$	4.7	1.7	4.1	1.1	1.4	1.1
	(0.26)	(0.55)	(0.23)	(0.36)	(0.15)	(0.46)
$D^{(-)}_{l,t} \times \mathbf{1}\{\text{Syndication}\}_l$	1.8	1.1	−2.6	0.3	4.2	0.85
	(0.48)	(0.63)	(0.30)	(0.40)	(0.45)	(0.54)
mean rate	15.0%	17.4%	6.8%	4.8%	9.6%	14.0%
lender × quarter f.e.	✓	✓	✓	✓	✓	✓
sector × quarter f.e.	✓	✓	✓	✓	✓	✓
borrower × quarter f.e.	✗	✓	✗	✓	✗	✓
maturity at orig. f.e.	✓	✓	✓	✓	✓	✓
loan f.e.	✓	✓	✓	✓	✓	✓
borrower controls	✓	✗	✓	✗	✓	✗
borrowers w/ SL & SD loans	✗	✓	✗	✓	✗	✓
# obs	2559k	1050k	2559k	1050k	2559k	1050k
# loans	275k	114k	275k	114k	275k	114k
# borrowers	83k	7k	83k	7k	83k	7k

Note : Loan-quarter sample. Standard errors clustered by loan and quarter in parentheses. $D^{(-)}_{i,t}$ is an indicator function that is equal to 1 if and only if the loan experiences a decline in internal rating from $t-1$ to t. A decline in internal rating is associated with a deterioration in credit quality.

Evergreening: avoid default by offering favorable credit terms

	# loans	# obs	% distressed	Modification		Mat. extension		IR change	
				% distr.	% not distr.	% distr.	% not distr.	% distr.	% not distr.
All loans	391k	$3,927$k	3.56%	1.71%	11.47%	1.00%	5.21%	1.05%	6.90%
Single-lender	287k	$2,920$k	3.64%	1.50%	9.17%	1.11%	6.00%	0.70%	3.80%
Syndications	103k	$1,007$k	3.33%	2.31%	18.15%	0.67%	2.92%	2.07%	15.88%

Note : Financial distress is defined as a deterioration in internal credit rating. The fractions reported under "Modification", "Mat. extension", and "IR change" add up to the total fraction of loan-quarter observations that are modified, received a maturity extension, or experienced a change in interest rates.

Modifications are not necessarily associated with financial distress

- majority of maturity extensions happen outside of financial distress - $\neq$ evergreening [Sánchez et al., 2023]
- majority of interest rate changes happen outside of financial distress

$\therefore$ flexibility is used primarily outside of financial distress episodes

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				% distr.	% not distr.	% distr.	% not distr.	% distr.	% not distr.
All loans	391k	3, 927k	3.56%	1.71%	11.47%	1.00%	5.21%	1.05%	6.90%
Single-lender	287k	2, 920k	3.64%	1.50%	9.17%	1.11%	6.00%	0.70%	3.80%
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Covenants and Modifications - Loan-level data

[merge details] [loan-quarter]

	# modified	# not modified	# total
only violated & waived	1,065	238	1,303
only violated & enforced	93	22	115
both waived & enforced	206	32	238
never violated	2,389	883	3,272
total	3,753	1,175	4,928

Note : Loan sample of syndicated loans located in Y14 and SNC. Tests are at loan level so numbers in table core refer to the loan 'ever' experiencing event.

73% of merged loans that are modified never undergo a covenant violation

- though 85% of loans that violate covenants are modified [Roberts and Sufi, 2009]
- magnitude of modifications is substantial and in the direction of relief

Performance Pricing - Loan-level data

[merge details] [loan-level]

	$\mathbf{1}\{\text{Modification}\}_{l,t}$			$\mathbf{1}\{\text{Maturity extension}\}_{l,t}$			$\mathbf{1}\{\text{Interest rate change}\}_{l,t}$		
$\mathbf{1}\left\{\begin{array}{c}\text{Syndication,}\\\text{no Dealscan merge}\end{array}\right\}_l$	9.9	9.1	6.8	−3.6	−1.6	−2.0	13.6	10.4	8.4
	(0.24)	(0.29)	(0.36)	(0.10)	(0.17)	(0.23)	(0.23)	(0.26)	(0.32)
$\mathbf{1}\left\{\begin{array}{c}\text{Syndication,}\\\text{Dealscan merge,}\\\text{no performance pricing}\end{array}\right\}_l$	10.4	7.7	7.0	−3.7	−2.7	−2.1	14.3	9.8	8.7
	(0.37)	(0.42)	(0.40)	(0.15)	(0.23)	(0.25)	(0.37)	(0.37)	(0.36)
$\mathbf{1}\left\{\begin{array}{c}\text{Syndication,}\\\text{Dealscan merge,}\\\text{performance pricing}\end{array}\right\}_l$	4.6	4.7	4.7	−3.8	−3.2	−2.9	8.0	7.0	6.7
	(0.40)	(0.50)	(0.48)	(0.19)	(0.29)	(0.32)	(0.38)	(0.44)	(0.44)
mean rate	13.2%	15.0%	15.2%	6.5%	7.2%	5.2%	7.9%	9.3%	11.4%
lender × quarter f.e.	✗	✓	✓	✗	✓	✓	✗	✓	✓
sector × quarter f.e.	✗	✓	✓	✗	✓	✓	✗	✓	✓
maturity at orig. f.e.	✗	✓	✓	✗	✓	✓	✗	✓	✓
loan controls	✗	✓	✓	✗	✓	✓	✗	✓	✓
borrower controls	✗	✓	✗	✗	✓	✗	✗	✓	✗
borrower × quarter f.e.	✗	✗	✓	✗	✗	✓	✗	✗	✓
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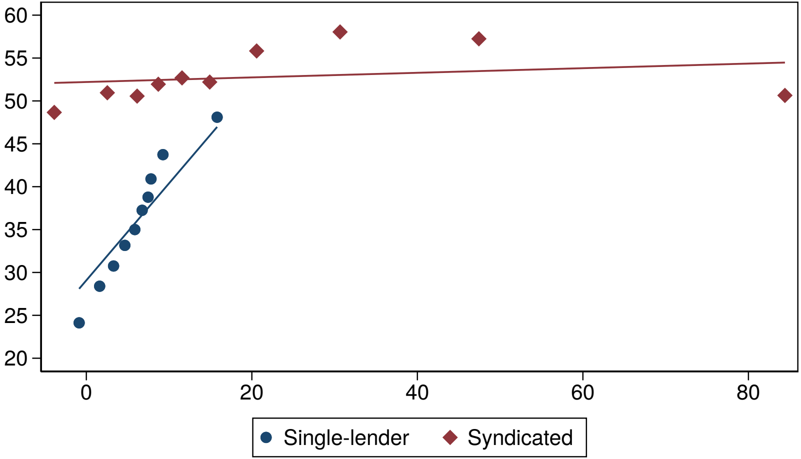
# borrowers	155k	83k	36k	155k	83k	36k	155k	83k	36k

Note : Loan-quarter sample. Standard errors clustered by loan and quarter in parentheses. [Controls]

Modification rates (percent) and loan size ($ mn)

[More]



Note : Each point is a decile of the distribution of initial loan commitments. The binscatterplots also control for lender-time, sector-time, and maturity at origination fixed effects.

Cost of Monitoring

	% Single-lender (SL) loans	% Syndicated (SD) loans
No audit	42.9%	5.3%
Audit	30.7%	21.1%
No financials update	13.9%	1.85%
Financials update	59.6%	24.6%

Modifications could require information sharing to monitor the value of loans

Relative to syndications, single-lender loans are

- less likely to have financials updated (81% vs. 93%)
- half as likely to be audited

Conclusion

[Re-originations] [Renewals]

Key findings

1. Relative to syndications, single-lender loans are **less likely to be modified**

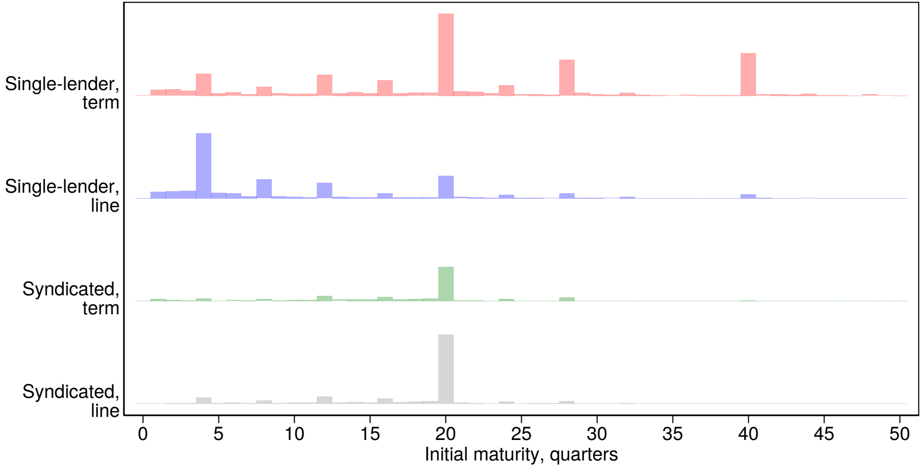
$\therefore$ "arm's length" lending to small firms, but "relationship" lending in syndicated market

2. The **types** of modifications differ; interest rate changes much more likely for syndications
3. Modifications not driven distress or by ex ante provisions like covenants or performance pricing
4. Modifications involve monitoring costs that don't scale with loan size

More

Loans modifications over time: term vs. lines

[Back]



Syndication

[Back]

Syndication

`participationflag` (34) not equal to 1 for the last observation of a given loan. `participationflag` equal to 1 means that the credit facility is neither participated or syndicated among other financial institutions nor part of the SNC.

Defining modifications

[Back]

Maturity

Change in `maturitydate` (19), the last date upon which the funds must be repaid, inclusive of extension options that are solely at the borrower's discretion, and according to the most recent terms of the credit agreement.

Spreads

For non-fixed rate loans, change in `interestratespread` (40). For fixed rate loans, change in `interestrate` (38) provided the loan is not fully drawn and the interest rate is not equal to zero.

Amounts

We do not primarily focus on changes in amounts because of the difficulty in distinguishing amortizations from reductions in commitments. However, we record a modification of the amount when `committedexposure` (24) increases by more than 10% over the quarter.

Sources

[Back] [Other sources]

FR Y14-Q H.1

- Commercial loans $\geq$ \$1 mn held by stress-tested bank holding companies
- $\approx$ 50% - 70% of all commercial loans, 2011 to present
- Loan $\times$ quarter observations
  - loan terms: commitment, interest rate, collateral, maturity
  - borrower financials: balance sheets, income statement, internal rating
  - syndications [Definition]

Additional sources

- Bankruptcy data
  - match using TIN, name, and location
- Shared National Credit (SNC) Program
  - covenant maintenance information for (random) subsample of syndicated loans

Comparison to existing data sources on loan renegotiation

[Back]

Alternative data sources

- Dealscan [Roberts and Sufi, 2009]
- SNC [Falato and Chodorow-Reich, 2020]
- hand-collected credit agreements [Roberts, 2015]

Advantages

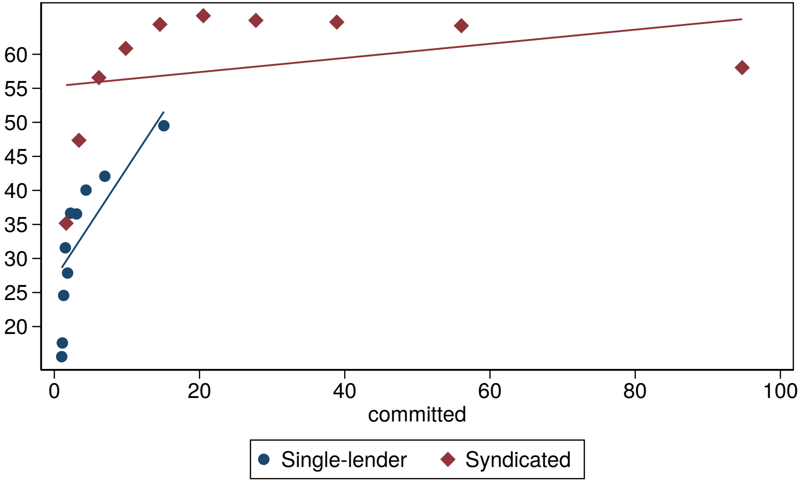
- borrowers include private, smaller firms
- directly compare syndications with single-lender loans
- observe loan terms after origination
- focus on debt flexibility during and outside of distress [Faria-e-Castro, Paul, and Sánchez (2023)]

Drawbacks

- limited information on covenants

Modification rates (percent) and size ($ mn), no borrower fixed effects

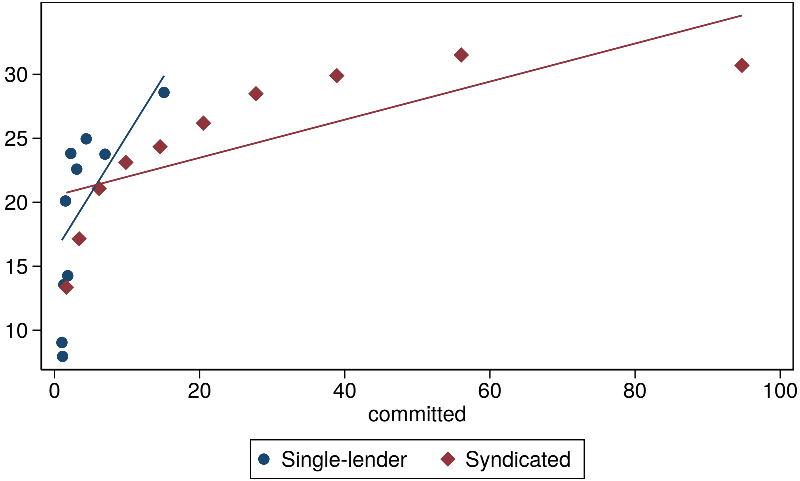
[Back]



Note : Each point is a decile of the distribution of initial loan commitments.

Loan renegotiation rates and size, no borrower fixed effects

[Back]



Note : Each point is a decile of the distribution of initial loan commitments.

Controls

[Back]

Firm

- debt to assets
- net income to assets
- number of banking relationships
- bond market access
- age of banking relationship
- number of relationship loans
- bankruptcy flag
- public company

Loan

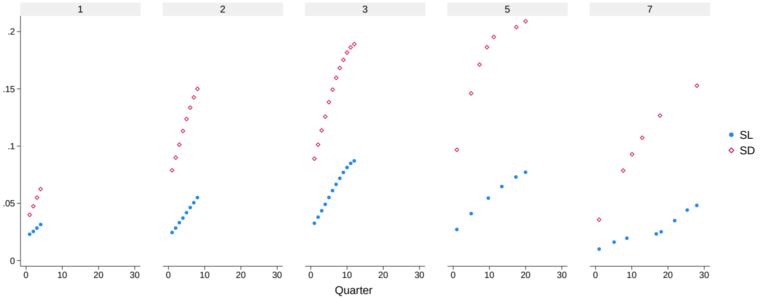
- initial maturity
- maturity remaining
- interest rate spread
- loan size
- secured

Macro

- Real GDP growth
- PCE inflation

The timing of loan modifications: interest rates

[Back]



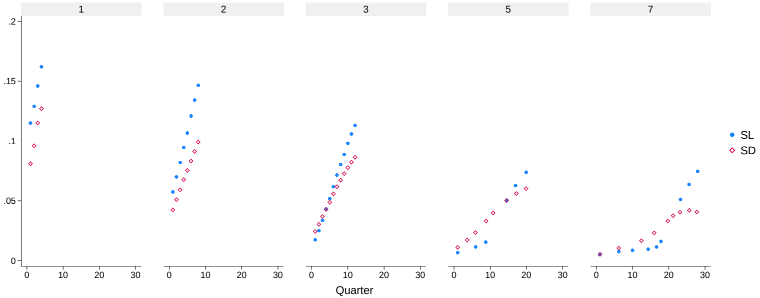
Each panel reports non-parametric estimates of the hazard function by initial maturity:

$$h_t = \sum_{q=0}^{t} \frac{M(t-q)}{N(t-q)} - \sum_{q=0}^{t-1} \frac{M(t-1-q)}{N(t-1-q)}$$

where $M(t)$ is the # of loans modified t quarters after origination, and $N(t)$ is the number of active loans t quarters after origination.

The timing of loan modifications: maturity extensions

[Back]



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where $M(t)$ is the # of loans modified t quarters after origination, and $N(t)$ is the number of active loans t quarters after origination.

Covenant violations: Y14-SNC merge

[back]

	SNC sample ∩ Y14				SNC sample			
	p25	p50	p75	mean	p25	p50	p75	mean
Loan size ($ mn)	16.5	44.0	120.6	95.3	70.0	198.8	500.0	459.8
Facilities per loan (#)	1	2	3	2	4	8	17	50
Mat. at orig. (quart.)	16	20	20	18	15	20	20	22
# participants	31, 472				30, 184			
# loans	14, 603				24, 870			
# facilities	38, 122				30, 184			
% term loans	32				–			
% fixed rate	6				–			
% public	50				–			

Shared National Credit program (SNC)

- Annual/bi-annual frequency, $20 million to $100 million reporting threshold
- SNC loan is the entire syndication vs. Y14 loan is a facility
- SNC subsample has syndications that are larger on average, but otherwise comparable to the Y14

Covenants, modifications and renegotiations - Loan$\times$quarter-level data

[back]

	# modified	# not modified	# total
only violated & waived	707	452	1,159
only violated & enforced	55	45	100
both waived & enforced	77	62	139
never violated	915	1750	3,665
total	2754	2309	5,063

Quarters during which loans undergo a modification are generally unrelated to covenant violation

though covenant violation quarters are associated with loan modifications

Performance Pricing - Y14 Dealscan merge

[back]

	# loans	% loans with interest rate change	% loans with maturity extension
Panel A: Syndicated (SD) loans in Y14 ∩ Dealscan			
All loans			
No performance pricing clause	5284	51%	26%
Performance pricing clause	2674	39%	26%
t-test for diff. in means		(10.15)	(0.55)
Panel B: All syndicated (SD) loans in Y14			
Not in Dealscan	95885	50%	22%
In Dealscan, no performance pricing clause	5284	51%	26%
t-test for diff. in means w.r.t. SD loans not in Dealscan		(-2.72)	(-7.03)
In Dealscan, performance pricing clause	2674	39%	26%
t-test for diff. in means w.r.t. SD loans not in Dealscan		(10.16)	(-4.44)

Performance Pricing - Loan-level

[back]

	$\mathbf{1}\{\text{At least one interest rate change}\}_l$				
$\mathbf{1}\left\{\begin{array}{c}\text{Performance}\\ \text{pricing}\end{array}\right\}_l$	-10.91	-9.56	-10.94	-11.90	4.11
	(1.179)	(1.187)	(1.148)	(1.210)	(1.763)
lender f.e.	✓	✗	✗	✗	✗
sector f.e.	✗	✓	✗	✗	✗
maturity at orig. f.e.	✗	✗	✓	✗	✗
orig. date f.e.	✗	✗	✗	✓	✗
borrower f.e.	✗	✗	✗	✗	✓
# loans	7958	7896	7949	7958	6317

What happens during re-origination?

[back]

		Origination		Modification at re-origination				
		all	re-orig.	% modif.	% incr.	mean incr.	% decr.	mean decr.
Spread (bps)	All loans	167	171	13%	7%	66	6%	-73
	Single-lender	158	157	14%	8%	63	6%	-83
	Syndications	189	201	12%	6%	73	6%	-51
Maturity (y)	All loans	5.5	3.9	52%	51%	1.9	2%	-2.7
	Single-lender	5.9	3.7	54%	53%	1.7	2%	-3.1
	Syndications	4.5	4.3	49%	47%	2.3	2%	-1.6

Note : A renegotiation is either a renewal of the credit agreement, or a re-origination of a new or restated credit agreement.

Loan re-originations

- $\sim$ 80 % of re-originations coincide with a modification
- Generally lead to a maturity extension [Sánchez et al., 2023]

How frequent are re-originations?

[back]

	# loans	# events					
		0	1+	1	2	3	4+
All loans							
Modifications	391k	58%	42%	17%	8%	5%	12%
Re-originations	391k	91%	9%	6%	2%	1%	1%
Re-originations							
Single-lender	287k	91%	9%	5%	2%	1%	1%
Syndications	103k	90%	10%	7%	2%	1%	1%

Note : A re-origination is a new or restated credit agreement.

Renegotiations $\subseteq$ Modifications

re-originations usually (80%) involve a modification, 10% of modifications coincide with re-originations

Unconditionally, loan re-originations

occur for $\sim$ 10% of loans

Re-originations by loan type

[back]

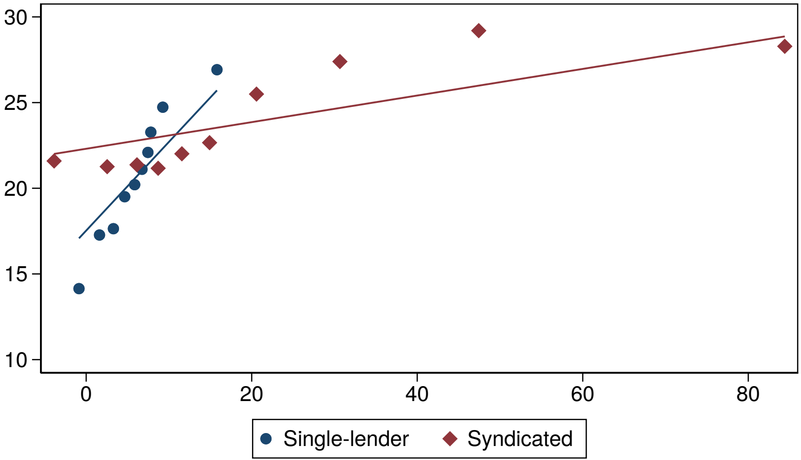
	$\mathbf{1}\{\text{Re-originations}\}_{i,t}$		
$\mathbf{1}\{\text{Syndication}\}_{l}$	0.2 (0.06)	0.2 (0.09)	0.4 (0.1‘)
mean rate	1.4%	1.7%	1.4%
lender × quarter f.e.	✗	✓	✓
sector × quarter f.e.	✗	✓	✓
borrower × quarter f.e.	✗	✗	✓
maturity at orig. f.e.	✗	✓	✓
loan controls	✗	✓	✓
borrower controls	✗	✓	✗
borrowers with SL and SD loans	✗	✗	✓
# obs	2639k	1171k	662k
# loans	289k	167k	84k
# borrowers	120k	60k	5k

Note : Loan-quarter sample. Standard errors clustered by loan and quarter in parentheses.

Re-originations are more likely among syndications, consistent with modifications

Renegotiation rates (percent) and loan size ($ mn)

[back]



Note : Each point is a decile of the distribution of initial loan commitments. The binscatterplots also control for lender-time, sector-time,

What happens during renewal?

[back]

		Origination		Modification at re-origination				
		all	re-orig.	% modif.	% incr.	mean incr.	% decr.	mean decr.
Spread (bps)	All loans	167	164	10%	6%	72	4%	-70
	Single-lender	158	152	10%	6%	75	4%	-77
	Syndications	189	193	10%	6%	62	4%	-53
Maturity (y)	All loans	5.5	4.9	52%	51%	1.6	1%	-2.6
	Single-lender	5.9	4.7	55%	54%	1.4	1%	-3.0
	Syndications	4.5	5.3	45%	43%	2.0	1%	-1.6

Note : a renewal is a renewal of the credit agreement.

Loan renewals

- $\sim$ 60 % of renewals coincide with a modification
- Generally lead to a maturity extension

[Sánchez et al., 2023]

Renewals by loan type

[back]

	$\mathbf{1}\{\text{Renewals}\}_{i,t}$		
$\mathbf{1}\{\text{Syndication}\}_l$	-0.4	0.6	0.5
	(0.13)	(0.09)	(0.15)
mean rate	3.4%	3.4%	1.9%
lender × quarter f.e.	✗	✓	✓
sector × quarter f.e.	✗	✓	✓
borrower × quarter f.e.	✗	✗	✓
maturity at orig. f.e.	✗	✓	✓
loan controls	✗	✓	✓
borrower controls	✗	✓	✗
borrowers with SL and SD loans	✗	✗	✓
# obs	2639k	1171k	662k
# loans	289k	167k	84k
# borrowers	120k	60k	5k

Note : Loan-quarter sample. Standard errors clustered by loan and quarter in parentheses.

Renewals are more likely among syndications, consistent with re-originations modifications

composition effect due to single-lender, one-year credit lines being disproportionately more likely to be renewed at maturity