Who Needs Banks?

Sabrina Ben Saïd[1] Cyril Monnet[2] Erwan Quintin[1]

[1]University of Wisconsin – Madison
[2]University of Bern and Gerzensee Center

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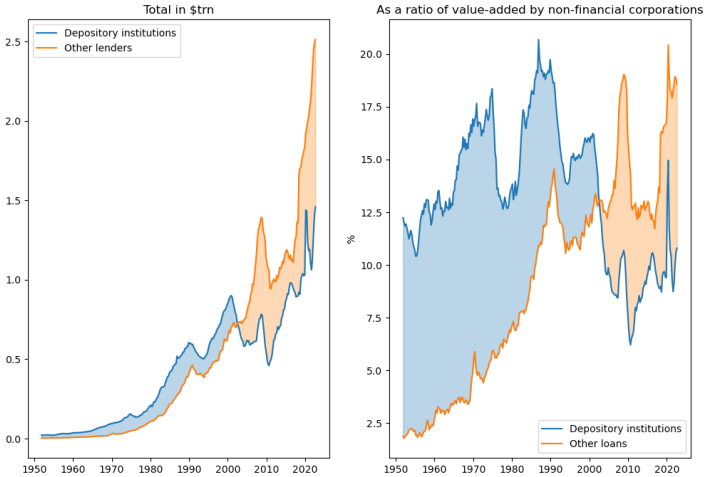
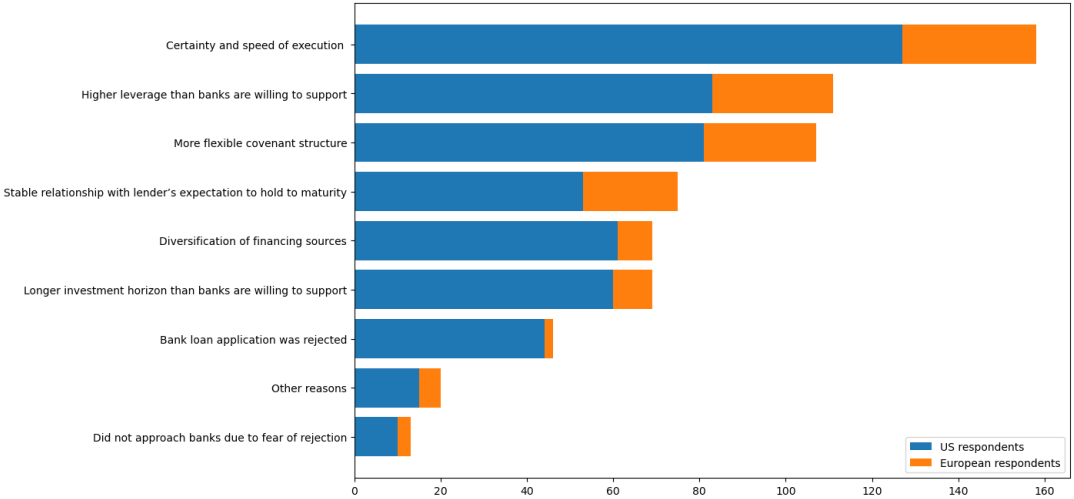
Motivation

- Non-bank lenders to corporations have overtaken banks (non-bank lenders)(details)



Sources: Flow of Funds and FRED

Speed of execution matters



Block et. al (2023), Becker Friedman Institute

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- We provide empirical support for this prediction

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- We provide empirical support for this prediction
- Loan closing time differences of the order of a few weeks, alone, generate long and protracted transitions

Our story for the secular transition

1. Until roughly 1980, banks dominated because of the cost of fund advantage they enjoyed
2. The erosion of that advantage started a transition towards a new steady state in which non-banks are now the dominant lender in corporate markets
3. That transition was accelerated by regulatory shocks post-2008

Comparison to Buchak, Matvos, Piskorski, and Seru, 2024

- BMPS also study the secular decline in on-balance-sheet private lending by banks
- Key drivers (they say):
  1. A “demand” shift towards “informationally insensitive banks”
  2. Shift away from deposits (small)
  3. Regulation (after 2008)
- We propose a fundamental explanation for the secular rise of underwriting-light loans
- An explanation that rationalizes risk segmentation

The Environment

- Time runs continuously and forever
- The economy contains a mass one of borrowers and a large mass of lenders
- All agents are risk-neutral, discount future flows at rate ρ...
- ... and have access to a risk-free storage technology with continuous return ρ as well

Borrowers

- Borrowers die at a geometric rate of $\sigma > 0$ and are replaced by new borrowers
- Borrowers are born with a project of success probability $p \in [0, 1]$ drawn from a distribution μ **which only they observe**
- Activation requires a unit of capital, which they must borrow from a lender
- Approaching lenders entails a fixed effort cost $c > 0$
- If activated, the project is successful with probability p and, in that case only, produces $y > 0$ until the borrower dies
- Instead of operating a project, borrowers can earn $w > 0$ each instant

Lenders

- Lenders choose from a menu of underwriting policies of different intensity $\{\lambda_i > 0 : i = 1, \ldots n\}$ and success rate $\{\theta_i \in [0, 1] : i = 1, \ldots n\}$
- Two normalizations:
  1. $\lambda_1 = +\infty$ but $\theta_1 = 0$.
  2. $\lambda_n < +\infty$ and $\theta_n = 1$.
- Fund projects by issuing perpetuities that earn $\{r_i > 0 : i = 1, \ldots n\}$
- r_i falls weakly with i

What is a bank?

- We think of lenders who opt for the tightest underwriting policy as banks
- Our banks have access to potentially cheaper funds, like depository institutions do
- And like depository institutions, they must have careful underwriting standards in place

Loan contracts

- Lenders post a menu of loan payments for each underwriting policy $i \in \{1, n\}$;
- Borrowers of each private type $p \in [0, 1]$ choose which type of lender to approach;
- Once the verification process completes:
  1. Borrower type is revealed with probability θ_i
  2. A unit of capital is installed
  3. Payment $q \in \{q_{i,t}(p) : p \in [0, 1], \bar{q}_{i,t}\}$ is made until the project dies

Value of approaching a bank

$$
\begin{aligned}
V_t^n(p) &= \int_0^{+\infty} \lambda_n e^{-(\lambda_n+\rho+\sigma)s} \left\{ p\frac{y - q_{n,t}(p)}{\sigma+\rho} + (1-p)\frac{w}{\sigma+\rho} \right\} ds - c \\
&= \frac{\lambda_n}{\lambda_n+\rho+\sigma} \left\{ p\frac{y - q_{n,t}(p)}{\sigma+\rho} + (1-p)\frac{w}{\sigma+\rho} \right\} - c. \qquad (1)
\end{aligned}
$$

Value of approaching a non-bank

$$V_t^i(p) = \frac{\lambda_i}{\lambda_i + \rho + \sigma} \left\{ p \frac{y - (\theta_i q_{i,t}(p) + (1 - \theta_i)\bar{q}_{i,t})}{\sigma + \rho} + (1 - p)\frac{w}{\sigma + \rho} \right\} - c.$$

Equilibrium

Loan terms, lender beliefs, occupational/funding decision rules for borrowers, and lending decisions by lenders such that, taking all terms as given:

1. Lenders maximize their profits;
2. Lenders' beliefs are consistent with borrower decision rules;
3. Borrowers maximize their expected lifetime income;
4. The market for each loan type clears.

Case $n = 2$

Borrowers approach a non-bank if

$$p\frac{y - q_1}{\sigma + \rho} + (1 - p)\frac{w}{\sigma + \rho} > \frac{\lambda_2}{\lambda_2 + \rho + \sigma}\left\{p\frac{y - \frac{r_2}{p}\left(1 + \frac{\sigma}{\rho}\right)}{\sigma + \rho} + (1 - p)\frac{w}{\sigma + \rho}\right\}.$$

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Borrowers with $p \geq \underline{p}$ approach a non-bank

Loan terms

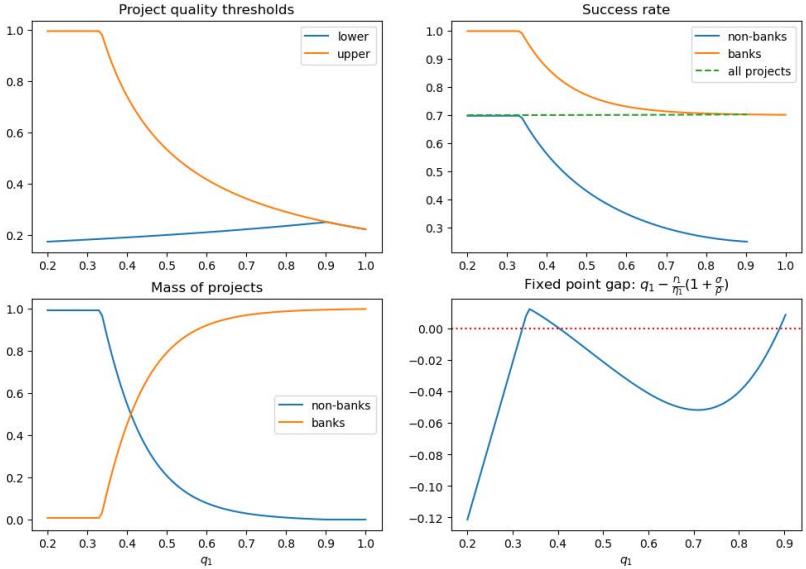
- Given free entry,

$$q_{n,t}(p) = \frac{r_n}{p}\left(1 + \frac{\sigma}{\rho}\right)$$

- As for non-banks,

$$q_1 = \frac{r_1}{\eta_1}\left(1 + \frac{\sigma}{\rho}\right) \text{ with } \eta_1 \equiv \frac{\int_{\underline{p}}^{\bar{p}} p d\mu}{\mu([\underline{p}, \bar{p}])}$$

Equilibrium direct loan terms



Endogenous distribution of borrower types

- Borrowers and their project are in one of four possible states:
  1. funded by non-banks
  2. funded by banks
  3. under verification
  4. abandoned

- The associated transition rate matrix is:

$$
\begin{array}{c}
 \\
\text{(non-bank funded)} \\
\text{(bank funded)} \\
\text{(verification)} \\
\text{(abandoned)}
\end{array}
\begin{array}{c}
\begin{array}{cccc}
\text{(non-bank funded)} & \text{(bank funded)} & \text{(verification)} & \text{(abandoned)}
\end{array} \\
\begin{bmatrix}
-\sigma(1-\delta_1) & 0 & \sigma\delta_2 & \sigma(1-\delta_1-\delta_2) \\
\sigma\delta_1 & -\sigma & \sigma\delta_2 & \sigma(1-\delta_1-\delta_2) \\
\sigma\delta_1 & \lambda\eta_2 & -\lambda-\sigma(1-\delta_2) & \sigma(1-\delta_1-\delta_2)+\lambda(1-\eta_2) \\
\sigma\delta_1 & 0 & \sigma\delta_2 & -\sigma(\delta_1+\delta_2)
\end{bmatrix}.
\end{array}
$$

The general case

Condition 1 $\frac{\lambda_i}{\lambda_i+\rho+\sigma}\theta_i r_i$ is non-decreasing in i.

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Proposition

Under condition 1, a stationary equilibrium exists in which borrower policies are characterized by thresholds $0 \leq \underline{p}_1 \leq \underline{p}_2 \leq \ldots \underline{p}_n \leq 1$ *such that borrowers of type p do not approach any lender if* $p < \underline{p}_1$ *and, otherwise, approach a lender of type i such that* $p \in [\underline{p}_i, \underline{p}_{i+1})$. *distribution.*

Cross-sectional predictions

Corollary

In any equilibrium with assortative matching in which both banks and non-bank lenders are active,

1. *Bank loans carry a lower rate than non-bank loans and are less likely to fail than non-bank loans;*
2. *Producers with a bank loan earn more than producers with non-bank-loans;*
3. *Producers earn more than non-producers (i.e. than borrowers who choose not to activate their project).*

Macro predictions

Corollary

Once a non-bank lending option is introduced, at any stationary equilibrium in which both types of lenders are active and relative to the bank-only equilibrium:

1. *More borrowers choose to operate a project and aggregate output rises;*
2. *Bank market share, default rates, and charge-off rates all fall.*

Quantitative experiments

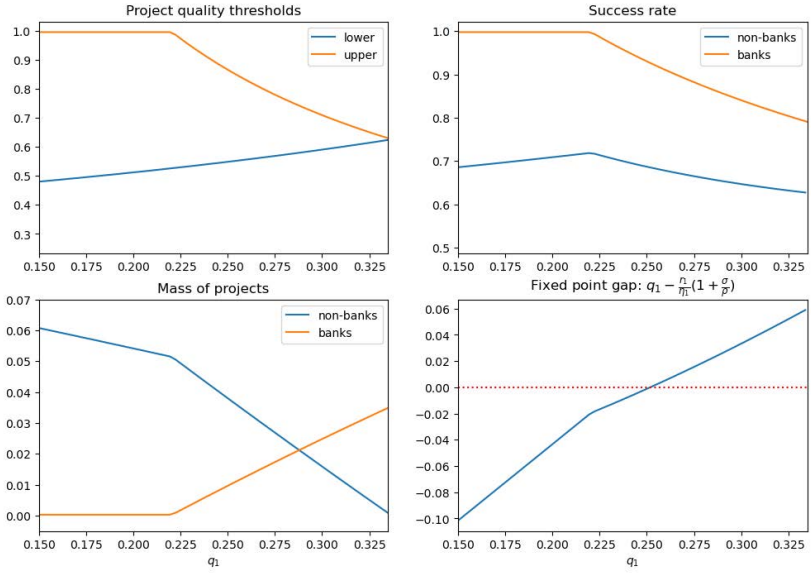
- Pre-1980 initial steady state: cost advantage is 150bps, bank market share is around 70%
- We trace the transition between this initial steady state and the final steady state once the cost advantage falls to 75bps

Parameters selected jointly

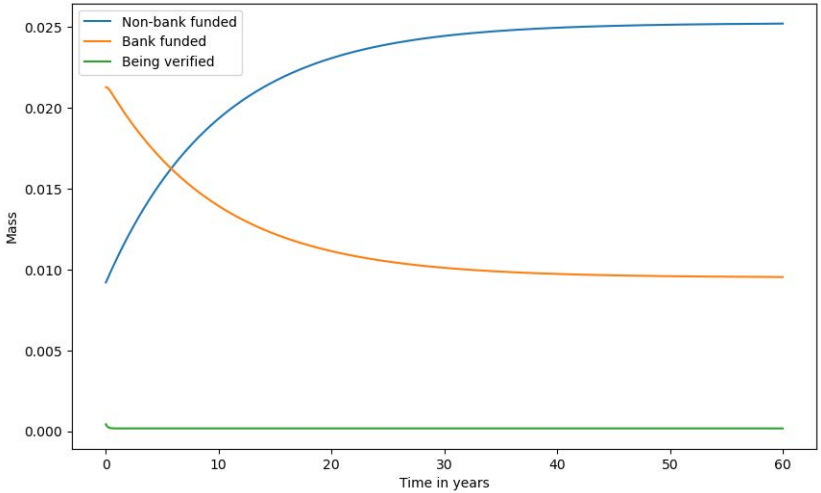
Parameter	Description	Value	Target	Data	Model
Benchmark					
λ	Verification speed	6.00	E(verification time in months)	2.00	2.00
w	Wage of non-producers	2.05	Producer income premium	35.00%	35.43%
c	Cost of approaching a lender	2.57	Fraction of producer	3.50%	3.48%
l	Location of type distribution	-3.11	Banks' charge-off rate	0.82%	0.81%
Slow verification					
λ	Verification speed	8.67	E(verification time in months)	1.50	1.50
w	Wage of non-producers	2.06	Producer income premium	35.00%	35.80%
c	Cost of approaching a lender	3.16	Fraction of producer	3.50%	3.55%
l	Location of type distribution	-2.60	Banks' charge-off rate	0.82%	0.79%
Fast verification					
λ	Verification speed	4.80	E(verification time in months)	2.50	2.50
w	Wage of non-producers	2.04	Producer income premium	35.00%	34.65%
c	Cost of approaching a lender	2.21	Fraction of producer	3.50%	3.57%
l	Location of type distribution	-3.30	Banks' charge-off rate	0.82%	0.80%

other parameters

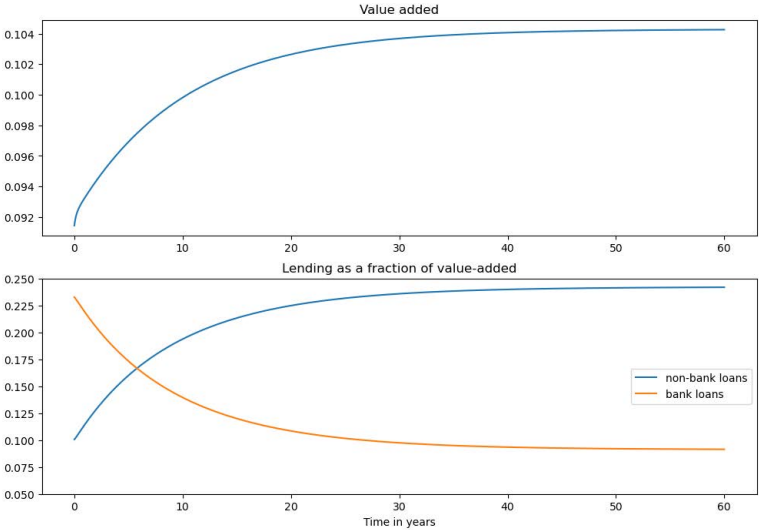
Funding policies



Transition


Non-bank funded
Bank funded
Being verified
0.025
0.020
0.015
0.010
0.005
0.000
Mass
0
10
20
30
40
50
60
Time in years

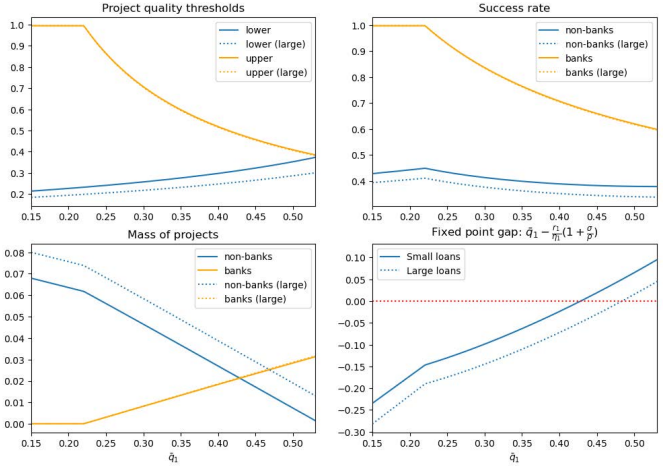
Value added


Value added
0.104
0.102
0.100
0.098
0.096
0.094
0.092
0
10
20
30
40
50
60
Lending as a fraction of value-added
0.250
0.225
0.200
0.175
0.150
0.125
0.100
0.075
0.050
non-bank loans
bank loans
Time in years

Long-term impact of non-bank lending

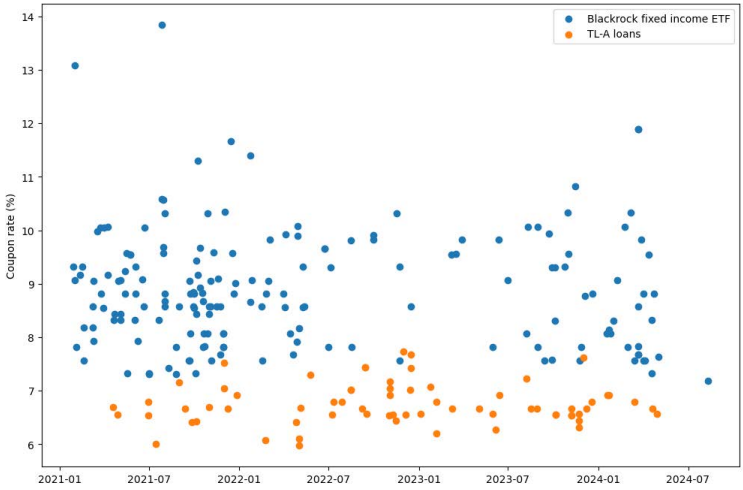
Aggregate statistic	Banks only	Banks and non-banks	Change
$\lambda_n = \mathbf{6.00}$			
Value added (x100)	8.10	10.44	+28.89%
Fraction of producers	2.70	3.48	+28.89%
Bank charge-off rates	2.74	0.81	-70.43%
Producer income premium	37.08	35.43	-4.45%
Share of non-bank loans	0.00	72.56	NA
$\lambda_n = \mathbf{8.67}$			
Value added (x100)	8.85	10.65	+20.34%
Fraction of producers	2.95	3.55	+20.34%
Bank charge-off rates	1.91	0.79	-58.64%
Producer income premium	36.54	35.80	-2.98%
Share of non-bank loans	0.00	60.94	NA
$\lambda_n = \mathbf{4.80}$			
Value added (x100)	7.92	10.71	+35.23%
Fraction of producers	2.64	3.57	+35.23%
Bank charge-off rates	3.25	0.80	-75.38%
Producer income premium	36.79	34.65	-5.82%
Share of non-bank loans	0.00	77.66	NA

Size segmentation



- Large borrowers rely on banks more than small borrowers

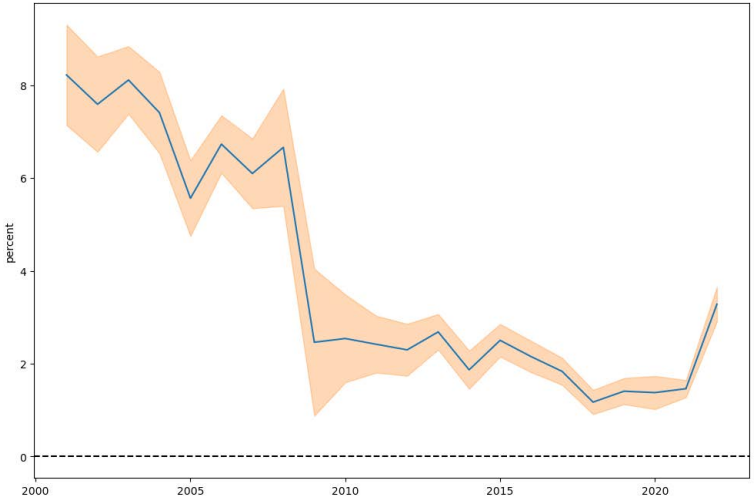
Do non-bank lenders specialize in risky loans?



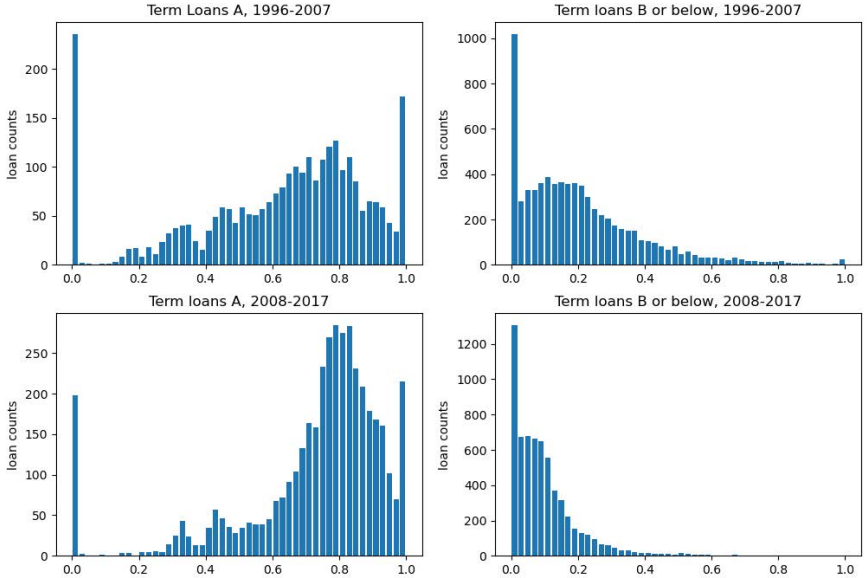
Private credit vs leveraged loans, sample year (2013)

	Count	Mean	Median	SD	Min	Max
Private credit loans						
Spread (QM, percent)	379	7.56	7.25	2.87	0.40	17.00
Loan amount ($m)	379	21.73	8.25	37.23	0.01	265.00
Revolver	379	0.09	0.00	0.29	0.00	1.00
Secured	206	0.98	1.00	0.14	0.00	1.00
Maturity (months)	206	64.49	61.00	20.05	5.00	180.00
Leveraged loans						
Spread (QM, percent)	948	4.28	3.75	1.87	1.38	14.00
Loan amount ($m)	948	524.96	315.00	635.79	2.00	7,600.00
Revolver	948	0.50	0.00	0.50	0.00	1.00
Secured	65	0.97	1.00	0.17	0.00	1.00
Maturity	65	74.43	81	14.42	33.00	96.00

Coefficient on private credit dummy



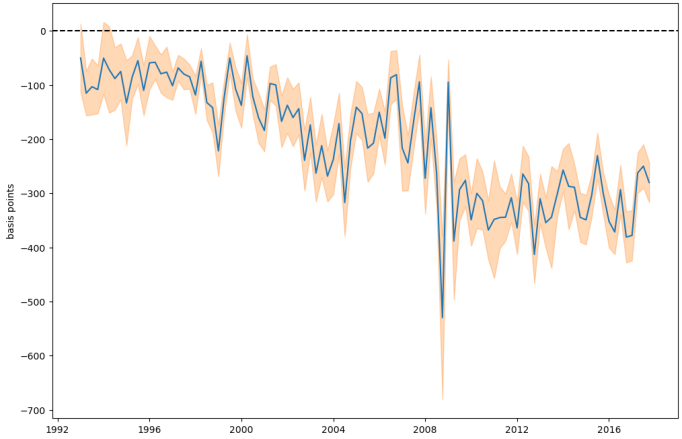
Syndicated loan markets are segmented



Loan-level data on syndicated loans

- We use Dealscan Data on syndicated loans originated in the US between 1996 and 2017
- We measure loan's ownership following Blickle et. al (2023)
- We first measure risk using the spread: the quoted margin over LIBOR at origination
- We estimate, quarter-by-quarter:

$$Spread = \alpha + \beta bank's\ share + \Gamma X + \epsilon$$



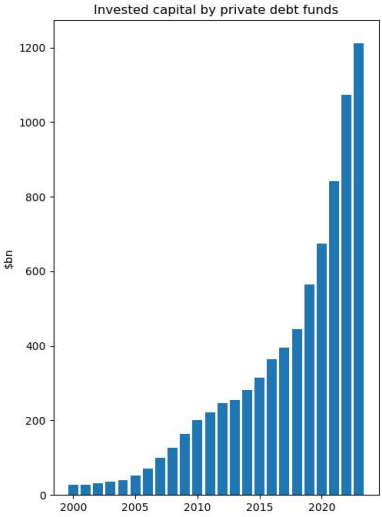
β estimates quarter-by-quarter

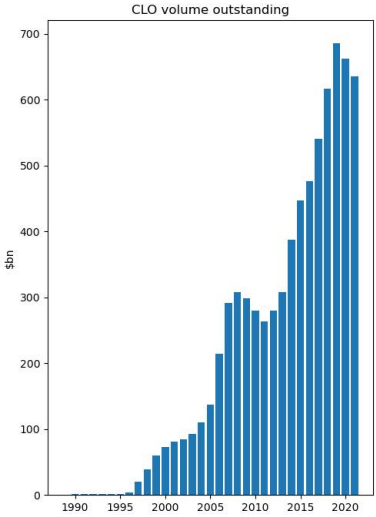
- A higher share of banks on a syndicated loan is associated with lower interest rate
- That effect gets stronger with time

Conclusion

- We build a model in which borrowers have private information about the quality of their loans
- Optimally and in equilibrium, there emerges a juxtaposition of lenders that have strict underwriting standards and lenders that do not
- Even small gaps in the expeditiousness of the approval process between banks and non-banks can easily account for a large part of this emergence
- Do lax underwriting standards options make the economy fragile?

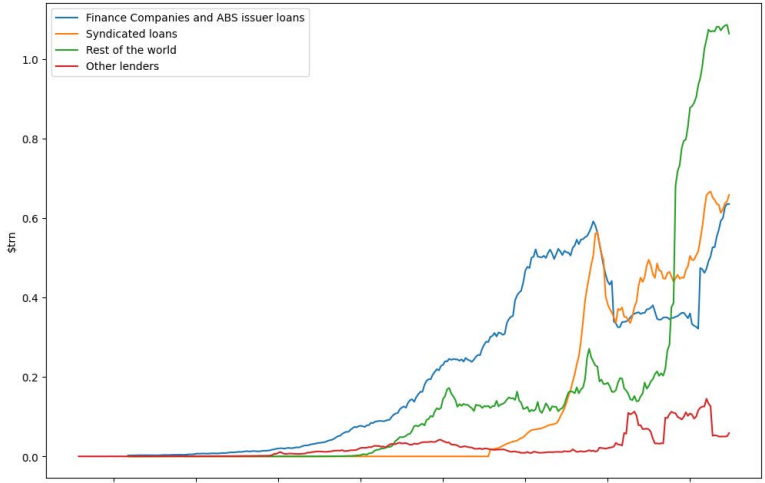
Private debt funds and CLO facilities





go back

Breakdown of non-bank loans



go back