Credit Relationships and Dynamic Credit Constraints

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Link to Paper

Motivation

- **Credit constraints** are key to corporate investments and transmission of macroeconomic shocks
- **Credit relationships** are known to relax credit constraints (lower collateral requirement or looser financial covenant)
- Mechanism not fully understood: **collateral** (asset-based) or **covenant** (earnings-based)?

Research Question:
How do credit relationships affect the **nature** of credit constraints?

Main Findings and Contributions

1. **A new stylized fact**:
   - Collateral incidence ↓ while covenant incidence ↑ as credit relationships grow in U.S. syndicated loan market
2. **A new channel** through which credit relationships increase credit availability:
   - Access to earnings-based borrowing ↑ as credit relationship strengthens
   - Collateral-covenant substitution is key in ↑ credit availability in relationships
3. **A dynamic credit constraint** driven by relationship:
   - Bank learning in relationship affects access to earnings-based borrowing
   - Collateral-covenant substitution alters the nature of credit constraint

New Stylized Fact on Collateral vs. Covenant

- Sample: U.S. dollar denominated loans incurred by U.S. nonfinancial corporations between 1990 and 2019 (Source: LPC DealScan)

Interaction Sort	Full Sample	Low Rel.	Medium Rel.	High Rel.
Loan Amount (mio 2017 USD)	417.61	277.07	485.62	834.05
Spread (drawn spread bps)	193.43	205.68	188.07	156.51
Collateral (frequency)	45.33%	**47.73%**	**45.58%**	**36.67%**
Covenant (frequency)	31.68%	**29.18%**	**34.09%**	**37.82%**
No. of Prev. Int.	0.78	0	1	3.26
Observations	60322	37741	11767	10814

Fig. 1: Selective Characteristics of U.S. syndicated loans by relationships

Dynamic Credit Constraint

- Simple model of credit relationships with endogenous contractual device choices
  - Two main frictions
    - Information asymmetry: firm's productivity is private information
    - Limited commitment: borrowing firm cannot commit to repay
  - Two different contractual device choices:
    - Collateral: linked to physical assets (stock variable)
    - Covenant: linked to future earnings (flow variable)
  - Bank-firm relationship formed from repeated interactions
  - Bank can observe firm productivity in ongoing relationship
- **Dynamic credit constraint driven by bank learning in relationships**

$$b_{t+1} \leq \max\{\bar{b^k_{t+1}}, \bar{b^\pi_{t+1}}\} = \left(\frac{1}{1+r}\right) \max\left\{\theta^k(1-\delta)k_{t+1}, \eta \mathbb{E}^B_t(y_{t+1} \mid \text{default})\right\}$$

  - Non-relationship benchmark: $\mathbb{E}^B_0(a \mid \text{default}) = 0$, only borrowing with collateral is available
    - Info asymmetry + limited commitment = very tight covenant and $b^\pi_{t+1} = 0$
  - Relationship case: $\mathbb{E}^B_1(a \mid \text{default}) = a$, borrowing with either collateral or covenant is available
    - Learning in relationship → info asymmetry ↓ → access to earnings-based credits ↑

Empirical Verifications

- Loan-level data (LPC DealScan) + firm-level characteristics (Compustat)
- Sample: U.S. dollar denominated loans incurred by U.S. nonfinancial corporations between 1990 and 2019
- Relationship proxies:
  - *Relation*: number of previous interactions between same borrower and lead lender
  - *Duration*: number of years since earliest lead lender-borrower interaction
- **Instrument** for relationship measure: exogenous relationship separation due to most recent lender failure during GFC
  - Relevance: failure of most recent lenders, or exposure to failed lenders likely to cause separation
  - Exclusion restriction: financial health of previous lender unlikely to affect contractual choice of current deal

The Collateral-Covenant Substitution Channel

1. Relationships improve access to earnings-based borrowing

Dep. Var.: Covenant	Relationship strength measured by log(Relation)		log(Duration)	
	1st stage	2nd stage	1st stage	2nd stage
Prev.LL Failed/Exposed	-0.1626*** (-4.26)		-0.1236** (-2.47)	
log(Relation)		0.4194** (1.96)		
log(Duration)				0.5517* (1.67)
log(Total Assets)		-0.2048*** (-3.22)		-0.1904*** (-2.77)
Observations	3100	3100	3100	3100
Cragg-Donald F		31.06		11.44
Kleibergen-Paap rk F		18.16		6.11
Stock-Yogo (2005) crit.		16.38		16.38

2. Resulting covenant ↑ replaces collateral requirement

Dep. Var.: Collateral	Relationship strength measured by log(Relation)	log(Duration)
$\widehat{\text{Covenant}}$	-0.1089** (-2.33)	-0.0723** (-2.53)
Observations	2325	2325
Adj. R-squared	0.8442	0.8444

3. This substitution is the key channel of relationship lending

Dep. Var.: log(Loan Amount)	Relationship strength measured by log(Relation)	log(Duration)
log(Relation)	0.0546* (1.91)	
log(Duration)		0.0407* (1.69)
Collateral	0.0296 (0.63)	0.0250 (0.52)
Covenant	0.2809*** (8.85)	0.2825*** (8.78)
Collateral × Covenant	0.1091** (2.10)	0.1091** (2.07)
Observations	8862	8627
Adj. R-squared	0.8229	0.8195

Conclusion

- **Not only collateral but also covenant**: credit relationships affect not only quantity but also the nature of credit. Relationship-driven collateral-covenant substitution is key for credit access
- **Not only SMEs but also large firms**: empirical evidence that large corporations also benefit from relationships through improved access to earnings-based borrowing
- **Credit constraints are dynamic in relationships**: credit relationships can alter the nature of credits, which have different implications for shock transmission. Such dynamics are important in macro modeling given the prevalence of relationship lending