Supply-Side Determinants of Loan Contract Strictness

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Introduction

- Financial covenants a key component in corporate loan contracts, creating ex-post renegotiation points contingent on borrower performance
  - Loan size, interest rates, and collateral renegotiated post-violation (Beneish and Press (1993), Roberts and Sufi (2009)).
  - Also, capital structure, investment policy, cash management, and personnel (Chava and Roberts (2008), Nini, Smith, and Sufi (2009a, 2009b)).
- Meanwhile, we observe substantial variation in use and strictness of financial covenants.
  - Covenant-lite loans jumped from 1% to 18% of leveraged loans between 2005 and 2007 (Standard & Poor's, 2007).
  - Since then, covenants have tightened considerably, allocating contingent control for even modest borrower deterioration.

Introduction

What drives variation in contract strictness?

- Prior literature focused on borrower characteristics.
  - An "agency theory of covenants" (Smith and Warner (1979), Bradley and Roberts (2004), Billet, King, and Mauer (2007))
- This paper...
  - Controlling for borrower characteristics, how do lenders impact contract strictness?
  - What factors influence lenders' preference for contingent control?

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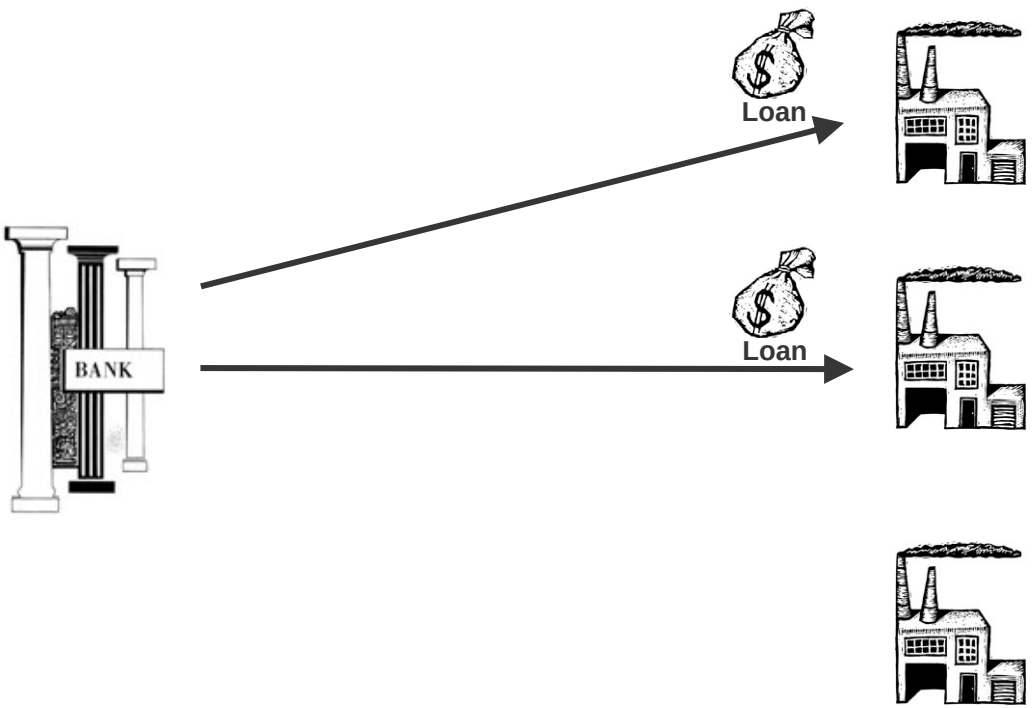

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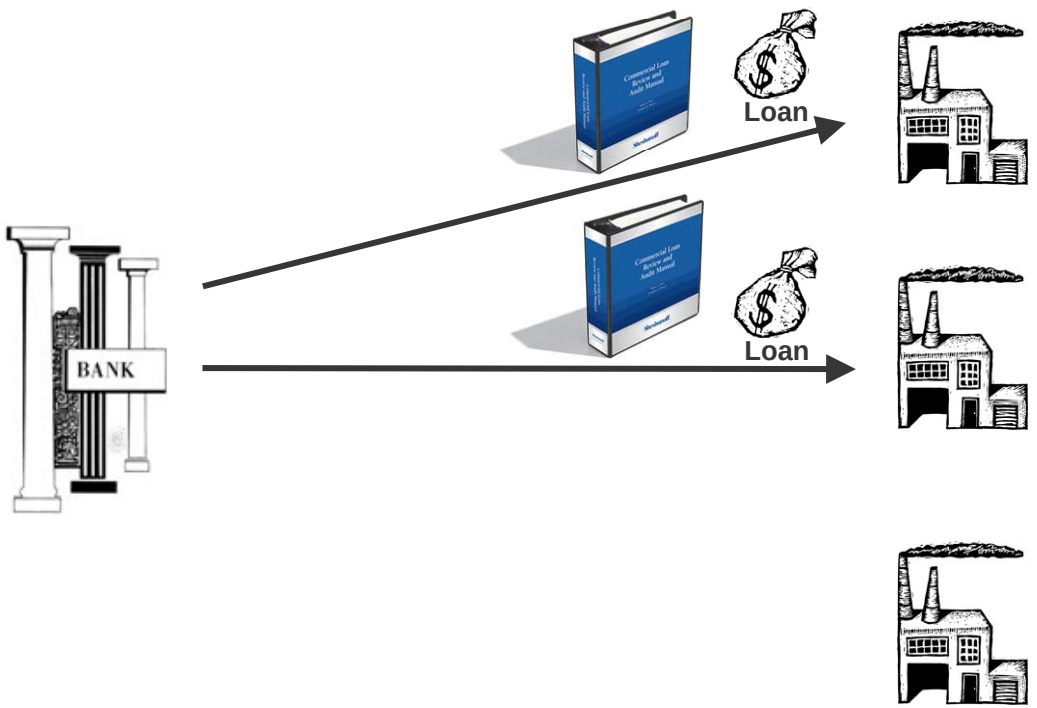

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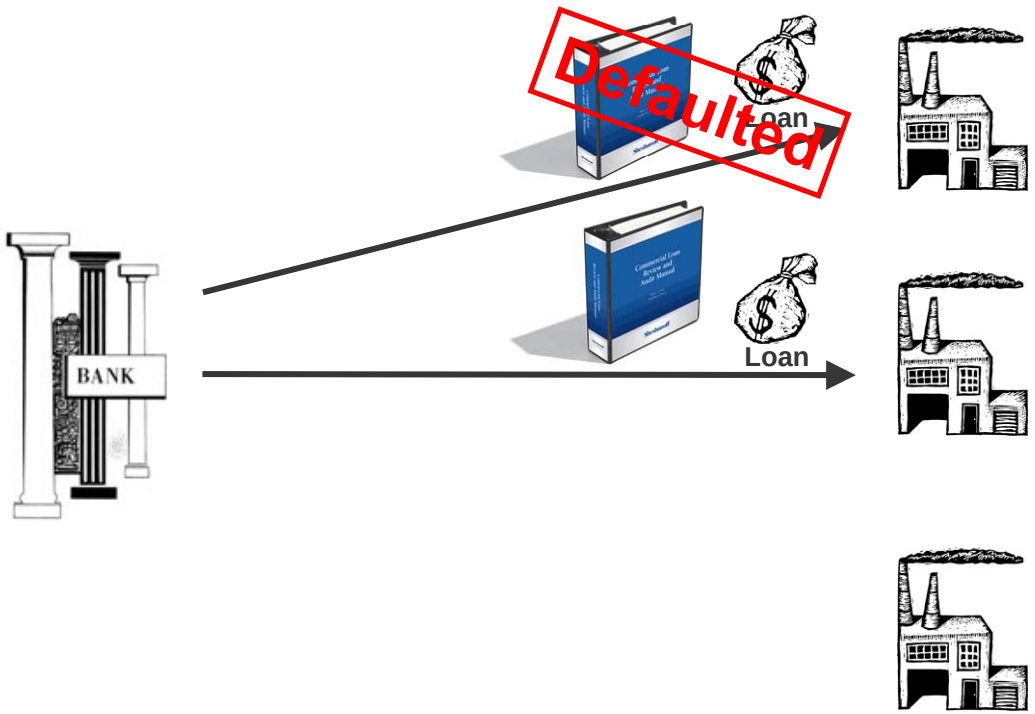

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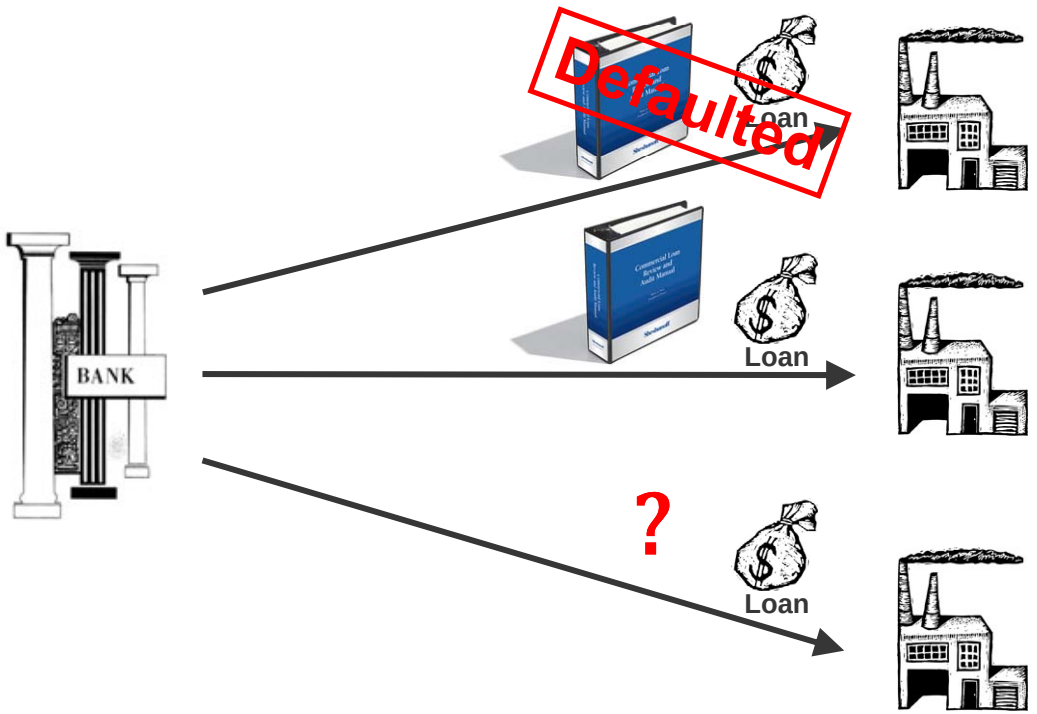


Introduction

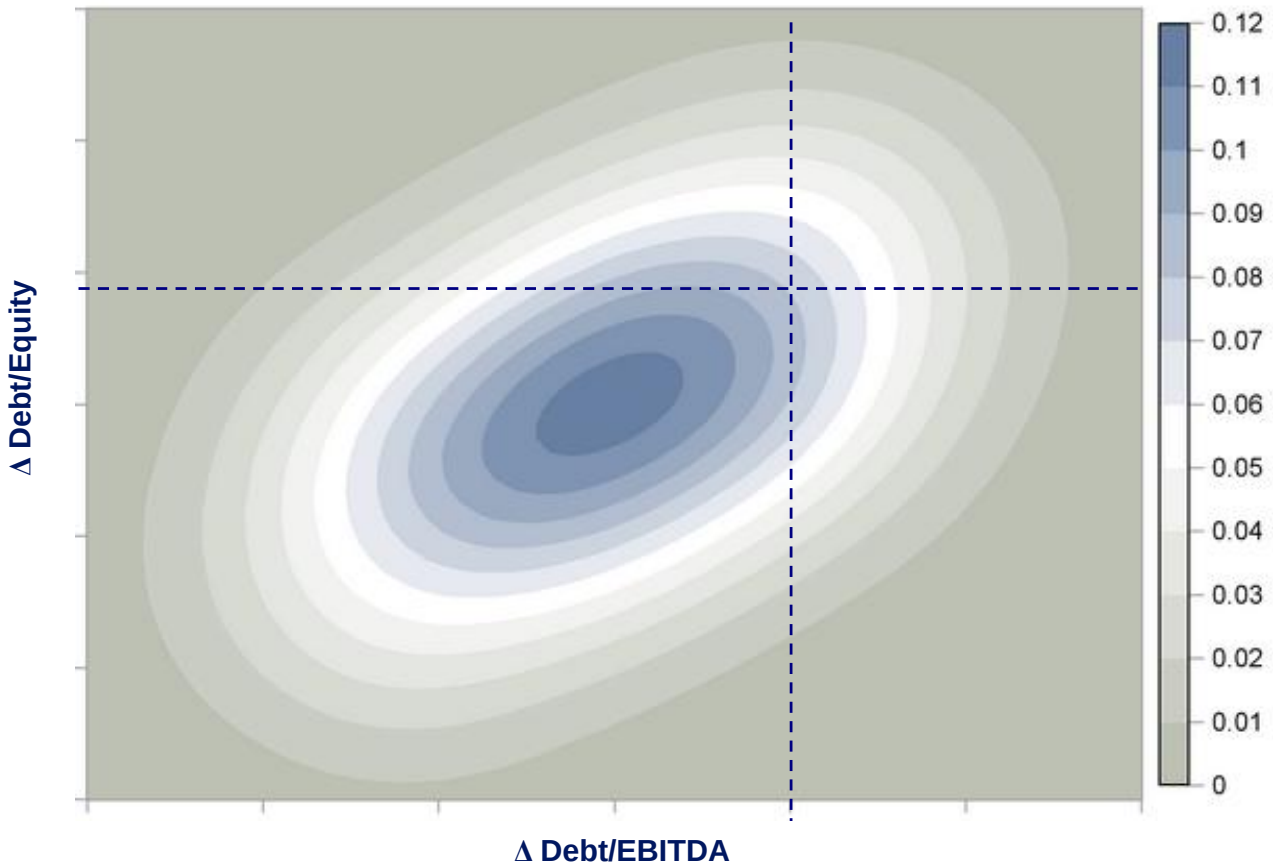
- Key Results
  - Controlling for borrower and time effects, lenders write tighter contracts than their peers after suffering defaults to their own loan portfolios.
  - Default effects span economic sectors.
  - What is economic mechanism behind tightening?
    - Capital?
    - Information?

Measuring covenant strictness

- Prior measures of covenant strictness include number of covenants, slack of net worth covenant.
- Need a measure that combines slack over multiple covenants into a single measure– a "distance" to technical default.
- Strategy: Use estimated distribution of ratios to jointly interpret slack.
- Suppose $r'_N = r_N + \epsilon_N \sim N_N(0, \Sigma)$
- Then $\widehat{STRICTNESS} \equiv 1 - F_N(SLACK_N)$ is the probability of a covenant violation.

Measuring covenant strictness

$$\widehat{STRICTNESS} \equiv 1 - F_N(SLACK_N)$$



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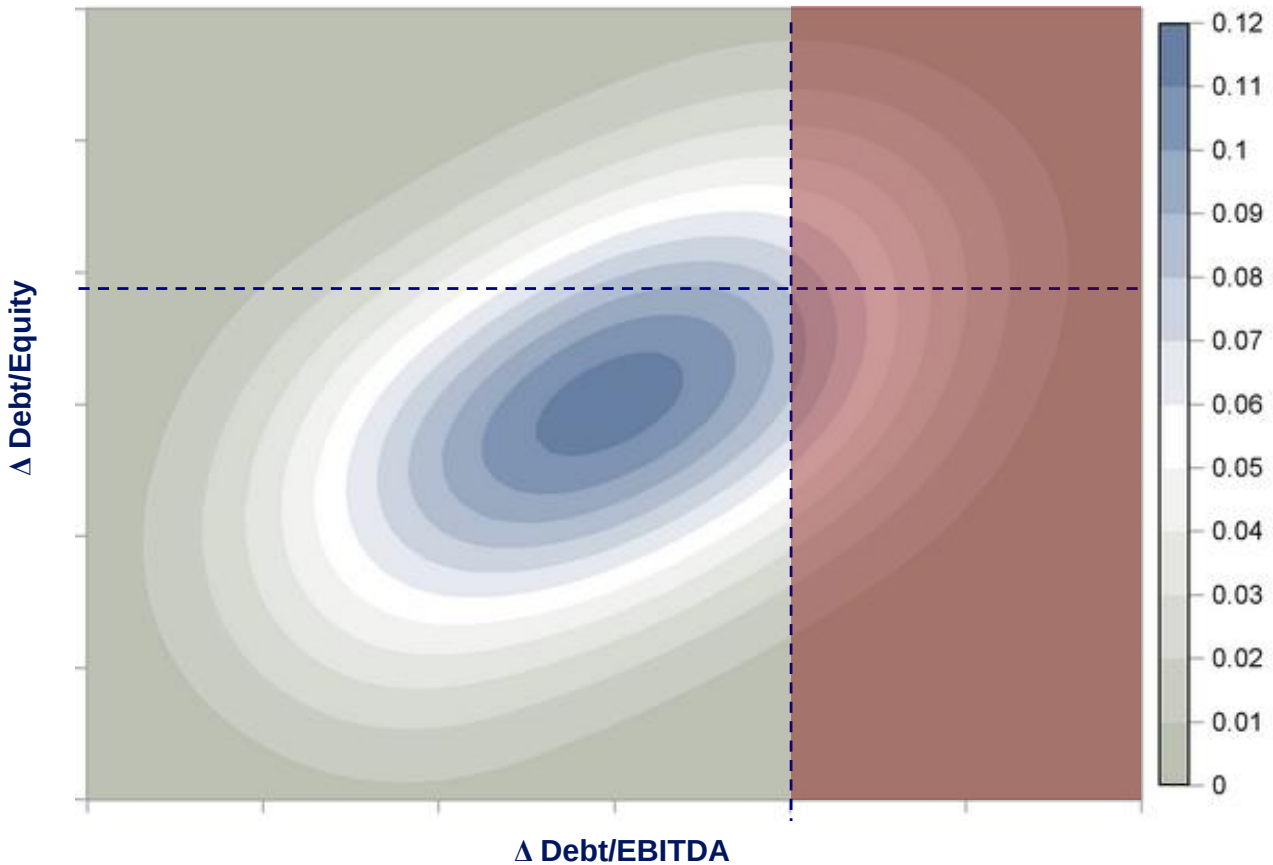

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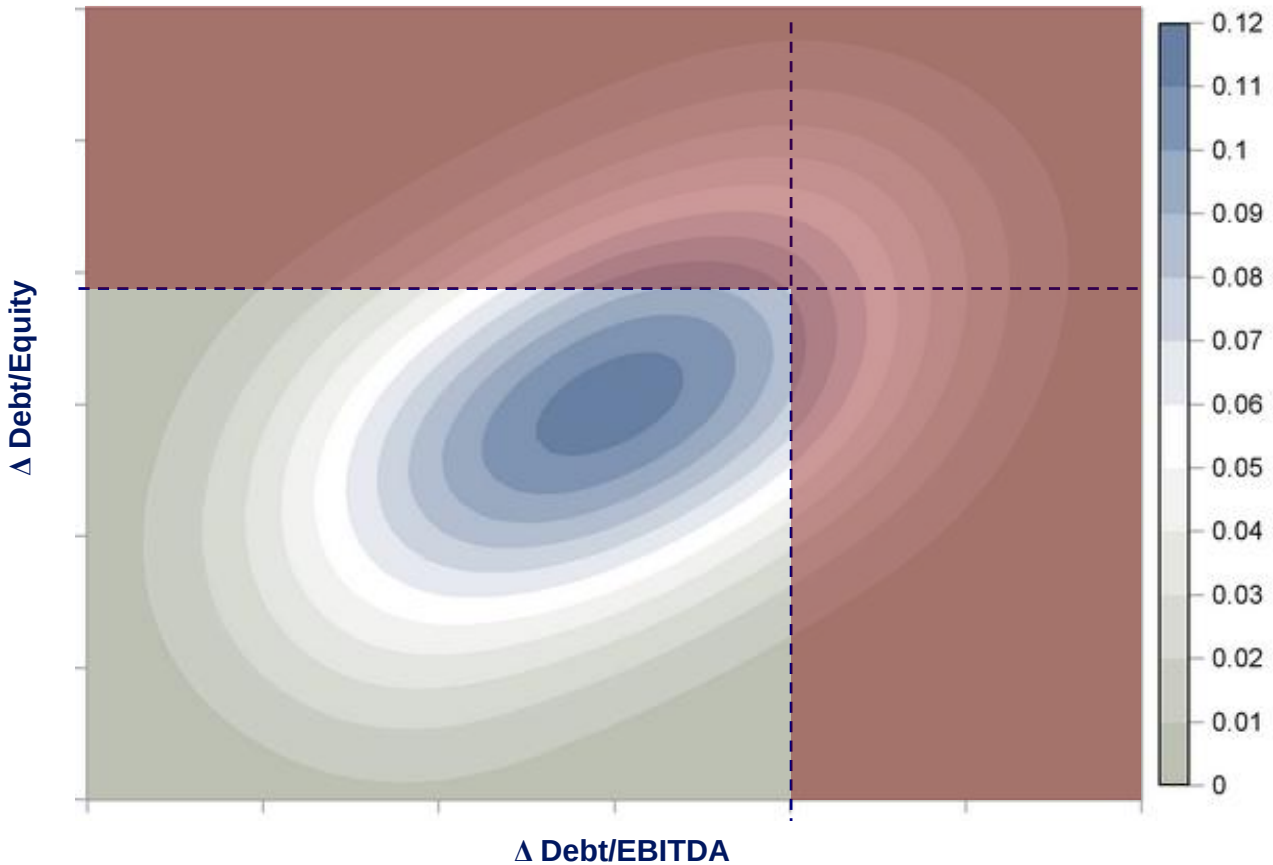

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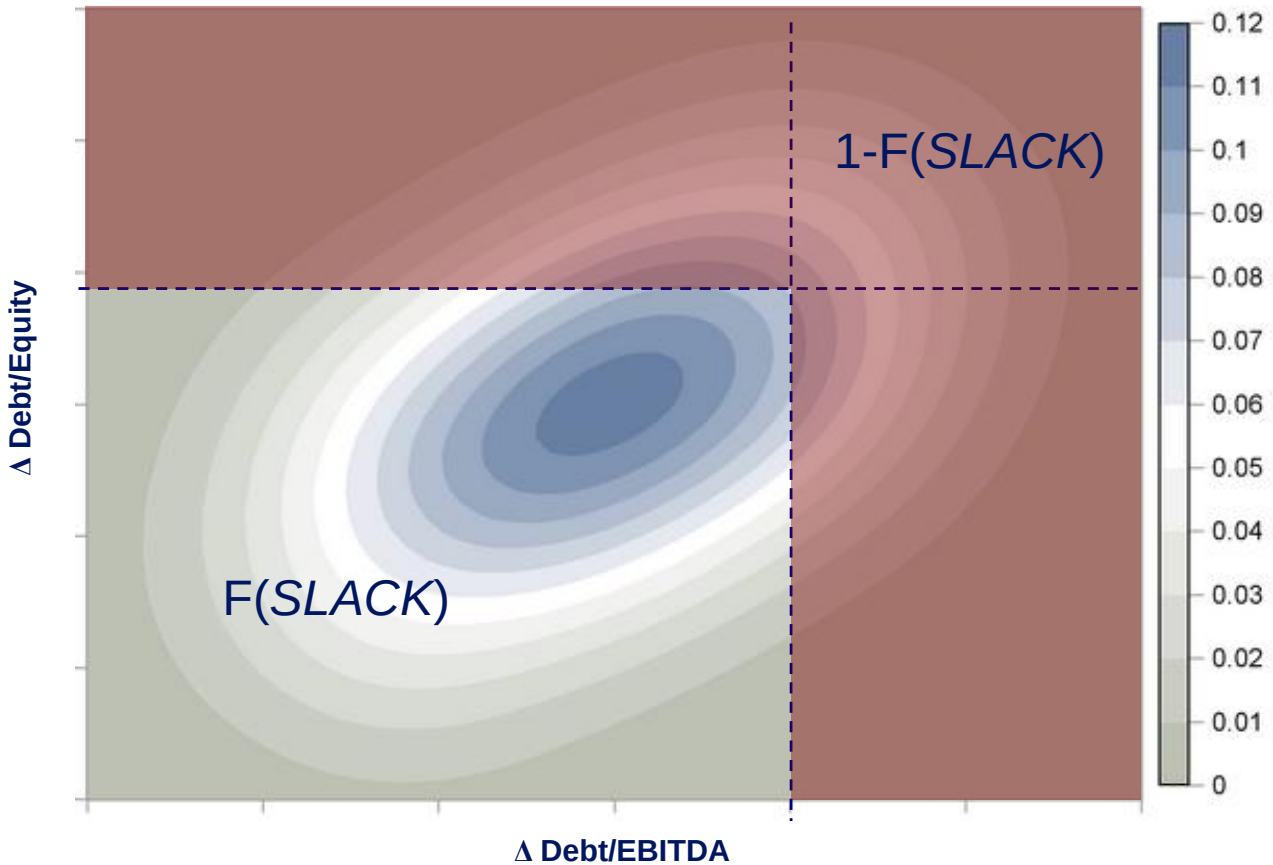
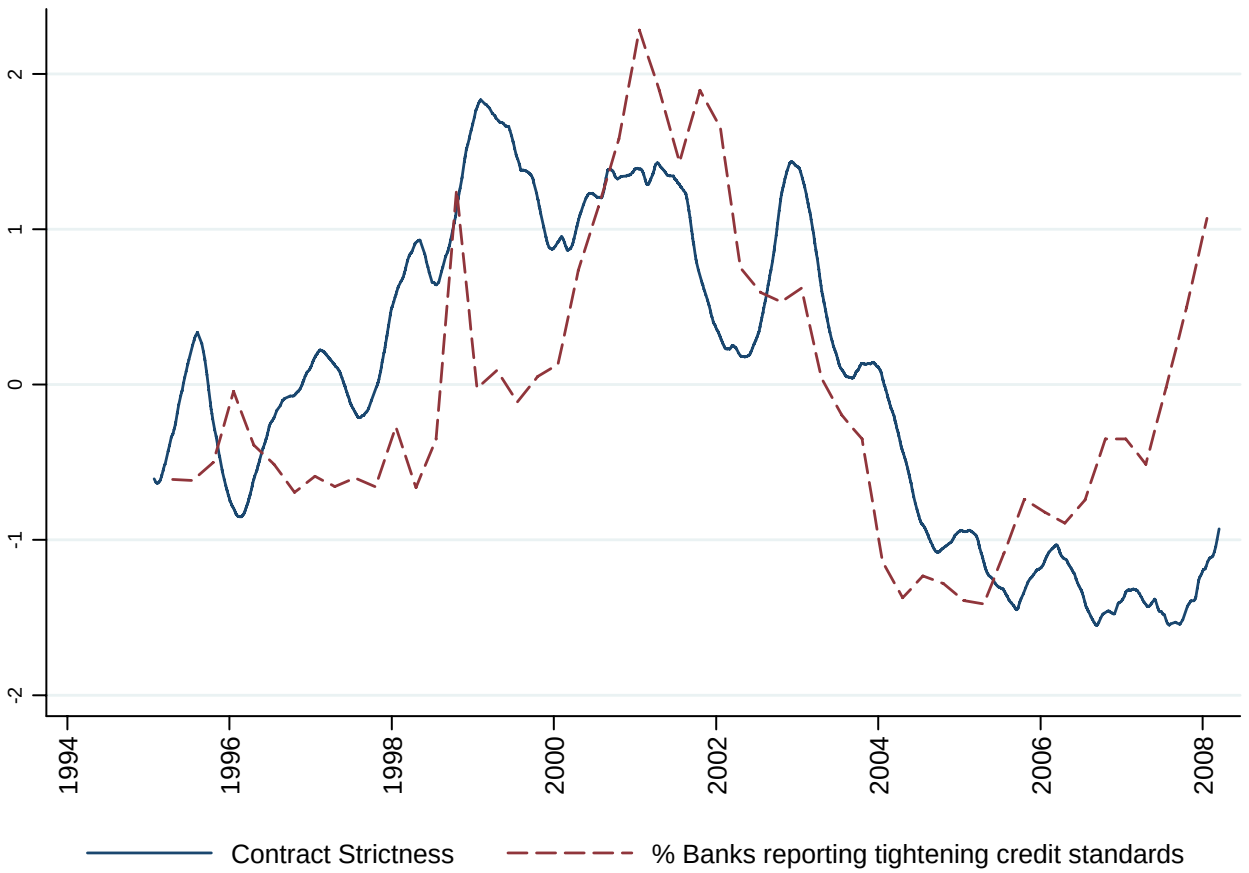


Estimating $\widehat{STRICTNESS}$

- 3,172 DealScan bank/borrower contracts matched to Compustat using Chava and Roberts (2008). Slack is measured in the first period of the contract for the following covenants:
  - Max. Debt/EBITDA
  - Max. Debt/Equity
  - Max. Debt/Tangible Net Worth
  - Min. Current Ratio
  - Min. Quick Ratio
  - Min. Tangible Net Worth
  - Min. Total Net Worth
  - Min. EBITDA
  - Min. Fixed Charge Coverage
  - Min. Interest Coverage
  - Max. Capital Expenditure
- $\widehat{\Sigma_N}$ estimated by one digit SIC industry.
- Measure outperforms prior measures in predicting actual covenant violations.

Properties of $\widehat{STRICTNESS}$

A moving average of $\widehat{STRICTNESS}_t$ is plotted below using a bandwidth of q=180 against the percentage of banks reporting tightening credit standards in the Federal Reserve's quarterly survey of senior loan officers. Variables are standardized.



Contract strictness and lender defaults

The model...

$$STRICTNESS_{i,t} = \alpha_i + \gamma_t + \beta X_{i,t} + \lambda DEFAULTS_{i,t-} + \epsilon_{i,t}$$

- *STRICTNESS* estimated for 3,172 Dealscan loan contracts.
- Defaults matched from S&P to DealScan, demeaned by lender.
- Potential selection bias if lenders select unobservably riskier firms based on recent default experience.
- Fixed effects correct for selection on unobservables.
- $X_{i,t}$ includes borrower long-term debt rating, Altman's Z-score and squared Z-score, and loan characteristics.
- Time effects absorb business-cycle risk.

Contracts and lender defaults

Panel A

Loan Strictness	I	II	III	IV	V	VI
Defaults on lender portfolio- past 360 days	0.19***					
	(0.07)					
Defaults on lender portfolio- past 90 days		0.57***	0.57***	0.56***	0.59***	0.51***
		(0.19)	(0.19)	(0.18)	(0.18)	(0.17)
Defaults on lender portfolio- 90-180 days		0.16	0.17	0.16		
		(0.19)	(0.19)	(0.18)		
Defaults on lender portfolio- 180-270 days		-0.07	-0.04			
		(0.17)	(0.17)			
Defaults on lender portfolio- 270-360 days		0.16				
		(0.19)				
ln(Maturity)	-0.83	-0.79	-0.80	-0.81	-0.81	-0.34
	(0.82)	(0.81)	(0.81)	(0.81)	(0.81)	(0.80)
ln(Amount)	1.26	1.28	1.30	1.30	1.28	0.90
	(0.93)	(0.92)	(0.93)	(0.93)	(0.93)	(0.97)
Secured	-0.78	-0.79	-0.74	-0.74	-0.78	-1.37
	(1.51)	(1.51)	(1.50)	(1.50)	(1.50)	(1.48)
ln(# of participants)	1.11	1.15	1.10	1.11	1.13	1.59
	(0.96)	(0.97)	(0.98)	(0.98)	(0.98)	(0.99)
Borrower Z-score	-3.95***	-3.96***	-3.99***	-3.98***	-3.98***	-0.98
	(0.59)	(0.59)	(0.59)	(0.59)	(0.59)	(0.92)
Borrower Z-score^2	0.05***	0.05***	0.05***	0.05***	0.05***	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Observations	2145	2145	2145	2145	2145	2145
R-squared (excluding unreported fixed effects)	0.193	0.197	0.196	0.196	0.196	0.263
Ratings Dummies	YES	YES	YES	YES	YES	YES
Borrower Fixed Effects	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES
Other Controls (ln(assets), market-to-book, covenanted accounting variables used to construct loan strictness)	-	-	-	-	-	YES

Contracts and lender defaults

	Panel B			
Loan Strictness	I	II	III	IV
Defaults on lender portfolio- past 90 days	0.55***	0.52***	0.55***	0.58***
	(0.18)	(0.18)	(0.18)	(0.18)
ln(Maturity)	-1.05	-1.11	-1.04	-1.08
	(0.82)	(0.81)	(0.82)	(0.81)
ln(Amount)	1.08	1.12	1.09	1.21
	(0.90)	(0.89)	(0.92)	(0.89)
Secured	-0.69	-0.60	-0.65	-0.65
	(1.56)	(1.54)	(1.56)	(1.56)
ln(# of participants)	1.22	1.22	1.16	1.13
	(0.95)	(0.95)	(0.95)	(0.95)
Borrower Z-score	-4.18***	-4.18***	-4.16***	-4.18***
	(0.61)	(0.61)	(0.61)	(0.61)
Borrower Z-score^2	0.05***	0.05***	0.05***	0.05***
Aggregate defaults - past 90 days	0.16**	0.19**	0.17***	0.17***
	(0.06)	(0.08)	(0.06)	(0.06)
Baa-Aaa credit spreads		-1.86		
		(2.73)		
S&P 500 return - past 90 days			0.62	
			(6.34)	
Quarterly GDP growth				0.32
				(0.21)
Observations	2145	2145	2145	2145
R-squared (excluding unreported fixed effects)	0.169	0.169	0.170	0.171
Ratings Dummies	YES	YES	YES	YES
Borrower Fixed Effects	YES	YES	YES	YES
Year Dummies	NO	NO	NO	NO

Does recent experience proxy for borrower risk?

- If banks specialize in an industry, then their defaults may be more informative than average.
- Tightening may reflect increased risk in area of specialization.
- Similar story holds for geographic concentrations.
- Table 3 removes defaults in the same industry and/or state/country as the contracting borrower. If tightening is driven by changing riskiness is a given industry/region, this should eliminate the effect.

Does recent experience proxy for borrower risk?

Loan Strictness	Different SIC I	Different State/Country II	Different SIC & State/Country III
Defaults on lender portfolio- past 90 days	0.67*** (0.18)	0.60*** (0.19)	0.64*** (0.19)
ln(Maturity)	-0.83 (0.81)	-0.80 (0.81)	-0.81 (0.81)
ln(Amount)	1.30 (0.93)	1.29 (0.93)	1.28 (0.93)
Secured	-0.78 (1.50)	-0.79 (1.51)	-0.78 (1.51)
ln(# of participants)	1.12 (0.98)	1.08 (0.97)	1.08 (0.97)
Borrower Z-score	-3.97*** (0.59)	-3.96*** (0.59)	-3.96*** (0.59)
Borrower Z-score^2	0.05*** (0.01)	0.05*** (0.01)	0.05*** (0.01)
Observations	2145	2145	2145
R-squared (partial, excluding unreported fixed effects)	0.197	0.195	0.196
Ratings Dummies	YES	YES	YES
Borrower Fixed Effects	YES	YES	YES
Year Dummies	YES	YES	YES

Contracts and lender capital

What drives post-default contract tightening?

- H1: Depleted bank capital induces lenders to insure against insolvency by writing stricter contracts.
- Do defaults affect contracting *by way of* the bank's capital stock?
- In addition to Compustat/DealScan borrower links, we need lender accounts.
  - DealScan lender names are hand matched to Compustat North America, Compstat Global, and Compustat Banks databases.
  - 205 banks are matched.
  - Capitalization calculated as Shareholder Equity/Total Assets

Contracts and lender capital

Loan Strictness	
Defaults on lender portfolio- past 90 days	0.63***
	(0.19)
ΔLender capitalization$_{t+2}$	0.22
	(0.48)
ΔLender capitalization$_{t+1}$	-1.06**
	(0.50)
ΔLender capitalization$_{t}$	-1.23***
	(0.50)
ΔLender capitalization$_{t-1}$	0.35
	(0.53)
ln(Maturity)	-0.57
	(0.87)
ln(Amount)	1.02
	(1.00)
Secured	-1.06
	(1.64)
ln(# of participants)	0.80
	(1.06)
Borrower Z-score	-4.53***
	(0.59)
Borrower Z-score^2	0.05***
	(0.01)
Observations	1806
R-squared (partial, excluding unreported fixed effects)	0.224
Ratings Dummies	YES
Borrower Fixed Effects	YES
Year Dummies	YES

Contracts and screening ability

What drives post-default contract tightening?

- H2: Lenders learn about their own screening ability through defaults.
  - Loan officer ability, credit model accuracy, effectiveness of policies and procedures
  - Meanwhile, covenants allow renegotiation of terms as borrower information is revealed.
- If defaults inform screening ability, defaults on recently originated loans more informative than older "legacy" loans.

Contracts and screening ability

Loan Strictness	I	II	III	IV	V	VI
(i) Lender defaults (loans<720 days old)	0.61**					0.62*
	(0.25)					(0.34)
(ii) Lender defaults (720 days old<loans<1,440 days old)		0.59**				0.44
		(0.29)				(0.45)
(iii) Lender defaults (1,440 days old<loans<1,800 days old)			0.43			0.72
			(0.32)			(1.04)
(iv) Lender defaults (1,800 days old<loans<3,600 days old)				0.25		-0.05
				(0.31)		(0.82)
(v) Lender defaults (loans>3,600 days old)					0.23	-1.14
					(0.31)	(1.03)
(i)-(v)						1.76*
ΔLender capitalization$_t$	-1.42***	-1.35***	-1.36***	-1.37***	-1.38***	-1.37***
	(0.44)	(0.44)	(0.44)	(0.44)	(0.44)	(0.44)
Lender capitalization$_{t-1}$	-0.52**	-0.53**	-0.53**	-0.55**	-0.55**	-0.55**
	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)	(0.22)
ln(Maturity)	-0.76	-0.74	-0.77	-0.78	-0.75	-0.72
	(0.92)	(0.92)	(0.92)	(0.92)	(0.92)	(0.91)
ln(Amount)	1.76*	1.73*	1.75*	1.75*	1.73*	1.73*
	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)	(1.04)
Secured	0.25	0.34	0.39	0.31	0.32	0.36
	(1.68)	(1.69)	(1.70)	(1.69)	(1.69)	(1.69)
ln(# of participants)	0.98	0.92	0.91	0.88	0.89	0.93
	(1.09)	(1.09)	(1.09)	(1.09)	(1.09)	(1.10)
Borrower Z-score	-1.18***	-1.20***	-1.22***	-1.21***	-1.21***	-1.18***
	(0.29)	(0.29)	(0.29)	(0.29)	(0.29)	(0.29)
Borrower Z-score^2	0.01**	0.01**	0.01**	0.01**	0.01**	0.01**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	1857	1857	1857	1857	1857	1857
R-squared (partial, excluding unreported fixed effects)	0.150	0.153	0.150	0.149	0.149	0.155
Ratings Dummies	YES	YES	YES	YES	YES	YES
Borrower Fixed Effects	YES	YES	YES	YES	YES	YES
Year Dummies	YES	YES	YES	YES	YES	YES

Conclusion

Other results

- Effects are driven by relationship dependent borrowers
  - Few lending relationships
  - No access to CP markets
- Borrowers are stakeholders in the performance of their lenders.

Summary

- Propose a new measure of contract strictness.
- Show borrower contracts depend on the recent performance of their lenders.
  - In particular, lenders tighten contracts after suffering defaults to their loan portfolios.
  - Capital effects are important, but not sufficient to explain tightening.
  - Evidence is consistent with screening hypotheses.