Liquidity insurance and Pledgeability

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Facts

Credit lines (CLs) account for 50-75% of firms' bank financing (Greenwald, Krainer, and Paul, 2020)

Typically, they contain:

- Covenants on cash holdings/dividends (Sufi, 2009)
- Covenants on debt (Acharya, Almeida, Ippolito, Perez, 2020)

CLs often revoked after a covenant violation, esp. to small firms (Chodorow-Reich, Darmouni, Luck, and Plosser, 2020)

Motivation

Current theories don't explain all of these facts

- CLs meant to solve low cash problem
  - But firms need to hold cash to get CLs
- CLs should not be revocable to provide liq. insurance
  - But they are often revoked upon violation of covenants

Question

If CLs need to provide insurance, why revocable?

I.e. why do they have covenants?

Why do they have covenants on cash and leverage?

Why require firm to hoard cash?

Why do firms choose to violate covenants?

Is firm better off losing credit access?

This Paper

Model a firm's optimal liquidity provision when

- Firm subject to random liquidity shock (HT 98)
- Pledgeability is limited (HT 98)
- Quality of project is not contractable (New)

Results Preview

Benchmarks: Standard contracts don't achieve efficiency

- Spot market: not enough debt capacity $\Longrightarrow$ underinvestment
- CLs: too much insurance $\Longrightarrow$ overinvestment

R1: CL with cash covenants achieves efficiency

- Liq. insurance creates incentive to continue
- Cash covenants solve overinvestment problem
- Firm better insured when pledgeability higher

R2: Large firm with multiple projects are better insured

- Continuing bad project increases pledgeability
- Increasing pledgeability reduces incentive to continue

Baseline Model

Model Overview

No discounting, universal risk neutrality

Entrepreneur (E) with endowment w

- Obtains private benefit b from not working

Project of quality $Q \in \{G, B\}$ where $\Pr(Q = G) = q$

- Costs I at date 0
- Needs maintenance cost $\tilde{\rho} \in \{0, \rho\}$ at date 1 where $\Pr(\tilde{\rho} = \rho) = \lambda$
- Yields R with proba. p_Q if E works and $p_Q - \Delta p$ otherwise

Competitive creditors

Timing

Date 0:

E borrows to invest in project

E can sign a contract to mitigate liquidity risk

Date 1:

Liquidity shock $\tilde{\rho}$ observed

Quality Q observable but not contractable

E executes contracts: diverts cash/draws down CLs/borrows

Date 2:

E decides whether to exert effort and payoff realized

Parametric Assumptions

A1. Liquidity shock neither too high nor too low

$$\max\left\{p_G\left(R-\frac{b}{\Delta p}\right), p_B R\right\} < \rho < p_G R$$

A2. Entrepreneur endowment not too high

$$w \leq I + \lambda q \rho - p_G\left(R-\frac{b}{\Delta p}\right)$$

A3. Bad project is really bad (only for R2b)

$$p_B < p_G - \Delta p$$

First Best

If the project is good

$$p_G R > \rho$$

Continue regardless of the liq. shock, conditional on effort

If the project is bad

$$\rho > p_B R > 0$$

Continue only when there is no shock

B1: Ex Interim Markets Cannot Achieve First Best

B1: Ex Interim Markets Cannot Achieve FB

Result: Underinvestment with markets: good projects liquidated

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Result: Underinvestment with markets: good projects liquidated

If $Q = G$ and $\tilde{\rho} = \rho$ it's efficient to continue

But to exert effort, E must get R_b s.t.

$$p_G R_b \geq (p_G - \Delta p) R_b + b \implies R_b \geq \frac{b}{\Delta p}$$

E cannot raise money as creditors cannot break even (by A1)

$$\rho > p_G \left(R - \frac{b}{\Delta p} \right)$$

(Expected) Pledgeability $\theta := \frac{p_G(R - R_b)}{R} = p_G \left(1 - \frac{b/R}{\Delta p} \right)$ too low

Intuition

E can continue project if could borrow against whole cash flow

But E must be compensated to exert effort

E cannot borrow enough to mitigate the liquidity shock

In HT 98, a CL solves the problem: compensate creditors ex ante

Can it solve the problem here, too?

B2: Credit Line Cannot Achieve FB

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Result: Overinvestment with CL, bad project inefficiently continued

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Suppose E obtain a CL with limit $l = \rho$ from creditor

When $Q = B$, it is efficient not to continue (by A1)

But E gets paid $p_B \frac{b}{\Delta p}$ if project continued, and 0 otherwise

Intuition

CLs provide liquidity insurance when firm cannot borrow

Good project efficiently continued

CLs also provide liquidity insurance when firm shouldn't continue

Bad project inefficiently continued

E doesn't have skin in the game: cost entirely borne by creditor

R1: Credit Line with Cash Covenants Achieves FB

CL drawdowns are harder to divert

E can divert its own cash but not CL drawdowns

Use of proceeds often restricted

E.g. Revolving Credit Facility Agreement (NORDSTROM)

Section 2.3. Use of Proceeds. *The proceeds of the Loans shall be used by the Borrower only for working capital, capital expenditures and other lawful general corporate purposes of the Borrower and its Subsidiaries, including (a) loans made by the Borrower to its Subsidiaries and (b) the payment of commercial paper ... the proceeds of the Loans shall not be used to finance any acquisition ...*

Section 6.2. Restricted Payments.*The Borrower shall not, and shall not permit any Subsidiary to, declare, pay or make, or agree to declare, pay or make, any Restricted Payment...("Restricted Payment" means (i) any dividend or other distribution ...)*

R1: CL with Cash Covenants Achieves FB

Suppose E has cash $c = p_B \frac{b}{\Delta p}$ and CL $l = \rho - c$ with cash covenants

When $Q = B, \tilde{\rho} = \rho$, E diverts cash

$$c \geq p_B \frac{b}{\Delta p}$$

When $Q = G, \tilde{\rho} = \rho$, E does not divert cash

$$c < p_G \frac{b}{\Delta p}$$

When $\tilde{\rho} = 0$, firm always diverts cash, but project continued

Pledgeability vs Liquidity Insurance

Without liquidity insurance:

Low pledge. $\Rightarrow$ Too little debt capacity $\Rightarrow$ Underinvest (HT 98)

With (too much) liquidity insurance:

Low pledge. $\Rightarrow$ Too little skin in the game $\Rightarrow$ Overinvest (New)

Covenants on cash solve the problem: insurance not too much

E better insured when pledgeability higher

Empirical Prediction

Firm cash holdings drop after CL drawdown

Direct evidence (Berrospide and Meisenzahl, 2015)

> *"... a one standard deviation increase in drawdowns reduces average cash holdings by about 1 percent of total assets...reduce cash holdings by about 8 percent..."*

Large Firms

Large Firms

In this section, we model a firm with two projects

- i.i.d. quality shocks
- perfectly correlated liquidity shocks

Firm can decide to continue each project *independently*

Each project has its own private benefit b

Ex Post Efficient Actions

Without liquidity shock: all projects should be continued

With liquidity shock: only good project(s) should be continued

R2a: Multiple Projects Increase Pledgeability

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Result: Pledgeability higher with two projects (Laux 01)

$$p_A p_B R_b \geq (p_A - \Delta p)(p_B - \Delta p) R_b + 2b$$

In expectation, E gets lower than two separate projects

$$p_A p_B R_b = \frac{2b}{1 - \frac{p_A - \Delta p}{p_A} \frac{p_B - \Delta p}{p_B}} < p_A \frac{b}{\Delta p} + p_B \frac{b}{\Delta p}$$

Intuition

E's rent is at least R_b to induce him to exert effort

Would like to punish E in case of failure to reduce rent

Impossible with only one project because of limited liability

But possible with two projects if not continued independently

If Project 1 fails, with prob p_H other succeeds and E gets R_b

Even under LL, E's income on Project 1 can be reduced to $-R_b$

R2b: Firm Better Insured with Multiple Projects

R2b: E Better Insured with Multiple Projects

Result: E only continues good project 2 even fully insured (New)

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E chooses whether to continue project 2 at date 1

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Suppose both projects shocked and project 1 is good

E chooses whether to continue project 2 at date 1

Continuing project 2 increases private benefit by b

E needs to be compensated for effort more

Continuing project 2 increases pledgeability

E extracts fewer rents from the good project 1

R2b: E Better Insured with Multiple Projects

Good project 2 increases expected compensation for effort more

E relatively more inclined to continue

$$\underbrace{\frac{2b}{1-\frac{p_G-\Delta p}{p_G}\frac{p_G-\Delta p}{p_G}}}_{\text{Continue both G \& G}} \geq \underbrace{\frac{b}{1-\frac{p_G-\Delta p}{p_G}}}_{\text{Continue only G}}$$

R2b: E Better Insured with Multiple Projects

Bad project 2 dilutes rent from the good project 1 more

E more incentivized not to continue

$$\underbrace{\frac{b}{1-\frac{p_G-\Delta p}{p_G}}}_{\text{Continue only G}} \geq \underbrace{\frac{2b}{1-\frac{p_A-\Delta p}{p_A}\frac{p_B-\Delta p}{p_B}}}_{\text{Continue both G \& B}} \Leftrightarrow \Delta p \leq p_G - p_B \text{ (A3)}$$

R2b: E Better Insured with Multiple Projects

Good project 2 increases expected compensation for effort more

E relatively more inclined to continue

Bad project 2 dilutes rent from the good project 1 more

E more incentivized not to continue

E only continues an additional project B if it's good (by A3)

E can be better insured with two projects

Conclusion

Firm lacks pledegability to borrow when liquidity shock occurs

CLs provide liq. insurance to continue efficient project

Liquidity insurance creates incentive to continue inefficiently

Covenants on cash require firm to have skin in the game

Firm better insured when pledgeability higher

Continuing inefficient project increasers pledgeability

Large firms can be better insured

THANK YOU!

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