Liquidity Insurance in Macro

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Motivation

- Renewed attention to financial frictions in general and role of banks in particular
- Existing models model bank specialness as an advantage in providing loans due to monitoring (e.g., Gertler-Karodi 2011, Gertler-Kiyotaki 2013)
- But banks have another unique role: provision of liquidity insurance to the corporate sector through credit lines
- My goal is to explore potential channels through which banks may matter for macro through the liquidity insurance channel

Plan

- What is special/different about credit lines?
- Why is corporate liquidity insurance provided almost exclusively by banks?
- A model with bank lending and liquidity insurance provision
- Preliminary empirical evidence
- Potential macro implications and modeling challenges

Credit lines in corporate finance

- Liquidity insurance role
  - Loan commitment: available until maturity, provided that covenant violation doesn't happen
  - Credit lines tend to be used following negative shocks to profitability (Acharya et al., 2014a) and during periods of financial market turmoil (Ivashina and Scharfstein, 2011)
  - Credit lines remain frequently unused (WALMART)
  - Not only for short-term liquidity insurance (maturity)

Cross-section of bank dependence

- Standard view is that bank-dependent firms tend to be smaller, low credit quality firms that cannot access market financing
- But this correlation does not hold for credit lines
  - Large firms are more likely to rely on credit lines for liquidity management, small firms hold mostly cash (size)
  - Firms that rely on credit lines for liquidity management are more profitable and have higher credit ratings than firms that rely on cash (Sufi, Acharya et al., 2014a)

What is different about credit lines?

- Economically distinct from a standard bank loan because of liquidity insurance aspect
- The type of firm that relies on banks for liquidity insurance is also very different from the standard characterization of “bank-dependent firm”
  - Large, liquid, profitable, high credit quality

Why banks?

- Arguments in the literature
  - Synergy with provision of liquidity insurance to consumers (Kashyap, Rajan and Stein, 2002)
  - Cash flows into the banking sector following negative aggregate shocks (Gatev and Strahan, 2006), perhaps due to deposit insurance (Pennacchi, 2006)
- High quality firms may only depend on credit lines in in periods of market turmoil, thus the importance of aggregate risk
- Even though credit lines tend to become less desirable as aggregate risk increases (Acharya, Almeida and Campello, 2013), they are provided by banks because of aggregate liquidity risk insurance

Preview of macro links

- Standard literature: bank balance sheet matters, because bank lending is necessary **for all firms** but there is an agency problem
- This framework can add significant heterogeneity in bank effects across firms
  - Better identification of bank effects (empirical)
- Why it may matter for macro
  - Existing models assume that all firms borrow from banks, so real effects of shocks are large
  - High quality firms do not rely on banks during normal times, but in the event of a shock they may draw on credit lines and move into cash. These effects contribute to dry up bank liquidity, and may increase effects on small firms that always rely on banks
  - In addition fraction of high quality firms may decrease, so more firms become bank-dependent

What about monitoring?

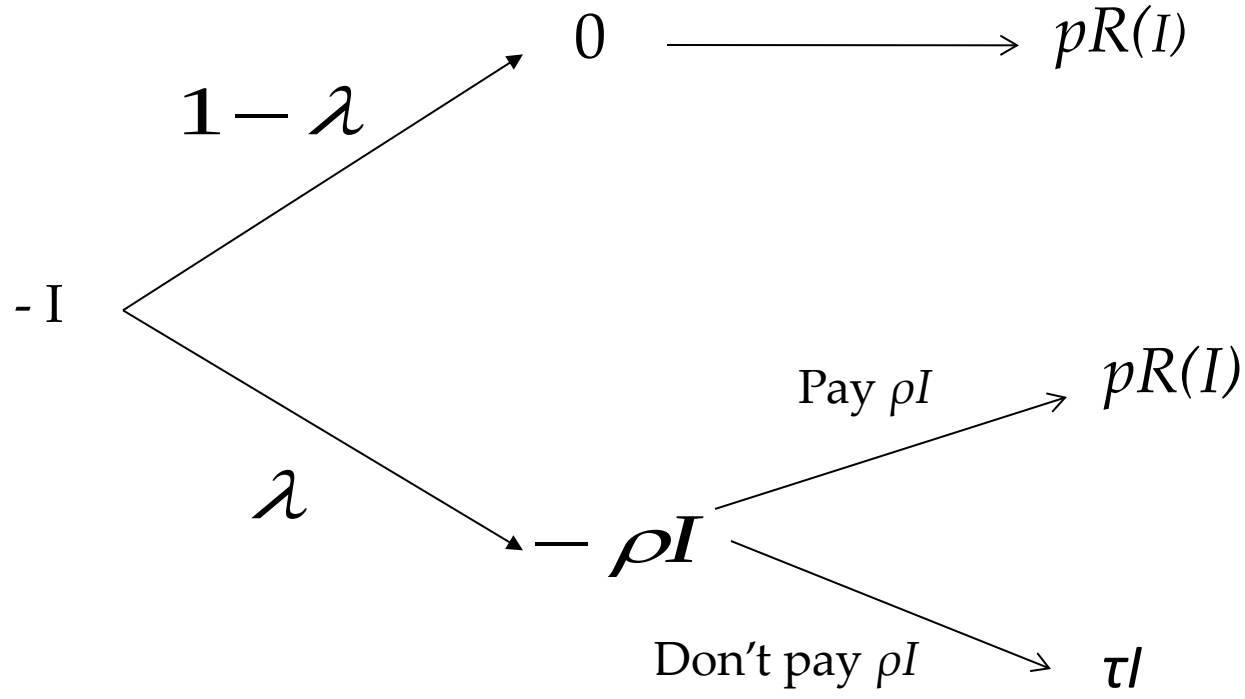
- One can extend the monitoring framework to credit line provision (Acharya et al., 2014a)
- In particular, it helps explain why covenants and revocation of unused lines are part of an optimal contract
- But monitoring by itself may not explain why credit lines are provided by banks and not by other financial intermediaries

A micro framework

- Model in which banks provide both monitored term loans and credit lines (liquidity insurance) (Acharya et al., 2014b)
- A framework to introduce the "*bank liquidity insurance channel*" to the literature
- I will first present the micro framework and then explore some potential macro implications

Model set up

- Model based on Holmstrom and Tirole (1997, 1998)
- Firm with an investment project that requires I at date 0. The firm's initial net worth is $A > 0$
- Investment opportunity also may require an additional investment at date 1. The date-1 investment requirement can equal either ρI , with probability λ, or zero, with probability $1-\lambda$
- If firm continues, it produces $pR(I)$ at date 2. $R'' < 0$ (DRS)
- Liquidation payoff at date 1 equals τI



pR(I) – $\rho I > \tau I$, so continuation is efficient

Moral hazard

- The probability of success *p* depends on effort by the firms' managers
- If the managers exert high effort, the probability of success is equal to p_H
- Otherwise, the probability is $p_B < p_H$ but the managers consume a private benefit equal to *BI*
- To exert effort manager keeps a fraction of cash flows so pledgeable income is

$$\rho_0(I) = pH\left[R(I) - \frac{BI}{p_H - pL}\right]$$

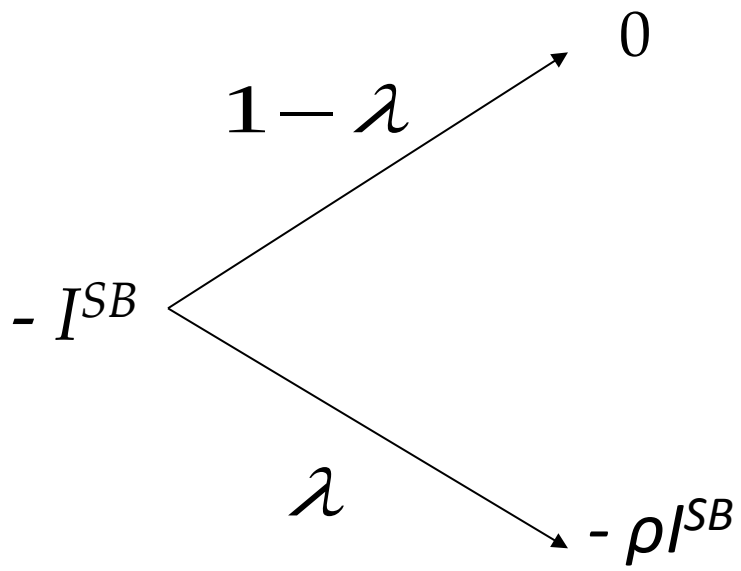
Second-best solution

- With no other frictions, the firm solves the following problem

$$\max p_H R(I) - (1 + \lambda\rho)I$$
$$\text{s.t. } (1 + \lambda\rho)I \leq A + \rho_0(I)$$

Denote the solution I^{SB}, U^{SB}

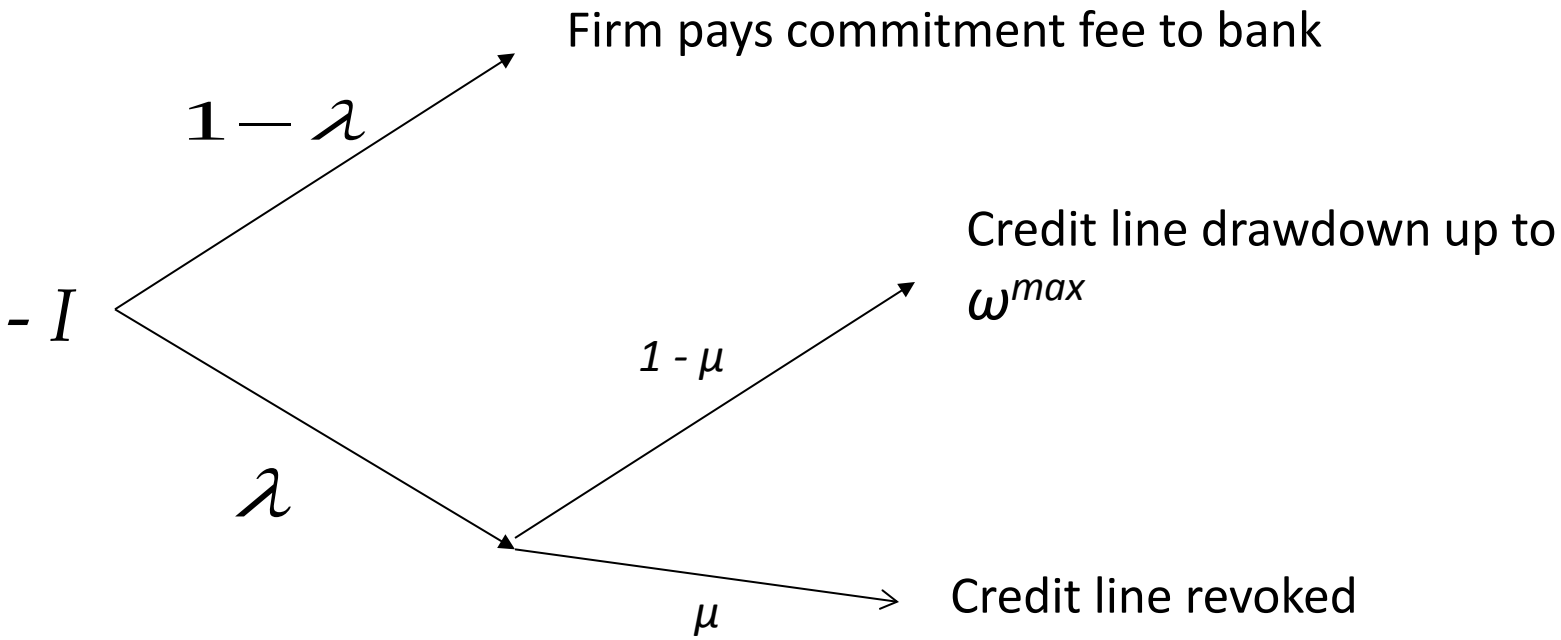
Liquidity management



- Conditional on state λ, pledgeable income is $\rho_0(I^{SB})$
- So if $\rho_0(I^{SB}) < \rho I^{SB}$ firm needs additional liquidity
- Total demand for liquidity for each I is

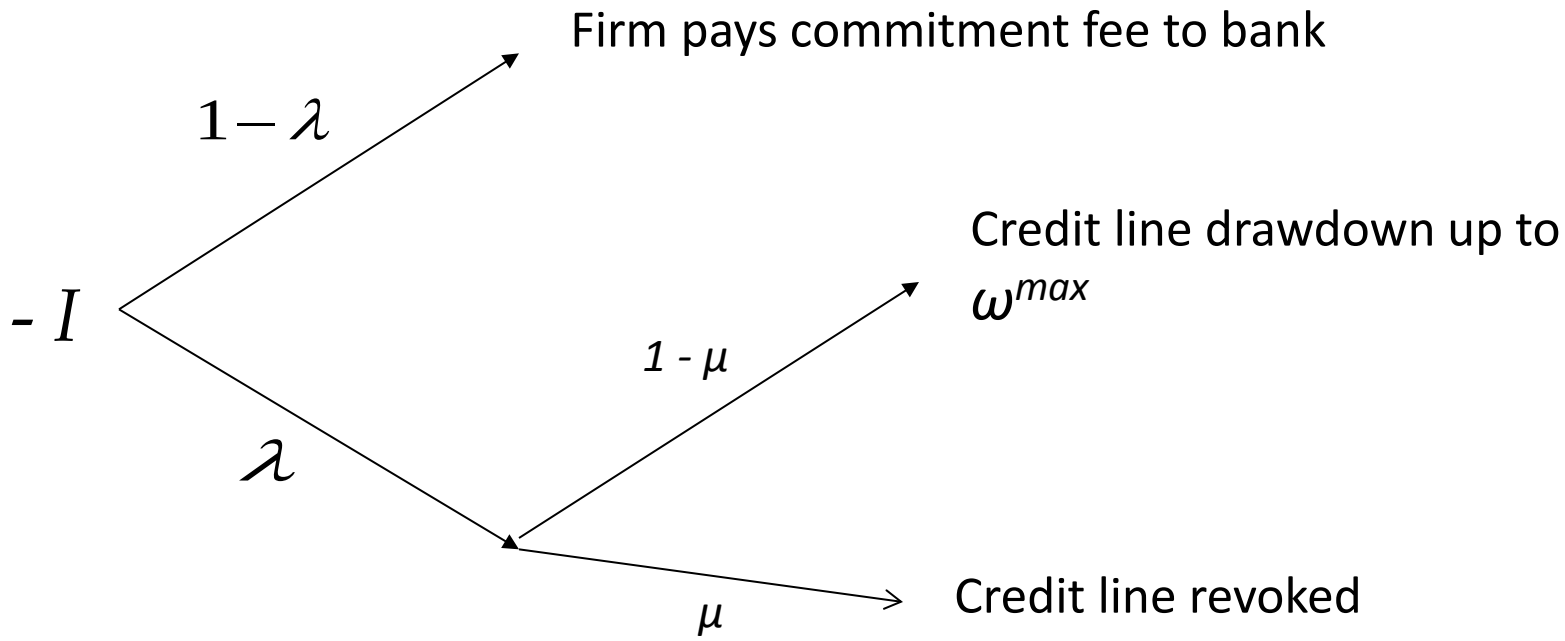
$$L(I) = \rho I - \rho_0(I)$$

Credit line implementation



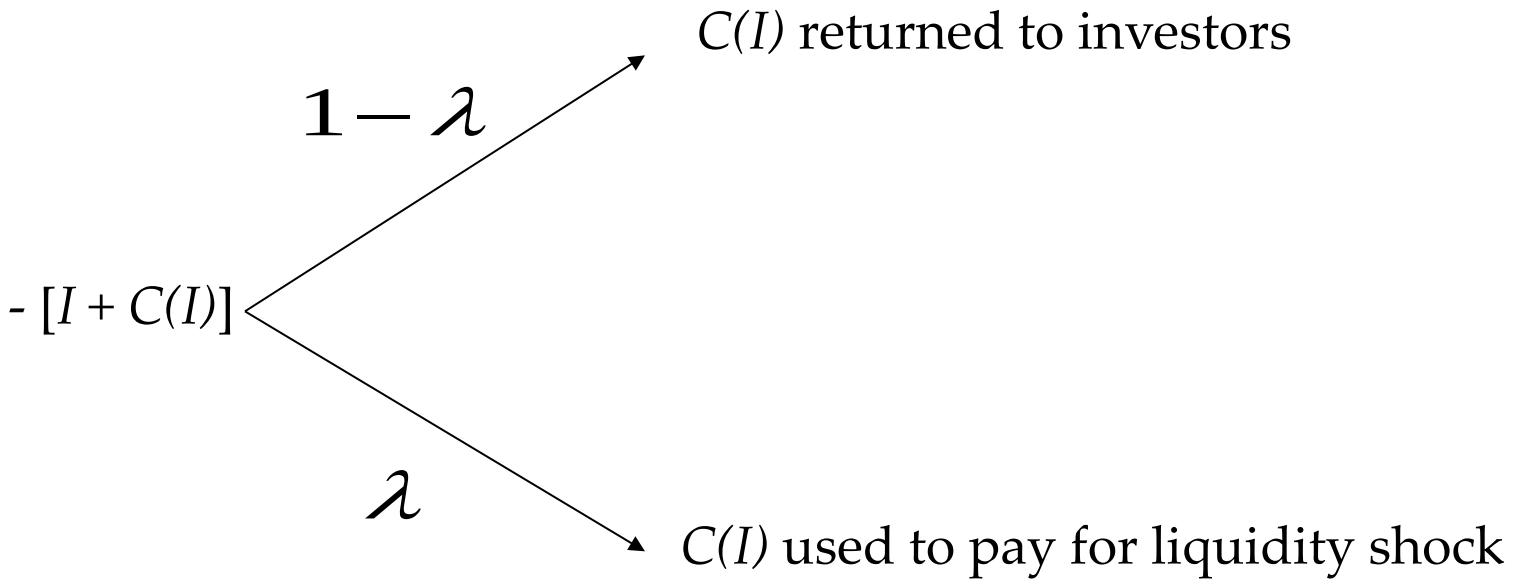
- In equilibrium, both μ and ω^{max} arise from liquidity shortage in banks in the event of an aggregate liquidity shock
- For example, in Kashyap, Rajan and Stein, ω^{max} is the excess cash from consumer liquidity insurance and μ is the probability that consumers demand it
- No link between revocation and monitoring in this model

Credit line implementation



- If ω^{max} is less than $L(I)$, then firm must also hold some cash
- Cash demand = $C_\omega(I) = L(I) - min[L(I), \omega^{max}]$
- Holding cash is costly
- Liquid assets (e.g., treasuries) sell at date-0 price $q > 1$, so $q - 1$ is the liquidity premium per unit of cash

Cash-only implementation



- Firm chooses to rely only on cash to avoid risk of (costly) revocation
- *C(I) = L(I)*
- But cash consumes pledgeable income (lower investment) and increases liquidity premium

Choice between cash and credit line

- Payoffs

$$U^C = p_H R(I^C) - (1 + \lambda\rho)I^C - (q-1)C(I^C)$$

$$U^w = (1 - \lambda\mu)p_H R(I^w) + \lambda\mu\gamma I^w - (1 + \lambda\rho(1-\mu))I^w - (q-1)C(Iw)$$

- Since cost of revocation decreases with liquidation payoff γ, firms with high liquidation value γ are more likely to choose credit lines for liquidity management
- Similar result would hold for variation in liquidity risk λ, risky firms are more likely to choose cash because the expected cost of revocation is high
- We focus on γ as source of firm heterogeneity, since it facilitates construction of equilibrium

Bank monitored lending

- Let us assume away liquidity management frictions for now, so both cash and credit lines achieve second best I^{SB}, U^{SB}
- Standard monitoring framework (HT 97)

  Bank can reduce private benefits from BI to bI by paying a monitoring cost ϕI
- Can bank lending achieve a better solution than U^{SB}?
- Since monitoring is costly, bank retains a stake in the project
- If there is sufficient bank capital, bank transfers all rents to firm ex-ante (assume that for now)

Bank monitored lending - solution

$$\max p_H R(I) - (1 + \lambda\rho)I \; - \varphi I$$

$$\text{s.t. } \left(1 + \lambda\rho - \left(\frac{p_H}{p_H - pL}\right)\varphi\right) I \leq A + \rho^b{}_0(I)$$

Where

$$\rho^b{}_0(I) = pH\left[R(I) - \frac{b + \varphi}{p_H - pL} I\right]$$

- Firm uses monitored financing if

$$U^{SB} < U^b$$

- This can only happen if banking increases investment

$$I^{SB} < I^b$$

Bank monitored lending - intuition

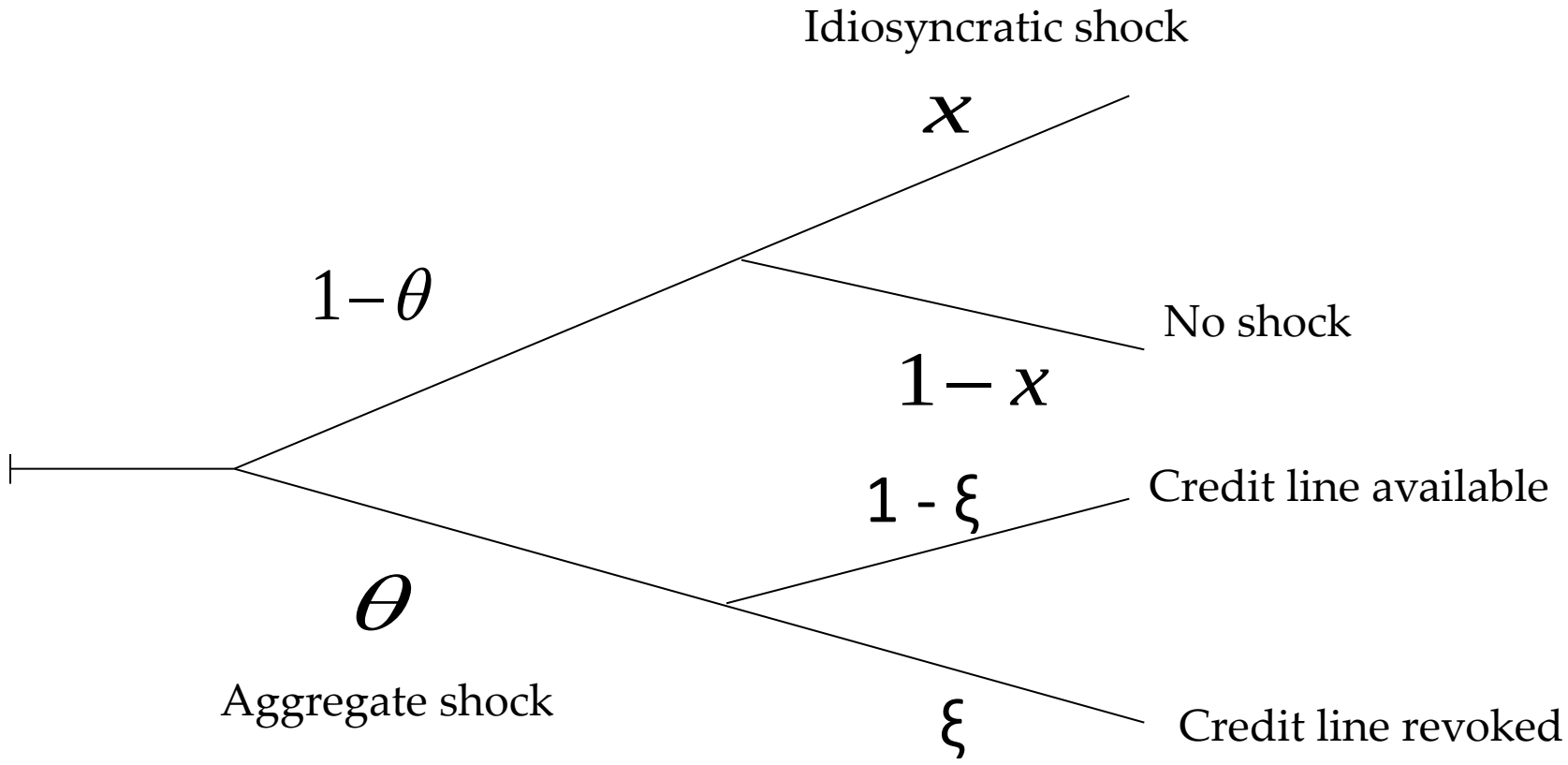
- Trade-off: bank increases pledgeable income and investment, but monitoring is costly and reduces productivity
- So firms choose bank monitoring when the gain from increasing investment is larger
- Net worth effects: since marginal productivity is decreasing, monitoring is more beneficial when investment is low (firm is financially constrained)
- Low net worth (low A) firms are more likely to become bank-dependent

Monitored lending with liquidity management frictions

- Previous results continue to hold
  - Firms with high liquidity risk more likely to choose cash rather than credit lines
  - Low net worth firms more likely to use bank monitoring
- Thus the model can match the empirical finding that small, low credit quality firms are more likely to be bank dependent but less likely to use credit lines for liquidity insurance
  - As long as liquidity risk is positively correlated with financial constraints in the cross-section

Equilibrium framework

- Economy with high and low credit quality firms, and a single bank
- Price of liquid asset q determined in equilibrium, exogenous supply $C_s(q)$



Equilibrium framework (cont.)

- Bank has initial capital K_0, and contingent liquidity W_1 that is available to fund credit line drawdowns in state θ
- W_1 can arise from consumer liquidity insurance (Diamond and Dybvig, 1983, Kashyap, Rajan and Stein, 2002), or from flight into banks in bad aggregate states (Gatev and Strahan, 2006)
- Supply of contingent liquidity is risky
  - Probability $\xi > 0$ that W_1 is not available
- Thus the probability of credit line revocation is

$$\lambda\mu = \theta\xi$$

- Credit line available in state $\theta(1 - \xi)$, up to W_1

Equilibrium definition

- Bank chooses optimal amount of capital and liquidity K^*_0, W^*_1 given endowments K_0, W_1, firms optimal choices, and liquidity premium q^*
  - We allow bank to transfer cash across time
  - Assume bank does so to maximize welfare (central planning problem)
- Firms of both types pick their highest possible payoff given bank's optimal choice K^*_0, W^*_1 and the liquidity premium q^*
- The date-0 market for liquid assets clears at q* given the demand for liquid assets from firms and the bank

Optimal liquidity choice by bank

- It is never optimal to increase W^*_1 beyond W_1 by saving cash in the bank
  - Equivalent to firm solution
  - Increasing term loans has a higher marginal benefit for the economy than increasing credit line provision, because it benefits financially constrained firms
- For the same reasons it is optimal to use future liquidity to make loans rather than provide additional credit lines
- But this also means that shocks to bank health (capital or liquidity) will affect mostly credit line provision unless bank capital is already low

Effect of shocks to bank health

- Shocks to K_0 or W_1 have similar effects because the bank can shift funds across time
- Effect depends on initial equilibrium
  - If initial capital is not too low, shocks affect ability to honor credit lines
  - Otherwise, it affects ability to make standard loans
- Cross-sectional implications
  - Credit line channel affects mostly high credit quality firms. Low quality firms are affected indirectly through changes in the cost of holding cash
  - Standard lending channel affects mostly low credit quality firms. High quality firms may be affected through changes in cost of cash

Example

- Suppose bank health decreases starting from equilibrium with excess bank capital
- Shock reduces ability of banks to honor credit line
- *"Ex-ante"* effect: high quality firms move from credit lines to cash. Pledgeable income decreases, so real activity may also be affected
- *"Ex-post"* effect: some high quality firms may need to drawdown on existing credit lines. In that case shock may have direct effect on their ability to invest
- Low quality firms are also affected because they rely on cash and cost of cash likely goes up

Empirical strategy

- Separating ex-ante from ex-post effects of bank health
- Ex-post effects rely on covenant violations
  - Following a violation, bank is allowed to restrict access to existing credit lines
  - Bank health can affect waiver-revocation margin
  - Even (ex-ante) high-quality firms may be dependent on credit lines following covenant violations (financial distress)
- Ex-ante effects identified using sample of firms that have not violated covenants
- In both cases we rely on cross-bank variation in bank health
  - Firm-bank match is not part of current theory
  - Shock to individual bank health should matter most in times of aggregate liquidity shortage, because reallocation of liquidity across individual banks may not happen

Empirical tests – sample (I)

- Firm-level data from Capital IQ (CIQ) and Compustat: 2002-2011
  - CIQ compiles information on drawn and undrawn credit lines
  - U.S. firms covered on both databases 2002-2011
  - Remove utilities (SIC 4900-4999) and financials (SIC 6000-6999)
  - Final sample: 26.578 firm-year observations, 18,691 firm-years with CL
- Novel database of credit line covenant violations and consequences of violations
  - Obtained by parsing 10-K filings from the SEC
  - SEC requires disclosure of violation event and material consequences ("...companies that are, or are reasonably likely to be, in breach of such covenants must disclose material information about that breach and analyze the impact on the company if material...“)
  - Collect violation events and whether lender waives violation or revokes access to the line of credit

Empirical tests – sample (II)

- Database on Firm-Bank Linkages
  - Strategy: link firms to banks they have been borrowing from in previous 5-10 years/currently borrowing from
  - Using syndicated loan data (Loan Pricing Corporation (LPC)'s Dealscan database)
  - Weighted by amount of lending originated by each bank
  - Consider only leads / all banks

Empirical tests – ex-post effects

	Crisis Period		Pre-Crisis Period	
	(1)	(2)	(3)	(4)
Dep Var: Waiver (dummy)	Firms with LC	LC>10% Assets	Firms with LC	LC>10% Assets
Change in Lender Capital Ratio$_{t-1}$	10.83***	14.26***	3.659	5.298
	(2.669)	(2.624)	(1.346)	(1.360)
Change in Lender Liquidity Ratio$_{t-1}$	2.005*	3.537**	0.307	1.232
	(1.818)	(2.302)	(0.290)	(0.834)
Size $_{t-1}$	-0.065***	-0.096***	-0.0820***	-0.097***
	(-3.090)	(-2.949)	(-3.614)	(-2.800)
Rated $_{t-1}$ (dummy)	-0.0138	-0.0871	-0.0556	-0.001
	(-0.203)	(-0.918)	(-0.758)	(-0.008)
Profitability $_{t-1}$	-0.320	-0.185	-0.191	-0.181
	(-1.223)	(-0.692)	(-0.920)	(-0.638)
Lender Capital Ratio $_{t-1}$	-6.775**	-7.477	-1.276	1.117
	(-1.999)	(-1.630)	(-0.438)	(0.253)
Lender Size $_{t-1}$	-0.00162	-0.0164	-0.0231	-0.0147
	(-0.0646)	(-0.549)	(-1.134)	(-0.520)
Lender Deposit Ratio $_{t-1}$	-2.360*	-2.796*	-1.111	-0.152
	(-1.872)	(-1.915)	(-1.431)	(-0.127)
Lender Liquidity Ratio $_{t-1}$	-1.040**	-0.800	0.287	1.136**
	(-2.494)	(-1.621)	(0.761)	(2.135)
Lender Non-Perform Ratio $_{t-1}$	-10.85***	-13.23***	-5.896	11.28
	(-3.524)	(-3.274)	(-0.628)	(0.803)
Observations	397	209	458	236
R-squared _	0.101	0.152	0.0704	0.100

- Positive shock to bank health associated on average with higher likelihood of waiver of violations, only in crisis

Empirical tests – ex-post effects

	Δ(Drawn Credit Lines / Bank Debt)$_t$		Δ(Drawn Credit Lines / Total Debt)$_t$		Δ(Drawn Credit Lines / Total Assets)$_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
	No Controls	Controls	No Controls	Controls	No Controls	Controls
Covenant Violation$_{t-1}$ (dummy)	-0.110**	-0.106**	-0.0988**	-0.0969**	-0.0298**	-0.0320**
	(-2.416)	(-2.355)	(-2.406)	(-2.382)	(-2.175)	(-2.345)
Covenant Violation$_{t-1}$*Waiver $_{t-1}$	0.161**	0.142**	0.116**	0.0921*	0.0374**	0.0384**
	(2.526)	(2.270)	(2.079)	(1.656)	(1.966)	(2.029)

- Firms that violate a covenant and are revoked suffer a significant reduction in their access to credit lines, in contrast to waived firms who retain access and increase their bank dependence
- (All regressions include, unreported, firm controls, lender controls, year FE, robust errors)

Empirical tests – ex-post effects

	Δ(Drawn Credit Lines / Bank Debt)$_t$		Δ(Drawn Credit Lines / Total Debt)$_t$		Δ(Drawn Credit Lines / Total Assets)$_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
	No Controls	Controls	No Controls	Controls	No Controls	Controls
Covenant Violation$_{t-1}$ (dummy)	-1.029	-0.884	-1.447*	-1.440**	-1.369*	-0.931**
	(-1.127)	(-1.120)	(-1.778)	(-2.499)	(-1.651)	(-1.990)
Covenant Violation$_{t-1}$*Waiver $_{t-1}$	2.730	2.451	3.397*	3.842**	3.350	2.333*
	(1.120)	(1.099)	(1.786)	(2.474)	(1.624)	(1.943)

- IV analysis: waivers driven by bank health have significant impact on access to precommitted credit following a covenant violation and increase bank dependence

Empirical tests – ex-post effects

	Net Credit Line Drawdowns		Net Loan Originations		Net Bond Issues	
	(1)	(2)	(3)	(4)	(5)	(6)
	No Controls	Controls	No Controls	Controls	No Controls	Controls
Covenant Violation$_{t-1}$ (dummy)	-0.025**	-0.025**	-0.009	-0.008	0.0172*	0.0187*
	(-2.508)	(-2.551)	(-1.020)	(-1.017)	(1.724)	(1.899)
Covenant Violation$_{t-1}$*Waiver $_{t-1}$	0.021	0.023*	-0.006	-0.004	-0.0237*	-0.0213
	(1.572)	(1.663)	(-0.493)	(-0.420)	(-1.737)	(-1.578)

- Firms that violate credit line covenants and are revoked turn to bond financing, while those that are waived retain bank financing through credit lines

Empirical tests – ex-post effects

	Sales Growth$_{t+1}$		Change in Profitability$_{+1}$		Workforce Growth$_{t+1}$		Investment$_{t+1}$	
	(1)	(2)	(3)	(4)	(3)	(4)	(3)	(4)
Dep Var: Performance Measure	Firms with LC	LC>15% Assets	Firms with LC	LC>15% Assets	Firms with LC	LC>15% Assets	Firms with LC	LC>15% Assets
Waiver$_{t-1}$	1.072**	0.786*	0.0837*	0.109	0.201	0.264**	0.409*	0.0272
	(2.403)	(1.882)	(1.741)	(1.606)	(1.427)	(2.037)	(1.670)	(0.158)

- IV analysis: waivers driven by bank health have real implications for firms (weak results)

Empirical tests – ex-ante effects

Dependent Variable: Change in Firm Cash Ratio†	LC > 0 (1) Crisis	LC > 0 (2) Pre-Crisis	LC > 0.05 (3) Crisis	LC > 0.05 (4) Pre-Crisis	LC > 0.1 (5) Crisis	LC > 0.1 (6) Pre-Crisis
Change in Lender Capital Ratio$_{t-1}$	−1.913*	−1.331***	−2.226**	−1.250***	−1.746	−1.020*
	(−1.809)	(−2.956)	(−2.033)	(−2.652)	(−1.371)	(−1.888)
Change in Lender Liquidity Ratio$_{t-1}$	−0.339*	−0.492***	−0.327	−0.427**	−0.160	−0.384**
	(−1.710)	(−3.084)	(−1.625)	(−2.546)	(−0.698)	(−2.010)

- Sample of firms that are **not** in violation of a covenant: a deterioration in their lenders' health is associated with an increase in cash holdings as a share of total liquidity (cash + LC)
- For the full sample effect is as strong inside as outside of the crisis, possibly due to mix of ex-ante and ex-post effects

Empirical tests – ex-ante effects

	LC > 0		LC > 0.05		LC > 0.1	
Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)
Change in Firm Cash Ratio†	Crisis	Pre-Crisis	Crisis	Pre-Crisis	Crisis	Pre-Crisis
Change in Lender Capital Ratio$_{t-1}$	−6.181**	−0.465	−5.603*	0.177	−3.886	1.027
	(−2.077)	(−0.529)	(−1.898)	(0.194)	(−1.452)	(1.014)
Change in Lender Liquidity Ratio$_{t-1}$	−1.546***	−0.068	−1.557***	0.080	−1.488***	0.276
	(−2.910)	(−0.192)	(−2.923)	(0.222)	(−3.340)	(0.733)

- Subsample of high credit quality firms (rated, top quartile of size, and dividend payers): deterioration in their lenders' health is associated with an increase in cash holdings as a share of total liquidity (cash + LC) only inside of the crisis
- For these firms ex-post effects likely small and most of the effects due to ex-ante mechanism

Relationship to existing macro models

- Existing literature captures bank-dependency by assuming that there is no direct lending from household to firms (Gertler-Karodi, 2011, Gertler-Kiyotaki, 2013)
- Bank lending is necessary, and there is an agency problem at the level of the bank that links bank's ability to raise financing to balance sheet health
- In contrast, model here has considerably more heterogeneity in bank-dependency
  - Low-quality firms rely on banks for most of their borrowing, while high-quality firms rely on banks mostly for liquidity insurance
- Why do we care about additional heterogeneity?
  - Identification of bank effects
  - But would this matter for macro effects of bank health?

Potentially new effects

- Endogenous amplification of shocks, coming from extensive margin effects
- Ex-post effects on high-quality firms
  - High quality firms only rely on bank lending in the event of negative aggregate shock
  - May run on credit lines even if not necessary (Ivashina and Scharfstein, 2010)
  - These effects may create reduction in bank capital available to fund low quality firms
- Ex-ante effects on high-quality firms
  - They also move out of credit lines and into cash going forward
  - This effect reduces bank profitability and capital as well, may transmit to bank-dependent firms
- Composition effects
  - Fraction of low-quality, bank-dependent firms will increase in bad states

What can these effects add to macro models of banking

- Existing models already have amplification effects coming from deterioration of bank balance sheets following negative shocks
- What would these additional effects add?
- Gertler-Karodi (2011): effects rely on “vulnerable state “ of banking sector at the onset of the crisis (high leverage ratios)
- In this new framework, bank lending may look small during normal periods, but extensive margin effects kick in during bad times and create large effects
- Quantitative effects: standard models can have difficulty generating large enough amplification effects (Kocherlakota, 2000)

Modeling challenges

- Existing macro models do not incorporate these endogenous amplification effects
- Micro models (like the one I presented) do not have sufficient dynamics. One-shot, 3-period model
- Need model in which firms are making simultaneous borrowing and liquidity insurance decisions in all periods, to capture interactions between ex-ante and ex-post effects of bank health
- Perhaps one way of doing this is by using an overlapping generation framework
  - Projects are born today and owners make borrowing and insurance decisions for tomorrow
  - New projects are born tomorrow and may compete for bank funds with existing projects that draw on bank insurance (credit lines)
  - Endogenous net worth – net worth available for new projects is function of payoff of existing ones

Table 2
Revolving lines drawdowns, U.S. corporate loans (billion USD).
Compiled from SEC filings and Reuters.

Date drawn	Company	Credit rating (12/31/08)	Amount drawn ($MM)	Credit line ($MM)	Maturity	Spread (Undrawn/ Drawn)	Lead bank	Comment (SEC filings)
8/25/2008	Delta Air Lines	BB−/Ba2	1,000	1,000	2012	50/L+200	JPM	Simply put, we have taken this action to increase our cash balance as we approach the closing of the merger. We believe this will provide us with the utmost in flexibility—at minimal cost—as we prepare for this critical transition.
Sep-2008	Marriott	BBB+/Baa2	908	2,500	2012	8/L+35	Citi	Shrinking liquidity in the commercial paper market.
9/15/2008	FairPoint Communications	BB+/Ba3	200	200	2014	37.5/L+275	Lehman	The Company believes that these actions were necessary to preserve its access to capital due to Lehman Brothers' level of participation in the Company's debt facilities and the uncertainty surrounding both that firm and the financial markets in general.
9/16/2008	International Lease Finance Corporation	AA−/A1	6,500	6,500	2009–11	10/L+25	Citi	ILFC drew on its unsecured revolving credit facilities to provide it with liquidity to repay its commercial paper and other general obligations as they become due.
9/19/2008	Michaels Stores	B	120	1,000	2011	25/L+150	BofA	The Company took this proactive step to ensure that it had adequate liquidity to meet its cash needs while there are disruptions in the debt markets.
9/22/2008	General Motors	B−/Caa3	3,400	4,100	2011	30/L+205	Citi, JPM	The company said it was drawing down the credit in order to maintain a high level of financial flexibility in the face of uncertain credit markets

Wal-Mart Stores Inc. Capital Structure Summary

Capital Structure Data				
For the Fiscal Period Ending				
Currency	***USD***		***USD***	
Units	**Millions**	**% of Total**	**Millions**	**% of Total**
Total Debt	54,227.0	*39.7%*	56,642.0	*40.6%*
Total Common Equity	76,343.0	*55.9%*	76,255.0	*54.7%*
Total Minority Interest	5,914.0	*4.3%*	6,575.0	*4.7%*
Total Capital	**136,484.0**	***100.0%***	**139,472.0**	***100.0%***

Debt Summary Data				
For the Fiscal Period Ending				
Currency	***USD***		***USD***	
Units	**Millions**	**% of Total**	**Millions**	**% of Total**
Total Revolving Credit	**0**	***0.0%***	**0**	***0.0%***
Total Senior Bonds and Notes	627.0	*1.2%*	60,215.6	*106.3%*
Total Capital Leases	3,350.0	*6.2%*	3,097.0	*5.5%*
General/Other Borrowings	50,159.0	*92.5%*	7,719.0	*13.6%*
Total Principal Due	**54,136.0**	***99.8%***	**71,031.6**	***125.4%***
Total Adjustments	91.0	*0.2%*	(14,389.6)	*(25.4%)*
Total Debt Outstanding	**54,227.0**	***100.0%***	**56,642.0**	***100.0%***
Available Credit				
Undrawn Revolving Credit	16,261.0	-	15,447.0	-
Total Undrawn Credit	**16,261.0**	**-**	**15,447.0**	**-**

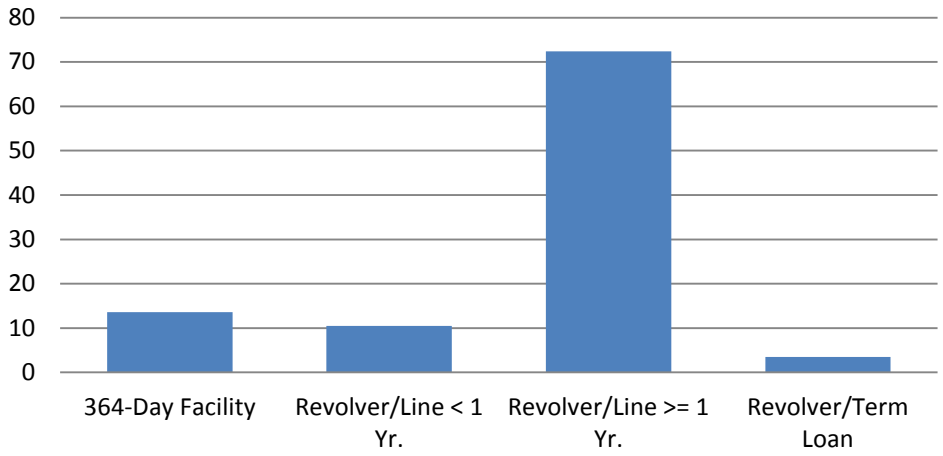
Table 4

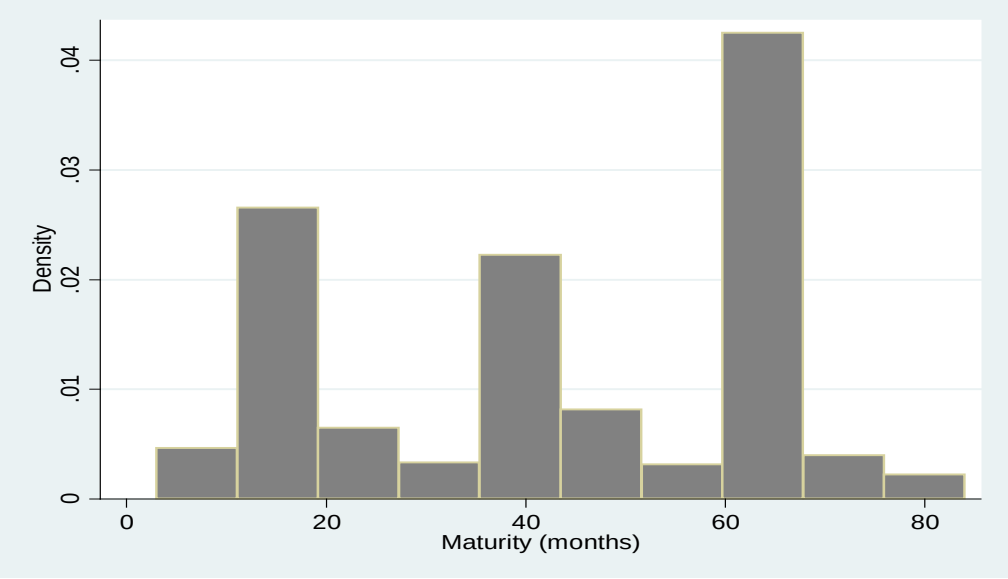
The Relationship between Profitability and Drawdowns on Lines of Credit

This table presents regression results to study the relationship between profitability and drawdowns of lines of credit. The sample consists of non-utilities (excluding SIC codes 4900-4949) and non-financials (excluding SIC codes 6000-6999) U.S. firms covered by both Capital IQ and Compustat from 2002 to 2008 for a total of 23,013 firm-years. We have removed firm-years with 1) negative revenues, and 2) negative or missing assets. The dependent variable in columns 1-5 is the annual variation in drawn lines of credit. The dependent variable in columns 6-10 is the annual drawdown in lines of credit: The variable takes value zero if the change in drawn lines of credit is non-positive. "Profits > 0%" and "Profits > 5%" are dummies for profitability being respectively above 0% and 5%. Year and Rating fixed effects included. Rating fixed effects are based on 22 rating dummies and the unrated dummy. Robust standard errors clustered at the firm level are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Columns 1-6 employ OLS, while columns 6-10 employ a Tobit specification with 8739 left-censored observations at Drawdown ≤ 0.

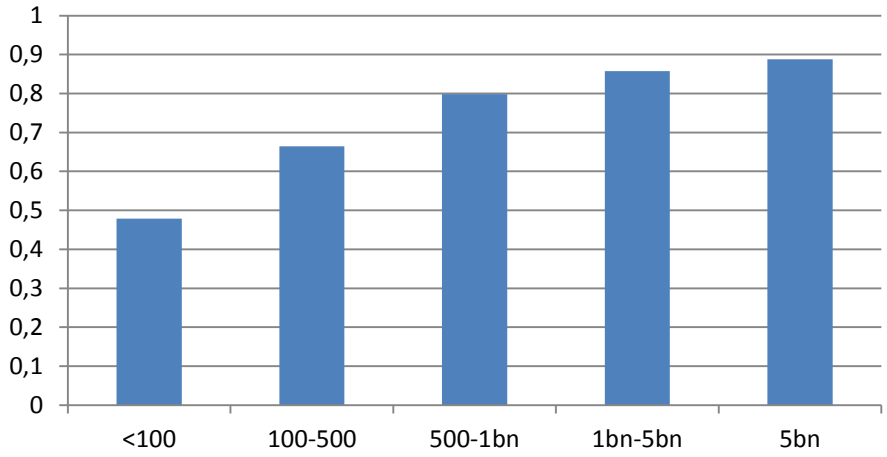
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	Changes in Revolving Credit					Drawdowns in Revolving Credit				
Profitability	-0.022***					-0.054***				
	(0.006)					(0.002)				
Profits > 0%		-0.007***					-0.015***			
		(0.002)					(0.001)			
Profits > 5%			-0.008***					-0.012***		
			(0.002)					(0.001)		
Change in Profitability				-0.056***					-0.098***	
				(0.011)					(0.001)	
Increases in Profitability					-0.061***					-0.117***
					(0.014)					(0.005)

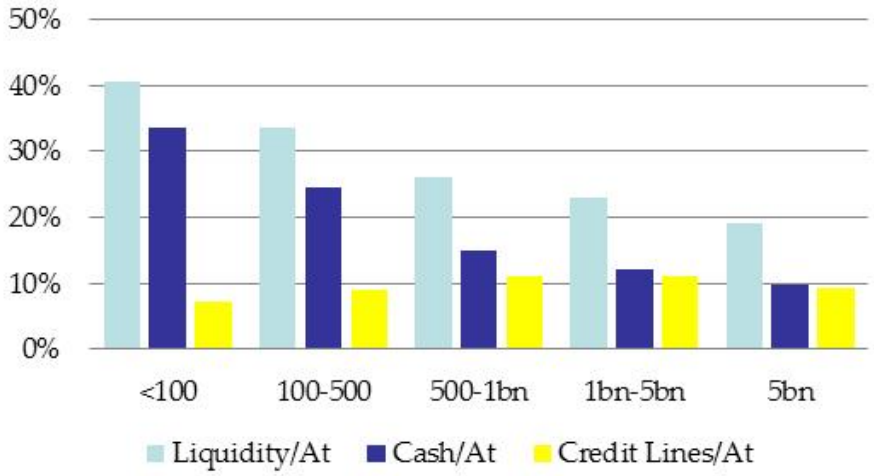
Maturities of Credit lines





The use of credit lines by size groups





	(1)	(2)
	Presence of a Credit Line (Dummy)	
	All Firms	Rated
Profitability	0.362***	0.116*
	(0.041)	(0.069)
Size	0.002	-0.013**
	(0.005)	(0.006)
Book Leverage	0.271***	0.080***
	(0.034)	(0.028)
M/B	-0.035***	-0.029***
	(0.005)	(0.006)
Tangibility	0.201***	0.043
	(0.039)	(0.032)
NWC/Assets	0.504***	0.134***
	(0.036)	(0.043)
Capex/Assets	0.210*	0.015
	(0.126)	(0.123)
R&D/Sales	-0.023**	-0.304***
	(0.009)	(0.084)
Div. Payer Dum.	0.076***	0.015
	(0.015)	(0.011)
CF Volatility	-2.172***	-0.977**
	(0.555)	(0.382)
Beta KMV	-0.004	0.002
	(0.003)	(0.004)
Rating	-0.009***	-0.012***
	(0.001)	(0.003)

Credit line users have more profits, tangible assets, and higher credit ratings than firms that do not have credit lines