Bank Liquidity and the Cost of Debt

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Our Paper's Contribution

- Little research on link between bank liquidity and funding costs.
- Build a model where more liquid firms have lower funding costs.
- Find initial empirical evidence for this relationship.
- This effect may imply higher optimal liquidity requirements.

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Motivation

- Policy question: what is the economic cost of higher liquidity requirements?
- Inspiration comes from capital requirements' "M-M" offsets.
- There's some opportunity cost for firms - liquid assets yield less.
- *but* if their liquidity risk is reduced then the risk premium on their funding should fall.
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The model set up

- Three periods: t=0, 1, 2
- Two types of agent: a bank and a continuum of investors, normalised to size 1.
- The bank is funded by fixed amounts of debt (D) and equity (E).
- The bank owns the equity, investors own the debt. E = 1 - D.

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- The bank can choose between cash (c) and loans (1-c) in period 0.
- Loans have a random yield R in period 2.
- The bank can repo loans to raise up to $\theta R(1-c)$ in period 1, where $\theta < 1$
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- In period 1, each investor receive a private signal $x_i = R + e_i$, where e_i is $N(0, \sigma^2)$.
- Some proportion of investors $W \in [0, 1]$ decide whether to withdraw based on their signal
- The bank will fail in period 1 if $\theta R(1 - c) + c < WD$.
- If the bank fails then runners receive 1, other investors receive 0.
- If the bank survives to period 2 it repays its remaining investors and the repo, rest is profit.

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Solving the model

Solve backwards:

1. Find the optimal run strategy for investors, given the bank's choices of c and r_D.
2. Given the run strategy, find the minimum r_D in period 0 necessary to participate.
3. Given r_D and the investor's run strategy, find the bank's optimal cash choice.

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Equilibrium consists of bank choice c, r_D and investor strategy.

Run strategy

- In period 1, investors know the insolvency point of the bank R_0 is given by $R_0(1-c)+c = Dr_D$.
- For signals $x_i < R_0$ it is strictly dominant for investors to run because they expect insolvency.
- However there will also be some point R^0 such that $\theta R^0(1-c)+c = D$ where the bank is immune to runs.
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Period 1 equilibrium

- Unique equilibrium "switching point" R^*: investors run if they receive signals below and vice versa.
- The frequency of bank runs is given by $P(R < R^*)$.
- Generally we have $R^* > R_0$ i.e. solvent banks will suffer runs, even if all investors believe they are solvent.

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Comparative static - more cash

- We have a unique equilibrium "switching point" R^*: investors run if they receive signals below and vice versa.
- The frequency of bank runs is given by $P(R < R^*)$.
- Holding more cash reduces R^* and the frequency of bank runs.

Equilibrium funding cost

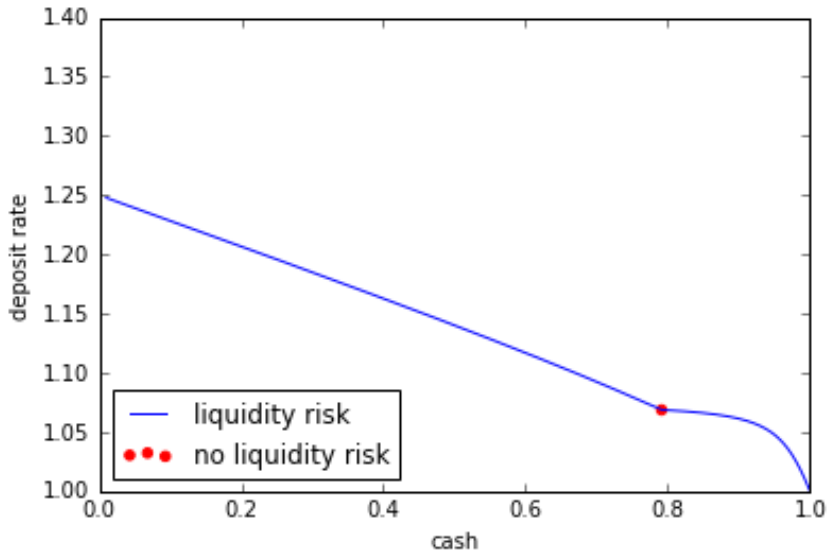


Figure: Well capitalised bank

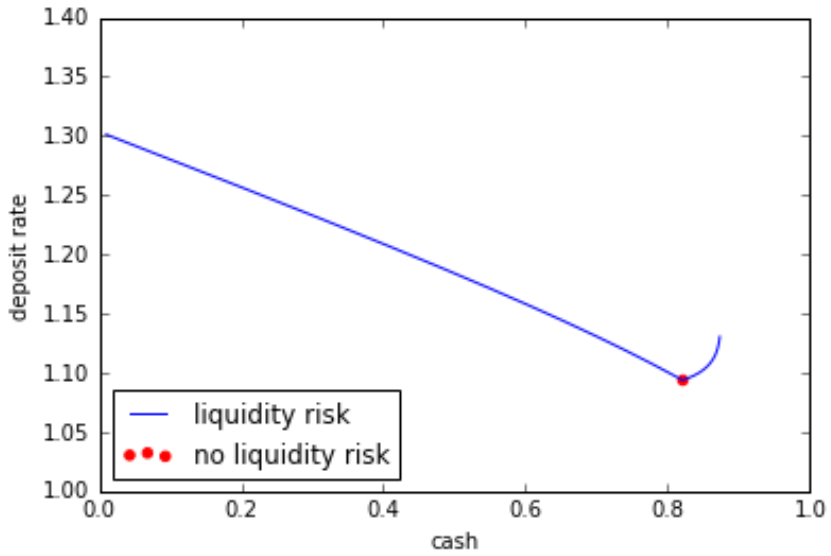


Figure: Badly capitalised bank

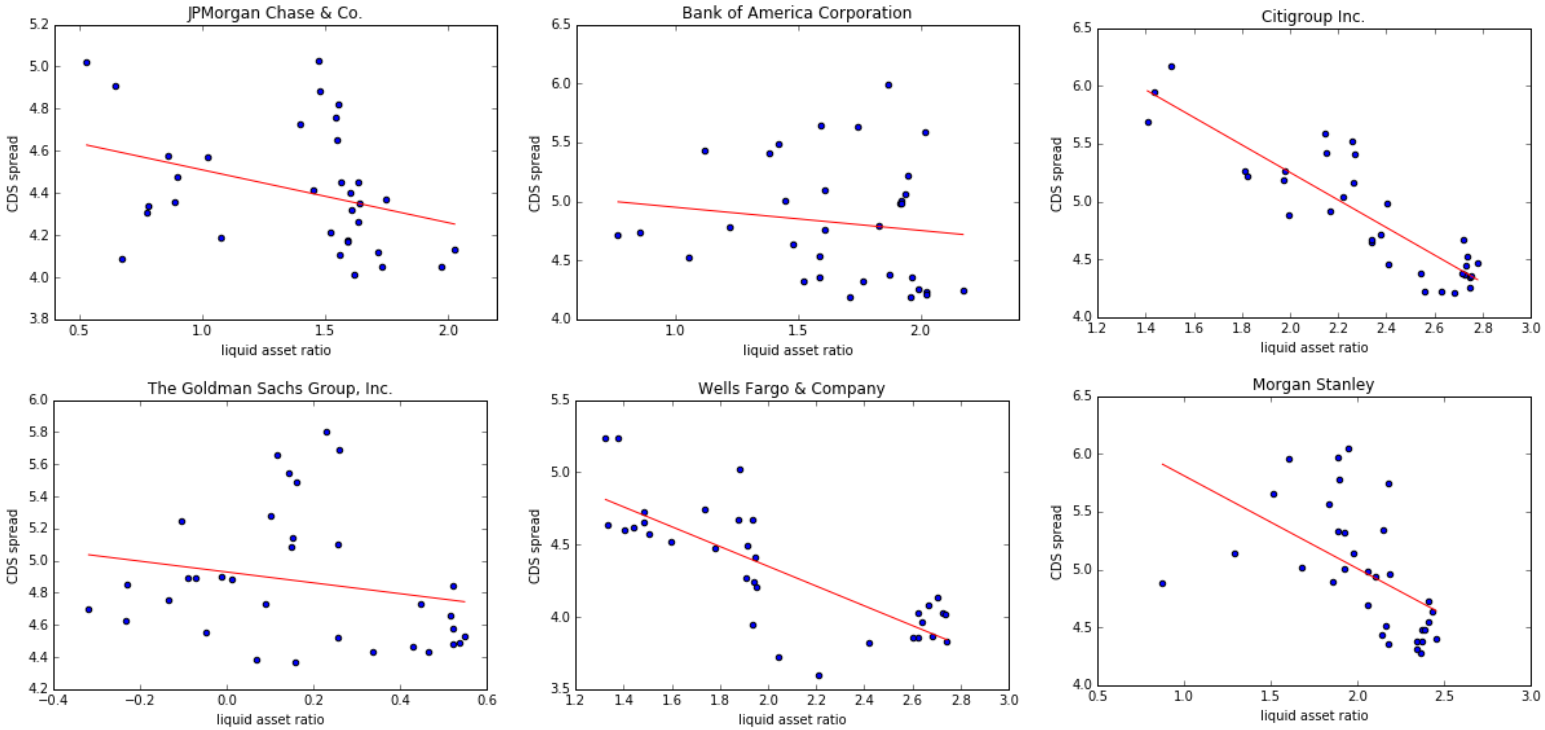
Empirical specification

We want to test our model's prediction that funding costs decline with cash choice.

$$\text{cost of funding}_{it} = \alpha_i + \beta_1 \frac{\text{equity}}{\text{total assets}}_{it} + \beta_2 \frac{\text{liquid assets}}{\text{total assets}}_{it} + \beta_3 \frac{\text{short term debt}}{\text{total assets}}_{it} + \gamma Z_t + \epsilon_{it} \quad (1)$$

- Data in logs
- Balance sheet data: Fed FRY9C disclosures
- Controls Z_t for VIX index and US Treasury yield
- CDS spreads: Bloomberg
- Time periods: quarterly data 2009-2016
- 6 firms: JPMorgan, Goldman, Morgan Stanley, Bank of America, Citigroup, Wells Fargo

Correlations



Initial results

VARIABLES	(1) FE only	(2) FE + BS Variables	(3) FE + BS Variables + Controls
liq asset ratio	-0.465**	-0.389***	-0.243***
	(-3.086)	(-4.251)	(-4.276)
leverage ratio		-1.813***	-1.115***
		(-4.947)	(-6.007)
ST debt ratio		0.0398	0.0130
		(0.915)	(0.609)
Constant	5.178***	8.704***	6.921***
	(34.47)	(11.80)	(14.15)
Observations	198	198	198
R-squared	0.181	0.301	0.706
Number of firmid	6	6	6
Fixed Effects	YES	YES	YES
Controls	NO	NO	YES

Robust t-statistics in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Magnitude of effect

- 1% change in liquidity associated with .24% change in CDS.
- NOT percentage points.
- If bank with LAR of 10% raises to 11%, that's a 10% increase.
- If CDS spread starts at 100bps, predicted decline to 97.6bps.

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Robust to:

- Dropping each year out the sample
- Dropping each firm out the sample
- Specification changes e.g. broader liquidity measure, deeper lags

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Summary and further work

- Policy question: social cost of higher liquidity requirements?
- Built a model where holding more cash reduces funding costs.
- BUT model is very simple and numeric simulations could be improved.
- Provided some evidence for an association between liquidity and CDS spreads.
- BUT sample is small and US only - need more widespread liquidity disclosures or different measure of funding costs.

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