



The Effect of Banking Crisis on Bank-Dependent Borrowers

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Motivation

Should bank-health affect borrowers' performance?

- No, if borrowers with positive NPV project can substitute bank-loans with other sources of funds.
- Yes, if bank-loans are special, i.e., firms face frictions in raising capital from other sources (e.g., public debt market).
- At a broader level: do firms face value-relevant frictions in raising external capital?





Motivation

Considerable debate in the literature - both in macroeconomics and corporate finance. Yet no conclusive answers due to three main reasons:

- Is it bank's health affecting borrowers or the reverse?
- Are there common economic shocks affecting both banks and borrowers?
- Some banking crises such as the Japanese crisis are spread over a long period of time, making the task of separating the borrower's investment opportunity set from the bank's supply of loan harder.





Related Literature

- Vast literature on whether banks are special, bank-borrower relationships and the transmission of monetary policy (Bernanke (1983), Bernanke & Blinder (1988,1992), Dahiya, Suanders and Srinivasan (2002), Gorton & Winton (2002), Gertler & Gilchrist (1994), Kashyap, Stein & Wilcox (1993), Kashyap & Stein (2000), Kashyap, Rajan & Stein(2002), Petersen & Rajan (1994), Santos & Winton (2005), Stein (1998))
- In the same spirit:
 - Peek & Rosengren (AER,2000) study real effects of Japanese banking crisis on japanese bank lending to U.S. real estate sector
 - Ashcraft (AER,2003) uses FDIC induced failures as a natural experiment to study local area real economic activity
- Related recent papers on international evidence: Khwaja and Mian (2005), Parvisini (2005)





Figure 1: Crisis Timeline

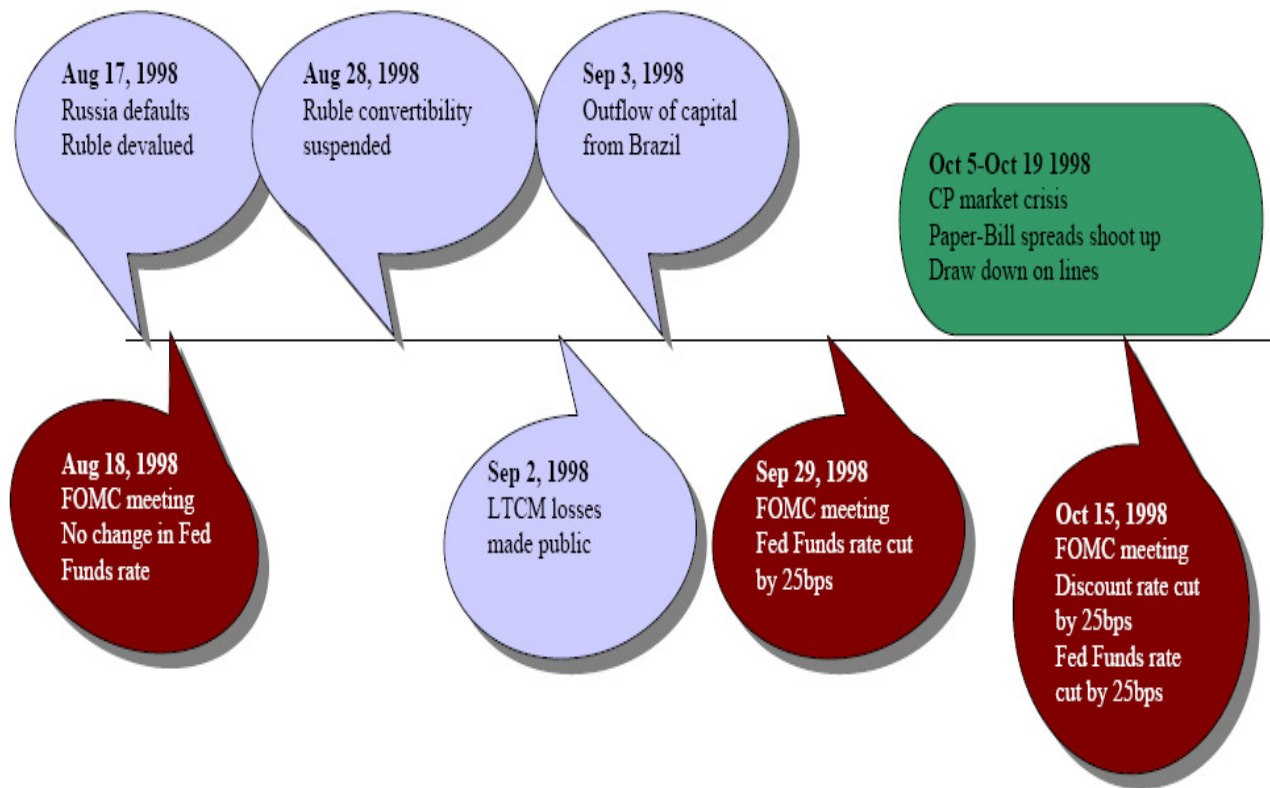




Figure 1 Panel A Banks Price Index May 14 - Nov 17, 1998



— Banks - - - S&P500

Source: DataStream

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Figure 2: Paper - Bill Spread in BPS May 14 - Nov 17 1998

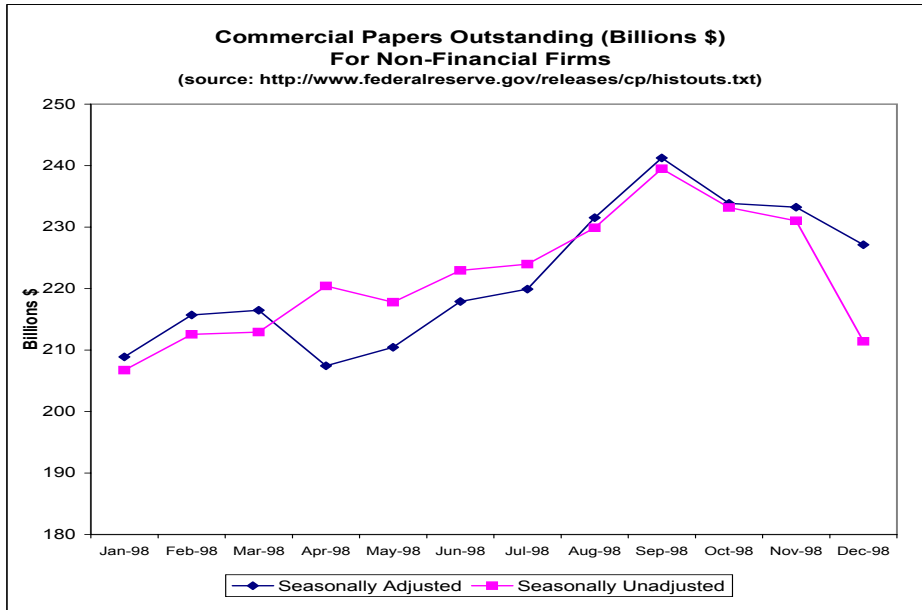


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Effect on Banks

- U.S. banks experienced large negative returns around the Russian crisis (Kho, Lee & Stulz (2000), Gatev & Strahan (2004)).
- In addition, the stock-return volatility increased dramatically (Gatev & Strahan (2004)).



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Effect on Banks: Accounting Numbers

Accounting Measures show banks were under considerable pressure (FDIC 1998Q3 report)

- Bank profits \$1.1 bn below Q2 profits.
- Earnings decline caused by weakness in overseas operations and trading activities of the banks, contributed to a decline of more than \$4.0 billion in the earnings of the large U.S. banks
- Banks charged off \$5.7 billion in loans in Q3, an increase 19.3 % over 97.Q3; Highest quarterly net charge-off rate since 1993.Q4
- 2 bank failures in the quarter; Number of problem banks increased to 70 in Q3 from 64 in Q2
- Ex-post measures: **new loan issuances decreased by 24%-27%** compared to the previous 6-months.

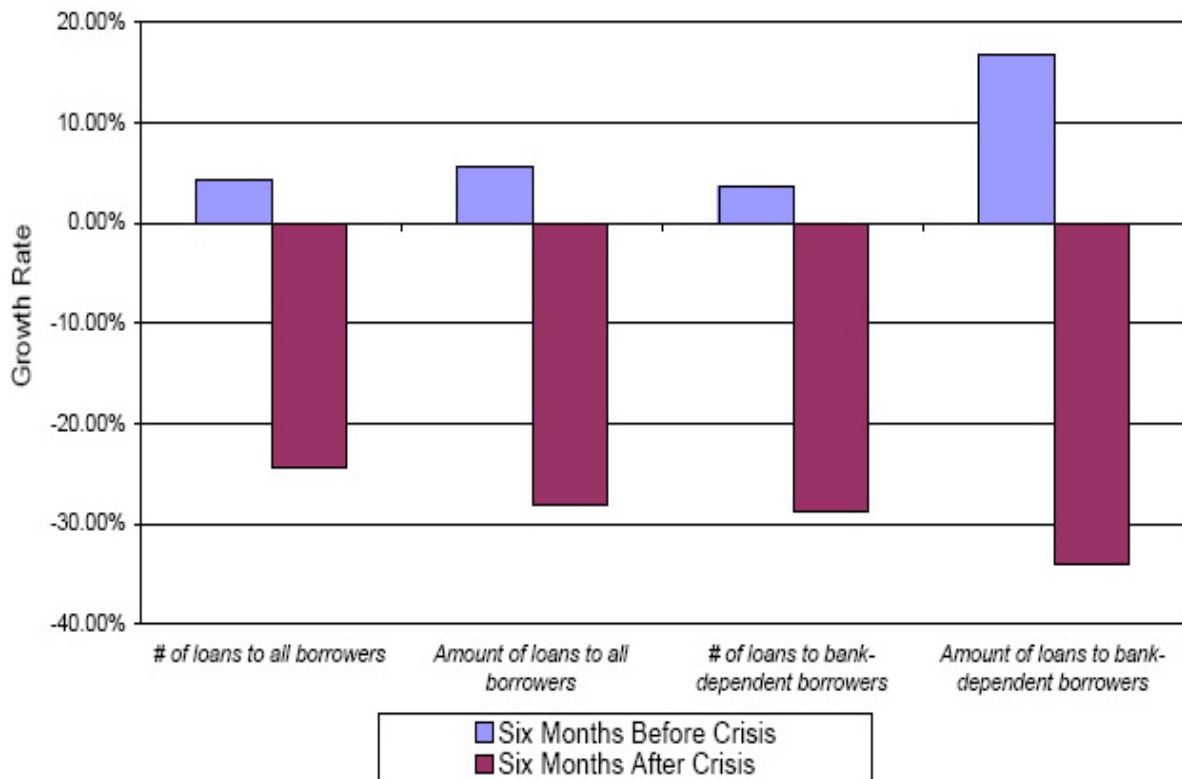


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Figure 2a: Growth in Bank-Loans



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What we do in this paper

We apply an exogenous variation to analyze the effect of bank-health on borrower performance. We focus on stock-market based measures to trace the valuation effects.

Russian Crisis of 1998 gives a nice setting because

- It affected banks adversely. Crisis, per se, was independent of borrowers' health or investment opportunity set.
- Crisis started in a different geographical region than the banks and borrowers, making the omitted variable problem less likely.





An Attractive Setting

A sharp test is possible since

- Big shocks were experienced in a narrow window (16 days) of time in late August and early September of 1998.
- At the same time, public debt market, was functioning well.
- Just two months later, liquidity dried up in the public debt market as well (Gatev, Schuermann and Strahan (2004)), allowing us to perform a *falsification* test.
- Fed intervened aggressively, allowing us to perform the test in the *reverse direction* as well.



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Preview of Main Results

- Bank-dependent firms earn significantly lower returns than firms with access to public debt markets in the 16-day trading window around the Russian Default and flight of capital from Brazil (August 14 to September 4).
- Bank-dependent borrowers **do not** experience larger negative returns during Oct-98.
- Bank-dependent borrowers earn a **positive and significant** return over firms with access to public debt market around FOMC interest rate cuts (on Sep 29 and Oct 15, 1998).



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Sample Selection

- Start with firms in the intersection of CRSP and COMPUSTAT as of May-1998
- Exclude
 - Financials and utilities
 - Stock price of less than 1\$
 - Firms with zero debt in the previous FY
 - Using compustat segment file remove firms with operations in Russia, Brazil, Europe, Eurasia, Eastern Europe and South America.
- Final sample of 3368 firms
- Accounting information lagged and taken as of May-1998



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Key variable construction

Event Window: Aug 14,1998 - Sep 4, 1998

Returns

- standard event study methodology (Kothari and Warner (2005))
- market-model beta estimated using 250 trading days, ending 50 days prior to the event window

Bank-Dependence

Two definitions of Bank-dependence. Bank-dependent if

- absence of S&P credit rating (Kashyap, Lamont &Stein (1994), Faulkender & Petersen (2005)).
- absence of CP rating.



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Descriptive Statistics



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	With credit rating ($N = 634$)			
	Mean	25% pctl	50% pctl	75% pctl
<i>mktcap</i>	6.28b	353.44	1.16b	4.02b
<i>mtb</i>	1.81	1.21	1.52	2.06
<i>lever</i>	0.39	0.24	0.36	0.51
<i>altman-z</i>	3.01	1.60	2.61	3.88
<i>car - ew</i>	-5.93%	-13.47%	-4.01%	2.54%
<i>car - vw</i>	2.71%			

	Without Credit Rating ($N = 2871$)			
	Mean	25% pctl	50% pctl	75% pctl
<i>mktcap</i>	305.47	29.44	84.88	252.45
<i>mtb</i>	2.48	1.21	1.66	2.51
<i>lever</i>	0.23	0.06	0.19	0.35
<i>altman-z</i>	5.44	2.17	3.69	6.02
<i>car - ew</i>	-10.75%	-20.68%	-9.57%	-0.11%
<i>car - vw</i>	-7.32%			

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Regression Results

- Dependent variable: event window CAR
- OLS regression including Industry fixed effects
- Robust standard errors

	Estimate	<i>t</i> -value	Estimate	<i>t</i> -value
<i>bankdep</i>	-0.0212	(-2.36)	-0.0216	(-2.40)
<i>log(mktcap)</i>	0.0147	(6.71)	0.0144	(6.52)
<i>lever</i>	-0.0396	(-2.26)	-0.0413	(-2.35)
<i>log(mtb)</i>	-0.0150	(-1.88)	-0.0132	(-1.56)
<i>altman-z</i>	0.0001	(0.35)	0.0001	(0.22)
<i>r&d</i>			-0.0003	(-0.57)
<i>Adj R</i> ²	5.0%		5.0%	
<i>N</i>	3252		3252	



Sub-sample of safe firms

- Sample restricted to top 50% and top 25% of credit quality (Z-score).
- Dependent variable: event window CAR.

	Estimate	<i>t</i> -value	Estimate	<i>t</i> -value
<i>bankdep</i>	-0.0429	(-3.21)	-0.0474	(-2.19)
<i>log(mktcap)</i>	0.0147	(4.61)	0.0204	(4.22)
<i>lever</i>	-0.0394	(-1.30)	-0.0523	(-1.18)
<i>log(mtb)</i>	-0.0069	(-0.68)	-0.0028	(-0.19)
<i>r&d</i>	0.0002	(0.34)	-0.0002	(-0.20)
<i>AdjR</i> ²	6.7%		4.9%	
<i>N</i>	1572		834	



Large and Safe Firm Sub-sample

- Sample restricted to top 50% of credit quality (Z-score) and firms with more than \$500 million (Column 1) or \$1 billion (Column 2) in market capitalization.
- Dependent variable: event window CAR.

	Estimate	<i>t</i> -value	Estimate	<i>t</i> -value
<i>bankdep</i>	-0.0410	(-2.90)	-0.0384	(-2.24)
<i>log(mktcap)</i>	0.0120	(1.83)	0.0203	(2.43)
<i>lever</i>	-0.0642	(-1.49)	-0.0356	(-0.66)
<i>log(mtb)</i>	-0.0066	(-0.44)	-0.0128	(-0.68)
<i>r&d</i>	0.0024	(2.14)	0.0036	(3.12)
R^2	0.051		0.098	
<i>N</i>	432		266	



Effect of Growth Opportunity

- Dependent variable: event window CAR
- OLS regression including Industry fixed effects

	<i>All Firms</i>		<i>Safe Firms</i>	
	Estimate	<i>t</i> -value	Estimate	<i>t</i> -value
<i>bankdep</i>	0.0005	(0.04)	0.0103	(0.48)
<i>bankdep * mtb</i>	-0.0455	(-3.00)	-0.0584	(-3.22)
<i>log(mtb)</i>	0.0277	(1.94)	0.0488	(2.76)
<i>log(mktcap)</i>	0.0136	(6.11)	0.0140	(4.15)
<i>lever</i>	-0.0394	(-2.23)	-0.0358	(-0.91)
<i>altman-z</i>	0.0001	(0.42)	-0.0003	(-0.75)
<i>r&d</i>	-0.0002	(-0.38)	0.0003	(0.44)
<i>AdjR</i> ²	5.1%		5.7%	
<i>N</i>	3252		1476	



Effect of Financial Flexibility: Free Collateral

- Regression within bank-dependent firms only.
- $\text{loansec} = 1 - (\# \text{ of loans secured} / \text{total } \# \text{ of loans in the Dealscan Database})$
- $\text{amtsec} = 1 - (\text{amount of secured loans} / \text{total loans})$
- $\text{sectan} = 1 - (\text{amount of secured loans} / \text{tangible assets})$

	Model 1		Model 2		Model 3	
	Est	<i>t</i> -val	Est	<i>t</i> -val	Est	<i>t</i> -value
<i>loansec</i>	0.0366	(2.48)				
<i>amtsec</i>			0.0398	(2.75)		
<i>sectan</i>					0.0026	(2.80)
<i>log(mktcap)</i>	0.0074	(1.24)	0.0070	(1.17)	0.0098	(1.75)
<i>lever</i>	-0.0346	(-0.84)	-0.0339	(-0.82)	-0.0251	(-0.60)
<i>log(mtb)</i>	0.0081	(0.46)	0.0082	(0.46)	0.0062	(0.36)
<i>AdjR</i> ²	0.075		0.077		0.082	
<i>N</i>	643		643		641	



CP crisis period results

- Dependent variable: event window (Oct,5 - Oct,19) CAR
- OLS regression including Industry fixed effects

	Estimate	<i>t</i> -value	Estimate	<i>t</i> -value
<i>bankdep</i>	-0.0094	(-1.04)		
<i>nocrating</i>			-0.0060	(-0.61)
<i>log(mktcap)</i>	0.0137	(6.08)	0.0145	(7.07)
<i>lever</i>	-0.0620	(-3.80)	-0.0577	(-3.69)
<i>log(mtb)</i>	-0.0158	(-1.92)	-0.0168	(-2.07)
<i>AdjR</i> ²	3.2%		3.2%	
<i>N</i>	3306		3306	

- When liquidity dried up in public debt market, banks experienced help from FED and deposits poured into the banking sector, the difference between bank-dependent and other borrowers become insignificant.



Response to FED actions: FOMC meeting Sep 29,1998

- Event window CAR: $(-1,0)$ around the FOMC meeting
- This meeting largely anticipated by the market
- Fed took note of the turmoil in international market and its effect on banking system

	Estimate	<i>t</i> -value
<i>bankdep</i>	0.0082	(1.60)
<i>log(mktcap)</i>	0.0002	(0.14)
<i>lever</i>	-0.0108	(-0.95)
<i>log(mtb)</i>	-0.0006	(-0.12)
<i>altman-z</i>	0.0001	(0.15)
<i>r&d</i>	-0.0002	(-0.85)
<i>Adj R</i> ²	0.01%	
<i>N</i>	3201	





Fed's response on Oct 15, 1998

”..... Growing caution by lenders and unsettled conditions in financial markets more generally are likely to be restraining aggregate demand in the future. Against this backdrop, further easing of the stance of monetary policy was judged to be warranted to sustain economic growth in the context of contained inflation

- approved a reduction in the discount rate by 25 basis points from 5 percent to 4-3/4 percent.
- federal funds rate to fall 25 basis points from around 5-1/4 percent to around 5 percent.



FOMC meeting Oct 15,1998

- Event window CAR: (-1,0) around the FOMC meeting

	Estimate	<i>t</i> -value
<i>bankdep</i>	0.0122	(2.25)
<i>log(mktcap)</i>	0.0058	(4.42)
<i>lever</i>	0.0073	(0.73)
<i>log(mtb)</i>	-0.0089	(-1.84)
<i>altman-z</i>	-0.0001	(-0.44)
<i>r&d</i>	-0.0005	(-1.75)
<i>Adj R</i> ²	1.6%	
<i>N</i>	3174	



Robustness

- Self-selection of bond rating
- Alternate return definitions (raw return, scholes-williams)
- Alternate definitions of bank-dependence
- Industry Fixed Effects
- Cross-sectional correlation in errors at
 - industry level
 - across bank-dependent and bank-independent firms
- Bootstrapping
- Median Regression
- Different Industry classifications (2-digit, 3-digit SIC, FF)
- Remove LTCM crisis (Sep 2,1998) from event window
- Different event windows around the crisis





Self-Selection Model Results

Second stage regression results

	Estimate	<i>t</i> -value	Estimate	<i>t</i> -value
<i>bankdep</i>	-0.0869	(-4.07)		
<i>nocprating</i>			-0.1147	(-5.00)
<i>log(mktcap)</i>	0.0068	(2.21)	0.0112	(5.37)
<i>lever</i>	-0.0419	(-2.67)	-0.0310	(-2.05)
<i>log(mtb)</i>	-0.0050	(-0.70)	-0.0137	(-2.15)



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Matched Sample of Banks-Borrowers

- Using Dealscan database, we have matched borrowers with their lead bankers.
- Next, we link the dataset with BHC call report to obtain financial health of the banks.
- Finally, we link the BHC dataset with CRSP to obtain the market return of banks.
- This sample (of over 500 observations) represents relatively larger firms, but we still get the similar effect across bank-dependent and other firms.





Some Preliminary Result

- We find that bank-dependent firms with sole banking relationship earn significantly lower return than firms with multiple relationships.
- Borrowers of banks that experience decline in equity value from 1998Q2 to 1998Q4 experience larger negative returns.
- Borrower of banks with more liquid balance sheet fare better than borrowers of banks with less liquidity.



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Conclusion

- We use the exogenous shock of Russian crisis of Fall'98 as a natural experiment to separate the effect of **borrower's demand of credit** from **bank's ability to supply credit**
- By focussing on three trading windows around the crisis we show that
 - When banks got affected, public debt markets still functioning well, bank-dependent firms earn **significantly lower** returns
 - Subsequently, when liquidity in public debt markets also dried up there is **no differential effect** for bank-dependent firms
 - When Fed provided support to the banking system, bank-dependent firms earned a **positive and significant** return
- Losses are more pronounced in bank-dependent firms with **higher growth opportunities and lower financial flexibility**





Conclusion

”.....Financial crises have a cruel way of revealing what an economy lacks. When many emerging markets suffered a sudden outflow of capital in the late 1990s, one painful lesson was that their financial systems had relied too heavily on bank lending and paid too little attention to developing other forms of finance. The lack of a spare tyre, said Alan Greenspan, chairman of America’s Federal Reserve, in 1999, ”is of no concern if you do not get a flat. East Asia had no spare tyres.” If a functioning capital market had existed, remarked Mr Greenspan, the East Asian crisis might have been less severe. Developing deep and liquid corporate-bond markets, in particular, could make emerging economies less vulnerable....”



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Extensions and Future Work

- Using a matched-sample of bank-borrower relationships
 - Does bank strength matter?
 - Do strong borrowers and borrowers with multiple bank relationships suffer less?
- Who pays for banks mis-adventures abroad?
 - Do banks pass on the losses to borrowers with high switching costs?



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