



How Important Is Moral Hazard For Distressed Banks?

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Introduction

- Moral hazard refers to situations in which one party makes choices about how much risk to take, but does not bear the cost if things go badly.
- The theoretical literature argues government safety nets could create strong moral hazard incentives in distressed banks. These incentives suggest distressed banks will:
 - Not attempt to deleverage.
 - Pursue risky investments.
- The moral hazard driven risk-taking incentives have sometimes been characterized as *incentives to gamble*.
 - This characterization is a commonly held view in the banking literature.
 - For example, Freixas, Rochet, and Parigi (2004) write that moral hazard and gambling for resurrection are “typical behaviors for banks experiencing financial distress.”
- However, many factors such as regulation, managerial risk aversion, etc., could limit moral hazard incentives
 - Existing empirical evidence is mixed.
 - Overall net effect of these factors remains an unsettled question.





What we do and preview of results

- We explore in a systematic fashion whether the behavior of distressed banks is consistent with deleveraging or greater risk-taking.
- We focus on US banks during periods surrounding the S&L and Global-Financial-Crisis.
 - These periods each witnessed substantial bank financial distress.
- We find distressed banks :
 - Decreased their leverage
 - Made efforts to shrink their balance sheets (both assets and liabilities)
 - Did not increase risk-taking
- The results suggest moral hazard incentives do not drive distressed bank behavior for the average bank.





Moral Hazard Incentives

- Highly leveraged banks have incentives to not decrease leverage and increase risk because:
 - They don't bear the full cost of risk-taking due to deposit insurance (Merton, 1977).
 - Because they have little at stake, i.e. low remaining value of equity (Jensen and Meckling, 1976).
 - Have debts so large that any gains go to creditors so even sound investments are avoided (Myers, 1977).
- Moral hazard is a common theme among these models – i.e., leverage and or risk-taking choices of distressed firms is at the expense of creditors and potentially beneficial only to shareholders
 - Other more recent theoretical models similarly suggest distressed firms resist deleveraging or take on more risk.
- While many of theoretical studies are not focused on banks– the arguments readily apply to banks.
 - Admati (2014) notes that banks have especially high leverage and avoid deleveraging as it benefits only creditors and hurts shareholders.





Moral Hazard – Limiting Factors

- Banks may find it sub-optimal to engage in moral hazard behaviors for various reasons including:
 - Preserving managerial reputation (Hirschleifer, 1993)
 - Managerial risk-aversion (e.g., Kim and Santomero, 1988)
 - Threat of runs (e.g. Cooper and Ross, 1998)
 - Bond covenants (e.g. Ashcraft, 2008)
 - Preservation of franchise value (e.g., Demsetz, Saidenberg, and Strahan, 1996)
- Further, regulation may limit risk taking incentives in several ways:
 - Capital requirements limit moral hazard incentives (Rochet (1992); Hellmann, Murdock, and Stiglitz (2000); Admati (2014))
 - Regulators could directly prevent “gambling for resurrection” (Dewatripont and Tirole (2012))
 - Banks may want to avoid regulatory interventions (e.g., Kandrak, J. and B. Schlusche, 2018)
- In summary, regulation *in addition* to numerous other forces likely incentivize distressed banks to deleverage and de-risk rather than gamble.





Evidence

- Evidence based on S&L crisis period suggests:
 - Increased competition and reduced bank charter values gave banks incentives to gamble (e.g., Shoven et al (1992), Benston and Kaufman (1997), Field (2017)).
 - Fixed premium deposit insurance incentivized depositors to fund gambling banks regardless of risk.
- A related literature suggested there were limiting forces, i.e. “market discipline” in that uninsured depositors were likely to flee distressed banks especially if not compensated for the higher risk.
 - Keely (1990), Hannan and Hanweck, (1988), Park and Peristiani (1998), and Cook and Spellman (1994)
- Mixed recent evidence:
 - Baldursson and Portes (2013) find support for gambling behavior for banks in Iceland.
 - Laeven and Levine (2009) find cross-country evidence that regulation can limit risk-taking incentives.
 - Bonaccorsi di Patti and Kashyap (2017) find some troubled Italian banks gamble but others do not.
 - Koudstaal and van Wijnbergen (2012) and Acharya et al (2011) find support for risk-taking behaviors.
 - Kirti (2017) finds evidence for derisking and DeAngelo, Gonçalves, and Stulz (2018) suggest highly leveraged firms aggressively deleverage.





Data

- Data: Primarily rely on mandatory financial reports (call reports) reported by all banks
- Consider 2 Periods: 1985-1994 and 2005-2015
 - First period has about 16k banks and 480k bank-quarters
 - Second period has about 8k banks and 260k bank-quarters
 - Each period includes a crisis; first period (S&L) and second period(GFC)
- Use large set of financial and non-financial controls including:
 - Financial: Log assets , Assets > \$50bn, MBHC member , Deposits/liabilities , Loans/assets , Core deposit ratio
 - Non-Financial: Metro location , De novo bank , TARP , Change in log state per-capita income , Change in state unemployment rate
- Distress indicators: Low Z-score and Equity-Capital
 - Main Distress measure: Low Z-score AND Low Equity-Capital





Main Tests - Deleveraging

- Two Key Questions: (i) Do distressed banks deleverage and if so, (ii) how do they deleverage?
 - Estimate following models:
 Δ Equity Capital Ratio (q, q+4) = $f_2(D, D^*Crisis, X2, \text{Quarter FE}, \text{State FE})$
 Δ Balance Sheet Item (q, q+4) = $f_3(D, D^*Crisis, X3, \text{Quarter FE}, \text{State FE})$
- Asset side Measures: Assets, Loans, Fixed Assets, # Branches, and Employees
Liability side : Liabilities, Deposits, Deposit Rate, Non-Deposit Liabilities
Equity: Common Stock, Preferred Stock, Dividends
- We use 4-quarter change because it is potentially less noisy relative to 1-qtr
 - Driscoll-Kraay standard errors to address biases from overlapping data (Fahlenbrach et al . (2017).
 - Lagged dependent variables in certain specifications to mitigate regression to the mean bias.





Deleveraging – Equity Capital Ratio

Dependent variable: Sample period:	Change in equity capital (q, q+4)					
	1985-1994		2005-2014		2005-2014	
Financial distress (q-1)	0.818*** (6.70)	0.870*** (7.37)	0.798*** (13.98)	0.819*** (16.40)	0.798*** (13.99)	0.819*** (16.41)
× Crisis (q-1)	-0.185 (-1.16)	-0.190 (-1.23)	-0.507*** (-4.47)	-0.494*** (-4.15)	-0.525*** (-4.74)	-0.512*** (-4.45)
× TARP (q-1)					0.518*** (3.87)	0.546*** (3.97)
Change in equity capital (q-4, q)		0.046*** (4.27)		0.026 (1.51)		0.026 (1.51)
Bank-quarter and state-quarter c	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	468728	468395	251668	251275	251668	251275
R ²	0.081	0.083	0.064	0.058	0.064	0.059

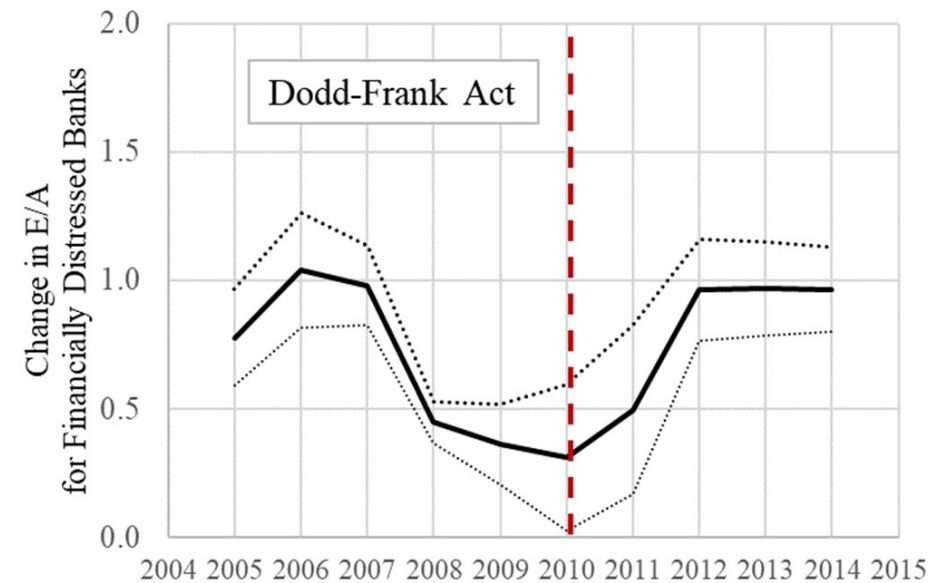
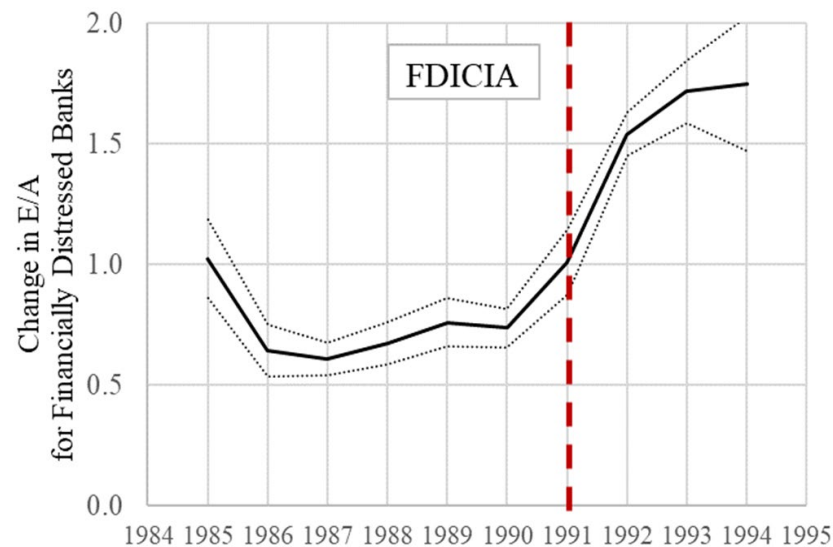
- Distressed banks improve their capital ratios by roughly similar amounts each period
- 1985-1994: Increase of 0.87 PP (i.e., about 10 % and 27% relative to the mean and stdev deviation of capital)
- 2005-2014: Increase of 0.80 PP (i.e., about 8% and 45% relative to mean and stdev of capital)
--Somewhat less deleveraging during the crisis (about 0.30 PP vs 0.82 PP) but only for non-TARP banks





Deleveraging by year

- We re-estimate previous regression but replace crisis dummy with yearly interaction terms.
- Main take-away: Yearly interaction coefficients show deleveraging all years of both periods.
- Plots also suggests:
 - Sustained increasing in deleveraging after FDICIA -- likely driven by more stringent regulation
 - No evidence deleveraging greater after GFC.





Deleveraging – Assets and Liabilities

Change in Assets/Liabilities - Distressed Banks

	<u>1985-1994</u>	<u>2005-2014</u>
Assets	-8.3%	-7.7%
Loans	-8.9%	-7.9%
Fixed Assets	-6.7%	-7.5%
Branches	-3.4%	-5.1%
Employees	-7.1%	-5.6%
Salaries	-8.8%	-7.4%
Sal/Employee	-0.15	-0.265
Liabilities	-9.5%	-9.6%
Deposit Rate	-2.6%	-2.8%
Deposits	9.3%	-9.5%
Other Liabilities	-18.5%	-20.6%

* Statistically significant results in yellow.

- Regression results – we observe distressed banks had:
 - Lower asset growth rates; total assets, loans, and fixed assets declined for both periods.
 - Reduced branch and employee growth for both periods.
 - Decreased total employees salaries over both periods.
 - Reduced liabilities and deposits.
 - Lower deposit rates on average.
- Despite substantial differences in the two periods, the response of distressed banks appears to be in similar range in most cases.
- Crisis:
 - Deleveraging unchanged during S&L crisis (85-94 period)
 - Sharper reduction various asset/liability indicators during GFC (05-14 period);
- TARP impact mixed/ambiguous – depends on indicator.





Deleveraging – Equity Components

Change in Equity/Related Components - Distressed Banks

	1985-1994	2005-2014
Common Stock	1.9%	2.7%
Preferred Stock	4.5%	-0.1%
Common Stock (Increase)	8.8%	4.0%
Preferred Stock (Stock)	3.3%	0.6%
Common Stock/Equity	0.09	0.05
Preferred Stock/Equity	0.05	0.00
Dividends	-25.5%	-30.5%

* Statistically significant results in yellow.

- Regression Results – we find distressed banks:
 - Increased level of common stock equity for each period.
 - Were more likely to increase common equity during both periods.
 - Increase preferred stock equity in the first period, insignificant result for 2nd period.
 - Sharply reduced dividends in both periods.
- Crisis impact mixed:
 - S&L Crisis (85-94): Lower increase in preferred shares but decline in dividends more substantial.
 - GFC (05-14): Lower increase in common and preferred shares except for banks receiving TARP





Distress and Risk-Taking - Tests

- The results thus far document that distressed banks deleverage:
 - This is consistent with capital preservation and reducing risk.
- However, they do not rule out that banks could deleverage but still gamble with a smaller portfolio (e.g., shed safe assets).
- We consider the evolution of riskiness for distressed bank using the following regression framework:
$$\Delta \text{Risk Measure}(q, q+4) = f_4(D, D^* \text{Crisis}, X_4, \text{Quarter FE}, \text{State FE})$$
- We measure risk using 4 measures:
(1) Log Z-Score: Distance from default, (2) Non-performing loans, (3) Earnings volatility, and (4) Risk-weighted assets (RWA) / Assets
- If distressed banks increase risk-taking, we expect risk to increase in these risk measures.
 - A caveat is that we can only measure the risk we can observe.





Distress and Risk-Taking - Results

Change in Observed Risk- Distressed Banks

	<u>1985-1994</u>	<u>2005-2014</u>
Z-Score	84.4%	84.2%
Performing Loan Ratio	0.54	0.23
Earnings Volatility	-0.32	-0.24
RWA/Assets		-7.46
Loans to Executives	-19.9%	-36.3%
Loans to Executives/Total Loans	-0.045	-0.069
Loans to Executives (Yes)	-7.6%	-13.1%

* Statistically significant results in yellow.

- Regression Results: Distressed banks do *not* have increases in risk, conditional on controls
- In both periods, we find distressed banks have:
 - Higher Z-scores
 - Improved (or at least no worse) performing loan ratios
 - Reduced earnings volatilities
 - Reduced RWA/Assets (latter period only)
- Some earlier evidence suggests loans to managers/shareholders is a potential way in which banks may increase their risk.
 - We find loans to executives do not increase for distressed banks.
- The impact of crisis period and TARP is ambiguous and depends on period and risk measure.





Conclusion

- We find that distressed banks :
 - Deleverage on average and do so on all parts of balance sheet
 - Have lower observed risk over 1, 4, and 8 quarter horizons.
- The main result is robust:
 - Holds for the years surrounding both the S&L crisis and the GFC
 - Different types of banks (public/non-public), small/large.
- Overall our results suggest deleveraging is a behavior for distressed banks on average
 - inconsistent with moral hazard stories suggesting otherwise.
- Policy implications for the next wave of bank failure/distress:
 - Need to stay aware of the potential for moral hazard in banking due to government programs; for example some programs have come with federal guarantees under certain conditions, i.e. PPP program
 - Our results suggest, the typical distressed bank focuses on capital preservation and deleveraging.
 - However, because bad apples will exist, regulatory actions such as those that require deleveraging for risky banks (cutting dividends, raising capital, etc.) continue to be important to mitigate moral hazard.





Appendix: Robustness Tests

- Overall, we find that distressed banks shrink their assets and liabilities, increase equity, and do not increase observable measures of risk over a 4-quarter horizon as measured by our various risk measures.
 - However, the weakest distressed banks, are likely to be unable to increase capital and fail, and thus only the surviving banks remain thus they naturally increase their capital.
- To alleviate the possibility of such survivorship bias driving our results, we also look at a 1-quarter horizon.
 - We find similar results in these tests.
- We also conduct the following tests:
 - Re-estimate the regressions with the risk variable being beyond a 4-quarter window, i.e. 8 quarters or 12 quarters.
 - Consider the individual risk measures (10th percentile equity/assets and zscore).
- In these additional tests as well, we still observe the results being consistent with distressed banks reducing assets/liabilities, and de-risking, or at least not increasing risk-levels.





Appendix: Other Tests - Extensions

- Literature suggests that moral hazard incentives could be stronger for public banks but such banks also are thought to enjoy implicit (TBTF) subsidies which could increase these incentives.
 - Thus, it is an empirical question and to test it, we break the sample into public and private banks.
 - The results are similar despite considerable differences in the size, incentives, and regulation over the two subsamples
- The FDIC Improvement Act (FDICIA), adopted in 1991, introduced prompt corrective action (PCA)-- In additional tests, we exclude banks most constrained by regulatory capital constraints (i.e., those that have breached at least one PCA threshold)
 - We find qualitatively similar results suggesting factors beyond regulation matter for deleveraging incentives.
- As additional robustness checks, we also test whether banks that eventually fail behave differently from banks we define as distressed.
 - We find that banks that fail take actions similar to those that do not fail (reduce assets, reduce liabilities, and reduce employees etc.); however, not surprisingly these banks are unable to boost equity.

