

Do Distressed Banks Really Gamble for Resurrection?

Itzhak Ben-David, The Ohio State University and NBER

Ajay A. Palvia, The Office of the Comptroller of the Currency

René M. Stulz, The Ohio State University and NBER

Disclaimer: Views expressed are those of the authors and not those of the Office of the Comptroller of Currency or Department of Treasury

Pre-View

- The term “gamble for resurrection” has been used for decades to denote excessive risk-taking by troubled banks.
 - A commonly held and prevalent 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.*”
- Alternatively, a distressed bank might try to survive by *lowering* its risk and *deleveraging*.
 - There are many forces that could push a bank’s shareholders to do this.
- We explore in a systematic fashion whether the behavior of distressed banks is consistent with gambling for resurrection or deleveraging.
- 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 deleverage on average rather than gamble for survival.

Incentives to Gamble

- Theory suggests distressed firms have incentives to gamble (i.e., risk shift) because they have little at stake, i.e. low remaining value of equity (Jensen and Meckling, 1976)
 - If risky bets are profitable, benefits accrue to shareholders
 - If risky bets are not profitable, downside goes mostly to creditors
- Many authors present models of firm distress where firms gamble for resurrection or take excessive risk:
 - White (1989), Rose-Ackerman (1991), Adler (1995), Eberhart and Senbet (1993), Akerlof and Romer (1993); Downs and Rocke (1994); Colonnello, Curatola, and Hoang (2017).
- A related view is distressed firms increase risk by increasing leverage or avoiding deleveraging.
 - Admati, DeMarzo, Hellwig, and Pfleiderer (2018): Develop a model where, with debt in place, shareholders resist leverage decreases.
 - Admati (2014): Deleveraging benefits creditors and hurts shareholders so banks avoid it.

Incentives to *not* Gamble

- Regulatory Driven Incentives:
 - Higher capital requirements mitigate banks preferences to not delever (Admati, 2014) or reduce banks' incentives to gamble for resurrection (Rochet (1992) and Hellmann, Murdock, and Stiglitz (2000))
- Regulation could also *directly* prevent banks from gambling:
 - Dewatripont and Tirole (2012) suggest bank regulation could prevent troubled banks from paying more for deposits; this would limit depositors willingness to supply funds to risky banks, (i.e., circumvent the traditional “gambling for resurrection” narrative).
- Banks may find it sub-optimal to gamble for various other 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)

Evidence

- Evidence for “gambling for resurrection” stems substantially from the S&L crisis :
 - Shoven et al (1992), Field (2017), Benston and Kaufman (1997)
- This literature also notes that market forces (discipline) may have limited such behavior:
 - Keely (1990), Hannan and Hanweck, (1988), Park and Peristiani (1998), and Cook and Spellman (1994)
- More “recent” evidence is from a variety of contexts. Much of it shows some degree of “gambling” in response to distress in the aftermath of recent crises:
 - Baldursson and Portes (2013), Koudstaal and van Wijnbergen (2012), Acharya et al (2011).
- This recent literature also suggests factors such as regulation and governance could limit risk-taking behaviors (Laeven and Levine (2009), Kandrak and Schlusche, (2018))
- On the other hand, other recent studies suggest reductions in risk-taking and/or deleveraging in response to distress
 - Bonaccorsi di Patti and Kashyap (2017), Bidder, Krainer, and Shapiro (2017) , DeAngelo, Gonçalves, and Stulz (2018) , and Kirti (2017):

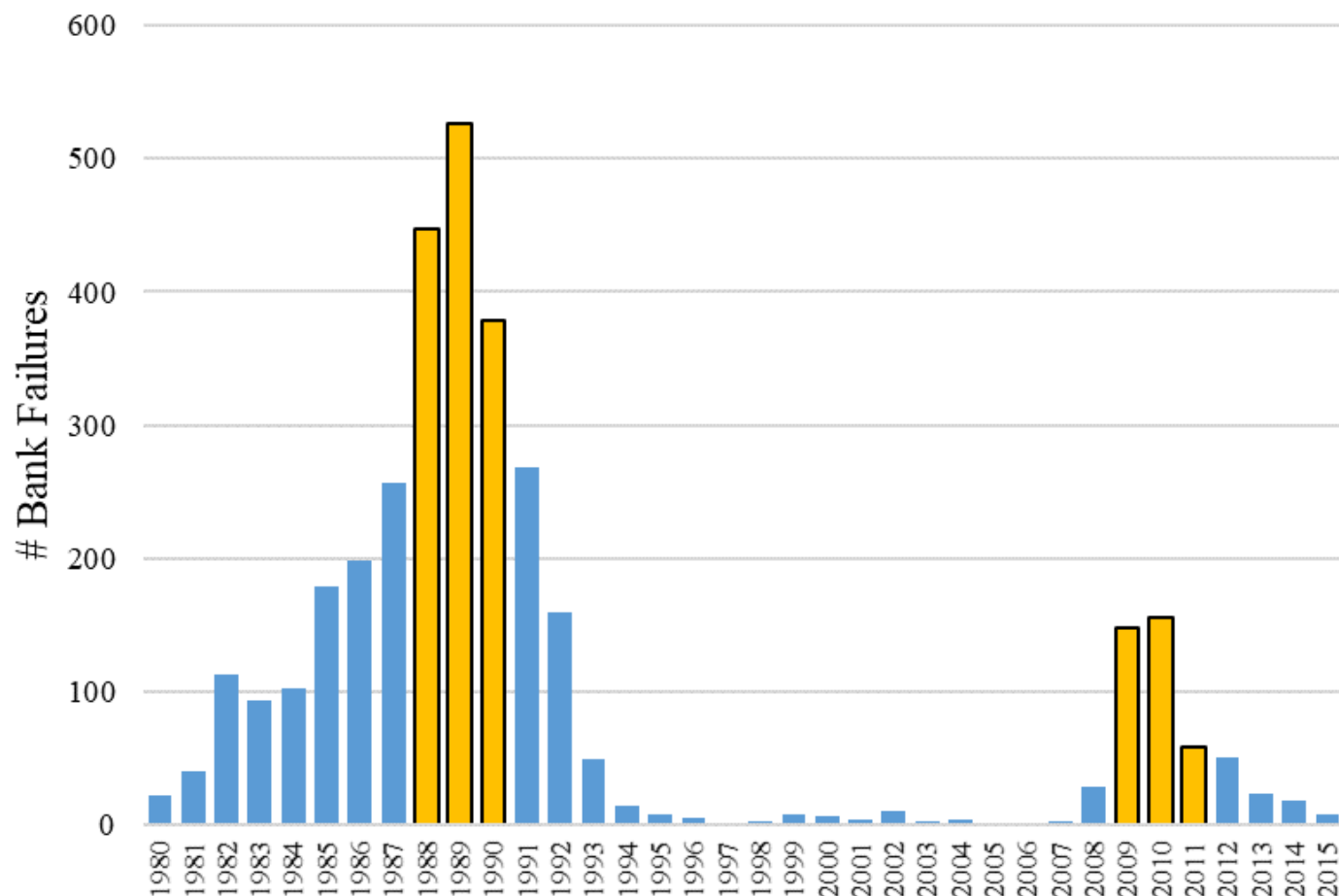
Data and Methodology

- Data: Primarily rely on mandatory financial reports (call reports) reported by all banks
- Consider 2 unbalanced panels for each of two sub-periods respectively:
 - (i) 1985-1994: 15,915 banks and 480,000 bank-quarters
 - This period includes the S&L crisis.
 - (ii) 2005-2014: 8,131 banks and 260,000 bank-quarters
 - This period includes the Global Financial Crisis (GFC).
- Use large set of financial and non-financial controls including:
 - Log assets , Assets > \$50bn, MBHC member , Deposits/liabilities , Loans/assets , Core deposit ratio , Metro location , De novo bank , TARP , Change in log state per-capita income , Change in state unemployment rate
- Analysis Steps:
 - (i) Find proxy for banks' financial distress and evaluate effectiveness
 - (ii) Define crisis periods
 - (iii) consider empirical questions, i.e. whether distressed banks delever and derisk.

Measuring Financial Distress

- We choose two distress measures based on meeting two key criteria:
 - (i) Widespread acceptance as distress measures
 - (ii) Ability to estimate the measure across both sample periods
- Our first measure is *Equity Capital Ratio*: (Total Equity / Total Assets)
 - Central to bank regulation and widespread belief that banks with more capital are safer
 - Berger and Bouwman (2013) show banks w/ higher capital buffers are more likely to survive a crisis and that such buffers are particularly important for smaller banks
- Second measure is *Z-Score*: $(Mean(ROA) + Mean(Equity Capital Ratio)) / \sigma(ROA)$
 - Intuitively this captures the “distance to default” or the number of standard deviations of ROA it would take to exhaust the current level of earnings plus capital
 - Used extensively in the banking literature: Boyd and Runkle (1993), Leaven and Levine (2009), Berger et al. (2013)
- We use *bottom decile* of these variables as well as the intersection of these as our main distress measure.
- We conduct preliminary analysis to assess the affective of our distress measures.
 - We find all distress measures strongly linked to bank failure across all 3 failure horizons.

Defining Crises



- Many ways to define banking crises.
-- We choose ours empirically based on bank failures.
- Figure shows failures from 1984-2015
- Our two sample periods:
1985-1994 *and* 2005-2014
- For each sample period, the 3-year window with maximum number of failures is:
-- S&L Crisis: 1988-1990 (1351 bank failures)
-- Global Financial Crisis: 2009-2011 (362 failures)

Deleveraging

- First Question: To what extent do distressed banks deleverage ?
 - Estimate association between change in equity capital and bank distress.
 - We use 4-quarter change because it is potentially less noisy relative to 1-qtr

$$\Delta \text{Equity Capital Ratio} = f_2(D, D^* \text{Crisis}, X_2, \text{Quarter FE}, \text{State FE})$$

- Second Question: How do distressed banks deleverage?
 - Estimate the association between several balance sheet measures on both the asset and liability side with financial distress
 - Again, use 4-quarter change because it is potentially less noisy relative to 1-qtr

$$\Delta \text{Balance Sheet Item } (q, q+4) = f_3(D, D^* \text{Crisis}, X_3, \text{Quarter FE}, \text{State FE})$$

- Asset side : Changes in Log Asset, Log Loans, Log Fixed Assets, Log Branches, and Log Employees
- Liability side : Changes in Log Liabilities, Log Deposits, Deposit Rate, Log Other Liabilities, Log Common Stock, Log Dividends

Deleveraging – Equity Capital Ratio

Dependent variable:	Change in equity capital (q, q+4)					
	1985-1994		2005-2014		2005-2014	
Sample period:						
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)
-- Crisis impact negligible
- 2005-2014: Increase of 0.80 PP (i.e., about 8% and 45% relative to mean and stdev of capital)
-- Non-TARP banks are less able to increase capital (about 0.30 PP increase)

Deleveraging - Assets

1985-1994

Dependent variable:	Assets				
	Change in... (q, q+4)				
	Log assets	Log loans	Log fixed assets	Log #branches	Log #employees
	(1)	(2)	(3)	(4)	(5)
Financial distress (q-1)	-0.082*** (-15.98)	-0.087*** (-14.56)	-0.066*** (-8.95)	-0.035*** (-8.00)	-0.070*** (-20.19)
× Crisis (q-1)	0.001 (0.09)	-0.008 (-0.62)	-0.002 (-0.19)	0.000 (0.09)	0.005 (0.73)
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes
N	470055	469992	468419	469893	469956
R ²	0.078	0.107	0.012	0.017	0.028

2005-2014

Dependent variable:	Assets				
	Change in... (q, q+4)				
	Log Assets	Log Loans	Log Fixed Assets	Log #Branches	Log #Employees
	(1)	(2)	(3)	(4)	(5)
Financial distress (q-1)	-0.077*** (-15.33)	-0.078*** (-12.04)	-0.073*** (-5.44)	-0.050*** (-8.44)	-0.056*** (-19.85)
× Crisis	-0.035*** (-4.51)	-0.017** (-2.60)	-0.007 (-0.57)	-0.008 (-1.43)	-0.017*** (-4.07)
× TARP	-0.002 (-0.17)	0.006 (0.34)	0.027* (1.82)	0.001 (0.25)	-0.010 (-1.26)
Quarter FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
N	251854	251829	250951	251548	251782
R ²	0.149	0.197	0.027	0.037	0.042

- Distressed banks had lower asset growth rates; total assets, loans, and fixed assets declined between 6.6% and 8.7% (during 85-94) and between 7.3% and 7.8% (during 05-14), conditional on controls.
- Distressed banks also have reduced branch and employee growth of between 3.5% and 7.0% during 85-94 and around 5% during 05-14.
- Negligible impact of crisis in the first period
- Greater reduction of assets during latter crisis but mostly no impact due to TARP

Deleveraging - Liabilities

1985-1994

Dependent variable:	Liabilities			
	Change in... (q, q+4)			
	Log liabilities	Log deposit rate	Log deposits	Log other liabilities
	(6)	(7)	(8)	(9)
Financial distress (q-1)	-0.094*** (-13.76)	-0.026*** (-6.86)	-0.092*** (-13.19)	-0.192*** (-7.15)
× Crisis (q-1)	0.007 (0.77)	-0.006 (-0.67)	0.007 (0.75)	0.026 (0.78)
Quarter fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
N	470133	454183	469335	468385
R ²	0.063	0.591	0.064	0.104

2005-2014

Dependent variable:	Liabilities			
	Change in... (q, q+4)			
	Log liabilities	Log Deposit Rate	Log Deposits	Log Other Liab
	(6)	(7)	(8)	(9)
Financial distress (q-1)	-0.095*** (-17.35)	-0.027*** (-2.89)	-0.093*** (-19.10)	-0.209*** (-12.99)
× Crisis	-0.033*** (-4.17)	-0.009 (-0.75)	-0.034*** (-4.82)	-0.039** (-2.10)
× TARP	-0.009 (-0.63)	0.072*** (3.22)	-0.030** (-2.18)	0.226*** (7.56)
Quarter FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
N	251885	250166	251486	251833
R ²	0.127	0.603	0.105	0.108

- Distressed banks reduced total liabilities and deposits (about 9.4% and 9.2 % in first period and a similar range in the latter period) conditional on controls (not shown).
- Similarly, distressed banks paid lower deposit rates on average, about 2.6% lower in both periods.
- Impact of Crisis:
 - Negligible impact on distressed bank deleveraging in the 1985-1994 period
 - Sharper reduction in liabilities for distressed banks during the latter crisis period
- Mixed results for TARP banks – but no impact on overall liabilities.

Deleveraging - Equity

1985-1994		
Dependent variable:	Equity	
	Change in... (q, q+4)	
	Log common	Log
	stock	dividends
	(10)	(11)
Financial distress (q-1)	0.017*	-0.261***
	(1.81)	(-14.20)
× Crisis (q-1)	-0.009	-0.069
	(-0.96)	(-1.47)
Quarter fixed effects	Yes	Yes
State fixed effects	Yes	Yes
N	469962	464286
R ²	0.012	0.136

2005-2014		
Dependent variable:	Equity	
	Change in... (q, q+4)	
	Log Common	Log
	Shares	Dividends
	(10)	(11)
Financial distress (q-1)	0.027*	-0.302***
	(1.81)	(-4.54)
× Crisis	-0.032**	-0.139
	(-2.17)	(-1.38)
× TARP	0.023**	0.160
	(2.43)	(0.64)
Quarter FE	Yes	Yes
State FE	Yes	Yes
N	249568	250402
R ²	0.005	0.141

- Distressed banks increased common stock equity during both periods and reduced dividends in both periods
- Crisis impact:
 - Negligible impact during first period
 - During latter period, non-TARP banks did not increase common equity

Balance Sheet Impact- Robustness

- Results suggest that distressed banks on average both reduce assets and liabilities which hold up in several further tests.
 - Replace the distress variable to be the 1st decile of equity capital and the 1st decile of Z-score
 - Exclude banks most constrained by regulatory capital constraints (i.e., those that have breached at least one PCA threshold)
 - Consider 1-quarter window for dependent variable
- Some variations and differences in these results
 - However, common theme across all robustness tests: *distressed banks shrink their assets, reduce their liabilities, and increase their equity*

Distress and Risk-Taking

- The results thus far document that distressed banks deleverage which is inconsistent with borrowing to fund new risky investments – a key aspect of the “gambling for resurrection” narrative.
- However, it is possible (though unlikely) that banks could deleverage but still gamble with a smaller portfolio
- 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
- As before, we use a 4-quarter window, so risk-evolution is considered over the next year
- If banks gamble for resurrection, we expect risk to increase for distressed banks.

Distress and Risk Taking: 1985-1994

Sample period: Dependent variable:	1985-1994		
	Change in... (q, q+4)		
	Log Z- score	Performing- loan ratio (%)	Earnings volatility
	(1)	(2)	(3)
Financial distress (q-1)	0.839*** (15.93)	0.504*** (6.45)	-0.329*** (-38.80)
× Crisis (q-1)	0.086 (1.16)	-0.045 (-0.71)	-0.013 (-0.75)
Bank-quarter and state-quarter control	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes
N	468337	470142	470127
R ²	0.038	0.040	0.031

- We find distressed banks do *not* have increases in risk, conditional on controls (not shown).
- Instead they have:
 - Higher Z-scores
 - Improved performing loan ratios
 - Reduced earnings volatilities
- The impact of the crisis is ambiguous with signs varying
 - However, the effects are small and non-significant

Distress and Risk Taking: 2005-2014

Sample period: Dependent variable:	2005-2014			
	Change in... (q, q+4)			
	Log Z- score	Performing- loan ratio (%)	Earnings volatility	RWA/ Assets (q) (%)
	(8)	(9)	(10)	(11)
Financial distress (q-1)	0.841*** (13.74)	0.242 (0.92)	-0.236*** (-10.88)	-7.065*** (-8.87)
× Crisis (q-1)	-0.359*** (-4.67)	-0.281 (-0.86)	-0.076*** (-2.91)	-2.718*** (-3.82)
× TARP (q-1)	0.363** (2.44)	-0.557* (-1.98)	-0.449*** (-5.58)	1.667 (1.28)
Bank-quarter and state-quarter controls	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
N	251607	252181	252173	249274
R ²	0.056	0.081	0.034	0.045

- Results show distressed banks do not have increases in risk (conditional on controls).
- Distressed banks have:
 - Higher Z-scores
 - Reduced earning volatilities
 - Reduced RWA/Assets
 - Better Perf Loan Ratio (not stat sig)
- Crisis Period Impact Mixed:
 - Greater risk reduction for earnings volatility and RWA/Assets; Less risk reduction for Z-Score/Perf Loan Ratio
- TARP banks' impact mixed:
 - Greater risk reduction (Z-score/Earnings Volatility); Less reduction (Perf Loan Ratio and RWA/Assets)

Risk Taking– Robustness Tests

- Overall, we find that distressed banks do not have greater levels of risk over a 4-quarter horizon as measured by our various risk measures.
 - However, as before there is potential survivorship bias
- As before, to alleviate the issue, we also look at a 1-quarter horizon.
 - We find distressed bank distance to default is higher and earnings volatility declines (both sample periods); risk-weighted assets ratio is lower (latter period). There is no statistical change for performing loan ratio.
- We also evaluate the risk variable beyond the 4-quarter window, i.e. 8 quarters out.
 - We find distance to default higher and earnings volatility lower(both sample periods); risk-weighted assets ratio also lower (latter period). Performing loan ratio also improves substantially.
- Thus, in these additional tests we still observe the results being consistent with distressed banks de-risking, or at least not increasing risk-levels.

Conclusion

- Our evidence is inconsistent with the view that “gambling for resurrection” is the behavior of the average distressed bank.
- We find that:
 - (i) Distressed banks deleverage on average
 - (ii) Deleveraging happens on all parts of balance sheet
 - (iii) Distressed banks have lower observed risk over 1, 4, and 8 quarter horizons.
- Thus, our results suggest:
 - Deleveraging is a natural tendency for distressed banks as we observe it during two distinct periods with different types of financial crises and different regulatory environments.