

What Happens to Problem Banks? Evidence from the 1980s and Guidance for the 2010s

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Summary

- In this study, we analyze six annual cohorts of newly downgraded U.S. problem banks (from Composite CAMELS 1 or 2 to Composite CAMELS 3, 4 or 5) from the last major banking crisis:
 - 1984 – 1989.
- We use a competing-hazards model where problem banks either
 - Fail, or
 - Recover during subsequent years.

Summary

- We find that traditional measures based on variables that proxy for components of the CAMELS ratings do a credible job in explaining failures and recoveries:
 - Problem banks with
 - lower capital, worse asset quality, lower earning and less liquiditywere more likely to fail, whereas problem banks with
 - higher capital, better asset quality, higher earnings and greater liquiditywere more likely to recover.

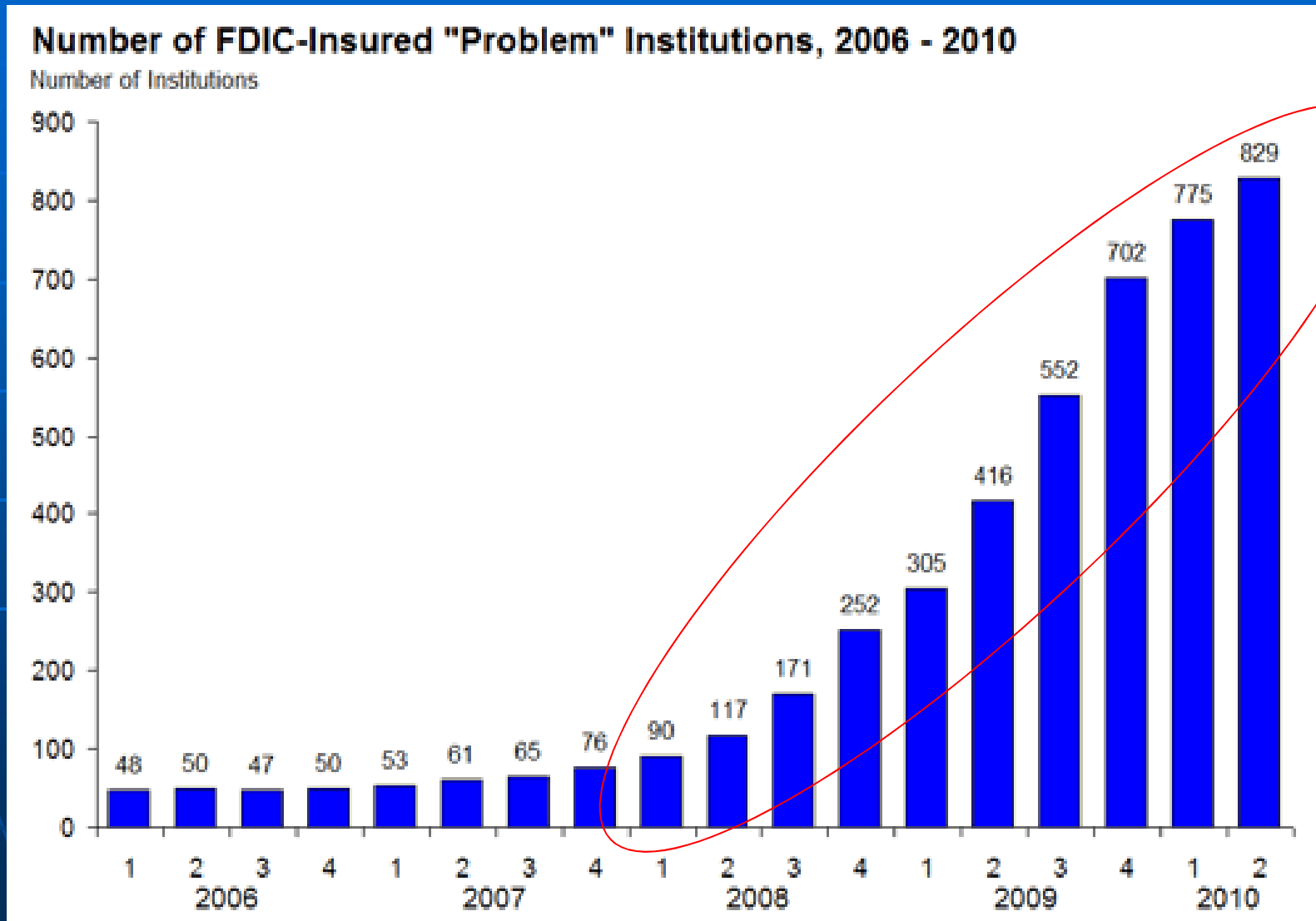
Summary

- We then use hazard models fit of the outcomes of problem banks from the 1980s to forecast the likelihood of failure or recovery for banks downgraded to problem status during the current crisis--from 2007-2009.
- The models do a credible job of correctly classifying problem banks from the recent crisis, using a model fit to data from the 1980s crisis.

Introduction

- The growing number of U.S. problem banks during the ongoing financial crisis has become a large problem for the FDIC, just as it did during the 1980s financial crisis.
- From year-end 2007 to Q1 2011, the number of problem banks has risen from less than 100 to almost 900.
- During the same period, more than 300 additional U.S. banks have been closed.

Figure 1



Source: FDIC's Quarterly Banking Profiles

U.S. Supervisory Risk Ratings

- There are two General Types of CAMELS ratings:
 - *Composite Ratings*
 - Evaluate overall financial health of a bank
 - *Component Ratings*
 - Evaluate specific areas of financial health
 - **C**apital, **A**sset quality, **M**anagement, **E**arnings, **L**iquidity, and **S**ensitivity to market risk
- CAMELS range from 1 to 5 with 1 being the best rating and 5 being the worst rating.

Literature on Problem Banks

- Exceedingly thin because of the confidentiality of these ratings.
 - Oshinsky and Olin (2005)
 - Kane, Bennett, Oshinky (2008)
 - Cole and Curry (2011a, b)

Literature on Problem Banks

- Oshinsky and Olin(2005)
 - Analyzed CAMELS 4,5 rated problem banks from 1990-2002 using multinomial logit;
 - Four paired events: failure, recovery, merger and still problem;
 - Results show that levels of tangible equity capital (positive) and nonperforming loans (negative) were important determinants of recovery or failure.
 - Only followed outcomes for two years.

Literature on Problem Banks

- Kane, Bennett, Oshinsky (2008)
 - Document the frequency with which CAMEL ratings were changed during the 1984 – 2003 period
 - Find that upgrades became significantly more likely during the post FDICIA period, even after controlling for economic conditions.
 - Also find that troubled banks were more likely to seek a merger partner than risk failure during the post-FDICIA period.

Literature on Banks Resolutions

- Wheelock and Wilson (2000)
 - Like us, they use a competing hazard model to identify factors that affect the likelihood that a bank will disappear due to failure or acquisition;
 - Sample of large banks from 1984-1993;
 - 230 failures; 1,380 acquired
 - Banks with lower capital; worse asset quality; lower earnings; were more likely to fail;
 - Banks with lower capital and earnings were more likely to merge.

Data

- Failures:
 - from FDIC's failure list (1984-2010)
- Supervisory Ratings:
 - from FDIC's CAMELS database
- Financial Data:
 - from U.S. FFIEC Quarterly Call Reports
- Supervisory Mergers:
 - based upon disappearance from Call data.
 - treated as failures

Sample Selection:

- All bank receiving a downgrade from composite CAMELS 1 or 2 to 3, 4, or 5 for nine periods:
 - 1984 – 1989 (In-Sample Cohorts) and
 - 2007 – 2009 (Out-of-Sample Cohorts)
- Each bank is traced by FDIC Certificate Number to its final outcome of failure or recovery, except for members of the 2007 – 2009 cohorts that had yet to be resolved through June 2010.

Figure 2:
Number of New Problem Banks(CAMELS 3,4,5) By Year:
1984 – 2010

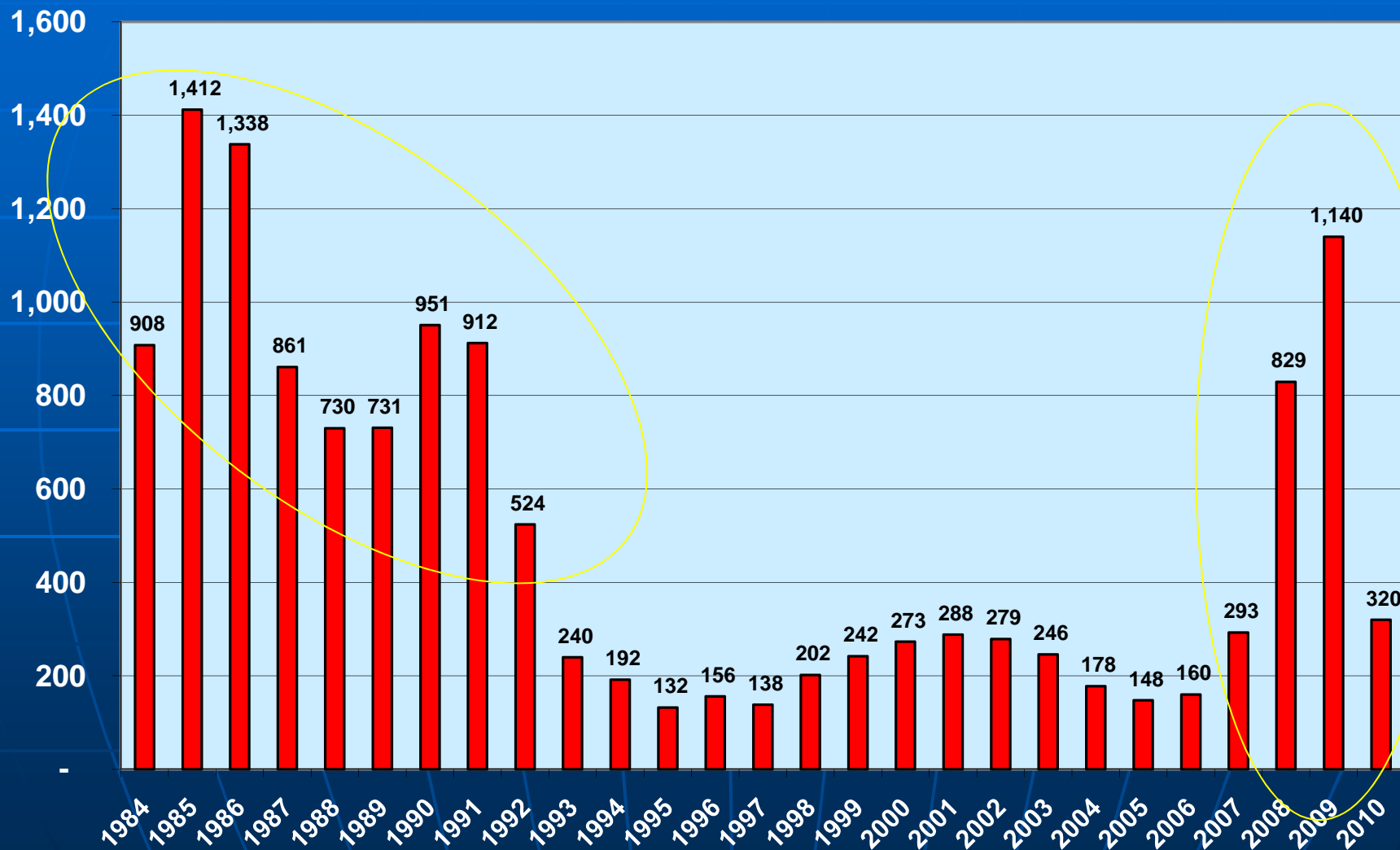


Table 2 :
Survival Analysis
 New Problem Banks:1984-1989:
 (Pooled Sample with Ultimate Resolutions)

Time	0	3 Years	5 Years	10 Years	10 Years+
RECOVERY	3,328	2,151	2,795	3,300	28
		65%	84%	99%	1%
FAILURE	1,388	1,067	1,277	1,383	5
		77%	92%	100%	0%
Total Sample	4,716	3,218	4,072	4,683	33
		68%	86%	99%	100%

Final Problem Bank Samples

- For the 1984 – 1989 “in sample” cohorts:
 - 3,183 “Recoveries”
 - 1,349 “Failures”
- For the 2007-2009 “out-of-sample” cohorts:
 - 208 “Recoveries”
 - 322 “Failures”
 - 1720 “Still Problem”

Methodology

- We use a simple discrete-time hazard model as described by Shumway (2001);
- In modeling the failure hazard, failed banks are treated as censored at the date of failure or acquisition.
- In modeling the recovery hazard, banks are treated as censored at the date of recovery.
- Thus we have competing hazards:
 - failure or recovery

Methodology

- Models of failure and survival for 6 cohorts of problem banks: 1984 – 1989
- Pool data for in-sample cohorts (1984-1989)
- Use coefficients estimated from pooled in-sample data in conjunction with out-of-sample Call data to generate forecasts for the out-of-sample cohorts: (2007 – 2009)

Model Specification

- All variables are scaled by total assets
- Extreme values of all financial variables are winsorized at the 1st and 99th percentile values.

Model Specification

- *Asset Quality*

- Consumer Loans

- Commercial & Industrial Loans

- Residential Real-Estate Loans

- Commercial Real-Estate Loans

- Construction & Development Loans

- Commercial loan

- Nonperforming Assets

- Loans past due 30 – 89 days and still accruing

- Loans past due 90 + days and still accruing

- Non-accrual loans

- OREO

- Loans Loss Reserves

Model Specification

- *Liquidity*
 - Cash & due from
 - Total securities
 - Broker Deposits
 - Volatile Liabilities
- *Capital*
 - Total Equity Capital
- *Earnings*
 - Net Income
- *Other Variables*
 - Log of Assets (proxy for size)
 - Log of Age
 - Annual cohort dummies

Table 3
Descriptive Statistics:
Recovery vs. Failure
(Pooled data 1984-1989)

Difference in Means: 1984-1989 Data					
Variable	Recover Mean	Failures Mean	Difference	t-Difference	
Log Age	3.56	2.87	0.69	16.6	***
Log Assets	10.58	10.62	-0.04	-0.9	
Loans	51.63	59.73	-8.10	-17.8	***
Cash	8.84	9.46	-0.63	-3.0	***
Securities	28.75	15.36	13.38	31.5	***
Brokered Deposits	0.13	0.93	-0.80	-10.2	***
Equity	8.01	4.46	3.55	36.4	***
C&I Loans	10.80	16.15	-5.35	-16.7	***
Consumer Loans	10.06	11.73	-1.67	-6.2	***
C&D Loans	1.66	3.37	-1.71	-12.1	***
CRE Mortgages	6.13	8.66	-2.53	-11.7	***
Residential Mortgages	11.64	11.99	-0.36	-1.2	
NPLS	3.61	9.79	-6.17	-36.6	***
Reserves	1.09	2.01	-0.92	-24.5	***
ROA	0.50	-2.60	3.10	36.6	***
Liquid Assets	37.67	25.13	12.54	29.4	***
Volatile Liabilities	10.68	18.84	-8.17	-21.7	***
Obs.	3,189	1,349			

Table 4
Descriptive Statistics:
Recovery vs. Failure Differences in Means
(1984-1989: individual cohorts)

Variable	1984	1985	1986	1987	1988	1989
Log Age	+	+	+	+	+	+
Log Assets	+		-		-	-
Loans	-	-	-	-	-	-
Cash			-			
Securities	+	+	+	+	+	+
Brokered Deposits	-	-	-	-	-	-
Equity	+	+	+	+	+	+
C&I Lans	-	-	-	-	-	-
Consumer Loans		-	-			
C&D Loans	-	-	-	-	-	-
CRE Mortgages		-	-	-	-	-
Residential Mortgages	+					-
NPLS	-	-	-	-	-	-
Reserves	-	-	-	-	-	-
ROA	+	+	+	+	+	+
Liquid Assets	+	+	+	+	+	+
Volatile Liabilities	-	-	-	-	-	-

Table 5
Results: Recovery Model
 Recovery = 1; Failure=0
 (1984-1989 pooled data)

Variable	Coefficient	t-statistic	Sig.
Log Age	-0.032	-1.47	
Log Assets	0.080	3.60	***
Cash	0.022	5.52	***
Securities	0.023	10.18	***
Brokered CDs	-0.094	-4.34	***
Equity	0.077	8.26	***
Consumer Loans	-0.003	-0.82	
C&I Loans	-0.020	-6.04	***
Residential Mortgages	0.025	9.14	***
CRE Mortgages	0.010	2.51	**
C&D Loan	-0.031	-4.26	***
Reserves	0.501	14.23	***
NPLs	-0.238	-23.83	***
ROA	0.420	17.58	***
Y1985	-0.123	-1.46	
Y1986	-0.160	-1.95	*
Y1987	-0.560	-6.48	***
Y1988	-0.192	-2.07	**
Y1989	-0.175	-1.82	*

Table 6
Results: Failure Model
 Failure = 1, Recovery = 0

Variable	(Failure Model-1984-1989)		Sig.
	Coefficient	t-statistic	
Log Age	-0.029	-0.935	
Log Assets	-0.020	-0.625	
Cash	-0.019	-3.167	***
Securities	-0.038	-9.500	***
Brokered CDs	0.047	3.133	***
Equity	-0.217	-15.500	***
C&I Loans	-0.017	-4.250	***
Consumer Loans	-0.021	-5.250	***
C&D Loans	-0.018	-2.250	**
CRE Mortgages	0.005	1.000	
Residential Mortgages	-0.018	-4.500	***
NPLs	0.076	9.500	***
Reserves	-0.082	-2.050	**
ROA	-0.174	-9.667	**
Y1985	-0.341	-2.965	***
Y1986	-0.304	-2.739	***
Y1987	-0.246	-2.050	**
Y1988	-0.432	-3.130	***

Out-of-Sample Forecasting Accuracy

- How well does the model do in forecasting future “out-of-sample” failures and recoveries?
- For the 2007-2009 “out-of-sample” cohorts:
 - 208: “Recoveries”
 - 322: “Failures”
 - 1,720: “Still Problems”
- Significant changes in the financial system
 - Structural consolidation: 12,000 -> 8,000 banks
 - Shift to holding MBS rather than mortgages
 - Off-balance sheet activities of large banks (e.g. SIV's)

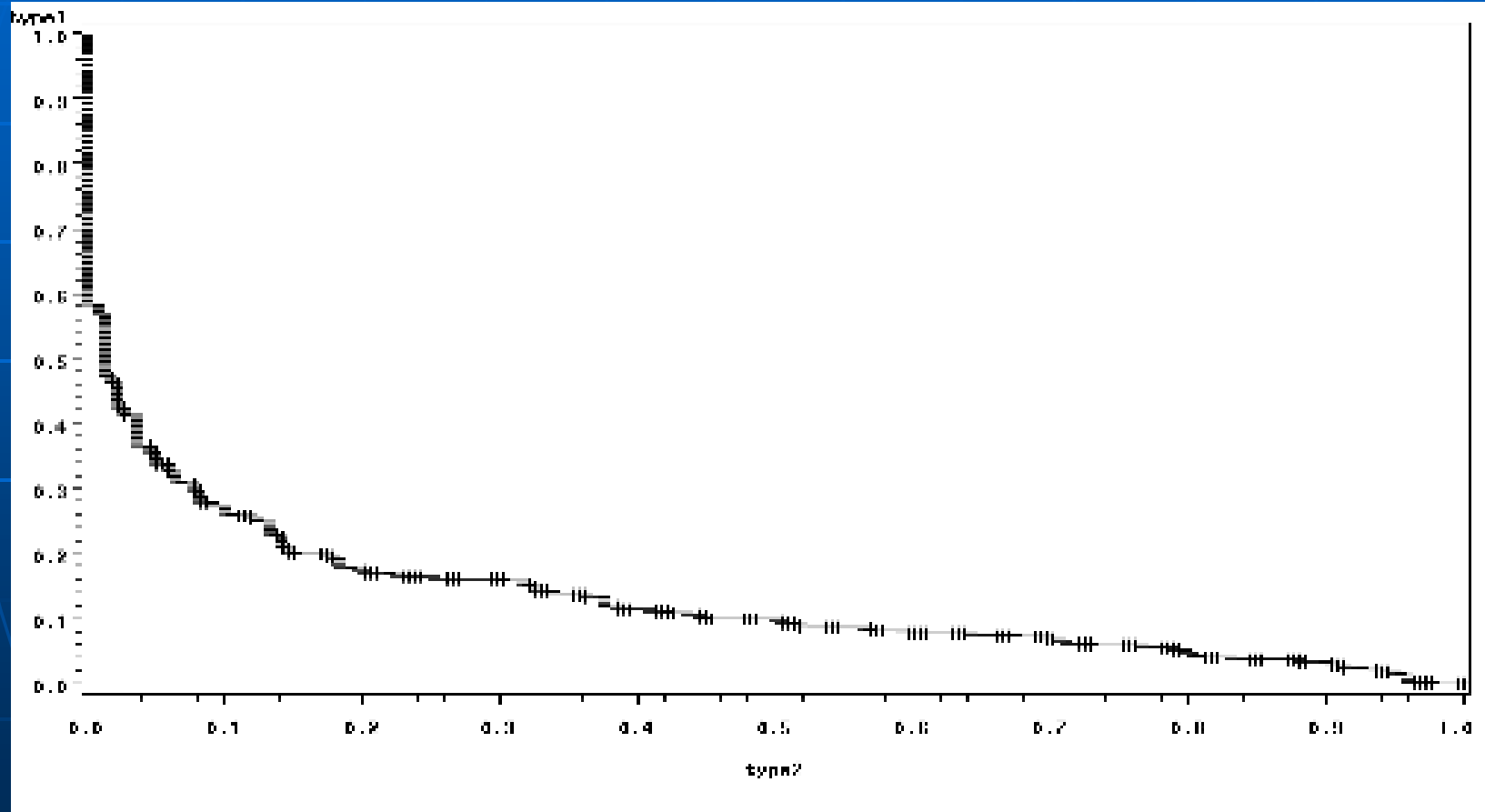
Out-of-Sample Forecasting Accuracy

- We examine trade-off of Type 1 vs. Type 2 error rates for problem banks: 2007 – 2009
- Type 1 Error:
 - Failure misclassified as Recovery
- Type 2 Error:
 - Recovery misclassified as Failure

Out-of-Sample Forecasting Accuracy

- For each Type 2 error rate, what percentage of Failures do we misclassify as Recoveries (Type 1 error rate)?
- From a banking supervision perspective, think of this as examining X% of all banks and identifying Y% of all banks that will fail within next 12 months.
- Similar to Receiver Operating Characteristics (ROC) Curve.

Out-of-Sample Accuracy: Failure Type 1 vs. Type 2 Error Rates (1984-1989 Data; 2007-2009 Failures)



Out-of-Sample Accuracy: Failure (n=322)

Type 1 vs. Type 2 Error Rates

(1984-1989 Data, 2007-2009 Failures)

■ Type 2 Error Rate

Type 1 Error Rate

10%

27.2%

5%

35.6%

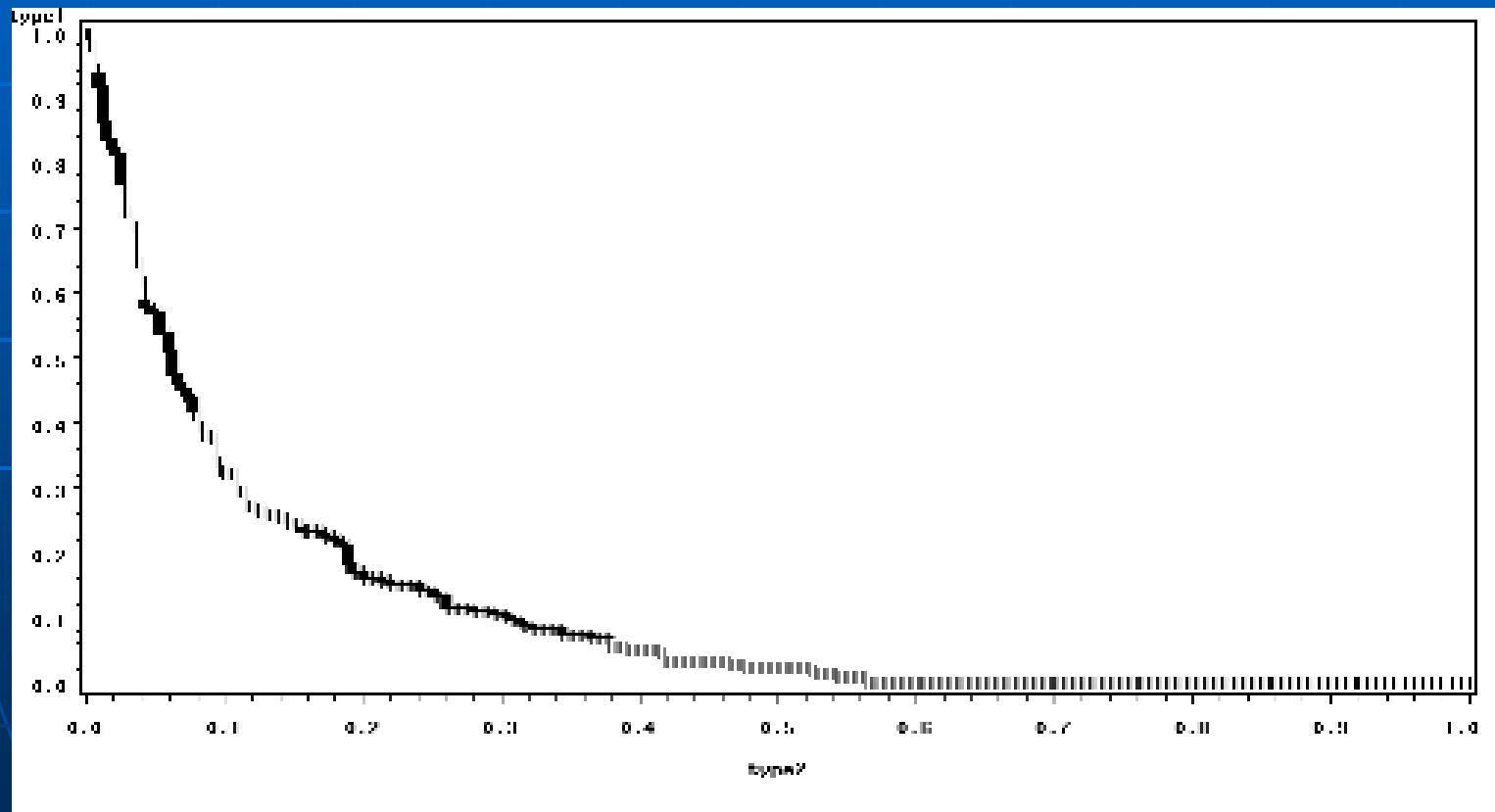
1%

56.7%

Out-of-Sample Accuracy: Recovery

Type 1 vs. Type 2 Error Rates

(1984-1989 Data, 2007-2009 Recoveries)



Out-of-Sample Accuracy: Recovery (n=208)

Type 1 vs. Type 2 Error Rates

1984-1989 Data, 2007-2009 Recoveries)

■ Type 2 Error Rate

10%

5%

1%

Type 1 Error Rate

32.1%

56.8%

91.7%

Conclusions

- In this study, we analyze the determinants of problem bank failures or recovery occurring during two crisis periods:
1984-1989; 2007-2009
- We find that traditional proxies for the CAMELS components, do a reasonably good job in explaining the problem banks that failed and recovered in both crisis periods

Conclusions

- We find that higher failure rates are associated with:
 - lower levels of liquidity;
 - higher levels of non-performing assets;
 - higher levels of construction & development lending;
 - heavier reliance upon brokered deposits for funding; and
 - lower net income.
- Just the reverse for recoveries

Conclusions

- Finally, we find that the model is credible in out-of-sample forecasting tests for the 2007-2009 period

- Thank You!
- Comments?