Capital Regulation at Community Banks: Lessons from 400 Failures

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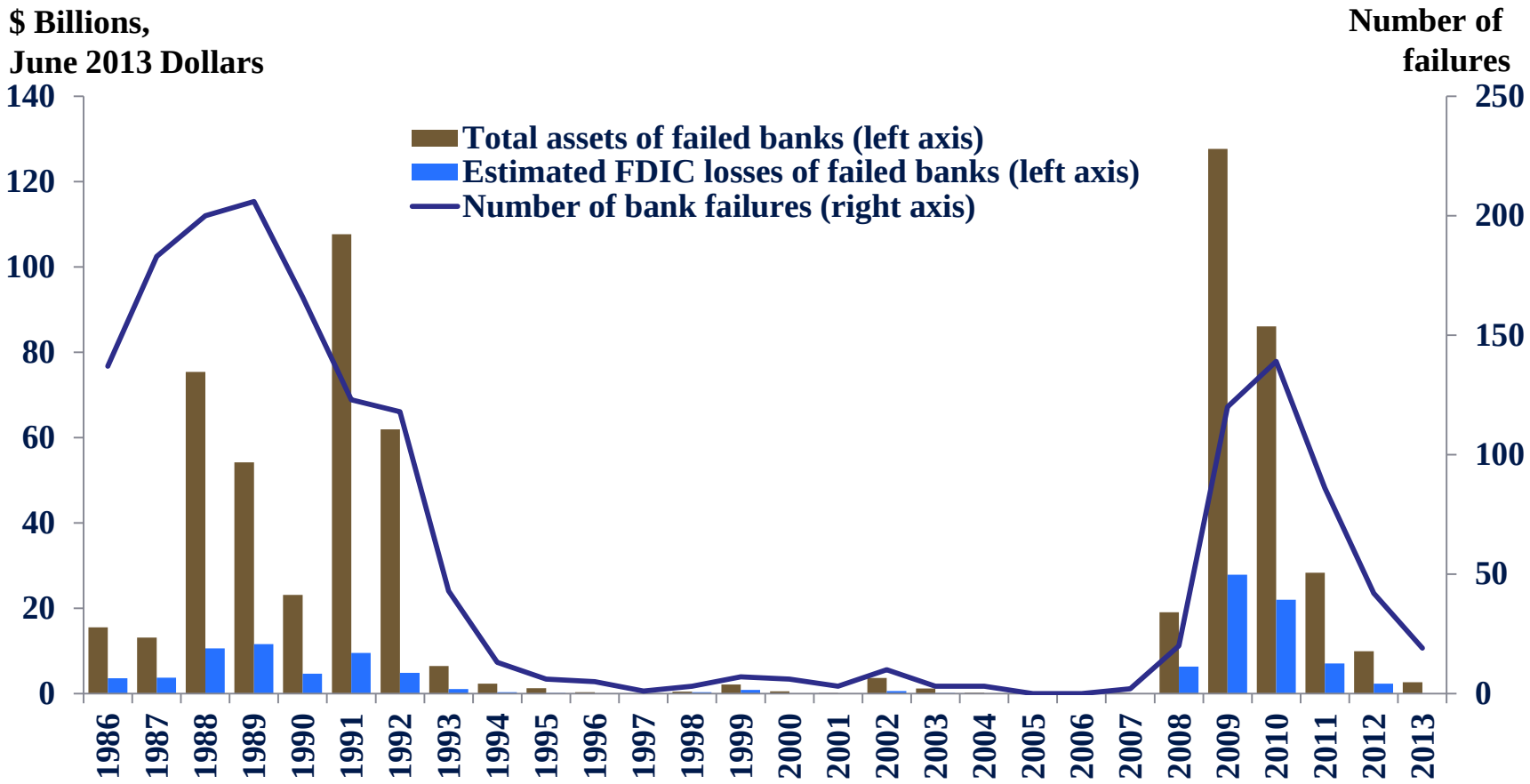
Overview

- Failures: What does studying them reveal?
- Failures and regulatory capital status
- Failures and capital ratios: In-sample explanation
- Failures and capital ratios: Out of sample prediction

Bank Failures Surge to 20-Year High



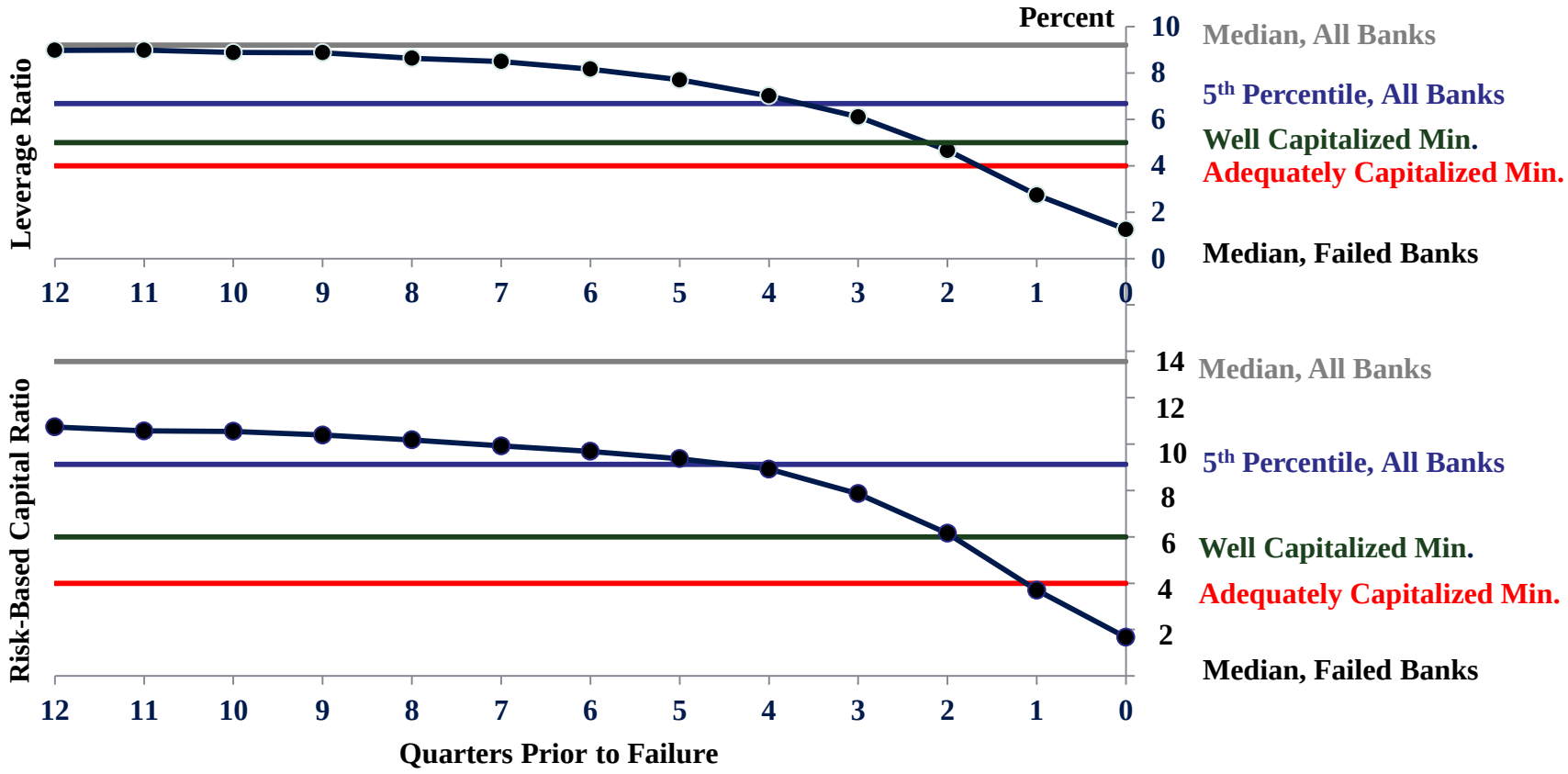
SOURCE: Federal Depsosit Insurance Corporation.

Note: Assistance transactions excluded. Comprehensive data for FDIC estimated loss are not available prior to 1986 and are not yet available for 2013.

Capital Status of Failing Banks Two Years before Failure

	Tier 1 Leverage Ratio		Tier 1 Risk Based Ratio	
Prompt Corrective Action Category	**Capital Required for Category**	**Number of Banks in Category**	**Capital Required for Category**	**Number of Banks in Category**
Well Capitalized	5 percent or more	401	6 percent or more	408
Adequately Capitalized	4 – 5 percent	12	4 – 6 percent	10
Undercapitalized	3 – 4 percent	5	3 – 4 percent	6
Significantly Undercapitalized	Less than 3 percent	7	Less than 3 percent	1

Leverage, Risk-Based Capital Ratio Changes Precede Failures



Note: The median and 5th percentile values are constants calculated using the five-year period preceding the analysis window and include all commercial banks from 2000:Q1 through 2004:Q4. Failed bank medians include banks that failed between 2008:Q1 and 2013:Q2.

Timing of Estimation and Prediction *(8 Quarter Failure Window)*

- Estimation
  - *(Table 4 in Paper)*

Financials Drawn from	Related to Failures from
2008Q2	2008Q3 – 2010Q2

- Prediction
  - *(Figure 2 in Paper)*

Financials Drawn from	Related to Failures from
2010Q2	2010Q3 – 2012Q2

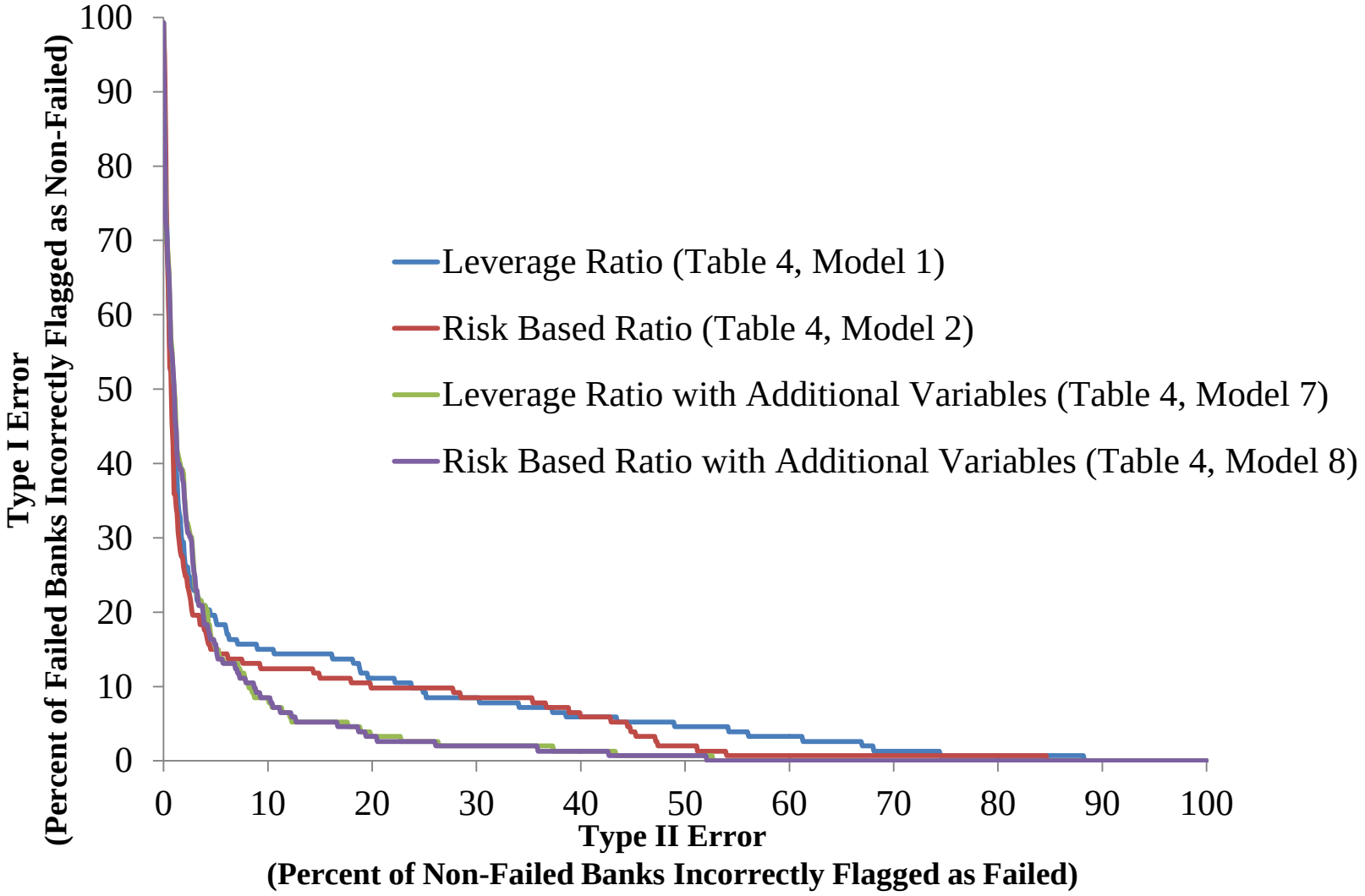
Estimation Results
8 Quarter Failure Window (Table 4)

	Model 1	Model 2	Model 4	Model 5	Model 7	Model 8
Tier 1 Leverage Ratio	–		–		–	
Risk Based Capital Ratio		–		–		–
Risk Weighted Assets			+	+	0	0
Troubled Assets					+	+
Earnings					–	–
CRE					+	+
1-4 Family Mortgages					–	–
Growth					+	+
Misc.					various	various
Gamma (Fit)	0.38	0.60	0.60	0.61	0.84	0.84

Prediction Error Tradeoff

- Set a high bar—only flag a few of the weakest banks as potential failures?
  - Advantage: Only a few banks that don't fail will be flagged (low Type II error)
  - Disadvantage: Many banks that fail will not be flagged (high Type I error)
- One model "beats" another at a given Type II error rate if it has a lower Type I error rate.

Type I / Type II Error Tradeoff When Forecasting out of Sample Failures Two Years ahead with 2010Q2 Financial Data



Timing of Estimation and Prediction *(4 Quarter Failure Window)*

- Estimation:

Financials Drawn from	Related to Failures from
2008Q2	2008Q3 – 2009Q2
2009Q2	2009Q3 – 2010Q2

  - *(Table 5 in Paper)*

- Prediction:

Financials Drawn from	Used to Predict Failures from
2010Q2	2010Q3 – 2011Q2
2011Q2	2011Q3 – 2012Q2

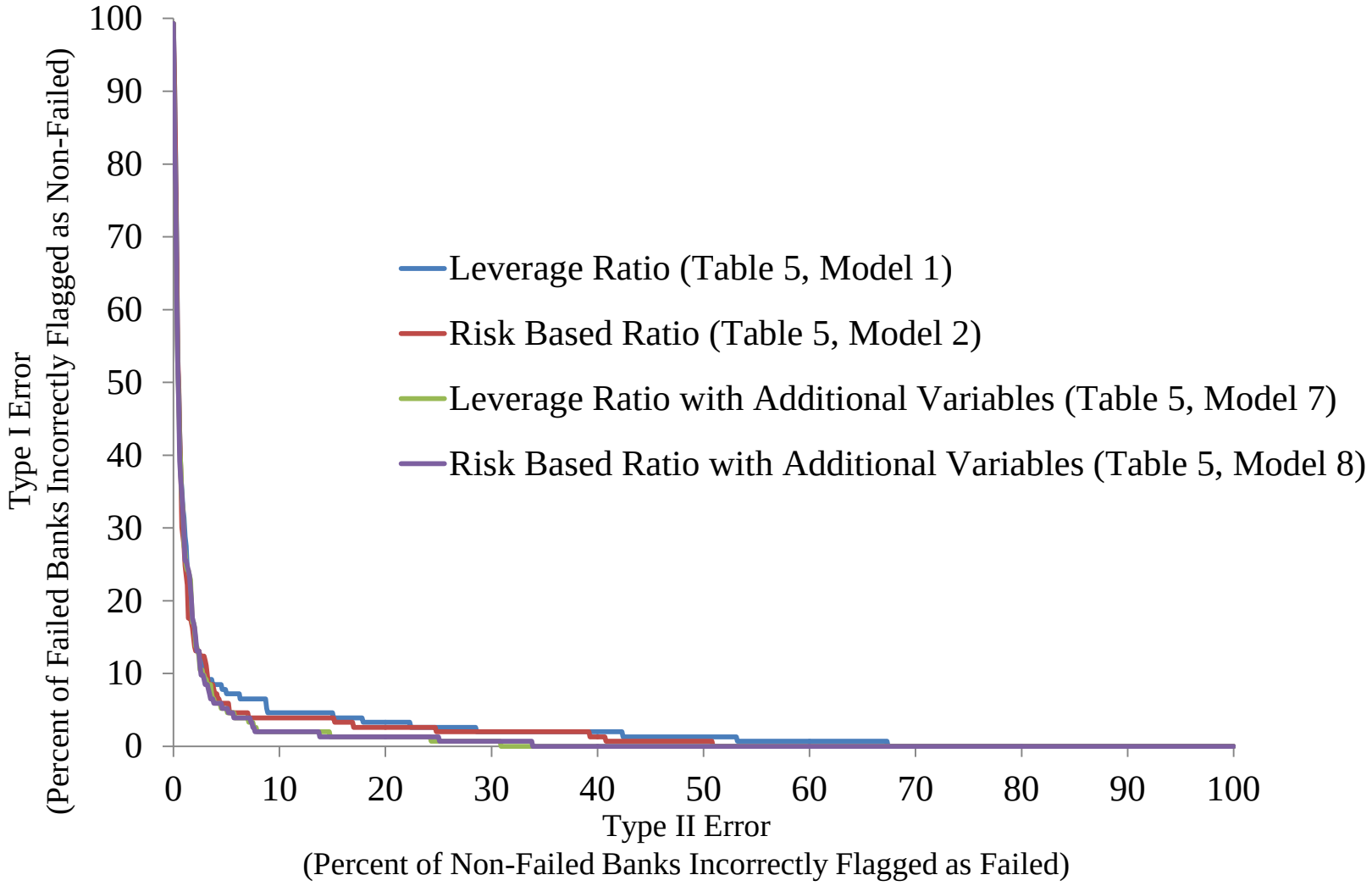
  - *(Figure 3 in Paper)*

Estimation Results
4 Quarter Failure Window (Table 5)

	Model 1	Model 2	Model 4	Model 5	Model 7	Model 8
Tier 1 Leverage Ratio	–		–		–	
Risk Based Capital Ratio		–		–		–
Risk Weighted Assets			+	–	+*	–*
Troubled Assets					+	+
Earnings					–	–
CRE					+	+
1-4 Family Mortgages					–	–
Growth					0	0
Misc.					various	various
Gamma (Fit)	0.77	0.84	0.83	0.84	0.93	0.93

*Significant at 5 percent but not at 1 percent.

Type I / Type II Error Tradeoff When Forecasting out of Sample Failures One Year ahead with 2010Q and 2011Q2 Financial Data



Timing of Estimation and Prediction *(4 Quarter Failure Window--Lagged)*

- Estimation:

Financials Drawn from	Related to Failures from
2007Q2	2008Q3 – 2009Q2
2008Q2	2009Q3 – 2010Q2

  - *(Table 6 in Paper)*

- Prediction:

Financials Drawn from	Used to Predict Failures from
2009Q2	2010Q3 – 2011Q2
2010Q2	2011Q3 – 2012Q2

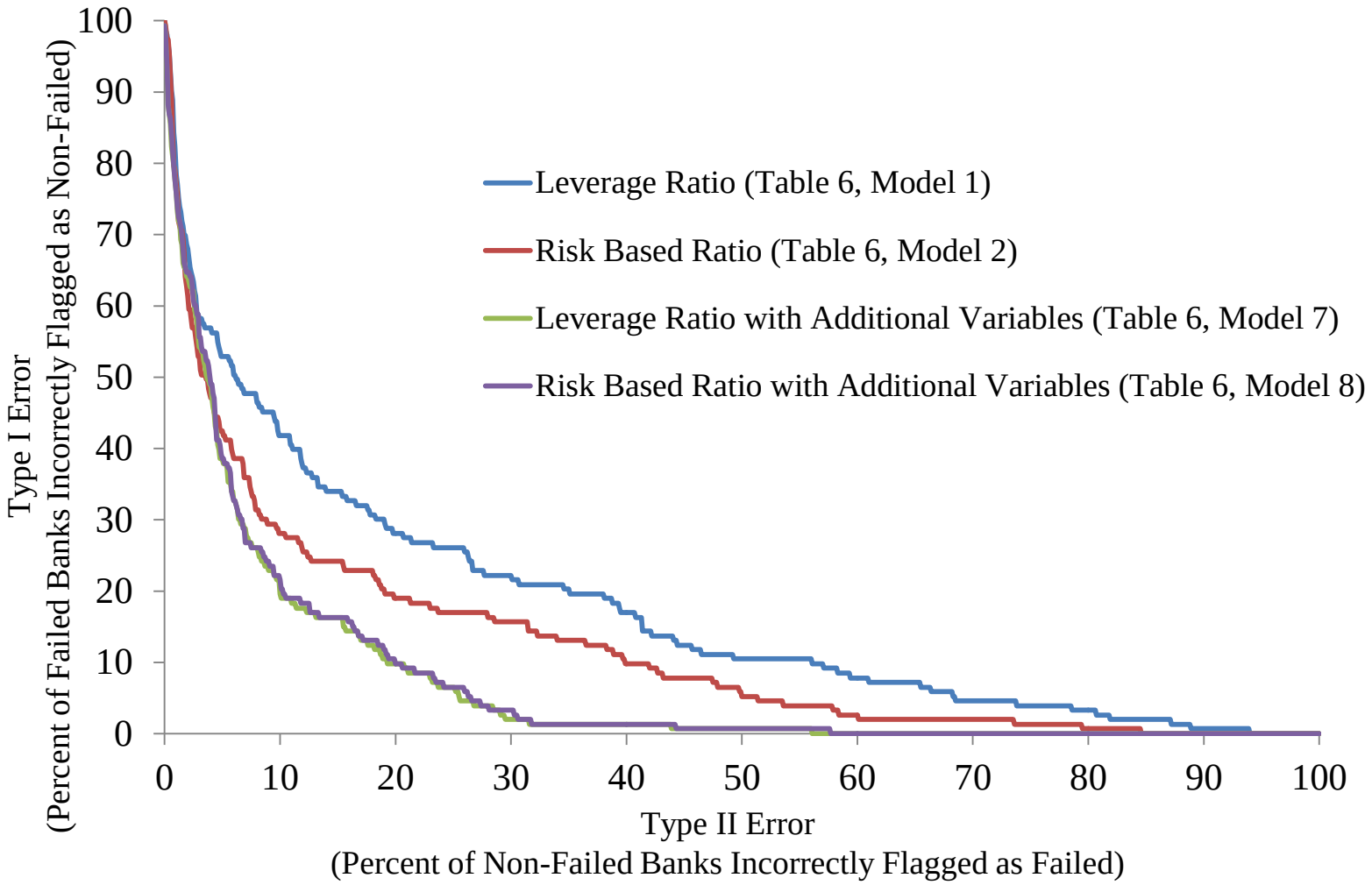
  - *(Figure 4 in Paper)*

Estimation Results

4 Quarter Failure Window--Lagged (Table 6)

	Model 1	Model 2	Model 4	Model 5	Model 7	Model 8
Tier 1 Leverage Ratio	–		–		–	
Risk Based Capital Ratio		–		–		–
Risk Weighted Assets			+	+	0	0
Troubled Assets					+	+
Earnings					–	–
CRE					+	+
1-4 Family Mortgages					–	–
Growth					+	+
Misc.					various	various
Gamma (Fit)	0.26	0.54	0.59	0.60	0.80	0.80

Type I / Type II Error Tradeoff When Forecasting out of Sample Failures One to Two Years ahead with 2009Q2 and 2010Q2 Financial Data



Alternative Failure Definition
(8 Quarter Failure Window)

- Timing same as original 8 quarter window
- Define date of failure as earliest of closure by FDIC or transition to critically undercapitalized

Estimation Results: Alternative Failure Definition

8 Quarter Failure Window (Table 7)

	Model 1	Model 2	Model 4	Model 5	Model 7	Model 8
Tier 1 Leverage Ratio	–		–		–	
Risk Based Capital Ratio		–		–		–
Risk Weighted Assets			+	+	0	0
Troubled Assets					+	+
Earnings					–	–
CRE					+	+
1-4 Family Mortgages					–*	–*
Growth					+	+
Misc.					various	various
Gamma (Fit)	0.26	0.54	0.59	0.60	0.80	0.80

*Significant at 5 percent but not at 1 percent.

Conclusion

- Both risk-weighted and simple tier 1 leverage ratios provide useful information about failure.
- The edge that the risk-weighted ratio holds is diminished if other factors are brought into consideration.
- A simple ratio plus regulatory judgment can deliver effective capital regulation.