Natural Disasters, Loan Loss Accounting and Subsequent Lending

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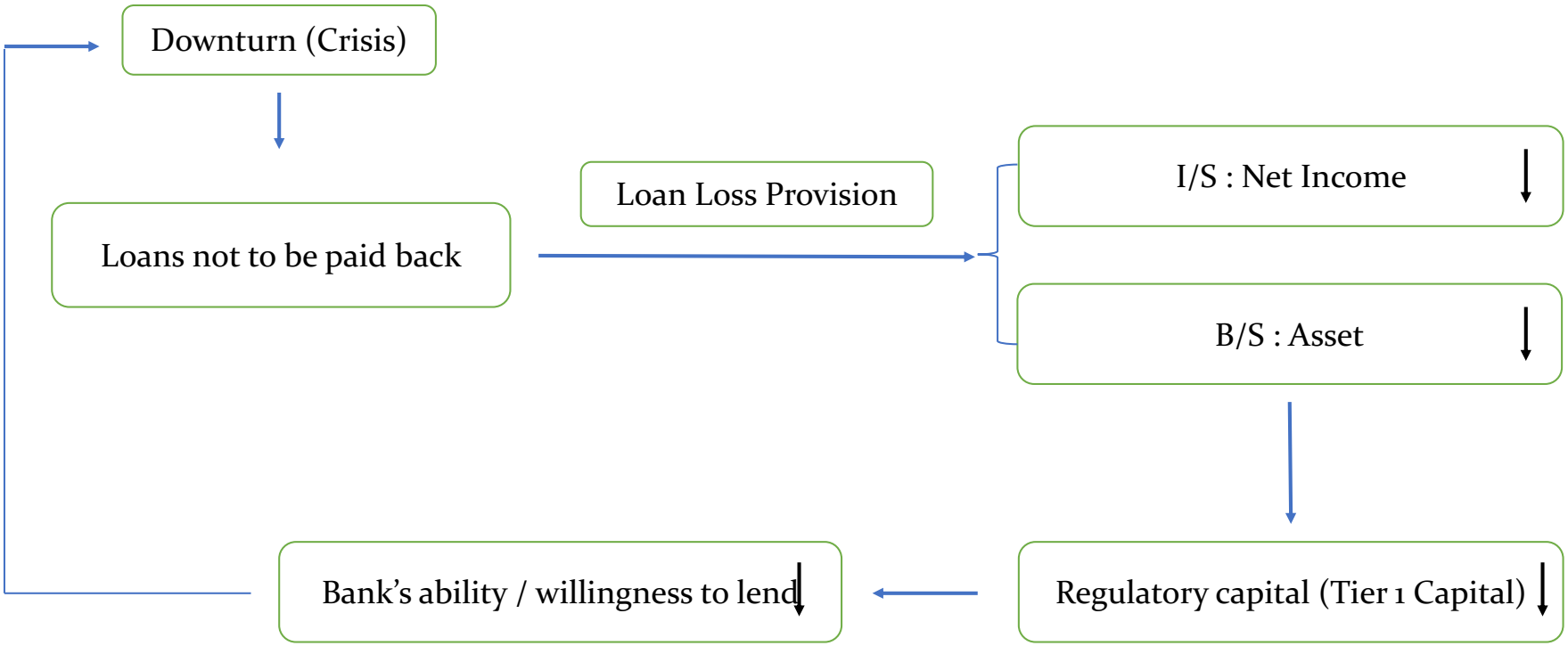
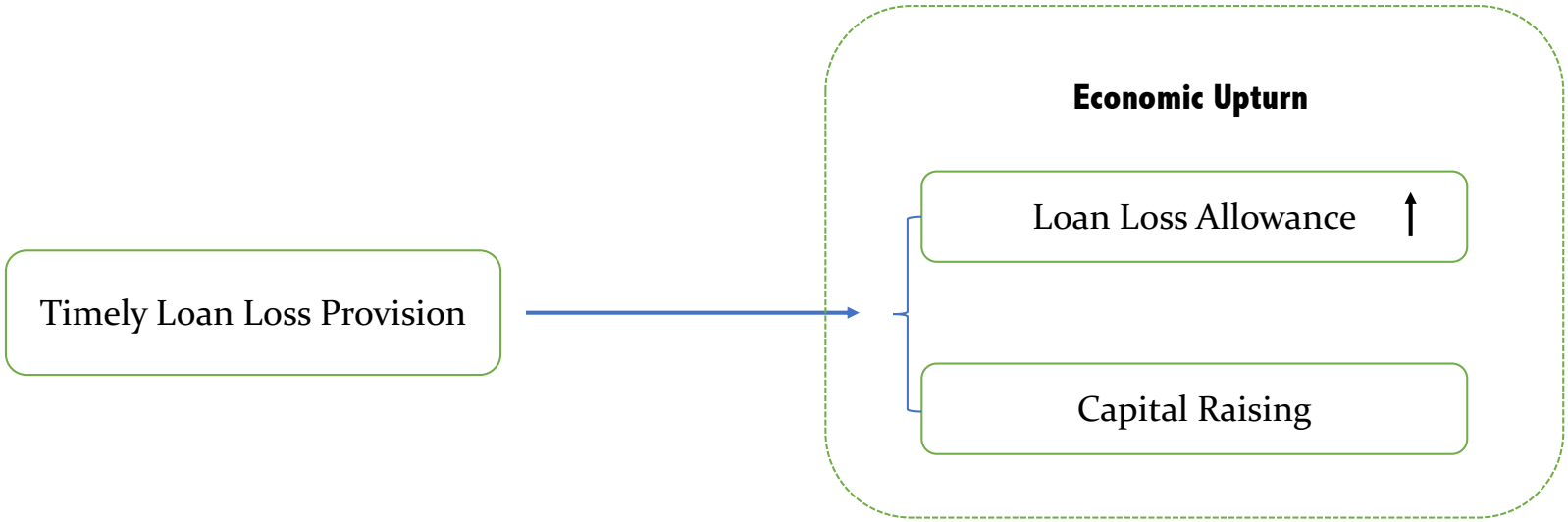
Motivation

Procyclical lending and financial stability



Motivation

Procyclical lending and financial stability
Regulators argue:



Motivation

- October 22, 2005

  Banks Take a Hit from Hurricanes Katrina, Rita

  The Wall Street Journal

- January 27, 2013

  New Jersey's Banks bracing for Hurricane Sandy losses to hit Balance Sheets

  The Star-Ledger

Research Questions

1) How do natural disasters affect banks' loan loss estimates?
   a) Specifically, how do banks adjust their loan loss provision estimates after the disasters?

2) Do banks with more timely, or conservative, loan loss estimates before the disaster demonstrate an increased ability to lend after the disaster?

This Paper

To answer our research questions,

- exploit natural disasters as a local exogenous shock that stimulates credit demand.
- uses a novel data set identifying banks affected by natural disasters and the damage they result in
- estimate a difference-in-difference model by comparing banks that experience a disaster in a given quarter, to banks with similar characteristics that did not experience a disaster
- measure banks adjustments to LLP based on weights to indicators of loan losses – past, current, and future changes in non–performing loans

This Paper

Then,

- follow prior research and measure bank loan loss provision policy – using timeliness and conservatism
- examine how banks with more timely provisions, or conservative estimates before the crisis respond to lending following the disasters

Relevance

- Large banking literature on the transmission of shocks across market
  - What is novel in our paper; we identify how banks adjust their accounting estimates responding to these shocks
- Large accounting literature understanding timeliness of loan loss provisions and how this relates to lending (see Beatty and Liao (2014) for a review)
  - Critiques of the work from Acharya and Ryan (2016)
  - Overreliance on few crisis period
  - Failure to disentangle loan supply and demand effects
- We exploit local exogenous shocks to loan demand

Relevance

- There is an increasing trend in climate risk affecting banks. So understanding the role of climate risk in banks is important in its own right.

- July 14, 2019

  Climate Change: A Financial Risk for Banks

  The Wall Street Journal

Data

Data Sources

1) Disaster data: SHELDUS includes disasters which Governor declared 'state of emergency' and funds from FEMA

   – includes date, county location, disaster type, property losses.

2) Bank branch information from FDIC Summary of Deposits
3) Bank level data from US Call Reports
4) Home prices and macro data from FHFA, BLS, and BEA

Sample period: 1994 – 2017

Data Sources

Following Cortes and Strahan (2017), we restrict our analysis to the following disaster types:

1) Hurricane
2) Earthquake
3) Severe storms
4) Tornado
5) Wildfire
6) Coastal
7) Flooding

Empirical Strategy

Empirical Strategy

- Identifying Disaster Banks (treatment): If a bank has operation in any of the counties impacted by a disaster ($Shock = 1$)
- Control sample: Find banks with similar characteristics that did not experience a disaster
- Similar lagged characteristics: size, deposit, loan, loan portfolio charactersitics, HQ-State GDP.

Sample Banks

Year	Affected Banks	Year	Affected Banks
1994	469	2010	1591
1995	738	2011	1919
1996	1164	2012	998
1997	521	2013	973
1998	1598	2014	486
1999	903	2015	1166
2000	577	2016	806
2001	702	2017	1087
2002	866		
2003	1351		
2004	1743		
2005	1815		
2006	1319		
2007	1441		
2008	2513		
2009	705		

Summary Statistics

Variables	N	Mean	SD	Median
Disaster				
Dummy_4QTR	186,558	0.343	0.475	0.000
PropertyDamage_4QTR	186,558	122.113	769.169	0.000
Bank				
Ln(Total Asset)	186,558	5.925	1.141	5.620
Tier1 Ratio	176,306	14.738	6.284	12.900
LLP(%)	186,558	0.119	0.236	0.053
Loan	186,558	0.661	0.143	0.679
Non-Perf. Assets(%)	186,558	1.985	2.701	1.061
Interest Income	186,558	0.035	0.018	0.033
Deposit	186,558	0.817	0.085	0.838
Earnings before Provision(%)	186,558	0.317	0.200	0.307
Comm'l & Indus'l Loan(%)	186,558	13.586	10.421	11.788
Real Estate Loan(%)	186,558	73.373	18.405	76.025
Consumer Loan(%)	186,558	7.756	10.144	4.354
Comm'l RE Loan(%)	167,750	0.262	0.869	0.000
Resid'l RE Loan(%)	186,558	37.045	22.738	31.831
Alwn(%)	186,558	1.444	0.732	1.302
State				
Δ GDP	4,998	6.17	11.59	2.71
Δ UNEMP	4,998	-0.02	0.31	-0.07
HouseIndx	4,998	186.16	58.60	184.19

*Property Damage and Δ GDP are in thousands.

Regression Estimates

Disaster effects on loan loss provisions

$$\begin{aligned} LLP_{bt} = {} & \beta_1 Shock_b \times Post_t + \alpha_1 \Delta NonPerf.Assets_{b,t+1} \\ & + \alpha_2 \Delta NonPerf.Assets_{b,t} + \alpha_3 \Delta NonPerf.Assets_{b,t-1} \\ & + \alpha_4 \Delta NonPerf.Assets_{b,t-2} + Controls \\ & + \text{Bank FE} + \text{State} \times \text{Time FE} \end{aligned} \tag{1}$$

- Bank fixed effects capture bank unobservable, while HQ state-quarter fixed effects capture state time trends
- We compare treated and control banks in the same state in the same quarter

Regression Estimates

Disaster effects on loan loss provisions

$$
\begin{aligned}
LLP_{bt} = {} & \beta_1 Shock_b \times Post_t + \beta_2 Shock_b \times Post_t \times \Delta NonPerf.Assets_{b,t+1} \\
& + \beta_3 Shock_b \times Post_t \times EBP_{b,t} \\
& + \beta_4 Shock_b \times Post_t \times Tier1Ratio_{b,t-1} \\
& + \alpha_1 \Delta NonPerf.Assets_{b,t+1} + \alpha_2 \Delta NonPerf.Assets_{b,t} \\
& + \alpha_3 \Delta NonPerf.Assets_{b,t-1} + \alpha_4 \Delta NonPerf.Assets_{b,t-2} \\
& + Controls + \text{Bank FE} + \text{State} \times \text{Time FE}
\end{aligned} \tag{2}
$$

- β_2 measures the extent to which current provisions explicitly capture future detoriations in the performance of loan portfolio.
- β_3 captures earnings smoothing – banks record large provisions because their earnings are high, and low because earnings are low

Results: Disaster and Loan Loss Estimates (Eqn 3.1)

	(1) Full	(2) Full	(3) Full	(4) Small	(5) Large
Shock × Post	0.0000***	-0.0000***	-0.0000	-0.0000***	0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Δ Non-Perf. Assets$_{t+1}$		0.0211***	0.0102***	0.0090***	0.0066***
		(0.0008)	(0.0007)	(0.0008)	(0.0016)
Δ Non-Perf. Assets		0.0408***	0.0289***	0.0232***	0.0427***
		(0.0009)	(0.0008)	(0.0009)	(0.0017)
Δ Non-Perf. Assets$_{t-1}$		0.0544***	0.0370***	0.0336***	0.0397***
		(0.0009)	(0.0008)	(0.0009)	(0.0016)
Δ Non-Perf. Assets$_{t-2}$		0.0499***	0.0329***	0.0276***	0.0422***
		(0.0009)	(0.0008)	(0.0009)	(0.0016)
Other Bank Controls	No	Yes	Yes	Yes	Yes
Bank FE	No	No	Yes	Yes	Yes
State-Qtr FE	No	No	Yes	Yes	Yes
Observations	186558	157907	157772	110602	47045
Adjusted R^2	0.00	0.15	0.40	0.35	0.52

Standard errors in parentheses.

Results: Disaster and Loan Loss Estimates (Eqn 3.1)

	(1) Full	(2) Full	(3) Full	(4) Small	(5) Large
Shock × Post	0.0000***	-0.0000***	-0.0000	-0.0000***	0.0000**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Δ Non-Perf. Assets$_{t+1}$		0.0211***	0.0102***	0.0090***	0.0066***
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Adjusted R^2	0.00	0.15	0.40	0.35	0.52

Standard errors in parentheses.

Results: Disaster and Loan Loss Estimates (Eqn 3.2)

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Shock × Post	-0.0000	-0.0000	0.0001***	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Shock × Post × Δ Non-Perf. Assets$_{t+1}$	0.0047***			0.0045***
	(0.0015)			(0.0015)
Shock × Post × Δ Non-Perf. Assets	0.0102***			0.0100***
	(0.0016)			(0.0016)
Shock × Post × Δ Non-Perf. Assets$_{t-1}$	0.0111***			0.0109***
	(0.0016)			(0.0016)
Shock × Post × Δ Non-Perf. Assets$_{t-2}$	0.0023			0.0021
	(0.0016)			(0.0016)
Shock × Post × EBP		0.0061		0.0033
		(0.0055)		(0.0055)
Shock × Post × Tier1 Ratio$_{t-1}$			-0.0007***	-0.0006***
			(0.0002)	(0.0002)
Δ Non-Perf. Assets$_{t+1}$	0.0054***	0.0070***	0.0070***	0.0055***
	(0.0009)	(0.0007)	(0.0007)	(0.0009)
Δ Non-Perf. Assets	0.0211***	0.0246***	0.0246***	0.0212***
	(0.0009)	(0.0008)	(0.0008)	(0.0009)
EBP	0.2660***	0.2636***	0.2657***	0.2647***
	(0.0036)	(0.0041)	(0.0036)	(0.0041)
Tier1 Ratio$_{t-1}$	-0.0016***	-0.0016***	-0.0014***	-0.0014***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Other Bank Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
State-quarter FE	Yes	Yes	Yes	Yes
Observations	157673	157673	157673	157673
Adjusted R^2	0.44	0.44	0.44	0.44

Standard errors in parentheses.

Results: Disaster and Loan Loss Estimates (Eqn 3.2)

	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Shock × Post	-0.0000	-0.0000	0.0001***	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Shock × Post × Δ Non-Perf. Assets$_{t+1}$	0.0047***			0.0045***
	(0.0015)			(0.0015)
Shock × Post × Δ Non-Perf. Assets	0.0102***			0.0100***
	(0.0016)			(0.0016)
Shock × Post × Δ Non-Perf. Assets$_{t-1}$	0.0111***			0.0109***
	(0.0016)			(0.0016)
Shock × Post × Δ Non-Perf. Assets$_{t-2}$	0.0023			0.0021
	(0.0016)			(0.0016)
Shock × Post × EBP		0.0061		0.0033
		(0.0055)		(0.0055)
Shock × Post × Tier1 Ratio$_{t-1}$			-0.0007***	-0.0006***
			(0.0002)	(0.0002)
Δ Non-Perf. Assets$_{t+1}$	0.0054***	0.0070***	0.0070***	0.0055***
	(0.0009)	(0.0007)	(0.0007)	(0.0009)
Δ Non-Perf. Assets	0.0211***	0.0246***	0.0246***	0.0212***
	(0.0009)	(0.0008)	(0.0008)	(0.0009)
EBP	0.2660***	0.2636***	0.2657***	0.2647***
	(0.0036)	(0.0041)	(0.0036)	(0.0041)
Tier1 Ratio$_{t-1}$	-0.0016***	-0.0016***	-0.0014***	-0.0014***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Other Bank Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
State-quarter FE	Yes	Yes	Yes	Yes
Observations	157673	157673	157673	157673
Adjusted R^2	0.44	0.44	0.44	0.44

Standard errors in parentheses.

Results: Disaster and Loan Loss Estimates

Small vs Large Banks may differ in their loan loss responses to disasters.
Following prior literature, large bank ($>$ 500 million assets)

- Large banks more exposed but diversified vs small banks more exposed given their geographic presence
- Larger banks more sophisticated modelling techniques vs small banks
- May differ in portfolio composition (see Ryan and Keeley [2013])

Results: Disaster and Loan Loss Estimates (Eqn 3.2)

	Small		Large	
	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Shock × Post	-0.0001***	0.0001	0.0001***	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Shock × Post × Δ Non-Perf. Assets$_{t+1}$	-0.0002	-0.0003	0.0123***	0.0121***
	(0.0018)	(0.0018)	(0.0032)	(0.0032)
Shock × Post × Δ Non-Perf. Assets	0.0036**	0.0034*	0.0168***	0.0168***
	(0.0018)	(0.0018)	(0.0033)	(0.0033)
Shock × Post × Δ Non-Perf. Assets$_{t-1}$	0.0054***	0.0052***	0.0203***	0.0203***
	(0.0018)	(0.0018)	(0.0032)	(0.0032)
Shock × Post × Δ Non-Perf. Assets$_{t-2}$	-0.0014	-0.0016	0.0020	0.0020
	(0.0018)	(0.0018)	(0.0032)	(0.0033)
Shock × Post × EBP		0.0005		0.0193*
		(0.0069)		(0.0099)
Shock × Post × Tier1 Ratio$_{t-1}$		-0.0008***		0.0004
		(0.0002)		(0.0004)
Δ Non-Perf. Assets$_{t+1}$	0.0066***	0.0067***	-0.0012	-0.0012
	(0.0010)	(0.0010)	(0.0021)	(0.0021)
Δ Non-Perf. Assets	0.0184***	0.0185***	0.0312***	0.0312***
	(0.0010)	(0.0010)	(0.0021)	(0.0021)
EBP	0.2750***	0.2748***	0.2630***	0.2547***
	(0.0044)	(0.0050)	(0.0067)	(0.0079)
Tier1 Ratio$_{t-1}$	-0.0016***	-0.0013***	-0.0016***	-0.0017***
	(0.0002)	(0.0003)	(0.0004)	(0.0005)
Other Bank Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
State-quarter FE	Yes	Yes	Yes	Yes
Observations	110367	110367	46749	46749
Adjusted R^2	0.38	0.38	0.57	0.57

Standard errors in parentheses.

Results: Disaster and Loan Loss Estimates (Eqn 3.2)

	Small		Large	
	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Shock × Post	-0.0001***	0.0001	0.0001***	-0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Shock × Post × Δ Non-Perf. Assets$_{t+1}$	-0.0002	-0.0003	0.0123***	0.0121***
	(0.0018)	(0.0018)	(0.0032)	(0.0032)
Shock × Post × Δ Non-Perf. Assets	0.0036**	0.0034*	0.0168***	0.0168***
	(0.0018)	(0.0018)	(0.0033)	(0.0033)
Shock × Post × Δ Non-Perf. Assets$_{t-1}$	0.0054***	0.0052***	0.0203***	0.0203***
	(0.0018)	(0.0018)	(0.0032)	(0.0032)
Shock × Post × Δ Non-Perf. Assets$_{t-2}$	-0.0014	-0.0016	0.0020	0.0020
	(0.0018)	(0.0018)	(0.0032)	(0.0033)
Shock × Post × EBP		0.0005		0.0193*
		(0.0069)		(0.0099)
Shock × Post × Tier1 Ratio$_{t-1}$		-0.0008***		0.0004
		(0.0002)		(0.0004)
Δ Non-Perf. Assets$_{t+1}$	0.0066***	0.0067***	-0.0012	-0.0012
	(0.0010)	(0.0010)	(0.0021)	(0.0021)
Δ Non-Perf. Assets	0.0184***	0.0185***	0.0312***	0.0312***
	(0.0010)	(0.0010)	(0.0021)	(0.0021)
EBP	0.2750***	0.2748***	0.2630***	0.2547***
	(0.0044)	(0.0050)	(0.0067)	(0.0079)
Tier1 Ratio$_{t-1}$	-0.0016***	-0.0013***	-0.0016***	-0.0017***
	(0.0002)	(0.0003)	(0.0004)	(0.0005)
Other Bank Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
State-quarter FE	Yes	Yes	Yes	Yes
Observations	110367	110367	46749	46749
Adjusted R^2	0.38	0.38	0.57	0.57

Standard errors in parentheses.

Results: Disaster and Loan Loss Estimates (Eqn 3.2)

	Small		Large	
	(1) Q4	(2) Non-Q4	(3) Q4	(4) Non-Q4
Shock × Post	-0.0001	0.0001*	-0.0001	-0.0000
	(0.0001)	(0.0000)	(0.0002)	(0.0001)
Shock × Post × Δ Non-Perf. Assets$_{t+1}$	0.0086*	-0.0011	0.0054	0.0159***
	(0.0051)	(0.0018)	(0.0089)	(0.0034)
Shock × Post × Δ Non-Perf. Assets	0.0148***	0.0014	0.0354***	0.0081**
	(0.0048)	(0.0019)	(0.0083)	(0.0037)
Shock × Post × Δ Non-Perf. Assets$_{t-1}$	-0.0008	0.0068***	0.0211**	0.0215***
	(0.0051)	(0.0019)	(0.0085)	(0.0035)
Shock × Post × Δ Non-Perf. Assets$_{t-2}$	-0.0039	-0.0028	-0.0282***	0.0129***
	(0.0050)	(0.0019)	(0.0088)	(0.0035)
Shock × Post × EBP	0.0211	-0.0010	0.0447**	0.0100
	(0.0166)	(0.0075)	(0.0225)	(0.0110)
Shock × Post × Tier1 Ratio$_{t-1}$	-0.0006	-0.0008***	0.0007	0.0004
	(0.0006)	(0.0002)	(0.0010)	(0.0004)
Δ Non-Perf. Assets$_{t+1}$	0.0140***	0.0033***	-0.0001	-0.0050**
	(0.0029)	(0.0010)	(0.0059)	(0.0022)
Δ Non-Perf. Assets	0.0134***	0.0191***	0.0384***	0.0297***
	(0.0027)	(0.0011)	(0.0052)	(0.0023)
EBP	0.2813***	0.2672***	0.1340***	0.3275***
	(0.0114)	(0.0056)	(0.0170)	(0.0092)
Tier1 Ratio$_{t-1}$	-0.0025***	-0.0013***	-0.0025**	-0.0018***
	(0.0007)	(0.0003)	(0.0011)	(0.0005)
Other Bank Controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
State-Time FE	Yes	Yes	Yes	Yes
Observations	26582	82888	11188	35162
Adjusted R^2	0.40	0.37	0.54	0.58

Standard errors in parentheses.

Results: Disaster and Loan Loss Estimates

Banks with different loan composition may differ in their responses.

- Homogeneous vs Heterogeneous loan composition
- Homogeneous - banks with relatively higher proportion of homogeneous loans
- Homogeneous – residential real estate and consumer loans - loan loss estimated at a pool level
- Heterogeneous loans - accrue for losses at individual level, with more judgment about expected future performance
- We expect banks with more heterogeneous loans to be more timelier

Results: Disaster and Loan Loss Estimates (Eqn 3.2)

	Homogenous		Heterogenous	
	(1) LLP	(2) LLP	(3) LLP	(4) LLP
Shock × Post	-0.0000	0.0000	-0.0000*	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Shock × Post × Δ Non-Perf. Assets$_{t+1}$	-0.0008	-0.0008	0.0089***	0.0085***
	(0.0024)	(0.0024)	(0.0020)	(0.0020)
Shock × Post × Δ Non-Perf. Assets	0.0073***	0.0073***	0.0120***	0.0116***
	(0.0024)	(0.0025)	(0.0021)	(0.0021)
Shock × Post × Δ Non-Perf. Assets$_{t-1}$	0.0108***	0.0108***	0.0113***	0.0109***
	(0.0024)	(0.0024)	(0.0021)	(0.0021)
Shock × Post × Δ Non-Perf. Assets$_{t-2}$	0.0004	0.0004	0.0022	0.0019
	(0.0024)	(0.0024)	(0.0021)	(0.0021)
Shock × Post × EBP		-0.0024		0.0162**
		(0.0076)		(0.0082)
Shock × Post × Tier1 Ratio$_{t-1}$		-0.0001		-0.0011***
		(0.0002)		(0.0004)
Δ Non-Perf. Assets$_{t+1}$	0.0040***	0.0039***	0.0057***	0.0059***
	(0.0014)	(0.0014)	(0.0012)	(0.0012)
Δ Non-Perf. Assets	0.0151***	0.0151***	0.0224***	0.0225***
	(0.0014)	(0.0014)	(0.0012)	(0.0012)
EBP	0.2669***	0.2678***	0.2666***	0.2606***
	(0.0053)	(0.0059)	(0.0051)	(0.0059)
Tier1 Ratio$_{t-1}$	-0.0008***	-0.0007***	-0.0018***	-0.0014***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Other Bank controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
State-Time FE	Yes	Yes	Yes	Yes
Observations	70966	70966	85875	85875
Adjusted R^2	0.51	0.51	0.41	0.41

Standard errors in parentheses

Bank Provisioning Policies and Responses to Demand for Loans

Regression Estimates

Relationship between provisions before disaster and lending.

$$
\begin{aligned}
Y_{bt} = {} & \beta_1 Shock_b \times Post_t + \beta_2 Shock_b \times Post_t \times LLPPolicy_{b,t-1} \\
& + \beta_3 Shock_b \times Post_t \times EBP_{b,t} \\
& + \beta_4 Shock_b \times Post_t \times Tier1Ratio_{b,t-1} + \beta_5 LLPPolicy_{b,t-1} \\
& + \beta_6 EBP_{b,t} + \beta_7 Tier1Ratio_{b,t-1} \\
& + \beta_8 LLPPolicy_{b,t-1} \times Tier1Ratio_{b,t-1} \\
& + Controls + \text{Bank FE} + \text{State} \times \text{Time FE}
\end{aligned} \tag{3}
$$

Y_{bt} is the change in four quarter loans.

Loan Loss Provision Policy

LLP Policy measured using two measures – conservatism and timeliness.
Conservatism: Based on residual from an expectation model of provisions

- Estimate each quarter in the cross section separately for small and large banks
- Average each bank's residual across the current and previous twelve–quarters
- Banks with more positive average residuals provision more per dollar-change in non-performing loans, and hence more conservative

Loan Loss Provision Policy

Timeliness: Based on Beatty and Liao (2011), and Bushman and Williams (2015).

- Bank specific regressions that sequentially (1) excludes changes in current and future non-performing loans and then (2) includes changes in current and future non-performing loans
- timeliness measured as incremental R^2 subtracting (1) from (2)
- Higher incremental R^2 consistent with timely recognition of expected losses
- More timely banks recognize provisions concurrently with increase in non–performing loans, and in anticipation of future non–performing loans.

Results: Provisioning and Lending (Eqn 3.3)

	(1) Full	(2) Small	(3) Big
Shock × Post	0.0039***	0.0031***	0.0051**
	(0.0010)	(0.0011)	(0.0022)
EBP_{t-1}	1.5693***	1.0823***	1.2779**
	(0.2336)	(0.2687)	(0.5053)
Tier1 $Ratio_{t-1}$	0.0011***	0.0014***	0.0022***
	(0.0002)	(0.0002)	(0.0004)
Other Bank Controls	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
State-Time FE	Yes	Yes	Yes
Observations	73327	56057	16545
Adjusted R^2	0.49	0.50	0.55

Standard errors in parentheses.

Results: Provisioning and Lending (Eqn 3.3)

	(1) Full	(2) Small	(3) Big	(4) Full	(5) Small	(6) Big
HighRES12	-0.0209***	-0.0203***	-0.0207***	-0.0306***	-0.0328***	-0.0297***
	(0.0008)	(0.0009)	(0.0017)	(0.0021)	(0.0023)	(0.0048)
Shock × Post	0.0030***	0.0019*	0.0051**	0.0009	-0.0062**	0.0214***
	(0.0010)	(0.0012)	(0.0023)	(0.0024)	(0.0028)	(0.0055)
Shock × Post × HighRES12	0.0038**	0.0051***	-0.0013	-0.0069	0.0027	-0.0204*
	(0.0017)	(0.0019)	(0.0035)	(0.0044)	(0.0050)	(0.0108)
EBP_{t-1}	1.4968***	1.1013***	1.0671**	1.4697***	1.0943***	0.9900**
	(0.2322)	(0.2672)	(0.5022)	(0.2322)	(0.2671)	(0.5023)
Tier1 $Ratio_{t-1}$	0.0008***	0.0011***	0.0019***	0.0005***	0.0006***	0.0018***
	(0.0002)	(0.0002)	(0.0004)	(0.0002)	(0.0002)	(0.0004)
Shock × Post × Tier1 $Ratio_{t-1}$				0.0001	0.0005***	-0.0012***
				(0.0001)	(0.0002)	(0.0004)
HighRES12 × Tier1 $Ratio_{t-1}$				0.0006***	0.0008***	0.0007**
				(0.0001)	(0.0001)	(0.0003)
Shock × Post × HighRES12 × Tier1 $Ratio_{t-1}$				0.0007***	0.0002	0.0014*
				(0.0003)	(0.0003)	(0.0008)
Other bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
State-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	73327	56057	16545	73327	56057	16545
Adjusted R^2	0.50	0.51	0.55	0.50	0.51	0.55

Standard errors in parentheses

Results: Provisioning and Lending (Eqn 3.3)

	(1) Full	(2) Small	(3) Big	(4) Full	(5) Small	(6) Big
HighRES12	-0.0209***	-0.0203***	-0.0207***	-0.0306***	-0.0328***	-0.0297***
	(0.0008)	(0.0009)	(0.0017)	(0.0021)	(0.0023)	(0.0048)
Shock × Post	0.0030***	0.0019*	0.0051**	0.0009	-0.0062**	0.0214***
	(0.0010)	(0.0012)	(0.0023)	(0.0024)	(0.0028)	(0.0055)
Shock × Post × HighRES12	0.0038**	0.0051***	-0.0013	-0.0069	0.0027	-0.0204*
	(0.0017)	(0.0019)	(0.0035)	(0.0044)	(0.0050)	(0.0108)
EBP_{t-1}	1.4968***	1.1013***	1.0671**	1.4697***	1.0943***	0.9900**
	(0.2322)	(0.2672)	(0.5022)	(0.2322)	(0.2671)	(0.5023)
Tier1 $Ratio_{t-1}$	0.0008***	0.0011***	0.0019***	0.0005***	0.0006***	0.0018***
	(0.0002)	(0.0002)	(0.0004)	(0.0002)	(0.0002)	(0.0004)
Shock × Post × Tier1 $Ratio_{t-1}$				0.0001	0.0005***	-0.0012***
				(0.0001)	(0.0002)	(0.0004)
HighRES12 × Tier1 $Ratio_{t-1}$				0.0006***	0.0008***	0.0007**
				(0.0001)	(0.0001)	(0.0003)
Shock × Post × HighRES12 × Tier1 $Ratio_{t-1}$				0.0007***	0.0002	0.0014*
				(0.0003)	(0.0003)	(0.0008)
Other bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
State-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	73327	56057	16545	73327	56057	16545
Adjusted R^2	0.50	0.51	0.55	0.50	0.51	0.55

Standard errors in parentheses

Results: Provisioning and Lending (Eqn 3.3)

	(1) Full	(2) Small	(3) Big	(4) Full	(5) Small	(6) Big
HighR2	0.0007	0.0006	0.0020	-0.0017	-0.0025	-0.0058
	(0.0006)	(0.0007)	(0.0014)	(0.0017)	(0.0019)	(0.0042)
Shock × Post	0.0049***	0.0047***	0.0070***	0.0036	-0.0010	0.0223***
	(0.0012)	(0.0014)	(0.0026)	(0.0029)	(0.0034)	(0.0066)
Shock × Post × HighR2	-0.0020	-0.0031*	-0.0039	-0.0103***	-0.0099**	-0.0124
	(0.0014)	(0.0016)	(0.0030)	(0.0039)	(0.0045)	(0.0090)
EBP_{t-1}	1.5736***	1.0883***	1.2904**	1.5789***	1.0999***	1.2845**
	(0.2337)	(0.2688)	(0.5053)	(0.2337)	(0.2688)	(0.5052)
Tier1 $Ratio_{t-1}$	0.0011***	0.0014***	0.0022***	0.0010***	0.0012***	0.0020***
	(0.0002)	(0.0002)	(0.0004)	(0.0002)	(0.0002)	(0.0005)
Shock × Post × Tier1 $Ratio_{t-1}$				0.0001	0.0004*	-0.0011**
				(0.0002)	(0.0002)	(0.0004)
HighR2 × Tier1 $Ratio_{t-1}$				0.0002	0.0002*	0.0006*
				(0.0001)	(0.0001)	(0.0003)
Shock × Post × HighR2 × Tier1 $Ratio_{t-1}$				0.0006**	0.0004	0.0006
				(0.0002)	(0.0003)	(0.0006)
Other Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
State-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	73327	56057	16545	73327	56057	16545
Adjusted R^2	0.49	0.50	0.55	0.49	0.50	0.55

Standard errors in parentheses

Results: Provisioning and Lending (Eqn 3.3)

	(1) Full	(2) Small	(3) Big
HighLLP	-0.0144***	-0.0133***	-0.0236***
	(0.0019)	(0.0021)	(0.0047)
Shock × Post	-0.0027	-0.0074**	0.0197***
	(0.0029)	(0.0033)	(0.0064)
Shock × Post *HighLLP	0.0014	0.0021	-0.0083
	(0.0041)	(0.0047)	(0.0099)
EBP_{t-1}	2.0154***	1.5047***	1.7052***
	(0.2347)	(0.2698)	(0.5080)
Tier1 $Ratio_{t-1}$	0.0008***	0.0011***	0.0018***
	(0.0002)	(0.0002)	(0.0004)
Shock × Post × Tier1 $Ratio_{t-1}$	0.0005***	0.0007***	-0.0010**
	(0.0002)	(0.0002)	(0.0004)
HighLLP × Tier1 Ratio	0.0002**	0.0002	0.0009***
	(0.0001)	(0.0001)	(0.0003)
Shock × Post × HighLLP × Tier1 Ratio	-0.0002	-0.0002	0.0004
	(0.0003)	(0.0003)	(0.0007)
Other Bank controls	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes
State-quarter FE	Yes	Yes	Yes
Observations	73327	56057	16545
Adjusted R^2	0.49	0.51	0.55

Standard errors in parentheses

Conclusion

Conclusion

- We document disasters result in an increase use of forward–looking information based on current and future changes in non–performing assets
  - Large banks are more timelier
- Smaller banks with ample provisions with higher Tier 1 capital have lending growth in the post-disaster periods.
- We find no evidence that banks with more forward-looking loan loss provisions are better prepared to respond to loan demand in post-disaster periods

Thank You