Concentrating on Bailouts: Government Guarantees and Bank Asset Composition

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Concentrated exposures often cause banking crises

Recent cautionary tales

- **SVB**: tech start-up space and U.S. government bonds
- **Signature Bank**: digital assets space and commercial real estate in NYC (≈600% of T1-Capital)
- **First Republic**: single-family home loans represents 59% of lending portfolio

Why do banks then often opt for high asset concentration?

- **Existing literature:** banks' asset composition results from trade-off between specialized/concentrated (e.g., Winton, 1999) versus diversified asset portfolios (e.g., Diamond, 1984).
- **Our paper:** Government guarantees (GG) skew this trade-off, encouraging banks to engage in risk-taking via asset concentration.
- GGs incentivize a bank to further load up on assets whose failure would bring down the bank anyway.

Model Intuition I

SVB-like Balance Sheet

Assets	**Lb. & Eq.**
US Gov Bonds	Debt
$ 120 Bn	$ 195 Bn
Other Assets	Equity
$ 90 Bn	$ 15 Bn

- GG make banks' financing costs largely insensitive to their investment behavior
- Increase exposures toward assets that raise returns in **solvency** states and lead to losses only in **insolvency** states

Model Intuition II

SVB-like Balance Sheet

Assets	**Lb. & Eq.**
US Gov Bonds	Debt
$ 120 Bn	$ 195 Bn
Other Assets	Equity
$ 90 Bn	$ 15 Bn

1. When an eventual value loss threatened its stability, a bank like SVB will be incentivized to double down on U.S. bonds
2. Further loading up on "safe" government bonds increases the bank's risk level more than investing in other risky assets

Empirical Findings

Exploiting political connections in the U.S. banking system, we verify GG protection induces risk-taking via asset concentration:

- Protected banks concentrate their lending portfolios (13.5%)
  - Stronger for highly exposed banks (45%)
- Banks gaining (losing) GG protection load relatively more (less) on asset classes to which they had a high pre-exposure
  - Transitioning their portfolios over the following three years

Contribution

1. Government guarantees on bank investment behavior: risk-taking characterized by idiosyncratic risk of new loans.
   - Merton (1977); Allen et al. (2011); Cordella and Yeyati (2003); Gropp and Vesala (2004); Dam and Koetter (2012); Gropp et al. (2011); Brandao-Marques et al. (2013); Duchin and Sosyura (2014); Kostovetsky (2015)

2. Bank specialization: determinants and implications for risk-taking
   - Agarwal et al. (2020); De Jonghe et al. (2020); Beck et al. (2022); Blickle et al. (2023); Casado and Martinez-Miera (2023)

We provide empirical evidence that government guarantees can induce banks to engage in risk-taking via asset concentration

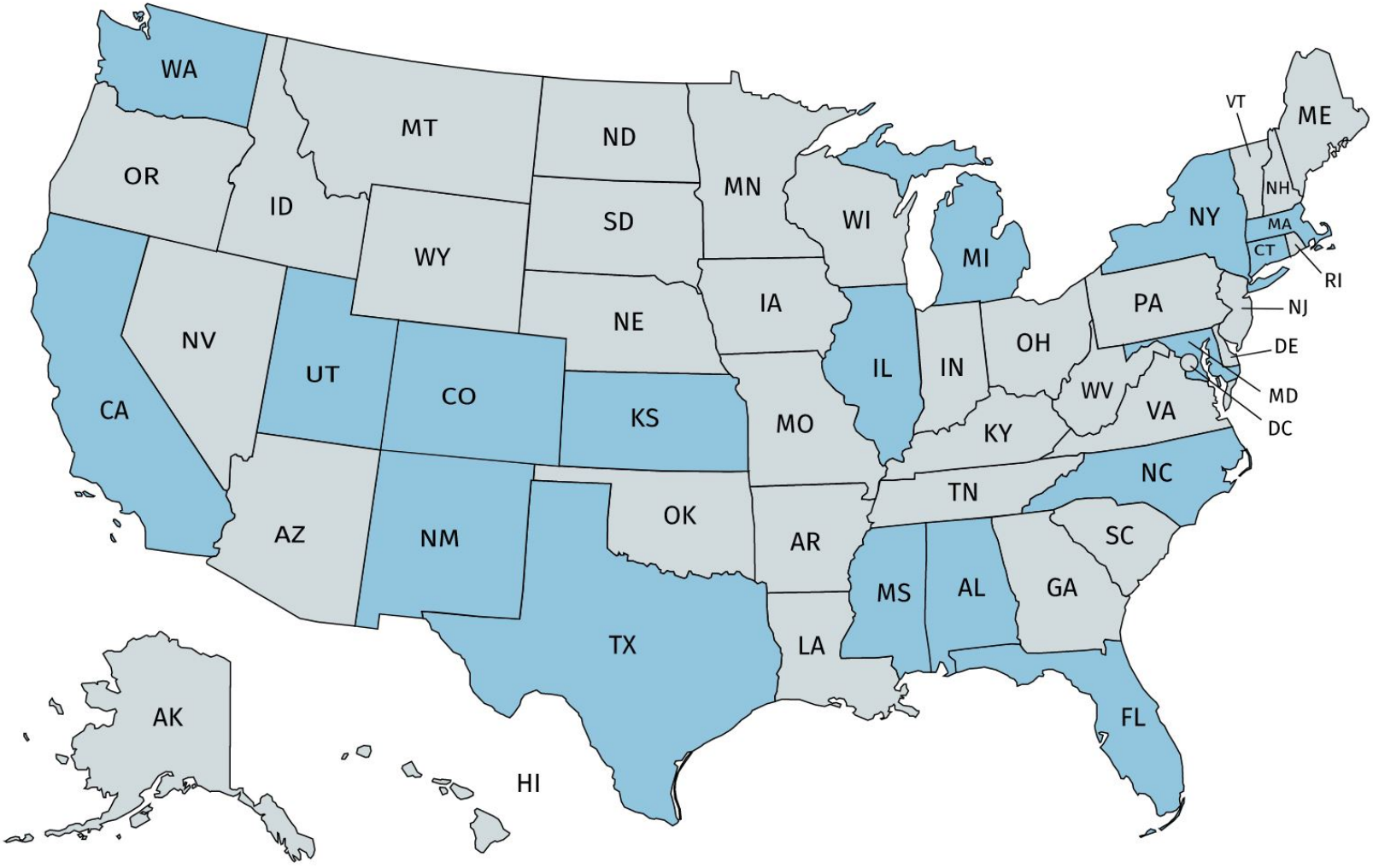
Measuring bailout expectations

Empirical challenge: implicit GG not observable and endogenous to investment behavior

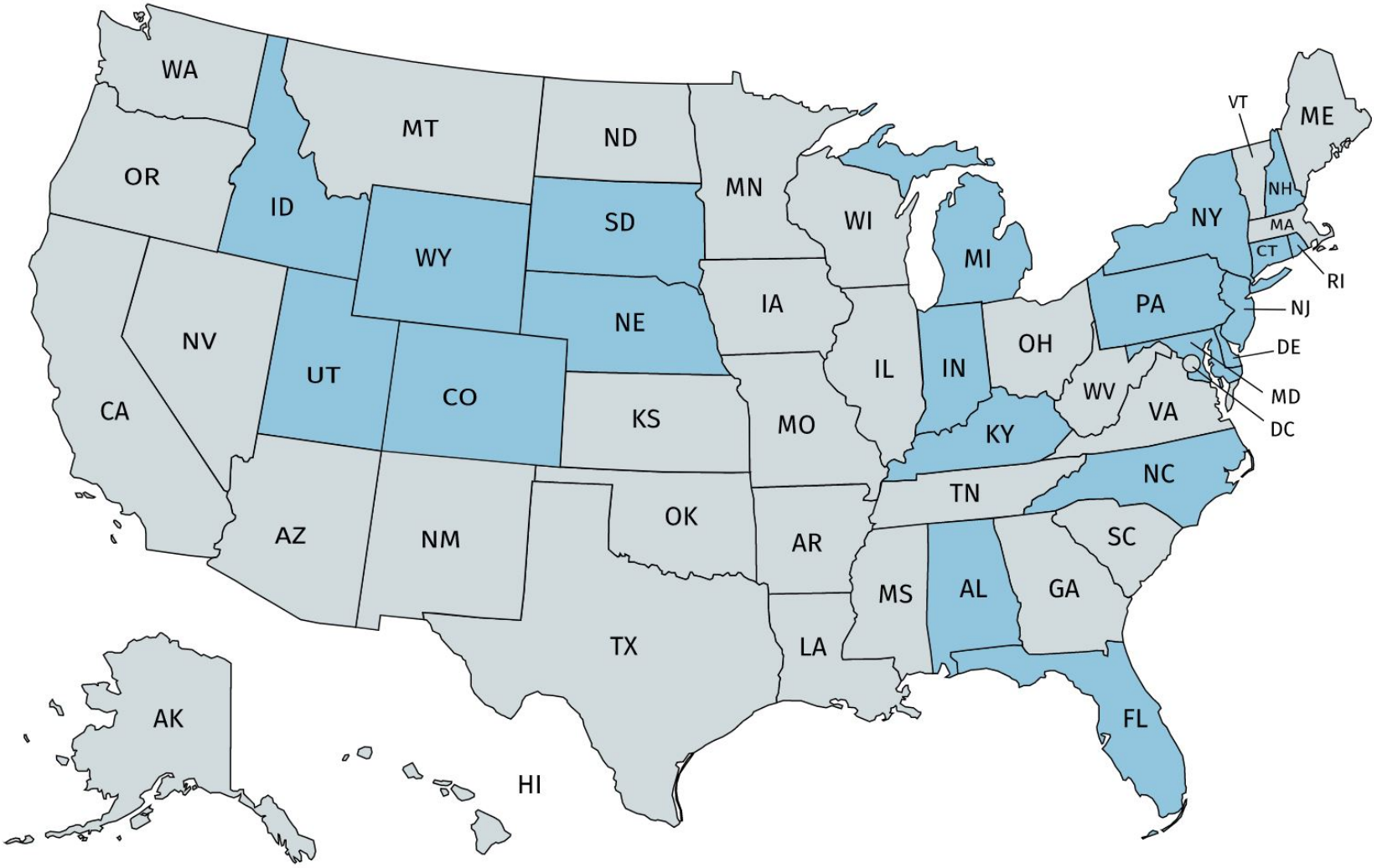
Conjecture: higher bailout likelihood if the state in which the bank is headquartered is represented in BHUA Senate Committee

- **Task**: Involved in monitoring, law deliberation, and bailout decisions (e.g., TARP) (Duchin and Sosyura, 2014) More Details
- **Assignment**: Based on party considerations and share, senators' qualifications and other factors
- **Dispersed**: State representation and banks are regionally dispersed, and change in state location is uncommon

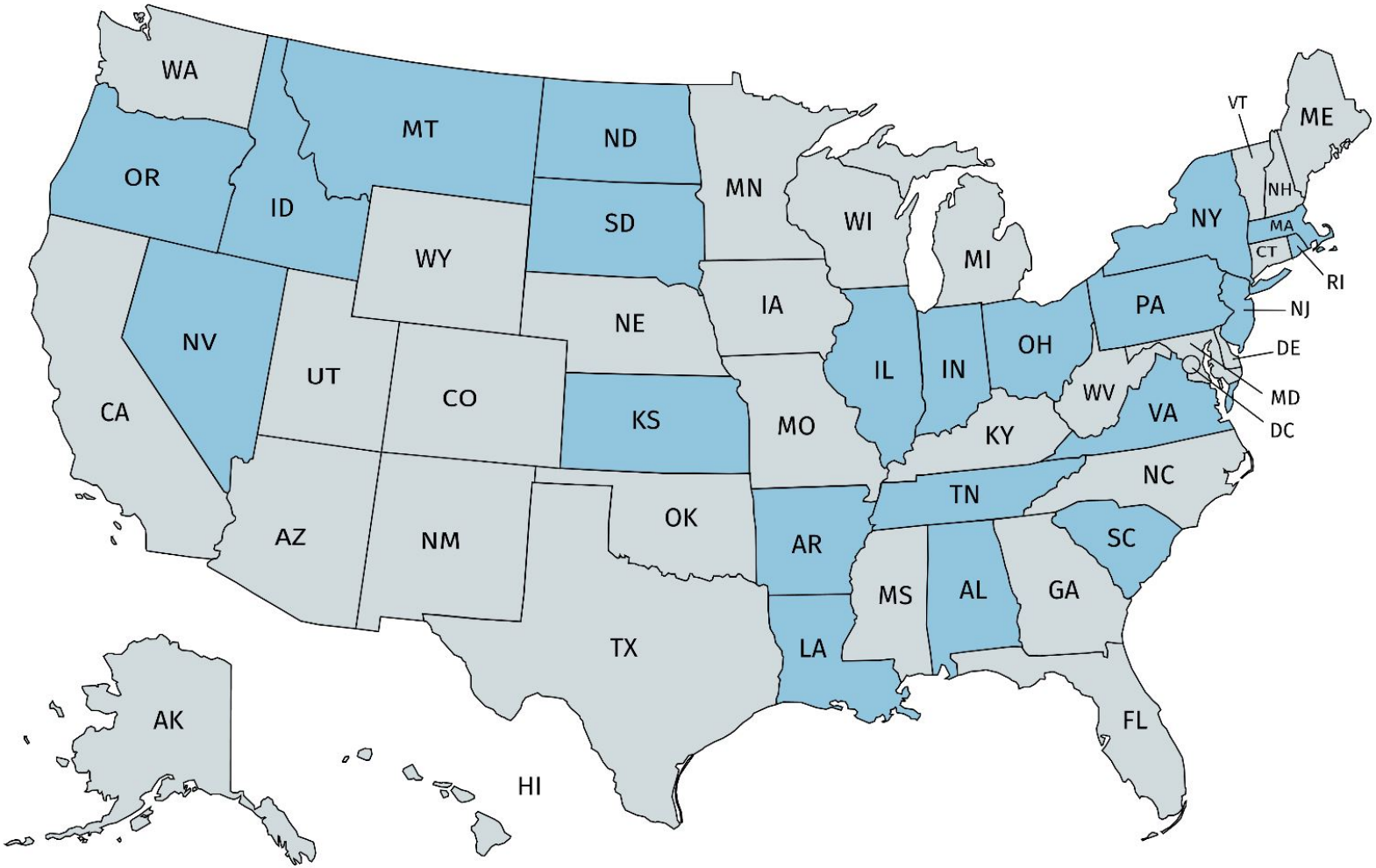
State representation in BHUA Senate Committee (1996)



State representation in BHUA Senate Committee (2006)



State representation in BHUA Senate Committee (2016)



Portfolio Data

- Characterizing exposure based on lending portfolios at BHC level[1] (1996-2016) for >3,000 U.S. banks
  - **Lending Classes (BHC)**: Residential Real Estate (RE) (3), Commercial RE (3), Agri (2), Consumer Credit (2), Commerce and Industry (2), and to other financial firms (2).
  - **Exposure**:

$$\frac{Total\ or\ Class\ Lending\ Volume}{Tier\ 1\ Capital}$$

  - **Controls**: Lagged Size (log Assets), ROA (EBIT/A), Liquidity (Cash + STI/A), Wholesale leverage ((A-E-D)/A), Dividends, State-level log-GDP.

Descriptive Statistics

[1] Bank Holding Company database, derived from Y-9C reports and made available by Federal Reserve Bank of Chicago

Protected banks have more concentrated portfolio

Empirical specification

$$Portfolio\ Concentration_{b,t+1} = \beta_1 GG_{b,t} + \delta X_{b,t} + \alpha_t + \alpha_b + \epsilon_{i,t}$$

$$CW_{b,c,t} = \frac{Lending\ Volume\ to\ Class_{b,c,t}}{Total\ Lending\ Volume_{b,t}}$$

1. Portfolio HHI:
$$\sum CW^2$$
2. Portfolio EDM:
$$\sum [CW * Log(CW)]$$

GG and Concentration

Table: Portfolio Concentration

	Portfolio HHI			Portfolio EDM		
	Full Sample	High Ex.	Low Ex.	Full Sample	High Ex.	Low Ex.
GG	0.292**	**0.505****	0.242*	0.742*	**1.515****	0.592
	(0.032)	(0.039)	(0.087)	(0.053)	(0.019)	(0.141)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
N	20,861	4,351	16,510	20,861	4,351	16,510
R^2	0.840	0.907	0.824	0.870	0.921	0.855

Asset concentration conditional on lending exposure

Panel A: Inter-State	Portfolio HHI			Portfolio EDM		
GG	-0.199	0.191	0.213	-0.807	0.468	0.475
	(0.439)	(0.169)	(0.106)	(0.296)	(0.224)	(0.194)
GG x Lending Exposure (Continuous)	**0.065***			**0.207****		
	(0.059)			(0.042)		
GG x Lending Exposure (Top 25%)		**0.384****			**0.994****	
		(0.013)			(0.040)	
GG x Lending Exposure (Top 10%)			**0.773*****			**2.572*****
			(0.008)			(0.005)
$\hat{\beta}_1 + \hat{\beta}_3$		0.575***	0.986***		1.461***	3.048***
		(0.001)	(0.001)		(0.007)	(0.001)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
N	20,861	20,861	20,861	20,861	20,861	20,861
R^2	0.840	0.839	0.839	0.870	0.869	0.869

Asset concentration conditional on lending exposure

Panel B: Intra-State	Portfolio HHI			Portfolio EDM		
GG x Lending Exposure	**0.070****			**0.212****		
(Continuous)	(0.046)			(0.047)		
GG x Lending Exposure		**0.399****			**1.019****	
(Top 25%)		(0.010)			(0.041)	
GG x Lending Exposure			**0.721****			**2.421*****
(Top 10%)			(0.013)			(0.009)
State-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
N	20,799	20,799	20,799	20,799	20,799	20,799
R^2	0.855	0.854	0.854	0.882	0.881	0.881

How do GG gainers and losers reallocate their portfolios?

Transition to more (less) concentrated portfolio after $\triangle$GG

Empirical specification

$$\triangle \ Log(Class \ Weight \ or \ Volume)_{b,c,t+T} = \beta_1 \triangle GG_{b,t} + \beta_2 Exposure \ Ratio_{b,c,t}$$

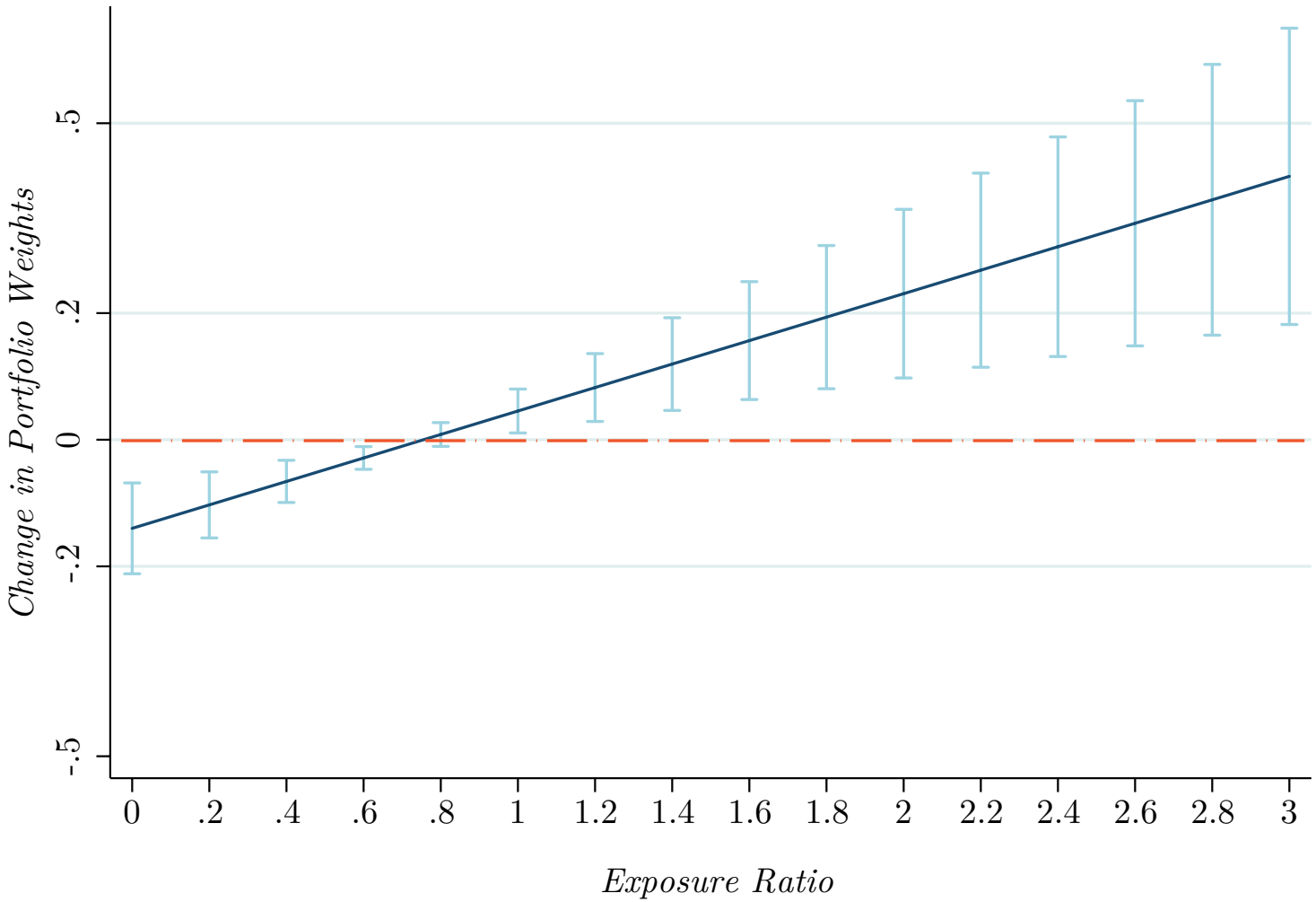
$$+\beta_3 \triangle GG \ * Exposure \ Ratio_{b,c,t} + \delta X_{b,t} + Class_c * Year_t + Bank_b + \epsilon_{b,c,t}$$

1. Portfolio Weights: $\triangle Log(Portfolio \ Weight_{b,c,t+T})$
2. Lending Behaviour: $\triangle Log(Lending \ Volume_{b,c,t+T})$

Reallocation after change in GG coverage (3-year)

	Continuous Exposure			Top 25% Exposure		
	ΔPW (t+1)	ΔPW (t+2)	ΔPW (t+3)	ΔPW (t+1)	ΔPW (t+2)	ΔPW (t+3)
△GG	-0.025	-0.061**	-0.111***	-0.010	-0.036*	-0.073***
	(0.101)	(0.012)	(0.003)	(0.383)	(0.080)	(0.005)
△GG x Exposure Ratio	0.034*	0.083***	**0.144*****			
	(0.052)	(0.006)	(0.003)			
△GG x Top 25% Exposure				0.043	0.168*	**0.305****
				(0.401)	(0.072)	(0.013)
$\hat{\beta}_1 + \hat{\beta}_3$				0.032	0.131*	**0.232****
				(0.413)	(0.069)	(0.014)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Class-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	184,062	156,198	132,980	184,062	156,198	132,980
R^2	0.089	0.142	0.185	0.087	0.136	0.175

Effect of GG protection on Portfolio Weights (p.p.)



Change in lending behavior (3-year)

	Continuous Exposure			Top 25% Exposure		
	ΔLCV (t+1)	ΔLCV (t+2)	ΔLCV (t+3)	ΔLCV (t+1)	ΔLCV (t+2)	ΔLCV (t+3)
△GG	-0.231	-1.744*	-2.634**	-0.165	-1.391	-2.110**
	(0.639)	(0.090)	(0.029)	(0.715)	(0.120)	(0.031)
△GG	0.132	1.131**	**1.903*****			
x Exposure Ratio	(0.617)	(0.018)	(0.002)			
△GG x				0.019	2.221**	**4.032*****
Top 25% Exposure				(0.976)	(0.014)	(0.000)
$\hat{\beta}_1 + \hat{\beta}_3$				-0.146	0.830	**1.922****
				(0.768)	(0.311)	(0.049)
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Class-Time FE	Yes	Yes	Yes	Yes	Yes	Yes
N	184,062	156,198	132,980	184,062	156,198	132,980
R^2	0.075	0.134	0.185	0.074	0.131	0.180

Matching Approach - Portfolio Weights

	Losers		Gainers	
	ΔPW	ΔPW	ΔPW	ΔPW
Treated x Post	0.098*	0.067	0.098**	-0.072**
	(0.096)	(0.128)	(0.036)	(0.038)
Treated x Post	**-0.125****		**0.128****	
x Exposure Ratio	(0.029)		(0.022)	
Treated x Post		**-0.261****		**0.289****
x Top 25% Exposure		(0.022)		(0.013)
N	22,979	22,989	34,565	34,583
R^2	0.219	0.217	0.260	0.257
Bank FE	Yes	Yes	Yes	Yes
Class-Time FE	Yes	Yes	Yes	Yes

Matching Approach - Lending Volume

	Losers		Gainers	
	ΔLCV	ΔLCV	ΔLCV	ΔLCV
Treated x Post	3.122	2.627	-2.166	-1.886
	(0.196)	(0.261)	(0.401)	(0.395)
Treated x Post	**-1.874****		**2.548****	
x Exposure Ratio	(0.043)		(0.021)	
Treated x Post		**-3.902****		**5.964*****
x Top 25% Exposure		(0.046)		(0.003)
N	22,979	22,989	34,565	34,583
R^2	0.228	0.227	0.242	0.240
Bank FE	Yes	Yes	Yes	Yes
Class-Time FE	Yes	Yes	Yes	Yes

Robustness

- Placebo Test Lending behavior
- Excluding years and states
- Within State

Conclusion

We show government guarantees risk-taking incentives have an important portfolio dimension and lead to asset concentration:

- Protected banks lend relatively more to the asset classes of higher pre-exposure and concentrate portfolios

This mechanism has relevant implications for expanding policy initiatives of government guarantees for banks

- Recent bailouts of institutions (e.g., SVB and Credit Suisse)
- Ongoing deliberations about potentially widening the scope deposit insurance schemes (US & EU)

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Corporate Finance Model

- Two dates and three RN parties: G, B, C. Bank has legacy investment (L) and two alternative marginal assets (A)
- Low-exposure case: bank defaults only when both assets fail. High-exposure case: bank defaults whenever legacy asset fails
- Higher ρ_A increases expected returns in solvency states (*CFC*) but lowers liquidation value in insolvency states (*FCC*)
- GG drives a wedge: creditors assign a lower value to the liquidation value of marginal asset. *CFC dominates FCC*
- Banks with high pre-exposure will further concentrate their portfolio on this asset when GG increases

Example: Simplified Balance Sheet

Assets	units	*Return*	**EQ. & LB.**	units
Other Assets	4	1.00	Equity	4
Loans Type A	1	1.10	Debt	6
Loans Type B	5	1.10		

- With only two states for Loans: success or failure
  $\Longrightarrow$ When Loan Type B defaults, bank is insolvent.
- Bank's creditors don't completely adjust their required interest rate after changes in bank's portfolio (GG).

Example: Payoffs

Exp. Payoffs	A & B	A & $\bar{B}$	$\bar{A}$ & B	$\bar{A}$ & $\bar{B}$
Bank	4.6	0	3.5	0
Creditor	6	5.1	6	4

Example (Payoffs for each scenario)

$$\Pi_b = P_{A,B}[4+6*1.1-6]+P_{A,\bar{B}}[0]+P_{\bar{A},B}[4+5*1.1-6]+P_{\bar{A},\bar{B}}[0]$$

$$\Pi_c = P_{A,B}[6]+P_{A,\bar{B}}[5.1]+P_{\bar{A},B}[6]+P_{\bar{A},\bar{B}}[4]$$

Example: Risk-taking via asset concentration

Assets	units	*Return*	**Load on A**	**Load on B**
Other Assets	4	1.0	3	3
Loans Type A	1	1.1	**2**	1
Loans Type B	5	1.1	5	**6**

- Bank's P(default) depends on Loan B, not shift direction
- Creditors don't adjust rates accordingly
- bank cannot reap value from improving diversification and lowering bankruptcy probability
- Consequently, further loading on high pre-existing exposure (i.e., Loan B) dominates

Equity will prefer load on B

- Creditors' expected payment is better with increased diversification, as payoff is higher for (A,$\bar{B}$) state

Load A	A & B	A & $\bar{B}$	$\bar{A}$ & B	$\bar{A}$ & $\bar{B}$
Bank	4.7	0	**2.5**	0
Creditor	6	**5.2**	6	3

- Shareholders' expected profit is better with increased concentration, as payoff is higher in solvency state ($\bar{A}$,B)

Load B	A & B	A & $\bar{B}$	$\bar{A}$ & B	$\bar{A}$ & $\bar{B}$
Bank	4.7	0	**3.6**	0
Creditor	6	**4.1**	6	3

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Low exposure case: Equity may be indifferent

Assets	units	*Return*	**Load on A**	**Load on B**
Other Assets	4	1.0	3	3
Loans Type A	**3**	1.1	**4**	3
Loans Type B	**3**	1.1	3	**4**

Load B	A & B	A & $\bar{B}$	$\bar{A}$ & B	$\bar{A}$ & $\bar{B}$
Bank	4.7	**1.4**	**0.3**	0
Creditor	6	6	6	3

Load B	A & B	A & $\bar{B}$	$\bar{A}$ & B	$\bar{A}$ & $\bar{B}$
Bank	4.7	**0.3**	**1.4**	0
Creditor	6	6	6	3

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Model - High Exposure: Bank Profit Maximization

$$\Pi_{A,hi} = \Delta_A + \rho_A [lR_L + xR_A - dD] + (\lambda_L - \rho_A)[lR_L - dD] - e. \tag{3.10}$$

$$\begin{aligned} &\rho_A dD + (\lambda_L - \rho_A) dD + (\lambda_A - \rho_A)[\alpha dD + (1-\alpha) xR_A] \\ &+ (1 - \lambda_L - \lambda_A + \rho_A)\alpha dD \geq d. \end{aligned} \tag{3.11}$$

$$\begin{aligned} \Pi^*_{A,hi} &= \Delta_A + \underbrace{(\lambda_L lR_L + \lambda_A xR_A)}_{=PV_{A,hi}} \\ &+ \underbrace{(1-\lambda_L)\alpha \frac{d - (\lambda_A - \rho_A)(1-\alpha)xR_A}{\lambda_L + (1-\lambda_L)\alpha} - (\lambda_A - \rho_A)\alpha xR_A}_{=G_{A,hi}} - 1. \end{aligned} \tag{3.13}$$

$$\frac{\partial F_{\overline{A},hi}}{\partial \alpha} = \frac{1}{2\delta} \frac{\lambda_L(\rho_{\overline{A}} - \rho_{\underline{A}})xR}{\lambda(\lambda_L + (1-\lambda_L)\alpha)^2} > 0. \tag{3.18}$$

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BHUA Senate Committee Representation

- **Causality** Incoming senators are interested in other committees of greater exposure and power[2],
- Committee composition is hardly defined by a particular firm.

- **Reasons for change** Leave to another committee or other tasks[3], retire or death, followed by a new incorporation.
- Change in Rep-Dem proportion can modify the committee, as parties re-assign (scarcer) members.

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[2] Most seek committees: Appropriations, Armed Services, Finance, and Foreign Relationships; according to Congressional Research Service (Kostovetsky, 2015)

[3] e.g., electoral campaigns

Table: Descriptive Statistics on BHC Call Report Data

	Observation	Mean	Std. Dev.	10 %	50 %	90 %
GG	25,203	0.407	0.491	0.000	0.000	1.000
Size	25,203	13.390	1.322	12.124	13.134	14.925
Wholesale Debt	25,203	0.104	0.092	0.016	0.081	0.213
Liquidity	25,071	0.048	0.034	0.019	0.038	0.087
ROA	25,203	0.023	0.018	0.007	0.024	0.041
Dividends	25,203	0.770	0.421	0.000	1.000	1.000
State GDP	25,203	12.53	0.94	11.28	12.59	13.70
Portfolio HHI	25,203	24.72	7.35	16.33	22.94	34.05
Portfolio EDM	25,203	-164.75	23.64	-192.00	-168.16	-133.23
Lending Exposure	25,067	7.595	3.285	3.948	7.161	11.604
Exposure Ratio	259,629	0.725	1.012	0.012	0.263	2.118
$\Delta Log(PW)$	219,075	-0.002	1.485	-1.438	-0.016	1.468
$\Delta Log(LV)$	219,075	5.694	41.718	-29.916	3.220	44.343

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Placebo Test