CEO Ownership, Risk Management, and Bank Runs at Unlimited Liability Banks during the 1890s

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The views expressed in this paper are those of the authors and do not reflect the views of the FDIC, the Bank Policy Institute, or the United States. Haelim Anderson performed much of her work on this paper while on staff at the FDIC prior to joining the Bank Policy Institute.

Motivation

- Question
  - How does managerial stock ownership under unlimited liability affect banking stability (runs, suspensions, and failures)?
- Challenge
  - Banks operate under limited liability
  - Preferred level of bank risk is unknown due to regulation and supervision
- Strategy
  - Measure managerial incentives using presidential bank stock ownership and corresponding presidential liabilities (the amount of presidents' personal asset) that may be taken by regulatory authority in the event of a bank failure.
  - Study how managerial ownership affects banking stability.

Our Findings

- We examine the relationship between presidential liability, risk management, and bank runs.
  1. Presidential ownership didn't have a significant effect on bank risk taking incentives before the panic of 1893, but presidential liability did.
     - Banks with greater presidential liabilities had less credit risk pre-1893.
     - Banks with greater presidential ownership and liabilities had less solvency risk post-1893.
  2. Bank runs were closely tied to credit risks, and bank failures originated from solvency risks.
     - Banks with risky loan portfolios were likely to experience runs.
     - Banks with low equity holdings were likely to fail.
  3. Banks with high presidential ownership and liabilities restored their cash reserves quicker in the years following the bank run relative to their peer banks.

Compensation Policies following Crisis 1

- After SVB failure, President Biden urged Congress to bolster regulation on bank executives.
- the US Senate Committee on Banking, Housing and Urban Affairs (SBC) passed the Recovering Executive Compensation from Unaccountable Practices Act (RECOUP) Act in June 2023
  1. require banks to include governance and accountability standards in their bylaws
  2. give banking regulators the authority to clawback certain compensation from senior executives at failed banks, including profits made by selling the bank's stock.

Compensation Policies following Crisis 2

Financial Institution Letter

Incentive-Based Compensation Arrangements

May 6, 2024

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Notes

Access FDIC Financial Institution Letters (FILs) on the FDIC's website.

Summary:

On May 3, 2024, the FDIC Board of Directors approved a *Notice of Proposed Rulemaking* (NPR) and request for comment entitled *Incentive-Based Compensation Arrangements*, a rule to implement Section 956 of the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act). In this NPR, the FDIC, the Office of Comptroller of the Currency (OCC), the National Credit Union Administration (NCUA), and the Federal Housing Finance Agency (FHFA) (collectively the "Agencies" for purposes of this NPR) are re-proposing the regulatory text previously proposed in June 2016, along with certain alternatives and questions, for public comment.[1] The NPR would provide a consistent set of enforceable standards and help safeguard covered financial institutions from certain types and features of incentive-based compensation arrangements that encourage inappropriate risks by providing excessive compensation or that could lead to material financial loss to the institution.

Statement of Applicability: This proposed rulemaking does not apply to FDIC-supervised institutions with less than $1 billion in average total consolidated assets.

Compensation Policies following Crisis 3

- The NPR uses a tiered approach that would apply provisions to covered financial institutions according to three categories of average total consolidated assets: Level 1 ($250 billion or more), Level 2 ($50 billion to $250 billion), and Level 3 ($1 billion to $50 billion).

- For all covered institutions, the proposed rule would:
  - Prohibit types and features of incentive-based compensation arrangements that encourage inappropriate risks.
  - Require adherence to basic principles for incentive-based compensation arrangements to balance between risk and reward and establish effective risk management governance.
  - Require appropriate board of directors (or committee) oversight, recordkeeping, and disclosures to the appropriate agency.

- For Level 1 and Level 2 institutions, the proposed rule would:
  - Require the following: deferral of awards for senior executive officers (SEOs) and significant risk-takers (SRTs); consideration of forfeiture or downward adjustment of awards; provide for clawback of paid awards; establishment of a board compensation committee; appropriate risk management and control framework; additional recordkeeping requirements for SEOs and SRTs; and policies and procedures to ensure rule compliance.
  - Prohibit or limit: excessive award leveraging; using only relative (peer) performance measures; use of options; volume-driven incentive-based compensation without regard to transaction quality or compliance with sound risk management; and the purchasing of hedging instruments by an institution on behalf of a covered person to offset any decrease in the value of incentive-based compensation.

Related Work

- Bank equity capital and moral hazard
  - Kim and Santomero (1988), Furlong and Keeley (1989), Gennotte and Pyle (1991), Rochet (1992), Besanko and Kanatas (1996), Laeven and Levine (2009), Aiyar, Calomiris, and Wieladek (2015), and Greenwood, Stein, Hanson, and Sunderam (2017).
- Extended liability and financial stability
  - Esty (1998), Grossman (2001), Mitchener and Richardson (2013), and Koudijs, Salisbury, and Sran (2018), Macey and Miller (1992), Kane and Wilson (1998).
- Banking panic of 1893
  - Carlson (2005), Calomiris and Carlson (2016), Calomiris and Carlson (2017), Calomiris and Carlson (2021), Calomiris and Carlson (2023).

HISTORICAL BACKGROUND

California State Banks in the 1890s

- During the 1890s, presidents of California state banks were personally exposed to downside risks in the case of bank failure through stock ownership.
  - Every bank was required to have at least 5 directors, who had to hold at least 10 shares of the capital stock of the bank.
  - One of the directors had to become the president of the board.
  - Every bank had to announce the names of bank directors and the value of shares of stock held by each director.
- Stock ownership played an important role in promoting bank stability as state banks operated with minimal regulations.
  - Unlike state banks, national banks were subject to minimum capital requirements and reserve requirements. They were also prohibited from making risky loans.

Stock Ownership Feature: Clawback

- The unlimited liability rule attached to bank stocks shares some similarities with clawback rules of today
  - In the case of failure, bank shareholders were liable for the percentage of debts and liabilities in excess of the liquidated assets that were equivalent to the proportion of the face value of the bank's capital stock they held.
  - It imposed post-closure losses on bank stockholders, increasing incentives for banks to hold capital and decreasing moral hazard.
  - It incentivized banks in financial difficulty to close before their liabilities exceeded their assets. By doing so, banks allowed their depositors to avoid potential losses. (Macey and Miller, 1992).

Stock Ownership Feature: Restricted Stock

- The unlimited liability rule attached to bank stocks shares some similarities with clawback rules of today.
  - The markets for bank stocks were illiquid because bank stocks were traded in OTC markets.
  - Bank shareholders saw each other as partners and treated each other with high levels of trust and loyalty.
  - The sale of bank stocks had to be approved by the board of directors because bank stocks were subject to extended liability rule.
- This restriction was instated to promote long-termism and discourage risk-taking by increasing managers' exposure to downside risks.

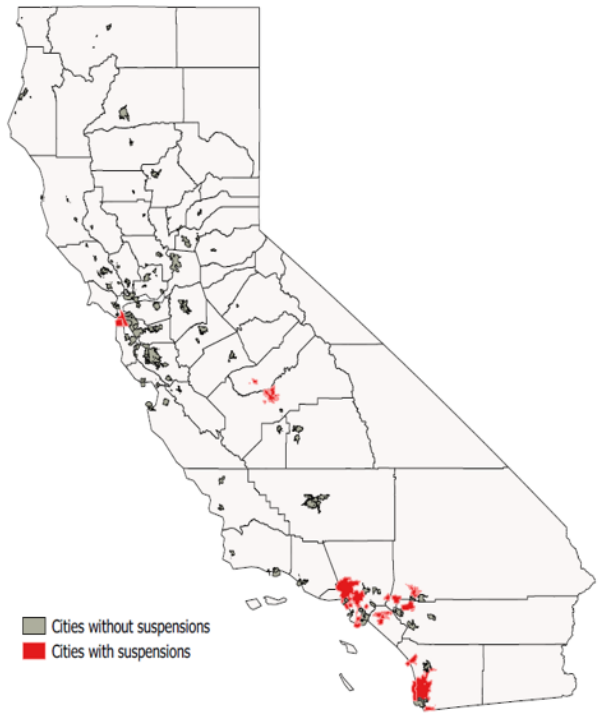
The Panic of 1893

- The Panic of 1893 was the most severe panic during the National Banking Era.
- The panic began in May and ended in August after 503 banks suspended operations.

  The peak occurred in June and July when 340 banks suspended operations.

The Panic of 1893 - California

- California was one of the most severely affected states during this panic.
  - Deposits held by state banks contracted by 22% between January and July of 1893.
  - The contraction of deposits was larger for rural banks at 37% compared to San Francisco banks at 12%.
- The panic began in May and ended in August after 503 banks suspended operations. The peak occurred in June and July when 340 banks suspended operations.



	National		State		Savings		Private Banks		Total		Grand Total
	US	CA	US	CA	US	CA	US	CA	US	CA	
Suspensions	158	6	172	19	47	2	198	0	575	27	602
Resumptions	86	5	49	17	10	0	0	0	145	22	167
Failures	71	1	123	2	37	2	198	0	430	5	435

The Panic of 1893 - CA Bank Failure Dates

Table A1: California Banks that Suspended Convertibility During the Panic of 1893

Bank	Date of Suspension
Riverside Banking Company	6/14/1893
Farmers Exchange Bank - San Bernardino	6/17/1893
Savings Bank of San Bernardino	6/17/1893
Bank of Oceanside	6/20/1893
Southern California National Bank - Los Angeles	6/20/1893
Consolidated National Bank of San Diego	6/21/1893
Savings Bank of San Diego	6/21/1893
Pacific Loan & Trust Company	6/21/1893
The Bank of Commerce - San Diego	6/21/1893
The First National Bank of San Diego	6/21/1893
Broadway Bank - Los Angeles	6/21/1893
City Bank (Savings) - Los Angeles	6/21/1893
East Side Bank - Los Angeles	6/21/1893
First National Bank - Los Angeles	6/21/1893
University Bank - Los Angeles	6/21/1893
Bank of Anaheim - Anaheim	6/21/1893
Bank of Orange - Orange	6/22/1893
Citizens Bank - Ontario	6/22/1893
The Commercial Bank - Santa Ana	6/22/1893
The First National Bank - Santa Ana	6/22/1893
The Los Nietos Bank - Downey	6/22/1893
The People's Bank - Pomona	6/22/1893
Bank of Madera - Madera	6/23/1893
Pacific Bank - San Francisco	6/23/1893
Peoples Home Savings Bank - San Francisco	6/23/1893
The First National Bank of San Bernardino	6/23/1893
The Loan and Savings Bank of Fresno	6/24/1893

Source: Various newspapers.

EMPIRICAL ANALYSIS

Balance Sheet Data

- Report of the Board of Bank Commissioners of the State of California
  - Sate banks' July balance sheet information from 1890 to 1896
  - The report contains:
    - balance sheet information on state banks
    - names of bank board members
    - the number of shares of stock held by each board member
    - the names of bank president (CEO) and cashier (CFO) among the members of the board

July Statement.

Resources.		Liabilities.	
Bank premises	$16,000 00	Capital paid in coin	$60,000 00
Real estate taken for debt	1,151 60	Due depositors	62,227 30
County warrants	45 00	Due banks and bankers	10,976 10
Loans on real estate	21,227 94	Dividends unpaid	4 00
Loans on stocks	2,400 00	Undivided profits	1,886 05
Loans on other securities (grain, etc.)	4,200 00		
Loans on personal security and overdrafts	77,450 78		
Money on hand	8,243 95		
Due from banks and bankers	951 53		
Furniture and fixtures	3,300 00		
Other assets	122 65		
Total resources	$135,093 45	Total liabilities	$135,093 45

The amount of capital stock is $100,000; amount subscribed is $60,000; amount paid in coin is $60,000. The total number of shares of stock issued is 1,200 shares; the amount paid on each share of stock is $50.

The names of the Directors, and number of shares of stock held by each, are as follows: J. R. Ryland, 210; F. H. McCullagh, 60; Chas. F. Wilcox, 260; Magnus Tait, 20, A. Berryman, 15. Total number of shares held by the Directors is 535 shares.

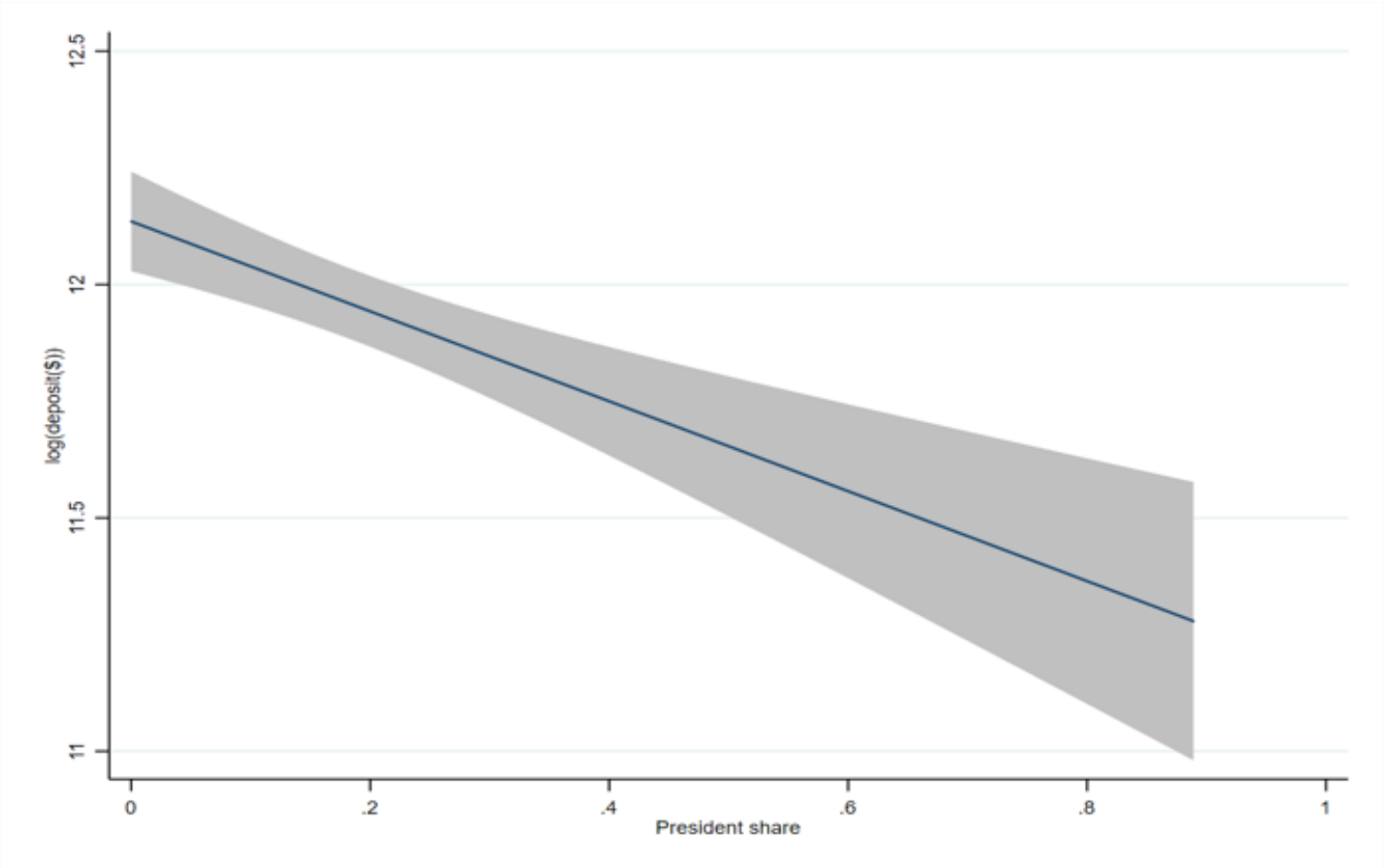
Measuring Bank risk

- We focus on three risk types:
  - Credit risk: unsecured loan ratio
  - Liquidity risk: cash-to-asset ratio
  - Solvency risk: equity-to-asset ratio
- The report provides information on four loan categories:
  - loans on real estate
  - loans on stocks bonds and warrants
  - loans on other securities
  - loans on personal security
- The first three categories were secured loans, whereas the last category was unsecured loans.
  - The distinction between the secured and unsecured loans allows us to assess the riskiness of loan portfolios.
  - For CA state banks during this period, unsecured loans were the riskiest.

Measuring Presidential Liabilities

- Percentage ownership was used as a measure of bank presidents' liabilities
- However, three variables determine the extent to which bank failure financially impacts bank presidents under the unlimited liability rule:
  - percentage ownership
  - size of bank liabilities
  - liquidation value of assets
- For our analysis, we compute dollar amounts of ownership and liabilities for bank presidents.
- We study the effect of the unlimited liability rule assuming the worst case: the liquidation value of assets other than cash is minimal, and shareholders bear the entire cost of excess liabilities.

Measuring Management Liability



- p$P_{Deposit}$ = pP x (Deposit-Cash)

Banks in Riverside, California (1892)

	Banks in Riverside, CA (excluding Riverside Banking Company)			Riverside Banking Company		
	mean	p50	sd	mean	p50	sd
President share (%)	0.190	0.120	0.213	0.073	-	-
Vice President share (%)	0.057	0.071	0.032	0.073	-	-
Cashier share (%)	0.100	0.000	0.173	0.018	-	-
Assistant Cashier share(%)	0.000	0.000	0.000	0.000	-	-
Manager share(%)	0.347	0.200	0.401	0.165	-	-
log(President liabilities)	9.098	9.538	0.935	10.885	-	-
log(Manger liabilities)	9.707	10.049	0.871	11.696	-	-
log(President ownership)	8.081	7.496	1.342	10.166	-	-
log(Manger ownership)	8.690	8.006	1.345	10.977	-	-
log(Assets)	11.825	11.813	0.478	13.922	-	-
log(Bank Age)	0.963	1.099	0.234	2.079	-	-
Equity Ratio	0.320	0.308	0.184	0.339	-	-
Cash Ratio	0.073	0.027	0.088	0.069	-	-
Loan & Leases Ratio	0.711	0.672	0.125	0.758	-	-
Unsecured Loans Ratio	0.497	0.638	0.443	0.817	-	-
Real Estate Loans Ratio	0.400	0.125	0.520	0.183	-	-
Deposit-to-Capital Ratio	3.759	2.444	3.487	2.052	-	-
N	3			1		

Summary Statistics (1892)

Panel A. Ownership and Balance Sheet Information based on Bank Runs

	All Banks			Bank Run					
				No Bank Run			Bank Run		
	mean	p50	sd	Mean	p50	sd	Mean	p50	sd
log(Assets)	12.66	12.59	1.36	12.69	12.59	1.40	12.32	12.39	0.75
Bank Age	9.87	6.00	8.14	9.86	6.00	8.29	9.89	6.50	6.61
Equity Ratio	0.39	0.40	0.18	0.38	0.39	0.18	0.47	0.46	0.14
Cash	0.07	0.06	0.05	0.07	0.06	0.05	0.08	0.07	0.03
Loan & Leases	0.74	0.78	0.15	0.74	0.78	0.15	0.68	0.70	0.18
Unsecured Loans	0.47	0.56	0.34	0.45	0.52	0.34	0.71	0.70	0.18
Deposit-to-Capital	3.64	1.71	5.70	3.84	1.77	5.93	1.56	1.19	1.16
President share (%)	0.19	0.13	0.19	0.19	0.12	0.19	0.19	0.14	0.17
Manager share (%)	0.32	0.26	0.24	0.32	0.26	0.23	0.34	0.26	0.25
log(Off-B/S Liability)	9.55	9.54	1.89	9.61	9.56	1.90	8.96	9.22	1.69
log(On-B/S Capital)	9.04	9.10	1.70	9.04	9.15	1.72	8.98	8.91	1.54
N	201			183			18		

Bank Runs

$$\Delta log(D_{i,1893}) = \beta_0 + \beta_1 X_{i,1892} + \epsilon_{i,t} \tag{1}$$

$$P(Y = 1|X_{i,1892}) = \phi(\beta_0 + \beta_1 X_{i,1892}) \tag{2}$$

- $\Delta log(D_{i,1893})$ is a deposit growth rate between July 1892 and July 1893.
- $P(Y = 1|X_{i,1892})$ is an indicator variable equal to 1 if the bank run occurred at the bank i in 1893, and 0 otherwise.
  - We define bank runs banks as those whose deposits declined by more than 20 percent from July 1892 to July 1893.
- $X_{i,1892}$ is one-year lagged value of bank characteristics that are used as predictors.
  - (log) total assets, bank age, leverage ratio (equity-to-asset), cash holding (cash-to-asset), total loan holdings (loan-to-asset), and riskiness of loan portfolio (unsecured loans-to-total loans).

Effect of Bank Risk Management on Bank Runs

	(1)	(2)	(3)	(4)
	Probit	Probit	OLS	OLS
VARIABLES	Bank Run	Bank Run	Δlog(Deposit)	Δlog(Deposit)
SAMPLE	All banks	Rural banks	All banks	Rural banks
log(Assets)	0.00169	0.0899	-0.0259	-0.019
	(0.106)	(0.130)	(0.0203)	(0.031)
log(Bank Age)	0.145	0.0823	-0.149***	-0.166***
	(0.152)	(0.158)	(0.0354)	(0.041)
Equity Ratio	0.978	1.052	0.124	0.194
	(0.705)	(0.750)	(0.191)	(0.208)
Cash Ratio	-4.735*	-5.014*	1.449*	1.807*
	(2.814)	(2.860)	(0.866)	(0.937)
Loan & Leases Ratio	-0.796	-1.018	0.0810	0.132
	(0.753)	(0.806)	(0.185)	(0.203)
Unsecured Loans Ratio	1.063**	0.955**	-0.451***	-0.432***
	(0.430)	(0.430)	(0.121)	(0.123)
Constant	-1.412	-2.139	0.712**	0.567
	(1.433)	(1.655)	(0.276)	(0.380)
Observations	203	183	194	178
R-squared			0.273	0.279

Bank Suspensions and Failures

$$P(Y = 1|X_{i,1892}) = \phi(\beta_0 + \beta_1 X_{i,1892}) \tag{3}$$

- We estimate the probability of bank suspension and failure using a probit analysis.
- $P(Y = 1|X_{i,1892})$ is an indicator variable equal to 1:
  - if bank suspension occurred at bank i in 1893, and 0 otherwise.
  - if bank i failed between 1893 and 1896, and 0 otherwise.
- $X_{i,1892}$ is one-year lagged value of bank characteristics that are used as predictors.
  - (log) total assets, bank age, leverage ratio (equity-to-asset), cash holding (cash-to-asset), total loan holdings (loan-to-asset), and riskiness of loan portfolio (unsecured loans-to-total loans).

Effect of Bank Risk Management on Bank Suspension and Failure

	(1)	(2)	(3)	(4)
	Bank suspension	Bank suspension	Bank failure	Bank failure
	All banks	Rural banks	All banks	Rural banks
log(Assets)	-0.0268	-0.0449	-0.032	-0.128
	(0.177)	(0.244)	(0.138)	(0.235)
log(Bank Age)	0.113	0.0150	0.370*	0.371
	(0.235)	(0.258)	(0.217)	(0.262)
Equity Ratio	-1.934*	-1.836	-2.599**	-2.678*
	(1.161)	(1.173)	(1.234)	(1.550)
Cash Ratio	-4.386	-5.262	6.125*	7.548**
	(3.914)	(3.942)	(3.158)	(3.452)
Loan & Leases Ratio	-3.086***	-2.921***	-0.274	0.406
	(0.913)	(0.900)	(1.010)	(0.996)
Unsecured Loans Ratio	2.544***	2.291***	0.326	0.345
	(0.640)	(0.566)	(0.582)	(0.694)
Constant	0.241	0.729	-1.329	-0.810
	(2.224)	(2.888)	(1.694)	(2.776)
Observations	203	183	203	183

Bank Risk Management

$$y_{i,t} = \beta_0 + \beta_1 P_{i,t} + \gamma s_{i,t} + \theta_i + \vartheta_t + \varepsilon_{i,t} \tag{4}$$

- y is one of the measures of bank risk management:
  - Cash-to-asset ratio
  - Equity ratio
  - Unsecure loan-to-total loan ratio
- P is presidential liabilities of bank that is measured either as a:
  - President ownership (on-B/S capital)
  - President liabilities (off-B/S liabilities)
- s is a bank level control: Total asset size, bank age
- θ is a bank fixed effect
- ϑ is a time fixed effect

Effect of Managerial Liability and Ownership on Bank Risk Management (1890-1892)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Equity Ratio	Cash Ratio	Loan & Leases Ratio	Unsecured Loans Ratio	Equity Ratio	Cash Ratio	Loan & Leases Ratio	Unsecured Loans Ratio
log(Assets)	-0.247***	0.011	0.094	-0.000	-0.246***	0.015	0.058	-0.075
	(0.035)	(0.0243)	(0.0926)	(0.117)	(0.032)	(0.022)	(0.074)	(0.098)
Lag log(Off-B/S Guarantee)	0.004	-0.002	-0.0170	-0.072**				
	(0.005)	(0.006)	(0.0407)	(0.029)				
Lag log(On-B/S Capital)					0.005	-0.009	0.004	-0.045
					(0.008)	(0.011)	(0.022)	(0.034)
Constant	3.530***	-0.052	-0.317	1.120	3.501***	-0.044	-0.057	1.812
	(0.447)	(0.289)	(1.032)	(1.397)	(0.413)	(0.255)	(0.931)	(1.292)
Observations	326	326	326	326	328	328	328	328
R-squared	0.375	0.032	0.028	0.072	0.397	0.045	0.015	0.040
Number of Banks	178	178	178	178	178	178	178	178
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y

Effect of Managerial Liability and Ownership on Bank Risk Management (1894-1896)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Equity Ratio	Cash Ratio	Loan & Leases Ratio	Unsecured Loans Ratio	Equity Ratio	Cash Ratio	Loan & Leases Ratio	Unsecured Loans Ratio
log(Assets)	-0.248***	-0.012	-0.0192	0.016	-0.240***	-0.011	-0.013	0.014
	(0.026)	(0.011)	(0.0283)	(0.035)	(0.025)	(0.010)	(0.028)	(0.033)
Lag log(Off-B/S Guarantee)	0.005**	0.001	0.007*	-0.003				
	(0.002)	(0.002)	(0.00422)	(0.006)				
Lag log(On-B/S Capital)					0.006**	0.002	-0.002	-0.009
					(0.003)	(0.002)	(0.005)	(0.006)
Constant	3.481***	0.224	0.934**	0.292	3.379***	0.202	0.944***	0.376
	(0.329)	(0.137)	(0.360)	(0.431)	(0.309)	(0.132)	(0.356)	(0.421)
Observations	825	825	825	825	830	830	830	830
R-squared	0.444	0.108	0.165	0.053	0.446	0.108	0.164	0.055
Number of Banks	232	232	232	232	233	233	233	233
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y

Conclusion

- We connect corporate governance, risk management, and bank runs at California state banks during the 1890s.
- Presidential ownership didn't have a significant effect on bank risk taking incentives before the panic of 1893, but presidential liability did.
  - Banks with greater presidential liabilities had less credit risk pre-1893.
  - Banks with greater presidential ownership and liabilities had less solvency risk post-1893.
- Bank runs were closely tied to credit risks, and bank failures originated from solvency risks.
  - Banks with risky loan portfolios were likely to experience runs.
  - Banks with low equity holdings were likely to fail.

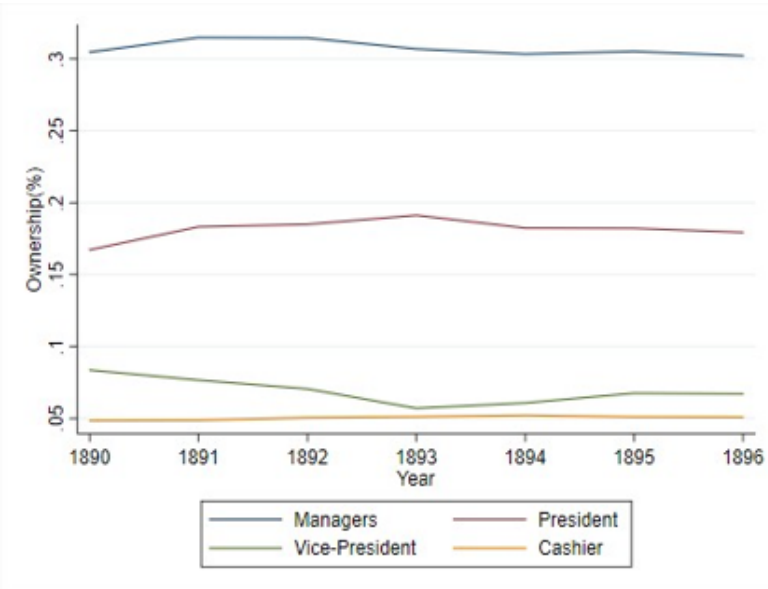
APPENDIX

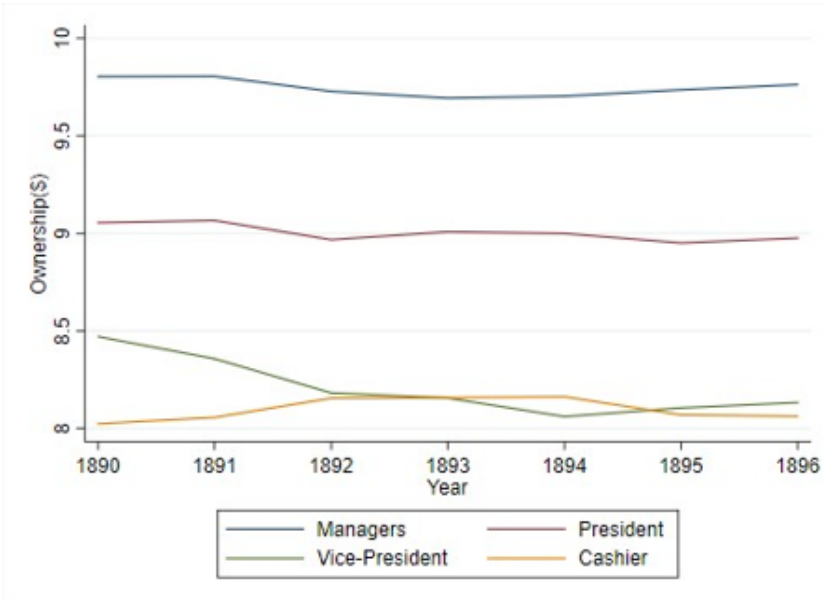
Summary Statistics (1892): Suspension

Panel B. Ownership and Balance Sheet Information based on Bank Suspensions

	All Banks			Bank Suspensions					
				No Suspension			Suspension		
	mean	p50	sd	mean	p50	sd	Mean	p50	sd
log(Assets)	12.66	12.59	1.36	12.68	12.60	1.37	12.28	11.78	1.27
Bank Age	9.87	6.00	8.14	9.96	6.00	8.18	8.46	6.00	7.67
Equity Ratio	0.39	0.40	0.18	0.39	0.40	0.18	0.41	0.39	0.16
Cash	0.07	0.06	0.05	0.07	0.06	0.05	0.09	0.09	0.05
Loan & Leases	0.74	0.78	0.16	0.75	0.79	0.15	0.61	0.63	0.12
Unsecured Loans	0.47	0.56	0.34	0.45	0.52	0.34	0.76	0.81	0.18
Deposit-to-Capital	3.64	1.71	5.70	3.73	1.70	5.87	2.38	1.77	1.62
President share (%)	0.19	0.13	0.19	0.19	0.12	0.19	0.23	0.23	0.16
Manager share (%)	0.32	0.26	0.22	0.31	0.25	0.24	0.37	0.35	0.24
log(Off-B/S Liability)	9.55	9.71	1.85	9.71	9.66	1.84	9.69	10.45	2.11
log(On-B/S Capital)	9.04	9.10	1.71	9.02	9.08	1.71	9.07	9.31	1.84
N	201			188			13		

Average manager ownership trend over time





Instrumental Variable Analysis

$$P(Y = 1|X_{i,1892}) = \phi(\beta_0 + \beta_1 IV_{i,1892} + s_{i,t}) \tag{5}$$

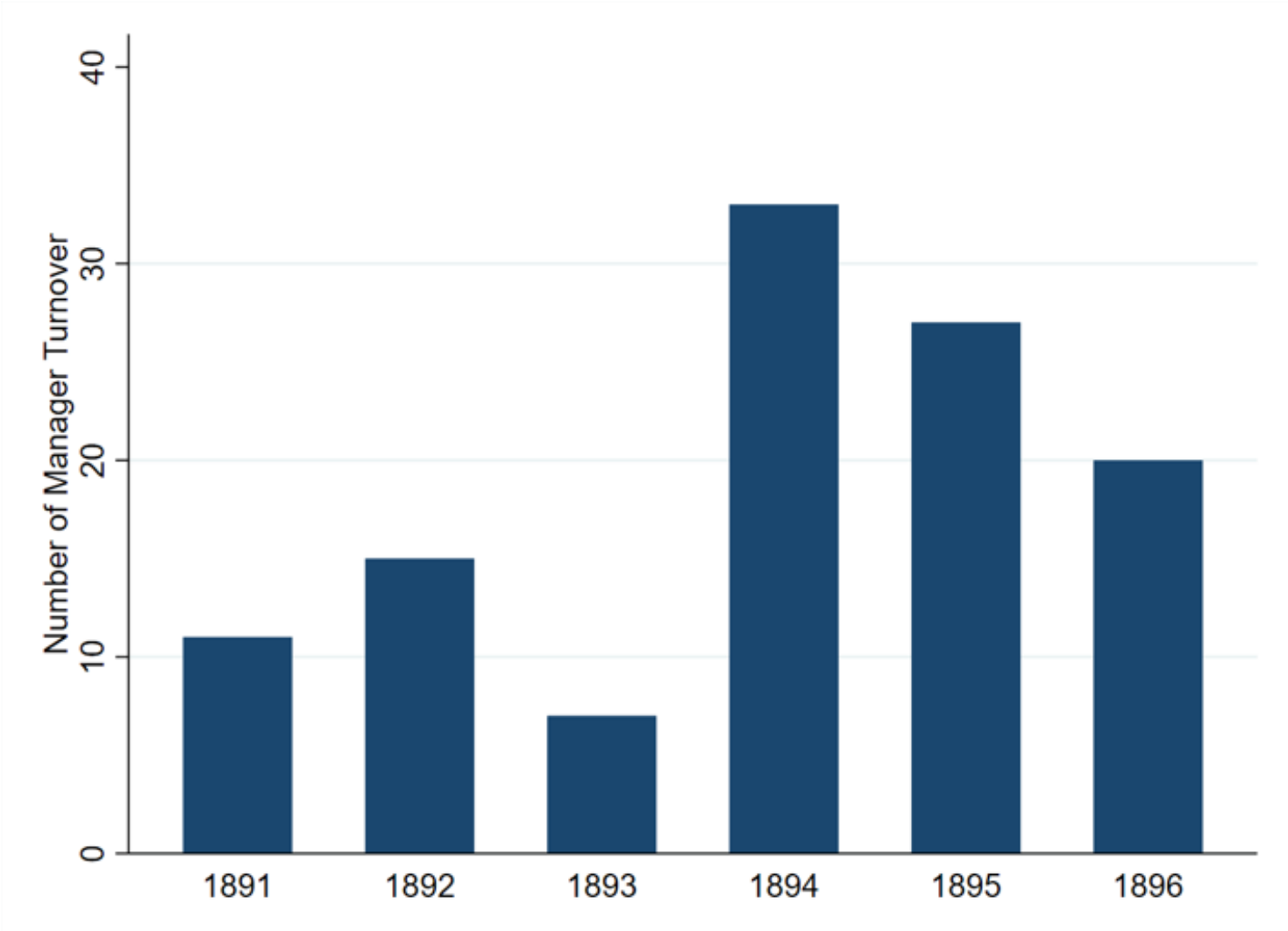
$$IV_{i,t} = \beta_0 + \beta_1 P_{i,t} + s_{i,t} + \theta_i + \vartheta_t + \varepsilon_{i,t} \tag{6}$$

- Earlier results suggest that regulators can potentially reduce bank failures and runs by imposing greater liability on the management.
- We use two-stage approach to estimate the effect of the president liability and ownership on the probability of failure and bank run.
- $P(Y = 1|X_{i,1892})$ is an indicator variable equal to 1:
  - if bank suspension occurred at bank i in 1893, and 0 otherwise.
  - if bank i failed between 1893 and 1896, and 0 otherwise.
- IV is one of the measures of bank risk management:
  - Equity ratio
  - Unsecure loan-to-total loan ratio
- P is presidential liabilities of bank that is measured either as a:
  - President ownership (on-B/S capital)
  - President liabilities (off-B/S liabilities)

Instrumental Variable Analysis

	(1)	(2)	(3)	(4)
Analysis Period	**1890-1892**	**1890-1892**	**1892-1896**	**1892-1896**
Panel A: IV Analysis	**Unsecured Loans Ratio**	**Unsecured Loans Ratio**	**Equity Ratio**	**Equity Ratio**
log(Assets)	-0.064	-0.149	-0.240***	-0.230***
	(0.133)	(0.110)	(0.026)	(0.024)
Lag log(Off-B/S Guarantee)	-0.061*		0.007**	
	(0.035)		(0.003)	
Lag log(On-B/S Capital)		-0.050		0.011***
		(0.035)		(0.004)
Constant	1.254	2.176	3.213***	3.078***
	(1.536)	(1.389)	(0.325)	(0.302)
Firm FE	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Panel B: Main Analysis	**Bank Run**	**Bank Run**	**Bank Failure**	**Bank Failure**
Unsecured Loans Ratio	1.628**	2.004*		
	(0.670)	(1.183)		
Equity Ratio			-1.793**	-1.854**
			(0.797)	(0.788)
log(Assets)	-0.065	-0.024	-0.059	-0.056
	(0.094)	(0.130)	(0.094)	(0.094)
Constant	-1.335	-2.024	-0.281	-0.299
	(1.410)	(2.120)	(1.308)	(1.294)
	(0.134)	(0.160)	(0.0983)	(0.098)
Observations	326	328	1000	1005

President Change



Change in President

$$IV_{i,t} = \beta_0 + \beta_1 P_{i,t} Y_{i,t} + \gamma s_{i,t} + \theta_i + \vartheta_t + \varepsilon_{i,t} \tag{7}$$

- Bank president turnover was infrequent before 1893, but spiked following the panic.
- However, much of the bank president turnover post-1893 was from handful of banks switching multiple presidents over a short period of time (bank scrambling to find a right manager).
- Thus, we drop banks if their new presidency term is less than a year.
- P is change in presidential liabilities of bank that is measured either as a:
  - % change in President ownership (on-balance sheet liabilities)
  - % change in President liabilities (off-balance sheet liabilities)
- $Y_{i,t}$ is number of years following change in bank presidency