Equity Cross-Subsidization Between Bank and Non-Bank Subsidiaries

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Capital Regulation and Internal Capital Markets

Post-crisis reforms tightened bank capital requirements while largely exempting nonbank subsidiaries within the same holding companies.

Regulatory asymmetry within BHCs:

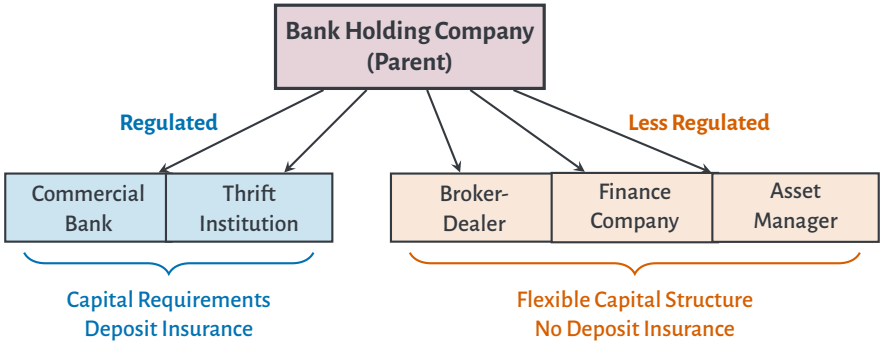
- **Banks:** Higher capital requirements, stress tests, leverage constraints (Basel III, Dodd-Frank)
- **Nonbanks:** Lightly regulated despite material operations (lenders, brokers, insurers)
- BHCs operate **internal capital markets** – can reallocate equity across subsidiaries

Central Question

When regulation forces banks to raise capital, where does it come from?

1. External markets (equity issuance, retained earnings)?
2. **Internal reallocation from less-regulated nonbank subsidiaries?**

Bank Holding Companies are Complex Organizations



Key observation: Differential capital constraints create opportunities for internal reallocation

Nonbanks: Small Subsidiaries, Large Equity Stakes

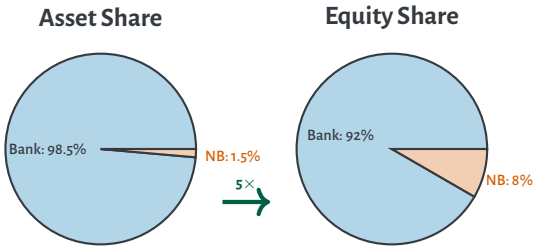
Conventional View:

- Nonbank subsidiaries are "small"
- Average: 1.5% of BHC assets
- $\Rightarrow$ Economically unimportant?

What We Show:

- Nonbanks are **capital-intensive**
- Average equity/assets of nonbanks: 60–70%
- Average equity/assets of Banks: 10–12%

$\Rightarrow$ **5–6$\times$ capital multiplier**



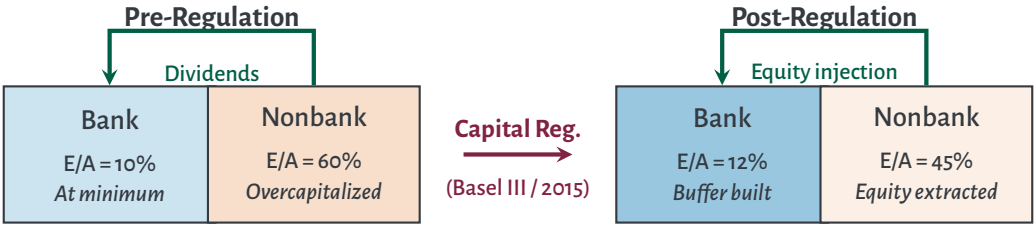
Implication: Nonbanks serve as **"equity reservoirs"** for the consolidated BHC.

This creates an opportunity: Small asset footprint, large equity buffer available for reallocation

This Paper: Equity Cross-Subsidization

Central Hypothesis:

When bank capital regulation tightens, BHCs reallocate equity *from* overcapitalized nonbank subsidiaries *to* capital-constrained bank subsidiaries.



Internal equity reallocation allows BHCs to meet tighter bank requirements without raising costly external capital

The Internal Equity Multiplier Mechanism

Key insight: A dollar of equity inside a BHC is not allocated neutrally – BHCs can move it to where it produces the *largest regulatory benefit*.

How the Multiplier Works

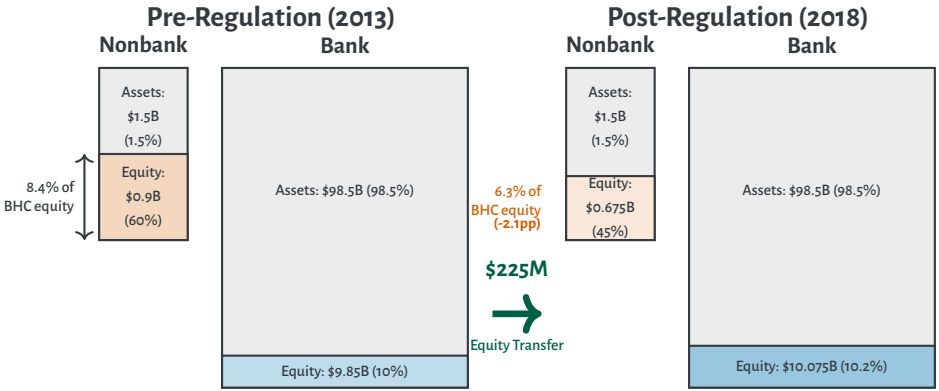
Shifting $1 from nonbank (unregulated) to bank (regulated):

- Bank can lever up that $1 more under capital requirements
- $1 in bank creates larger regulatory buffer than $1 in nonbank
- Allows bank to support more assets, reduce RWA ratios, meet stress tests

$$\textbf{Effective regulatory value:} \frac{\Delta \text{Bank Regulatory Capital}}{\$1 \text{ from nonbank}} > 1$$

Key prediction: When bank regulation tightens, BHCs will extract equity from nonbanks to recapitalize banks – **regulatory arbitrage through internal reallocation**.

Equity Reallocation: Example



Key: A 15pp decline in nonbank capital ratio (60%→45%) frees $225M equity
⇒ Bank capital ratio increases 23 bps ⇒ Supports $2.25B new loans

Preview of Findings

1. Banks with nonbank exposure build excess capital post-2015

- Bank capital ratios increase by 2–5 pp relative to BHC-level requirements
- Effect concentrated in BHCs with high nonbank equity shares

2. Equity flows from nonbanks to banks

- First to document equity cross-subsidization from nonbanks to banks
- Nonbank dividend yields increase; equity investment from parent declines
- Bank equity share of BHC rises; nonbank equity share falls
- New mechanism: Capital regulation affects *within-firm* allocation

3. Consequences: Banks safer, nonbanks riskier

- **Banks:** Lower RWA, higher ROA, reduced charge-offs
- **Nonbanks:** Higher leverage, more NPLs, lower Z-scores
- Risk doesn't disappear: it migrates to less-regulated subsidiaries
- Nonbanks within BHCs: "Shadow banks in plain sight"

Contribution and Relevance

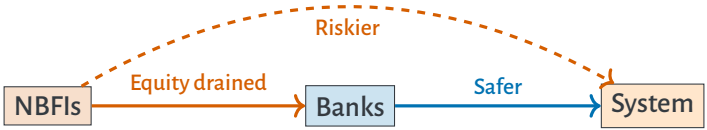
Contribution:

- Identifies new form of **regulatory arbitrage within firms**
- Shows entity-level capital rules insufficient when BHCs optimize across subsidiaries
- Reveals "internal equity multiplier" – capital more valuable in regulated entities

Policy implications:

- **Risk migration:** Regulation reallocates rather than eliminates risk
- **Hidden vulnerabilities:** Safer banks, fragile nonbanks, exposed system
- **Regulatory design:** Need consolidated capital requirements or nonbank regulation

Key Mechanism:



II. Stylized Facts

Equity Multiplier: Key Concept

Definition: The ratio of a subsidiary's equity share to its asset share:

$$\text{Equity Multiplier} = \frac{\text{NB Equity}/\text{BHC Equity}}{\text{NB Assets}/\text{BHC Assets}} = \frac{\text{NB Capital Ratio}}{\text{BHC Capital Ratio}}$$

Numerical Example:

	Nonbank	Bank
Assets	\$1.5B	\$98.5B
Asset Share	1.5%	98.5%
E/A Ratio	60%	10%
Equity	\$0.9B	\$9.85B
Equity Share	**8.4%**	91.6%

$$\textbf{Multiplier} = \frac{8.4\%}{1.5\%} = \mathbf{5.6}\times$$

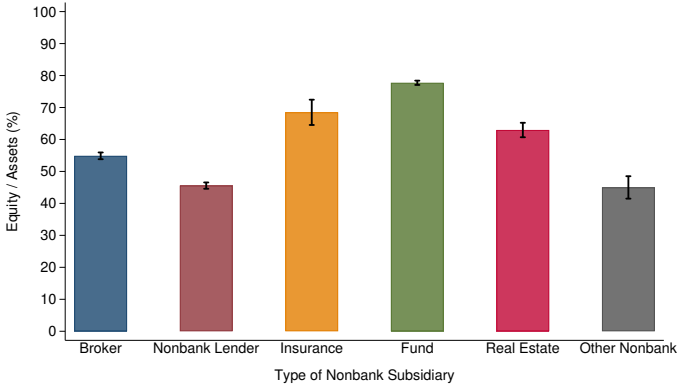
Interpretation: Small changes in nonbank capitalization $\rightarrow$ **large** equity reallocations

Summary Statistics: Capital Structure Asymmetry

	N	Mean	SD	5%	25%	50%	75%	95%
Nonbank Share of BHC Assets	6,596	0.07	0.13	0.00	0.01	0.02	0.05	0.32
Nonbank Share of BHC Equity	6,596	0.21	0.21	0.01	0.06	0.16	0.30	0.68
Nonbank Capital Ratio	6,596	0.69	0.59	0.04	0.26	0.69	0.99	1.40
BHC Capital Ratio	6,596	0.11	0.07	0.05	0.08	0.09	0.11	0.17
Equity Multiplier	6,596	8.24	7.68	0.30	2.33	6.46	11.95	21.56

- **Median nonbank asset share:** 2% $\Rightarrow$ Median nonbank equity share: 16%
- **Median equity multiplier:** 6.5$\times$
- **At 95th percentile:** Nonbank hold 68% of BHC equity despite 32% of assets
- Nonbank capital ratios highly variable (SD = 0.59) $\Rightarrow$ room for optimization

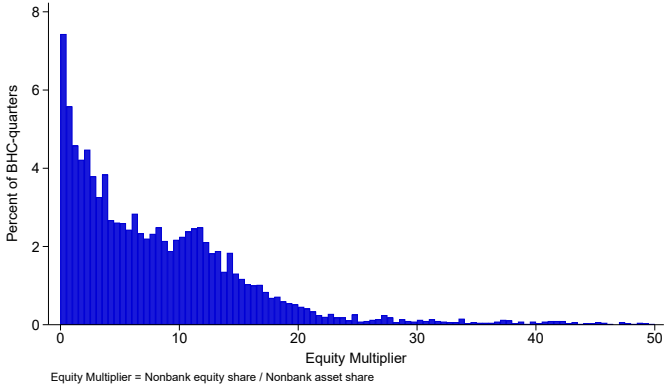
Fact #1: Nonbanks Are Highly Capitalized



- Nonbank capital ratios range from 40% (nonbank lenders) to 95% (funds)—far exceeding bank capital ratios of 10–12%
- No deposit insurance $\Rightarrow$ market discipline
- Volatile revenue streams; counterparty requirements

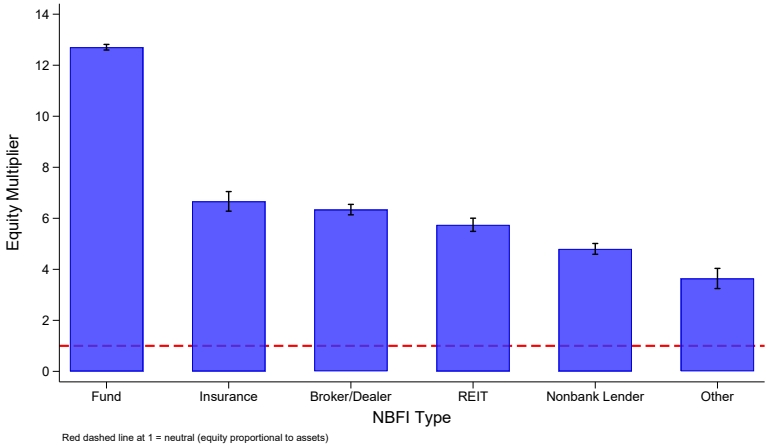
Fact #2: Equity Multiplier

Definition: How much equity share per unit of asset share



- Equity Multiplier = $\frac{\text{Nonbank Equity Share of BHC}}{\text{Nonbank Asset Share of BHC}} = \frac{E_{NB}/E_{BHC}}{A_{NB}/A_{BHC}}$
- Median BHC has 6x equity multiplier: Nonbank hold $6\times$ more equity than their asset footprint suggests

Fact #3: Equity Multiplier Varies by Nonbank Type



- Funds (12.7x) and asset managers (7.8x) are most capital-intensive; nonbank lenders (4.8x) least, but all exceed 1x ▸ Table

Fact #4A: Largest BHCs have Material Nonbank Operations

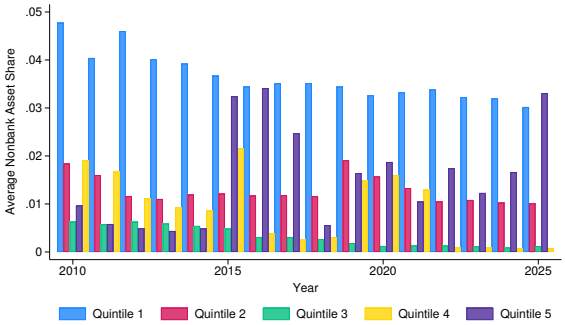
Key Pattern: Largest BHCs have highest Nonbank exposure

- **Top 4 BHCs:** Nonbank asset share 15–25%
- **Top quintile:** Nonbank asset share ~8%
- **Bottom quintile:** Nonbank asset share <1%

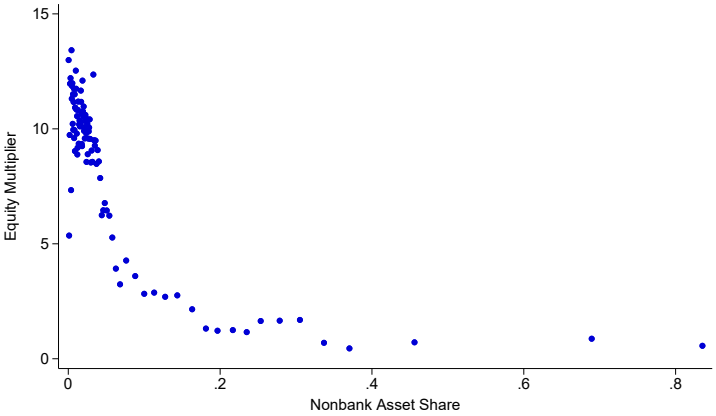
Implication:

- Equity cross-subsidization most relevant for **systemically important** institutions
- Policy relevance: SIFIs most affected
- **Our sample:** Focus on banks with material nonbank operations

More

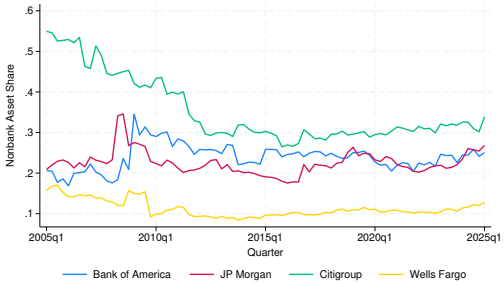


Fact #4B: Nonbank Operations Less Capital-Intensive

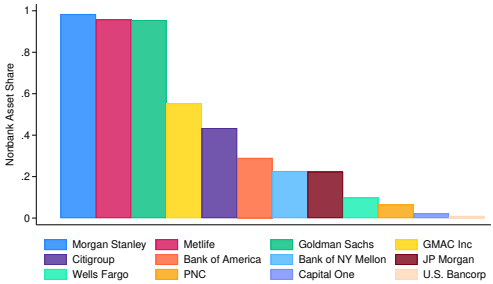


- BHCs with larger nonbank operations maintain **higher equity ratios**
- Lower capital intensity makes NBFIs attractive targets for equity extraction – BHCs can reduce NBFI capital without proportionally increasing default risk

Fact #4C: Largest BHCs Have Substantial Nonbank Operations



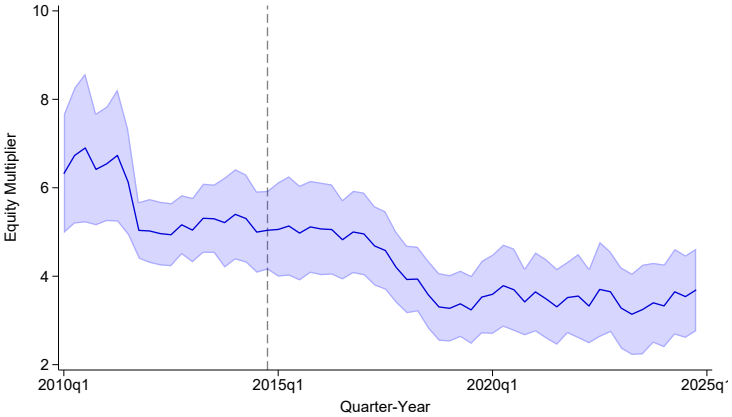
Top 4 BHCs Over Time



Top 12 BHCs (2010)

- Largest BHCs (JPM, BofA, Citi, Wells Fargo) maintain 10-25% nonbank asset shares
- NBFI exposure substantially higher than sample average (5-8%)
- Top 4 increased NBFI share from 10% (2005) to 20% (2010), then stabilized

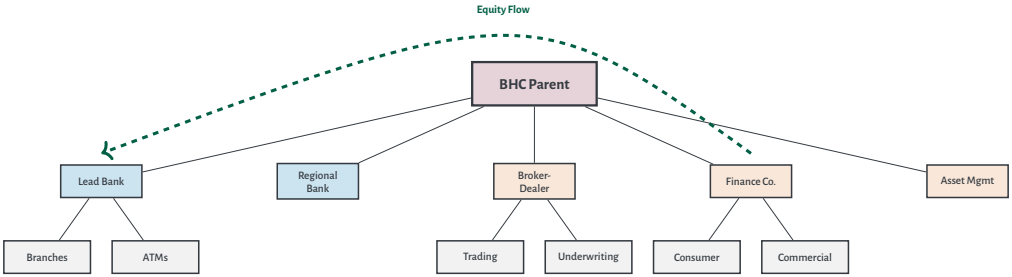
Fact #5: Equity Multiplier Declined Sharply After 2015



- Equity multiplier fell from 5.5x (pre-2015) to 3.0x (post-2015), consistent with equity extraction from nonbanks ▸ More

III. Institutional Background

BHC Organizational Structure



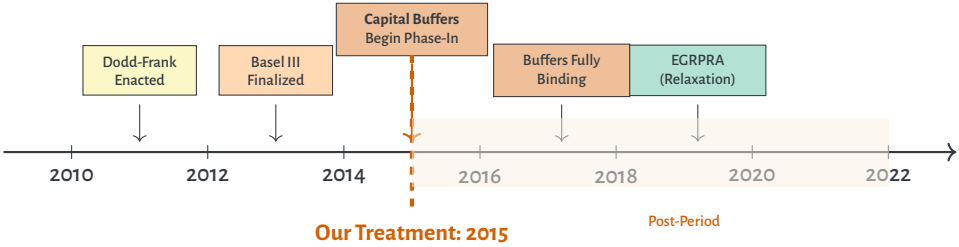
Bank Subsidiaries:

- Subject to Basel capital requirements
- Tier 1, Total Capital, Leverage ratios
- FDIC deposit insurance
- Fed/OCC examination

Nonbank Subsidiaries:

- Diverse regulatory regimes (SEC, state)
- No standardized capital requirements
- Higher historical capital ratios (voluntary)
- Less scrutiny, more flexibility

Capital Buffer Phase-In



Basel Regulation

- Capital conservation buffer (2.5%) began phasing in 2016
- 2018 EGRPRA *relaxed* requirements
- 2015 marks the start of binding Basel III capital conservation buffers—banks anticipated constraints and pre-positioned capital

IV. Identification Strategy

Identification Challenge

Problem:

Post-2015 outcomes may be correlated with pre-existing BHC characteristics:

- BHCs with more nonbanks may be larger, more complex, more risk-seeking
- These characteristics may independently affect post-2015 behavior
- Simple difference-in-differences compares different types of BHCs

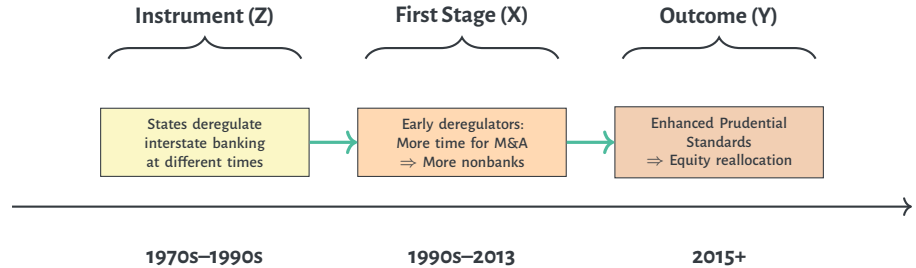
Our Approach:

Exploit variation in nonbank exposure driven by **historical state-level deregulation timing** rather than BHC choices.

Key Insight:

BHCs headquartered in states that deregulated earlier had *exogenous* advantages in building nonbank subsidiaries $\Rightarrow$ Use deregulation timing as source of variation in nonbank exposure.

Identification: Interstate Banking Deregulation



Reduced-Form IV Strategy:

$$Y_{it} = \beta \cdot \underbrace{(\text{Years from Dereg})_i}_{\text{Instrument}} \times \underbrace{\mathbb{1}[\text{Post-2015}]_t}_{\text{Treatment Timing}} + \alpha_i + \gamma_t + \varepsilon_{it}$$

Interpretation: β = Effect of exogenous variation in nonbank exposure (driven by deregulation timing) on post-2015 outcomes.

Addressing Endogeneity Concerns

What the Instrument Does

- Isolates variation in nonbank exposure due to *opportunity* (early access to interstate expansion)
- Not driven by BHC choices about *whether* to expand
- Timing determined by state politics, not BHC characteristics (Kroszner and Strahan 1999)

Addressing Endogeneity Concerns

What the Instrument Does

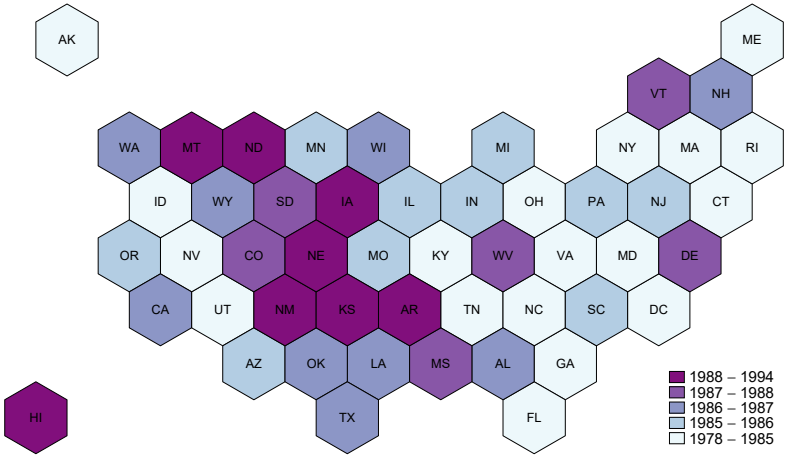
- Isolates variation in nonbank exposure due to *opportunity* (early access to interstate expansion)
- Not driven by BHC choices about *whether* to expand
- Timing determined by state politics, not BHC characteristics (Kroszner and Strahan 1999)

Early-deregulating states may differ systematically (size, finance-friendly, etc.)

1. **Balance table:** Pre-treatment balance on most key observables
2. **BHC fixed effects:** Absorb all time-invariant differences
3. **Pre-2013 characteristics** $\times$ **Post:** Control for differential trends by size, leverage, growth, profitability, funding, and complexity
4. **Parallel trends tests:** Verify no pre-2015 differences in outcomes
5. **Placebo tests:** Randomizing timing or distance yields null effects
6. **2SLS framework:** Robust results with alternate identification strategy with different assumptions

Key: We compare BHCs with different nonbank exposure *within* similar size/complexity groups, *conditional on* pre-trends

Interstate Banking Deregulation by State



Logic: BHCs in early-deregulating states had more time to acquire subsidiaries $\Rightarrow$ more complex structures with nonbanks today.

Balance Table: Pre-Treatment Characteristics (2013Q4)

	Early Dereg	Late Dereg	Difference
Panel A: Size and Complexity			
Log(Total Assets)	15.19	14.21	0.98***
Asset Growth	0.021	0.040	-0.02
Top 200 BHC	0.35	0.19	0.16**
Log(Nonbank Assets)	11.51	8.25	3.26***
Nonbank NAICS Diversity	0.35	0.42	-0.04**
Panel B: Balance Sheet			
Leverage	9.85	9.76	0.09
Loan Share	0.60	0.59	0.005
Securities Share	0.23	0.27	-0.03
Deposits/Assets	0.81	0.82	-0.01
Cash Share	0.08	0.08	-0.00
Panel C: Profitability			
ROA	0.002	0.003	-0.001***

Note: Early = deregulated by 1986 or earlier. Differences in size/complexity are *expected* (mechanism), controlled for. Balance sheet composition balanced ▸ Sample

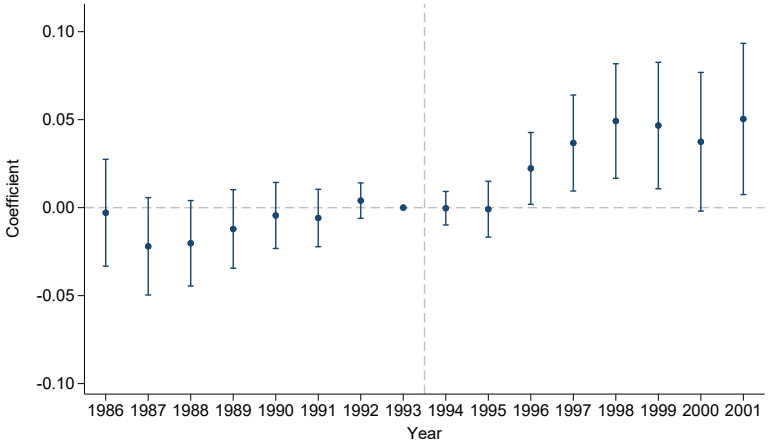
Instrument Validation: First Stage

First Stage: Does deregulation timing predict nonbank exposure?

Nonbank Share × Post	(1)	(2)	(3)	(4)
Years from Dereg × Post	0.288***	0.511***	0.527***	0.338***
	(0.065)	(0.142)	(0.139)	(0.108)
Bank FE			✓	✓
Qtr-Year FE		✓	✓	✓
Controls				✓
N	12,558	12,558	12,558	12,558
R^2	0.108	0.130	0.636	0.685

Interpretation: Conditional on controls and fixed effects, deregulation timing predicts nonbank exposure but not other BHC characteristics that might confound post-2015 responses.

Parallel Trends



- **Parallel Trends Assumption Satisfied:** No differential trends in nonbank share between early and late deregulators before 2015

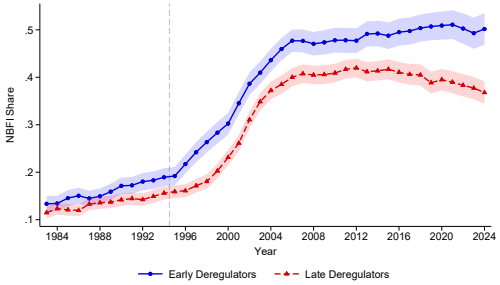
Instrument Validity: Persistence of Nonbank Exposure

	(1) 1-Year	(2) 2-Year	(3) 3-Year	(4) 5-Year
Nonbank Share$_{t-4}$	0.900***			
	(0.025)			
Nonbank Share$_{t-8}$		0.857***		
		(0.028)		
Nonbank Share$_{t-12}$			0.805***	
			(0.036)	
Nonbank Share$_{t-20}$				0.709***
				(0.053)
R^2	0.922	0.884	0.846	0.789
N	44,308	39,029	34,510	26,957

- **Result:** Nonbank exposure is highly persistent over decades – $R^2 > 0.78$ even at 5-year lags justifies using 20+ year-old deregulation as instrument for current nonbank exposure

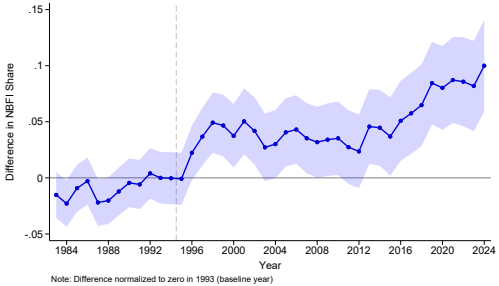
Nonbank Share Trends: Early vs Late Deregulators

Raw Trends



Early deregulators have consistently higher nonbank share

Difference (Early - Late)

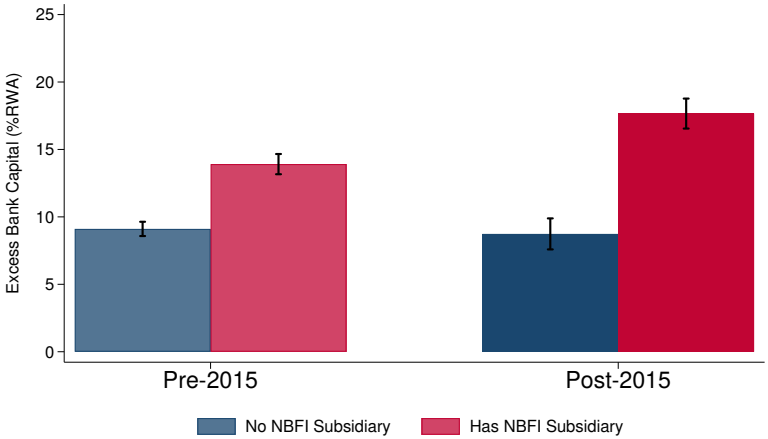


Gap stable pre-2015, changes post-2015

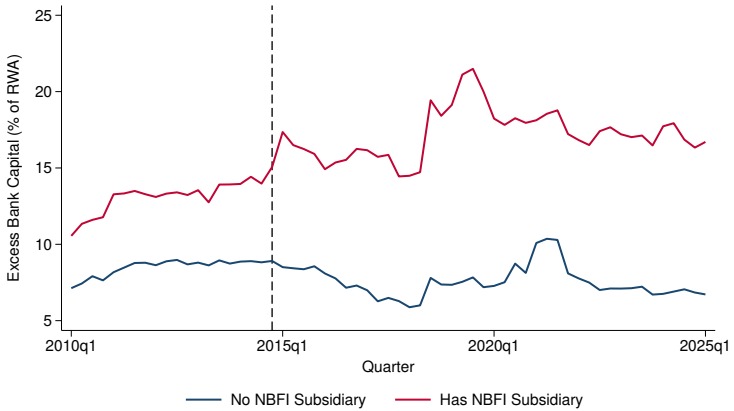
Key Finding: Parallel pre-trends validate instrument; post-2015 divergence shows treatment effect.

V. Main Results

Bank Capital Pre vs Post 2015 (2005 Nonbank Status)

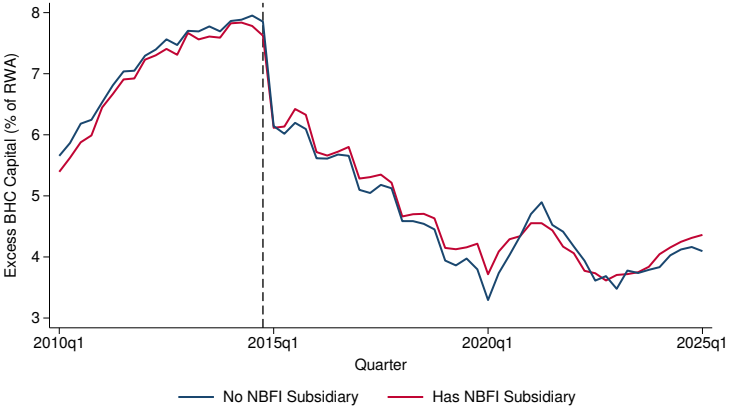


Event Study: Excess Bank Capital (2005 Nonbank Status)



Finding: Sharp divergence post-2015 — banks in BHCs with nonbank exposure build excess capital ▸ Table ▸ Ratio ▸ Size ▸ Diversified

Event Study: Excess BHC Capital (2005 Nonbank Status)



Finding: No effect at consolidated BHC level $\Rightarrow$ **internal reallocation** ▸ Table

Banks with Nonbank Exposure Build Excess Capital

Retained Earnings/Assets	(1)	(2)	(3)	(4)
Years from Dereg × Post	0.0054**	0.0054**	0.0020**	0.0019**
	(0.0021)	(0.0021)	(0.0008)	(0.0009)
Years from Dereg	0.0035	0.0035		
	(0.0032)	(0.0032)		
Post	-0.0130			
	(0.0106)			
Constant	0.0525***			
	(0.0157)			
Bank FE			✓	✓
Qtr-Year FE		✓	✓	✓
Controls				✓
N	12,558	12,558	12,558	12,558
R^2	0.0190	0.0209	0.9500	0.9529

- BHCs with greater nonbank exposure increase bank capital ratios relative to BHC-level requirements after 2015

Banks with Nonbank Exposure Build Excess Bank/BHC Capital Ratio

Excess Bank Cap./Excess BHC Cap.	(1)	(2)	(3)	(4)
Years from Dereg × Post	3.3797**	3.1142**	2.0478**	1.7766***
	(1.3785)	(1.3162)	(0.8339)	(0.6211)
Years from Dereg	1.0960***	1.0989***		
	(0.2996)	(0.3008)		
Post	-13.3325*			
	(7.9656)			
Constant	-2.7111*			
	(1.4704)			
Bank FE			✓	✓
Qtr-Year FE		✓	✓	✓
Controls				✓
N	9,873	9,873	9,873	9,873
R^2	0.0712	0.0993	0.6697	0.6946

- **Key:** Bank excess capital increases *relative to* BHC excess capital $\Rightarrow$ internal reallocation.

No Effect at BHC Level

Excess BHC Cap.	(1)	(2)	(3)	(4)
Years from Dereg × Post	0.0061	0.0157	-0.0583	0.0058
	(0.1028)	(0.0988)	(0.0680)	(0.0721)
Years from Dereg	-0.1331	-0.1310		
	(0.0986)	(0.0989)		
Post	-2.4567***			
	(0.8104)			
Constant	8.2797***			
	(0.7489)			
BHC FE			✓	✓
Qtr-Year FE		✓	✓	✓
Controls				✓
N	6,079	6,079	6,079	6,079
R^2	0.1009	0.1428	0.7860	0.7961

- **Key:** No change in *consolidated* BHC capital $\Rightarrow$ **internal reallocation**, not new capital raising.

VI. BHC-Level Equity Flows

Key Mechanism: Equity Flows

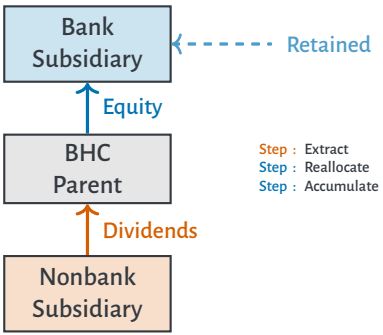
The Three-Step Process:

1. **Nonbanks** pay dividends to parent (equity extraction)
2. **Parent** reallocates to bank subsidiaries (equity injection)
3. **Banks** retain earnings internally (capital accumulation)

Result:

- Banks build capital buffer *both ways*
- BHC consolidated: no net change
- Efficient internal reallocation

Capital Flow Diagram



Net effect at BHC: minimal (internal flow)

Mechanism allows banks to build capital faster than external equity issuance alone would permit, while reducing BHC-level capital costs.

Equity Investment to Subsidiaries

	(1) Bank Share	(2) Non-Bank Share	(3) Total
Years from Dereg × Post	0.0204**	-0.0238**	0.0027
	(0.0079)	(0.0104)	(0.0086)
BHC FE	✓	✓	✓
Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	1,400	1,400	1,400
R^2	0.8070	0.6738	0.9075

- Bank equity share rises 2 pp; nonbank equity share falls 2.4 pp; total unchanged ⇒ reallocation

▸ Growth ▸ More

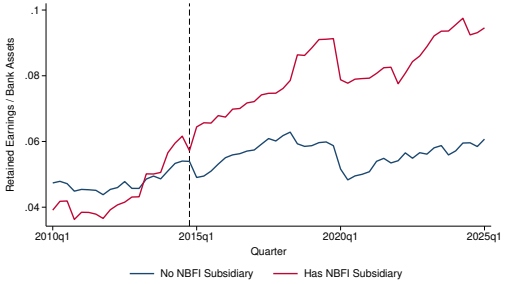
Undistributed Income Increases for Banks

Retained Earnings Share	(1)	(2)	(3)	(4)
Years from Dereg × Post	0.0048**	0.0048**	0.0020**	0.0019**
	(0.0019)	(0.0019)	(0.0008)	(0.0009)
Years from Dereg	0.0035	0.0035		
	(0.0032)	(0.0032)		
Post	-0.0095			
	(0.0092)			
Constant	0.0525***			
	(0.0157)			
Bank FE			✓	✓
Qtr-Year FE		✓	✓	✓
Controls				✓
N	13,362	13,362	13,362	13,362
R^2	0.0182	0.0200	0.9497	0.9525

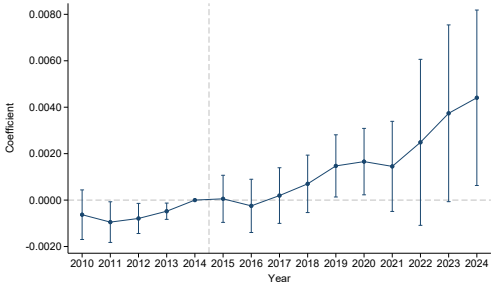
- Bank retained earnings increase with nonbank exposure
- No effect at BHC level, consistent with internal recapitalization (not external equity issuance)

BHC

Undistributed Income by Nonbank Status



Raw Trends



Event Study

- BHCs with more nonbank exposure show **divergent retained earnings patterns** post-2015
- Event study confirms parallel pre-trends and significant post-2015 effect

Dividend Extraction from Banks and Nonbanks

	(1) Bank	(2) Nonbank
Years from Dereg × Post	0.0000	0.0947**
	(0.0005)	(0.0459)
BHC FE	✓	✓
Qtr-Year FE	✓	✓
Controls	✓	✓
N	1,334	1,334
R^2	0.1638	0.0698

- Nonbank dividend yields jump 9.5 pp post-2015 – this is how equity is extracted from nonbanks and routed to banks

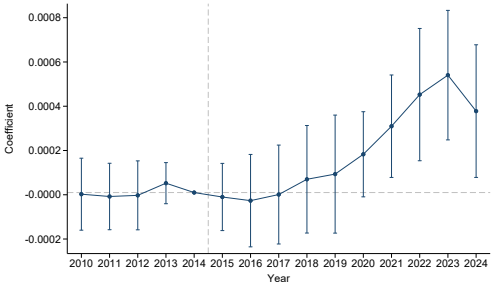
VII. Consequences for Banks

Bank Become Safer and More Profitable

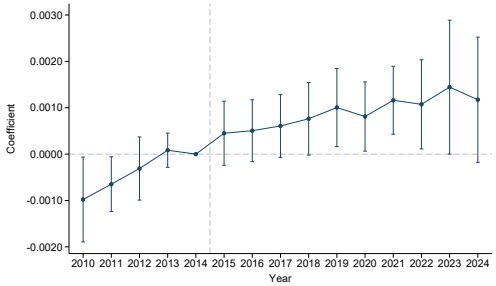
	(1) ROE	(2) ROA	(3) Charge-Offs
Years from Dereg × Post	0.0001***	0.0012***	-0.0002***
	(0.0000)	(0.0003)	(0.0000)
BHC FE	✓	✓	✓
Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	12,054	12,054	12,054
R^2	0.2769	0.3752	0.3504

- Bank profitability improves (ROE +1 bps; ROA +12 bps); charge-offs decline

Event Studies: Bank Outcomes



ROA



ROE

- Clear break in 2015 for both ROA and ROE
- Profitability gains sustained through 2024

Bank Portfolio Composition: Patterns of Derisking

	(1) Loan Share	(2) Sec Share	(3) Cash Share
Years from Dereg × Post	-0.0060***	0.0033*	0.0052**
	(0.0021)	(0.0019)	(0.0024)
Bank FE	✓	✓	✓
Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	13,333	13,333	13,333
R^2	0.9185	0.8830	0.8769

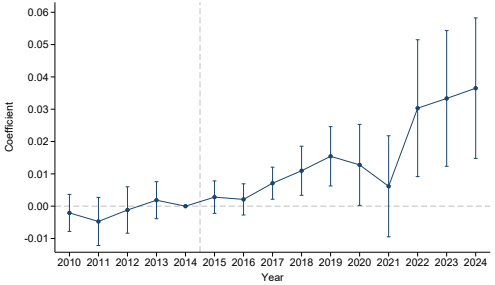
- Loan share decreases; cash share increases ▸ Growth

Decomposition of Bank ROE

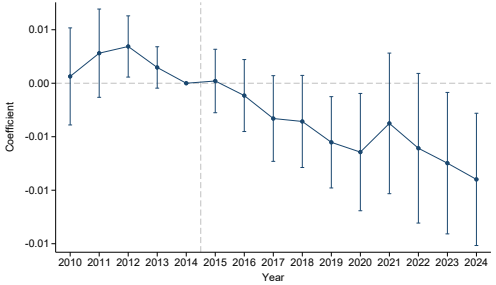
	(1) Leverage	(2) Equity/RWA	(3) RWA/Assets	(4) Marginal ROE	(5) Off-BS Commitment
Years from Dereg × Post	-0.0011	0.0113***	-0.0067***	0.0085	-0.0017
	(0.0007)	(0.0039)	(0.0016)	(0.0090)	(0.0018)
Bank FE	✓	✓	✓	✓	✓
Qtr-Year FE	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓
N	11,442	11,442	11,442	11,442	11,442
R^2	0.9725	0.9582	0.8961	0.0472	0.8282

- Banks maintain constant leverage while improving asset quality
- Evidence of prudent reallocation toward liquid assets

Banks Increased Capital Buffers and Reduced Risk



Equity/RWA



RWA/Assets

- Capital buffers increased post-2015 (left panel)
- Risk-weighted asset ratios declined (right panel)
- Banks derisked by shifting toward safer, more liquid assets
- Capital regulation effectively makes banking sector safer

Where Did the Extra Bank Capital Come From?

What we've established:

1. Bank excess capital increases post-2015
2. Banks become more profitable
3. Banks reduce risk (RWA/Assets declined)
4. Banks shift to safer assets (more cash, fewer loans)

Two possible explanations:

1. External capital

- BHCs raised new equity
- Retained more earnings
- Changed leverage

2. Internal reallocation

- Shifted equity from other subsidiaries
- Extracted capital from nonbanks
- Reallocated within BHC

Test: Examine BHC consolidated balance sheets...

BHC Balance Sheets Remained Stable

	(1) Loan Share	(2) Sec Share	(3) Cash Share
Years from Dereg × Post	-0.0019	0.0016	0.0010
	(0.0028)	(0.0031)	(0.0010)
BHC FE	✓	✓	✓
Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	6,067	6,067	6,067
R^2	0.9157	0.8934	0.7750

- **No significant changes** to BHC portfolio composition or leverage ▸ Profit ▸ Decomposition

Implication: If consolidated BHC balance sheet unchanged, equity flows must be *between subsidiaries* → Look at nonbank subsidiaries...

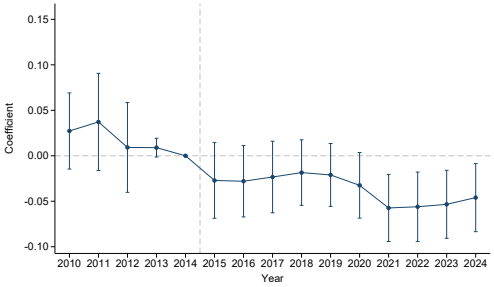
VIII. Consequences for Nonbanks

Nonbank Balance Sheets Deteriorate

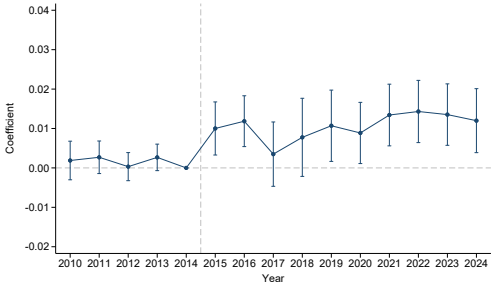
	(1) Equity/Assets	(2) Bal from Subs/Assets	(3) Bal to Subs/Assets	(4) Net Bal to Subs/Assets	(5) Dividends/Equity	(6) ln(Assets)
Years from Dereg × Post	-0.0771**	-0.0667*	0.0693**	0.1360***	0.0096**	0.0454
	(0.0363)	(0.0374)	(0.0324)	(0.0439)	(0.0037)	(0.1539)
Non-Bank FE	✓	✓	✓	✓	✓	✓
Industry-Qtr-Year FE	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓
N	4,697	4,697	4,697	4,697	4,697	4,697
R^2	0.8548	0.8902	0.8083	0.8669	0.2994	0.9294

- Nonbank equity ratios fall 7.7 pp; net transfers to parent increase 13.6 pp; asset size unchanged ⇒ nonbanks lever up, don't shrink ▸ More

Event Study: Nonbank Equity and Dividends



Equity/Assets



Dividends/Equity

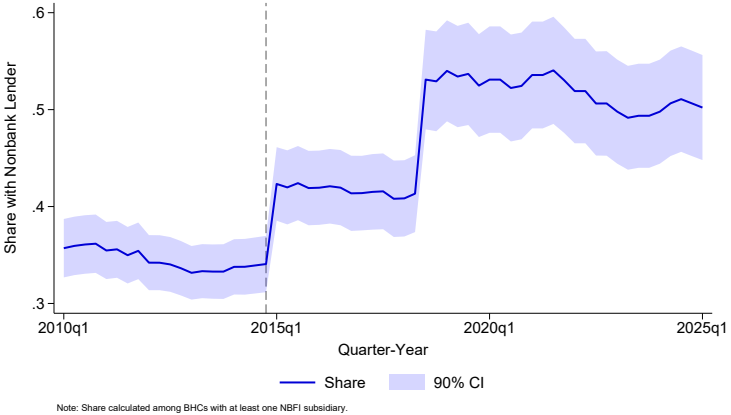
- Clear break in 2015—equity share declines while dividend yields spike, consistent with equity extraction

Extensive Margin: Addition of Nonbank Subsidiary Types

	(1) Broker/Dealer	(2) Lender	(3) Insurer	(4) Fund	(5) REIT
Years from Dereg × Post	-0.0005	0.0018*	-0.0001	0.0010	0.0009
	(0.0017)	(0.0010)	(0.0010)	(0.0032)	(0.0018)
Bank FE	✓	✓	✓	✓	✓
Qtr-Year FE	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓
N	6,155	6,155	6,155	6,155	6,155
R^2	0.2333	0.1005	0.0615	0.2729	0.0974

- Post-2015, BHCs are more likely to enter lending activities ▸ Deletions ▸ Totals

Share of BHCs with Nonbank Lenders Rising



Note: Share calculated among BHCs with at least one NBFI subsidiary.

- Among BHCs with nonbanks, share with nonbank lender subsidiaries increases from 30% to 55% – potential risk migration

Why Nonbanks Shift to Lending: Equity Constraint

Question: If nonbanks lose equity, why do they increase lending?

Why Nonbanks Shift to Lending: Equity Constraint

Question: If nonbanks lose equity, why do they increase lending?

Before Equity Extraction:

- High equity ratios (60-70%)
- Support capital-intensive activities:
  - Trading (requires capital buffers)
  - Advisory (human capital)
  - VC investments (illiquid)
- Stable, fee-based income

Why Nonbanks Shift to Lending: Equity Constraint

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Before Equity Extraction:

- High equity ratios (60-70%)
- Support capital-intensive activities:
  - Trading (requires capital buffers)
  - Advisory (human capital)
  - VC investments (illiquid)
- Stable, fee-based income

After Equity Extraction:

- Lower equity ratios (45-50%)
- Can't support capital-intensive activities
- Shift to lending:
  - More scalable with leverage
  - Generate interest income
  - Compensate for lost fees
- Higher risk with thinner cushion

Unintended Consequences

Equity extraction forces nonbanks to **take more risk** (lending) with **less capital** (lower equity ratios). Equity multiplier made nonbanks capital-rich; now, capital-constrained and must pursue riskier, leverage-dependent activities.

Lending Growth of Bank and Nonbank Subsidiaries within BHC

$\Delta ln(Lending)$	(1) Bank	(2) Nonbank
Years from Dereg × Post	0.0009	0.0720***
	(0.0019)	(0.0151)
BHC FE	✓	✓
Qtr-Year FE	✓	✓
Controls	✓	✓
N	760	760
R^2	0.1716	0.1067

- Post-2015, nonbank lending grows by 7.2 pp – no change among bank subsidiaries ▸ More

Nonbank Capital-Intensive Business Decline

	(1) Trading Rev	(2) Advisory/Fiduciary Rev	(3) VC Rev
Years from Dereg × Post	-0.0005***	-0.0066*	-0.0005*
	(0.0002)	(0.0037)	(0.0003)
Non-Bank FE	✓	✓	✓
Industry-Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	4,496	4,496	4,496
R^2	0.2787	0.9186	0.2539

- Nonbanks reduce capital-intensive activities (trading, advisory, VC) as equity is extracted, consistent with constrained operations

Nonbank Asset Composition: More Loans, Less Cash

	(1) Earning Assets/Assets	(2) Loans/Assets	(3) Traded Gov Sec/Assets
Years from Dereg × Post	0.0688**	0.0352**	-0.0010**
	(0.0276)	(0.0145)	(0.0004)
Non-Bank FE	✓	✓	✓
Industry-Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	5,327	5,327	5,327
R^2	0.8912	0.9560	0.3972

- Nonbanks shift toward illiquid, risky assets as capital cushion shrinks.

Nonbank Lending Growth among Nonbank Lenders

Δln(Lending)	(1) Real Estate	(2) C&I	(3) Consumers	(4) Non-US
Years from Dereg $\times$ Post	-0.0290	0.0230	0.0746***	-0.0471
	(0.0166)	(0.0400)	(0.0067)	(0.0554)
Non-Bank FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
N	851	851	851	851
R^2	0.0631	0.0845	0.4349	0.0825

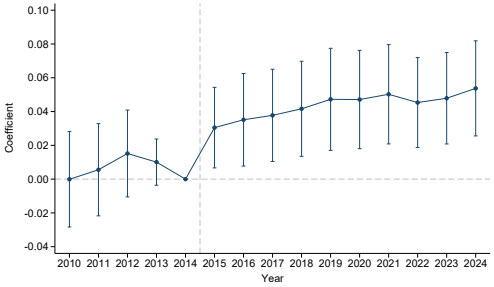
- Post-2015, lending growth driven by consumer loans – riskier segment ▸ More

Nonbank Risk Increases

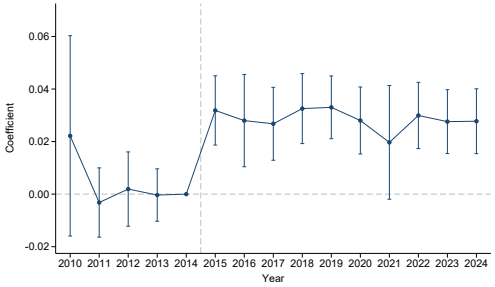
	(1) 30-89 days	(2) 90+Days	(3) All	(4) Loss Provision
Years from Dereg × Post	0.0043	0.0266***	0.0308***	0.0937***
	(0.0054)	(0.0069)	(0.0085)	(0.0142)
Non-Bank FE	✓	✓	✓	✓
Industry-Qtr-Year FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
N	1,548	1,548	1,548	571
R^2	0.4777	0.6761	0.6851	0.7656

- Past-due loans rise 2.7–3.1 pp; loss provisions up 9.4 pp; probability of negative earnings up 6.1 pp $\Rightarrow$ nonbanks become materially riskier

Event Study: Nonbank Credit Risk



Loan Share



Past due and Nonaccrual

- Nonbank credit risk increases after 2015

Nonbank Business Model Shift

	(1) ln(Interest Inc.)	(2) ln(Non-Interest Inc.)
Years from Dereg × Post	0.9351***	-0.2755
	(0.3125)	(0.2310)
Non-Bank FE	✓	✓
Industry-Qtr-Year FE	✓	✓
Controls	✓	✓
N	2,387	2,387
R^2	0.7753	0.8091

- Nonbanks shift toward lending away from fees.

Decomposition of Nonbank Income Volatility

	(1) $\mathbb{1}$[Negative Earnings]	(2) $\sigma(ln(\text{Int Inc}))$	(3) $\sigma(ln(\text{Non Int Inc}))$
Years from Dereg $\times$ Post	0.0608**	0.2776***	0.1149
	(0.0280)	(0.0455)	(0.1293)
Non-Bank FE	✓	✓	✓
Industry-Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	6,196	4,041	3,427
R^2	0.4102	0.6240	0.5606

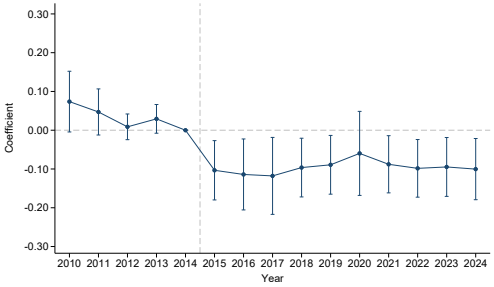
- Nonbank earnings become more volatile, especially interest income – consistent with higher leverage and risk

Deterioration of Nonbank Profitability

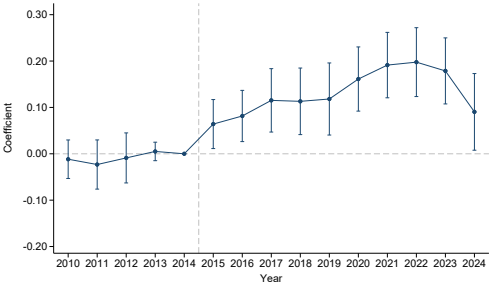
	(1) ROA	(2) ROE	(3) Trading Yield
Years from Dereg × Post	-0.0037	-0.1079**	-0.0006***
	(0.0056)	(0.0464)	(0.0001)
Non-Bank FE	✓	✓	✓
Industry-Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	4,708	4,708	4,708
R^2	0.4032	0.3094	0.2784

- ROE declines by 10.8pp – nonbanks become substantially less profitable

Event Study: Nonbank Profitability and Net Flows



ROE



Net Balance to Other Subsidiaries

- ROE declines while net balance to related subsidiaries spike, consistent with equity extraction after 2015

Deterioration of Nonbank Solvency

	(1) Z-score	(2) Prob(Default)
Years from Dereg × Post	-5.6099**	0.0021*
	(2.2035)	(0.0012)
Non-Bank FE	✓	✓
Industry-Qtr-Year FE	✓	✓
Controls	✓	✓
N	3,556	3,556
R^2	0.8979	0.3097

- Z-scores fall – nonbanks move closer to insolvency threshold

Mechanism: Equity Reallocation Enables Portfolio Rebalancing

Banks do two things simultaneously:

1. Receive equity transfers from nonbanks
2. Rebalance portfolios toward safer, more liquid assets

Key evidence these are linked:

Bank Level
- Loan share ↓
- Cash share ↑
- RWA/Assets ↓

BHC Level
- Loan share ~
- Cash share ~
- No rebalancing

Nonbank Level
- Equity ↓
- Leverage ↑
- Dividends ↑

Interpretation

Equity extraction from nonbanks provides the capital cushion that allows banks to rebalance toward safer assets. Without internal reallocation, banks would face a tradeoff between safety and lending – equity extraction removes this constraint.

IX. BHC Equity at Risk: Stress Test

Systemic Implications: What If Nonbanks Face Losses?

Stress Test Question

If nonbank subsidiaries suffer losses, how much parent capital would be needed to recapitalize them?

Motivation:

- We've shown BHCs extracted equity from nonbanks (reducing capital buffers by 5.7pp)
- Nonbanks shifted to riskier lending, increasing credit risk exposure
- What happens if these undercapitalized nonbanks now face losses?

Key scenarios:

- Moderate stress: 5% shock, 40% target (comparable to 2008 losses)
- Severe stress: 15% shock, 60% target (full restoration to pre-2015 levels)

Stress Test Methodology

For each nonbank subsidiary:

1. Apply asset shock:

$$\text{Loss} = \text{shock} \times \text{Assets}$$

2. Calculate new equity:

$$\text{New Equity} = \text{Equity} - \text{Loss}$$

3. Compute capital shortfall:

$$\text{Shortfall} = \max(0, \kappa \times \text{Assets} - \text{New Equity})$$

Aggregate to BHC level:

$$\text{BHC Equity Buffer at Risk} = \frac{\sum \text{Shortfall}}{\text{Total BHC Equity}} \times 100$$

Parameter Grid:

Shocks (σ):

- 1%: Mild recession
- 5%: 2008-comparable
- 10%: Severe
- 15%: Catastrophic

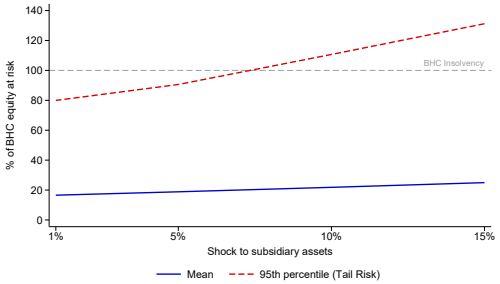
Targets (κ):

- 20%: Minimum viable
- 40%: Post-reallocation
- 50%: Moderate
- 60%: Pre-2015 levels
- 70%: Full restoration

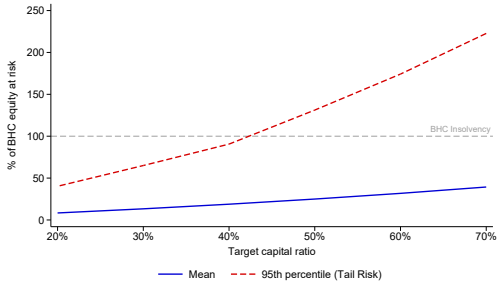
Output: 24 scenarios (4 shocks × 6 targets)

BHC Recapitalization Across Scenarios

By Shock Severity (40% target)



By Capital Target (5% shock)



Left: Increasing shock

- 5%: p95 = 91%
- 10%: p95 = 111% → Insolvency
- 15%: p95 = 131% → Insolvency

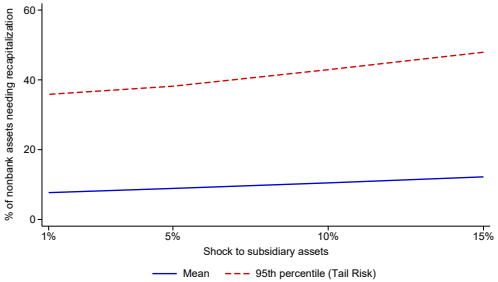
Right: Increasing target

- 40%: p95 = 91%
- 50%: p95 = 131% → Insolvency
- 60%: p95 = 174% → Insolvency

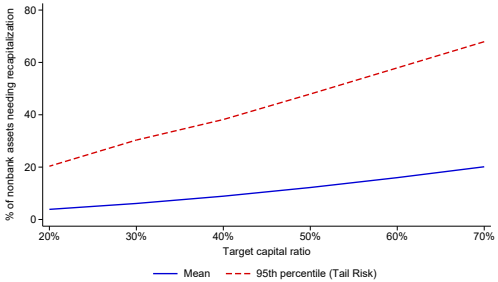
Tail-risk BHCs face insolvency at moderate shocks (⩾10%) or moderate targets (⩾50%) ▸ Mean ▸ Tail

Nonbank Asset Distress Across Scenarios

By Shock Severity (40% target)



By Capital Target (5% shock)



Left: Increasing shock

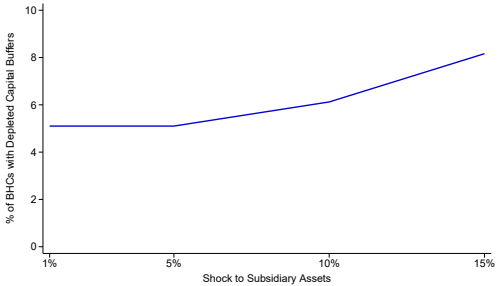
- 5%: Mean = 9%, p95 = 38%
- 10%: Mean = 10%, p95 = 43%
- 15%: Mean = 12%, p95 = 48%

Right: Increasing target

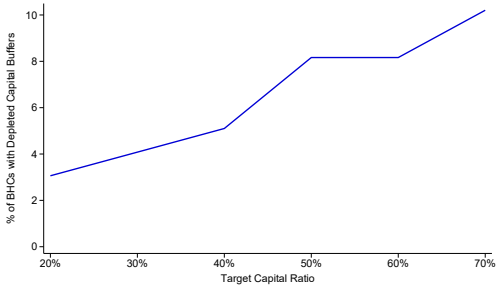
- 40%: Mean = 9%, p95 = 38%
- 50%: Mean = 12%, p95 = 48%
- 60%: Mean = 16%, p95 = 58%

Even when only 12-16% of assets need recap, parent capital requirements exceed 100% for tail BHCs ▸ Mean ▸ Tail

Capital Buffer Depletion: Systemic Concern



By Shock Severity



By Capital Target

Holding target at 40%

- **5% shock**: **5.1%** of BHCs depleted
- **15% shock**: **8.2%** of BHCs depleted

Holding shock at 5%

- **40% target**: **5.1%** of BHCs depleted
- **60% target**: **8.2%** of BHCs depleted

▸ More

Stress Test: Bottom Line

Hidden Systemic Vulnerability

Equity extraction creates a **hidden systemic vulnerability**: In stress scenarios comparable to 2008, a substantial fraction of BHCs may be unable to recapitalize their nonbank subsidiaries without external support, with tail-risk BHCs facing potential insolvency

Key Findings at 5% Shock (2008-Comparable):

Magnitude:

- Average BHC needs **19-25%** of equity
- Tail BHCs (p95) need **91-174%** → Insolvency

Breadth:

- **5-8%** of BHCs completely depleted
- **12-16%** of nonbank assets need recap

Policy Implication: Consolidation of nonbank risk under bank regulation concentrates tail risk at parent level. Aggregate capital may be insufficient to absorb subsidiary losses in stress scenarios – equity reallocation amplifies rather than mitigates systemic vulnerability.

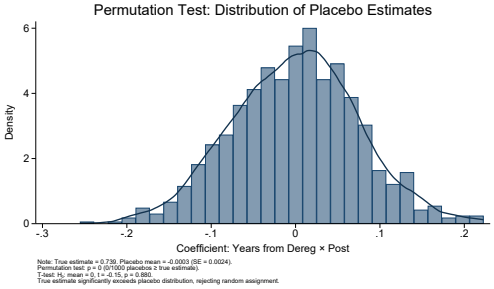
X. Robustness

2SLS Estimates

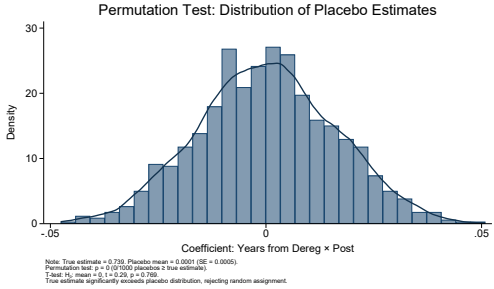
Excess Bank Cap	(1)	(2)	(3)	(4)
$\widehat{\text{Nonbank Share}} \times$ Post	9.4067***	17.0469***	1.4489*	2.1365*
	(3.4466)	(5.6947)	(0.8095)	(1.1549)
Constant	23.7255***			
	(4.0164)			
Bank FE			✓	✓
Qtr-Year FE		✓	✓	✓
Controls				✓
N	12,558	12,558	12,558	12,558
KP LM Statistic	16.458	11.065	12.257	10.144
CD Wald F Statistic	1524.187	1201.771	1161.075	524.242
KP Wald F Statistic	19.635	12.941	14.384	10.992

- 2SLS estimate comparable to OLS
- Measurement error/selection attenuates OLS

Placebo Tests



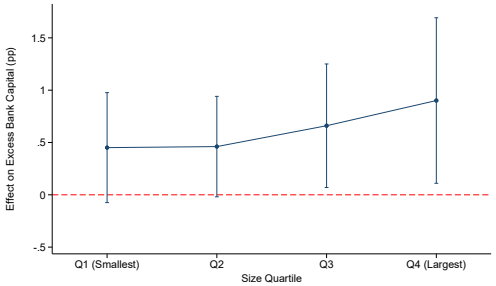
Randomized Years from Dereg



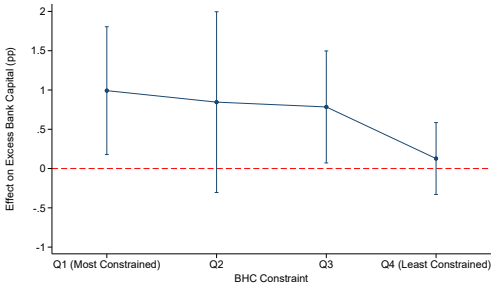
Randomized Post

- True estimate exceeds all 1,000 placebos in both tests ($p < 0.001$) $\Rightarrow$ effect is not spurious correlation

Heterogeneity by Bank Size and BHC Constraint



By Bank Size Quartile



By BHC Capital Constraint

- Effect is strongest (weakest) among largest (smallest) banks
- Effect is strongest (weakest) among ex ante capital-constrained (capital-unconstrained) banks

XI. Conclusion

Potential Welfare Implications

Benefits:

1. Banks become **safer**
   - Higher capital ratios
   - Lower RWA density
   - Reduced charge-offs
2. Regulatory objective achieved
3. No costly external equity issuance
4. Efficient internal capital allocation

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Costs:

1. Nonbanks become **riskier**
   - Higher leverage
   - Lower Z-scores
   - More NPLs
2. Risk migrates within regulatory perimeter
3. Potential contagion if nonbank fails
4. Debt overhang distorts nonbank investment

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Key Considerations

- If nonbanks are "ring-fenced" $\Rightarrow$ Limited spillover, likely net positive
- If BHC backstops nonbank $\Rightarrow$ Hidden contingent liability, net effect unclear
- Stress tests suggest material equity-at-risk (5–10% of BHCs) in moderate scenarios

Conclusion

1. BHCs Reallocate Equity From Nonbanks to Banks Post-2015

- Bank capital ratios increase 2–5 pp relative to BHC requirements
- Nonbank dividend yields rise; equity investment declines
- No change at consolidated BHC level $\Rightarrow$ pure internal reallocation
- First evidence of equity cross-subsidization within financial conglomerates

2. Equity Reallocation Creates Divergent Risk Profiles

- Banks safer: Higher capital, lower RWA, reduced charge-offs, improved ROA
- Nonbanks riskier: Higher leverage, more NPLs, lower Z-scores, shift to risky lending
- Risk does not disappear – it migrates to less-regulated subsidiaries within same BHC

3. Policy Implications: Hidden Fragility in Regulatory Perimeter

- Consolidated capital requirements may be circumvented via internal reallocation
- Nonbank subsidiaries create hidden vulnerabilities
- Consider incorporating nonbank affiliate distress scenarios in stress tests and subsidiary-level capital floors or enhanced monitoring of intra-group flows

Appendix

Equity Multiplier by Nonbank Type: Detail

Back

Nonbank Type	Mean Mult	Median	Mean Cap Ratio	Asset Share	Equity Share	Obs
Fund	12.71	12.83	93.1%	2.3%	28.9%	6,924
Insurance	6.66	6.31	70.2%	1.0%	6.0%	206
Broker/Dealer	6.34	6.05	60.7%	4.3%	10.8%	1,476
Real Estate (REIT)	5.75	5.23	64.2%	1.2%	5.4%	758
Nonbank Lender	4.80	2.89	49.3%	6.8%	16.2%	2,172
Other Financial	3.64	3.08	44.2%	4.3%	10.3%	103

- Funds have highest multiplier (12.7×) due to 93% capital ratios; nonbank lenders among lowest (4.8×) but largest asset footprint

Excess Bank Capital: Difference-in-Differences Specification

Back

Excess Bank Capital	(1)	(2)	(3)	(4)
$\mathbb{1}[\text{NBFI Sub}] \times \text{Post}$	4.8312**	4.8349**	2.0532*	2.0646**
	(2.3535)	(2.3377)	(1.0553)	(0.8277)
$\mathbb{1}[\text{NBFI Sub}]$	15.2740***	15.2727***		
	(3.0533)	(3.0547)		
Post	-1.7105***			
	(0.5685)			
Constant	9.1104***			
	(0.8462)			
Bank FE			✓	✓
Quarter-Year FE		✓	✓	✓
Controls				✓
N	54,814	54,814	54,814	54,814
R^2	0.025	0.025	0.940	0.940

- Banks in BHCs with any NBFI subsidiary increase excess capital by 2.0pp more than banks in BHCs without any NBFIs post-2015

Ratio Specification: Bank Capital Relative to BHC Capital

Back

Bank Excess/BHC Excess	(1)	(2)	(3)	(4)
$\mathbb{1}[\text{NBFI Sub}] \times \text{Post}$	7.0730***	6.2445***	4.4044***	2.9060***
	(2.1569)	(1.9833)	(1.3521)	(0.9498)
$\mathbb{1}[\text{NBFI Sub}]$	2.3452***	2.3505***		
	(0.5541)	(0.5558)		
Post	0.9603			
	(0.7678)			
Constant	1.4776***			
	(0.1621)			
Bank FE			✓	✓
Quarter-Year FE		✓	✓	✓
Controls				✓
N	39,052	39,052	39,052	39,052
R^2	0.016	0.025	0.403	0.419

- Bank excess capital increases 2.9pp relative to BHC excess capital
- Ratio specification rules out that BHCs simply raised more capital overall

Heterogeneity: Effect Concentrated in Largest BHCs

Back

Excess Bank Capital	(1)	(2)	(3)
Top 200 × NBFI Sub × Post	8.7596*	7.8560***	5.2519***
	(4.6929)	(2.4985)	(1.8515)
Top 200 × NBFI Sub	36.0569***	3.6448	
	(7.1023)	(9.7661)	
Top 200 × Post	-2.1663**	-2.2313***	
	(0.8847)	(0.7277)	
NBFI Sub × Post	-0.6023	-0.5288	-0.2223
	(0.8753)	(0.3875)	(0.3660)
NBFI Sub	1.9367		
	(2.0470)		
Top 200	-1.5171	1.6649	
	(1.1029)	(1.0755)	
Post	-1.3914**		
	(0.6100)		
Bank FE		✓	✓
Quarter-Year FE		✓	✓
Controls			✓
N	54,799	54,799	54,799
R^2	0.075	0.940	0.941

- Effect driven by largest BHCs

Heterogeneity: Attenuated Effect for Diversified BHCs

Back

Excess Bank Capital	(1)	(2)	(3)
Diversified × NBFI Sub × Post	-20.1472**	-10.3999*	-11.9498**
	(9.9763)	(5.3182)	(4.7029)
Diversified × NBFI Sub	-60.8691***	19.1865***	
	(13.8268)	(6.8646)	
Diversified × Post	-2.4389	-0.7014	
	(2.9142)	(1.0658)	
NBFI Sub × Post	15.6538*	7.8800*	8.9556**
	(8.0238)	(4.1373)	(3.5677)
NBFI Sub	51.3262***		
	(10.7035)		
Diversified	-0.6725	1.3386	
	(2.9437)	(1.9047)	
Post	0.4598		
	(2.9480)		
Constant	8.8476***		
	(2.9523)		
Bank FE		✓	✓
Quarter-Year FE		✓	✓
Controls			✓
N	47,695	47,695	47,695
R^2	0.093	0.940	0.942

- Non-diversified BHCs increase bank capital; more diversified structures provide alternative adjustment margins

No Effect on Consolidated BHC Capital

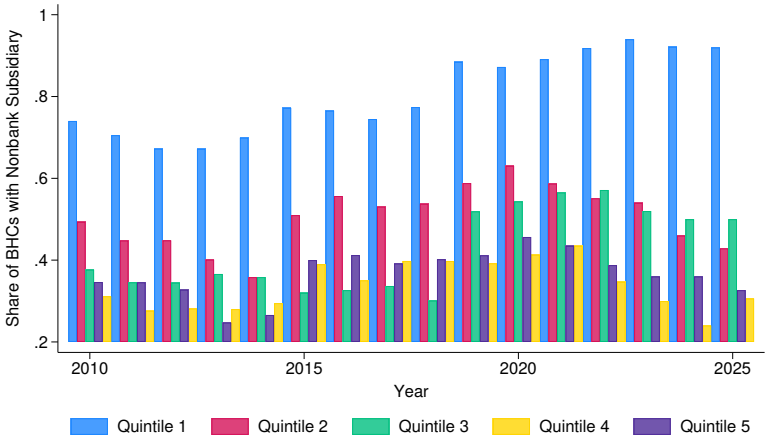
Back

Excess BHC Capital	(1)	(2)	(3)	(4)
$\mathbb{1}[\text{NBFI Sub}] \times \text{Post}$	-0.2032	-0.0742	-0.1472	0.3482
	(0.3500)	(0.3468)	(0.2834)	(0.2805)
$\mathbb{1}[\text{NBFI Sub}]$	0.7646**	0.7711**		
	(0.3840)	(0.3841)		
Post	-2.5616***			
	(0.1932)			
Constant	7.3429***			
	(0.1704)			
BHC FE			✓	✓
Quarter-Year FE		✓	✓	✓
Controls				✓
N	29,267	29,267	29,267	29,267
R^2	0.080	0.101	0.772	0.784

- No significant change in consolidated BHC excess capital, ruling out external capital raising or BHC-level behavior changes

Fact #4A: Share of BHCs with Nonbank Subsidiary by Asset Quintile

Back



Sample Characteristics: IV Sample vs. Full Sample

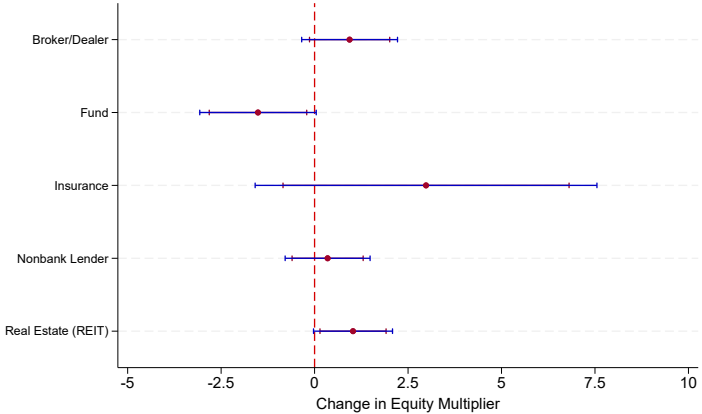
Back

	IV Sample	Non-IV Sample	Full Sample	Difference
Number of BHCs	164	748	912	
Panel A: Size and Organizational Complexity				
— Asset Rank	381.69	472.90	456.50	-91.21***
— Log(Total Assets)	14.658	14.019	14.134	0.639***
— Asset Growth	0.031	0.027	0.028	0.004
— Top 200 BHC	0.262	0.131	0.155	0.131***
— Log(Nonbank Assets)	9.862	9.111	9.277	0.751*
— Nonbank NAICS Diversity	0.388	0.433	0.424	-0.045**
— ROA	0.002	0.002	0.002	0.000*
Panel B: Balance Sheet Characteristics				
— Leverage	9.802	10.352	10.253	-0.550
— Loan Share	0.596	0.622	0.617	-0.026**
— Securities Share	0.250	0.224	0.228	0.027**
— Deposits/Assets	0.815	0.816	0.816	-0.002
— Cash Share	0.082	0.080	0.080	0.002

- Instrument requires banks to exist pre-deregulation (1980s–90s)
- Older banks are larger, more complex – precisely the banks where internal capital markets matter

Decline Driven Mostly by Reallocation Across Subsidiary Types

Back



- Nonbanks largely maintain equity multiplier pre- and post-2015
- Aggregate decline mostly driven by BHC reallocating equity across types (from high- to low-multiplier subsidiaries)

BHCs Reallocated Equity Toward Bank Subsidiaries

Back

Bank Share	(1)	(2)
Years from Dereg × Post	0.0199*	0.0194**
	(0.0100)	(0.0075)
BHC FE	✓	✓
Qtr-Year FE	✓	✓
Controls	✓	✓
N	1,400	1,400
R^2	0.7677	0.7997

- Bank subsidiaries' share of total BHC equity increased by 1.9 percentage points
- Evidence of internal capital reallocation from nonbank to bank subsidiaries within BHCs

Growth in Equity Investment in Subsidiaries

Back

	(1) Bank	(2) Nonbank
Years from Dereg × Post	0.0026**	-0.0437*
	(0.0011)	(0.0235)
BHC FE	✓	✓
Qtr-Year FE	✓	✓
Controls	✓	✓
N	1,334	1,334
R^2	0.1401	0.0710

- Growth in equity investment increases for bank subsidiaries and declines for nonbank subsidiaries

Undistributed Income Effects at BHC-Level

Back

Retained Earnings Share	(1)	(2)	(3)	(4)
Years from Dereg × Post	0.0015	0.0015	0.0009	0.0002
	(0.0009)	(0.0009)	(0.0006)	(0.0006)
Years from Dereg	-0.0054***	-0.0054***		
	(0.0010)	(0.0010)		
Post	-0.0013			
	(0.0072)			
Constant	0.1035***			
	(0.0067)			
Bank FE			✓	✓
Qtr-Year FE		✓	✓	✓
Controls				✓
N	6,067	6,067	6,067	6,067
R^2	0.0903	0.0983	0.9252	0.9291

- No change in retained earnings at BHC level

Growth of Bank Portfolio Composition: Patterns of Derisking

Back

	(1) Δln(Loans)	(2) Δln(Sec)	(3) Δln(Cash)
Years from Dereg$\times$ Post	0.0008*	0.0023**	0.0046**
	(0.0005)	(0.0011)	(0.0021)
Bank FE	✓	✓	✓
Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	11,774	11,774	11,774
R^2	0.1318	0.1002	0.0760

- Cash grows faster after 2015

BHC Becomes Safer and More Profitable

Back

	(1) ROE	(2) ROA	(3) Charge-Offs
Years from Dereg × Post	0.0001**	0.0011**	-0.0001**
	(0.0000)	(0.0005)	(0.0000)
BHC FE	✓	✓	✓
Qtr-Year FE	✓	✓	✓
Controls	✓	✓	✓
N	5,896	5,896	5,896
R^2	0.4774	0.3293	0.4848

- Consolidated BHC profitability also improves – net effect is positive despite nonbank deterioration

Decomposition of BHC ROE

Back

	(1) Leverage	(2) Equity/RWA	(3) RWA/Assets	(4) Marginal ROE	(5) Off-BS Commitment
Years from Dereg × Post	0.0363	0.0003	-0.0059**	0.0179	-0.0009
	(0.0568)	(0.0010)	(0.0026)	(0.0260)	(0.0015)
Bank FE	✓	✓	✓	✓	✓
Qtr-Year FE	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓
N	5,388	5,388	5,388	5,388	5,388
R^2	0.7180	0.8713	0.8797	0.0393	0.8729

- Banks maintain constant leverage while improving asset quality
- Evidence of prudent reallocation toward liquid assets

Extensive Margin: Divestment of Nonbank Subsidiary Types

Back

	(1) Broker/Dealer	(2) Lender	(3) Insurer	(4) Fund	(5) REIT
Years from Dereg × Post	0.0038	0.0010	0.0064***	0.0016	-0.0010
	(0.0026)	(0.0024)	(0.0022)	(0.0030)	(0.0020)
Bank FE	✓	✓	✓	✓	✓
Qtr-Year FE	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓
N	6,155	6,155	6,155	6,155	6,155
R^2	0.5450	0.5601	0.5264	0.4992	0.5193

- Post-2015, BHCs are more likely to exit the insurance activities

BHCs Expanded Nonbank Activities Over Time

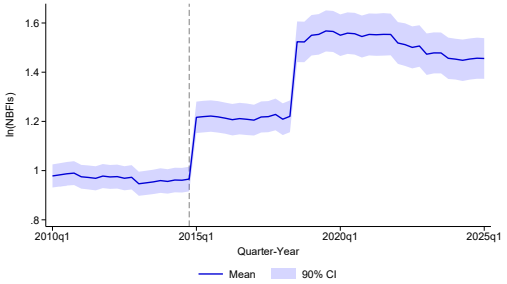
Back

Regression Results

	ln(Nonbank Types)	
	(1)	(2)
Years from Dereg × Post	0.0821***	0.0270*
	(0.0107)	(0.0157)
BHC FE		✓
Quarter-Year FE		✓
Controls		✓
N	5,558	5,558
R^2	0.108	0.964

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

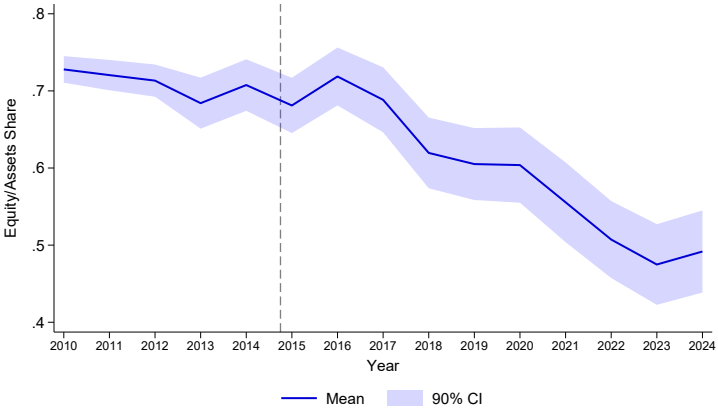
Time Trends



- BHCs steadily increase the number of distinct nonbank subsidiary types over time

Nonbank Equity Share

Back



- Nonbanks that existed in 2010 (balanced panel, no entry/exit effects)
- Equity/assets ratio declined sharply post-2015 for nonbank subsidiaries

Revenue Growth of Bank and Nonbank Subsidiaries within BHC

	(1) Bank	(2) Nonbank
Years from Dereg × Post	0.0013	-0.0095***
	(0.0010)	(0.0031)
BHC FE	✓	✓
Qtr-Year FE	✓	✓
Controls	✓	✓
N	1,054	1,054
R^2	0.1168	0.7980

- Post-2015, nonbank revenue growth declines by 0.95 pp – no change among bank subsidiaries

Back

Nonbank Lending Growth among All Nonbanks

Back

Δln(Lending)	(1) Real Estate	(2) C&I	(3) Consumers	(4) Non-US
Years from Dereg $\times$ Post	-0.0341***	-0.0524**	0.0147*	0.0217
	(0.0121)	(0.0195)	(0.0082)	(0.0171)
Non-Bank FE	✓	✓	✓	✓
Industry-Qtr-Year FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
N	4,572	4,572	4,572	4,572
R^2	0.2058	0.1989	0.3537	0.1607

- Post-2015, lending growth driven by consumer loans – riskier segment

Mean BHC Equity at Risk

Back

	Target Capital Ratio						
Shock	20%	30%	40%	50%	60%	70%	Total
1%	6.61	11.23	16.57	22.42	28.99	36.23	20.34
5%	8.38	13.30	18.84	24.97	31.78	39.33	22.77
10%	10.74	16.02	21.82	28.30	35.47	43.29	25.94
15%	13.30	18.84	24.97	31.78	39.33	47.62	29.31
Total	9.76	14.85	20.55	26.87	33.89	41.62	24.59

Average BHC would need 19-32% of equity to recapitalize NBFIs under moderate scenarios (5-10% shock, 40-60% target). While below insolvency, represents substantial capital commitment.

95th Percentile BHC Equity at Risk (Tail Risk)

Back

	Target Capital Ratio						
Shock	20%	30%	40%	50%	60%	70%	Total
1%	27.07	55.45	79.94	114.71	156.84	200.33	105.72
5%	40.23	65.00	90.58	131.21	174.17	222.71	120.65
10%	53.06	77.39	110.65	152.51	195.91	253.56	140.51
15%	65.00	90.58	131.21	174.17	222.71	288.43	162.02
Total	46.34	72.11	103.10	143.15	187.41	241.26	132.23

Red = >100% (parent insolvency)

Key finding: Top 5% most-exposed BHCs face **parent insolvency** at moderate stress levels. At 5% shock with 50% target, tail BHCs need 131% of equity—exceeding total parent capital.

Mean Percentage of Nonbank Assets at Risk

Back

	Target Capital Ratio						
Shock	20%	30%	40%	50%	60%	70%	Total
1%	3.15	5.17	7.69	10.81	14.45	18.45	9.95
5%	3.86	6.12	8.90	12.21	15.99	20.14	11.20
10%	4.94	7.42	10.49	14.07	18.04	22.41	12.90
15%	6.12	8.90	12.21	15.99	20.14	24.97	14.72
Total	4.52	6.90	9.82	13.27	17.15	21.49	12.19

Interpretation: On average, 9-17% of NBFI assets would need recapitalization under moderate scenarios. Measures **breadth** of distress (how many NBFIs affected) rather than magnitude relative to parent capital.

95th Percentile: Nonbank Assets at Risk (Tail)

Back

	Target Capital Ratio						
Shock	20%	30%	40%	50%	60%	70%	Total
1%	16.40	26.34	35.85	43.92	53.92	63.92	40.06
5%	20.34	30.34	38.19	47.92	57.92	67.92	43.77
10%	25.34	35.34	42.92	52.92	62.92	72.92	48.73
15%	30.34	38.19	47.92	57.92	67.92	77.92	53.37
Total	23.11	32.55	41.22	50.67	60.67	70.67	46.48

Red = >50% of NBFIs at risk

Key finding: Top 5% of BHCs have **majority of NBFI portfolio** at risk. At 5% shock with 60% target, 58% of NBFI assets would need recapitalization—widespread distress across subsidiary portfolio.

Percentage of BHCs with Depleted Capital Buffers

Back

Shock	Target Capital Ratio						
	20%	30%	40%	50%	60%	70%	Total
1%	2.04	4.08	5.10	8.16	8.16	8.16	5.95
5%	3.06	4.08	5.10	8.16	8.16	10.20	6.46
10%	4.08	5.10	6.12	8.16	8.16	10.20	6.97
15%	4.08	5.10	8.16	8.16	10.20	10.20	7.65
Total	3.32	4.59	6.12	8.16	8.67	9.69	6.76

Red = >5% (systemic concern threshold)

Systemic implications: 5-10% of BHCs would have **completely depleted buffers** under moderate stress. At 5% shock with 50% target, 8.2% of holding companies have zero remaining excess capital—**1 in 12 BHCs** unable to absorb further losses.