
# Regulation and the Boundaries of the Banking Firm

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# Overview

- Why do Non-Bank Financial Institutions (NBFIs) emerge?
- Are banks being disintermediated?
- Are there common principles explaining NBFIs growth and coexistence with banks?

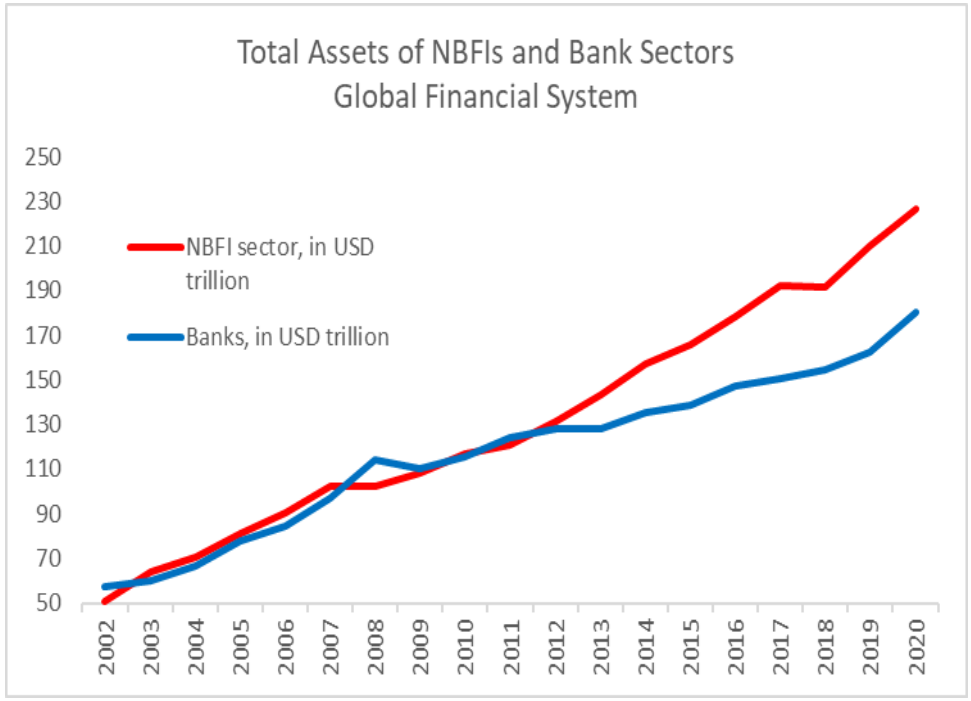
# Efficient management of liquidity and capital needs

1. Banks provide liquidity support to unaffiliated NBFIs
   - Acharya, Cetorelli and Tuckman, Where Do Banks End and NBFIs Begin,
     *Review of Corporate Finance Studies*, Forthcoming
   - Acharya, Cetorelli and Tuckman, Transformed Intermediation: Credit Risk to NBFIs, Liquidity Risk to Banks,
     *Journal of Finance*: Insights & Perspectives, Forthcoming
   - Acharya, Cetorelli and Tuckman, Transformed Intermediation: A Conceptual Framework, 2026

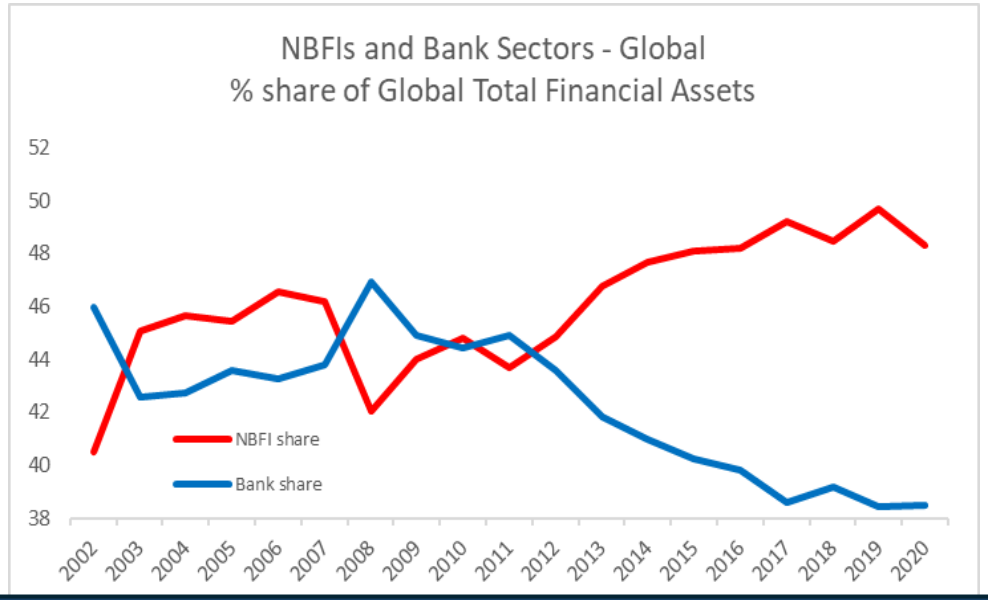
2. NBFIs grow inside the banking firm to manage liquidity and capital needs
   - Cetorelli and Prazad, The Nonbank Footprint of Banks, 2025
   - Cetorelli and Kundu, Regulatory Arbitrage within the Firm, 2026

3. Regulation is a key driver of these dynamics

Spectacular growth of NBFIs and …




… (Apparent) domination over banks post GFC




## Common narrative:

- Banks retreat from intermediation activities as a result of tighter regulation
- NBFIs emerge and grow substituting banks

Source: Financial Stability Board (2022)

# Transformation view – An Alternative Perspective

- Banks' obituary premature. Recurrently written (about once every decade)
- Banks do not die. They *transform* their business model
- NBFIs and banks often complement each other
- Not necessarily (or not exclusively) a story of substitution/competition
  - Nonbanks growing footprint in, eg, corporate and consumer lending, asset securitization, LBO financing, mortgage servicing …
  - … But banks offer funding and liquidity services to these nonbanks (eg, term loans, warehouse financing, credit lines)

# Basic Elements of the Transformation View

1. Tightening of post-GFC bank regulations
   - Higher regulatory cost for riskier activities
   - Larger holdings of liquid buffers
2. Banks have natural advantage as intermediaries
   - Exclusive access to official backstops
   - Stable funding and liquidity risk management
3. NBFIs have a natural dependence on banks

# Why are NBFIs dependent on banks?

- Dependence should be expected if NBFIs activity  of financial intermediation nature:
  - Liquidity/Maturity transformation
  - Management of liquidity risk essential component of business activity

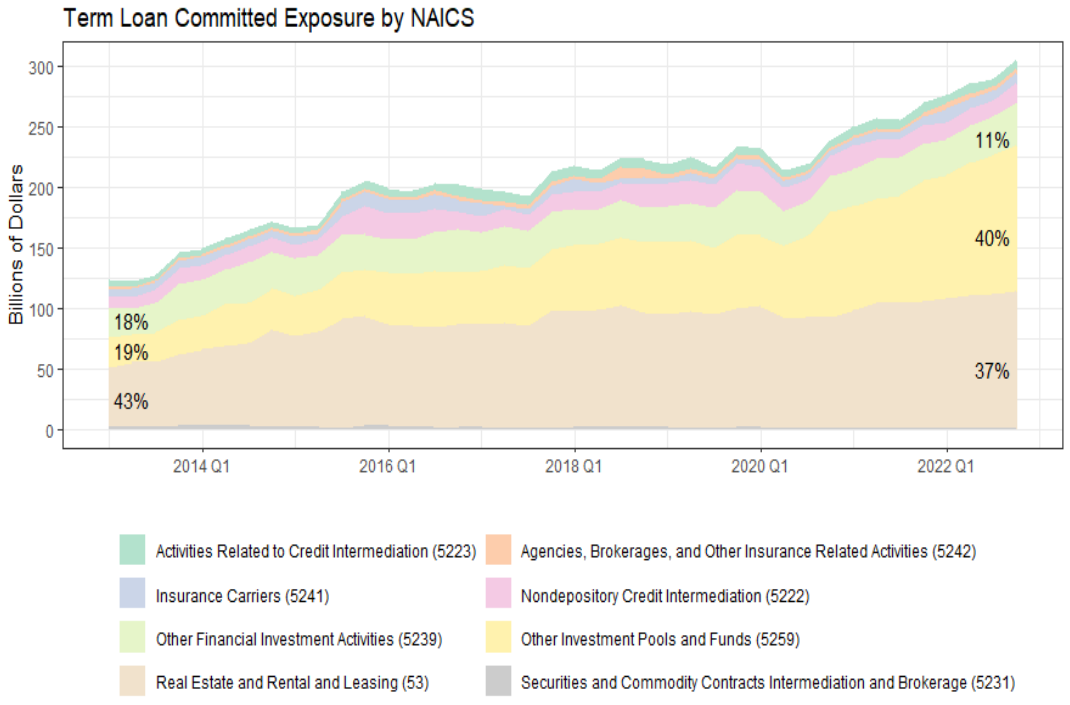
# How do *banks* manage liquidity risk?

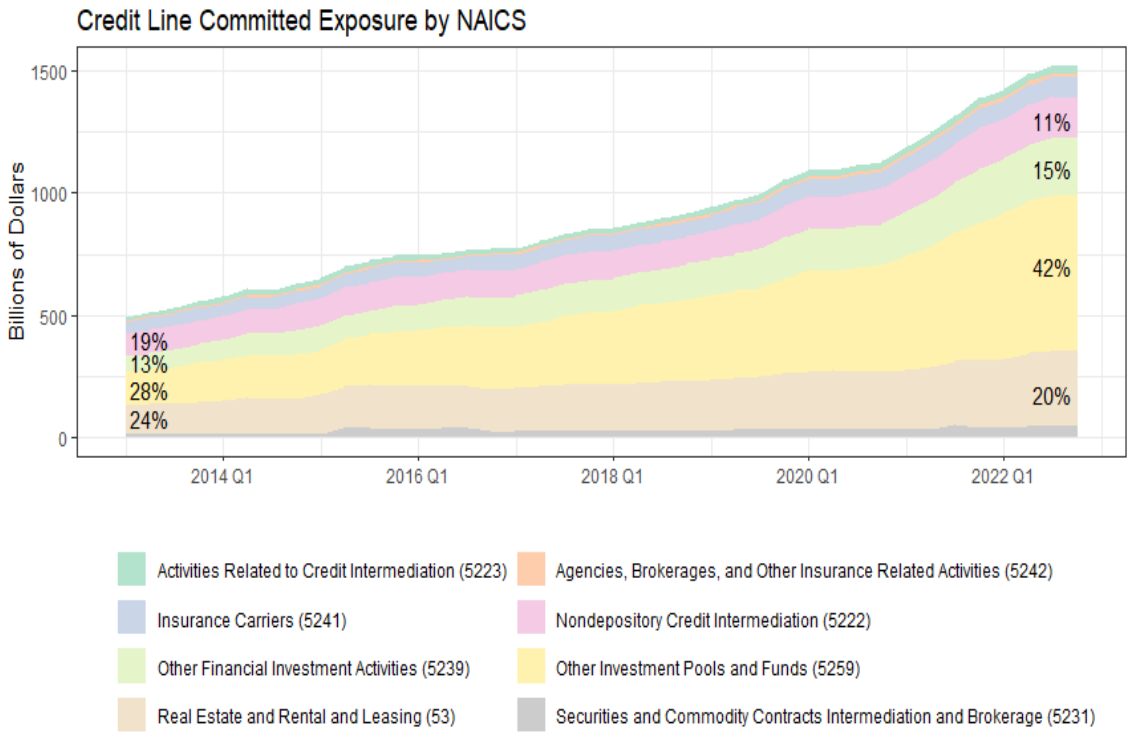
- Natural liquidity synergies between credit and deposit activities (Kashyap, Rajan and Stein, 2002)
- Stability of deposit. Deposit insurance important factors behind stability
- Access to contingent liquidity facilities (Discount Windows and/or emergency facilities as needed – TAF in 2008, BTFP in 2023)

# How can NBFIs manage liquidity risk?

- NBFIs do not have standard access to liability guarantees, nor to liquidity facilities
- Need to “buy” liquidity insurance
- Banks the natural providers of such services
- Banks can arbitrage away tighter regulation
- Growth of NBFIs → growth of bank-NBFI interconnections

# Large increase in loans and credit lines to NBFIs

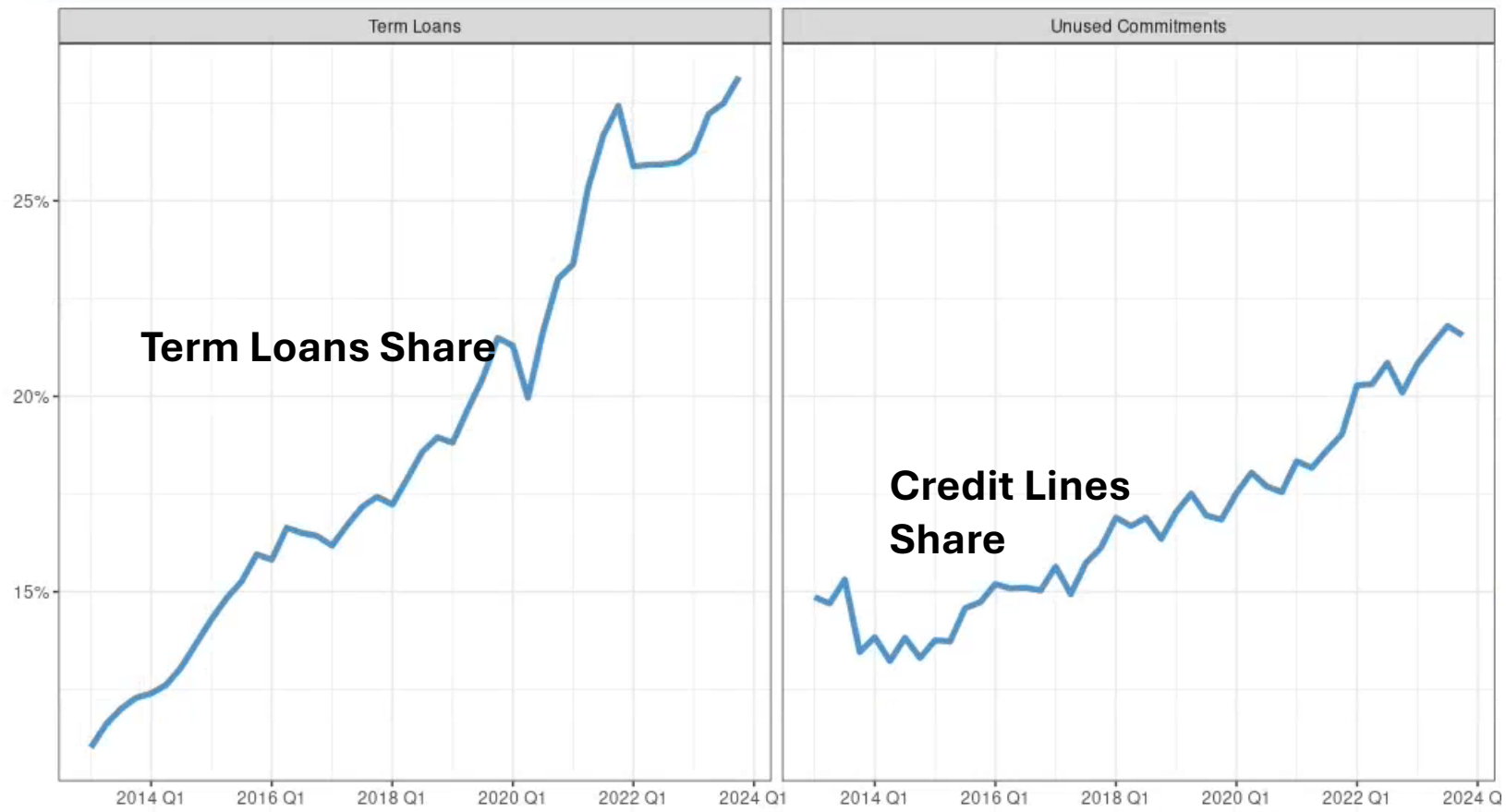



Source: Y-14 reporting – By reporting bank, individual term loan or credit line contract with individual obligors

# Disproportionate shift of banks' activity towards NBFIs

Loans and Lines to NBFIs as Shares of Total Bank Loans and Credit Line Commitments

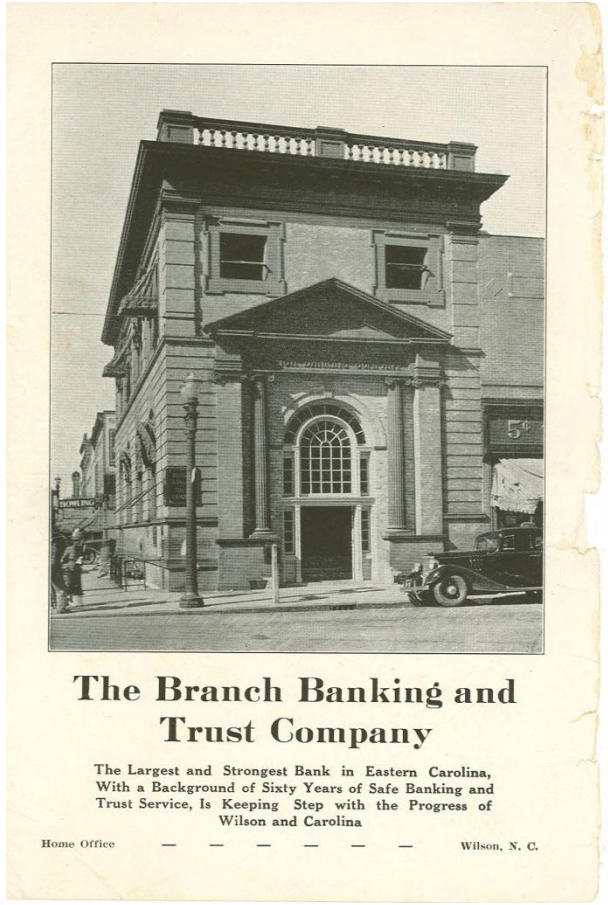



Source: Y9c reporting

# Organizational transformation

- Banks are not static, immutable institutions
- Dispelling the conventional notion of a banking firm defined by deposit taking and loan making
- Modern banking firms are complex conglomerates
- Nonbanks can – AND DO – grow *inside* the boundaries of the banking firm
- Highly overlooked dimension of NBFI dynamics

# BB&T. A Parable of the Changing Boundaries of the Banking Firms





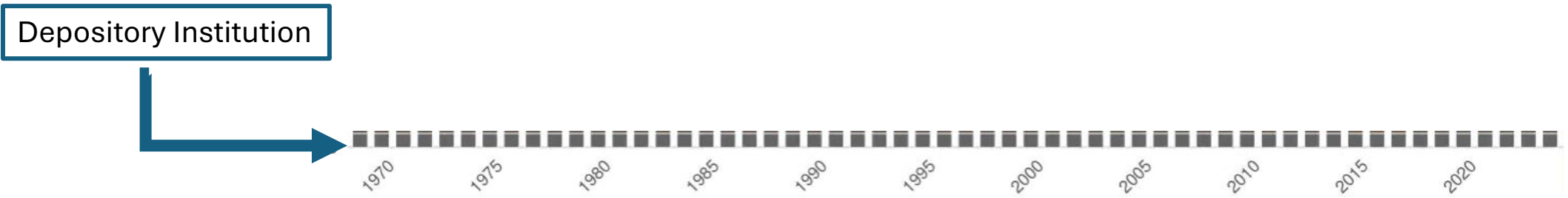
Started by Alpheus Branch in 1872. "… accepted time deposits, paid interest and loaned money to help rebuild the farms and small businesses in the community. …"

Survived Great Depression, Banking crisis of 1985-92, Great Recession

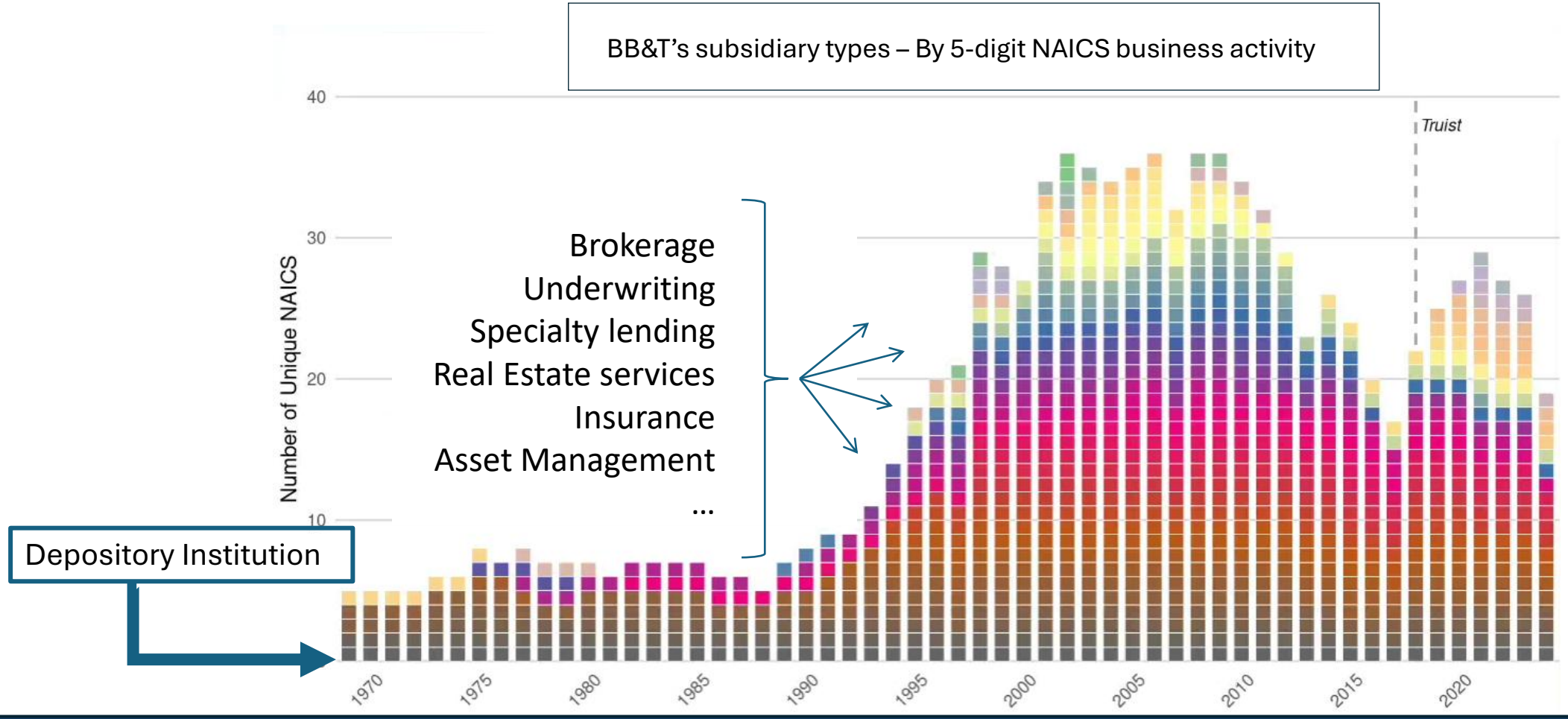
Depository institution pre-2019: BB&T Company, > $200B

Post-merger with Truist: Truist Bank, > $500B

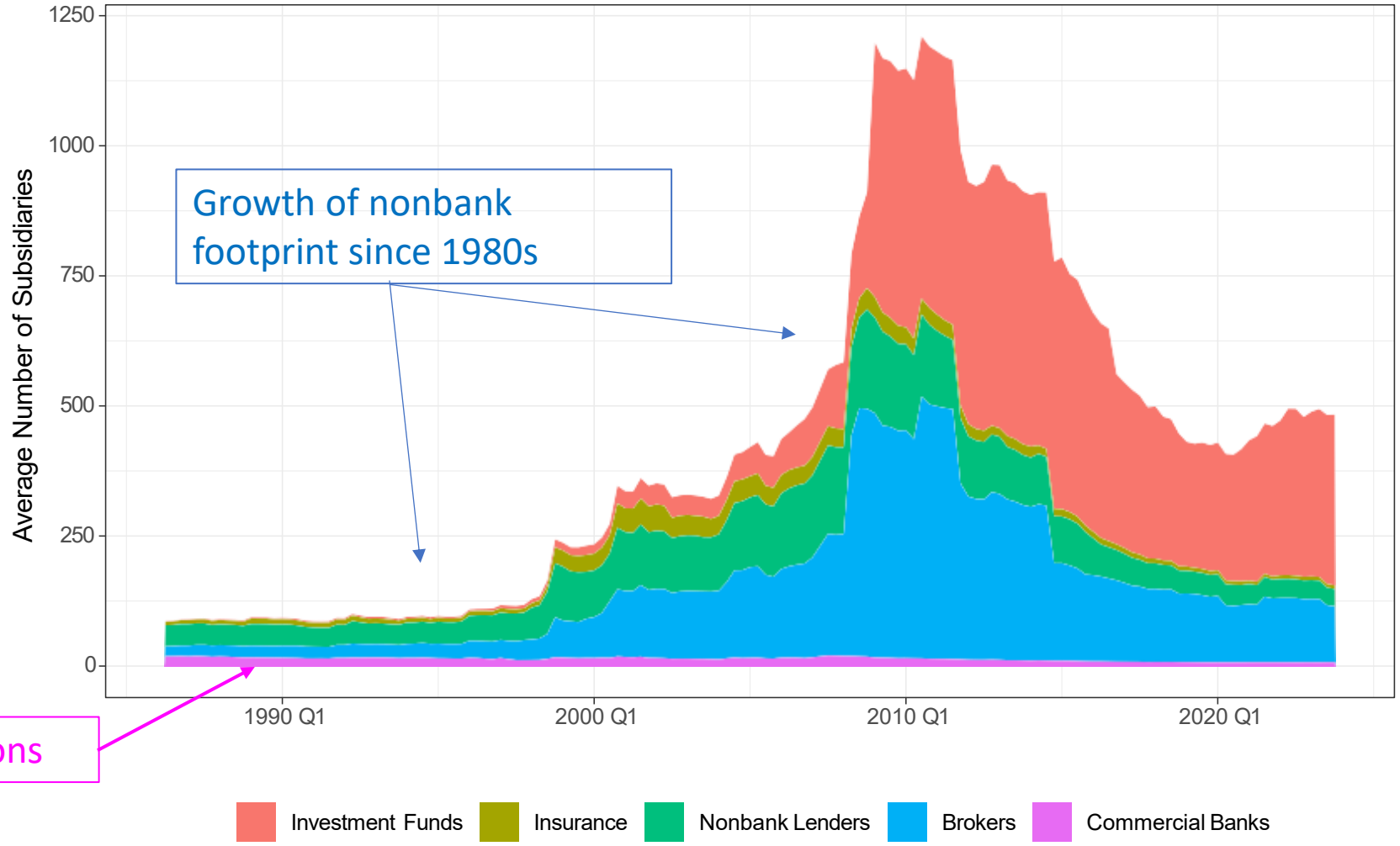
# The Boundaries of BB&T's Banking Firm



# The Boundaries of BB&T's Banking Firm

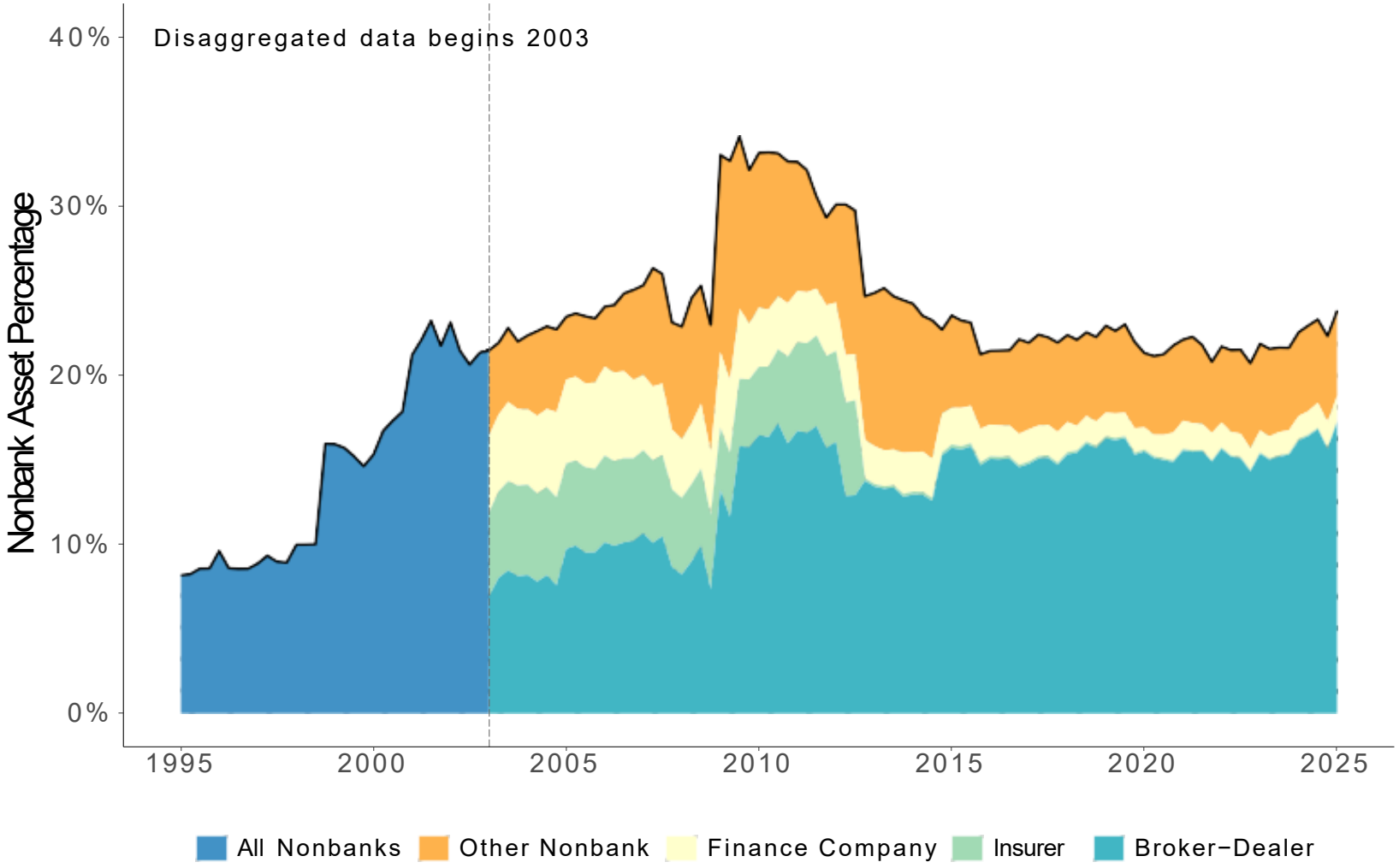


# Composition of BHC Subsidiaries by Activity – U.S. Industry



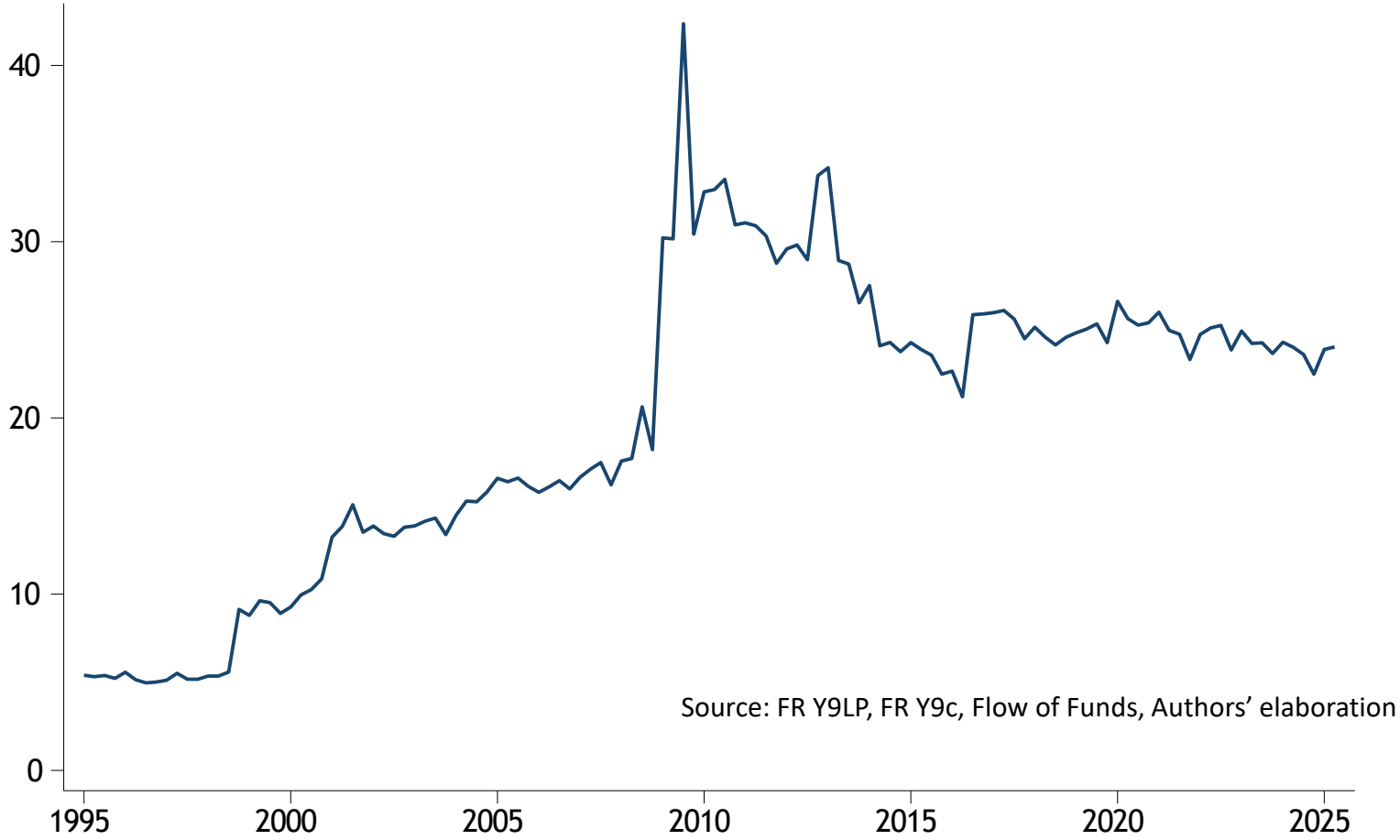

Source: FR Y6, FR Y10, Authors' elaboration

# Nonbank Activity Is Large *Inside* BHCs




Source: FR Y9LP, FR Y9c, Authors' elaboration

# And Large as Share of *Aggregate U.S.* Nonbank Assets




Roughly **one in four** nonbank dollars in the U.S. is inside a banking firm

# Why has the Banking Firm Expanded

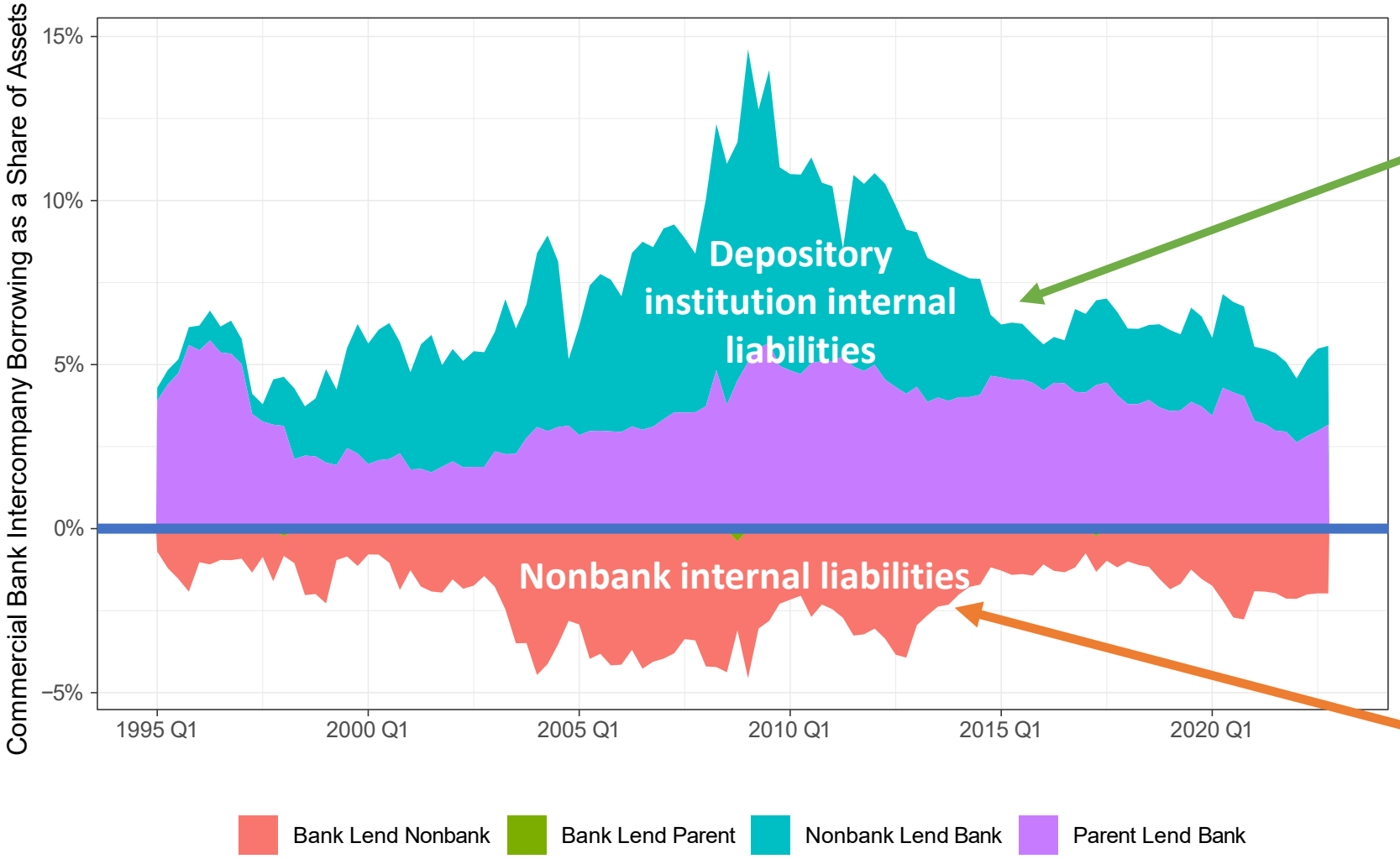
# Liquidity Synergies

- Kashyap, Rajan, and Stein (KRS) (2002) show that within commercial banks, deposits and credit lines are synergistic, as long as outflows are uncorrelated

- KRS argument is about bank *divisions*, but logic naturally extends to *subsidiaries* of modern banking firms

- If affiliated banks and nonbanks experience relatively uncorrelated liquidity outflows, then diversified BHCs can redistribute liquid assets among subsidiaries to economize on liquidity

# Cross-Funding Dependency Inside the Banking Firm




Bank subs hold significant share of liabilities that are claims of nonbank subs

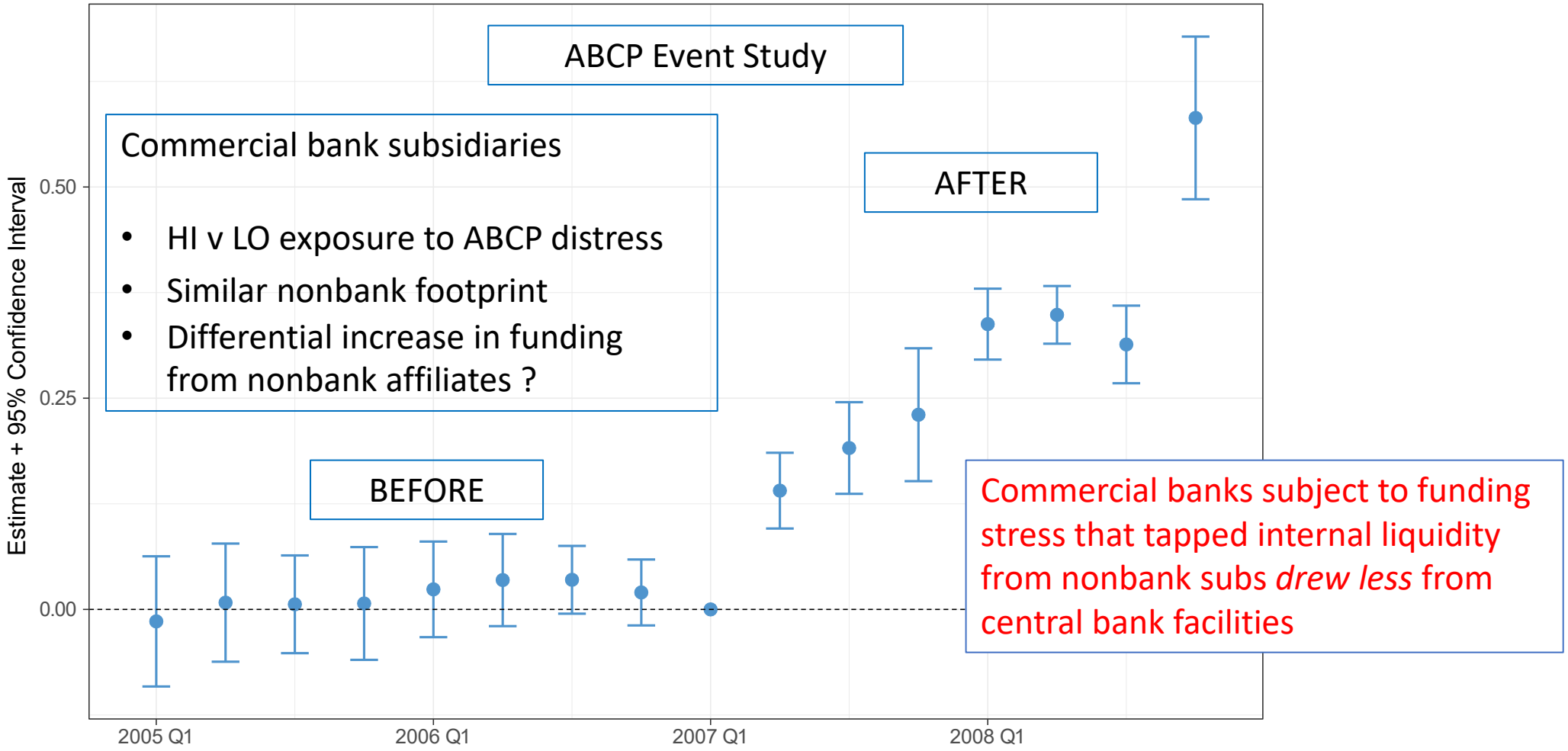
Nonbank subs hold significant share of liabilities that are claims of bank subs

Source: FR Y9LP, Call Report, Authors' elaboration

# Testable Predictions

- Depository institution subsidiaries of BHCs with larger nonbank footprint have
  - Smaller cash buffers
  - Invest more
- Implicit lines of credit. Intracompany transfers especially large in times of need
- Regulation matters. With regulatory restrictions, intracompany transfers decrease, BHCs scale back nonbank footprint

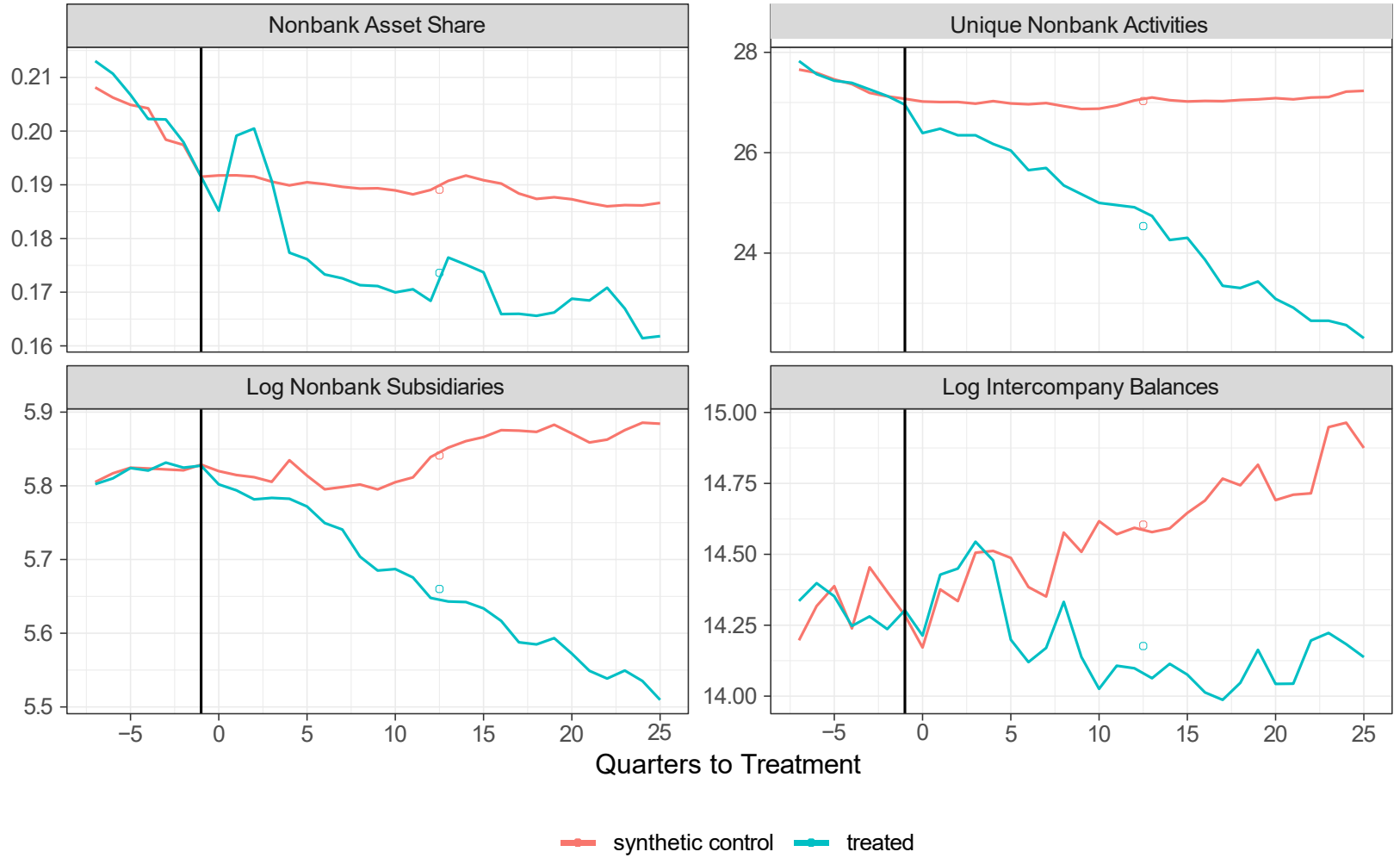
# Is Internal Funding Transferred in Times of Need?



# The Role of Regulation on Liquidity Synergies: “Living Wills"

- Dodd-Frank Resolution Planning (Living Wills) specifically restricted intracompany funding between banks and nonbanks without imposing actual restrictions on nonbank activities.
- If BHCs expand nonbank footprint to exploit liquidity synergies, then reductions in their value should lead BHCs to shrink their nonbank footprint.
- We use living wills as an exogenous shock to ex-ante value of liquidity synergies.

# Living Wills Reduce Nonbank Footprint



# Equity capital synergies

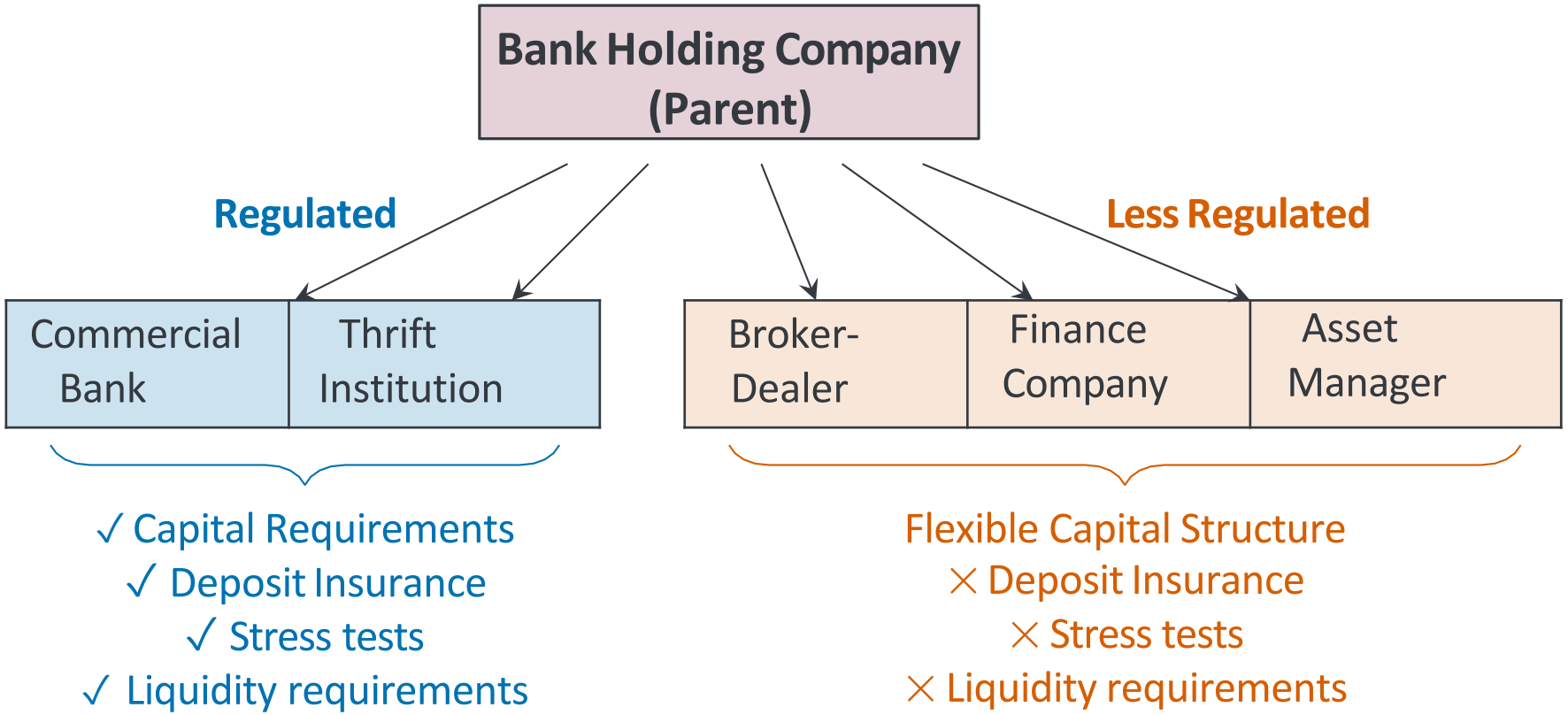
Internal sharing of funding/liquidity a driver of firm's boundaries

What about internal sharing of *equity capital?*

Equity capital subject to regulatory constraints

# Capital Regulation and Impact on Firms' Boundaries

Capital requirements apply **asymmetrically** at the subsidiaries level



# Research Question

What happens when regulation binds only on one side of the organization?

- When prudential standards bind **asymmetrically** across subsidiaries, internal capital markets become a mechanism for **regulatory arbitrage**.
- Regulation changes where risk sits within the boundaries of the firm, relocating to the lightly regulated side of the same firm
- Risk crosses the regulatory perimeter but stays **within** consolidated supervision

# Main Findings

1. **Capital moves internally**
   - Banks accumulate more excess capital after Basel III
   - Consolidated BHC capital is unchanged
2. **We observe the mechanism**
   - Parents **extract** equity from nonbanks
   - Parents **inject** equity into banks
   - External equity issuance declines
3. **Risk migrates within the firm**
   - Banks: higher capital, lower RWAs, better asset quality
   - Nonbanks: lower capital, riskier lending, worse credit quality
4. **Hidden vulnerabilities**
   - Under stress scenario, **4–6%** of BHCs would exhaust capital buffers supporting distressed nonbanks
   - Bank-level capital improvements overstate gains in consolidated safety

# Capital Where Regulation Does Not Bind

- Bank subsidiaries operate with E/A close to minimum requirement
  - E/A ~= 10%
- Nonbank subs operate with much larger equity to asset ratios
  - Median E/A ~= 70%
- Nonbank subsidiaries as equity reservoir for the holding company

- The firm isn't short of capital — it's short of capital in the right entity.
- Capital sits where regulation doesn't bind

# Identification Challenge and Solution

**Challenge:** organizational complexity is endogenous – BHCs choose their nonbank footprint

**Approach:** instrument complexity with historical interstate-banking deregulation timing

- **Years from Dereg**$_i$ $=$ 1994 $-$ (home-state deregulation year)
- Early-deregulating states gave BHCs a longer runway to build complex subsidiary structures before Riegle-Neal (1994) harmonized interstate rules
- Orthogonal to post-2015 capital management; predetermined decades earlier

*Reduced form*

$$Y_{it} = \alpha + \beta\,(\text{Years from Dereg}_i \times \text{Post}_t) + \gamma_i + \delta_t + X'_{i,2013}\boldsymbol{\theta} \cdot \text{Post}_t + \varepsilon_{it}$$

$\text{Post}_t = \mathbb{1}[t \geq 2015\text{Q1}]$; entity + quarter-year FE; 2013Q1 controls $\times$ Post

# Banks Build Excess Capital; BHCs Do Not

| | Bank Excess Capital (1) | BHC Excess Capital (2) | Bank/BHC Excess Ratio (3) |
|---|---|---|---|
| Years from Dereg × Post | 0.7395* | 0.0058 | 1.7766*** |
| | (0.3992) | (0.0721) | (0.6211) |
| Observations | 12,558 | 6,079 | 9,873 |
| $R^2$ | 0.950 | 0.796 | 0.695 |
| Bank FE | ✓ | | ✓ |
| BHC FE | | ✓ | |
| Quarter-Year FE | ✓ | ✓ | ✓ |
| Controls × Post | ✓ | ✓ | ✓ |

- For each year of deregulation exposure, bank excess capital increases by +0.74 ⇒ ≈ **5 pp cumulative difference** for median
- Internal reallocation, not external issuance

# Economic Mechanism – Internal Equity Transfer

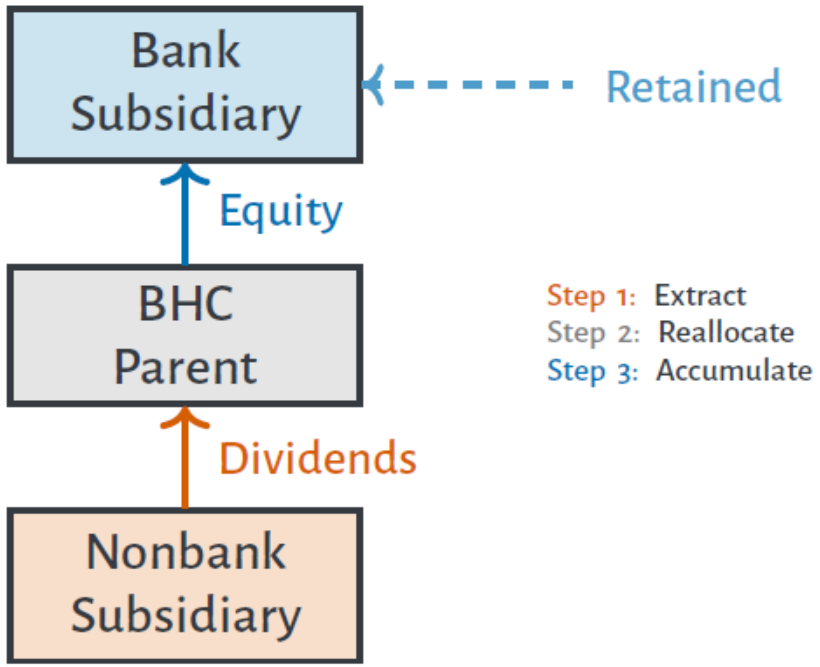
**The Three-Step Process:**

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**




*Mechanism allows banks to satisfy stricter capital requirements without costly external equity issuance, exploiting internal equity reservoirs in nonbank subsidiaries.*

# Asymmetric Equity Investments into Subsidiaries

| | Parent Equity Investments | | |
|---|---|---|---|
| | Bank Share (1) | Nonbank Share (2) | Total Share (3) |
| Years from Dereg × Post | 0.0228** | -0.0264** | 0.0045 |
| | (0.0093) | (0.0114) | (0.0104) |
| Observations | 1,334 | 1,334 | 1,334 |
| $R^2$ | 0.810 | 0.669 | 0.912 |
| BHC FE | ✓ | ✓ | ✓ |
| Quarter-Year FE | ✓ | ✓ | ✓ |
| Controls × Post | ✓ | ✓ | ✓ |

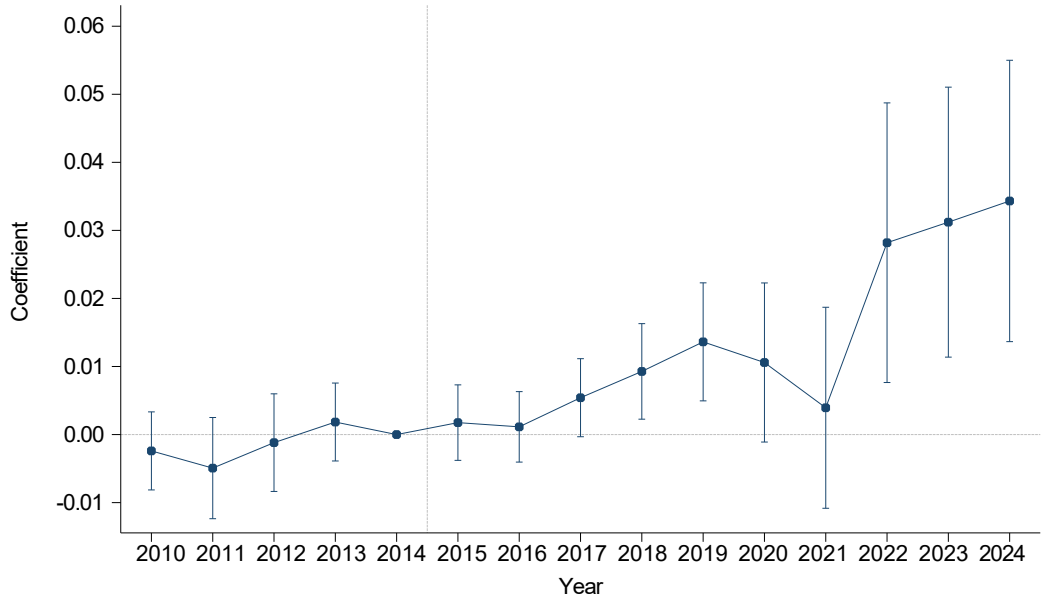
- Bank equity share rises 2 pp; nonbank equity share falls 3 pp; total unchanged ▸ Growth ▸ More

# Asymmetric Net Payouts Across Subsidiaries

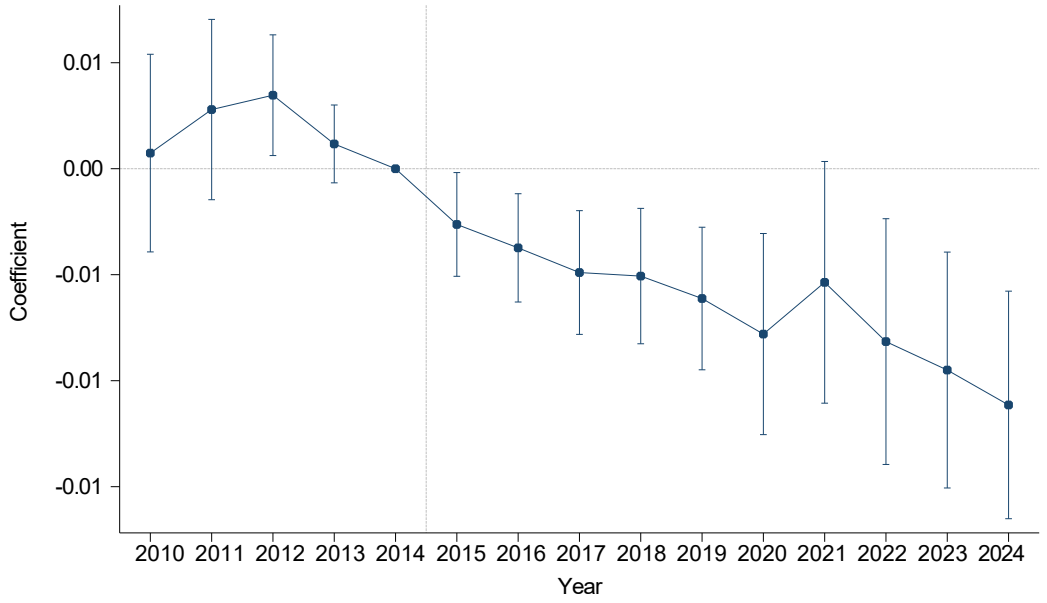
| | Parent Equity Investments | | | Dividend Payouts | |
|---|---|---|---|---|---|
| | Bank Share (1) | Nonbank Share (2) | Total Share (3) | Bank Payout (4) | Nonbank Payout (5) |
| Years from Dereg × Post | 0.0228** | -0.0264** | 0.0045 | 0.0000 | 0.0947** |
| | (0.0093) | (0.0114) | (0.0104) | (0.0005) | (0.0459) |
| Observations | 1,334 | 1,334 | 1,334 | 1,334 | 1,334 |
| $R^2$ | 0.810 | 0.669 | 0.912 | 0.164 | 0.070 |
| BHC FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Quarter-Year FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Controls × Post | ✓ | ✓ | ✓ | ✓ | ✓ |

- Nonbank dividend payouts jump 9.5 pp post-2015 – equity extracted from nonbanks and routed to banks

# Bank subsidiaries increase capital buffers and reduce risk …



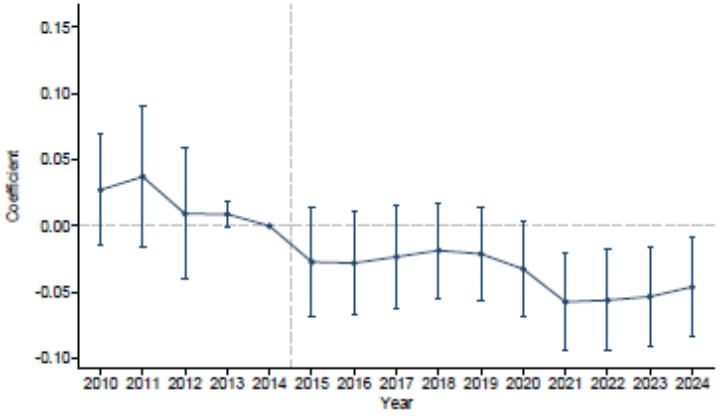

**Equity /RWA**



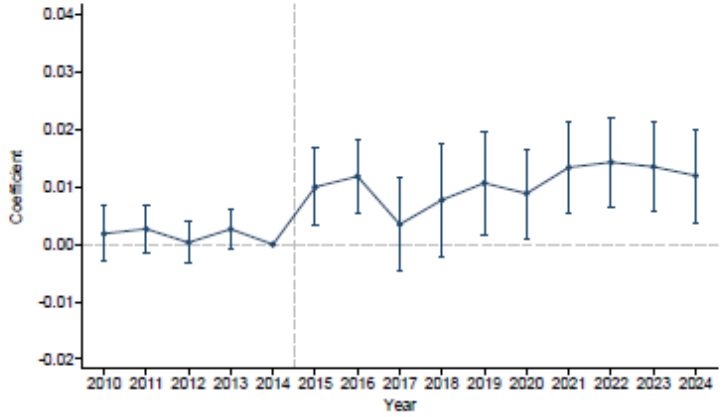

**RWA /Assets**

- Capital buffers rise post-2015 (left); risk-weighted asset ratios fall (right)
- Banks derisk by shifting toward safer, more liquid assets
- At the bank level, capital regulation works as intended

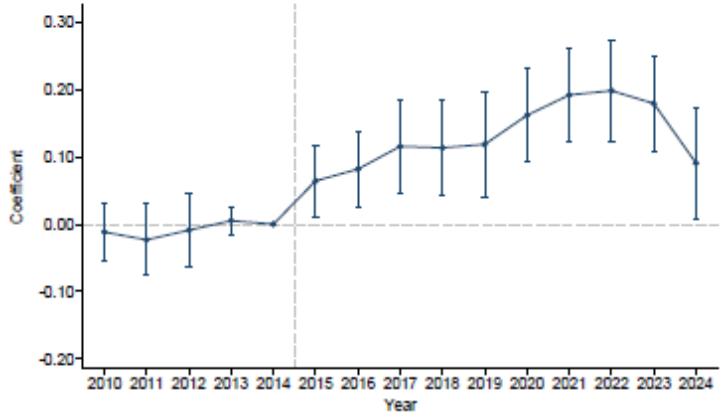
# … But significant change in nonbank business model



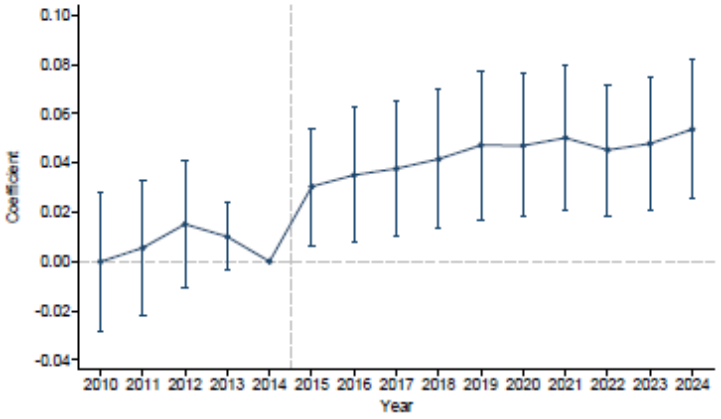

**Equity / Assets**



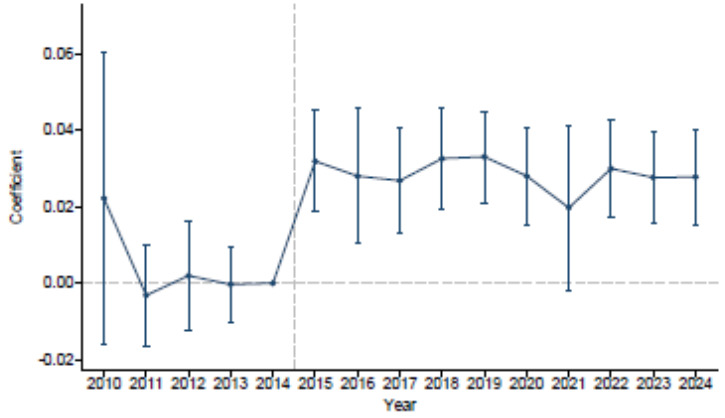

**Dividend Yield**



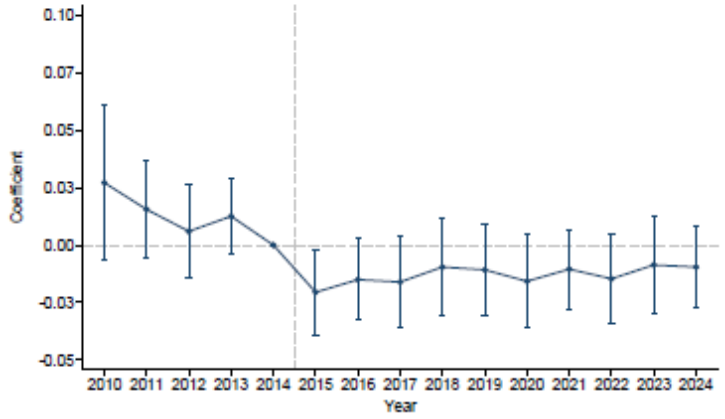

**Net Balance to Parent**




**Loan Share**




**Past Due & Nonaccrual**




**ROE**

# Hidden vulnerabilities – BHC Equity at Risk

*Key Point:*

- Equity extraction creates hidden systemic vulnerabilities.
- In stress scenarios comparable to 2008, a substantial fraction of BHCs cannot recapitalize their nonbank subsidiaries without external support, with tail-risk BHCs facing potential insolvency.

**Policy Implication:** While banks appear safer, the system may be more fragile. Nonbank distress could exhaust parent buffers precisely when BHCs lack capacity to absorb losses—equity reallocation amplifies tail risk rather than mitigating it.

# Takeaways

- Banks do not seem to be substituted away from NBFIs
- Banks remain deeply on the hook as intermediation activities move to NBFIs
- Credit risk moving from banks to NBFIs – Liquidity risk moving from NBFIs to banks
- Raising regulatory burden on banks do not necessarily reduce exposures; only changes their nature.

# Takeaways

- Focus on legal entities (banks vs nonbanks) is probably over-emphasized
- Might be more productive to start from intermediation functions
- In a world where society grants special status to a given set of legal entities (banks), any form of intermediation, old or new, should be conducted by these intermediaries
- The extent this is true in practice is likely the result (intended or not) of regulation