Loan-funded Loans:
Asset-like Liabilities inside Bank Holding Companies*

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Abstract

Leveraging unique data on internal capital flows between Bank Holding Companies (BHCs) and their subsidiaries, we investigate the role of internal loans to commercial banks over the past three decades. These loans serve as asset-like liabilities, providing banks with a stable, low-cost funding alternative to traditional demand deposits. Banks with access to internal loans engage more aggressively in the syndicated loan market, issuing loans with larger amounts, longer maturities, and lower interest rates. Additionally, they are more likely to establish relationships with new borrowers. Despite instances of underperformance, the aggregate impact of loan-funded loans on bank performance is positive. We further characterize how bank and nonbank subsidiaries compete for internal loans from their BHC. We show that nonbanks have received increasingly preferential treatment over time. Our findings suggest that the expansion of nonbanks inside BHCs can negatively affect credit access in the broader economy.

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*We thank... All errors remain our responsibility.

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Abstract

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I. Introduction

Most banking studies focus on commercial banks or bank holding companies (BHCs) as if they were monolithic entities. In reality, internal markets are active inside financial institutions and large amounts of funds flow frequently between banks and their parent BHCs.[1] Critically, a commercial bank's liquidity condition results from both short-term deposits and internal loans from its holding company, yet the latter is overlooked by the literature. Unlike other funding sources, internal loans from the parent company act as asset-like liabilities, and they exert a crucial influence on bank liquidity, lending capacity, and overall performance. This important channel is understudied and our paper addresses this gap.

A few earlier papers have highlighted the importance of internal capital markets in the banking sector. For instance, Cetorelli and Goldberg (2012a,b,c) look at the cross-border activity of global banks and find that having foreign operations makes them more resilient than standalone domestic banks. Strahan, Gilje, and Loutskina (2016) study internal flows between branches within the same commercial bank. In contrast to these papers, we study the internal capital flows from parent BHCs to their bank and nonbank subsidiaries assessing the dollar amount of internal loans from flowing BHCs to their various subsidiaries. Notably, as we show below, affiliation does not necessarily mean that a bank will receive internal loans from its parent; indeed, 67% of bank-quarters in our sample do not observe internal loans.[2] To our knowledge, this paper is the first that utilizes novel regulatory data of internal capital flows to directly study the influence of internal loans from BHCs.

We construct a unique dataset that combines unconsolidated parent-company-only financial statements from FR Y-9LP filings (which capture capital flows between parent companies and their subsidiaries) together with commercial bank financial statements from FFIEC 030

[1] For instance, to evaluate bank liquidity, Bai, Krishnamurthy, and Weymuller (2018) look at the mismatch between asset-side and liability-side liquidity demand using BHCs' balance sheets, whereas Berger and Bouwman (2009) use measures like cash holdings and liquidity ratios from commercial banks' balance sheets.

[2] Campello (2002) also look at the relations between BHCs and their affiliated commercial banks, but he relies solely on the indicator variable of being affiliated with a BHC.

filings. Covering U.S. banks and BHCs from 1991 to 2023, this dataset enables an in-depth analysis of both time-series and cross-sectional dynamics of internal loans issued by parent companies to their subsidiaries.

Our findings reveal three key characteristics of internal loans. First, internal loans are prevalent across BHCs of all sizes, with large BHCs (those with assets over $50 billion) most likely to extend such loans to their bank subsidiaries; on average, 82% of large BHCs did so over the past three decades. Mid-sized and smaller BHCs have significantly reduced internal lending, with the proportion dropping from 80% and 38% in 1991 to 30% and 15% in 2022; though notably, a higher proportion of these institutions actively engaged in internal lending during the global financial crisis (GFC). Second, in terms of scale, internal loans typically represent 2$\sim$4% of total bank assets, with the average ratio declining at the onset of recessions but increasing during crises, likely supported by government programs such as the Troubled Asset Relief Program (TARP) and the Paycheck Protection Program (PPP). Third, the average cost of internal loans to bank subsidiaries is consistently higher than that to nonbank subsidiaries. While both rates generally follow similar time-series trends, the cost gap between bank and nonbank subsidiaries widens during economic expansions and persists into recessions. The patterns we report suggest that in expansionary periods BHCs may subsidize internal loans to nonbank subsidiaries at the expense of their commercial bank counterparts.

Before conducting our formal analyses, we first examine the factors influencing internal loans. Similar to bank loans extended to corporations, internal loans from parent BHCs are determined jointly by demand and supply — in this context, the demand from affiliated banks and the supply provided by their holding companies. What differentiates internal loans is that borrowing from the parent company does not necessarily impose strict liabilities on the subsidiary banks. With that observation in mind, we focus on a range of internal factors that reflect the conditions of both banks and BHCs, as well as external macroeconomic factors, to capture the combined impact of demand and supply in the origination of internal loans. Our findings suggest that banks with lower capitalization, constrained in their access to external capital, rely more heavily on internal loans from their parent BHCs to meet liquidity needs. Additionally, internal lending is more likely when banks represent a large share of the BHCs' total assets.

The likelihood of internal loans is positively associated with higher short- and long-term interest rates and elevated levels of the VIX index. This indicates that macroeconomic conditions unfavorable to banks, such as more costly external funding or increased economic uncertainty, correlate with a heightened need to raise liquidity through internal loans from parent companies. Nonetheless, capital constraints during recessionary periods can limit BHCs' capacity to supply these internal loans.

We construct two variables capturing the presence and intensity of internal loans from BHCs to their bank subsidiaries: an indicator variable and the internal loan amount scaled by the bank's total assets. We then examine the impact of these internal loans on banks' external lending, lending relationships, loan performance, and overall bank performance.

Our first outcome of interest is the ability of commercial banks to transform internal loans from their parent BHCs into external loans. We find that banks receiving internal loans exhibit notable loan growth in the subsequent quarter — approximately 10.0% higher than banks without internal loans. This increase translates to a 96-basis point higher annual loan growth rate for such banks, which is quite significant when compared to the sample average of 10.5%. Across the relevant distribution, banks at the $75th$ percentile of $InternalLoan/BankAsset$ achieve a 21.2% higher loan growth than those at the $25th$ percentile, with each additional percentage point of internal loans (as a ratio of bank assets) corresponding to an 80-basis point increase in annual loan growth. These base results show that internal liquidity is a significant driver of commercial banks' capacity to issue loans to their customers.

Second, we observe that internal loans from parent BHCs are associated with poorer subsequent loan performance. Banks receiving internal loans accumulate an excess of 2.6%

non-performing loans (compared to the average of 1.4% of the loan portfolio) in the subsequent quarter, relative to comparable banks (and loans) that are not funded with internal BHC loans. An additional one percent of internal loans (as a percentage of the bank's assets) correlates with an 86-basis point increase in non-performing loans as a share of the bank's total loan portfolio. This is notably similar to the observed increase in loan growth, suggesting a mechanism whereby banks, in expanding their loan portfolios, may take on higher-risk borrowers. Notably, internal loans tend to have lower levels of monitoring than external funding and are less regulated than traditional bank deposits. This lower oversight is likely to contribute to increased risk-taking stemming from internal loans.

Third, we further examine the impact of internal funding on loan terms and borrower characteristics by analyzing loan-level data where the same firm borrows simultaneously from banks with and without access to internal liquidity. Banks receiving internal loans from parent companies tend to issue larger loans in the following quarter, with loan size increasing proportionally to the amount of internal loan funding available. These loans also tend to have longer maturities and carry lower interest rates. Perhaps surprisingly, banks with internal funding are more likely to initiate lending relationships with new borrowers. We find that these new borrowers are more financially constrained than those borrowing from banks without internal loan funding.

Our findings indicate that internal loans from parent BHCs provide banks with a stable, lower-cost source of funding, enabling them to lend more aggressively in the syndicated loan market and to develop new borrower relationships. An active internal debt capital market allows banks to leverage affordable funding and pass on the benefits to borrowers through modified loan terms.

Lastly, our analysis reveals that, despite poorer loan performance, internal loans ultimately have a positive effect on overall bank performance. A within-bank estimation shows a 16% increase in returns on assets in the quarter following the receipt of internal loans from parent

BHCs. For context, the average quarterly return on assets for banks in our sample is -2.5%, with a median of 0, reflecting an equal distribution of positive and negative returns over the past three decades. Moreover, when examining internal loan intensity as a continuous variable, we find that each 1% increase in the ratio of internal loans to bank assets is associated with a 3.4 percentage point improvement in bank performance.

To identify causality, we leverage on the announcement of Basel III accord, which introduced a quasi-exogenous shock to BHCs' ability to grant loans to their subsidiaries. To wit, in December 2010, the Basel Committee on Banking Supervision announced the Basel III capital and liquidity standards bank reform. Critically for our purposes, one component of the reform was that banks were required to maintain a minimum Common Equity Tier 1 (CET1) capital of 4.5% of risk-weighted assets, a substantial increase from the previous Basel II requirement of 2%. We find that, following the announcement, BHCs below the new 4.5% CET1 threshold sharply, substantially reduced their internal loans to subsidiary banks compared to their unconstrained counterparts.

Using an instrumental variable difference-in-differences approach within a narrowly defined period around the announcement (from 2010:Q1 through 2011:Q3), we confirm that the availability of internal loans was crucial to banks' lending capacity and risk tolerance. With the exogenous reduction in internal loans, banks significantly decreased loan origination, exhibited greater caution in borrower selection, and recorded fewer non-performing loans. Notably, these banks also reported lower returns on assets after internal lending was cut.[3]

So far, our findings underscore the critical role of BHCs' internal loans for commercial banks, demonstrating that they bolster banks' loan origination capabilities, improve return performance, and increase borrower access to credit with more favorable terms. At the same time, BHCs also manage a growing sector of nonbank subsidiaries, which have expanded significantly over the past decade (Acharya, Cetorelli, and Tuckman, 2024). Unlike bank

[3] Our findings suggest that reductions in internal funding may contribute to the contraction in bank balance sheets documented in the existing literature (e.g., Gropp et al. (2019), Buchak et al. (2024), among others).

subsidiaries, which can leverage deposits for liquidity, nonbank subsidiaries generally lack such alternatives, creating a heightened demand for internal funding from BHCs (Jiang, Matvos, Piskorski, and Seru, 2020).

When examining BHCs' internal loan allocations to bank and nonbank subsidiaries, we find that the average cost of internal loans to banks is markedly higher than to nonbanks within the same BHC. Although both loan rates tend to follow similar time series patterns, the cost disparity between bank and nonbank subsidiaries widens during expansionary periods. Our analysis further shows that nonbank subsidiaries compete with bank subsidiaries for internal loan allocations: BHCs with nonbank subsidiaries are less likely to allocate internal loans to bank subsidiaries and do so at lower levels. Moreover, BHCs with a larger number or proportion of assets in nonbank subsidiaries tend to reduce internal loan allocations to bank subsidiaries more significantly. Our results suggest that nonbank subsidiaries receive preferential treatment in internal loan allocations from BHCs, potentially at the expense of their commercial bank counterparts. One implication from the new analysis we bring to bear is that the rapid expansion of nonbank subsidiaries may impact credit access in the economy.

Our paper makes a direct contribution to the literature on the internal capital markets of financial intermediaries. Earlier studies, such as Houston, James, and Marcus (1997) and Campello (2002), do not observe any internal capital flows *per se* and instead rely on indirect proxies. For instance, Houston et al. (1997) infer internal capital market activity by measuring the sensitivity of loan growth at subsidiary banks to the holding company's cash flow, assuming that internal capital markets exist. Campello (2002) uses an indicator for BHC affiliation to study the differential responses of affiliated and non-affiliated banks to monetary policies, only indirectly at best capturing internal capital market effects.

In contrast, our paper leverages newly available regulatory data that tracks the exact dollar amount of internal loans between holding companies and their bank and non-bank subsidiaries, spanning over three decades. This data allows us to show that bank affiliation alone does not ensure access to internal loans from the parent company. Critically, the flow of internal capital fluctuates significantly: it increases during periods of economic stress but subsides in expansionary periods, and it varies across BHC size. While large BHCs are more likely to engage in internal lending (though not universally), medium and small BHCs have shown notable changes in their internal capital market activity from the 1990s through the 2020s. One third of the bank-quarters in our sample show non-zero internal loans, highlighting the varying and situational nature of internal capital flows.

More recent papers such as Cetorelli and Goldberg (2012a,b) exploit confidential data to study cross-border internal capital markets between US banks and their foreign branches, while Strahan et al. (2016) study internal flows between branches within the same commercial bank. These studies focus on internal flows between branches *within the same commercial bank*. In this way, the commercial bank reallocates excess deposits between domestic and foreign branches, or branches across states, based on local funding needs. These commercial bank internal capital markets tend to be frictionless, as evidenced by several distinct features. For example, unlike subsidiaries, branches are, by definition, not financed through equity and thus are legally the same entity as the commercial bank parent. Most critically, branches cannot fail independently from the parent. And internal loans between branches of the same commercial bank are subject to minimal (close to none) regulatory interference.

In contrast, we study the internal capital market between the parent BHC and its bank subsidiary. This internal capital market differs significantly from that of branches within the same commercial bank in several ways. Bank subsidiaries and their BHCs are legally distinct entities; they can fail independently from the rest of the organization, being subject to separate and different insolvency regimes (see Bliss and Kaufman (2006)). Internal loans are also subject to additional legal constraints under Section 23A and Section 23B of the Federal Reserve Act. These regulations impose quantitative limits on covered transactions between banks and their affiliates.

Our work also contributes to an emerging study of banks' exposure to nonbanks. Most recently, Acharya et al. (2024) argue that banks have increased their nonbanking footprints through increased funding of non-banking financial institutions. Cetorelli et al. (2021) find that banks adapted their core banking and increasingly expanded into newer activities in the 1992-2006 period. A contemporaneous work by Cetorelli and Prazad (2024) investigates the nonbank exposure of BHCs and demonstrate that liquid asset holdings of banks reduced when assimilating nonbanking activities into their structure, consistent with our findings. While work on this front primarily focuses on the long-term liquidity and fragility of the financial system, we uncover a more immediate concern of reduced credit access to the real economy when nonbanks compete with banks for liquidity under the same BHC umbrella.

II. Institutional Background: Internal Bank Loans

Internal loans from BHCs to their bank subsidiaries play a crucial role in managing liquidity, reallocating capital, and responding to regulatory constraints. BHCs operate internal capital markets, allowing them to reallocate funds within their subsidiaries to optimize capital use and stabilize operations. Internal markets are found to be particularly effective during periods of financial stress or regulatory changes, enabling a more dynamic response to liquidity needs. For instance, Cetorelli and Goldberg (2012c) highlight the importance of internal funding mechanisms, especially during the 2007–2009 financial crisis when affiliated banks were more resilient compared to standalone institutions. Similarly, Campello (2002) finds that during periods of monetary tightening, internal capital markets allow BHCs to insulate their smaller bank subsidiaries from adverse monetary policy effects. Regulatory developments, such as the Basel III capital requirements that alter the scope of permissible activities and spell stricter capital requirements for BHCs and their subsidiaries have prompted BHCs to manage their internal loans strategically (e.g., Pogach and Unal (2018)). Internal loans are also crucial for liquidity management within BHC structures. Caglio et al. (2021) demonstrate that during the financial crisis, BHC-affiliated broker-dealers had better access to internal funding, allowing them to reduce reliance on the repo market and adjust their asset holdings more efficiently.

Our analysis into internal capital markets inside financial institutions is new and focus internal *loan financing* of subsidiaries as they offer several advantages over *equity financing*. These include reduced regulatory capital requirements, increased flexibility, tax benefits, as well as the "disciplining mechanism" that accompanies debt financing. Internal loans present a flexible liquidity tool at BHCs' disposal that helps them ameliorate financing frictions and effectively continue their core banking and nonbanking activities.

In the United States, internal loans are subject to additional legal constraints under Section 23A and Section 23B of the Federal Reserve Act. These regulations impose quantitative limits on covered transactions between banks and their affiliates, restricting such transactions to no more than 10% of the bank's capital stock and surplus with a single affiliate and no more than 20% with all affiliates combined. Moreover, each internal loan or credit exposure originated by commercial banks must be fully secured with high-quality collateral, with different collateral types requiring varying levels of overcollateralization, ranging from 100% to 130% based on the asset's riskiness. These legal restrictions are designed to mitigate risks arising from excessive interconnectedness between banks and their affiliates, thereby promoting financial stability (Federal Reserve Board, 2021a,b). Notably, internal lending from parent BHCs to subsidiary banks is not subject to the Section 23A quantitative limits and collateral requirements making such internal loans an inexpensive form of liquidity. The reverse, i.e., internal loans from subsidiaries to parents BHCs, is subject to these limitations indicating that the cost benefits favor commercial banks as recipients of internal loans rather than providers. Likewise, equity financing in bank subsidiaries also attracts higher scrutiny and is subject to the quantitative Section 23A limits.

In contrast to existing literature that primarily relies on the specific episodes of liquidity constraint in banks or relies on funding proxies based on the *need for liquidity*, we focus on a direct measure of internal lending that isolates the debt funding. We do so using data drawn from granular, parent-only financial statements presented in the FR Y-9LP regulatory filings that we describe more fully in Section III. This allows us to measure internal liquidity injections through loans over an extended sample that spans both crisis and non-crisis periods. We depict these long-run dynamics of internal lending in Figure 3. The pattern depicted suggests the prevalence of internal loans in BHCs of all sizes and at all times. While we note that this liquidity peaks during crisis episodes, we also find that the bank subsidiaries of the largest BHCs are, in fact, the most likely to seek internal loans from their parents. Overall, the plot indicates a dynamic, time-varying pattern in internal loan allocations across the size spectrum, reflecting subsidiary banks' internal borrowing decisions that form the backdrop of our subsequent empirical analyses.

III. Data and Methodology

A. Data

The core of our data are derived from the Federal Reserve's FR Y-9LP filings, which provide granular parent-only financial information on large bank holding companies (BHCs) and savings and loan holding companies (SLHCs). These quarterly reports include balance sheets, income statements, and other parent-company-level financial details, focusing on assets, liabilities, and regulatory capital. While the data from this reporting form are available starting from 1981, we employ a sample period spanning 1991 through 2023 due to a paucity in the availability of data in the early years. We further restrict our attention to BHCs that have consistently met evolving reporting requirements during this period. The asset threshold for reporting has changed multiple times over this period: initially raised from $500 million to $1 billion in March 2015 and then further to $3 billion in September 2018. We restrict our sample to only those BHCs that survived all these threshold increases, ensuring uniformity in reporting standards over time.

The FR Y-9LP filings are unique in that they provide parent-only financial statements, focusing specifically on the financial condition of the holding company itself rather than on its subsidiaries. These standalone statements and their accompanying schedules report the transactions with subsidiaries and other affiliates distinctly from transactions with external firms. These data allow us to track the *disaggregated quarterly flow of funds* in the form of loans, cash deposits, and equity funding to their banking and non-banking subsidiaries. In particular, we focus our attention on elements that allow us to capture the level of internal lending, asset composition, cash deposits, and net income of banking and non-bank subsidiaries separately, along with the income earned by the BHCs from these loans and deposits. We detail the specific line items employed along with the construction of our variables based on these measures in Section III.B. We use the Replication Server System Database Identifier (RSSDID) assigned by the Federal Reserve to merge these data with other regulatory filings reported at the BHC level.

We complement these base data with a number of other sources that provide a comprehensive view of the BHC, its banking subsidiaries, and their loan borrowers. We use aggregated financial data from FR Y-9C filings. Specifically, we obtain data on total BHC assets, credit lines, and regulatory capital ratios. We also use data from the Consolidated Reports of Condition and Income (FFEIC 031/041/051 — Call Reports) to determine loan levels, loan performance, commercial banks' assets, and the bank-level regulatory capital ratios. We link commercial bank subsidiaries to their parent BHC using data from FR-Y6 filings that provide the ownership structure of BHCs and all subsidiary entities. We use these same data to characterize the nonbank subsidiaries of BHCs. These data are accessed through the National Information Center (NIC) maintained by the Federal Financial Institutions Examination Council (FFIEC). Specifically, we utilize the *Relationships* and *Attributes* files, respectively, that are provided on the portal. FR Y-9LP, FR Y-9C, and Call Reports data are accessed through Standard & Poor's Global Market Intelligence platform (formerly SNL Financial). The advantage of using this source is that the data provider ensures a consistent bank identifier that accounts for mergers and acquisitions and minimizes errors in the data. Our final filtered sample, free of reporting biases, comprises 33,986 BHC-quarter observations that represent 386 unique BHCs over the sample period. This sample size is comparable to other studies using bank data over similar periods (e.g., Stulz et al. (2022)).

In addition, we employ the WRDS-Reuters' DealScan database for our loan-level analyses, which we map to borrower fundamentals on Compustat using the latest linking data provided by Chava and Roberts (2008). We restrict the DealScan data to loans made by U.S. lenders, aligning with our broader research framework. We map these data to lenders' Compustat GVKEY using the linking table provided by Schwert (2018), and then to the RSSD ID based on the Federal Reserve Bank of New York's CRSP-FRB Link through the CRSP PERMID, which we get from the CRSP-Compustat linking tables. We use a fuzzy-matching algorithm with manual checks to extend the link provided by Schwert (2018) until 2023, as the original source was last updated in April 2020. We further use macroeconomic data on the U.S. CPI, GDP growth rates, the VIX Index and interest rates from the Federal Reserve Economic Data (FRED) website, maintained by the St. Louis Federal Reserve. Finally, we obtain the dates for economic recessions from the NBER Business Cycle Dating web page.

B. Variable Construction and Measurement

B.1. Measures of Internal Lending

We define two key variables that capture the existence and the intensity of internal borrowing by bank subsidiaries from their parent BHCs. The first of these is *Internal Loans*, which measures the level of internal lending from BHCs to their banking subsidiaries. This variable is defined as the total loans, advances, notes, bonds, and debentures from parent BHCs to their banking subsidiaries for a given quarter, scaled by the total *Banking Assets* of the BHC in the same quarter. The former is directly reported as a line item in the FR Y-9LP filings' schedule PC-A (Item 1.b.(1)). The latter variable, *Banking Assets*, is defined as the sum of total assets of all banking subsidiaries for a given BHC. In addition to this lending intensity measure, we also define a binary variable, $\mathbf{1}_{InternalLoans}$ that takes the value of one for BHCs in quarters where they report non-zero values for internal loans to banking subsidiary, and zero otherwise. Both variables are constructed at the BHC-quarter level and, alternatively, serve as both dependent and independent variables in our regression analyses.

B.2. Measures of Lending Outcomes and Performance

Our primary outcome variables for BHC-level analyses focus on subsidiary banks' lending growth and future loan performance, which are captured by the variables, $\Delta log(Loans)$ and NPL. $\Delta log(Loans)$ is defined as the logarithm of current quarter loans outstanding, divided by the one-quarter lagged loans outstanding for commercial bank subsidiaries of the BHC. In our empirical analyses, we scale this variable by 100. This adjustment ensures that the values are more intuitively comparable, enhancing the interpretability and readability of the results. The next variable is NPL, which measures resulting loan performance. We define this variable as the quarterly level of non-performing loans, scaled by the current quarter total outstanding loans of the BHC. We choose our scaling variable to account for the size of the loan base when we study its evolution over time. This variable is also scaled up by 100 in our regression.

We track the financial performance of banking subsidiaries through our measure, *Return on Bank Assets*. The variable captures the return that parent BHCs earn on their internal loans to their bank subsidiaries. We define it as the parent BHC's share of the undistributed income of its bank subsidiaries, scaled by the total banking assets. We construct the measure on a quarterly basis relying on the disaggregated income statement data from FR Y-9LP filings presented in Schedule PI (Item 7.a.). In the raw income statement data, line items are reported on a calendar year-to-date basis. From this, we calculate the income for the quarter by subtracting the reported income for previous quarters in the same calendar year from the current quarter's reported values as: $Income_q = Income_q^{YTD} - \sum_{i=1}^{q-1} \forall q \geq 2$. The resulting value is scaled by *Banking Assets*, constructed as described earlier.

B.3. Loan-level Measures

We go beyond the aggregated bank-level lending outcomes and employ measures that capture loan and borrower characteristics at the loan level. To this end, we define the following measures drawn from WRDS-Reuters' DealScan data: *Facility Amount*, which is the size of the given tranche, denominated in U.S. Dollars, scaled by the lending BHC's banking assets; *Maturity*, which is the logarithm of number of months to maturity of the tranche, at the time of issuance; *All in Drawn Spread* is the logarithm of the spread of the loan plus any annual (or facility) fee paid to the banking syndicate by the borrower; and *Rating Level* which is an ordinal ranking of the borrower's S&P Credit rating in each quarter that takes a maximum value of 24 for $AAA-$ and minimum value of 1 for *SD*.

We define a pair of measures at the bank level that are drawn from loan-level data and capture the bank's evolving lending relationships. The first of these is *New Borrower Count*, which measures the number of first-time borrowers of a given bank in a given quarter who did not have a prior syndicated lending relationship with the bank. The second measure is *New Borrower Lending*, which is the sum of the bank's shares of each syndicated loan originated towards these first-time borrowers in each quarter.

Lastly, we construct variables at the deal–(package–)level that measures the level of risk-sharing among lenders in the syndicate. *Lead Arranger* is a binary variable that takes a value of 1 for a bank if it is a lead arranger in the deal and 0 if it is only a participant. *Lender Share* is the logarithm of the share of the total deal amount that is attributed to a given bank. We calculating this as a product of the share (in percentage) provided in the data and the deal amount. *Lender HHI* measures the concentration of the lenders within a package as the Herfindahl-Hirschman Index (HHI). For each syndicated loan package p comprising N lenders, each of whom is denoted l, it is defined as: $LenderHHI_p = \sum_{l=1}^{N}(LenderShare_{l,p})^2$.

B.4. Other Conditioning Variables

Identification around Basel III rule announcement. We study the effect of the Basel III rule announcement, which represents an external shock to BHC's liquidity transformation capabilities, by restricting their ability to generate new loans based on their existing equity capital. Specifically, the rule was announced in December 2010 and set the minimum requirement of Common Equity Tier 1 (CET1) Capital Ratio at 4.5%, with a phased introduction beginning in 2013. Against the backdrop of this regulation, we define a cross-sectional conditioning variable $\mathbf{1}_{CET1 \leq 4.5}$, which takes the value of one for BHCs with the ratio at 4.5% or below in 2010:Q4, and zero for those above the threshold in the same quarter. The time dimension of the announcement yields a binary variable that takes the value of one for each quarter after the announcement date, for three subsequent quarters (i.e., 2011:Q1 to 2011:Q3), and zero for each of the three quarters prior to the announcement date (i.e., 2010:Q1 to 2010:Q3).

Bank vs. nonbank subsidiaries. We also study the effect of nonbank subsidiaries of BHCs when they compete with banking subsidiaries for internal loan allocations from parent BHCs. In these tests, we employ conditioning variables that capture the relative scale of nonbank subsidiaries within the BHC's overarching structure. The first of these variables is $\mathbf{1}_{NonbankSubsidiary}$ that takes the value of one for BHCs that have at least one nonbank subsidiary and zero for BHCs with no nonbank subsidiaries for each quarter. The next variable captures the relative *scale* of nonbank subsidiaries and is given by *Nonbank Subs Ratio*. The variable is constructed by dividing the number of nonbank subsidiaries in a given quarter, by the total number of all (bank and nonbank) subsidiaries reported by the BHC in the same quarter. Finally, the last variable, *Nonbank Asset Ratio*, captures the relative *size* of nonbank subsidiaries. It is constructed as one minus the ratio of banking assets to total assets on the parent's standalone financial statements. The ensuing numerator captures the total assets of the BHC that are not held by its commercial bank subsidiaries, thus proxying for assets of nonbank subsidiaries since this is not directly reported consistently in any mandatory regulatory filings.

B.5. Control Variables

We account for several factors that could potentially impact banks' decision to borrow internally from their parent BHCs and also their lending and loan performance outcomes. At the bank level, we control for the asset liquidity ratio (sum of cash & balances due from depository institutions, securities, fed funds & repos, trading account assets; less pledged securities, and scaled by total assets), core deposits (checking, savings, and small time deposits, scaled by assets), Tier 1 capital ratio (common equity tier 1 capital plus additional tier 1 capital, scaled by risk-weighted assets) and size (logarithm of assets). BHC level controls include unused credit line commitments (scaled by assets), and the total notional amounts of letters of credit (scaled by assets) and the ratio of bank assets to BHC assets.

We also employ macroeconomic controls at a quarterly frequency in certain specifications. These include the GDP growth rate (in logarithmic terms), the long term 10-year Treasury yield, the overnight Federal Funds Rate, the closing level of the VIX Index, and a binary variable that is set to one in quarters classified by the NBER as recessions, and zero otherwise.

C. Summary Statistics

The summary statistics of the key variables used in our analyses are presented in Table 1. The complete sample comprises 33,986 observations at the BHC-quarter level that represent 386 unique BHCs. All bank-level variables are aggregated at the parent BHC level in each quarter. The median BHC in our sample has one commercial bank subsidiary, with the number higher only for the largest of the BHCs.

Table 1 about here

On average, 32.9% of the BHCs over our sample make an internal loan to their bank subsidiaries, representing 0.70% of the subsidiary's assets. We depict the variation in this internal lending measure across time and along the BHC size spectrum in Figure 3. Notably, across all size categories, we find a significant proportion of BHCs that lend internally to their subsidiaries and those that do not. We also observe pronounced *within-BHC variation* in this measure across time, suggesting that internal borrowing and lending are dynamic processes.

IV. Internal Loans and Bank Outcomes

A. Dynamic Nature of Internal Lending

We begin our empirical analyses by performing a preliminary investigation of factors that drive commercial bank subsidiaries to seek internal loans from their parent BHCs. We perform this study by including an array of internal factors reflecting the BHC structure and external macroeconomic factors that together reflect both the *need* and the *ability* to originate internal loans. To this end, we estimate a logistic regression of the form:

$$y_{i,t} = \beta_1 \cdot \mathbf{\Sigma}_{i,t} + \beta_2 \cdot \mathbf{\Pi}_{i,t} + \beta_3 \cdot \mathbf{M}_t + \zeta_{i,t} + \rho_{i.t} + \phi_t + \epsilon_{i,t} \tag{1}$$

where the outcome variable $y_{i,t}$ is the internal lending measure $\mathbf{1}_{InternalLoans}$ for BHC i in quarter t, $\mathbf{\Sigma}$ denotes bank-subsidiary characteristics, $\mathbf{\Pi}$ represents parent BHC characteristics, and $\mathbf{M}$ denotes macroeconomic variables. ζ, ρ and ϕ denote BHC–, credit-rating– and quarter–fixed effects, respectively.

We estimate several alternate specifications of Eq. 1 that incrementally test the impact that each of these set of factors on the decision of the commercial bank to borrow internally, which is captured by our binary variable, $\mathbf{1}_{InternalLoans}$. The results of these estimations are presented in Table 2.

TABLE 2 ABOUT HERE

Column (1) represents a minimal specification, where we include bank characteristics as dependent variables without the use of BHC– or quarter–fixed effects. The coefficients suggest a negative and highly significant relationship between banks' liquidity positions and their decision to borrow internally from their parent BHCs. The economic magnitudes are large. The coefficient of –0.193 on *Asset Liquidity Ratio* suggests that a one standard deviation decline in the level of liquid assets (0.117) of banks is associated with a 2.2 percentage point ($= 0.117 \times 0.193$) increase in the likelihood of commercial banks to borrow internally, compared to the mean of 32.9%. Likewise, the negative coefficient on *Core Deposits/Assets* implies that one standard deviation (2.184) decrease is associated with a 7.6 percentage point ($= 2.184 \times 0.035$) increase in the likelihood of borrowing internally. The negative and significant coefficient on *Tier 1 Capital Ratio* indicates that less capitalized banks are constrained in their ability to access external capital and rely more on internal loans from their parent BHCs to meet their needs.

The assets of bank subsidiaries closely track those of their parent BHCs (Figure 1). To shed light on the positive coefficient observed on *Size*, we introduce an additional measure in Column (2) that links bank characteristics to those of the parent BHC, *Bank-BHC Asset Ratio*. This metric describes the relative size of banks and parent BHCs. Viewed in conjunction, these coefficients suggest that while subsidiaries of large BHCs tend to seek more internal lending, such lending is markedly pronounced when BHCs outweigh their bank subsidiaries in terms of assets, as evidenced by the negative and strongly significant coefficient on *Bank-BHC Asset Ratio*. The coefficient on *Bank-BHC Asset Ratio* suggests that in moving from the 25^{th} to 75^{th} percentile of the variable's distribution, commercial bank subsidiaries are 41.6% ($= 0.552 \times 0.248/0.329$) more likely to seek internal loans from their parent BHCs.

In Column (3), we explore the relationship between macroeconomic conditions and internal lending by introducing variables that capture the the interest rate environment, the level of uncertainty and phases of the business cycle. The coefficients on bank– and BHC–characteristics remain qualitatively unchanged upon introducing these covariates. The results reveal that the levels of both short- and long-term interest rates are positively associated with internal lending, suggesting that internal loans are possible substitutes for external funds in the form of deposits or external borrowing, which are presumably more expensive in high-interest rate environments. Economic uncertainty has an analogous effect on internal loans, and periods with higher levels of the *VIX* index are associated with a higher likelihood of internal loans. Together, these coefficients suggest that macroeconomic situations that are unfavorable for banks are associated with a *need* for them to raise liquidity through internal loans from parent BHCs. They are, however, constrained in their *ability* to make such loans during periods of economic stresses that we capture through the negative coefficient on the variable *NBER Recession Flag*.

We provide the results from a within-BHC estimation in column (4) of Table 2, where we introduce a BHC fixed effect. All coefficients remain qualitatively unchanged, and the results on the macroeconomic factors continue to be significant in this specification. This provides evidence that a given bank-BHC pair dynamically evaluates internal lending decisions under changing economic conditions. In the remaining columns, we introduce a year-quarter–fixed effect that naturally subsumes macroeconomic factors. In column (5), which is the within-quarter analog of column (3), we find that our inferences about bank and BHC characteristics continue to obtain with comparable statistical and economic significance. Finally, column (6) represents a fully saturated specification with both BHC– and year-quarter–fixed effects. We continue to find qualitatively similar coefficient estimates for within-BHC and within-quarter variation in internal lending.

Altogether, the results in this section indicate that less liquid banks are more likely to rely on internal loans from their parents during unfavorable macroeconomic conditions, underscoring the *need* of internal loans from BHCs for their liquidity requirements. At the same time, capital constraints arising from recessionary episodes limit the *ability* of BHCs to supply these internal loans. Our base findings are consistent with prior studies on BHC liquidity management through internal capital markets (e.g., Houston et al. (1997), and Cetorelli and Goldberg (2012c)), the effect of relative subsidiary sizes (Stein (1997)), capital constraints (Campello (2002)) and the impact of macroeconomic conditions on liquidity (Kashyap et al. (2002), Gertler and Kiyotaki (2010), Ivashina and Scharfstein (2010), among others). Our results stand apart in analyzing the combined effects of these frictions in a homogenized framework that employs a direct measure of internal liquidity. In subsequent tests, we link banks' internal liquidity to their intermediation and financial performance.

B. The Impact of Internal Loans on Bank Lending

In this section, we investigate the impact of internal loans from parent BHCs on the commercial banks' lending and subsequent loan performance. Our empirical strategy in this series of tests employs a difference estimator onto BHC-quarter data as follows:

$$y_{i,t} = \beta_1 \cdot \chi_{i,t-1} + Controls_{i,t-1} + \zeta_{i,t} + \phi_t + \epsilon_{i,t} \tag{2}$$

where the dependent variable, $y_{i,t}$, is one of $\Delta log(Loans)$, NPL, or *Return on Bank Assets*, constructed as described in Section III.B. The main independent variable, $\chi_{i,t-1}$, is either one of our measures of internal lending: $\mathbf{1}_{InternalLoans}$, which is a binary treatment variable, or *Internal Loans*, a continuous treatment. Controls include one-quarter lagged bank- and BHC-level characteristics, while ζ and ϕ denote the fixed effects as Eq. (1).

B.1. Internal Loans and Bank Loan Growth

The first outcome that we focus on is commercial banks' ability to transform internal loans from their parent BHCs into external loans. We do so by employing our measure of quarterly loan growth, $\Delta log(Loans)$ as the independent variable to estimate Eq. (2). The results are reported in Table 3.

TABLE 3 ABOUT HERE

In columns (1) and (3), the key independent variable is set to the binary measure, $\mathbf{1}_{InternalLoans}$, with a one-quarter lag, while in columns (2) and (4) it is set to the continuous treatment, *Internal Loans*. The across-bank estimates in the first two columns are obtained without the inclusion of BHC-fixed effects. The positive and significant coefficient on

$\mathbf{1}_{InternalLoans}$ in column (1) suggests that banks that receive internal loans from parent BHCs exhibit enhanced loan growth in the subsequent quarter. The corresponding coefficient in column (2) indicates that they exhibit loan growth proportional to the level of internal loans.

In the subsequent specifications, we introduce a BHC–fixed-effect and obtain *within*-bank estimates. The column (3) coefficient of 0.260 suggests that banks when they borrow from their BHCs register 10.0% (= 0.260/2.592) higher loan growth in the subsequent quarter compared to when they do not receive internal loans. This also translates to a 96-basis point higher *annual* loan growth rate for those banks compared to the sample average of 10.5%. We obtain consistent results in column (4), where the independent variable is set to *Internal Loans*. The coefficient is once again positive and significant, and the estimate of 6.874 indicates that banks at the 75^{th} percentile of this distribution post a 21.2% higher loan growth than banks at the 25^{th} percentile ($= 6.874 \cdot 0.08/2.592$). In real terms, that translates to an 80-basis point increase ($= 4 \times 6.874/100 \times 0.029$) in annual loan growth for one additional percentage point of internal loans obtained (as a ratio of the bank's assets).

Taken together, the results in this section suggest that the availability of internal loans is an important factor of banks' ability to originate new loans to their customers. They point to the fact that internal loans act as an alternate form of bank liquidity that is transformed almost entirely, as revealed by the proportionate increases in loan origination.

B.2. Internal Loans and Alternative Bank Liquidity

Internal loans from parent BHCs are one among many sources of liquidity to commercial banks and they provide liquidity by adding to banks' liabilities. Simultaneously banks also have ability to create liquidity through the sale of their assets. In this set of tests, we compare how liquidity measured as internal loans from parents contrast against other measures of liquidity —specifically, banks' asset-side liquidity creation measure of Berger and Bowman (2009), their stock of high-quality liquid assets (HQLA) comprised of their cash , US Treasuries and agency mortgage-backed securities (see also Stulz et al. (2022)), and BHC's ability to supply this liquidity through the the asset-side of the liquidity mismatch index (Bai, Krishnamurthy, and Weymuller (2018)). We first present a cross-sectional comparison of these measures against internal loans in Figure 4. The graphs reveal that internal loans act as possible substitutes for asset-based liquidity. Banks on the lower-end of HQLA exhibit increased internal loan borrowings (Panel A), as do banks with lowered ability to generate asset-side liquidity (Panel B. Internal loans borrowings also appear to increase with the BHC's ability to supply liquidity (Panel C, in line with our findings in Section IV.A.[4]

We next compare the relative abilities of these liquidity alternatives in liquidity creation of banks. To this end, we define two independent variables, *Bank Liquidity* and *HQLA* and introduce them in the specification given by Eq. (2) alongside our measures of internal lending. We report the results in Table 4.

Table 4 about here

The results reveal that internal loans continue to play a crucial role in banks' lending efforts when accounting for their asset-side liquidity. In columns (1) through (3), we find that the coefficient on the binary measure $\mathbf{1}_{InternalLoans}$ continues to prevail in terms of both economic and statistical significance upon the introduction of these alternative measures. Similarly, the statistically and economically significant coefficients on the continuous measure, *Internal Loans*, demonstrate that the stock of internal loans plays a critical role in banks' lending abilities. We next turn our attention to the performance of external loans in order to gauge any differences in the slackness and monitoring when banks are funded internally through loans from parent BHCs.

[4]We also characterize the impact of asset-side liquidity measures on commercial banks' likelihood of borrowing internally in Appendix Table B.1. The results reveal similar dynamics as those depicted in the figure, with bank-level liquidity measures acting as possible substitutes, while BHC-level liquidity measures negatively impact the ability of subsidiaries to borrow internally.

B.3. Internal Loans and Bank Loan Performance

We study the differential performance of loan portfolios of banks that receive internal loans compared to those that do not by focusing on the loan performance measure, NPL. The motivation behind these tests is that internally borrowed loans are likely associated with lower monitoring than external funds and are subject to less regulatory oversight than bank deposits. These estimations follow an identical scheme as before, with a one-quarter lag in the independent variables and the dependent variable scaled up by a factor of 100. We reiterate that the scaling variable is the total loans of the bank, which means that reported variations automatically account for growth in the loan portfolios (see Rajan (1994), and Berger and DeYoung (1997)). The results of the estimations are reported in Table 5.

Table 5 about here

Across all specifications, we find consistent evidence that internal loans from parent BHCs are associated with markedly worse future loan performance with positive and statistically significant coefficient estimates. As before, the first two columns present the across-BHC estimations while the last two include a BHC–fixed-effect. Column (3), which presents the within-bank estimations using a binary treatment, suggests that banks that receive internal loans accumulate an excess 2.6% $(= 0.036/(0.014 \cdot 100))$ of non-performing loans in the subsequent quarter relative to the average of 1.4% of the loan portfolio, when compared to banks that do not receive internal loans. The continuous treatment in column (4) pegs the magnitude of this relationship. The coefficient estimate of 0.860 denotes that an additional 1% of internal loans (as a percentage of the bank's assets) translates to an 86-basis point increase in the level of non-performing loans as a share of the same bank's total loan portfolio. This compares to a 96-basis point increase in loan growth itself, as reported in the immediately preceding analysis.

The above results suggest a laxness in the screening and monitoring of borrowers when banks receive internal loans from their parent BHCs, mirroring the likely terms of the internal loans themselves. In conjunction with the results on loan growth, they point to a plausible mechanism where banks lend more aggressively to expand their loan portfolios and engage with higher-risk borrowers in the process. They also suggest why BHCs would prefer internal loans to equity investments when providing liquidity, as the adverse selections are likely to be even higher under equity financing (e.g., Jensen (1986), and Leary and Roberts (2010)). In the next set of tests, we turn to granular data at the loan level and provide further evidence of this mechanism by examining loan terms and borrower characteristics.

C. The Impact of Internal Loans on Bank Lending Relationships: Loan-Level Evidence

C.1. Loan and Borrower Characteristics

While aggregate evidence in the above analyses points to increased risk-taking behavior on the part of banks, we next provide granular analyses at the loan level. We perform these tests on data drawn from syndicated loans that unmask the identities of the lending bank and the borrowing firm in each loan. In these regressions, the unit of observation is either a particular facility or the syndicated loan package itself, depending on the level of aggregation of the dependent variable. We perform a series of loan-level analyses by incorporating both bank and BHC characteristics using a modified form of the specification in Eq. (2). In addition, we restrict the data to retain only those loans where the borrowing firms have at least two different loans in the same quarter. We require one (or more) of these loans in a given quarter to be originated by a lead arranger who receives internal loans from its parent BHC and at least one other loan to be originated by a lead arranger who does not receive such internal loans.[5] By imposing this restriction, we simply ensure that our analyses with the binary treatment indicator facilitate a like-for-like comparison of loan terms and borrower

[5] We verify that imposing this restriction does not materially alter our sample and that the resulting sample characteristics resemble those of the original sample. We provide a comparison in Appendix Table B.2.

characteristics. The specification is given as:

$$y_l = \beta_1 \cdot \chi_{i,l,t-1} + Controls_{i,l,t-1} + \zeta_i + \lambda_j \times \phi_t + \epsilon_{i,j,l,t} \tag{3}$$

where y_l represents the loan-level outcome of loan l, the subscript i denotes the lead bank for loan l and the subscript j denotes the borrower of the loan l. λ_j represents a borrower fixed effect, and used interacted with the quarter fixed effect ϕ_t ensures that our coefficients are obtained within–borrower-quarter. Other symbols retain the same meaning as described in Eq. (1). The results of the estimation are reported in Table 6.

Table 6 about here

Columns (1) and (2) suggest that banks who receive internal loans from their parent BHCs make bigger loans in the subsequent quarter, and the loan size increases in proportion to the amount of internal loan stock. The next two columns (column (3) and column (4)) speak to the longevity of internal loans as a source of funding. The coefficients in these columns show that the average time to maturity of loans is higher when the lead arranger has access to internal loans, which is likely a stable source of longer-term funding. The remaining columns focus on the risk-seeking behavior of banks under internal lending. Internally funded banks appear to undercut other banks in terms of loan pricing, with the average spread being lower. It is also indicative that these banks are likely passing on the cost benefits of internally obtained liquidity to their borrowers. The last two columns show that the borrowers of loans originated by banks with access to internal loans are less creditworthy, suggesting a slackness in credit requirements on the back of internally obtained loans.

The results in Table 6 point to a decline in risk aversion in lending when banks are presented with an inexpensive liquidity source in the form of internal loans from parent BHCs. Such banks appear to lend more aggressively in the competitive syndicated loan market, and we find suggestive evidence that they likely undercut their peers in loan pricing. These findings reconcile with the increase in non-performing loan levels reported previously. On the flip side, they also suggest improved access to credit for borrowers on the margin — an idea that we expound more rigorously in the next set of tests.

C.2. New Lending Relationships

Our results so far consistently point to an increase in lending activity for commercial banks that receive internal loans from their parent BHCs. While loan performance and borrower characteristics point to a negative impact on the bank, a potential positive economic effect could arise if at least a share of these elevated loan originations are to new borrowers who can obtain credit at lower costs. The next test is designed to gauge the emergence of new bank-borrower relationships and associated loan sizes within the syndicated loan market. We do so using a collapsed BHC-quarter–level panel of the syndicated loan data and tracking the lending relationships over time since the beginning of these data. We define two variables measuring the expansion of loan portfolios on the extensive margin: (1) *New Borrowers (Count)*, which is a sum of the number of first-time borrowers corresponding to a given bank in each quarter; and (2) *New Borrower Lending*, which is the total of the share contributed by the bank in each quarter in loans to these new borrowers. We use these as dependent variables in our BHC-level estimation represented by Eq. (2). We report the results of these analyses in Table 7.

Table 7 about here

The results reveal that internal loans help banks to create new lending relationships with new borrowers. We find that banks with internal loans are significantly more likely to originate loans towards new borrowers in the subsequent quarter (column (1)), and the more funding, the more new relationships that are created (column (2)). Further, with the additional liquidity gained through internal loans, banks also increase the total lending amount to new borrowers (column (3)). The level of lending to these new borrowers also exhibits a positive correlation with the level of internal lending from parent BHCs (column (4)). Note that the measure of lending to new borrowers captures each bank's individual share of the syndicated loan, whether it is a lead bank or a deal participant reflecting the total loan volume.

These results provide a positive real effect of internal liquidity. They suggest that when banks have an active internal debt capital market, they have an enhanced ability to establish new borrower relationships — they act on the extensive margin of lending activity. The fact that firms dependent on bank debt are more likely small and constrained is well-established in literature (Berger and Udell (1994), Petersen and Rajan (1994), Degryse and Ongena (2005), etc.). In our next set of results, we take this idea a step further and investigate whether the availability of internal loans amplifies banks' ability to extend new credit to such constrained firms. We do so by examining the risk characteristics of new borrowers along with the lending bank's access to internal loans. We employ two widely-used indexes of financial constraint proposed by Whited and Wu (2006) and Hadlock and Pierce (2010), respectively, in addition to the firm size (measured as logarithm of assets) and the option-implied stock volatility. We use these as dependent variables in a difference-in-differences specification that includes cross-sectional variation at the bank-level through $\mathbf{1}_{InternalLoans}$ and at the borrower-level through *New Borrower*, which is set to one for firms borrowing from a given bank for the first time in a given quarter. The specification is given as:

$$\begin{aligned} y_{j,t} = \beta_1 \cdot \mathbf{1}^{i,t-1}_{InternalLoans} + \beta_2 \cdot NewBorrower_{j,t} + \\ \beta_3 \cdot \mathbf{1}^{i,t-1}_{InternalLoans} \times NewBorrower_{j,t} + \zeta_i + \lambda_j + \phi_t + \epsilon_{i,j,t} \end{aligned} \tag{4}$$

The fixed effects ζ, λ and ϕ represent the BHC, borrowing firm and quarter respectively. The results of the estimation are presented in Table 8.

<u>TABLE 8 ABOUT HERE</u>

The estimates in columns (1) and (2) demonstrate that loan recipients in these newly created relationships, on average, exhibit higher levels of financial constraints across both the measures of *Whited-Wu* and *Hadlock-Pierce*. Further, the coefficients on the interacted terms reveal that when banks have access to internal loans from their parent BHCs, they establish new relationships with firms that are significantly more constrained relative to other borrowers and also borrowers from banks that do not have access to such internal loans. Column (3) suggests that in a similar vein, smaller firms benefit from the new relationships created by such banks. In column (4) we examine the interplay between firms' volatility that hinders their access to bank debt (e.g., Minton and Schrand (1999)), and banks' own access to internal loans. Once again, we find that new borrowers from internally funded banks have higher option-implied volatility (*Implied Vol.*) compared to those establishing new relationships with banks that lack such access.

Our findings in this section suggest that internal loans from parent BHCs find their way to capital-constrained portions of the real economy through evolving lending relationships. Internal loans appear to bolster banks' ability to fill gaps in credit access and better fulfill their core intermediation requirements (Diamond (1984), and Fama (1980)).

D. The Impact of Internal Loans on Risk-Sharing

We take our analysis of the changes in risk-aversion documented in previous sections a step further by providing a direct comparison of the risk-sharing among lenders *within* syndication structures. The structure of a syndicate captures the *relative* levels of risk that each syndicating bank exposes itself to and conveys richer information than the across-loan comparisons. We define three measures that capture the concentration of risk with a given syndicate participant: (1) *Lead Arranger*, which is a binary variable set to 1 if the participant is categorized as a lead arranger of the loan deal; (2) *Lender Share*, which is the logarithm of the total loan exposure of the bank in dollar terms; and (3) *Lender HHI*, which is the concentration of the shares of each lender within the deal measured by the Herfindahl-Hirschmann Index (HHI). We use these dependent variables in our within-borrower loan-level specification denoted by Eq. (3) and report the results in Table 9.

TABLE 9 ABOUT HERE

The first two estimates in columns (1) and (2) indicate that banks with access to internal loans are more likely to act as a lead arranger in the deal and therefore bear the bulk of the risk exposures (see Sufi (2007), and Ivashina (2009)). We also find evidence that these banks tend to hold a disproportionately high share of the originated loans (columns (3) and (4)). Critically, since they are also more likely to be lead arrangers, the loans are retained on the lenders' balance sheets rather than being sold after origination (Güner (2006)). This important finding directly speaks to an increase in the risks of loan portfolios of banks that receive loans internally from their parents. Finally, we also find that loan syndicates that contain a participant bank with access to internal lending tend to be more concentrated, as denoted by the higher HHI for such lenders (columns (5) and (6)), indicating less sharing of risks in the syndicate. Note that our choice of fixed effects ensures that the reported estimates are *within* BHC and *within* borrower-quarter.

Taken together, the results of this section suggest that when funded internally through loans, commercial banks are less likely to be cautious about their risk exposures both in terms of borrower screening and sharing risk with deal participants. The findings consistently point to a lower level of monitoring attached to internal loans in comparison to both external loans and bank deposits, which are the key alternate forms of liquidity to banks.

E. The Impact of Internal Loans on Bank Performance

We next turn our attention from the evaluation of banks' loan origination to assessing their short-term performance. We do so by focusing on the quarterly return on bank assets, which isolates the bank's income and assets from those of the parent BHC. We use the measure of *Return on Bank Assets*, whose construction we describe in Section III.B, as the dependent variable to estimate Eq. (2). The results are reported in Table 10.

TABLE 10 ABOUT HERE

The coefficient estimates suggest significant performance gains for banks when they receive internal loans from their parent BHCs both across-BHC (columns (1) and (2)) and within-BHC (columns (3) and (4)). The coefficient of the within-bank estimation in column (3) translates to 16% higher returns in the immediately subsequent quarter when banks receive internal loans from their parents as compared to when they do not. This compares to a –2.5% mean quarterly return for banks in our sample. Notably, the median return is 0, suggesting an even distribution of positive and negative returns in the sample. The coefficient on the continuous treatment variable in column (4) denotes that every 1% of their assets that banks receive through internal loans translates to a performance gain of 3.4 percentage points.

These results provide context as to why commercial bank subsidiaries continue to receive internal loans from their parent BHCs, especially in light of the evidence on borrower quality and subsequent loan performance. The evidence points to the fact that parent BHCs likely pay close attention to the return performance metrics of their subsidiaries in their decision to approve internal loans, consistent with the literature on internal capital markets for cash allocations (e.g., Stein (1997), and Shin and Stulz (1998)). The fact that banks engage in return-seeking behavior is consistent with our findings on increased risk in banks' loan portfolios.

V. Plausibly Exogenous Shock to Internal Lending

The results in Section IV establish the long-run associations between internal loans from parent BHCs and banks' loan origination and performance. In this section, we provide an identification strategy that exploits the announcement of Basel III capital requirements, representing a quasi-exogenous shock to the parent BHC's ability to provide internal loans to their subsidiaries. Through these analyses, we substantiate the broad linkages between internal loans and subsequent bank-level outcomes. We employ an instrumental variable regression with a difference-in-difference instrument that isolates the variation in internal lending driven only by the effects of the shock and its subsequent impact on bank lending and performance. We provide context on the Basel III rule and discuss our identification design and the results of our analyses below.

The Basel III reforms were first announced in December 2010 by the Basel Committee on Banking Supervision in response to the vulnerabilities exposed by the 2007-2009 financial crisis. The 2010 announcement set the groundwork for stricter capital and liquidity standards, including the introduction of the Common Equity Tier 1 (CET1) ratio, which was unprecedented in its focus on high-quality capital. This ratio required BHCs to maintain a minimum CET1 capital of 4.5% of risk-weighted assets, a significant increase from the previous Basel II requirement of 2%. The U.S. Federal Reserve and other regulators subsequently adopted the Basel III framework with phased implementation starting in 2013, and full compliance with key capital requirements, including the CET1 ratio, by 2015.

This 2010 announcement laid the foundation for significantly higher capital standards aimed at increasing the resilience of bank holding companies. With the initial announcement, BHCs had to balance the need to maintain higher reserves of CET1 capital against their traditional role as internal liquidity providers to subsidiaries. The constraints on capital allocation reduced their flexibility in extending internal loans, prioritizing compliance with regulatory minimums to avoid penalties. To wit, we demonstrate that the 2010 announcement was a sizable shock to BHCs' internal lending behavior by mapping out the internal lending outcomes against their CET1 ratio compliance in Figure 9. The plot in Panel A depicts both the internal lending decision ($\mathbf{1}_{InternalLoans}$) and the level of this internal lending (*Internal Loans*) for individual BHCs whose CET1 ratio was between 0% and 10% in 2009:Q4, which was one year before the rule announcement. As the plot indicates, BHCs across the capital ratio spectrum continued to make internal loans to their subsidiary banks with no apparent differences in internal lending behavior within this range of CET1 ratios. Panel B presents a similar plot but in 2010:Q4, the time of the Basel III announcement. As revealed by the figure, BHCs below the minimum CET1 threshold of 4.5% immediately cut down on lending internally to their subsidiary banks. The response was plausibly tied to BHCs shrinking their balance sheets in light of Basel III rules' adoption, a response that is in line with anecdotal evidence from the time.[6] This sudden and sharp breakdown of internal lending revealed by the figure indicates that the rule announcement spurred BHCs to immediately reevaluate their internal lending to reach the mandated capital threshold, thereby avoiding costly future fines.

The striking dynamics in the above figure provide the setting for our identification design. We employ an instrumental variable (IV) design in a tightly defined time window from 2010:Q1 through 2011:Q3, capturing the quarters around the rule announcement. Specifically, in the first stage, we instrument BHCs' internal lending responses through changes in our key internal lending measures, using a term capturing their exposure to the Common Equity Tier 1 Capital ratio mandates. We do so by defining a variable *Basel III Exposure* that is set to one for BHCs with CET1 ratio below the 4.5% compliance threshold in quarters following the rule announcement, based on their reported values in the announcement quarter of 2010:Q4, and zero for others.

We retain only BHCs with a CET1 ratio of up to 10% to ensure a comparable counterfactual. This choice of the time window and subsample provides a tight identification to gauge the effects around the exogenous shock represented by the Basel III rule announcement. We define two variables that capture the BHC response to Basel III rule announcement. The first of these measures, $\mathbf{1}_{InternalLoanCuts}$, is a binary variable that is set to one for BHCs that stopped internal funding in the immediate aftermath of the announcement. The second, Δ*Internal Loans*, captures the magnitude of changes in internal loans provide by BHCs in successive quarters. These two measures represent the dependent variables in the first stage of our IV regression. In the second stage, we use their fitted values to gauge the direct impact of internal loans on the bank's lending and performance outcomes instrumented through their response to the Basel III shock. These regressions are estimated at the BHC-quarter level

[6] E.g., "Basel Report Shows Banks Have Way to Go to Meet Capital Rules," *New York Times*, Dec 16, 2010.

using the specifications described by the following equations

$$\upsilon_{i,t} = \beta \cdot \mathit{Basel\ III\ Exposure}_{i,t} + \mathit{Controls}_{i,t-1} + \zeta_{i,t} + \phi_t + \epsilon_{i,t} \tag{5}$$

$$y_{i,t} = \bar{\beta} \cdot \widehat{\upsilon_{i,t}} + \mathit{Controls}_{i,t-1} + \zeta_{i,t} + \phi_t + \epsilon_{i,t} \tag{6}$$

where $\upsilon_{i,t}$ is either $\mathbf{1}_{InternalLoanCuts}$ or Δ*Internal Loans* for BHC i in quarter t, and $\widehat{\upsilon_{i,t}}$ denotes the fitted values of the variables from the first stage regression. Controls and fixed effects remain the same as in the previous specifications. Our regression scheme therefore ensures that we capture the differential impact in the outcome variables arising from changes in internal loan decisions only due to the impact of the constraint on such internal lending placed by the exogenously determined capital ratio requirement. The results of our empirical analyses are presented in Table 11.

Table 11 about here

Columns (1) and (2) represent a simple, OLS-based test of the dynamics depicted in Figure 9, where we estimate the impact of the Basel III rule announcement on internal lending outcomes within BHCs. Our coefficient estimates indicate that BHCs facing regulatory constraints significantly cut down on their likelihood of approving internal loans to subsidiary banks relative to their non-constrained counterparts following the rule announcement. The coefficient in column (1) points to a 1.9 percentage point decline in the likelihood of internal loans within such BHCs compared to the pre-period average of 27.3% for the restricted sample. Column (2) presents the results for the continuous treatment analog, which reveals a 78.7% (= 0.048/0.061) additional reduction in the level of internal loans for constrained banks in the post-period compared to the pre-period mean of 0.061, or 6.1% of the asset base.

We test the impact of the Basel III–induced sudden and sharp decrease in internal loans on bank lending behavior and their subsequent performance in the remaining columns through the IV specification. The results of these analyses reveal that with a cutback to internal loans spurred by the announcement of the capital requirements, banks originated significantly fewer loans in the subsequent quarters, contributing to a decline in loan growth (columns (3) and (4)). Further, loans originated by subsidiary banks of constrained BHCs on the back of the exogenous decline in internal lending exhibited better performance with lower levels of non-performing loans (columns (5) and (6)). However, the banks also posted lower returns on their assets following the scaling back of internal lending (columns (7) and (8)).

These results underscore the validity of our long-term analyses in Section IV and establish that the availability of internal loans is key to banks' lending abilities and risk appetites. They provide evidence that in the absence of such internal loans, banks tend to be more cautious in selecting their borrowers, with fewer of these loans becoming non-performing. The associated decline in return performance highlights that banks face a mutually exclusive choice between seeking profits and minimizing the risk of their loan portfolios.

VI. Internal Loans and Monetary Policy Transmission

To examine the role of internal capital markets in monetary policy transmission, we leverage significant monetary policy shifts between 1991 and 2023. Critical episodes are identified based on the magnitude of policy changes and the clarity of Federal Reserve communications. While an extensive body of literature explores the bank lending channel of monetary policy (Bernanke and Blinder, 1992; Kashyap and Stein, 2000; Drechsler et al., 2017), comparatively little attention has been given to how organizational structures, such as bank holding companies (BHCs), influence banks' responses to monetary shocks. Internal capital markets within BHCs have the potential to shield subsidiary banks from liquidity shocks, thereby moderating the impact of monetary policy (Houston et al., 1997; Campello, 2002). For instance, Ashcraft and Campello (2006) argue that the internal market enables subsidiaries to sustain lending during periods of monetary tightening, particularly when parent BHCs have greater access to external capital markets, suggesting a demand-driven response to policy changes. However, our findings indicate that the affiliation with BHCs does not consistently result in internal loans to subsidiaries, challenging the assumption that internal capital markets uniformly mitigate the effects of monetary tightening.

Our analysis focuses on the supply-side response to monetary policy shocks from post-1994 events, aligning with the "modern" Fed era characterized by enhanced transparency (Lindsey, 2003). These events span diverse monetary regimes: conventional policy (1994-2008), crisis interventions (2007-2009), unconventional policies like quantitative easing (2009-2015), normalization (2015-2019), and the pandemic response (2020-2023). This range allows for an examination of how internal capital markets function under varying monetary environments. Figure 5 illustrates the key monetary policy events considered. These events represent the first in a series of successive increases or decreases in the Federal Open Market Committee's (FOMC's) target federal funds rate as reported in the policy tools website.[7]

The selected episodes are well-identified monetary shocks. The 1994 episodes signify the onset of explicit Fed funds rate targeting and public announcements (Faust et al., 2004). The 2007-2009 financial crisis responses offer sharp, exogenous variations in monetary stance, accounting for broader economic conditions (Bernanke, 2020). The announcements of quantitative easing (QE) provide discrete policy shocks extensively studied in prior research (Krishnamurthy and Vissing-Jorgensen, 2011). Lastly, the post-2015 normalization period and subsequent pandemic response represent modern implementations of both conventional and crisis-era monetary policies.

We employ a stacked difference-in-differences estimation focusing on four quarters before and after each shock. The model is specified as follows:

$$\begin{aligned} y_{i,t} = \beta_1 \cdot \chi_{i,t} + \beta_2 \cdot Post\_MP\_Shock_{s,t} + \beta_3 \cdot \chi_{i,t} \times Post\_MP\_Shock_{s,t} \\ + \zeta_i + \Sigma_s \times \rho_t + \epsilon_{i,s,t} \end{aligned} \tag{7}$$

where the outcome variable $y_{i,t}$ is either $\Delta log(Loans)$ or $MTG\ Rates$, the latter is the loga-

[7]See Board of Governors of the Federal Reserve System — Open Market Operations.

rithm of the average 15-year mortgage rate across all subsidiaries of BHC i in quarter t. The variable $\xi_{i,t}$ is either the binary indicator($\mathbf{1}_{InternalLoans}$) or the continuous measure of *Internal Loans* for BHC i in quarter t. The indicator variable $Post\_MP\_Shock$ is equal to one during the four quarters following each shock and zero during the four quarters prior to shocks. $\Sigma_s \times \rho_t$ denotes the shock−event−quarter fixed effect. Results are summarized in Table 12.

Table 12 about here

Table 12 highlights the role of internal loans in mitigating banks' responses to monetary shocks. Columns (1) to (4) examine monetary tightening episodes, showing that banks with access to internal loans reduce new loan originations less sharply compared to those without such access. Furthermore, these treated banks exhibit smaller post-announcement increases in mortgage lending rates, reflecting a dampened transmission of policy-induced rate hikes. Columns (5) to (8) reveal that during monetary easing, banks with internal loans display more muted adjustments in both lending levels and pricing, compared to their counterparts.

These results underscore two key implications. First, internal capital markets within BHCs help smooth subsidiary banks' lending behavior across monetary cycles, dampening their sensitivity to external shocks. Second, this smoothing effect suggests that monetary policy efficacy may be partially offset by the presence of internal loans, as parent BHCs continue supporting subsidiaries irrespective of the broader policy stance. Future policy measures should account for these attenuated responses to better align monetary objectives with financial market realities.

VII. Competition of Internal Loans: Bank vs Nonbank

In the preceding sections, we have demonstrated the importance of internal loans from parent BHCs as a source of commercial bank liquidity. They enhance banks' loan origination ability and returns performance, while also increasing credit access to borrowers at better loan terms. In this section, we explore the competition for internal loans posed by nonbank subsidiaries within the same BHC structure. Nonbank subsidiaries serve targeted functions within the BHC, such as reducing regulatory burdens by optimizing capital requirements through regulatory arbitrage (Houston et al. (1997)), or managing risks by isolating riskier activities (Ashcraft (2005)), and therefore vie for internal loans from parent BHCs. Unlike commercial bank subsidiaries that can utilize deposits for their liquidity requirements, nonbanks are less likely to have alternate liquidity sources prompting a stronger need to seek internal loans from BHCs (see also Jiang et al. (2020)). In this section, we study how the presence of nonbank subsidiaries affects BHCs' internal loan allocations to their commercial bank subsidiaries.

We first present a graphical representation of the loan allocation dynamics for both bank and nonbank subsidiaries in Figure 6. Panel A depicts the time series variation in internal loans allocated to bank subsidiaries. Bank subsidiaries receiving internal loans appears to be a dynamic outcome, with fluctuations that closely track business cycles and the average level ranging from just over 2% to just under 4% over the 32-year sample period. Notably, these internal loans decline at the onset of recessionary periods but pick up in the depths of crises, presumably on the back of government-sponsored programs such as the Troubled Asset Relief Program (TARP) and the Paycheck Protection Program (PPP). Complementarily, the level appears to decline closely following the peak of the cycles. Panel B, on the other hand, suggests a different dynamic for loans to nonbanks. The average level appears to hold steady at just around 0.3% over the entire sample period. This suggests a continuous need for *internal* liquidity for these subsidiaries, which is consistent with them performing targeted functions.

We also examine the cost of internal loans, which we approximate as the quarterly interest income from banks and nonbanks to the BHC, scaled by the previous quarter's internal loans to each category of subsidiaries. The time series of these internal lending rates are presented in Figure 8. The graphs reveal that the average cost of internal loans to bank subsidiaries is markedly higher than that to nonbank subsidiaries. While the two rates broadly follow the same time series patterns, the cost spread between bank and nonbank subsidiaries widens in the expansionary phases — a trend that continues well into the depths of recessions. In fact, the quarterly changes in the costs (and levels) of internal loans to banks and nonbanks exhibit a strong and statistically significant negative correlation of –0.23 (–0.25) over recessionary periods, within-BHCs. This points to the two sets of subsidiaries directly competing with each other when the BHC's ability to supply liquidity is diminished. The patterns suggest that in such phases, BHCs subsidize internal loans to nonbank subsidiaries at the cost of their commercial bank counterparts.

We formally test the impact on internal loans to bank subsidiaries under a resource competition from nonbank subsidiaries by defining three different measures that capture the scale and scope of the nonbank subsidiaries. We employ a regression scheme comparable to that depicted in Eq. (1) where we set the conditioning variable to one of $\mathbf{1}_{NonbankSubsidiary}$, *Nonbank Subs Ratio*, or *Nonbank Asset Ratio*. The dependent variable is alternatively set to $\mathbf{1}_{InternalLoans}$ or *Internal Loans*. Table 13 reports the results of the estimations.

TABLE 13 ABOUT HERE

The negative and significant coefficients across all specifications suggest that nonbank subsidiaries directly compete with bank subsidiaries for internal loan allocations. Columns (1) and (4) suggest that in the presence of even a single nonbank subsidiary, bank subsidiaries are less likely to receive loans from their parent BHCs, and the resulting loan amounts are markedly lower. Columns (2) and (5) indicate that this effect is modulated by the relative number of nonbank subsidiaries, and BHCs with more nonbank subsidiaries reduce internal lending to bank subsidiaries to a greater extent. Finally, columns (3) and (6) point to analogous effects based on the relative size of bank and nonbank subsidiaries.

Altogether, the results in this section point to nonbank subsidiaries receiving favorable treatment from parent BHCs when they seek internal loans. While this is consistent with BHCs paying attention to the performance metrics and nonbank subsidiaries likely delivering higher returns than their bank counterparts, they nevertheless reduce available internal liquidity to banks to engage in their core intermediary functions. With bank subsidiaries relying on internal loans to originate loans and expand their borrower base, our findings suggest that nonbank endeavors within the BHC structure likely hurt access to credit in the real economy.

VIII. Conclusion

Our study provides novel insights into the critical role of internal lending within Bank Holding Companies (BHCs) and its implications for banking operations, risk-taking, and regulatory compliance. By leveraging unique data from the Federal Reserve's FR Y-9LP filings, we introduce new measures of internal loans, capturing both the presence and intensity of these intra-firm financial flows. Our findings reveal that internal loans serve as a strategic liquidity tool for BHCs, allowing them to support their banking subsidiaries during periods of economic stress or heightened regulatory pressure. Subsidiaries that do receive internal liquidity injections via loans exhibit enhanced loan origination ability over crisis and non-crisis periods. This flexibility, however, comes with trade-offs, as increased internal lending is associated with elevated risk-taking and poorer loan performance at recipient banks.

Our empirical analysis demonstrates that internal lending not only boosts short-term lending growth but also drives the formation of new lending relationships. These benefits are tempered by higher incidences of non-performing loans, larger syndicated loan exposures, and greater concentration of risk on recipient banks' balance sheets. The evidence suggests that internal loans are a double-edged sword, providing essential liquidity support while simultaneously encouraging riskier lending practices, likely driven by moral hazard or reduced market discipline within BHC networks.

The results of this study have significant implications for policymakers and regulators. First, the strategic use of internal loans highlights the importance of monitoring intra-firm financial flows, especially in times of economic uncertainty or during regulatory changes like the introduction of Basel III. Second, the observed risk-taking behavior calls for a nuanced understanding of internal capital markets within BHCs and their role in amplifying or mitigating systemic risks. Regulators should consider the balance between enabling BHCs to provide internal liquidity support and preventing excessive risk-taking that could undermine financial stability.

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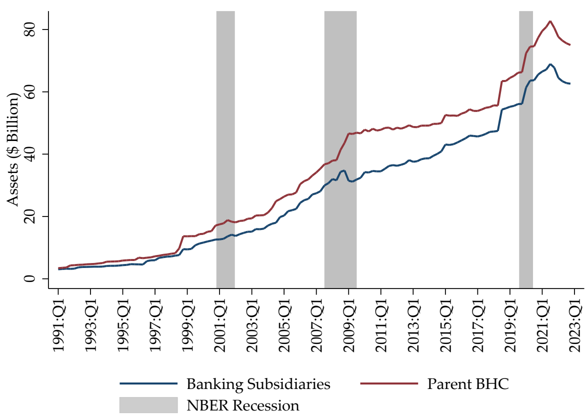
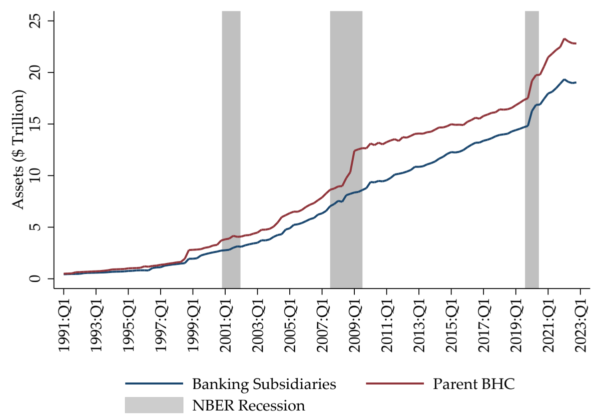
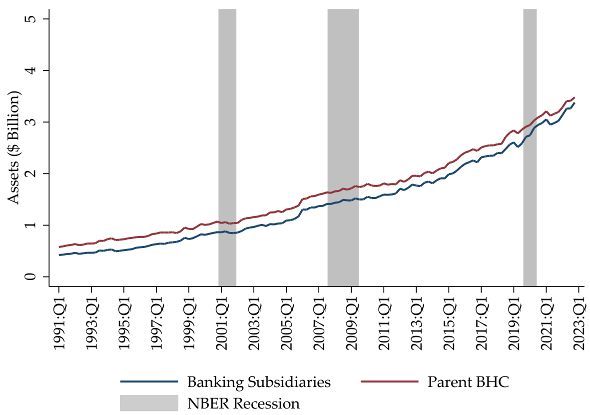


(A) Asset Evolution (Mean)

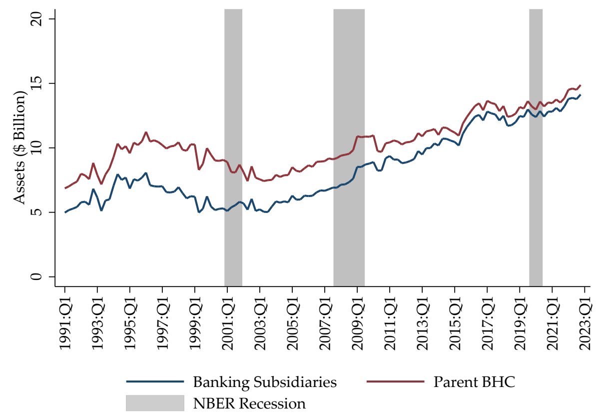


(B) Asset Evolution (Aggregate)

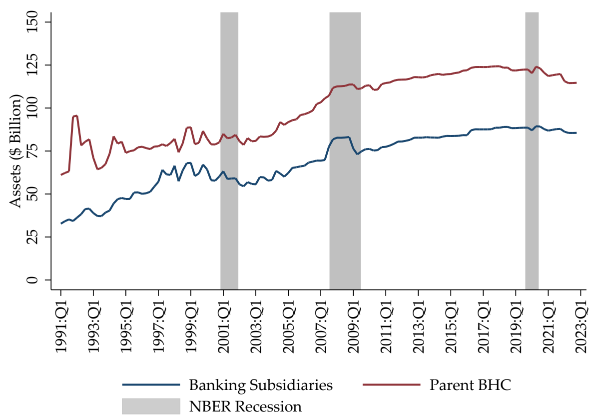
Figure 1. Evolution of BHC and Commercial Bank Assets. This figure depicts the quarterly evolution of assets of parent bank holding companies and their commercial bank subsidiaries in the sample. Panel A presents the cross-sectional mean of the assets of parent bank holding companies in the sample (in red) and the combined assets of commercial bank subsidiaries of the same BHCs (in blue) over the sample period of 1991:Q1 through 2023:Q1. Panel B presents the corresponding plot of the sum of assets of all parent bank holding companies (in red) and of their commercial bank subsidiaries (in blue). The shaded bars represent the NBER quarterly recession indicators.



(A) BHC Assets ≤\$5bn



(B) \$5bn < BHC Assets ≤\$50bn



(C) BHC Assets >\$50bn

Figure 2. Asset Distribution across BHC Size Spectrum. This figure depicts the quarterly cross-sectional mean of the assets of parent bank holding companies (in red) and the combined assets of commercial bank subsidiaries of the same BHCs (in blue), across the BHC size spectrum. Panel A depicts the series for small BHCs (with assets less than \$5 billion). Panel B depicts the series for mid-sized BHCs (with assets between \$5 billion and \$50 billion). Panel C depicts the series for large BHCs (with assets more than \$50 billion). All plots are over the sample period of 1991:Q1 through 2023:Q1. The shaded bars represent the NBER quarterly recession indicators.

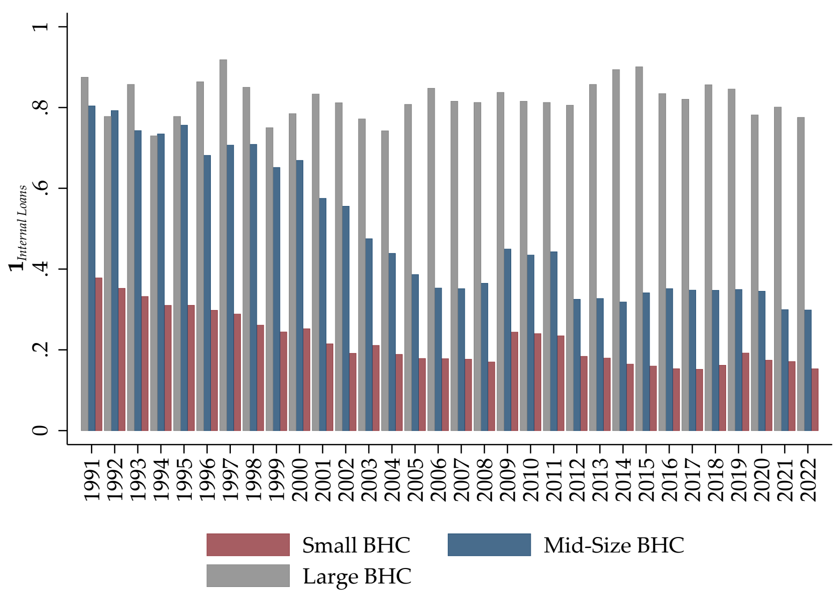
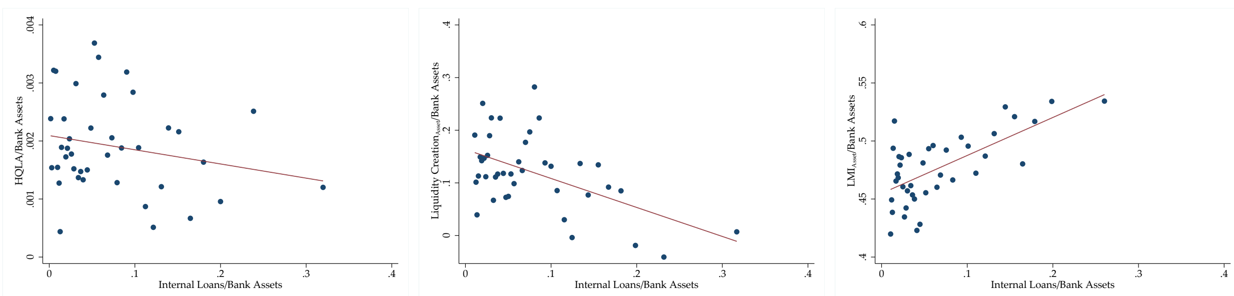


Figure 3. Heterogeneity in Internal Lending across BHCs. This plot depicts the share of commercial bank subsidiaries with an active internal loan from the parent bank holding company, as reported in FR Y-9LP filings, averaged across each year in the sample. The y-axis is the annual cross-sectional average of binary variable $\mathbf{1}_{InternalLoans}$ that takes the value of 1 for BHCs with an outstanding internal loan to their commercial bank subsidiaries, and zero for the others. The grey bars represent the annual average for large BHCs with assets >50 billion, while the blue and red bars represent the corresponding value for small (with assets $\leq$5 billion) and mid-size (with assets between \$5 and \$50 billion), respectively.



(A) High-Quality Liquid Assets **(B)** Asset-side Liquidity Creation **(C)** BHC Liquidity Stock

Figure 4. Correlations With Liquidity Measures. This figure depicts a comparison of *Internal Loans* against alternate liquidity measures at the bank- and BHC-levels. Panel A plots the relation between banks' stock of internal loans and their high quality liquid assets (see also Stulz et al. (2022)), while Panel B depicts the relation between banks' internal loan stock and their asset-side liquidity creation following the measure of Berger and Bouwman (2009). Panel C depicts the level of internal loans to commercial bank subsidiaries against the BHC's ability to supply liquidity, measured by asset side of the Liquidity Mismatch Index of Bai, Krishnamurthy, and Weymuller (2018). The quarterly variables are aggregated across all bank subsidiaries at the BHC level and represented in the form of 40 equal-sized bins based on the cross-sectional distribution of the depicted variables.

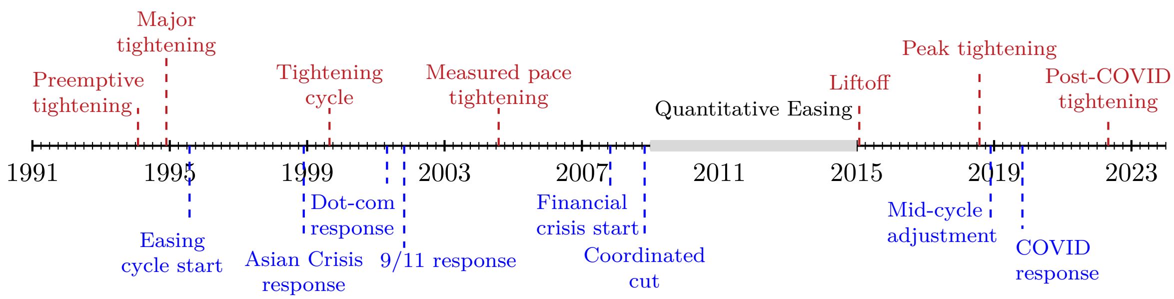
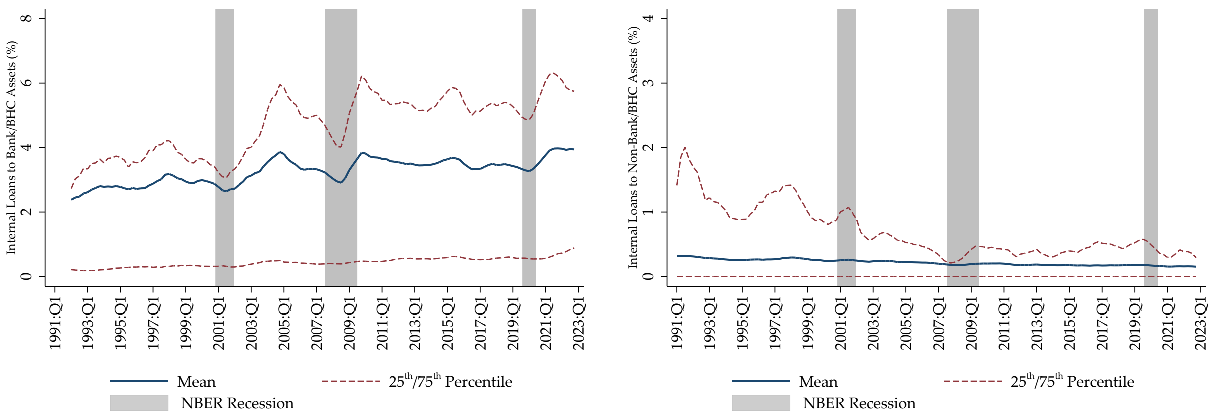


Figure 5. Monetary Policy Shocks. This figure depicts the major monetary policy shocks between 1991:Q1 and 2023:Q1 employed in our analyses. Events associated with tightening of the monetary policy are indicated in red and above the timeline, while those associated with easing are presented in blue and below the timeline. These events represent the first in a series of successive increases or decreases in the FOMC's target federal funds rate.



(A) Internal Loans to Commercial Bank Subsidiaries **(B)** Internal Loans to Non-bank Subsidiaries

Figure 6. Time Variation in Internal Lending of BHCs. This figure depicts the quarterly evolution of the stock of internal loans from the parent bank holding company (Internal Loans to Bank) to its commercial bank and non-bank subsidiaries, as reported in FR Y-9LP filings over the sample period. Panel A presents the average total quarterly lending to commercial bank subsidiaries of the BHC as a percentage of the parent BHC's total assets (in blue), along with the 25$^{\text{th}}$ and 75$^{\text{th}}$ percentile of the distribution (in red). Panel B presents the analogous series for internal lending to non-bank subsidiaries. The shaded bars represent the NBER quarterly recession indicators.

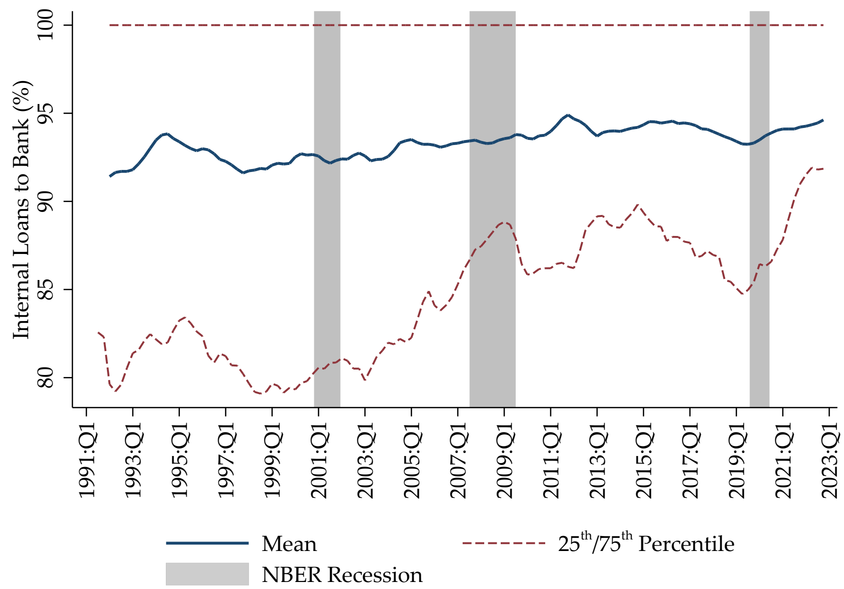


Figure 7. **Internal Lending Sahre of Bank Subsidiaries.** This figure depicts quarterly distribution of commercial bank subsidiaries' share of total internal loans to both bank and nonbank subsidiaries in each quarter for the sample period of 1991:Q1 to 2023:Q1. The lines represent the mean of this share across all BHCs in the quarter (in blue) and the 25$^{\text{th}}$ and 75$^{\text{th}}$ percentile of its distribution (in red). The shaded bars represent the NBER quarterly recession indicators.

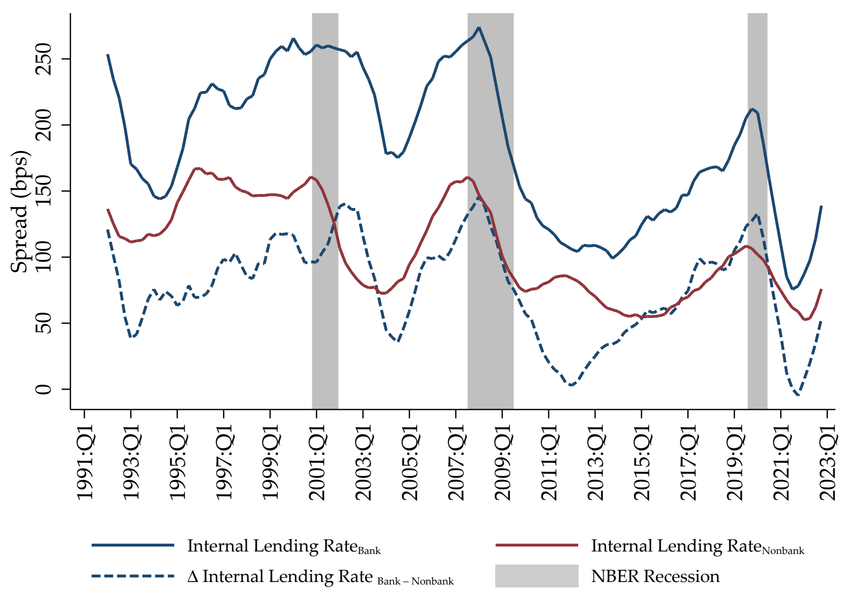
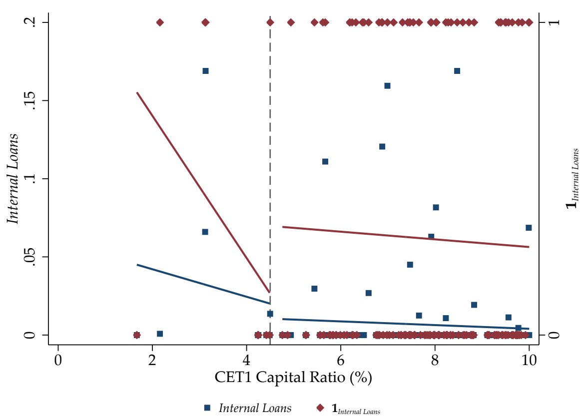
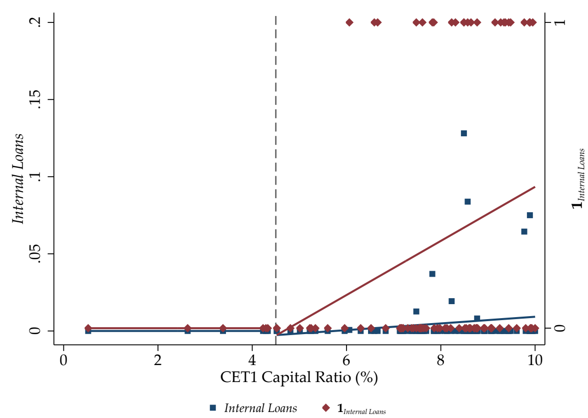


Figure 8. Cost of Internal Funding. This figure depicts the cost of internal lending (in basis points) to bank and nonbank subsidiaries of bank holding companies and the spread between them, averaged over all BHCs in each quarter over the sample of 1991:Q1 to 2023:Q1. The shaded bars represent the NBER quarterly recession indicators.



(A) 2009:Q4



(B) 2010:Q4

Figure 9. Plausible Exogenous Shock to Internal Lending Ability. This figure depicts the distribution of internal funding across BHCs with common equity tier 1 (CET1) capital ratio lying in the range between 0 and 10% at two distinct points in time across the announcement of the CET1 ratio threshold under Basel III. Panel A plots this distribution as of 2009:Q4, one year before the rule announcement in November 2010. Panel B plots the distribution in the quarter of the rule announcement, i.e., 2010:Q4. In both figures, the blue squares depict the level of internal loans from BHCs to their commercial bank subsidiaries, while the red diamonds represent the binary variable $\mathbf{1}_{InternalLoan}$. The lines of the same color represent the linear fit of the scatter plot separated into regions below, and above, the critical threshold of 4.5%.

Table 1. Summary Statistics

This table presents summary statistics for the key variables used in our empirical analyses over the 1991:Q1–2023:Q1 period. The unit of observation is BHC–quarter level. The definitions of the variables, along with the sources and construction are provided in Appendix Table A.1.

	Mean	SD	Median	IQR	N
Bank and BHC Characteristics					
Asset Liquidity Ratio	0.191	0.117	0.167	0.132	33,986
Core Deposits	7.262	2.184	7.295	2.816	33,498
Size	12.843	1.908	12.576	2.195	33,986
Tier 1 Capital Ratio	0.125	0.047	0.117	0.036	32,610
Bank-BHC Asset Ratio	0.692	0.379	0.902	0.552	33,892
Unused Commitments	0.000	0.000	0.000	0.000	33,986
Letters of Commitment	0.000	0.002	0.000	0.000	33,986
Lending and Performance Outcomes					
Loans	6.207	1.796	6.228	2.455	33,158
$\mathbf{1}_{InternalLoans}$	0.329	0.470	0.000	1.000	33,986
NPL	0.014	0.018	0.008	0.013	26,631
Return on Bank Assets	–0.025	0.467	0.000	0.305	31,969
Loan-Level Measures					
Internal Loans	0.007	0.027	0.037	0.080	33,986
Facility Amount	0.032	0.345	0.004	0.137	108,266
Maturity	3.726	0.623	3.989	0.511	108,266
All in Drawn Spread	0.541	0.712	0.615	0.789	108,266
Rating Level	14.69	3.189	15.00	5.000	108,266
New Borrower (Count)	2.956	1.392	2.996	2.268	2,927
New Borrower Lending	5.993	11.382	1.847	6.417	2,904
Lead Arranger	0.378	0.485	0.000	1.000	51,239
Lender Share	0.170	0.238	0.083	.126	51,239
Lender HHI	0.136	0.168	0.080	0.113	51,239

Table 2. Factors Affecting Internal Lending

This table reports output from the estimation of Eq. (1). The dependent variable is $\mathbf{1}_{InternalLoans}$ across all specifications. Column (1) is estimated over a minimal specification of Eq. (1) that includes only the subsidiary bank characteristics. The specification for Column (2) includes parent BHC characteristics, without considering macroeconomic factors. Columns (3) through (6) are estimated under the complete specification with modifications in the inclusion of fixed effects. BHC–, quarter–, and credit-rating–fixed effects are included as indicated. All variables are constructed as described in Appendix Table A.1. The unit of observation is a BHC–quarter. All coefficients are estimated over the 1991:Q1 to 2023:Q1 period using a logistic regression. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	$\mathbf{1}_{InternalLoans}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Bank Characteristics						
Asset Liquidity Ratio	–0.193***	–0.730***	–1.622***	–0.267**	–1.981***	–0.488***
	(0.055)	(0.092)	(0.101)	(0.128)	(0.105)	(0.131)
Core Deposits	–0.035***	–0.019***	–0.014***	–0.011***	–0.012***	–0.013***
	(0.005)	(0.005)	(0.004)	(0.002)	(0.004)	(0.004)
Size	0.076***	0.015***	0.009***	0.066***	0.008***	0.056***
	(0.008)	(0.002)	(0.002)	(0.014)	(0.002)	(0.014)
Tier 1 Capital Ratio	–0.514***	–0.556***	–2.876***	–1.406***	–3.028***	–1.275***
	(0.195)	(0.115)	(0.356)	(0.416)	(0.378)	(0.431)
BHC Characteristics						
Bank-BHC Asset Ratio		–0.248***	–0.051***	–0.247***	–0.240***	–0.181***
		(0.026)	(0.017)	(0.042)	(0.027)	(0.043)
BHC Size		0.108***	0.250***	0.017**	0.283***	0.104***
		(0.007)	(0.009)	(0.008)	(0.009)	(0.023)
Macroeconomic Factors						
GDP Growth Rate (log)			0.556*	0.254		
			(0.315)	(0.218)		
10Y Tsy Rate			0.228***	0.056***		
			(0.018)	(0.015)		
Fed Funds Rate (Overnight)			0.009***	0.017***		
			(0.002)	(0.006)		
VIX			0.434***	0.236***		
			(0.125)	(0.087)		
NBER Recession Flag			–0.080***	–0.037*		
			(0.033)	(0.022)		
Fixed Effects						
Credit Rating	Yes	Yes	Yes	Yes	Yes	Yes
BHC	No	No	No	Yes	No	Yes
Year-Quarter	No	No	No	No	Yes	Yes
Observations	32,186	32,183	29,810	22,426	29,810	22,426
Pseudo R-squared	0.07	0.07	0.09	0.24	0.09	0.24

Statistical significance is indicated as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3. Impact of Internal Loans on Loan Growth

This table reports the output of Eq. (2). The dependent variable is $\Delta log(Loans)$, scaled by a factor of 100 across all specifications. All variables are constructed as described in Appendix Table A.1. Columns (1) and (2) report the results from a regression that includes both BHC– and year-quarter–fixed effects. Columns (3) and (4) present the results with only a year-quarter–fixed effect. The unit of observation is a BHC–quarter. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	$100 \cdot \Delta log(Loans)$			
	(1)	(2)	(3)	(4)
$\mathbf{1}_{InternalLoans}$	0.193***		0.260***	
	(0.058)		(0.055)	
Internal Loans		2.839***		6.874***
		(0.316)		(0.257)
Controls				
Asset Liquidity Ratio	5.562**	5.581**	9.067*	9.112*
	(1.206)	(1.220)	(3.017)	(3.052)
Tier 1 Capital Ratio	0.601**	0.601**	1.045**	1.043**
	(0.070)	(0.069)	(0.169)	(0.167)
Core Deposits	0.228	0.228	0.270	0.267
	(0.165)	(0.165)	(0.172)	(0.175)
Size	–3.671**	–3.673**	–6.661*	–6.665*
	(1.342)	(1.344)	(1.987)	(1.988)
Loans	–0.980*	–0.978*	–1.007	–0.998
	(0.277)	(0.277)	(0.410)	(0.415)
Fixed Effects				
BHC	No	No	Yes	Yes
Year-Quarter	Yes	Yes	Yes	Yes
Observations	31,875	31,875	31,875	31,875
R-squared	0.14	0.14	0.41	0.41

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Table 4. Internal Loans and Alternative Bank Liquidity

This table reports the output of Eq. (2). The dependent variable is $\Delta log(Loans)$, scaled by a factor of 100 across all specifications. All variables are constructed as described in Appendix Table A.1. All regressions include BHC– and year-quarter–fixed effects. The unit of observation is a BHC–quarter. All regressions are estimated over the 1991:Q1 to 2016:Q4 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	$100 \cdot \Delta log(Loans)$					
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbf{1}_{InternalLoans}$	0.259**	0.274**	0.235**			
	(0.126)	(0.129)	(0.118)			
Internal Loans				1.937***	1.927***	1.946***
				(0.648)	(0.648)	(0.648)
Bank Liquidity	0.009		0.060	0.013		0.066
	(0.057)		(0.057)	(0.057)		(0.056)
HQLA		0.006**	0.007**		0.006**	0.007**
		(0.002)	(0.002)		(0.002)	(0.002)
Controls						
Tier 1 Capital Ratio	3.675**	3.475**	4.798***	3.671**	3.508**	4.776***
	(1.563)	(1.480)	(1.695)	(1.565)	(1.480)	(1.696)
Core Deposits	0.053	0.015	0.026	0.055	0.017	0.028
	(0.034)	(0.030)	(0.036)	(0.034)	(0.030)	(0.036)
Size	–0.360***	–0.587***	–0.537***	–0.362***	–0.596***	–0.548***
	(0.071)	(0.080)	(0.088)	(0.071)	(0.080)	(0.088)
Loans	–0.068*	–0.058	–0.030	–0.068*	–0.058	–0.029
	(0.039)	(0.037)	(0.041)	(0.039)	(0.037)	(0.041)
Fixed Effects						
BHC	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,767	20,563	18,344	19,767	20,563	18,344
R-squared	0.235	0.239	0.242	0.235	0.239	0.243

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Table 5. Impact of Internal Loans on Loan Performance

This table reports the output of Eq. (2). The dependent variable is NPL, scaled by a factor of 100 across all specifications. All variables are constructed as described in Appendix Table A.1. Columns (1) and (2) report the results from a regression that includes both BHC– and year-quarter–fixed effects. Columns (3) and (4) present the results with only a year-quarter–fixed effect. The unit of observation is a BHC–quarter. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	$100 \cdot NPL$			
	(1)	(2)	(3)	(4)
$\mathbf{1}_{InternalLoans}$	0.036***		0.067***	
	(0.013)		(0.018)	
Internal Loans		0.530***		0.860***
		(0.114)		(0.235)
Controls				
Asset Liquidity Ratio	–0.377***	–0.377***	–0.002	–0.037
	(0.117)	(0.118)	(0.172)	(0.172)
Tier 1 Capital Ratio	1.987***	1.989***	2.976***	2.978***
	(0.430)	(0.429)	(0.511)	(0.511)
Core Deposits	–0.019***	–0.019***	0.035***	0.034***
	(0.005)	(0.005)	(0.008)	(0.008)
Size	0.008	0.008	0.012	0.014
	(0.006)	(0.006)	(0.015)	(0.015)
Loans	–0.012**	–0.012**	–0.025***	–0.026***
	(0.005)	(0.005)	(0.009)	(0.009)
Fixed Effects				
BHC	Yes	Yes	No	No
Year-Quarter	Yes	Yes	Yes	Yes
Observations	31,877	31,877	31,877	31,877
R-squared	0.62	0.62	0.45	0.45

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Table 6. Loan-Level Impact of Internal Loans

This table reports the output of the loan-level estimation in Eq. (3). The dependent variables are as follows: in columns (1) and (2), *Facility Amount*, which is the size of the tranche, scaled by the lender's assets; in columns (3) and (4), *Maturity*, which is the logarithm of the loan tenor in months; in columns (5) and (6) the *All in Drawn Spread* which is the logarithm of the raw value; in columns (7) and (8), *Rating Level*, which is a rank-ordering of the S&P credit rating with the highest (Internal Loans and Lending Relationships) set to 24 and the lowest (*SD*) set to 1. All other variables are constructed as described in Appendix Table A.1. The unit of observation is a loan. BHC–, borrower–, quarter and borrower-quarter–fixed effects are included as indicated. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	Facility Amount		*Maturity*		*All In Drawn Spread*		*Rating Level*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbf{1}_{InternalLoans}$	0.032**		0.160***		–0.002***		–0.070**	
	(0.013)		(0.084)		(0.001)		(0.036)	
Internal Loans		0.021***		1.205**		–0.036***		–0.950***
		(0.007)		(0.515)		(0.012)		(0.265)
Controls								
Asset Liquidity Ratio	0.029***	0.030***	–1.510**	–1.630***	0.414**	0.431**	29.443***	29.748***
	(0.008)	(0.008)	(0.605)	(0.600)	(0.189)	(0.189)	(4.167)	(4.163)
Tier 1 Capital Ratio	0.012	0.011	–5.351*	–6.353**	0.139**	0.116*	13.198***	12.964***
	(0.096)	(0.113)	(3.038)	(3.075)	(0.063)	(0.063)	(1.713)	(1.736)
Core Deposits	–0.001*	–0.001**	0.190***	0.193***	0.001	0.001	0.053**	0.054**
	(0.001)	(0.001)	(0.056)	(0.056)	(0.001)	(0.001)	(0.025)	(0.025)
Size	–0.003***	–0.003***	–0.471***	–0.506***	-0.007	-0.003	6.804***	6.758***
	(0.001)	(0.001)	(0.095)	(0.096)	(0.011)	(0.011)	(0.347)	(0.342)
Loans	0.000	0.000	–0.146***	–0.155***	0.000	-0.000	0.087***	0.087***
	(0.000)	(0.001)	(0.039)	(0.039)	(0.001)	(0.001)	(0.017)	(0.017)
Fixed Effects								
BHC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter	No	No	No	No	No	No	Yes	Yes
Borrower x Year-Quarter	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Observations	107,921	107,921	106,679	106,679	102,252	102,252	107,547	107,547
R-squared	0.344	0.344	0.398	0.398	0.929	0.929	0.058	0.058

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Table 7. Internal Loans and Banking Relationships

This table reports the output of Eq. (2). The dependent variable in columns (1) and (2) is *New Borrowers (Count)*, which is the total number of first-time borrowers corresponding to a given bank in each quarter; and in columns (3) and (4) is *New Borrower Lending*, which is the total of the share contributed by the bank in each quarter in loans to these new borrowers. All other variables are constructed as described in Appendix Table A.1. The unit of observation is a BHC–quarter. BHC– and year-quarter–fixed effects are included as indicated. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	New Borrowers (Count)		*New Borrower Lending*	
	(1)	(2)	(3)	(4)
$\mathbf{1}_{InternalLoans}$	0.101***		0.631***	
	(0.031)		(0.218)	
Parent Funding Level		0.640***		10.984***
		(0.215)		(4.030)
Controls				
Asset Liquidity Ratio	–2.330***	–2.380***	–23.798***	–22.993***
	(0.295)	(0.293)	(4.616)	(4.590)
Tier 1 Capital Ratio	–2.644***	–2.787***	–51.473***	–50.800***
	(1.007)	(0.996)	(8.508)	(8.495)
Core Deposits	–0.023	–0.019	0.430**	0.386**
	(0.017)	(0.017)	(0.176)	(0.178)
Size	0.744***	0.751***	–0.735	–0.847
	(0.042)	(0.042)	(0.531)	(0.538)
Loans	–0.066***	–0.070***	0.166	0.224
	(0.018)	(0.018)	(0.252)	(0.256)
Fixed Effects				
BHC	Yes	Yes	Yes	Yes
Year-Quarter	Yes	Yes	Yes	Yes
Observations	2,875	2,875	2,855	2,855
R-squared	0.84	0.84	0.60	0.60

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Table 8. Internal Loans and Banking Relationships: Borrower Characteristics

This table reports the output of Eq. (4). The dependent variable in columns (1) and (2) are measures of firm financial constraint: *Whited-Wu* is the index drawn from Whited and Wu (2006), while *Hadlock-Pierce* is the size-age index drawn from Hadlock and Pierce (2010). The dependent variable in column (3) is *Size*, which is logarithm of the firm's assets and in column (4) it is *Implied Vol.*, which is the option-implied volatility of the firm's traded stock. All other variables are constructed as described in Appendix Table A.1. The unit of observation is a BHC–quarter. BHC– and year-quarter–fixed effects are included as indicated. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	Whited-Wu	*Hadlock-Pierce*	*Size*	*Implied Vol.*
	(1)	(2)	(3)	(4)
$\mathbf{1}_{InternalLoans}$	0.000	0.011	0.049	0.010
	(0.003)	(0.025)	(0.064)	(0.007)
New Borrower	0.011***	0.127***	–0.191***	0.019***
	(0.003)	(0.023)	(0.055)	(0.007)
$\mathbf{1}_{InternalLoans} \times$ *New Borrower*	0.014***	0.141***	–0.220***	0.023***
	(0.003)	(0.023)	(0.059)	(0.007)
Controls				
Asset Liquidity Ratio	0.008	0.071	-0.006	0.007
	(0.011)	(0.067)	(0.171)	(0.017)
Tier 1 Capital Ratio	–0.070	–0.079	0.390	–0.217**
	(0.059)	(0.384)	(0.919)	(0.093)
Core Deposits	0.001	0.003	–0.020	–0.000
	(0.001)	(0.006)	(0.015)	(0.002)
Size	–0.001	0.030***	–0.016	0.001
	(0.002)	(0.011)	(0.028)	(0.003)
Loans	–0.001	0.000	0.004	0.001
	(0.001)	(0.004)	(0.011)	(0.001)
Fixed Effects				
BHC	Yes	Yes	Yes	Yes
Rating	Yes	Yes	Yes	Yes
Borrower	Yes	Yes	Yes	Yes
Year-Quarter	Yes	Yes	Yes	Yes
Observations	28,013	27,296	32,806	23,597
R-squared	0.29	0.28	0.44	0.56

Statistical significance is indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 9. Internal Lending and Loan-level Risk Sharing

This table reports the output of the loan-level estimation in Eq. (3). The dependent variables are as follows: in columns (1) and (2), *Lead Arranger*, which is a binary variable that is set to one for lenders identified as lead arrangers, and zero otherwise; in columns (3) and (4), *Lender Share*, which is the logarithm of the share of the loan facility committed by a given lender; in columns (5) and (6) the *Lender HHI*, which is a facility level measure of the Herfindahl-Hirschman Index of all lenders' share in the facility. All other variables are constructed as described in Appendix Table A.1. The unit of observation is a loan. BHC–, borrower–, quarter and borrower-quarter–fixed effects are included as indicated. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	Lead Arranger		*Lender Share*		*Lender HHI*	
	(1)	(2)	(3)	(4)	*(5)*	*(6)*
$\mathbf{1}_{InternalLoans}$	0.039***		0.028**		0.017***	
	(0.010)		(0.014)		(0.006)	
Internal Loans		0.295***		0.364***		0.056*
		(0.074)		(0.088)		(0.032)
Controls						
Asset Liquidity Ratio	5.165***	3.347***	1.241	0.738	–1.267**	–1.525***
	(1.090)	(0.896)	(1.088)	(1.008)	(0.548)	(0.552)
Tier 1 Capital Ratio	–2.340***	–2.907***	–4.361***	–3.804***	0.264	0.286
	(0.359)	(0.282)	(0.507)	(0.522)	(0.212)	(0.211)
Core Deposits	0.033***	0.010**	0.010	0.011	–0.008	–0.008
	(0.005)	(0.004)	(0.007)	(0.008)	(0.006)	(0.006)
Size	0.161***	–1.048***	–0.157*	–0.167**	–0.339***	–0.318***
	(0.008)	(0.064)	(0.086)	(0.084)	(0.109)	(0.106)
Loans	0.007*	0.009**	0.031***	0.035***	0.002	0.002
	(0.004)	(0.003)	(0.006)	(0.006)	(0.003)	(0.003)
Fixed Effects						
BHC	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter	No	No	No	No	No	No
Borrower x Year-Quarter	Yes	Yes	Yes	Yes	Yes	Yes
Observations	175,105	175,105	43,418	43,418	41,646	41,646
R-squared	0.48	0.48	0.72	0.72	0.79	0.79

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Table 10. Impact of Internal Lending on Bank Performance

This table reports the output of Eq. (2). The dependent variable is*Return on Bank Assets* across all specifications. All variables are constructed as described in Appendix Table A.1. Columns (1) and (2) report the results from a regression that includes both BHC– and year-quarter–fixed effects. Columns (3) and (4) present the results with only a year-quarter–fixed effect. The unit of observation is a BHC–quarter. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	Return on Bank Assets			
	(1)	(2)	(3)	(4)
$\mathbf{1}_{InternalLoans}$	0.187***		0.162***	
	(0.062)		(0.062)	
Parent Funding Level		2.655***		3.380***
		(0.854)		(1.084)
Controls				
Asset Liquidity Ratio	1.280***	1.265***	1.407***	1.482*
	(0.449)	(0.424)	(0.487)	(0.789)
Tier 1 Capital Ratio	–7.445***	–7.459***	–7.729***	–10.852***
	(1.477)	(1.507)	(1.560)	(2.150)
Core Deposits	0.019	0.019	0.011	0.133**
	(0.020)	(0.021)	(0.021)	(0.056)
Size	–0.002	0.003	–0.050	–0.128*
	(0.025)	(0.026)	(0.040)	(0.074)
Loans	0.030	0.029	0.041	0.127*
	(0.034)	(0.040)	(0.035)	(0.067)
Fixed Effects				
BHC	No	No	Yes	Yes
Year-Quarter	Yes	Yes	Yes	Yes
Observations	31,146	31,146	31,146	31,146
R-squared	0.07	0.07	0.16	0.16

Statistical significance is indicated as follows: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 11. Identification under Basel III Capital Requirement

This table reports the output of Eq. (5) and Eq. (6). Columns (1) and (2) present the results from an OLS estiamtion of Eq. (5), while teh subsequent columns present the results from the IV regressions in (5) and Eq. (6). The dependent variables are denoted in specific columns. All variables are constructed as described in Appendix Table A.1. The F-statistics corresponding to the Cragg-Donald Wald test for weak instruments (Stock and Yogo (2002)) are included in Panel B. The unit of observation is a BHC–quarter. BHC–, and quarter–fixed effects are included as indicated. All regressions are estimated over the 2010:Q1 to 2011:Q3 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	$\mathbf{1}_{InternalLoans}$	*Internal Loans*	$100 \cdot \Delta log(Loans)$		$100 \cdot NPL$		*Return on Bank Assets*	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Basel III Exposure	–0.019***	–0.048***						
	(0.004)	(0.000)						
$\mathbf{1}_{\widehat{InternalLoanCuts}}$			–0.368***		–0.021***		–0.545***	
$=$*Basel III Exposure*			(0.048)		(0.004)		(0.094)	
$\Delta \widehat{Internal} Loan$				–2.361***		–5.496***		–0.216***
$=$*Basel III Exposure*				(0.405)		(1.919)		(0.043)
Controls								
Asset Liquidity Ratio	–0.689**	–1.762	0.090	–7.846**	0.012**	0.445***	–3.044*	1.148
	(0.016)	(0.962)	(0.232)	(2.602)	(0.005)	(0.136)	(1.467)	(2.417)
Tier 1 Capital Ratio	–0.025	–0.844	–0.473	1.355	0.192***	0.298***	5.023	7.491
	(0.029)	(0.451)	(0.430)	(2.039)	(0.033)	(0.065)	(5.633)	(4.042)
Core Deposits	0.017	0.146	–0.002	0.029	0.002	0.002*	0.184	0.040
	(0.005)	(0.050)	(0.009)	(0.028)	(0.001)	(0.001)	(0.108)	(0.262)
Size	–0.008	0.483	–0.024**	–0.030	0.000	0.003	–0.112	–1.805
	(0.023)	(0.155)	(0.008)	(0.017)	(0.000)	(0.002)	(0.129)	(0.418)
Loans	–0.026	–0.188	0.029**	0.020	–0.001	0.000	–0.113	–0.121
	(0.005)	(0.081)	(0.010)	(0.018)	(0.001)	(0.001)	(0.108)	(0.181)
Fixed Effects								
BHC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	249	249	252	246	252	264	246	264
R-squared								
F-Stat	0.89	0.78	40.26	43.21	40.26	43.21	40.26	43.21

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Table 12. Internal Loans and Monetary Policy Transmission

This table reports output from Eq. (7), where the conditioning variable $\chi_{i,t}$ is set to to either the binary variable, $\mathbf{1}_{InternalLoans}$ or the continuous treatment variable, *Internal Loans*. The dependent variable in columns (1), (2), (5) and (6) is $100 \cdot \Delta log(Loans)$, while in columns (3), (4), (7) and (8), it is *Internal Loans*. Columns (1) through (4) incorporate only monetary policy events associated with tightening, whereas columns (5) through (6) incorporate only the events associated with loosening. All variables are constructed as described in Appendix Table A.1. The unit of observation is a BHC–quarter. BHC– and shock×event-quarter–fixed effects are included as indicated. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	$100 \cdot \Delta log(Loans)$		*MTG Rates*		$100 \cdot \Delta log(Loans)$		*MTG Rates*	
	(1)	(2)	(3)	(4)	*(5)*	*(6)*	(7)	(8)
$\mathbf{1}_{InternalLoans}$	0.175		–0.008		0.050		–0.023	
	(0.249)		(0.016)		(0.098)		(0.025)	
Internal Loans		1.123		–0.252		1.059		–0.976
		(1.404)		(0.430)		(1.338)		(1.284)
$\mathbf{1}_{InternalLoans}$ × *Post_MP_Shock*	0.470***		–0.025***		–0.299***		–0.031***	
	(0.134)		–0.004		(0.099)		(0.010)	
Internal Loans × *Post_MP_Shock*		1.346***		–0.115***		–1.308***		–0.338**
		(0.246)		(0.022)		–0.234		(0.089)
Controls								
Asset Liquidity Ratio	–5.598	3.423	–0.410	0.148	–4.728	4.745	–0.105***	3.247
	(7.120)	(5.603)	(1.702)	(0.993)	(7.392)	(7.453)	(0.025)	(2.536)
Tier 1 Capital Ratio	–4.106***	–0.433	0.200	–0.499	–5.831***	–2.056	0.191	0.368
	(1.431)	(0.451)	(0.318)	(3.537)	(1.568)	(5.432)	(0.155)	(0.298)
Core Deposits	0.008	0.030	0.010	0.010	0.175***	0.218***	0.007**	0.023
	(0.038)	(0.040)	(0.011)	(0.010)	(0.038)	(0.062)	(0.003)	(0.013)
Size	–0.191**	–0.127	–0.003	–0.021	–0.109	–0.028	–0.005	0.198***
	(0.077)	(0.112)	(0.022)	(0.036)	(0.078)	(0.118)	(0.003)	(0.038)
Loans	0.167***	0.183***	–0.028**	–0.031**	0.036	0.045	–0.011***	–0.037**
	(0.039)	(0.042)	(0.013)	(0.015)	(0.040)	(0.050)	(0.003)	(0.015)
Shock Type	Tightening				Loosening			
Fixed Effects								
BHC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shock × Event-Quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	15,495	15,850	6,060	6,184	17,590	17,845	4,802	4,909
R-squared	0.099	0.133	0.905	0.906	0.240	0.238	0.944	0.942

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Table 13. Bank vs. Nonbank Internal Lending Allocations

This table reports output from Eq. (2), where the conditioning variable $\chi_{i,t}$ is set to to either the binary variable, $\mathbf{1}_{NonbankSubsidiary}$; the continuous variable *Nonbank Subs Ratio*, or *Nonbank Asset Ratio*. The dependent variable in columns (1) through (3) is $\mathbf{1}_{InternalLoans}$ where the coefficients are estimated through logistic regression, and in columns (4) through (6), it is *Internal Loans* and an ordinary least squares estimation. All variables are constructed as described in Appendix Table A.1. The unit of observation is a BHC–quarter. BHC– and quarter–fixed effects are included as indicated. All regressions are estimated over the 1991:Q1 to 2023:Q1 period. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	$\mathbf{1}_{InternalLoans}$			*Internal Loans*		
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbf{1}_{NonbankSubsidiary}$	–0.142***			–0.003***		
	(0.022)			(0.001)		
Nonbank Subs Ratio		–0.276***			–0.005***	
		(0.030)			(0.001)	
Nonbank Asset Ratio			–0.116***			–0.004***
			(0.034)			(0.001)
Controls						
Asset Liquidity Ratio	–0.780***	–0.779***	–0.631***	–0.016***	–0.015***	–0.020***
	(0.149)	(0.148)	(0.148)	(0.004)	(0.004)	(0.004)
Tier 1 Capital Ratio	–0.025	–0.025	–0.002	0.008	0.007	0.001
	(0.366)	(0.366)	(0.359)	(0.010)	(0.010)	(0.010)
Core Deposits	–0.009	–0.009	–0.021**	–0.001***	–0.001***	–0.001***
	(0.009)	(0.009)	(0.009)	(0.000)	(0.000)	(0.000)
Size	0.004	0.004	0.005	0.002***	0.002***	0.002***
	(0.015)	(0.015)	(0.015)	(0.000)	(0.000)	(0.000)
Loans	–0.048***	–0.048***	–0.036***	–0.000	–0.000	–0.001***
	(0.007)	(0.007)	(0.007)	(0.000)	(0.000)	(0.000)
Model		Logit			OLS	
Fixed Effects						
BHC	Yes	Yes	Yes	Yes	Yes	Yes
Year-Quarter	Yes	Yes	Yes	Yes	Yes	Yes
Observations	31875	31875	31764	31875	31875	31764
(Pseudo) R-squared	0.25	0.25	0.23	0.45	0.45	0.45

Statistical significance is indicated as follows: *** p <0.01, ** p <0.05, * p <0.1.

Appendix A Variables Definitions and Sources

Table A.1. Variable Construction

Variable	Construction	Source
Banking Assets	Total Assets of Commercial Bank Subsidiaries of the BHC	Call reports
Internal Loans	Total Loans & receivables from banking subsidiary (to BHC), scaled by banking assets	FR Y-9LP
$\mathbf{1}_{InternalLoans}$	1 for BHC-quarters within non-zero Internal Loans	
$\Delta log(Loans)$	Logarithm of current quarter loans outstanding, minus the logarithm of one-quarter lagged loans outstanding	Call reports
NPL	Non-Performing Loans scaled by current quarter outstanding loans	Call reports
Return on Bank Assets	Parents' share of bank subsidiary's income, scaled by one quarter lagged banking assets	FR Y-9LP
Asset Liquidity Ratio	The sum of cash & balances due from depository institutions, securities, fed funds & repos, trading account assets; less pledged securities	FR Y-9C
Tier 1 Capital Ratio	Basel 3 Regulatory Common Equity Tier-1 Capital Ratio	Call reports
Core Deposits/Assets	Checking, savings, and smalltime deposits, scaled by total banking assets	Call reports
Size	ln(BHC Total Assets)	FR Y-9C
Bank Liquidity	Asset-side liquidity creation	Berger and Bouwman (2009)
HQLA	Sum of bank cash holdings, US Treasuries, US government and government-sponsored agency obligations, and GSE mortgage-backed securities	Call reports
Asset-side LMI	Asset-side liquidity of BHC used in the Liquidity Mismatch Index	Bai, Krishnamurthy, and Weymuller (2018)
Unused Commitments	Total Unused Commitments, scaled by BHC Assets	FR Y-9C
Letters of Credit	Notional Amount of Financial Standby Letters of Credit, scaled by BHC Total Assets	FR Y-9C
GDP Growth Rate (log)		FRED
10Y Tsy Rate	10 year on-the-run treasury rate	FRED
Fed Funds Rate (Overnight)	Effective Federal Funds Rate, averaged over quarter	FRED
NBER Recession Flag		FRED
VIX	VIX close on last day of quarter	FRED
$\mathbf{1}_{CET1 \leq 4.5}$	Set to one for BHCS with Common Equity Tier 1 Capital Ratio $\leq$ 4.5% in 2010:Q4 and zero for those with values $>$ 4.5% in the same quarter	FR Y-9C
Post Basel 3	Set to one for 2011:Q1 to 2011:Q3 and zero for 2010:Q1 to 2010:Q3	
$\mathbf{1}_{NonbankSubsidiary}$	Set to one if at least one active subsidiary is classified as Nonbank	NIC (FR Y-6)
Nonbank Subs Ratio	Number of active nonbank subsidiaries/number of active banking subsidiaries	NIC (FR Y-6)
Nonbank Asset Ratio	One minus ratio of banking assets to parent's assets on parent-only balance sheet	FR Y-9LP
Facility Amount	Size of the given tranche, denominated in U.S. Dollars, scaled by the lending BHC's banking assets	WRDS-Reuters' Dealscan
Maturity	Logarithm of number of months to maturity of the tranche, at the time of issuance	WRDS-Reuters' Dealscan
All in Drawn Spread (log)	Logarithm of the spread of the loan plus any annual (or facility) fee paid by the borrower	WRDS-Reuters' Dealscan
Rating Level	Ordinal ranking of the borrower's S&P Credit rating in each quarter taking maximum value of 24 for $AAA-$ and minimum value of 1 for SD	WRDS-Reuters' Dealscan

Appendix B Additional Figures and Tables

Table B.1. Internal Lending and Bank Liquidity

This table reports output from the estimation of Eq. (1). The dependent variable is $\mathbf{1}_{InternalLoans}$ across all specifications. All variables are constructed as described in Appendix Table A.1. Regressions are estimated over varying periods depending on the availability of measures. Columns (1) and (2) include measures of bank-level liquidity and are estimated over 1991:Q1 through 2016:Q1. Column (3) includes a BHC-level liquidity measure and is estimated over 2003:Q1 through 2016:Q4. Column (4) includes liquidity measures at both levels and is estimated over 2003:Q1 through 2016:Q4. Credit-rating–, BHC–, and year-quarter–fixed effects are included in all specifications. The unit of observation is a BHC–quarter. Robust standard errors, reported in parentheses, are dual–clustered by BHC and quarter.

	$\mathbf{1}_{InternalLoans}$			
	(1)	(2)	(3)	(4)
Bank Liquidity				
HQLA	0.023***			0.008*
	(0.005)			(0.004)
Bank Liquidity		0.015***		0.010
		(0.001)		(0.011)
BHC Liquidity				
Asset-Side LMI			–0.014***	–0.013***
			(0.004)	(0.004)
Fixed Effects				
Credit Rating	Yes	Yes	Yes	Yes
BHC Characteristics	Yes	Yes	Yes	Yes
Year-Quarter	Yes	Yes	Yes	Yes
Observations	19,094	19,094	11,001	11,001
Pseudo R-squared	0.237	0.238	0.180	0.194

Statistical significance is indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table B.2. Syndicated Loan Sample

This table presents summary statistics for the key outcome variables in our loan-level analyses. Full sample refers to the sample of syndicated loans data matched to our base sample drawn from regulatory data at the BHC-quarter level. The filtered sample denotes the subsample where we impose the restriction that each borrower should have at least two loans in a quarter as described in Section IV.C.

	Mean	SD	Median	IQR	N
Full sample					
Deal Amount	928.6	1052.3	500	1,075	197,196
Facility Amount	449.6	523.6	245	519	197,196
Rating Level	14.5	3.4	14	5	197,196
Maturity	46.8	22.1	52	27	197,196
All in Drawn Spread	216.7	709.1	190	150	197,196
Restricted sample					
Deal Amount	930.0	1046.0	500	1,070	121,383
Facility Amount	446.0	517.2	250	519	121,383
Rating Code	14.6	3.2	14	5	121,383
Maturity	47.7	21.3	54	24	121,383
All in Drawn Spread	216.4	135.5	200	150	121,383