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Banking on Nonbanks

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ABSTRACT: We study how banking groups adjust corporate credit supply in response to tighter macroprudential policies. Using granular data on syndicated corporate loans, we show that banking groups reallocate lending from bank subsidiaries toward affiliated nonbank financial institutions (NBFIs) following regulatory tightening. Relative to bank subsidiaries within the same group, NBFI subsidiaries expand lending, and their credit supply also increases in absolute terms. We estimate that by 'banking on' their nonbanks, banking groups offset, on average, more than half of the contraction in bank lending induced by macroprudential tightening. Our findings highlight an important intra-group reallocation channel through which banking groups can partially offset regulatory constraints and result in greater bank–nonbank interconnectedness.

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1 Introduction

The tightening of bank regulation following the 2007–09 Global Financial Crisis (GFC) coincided with a rapid expansion of Nonbank Financial Institutions (NBFIs).[1] Over the same period, macroprudential policy (MaPP) measures aimed at curbing excessive credit growth were widely implemented across countries. A defining feature of modern financial systems, however, is that many banks operate within complex groups that include both regulated bank subsidiaries and less regulated nonbank affiliates. This raises a natural question: how do banking groups adjust their credit supply when bank-level regulatory constraints tighten?

While MaPP measures are designed to strengthen financial stability, and mitigate systemic risk, they may also induce shifts in lending activity across the regulatory perimeter. Nonbanks—comprising non-deposit-taking financial intermediaries such as broker-dealers, investment funds, asset managers, pension funds, and insurance companies—are typically subject to lighter prudential oversight than banks and, in some cases, remain outside the regulatory perimeter altogether. This regulatory asymmetry likely contributed to the expansion of the NBFI sector during periods of intensified regulatory pressure on banks. By 2024, NBFIs accounted for about 51 percent of global financial assets, up from 43 percent in 2008 (Financial Stability Board 2025). Although this trend is most prominent in advanced economies (AEs), nonbank intermediation has also become increasingly important in several emerging market and developing economies (EMDEs)—see IMF (2025*a*). In the global syndicated loan market, nonbanks originated roughly 50 percent of loans to nonfinancial corporations (NFCs) in 2024, compared with about 30 percent during the GFC (Albuquerque et al. 2025).[2] The expansion of NBFIs has translated into greater interconnectedness between banks and nonbanks, with banks gradually increasing their exposures to nonbanks since the GFC (Krainer et al. 2024, Albuquerque et al. 2025, IMF 2025*b*, Schnabel 2025).

In this paper, we focus on a largely unexplored dimension of bank–nonbank interconnectedness: the role of parent banks in channeling credit to NFCs through their nonbank affiliates.[3] Figure 1 illustrates a marked increase in the share of NBFI subsidiaries in total banking-group lending in the global syndicated loan market since the GFC. Although lending through both

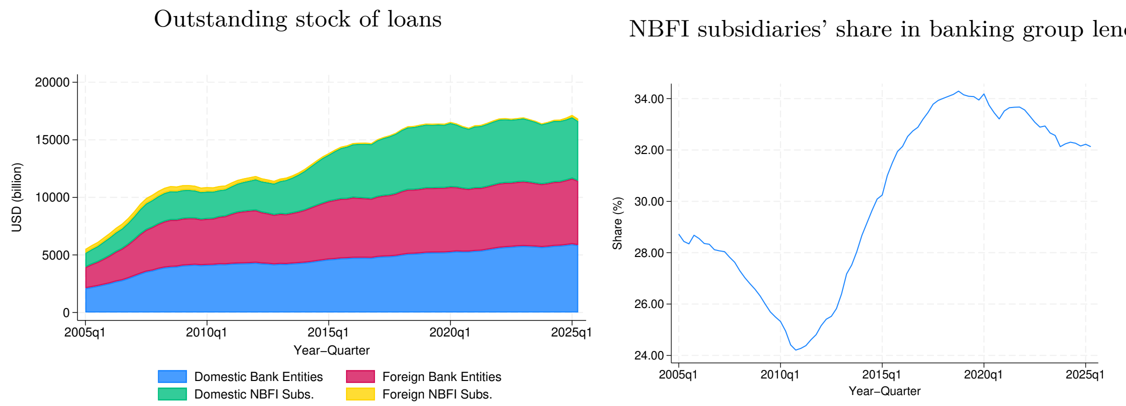
[1]For instance, Buchak et al. (2018), Kim et al. (2018), Irani et al. (2021), Claessens et al. (2023), Krainer et al. (2024), Lee et al. (2024), Albuquerque et al. (2025), Bednarek et al. (2025), Erel and Inozemtsev (2025).

[2]For the euro area, Schnabel (2025) reports that the share of nonbank credit to nonfinancial corporations increased from 10 percent of all credit granted by financial institutions in 1999 to about 30 percent in 2024.

[3]We use the terms subsidiaries and affiliates interchangeably. The same applies to banking groups and parent banks, and NBFIs and nonbanks.

bank and nonbank subsidiaries has expanded over time, the growth of NBFI lending has been particularly strong, rising from about 24 percent of banking group lending around 2010 to roughly 32 percent in 2024. This increase is driven primarily by domestic NBFI subsidiaries, with foreign NBFI subsidiaries accounting for a small share of total lending. The trend is especially pronounced in the United States, where NBFI subsidiaries account for more than half of syndicated lending by U.S. banking groups (Figure A.2 in Appendix A).[4]

Figure 1: Banking groups' lending to NFCs in the corporate syndicated loan market



Notes: Left panel: volume of outstanding syndicated loans from banking groups to NFCs by domestic bank subsidiaries (blue area), foreign bank subsidiaries (red area), domestic NBFI subsidiaries (green area), and foreign NBFI subsidiaries (yellow area). Right panel: share of syndicated loans originated by NBFI subsidiaries in total banking group lending.

Against this background, we examine whether the rise in bank-owned NBFI lending reflects a response to tighter bank regulation—a question that has not yet been explored. A large literature shows that parent banks often offset domestic regulatory tightening by reallocating lending across borders through foreign bank subsidiaries that are subject to host-country rules (Houston et al. 2012, Ongena et al. 2013, Danisewicz et al. 2017, Franch et al. 2021, Demirgüç-Kunt et al. 2023). This literature often refers to this mechanism as 'regulatory arbitrage', i.e., shifts in lending toward less regulated entities in response to tighter constraints. We posit that banking groups with NBFI subsidiaries have an additional margin of adjustment: they may reallocate lending toward affiliated nonbank entities that typically fall outside the full scope of both home- and host-country regulatory frameworks.[5]

We study this mechanism in the syndicated loan market, which provides an ideal setting

[4]These trends are in line with Cetorelli and Prazad (2025) who document that the asset share of NBFI subsidiaries within U.S. bank holding companies (BHCs) has grown substantially over the past three decades. An earlier paper noted that the growth in nonbanking assets within U.S. BHCs may have also reflected legislative changes, most prominently the 1999 Gramm-Leach-Bliley Act that allowed BHCs to broaden their activity scope, including investment banking (Avraham et al. 2012).

[5]A complementary view in Cetorelli and Prazad (2025) suggests that parent banks create nonbank affiliates not solely to navigate regulatory constraints, but also to enhance liquidity-risk management by diversifying funding channels. The paper documents significant intra-company borrowing and lending between bank and nonbank subsidiaries, with these internal flows intensifying during episodes of financial stress.

because loans can be originated by both banks and nonbanks, and represent a sizable source of NFCs' total financing. Using granular syndicated corporate loan data covering 963 banking groups across 27 countries (21 AEs and 6 EMDEs) over 2005Q1–2023Q4, we estimate the differential lending response of NBFI subsidiaries relative to bank subsidiaries within the same banking group following loan-supply MaPP tightening. Our empirical design includes banking-group fixed effects and firm×quarter fixed effects, thereby isolating within-group substitution in credit supply between bank and nonbank subsidiaries, while controlling for time-varying borrower demand (Khwaja and Mian 2008).

A key contribution of the paper is the construction of a novel dataset linking parent banks to their bank and nonbank subsidiaries over 2000–2024. This fills an important gap in the literature that has focused primarily on bank subsidiaries (Claessens and Van Horen 2015, Schwert 2018, Silva 2019). The exceptions are Bai et al. (2025), and Cetorelli and Prazad (2025) who exploit regulatory filings to map bank and nonbank subsidiaries within U.S. bank holding companies to study intra-group fund transfers. Our dataset maps ownership structures—the ultimate parent company—across both bank and nonbank subsidiaries that are active in the syndicated loan market using regulatory filings, broker-dealer registries, national business registries, and large language models (LLMs).[6] We focus on the top 250 NBFIs and the top 250 bank lending entities, which account for roughly 90 percent of total lending within each group.

To identify MaPP shocks, we use the Alam et al. (2025) iMaPP database. We focus on measures that directly constrain banks' lending capacity, namely loan-supply restrictions, prudential measures that focus on stress testing, and reserve requirements. These measures are similar in scope to policies that aim at 'dampening the credit cycle' (Gambacorta and Murcia 2020). We construct cumulative country-level stringency indices and identify MaPP shocks using two complementary approaches: a residualized MaPP index that purges cyclical macrofinancial components, and a high-frequency announcement-based strategy for a subset of AEs.

Our main findings are as follows. First, we uncover a new regulatory-induced lending reallocation from bank to nonbank subsidiaries that allows banking groups to mitigate the contractionary effects of restrictive macroprudential policies on corporate lending. A one–standard deviation MaPP tightening reduces lending by bank subsidiaries by 1.0 percent, while increasing lending by NBFI subsidiaries by 2.0 percent relative to bank subsidiaries and by 1.0 percent in absolute terms. These effects are economically significant: by reallocating credit from tightly

[6]We acknowledge that our banking group ownership structure may be incomplete, as banking groups may own or control additional entities active outside the syndicated loan market, such as private credit.

regulated bank entities toward less-regulated NBFI subsidiaries, banking groups offset on average more than half of the adverse impact of MaPP tightening on group-level credit growth. The effect is strongest among banking groups with weaker balance sheets, which face greater incentives to mitigate regulatory constraints. Our results are driven primarily by U.S. banking groups, and to a lesser extent by the euro area. Among NBFIs, investment banks and broker-dealers account for most of the adjustment. Moreover, we find little evidence that this reallocation is associated with greater risk-taking or credit misallocation. Although NBFIs lend more, on average, to riskier borrowers, the increase in lending following MaPP shocks is not disproportionately concentrated in that segment, consistent with Albuquerque et al. (2025). We also show that both bank and NBFI subsidiaries pass on higher regulatory costs to borrowers via higher loan spreads, although the magnitudes are rather negligible.

The increase in lending by NBFI subsidiaries is consistent with recent evidence showing that global U.S. banking groups extend credit to their NBFI affiliates at more favorable terms than to their bank subsidiaries (Bai et al. 2025). Although we do not directly observe internal capital-market flows within banking groups, our results suggest that MaPP tightening induces parent banks to reallocate funding, potentially at preferential terms, to their NBFI subsidiaries.[7] This reallocation enables these subsidiaries to sustain lending activity, thereby attenuating the overall contractionary impact of MaPP at the group level.

Second, we further show that tight bank–nonbank internal linkages shape the international transmission of bank capital flows. Banking groups respond to domestic MaPP tightening not only by reallocating lending across borders through foreign bank subsidiaries, as documented in prior work (Houston et al. 2012, Ongena et al. 2013, Danisewicz et al. 2017, Cerutti and Zhou 2018, Franch et al. 2021, Demirgüç-Kunt et al. 2023), but also by adjusting lending through both domestic and foreign NBFI affiliates. Our novel contribution is to show that these entities play distinct roles: foreign bank and foreign NBFI subsidiaries help offset the impact of regulation on cross-border lending, particularly in core foreign markets where banking groups have an established presence, while domestic NBFI subsidiaries cushion the impact on domestic lending. This dual strategy allows banking groups to mitigate the contractionary effects of macroprudential policy both internationally and domestically.

Third, we uncover important strategic lending reallocation by parent banks depending on where regulatory tightening originates. When bank subsidiaries operating abroad (in host coun-

[7] Direct financial support of NBFI subsidiaries by parent banking groups has also been documented by Franceschi et al. (2023) using loan- and security-level data for the euro area.

tries) face tighter regulation, parent banks partly offset the resulting contraction in credit supply by channeling lending through both domestic and host-country NBFI subsidiaries, which typically fall outside the regulatory perimeter. By contrast, when MaPP tightening occurs in the home country, parent banks reallocate lending toward foreign bank and NBFI affiliates that are not directly affected by source-country rules, while relying on domestic NBFIs to sustain credit at home. This highlights the flexibility of multinational banking groups in engaging in regulatory mitigation across borders.

Finally, we show that independent NBFIs, those not affiliated with banking groups, reduce lending to NFCs relative to bank-owned bank and NBFI subsidiaries following MaPP tightening, consistent with competition effects and limited access to stable funding sources. On the former, banking groups appear to crowd out independent NBFIs in markets where they have a large presence, suggesting that parent banks use their NBFI subsidiaries to protect their market share. On the latter, while bank-owned NBFIs can rely on the parent's deposit base or wholesale credit lines, we conjecture that independent NBFIs lack such intra-group funding channels to sustain lending, especially during periods of regulatory tightening when credit is scarce.

Our results are robust to a range of alternative specifications, including: (i) using high-frequency identification of MaPP announcements for six large AEs; (ii) along the extensive margin, with NBFI subsidiaries more likely to establish new lending relationships in response to MaPP tightening; (iii) inter-banking group effects, indicating that substitution from bank to nonbank subsidiaries occurs not only within but also across banking groups; (iv) excluding prudential policies related to stress testing, and reserve requirements; (v) accounting for cross-country differences or time-varying changes within banking groups; (vi) using a regression-based approach from Blickle et al. (forthcoming) to impute the missing loan shares; and (vii) dropping NBFIs from large banking groups and with syndicated loans above USD 100 million.

By contrast, capital-based MaPP measures yield different patterns. In this case, NBFI subsidiaries reduce lending relative to bank subsidiaries, consistent with the view that policies targeting banks' consolidated capital positions constrain lending across all entities within banking groups (Ongena et al. 2013, Aiyar et al. 2014, Danisewicz et al. 2017, Franch et al. 2021, Fabiani and Neanidis 2025).

Our paper contributes to four strands of the literature. First, we we document a novel channel through which banking groups respond to tighter loan-supply regulation by reallocating lending toward their NBFI subsidiaries. Prior research has primarily focused on cross-border adjustments through foreign bank affiliates in response to regulatory differences: with banks shifting funds toward jurisdictions with looser regulation (Houston et al. 2012, Ongena et al. 2013, Danisewicz et al. 2017, Franch et al. 2021, Demirgüç-Kunt et al. 2023), increasing the likelihood of establishing branches or subsidiaries in lightly regulated markets (Houston et al. 2012, Frame et al. 2020, Demirgüç-Kunt et al. 2023), and raising the probability of acquiring banks in permissive regulatory environments (Karolyi and Taboada 2015). We extend this literature by showing that both domestic and foreign NBFIs withing banking groups play an important role in domestic and cross-border credit supply.

Second, we construct a new dataset over 2000–2024 that maps banking group ownership structures across bank and nonbank subsidiaries active in the corporate syndicated loan market. With the exception of Bai et al. (2025), and Cetorelli and Prazad (2025), who explore internal fund transfers between U.S. bank holding companies and their bank and NBFI subsidiaries, existing studies, to the best of our knowledge, concentrate solely on bank subsidiaries (Claessens and Van Horen 2015, Schwert 2018, Silva 2019). Our dataset fills this gap and captures the rapidly growing role of NBFIs within financial conglomerates.

Third, we contribute to the literature on the transmission of macroprudential policy through nonbanks. While Albuquerque et al. (2025) show that nonbanks mitigate the impact of MaPP (and monetary policy) on corporate lending at the lender level, our analysis highlights the importance of banking-group structure in shaping this response. In contrast to studies of specific regulatory episodes that show that tighter regulation spurred migration of corporate credit to the nonbank sector, including the 2013–14 U.S. interagency guidance on leveraged lending (Kim et al. 2018), and Basel III implementation in the U.S. (Irani et al. 2021) and Korea (Lee et al. 2024), we examine time-series MaPP shocks across a broad international sample.

Finally, we contribute to the emerging literature on high-frequency identification of macroprudential policy shocks (Bluwstein and Patozi 2024, Drechsel and Miura 2025, Duprey and Tuzcuoglu 2025). We compile a novel dataset of MaPP announcements for six major AEs and compute daily bank stock return surprises around these events, providing a high-frequency measure of MaPP shocks that can be used for a broad range of macrofinancial analysis.

The remainder of the paper is organized as follows. Section 2 describes the data and banking group ownership dataset. Section 3 presents the empirical framework and baseline results. Section 4 discusses the high-frequency MaPP identification as a robustness test. Section 5 reports additional robustness checks, and Section 6 concludes.

2 Data

2.1 Syndicated loans

We use Dealogic as our primary source for syndicated loan data, which covers nearly all primary-market loans issued worldwide by nonfinancial firms. Syndicated loans are central to global finance, representing up to half of cross-border debt (Elliott et al. 2024), about one-third of total cross-border bank lending (Cerutti et al. 2015), and about three-quarters of total bank lending to firms (Doerr and Schaz 2021). The dataset provides detailed information on each loan, including syndicate structure, borrower characteristics, loan size, maturity, type (e.g., term loans, credit lines), and pricing. In this market, firms borrow from lender consortia that jointly supply credit and set legal terms, with lead arrangers playing a key role in negotiating conditions, forming the syndicate, and coordinating between borrower and lenders. Our main variable of interest is the US dollar amount of newly issued loans, deflated by each country's CPI deflator. In some exercises we also look into price effects with the all-in drawn spread, i.e., the interest rate margin plus fees over LIBOR.

This dataset is well suited to our study because loans are intermediated by both banks and nonbanks. Following Albuquerque et al. (2025), we classify banks using Dealogic SIC codes beginning with 60 (depository institutions). Nonbanks are defined as non-deposit-taking financial intermediaries with SIC codes 61–67, excluding real estate firms (most codes starting with 65) and certain mortgage brokers (6162).[8] To deal with potential misclassification, we check that our nonbank lenders are not identified as banks in Capital IQ. For lenders without SIC codes, we use text-based methods, flagging banks through keywords such as 'bank,' 'banco,' 'banca,' and 'banque', and subsequently identifying investment banks through the term 'investment'. We exclude international financial institutions (e.g., the World Bank, the European Investment Bank) and development banks. Our nonbank sample includes mainly investment banks and broker-dealers (64 percent of the sample of NBFI subsidiaries), but we also capture investment funds, asset managers (including hedge funds, private equity, and other alternative investment vehicles), as well as insurance companies, and pension funds (Table A.3 in Appendix A).

Loan-level datasets typically do not report lenders' participation amounts. Following Duchin and Sosyura (2014) and Albuquerque et al. (2025), we impute missing loan shares by assigning 50 percent of the loan to lead arrangers and distributing the remainder equally among other

[8] We allocate the following codes starting in 65 to nonbanks: 6510 (Real Estate Operators & Lessors, 6519 (Lessors of Real Property) and 6532 (Real Estate Dealers).

participants. This reflects evidence that lead arrangers usually retain the largest share (Sufi 2007, Ivashina 2009). Our results are, however, robust to alternative imputation techniques (see Section 5 that uses a regression-based approach from Blickle et al. forthcoming).

Our final sample spans 27 lender countries (21 AEs and 6 EMDEs) from 2005Q1 to 2023Q4. Table A.4 in Appendix A shows the lender countries and their respective average loan shares. We cover 963 unique banking groups, which together hold 4,871 subsidiaries. Among these lender entities, 75 percent are bank subsidiaries and 25 percent are NBFIs. Conditional on having at least one NBFI, each banking group has on average 12.4 bank subsidiaries and 6.2 NBFI subsidiaries (an unconditional average of 3.8 bank subsidiaries and 1.3 NBFI subsidiaries in the full sample). In total, 438 are listed banking groups, while 525 are unlisted. Despite a broadly balanced split between listed and unlisted banking groups, the bulk of the lending (90 percent) is originated by listed banking groups. On the borrower side, we restrict the sample to nonfinancial firms, excluding banks, diversified financials, and insurers, yielding 52,380 unique nonfinancial firms (both listed and private) across 150 borrower countries (38 AEs and 112 EMDEs). In our sample, private NFCs account for 66 percent of total borrowing. Compared with Albuquerque et al. (2025), we cover a broader set of countries and extend the period to include COVID-19.

In Section 3.6, we expand the sample to include 939 nonbanking parent companies to examine how the lending behavior of NBFIs not owned by banking groups differs from that of NBFIs belonging to banking groups. In this expanded sample, independent NBFIs account for about two-thirds of all NBFI entities. Although we have twice as many NBFIs not owned by banking groups relative to bank-affiliated NBFIs, the latter group accounts for a substantially larger share of the syndicated loans in our sample—roughly 27 percent, compared with 9 percent by other NBFIs.

We find that NBFIs typically take larger tranche values, especially those bank-owned, and charge higher spreads (Table A.5 in Appendix A). An interesting novel finding, to the best of our knowledge, is to show that other NBFIs (not bank-owned) charge considerably higher spreads, potentially signaling greater risk appetite. By contrast, the median term lengths are fairly similar across lender types, of around five years.

2.2 Balance sheet data

To explore the heterogeneity of the effects of MaPP shocks, we resort to balance sheet data on banking group lenders and nonfinancial firms from S&P Compustat and Capital IQ. The matching will be imperfect because we only have data for listed firms. We link the datasets using Capital IQ identifiers provided by Dealogic and the Capital IQ–Compustat link provided by S&P. For banking groups, we retrieve leverage ratios (debt to equity or debt to assets), size measured with the logarithm of total assets, nonperforming loans as a percentage of total loans (NPLs), return on assets (ROA), and Tier 1 capital ratios. In addition, we proxy credit risk with the probability of default (PD) over the next 24 months, a modified version of Merton's distance-to-default model, computed by the National University of Singapore's Credit Research Initiative (NUS-CRI). Overall, we identify 513 unique listed banks with Compustat balance sheet information (by definition, all private firms in Dealogic are unmatched).

For nonfinancial firms, we capture firms' credit risk with the following: (i) the PD over the next 24 months from NUS-CRI; (ii) the leverage ratio, measured as the sum of total debt (short- and long-term debt) as a share of total assets; (iii) the age of the firm; (iv) a zombie dummy from Albuquerque and Iyer (2024), i.e., unprofitable and unviable firms defined as firms whose interest coverage ratio (ICR) is below one, the leverage ratio is above the median firm in the same country-industry pair, and real sales growth are negative, with all indicators being met for at least two consecutive years; (v) 'vulnerable' firms, defined as firms with high debt (top quintile of the distribution) and low liquid assets (first quintile of the distribution), following Albuquerque (2024); (vi) firms with a loan-weighted average spread over the past five years in the top quartile of the sample distribution in each quarter; and (vii) leveraged loans, defined as borrowers whose spread is over 150 basis points over Libor, a conventional benchmark used by financial market participants. We match around 5.6k unique firms with Compustat data, and roughly 19.3k firms with non-missing Dealogic data on spreads.

2.3 Bank ownership structure

We construct a novel dataset on banking group ownership structures, linking bank and nonbank subsidiaries from 2000 to 2024. This dataset fills an important gap in the literature, as existing studies do not provide systematic information on the ownership linkages between parent banks and their NBFI affiliates. Previous work has focused solely on bank-level relationships, thus overlooking the increasingly important role of NBFIs within financial conglomerates (Claessens and Van Horen 2015, Schwert 2018, Silva 2019). Bai et al. (2025), and Cetorelli and Prazad (2025) are the exceptions: these two papers use regulatory data to identify bank and nonbank subsidiaries of U.S. bank holding companies, allowing them to study how internal fund transfers within banking groups shape lending dynamics (Bai et al. 2025), and how they act as a liquidity insurance mechanism (Cetorelli and Prazad 2025).

We start by taking the ultimate parent field from Dealogic, which reflects the top-level controlling entity in the ownership structure, i.e., based on majority control. The ultimate parent is the entity that ultimately owns or controls more than 50% of the reporting institution, or that has the ability to exercise dominant influence over management or policies. This information, however, is only available as a static snapshot—it does not reflect changes in ownership over time due to mergers, acquisitions, or restructurings. To overcome this limitation, we construct a time-varying ownership structure for each lender entity, enabling us to trace changes in the ultimate control within banking groups over time.

Our sample focuses on the top 250 bank and top 250 nonbank lender entities appearing in the Dealogic syndicated loan dataset. The top 250 NBFIs account for around 90 percent of total lending by NBFIs in our full sample, and the top 250 bank entities account for roughly 84 percent of total lending by banks. This ensures that we capture the overwhelming majority of global syndicated loan market activity.

To establish the evolution of ultimate ownership, we compile information from FINRA's BrokerCheck, SEC filings (Forms 10-K, 8-K, and BD), Companies House (U.K.), national business registries, and other regulatory disclosures that document changes in control, mergers, restructurings, and entity liquidations. These sources provide dated information on parent–subsidiary relationships, enabling us to map ownership events to specific years. We further augment these sources with publicly available annual reports, historical press releases, regulatory acquisition approvals, and global Legal Entity Identifier relationship data. Together, these sources allow us to cross-validate ownership transitions and distinguish between legal mergers, internal reorganizations, partial divestitures, and genuine changes in the ultimate controlling entity.

In addition, we leverage LLMs to assist in the identification, standardization, and classification of both bank and nonbank affiliates involved in the syndicated loan market. LLMs help us reconcile naming inconsistencies across sources, detect when different legal entities correspond to the same economic group, and identify missing ownership links that are not explicitly recorded in Dealogic. For each lender, we reconstruct a continuous ownership timeline and record all changes in its ultimate parent, such as mergers (e.g., the combination of BB&T and SunTrust Banks into Truist Financial Corporation and Truist Bank in 2019), takeovers (e.g., Bank of Scotland into Lloyds Banking Group in 2009), restructurings following distress (e.g., Fortis Bank into BNP Paribas Fortis in 2008), or rebranding events without a change in control. This systematic approach allows us to capture complex multi-layered ownership hierarchies and to document the precise timing of major structural shifts. For instance, our dataset records that Credit Suisse First Boston was owned by Credit Suisse International until June 12, 2023, after which it was absorbed into the UBS Group following the government-facilitated rescue. Finally, we exclude subsidiaries that became government-owned, especially during the GFC, including those that received capital injections from the U.S. Treasury through the 2009 Troubled Asset Relief Program (TARP).

More broadly, our methodology produces the first comprehensive, time-varying global map of bank and nonbank ownership structures for the syndicated loan market. However, we emphasize that the ownership structure we recover for each banking group may be incomplete, as it is limited to subsidiaries that are active in the syndicated loan market. The full list of ownership changes can be found in Appendix A, Table A.1 for bank subsidiaries, and Table A.2 for nonbank subsidiaries. We also make available the full time-varying banking group ownership dataset.

2.4 Macroprudential shocks

Our primary source of MaPP actions come from the iMaPP macroprudential database of Alam et al. (2025). This comprehensive dataset records changes in 17 MaPP instruments across 134 countries. Figure A.1 in Appendix A) shows that country authorities both in AEs and EMDEs have been increasingly using macroprudential policies since the GFC.

We use data for 27 countries, restricting our attention to measures directly constraining banks' lending capacity, split into three main categories. The first set of measures focus on loan supply, namely limits to credit growth, loan-loss provisioning requirements, loan restrictions, loan-to-deposit ratio caps, and limits on FX lending. The second category is reserve requirements. The final set includes prudential measures that focus on stress testing, restrictions on profit distribution, and structural measures (e.g., limits on exposures between financial institutions). Including stress-testing measures is particularly relevant for the U.S., where mandatory stress testing was introduced for large bank holding companies following the 2010 Dodd–Frank

Wall Street Reform and Consumer Protection Act (the Dodd–Frank Act) and implemented from 2012 onward. In addition, dividend distribution restrictions were widely implemented across jurisdictions, including in Europe, during the early phase of the COVID-19 pandemic in 2020. All these MaPP measures are coded as binary variables, with the value of one representing a tightening, minus one a loosening, and a zero when there is no change in policy.

Recent work has advanced the identification of MaPP shocks using high-frequency data, either by combining information from Federal Reserve speeches with sign restrictions (Drechsel and Miura 2025) or by documenting banking regulation announcements in the United Kingdom and Canada (Bluwstein and Patozi 2024, Duprey and Tuzcuoglu 2025). The collection of bank regulation announcements is challenging for some jurisdictions in our sample—or even impossible given the lack of official documents reporting that information. We thus adopt another approach as our baseline, first introduced by Chari et al. (2022).[9] To capture the overall MaPP stringency, we first cumulate and aggregate the binary indicators from the iMaPP database at the country level of the parent company. Because MaPP actions may respond endogenously to macrofinancial conditions, we follow Albuquerque et al. (2025) in purging MaPP actions of the state of the economy. Specifically, we regress the MaPP index on country fixed effects and lagged macroeconomic and financial controls, and take the residuals as exogenous MaPP shocks:

$$MaPP_{c,t} = \beta_1 Macro_{c,t-1} + \beta_2 Financial_{c,t-1} + \alpha_c + \epsilon_{c,t}, \tag{1}$$

where c stands for the country of the parent company at quarter t. The (lagged) macroeconomic controls include real GDP growth, real effective exchange rate (REER) growth, year-on-year CPI inflation, and the five-year ahead real GDP forecast. Financial variables include the year-on-year change in real house prices, private credit-to-GDP growth, ten-year government bond yield, ten-year government bond yield gap (relative to the equivalent U.S. bond yield), Chinn-Ito index of financial openness, and banks' average Z-score. The resulting shock series is balanced between tightening and loosening episodes (Figure A.3 in Appendix A).

Our MaPP shocks exhibit expected properties: a contractionary MaPP shock strengthens banks' resilience but dampens real activity. Following a one-standard-deviation MaPP tightening, bank balance sheet health improves (higher Z-score), while GDP growth, private credit, and bank stock prices decline (Figure B.1 in Appendix B).[10]

[9] In Section 4 we compile high-frequency MaPP announcements for six major economies.

[10] We use local projections to estimate the dynamic effects of MaPP shocks on real GDP growth, private credit

3 Main results

3.1 Empirical model

Our analysis is carried out at the lender-borrower-quarter level. We restrict the sample to banking groups to test the differential lending behavior of NBFI subsidiaries relative to bank subsidiaries within the same banking group following a MaPP tightening shock.[11] We run the following specification:

$$Log(Loans)_{l,j,i,t} = \beta_1 MaPP_{c,t-1} + \beta_2 MaPP_{c,t-1} \times \mathit{NBFI\ subs.}_{l,j} + \beta_3 \mathit{NBFI\ subs.}_{l,j} + \gamma_j + \mu_{i,t} + \epsilon_{l,j,i,t}, \quad (2)$$

where the dependent variable is the logarithm of the US dollar amount of new syndicated loans of lender l belonging to banking group j granted to nonfinancial firm i at time t (in some exercises we test for price effects using the all-in drawn spread over LIBOR).[12] $MaPP_{c,t-1}$ are the lagged MaPP shocks at the banking group-country level, while $\mathit{NBFI\ subs.}_{l,j}$ is a dummy variable equal to one when loans are intermediated by a NBFI subsidiary within a banking group.

We add banking-group fixed effects (γ_j), allowing us to center our analysis on possible substitution effects in the syndicated loan market between bank and nonbank subsidiaries *within* the same banking group. Accordingly, β_1 indicates the lending response of bank subsidiaries following a one-standard deviation MaPP tightening shock, while the main coefficient of interest, β_2, measures the differential lending provided by NBFI subsidiaries relative to bank subsidiaries within the same banking group after the MaPP shock. We also control for time-varying borrower characteristics with firm×quarter fixed effects ($\mu_{i,t}$). The inclusion of these fixed effects—in the spirit of Khwaja and Mian (2008)—implies that the identification of β_2 relies on variation in lending across different subsidiary types (bank versus nonbank) that belong to the same parent bank, lend to the same borrower and in the same quarter. In robustness checks, we relax

growth, bank stock price growth, and changes in banks' Z-scores, with the latter sourced from the World Bank's World Development Indicators. The Z-score is an inverse measure of default risk, with higher values indicating greater bank stability. All specifications include country and time fixed effects, and standard errors are clustered at the country level.

[11] We expand the sample to other nonbank parent companies in Section 3.6.

[12] To assess price effects, we aggregate the data at the tranche–lender-borrower–quarter level. This aggregation is more appropriate because differences in spreads across tranches (or loan facilities) issued by a given borrower in a given quarter primarily reflect facility-specific characteristics (e.g., revolving credit lines versus term loans), rather than differential pricing by lenders. Accordingly, we control for borrower demand using ILST fixed effects, rather than firm×quarter fixed effects. While spreads are determined at the facility level, banks and nonbanks differ in their participation (loan shares) across facilities within the same deal and quarter; using ILST fixed effects therefore preserves the cross-lender variation needed to identify differential pricing responses. In the spread regressions we also add the years to maturity as an additional control variable to account for the impact of loan duration on lenders' pricing decision.

this assumption by controlling for credit demand using industry-location-size-time (ILST) fixed effects, following Degryse et al. (2019).[13] ILST fixed effects compare borrowers within the same two-digit industry, country, and quarter, while further accounting for firm size by grouping firms into quartile bins of total borrowing volume within each country-year pair. Standard errors are clustered at the firm level to address within-firm correlation and potential dependence across multiple loans to the same borrower.

3.2 Banks' regulatory-induced reallocation? Lending through NBFIs

We run Equation (2) to analyze the differential lending to nonfinancial firms of NBFI subsidiaries relative to bank subsidiaries within the same banking group. Column (1) of Table 1 shows that bank lending in the syndicated loan market falls by 2.2 percent after a one-standard deviation MaPP tightening shock. Lower credit supply is consistent with the notion that tighter banking regulation constrains banks' lending capacity (Begenau and Landvoigt 2022, Albuquerque et al. 2025). The magnitude of this effect decreases considerably when controlling for demand with firm×quarter fixed effects, suggesting that demand plays a key role in loan dynamics after MaPP shocks (column 2).

Our key finding shows that banking groups *increase* credit supply through their NBFI subsidiaries, both relative to their bank subsidiaries and in absolute terms (column 3): while bank subsidiaries reduce lending by 1.0 percent, banking groups expand lending through their NBFI affiliates by 2.0 percent relative to bank entities, and by 1.0 percent in absolute terms. We interpret this pattern as novel evidence that MaPP tightening induces an intra-group reallocation of credit supply, whereby banking groups shift lending from more tightly regulated bank entities toward NBFI subsidiaries. Although we do not observe direct intra-group funding flows, our results are consistent with the role of global banks' internal capital markets in subsidizing lending to their nonbank affiliates, potentially at the expense of their bank subsidiaries (Bai et al. 2025). In this context, tighter MaPP may prompt parent banks to reallocate funds toward NBFI subsidiaries, possibly on more favorable terms, thereby enabling them to expand lending and partially offset the group-level impact of MaPP tightening.

A back-of-the-envelope calculation illustrates the magnitude of this offset. Using the average lending share of NBFI subsidiaries (28.4 percent) in our sample, we estimate that banking groups with NBFI affiliates were able to offset more than half of the contractionary effect of MaPP

[13] In these regressions, we also include time-invariant borrower fixed effects.

tightening on syndicated lending.[14]

Our main findings are driven by U.S. banking groups (columns 4), and to a lesser extent by euro area banking groups (column 6).[15] Our findings complement the recent evidence in Albuquerque et al. (2025) that nonbanks increase lending relative to banks following MaPP tightening. Our contribution is to show that banking groups mitigate the impact of tighter banking regulation by shifting lending from bank subsidiaries to their nonbanks.

Table 1: Effect of macroprudential policy shocks on credit supply

	(1) All	(2) All	(3) All	(4) U.S.	(5) U.K.	(6) EA
MaPP shock	-0.022***	-0.004***	-0.010***			-0.003
	(0.003)	(0.001)	(0.001)			(0.003)
MaPP shock × NBFI subs.			0.020***	0.053***	-0.003	0.005*
			(0.002)	(0.004)	(0.011)	(0.003)
NBFI subs.			0.039***	0.067***	-0.072***	0.024***
			(0.003)	(0.005)	(0.016)	(0.007)
Time FE	✓					
Banking group FE	✓	✓	✓	✓	✓	✓
Firm × Time FE		✓	✓	✓	✓	✓
Observations	719,874	696,913	696,913	201,751	31,580	134,242
R^2	0.284	0.894	0.894	0.852	0.842	0.888

Notes: Dependent variable is the log of new syndicated loans. Sample restricted to selected countries in columns (4) to (6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Our results are robust to relaxing the identification of demand by replacing firm×quarter fixed effects with ILST fixed effects (Table B.1 in Appendix B). Our novel regulatory-induced lending reallocation mechanism also materializes along the extensive margin, with NBFI subsidiaries more likely to form new lending relationships in response to MaPP tightening shocks, but we find the opposite result for nonbank subsidiaries of U.K. and euro area banking groups (Table B.2 in Appendix B). Moreover, bank-owned NBFI subsidiaries respond to tighter regulation by passing on higher regulatory costs to borrowers, but the economic magnitude is negligible: relative to bank subsidiaries, NBFI subsidiaries adjust facility-level spreads by an additional 1.5 basis points in response to a one-standard deviation MaPP shock (column 3 of Table B.3). We note, however, that the negligible increase in spreads is in addition to the already higher spreads charged by nonbanks on average (coefficient in the third row).

[14] We combine the estimated absolute effects for NBFI and bank subsidiaries, which implies that the overall reduction in syndicated lending at the group level is limited to -0.43 percent (1.0 × 0.284 - 1.0 × 0.716 = -0.43 percent), compared with -1.0 percent for bank entities alone. This corresponds to a mitigation ratio of (-0.43 + 1.0) / -1.0 = -0.57, or -57 percent.

[15] In these country-specific specifications the MaPP shock is common across borrowers and lenders, preventing us from estimating the average effect for bank subsidiaries (it is absorbed by firm×quarter fixed effects).

Examining heterogeneity among nonbanks, we find that our results are primarily driven by investment banks and broker-dealers, which is consistent with their predominance in our NBFI sample (Table B.4 in Appendix B). Interestingly, investment funds and asset managers (including hedge funds, private equity, and other alternative investment vehicles) do not appear to increase lending following tighter MaPP shocks. One possible explanation is that parent banks may predominantly shift lending from their bank subsidiaries to their investment bank arms, which tend to already be well established in the syndicated loan market. In addition, investment funds and asset managers may be more active in private or bilateral credit markets (e.g., direct lending and private debt funds) than in the syndicated loan market. This may then explain why any MaPP-induced reallocation toward those forms of credit would not be fully captured in our syndicated loan dataset. Finally, we conjecture that leverage constraints may also play a role: investment funds and asset managers are typically less leveraged than other NBFIs, such as investment banks, relying primarily on investor capital rather than borrowed funds, which may restrict their ability to expand lending.

An open question is whether the increase in lending by NBFI subsidiaries reflects greater risk-taking by the banking group. Prior research suggests that tighter home-country regulation, by reducing bank profitability, may induce multinational banks to take on more risk abroad—for instance, by relaxing credit standards through their foreign subsidiaries (Ongena et al. 2013) or by establishing new subsidiaries abroad (Demirgüç-Kunt et al. 2023). We examine the risk-taking hypothesis in our setting by augmenting Equation (2) to test whether lending to risky borrowers increases following tighter MaPP:

$$\begin{aligned} Log(Loans)_{l,j,i,t} &= \beta_1 MaPP_{c,t-1} + \beta_2 MaPP_{c,t-1} \times NBFI\ subs._{l,j} + \beta_3 NBFI\ subs._{l,j} \\ &+ Risky_{i,t-1} \times (\beta_4 MaPP_{c,t-1} + \beta_5 MaPP_{c,t-1} \times NBFI\ subs._{l,j} + \beta_6 NBFI\ subs._{l,j}) \\ &+ \gamma_j + \mu_{i,t} + \epsilon_{l,j,i,t}, \end{aligned} \quad (3)$$

where $Risky_{i,t-1}$ is a predetermined, time-varying dummy variable proxying risky borrowers. We use several balance sheet variables to capture firms' credit risk: high-PD firms, defined as firms with a PD over the next 24 months falling in the top quartile of the distribution; a dummy variable capturing firms with a loan-weighted average spread over the past five years in the top quartile of the sample distribution; a dummy variable representing leveraged loans; high-leveraged firms, defined as firms with a leverage ratio in the top quartile of the distribution; young firms, defined as firm age belonging to the first quartile; a zombie dummy from Albuquerque and Iyer (2024) that captures unprofitable and unviable firms; and firms with high debt and low liquid assets, the so-called vulnerable firms from Albuquerque (2024). The coefficient of interest β_5 measures the additional lending provided by NBFI subsidiaries to risky borrowers relative to other borrowers in response to a one-standard deviation MaPP tightening.

In Table 2 we report in each column a different time-varying proxy of risky borrowers. Across several alternative indicators of borrowers' credit risk, we do not find any statistical evidence that the increase in lending by NBFI subsidiaries during MaPP shocks is disproportionally channeled to risky borrowers. If anything, the fourth row in columns (2) and (3) show that NBFIs may favor lending to less risky borrowers—firms with lower spreads, and not leveraged loans. Although NBFIs tend to be more exposed to risky borrowers (the last row suggests higher lending to high-PD firms, highly leveraged firms and with limited liquid assets), we do not find that their exposure increases in response to MaPP tightening shocks, consistent with the findings in Albuquerque et al. (2025). We also do not find that NBFI subsidiaries increase their exposure to zombie firms due to tighter regulation.[16] Overall, by substituting lending from bank to nonbank subsidiaries, banking groups seem to decrease, or at least maintain, the overall risk in their lending portfolio.

Our findings appear to contrast with those of Bednarek et al. (2025), who document that nonbanks and non-EBA banks increased their exposure to riskier borrowers following the 2011 EBA stress test. Similarly, Bhardwaj and Javadekar (2025) show that a 2009 regulatory change in banks' risk weights on exposures to certain NBFIs in India prompted those NBFIs to lend to smaller, younger, and riskier firms. The apparent inconsistency between our results and these studies may reflect differences in sample coverage—we examine multiple countries rather than a single jurisdiction—and in the nature of the regulatory shocks analyzed. Specifically, while these studies focus on a single regulatory event, our identification relies on multiple macroprudential policy changes over the past two decades. Furthermore, our analysis captures *within–banking–group* effects, in contrast to studies comparing the behavior of lenders across different parent institutions.

[16] Albuquerque and Mao (forthcoming) show that monetary policy tightening can incentivize banks to offer more favorable credit terms to zombie firms in order to prevent defaults. Our result, by contrast, suggests that macroprudential policies operate differently from monetary policy in shaping banks' incentives to lend to zombie firms.

Table 2: Lending to risky borrowers

	(1) PD	(2) Spread 5y	(3) Lev. loan	(4) Lev. ratio	(5) Age	(6) Vuln	(7) Zombie
MaPP shock	-0.005	-0.014***	-0.019***	-0.004	-0.014***	-0.006*	-0.009***
	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
MaPP shock × NBFI subs.	0.016***	0.034***	0.058***	0.021***	0.015***	0.019***	0.022***
	(0.005)	(0.003)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
MaPP shock × Risky	-0.009	-0.003	-0.001	-0.010	0.009	0.001	0.022
	(0.007)	(0.004)	(0.004)	(0.007)	(0.008)	(0.007)	(0.016)
MaPP shock × NBFI subs. × Risky	-0.002	-0.014**	-0.012**	-0.015	0.001	-0.015	-0.006
	(0.010)	(0.006)	(0.006)	(0.010)	(0.010)	(0.014)	(0.020)
NBFI subs.	0.041***	0.039***	0.044***	0.036***	0.033***	0.038***	0.036***
	(0.008)	(0.004)	(0.006)	(0.008)	(0.012)	(0.007)	(0.007)
NBFI subs. × Risky	0.019*	0.010	0.004	0.032***	-0.012	0.032*	-0.039*
	(0.012)	(0.006)	(0.007)	(0.012)	(0.013)	(0.016)	(0.021)
Banking group FE	✓	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓	✓
Observations	103,949	345,509	281,128	112,040	52,731	107,051	147,417
R^2	0.801	0.833	0.839	0.803	0.881	0.803	0.882

Notes: Dependent variable is the log of new syndicated loans. Each column refers to different time-varying proxies of Risky borrowers. *PD* captures firms with the two-year probability of default in the top quartile of the distribution; *Spread 5y* refers to firms with an average spread in the top quartile over the past five years; *Lev. loan* stands for leveraged loans, defined as firms with a spread over 150 bps; *Lev. ratio* captures highly leveraged firms, i.e., firms with total debt over assets in the top quartile of the distribution; *Age* refers to firm age falling in the first quartile of the distribution; *Vuln* refers to vulnerable firms with high debt and low liquid assets; and *Zombie* is a dummy variable capturing unproductive and unviable firms. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Zooming in on bank heterogeneity, recent findings suggest that financially constrained banks are more likely to adjust their lending patters in response to tighter macroprudential policies, including by expanding lending abroad (Demirgüç-Kunt et al. 2023, Fabiani and Neanidis 2025). In particular, low-capitalized banks—whose capital ratios are closer to regulatory limits—face more binding constraints and higher funding costs at home, which incentivizes them to lend in markets with less restrictive regulation. Building on this evidence, we test whether similar patterns hold for NBFI subsidiaries by examining how their lending behavior varies with the financial strength of their parent banking groups.[17] Specifically, we assess whether financially weaker banks redirect more lending through their NBFI subsidiaries following MaPP tightening. In this regression, we replace banking-group fixed effects with individual-lender fixed effects, as our goal is to examine how the responses of lenders, banks and nonbanks, differ *between* banking groups with varying balance sheet strength (e.g., those with high versus low capital ratios).

We capture financial strength of the banking group using four proxies: (i) the probability

[17] We use the balance sheet of the parent bank, as the lending behavior of subsidiaries is typically more sensitive to the cash flow and capital position of the parent group rather than that of the subsidiary itself (Houston et al. 1997, De Haas and van Lelyveld 2010, Cetorelli and Goldberg 2011, De Haas and Van Horen 2013).

of default (PD), (ii) nonperforming loans (NPLs), (iii) the Tier 1 capital ratio, and (iv) size, measured as the logarithm of total assets. For the first two measures, we construct time-varying dummy variables that identify 'weak' banking groups as those in the top quartile of the distribution of PDs or NPLs. Similarly, we classify as weak those banking groups with capital ratios or total assets in the bottom quartile of the sample distribution.

The third row of Table 3 shows that weaker banking groups tend to provide less lending through their bank affiliates compared to stronger banking groups following MaPP tightening.[18] This result seems to be driven by a differential response to regulatory tightening: banking groups with weaker balance sheets—higher distress risk, lower capitalization, or smaller size—increase lending through affiliated NBFI subsidiaries by more (fourth row). This finding aligns with available empirical evidence that low-capitalized banks expand foreign lending when regulation tightens at home (Demirgüç-Kunt et al. 2023, Fabiani and Neanidis 2025). Our contribution is to highlight a complementary, previously undocumented mechanism: financially weaker banking groups appear to shift lending more toward their NBFI affiliates, which are likely to be less affected by direct regulatory constraints.

Table 3: Banking group characteristics

	(1) PD	(2) NPLs	(3) T1R	(4) Size
MaPP shock	-0.015***	-0.017***	-0.001	0.013***
	(0.003)	(0.003)	(0.004)	(0.005)
MaPP shock × NBFI subs.	0.002	0.007**	-0.009*	-0.022***
	(0.003)	(0.003)	(0.005)	(0.005)
MaPP shock × Bank charact.	-0.007	-0.005	-0.019***	-0.040***
	(0.005)	(0.014)	(0.004)	(0.005)
MaPP shock × NBFI subs. × Bank charact.	0.025***	-0.013	0.025***	0.025***
	(0.006)	(0.018)	(0.005)	(0.008)
Bank charact.	-0.007	-0.054***	0.048***	0.006
	(0.006)	(0.013)	(0.005)	(0.011)
Banking group controls	✓	✓	✓	✓
Lender FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	233,003	233,003	233,003	233,003
R^2	0.846	0.846	0.846	0.846

Notes: Dependent variable is the log of new syndicated loans. Each column refers to a specific bank characteristic: *PD* and *NPLs* refer to banks with a two-year PD (NPLs) in the top quartile of the sample distribution, while *T1R* and *Size* refer to banks with Tier 1 capital ratio (log of total assets) in the first quartile of the sample distribution. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

[18] We add several lagged time-varying bank controls, namely the logarithm of total assets, the return on assets, NPLs, Tier one capital ratio, the leverage ratio, and the two-year probability of default.

To sum up, we show that tighter bank regulation induces a reallocation of credit within banking groups, with lending shifting from bank subsidiaries to affiliated NBFI entities. This effect is particularly pronounced for financially weaker banks, which face stronger incentives to mitigate regulatory costs. Previous specifications, apart from Table 3, document this lending behavior within banking groups, leaving open the question of between-group effects. In Table B.5 in Appendix B, we include individual lender fixed effects to isolate the differential effect of MaPP shocks on NBFI versus bank subsidiaries across lenders.[19]

The new results also reveal inter-group credit supply substitution: banking groups increase lending via their NBFI affiliates relative to bank subsidiaries by approximately 0.9 percent. This between-group effect is roughly half the magnitude of the within-group effect reported in Table 1, suggesting that substitution from bank to nonbank subsidiaries is stronger within banking groups than across them. As before, we observe qualitatively similar patterns for U.S. and euro area lenders.

3.3 Regulation of parent banks versus nonbank subsidiaries

Our findings suggest that banking groups can partially offset tighter bank regulation by expanding credit supply through their NBFI affiliates while simultaneously charging higher loan rates, thereby preserving, or even enhancing, profitability at the group level. Before continuing with our empirical analysis, we take a step back to describe the regulatory framework faced by parent banks relative to their (nonbank) subsidiaries. The reallocation of lending documented in this paper appears to be facilitated by the prevailing regulatory perimeter in many jurisdictions, under which commercial banks are subject to extensive prudential oversight, while nonbanks face comparatively lighter regulation.

In the United States, for example, commercial banks are regulated by the Federal Reserve, the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC), and are required to comply with stringent capital, liquidity, activity, and safety-and-soundness requirements (Avraham et al. 2012). By contrast, most NBFI affiliates are not subject to bank-like capital or liquidity regulation. Moreover, the Federal Reserve does not oversee the day-to-day activities of broker-dealers, insurers, or asset managers, which

[19] The individual lender fixed effects in Table B.5 absorb all time-invariant characteristics of each subsidiary. The estimated coefficient on the MaPP $\times$ NBFI interaction therefore identifies differential responses across lenders rather than strictly at the banking-group level. When parents have multiple subsidiaries, some within-group variation is absorbed by these fixed effects. We refer to this as the 'between-group' effect for expositional simplicity, but technically it reflects the average differential effect across lenders in our sample.

instead fall under the supervision of functional regulators, such as the SEC and FINRA for broker-dealers, and the SEC for asset managers, whose mandates primarily emphasize investor protection and market integrity rather than systemic risk.

Although Regulation Y subjects U.S. bank holding companies to consolidated supervision by the Federal Reserve, risks originating in NBFI subsidiaries are relevant for supervisory purposes only insofar as they affect the group's aggregate capital and liquidity position. At the same time, nonbank subsidiaries within banking groups are not directly subject to bank-level capital, liquidity, or other macroprudential requirements. As a result, macroprudential tightening primarily binds insured depository institutions, while nonbank affiliates are affected only indirectly through consolidated constraints and supervisory oversight. This regulatory architecture provides banking groups with considerable scope to reallocate lending activity toward their nonbank arms, particularly in syndicated loan markets where exposures can be shifted relatively easily across entities.

3.4 Foreign subsidiaries and cross-border lending

Our core finding—that NBFI subsidiaries allow banking groups to partially offset tighter macroprudential policies—should be viewed in the broader literature emphasizing the role of cross-country regulatory differences in shaping bank capital flows. Prior research shows that banks reallocate funds toward jurisdictions with looser regulation (Houston et al. 2012, Ongena et al. 2013, Danisewicz et al. 2017, Franch et al. 2021, Demirgüç-Kunt et al. 2023), are more likely to establish branches or subsidiaries in countries with lighter regulation (Houston et al. 2012, Frame et al. 2020, Demirgüç-Kunt et al. 2023), and tend to acquire banks in more permissive regulatory environments (Karolyi and Taboada 2015). This literature focuses exclusively on foreign bank subsidiaries, not NBFIs.

In theory, banking groups can use their foreign bank subsidiaries to offset tighter regulation at home since they are subject to host-country regulation rather than the parent's home-country rules.[20] We conjecture that banks can also use their foreign NBFI subsidiaries, not only domestic NBFIs, a topic that has not been explored. Given their lighter regulatory treatment, these entities are unlikely to fall squarely under either home- or host-country regulation.

[20] We emphasize that we focus exclusively on subsidiaries in this paper, not branches. Foreign bank branches remain under the home-country regulator, while subsidiaries are subject to regulation in the host country. This distinction makes subsidiaries the relevant vehicle through which differences in regulatory regimes across jurisdictions affect lending decisions. For a comparison between branches and subsidiaries, see Danisewicz et al. (2017) and Franch et al. (2021).

Against this backdrop, we investigate whether banking groups rely on foreign bank subsidiaries to mitigate regulation at home, and whether our earlier results on NBFIs are driven primarily by domestic or foreign entities. This distinction allows us to contribute to the literature in one of two possible ways. If foreign NBFIs were driving our main results, our findings would largely align with existing evidence on the role of foreign entities in the transmission of regulatory differences, rather than pointing to a distinct new channel (Houston et al. 2012, Ongena et al. 2013, Danisewicz et al. 2017, Cerutti et al. 2017, Cerutti and Zhou 2018, Franch et al. 2021, Demirgüç-Kunt et al. 2023). By contrast, if domestic NBFIs are the key driver, this would point to a previously undocumented intra-group reallocation channel through which banking groups mitigate the effects of tighter regulation.

We adapt Equation (3) by replacing the risky borrower dummy with a foreign subsidiary dummy that captures whether a subsidiary (bank or NBFI) is located outside the parent bank's home country. Columns (2) and (3) of Table 4 are consistent with the literature's earlier findings: foreign subsidiaries help parent banks cushion the impact of tighter regulation at home. In particular, column (3) shows that foreign bank subsidiaries increase lending by 2.4 percent relative to domestic bank subsidiaries (1.1 percent in absolute terms). The picture looks different for NBFIs. Domestic NBFIs expand lending by 2.1 percent relative to their foreign counterparts, which do not adjust lending in response to MaPP shocks (sum of all coefficients yield a statistically insignificant point estimate of –0.4 percent). Taken together, these findings reinforce our earlier novel result on the key role of NBFI subsidiaries, showing that the overall effect is driven by domestic rather than by foreign NBFIs.

The absence of a response from foreign NBFIs may seem puzzling at face value. There are two interrelated plausible explanations. First, banking groups do not frequently use their foreign NBFIs to participate in the corporate syndicated loan market as we have seen in Figure 1 in the introduction; foreign NBFIs accounted for only 2.2 percent of all banking group lending over our estimation sample. In addition, this share has been declining over time, representing 0.9 percent in 2024. Second, from the banking groups' perspective, there are benefits of keeping lending channels close to home. Domestic NBFIs can more easily share management, risk systems, and internal information flows with their parent, making it less costly to redirect funds through them. By contrast, foreign NBFIs may lack these within-group synergies, reducing their usefulness as a conduit when regulation tightens at home.

Table 4: The role of foreign subsidiaries

	(1) All	(2) All	(3) All	(4) Cross-border	(5) Cross-border	(6) Cross-border	(7) Cross-border (excl. EA)
MaPP shock	-0.004***	-0.006***	-0.013***	-0.005***	-0.008***	-0.008***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
MaPP shock × Foreign subs.		0.013***	0.024***		0.019***	0.018***	0.030***
		(0.004)	(0.004)		(0.004)	(0.004)	(0.006)
MaPP shock × NBFI subs.			0.021***			0.001	0.003
			(0.002)			(0.003)	(0.004)
MaPP shock × Foreign subs. × NBFI subs.			-0.036***			0.005	-0.017
			(0.009)			(0.010)	(0.015)
Foreign subs.		-0.049***	-0.039***		-0.025***	-0.032***	-0.011
		(0.004)	(0.004)		(0.005)	(0.005)	(0.007)
NBFI subs.			0.040***			-0.017***	-0.023***
			(0.003)			(0.005)	(0.006)
Foreign subs. × NBFI subs.			-0.035***			0.031***	0.045***
			(0.010)			(0.011)	(0.016)
Banking Group FE	✓	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓	✓
Observations	696,913	696,909	696,909	258,743	258,742	258,742	153,061
R^2	0.894	0.894	0.894	0.854	0.854	0.854	0.860

Notes: Dependent variable is the log of new syndicated loans. Sample is restricted to cross-border lending in columns (4) to (7). Column (7) excludes euro area lenders. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Columns (4) to (7) restrict the sample to cross-border flows, where the borrower is located in a different country from the parent bank. Column (4) shows that cross-border lending also declines on average after a MaPP tightening shock in the source country, with foreign affiliates mitigating the fall (column 5). But in this setting, both foreign bank and NBFI subsidiaries play a somewhat larger role than domestic NBFIs in offsetting the impact of tighter regulation (column 6). This suggests that banks rely more on domestic NBFIs to sustain lending to home-country borrowers, while both foreign bank subsidiaries and foreign NBFI subsidiaries are used primarily to support lending abroad (although foreign NBFIs do not account for a large share of lending, as previously noted). The increased lending activity by domestic NBFIs and foreign affiliates stresses the importance of the key role of banking groups' internal capital markets in reallocating funds across borders. We get qualitatively similar results when excluding euro area lenders from the sample in column (7), to account for the possibility that reciprocity in some macroprudential policies within the euro area may mitigate leakages through cross-border flows between euro area countries.

We further explore heterogeneity in cross-border lending by examining whether parent banks mitigate MaPP shocks more strongly in their core markets, defined as countries where they have a relatively large lending presence. For each banking group, we compute the average share of loans to a given country relative to its total cross-border lending. We then construct a *high country loan share* dummy equal to one when this share falls in the top quartile of the distribution across all banking groups, and a *low country loan share* dummy equal to one when it falls in the bottom quartile.

Table 5: Lenders' country share and NBFI subsidiaries

	(1) High	(2) High	(3) Low	(4) Low
MaPP shock	-0.007***	-0.009***	-0.008***	-0.008***
	(0.001)	(0.002)	(0.002)	(0.002)
MaPP shock × Foreign subs.	0.011**	0.010**	0.029***	0.024***
	(0.004)	(0.005)	(0.005)	(0.005)
MaPP shock × Ctry shr	-0.005	0.004	0.004	0.001
	(0.003)	(0.004)	(0.003)	(0.003)
MaPP shock × Foreign subs. × Ctry shr	0.048***	0.051***	-0.037***	-0.029***
	(0.010)	(0.011)	(0.008)	(0.009)
MaPP shock × NBFI subs.		0.008***		-0.002
		(0.003)		(0.003)
MaPP shock × Foreign subs. × NBFI subs.		0.004		0.019
		(0.012)		(0.012)
MaPP shock × NBFI subs. × Ctry shr		-0.037***		0.011**
		(0.007)		(0.005)
MaPP shock × Foreign subs. × NBFI subs. × Ctry shr		-0.007		-0.045**
		(0.024)		(0.022)
Foreign subs.	-0.026***	-0.033***	-0.021***	-0.029***
	(0.005)	(0.006)	(0.006)	(0.006)
Ctry shr	0.030***	0.024***	-0.050***	-0.049***
	(0.005)	(0.005)	(0.004)	(0.005)
Foreign subs. × Ctry shr	-0.005	-0.015	-0.031***	-0.032***
	(0.011)	(0.012)	(0.008)	(0.009)
NBFI subs.		-0.033***		-0.017***
		(0.005)		(0.005)
Foreign subs. × NBFI subs.		0.041***		0.036***
		(0.012)		(0.013)
NBFI subs. × Ctry shr		0.042***		-0.008
		(0.008)		(0.006)
Foreign subs. × NBFI subs. × Ctry shr		0.007		0.006
		(0.027)		(0.021)
Banking group FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	258,742	258,742	258,742	258,742
R^2	0.854	0.854	0.854	0.854

Notes: Dependent variable is the log of new syndicated loans. *Ctry shr* in columns 1-2 (3-4) refers to countries in which banks have a high (low) presence. Sample restricted to cross-border flows. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Restricting the analysis to cross-border loans, we find that, in response to tighter MaPP, banking groups use their foreign affiliates to mitigate the contraction in credit supply in those markets where they have a large presence (column 1 of Table 5). This is consistent with the literature finding that global banks scale back lending in non-core countries in the face of liquidity and regulatory shocks to preserve lending to core countries (De Haas and van Lelyveld 2010, Cetorelli and Goldberg 2012, Aiyar et al. 2014). Column (2) shows that the increased lending response to markets where banking groups have a large presence is mostly driven by an increase in lending by foreign bank subsidiaries, and to a lesser extent by foreign NBFI subsidiaries: foreign bank subsidiaries increase lending by an additional 5.5 percent in core markets relative to other markets (sum of third and fourth columns), and foreign NBFIs expand lending by 1.1 percent in core markets relative to other markets (0.4 + 5.1 - 3.7 - 0.7). Another way to illustrate the same findings is by exploring the heterogeneity between countries where banking groups have a small presence relative to others (columns 3-4). Consistent with earlier findings, foreign subsidiaries cut lending in non-core markets relative to other markets.

Overall, our results provide evidence of a novel intra-group adjustment channel that operates during periods of tighter banking regulation. Our contribution is to show that banking groups rely not only on foreign bank affiliates, but also on domestic NBFIs to buffer the impact of regulation on lending. Moreover, banks appear to use these entities for distinct purposes: foreign bank and NBFI subsidiaries mitigate the effect of regulation on cross-border lending—especially in core markets where banking groups have a large presence—while domestic NBFIs cushion the effect on lending at home. This dual strategy allows parent banks to reduce the impact of tighter macroprudential regulation both abroad, as documented in earlier studies (Houston et al. 2012, Ongena et al. 2013, Danisewicz et al. 2017, Frame et al. 2020, Franch et al. 2021, Demirgüç-Kunt et al. 2023), and—newly shown here—at home.

3.5 Macroprudential shocks in the host country

Thus far, we have assumed that regulatory tightening occurs in the parent bank's home country, prompting banks to expand lending domestically through their NBFI affiliates and abroad through their foreign subsidiaries. A natural question is whether parent banks engage in similar intra-group lending reallocation when tightening instead takes place in the host countries of their foreign affiliates. The evidence is mixed. Using BIS banking statistics, Houston et al. (2012) find that tighter regulation abroad reduces bank capital inflows, and Franch et al. (2021) show that euro area banks curtail lending following higher capital requirements abroad. In contrast, Fabiani and Neanidis (2025) find no significant effect of host-country macroprudential tightening on cross-border interbank lending.

To investigate this, we re-estimate the previous specification, but now match MaPP shocks at the borrower-country level, so that the shocks directly affect macroeconomic conditions, including credit demand, in the country where foreign subsidiaries operate. A key difference relative to Table 4 is that the average effect cannot be estimated when controlling for time-varying borrower demand, as borrower-country MaPP shocks are collinear with firm×quarter fixed effects. Another difference is that we also distinguish between 'host' subsidiaries, referring to bank or NBFI subsidiaries operating in the country where MaPP tightens, 'home' subsidiaries, referring to lenders located in the parent bank's home or source country, and 'foreign' subsidiaries, referring to lenders located in a third country. In Table 6, we report the differential loan supply responses for each lender type relative to (domestic) bank subsidiaries.

We start off by showing that banking groups' credit supply falls following MaPP tightening shocks in the host country: column 1 of Table 6 reports a negative average effect when not controlling for time-varying borrower characteristics. Column (2) adds all interaction terms; we find that both domestic and host NBFI subsidiaries expand lending by respectively 2.1 percent and 1.6 percent relative to home bank subsidiaries during host-country MaPP tightening. This is consistent with our earlier findings for lender-country shocks, but now we show that parent banks also use their NBFIs to mitigate tighter regulation *abroad*. By contrast, host bank subsidiaries contract lending in a manner similar to domestic bank subsidiaries (the coefficient of 0.001 in column 2 is not statistically significant, but the average effect in column 1 is negative).

The regression also estimates separately the lending behavior of 'foreign' subsidiaries that are neither located in the country of the parent nor in the host country where regulation is tightening. We find that foreign bank affiliates located in a third country also increase lending differentially by 1.6 percent relative to home bank subsidiaries, while foreign NBFIs curtail lending somewhat (although they account for a very small share of total lending). Overall, we find that both home and host NBFIs, together with bank subsidiaries located in a third country, are the main channel mitigating tighter host-country regulation. This pattern is consistent with the view that tighter host-country regulation constrains directly only the bank subsidiaries subject to the shock. Accordingly, our results show that entities with looser regulation, or even outside of the regulatory perimeter, play an important role in maintaining lending in the syndicated loan market when regulation tightens.

One could argue, however, that host-country shocks may partly reflect policy responses by local authorities to counteract excessive capital inflows triggered by tighter macroprudential policies in banking groups' home countries. To control for this possibility, we add country–lender

MaPP shocks in column (3). The results are unaffected: our estimates remain stable, and the coefficients on the home-country MaPP shocks are qualitatively similar to those reported in column (3) of Table 4, stressing the important role of NBFIs (domestic and located in the host country) in mitigating the effect of MaPP shocks abroad, and of foreign bank and NBFI affiliates ('host subs.' in this regression) in mitigating the shocks at home.

Table 6: MaPP shocks in the host country

	(1) All	(2) All	(3) All	(4) Cross-border	(5) Cross-border	(6) Cross-border
MaPP shock (host)	-0.029***			-0.040***		
	(0.005)			(0.006)		
MaPP shock (host) × NBFI subs.		0.021***	0.014***		0.003	0.002
		(0.002)	(0.002)		(0.003)	(0.003)
MaPP shock (host) × Host subs.		0.001	-0.004		0.001	-0.001
		(0.006)	(0.006)		(0.007)	(0.007)
MaPP shock (host) × Host subs. × NBFI subs.		-0.005	0.005		-0.003	0.001
		(0.013)	(0.014)		(0.014)	(0.015)
MaPP shock (host) × Foreign subs.		0.016***			0.006	
		(0.005)			(0.006)	
MaPP shock (host) × Foreign subs. × NBFI subs.		-0.055***			-0.022	
		(0.014)			(0.015)	
MaPP shock			-0.011***			-0.007***
			(0.001)			(0.002)
MaPP shock × NBFI subs.			0.013***			0.001
			(0.002)			(0.003)
MaPP shock × Host subs.			0.036***			0.026***
			(0.005)			(0.006)
MaPP shock × Host subs. × NBFI subs.			-0.036***			-0.017
			(0.012)			(0.014)
NBFI subs.		0.042***	0.043***		-0.013**	-0.008
		(0.003)	(0.003)		(0.005)	(0.005)
Host subs.		-0.034***	-0.028***		-0.018**	-0.009
		(0.006)	(0.006)		(0.007)	(0.007)
Host subs. × NBFI subs.		-0.036***	-0.038***		0.015	0.009
		(0.013)	(0.013)		(0.014)	(0.015)
Foreign subs.		-0.041***			-0.038***	
		(0.006)			(0.007)	
Foreign subs. × NBFI subs.		-0.030**			0.047***	
		(0.014)			(0.017)	
Time FE	✓					
Banking group FE	✓	✓	✓	✓	✓	✓
Firm × Time FE		✓	✓	✓	✓	✓
Observations	692,625	672,537	667,861	262,551	234,147	229,704
R^2	0.275	0.896	0.897	0.075	0.858	0.857

Notes: Dependent variable is the log of new syndicated loans. Sample is restricted to cross-border lending in columns (4) to (6). MaPP shocks at the country-borrower level (columns 1-2, and 4-5) and adding country-lender level (columns 3 and 6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

In columns (4)-(6), we restrict the sample to cross-border flows, i.e., cases where the borrower's country differs from the parent bank's home country. We find that cross-border lending declines on average by 4 percent (column 4), and that this decline seems to be broad-based across the different subsidiaries. This suggests that regulatory shocks abroad lead parent banks to privilege domestic lending.

In sum, the evidence points to important differences in banking groups' behavior across locations of regulatory tightening. When regulation tightens at home, parent banks reallocate cross-border lending toward their foreign affiliates, which are not directly affected by source-country regulation, while using domestic NBFIs to sustain lending at home. By contrast, when host-country bank subsidiaries face tighter regulation, parent banks partially offset the reduction in credit supply by channeling lending through their domestic and host NBFI subsidiaries.

3.6 Bank-owned NBFIs vs other NBFIs

Up to this point, we have focused on how MaPP shocks affected the differential lending response of NBFIs relative to banks within banking groups. In this section, we extend the analysis by including NBFIs not owned by banking groups. This allows us to test whether the observed increase in lending by NBFI subsidiaries following MaPP shocks is specific to banking-group affiliation or reflects the NBFI business model more broadly—specifically, their exposure to a lighter regulatory environment irrespective of ownership.

In the expanded sample, we cover 955 unique banking groups, and 939 unique nonbanking groups. In total, we have 2,950 bank entities, 1,692 NBFIs not affiliated with banking groups, and 824 bank-owned NBFI subsidiaries. While bank-affiliated NBFIs are roughly half as numerous as other NBFIs, they account for a substantially larger share of syndicated loans in our sample, averaging around 27 percent of all loans compared to 9 percent for other NBFIs (Figure B.2 in Appendix B). Our new model expands Equation 2:

$$\begin{aligned} Log(Loans)_{l,j,i,t} &= \beta_1 MaPP_{c,t-1} + NBFI_{l,j} \times (\beta_2 MaPP_{c,t-1} + \beta_3 MaPP_{c,t-1} \times BG\ subs_j + \beta_4 BG\ subs_j) \\ &+ \gamma_l + \mu_{i,t} + \epsilon_{l,j,i,t}, \end{aligned} \quad (4)$$

where $NBFI_{l,j}$ is a dummy variable taking the value of one for nonbank lenders, either owned by banking or nonbanking groups j, while $BG\ subs_j$ is a dummy variable for lenders that belong to banking groups (this is the previously used NBFI subsidiary dummy, but renamed to avoid confusion with the other NBFIs in the specification). Since we are interested in the differential lending response of bank-owned NBFIs against the response of NBFIs that do not belong to banking groups, we run this specification with individual lender fixed effects γ_l. The coefficient

β_1 measures the average lending response of bank entities to a MaPP shock, β_2 captures the additional lending response for NBFIs not owned by banking groups, and β_3 indicates the additional lending response of bank-owned NBFI subsidiaries relative to other NBFIs.

Our extended specification indicates that other NBFIs (not affiliated with banking groups) reduce lending to NFCs by 0.7 percent relative to banks following a one-standard-deviation MaPP tightening shock (column 3 of Table 7). In contrast, bank-owned NBFI subsidiaries increase lending, by 1.8 percent, relative to other NBFIs. This pattern is driven lenders from the United States (column 4), consistent with earlier results. This evidence suggests that NBFIs outside banking groups behave fundamentally differently from NBFI subsidiaries of banking groups. Importantly, this novel finding complements Albuquerque et al. (2025), showing that the increase in lending by nonbanks after a MaPP shock (and possibly also after a monetary policy shock) is driven exclusively by NBFIs belonging to banking groups, rather than by other NBFIs.

Table 7: Effect of macroprudential policy shocks on credit supply: adding other NBFIs

	(1) All	(2) All	(3) All	(4) U.S.	(5) U.K.	(6) EA
MaPP shock	-0.029***	-0.006***	-0.009***			-0.003
	(0.003)	(0.001)	(0.001)			(0.003)
MaPP shock × NBFI			-0.007**	-0.021***	0.013	0.003
			(0.003)	(0.007)	(0.036)	(0.004)
MaPP shock × NBFI × BG subs.			0.018***	0.062***	-0.019	0.002
			(0.003)	(0.007)	(0.037)	(0.004)
NBFI × BG subs.			0.000	-0.097**	-0.015	0.030
			(0.016)	(0.047)	(0.099)	(0.021)
Time FE	✓					
Lender FE	✓	✓	✓	✓	✓	✓
Firm × Time FE		✓	✓	✓	✓	✓
Observations	782,594	761,629	761,629	234,795	32,599	150,994
R^2	0.303	0.895	0.895	0.856	0.847	0.890

Notes: Dependent variable is the log of new syndicated loans. *BG* stands for Banking Group. Sample restricted to selected countries in columns (4) to (7). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Why do NBFIs that are not part of banking groups fail to expand their market share in the syndicated loan market when bank regulation tightens? To explore this question, we compare their lending response with that of bank-owned NBFIs in countries where banking groups have a large presence. Specifically, we examine whether bank-owned NBFIs crowd out other NBFIs in markets where the parent bank is strongly established. Building on Table 5, which shows that both NBFIs and foreign bank subsidiaries help banking groups maintain market share, we hypothesize that other NBFIs face tighter competitive constraints when bank-owned NBFIs and foreign affiliates expand in the banking group's core markets. We test this hypothesis using the following specification:

$$
\begin{aligned}
Log(Loans)_{l,j,i,w,t} = \; &= \beta_1 MaPP_{c,t-1} + \beta_2 MaPP_{c,t-1} \times NBFI_{l,j} + \beta_3 MaPP_{c,t-1} \times NBFI_{l,j} \times BG\ subs_j \\
&+ Ctry\ shr_{w,t-1} \times (\beta_4 MaPP_{c,t-1} + \beta_5 MaPP_{c,t-1} \times NBFI_{l,j} + \beta_6 MaPP_{c,t-1} \times NBFI_{l,j} \times BG\ subs_j) \\
&+ \gamma_l + \mu_{i,t} + \epsilon_{l,j,i,w,t}, \qquad (5)
\end{aligned}
$$

where Ctry $\text{shr}_{w,t-1}$ is a dummy variable equal to one if the share of syndicated loans originated by banking groups in country w, relative to total syndicated loans in their portfolios at time t, falls in the top quartile of the sample distribution. This country share dummy differs from that in Table 5: here, we first aggregate loans across all banking groups rather than at the individual group level, allowing us to examine the lending response of other NBFIs in countries where banking groups, in aggregate, hold a large market share. We focus particularly on $\beta 5$ and β_6, which capture the lending response to MaPP shocks of other NBFIs and bank-owned NBFIs, respectively, relative to bank subsidiaries in high-banking group loan share countries.

Column (1) of Table 8 shows that, after a tightening MaPP shock, other NBFIs increase lending by 3.9 percent and 3.7 percent respectively relative to bank and NBFI subsidiaries in countries where banking groups do not have a large presence. In turn, the triple interaction term $MaPP_{c,t-1} \times NBFI_{l,j} \times \text{Ctry shr}_{w,t-1}$ indicates that other NBFIs reduce lending substantially relative to bank-owned NBFI and bank subsidiaries in countries where banking groups have a high share of lending. This set of results seem to be driven entirely by domestic lending in column (2). We interpret this as evidence that banking groups engage in stronger lending reallocation at home, primarily through their NBFI subsidiaries, when they hold a large market stake. In these circumstances, lending by other NBFIs is crowded out, consistent with a competition effect whereby parent banks use their NBFIs to protect domestic market share.

The crowding-out effect on the lending of other NBFIs may stem from the advantages enjoyed by subsidiaries within banking groups. Entities affiliated with bank holding companies typically have better access to internal financial resources, through other bank and nonbank subsidiaries within the group, as well as greater access to external funding via the parent's connections to public equity markets (Ashcraft 2008).[21] Moreover, internal capital markets allow parent

[21] There is a large strand of the literature documenting the benefits of being a subsidiary of a banking group. For instance, banking reforms in the late 1980s in the United States had significant effects on the relationship between parent banks and their affiliates. Banks affiliated with holding companies were more likely to receive capital support when distressed, recovered more quickly, and faced a lower probability of failure in subsequent years (Ashcraft 2008). This evidence supports the view that parent banks tend to prevent the failure of their subsidiaries, conditional on their own capacity to absorb losses. Accordingly, the financial health of the parent

banks to reallocate funds across affiliates when their own capital position is affected, supporting the expansion of NBFI subsidiaries. In fact, even if the NBFI subsidiary itself cannot collect deposits, being part of a banking group gives them indirect access to the parent's deposit base or wholesale lines (and potentially also implicit guarantees).

Table 8: Lenders' country share and other NBFIs

	(1) All	(2) Domestic	(3) Cross-border
MaPP shock	0.002		0.002
	(0.003)		(0.003)
MaPP shock × NBFI	0.039***	0.046	0.044***
	(0.010)	(0.037)	(0.011)
MaPP shock × NBFI × BG subs.	-0.037***	-0.063*	-0.040***
	(0.010)	(0.034)	(0.011)
MaPP shock × Ctry shr	-0.013***		-0.008**
	(0.003)		(0.004)
MaPP shock × NBFI × Ctry shr	-0.051***	-0.065*	-0.050***
	(0.010)	(0.038)	(0.011)
MaPP shock × NBFI × BG subs. × Ctry shr	0.060***	0.103***	0.044***
	(0.011)	(0.035)	(0.012)
NBFI × BG subs.	-0.002	-0.047	0.087***
	(0.020)	(0.244)	(0.021)
NBFI × Ctry shr	0.015	-0.115	0.012
	(0.011)	(0.120)	(0.012)
NBFI × BG subs. × Ctry shr	0.004	-0.067	-0.001
	(0.012)	(0.241)	(0.013)
Lender FE	✓	✓	✓
Firm × Time FE	✓	✓	✓
Observations	761,626	446,693	281,083
R^2	0.895	0.911	0.858

Notes: Dependent variable is the log of new syndicated loans. *Ctry shr* refers to countries in which banking groups have a high presence. Sample restricted to domestic loans in column (2) and cross-border loans in column (3). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Consistent with this view, Bai et al. (2025) find that nonbank affiliates receive more favorable credit conditions from their parent banks than do bank affiliates. This evidence aligns with our finding that NBFI subsidiaries expand lending more than both bank subsidiaries and NBFIs that are not bank-owned. Our conjecture is that the internal capital markets available to bank-owned NBFIs give them a competitive advantage over other NBFIs, which likely do not receive

bank directly affects the financial condition of its subsidiaries (Houston et al. 1997, De Haas and van Lelyveld 2010, Cetorelli and Goldberg 2011, De Haas and Van Horen 2013). As a corollary, affiliates of financially stronger parent banks are able to expand lending more rapidly (De Haas and van Lelyveld 2010). Conversely, global banks may also transmit the adverse effects of domestic shocks to their foreign affiliates (Houston et al. 1997, Ashcraft 2008, Cetorelli and Goldberg 2011, De Haas and Van Horen 2013).

priority access to bank funding when MaPP tightens.

4 High-frequency identification of MaPP announcements

4.1 Construction of MaPP announcements

We complement our baseline residual-based extraction of MaPP shocks with a high-frequency (HF) identification strategy based on announcement events. This approach follows the identification methods widely used in the monetary policy literature and, more recently by Drechsel and Miura (2025) for U.S. banking regulation shocks. We construct a comprehensive set of lender-based MaPP announcements for the six largest country lenders in our syndicated loan market, the United States, Japan, the United Kingdom, Germany, France, and Canada. For all countries except Canada, we draw on the iMaPP database. For Canada, we rely on the event list compiled by Duprey and Tuzcuoglu (2025). Two considerations are central to building our series of shocks.

First, the iMaPP database reports both announcement and implementation dates for each macroprudential measure. We extract the initial announcement date for each measure, including cases in which the announcement and implementation occur on the same day. Second, most MaPP announcements are recorded only at the monthly frequency, which is insufficient for a high-frequency event-study design. To recover precise daily timestamps, we manually identify the exact release dates by consulting official regulatory communication channels, including central bank press releases, supervisory authority bulletins, and government gazettes. We then corroborate these findings using LLM-assisted searches to cross-validate both the timing and the content of each announcement. This two-step procedure ensures that event dates are accurate and comparable across countries, enabling us to construct a consistent high-frequency MaPP shock series.

Table 9 summarizes the number of MaPP announcement events collected for the six countries in our sample. We identify a total of 196 announcements related to lender-based measures, 64 of which refer to capital-based tools. Among all events, only six overlap with monetary policy announcements, two in Germany and France, and one each in the U.K., France, and Japan. Excluding these six events does not affect the results. To maintain consistency with the residual-based MaPP shocks used in our baseline analysis, we restrict the set of measures to lender-based MaPP announcements that exclude capital-based measures (the latter are incorporated in a robustness check). This results in a final set of 132 events for the HF analysis.

Table 9: Number of MaPP announcements by country and type

Country	Capital-based	Lender-based excl. cap.	Total
CAN	9	12	21
DEU	6	32	38
FRA	11	33	44
GBR	22	17	39
JPN	5	6	11
USA	11	32	43
Total	64	132	196

Notes: Capital-based refers to announcements related to capital requirements, CCyB, and conservation buffers. *Lender-based excl. cap.* includes all remaining lender-based MaPP measures.

Next, using the MaPP announcement dates identified above, we construct high-frequency MaPP surprises by computing excess daily returns on bank stock prices relative to the aggregate stock market. Specifically, for each announcement a, country c, and day t, we define the MaPP surprise as:

$$s_{a,c} = (\log p^{Bank}_{t_{a,c}} - \log p^{Bank}_{t-1_{a,c}}) - (\log p^{Mkt}_{t_{a,c}} - \log p^{Mkt}_{t-1_{a,c}}), \tag{6}$$

where $p^{Bank}_{t_{a,c}}$ denotes the end-of-day stock price of the representative banking-sector index in country c on the day of announcement a, and $p^{Mkt}_{t_{a,c}}$ is the corresponding country-level aggregate stock market index. By subtracting the aggregate market return, we isolate the portion of banks' stock price reaction that is specific to the banking sector and not driven by movements in nonfinancial firms or broad market conditions.

We focus on one-day excess returns for two reasons. First, we lack intraday stock price data for all six countries in our sample, which prevents us from employing the narrower event windows commonly used in the monetary policy literature. Second, expanding the window to multiple days (e.g., two- or three-day cumulative returns) increases the likelihood of capturing other market-relevant news, such as macroeconomic releases or other policy announcements, that may contaminate the measured response to MaPP announcements. Restricting attention to a one-day window therefore provides a relatively cleaner and more comparable measure of MaPP surprises across countries (with two-day windows examined as a robustness check).

Finally, we aggregate the daily MaPP surprises to the quarterly frequency by cumulating all announcement-day surprises within each quarter. As in our baseline measure, we then standardize the resulting quarterly series. Table A.6 in Appendix A shows that the volatility of the HF and baseline MaPP shocks are comparable, although the HF shocks tend to be more contractionary (given by the mean and median sample values).

4.2 Main results

Table 10 presents the results from estimating our baseline Equation (2) using HF MaPP surprises. Columns (1)–(2) report results for the baseline MaPP shocks, with column (2) restricting the sample to the six countries for which HF MaPP surprises are available. The results remain qualitatively unchanged. Columns (3)–(8) display results using the HF MaPP surprises. When considering MaPP announcements, parent banks curtail credit by 0.9 percent through their bank affiliates, while expanding lending via their NBFI subsidiaries by 1.5 percent relative to bank subsidiaries (column 3). In line with the baseline results, lender-based MaPP announcement measures directly constrain parent banks' lending to nonfinancial corporates, thereby strengthening banking groups' incentives to shift credit intermediation toward NBFI affiliates. Also consistent with our main results, the effects are driven by U.S. banking groups, while we do not find any statistically significant responses for UK and the selected European lenders.

The increase in lending by NBFI subsidiaries as a response to tighter macroprudential policies is accompanied by an increase in spreads charged to NFCs, of around 2.9 basis points, relative to bank subsidiaries (column 8). As in the baseline regressions, we interpret this result as evidence that banking groups try to pass on higher costs from regulation by increasing loan prices through their NBFI affiliates, although the magnitudes are negligible. Our results remain qualitatively unchanged to using instead a two-day change in the excess returns of bank stock prices when computing the response to the MaPP announcement in Equation (6)—see columns (2) and (5) of Table B.6 in Appendix B. This addresses potential concerns from the possibility that some MaPP announcements take place after stock market closing hours. Moreover, our results also remain strongly robust to considering estimated daily abnormal returns in bank stock prices instead of excess returns (columns 3 and 6 of Table B.6).[22]

[22]We compute abnormal returns as the residuals from regressions of bank stock prices on a constant and the aggregate stock market index of each country, thereby relaxing the baseline assumption that banks' market betas are equal to one.

Table 10: Effect of high-frequency macroprudential policy shocks

	(1) Base	(2) Base: HF smpl	(3) HF	(4) U.S.	(5) U.K.	(6) DE	(7) FR	(8) Spreads
MaPP shock	-0.010***	-0.016***	-0.009***					-0.462
	(0.001)	(0.002)	(0.002)					(0.603)
MaPP shock × NBFI subs.	0.020***	0.022***	0.015***	0.039***	-0.007	-0.020	0.002	2.878***
	(0.002)	(0.002)	(0.002)	(0.004)	(0.010)	(0.013)	(0.006)	(0.614)
NBFI subs.	0.039***	0.055***	0.019***	0.014*	0.032	0.013	-0.010	12.765***
	(0.003)	(0.003)	(0.005)	(0.007)	(0.029)	(0.022)	(0.015)	(1.319)
Banking group FE	✓	✓	✓	✓	✓	✓	✓	✓
ILST FE								✓
Firm × Time FE	✓	✓	✓	✓	✓	✓	✓	
Observations	696,913	534,142	332,712	134,723	15,815	11,337	16,989	273,263
R^2	0.894	0.899	0.910	0.860	0.884	0.885	0.932	0.371

Notes: Dependent variable is the log of new syndicated loans. Columns (1)-(2) use the baseline MaPP shocks, with column (2) restricting the sample to country lenders with HF shocks. Columns (3)-(8) use the HF shocks. The sample is restricted to selected country lenders in columns (4)-(7). Column (8) takes the all-in drawn spread as the dependent variable, with the data aggregated at the tranche-lender-borrower-quarter level. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

5 Additional robustness checks

We assess the robustness of our baseline findings reported in column (3) of Table 1.

First, we exclude reserve requirements and prudential measures related to stress testing, which are mostly important for the U.S., from the baseline MaPP specification. Columns (2) and (3) of Table 11 show that our main results remain qualitatively unchanged. The coefficient, however, on MaPP shock × NBFI subsidiary in column (3) increases considerably relative to the baseline, suggesting that loan-supply measures have a particularly strong effect on curtailing bank credit, and thus seems to be creating opportunities for NBFI subsidiaries to step in and fill the bank lending shortfall.

Second, we examine the sensitivity of our results to capital-based macroprudential measures. Prior research suggests that policies targeting banks' capital positions may have muted short-run effects on loan supply, as banks are typically granted time to meet the new requirements, delaying their impact on credit supply (Gambacorta and Murcia 2020). At the same time, evidence indicates that banks may be less able—or less inclined—to exploit regulatory gaps when subject to higher capital requirements (Ongena et al. 2013, Aiyar et al. 2014, Danisewicz et al. 2017, Franch et al. 2021, Fabiani and Neanidis 2025).[23] This is because capital-based measures generally apply at the consolidated group level, prompting parent banks to curtail lending

[23] For instance, higher capital requirements have negative spillovers to cross-border interbank lending, although not to loans to households or nonfinancial corporations (Aiyar et al. 2014, Danisewicz et al. 2017, Fabiani and Neanidis 2025).

across all subsidiaries to comply with tighter regulation, unlike loan supply-based measures that often target specific market segments or products (Franch et al. 2021).[24] In effect, in most of our sample, parent banks are required to calculate their capital ratios based on consolidated accounts, thus including the assets of all their subsidiaries (domestic and foreign). By contrast, loan supply prudential measures are typically applied at the subsidiary or local level, not on a consolidated basis. The reason is that the latter measures target domestic credit conditions rather than global balance sheets, and the local supervisor tends to lack jurisdiction over foreign affiliates—their purpose is to influence local loan supply and credit growth, not to ensure group-level solvency.

Table 11: Robustness checks: alternative MaPP shocks

	(1) Baseline	(2) Base excl. RR	(3) Base excl. RR and ST	(4) Capital-based	(5) HF: capital-based
MaPP shock	-0.010***	-0.008***	-0.017***	0.004***	0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
MaPP shock × NBFI subs.	0.020***	0.018***	0.040***	-0.014***	-0.019***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
NBFI subs.	0.039***	0.039***	0.038***	0.039***	0.016**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.007)
Banking group FE	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓
Observations	696,913	696,913	696,913	696,913	295,639
R^2	0.894	0.894	0.894	0.894	0.926

Notes: Dependent variable is the log of new syndicated loans. Column (1) uses the baseline MaPP shocks; column (2) removes reserve requirements; column (3) removes reserve requirements and stress-testing; column (4) focuses on capital-based measures, namely leverage limits, countercyclical buffers, conservation buffers, and capital requirements; Column (5) use capital-based measures identified with HF MaPP announcements. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

To test this, column (4) isolates the effects of capital-based measures, namely capital requirements, countercyclical buffers, conservation buffers, and leverage limits. In contrast to our baseline findings, we find that NBFI subsidiaries reduce lending by 1.4 percent relative to bank subsidiaries within the same group. Column (5) indicates qualitatively similar results when instead using the HF announcement MaPP shocks restricted to capital-based measures. This suggests that capital-based measures may indeed constrain banks' scope to adjust lending in response to MaPP tightening. The result aligns with the view that prudential measures targeting banks' capital positions at the consolidated level create incentives for banking groups to curtail lending across the group as a whole. The modest increase in lending through bank subsidiaries may reflect that NBFI subsidiaries, on average, account for larger lending volumes (third row),

[24] Capital requirements, however, do not seem to apply at the consolidated level in some countries, such as South Africa, and Switzerland (Danisewicz et al. 2017).

allowing parent banks to achieve group-level capital adjustments primarily by moderating lending in these subsidiaries.

Third, we examine whether cross-country differences, such as regulatory frameworks, or time-varying changes within banking groups, such as leverage, profitability, or size, affect our baseline results. To address cross-country heterogeneity, we include country–banking group × time fixed effects. Column 2 of Table B.7 shows that the estimated effects are highly similar to the baseline results reported in column 1. To account for time-varying heterogeneity within banking groups, we first include a set of lagged bank-level controls: the logarithm of total assets, return on assets, nonperforming loans (NPLs), the Tier 1 capital ratio, the leverage ratio, and the two-year PD (column 3). The estimates remain virtually unchanged, although the sample size declines substantially. We further tighten the specification by adding banking group × time fixed effects, which absorb all unobserved time-varying characteristics at the group level. Even under this demanding specification, our main results remain qualitatively unchanged (column 4). Finally, we continue to find that the effects are primarily driven by U.S. and euro area banking groups (columns 5 and 7).

Fourth, as our results are primarily driven by U.S. entities, we exclude loans above USD 100 million, which could fall under the U.S. Shared National Credit (SNC) Program. Such loans, even when issued by nonbank subsidiaries, are reported to and examined by the Federal Reserve and thus subject to a higher degree of supervision. In a subsequent exercise, we remove subsidiaries of U.S. bank holding companies with total consolidated assets above USD 100 billion as these groups are required to report loan exposures above USD 1 million held anywhere in the conglomerate under FR Y-14Q. Although the sample size declines substantially under these restrictions, aggregate and U.S. results confirm our main findings that NBFI subsidiaries expand loan origination as a response to regulatory tightening (Table B.8).[25]

Fifth, we ensure that our results are robust to recent evidence on lenders' post-origination participation shares. Blickle et al. (forthcoming) report that lead arrangers in the U.S. frequently sell their loan exposure after origination, although this is more evident for Term B loans, i.e., riskier loans that are usually bought by nonbanks. They provide guidance on estimating post-origination loan shares for Dealscan users through a regression-based approach. We adapt their codes to our Dealogic variables to approximate post-origination participation shares. This approximation, however, comes with a number of caveats. First, the coefficients

[25] We thank Mehdi Beyhaghi for this comment.

provided by Blickle et al. (forthcoming) are estimated for U.S. syndicated loans, while we cover a sample of multi-country loans, potentially leading to an imprecise imputation. Second, they consolidate the analysis at the banking group, thus excluding the granular information about loan origination from bank and nonbank subsidiaries. Finally, the variables on lender roles within the syndicate, which are used for the imputation of loan shares, do not map perfectly between Dealogic and Dealscan.

With these caveats in mind, it is reassuring to see that the regulatory-induced lending reallocation we have explored in this paper remains present even after accounting for possible changes in loan ownership in the secondary market (Table B.9).

Sixth, we add time fixed effects to Equation (1) to control for the potential role of global factors in driving differences in macroprudential policy stance across countries. Table B.10 shows that our baseline results are not sensitive to this modification in computing the MaPP shocks. In addition, we consider MaPP shocks lagged by two, three, and four quarters to account for the possibility that syndicate formation may occur several months after the realization of the shock. As shown in Table B.11, our baseline results with a one-quarter lag remain qualitatively unchanged.[26]

Finally, we employ alternative clustering approaches. Table B.12 indicates that our baseline results remain statistically significant when clustering the standard errors by firm and time (column 2), by banking group (column 3), by firm, banking group and time (column 4), and by country-banking group × time (column 5).

6 Conclusion

Our paper documents that banking groups respond to macroprudential tightening by strategically reallocating lending through their NBFI subsidiaries. This behavior is most pronounced among U.S. banking groups and, to a lesser extent, in the euro area. By shifting credit in this way, banking groups are able to offset more than half of the contractionary impact of MaPP on overall group-level credit supply. While our analysis focuses on documenting these empirical regularities, it does not directly assess the financial stability implications of such shifts. Nonetheless, given that NBFIs are typically subject to lighter regulation and that data gaps on

[26]Following Albuquerque et al. (2025), we adopt a one-quarter lag for MaPP shocks. This choice is supported by the macroprudential policy database for 28 EU countries developed by Budnik and Kleibl (2018), which shows that the median interval between the announcement and effective date of macroprudential measures is one quarter.

their balance sheets and credit exposures remain significant, it is important to discuss the other side of the coin.

By increasingly 'banking on their nonbanks', banking groups heighten bank–nonbank interconnectedness, weaken the effectiveness of macroprudential policy, and may potentially weaken regulators' efforts to contain systemic risk (Frame et al. 2020, Cetorelli et al. 2023, Acharya et al. forthcoming, Albuquerque et al. 2025, BCBS 2025, Cetorelli and Prazad 2025, IMF 2025*b*).[27] Greater interconnectedness also raises concentration risks within banking groups. For instance, if nonbank subsidiaries face an idiosyncratic or global shock, stress could quickly transmit to the parent bank. Fire sales by distressed nonbanks may depress the value of similar assets held by the parent bank, amplifying balance-sheet stress (Cetorelli et al. 2023). Moreover, the failure of NBFIs to meet obligations or provide critical services to banks can impair banks' capacity to lend, threatening liquidity, solvency, and ultimately the provision of financial services to the real economy (Bhardwaj and Javadekar 2025, BCBS 2025, Bochmann et al. 2025).

In such cases, parent banks may need to reallocate capital from other subsidiaries to support distressed NBFIs. Although this can prevent costly failures, it may lead to inefficient capital allocation and higher funding costs, thereby increasing the overall vulnerability of the group.

To address the growing interconnectedness between banks and nonbanks, several regulators (e.g., United Kingdom, Australia, and Singapore) have begun integrating system-wide stress tests and scenario analyses to better assess banks' exposures to NBFIs (Abbas et al. 2025, IMF 2025*b*). While much remains to be done, expanding the regulatory perimeter to encompass nonbanks should help improve the understanding of underlying credit risks and the financial stability implications of NBFIs' expanding role in credit intermediation. Moreover, international policy cooperation, encompassing regulatory harmonization and enhanced information sharing to address data gaps, plays a key role in mitigating cross-border regulatory loopholes and in safeguarding financial stability.

Taken together, our findings highlight a tradeoff faced by parent banks: reallocating lending through NBFI subsidiaries can help offset the costs of regulation and improve capital allocation efficiency, but it may do so at the expense of higher systemic risk due to increased bank–nonbank interconnectedness.

[27] The importance of nonbanks for financial stability is highlighted in the July 2023 Chicago Booth IGM Economic Experts Panel. In this survey, 78 percent of of participating economists agreed that NBFIs pose a substantial threat to financial stability, and 77 percent agreed that regulating the leverage and liquidity of non-bank financial intermediaries would substantially improve financial stability.

While our analysis centers on the syndicated loan market, NBFIs are also active in other credit segments, particularly private credit that has been growing rapidly. An open question, and an interesting avenue for future research, is whether tighter macroprudential policies have contributed to the expansion of private credit, a segment that increasingly competes with leveraged loans and high-yield bonds (IMF 2024, Abbas et al. 2025, Chernenko et al. 2025). In contrast to syndicated lending, private credit operates in relatively opaque and lightly regulated markets, raising additional financial stability concerns.

Appendix A: Data

Table A.1: Bank subsidiaries' parent changes over time

Bank Name	**Parent Name**	**Year**
ABN AMRO Bank NV	ABN AMRO Holding NV	2000
ABN AMRO Bank NV	RFS Holdings BV	2007
ABN AMRO Bank NV	State of the Netherlands	2008
ABN AMRO Bank NV	ABN AMRO Group NV	2010
ABN AMRO Bank NV	ABN AMRO Bank NV	2019
BBVA Compass	BBVA Compass	2000
BBVA Compass	Banco Bilbao Vizcaya Argentaria SA	2007
BBVA Compass	PNC Financial Services Group Inc	2021
Bank of Scotland	HBOS plc	2001
Bank of Scotland	Lloyds Banking Group plc	2009
Bank of Scotland plc	Bank of Scotland plc	2000
Bank of Scotland plc	HBOS plc	2001
Bank of Scotland plc	Lloyds Banking Group plc	2009
Bank of the West	BNP Paribas SA	2000
Bank of the West	Bank of Montreal	2023
Bankia SA	Banco Financiero y de Ahorros SA - BFA	2010
Bankia SA	Bankia SA	2012
Bankia SA	CaixaBank SA	2021
Branch Banking & Trust Co - BB&T	BB&T Corp	2000
Branch Banking & Trust Co - BB&T	Truist Financial Corp	2019
CIT Group Inc	CIT Group Inc	2002
CIT Group Inc	First Citizens BancShares Inc	2022
Chuo Mitsui Trust & Banking Co Ltd	Chuo Mitsui Trust & Banking Co Ltd	2000
Chuo Mitsui Trust & Banking Co Ltd	Sumitomo Mitsui Trust Group Inc	2011
Citizens Bank NA	Royal Bank of Scotland	2000
Citizens Bank NA	Citizens Financial Group Inc	2015
Citizens Financial Group Inc	Royal Bank of Scotland	2000
Citizens Financial Group Inc	Citizens Financial Group Inc	2015
Compass Bank	Banco Bilbao Vizcaya Argentaria SA	2007
Compass Bank	PNC Financial Services Group Inc	2021
Credit Suisse	Credit Suisse International	2000
Credit Suisse	UBS Group AG	2023
First Hawaiian Bank	BNP Paribas SA	2000
First Hawaiian Bank	First Hawaiian Inc	2018
Fortis Bank SA/NV	Fortis Group	2000
Fortis Bank SA/NV	BNP Paribas SA	2009
HVB Group	HVB Group	2000
HVB Group	UniCredit SpA	2005
IKB Deutsche Industriebank AG	KfW Bankengruppe	2001
IKB Deutsche Industriebank AG	Lone Star Global Acquisitions Ltd	2008
LaSalle Bank NA	ABN AMRO Bank NV	2000
LaSalle Bank NA	Bank of America Corp	2007
MUFG Union Bank NA	Mitsubishi UFJ Financial Group Inc	2000
MUFG Union Bank NA	US Bancorp	2022
NatWest Markets plc	Royal Bank of Scotland	2000
NatWest Markets plc	NatWest Group plc	2020
Natexis Banques Populaires SA	Groupe Banque Populaire	2006
Natexis Banques Populaires SA	BPCE SA	2009
RBS/ABN AMRO	Royal Bank of Scotland	2007
RBS/ABN AMRO	NatWest Group plc	2020
Royal Bank of Scotland	Royal Bank of Scotland	2000
Royal Bank of Scotland	NatWest Group plc	2020
Royal Bank of Scotland plc	Royal Bank of Scotland	2000
Royal Bank of Scotland plc	NatWest Group plc	2020
Silicon Valley Bank	Silicon Valley Bank	2000
Silicon Valley Bank	First Citizens BancShares Inc	2023
Sovereign Bank	Sovereign Bank	2000
Sovereign Bank	Banco Santander SA	2009
SunTrust Bank	SunTrust Banks Inc	2000
SunTrust Bank	Truist Financial Corp	2019
Taiwan Cooperative Bank	Taiwan Cooperative Bank	2000
Taiwan Cooperative Bank	Taiwan Cooperative Financial Holding Co Ltd	2011
Truist Bank	BB&T Corp	2000
Truist Bank	Truist Financial Corp	2019
Turkiye Garanti Bankasi AS	Dogus Holding AS	2000
Turkiye Garanti Bankasi AS	Banco Bilbao Vizcaya Argentaria SA	2014
UniCredit SpA	UniCredito Italiano SpA	2000
UniCredit SpA	UniCredit SpA	2008
Union Bank NA	Mitsubishi UFJ Financial Group Inc	2005
Union Bank NA	US Bancorp	2022

Notes: This table reports changes in the ultimate parent *bank* entities over time for selected banks in the Dealogic syndicated loan data sample.

Table A.2: Nonbank subsidiaries' parent changes over time

Nonbank Name	**Parent Name**	**Year**
ABN AMRO Capital USA LLC	ABN AMRO Holding NV	2000
ABN AMRO Capital USA LLC	RFS Holdings BV	2007
ABN AMRO Capital USA LLC	ABN AMRO Group NV	2010
ABN AMRO Capital USA LLC	ABN AMRO Bank NV	2019
Abbey National Treasury Services plc	Abbey National plc	2000
Abbey National Treasury Services plc	Banco Santander SA	2004
Alcentra Ltd	Bank of New York Mellon Corp	2000
Alcentra Ltd	Franklin Resources Inc	2022
Angelo Gordon & Co LP	Angelo Gordon & Co LP	2000
Angelo Gordon & Co LP	TPG Inc	2023
Antares Capital LP	Antares Capital LP	2000
Antares Capital LP	General Electric Co	2005
Antares Capital LP	Canada Pension Plan Investment Board	2015
Ares Management LP	Ares Management LP	2000
Ares Management LP	Ares Management Corp	2018
BB&T Capital Markets Inc	BB&T Corp	2000
BB&T Capital Markets Inc	Truist Financial Corp	2006
Banco Espirito Santo de Investimento SA	Banco Espirito Santo SA	2000
Banco Espirito Santo de Investimento SA	Guotai Haitong Securities Co Ltd	2015
Barings LLC	ING Groep NV	2000
Barings LLC	Massachusetts Mutual Life Insurance Co	2005
Bear Stearns & Co Inc	Bear Stearns & Co Inc	2000
Bear Stearns & Co Inc	JPMorgan Chase & Co	2008
BlueMountain Capital Management LLC	BlueMountain Capital Management LLC	2003
BlueMountain Capital Management LLC	Assured Guaranty Ltd	2019
BlueMountain Capital Management LLC	Sound Point Capital Management LP	2023
CIT Financial Services Inc	CIT Group Inc	2000
CIT Financial Services Inc	First Citizens BancShares Inc	2022
Credit Suisse (Singapore) Ltd	Credit Suisse International	2000
Credit Suisse (Singapore) Ltd	UBS Group AG	2023
Credit Suisse First Boston	Credit Suisse International	2000
Credit Suisse First Boston	UBS Group AG	2023
Credit Suisse First Boston (Cayman Islands)	Credit Suisse International	2000
Credit Suisse First Boston (Cayman Islands)	UBS Group AG	2023
Crescent Capital Group LP	Societe Generale SA	2001
Crescent Capital Group LP	Crescent Capital Group LP	2010
Crescent Capital Group LP	Sun Life Financial Inc	2021
Dresdner Kleinwort	Dresdner Bank AG	2000
Dresdner Kleinwort	Allianz AG	2001
Dresdner Kleinwort	Commerzbank AG	2009
Eaton Vance Management Inc	Eaton Vance Corp	2000
Eaton Vance Management Inc	Morgan Stanley	2021
Eaton Vance Prime Rate Reserves	Eaton Vance Management Inc	2000
Eaton Vance Prime Rate Reserves	Morgan Stanley	2021
Fortis Group	Fortis Group	2000
Fortis Group	BNP Paribas SA	2008
GMAC Inc	General Motors Co	2000
GMAC Inc	Cerberus Capital Management LP	2006
GSO Capital Partners LP	GSO Capital Partners LP	2000
GSO Capital Partners LP	Blackstone Inc	2008
Global Loan Agency Services Ltd	Global Loan Agency Services Ltd	2011
Global Loan Agency Services Ltd	Levine Leichtman Capital Partners LP	2022
HPS Investment Partners LLC	JPMorgan Chase & Co	2007
HPS Investment Partners LLC	HPS Investment Partners LLC	2016

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Nonbank Name	Parent Name	Year
HPS Investment Partners LLC	BlackRock Inc	2025
Highbridge Capital Management LLC	Highbridge Capital Management LLC	2000
Highbridge Capital Management LLC	JPMorgan Chase & Co	2004
IXIS Corporate & Investment Bank	Caisse Nationale des Caisses d'Epargne et de Prevoyance SA - CNCE	2000
IXIS Corporate & Investment Bank	BPCE SA	2009
Jefferies & Co Inc	Jefferies Financial Group Inc	2000
Jefferies & Co Inc	Leucadia National Corp	2013
Jefferies & Co Inc	Jefferies Financial Group Inc	2018
Lehman Brothers International (Europe)	Lehman Brothers Holdings Inc	2000
Lehman Brothers International (Europe)	Nomura Holdings Inc	2008
Lehman Brothers North America	Lehman Brothers Holdings Inc	2000
Lehman Brothers North America	Barclays plc	2008
Lloyds TSB Capital Markets	Lloyds TSB Group plc	2000
Lloyds TSB Capital Markets	Lloyds Banking Group plc	2009
Merrill Lynch Pierce Fenner & Smith Inc	Merrill Lynch & Co Inc	2000
Merrill Lynch Pierce Fenner & Smith Inc	Bank of America Corp	2009
Merrill Lynch & Co Inc	Merrill Lynch & Co Inc	2000
Merrill Lynch & Co Inc	Bank of America Corp	2008
MidCap FinCo Ltd	MidCap Financial LLC	2000
MidCap FinCo Ltd	Apollo Global Management Inc	2013
MidCap Financial Trust	MidCap Financial LLC	2008
MidCap Financial Trust	Apollo Global Management Inc	2013
Monroe Capital LLC	Monroe Capital LLC	2004
Monroe Capital LLC	Wendel SE	2025
NXT Capital LLC	Stone Point Capital LLC	2010
NXT Capital LLC	ORIX Corp	2018
Napier Park Global Capital LLC	Citigroup Inc	2000
Napier Park Global Capital LLC	Napier Park Global Capital LLC	2013
Napier Park Global Capital LLC	First Eagle Holdings Inc	2022
NewStar Financial Inc	NewStar Financial Inc	2004
NewStar Financial Inc	First Eagle Holdings Inc	2017
Oaktree Capital Management LP	Oaktree Capital Group LLC	2000
Oaktree Capital Management LP	Brookfield Corp	2019
Oppenheimer & Co Inc	Canadian Imperial Bank of Commerce - CIBC	2000
Oppenheimer & Co Inc	Oppenheimer Holdings Inc	2003
Owl Rock Capital Corp	Owl Rock Capital Corp	2016
Owl Rock Capital Corp	Blue Owl Capital Inc	2021
Seix Investment Advisors LLC	Seix Investment Advisors LLC	2000
Seix Investment Advisors LLC	SunTrust Banks Inc	2004
Seix Investment Advisors LLC	Virtus Investment Partners Inc	2014
SunTrust Robinson Humphrey Inc	SunTrust Banks Inc	2000
SunTrust Robinson Humphrey Inc	Truist Financial Corp	2019
Truist Securities Inc	Citigroup Inc	2000
Truist Securities Inc	SunTrust Banks Inc	2001
Truist Securities Inc	Truist Financial Corp	2019
Voya Financial Inc	ING Groep NV	2000
Voya Financial Inc	Voya Financial Inc	2014
Wachovia Capital Markets LLC	Wachovia Corporation	2000
Wachovia Capital Markets LLC	Wells Fargo & Co	2008
Wachovia Securities Inc	Wachovia Corporation	2000
Wachovia Securities Inc	Wells Fargo & Co	2008
Wells Fargo Securities LLC	Wachovia Corporation	2000
Wells Fargo Securities LLC	Wells Fargo & Co	2008
Western Asset Management Co	Legg Mason Wood Walker Capital Markets	2000

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Nonbank Name	**Parent Name**	**Year**
Western Asset Management Co	Franklin Resources Inc	2020

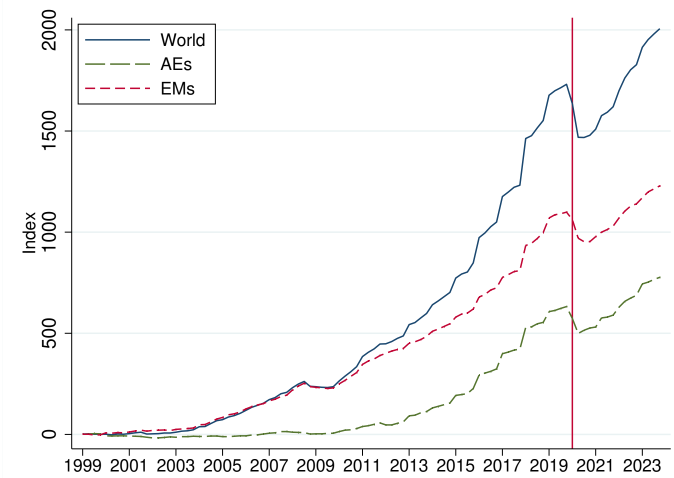
Notes: This table reports changes in the ultimate *nonbank* parent entities over time.

Table A.3: List of bank-owned NBFIs

Type	Number	Share
Investment banks, broker-dealers	784	64.2
Business credit institutions	26	2.1
Insurance and pension funds	26	2.1
Investment funds & asset managers	152	12.4
Other NBFI subsidiaries	234	19.2
Total	1,222	100

Notes: Number and share of unique bank-owned NBFIs.

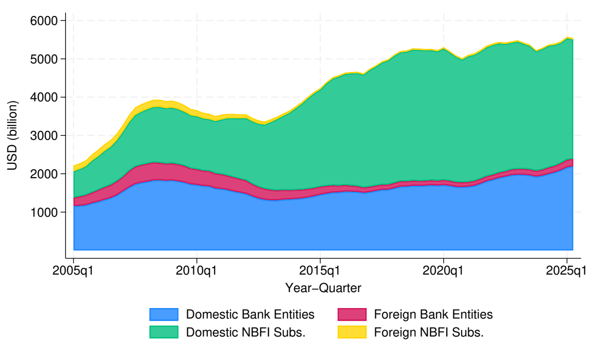
Figure A.1: Net cumulative sum of macroprudential measures



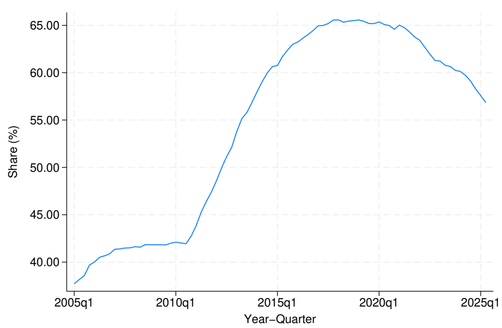
Notes: Alam et al. (2025) iMaPP database and authors' calculations. The red vertical line marks the start of the Covid-19 pandemic in 2020Q1.

Figure A.2: Lending to NFCs in the syndicated loan market: U.S. lenders

Outstanding stock of loans



NBFI subsidiaries' share in banking group lending



Notes: Left panel: volume of outstanding syndicated loans from banking groups to NFCs by domestic bank subsidiaries (blue area), foreign bank subsidiaries (red area), domestic NBFI subsidiaries (green area), and foreign NBFI subsidiaries (yellow area). Right panel: share of syndicated loans originated by NBFI subsidiaries in total banking group lending.

Table A.4: List of lender countries

Country	Share	Country	Share
AUS	1.90	IRL	0.30
AUT	0.40	ITA	2.37
BEL	0.30	JPN	12.16
BRA	0.19	KOR	0.18
CAN	8.40	MYS	0.22
CHE	2.52	NLD	3.03
CHN	3.09	NOR	0.51
DEU	5.65	PRT	0.12
DNK	0.31	SGP	0.86
ESP	3.16	SWE	0.71
FIN	0.63	THA	0.12
FRA	6.43	USA	35.13
GBR	10.29	ZAF	0.27
IND	0.76		

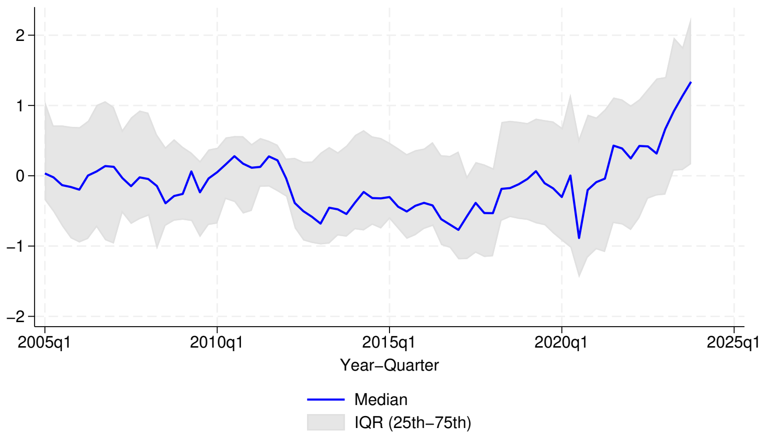
Notes: Loan share is the average loan share for each lender country in the estimation sample.

Table A.5: Loan characteristics

	Obs	Mean	STD	P25	P50	P75
Banks						
Term Length	220,526	5.19	4.15	3.00	5.00	6.00
Tranche Value (US million)	228,666	241.84	461.27	23.32	78.87	242.40
# Lender	231,400	5.86	5.33	2.00	4.00	7.00
Lender Share	916,147	0.18	0.19	0.06	0.12	0.25
All-in-Pricing (bps)	404,973	232.68	147.81	125.00	200.00	300.00
Margin-Pricing (bps)	285,307	225.72	142.56	125.00	200.00	300.00
Bank-owned NBFI subsidiaries						
Term Length	122,253	4.89	2.83	3.00	5.00	5.50
Tranche Value (US million)	126,270	351.44	558.34	48.22	143.75	393.77
# Lender	127,083	7.30	6.10	3.00	6.00	9.00
Lender Share	295,478	0.18	0.17	0.07	0.12	0.25
All-in-Pricing (bps)	200,189	249.63	152.96	140.00	225.00	325.00
Margin-Pricing (bps)	168,558	244.12	150.84	137.50	200.00	325.00
Other NBFIs						
Term Length	57,174	6.17	4.27	4.00	5.00	7.00
Tranche Value (US million)	61,044	270.79	475.07	31.98	96.48	286.72
# Lender	62,914	7.28	6.79	3.00	5.00	9.00
Lender Share	107,160	0.23	0.23	0.07	0.12	0.25
All-in-Pricing (bps)	70,058	386.80	183.72	250.00	375.00	500.00
Margin-Pricing (bps)	57,185	391.58	175.53	275.00	375.00	500.00

Notes: Summary statistics of loan-level characteristics by lender type, restricted to loans to nonfinancial borrowers.

Figure A.3: MaPP shocks over time



Notes: The blue solid line is the median MaPP shock sample values, and the grey area the interquartile range.

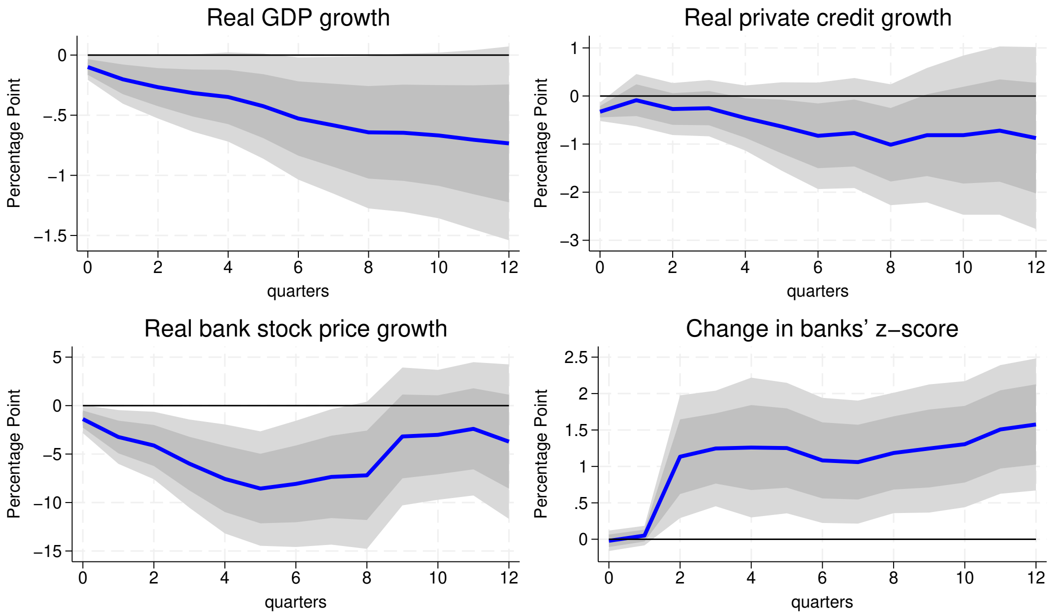
Table A.6: Summary statistics for baseline and high-frequency shocks

	Obs.	Mean	S.D.	P25	P50	P75
Baseline shocks	2,571	-0.02	0.96	-0.76	-0.03	0.67
HF shocks	288	0.02	0.97	-0.47	0.27	0.76

Notes: Summary statistics of baseline vs HF shocks.

Appendix B: Tables and Figures

Figure B.1: Country-level responses to MaPP shocks



Notes: Reproduced from Albuquerque et al. (2025). Cumulative impulse responses over 12 quarters following a one-standard deviation increase in MaPP shocks. The blue line is the point estimate, and dark (light) grey areas refer to the associated 68% (90%) confidence bands. Standard errors clustered by country.

Table B.1: Effect of macroprudential policy shocks on credit supply: ILST fixed effects

	(1) All	(2) All	(3) All	(4) U.S.	(5) U.K.	(6) EA
MaPP shock	-0.022***	-0.003***	-0.011***			-0.002
	(0.003)	(0.001)	(0.001)			(0.003)
MaPP shock × NBFI subs.			0.022***	0.049***	-0.006	0.004
			(0.002)	(0.004)	(0.012)	(0.004)
NBFI subs.			0.048***	0.066***	-0.039**	0.024***
			(0.004)	(0.006)	(0.017)	(0.007)
Time FE	✓					
Banking group FE	✓	✓	✓	✓	✓	✓
Firm FE		✓	✓	✓	✓	✓
ILST FE		✓	✓	✓	✓	✓
Observations	719,874	707,017	707,017	211,056	42,319	145,998
R^2	0.284	0.824	0.824	0.708	0.787	0.848

Notes: Dependent variable is the log of new syndicated loans. Sample restricted to selected countries in columns (4) to (6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.2: Extensive margin

	(1) All	(2) U.S.	(3) U.K.	(4) EA
MaPP shock	0.000			-0.007***
	(0.001)			(0.002)
MaPP shock × NBFI subs.	0.005***	0.035***	-0.051***	-0.011***
	(0.001)	(0.002)	(0.008)	(0.003)
NBFI subs.	0.019***	0.036***	0.061***	-0.023***
	(0.002)	(0.003)	(0.011)	(0.005)
Banking group FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	696,913	201,751	31,580	134,242
R^2	0.625	0.613	0.695	0.658

Notes: Dependent variable is a dummy variable equal to one in the quarter that we observe a specific lender-borrower lending relationship for the first time. Sample restricted to selected countries in columns (2)-(4). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.3: Effect of macroprudential policy shocks on spreads

	(1) All	(2) All	(3) All	(4) U.S.	(5) U.K.	(6) EA
MaPP shock	1.977***	1.932***	1.350***			3.452***
	(0.522)	(0.309)	(0.339)			(0.703)
MaPP shock × NBFI subs.			1.540***	-0.474	4.516*	-2.271**
			(0.496)	(0.744)	(2.681)	(1.154)
NBFI subs.			8.288***	6.636***	24.725***	5.708***
			(0.698)	(1.020)	(3.306)	(1.267)
Time FE	✓					
Banking group FE	✓	✓	✓	✓	✓	✓
ILST FE		✓	✓	✓	✓	✓
Observations	570,296	569,269	569,269	266,915	48,675	126,091
R^2	0.166	0.463	0.463	0.338	0.569	0.614

Notes: Dependent variable is the all-in drawn spread. Sample restricted to selected countries in columns (4) to (6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.4: Effect of macroprudential policy shocks by NBFI type

	(1)	(2)	(3)	(4)	(5)	(6)
MaPP shock	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
MaPP shock × NBFI subs.	0.004	0.020***	0.020***	0.020***	0.020***	
	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)	
MaPP shock × NBFI subs. × Investment banks, broker-dealers	0.016**					0.020***
	(0.006)					(0.002)
MaPP shock × NBFI subs. × Business credit institution		0.001				0.021
		(0.035)				(0.035)
MaPP shock × NBFI subs. × Investment funds & asset managers			-0.047***			-0.028**
			(0.014)			(0.014)
MaPP shock × NBFI subs. × Insurance and pension funds				0.005		0.025
				(0.047)		(0.047)
MaPP shock × NBFI subs. × Other NBFI subsidiaries					-0.006	0.014**
					(0.007)	(0.007)
NBFI subs.	-0.064***	0.040***	0.043***	0.040***	0.041***	
	(0.009)	(0.003)	(0.003)	(0.003)	(0.003)	
NBFI subs. × Investment banks, broker-dealers	0.113***					0.049***
	(0.009)					(0.003)
NBFI subs. × Business credit institution		-0.211***				-0.178***
		(0.033)				(0.033)
NBFI subs. × Investment funds and asset managers			-0.128***			-0.086***
			(0.013)			(0.013)
NBFI subs. × Insurance and pension funds				-0.334***		-0.299***
				(0.044)		(0.045)
NBFI subs. × Other NBFI subsidiaries					-0.059***	-0.020*
					(0.011)	(0.011)
Banking group FE	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓
Observations	696,913	696,913	696,913	696,913	696,913	696,913
R^2	0.894	0.894	0.894	0.894	0.894	0.894

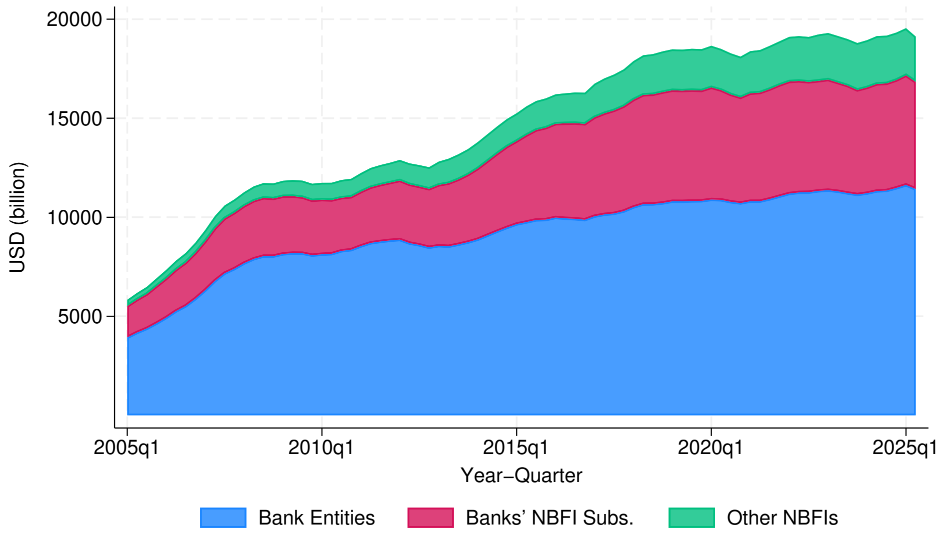
Notes: Dependent variable is the log of new syndicated loans. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.5: Effect of MaPP shocks on credit supply: individual lender FE

	(1)	(2)	(3)	(4)	(5)	(6)
	All	All	All	U.S.	U.K.	EA
MaPP shock	-0.028***	-0.005***	-0.008***			-0.004
	(0.003)	(0.001)	(0.001)			(0.003)
MaPP shock × NBFI subs.			0.009***	0.040***	-0.005	0.005*
			(0.002)	(0.004)	(0.010)	(0.003)
Time FE	✓					
Lender FE	✓	✓	✓	✓	✓	✓
Firm × Time FE		✓	✓	✓	✓	✓
Observations	718,732	695,697	695,697	201,429	31,460	133,790
R^2	0.309	0.898	0.898	0.859	0.846	0.891

Notes: Dependent variable is the log of new syndicated loans. Sample restricted to selected countries in columns (4) to (6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Figure B.2: Lending to NFCs in the corporate syndicated loan market: adding other NBFIs



Notes: Volume of outstanding syndicated loans to NFCs by bank subsidiaries (blue area) and NBFI subsidiaries (red area) of banking groups, and NBFIs not owned by banking groups (green area).

Table B.6: Effect of high-frequency macroprudential policy shocks: robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)
		Loans			Spread	
	Baseline	2-day	Abnormal	Baseline	2-day	Abnormal
MaPP shock	-0.009***	-0.009***	-0.009***	-0.462	-0.360	0.364
	(0.002)	(0.002)	(0.002)	(0.603)	(0.596)	(0.644)
MaPP shock × NBFI subs.	0.015***	0.013***	0.018***	2.878***	2.994***	3.018***
	(0.002)	(0.002)	(0.002)	(0.614)	(0.621)	(0.624)
NBFI subs.	0.019***	0.019***	0.019***	12.765***	12.803***	12.694***
	(0.005)	(0.005)	(0.005)	(1.319)	(1.319)	(1.319)
Banking group FE	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓			
ILST FE				✓	✓	✓
Observations	332,712	332,712	332,712	273,263	273,263	273,263
R^2	0.910	0.910	0.910	0.371	0.371	0.371

Notes: Dependent variable is the log of new syndicated loans (columns 1-3) or the all-in drawn spread (columns 4-6). *Baseline* is the preferred baseline specification, *2-day* takes a two-day change in the excess return of bank stock prices following MaPP announcements, and *Abnormal* computes abnormal returns in bank stock prices following MaPP announcements. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.7: Time-varying banking group characteristics

	(1) All	(2) All	(3) All	(4) All	(5) U.S.	(6) U.K.	(7) EA
MaPP shock	-0.010***		-0.013***				
	(0.001)		(0.003)				
MaPP shock × NBFI subs.	0.020***	0.018***	0.014***	0.007*	0.027***	0.022	0.028***
	(0.002)	(0.002)	(0.003)	(0.004)	(0.007)	(0.028)	(0.008)
NBFI subs.	0.039***	0.054***	0.107***	0.117***	0.195***	-0.011	0.051***
	(0.003)	(0.003)	(0.005)	(0.004)	(0.007)	(0.022)	(0.008)
Banking group controls			✓				
Banking group FE	✓	✓	✓				
Country BG × Time FE		✓					
Banking group × Time FE				✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓	✓
Observations	696,913	696,912	233,330	688,870	199,133	31,473	132,460
R^2	0.894	0.895	0.841	0.898	0.861	0.845	0.893

Notes: Dependent variable is the log of new syndicated loans. Sample restricted to selected countries in columns (5) to (7). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.8: Excluding SNC loans and large bank holding companies

	(1) Excl. SNC loans All	(2) Excl. SNC loans U.S.	(3) Excl. large BHCs All	(4) Excl. large BHCs U.S.
MaPP shock	-0.008***		-0.008***	
	(0.002)		(0.002)	
MaPP shock × NBFI subs.	0.018***	0.043***	0.005*	0.060***
	(0.003)	(0.005)	(0.003)	(0.016)
NBFI subs.	0.080***	0.146***	0.029***	-0.079***
	(0.005)	(0.008)	(0.005)	(0.022)
Banking group FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	255,756	53,064	410,309	21,128
R^2	0.869	0.864	0.913	0.890

Notes: Dependent variable is the log of new syndicated loans. The sample excludes loans above USD 100 million (columns 1-2) or subsidiaries of major bank holding companies with total consolidated assets above USD 100 billion in 2023Q4 operating in the U.S. (columns 3-4). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.9: Account for post-origination participation shares

	(1) All	(2) All	(3) All	(4) U.S.	(5) U.K.	(6) EA
MaPP shock	-0.025***	-0.002	-0.005***			-0.001
	(0.004)	(0.001)	(0.002)			(0.004)
MaPP shock × NBFI subs.			0.010***	0.016***	0.016	0.003
			(0.002)	(0.004)	(0.015)	(0.005)
NBFI subs.			0.042***	0.069***	-0.035	0.023**
			(0.004)	(0.006)	(0.022)	(0.009)
Time FE	✓					
Banking group FE	✓	✓	✓	✓	✓	✓
Firm × Time FE		✓	✓	✓	✓	✓
Observations	719,874	696,913	696,913	201,751	31,580	134,242
R^2	0.170	0.873	0.873	0.841	0.858	0.861

Notes: Dependent variable is the log of new syndicated loans. Loans are allocated based on the regression results of Blickle et al. (forthcoming). Sample restricted to selected countries in columns (4) to (6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.10: Alternative MaPP shocks with time fixed effects

	(1) All	(2) All	(3) All	(4) U.S.	(5) U.K.	(6) EA
MaPP shock	-0.022***	-0.002*	-0.015***			0.003
	(0.003)	(0.001)	(0.001)			(0.003)
MaPP shock × NBFI subs.			0.041***	0.096***	0.008	0.010***
			(0.002)	(0.004)	(0.012)	(0.003)
NBFI subs.			0.035***	0.051***	-0.069***	0.024***
			(0.003)	(0.005)	(0.016)	(0.007)
Time FE	✓					
Banking group FE	✓	✓	✓	✓	✓	✓
Firm × Time FE		✓	✓	✓	✓	✓
Observations	719,874	696,913	696,913	201,751	31,580	134,242
R^2	0.284	0.894	0.894	0.853	0.842	0.888

Notes: Dependent variable is the log of new syndicated loans. MaPP shocks are generated with additional time fixed effects in Equation 1. Sample restricted to selected countries in columns (4) to (6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.11: Alternative lags of MaPP shocks

	(1) Lag 1	(2) Lag 2	(3) Lag 3	(4) Lag 4
MaPP shock	-0.010***	-0.012***	-0.013***	-0.015***
	(0.001)	(0.001)	(0.001)	(0.001)
MaPP shock × NBFI subs.	0.020***	0.024***	0.027***	0.029***
	(0.002)	(0.002)	(0.002)	(0.002)
NBFI subs.	0.039***	0.039***	0.040***	0.041***
	(0.003)	(0.003)	(0.003)	(0.003)
Banking group FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	696,913	695,838	694,967	693,963
R^2	0.894	0.894	0.895	0.895

Notes: Dependent variable is the log of new syndicated loans. Column (1) uses the baseline MaPP shock lagged one quarter, as described in Section 2.4. In columns (2), (3), and (4) we lag the MaPP shock by respectively two, three, and four quarters. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.12: Alternative clustering of standard errors

	(1) Baseline	(2) Firm and time	(3) BG	(4) Firm, BG & time	(5) Country-BG×time
MaPP shock	-0.010***	-0.010***	-0.010**	-0.010**	-0.010***
	(0.001)	(0.003)	(0.005)	(0.005)	(0.003)
MaPP shock × NBFI subs.	0.020***	0.020***	0.020*	0.020*	0.020***
	(0.002)	(0.007)	(0.010)	(0.011)	(0.007)
NBFI subs.	0.039***	0.039***	0.039	0.039	0.039***
	(0.003)	(0.009)	(0.033)	(0.030)	(0.008)
Banking group FE	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓
Observations	696,913	696,913	696,913	696,913	696,913
R^2	0.894	0.894	0.894	0.894	0.894

Notes: Dependent variable is the log of new syndicated loans. Clustering of standard errors is by firm (column 1), firm and time (column 2), firm, banking group, and time (column 3), and country-banking group×time (column 4). Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

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