From banks to nonbanks: macroprudential and monetary policy effects on corporate lending*

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Abstract

The growing role of nonbanks in corporate credit intermediation raises important yet underexplored questions about the transmission of monetary policy (MP) and macroprudential policy (MaPP) to the real economy. Using syndicated loan data, we examine the impact of both MP and MaPP shocks on credit supply to nonfinancial firms. We show that nonbanks act as shock absorbers, cushioning firms—particularly those with preexisting nonbank relationships—from policy tightening. These shocks drive credit away from weaker banks toward nonbanks, raising concerns about credit quality. We also provide evidence that MaPPs on banks can lead them, especially weaker ones, to shift lending to nonbanks and away from nonfinancial corporations. This allows nonbanks to expand their footprint in corporate credit markets. Our findings highlight that the side effects of tighter MP and MaPP are non-trivial as credit intermediation migrates to a sector largely outside the regulatory perimeter, posing new financial stability risks.

Keywords: Monetary policy; Macroprudential policy; Nonbank lending; Corporate loans.

JEL classification: E51, E52, F34, G21, G23, G28

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"Why did shadow banks expand and prosper in the decades before the crisis, despite their inability to use federally insured deposits? One important advantage was that, given U.S. regulatory arrangements, the institutions that made up the shadow banking system could avoid many of the regulations applied to traditional commercial banks, such as minimum capital requirements and restrictions on their activities. Light regulation allowed shadow banks to be more flexible and innovative, for example in offering new products, but it also implied few restraints on their borrowing or risk-taking. Investments that were too risky for traditional banks thus often migrated to the shadow banking sector, out of the purview of bank regulators."

— Ben Bernanke, *21st Century Monetary Policy: The Federal Reserve from the Great Inflation to COVID-19*

1 Introduction

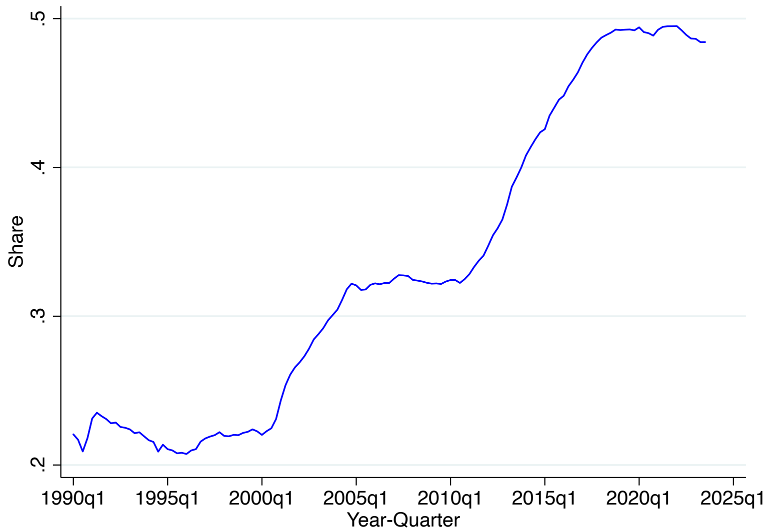
Nonbank financial institutions have significantly expanded their footprint in the global financial system over the past two decades, with their share of global financial assets rising from 43 percent in 2008 to 49 percent in 2023 (Financial Stability Board 2024). Reflecting this shift, Figure 1 shows that nonbanks now account for nearly 50 percent of corporate loan origination in the global syndicated loan market, up from just over 30 percent during the Global Financial Crisis (GFC).[1] While this trend is driven by the most financially developed markets, the broader move from bank to nonbank credit intermediation has global implications for borrowers.

In this paper, we focus on the implications of the growing role of nonbanks in corporate credit intermediation for the transmission of macroprudential policy (MaPP) and monetary policy (MP) to the real economy. Our work is motivated by three facts. First, the documented expansion of nonbanks. Second, the increasing use of MaPP since the GFC may have important—often unintended—implications for the nonbank sector. While designed to curb excessive credit growth and strengthen financial resilience (Claessens 2015, Cerutti et al. 2017, Altavilla et al. 2020, Biljanovska et al. 2023), MaPP tools may have contributed to the expansion of the less-regulated nonbank sector.[2] For instance, the post-GFC tightening of bank regulations, which imposed tighter constraints on banks' balance sheets, has coincided with the rise of nonbanks (Buchak et al. 2018, Irani et al. 2021, Bednarek et al. 2023, Claessens et al. 2023, Krainer et al. 2024, Erel and Inozemtsev 2025).

[1] Our sample includes lenders from 22 countries (see Section 2). Our nonbank share estimate is consistent with Abbas et al. (2025) and Albuquerque et al. (2025), who use the same dataset with a broader country coverage.

[2] An additional side effect of tighter MaPP is the increase in cross-border borrowing relative to domestic borrowing (see, among others, Cerutti et al. 2017, Cerutti and Zhou 2018).

Figure 1: Nonbank share in the corporate global syndicated loan market



Notes: Nonbank share is the loan amount outstanding intermediated by nonbanks relative to the total loan amount. Nonbanks include investment banks, broker-dealers, finance companies, insurance companies, pension funds, private equity firms, venture capital firms, hedge funds, and other non-depository-taking financial intermediaries.

Third, recent evidence from the U.S. and Denmark shows that the nonbank sector expands and increases its presence in corporate credit markets following contractionary MP shocks (Elliott et al. 2022, 2024, Cucic and Gorea 2024). The expansion of nonbanks during contractionary MP shocks is commonly attributed to the deposits channel of MP (Drechsler et al. 2017). Evidence from Denmark suggests that increased long-term funding available to nonbanks during these episodes may also play a role (Cucic and Gorea 2024).

Since monetary and macroprudential policies do not operate in isolation, a key contribution of our paper is to examine the effects of both MP and MaPP shocks on credit supply to nonfinancial firms using a framework that includes both shocks simultaneously. This allows us to control for one shock while assessing the impact of the other—an improvement over existing studies that typically focus on a single policy shock in isolation. In addition to extending the MP results on the U.S. economy and Denmark to a broader set of countries, our paper also offers novel insights into how MaPP shocks affect corporate lending through nonbanks. While recent literature has made important progress on the identification of MaPP shocks with high-frequency data, the analysis is restricted to studying the response of aggregate macroeconomic and financial variables (Bluwstein and Patozi 2024, Drechsel and Miura 2025, Duprey and Tuzcuoglu 2025). In addition, this literature does not focus on the role of nonbanks. At the same time, we advance our understanding how both policies affect the provision of credit to the economy, a first-order priority in our research agenda (Altavilla et al. 2020, Imbierowicz et al. 2021). Differently from them, we focus on nonbanks, specifically on how their lending behavior differs from that of banks following contractionary MP and MaPP shocks.

We use syndicated loans from Dealogic, covering nearly the entire universe of global syndicated corporate loans from 2000 to 2019. This dataset provides granular information on loan origination from both banks and nonbanks, making it well-suited for our analysis. Nonbanks in our sample primarily include investment banks, broker-dealers, and finance companies, along with several insurance companies, pension funds, private equity firms, and other non-depository-taking financial intermediaries. Although we focus on credit quantity, we also examine how nonbanks adjust loan pricing (spreads) in response to contractionary policy shocks.

We cover lenders from 22 countries, primarily advanced economies (AEs), and nonfinancial corporate borrowers from 153 countries. Given the breadth of our country sample, it is challenging to get exogenous variation for both MP and MaPP. For MP, we draw on the cross-country MP shock database from Choi et al. (2024). In turn, we construct our own cross-country MaPP shocks series based on the iMaPP database (Alam et al. 2025). We select MaPP measures that may arguably restrict banks' lending capacity, including measures that target loan supply (e.g., limits on credit growth, loan loss provisions, and lending restrictions), and prudential measures that focus on stress testing. We first construct a time series of cumulative stringency indices for each country. We then build on the monetary policy literature and purge the endogenous policy responses from cyclical influences by estimating a panel regression with country fixed effects and a set of macroeconomic and financial controls. The resulting residuals, which represent exogenous changes in MaPP unrelated to the state of the economy, serve as our MaPP shocks. We show the MaPP shocks seem to be uncorrelated with the MP shocks.[3]

We estimate a regression of the dollar amount of newly originated loans on MP and MaPP shocks, interacted with a nonbank lender dummy. The coefficient on this interaction term captures the differential effect of changes in MP and MaPP on nonbank credit supply relative to bank credit supply. To isolate credit supply from credit demand, our preferred specification controls for time-varying borrower credit demand using Khwaja and Mian (2008) firm×quarter fixed effects. This approach relies on the identification assumption that each nonfinancial firm borrows from both a bank and a nonbank within the same quarter.

Our main findings are as follows. First, nonbanks partially mitigate the contraction in bank

[3] While the identification of the MaPP shocks is not as granular as in recent literature for the U.S. (Drechsel and Miura 2025), U.K. (Bluwstein and Patozi 2024), and Canada (Duprey and Tuzcuoglu 2025), the advantage of our approach is that it can be applied to several countries. In addition, we show that our findings for the U.S. economy are fully consistent when using the Drechsel and Miura (2025) high-frequency identification with sign restrictions.

credit supply to nonfinancial corporations following contractionary MP and MaPP shocks. A one-standard deviation contractionary MP shock leads nonbanks to expand lending to corporates by 4.6 percent relative to banks' lending, and by 2.5 percent in absolute terms. Although nonbank lending also increases during MaPP shocks relative to banks, the estimated effect is nearly one-third the size of the one during MP shocks: in absolute terms nonbanks do not increase lending after MaPP shocks, but still gain market share relative to banks. The relatively larger impact of MP shocks compared to MaPP shocks in driving nonbank lending is also confirmed when both shocks are calibrated to deliver an equal impact on bank stock prices. Our findings for MP shocks align with the deposits channel of monetary policy, where tighter monetary policy induce deposits outflows from banks (Drechsler et al. 2017), constraining their lending capacity and contributing to the expansion of the nonbank sector (Den Haan and Sterk 2011, Nelson et al. 2018, Xiao 2020, Drechsler et al. 2022, Elliott et al. 2022, 2024, Agarwal et al. 2023, Cucic and Gorea 2024). While one might expect MP tightening to raise funding costs for both banks and nonbanks, our finding that nonbank lending expands relative to bank lending suggests that the deposits channel of MP is stronger than the broad funding cost channel.

For MaPP shocks, our findings are consistent with the theoretical underpinning that tighter capital requirements reduce the supply of bank deposits, thereby constraining banks' lending capacity (Begenau and Landvoigt 2022, Gebauer and Mazelis 2023). One key side effect of tighter financial regulation may thus translate into a relative shift in credit to the less-regulated nonbank sector (Kim et al. 2018, Cizel et al. 2019, Ahnert et al. 2021, Irani et al. 2021).

The expansion of nonbank lending materializes both through higher loan volumes and lower prices relative to banks. While nonbanks typically charge higher interest rates, they reduce their spreads relative to banks during contractionary MP shocks, with a more limited evidence during MaPP shocks. The combination of nonbanks' increased lending volumes and lower relative spreads supports our argument of a credit supply effect rather than a shift in borrower demand. Overall, our findings highlight the critical role of nonbanks in filling the funding gap created by the contraction in bank credit following contractionary shocks.

Second, we find that our baseline results are stronger for firms with preexisting relationships with nonbanks. While the value of relationship lending with banks during downturns is well-understood (Bolton et al. 2016, Sette and Gobbi 2015, Beck et al. 2018, Banerjee et al. 2021), our contribution is to show that relationship lending with nonbanks offer additional protection to firms after MP shocks (the evidence is weaker during MaPP shocks). But nonbanks also seem to charge higher spreads to these borrowers compared to first-time nonbank borrowers. This finding highlights important intensive margin effects, where nonbanks attract new borrowers by offering preferential credit terms.

Third, when we aggregate the data at the syndicated loan deal across countries, we find that the increase in nonbanks' loan share after contractionary policy shocks is more pronounced in loan deals involving weaker banks—those with low bank capital or high nonperforming loans (NPLs). The credit reallocation is a sign that tighter policy amplifies balance sheet constraints for less-capitalized banks, reducing their lending capacity. This supports the view that an increase in banks' funding costs (Gambacorta 2005, Jiménez et al. 2012, Gambacorta and Shin 2018) and the post-GFC regulations, while enhancing bank resilience, may have unintentionally encouraged greater nonbank participation in credit markets.

At the same time, we do not find evidence that nonbanks disproportionately shift lending toward riskier borrowers in response to tighter MP or MaPP shocks. We stress, however, that nonbanks, on average, lend more to riskier borrowers than banks do overall, raising concerns about overall financial stability. In addition, our main results are primarily driven by nonbanks with unstable funding, underscoring the financial stability risks associated with the growing presence of nonbanks, particularly during periods of financial stress (Irani et al. 2021, Aldasoro et al. 2024, Albuquerque et al. 2025, Chernenko et al. 2025, Fleckenstein et al. forthcoming).

Fourth, the growing presence of nonbanks in corporate credit intermediation has important real effects: firms relying on nonbank lending invest and hire more than other firms following contractionary MP and MaPP shocks. This reinforces our previous findings that nonbanks help shield firms from the tightening effects of MP and MaPP shocks. However, greater lending to these firms does not appear to reduce borrower risk: if anything, default probabilities rise. This highlights the dual implication of nonbank relationships for financial stability.

Finally, we find that banks, especially weakly-capitalized banks, reallocate lending toward nonbank borrowers and away from nonfinancial corporations following a tightening in MaPP shocks. This credit reallocation may help explain the rise in nonbank lending to corporates, as increased bank funding flows to nonbanks that, in turn, extend credit to the real economy. While our reduced-form results do not allow us to fully uncover the mechanisms underlying this shift, regulatory frameworks, such as Basel III, may have played a role. These frameworks often allow banks to apply a more favorable capital treatment of loans to nonbanks relative to nonfinancial corporations. Increased lending from banks to nonbanks thus seems to be related to the more costly regulatory burden of lending to nonfinancial corporations (Krainer et al. 2024, Chernenko et al. 2025). Tighter MaPP may incentivize banks—especially those closer to regulatory capital constraints—to prioritize lending to seemingly less risky borrowers, including nonbanks, in order to preserve capital buffers.

Our results are robust to a battery of tests, including: (i) using alternative macroprudential measures; (ii) USD loans against foreign currency-denominated loans; (iii) breaking down loans into cross-border versus domestic; (iv) restricting the specification to lenders from major AEs, or excluding the top nonbanks; (v) splitting borrowers between AEs and emerging market and developing economies (EMDE); (vi) term loans versus credit lines; (vii) focusing on the extensive margin of lending; and (viii) employing alternative clustering methods for the standard errors.

Our paper contributes to four strands of the literature. First, our main contribution is on the role of nonbanks in the transmission of macroprudential policies to corporate lending. Available analyses are restricted to cross-country aggregated data, and therefore cannot directly capture the role of nonbanks, remaining also silent on possible heterogeneous effects of MaPP at the micro level (Claessens 2015, Cerutti et al. 2017, Cerutti and Zhou 2018, Drechsel and Miura 2025).[4] We are only aware of three related papers (Kim et al. 2018, Cizel et al. 2019, Irani et al. 2021). Kim et al. (2018), and Irani et al. (2021) focus on specific U.S. regulatory episodes: the 2013-14 U.S. interagency guidance on leveraged lending and the US implementation of Basel III rules in early-2012, respectively—both of which seem to have triggered a migration of corporate credit to nonbanks. Our analysis is broader, focusing on several MaPP shocks for a broad set of countries. Another advantage of our paper is to condition the analysis on monetary policy shocks, as the overall effect of macroprudential actions are likely influenced by changes in monetary policy. In turn, Cizel et al. (2019) use aggregated data, while their definition of nonbank credit is broader (all sectors excluding banks).

Our second contribution centers on the effects of MP and MaPP shocks on corporate lending using granular lender-borrower data. Estimating the effects of MP and MaPP shocks within a unified framework allows for a cleaner identification of each policy's effect compared to studies that consider only one shock in isolation. This is important given the increasing use of MaPP since the GFC, and its potential interdependence with MP shocks. Existing evidence from Altavilla et al. (2020), and Imbierowicz et al. (2021) show that MaPP can amplify the effects

[4]Notable exceptions using micro-level data refer to the effect of dynamic provisioning, and of changes in capital requirements from Basel III, on bank lending to Spanish firms (Jiménez et al. 2017, Anguren et al. 2024), and of reserve requirements and dynamic provisioning in Colombia (Gómez et al. 2020). But these papers focus on banks only.

of MP on bank lending to corporations in the euro area and Germany (and to households in the former paper). Our contribution lies in examining how nonbanks affect the transmission of both MP and MaPP shocks on nonfinancial firms' access to credit: we find that the presence of nonbanks mitigates the effectiveness of both MP and MaPP on corporate lending.

Third, we extend to a large set of countries the available empirical evidence from the U.S. and Denmark on the role of nonbanks in the transmission of MP shocks to nonfinancial corporations (Elliott et al. 2022, 2024, Cucic and Gorea 2024). An additional novel contribution is to show that in response to policy shocks, the share of nonbank credit increases more in syndicates with weaker banks, raising financial stability concerns as credit shifts to a less-regulated sector.

Finally, we also contribute to the literature investigating the causes behind the expansion of nonbanks. Recent evidence finding that banks seem to redirect lending towards nonbanks is limited to specific episodes that deteriorate banks' capital positions, such as the Basel III implementation or the pandemic shock (Krainer et al. 2024). Our contribution is to generalize these findings to a broader set of events when macroprudential policy tightens. We conjecture that higher regulatory burdens prompt banks to reallocate lending toward less risky borrowers (nonbanks) and away from riskier ones (nonfinancial firms) to meet regulatory requirements.

The paper is structured as follows. Section 2 describes the datasets. Section 3 outlines the empirical specifications, while Section 4 presents the main results. Section 5 examines real effects on nonfinancial firms' performance. Section 6 explores bank-nonbank linkages during contractionary shocks. Section 7 discusses robustness checks, and Section 8 concludes.

2 Data

Syndicated loans

We use Dealogic as the primary source for syndicated loan data, which covers nearly all loans issued worldwide in the primary market by nonfinancial firms (Giannetti and Laeven 2012). Syndicated loans play a key role in global finance, accounting for up to half of all global cross-border debt (Elliott et al. 2024) and approximately three-quarters of total bank lending to firms (Doerr and Schaz 2021). This dataset offers comprehensive details on each loan, including syndicate composition, borrower characteristics, loan amounts, maturity and type (e.g., term loans and credit lines), and pricing (all-in drawn spread, which encompasses fees, margins, and reference rates). In the international syndicated loan market, firms obtain funding from a consortium of lenders, which collectively provide credit and establish the loan's legal framework. Lead arrangers play a pivotal role by negotiating loan terms, assembling the syndicate, and serving as the primary liaison between the borrower and participating lenders.

Our main focus is on the quantity of credit supply, measured as the logarithm of the US dollar amount of newly issued loans, deflated by the respective country's CPI deflator. In several exercises, we also examine price effects using the spread (or loan margin)—which is sometimes missing in Dealogic—referring to the interest rate margin over LIBOR. This price variable essentially nets out all fees, which largely go to the lead arranger, from the all-in drawn spread. We focus on the spread because our analysis considers all lending participants, not just lead arrangers, as in Ivashina (2009).

Loans can be intermediated by either banks or nonbanks. We classify banks based on Dealogic SIC codes starting with 60, corresponding to depository institutions. Nonbanks are identified using SIC codes 61 to 67, excluding real estate companies (most SIC codes starting with 65) and certain mortgage brokers (code 6162).[5] For lenders without assigned SIC codes, we apply text-based classification methods, identifying banks by searching for terms such as 'bank,' 'banco,' 'banca,' and 'banque' in their names. A similar approach is used to identify investment banks by detecting the term 'investment.' As is standard in such datasets, we also manually reclassify certain large investment banks that are typically misclassified as banks and drop international financial institutions, such as the World Bank. Our sample of nonbanks mainly consists of investment banks, broker-dealers, and finance companies, but also includes insurance companies, pension funds, private equity firms, venture capital firms, and hedge funds.

Our final sample spans 2000Q1–2019Q4, covering 5,904 lenders, of which 48 percent are nonbanks, in 22 countries (20 AEs and 2 EMDEs)—Table A.1 in Appendix A shows the full list of lender countries, together with the average loan shares. The selection of lender countries is dictated by data availability on MP and MaPP shocks (discussed below). Despite this restriction, our sample covers the majority of global syndicated loan deals in Dealogic, consistently accounting for over 80 percent at any given time (Figure OA.1 in the Online Appendix). On the borrower side, we restrict the analysis to nonfinancial firms by excluding financial firms—banks, diversified financials, and insurance firms—resulting in a sample of 48,373 unique nonfinancial firms (both listed and private) in 153 borrower countries (38 AEs and 115 EMDEs). The country of the borrower is the borrower entity's country of business operation.

[5]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).

Most of our analysis is conducted at the lender-borrower-quarter level, which requires a breakdown of lenders' participation in each loan deal. However, loan-level datasets often lack detailed information on the loan amounts allocated to each syndicate member. We thus estimate missing loan shares by assigning 50 percent of the total loan amount to lead arrangers and distributing the remainder equally among other syndicate participants (Duchin and Sosyura 2014). This approach reflects the fact that lead arrangers typically take the largest share of the originated loans (Sufi 2007, Ivashina 2009). Our results are robust to alternative methods of allocating missing loan shares, including by employing a regression-based approach (De Haas and Van Horen 2013)—see Section 7—or by prorating shares among participant lenders.[6] This is consistent with the finding that alternative imputation methods generally yield similar results (Cerutti et al. 2015, Doerr and Schaz 2021, Aldasoro et al. 2024).

Table A.2 in Appendix A shows that nonbanks typically take larger tranche values and charge higher spreads—consistent with a greater risk appetite—compared to banks, while term lengths remain similar at around five years.

Nonfinancial firms' balance sheets

To estimate the real effects of MP and MaPP shocks on nonfinancial firms in Section 5, we merge Dealogic data with quarterly balance sheet data from S&P Compustat North America and Compustat Global. These datasets contain detailed balance sheet information on listed nonfinancial firms for a large sample of countries. We clean the data and create a common firm identifier between Dealogic and Compustat by adopting a two-step matching procedure based on the fuzzy matching algorithm of Albuquerque and Iyer (2024). First, we directly match nonfinancial borrowers across these two datasets based on their unique names and ISINs. Second, for the remainder unmatched firms, we employ a fuzzy matching approach by calculating a Levenshtein Distance-based similarity score, ranging from 0 (least similar) to 100 (most similar), based on three borrower attributes, name, country, and industry. To improve accuracy, we normalize the distance by string length (Levenshtein similarity ratio) and set a minimum threshold ratio of 80, followed by manual verification of the matched firms. We identify 4,985 unique listed nonfinancial firms with Compustat balance sheet information (all private firms in Dealogic are unmatched by definition).

We use the following balance sheet variables to assess the real effects on firms: (i) tangible

[6] The literature using this method mostly focuses on lead arrangers only (Giannetti and Laeven 2012, Ivashina et al. 2015, Bräuning and Ivashina 2020).

investment, measured as the logarithm of net capital stock (capital expenditures in physical capital, namely property, plant, and equipment); (ii) intangible investment, computed as the sum of Research and Development (R&D) costs and 30 percent of Selling, General, and Administrative (SG&A) expenses, as in Peters and Taylor (2017); (iii) leverage, measured as the logarithm of total real debt (the sum of short- and long-term debt); (iv) liquid assets, proxied by current assets—cash and short-term investments, receivables, inventories, and other current assets—net of current liabilities (short-term debt, accounts payable, income taxes payable, and other current liabilities); (v) employment, computed as the logarithm of the total number of employees; and (vi) probability of default (PD) over the next 12 months, a modified version of Merton's distance-to-default model, computed by the National University of Singapore's Credit Research Initiative (NUS-CRI).

Banks' balance sheets

To zoom in on the heterogeneity among banks, we leverage data from Fitch Ratings PRO, which provides comprehensive data on banks' balance sheets and income statements across a broad range of countries. Our analysis focuses on consolidated financial statements, extracting Tier 1 capital ratios, NPLs as a percentage of total loans, and return on assets (ROA), all measured at the parent-bank level. Since Fitch Ratings PRO and Dealogic lack common lender identifiers, we employ a fuzzy matching algorithm based on lender names and countries. To ensure representativeness of the data, we restrict the sample to countries with at least five banks reporting non-missing Tier 1 capital ratios. We match roughly one-third of the banks in Dealogic with balance sheet data (1,047 banks out of 3,124 banks) across 20 countries.

Country-specific monetary policy shocks

We use monetary policy (MP) shocks from Choi et al. (2024), who compile shocks for 176 countries based on a hierarchical approach regarding shock identification (Table OA.1 in the Online Appendix). We restrict the sample to 22 countries where MP shocks are identified either (i) by external sources using a high-frequency identification methodology or (ii) based on central bank forecast deviations, à la Romer and Romer (2004). We use the cumulative sum of the shock series as our dependent variable is defined in level terms, as in Elliott et al. (2022, 2024), and Cucic and Gorea (2024). Our shock series is roughly balanced between tightening and loosening episodes (Figure A.1 in Appendix A).

Country-specific macroprudential policy shocks

Recent literature has made important progress on the identification of MaPP shocks with high-frequency data, by either combining information extracted from Federal Reserve speeches with sign restrictions (Drechsel and Miura 2025), or by documenting announcements on MaPP from the respective regulators in the U.K. and Canada (Bluwstein and Patozi 2024, Duprey and Tuzcuoglu 2025).[7] Our focus on a broader set of countries limits our ability to use similar high-frequency methods, primarily due to limited data on MaPP announcements in several jurisdictions, and due to shifts in supervisory responsibilities across institutions.

Our MaPP shocks are based on the Alam et al. (2025) macroprudential policy database, who compile a database tracking changes in 17 macroprudential policy measures across 134 countries since 1990. These measures are recorded as binary variables indicating tightening, loosening, or no change. We document in Figure OA.2 in the Online Appendix that countries have increasingly been resorting more to MaPP since the GFC.

To maintain consistency with our MP shock sample, we use MaPP data for the same 22 countries. We combine macroprudential measures from two main categories to examine the effect of MaPP on lenders' lending behavior. The first targets specifically loan supply: (i) limits to credit growth, (ii) loan loss provisions, (iii) loan restrictions, (iv) limits to the loan-to-deposit ratio, and (v) limits to FX loans. The second category includes prudential measures that focus on stress testing, restrictions on profit distribution, and structural measures (e.g., limits on exposures between financial institutions).[8] The implementation of all these MaPP measures can arguably impact banks' lending capacity, which is of particular interest in our paper.

Although we cannot capture the intensity of each independent macroprudential action, we construct MaPP stringency indices by cumulating binary variables and aggregating them at the country level. To address reverse causality and the endogenous response of macroprudential policy, we follow Chari et al. (2022), who builds on the monetary policy literature, and purge the cumulative MaPP indices of the state of the economy. Specifically, we compute our MaPP shocks as the residuals from a country-level panel regression, where the MaPP index is regressed

[7] Rojas et al. (2022) use a narrative approach based on IMF and central banks reports to identify exogenous changes in reserve requirements for Argentina, Brazil, and Uruguay. They find that only exogenous changes in legal reserve requirements, not endogenous ones, are associated with output contractions.

[8] We restricted our analysis to loan supply measures in a previous version of this paper. Given that in some countries, such as the U.S., prudential policies affecting banks' lending capacity also include stress-testing exercises, we expanded our previous baseline MaPP shocks with these measures. We thank Michael B. Gordy for the suggestion. In any case, our results are strongly robust to focusing only on loan supply measures, or by expanding the scope to also include reserve requirements, capital requirements, conservation buffers, among others (Table B.3 in Appendix B).

on country fixed effects and a set of lagged financial and macroeconomic variables. The idea is to isolate exogenous changes in MaPP actions unrelated to the state of the economy:

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

where macroeconomic control variables include real GDP growth, the real effective exchange rate (REER) growth rate, 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, annual private sector credit-to-GDP ratio growth, the ten-year government bond yield, the bond yield gap (domestic ten-year government bond yield minus the equivalent U.S. bond yield), the Chinn-Ito index of financial openness, and banks' average Z-score.[9] To assess the relative impact of MaPP and MP shocks, we standardize both variables, as they are jointly included in our specifications. Our MaPP shock series is roughly balanced between tightening and loosening episodes (Figure A.2 in Appendix A). The MaPP shocks seem to be uncorrelated with the MP shocks, as illustrated in Figure A.3, showing a correlation of 0.0844. In addition, we show in a robustness exercise that our main results remain unchanged when re-estimating Equation (1) by adding the MP shocks as an additional control variable to rule out any possible endogenous response of MaPP shocks to surprises in monetary policy (column 7 of Table OA.9 in the Online Appendix).

The MaPP shocks are well-behaved: a contractionary shock is able to reproduce stylized responses of the real economy from the literature. While MaPP can arguably make the banking sector more resilient to shocks, it faces the tradeoff of dampening economic activity, as illustrated by the impulse responses of real GDP growth and real private credit growth (Figure OA.3 in the Online Appendix shows the response to a one-standard deviation MaPP tightening).[10]

3 Empirical framework

3.1 Baseline specification

Our baseline regression examines the effects of MP and MaPP shocks on the US dollar amount of newly originated syndicated loans (or on the price of credit) in a large sample of nonfinancial

[9] As in Chari et al. (2022), we do not add time fixed effects as our focus is on the within-country variation in policy changes at the country level. But our baseline results are robust to adding time fixed effects (Table OA.9 in the Online Appendix).

[10] We use local projections methods and estimate the effect of MaPP shocks on real GDP growth and real private credit growth up to 20 quarters ahead. We add country and time fixed effects, and cluster standard errors by country.

firms across countries. We focus on the differential effect of these shocks on credit supply from nonbanks relative to banks:

$$
\begin{aligned}
Log(Loans)_{l,i,t} &= \beta_1 MP_{l,t-1} + \beta_2 MaPP_{l,t-1} + \beta_3 MP_{l,t-1} \times Nonbank_l + \beta_4 MaPP_{l,t-1} \times Nonbank_l \\
&+ \gamma_l + \mu_{i,t} + \epsilon_{l,i,t}, \qquad (2)
\end{aligned}
$$

where the dependent variable is the logarithm of the US dollar amount of new syndicated loans or the margin spread over LIBOR net of all fees. $MP_{l,t-1}$ and $MaPP_{l,t-1}$ are the lagged MP and MaPP shocks at the lender-country level. $Nonbank_l$ is a dummy variable equal to one for nonbanks and zero for banks. The main coefficients of interest, β_3 and β_4, indicate the differential lending from nonbanks *relative* to banks following contractionary MP and MaPP shocks.[11]

Our preferred set of fixed effects controls for lender characteristics (γ_l), and for time-varying borrower characteristics, including credit demand, with the Khwaja and Mian (2008) firm×quarter fixed effects ($\mu_{i,t}$). The identification of the latter fixed effects in our specification relies on the assumption that a given nonfinancial firm borrows from at least one bank and one nonbank in a given quarter.[12] Since this assumption may be too restrictive for some firms, we also report results using alternative ways to control for credit demand, specifically with country×industry×quarter fixed effects and industry-location-size-time (ILST) fixed effects (Degryse et al. 2019).[13] ILST fixed effects allow for a more granular comparison by controlling for borrowers within the same two-digit industry, country, and quarter, while also accounting for firm size, proxied by quartile bins of total borrowing volume within a given country-year pair. We cluster standard errors by firm to deal with within-firm correlation and to account for potential correlation among different loans of the same firm. Our main results, however, are robust to alternative clustering combinations (see Section 7).

While our main focus is on the US dollar amount of credit supply, we also examine price effects in some specifications. In these regressions, we add the years to maturity as an additional

[11]While it is standard in quarterly-frequency analyses to lag monetary policy shocks by one quarter (Correa et al. 2022, Berger et al. 2024, Elliott et al. 2024), the appropriate horizon for MaPP shocks remains less clear. To ensure comparability in lending responses to shocks, we also lag MaPP shocks by one quarter. Our choice is supported by evidence from the macroprudential policy database for 28 EU countries, developed by Budnik and Kleibl (2018), which shows that the median of the difference between the announcement and in-force date of macroprudential measures is one quarter. To strengthen our findings, we run a sensitivity analysis using alternative lag structures for the shocks, obtaining very similar results (Table OA.9 in the Online Appendix).

[12]It is uncommon for firms to take out more than one loan deal in the same quarter, as also noted by Elliott et al. (2024). This means that our firm×quarter fixed effects for the most part capture loan deal fixed effects.

[13]In regressions without firm×quarter fixed effects, we add time-invariant borrower fixed effects α_i.

control variable to account for the impact of loan duration on the spread charged by lenders. However, the analysis comes with the caveat that pricing data is less populated in Dealogic.

3.2 Relationship lending

We investigate whether our results are driven by relationship lending. To do so, we augment Equation (2) by interacting all terms with a variable measuring relationship lending:

$$\begin{aligned} Log(Loans)_{l,i,t} &= \beta_1 MP_{l,t-1} + \beta_2 MaPP_{l,t-1} + \beta_3 MP_{l,t-1} \times Nonbank_l + \beta_4 MaPP_{l,t-1} \times Nonbank_l \\ &+ Relation_{l,i,t-1} \times (\beta_5 + \beta_6 Nonbank_l + \beta_7 MP_{l,t-1} + \beta_8 MaPP_{l,t-1} \\ &+ \beta_9 MP_{l,t-1} \times Nonbank_l + \beta_{10} MaPP_{l,t-1} \times Nonbank_l) \\ &+ \gamma_l + \mu_{i,t} + \epsilon_{l,i,t}, \end{aligned} \tag{3}$$

where $Relation_{l,i,t-1}$ is a dummy variable capturing the extensive margin of relationship lending, equal to one if firm i has borrowed from lender l in the past five years. We also use loan *duration* as an alternative measure, defined as the logarithm of the number of years since the borrower first obtained a loan from a given lender, as in Banerjee et al. (2021). Coefficients β_7 and β_8 capture the differential effect of MP and MaPP shocks on lending by banks to borrowers with an established relationship compared to other borrowers. Coefficients β_9 and β_{10} measure the additional effect of these shocks on loans to borrowers with a prior relationship with nonbanks. Note that the total differential effect on lending to borrowers with a nonbank relationship relative to banks is given by $\beta_3 + \beta_9$ for MP shocks and $\beta_4 + \beta_{10}$ for MaPP shocks.

3.3 Bank characteristics and credit migration to nonbanks

To study the role of bank characteristics in the credit migration from banks to nonbanks in response to contractionary MP and MaPP shocks, we aggregate the data at the syndicated loan deal level. This follows the spirit of Irani et al. (2021), who study the reallocation of credit to nonbanks after changes in bank capital. Specifically, we test whether the nonbank share in loan deals increases within syndicates that include weaker banks following MP and MaPP shocks. We proxy weak banks using either bank capital ratios or NPLs at the parent-bank level:

$$\begin{aligned} NB\ shr_{d,t} &= \beta_1 MP_{d,t-1} + \beta_2 MaPP_{d,t-1} \\ &+ Weak\ bank_{d,t-1} \times (\beta_3 + \beta_4 MP_{d,t-1} + \beta_5 MaPP_{d,t-1}) \\ &+ \alpha_i + \text{ILST FE} + \epsilon_{d,t} \end{aligned} \tag{4}$$

where $NB\ shr_{d,t}$ denotes the share of loans from nonbanks in each syndicated loan deal d at time t. $Weak\ bank_{d,t}$ is a dummy variable capturing syndicates with weaker banks, proxied by a loan-weighted Tier 1 capital ratio (NPL) across all banks participating in a given syndicated loan deal falling in the bottom (top) quartile of the loan deal-time distribution. This definition is time-varying, allowing banks to transition between states. $MP_{d,t}$ and $MaPP_{d,t}$ represent our MP and MaPP shocks. Since loan deals often involve lenders from multiple jurisdictions, we use the country-specific shocks of each participating bank in the same loan deal and weight them according to the relative loan shares of each lender in the syndicate. The main coefficients of interest, β_4 and β_5, indicate the marginal credit migration within a syndicate from weak banks to nonbanks relative to syndicates with strong banks as a response to contractionary MP and MaPP shocks. A positive coefficient suggests that tighter MP or MaPP shocks prompts a migration of credit from weaker banks to nonbanks within syndicates.

Our preferred specification controls for time-invariant borrower characteristics α_i, and for time-varying credit demand using ILST fixed effects. Employing firm×time fixed effects would be too restrictive when aggregating data at the syndicated loan deal level as this approach assumes that a given nonfinancial firm borrows from multiple syndicates within the same quarter.

3.4 Borrowers' credit risk migration to nonbanks

To analyze nonbanks' risk-taking behavior, we modify Equation (4) by incorporating a dummy variable for risky borrowers. Specifically, we estimate the following model:

$$\begin{aligned} NB\ shr_{d,t} &= \beta_1 MP_{d,t-1} + \beta_2 MaPP_{d,t-1} \\ &+ Risky_{i,t-1} \times (\beta_3 + \beta_4 MP_{d,t-1} + \beta_5 MaPP_{d,t-1}) \\ &+ \alpha_i + \text{ILST FE} + \epsilon_{d,t} \end{aligned} \tag{5}$$

where $Risky_{i,t-1}$ is a dummy variable equal to one if firm i is a risky borrower at $t-1$. We consider four proxies: (i) borrowers with a loan-weighted average spread over the past five years in the top quartile of the sample distribution in each quarter;[14] (ii) leveraged loans, defined as borrowers whose spread is over 150 bps over Libor, a conventional benchmark used by financial market participants; (iii) high-PD borrowers, defined as those with a PD in the top quartile of the country-time distribution; and (iv) borrowers rated 'speculative' by S&P, i.e., those

[14] We compare the average spread by different years-to-maturity buckets to account for the possibility that higher spreads for a given borrower may simply reflect a longer duration of the loan.

with a long-term issuer credit rating below BBB^{-}. While the latter two measures have a more restricted sample size relative to the spread-based definition from Dealogic, both PDs and credit ratings are common indicators of financial constraints (Farre-Mensa and Ljungqvist 2016).

$MP_{d,t}$ and $MaPP_{d,t}$ represent the MP and MaPP shocks, computed as in the previous equation by aggregating country-specific shocks for each participating bank in a loan deal and weighting them according to the relative loan shares of each lender in the syndicate. The main coefficients of interest, β_4 and β_5, capture whether nonbanks increase their lending disproportionately within syndicates that include risky borrowers following contractionary policy shocks.

3.5 Real effects at the firm-level

In Section 5, we test whether firms with nonbank lending relationships exhibit different financial performance outcomes following contractionary shocks compared to those without such relationships. To assess this, we estimate the following regression at the firm-quarter level:

$$\begin{aligned} Y_{i,t} &= \beta_1 MP_{c,t-1} + \beta_2 MaPP_{c,t-1} + \textit{NB relation}_{i,t-1} \times (\beta_3 + \beta_4 MP_{c,t-1} + \beta_5 MaPP_{c,t-1}) \\ &+ \alpha_i + \mu_{c,s,t} + \epsilon_{i,t}, \end{aligned} \tag{6}$$

where the dependent variable $Y_{i,t}$ refers to various firm-specific balance sheet variables for firm i at time t, namely the logarithm of total real debt (short- and long-term debt), net liquid assets (the logarithm of total liquid assets minus short-term liabilities), the logarithm of tangible investment, the logarithm of intangible investment, the logarithm of total employment, and the PD over the next 12 months. $\textit{NB relation}_{i,t-1}$ is a dummy variable equal to one if a firm borrowed from nonbanks in the previous five years. The $MP_{c,t-1}$ and $MaPP_{c,t-1}$ shocks are computed as the loan-weighted average of lender-country shocks, with weights corresponding to the share of loans a firm borrowed from each lender. The specification includes borrower fixed effects (α_i) and controls for credit demand using country-industry-time fixed effects ($\mu_{c,s,t}$).

4 Empirical findings

4.1 Main results

Our main research question examines the differential lending behavior of nonbanks relative to banks following contractionary MP and MaPP shocks. Before analyzing their effects within an unified framework, we modify Equation (2) to first assess the individual effect of MP and MaPP shocks separately. This approach allows for a direct comparison of MP shock results with the existing literature.

Column (1) of Table 1 shows that contractionary MP shocks lead to a 7.8 percent decline in global syndicated loans to nonfinancial firms, consistent with the credit lending channel of monetary policy via tighter credit conditions. The subsequent columns control for credit demand using different set of fixed effects. Our results show that nonbanks partially offset the impact of monetary policy on corporate lending. For instance, column (5), controlling tightly for credit demand using firm×time fixed effects, indicates that a one-standard deviation MP tightening shock leads to a 2.3 percent decline in bank credit supply, which is partially mitigated by a 2.6 percent increase in nonbanks (nonbanks increase lending by 4.9 percent *relative* to banks).[15] This finding aligns with recent evidence from the U.S. (Elliott et al. 2022), Denmark (Cucic and Gorea 2024), and U.S. global spillovers (Elliott et al. 2024). The result is rationalized through banks' funding frictions, which allow nonbanks to gain market share, likely due to deposits outflows from banks triggered by a widening spread between the policy rate and deposit rates (Drechsler et al. 2017). Although MP tightening may raise funding costs for both banks and nonbanks, the relative rise in nonbank lending points to a stronger role for the deposits channel.

The last column shows that the expansion of nonbanks is reflected not only in higher lending volumes but also in lower borrowing costs, indicating that our result is driven by nonbanks' credit supply rather than changes in demand.

Table 1: Effect of monetary policy shocks

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Loans	(6) Spread
MP shock	-0.078*** (0.004)	-0.095*** (0.004)	-0.023*** (0.003)	-0.025*** (0.003)	-0.023*** (0.002)	0.189** (0.089)
MP shock × Nonbank		0.057*** (0.004)	0.057*** (0.004)	0.060*** (0.004)	0.049*** (0.003)	-0.473*** (0.140)
Firm FE	✓	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓			
ILST FE				✓		
Firm × Time FE					✓	✓
Observations	756,531	751,549	749,629	748,453	739,866	386,185
R^2	0.688	0.687	0.727	0.795	0.877	0.988

Notes: Dependent variable is the log of new syndicated loans (columns 1-5) and spread expressed in bps (column 6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

[15] The overall effect of a MP tightening on credit is still negative on average over the sample because bank lending accounts for a larger share of total syndicated lending relative to nonbank lending.

We re-estimate the same specification but now focus on MaPP shocks. Interestingly, we find similar qualitative results to those for MP shocks. Table 2 shows that a one-standard deviation MaPP tightening shock leads banks to cut credit supply by 2.0 percent, while nonbanks increase lending by 2.5 percent relative to banks, although there is a muted response in absolute terms. This finding is consistent with the theoretical framework of Begenau and Landvoigt (2022), in that tighter capital requirements reduce the supply of bank deposits, lowering nonbanks' debt financing costs (via lower convenience yields) and enabling nonbanks to expand. Similarly to MP shocks, banks respond to MaPP tightening by increasing lending spreads, whereas nonbanks charge lower spreads relative to banks, although it is estimated with less precision (column 6). These novel findings highlight the side effects of MaPP tightening, which result in a significant reallocation of credit to the nonbank sector (Kim et al. 2018, Cizel et al. 2019, Ahnert et al. 2021, Irani et al. 2021, Gebauer and Mazelis 2023).

Table 2: Effect of macroprudential policy shocks

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Loans	(6) Spread
MaPP shock	-0.040***	-0.054***	-0.021***	-0.020***	-0.020***	0.144**
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.065)
MaPP shock × Nonbank		0.036***	0.025***	0.027***	0.025***	-0.163
		(0.004)	(0.003)	(0.003)	(0.002)	(0.127)
Firm FE	✓	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓			
ILST FE				✓		
Firm × Time FE					✓	✓
Observations	756,531	751,549	749,629	748,453	739,866	386,185
R^2	0.688	0.687	0.726	0.795	0.877	0.988

Notes: Dependent variable is the log of new syndicated loans (columns 1-5) and spread expressed in bps (column 6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Our specification implicitly assumes symmetry in the effects of contractionary and expansionary shocks on corporate loans. This is corroborated by Tables OA.2 and OA.3 in the Online Appendix, which show that the coefficients for positive and negative MP and MaPP shocks are highly similar, including their interactions with the nonbank dummy.

The previous results examine the effects of MP and MaPP shocks in isolation. However, these shocks, do not operate in a vacuum, making it essential to analyze their effects within a unified framework. To do so, we run Equation (2) with both shocks, allowing for a better identification of the effect of each policy shock compared to studies that consider only one shock in isolation. Table 3 confirms that the previous results remain strongly robust when controlling for both MP and MaPP shocks: nonbanks partially mitigate the contraction in bank credit supply to corporate borrowers following contractionary shocks. We also find that nonbanks increase lending disproportionately more during MP shocks than MaPP shocks. Our preferred specification in column (4) with firm×time fixed effects indicates that nonbanks expand lending by 4.6 percent relative to banks during MP shocks, compared to 1.6 percent during MaPP shocks.[16] In absolute terms, nonbank lending expands by 2.5 percent during MP shocks, but is muted during MaPP shocks.

The nonbank credit expansion we have found in Table 3 also materializes along the price dimension. The point estimates show that nonbanks cut loan rates relative to banks and in absolute terms following MP shocks, while remaining unchanged during MaPP shocks (column 5). Higher quantities and lower spreads during MP shocks is consistent with credit supply effects from nonbanks (Elliott et al. 2022).

Table 3: Effect of monetary and macroprudential policy shocks on new loans

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Spread
MP shock	-0.071***	-0.021***	-0.023***	-0.021***	0.166*
	(0.004)	(0.003)	(0.003)	(0.002)	(0.089)
MaPP shock	-0.032***	-0.019***	-0.019***	-0.019***	0.124*
	(0.003)	(0.002)	(0.002)	(0.002)	(0.065)
MP shock × Nonbank		0.056***	0.057***	0.046***	-0.474***
		(0.004)	(0.004)	(0.003)	(0.157)
MaPP shock × Nonbank		0.015***	0.017***	0.016***	-0.058
		(0.003)	(0.003)	(0.002)	(0.140)
Firm FE	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓
Country × Sector × Time FE		✓			
ILST FE			✓		
Firm × Time FE				✓	✓
Observations	756,531	749,629	748,453	739,866	386,185
R^2	0.689	0.727	0.795	0.877	0.988

Notes: Dependent variable is the log of new syndicated loans with exception of column (5) referring to the spread expressed in bps. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Although both the MP and MaPP shocks have been standardized to have zero mean and unit standard deviation over the sample, their regression coefficients are not necessarily directly comparable. This is because the economic meaning of a one-standard deviation shock differs across the two policy types. To make their effects more comparable, it is necessary to analyze

[16] All our results are robust to restricting the specification to lenders from selected major AEs, namely the United States, the United Kingdom, France, and the euro area, as illustrated in Table OA.4 in the Online Appendix. In addition, our results are not influenced by endogeneity concerns between MP and MaPP shocks: the correlation between the two shocks is only 0.0844 (Figure A.3). In addition, to further exogenize our MaPP shocks, we re-estimate Equation (1) by adding the MP shocks as an additional control variable to rule out that MaPP shocks may respond to surprises in monetary policy. Column (7) of Table OA.9 in the Online Appendix shows that our main result remains strongly robust.

their impact on a common metric. While interest rates are a natural metric to assess the stance and transmission of MP, it is likely not suitable for comparing the effects of MaPP shocks. MaPP measures often operate through regulatory instruments—such as capital buffers or lending restrictions that do not directly affect policy rates or the yield curve. As a result, using interest rates to compare MP and MaPP effects would underestimate the transmission channels of MaPP. In contrast, bank stock prices provide a more comprehensive and unified metric: they respond not only to changes in interest rates, but also to shifts in future profitability, risk-taking incentives, and regulatory constraints. In this context, bank stock prices serve as a more comparable and even more meaningful gauge of the market impact of both MP and MaPP shocks.

For this purpose, we source bank stock price indices for our sample of 22 countries from Refinitiv DataScope. We first regress the log change of real bank stock prices on the MP and MaPP shocks, one at a time. The coefficient tells us the impact of a one-standard deviation shock on bank stock prices. We then normalize each shock by the respective coefficient: the normalized shocks correspond to a one percent decline in stock prices. Normalizing both shocks with this method allows us to directly compare the relative effects of each shock on new loans, holding constant the stock market impact. When we re-run the preferred specification of column (4) in Table (3) with the normalized shocks, we also find that the expansion of nonbank lending relative to bank lending is greater in the presence of MP shocks: an MP shock calibrated to decrease bank stock prices by one percent leads to a 5.5 percent relative increase in nonbank lending, which compares with 4.0 percent during MaPP shocks (column 2 in Table OA.5 in the Online Appendix. While the difference between the coefficients is smaller than under the baseline, the difference is also statistically significant at the five percent level when normalizing the shocks with bank stock prices. The relatively smaller expansion of nonbank credit compared to bank credit during MaPP shocks may reflect the possibility that macroprudential policies may also apply to some nonbanks in certain jurisdictions, despite nonbanks being subject to a lighter regulatory framework compared to commercial banks.

Monetary policy can amplify or mitigate the effectiveness of macroprudential policies, and vice-versa (Altavilla et al. 2020, Gambacorta and Murcia 2020, Imbierowicz et al. 2021). Table 4 tests for these possible amplification/mitigation effects. When not distinguishing banks from nonbanks, we find that MaPP and MP shocks complement each other in reducing credit supply to corporate borrowers (column 1). This echoes the results in Altavilla et al. (2020), who use credit registry data for several European countries over 2012-17 to find that the easing of both MP and MaPP amplify bank lending to both nonfinancial corporations and households in the euro area. Although our estimate is statistically significant at conventional levels, the economic magnitude is small: a one-standard deviation increase in both shocks leads to an additional decline in lending to nonfinancial corporations of 0.5 percent. This is consistent with Gambacorta and Murcia (2020), who find that the tightening of both policies reinforce the fall in credit growth in five Latin American countries, but that the effect is quantitatively small.

We add the interaction terms with nonbanks in column (2). The coefficient on the interaction term of both shocks flips to positive when isolating the effect for banks only: the tightening of both policies mitigates the credit supply contraction from banks by 0.3 percent. This is again of a relatively small magnitude compared to the individual effects of each policy tightening (2.1 percent for MP shocks and 1.8 percent for MaPP shocks). In turn, we find that the expansion of nonbank credit to be mitigated by 1.4 percent when both policies tighten (coefficient on triple interaction term), although nonbanks still increase their lending supply relative to banks, with a combined effect in the order of 4.2 percent (4.2 = 4.6 + 1.0 - 1.4).

To better understand the interaction between MP and MaPP shocks, we look into all possible tightening-loosening combinations for banks and nonbanks. Starting with bank lending, and focusing on the tightest specification in column (5), we only find a statistically significant effect when MP loosens and MaPP tightens ($MP^{-} \times MaPP^{+}$). Although the coefficient on MP tightening and MaPP loosening is not precisely estimated, we also find that it is negative. This suggests that that the lack of policy coordination, i.e., MP loosening and MaPP tightening, or vice-versa, typically leads to an additional contraction in bank lending. For instance, our estimates indicate that while an easing of monetary policy stimulates bank lending, a simultaneous tightening of macroprudential policy seems to fully offset that expansion (-0.3 = 2.2 - 1.8 - 0.7). We conjecture that policies going in different directions may send mixed signals to banks, which seem to make banks more conservative in their lending (more on this below).

Moving to nonbanks (last four rows), we can rationalize the negative coefficient we have found in column (2) as being driven by a combined tightening of MP and MaPP: the expansion of nonbank lending relative to banks in this scenario is mitigated by 2.3 percent. However, we note that nonbanks still expand lending relative to banks by 4.2 percent, when summing all relevant coefficients (4.2 = 5.3 + 1.2 - 2.3). One potential explanation for this apparent counterintuitive result may be related to market perceptions of what periods of joint policy tightening may mean: financial markets may interpret this coordinated policy action as a stronger signal of policymakers' intent to rein in credit growth and/or financial risk-taking, therefore having an overall deterrent effect on nonbanks which typically have less stable funding sources than banks.

By contrast, the expansion of nonbank credit relative to banks seems to be amplified when there is a divergence in the direction between MP and MaPP (as discussed previously). Our results are not driven by a few observations in each of the monetary-macroprudential policy combinations given the roughly balanced number of observations in each bucket (Table OA.6 and Figure OA.4 in the Online Appendix).

Table 4: Interaction between monetary and macroprudential policy shocks

	(1)	(2)	(3)	(4)	(5)
MP shock	-0.007***	-0.021***	-0.027***	-0.028***	-0.022***
	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)
MaPP shock	-0.012***	-0.018***	-0.017***	-0.017***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
MP shock × Nonbank		0.046***	0.067***	0.068***	0.053***
		(0.003)	(0.006)	(0.005)	(0.005)
MaPP shock × Nonbank		0.010***	0.012***	0.014***	0.012***
		(0.003)	(0.004)	(0.003)	(0.003)
MP shock × MaPP shock	-0.005***	0.003*			
	(0.001)	(0.002)			
MP shock × MaPP shock × Nonbank		-0.014***			
		(0.003)			
$MP^+ \times MaPP^+$			0.016***	0.011***	0.002
			(0.005)	(0.004)	(0.003)
$MP^+ \times MaPP^-$			-0.006	-0.004	-0.005
			(0.005)	(0.005)	(0.004)
$MP^- \times MaPP^+$			-0.014***	-0.012***	-0.007**
			(0.005)	(0.004)	(0.003)
$MP^- \times MaPP^-$			-0.001	-0.005	-0.003
			(0.005)	(0.004)	(0.004)
$MP^+ \times MaPP^+ \times$ Nonbank			-0.033***	-0.029***	-0.023***
			(0.008)	(0.007)	(0.006)
$MP^+ \times MaPP^- \times$ Nonbank			0.003	0.005	0.009*
			(0.007)	(0.006)	(0.005)
$MP^- \times MaPP^+ \times$ Nonbank			0.019**	0.020***	0.023***
			(0.007)	(0.006)	(0.006)
$MP^- \times MaPP^- \times$ Nonbank			0.002	0.007	-0.002
			(0.007)	(0.006)	(0.005)
Firm FE			✓	✓	
Lender FE	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓		
ILST FE				✓	
Firm × Time FE	✓	✓			✓
Observations	745,029	739,866	749,629	748,453	739,866
R^2	0.877	0.877	0.727	0.795	0.877

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.

To take stock of our findings, our contribution unfolds along three dimensions. First, the differential increase in nonbank credit supply during contractionary MP shocks found for US and Danish lenders (Elliott et al. 2022, 2024, Cucic and Gorea 2024) holds in a large sample of 22 countries. This suggests that nonbanks' behavior during contractionary MP shocks is a feature of their business model. Second, the expansion of nonbank lending is not restricted to periods of MP shocks, but also when MaPP tightens. This novel results suggests that shocks that directly affect banks' ability to lend have the side effect of shifting credit to the nonbanking sector. Third, the expansion of credit by nonbanks relative to banks is amplified when policy shocks do not go in the same direction, potentially as the divergence in policy direction may send mixed signals to banks—which seem to make banks' lending more conservative. This finding, for instance, suggests that (traditional) MaPPs that focus only on banks may not be able to stem the credit leakage to nonbanks during contractionary MP shocks. Although it is beyond the scope of the paper, extending the regulatory perimeter to nonbanks should help limit the extent of the credit leakages to nonbanks, thus improving the transmission of monetary policy, while contributing to improving the overall resilience of the financial sector (Abbas et al. 2025).

4.2 Relationship lending and nonbanks

Relationship lending provides valuable benefits to borrowers as higher credit supply and at more favorable terms alleviate firms' credit constraints during economic downturns, allowing nonfinancial firms to increase investment and employment (Bolton et al. 2016, Sette and Gobbi 2015, Beck et al. 2018, Banerjee et al. 2021).[17] The value of relationship lending arises because of lenders' informational advantage: banks collect substantial information on borrowers' underlying credit risk over time, allowing banks to change credit terms accordingly, and to better allocate loans to profitable firms during bad times. Relationship lending can also shield borrowers from contractionary MP shocks (Hachem 2011, Berger et al. 2024), although weakly-capitalized banks may have an incentive to keep unproductive and unviable zombie firms alive when the cost of debt goes up to avoid the recognition of losses (Albuquerque and Mao 2025).

The benefits of relationship lending during downturns appear to be largely confined to relationships with banks rather than nonbanks (Aldasoro et al. 2024). This is most likely connected to the greater nonbank cyclicality, reflecting the inherent instability of nonbanks' funding

[17] Banks typically charge higher interest rates to relationship borrowers during normal times, since collecting information is costly (Bolton et al. 2016). This behavior essentially translates into an insurance mechanism that allows a borrower to secure continuation of lending during bad times, and at more favorable terms (Bolton et al. 2016, Sette and Gobbi 2015, Beck et al. 2018).

model, typically characterized by greater frictions (Irani et al. 2021, Fleckenstein et al. forthcoming). But nonbanks may play an important role in shielding borrowers from contractionary MP shocks, above and beyond the protection offered by banks: evidence from the US economy and from US MP spillovers (Elliott et al. 2022, 2024), and from Denmark (Cucic and Gorea 2024). In fact, nonfinancial corporations with nonbank relations tend to borrow more and at more favorable terms in the aftermath of a tightening in MP, which allows them to mitigate the fall in investment, assets, employment, and profits. An open question is whether the literature's findings on the US and Denmark also hold in our sample of 22 country lenders.

In turn, we are not aware of research focusing on the role of relationship lending, either with banks or nonbanks, during contractionary MaPP or regulatory shocks. We aim to fill this gap. Based on our previous findings, we would expect nonbanks to provide differentially more credit to borrowers with whom they have an existing lending relationship during both contractionary MP and MaPP shocks. Arguably, the cost of acquiring information about the underlying credit quality of borrowers in relationship lending is lower compared to other borrowers, which may incentivize nonbanks to privilege lending to the first group of borrowers.

We run Equation (3), interacting all variables with two measures of relationship lending: based on the firms' borrowing history, we identify firms that have borrowed from a given lender in the past five years—pre-relation—and the duration of that relationship. Table 5 reveals two key findings. First, having an established lending relationship with banks allows nonfinancial firms to mitigate the contraction in credit supply driven by the tightening in both MP and MaPP. The estimated effects are economically significant: column (3), saturated with firm×time fixed effects, shows that firms with a prior lending relationship with banks offset nearly 94 percent of the decline in credit supply following MP tightening (0.033/0.035), and about one-fourth (0.006/0.022) during MaPP tightening. Similar results emerge when measuring relationship lending with *Duration*—the number of years a firm has borrowed from a lender—as shown in columns (4)-(6), though with smaller coefficients. This is consistent with the theoretical framework in Hachem (2011), and the empirical findings of Berger et al. (2024), who posit that relationship lending smooths the credit channel from contractionary MP shocks.

Our second main finding points to relationship lending being even more important for firms that borrow from nonbanks during MP shocks. Nonbanks provide substantially more loans to borrowers with whom they have an ongoing lending relationship when MP tightens: the triple interaction term between the MP shock, the nonbank dummy, and the pre-relation dummy ranges between 0.032 and 0.045 in columns (1)-(3), suggesting that firms with an existing lending relationship with nonbanks are able to borrow 3.2-4.5 percent more compared to firms that borrow for the first time from nonbanks. These results point to an important role played by nonbanks in allocating funding to borrowers when interest rates increase, particularly to firms with whom they have an established lending relationship. The evidence of the additional protection offered by nonbanks relative to banks is more mixed during MaPP shocks, depending on how we control for time-varying firm characteristics (last row). Increased lending from nonbanks when MP or MaPP tighten may come at a greater price for borrowers with an existing lending relationship, relative to those without one (last two rows in Table OA.7 in the Online Appendix). However, during MP shocks, borrowers from nonbanks still benefit from a decline in spreads compared to those borrowing from banks. This finding highlights important intensive margin effects: nonbanks appear to attract new borrowers by offering preferential credit terms.

Table 5: Relationship lending: pre-relationship and lending duration

	(1) Pre-relation	(2) Pre-relation	(3) Pre-relation	(4) Duration	(5) Duration	(6) Duration
MP shock	-0.034***	-0.037***	-0.035***	-0.031***	-0.033***	-0.035***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
MaPP shock	-0.023***	-0.021***	-0.022***	-0.021***	-0.020***	-0.021***
	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Relation	0.024***	0.062***	0.077***	0.020***	0.031***	0.031***
	(0.004)	(0.003)	(0.003)	(0.002)	(0.001)	(0.001)
Relation × Nonbank	-0.013**	-0.001	-0.002	-0.004	-0.000	-0.002
	(0.005)	(0.005)	(0.004)	(0.002)	(0.002)	(0.002)
MP shock × Nonbank	0.037***	0.044***	0.034***	0.035***	0.041***	0.032***
	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
MaPP shock × Nonbank	0.006	0.013***	0.015***	0.005	0.013***	0.014***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
MP shock × Relation	0.030***	0.032***	0.033***	0.009***	0.009***	0.012***
	(0.004)	(0.004)	(0.003)	(0.001)	(0.001)	(0.001)
MaPP shock × Relation	0.006*	0.003	0.006**	0.001	0.000	0.002*
	(0.004)	(0.003)	(0.002)	(0.001)	(0.001)	(0.001)
MP shock × Nonbank × Relation	0.045***	0.034***	0.032***	0.018***	0.016***	0.014***
	(0.006)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)
MaPP shock × Nonbank × Relation	0.012**	0.003	-0.003	0.004**	0.001	-0.001
	(0.006)	(0.005)	(0.004)	(0.002)	(0.002)	(0.001)
Firm FE	✓	✓		✓	✓	
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓			✓		
ILST FE		✓			✓	
Firm × Time FE			✓			✓
Observations	749,629	748,453	739,866	749,629	748,453	739,866
R^2	0.727	0.795	0.877	0.727	0.795	0.877

Notes: Dependent variable is the log of new syndicated loans. Relation in columns (1)-(3) refers to a dummy variable taking the value of one when a borrower has a previous lending relationship with a lender over the past five years; in columns (4)-(6) it refers to the logarithm of the number of years since the borrower got the first loan from a specific lender. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

4.3 Bank characteristics and credit migration to nonbanks

Our main finding shows that nonbank credit consistently increases relative to bank credit following contractionary MP and MaPP shocks: nonbanks fill an important funding gap created by the reduction in bank credit following contractionary policy shocks. An important question is whether banks' credit retrenchment is stronger for weaker or stronger banks. It could be the case that credit may shift from banks to nonbanks, irrespective of banks' balance sheet health, or the partial credit migration may flow from weaker to strongly capitalized banks, as lower-capitalized banks may arguably be more constrained in the face of shocks. To test this, we examine whether the credit migration from banks to nonbanks following shocks is stronger within syndicates that include weaker banks. Moreover, we check whether this reallocation is directed toward riskier firms. Both tests aim to assess potential financial stability risks associated with credit migration and its underlying quality to the less-regulated nonbank sector.

We begin by examining the role of bank characteristics in the migration of corporate credit to nonbanks in response to contractionary MP and MaPP shocks. To do so, we aggregate the data at the syndicated loan deal level, following Irani et al. (2021). Using Equation (4), we study how the nonbank loan share evolves in syndicates populated with weaker banks relative to those with stronger banks. We define weak banks with either bank capital or NPLs of the parent bank. Specifically, we construct a dummy variable that captures syndicates with weaker banks, proxied with the loan-weighted Tier 1 capital ratio (or NPL) across all banks participating in a given syndicated loan deal falling in the bottom (top) quartile of the loan deal-time distribution.

Since loan deals typically involve lenders from different jurisdictions, we compute our MP and MaPP shocks as the loan-weighted average of country-specific lender shocks for all lenders participating in each syndicate. We control for firm characteristics, including credit demand, with either country×industry×quarter fixed effects or ILST fixed effects. We do not use the Khwaja and Mian (2008) firm×quarter fixed effects at this level of aggregation as it requires comparing firms borrowing from multiple syndicates within the same quarter, which is relatively uncommon. Nonetheless, we have previously shown that our baseline results are broadly comparable to controlling for firm demand in different ways.

Columns 1–2 in Table 6 proxy weaker syndicates with the loan-weighted average of the bank capital of all participating banks, and columns 3-4 with the banks' NPL ratios. We highlight three key findings. First, the nonbank share is typically higher in syndicates with weaker banks, suggesting a tighter link between weakly capitalized banks and nonbanks (third row). Second, the first two rows show that the share of nonbank loans increases in response to contractionary policy shocks, reinforcing our earlier findings of credit migration from banks to nonbanks. Third, the increase in nonbank participation following MP and MaPP shocks is more pronounced in loan deals involving weaker banks. In our preferred specification with low bank capital in column (2), the nonbank loan share rises by an additional 1.3 and 1.7 percentage points following a one-standard-deviation increase in MP and MaPP shocks, respectively, compared to syndicates with stronger banks. These are economically large effects, as the mean difference in the nonbank share between syndicates with strong and weak banks is around one percentage point.

Overall, our results indicate that the expansion of nonbank credit supply following contractionary policy shocks stems from credit migration from banks, especially weaker banks, as nonbanks step in to fill the funding gap from the reduction in bank credit. While our reduced-form results cannot offer a detailed account of the amplification in credit migration from weaker banks, they are consistent with the notion that these banks face tighter balance sheet constraints. In the case of monetary policy, weaker banks may struggle more to switch from reservable to (uninsured) non-reservable liabilities as funding costs rise, forcing them to cut credit supply more (Gambacorta 2005, Jiménez et al. 2012, Gambacorta and Shin 2018). For MaPP shocks, our results align with recent research suggesting that post-GFC bank regulations—especially those designed to curb excessive risk taking—may have contributed to the expansion of the nonbank sector (Buchak et al. 2018, Irani et al. 2021, Bednarek et al. 2023, Claessens et al. 2023, Erel and Inozemtsev 2025). In particular, evidence for the U.S. and Europe shows that increases in capital requirements from Basel III and the 2011 EBA capital exercise have imposed tighter balance sheet constraints on banks, with more pronounced effects on those closer to the regulatory capital limits (Irani et al. 2021, Bednarek et al. 2023).

Having established that credit migrates to nonbanks, especially from weaker banks, following MP and MaPP shocks, we next examine whether credit *risk* also migrates to nonbanks by running Equation (5). Since borrowers' credit risk is typically not directly observable in loan-level datasets, we resort to four different sources to proxy for risky borrowers. The first measure uses our Dealogic dataset, from which we compute, for each firm, the loan-weighted average spread over the past five years, identifying risky borrowers as those in the top quartile of the sample distribution in each quarter. The second measure refers to leveraged loans, defined as borrowers whose spread is over 150 bps over Libor, a conventional benchmark used by financial

Table 6: Nonbank share and bank characteristics

	(1) Low Capital	(2) Low Capital	(3) High NPL	(4) High NPL
MP shock	0.013**	0.017**	0.011*	0.020***
	(0.006)	(0.007)	(0.006)	(0.008)
MaPP shock	0.021***	0.031***	0.025***	0.037***
	(0.005)	(0.005)	(0.005)	(0.005)
Bank charact.	0.005	0.011**	0.021***	0.014***
	(0.004)	(0.004)	(0.003)	(0.004)
MP shock × Bank charact.	0.011**	0.013*	0.018***	0.004
	(0.006)	(0.007)	(0.006)	(0.007)
MaPP shock × Bank charact.	0.016***	0.017***	0.002	0.001
	(0.004)	(0.005)	(0.004)	(0.005)
Firm FE	✓	✓	✓	✓
Country × Sector × Time FE	✓		✓	
ILST FE		✓		✓
Observations	47,615	42,387	47,615	42,387
R^2	0.657	0.678	0.658	0.678

Notes: Data aggregated at the syndicated loan deal level. The dependent variable is the share of loans from nonbanks in each syndicated loan deal. Bank charact. in columns (1)-(2) refers to a dummy variable taking the value of one for syndicates with low-capitalized banks (loan-weighted Tier 1 capital ratios across participating banks falling in the first quartile of the loan deals distribution), while in columns (3)-(4) it refers to a dummy variable taking the value of one for syndicates with high-NPL banks (loan-weighted NPLs across participating banks falling in the top quartile of the loan deals distribution). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

market participants. The third proxy looks at high-PD borrowers from NUS-CRI, computed as firms with a PD in the top quartile of the country-time distribution. The final measure resorts to S&P long-term issuer credit ratings, and defines risky borrowers as those that have a 'speculative'/junk rating, i.e., below BBB^-. The sample is more restricted for the latter two proxies given, respectively, the imperfect matching between Compustat and Dealogic, and the lack of ratings information.

We stress two main findings in Table 7. First, nonbanks provide more lending to risky borrowers, consistent with the narrative that financially vulnerable firms typically borrow more from nonbanks (Aldasoro et al. 2024) largely due to regulatory constraints that limit commercial banks' lending to risky borrowers (Chernenko et al. 2022). Second, the last two rows show that contractionary MP and MaPP shocks do not lead nonbanks to disproportionally increase lending to risky borrowers relative to non-risky borrowers. Despite the lack of evidence on credit risk migration from banks to nonbanks following policy shocks, we stress that nonbanks lend, on average, more to risky borrowers compared to banks.

One possible interpretation of our results is that financial stability risks may remain unchanged in the absence of a disproportionate shift in credit from nonbanks towards risky borrowers. However, we caveat this conclusion. First, while we do not find evidence of risk migration following contractionary policy shocks, nonbanks unconditionally lend more to risky borrowers. Second, nonbanks rely more on unstable funding sources than banks, are less regulated, and typically lack access to the central banks' emergency liquidity facilities during crises (Xiao 2020). Finally, financial stability risks may be further amplified by the procyclicality of nonbank credit. Empirical evidence suggests that firms borrowing more from nonbanks tend to experience steeper declines in credit supply during banking crises (Irani et al. 2021, Aldasoro et al. 2024, Albuquerque et al. 2025, Chernenko et al. 2025, Fleckenstein et al. forthcoming).

Table 7: Nonbank share and risky borrowers

	(1) 5y avg.	(2) 5y avg.	(3) Lev. loans	(4) Lev. loans	(5) High PD	(6) High PD	(7) Junk rtg.	(8) Junk rtg.
MP shock	0.007 (0.010)	0.009 (0.011)	0.011 (0.011)	0.010 (0.012)	-0.002 (0.018)	0.003 (0.021)	-0.024 (0.025)	-0.013 (0.026)
MaPP shock	0.053*** (0.007)	0.062*** (0.007)	0.055*** (0.008)	0.065*** (0.008)	0.031*** (0.012)	0.043*** (0.014)	0.074*** (0.016)	0.084*** (0.017)
Risky	0.011* (0.006)	0.007 (0.007)	0.016*** (0.006)	0.015** (0.006)	0.013** (0.007)	0.021** (0.008)	0.061*** (0.015)	0.050*** (0.018)
MP shock × Risky	0.007 (0.010)	0.005 (0.010)	-0.003 (0.008)	0.001 (0.009)	0.009 (0.012)	0.021 (0.014)	-0.021 (0.018)	-0.026 (0.020)
MaPP shock × Risky	-0.004 (0.007)	-0.008 (0.008)	-0.004 (0.006)	-0.008 (0.007)	-0.004 (0.006)	-0.004 (0.007)	-0.013 (0.013)	-0.013 (0.014)
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓		✓		✓		✓	
ILST FE		✓		✓		✓		✓
Observations	36,356	34,409	36,356	34,409	18,213	16,276	8,936	7,941
R^2	0.635	0.655	0.635	0.656	0.781	0.817	0.672	0.727

Notes: Data aggregated at the syndicated loan deal level. The dependent variable is the share of loans from nonbanks in each syndicated loan deal. Risky is a dummy variable taking the value of one for Risky borrowers. Each column refers to alternative proxies for Risky borrowers: *5y avg.* refers to borrowers with an average loan spread over the past five years in the top quartile of the sample distribution in each quarter; *Lev. loans* refers to leveraged loans; and *High PD* captures high-PD borrowers, i.e., firms with a PD in the top quartile of the country-time distribution; *Junk rtg.* refers to borrowers with a credit rating below BBB^-. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

5 Real effects on firms' financial performance

Having established that nonbanks play a crucial role in mitigating the adverse effects of MP and MaPP shocks on lending, we extend our analysis to assess whether the growing presence of nonbanks translates into significant firm-level real effects. Specifically, we examine whether firms that borrow from nonbanks exhibit better financial performance relative to firms that do not following contractionary policy shocks.

We aggregate the syndicated loan data at the firm-quarter-level and match borrowers with balance sheet data from Compustat using a fuzzy matching approach based on borrower attributes, name, country, and industry (see Section 2). This data aggregation allows us to investigate the impact of nonbank lending on firms' financial performance. However, it also presents a challenge in isolating credit supply effects from credit demand effects. Nevertheless, we have previously demonstrated that country-industry-time fixed effects effectively capture credit demand. Therefore, we argue that incorporating these fixed effects in firm-level regressions enables us to identify the credit supply channel of MP and MaPP shocks.

We construct firm-level MP and MaPP shocks by computing the loan-weighted average of lender-country shocks, with weights determined by the share of loans a firm borrowed from each lender. Our main coefficients of interest, derived from Equation (6), capture the interaction of the MP and MaPP shocks with $\textit{NB relation}_{i,t-1}$, a time-varying dummy variable equal to one if the firm has borrowed from at least one nonbank in the syndicate loan market within the past five years. The dependent variables include the logarithm of total real debt, the logarithm of net liquid assets (liquid assets minus short-term liabilities), the logarithm of capital expenditures (property, plant, and equipment), the logarithm of intangible investment, the logarithm of total employment, and the probability of default over the next 12 months.

Table 8 presents our main results. First, the third row suggests that, unconditionally, firms with nonbank relationships tend to have higher debt, investment, and employment, but also a higher probability of default, confirming the notion that nonbanks typically lend to riskier firms (Chernenko et al. 2022, Aldasoro et al. 2024). Second, the last two rows provide evidence of important real effects following contractionary MP and MaPP shocks for firms with prior nonbank relationships. Specifically, we find that capital expenditures and employment tend to be higher for firms with prior nonbank relationship relative to other firms after contractionary policy shocks, further supporting the idea that nonbanks help shield firms from the tightening effects of MP and MaPP shocks. Additionally, nonbank relationships help firms maintain higher intangible investment, though these effects are statistically significant only in response to MaPP shocks.

Despite the improvement in investment and employment, nonbank relationships do not seem to reduce borrowers' riskiness following contractionary shocks. If anything, the probability of default appears to increase for these firms, with stronger evidence during MaPP shocks. All our findings are insensitive to looking at shorter nonbank lending relationships—over the past two years—as indicated in Table OA.8 in the Online Appendix.

Our findings highlight the dual implication of nonbank relationships for financial stability. On the one hand, nonbank relationships help mitigate the adverse effect of tightening shocks on firms' access to credit—which allows these firms to maintain investment and employment. But, on the other hand, firms with nonbank relationships tend to have a higher probability of default, and carry higher debt burdens, which signal financial distress (Albuquerque 2024). Greater financial distress is reinforced by an increase in firms' probability of default in response to the shocks, raising concerns about the broader financial stability implications of nonbank credit intermediation.

Table 8: Real effects

	(1) Total Debt	(2) Liquid assets	(3) Capital exp.	(4) Intangibles	(5) Employment	(6) PD
MP shock	0.055	-0.002	0.021	0.056**	-0.010	0.014
	(0.045)	(0.050)	(0.027)	(0.028)	(0.026)	(0.061)
MaPP shock	-0.070**	-0.079**	-0.079***	-0.067***	-0.074***	-0.029
	(0.032)	(0.035)	(0.019)	(0.021)	(0.018)	(0.035)
NB relation	0.166***	0.004	0.105***	0.071***	0.060***	0.111***
	(0.024)	(0.027)	(0.013)	(0.015)	(0.010)	(0.026)
MP shock × NB relation	0.022	0.024	0.039*	-0.004	0.053***	0.035
	(0.037)	(0.042)	(0.022)	(0.023)	(0.019)	(0.041)
MaPP shock × NB relation	0.015	0.033	0.033**	0.040**	0.034***	0.049**
	(0.026)	(0.030)	(0.013)	(0.018)	(0.010)	(0.022)
Firm FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓	✓	✓	✓	✓	✓
Observations	23987	17057	24538	14455	23039	19400
R^2	0.916	0.898	0.974	0.963	0.982	0.611

Notes: Data are aggregated at the firm-quarter level. The dependent variables are: (1) log of total real debt, (2) log of real net liquid assets, (3) log of real tangible capital expenditures, (4) log of real intangible investment, (5) log of employment, and (6) the probability of default over the next 12 months. *NB relation* dummy equals one if the firm borrowed from a nonbank in the syndicate loan market in the past *five* years, and zero otherwise. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

6 Further considerations: bank lending to nonbanks

Throughout the paper, we have shown consistent evidence that nonbanks expand lending to non-financial corporations relative to banks following contractionary MP and MaPP shocks. While our reduced-form regressions cannot fully identify the underlying mechanisms, our findings align with several theoretical frameworks and empirical results from the related literature.

The expansion of the nonbanking sector following MP shocks is related to the deposits channel of MP. When MP tightens, the spread between the policy rate and the deposit rate widens, exacerbating funding frictions and leading to deposit outflows from banks, constraining banks' lending capacity (Drechsler et al. 2017). These deposits shift toward the nonbanking sector, facilitating its expansion (Nelson et al. 2018, Xiao 2020). Xiao (2020) further shows that money market funds, in particular, are more likely to pass-through higher interest rates to depositors due to their yield-sensitive costumer base. We conjecture that this increase in nonbank funding enables nonbanks to expand credit supply precisely when bank credit contracts.

Evidence from Denmark further supports this mechanism, showing that nonbanks experience an increase in long-term funding during contractionary MP shocks, while banks experience an outflow of long-term funding (Cucic and Gorea 2024). This funding advantage allows Danish nonbanks that rely more on long-term funding to expand lending to both households and nonfinancial corporations when MP tightens. More recently, Haque et al. (2025) show that Business Development Companies (BDCs) in the U.S., which play a significant role in private credit markets, respond to contractionary MP shocks by increasing their borrowing from banks through credit line drawdowns. Additionally, they renegotiate existing credit lines—albeit at a higher cost—allowing them to expand private lending activities despite tighter monetary conditions.

For MaPP shocks, the dominant view is that increased regulation on banks creates opportunities for nonbanks to fill the funding gap left by banks (Buchak et al. 2018, Kim et al. 2018, Irani et al. 2021, Bednarek et al. 2023, Claessens et al. 2023, Krainer et al. 2024, Erel and Inozemtsev 2025). Krainer et al. (2024) propose a novel mechanism to explain the expansion of nonbanks in the U.S. after the GFC. They find that tighter bank regulation since the GFC might have incentivized banks to shift lending from corporate borrowers to nonbanks, effectively allowing nonbanks to increase their financing of corporates. Their hypothesis suggests that when the regulatory burden on banks tightens, or during periods of financial crises, banks face incentives to shift lending to less risky borrowers to protect their capital buffers. This behavior can be rationalized by the fact that regulatory frameworks (e.g., Basel III) typically impose higher risk weights on exposures to nonfinancial corporate borrowers than on loans to nonbank financial institutions (e.g., insurance companies or asset managers, are often treated as financial institutions under regulatory rules). Indeed, increased bank lending to nonbanks appears to be driven by more favorable capital treatment, as evidenced by loans to BDCs in the U.S. (Chernenko et al. 2025, Haque et al. 2025).

Similarly, Kim et al. (2018) find that nonbanks increased their borrowing from banks following the 2013-14 U.S. interagency guidance on leveraged lending. This regulatory shift prompted the migration of risky leveraged loans to nonbanks, likely fueling their expansion in the leveraged loan market.

In this section, we build on the hypotheses from Cucic and Gorea (2024), and Krainer et al. (2024), to test whether our findings can, at least partially, be explained by an increase in nonbanks' funding, allowing them to expand lending to corporates during MP and MaPP shocks. Specifically, we investigate whether there is a shift in bank lending to nonbanks and away from corporate borrowers during the shocks. Our analysis aims to bridge gaps in the existing literature. Cucic and Gorea (2024) do not identify the source of nonbank funding, while the evidence on bank-to-nonbank lending remains largely restricted to the Basel III implementation in the U.S. (Krainer et al. 2024). In this context, an open question remains: do policy shocks—MP and MaPP—that constrain banks lead them to allocate more lending to nonbanks at the expense of nonfinancial borrowers?

We adapt our baseline specification and restrict the sample to commercial banks lending to both nonbanks and nonfinancial corporations:

$$\begin{aligned} Log(Loans)_{l,j,t} &= \beta_1 MP_{l,t-1} + \beta_2 MaPP_{l,t-1} \\ &+ \; NB\ borrower_j \times (\beta_3 MP_{l,t-1} + \beta_4 MaPP_{l,t-1}) + \gamma_l + \mu_{j,t} + \epsilon_{l,j,t}, \end{aligned} \tag{7}$$

where the dependent variable is the logarithm of new syndicated loans, $MP_{l,t-1}$ and $MaPP_{l,t-1}$ are the lagged lender country-specific MP and MaPP shocks, and $NB\ borrower_j$ is a dummy variable equal to one for nonbank borrowers, and zero for nonfinancial corporate borrowers. The main coefficients of interest, β_3 and β_4, indicate the differential lending from banks to nonbanks *relative* to nonfinancial corporations following contractionary MP and MaPP shocks. If our conjecture is correct, both coefficients would be positive, suggesting that banks reallocate lending from corporate borrowers to nonbanks during contractionary shocks.

The fourth row in columns (1) to (3) in Table 9—controlling for credit demand through different specifications—shows that banks increase lending to nonbank borrowers relative to nonfinancial corporations after MaPP shocks: depending on how we control for time-varying demand characteristics, we estimate that banks provide differentially 0.8-1.5 percent more loans to nonbanks following a one-standard deviation shock to MaPP.[18] Our findings are consistent with Kim et al. (2018), and Krainer et al. (2024), suggesting that a tightening of MaPP—effectively an increase in the regulatory burden on banks—may incentivize banks to reallocate credit toward borrowers perceived as less risky under regulatory frameworks. Although nonbanks may be formally assigned similar risk weights as nonfinancial corporations when controlling for the credit rating (or lack thereof), supervisors in some jurisdictions—such as the euro area—may permit banks to apply lower risk weights under the Internal Ratings-Based (IRB) approach, or to assign lower PDs and loss given default to nonbanks. This preferential regulatory treatment may stem from the fact that some nonbanks fall within the regulatory perimeter in some way

[18] The relevant coefficient on column (3) is statistically insignificant at the margin (p-value of 11 percent).

(e.g., leverage and liquidity ratios), and are therefore considered less risky than nonfinancial corporations.

Interestingly, we do not find that banks reallocate more lending to nonbanks following contractionary MP shocks. Although the point estimates are not statistically significant, banks seem to cut credit supply across the board, presumably as banks' funding frictions and deposit outflows during MP shocks constrain banks' ability to lend, including to nonbank borrowers.

Table 9: Bank lending to nonbanks and nonfinancial corporates

	(1)	(2)	(3)	(4)
MP shock	0.002	0.001	0.001	0.016***
	(0.004)	(0.003)	(0.003)	(0.005)
MaPP shock	-0.020***	-0.018***	-0.015***	-0.014***
	(0.002)	(0.002)	(0.002)	(0.003)
MP shock × NB Borrower	-0.013	-0.011	-0.010	-0.006
	(0.009)	(0.008)	(0.006)	(0.016)
MaPP shock × NB Borrower	0.015**	0.011**	0.008	-0.012
	(0.007)	(0.006)	(0.005)	(0.011)
MP shock × LC bank				-0.015***
				(0.005)
MaPP shock × LC bank				-0.007*
				(0.004)
MP shock × NB Borrower × LC bank				0.012
				(0.014)
MaPP shock × NB Borrower × LC bank				0.029**
				(0.013)
Firm FE	✓	✓		
Bank FE	✓	✓	✓	
Bank parent FE				✓
Bank controls				✓
Country × Sector × Time FE	✓			
ILST FE		✓		
Firm × Time FE			✓	✓
Observations	547,476	545,765	533,115	218,587
R-squared	0.757	0.815	0.889	0.877

Notes: Dependent variable is the log of new syndicated loans. We restrict the sample to bank lenders, while borrowers include both nonbanks and nonfinancial corporates. *NB borrower* is a dummy equal to one for nonbank borrowers and zero for nonfinancial corporate borrowers. *LC bank* in column (4) refers to a dummy variable equal to one for low-capitalized banks ((Tier 1 capital ratios in the first quartile of the country-time distribution), and zero for other banks. Bank controls refer to the lagged banks' ROA, NPL, and Tier 1 capital ratio. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

In column (4) we provide evidence that low-capitalized banks—those that are closer to the regulatory limits— are the primary drivers of our MaPP shocks results (we add time-varying lagged bank controls, namely the Tier 1 capital ratio, ROA, and NPLs, to control further for variation across banks). Specifically, banks with weaker capital positions increase lending to nonbanks relative to other borrowers during contractionary MaPP shocks. We interpret this result as reinforcing the idea that banks, especially weaker banks, face incentives during regulatory shocks to shift lending to less risky borrowers to protect their capital buffers. Overall, the increase in lending from banks to nonbanks during MaPP shocks may help explain the expansion of nonbank lending to corporate borrowers. The bottom line is that tighter macroprudential policies may not necessarily reduce banks' risks since banks become more exposed to nonbanks. The potential increase in bank-nonbank interconnectedness risks may ultimately amplify systemic vulnerabilities in the system (Acharya et al. 2024).

7 Robustness checks

We run a battery of tests to check the robustness of our main findings in Table 3 (mostly column 4). All results are presented in Appendix B and in the Online Appendix.

Funding models of nonbanks

Throughout our analysis, we have considered nonbanks as a single group; however, nonbanks vary along several characteristics, including in their funding structures. Following Irani et al. (2021), we create two groups based on the stability of their liabilities. Specifically, we classify pension funds and insurance companies as nonbanks with stable funding, given the long-term nature of their liabilities, with limited redemption risk. In contrast, we consider investment banks, broker-dealers, finance companies, private equity firms, venture capital firms, and hedge funds to have unstable funding, as their liabilities are typically liquid and subject to withdrawal risk—particularly during periods of financial turbulence.[19]

Table B.1 shows that nonbanks with unstable funding drive our main results during contractionary MP and MaPP shocks. This result further supports the notion that credit migration to the less regulated sector may pose significant financial stability risks, especially when intermediated by nonbanks with unstable funding. These nonbanks are less prone to roll over loans to borrowers during periods of financial stress (Irani et al. 2021, Aldasoro et al. 2024, Chernenko et al. 2025, Fleckenstein et al. forthcoming). However, we interpret this result with caution, as the nonbanks sample is skewed towards institutions with unstable funding structures.

Loan types, extensive margin, and allocation of missing loan shares

[19] We acknowledge that we are simplifying the funding structure in this exercise as we do not observe the exact funding structure of nonbanks, such as the amount of leverage and the maturity of debt.

We test the sensitivity of our results by: (i) term loans versus credit lines;[20] (ii) estimating the missing loan shares with a regression-based approach (De Haas and Van Horen 2013);[21] (iii) looking at the extensive margin of lending;[22] and (iv) excluding the top three nonbanks.[23]

Table B.2 shows that our baseline results remain robust for different loan types. i.e., term loans and credit lines (columns 2 and 3), to a regression-based approach when allocating the missing loan shares (column 4), to the extensive margin of lending (column 5), and to excluding the top three nonbanks from the sample (although the coefficient on the interaction term between MaPP shock and nonbanks is not estimated precisely).

Alternative macroprudential shocks

Our baseline MaPP shocks take into account macroprudential measures targeting the supply of loans and focused on stress testing, motivated by our research question that focuses on understanding lenders' credit supply behavior following policy shocks. Our set of macroprudential policies is also in the spirit of policies that aim at 'dampening the credit cycle', in the words of Gambacorta and Murcia (2020). They find that tightening these loan-targeted macroprudential policies produces stronger and faster effects on credit growth, whereas capital-based requirements affect credit supply more gradually over the medium term.

In Table B.3 we test the robustness of our results by adding other MaPP tools. Column (2) is very similar to the baseline but only keeps the set of measures that target directly loan supply. Column (3) incorporates reserve requirements to the baseline, while column (4) adds capital requirements, conservation buffers, and countercyclical capital buffers. Overall, our main results are strongly robust to these alternative specifications. Column (4) shows a smaller impact on credit growth when adding capital-based requirements, as these measures tend to be somewhat less effective to curb credit growth in the short run, producing effects over longer horizons (Gambacorta and Murcia 2020).

We run additional sensitivity checks by: lagging MaPP (and also MP) shocks by two, three, and four quarters (columns 2-4); controlling for additional lags of the MaPP shocks, including

[20] Nonbanks are typically more active in term loans in the *secondary market*, but in the primary market (our data) they tend to be involved in both loan facilities.

[21] We estimate the missing loan shares out-of-sample with a regression-based approach based on loan characteristics of the observed loan shares: loan amount, type of loan, syndicate characteristics (number of participants, lender role and nationality), loan currency, borrower characteristics (country, and industry), and time dummies.

[22] We follow Aldasoro et al. (2024) and expand our dataset with loan amounts of zero immediately before and after every quarter for which we observe loans for lender-borrower pairs.

[23] JP Morgan Securities LLC, BofA Securities, and Citigroup Global Markets Inc. account, on average, for around 10 percent of syndicated lending by nonbanks over our estimation period 2000-19.

the interaction terms with the nonbank dummy, to mitigate potential autocorrelation in the MaPP shocks (column 5); adding time fixed effects in Equation (1) when computing the MaPP shocks (column 6); and re-estimating Equation (1) by adding directly the MP shocks as an independent variable to further mitigate the possible endogeneity in the response of MaPP shocks to macroeconomic conditions. Table OA.9 in the Online Appendix shows that our results remain strongly robust to these sensitivity checks.

We also show that our results for the U.S. economy remain fully consistent when using the high-frequency identification strategy with sign restrictions proposed by Drechsel and Miura (2025). Their approach isolates high-frequency surprises in bank stock prices around FOMC speeches that focus mainly on bank regulation. These raw surprises are then transformed into 'bank regulation shocks' using sign restrictions that impose a positive comovement between bank stock prices and banks' credit risk. To allow for a comparison of coefficients across shock types, we normalize all shocks to induce a one percent decline in bank stock prices (similarly to what we did in Section 4.1). Table OA.5 in the Online Appendix reports the results for U.S. lenders using our MaPP shocks (column 4) and the Drechsel and Miura (2025) bank regulation shocks (column 5). We find that bank regulation shocks also lead to an expansion in nonbank lending relative to bank lending, consistent with our baseline results, although the effect is substantially larger for the bank regulation shock.

Additional robustness checks

We run further robustness checks: (i) pre-GFC (until 2007Q4) versus post-GFC periods (starting in 2010Q1); (ii) USD-denominated loans vs non-USD loans; (iii) cross-border versus domestic lending, with cross-border lending defined as loans where the borrower and lender are located in different countries, and domestic borrowing as loans when the country of the borrower and lender coincide; and (iv) borrowers located in AEs or EMDEs.

We find that our results are not sensitive to splitting the sample into the pre- and post-GFC period (columns 2 and 3 in Table B.4). Columns (4) and (5) indicate that increases in nonbank credit following the shocks is greater in USD lending, consistent with the narrative of lenders taking advantage of lower interest rate differentials with the US dollar in a context of the appreciation of the local currency against the US dollar caused by tighter domestic (MP or MaPP) policy (Bruno and Shin 2015, Avdjiev et al. 2018). Finally, we show that our baseline results hold when breaking down flows into cross-border versus domestic (columns 6 and 7), and borrowers from AEs or EMDEs (columns 8 and 9).

Alternative clustering methods

Our final robustness check examines the impact of different standard error clustering approaches. While our baseline specification clusters standard errors at the firm level, one could argue that clustering at the country-time level—which aligns with the frequency of the shocks—may be preferable. Table OA.10 in the Online Appendix confirms that our main results remain robust under various clustering strategies: firm and country-time (column 2), lender and country-time (column 3), and firm, lender, and time (column 4).

8 Conclusion

The rapid expansion of nonbanks since the GFC raises important questions about their role in the transmission of policy shocks to the real economy. Our findings show that when monetary or macroprudential policy tightens, nonbanks help cushion the contraction in bank credit supply to nonfinancial corporations. This credit migration provides an alternative funding source, potentially supporting corporate investment and economic activity when bank financing becomes constrained.

While we do not find evidence of a disproportionate shift in credit risk from banks to nonbanks following policy shocks, our results indicate that nonbanks are inherently more exposed to riskier borrowers than banks. Combined with their more volatile funding sources, limited regulatory oversight, higher leverage among nonbank financial institutions, and lack of access to central bank liquidity facilities, nonbanks may amplify financial system vulnerabilities—particularly during downturns, given their more procyclical lending behavior relative to banks. These findings highlight the need to carefully weigh the benefits and risks of nonbanks' growing role in credit intermediation. While nonbanks enhance firms' access to credit when bank lending contracts, the migration of credit to a less-regulated sector raises financial stability concerns, particularly as credit cycles turn.

As discussed throughout the paper, the presence of nonbanks can weaken the transmission of monetary policy to the real economy. Given that monetary policy primarily focuses on its mandate—price stability (and full employment in some jurisdictions)—financial stability concerns are addressed through macroprudential policies. Our analysis suggests that macroprudential measures targeting banks may inadvertently accelerate the expansion of nonbanks. This underscores the need for continued efforts to close data gaps in the nonbank sector and to extend macroprudential regulations to encompass nonbanks. Expanding the regulatory perimeter, such as leverage limits, capital and liquidity requirements, and stress-testing, would help curb credit leakages to nonbanks, improve the monetary policy transmission, and bolster the resilience of the financial system. While some steps have been taken, such as EU directives and regulations aimed at mitigating systemic risks in investment funds and insurance companies, further action is necessary (Abbas et al. 2025).

Our analysis focuses on nonbanks' role in public credit markets, particularly global syndicated loans. However, in the aftermath of the GFC, tighter banking regulations have led many firms—especially those with weaker balance sheets—toward 'private credit markets', where nonbanks play an even larger role (IMF 2024, Abbas et al. 2025, Chernenko et al. 2025, Haque et al. 2025). Unlike syndicated loans, these direct lending arrangements operate in more opaque and largely unregulated markets, posing additional financial stability risks that remain poorly understood. Investigating the implications of nonbank activity in private credit markets represents an important avenue for future research.

Appendix A: Data

Table A.1: List of lender countries

Lender country	Income	Loan share
Austria	AE	0.35%
Belgium	AE	0.74%
Brazil	EMDE	0.49%
Canada	AE	6.70%
Cyprus	AE	0.004%
Finland	AE	0.12%
France	AE	7.71%
Germany	AE	6.98%
Greece	AE	0.12%
India	EMDE	1.54%
Ireland	AE	0.44%
Italy	AE	1.95%
Japan	AE	11.13%
Lithuania	AE	0.03%
Netherlands	AE	3.71%
Norway	AE	0.70%
Portugal	AE	0.18%
Slovenia	AE	0.01%
Spain	AE	2.74%
Sweden	AE	1.02%
United Kingdom	AE	11.35%
United States	AE	43.68%

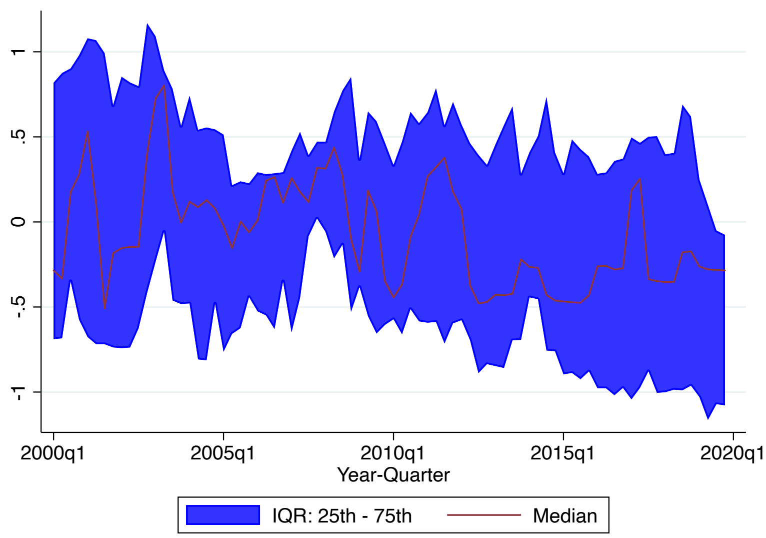
Notes: AE refers to Advanced Economies, and EMDE refers to Emerging Market and Developing Economies. Loan share is the average loan share for each lender country in our estimation sample.

Table A.2: Loan characteristics: nonbanks versus banks

	Mean	STD	P25	P50	P75
Nonbanks					
Term length (years)	5.13	3.48	3.00	5.00	6.00
Tranche value ($ million)	311.46	524.41	40.73	121.84	338.30
Syndicate members	7.32	6.74	3.00	5.00	9.00
Participation share	0.18	0.19	0.06	0.10	0.25
All-in-pricing (BPs)	266.86	162.66	150.00	250.00	350.00
Margin pricing (BPs)	266.57	161.38	150.00	250.00	350.00
Banks					
Term length (years)	5.00	3.92	3.00	5.00	6.00
Tranche value ($ million)	252.40	472.00	26.10	86.30	257.51
Syndicate members	6.44	6.19	3.00	5.00	8.00
Participation share	0.17	0.19	0.05	0.10	0.25
All-in-pricing (BPs)	208.32	139.42	102.50	187.50	275.00
Margin pricing (BPs)	204.62	135.67	100.00	175.00	275.00

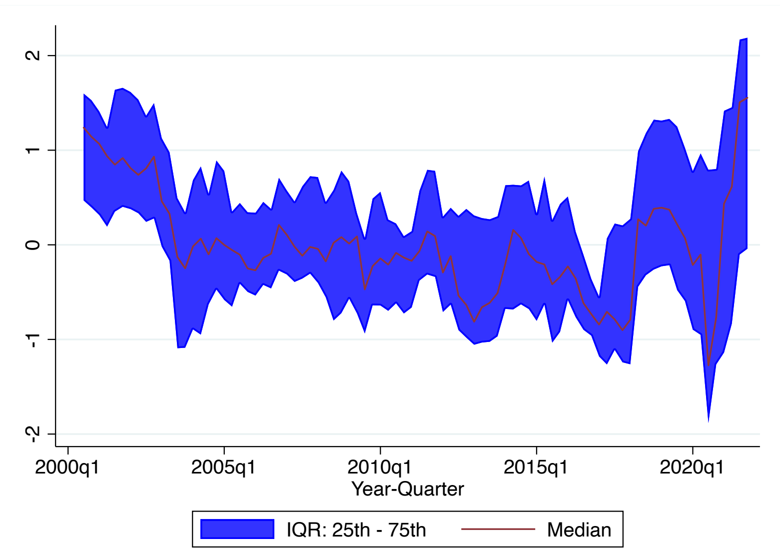
Notes: Summary statistics of loan-level characteristics, restricted to nonfinancial borrowers based on their SIC code classification.

Figure A.1: Monetary policy shocks over time



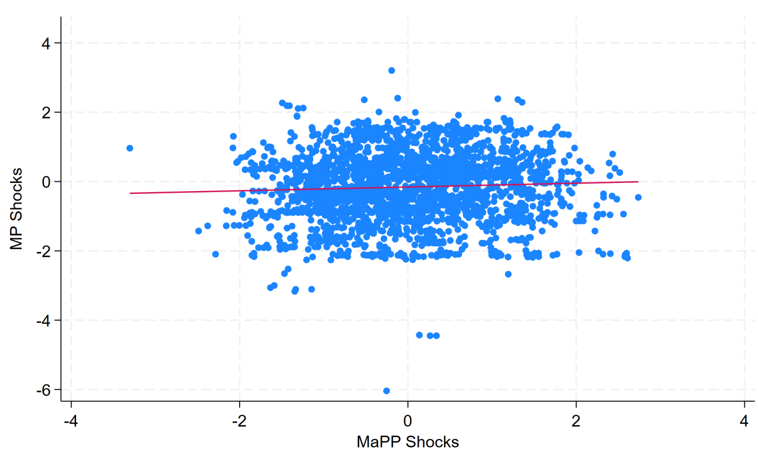
Notes: Red line is the median sample values of the MP shocks, and the blue area indicates the interquartile range.

Figure A.2: MaPP shocks over time



Notes: Red line is the median sample values of the MaPP shocks, and the blue area indicates the interquartile range.

Figure A.3: Correlation of MP and MaPP shocks



Notes: Red line is the linear regression line between the two series (correlation of 0.0844).

Appendix B: Tables

Table B.1: Funding models of nonbanks

	(1)	(2)	(3)
MP shock	-0.021***	-0.023***	-0.021***
	(0.003)	(0.003)	(0.002)
MaPP shock	-0.020***	-0.020***	-0.019***
	(0.002)	(0.002)	(0.002)
MP shock × Stable Nonbank	-0.119***	-0.109***	-0.097***
	(0.027)	(0.025)	(0.020)
MP shock × Unstable Nonbank	0.060***	0.061***	0.049***
	(0.004)	(0.004)	(0.003)
MaPP shock × Stable Nonbank	-0.047***	-0.030*	-0.017
	(0.018)	(0.015)	(0.013)
MaPP shock × Unstable Nonbank	0.017***	0.019***	0.018***
	(0.003)	(0.003)	(0.002)
Firm FE	✓	✓	
Lender FE	✓	✓	✓
Country × Sector × Time FE	✓		
ILST FE		✓	
Firm × Time FE			✓
Observations	740,206	739,026	730,335
R^2	0.726	0.794	0.877

Notes: Dependent variable is the log of new syndicated loans. *Stable nonbanks* refer to nonbanks with stable funding, namely pension funds and insurance companies. *Unstable nonbanks* are all the other nonbanks. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.2: Loan types, regression-based approach, and extensive margin

	(1) Baseline	(2) Term loans	(3) Credit lines	(4) Reg. approach	(5) Ext. margin	(6) Exc. top 3 nonbanks
MP shock	-0.021***	-0.019***	-0.022***	-0.022***	-0.007***	-0.016***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.001)	(0.002)
MaPP shock	-0.019***	-0.019***	-0.020***	-0.016***	-0.007***	-0.018***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
MP shock × Nonbank	0.046***	0.033***	0.056***	0.067***	0.016***	0.029***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.002)	(0.003)
MaPP shock × Nonbank	0.016***	0.012***	0.021***	0.030***	0.007***	0.0005
	(0.002)	(0.003)	(0.002)	(0.003)	(0.001)	(0.002)
Lender FE	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓
Observations	739,866	348,427	522,995	739,866	2,014,048	689,635
R^2	0.877	0.899	0.896	0.816	0.933	0.879

Notes: Dependent variable is the log of new syndicated loans. Column 1 shows the benchmark specification, columns 2 and 3 restrict the sample to term loans and credit lines, column 4 takes a regression-based approach to estimating the missing loan shares, column 5 analyzes the extensive margin, and column 6 excludes the top three nonbanks. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.3: Alternative MaPP shocks

	(1)	(2)	(3)	(4)
MP shock	-0.021***	-0.023***	-0.019***	-0.022***
	(0.002)	(0.002)	(0.002)	(0.002)
MaPP shock	-0.019***	-0.027***	-0.020***	-0.015***
	(0.002)	(0.002)	(0.002)	(0.002)
MP shock × Nonbank	0.046***	0.047***	0.046***	0.047***
	(0.003)	(0.003)	(0.003)	(0.003)
MaPP shock × Nonbank	0.016***	0.026***	0.016***	0.012***
	(0.002)	(0.003)	(0.002)	(0.002)
Lender FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	739,866	739,866	739,866	739,866
R^2	0.877	0.877	0.877	0.877

Notes: Dependent variable is the log of new syndicated loans. Column (1) uses the baseline MaPP shocks described in Section 2; column (2) focuses on measures targeting loan supply; column (3) adds reserve requirements to the baseline; and column (4) adds capital requirements, conservation buffers, and countercyclical capital buffers to the baseline. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table B.4: Robustness checks: split-sample specifications

	(1) Base	(2) Pre-GFC	(3) Post-GFC	(4) USD	(5) Non-USD	(6) Cross-border	(7) Domestic	(8) AE	(9) EMDE
MP shock	-0.021***	-0.004	-0.006*	-0.024***	-0.014***	-0.017***	-	-0.022***	-0.015**
	(0.002)	(0.005)	(0.003)	(0.003)	(0.004)	(0.003)		(0.002)	(0.007)
MaPP shock	-0.019***	0.002	-0.009***	-0.018***	-0.015***	-0.012***	-	-0.020***	-0.007
	(0.002)	(0.005)	(0.002)	(0.002)	(0.003)	(0.002)		(0.002)	(0.006)
MP shock × Nonbank	0.046***	0.015*	0.007*	0.058***	0.030***	0.028***	0.073***	0.048***	0.032***
	(0.003)	(0.009)	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)	(0.003)	(0.010)
MaPP shock × Nonbank	0.016***	0.016*	0.008***	0.023***	-0.002	0.013***	0.019***	0.016***	0.027***
	(0.002)	(0.010)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.002)	(0.009)
Lender FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE × Time	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	739,866	276,509	403,604	448,201	305,467	236,391	475,751	696,949	42,306
R^2	0.877	0.854	0.893	0.831	0.909	0.837	0.892	0.880	0.820

Notes: Dependent variable is the log of new syndicated loans. Column (1) refers to our baseline specification in Table 3; column (2) includes the pre-GFC sample (up to 2007Q4); column (3) the post-GFC sample (after 2010Q1); column (4) includes only USD loans; column (5) only non-USD loans; column (6) refers to cross-border lending; column (7) to domestic lending (a loan is classified as cross-border if the borrower's country is different from the lender's country); column (8) restricts the sample to borrowers in advanced economies (AEs); column (9) restricts the sample to borrowers in emerging markets and developing economies (EMDEs). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

References

Abbas, N., Albuquerque, B., Garrido, J. M., Gautam, D., Mosk, B., Piontek, T., Rosha, A., Tressel, T. and Yokoyama, A. (2025), Corporate Sector Vulnerabilities and High Levels of Interest Rates, Departmental Paper DP/2025/001, International Monetary Fund.

Acharya, V. V., Cetorelli, N. and Tuckman, B. (2024), Where Do Banks End and NBFIs Begin?, NBER Working Papers 32316, National Bureau of Economic Research, Inc.

Agarwal, I., Hu, M., Roman, R. and Zheng, K. (2023), Lending by Servicing: Monetary Policy Transmission Through Shadow Banks, Working Papers 23-14, Federal Reserve Bank of Philadelphia.

Ahnert, T., Forbes, K., Friedrich, C. and Reinhardt, D. (2021), 'Macroprudential FX regulations: Shifting the snowbanks of FX vulnerability?', *Journal of Financial Economics* **140**(1), 145–174.

Alam, Z., Alter, A., Eiseman, J., Gelos, G., Kang, H., Narita, M., Nier, E. and Wang, N. (2025), 'Digging Deeper–Evidence on the Effects of Macroprudential Policies from a New Database', *Journal of Money, Credit and Money* .

Albuquerque, B. (2024), 'Corporate debt booms, financial constraints and the investment nexus', *Journal of Applied Econometrics* **39**(5), 766–789.

Albuquerque, B., Becker, J. and Firat, M. (2025), Bonding through crisis: the role of nonbanks. mimeo.

Albuquerque, B. and Iyer, R. (2024), 'The Rise of the Walking Dead: Zombie Firms Around the World', *Journal of International Economics* **152**, 104019.

Albuquerque, B. and Mao, C. (2025), The Zombie Lending Channel of Monetary Policy, Available at https://ssrn.com/abstract=4572534, SSRN.

Aldasoro, I., Doerr, S. and Zhou, H. (2024), Non-bank lending during crises, CEPR Discussion Papers 18989, C.E.P.R. Discussion Papers.

Altavilla, C., Laeven, L. and Peydró, J.-L. (2020), Monetary and macroprudential policy complementarities: evidence from European credit registers, Working Paper Series 2504, European Central Bank.

Anguren, R., Jiménez, G. and Peydró, J.-L. (2024), 'Bank capital requirements and risk-taking: Evidence from Basel III', *Journal of Financial Stability* **74**, 101292.

Avdjiev, S., Koch, C., McGuire, P. and von Peter, G. (2018), 'Transmission of monetary policy through global banks: Whose policy matters?', *Journal of International Money and Finance* **89**, 67–82.

Banerjee, R. N., Gambacorta, L. and Sette, E. (2021), 'The real effects of relationship lending', *Journal of Financial Intermediation* **48**, 100923.

Beck, T., Degryse, H., De Haas, R. and van Horen, N. (2018), 'When arm's length is too far: Relationship banking over the credit cycle', *Journal of Financial Economics* **127**(1), 174–196.

Bednarek, P., Briukhova, O., Ongena, S. and von Westernhagen, N. (2023), Effects of bank capital requirements on lending by banks and non-bank financial institutions, Discussion Papers 26/2023, Deutsche Bundesbank.

Begenau, J. and Landvoigt, T. (2022), 'Financial Regulation in a Quantitative Model of the Modern Banking System', *The Review of Economic Studies* **89**(4), 1748–1784.

Berger, A. N., Bouwman, C. H., Norden, L., Roman, R. A., Udell, G. F. and Wang, T. (2024), Relationship Lending and Monetary Policy Shocks: Evidence from the U.S., Available at https://ssrn.com/abstract=4945534, SSRN.

Biljanovska, N., Chen, S., Gelos, G., Igan, D., Peria, M. S. M., Nier, E. and Valencia, F. (2023), Macroprudential Policy Effects: Evidence and Open Questions, Departmental Paper 23/002, International Monetary Fund.

Bluwstein, K. and Patozi, A. (2024), The effects of macroprudential policy announcements on systemic risk, Bank of England working papers 1080, Bank of England.

Bolton, P., Freixas, X., Gambacorta, L. and Mistrulli, P. E. (2016), 'Relationship and Transaction Lending in a Crisis', *The Review of Financial Studies* **29**(10), 2643–2676.

Bräuning, F. and Ivashina, V. (2020), 'Monetary policy and global banking', *The Journal of Finance* **75**(6), 3055–3095.

Bruno, V. and Shin, H. S. (2015), 'Capital flows and the risk-taking channel of monetary policy', *Journal of Monetary Economics* **71**, 119–132.

Buchak, G., Matvos, G., Piskorski, T. and Seru, A. (2018), 'Fintech, regulatory arbitrage, and the rise of shadow banks', *Journal of Financial Economics* **130**(3), 453–483.

Budnik, K. and Kleibl, J. (2018), Macroprudential regulation in the European Union in 1995-2014: introducing a new data set on policy actions of a macroprudential nature, Working Paper Series 2123, European Central Bank.

Cerutti, E., Claessens, S. and Laeven, L. (2017), 'The use and effectiveness of macroprudential policies: New evidence', *Journal of Financial Stability* **28**, 203–224.

Cerutti, E., Hale, G. and Minoiu, C. (2015), 'Financial crises and the composition of cross-border lending', *Journal of International Money and Finance* **52**, 60–81.

Cerutti, E. and Zhou, H. (2018), Cross-border Banking and the Circumvention of Macroprudential and Capital Control Measures, IMF Working Papers 18/217, International Monetary Fund.

Chari, A., Dilts-Stedman, K. and Forbes, K. (2022), 'Spillovers at the extremes: The macroprudential stance and vulnerability to the global financial cycle', *Journal of International Economics* **136**, 103582.

Chernenko, S., Erel, I. and Prilmeier, R. (2022), 'Why Do Firms Borrow Directly from Nonbanks?', *The Review of Financial Studies* **35**(11), 4902–4947.

Chernenko, S., Ialenti, R. and Scharfstein, D. (2025), Bank Capital and the Growth of Private Credit, Available at https://ssrn.com/abstract=5097437, SSRN.

Choi, S., Willems, T. and Yoo, S. Y. (2024), 'Revisiting the monetary transmission mechanism through an industry-level differential approach', *Journal of Monetary Economics* **145**, 103556.

Cizel, J., Frost, J., Houben, A. and Wierts, P. (2019), 'Effective Macroprudential Policy: Cross-Sector Substitution from Price and Quantity Measures', *Journal of Money, Credit and Banking* **51**(5), 1209–1235.

Claessens, S. (2015), 'An overview of macroprudential policy tools', *Annual Review of Financial Economics* **7**, 397–422.

Claessens, S., Cornelli, G., Gambacorta, L., Manaresi, F. and Shiinad, Y. (2023), 'Do Macroprudential Policies Affect Non-bank Financial Intermediation?', *International Journal of Central Banking* **19**(5), 185–236.

Correa, R., Paligorova, T., Sapriza, H. and Zlate, A. (2022), 'Cross-border bank flows and monetary policy', *The Review of Financial Studies* **35**(1), 438–481.

Cucic, D. and Gorea, D. (2024), Nonbank Lending and the Transmission of Monetary Policy, Available at https://ssrn.com/abstract=3974863, SSRN.

De Haas, R. and Van Horen, N. (2013), 'Running for the Exit? International Bank Lending During a Financial Crisis', *The Review of Financial Studies* **26**(1), 244–285.

Degryse, H., De Jonghe, O., Jakovljević, S., Mulier, K. and Schepens, G. (2019), 'Identifying Credit Supply Shocks with Bank-Firm data: Methods and Applications', *Journal of Financial Intermediation* **40**(C).

Den Haan, W. J. and Sterk, V. (2011), 'The Myth of Financial Innovation and the Great Moderation', *The Economic Journal* **121**(553), 707–739.

Doerr, S. and Schaz, P. (2021), 'Geographic diversification and bank lending during crises', *Journal of Financial Economics* **140**(3), 768–788.

Drechsel, T. and Miura, K. (2025), The macroeconomic effects of bank regulation: New evidence from a high-frequency approach, Available at `https://econweb.umd.edu/~drechsel/papers/bank_regulation_shocks.pdf`, Working Paper.

Drechsler, I., Savov, A. and Schnabl, P. (2017), 'The Deposits Channel of Monetary Policy', *The Quarterly Journal of Economics* **132**(4), 1819–1876.

Drechsler, I., Savov, A. and Schnabl, P. (2022), 'How monetary policy shaped the housing boom', *Journal of Financial Economics* **144**(3), 992–1021.

Duchin, R. and Sosyura, D. (2014), 'Safer ratios, riskier portfolios: Banks' response to government aid', *Journal of Financial Economics* **113**(1), 1–28.

Duprey, T. and Tuzcuoglu, K. (2025), 'High-frequency effects of macroprudential policy announcements', *Economics Letters* **250**, 112264.

Elliott, D., Meisenzahl, R., Peydró, J.-L. and Turner, B. (2022), Nonbanks, Banks, and Monetary Policy: U.S. Loan-Level Evidence since the 1990s, Working Paper 2022-27, Federal Reserve Bank of Chicago.

Elliott, D., Meisenzahl, R. R. and Peydró, J.-L. (2024), 'Nonbank lenders as global shock absorbers: Evidence from us monetary policy spillovers', *Journal of International Economics* **149**, 103908.

Erel, I. and Inozemtsev, E. (2025), 'Evolution of Debt Financing Toward Less-Regulated Financial Intermediaries in the United States', *Journal of Financial and Quantitative Analysis* **60**(3).

Farre-Mensa, J. and Ljungqvist, A. (2016), 'Do Measures of Financial Constraints Measure Financial Constraints?', *The Review of Financial Studies* **29**(2), 271–308.

Financial Stability Board (2024), Global Monitoring Report on Non-Bank Financial Intermediation, Technical report, Financial Stability Board.

Fleckenstein, Q., Gopal, M., Gallardo, G. G. and Hillenbrand, S. (forthcoming), 'Nonbank Lending and Credit Cyclicality', *The Review of Financial Studies* .

Gambacorta, L. (2005), 'Inside the bank lending channel', *European Economic Review* **49**(7), 1737–1759.

Gambacorta, L. and Murcia, A. (2020), 'The impact of macroprudential policies in Latin America: An empirical analysis using credit registry data', *Journal of Financial Intermediation* **42**, 100828.

Gambacorta, L. and Shin, H. S. (2018), 'Why bank capital matters for monetary policy', *Journal of Financial Intermediation* **35**, 17–29.

Gebauer, S. and Mazelis, F. (2023), 'Macroprudential regulation and leakage to the shadow banking sector', *European Economic Review* **154**, 104404.

Giannetti, M. and Laeven, L. (2012), 'Flight home, flight abroad, and international credit cycles', *American Economic Review* **102**(3), 219–224.

Gómez, E., Murcia, A., Lizarazo, A. and Mendoza, J. C. (2020), 'Evaluating the impact of macroprudential policies on credit growth in colombia', *Journal of Financial Intermediation* **42**, 100843.

Hachem, K. (2011), 'Relationship lending and the transmission of monetary policy', *Journal of Monetary Economics* **58**(6), 590–600.

Haque, S., Jang, Y. S. and Wang, J. J. (2025), Indirect Credit Supply: How Bank Lending to Private Credit Shapes Monetary Policy Transmission, Available at https://ssrn.com/abstract=5125733, SSRN.

Imbierowicz, B., Löffler, A. and Vogel, U. (2021), 'The transmission of bank capital requirements and monetary policy to bank lending in Germany', *Review of International Economics* **29**(1), 144–164.

IMF (2024), The Rise and Risks of Private Credit, *in* 'Global Financial Stability Report Spring 2024', Chapter 2, International Monetary Fund, pp. 53–76.

Irani, R. M., Iyer, R., Meisenzahl, R. R. and Peydró, J.-L. (2021), 'The rise of shadow banking: Evidence from capital regulation', *The Review of Financial Studies* **34**(5), 2181–2235.

Ivashina, V. (2009), 'Asymmetric information effects on loan spreads', *Journal of Financial Economics* **92**(2), 300–319.

Ivashina, V., Scharfstein, D. S. and Stein, J. C. (2015), 'Dollar funding and the lending behavior of global banks', *The Quarterly Journal of Economics* **130**(3), 1241–1281.

Jiménez, G., Ongena, S., Peydró, J.-L. and Saurina, J. (2012), 'Credit Supply and Monetary Policy: Identifying the Bank Balance-Sheet Channel with Loan Applications', *American Economic Review* **102**(5), 2301–26.

Jiménez, G., Ongena, S., Peydró, J.-L. and Saurina, J. (2017), 'Macroprudential Policy, Countercyclical Bank Capital Buffers, and Credit Supply: Evidence from the Spanish Dynamic Provisioning Experiments', *Journal of Political Economy* **125**(6), 2126–2177.

Khwaja, A. I. and Mian, A. (2008), 'Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market', *American Economic Review* **98**(4), 1413–1442.

Kim, S., Plosser, M. C. and Santos, J. A. (2018), 'Macroprudential policy and the revolving door of risk: Lessons from leveraged lending guidance', *Journal of Financial Intermediation* **34**, 17–31.

Krainer, J., Vaghef, F. and Wang, T. (2024), Bank Lending to Nonbanks: A Robust Channel Fueled by Constrained Capital?, Available at https://www.fdic.gov/system/files/2024-09/vaghefi-paper-090624.pdf, Working Paper.

Nelson, B., Pinter, G. and Theodoridis, K. (2018), 'Do Contractionary Monetary Policy Shocks Expand Shadow Banking?', *Journal of Applied Econometrics* **33**(2), 198–211.

Peters, R. H. and Taylor, L. A. (2017), 'Intangible capital and the investment-q relation', *Journal of Financial Economics* **123**(2), 251–272.

Rojas, D., Vegh, C. and Vuletin, G. (2022), 'The macroeconomic effects of macroprudential policy: Evidence from a narrative approach', *Journal of International Economics* **139**, 103644.

Romer, C. D. and Romer, D. H. (2004), 'A New Measure of Monetary Shocks: Derivation and Implications', *American Economic Review* **94**(4), 1055–1084.

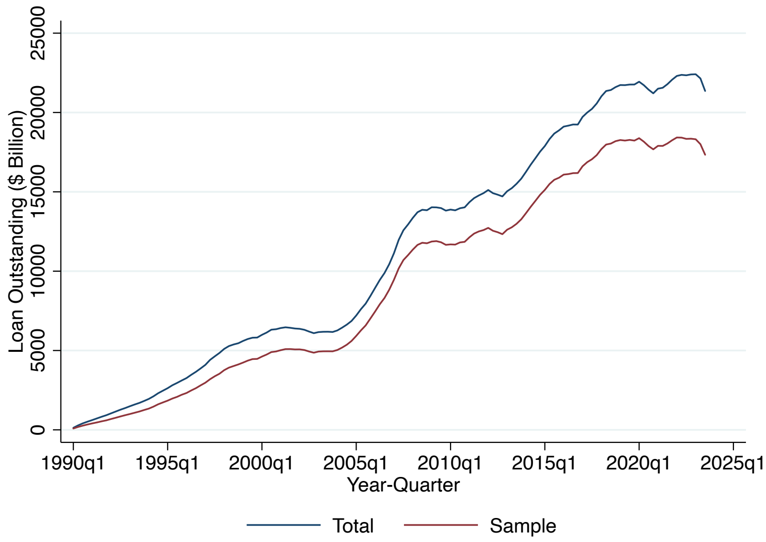
Sette, E. and Gobbi, G. (2015), 'Relationship lending during a financial crisis', *Journal of the European Economic Association* **13**(3), 453–481.

Sufi, A. (2007), 'Information Asymmetry and Financing Arrangements: Evidence from Syndicated Loans', *The Journal of Finance* **62**(2), 629–668.

Xiao, K. (2020), 'Monetary Transmission through Shadow Banks', *The Review of Financial Studies* **33**(6), 2379–2420.

ONLINE APPENDIX

Figure OA.1: Loan amount outstanding: raw data versus sample



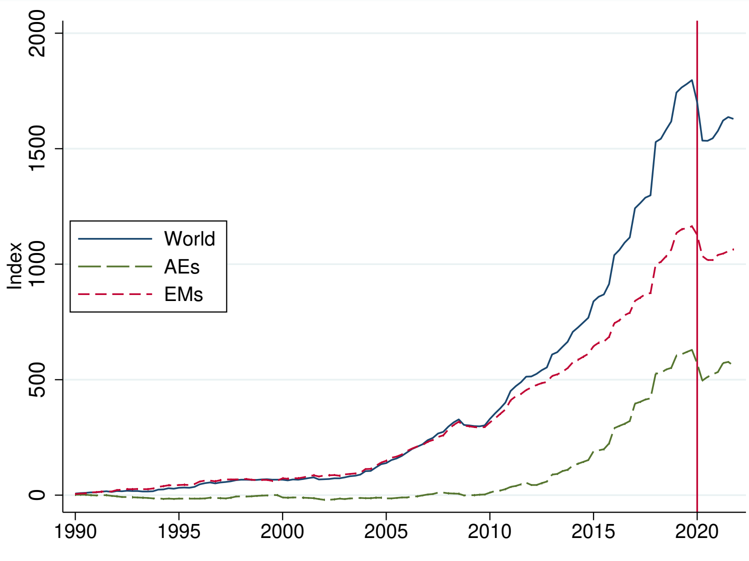
Notes: The blue line is the loan amount outstanding in the full Dealogic dataset, and the red line is the loan amount outstanding in our estimation sample.

Table OA.1: Sources of monetary policy shocks

Country	Identification	Source	Start Date	End Date
United States	High-Frequency	Jarocinski and Karadi (2020)	1990Q1	2024Q1
Euro Area (13 countries)	High-Frequency	Jarocinski and Karadi (2020)	1999Q1	2023Q4
United Kingdom	High-Frequency	Cesa-Bianchi et al. (2020)	1997Q1	2015Q4
Sweden	High-Frequency	Amberg et al. (2022)	1999Q1	2018Q4
Japan	High-Frequency	Kubota and Shintani (2022)	1992Q1	2020Q4
India	High-Frequency	Lakdawala and Sengupta (2021)	2003Q1	2020Q4
Canada	CBFD (a la R&R 2004)	Champagne and Sekkel (2018)	1974Q1	2015Q4
Brazil	CBFD (a la R&R 2004)	Alberola et al. (2021)	1974Q1	2015Q4
Norway	CBFD (a la R&R 2004)	Holm et al. (2021)	1990Q1	2018Q4

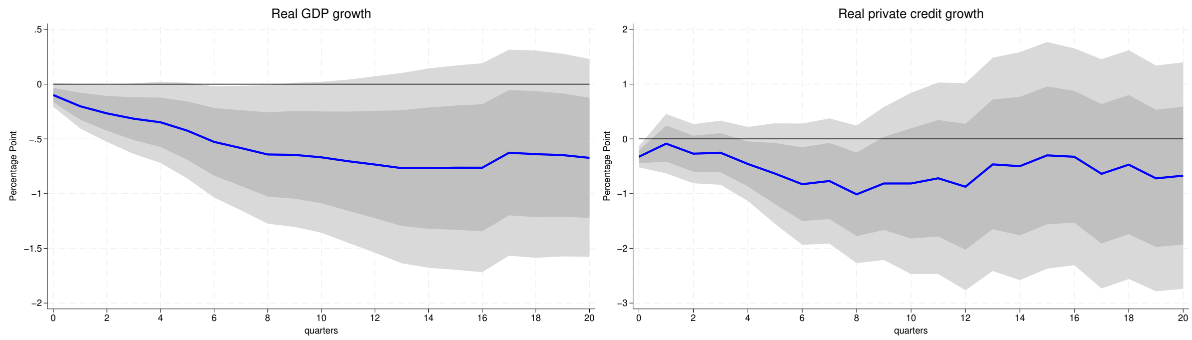
Notes: CBFD refers to Central Bank Forecasts Deviations.

Figure OA.2: Net cumulative sum of macroprudential actions



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 OA.3: Country-level responses to MaPP shocks



Notes: Cumulative impulse responses over 20 quarters following a one-standard deviation increase in MaPP shocks. 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 OA.2: Asymmetric effects of monetary policy shocks

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Loans	(6) Spread
MP^{+}	-0.089***	-0.110***	-0.025***	-0.026***	-0.026***	0.168
	(0.005)	(0.006)	(0.004)	(0.003)	(0.003)	(0.111)
MP^{-} Shock	0.068***	0.081***	0.021***	0.024***	0.021***	-0.210**
	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.105)
MP^{+} Shock × Nonbank		0.068***	0.055***	0.059***	0.048***	-0.432**
		(0.005)	(0.005)	(0.004)	(0.004)	(0.188)
MP^{-} Shock × Nonbank		-0.047***	-0.059***	-0.061***	-0.049***	0.515***
		(0.005)	(0.005)	(0.004)	(0.004)	(0.184)
Firm FE	✓	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓			
ILST FE				✓		
Firm × Time FE					✓	✓
Observations	756,531	751,549	749,629	748,453	739,866	386,185
R^2	0.689	0.687	0.727	0.795	0.877	0.988

Notes: Dependent variable is the log of new syndicated loans (columns 1-5) and the spread expressed in bps (column 6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Figure OA.4: MP-MaPP shocks combination over time

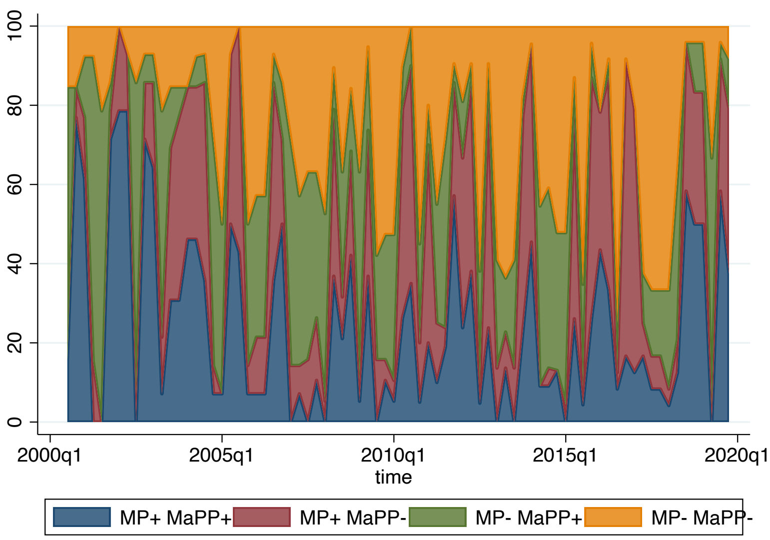


Table OA.3: Asymmetric effects of macroprudential policy shocks

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Loans	(6) Spread
$MaPP^{+}$ Shock	-0.047***	-0.069***	-0.019***	-0.021***	-0.020***	0.160
	(0.006)	(0.006)	(0.004)	(0.004)	(0.003)	(0.103)
$MaPP^{-}$ Shock	0.034***	0.039***	0.023***	0.020***	0.020***	-0.130
	(0.005)	(0.005)	(0.004)	(0.004)	(0.003)	(0.132)
$MaPP^{+}$ Shock × Nonbank		0.066***	0.011*	0.012**	0.014***	0.244
		(0.007)	(0.006)	(0.006)	(0.005)	(0.189)
$MaPP^{-}$ Shock × Nonbank		-0.010	-0.037***	-0.040***	-0.034***	0.524**
		(0.007)	(0.006)	(0.005)	(0.004)	(0.255)
Firm FE	✓	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓			
ILST FE				✓		
Firm × Time FE					✓	✓
Observations	756,531	751,549	749,629	748,453	739,866	386,185
R^2	0.688	0.687	0.726	0.795	0.877	0.988

Notes: Dependent variable is the log of new syndicated loans (columns 1-5) and the spread expressed in bps (column 6). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table OA.4: Robustness checks: major country lenders

	Baseline	US	UK	FR	EA	US+UK+EA
MP shock	-0.021***	-	-	-	-0.309	-0.028***
	(0.002)				(0.319)	(0.003)
MaPP shock	-0.019***	-	-	-	-0.002	-0.017***
	(0.002)				(0.003)	(0.002)
MP shock × Nonbank	0.046***	0.128***	0.078***	0.040***	0.038***	0.059***
	(0.003)	(0.009)	(0.020)	(0.007)	(0.004)	(0.004)
MaPP shock × Nonbank	0.016***	0.028***	0.013	0.015**	0.009**	0.028***
	(0.002)	(0.005)	(0.010)	(0.007)	(0.004)	(0.003)
Lender FE	✓	✓	✓	✓	✓	✓
Firm FE × Time	✓	✓	✓	✓	✓	✓
Observations	739,866	287,195	37,690	36,275	159,575	668,573
R^2	0.877	0.842	0.821	0.871	0.868	0.881

Notes: Dependent variable is the log of new syndicated loans. Column (1) refers to the baseline specification in Table 3, column (2) includes only US lenders, column (3) only UK lenders, column (4) only French lenders, column (5) only euro area lenders, and column (6) includes lenders from all these previous countries. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table OA.5: Rescaling coefficients with bank stock prices, and using Drechsel and Miura (2025) bank regulation shocks

	(1) Baseline	(2) Base: normalized	(3) US baseline	(4) U.S.: normalized	(5) U.S.: bank regulation
MP shock	-0.021***	-0.025***	-	-	-
	(0.002)	(0.003)			
MaPP shock	-0.019***	-0.046***	-	-	-
	(0.002)	(0.004)			
MP shock × Nonbank	0.046***	0.055***	0.128***	0.068***	0.076***
	(0.003)	(0.004)	(0.009)	(0.005)	(0.005)
MaPP shock × Nonbank	0.016***	0.040***	0.028***	0.018***	0.337***
	(0.002)	(0.006)	(0.005)	(0.003)	(0.107)
Lender FE	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓
Observations	739,866	739,818	287,195	287,195	202,117
R^2	0.877	0.877	0.842	0.842	0.852

Notes: Dependent variable is the log of new syndicated loans. Column (1) is the preferred baseline specification, while column (2) is the same specification but shows all coefficients normalized by bank stock prices, such that a one-standard deviation increase in each shock is associated with a one percent decline in bank stock prices. Column (3) is the preferred baseline specification for US lenders only, while column (4) normalizes the coefficients by bank stock prices. Column (5) uses the bank regulation shocks for the U.S. from Drechsel and Miura (2025), with all coefficients normalized by bank stock prices. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table OA.6: Distribution of sample across shocks combination

Shock	Observations
$MP^+ \times MaPP^+$	211,198
$MP^+ \times MaPP^-$	152,032
$MP^- \times MaPP^+$	199,881
$MP^- \times MaPP^-$	176,755
Total	739,866

Notes: Total number of observations for each monetary policy-macroprudential policy shocks combination.

Table OA.7: Relationship lending and margin spread

	(1) Pre-relation	(2) Pre-relation	(3) Pre-relation	(4) Duration	(5) Duration	(6) Duration
MP shock	0.244	0.084	0.210**	0.216	0.139	0.158
	(0.358)	(0.323)	(0.107)	(0.352)	(0.318)	(0.107)
MaPP shock	-0.358	-0.305	0.197**	-0.410	-0.352	0.150*
	(0.298)	(0.265)	(0.080)	(0.293)	(0.260)	(0.081)
Relation	-1.209**	-1.071**	-0.101	-0.906***	-0.858***	-0.027
	(0.526)	(0.487)	(0.111)	(0.204)	(0.182)	(0.036)
Relation × Nonbank	-1.900***	-1.716***	-0.292**	-0.660***	-0.524***	-0.077
	(0.534)	(0.486)	(0.141)	(0.202)	(0.182)	(0.052)
MP shock × Nonbank	-3.175***	-2.824***	-0.687***	-3.587***	-3.409***	-0.635***
	(0.612)	(0.553)	(0.194)	(0.622)	(0.567)	(0.198)
MaPP shock × Nonbank	2.274***	2.040***	-0.313	2.740***	2.598***	-0.219
	(0.506)	(0.468)	(0.204)	(0.501)	(0.466)	(0.198)
MP shock × Relation	-0.569	-0.250	-0.078	-0.156	-0.115	0.013
	(0.506)	(0.462)	(0.111)	(0.179)	(0.161)	(0.036)
MaPP shock × Relation	-0.596	-0.502	-0.152*	-0.158	-0.131	-0.018
	(0.388)	(0.349)	(0.085)	(0.135)	(0.122)	(0.030)
MP shock × Nonbank × Relation	1.777**	1.129*	0.447**	0.872***	0.805***	0.115*
	(0.690)	(0.627)	(0.193)	(0.259)	(0.237)	(0.068)
MaPP shock × Nonbank × Relation	0.016	0.205	0.456**	-0.492**	-0.487**	0.087
	(0.649)	(0.597)	(0.202)	(0.234)	(0.215)	(0.067)
Firm FE	✓	✓		✓	✓	
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓			✓		
ILST FE		✓			✓	
Firm × Time FE			✓			✓
Observations	388,592	388,439	386,185	388,592	388,439	386,185
R^2	0.840	0.855	0.988	0.840	0.855	0.988

Notes: Dependent variable is the spread expressed in bps. *Relation* in columns (1)-(3) refers to a dummy variable taking the value of one when a borrower has a previous lending relationship with a lender over the past five years; in columns (4)-(6) it refers to the logarithm of the number of years since the borrower got the first loan from a specific lender. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table OA.8: Real effects

	(1) Total Debt	(2) Liquid assets	(3) Capital exp.	(4) Intangibles	(5) Employment	(6) PD
MP shock	0.077*	0.011	0.023	0.056**	0.002	0.007
	(0.040)	(0.044)	(0.024)	(0.024)	(0.024)	(0.055)
MaPP shock	-0.074**	-0.082***	-0.074***	-0.059***	-0.061***	0.004
	(0.030)	(0.031)	(0.018)	(0.018)	(0.017)	(0.034)
NB relation	0.141***	-0.017	0.075***	0.033***	0.051***	0.087***
	(0.019)	(0.022)	(0.011)	(0.011)	(0.008)	(0.023)
MP shock × NB relation	-0.003	0.010	0.050***	0.000	0.047***	0.058*
	(0.031)	(0.034)	(0.017)	(0.018)	(0.014)	(0.035)
MaPP shock × NB relation	0.023	0.054**	0.034***	0.038***	0.022**	0.005
	(0.023)	(0.026)	(0.012)	(0.015)	(0.010)	(0.021)
Firm FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓	✓	✓	✓	✓	✓
Observations	23987	17057	24538	14455	23039	19400
R^2	0.916	0.898	0.974	0.963	0.982	0.610

Notes: Data are aggregated at the firm-quarter level. The dependent variables are: (1) log of total real debt, (2) log of real net liquid assets, (3) log of real tangible capital expenditures, (4) log of real intangible investment, (5) log of employment, and (6) the probability of default over the next 12 months. *NB relation* dummy equals one if the firm borrowed from a nonbank in the syndicate loan market in the past two years, and zero otherwise. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table OA.9: Alternative lag structures and shock specification

	(1) Lag 1	(2) Lag 2	(3) Lag 3	(4) Lag 4	(5) All Lags	(6) Time FE	(7) MP shocks
MP shock	-0.021***	-0.020***	-0.021***	-0.022***	-0.013***	-0.019***	-0.022***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)
MaPP shock	-0.019***	-0.018***	-0.019***	-0.019***	-0.015***	-0.020***	-0.016***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.001)
MP shock × Nonbank	0.046***	0.050***	0.054***	0.051***	0.016***	0.045***	0.049***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.003)	(0.003)
MaPP shock × Nonbank	0.016***	0.014***	0.014***	0.013***	0.016***	0.016***	0.011***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.002)	(0.002)
Lender FE	✓	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓	✓
Observations	739,866	731,803	724,672	716,867	716,867	739,866	739866
R^2	0.877	0.878	0.879	0.879	0.880	0.877	0.877

Notes: Dependent variable is the log of new syndicated loans. Column (1) uses the baseline MP and MaPP shocks lagged one quarter, as described in Section 2. In columns (2), (3), and (4) we lag the MP and MaPP shocks by respectively two, three, and four quarters. Column (5) includes lags one to four of the MaPP shocks, along with their interactions with the nonbank dummy. Columns (6) and (7) make use of, respectively, MaPP shocks when controlling for time fixed effects and for MP shocks in Equation (1). Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

Table OA.10: Alternative clustering methods

	(1)	(2)	(3)	(4)
MP shock	-0.021***	-0.021***	-0.021**	-0.021**
	(0.002)	(0.003)	(0.009)	(0.008)
MaPP shock	-0.019***	-0.019***	-0.019***	-0.019***
	(0.002)	(0.003)	(0.005)	(0.005)
MP shock × Nonbank	0.046***	0.046***	0.046**	0.046**
	(0.003)	(0.005)	(0.019)	(0.019)
MaPP shock × Nonbank	0.016***	0.016***	0.016*	0.016*
	(0.002)	(0.004)	(0.010)	(0.010)
Lender FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	739,866	739,866	739,866	739,866
R^2	0.877	0.877	0.877	0.877

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