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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 but underexplored questions about how both monetary policy (MP) and macroprudential policies (MaPP) affect lending and the real economy. Using syndicated loan data, we examine the joint impact of MP and MaPP shocks on credit supply to nonfinancial firms. Our findings show that nonbanks act as shock absorbers, cushioning firms—particularly those with existing nonbank relationships—from policy tightening. We also find that these shocks drive credit away from weaker banks toward nonbanks, raising concerns about credit quality. Finally, we provide evidence that MaPPs on banks can lead them, especially weaker banks, to shift lending to nonbanks and away from nonfinancial corporations. This allows nonbanks to expand their role in corporate credit markets. Overall, our findings highlight that tighter MP and MaPP may unintentionally push credit intermediation into a sector largely outside the regulatory perimeter, posing new financial stability risks.

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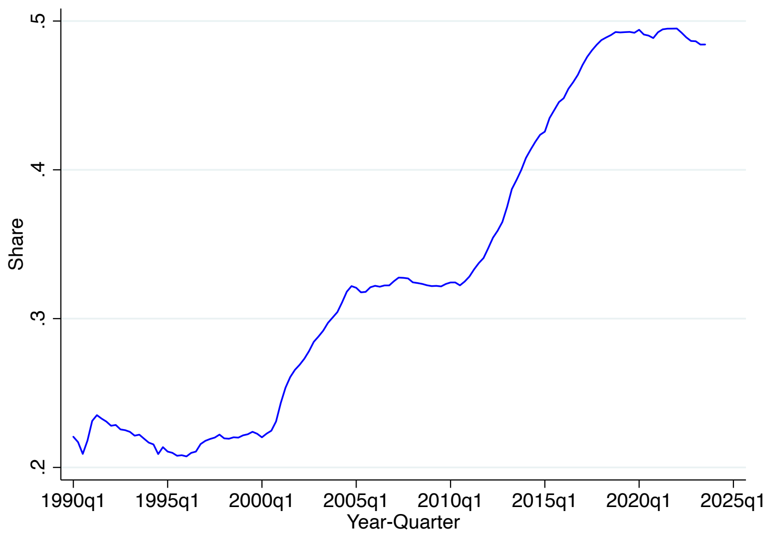
1 Introduction

Nonbank financial institutions have significantly expanded their footprint in the global financial system over the past two decades. According to the most recent Financial Stability Board report, the share of global financial assets held by nonbanks increased from 43 percent in 2008 to 49 percent in 2023 (Financial Stability Board 2024). Consistent with this trend, Figure 1 shows that the share of corporate loans intermediated by nonbanks in the syndicated loan market has risen sharply, reaching nearly 50 percent by the end of 2024, up from just over 30 percent during the Global Financial Crisis (GFC).[1] While the growing role of nonbanks in loan origination is primarily driven by the most financially developed markets, particularly the United States, the broader shift from bank to nonbank credit intermediation has implications for borrowers worldwide.

Figure 1: Nonbank share in the corporate syndicated loan market



Notes: Nonbank share is the loan amount outstanding intermediated by nonbanks relative to the total loan amount.

In this paper, we focus on the implications of the growing role of nonbanks in corporate credit intermediation for both monetary policy (MP) and macroprudential policy (MaPP). Recent evidence from the U.S. suggests that the nonbank sector expands and increases its presence in credit markets following contractionary MP shocks (Den Haan and Sterk 2011, Nelson et al. 2018, Xiao 2020, Drechsler et al. 2022, Agarwal et al. 2023). This expansion allows nonbanks to partially mitigate the transmission of MP to the real economy (Elliott et al. 2022, 2024, Cucic and Gorea 2024). The countercyclical expansion of nonbanks during contractionary MP shocks

[1] Our sample includes lenders from 22 countries, as described in Section 2. Figure A.1 in Appendix A shows that our sample covers most syndicated loan deals in Dealogic. Our estimate of the nonbank share is consistent with Abbas et al. (2025) and Albuquerque et al. (2025), who use the same dataset with a broader country coverage.

is commonly attributed to the deposits channel of MP. As policy rate hikes widen the spread between the policy rate and deposit rates, funding frictions intensify, prompting deposit outflows from the banking sector. These outflows constrain banks' lending capacity, and therefore lead to a migration of credit supply toward nonbanks (Drechsler et al. 2017). In addition, Cucic and Gorea (2024) find that in Denmark, the increase in nonbank lending to both households and nonfinancial corporations following contractionary MP shocks can be explained by the increased long-term funding available to nonbanks, while banks experience deposit outflows.

The increasing use of MaPP since the GFC has also had important—often unintended—implications for the nonbank sector. While MaPP measures are designed to enhance financial system resilience against shocks, particularly by curbing house prices and excessive credit growth (Claessens 2015, Cerutti et al. 2017, Altavilla et al. 2020, Biljanovska et al. 2023), they may have also contributed to the expansion of the less-regulated nonbank sector.[2] The post-GFC tightening of bank regulations, which imposed tighter constraints on banks' balance sheets, appears to be closely linked to the concurrent 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 forthcoming). This pattern aligns with the theoretical underpinning in Begenau and Landvoigt (2022) and Gebauer and Mazelis (2023), which suggests that tighter capital requirements reduce the supply of bank deposits, thereby constraining banks' lending capacity.

Since individual policies do not operate in isolation, our paper bridges both strands of the literature by examining the joint effect of both MP and MaPP on credit supply to nonfinancial firms (Altavilla et al. 2020, Imbierowicz et al. 2021, Gebauer and Mazelis 2023). Understanding how both policies jointly affect the provision of credit to the economy is a first-order priority in our research agenda. Differently from Altavilla et al. (2020), and Imbierowicz et al. (2021), our analysis centers on nonbanks, focusing on how their lending behavior differs from that of banks following contractionary MP and MaPP shocks. We use syndicated loan data from Dealogic, covering nearly the entire universe of syndicated corporate loans from 2000 to 2019. This dataset provides granular information on loan origination from both banks and nonbanks. Nonbanks in our sample primarily include investment banks and finance companies, along with several insurance companies, pension funds, private equity firms, and other financial intermediaries. While our primary focus is on credit quantity, we also examine how nonbanks adjust loan pricing (spreads) in response to contractionary policy shocks.

[2]The literature has also shown as a side effect of MaPPs that they can increase cross-border borrowing relative to domestic borrowing (see, among others, Cerutti et al. 2017, Cerutti and Zhou 2018).

Our sample focuses on lenders from 22 countries, primarily advanced economies (AEs), and nonfinancial corporate borrowers from 153 countries, spanning both AEs and emerging market and developing economies (EMDEs). High-frequency MP shocks are sourced from Choi et al. (2024), while MaPP shocks are estimated using the iMaPP database (Alam et al. forthcoming). Specifically, we focus on MaPP measures that target loan supply, including limits on credit growth, loan loss provisions, lending restrictions, loan-to-deposit ratio caps, and foreign exchange loan limits. To capture macroprudential policy stringency, we first cumulate the relevant binary indicators and aggregate them at the country level. To address endogeneity, and following the MP literature, we estimate a panel regression with country fixed effects and a set of macroeconomic and financial controls to purge the cumulative MaPP indices of cyclical economic conditions. The residuals from this regression serve as our MaPP shocks, which we show to be uncorrelated with MP shocks.

Our baseline specification regresses newly originated loans on MP and MaPP shocks, interacting these with a nonbank dummy variable. The key coefficients of interest capture the differential effects of nonbank credit supply relative to banks. To isolate credit supply from credit demand, we include a rich set of fixed effects. In our preferred specification, we control for time-varying borrower credit demand using Khwaja and Mian (2008) firm×quarter fixed effects. This approach relies on the identification assumption that a given nonfinancial firm borrows from at least one bank and one nonbank at the same point in time.

We have the following main findings. First, nonbanks partially mitigate the contraction in bank credit supply to nonfinancial corporate borrowers following contractionary MP and MaPP shocks. In our preferred specification that controls for borrower credit demand using firm×quarter fixed effects, a one-standard deviation contractionary MP shock leads nonbanks to expand lending to corporates by 4.6 percent relative to banks' lending. Although nonbank lending also increases during MaPP shocks, the estimated effect is nearly half the size of the one during MP shocks. 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 (Nelson et al. 2018, Xiao 2020, Elliott et al. 2022, 2024, Cucic and Gorea 2024). In the case of MaPP shocks, our findings suggest that tighter financial regulation may have unintended consequences by shifting credit to the less-regulated nonbank sector (Kim et al. 2018, Cizel et al. 2019, Ahnert et al. 2021, Begenau and Landvoigt 2022, Gebauer and Mazelis 2023).

The expansion of nonbank lending materializes not only through higher loan volumes but also through lower prices relative to banks. Although nonbanks typically charge higher level of spreads, we find that they reduce their spreads relative to banks during contractionary policy shocks, particularly MP shocks. The combination of increased lending volumes and lower spreads supports our argument that nonbanks' response reflects 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 relationship lending plays an important role during contractionary policy shocks. Our result is in line with the well-established literature that relationship lending with banks provides valuable benefits to borrowers during downturns (Bolton et al. 2016, Sette and Gobbi 2015, Beck et al. 2018, Banerjee et al. 2021) and particularly during contractionary MP shocks (Hachem 2011, Berger et al. 2024). Our contribution is to show that relationship lending with nonbanks offer additional protection to firms after MP shocks, though the evidence is less conclusive during MaPP shocks. These findings hold across alternative measures of relationship lending, including duration and relationship strength. Moreover, while nonbanks expand lending to borrowers with prior relationship when MP or MaPP tighten, they 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. It also aligns with evidence that lenders typically charge higher rates on relationship borrowers during non-crisis periods (Bolton et al. 2016).

Third, when we aggregate the data at the syndicated loan-deal level, we reinforce our previous findings that credit migrates from banks to nonbanks in response to MP and MaPP shocks. Specifically, nonbanks increase their participation share in syndicates following contractionary policy shocks. Notably, the increase is more pronounced in loan deals involving weaker banks—defined as those with either low bank capital levels or high nonperforming loans (NPLs). We conjecture that this migration of lending from weak banks to nonbanks may stem from tighter balance sheet constraints faced by weaker banks when funding costs rise (Gambacorta 2005, Jiménez et al. 2012, Gambacorta and Shin 2018),or regulatory requirements become more restrictive (Buchak et al. 2018, Irani et al. 2021, Bednarek et al. 2023, Claessens et al. 2023, Krainer et al. 2024, Erel and Inozemtsev forthcoming). At the same time, we find no evidence that tighter MP or MaPP conditions lead nonbanks to disproportionately finance riskier borrowers relative to other borrowers.

The credit migration does not seem to involve a disproportionate transfer of risk to nonbanks following policy shocks. We stress, however, that nonbanks, on average, lend more to risky borrowers *relative* to banks, raising concerns about overall financial stability. In addition, we document that our main results are primarily driven by nonbanks with unstable funding, underscoring the financial stability risks associated with this shift, 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. In particular, we find that firms relying on nonbank lending tend to increase investment and employment 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.

Finally, we explore whether the growth in nonbank credit supply during tightening shocks reflects a reallocation of bank funding toward nonbanks and away from nonfinancial corporate borrowers. We find that banks increase lending to nonbank borrowers relative to nonfinancial borrowers following MaPP shocks, but not following MP shocks. This result is particularly stronger for weakly-capitalized banks. While our reduced-form results do not allow us to fully explore the mechanism underlying the shift in bank behavior, we note that regulatory frameworks, such as Basel III, often impose higher risk weights on exposures to nonfinancial corporate borrowers compared to nonbanks, which are treated as financial institutions. In essence, increased lending from banks to nonbanks seems to be related to a more favorable capital treatment of loans to nonbanks and the more costly regulatory burden on banks (Krainer et al. 2024, Chernenko et al. 2025). In this context, we conjecture that tighter MaPP may incentivize banks—especially those closer to regulatory capital constraints—to prioritize lending to less risky borrowers in order to preserve capital buffers. Overall, the increased flow of bank credit to nonbanks during MaPP shocks may help explain the expansion of nonbank lending to corporate borrowers documented in the paper.

Our results are robust to a battery of tests, including: (i) adding capital-based requirements to our MaPP shocks; (ii) focusing on USD loans against foreign currency-denominated loans; (iii) breaking down flows into cross-border versus domestic; (iv) restricting the specification to lenders from major AEs, or excluding top nonbanks accounting for around 10 percent of the total nonbank loan origination; (v) splitting borrowers between AEs and EMDE; (vi) breaking down loans into term loans and 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 main strands of the literature. First, we examine the role of nonbanks in the transmission of shocks to the real economy. While existing research primarily focuses on MP transmission via nonbanks (Xiao 2020, Drechsler et al. 2022, Elliott et al. 2022, 2024, Agarwal et al. 2023, Cucic and Gorea 2024), most studies are U.S. centric, with Cucic and Gorea (2024) being a notable exception studying Danish lenders. In contrast, our paper analyzes both MP and MaPP shocks across lenders in 22 countries. This joint analysis is important given the rising prominence of MaPP since the GFC and its potential interdependence with MP shocks. Our key contribution is to show that credit migration from banks to nonbanks is also quantitatively important when MaPP tightens—provided MP is not loosened. Moreover, in response to both 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.

Second, we contribute to the literature on relationship lending (Hachem 2011, Bolton et al. 2016, Sette and Gobbi 2015, Beck et al. 2018, Banerjee et al. 2021, Berger et al. 2024). Our main contribution is to show that nonbanks provide additional protection to borrowers compared to bank relationships following MP shocks. This enables firms with nonbank relationships to better withstand the effects of MP tightening on their financial performance.

Third, we explore potential mechanisms behind nonbanks' expanding lending activities. Our findings align with the deposit channel of monetary policy: contractionary MP leads to deposit outflows from banks to nonbanks, facilitating nonbank lending growth. However, we also provide novel evidence that tighter MaPP can further fuel nonbank expansion by increasing bank funding to nonbanks. Consistent with Krainer et al. (2024) on the effects of Basel III implementation in the U.S., 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. This is consistent with Acharya et al. (2024) who document considerable growth in bank loans to nonbanks.

Finally, we contribute to the literature examining the effect of MP and MaPP shocks on the real economy. While the impact of MP shocks is relatively well-documented, there is scant empirical evidence on the effects of MaPP on private credit, and mostly restricted to cross-country aggregated data, constraining the ability to analyze the possible heterogeneous effects of MaPP at the micro level (Claessens 2015, Cerutti et al. 2017).[3] Moreover, there is limited empirical evidence on the joint effects of MP and MaPP on lending to nonfinancial firms using granular data. Notable exceptions include Altavilla et al. (2020), and Imbierowicz et al. (2021), who show that MaPP can amplify the effects of MP on bank lending to corporates in the euro area and Germany (and to households in the former paper). Our contribution lies in examining how nonbanks affect the joint transmission of MP and MaPP shocks on nonfinancial firms' access to credit.

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 maturity, loan type (e.g., term loans and credit lines), and pricing (all-in drawn spread, which encompasses fees, margins, and reference rates). In the 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 lender.

Our main focus is on the quantity of credit supply, measured as the logarithm 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 refers to the interest rate margin over LIBOR. This price variable essentially nets out all fees, which largely go to the lead

[3]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).

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). However, we note that price information is sometimes missing in Dealogic.

Loans can be intermediated by either banks or nonbanks. We classify banks based on Dealogic SIC codes starting with 60, which correspond 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).[4] 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 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 5,976 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 syndicated loan deals in Dealogic, consistently accounting for over 80 percent at any given time (Figure A.1 in Appendix A). On the borrower side, we restrict the analysis to nonfinancial firms by excluding financial firms—namely banks, diversified financials, and insurance firms—resulting in a sample of 48,684 unique nonfinancial firms (both listed and private) in 153 borrower countries (38 AEs and 115 EMDEs).[5]

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. To address this issue, we 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

[4]We allocate the following codes starting in 65 to nonbanks: 6510 (Real Estate Operators (no developers) & Lessors, 6519 (Lessors of Real Property) and 6532 (Real Estate Dealers).

[5]We identify the country of the borrower as the borrower entity's country of business operation.

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 broader literature, which suggests 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, 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 follow the data cleaning approach detailed in Albuquerque and Iyer (2024). Since Dealogic and Compustat lack a common firm identifier, we adopt 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 borrower attributes such as 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. Through this approach, 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 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

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

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 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 Connect, 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 and NPLs as a percentage of total loans, both measured at the parent-bank level. Since Fitch Connect 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. Given the imperfect matching between the two datasets, 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. 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). Consistent with Elliott et al. (2022, 2024), and Cucic and Gorea (2024), we use the cumulative sum of the shock series, as our dependent variable is defined in level terms.

Table A.3 in Appendix A shows the sources of the shocks for each country. Our shock series is roughly balanced between tightening and loosening episodes (Figure A.2 in Appendix A).

Country-specific macroprudential policy shocks

Our MaPP shocks are based on Alam et al. (forthcoming) macroprudential policy database, which compiles 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. To maintain consistency with our MP shocks sample, we use the MaPP data for the same 22 countries. To examine the effect of MaPP on lenders' lending behavior, we focus on measures specifically targeting 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.[7]

Although we cannot capture the intensity of each independent macroprudential action, we follow the related literature and 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) 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 on country fixed effects and a set of financial and macroeconomic variables:

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

where macroeconomic control variables include real GDP growth, the real effective exchange rate (REER) growth rate, lagged 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.[8] 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.3 in Appendix A). Our MaPP shocks are uncorrelated with the MP shocks, as illustrated in Figure A.4, showing a correlation of 0.0485. 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 B.10).

[7] Our results are robust to adding additional macroprudential measures to generate the shocks, such as reserve requirements, capital requirements, conservation buffers, among others (Table B.9 in Appendix B).

[8] As in Chari et al. (2022), we do not add time fixed effects since our focus is on the within-country variation in policy changes at the country level. But we show in Table B.10 in Appendix B that our baseline results are robust to adding time fixed effects when computing the MaPP shocks.

3 Empirical framework

3.1 Baseline specification

Our baseline regression examines the joint effect of MP and MaPP shocks on newly originated syndicated loans (or on the price of credit) in a large sample of nonfinancial firms. We focus on the differential effect of these shocks on credit supply from nonbanks relative to banks:

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

where the dependent variable is the logarithm 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.[9]

Our baseline set of fixed effects controls for time-invariant borrower and lender characteristics, captured by α_i and γ_l, respectively, 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.[10] 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). 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

[9]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. However, one could argue that macroprudential policies may involve significant delays between announcement and implementation. We address this concern by conducting a sensitivity analysis using alternative lag structures for the shocks (Table B.10 in Appendix B). Nonetheless, our choice of one-quarter lag 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 difference between the announcement and in-force date of macroprudential measures is one quarter.

[10]We note, a point also made by Elliott et al. (2024), that it is uncommon for firms to take out more than one loan deal in the same quarter. This means that our firm×quarter fixed effects for the most part capture loan deal fixed effects.

the same firm. Our main results, however, are robust to alternative clustering combinations (see Section 7).

While our main focus is on the quantity of credit supply, we also examine price effects in some specifications. However, the analysis comes with the caveat that pricing data is less populated in Dealogic. To account for price effects, we replace the log of loans with the spread as the dependent variable. In these cases, we add the years to maturity as an additional control variable to account for the impact of loan duration on the spread charged by lenders.

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:

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

where $\mathit{Pre\text{-}relation}_{l,i,t-1}$ 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

We investigate potential credit migration from banks to nonbanks in response to contractionary MP and MaPP shocks. To do so, we aggregate our data at the syndicated loan deal level, following 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 extent of credit migration within a syndicate from weak banks to nonbanks following contractionary MP and MaPP shocks. A negative coefficient suggests that tighter MP or MaPP shocks prompts a migration of credit from weaker banks to nonbanks within syndicates.

Our preferred baseline specification controls for time-varying credit demand using ILST fixed effects. Employing firm×time fixed effects, as in Khwaja and Mian (2008), would be too restrictive when aggregating data at the syndicated loan deal level. This approach would assume that a given nonfinancial firm borrows from multiple syndicates within the same quarter, which is a restrictive assumption that significantly reduces the sample size.

3.4 Borrowers' credit risk migration to nonbanks

To analyze nonbanks' risk-taking behavior following MP and MaPP shocks, we modify Equation (2) 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 $NB\ shr_{d,t}$ denotes the share of loans from nonbanks in each syndicated loan deal d at time t. $Risky_{i,t-1}$ is a dummy variable equal to one if firm i is classified as risky at time $t-1$. We consider three different proxies to identify risky borrowers: (i) borrowers with a loan-weighted average spread over the past five years in the top quartile of the sample distribution in each quarter;[11] (ii) borrowers rated 'speculative' by S&P, i.e., those with a long-term issuer credit rating below BBB$^-$; and (iii) high-probability of default (PD) borrowers, defined as those with a PD in the top quartile of the country-time distribution. While the latter measure has a more restricted sample size relative to the spread-based definition from Dealogic, it may better capture financial constraints relative to other metrics (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 MP and MaPP shocks.

3.5 Real effects at the firm-level

Our final exercise examines the real effects of nonbank lending following contractionary MP and MaPP shocks at the firm level. Specifically, 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:

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

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 (capturing capital expenditures in physical capital such as property, plant, and equipment), the logarithm of intangible investment, the logarithm of total employment, and the probability of default over the next 12 months. $NB\ relation_{i,t-1}$ is a dummy variable equal to

[11] 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.

one if a firm borrowed from nonbanks in the previous two years. The MP ($MP_{c,t-1}$) and MaPP ($MaPP_{c,t-1}$) 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 joint effects using Equation (2), we first assess the individual effect of MP and MaPP shocks separately. To do so, we modify the regression equation mentioned above to include only one shock at a time. 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 7.7 percent decline in syndicated loans to nonfinancial firms, consistent with the expectation that monetary policy affects the real economy through various channels, including the credit lending channel 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), which tightly controls 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 2.5 percent increase in nonbanks. [12] 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 lead to the leakage of bank credit supply to the nonbanking sector, likely due to deposits outflows from banks triggered by a widening spread between the policy rate and deposit rates (Drechsler et al. 2017). Finally, 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.

[12] 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.

Table 1: Effect of monetary policy shocks

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Loans	(6) Spread
MP shock	-0.077***	-0.093***	-0.023***	-0.025***	-0.023***	0.205**
	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.087)
MP shock × Nonbank		0.056***	0.056***	0.059***	0.048***	-0.500***
		(0.004)	(0.004)	(0.004)	(0.003)	(0.140)
Firm FE	✓	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓			
ILST FE				✓		
Firm × Time FE					✓	✓
Observations	765,143	760,089	758,164	756,977	748,188	391,970
R^2	0.687	0.685	0.725	0.793	0.876	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.

We re-estimate the same specification but now focus solely on MaPP shocks. Interestingly, we find very similar results to those for MP shocks. Table 2 shows that a one-standard deviation MaPP tightening shock leads banks to cut credit supply, but nonbanks partially mitigate this decline. 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 relatively lower spreads. However, the latter effect is estimated with less precision (column 6). These novel findings highlight the unintended consequences 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, Begenau and Landvoigt 2022, 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	-0.052***	-0.063***	-0.028***	-0.029***	-0.029***	0.136**
	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)	(0.064)
MaPP shock × Nonbank		0.037***	0.033***	0.037***	0.032***	-0.187
		(0.004)	(0.004)	(0.003)	(0.003)	(0.132)
Firm FE	✓	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓			
ILST FE				✓		
Firm × Time FE					✓	✓
Observations	765,143	760,089	758,164	756,977	748,188	391,970
R^2	0.686	0.685	0.725	0.793	0.876	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 B.1 and B.2 in Appendix B, 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 joint impact. To do so, we estimate a specification that includes both shocks, as presented in Table 3, corresponding to Equation 2. Our findings confirm 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. Additionally, we find that nonbanks increase lending disproportionately more during MP shocks than MaPP shocks. Our preferred specification in column (4) , including firm×time fixed effects, indicates that nonbanks expand lending by 4.6 percent more than banks during MP shocks, compared to 2.8 percent during MaPP shocks.[13] 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.

We find that bank capital plays a significant role in the response of bank credit supply following MP shocks. Table B.4 in Appendix B shows that banks with lower capital levels tend to curtail more credit to nonfinancial borrowers (columns 1-3), as lower-capitalized banks face greater financial constraints in switching from reservable to non-reservable liabilities (e.g., bonds) as funding costs rise.[14] In contrast, we do not find any differential effects based on bank capital levels following MaPP shocks. Our results remain robust when defining weak banks as high-NPL banks (columns 4-6).

The nonbank credit expansion we have found in Table 3 also materializes along the price dimension. When we pool MP and MaPP shocks together, the point estimates continue to show

[13] All our results are robust to restricting the specification to lenders from major AEs, namely the United States, the United Kingdom, and the euro area, as illustrated in Table B.3 in Appendix B (but not for Japanese lenders following MP shocks). In addition, our results are not influenced by endogeneity concerns between MP and MaPP shocks (correlation between the two shocks is 0.0485, as shown in Figure A.4). In any case, and 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 B.10 shows that our main result remains strongly robust.

[14] We expand Equation (2) by interacting MP and MaPP with a dummy variable capturing low-capitalized (high-NPL) banks based on Tier 1 capital ratios (NPLs) falling in the first (top) quartile of the country-time distribution. We also include bank-specific controls (lagged banks' ROA, NPL, and Tier 1 capital ratio), and replace lender fixed effects with lender-parent fixed effects given that we focus on lender characteristics at the parent level.

that nonbanks cut loan rates relative to banks following MP shocks and MaPP shocks, although the statistical evidence is less conclusive for MaPP shocks (column 5). Higher quantities and lower spreads, especially for MP shocks, are consistent with credit supply effects from nonbanks (Elliott et al. 2022).[15]

Columns (6)-(7) test possible amplification or mitigation effects from the interaction of MP and MaPP shocks. When we look at our overall sample, not distinguishing banks from nonbanks, we find that MaPP shocks and MP shocks complement each other in reducing credit supply to corporate borrowers (column 6). This echoes the results in Altavilla et al. (2020), who use credit registry data for several European countries over 2012-17 to provide evidence 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 corporates in the order of 0.3 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.

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

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Spread	(6) Loans	(7) Loans
MP shock	-0.073***	-0.022***	-0.025***	-0.022***	0.196**	-0.008***	-0.024***
	(0.004)	(0.003)	(0.003)	(0.002)	(0.088)	(0.002)	(0.002)
MaPP shock	-0.048***	-0.027***	-0.028***	-0.028***	0.115*	-0.018***	-0.026***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.064)	(0.002)	(0.002)
MP shock × Nonbank		0.053***	0.055***	0.046***	-0.491***		0.054***
		(0.004)	(0.004)	(0.003)	(0.144)		(0.003)
MaPP shock × Nonbank		0.028***	0.032***	0.028***	-0.077		0.017***
		(0.004)	(0.003)	(0.003)	(0.137)		(0.003)
MP shock × MaPP shock						-0.003*	0.011***
						(0.002)	(0.002)
MP shock × MaPP shock × Nonbank							-0.033***
							(0.003)
Firm FE	✓	✓	✓				
Lender FE	✓	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE		✓					
ILST FE			✓				
Firm × Time FE				✓	✓	✓	✓
Observations	765,143	758,164	756,977	748,188	391,970	753,416	748,188
R^2	0.687	0.725	0.794	0.876	0.988	0.876	0.876

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.

[15] However, Cucic and Gorea (2024) do not find that Danish nonbanks differentially adjust interest rates to corporates in the presence of contractionary MP shocks.

We add the interaction terms with nonbanks in column (7). Interestingly, we find that the negative coefficient on the interaction term of both shocks flips to positive when isolating the effect for banks only, suggesting that the previous result on the complementarity of policies comes from nonbanks, i.e., the expansion of nonbank credit seems to be mitigated when both policies go in the same direction (last row). These results are surprising at face value: the coefficient on the last-to-second row suggests that the tightening of both policies mitigates the credit supply contraction from banks by one percent. At the same time, the coefficient in the last row suggests that higher credit supply from nonbanks relative to banks is somewhat reduced by 3.3 percent when both policies tighten.

We go one step further to better understand the interaction between MP and MaPP shocks. Specifically, we look into all possible tightening-loosening combinations between the two shocks, for both banks and nonbanks. Starting with banks in the first four rows of Table 4, we find that the positive coefficient we have found previously on the interaction term between the two policy shocks for bank lending is mostly driven by the combination of loosening of both MP and MaPP shocks, which stimulate credit supply (coefficient on $MP^{-} \times MaPP^{-}$). This is fully consistent with the narrative that both policies amplify the effect on credit provision (Altavilla et al. 2020, Imbierowicz et al. 2021). We also find that the tightening of monetary policy, irrespective of the direction in the change of MaPP, always leads to a contraction in bank lending, providing evidence for the existence of a strong bank lending channel of monetary policy.

Moving to nonbanks (last four rows display the interaction coefficients), we can rationalize the negative coefficient we have found previously in Table 3 as also being driven mainly by the combination of loosenings of both MP and MaPP: nonbanks reduce credit supply relative to banks when both policies loosen. Moreover, the expansion of nonbank credit relative to banks only materializes when MP tightens, irrespective of the direction in which policymakers adjust MaPP policy. This suggests that a tightening in MP is the necessary driver of higher credit intermediation by nonbanks, in line with the theory of the deposit channel of monetary policy (Drechsler et al. 2017).[16] At the same time, tightening MaPP may not necessarily shift lending to nonbanks if accompanied by a loosening in MP.

Our results are not driven by a few observations in each of the monetary-macroprudential policy combinations, as we have a roughly balanced number of observations in each bucket (Table

[16]The stronger quantitative effect of $MP^{+} \times MaPP^{-}$ compared to $MP^{+} \times MaPP^{+}$ seems to be related to a stronger tightening in MP in our sample when it coincides with a MaPP loosening. In these cases, we conjecture that MaPP may be acting as a counterbalance to cushion some of the strong MP effects on the real economy.

A.4 and Figure A.5 in Appendix A). Our results are also robust to estimating the asymmetric effects for large country lenders, namely the United States, United Kingdom, Japan, and the euro area (Table B.5 in Appendix B).

Table 4: Asymmetric effect of monetary and macroprudential policy shocks on new loans

	(1)	(2)	(3)
MP$^+$ Shock × MaPP$^+$ Shock	-0.005	-0.008**	-0.011***
	(0.004)	(0.003)	(0.003)
MP$^+$ Shock × MaPP$^-$ Shock	-0.048***	-0.043***	-0.034***
	(0.007)	(0.006)	(0.005)
MP$^-$ Shock × MaPP$^+$ Shock	-0.001	-0.000	-0.002
	(0.004)	(0.004)	(0.003)
MP$^-$ Shock × MaPP$^-$ Shock	0.048***	0.047***	0.039***
	(0.006)	(0.005)	(0.004)
MP$^+$ Shock × MaPP$^+$ Shock × Nonbank	0.008*	0.009**	0.006*
	(0.005)	(0.004)	(0.003)
MP$^+$ Shock × MaPP$^-$ Shock × Nonbank	0.094***	0.100***	0.089***
	(0.009)	(0.008)	(0.007)
MP$^-$ Shock × MaPP$^+$ Shock × Nonbank	-0.009	-0.005	0.005
	(0.007)	(0.006)	(0.005)
MP$^-$ Shock × MaPP$^-$ Shock × Nonbank	-0.088***	-0.087***	-0.082***
	(0.009)	(0.008)	(0.006)
Firm FE	✓	✓	
Lender FE	✓	✓	✓
Country × Sector × Time FE	✓		
ILST FE		✓	
Firm × Time FE			✓
Observations	758,164	756,977	748,188
R^2	0.725	0.793	0.876

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 so far, we can place our contribution along three dimensions. First, we show that the differential increase in credit supply from nonbanks during contractionary MP shocks found for US and Danish lenders (Elliott et al. 2022, 2024, Cucic and Gorea 2024) holds for a large sample of 22 countries. This suggests that the behavior of nonbanks during contractionary MP shocks is a feature of nonbanks' business model, irrespective of the jurisdiction. Second, we find that the expansion of nonbank lending is not restricted to periods of MP shocks, but also to periods when MaPP tightens. This novel results suggests that shocks that may directly affect banks' ability to lend have the unintended effect of shifting credit to the nonbanking sector. Third, our results suggest that the expansion of credit by nonbanks relative to banks operates only when MP tightens, irrespective of MaPP loosening or tightening. This finding 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 it alleviates firms' credit constraints during economic downturns, resulting in higher credit supply and at more favorable terms, 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 some lenders, especially 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 2024).

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 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, as illustrated by evidence for the US economy and from US MP spillovers (Elliott et al. 2022, 2024), or for 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 findings on the US and Denmark also hold in our sample of 22 country lenders.

Another important question is on the value of relationship lending during MaPP shocks. We are not aware of research focusing on the role of relationship lending during contractionary

[17] Banks typically charge a higher interest rate to relationship borrowers during normal times, since collecting information is costly for banks (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).

MaPP or regulatory shocks, including of relationship lending with nonbanks. 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 estimate Equation (3), interacting all variables with two measures of relationship lending. Specifically, we create dummy variables based on the firms' borrowing history, identifying firms that have borrowed from a given lender in the past 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 tightening in both MP and MaPP shocks. The estimated effects are economically significant: for instance, column (3), saturated with firm×time fixed effects, shows that firms with a prior lending relationship with banks offset nearly 89 percent of the decline in credit supply following MP tightening (0.034/0.038), and about one-third (0.010/0.032) of the loan contraction 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 coefficient magnitudes. This is consistent with the theoretical framework in Hachem (2011), which posits that relationship lending smooths the credit channel from contractionary MP shocks, as well as the empirical findings of Berger et al. (2024).

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 interaction term between the MP shock, the nonbank dummy, and the pre-relation dummy ranges between 0.029 and 0.044 in columns (1)-(3), suggesting that firms with an existing lending relationship with nonbanks are able to borrow 2.9-4.4 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 those with whom they have an established lending relationship.[18]

The additional protection offered by nonbanks appears to be limited to MP shocks, as the coefficients in the last row are generally not statistically significant. While nonbanks provide

[18]Our results are robust to using an indicator capturing the strength of the lending relationship, i.e., the logarithm of the number of loans over the past five years for a given borrower-lender pair (results not reported).

relatively more credit to all borrowers compared to banks, they do not seem to privilege borrowers with established lending relationship following MaPP shocks. The last two rows in Table B.6 in Appendix B show that 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. However, during MP shocks, borrowers from nonbanks still benefit from lower 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. It is also consistent with the broader literature that lenders typically charge a higher interest rates to relationship borrowers during non-crisis periods (Bolton et al. 2016, Sette and Gobbi 2015, Beck et al. 2018).

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	-0.036***	-0.039***	-0.038***	-0.033***	-0.036***	-0.037***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
MaPP shock	-0.032***	-0.032***	-0.032***	-0.030***	-0.031***	-0.032***
	(0.003)	(0.002)	(0.002)	(0.003)	(0.003)	(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	-0.012**	-0.002	-0.002	-0.003	-0.001	-0.002
	(0.005)	(0.005)	(0.004)	(0.002)	(0.002)	(0.002)
MP shock × Nonbank	0.034***	0.043***	0.034***	0.032***	0.040***	0.032***
	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
MaPP shock × Nonbank	0.019***	0.027***	0.027***	0.018***	0.026***	0.024***
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)
MP shock × Relation	0.031***	0.033***	0.034***	0.009***	0.010***	0.012***
	(0.004)	(0.004)	(0.003)	(0.001)	(0.001)	(0.001)
MaPP shock × Relation	0.010***	0.007**	0.010***	0.003**	0.002	0.003***
	(0.004)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
MP shock × Nonbank × Relation	0.044***	0.031***	0.029***	0.018***	0.014***	0.013***
	(0.006)	(0.005)	(0.005)	(0.002)	(0.002)	(0.002)
MaPP shock × Nonbank × Relation	0.008	0.005	-0.004	0.004*	0.002	0.000
	(0.006)	(0.005)	(0.004)	(0.002)	(0.002)	(0.002)
Firm FE	✓	✓		✓	✓	
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓			✓		
ILST FE		✓			✓	
Firm × Time FE			✓			✓
Observations	758,164	756,977	748,188	758,164	756,977	748,188
R^2	0.726	0.794	0.876	0.726	0.794	0.876

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 given lender over the past five years, and 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. This suggests that nonbanks may be filling an important funding gap created by the reduction in bank credit following contractionary policy shocks. However, as shown in Table B.4 in Appendix B, weaker banks appear to curtail credit more in response to MP shocks. This raises an open question: is the credit retrenched by weaker banks shifting primarily to nonbanks, or is it being absorbed by strongly capitalized banks instead? To address this, we examine whether credit migrates from banks to nonbanks following MP and MaPP policy shocks within syndicates that include weaker banks and whether this reallocation is directed toward riskier firms. Both tests aim to assess potential financial stability risks associated with credit migration—particularly the extent to which risky credit is shifting 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 bank parent. Specifically, we construct a dummy variable that capture 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.[19] To control for firm characteristics, including credit demand, our preferred specification includes ILST fixed effects. This choice is motivated by the fact that Khwaja and Mian (2008) fixed effects are too restrictive at this level of aggregation—using firm-by-quarter fixed effects would require 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 when controlling for firm demand with either ILST fixed effects or firm$\times$quarter fixed effects.

Table 6 shows the results using two proxies for weaker syndicates: the loan-weighted average of the bank capital of all participating banks (columns 1–2) and the banks' NPL ratios

[19] Our results are insensitive to instead employing simple averages of the shocks.

(columns 3–4). We highlight three key findings. First, the nonbank share is typically higher in syndicates with weaker banks, though the association is relatively small (around one percentage-point higher), 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 is more pronounced in loan deals involving weaker banks following MP and MaPP shocks. In our preferred specification (column 2), which controls for ILST fixed effects, the nonbank loan share rises by an additional 1.3 and 2.3 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.

Table 6: Nonbank share and bank characteristics

	(1) Low Capital	(2) Low Capital	(3) High NPL	(4) High NPL
MP shock	0.016**	0.021***	0.016**	0.026***
	(0.006)	(0.007)	(0.007)	(0.008)
MaPP shock	0.008	0.018***	0.010*	0.022***
	(0.005)	(0.006)	(0.005)	(0.006)
Bank charact.	0.006	0.010**	0.020***	0.010**
	(0.004)	(0.005)	(0.004)	(0.004)
MP shock × Bank charact.	0.014**	0.013*	0.016***	-0.002
	(0.006)	(0.007)	(0.006)	(0.007)
MaPP shock × Bank charact.	0.016***	0.024***	0.008	0.013**
	(0.005)	(0.006)	(0.005)	(0.006)
Firm FE	✓	✓	✓	✓
Country × Sector × Time FE	✓		✓	
ILST FE		✓		✓
Observations	47,143	42,030	47,143	42,030
R^2	0.656	0.676	0.656	0.676

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.

Overall, our results indicate that the expansion of nonbank credit supply following contractionary policy shocks stems from credit migration from banks, as nonbanks step in to fill the funding gap from the reduction in bank credit. In addition, we show that credit migration to nonbanks is amplified in syndicates with weaker banks. 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 forthcoming). 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. To do so, we estimate Equation (5), which follows the same structure as our previous specification, but replaces the weak banks dummy with a risky borrowers dummy. Since borrowers' credit risk is typically not directly observable in loan-level datasets, we resort to three 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 resorts to S&P long-term issuer credit ratings, and defines risky borrowers as those that have a 'speculative' rating, i.e., below BBB$^-$. The final proxy takes looks at high-PD borrowers taken from NUS-CRI, computed as firms with a PD in the top quartile of the country-time distribution. The sample is more restricted for the second and third proxies, as the matching between Compustat and Dealogic is imperfect as some firms lack credit ratings or PDs.

We stress two main findings from Table 7. First, nonbanks provide more lending to risky borrowers, regardless of the risky measure used or the approach taken to control for credit demand. This is 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, our results underscore that nonbanks, on average, lend more to risky borrowers than banks. However, we do not observe a shift in the overall composition of nonbanks' lending portfolios toward riskier borrowers.

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 in two ways. 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) Junk rtg.	(4) Junk rtg.	(5) High PD	(6) High PD
MP shock	0.021**	0.017	-0.005	0.006	0.000	0.007
	(0.010)	(0.011)	(0.019)	(0.019)	(0.018)	(0.021)
MaPP shock	0.026***	0.043***	0.054***	0.065***	0.041***	0.049***
	(0.007)	(0.008)	(0.012)	(0.014)	(0.013)	(0.016)
Risky	0.019***	0.019**	-	-	0.013*	0.020**
	(0.007)	(0.008)			(0.007)	(0.009)
MP shock × Risky	-0.021**	-0.017	-0.011	-0.016	0.006	0.019
	(0.009)	(0.011)	(0.013)	(0.014)	(0.012)	(0.014)
MaPP shock × Risky	-0.001	-0.006	-0.016*	-0.016	-0.003	-0.000
	(0.009)	(0.010)	(0.009)	(0.010)	(0.007)	(0.008)
Firm FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓		✓		✓	
ILST FE		✓		✓		✓
Observations	40,098	36,965	15,274	13,806	18,124	16,200
R^2	0.669	0.685	0.688	0.728	0.782	0.817

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; *Junk rtg.* captures borrowers whose S&P rating is 'speculative', i.e., below BBB$^-$; and *High PD* captures high-PD borrowers, referring to firms with a PD in the top quartile of the country-time distribution. Standard errors clustered by firm. Asterisks, *, **, and ***, denote statistical significance at the 10%, 5%, and 1% levels.

5 Assessment of real effects

Having established that nonbanks play a crucial role in mitigating the adverse effects of MP and MaPP shocks on lending, we now extend our analysis to assess whether the growing presence of nonbanks translated 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, specifically 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 two 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, reinforcing 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.

Despite the improvements in investment and employment, we do not find evidence that nonbank relationships reduce borrowers' riskiness following contractionary shocks. If anything, the probability of default appears to increase for these firms, although our point estimates are subject to large standard errors. Additionally, we find that nonbank relationships help firms maintain higher liquid assets and intangible investment, though these effects are statistically significant only in response to MaPP shocks. While previous literature has documented the role of nonbanks in mitigating the contractionary effects of MP shocks in the U.S. and Denmark (Elliott et al. 2022, Cucic and Gorea 2024), our findings extend this evidence by demonstrating that nonbanks play a role in cushioning firms from the real effects of MaPP shocks, alongside MP shocks.

These 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 carry higher debt burdens and lower liquid assets, which signal financial distress (Albuquerque 2024). Greater financial distress is reinforced by a higher probability of default, 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	0.067*	0.019	0.010	0.054**	-0.007	0.021
	(0.039)	(0.044)	(0.023)	(0.024)	(0.023)	(0.058)
MaPP shock	-0.071**	-0.103***	-0.083***	-0.064***	-0.061***	0.033
	(0.033)	(0.038)	(0.020)	(0.023)	(0.019)	(0.047)
NB relation	0.141***	-0.028	0.076***	0.026**	0.051***	0.075***
	(0.019)	(0.023)	(0.011)	(0.012)	(0.009)	(0.023)
MP shock × NB relation	0.001	-0.000	0.058***	-0.004	0.051***	0.039
	(0.030)	(0.034)	(0.017)	(0.019)	(0.014)	(0.036)
MaPP shock × NB relation	0.017	0.081**	0.034**	0.049***	0.022*	0.029
	(0.026)	(0.033)	(0.014)	(0.019)	(0.011)	(0.025)
Firm FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓	✓	✓	✓	✓	✓
Observations	24,162	17,199	24,727	14,609	23,225	19,557
R^2	0.916	0.897	0.974	0.963	0.982	0.607

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.

6 Further considerations: bank lending to nonbanks

Throughout the paper, we have shown consistent evidence that nonbanks expand lending to nonfinancial 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 closely related to the deposits channel of monetary policy, discussed earlier. When the policy rate rises, the spread between the policy rate and the deposit rate widens, exacerbating funding frictions and leading to deposit outflows from banks, which constrains their 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 forthcoming). 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:

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

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. In our preferred specification with Khwaja and Mian (2008) fixed effects (column 4), we estimate that banks provide differentially 1.3 percent more loans to nonbanks following a one-standard deviation shock to MaPP. 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.

Table 9: Bank lending to nonbanks and nonfinancial corporates

	(1)	(2)	(3)	(4)
MP shock	-0.000	-0.001	-0.001	0.014***
	(0.003)	(0.003)	(0.003)	(0.005)
MaPP shock	-0.022***	-0.021***	-0.020***	0.002
	(0.003)	(0.002)	(0.002)	(0.004)
MP shock × NB borrower	-0.012	-0.011	-0.008	-0.001
	(0.008)	(0.007)	(0.006)	(0.016)
MaPP shock × NB borrower	0.021***	0.017***	0.013**	-0.011
	(0.007)	(0.006)	(0.006)	(0.011)
MP shock × LC bank				-0.017***
				(0.005)
MaPP shock × LC bank				-0.019***
				(0.004)
MP shock × NB borrower × LC bank				0.012
				(0.013)
MaPP shock × NB borrower × LC bank				0.024*
				(0.012)
Firm FE	✓	✓		
Bank FE	✓	✓	✓	
Bank parent FE				✓
Bank controls				✓
Country × Sector × Time FE	✓			
ILST FE		✓		
Firm × Time FE			✓	✓
Observations	554,718	552,993	540,137	220,690
R^2	0.755	0.813	0.888	0.876

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.

Interestingly, we do not find that banks reallocate more lending to nonbanks following contractionary MP shocks. This result suggests that banks cut credit supply across the board, presumably as deposit outflows during MP shocks constrain banks' ability to lend, including to nonbank borrowers.

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. 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

Funding models of nonbanks

Throughout our analysis, we have considered nonbanks as a single group; however, we acknowledge that nonbanks vary along several characteristics, particularly in their funding structures. Following Irani et al. (2021), we create two groups based on the stability or instability 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, 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.[20]

Table B.7 indicates 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

[20]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.

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 our sample of nonbanks is skewed towards institutions with unstable funding structures.

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

We test the sensitivity of our results by: (i) term loans versus credit lines;[21] (ii) estimating the missing loan shares with a regression-based approach (De Haas and Van Horen 2013);[22] (iii) looking at the extensive margin of lending;[23] and (iv) by excluding the top three nonbanks.[24]

Table B.8 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, namely limits to credit growth, loan loss provisions, loan restrictions, limits to the loan-to-deposit ratio, and limits to FX loans. This selection is 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.9 we test the robustness of our results by augmenting our MaPP shocks with

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

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

[23] Given the nature of our data—syndicated loans in the primary market—our paper has essentially analyzed the intensive margin of lending. To analyze the extensive margin, 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.

[24] The top three nonbanks refer to JP Morgan Securities LLC, BofA Securities, and Citigroup Global Markets Inc. On average, these nonbanks account for around 10% of syndicated lending by nonbanks over our estimation period 2000-19.

additional MaPP tools. Column (2) expands the baseline MaPP set by including loan-to-value (LTV) and debt-service-to-income (DSTI) ratios, which primarily affect the household sector. Column (3) incorporates reserve requirements, 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, in line with the notion that these measures tend not to be effective to curb credit growth in the short run, producing effects more over longer horizons (Gambacorta and Murcia 2020).

We run additional sensitivity checks by: lagging MP and MaPP shocks by two, three, and four quarters (columns 2-4); controlling for additional lags of the MaPP shocks, including 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 B.10 shows that our results remain strongly robust to all these sensitivity checks.

Additional robustness checks

We run further robustness checks exploring the following: (i) pre-GFC versus post-GFC periods, with pre-GFC defined until 2007Q4, and post-GFC starting in 2010Q1; (ii) USD-denominated loans vs non-USD loans, to investigate whether the currency denomination of the loan drives our results, particularly whether the appreciation of the local currency against the US dollar caused by tighter domestic monetary policy may lead to an increase in cross-border USD lending as lenders take advantage of lower interest rate differentials with the US dollar (Bruno and Shin 2015, Avdjiev et al. 2018); (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 mainly driven by the post-GFC period, especially for MaPP shocks, consistent with the notion that the regulatory initiatives to curb excessive risk taking by banks intensified after the GFC, which may have favored the expansion of nonbanks (column 3 in Table B.11). Columns (5) and (6) 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 checks examine 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 B.12 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 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). 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.

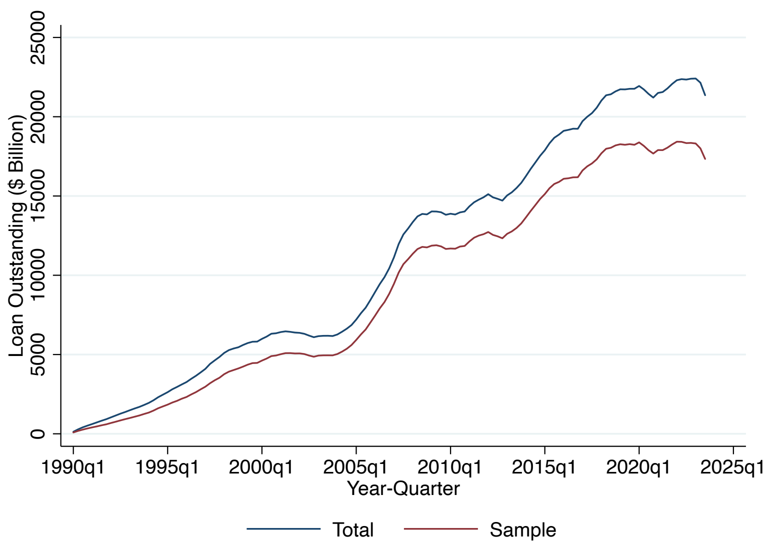
Appendix A: Data

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.

Figure A.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 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

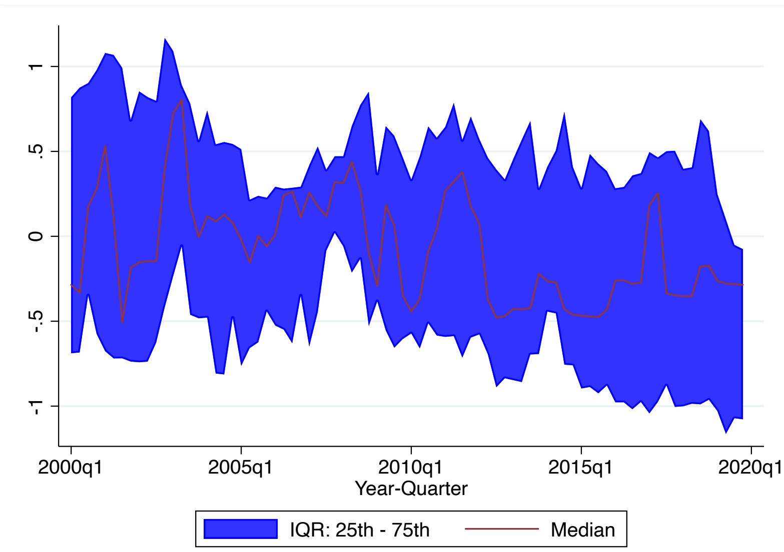
Notes: This table provides summary statistics of loan-level characteristics in our estimation sample. We restrict borrowers to non-financial firms based on their SIC code classification.

Table A.3: 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

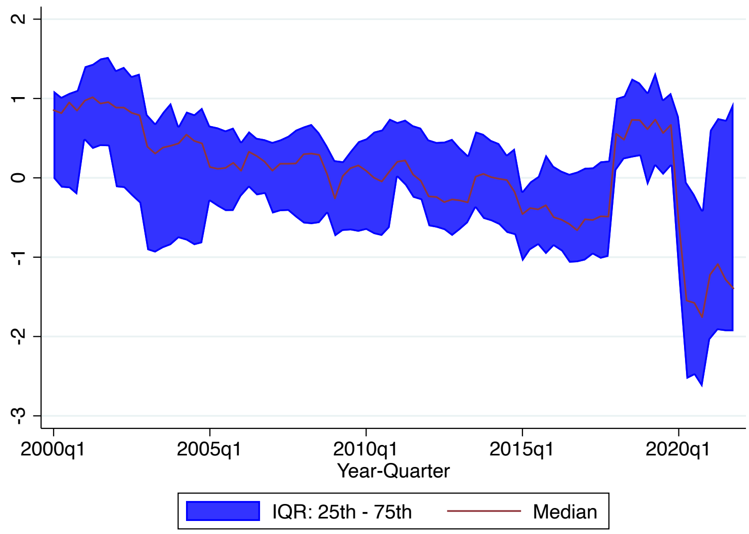
Notes: CBFD refers to Central Bank Forecasts Deviations.

Figure A.2: Monetary policy shocks over time



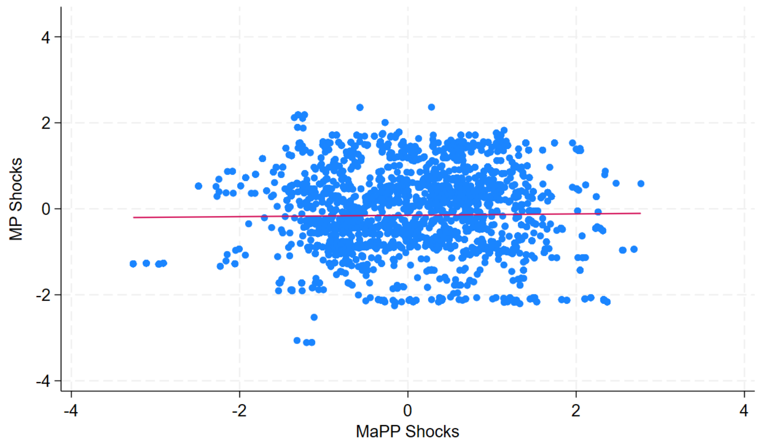
Notes: Red line is the median sample values of the MP shocks, and the blue area indicates the interquartile range.

Figure A.3: 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.4: Correlation of MP and MaPP shocks



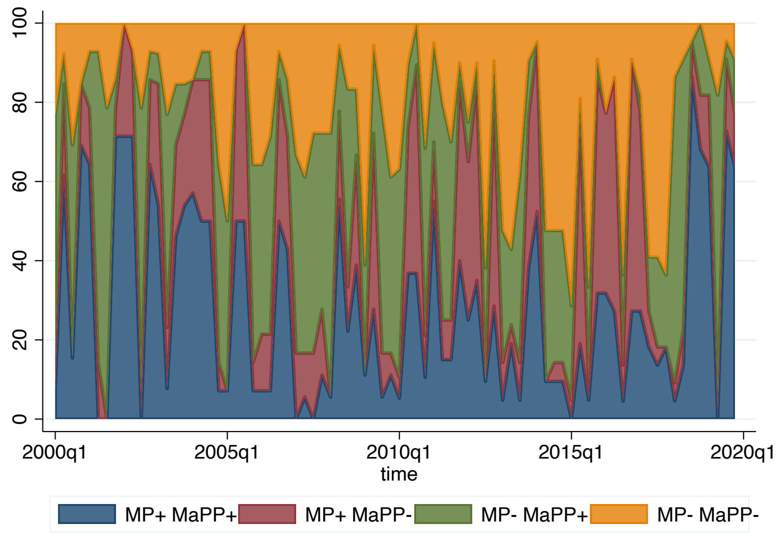
Notes: Red line is the linear regression line between the two series (correlation of 0.0485).

Table A.4: Distribution of sample across shocks combination

Shock	Observations
$MP^{+} \times MaPP^{+}$	222,674
$MP^{+} \times MaPP^{-}$	141,767
$MP^{-} \times MaPP^{+}$	223,030
$MP^{-} \times MaPP^{-}$	160,717
Total	748,188

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

Figure A.5: MP-MaPP shocks combination over time



Appendix B: Tables

Table B.1: Asymmetric effects of monetary policy shocks

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Loans	(6) Spread
MP^{+} Shock	-0.089***	-0.109***	-0.025***	-0.027***	-0.026***	0.172
	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.110)
MP^{-} Shock	0.066***	0.079***	0.020***	0.024***	0.020***	-0.236**
	(0.005)	(0.005)	(0.004)	(0.003)	(0.003)	(0.103)
MP^{+} Shock × Nonbank		0.067***	0.055***	0.059***	0.048***	-0.440**
		(0.005)	(0.005)	(0.004)	(0.004)	(0.187)
MP^{-} Shock × Nonbank		-0.045***	-0.058***	-0.059***	-0.049***	0.559***
		(0.005)	(0.005)	(0.004)	(0.004)	(0.184)
Firm FE	✓	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓			
ILST FE				✓		
Firm × Time FE					✓	✓
Observations	765,143	760,089	758,164	756,977	748,188	391,970
R^2	0.687	0.685	0.725	0.793	0.876	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 B.2: Asymmetric effects of macroprudential policy shocks

	(1) Loans	(2) Loans	(3) Loans	(4) Loans	(5) Loans	(6) Spread
MaPP^{+} Shock	-0.117***	-0.157***	-0.032***	-0.032***	-0.031***	0.304***
	(0.006)	(0.007)	(0.004)	(0.004)	(0.003)	(0.111)
MaPP^{-} Shock	-0.028***	-0.049***	0.022***	0.027***	0.026***	0.109
	(0.008)	(0.009)	(0.006)	(0.005)	(0.004)	(0.166)
MaPP^{+} Shock × Nonbank		0.125***	0.035***	0.039***	0.035***	0.040
		(0.008)	(0.006)	(0.006)	(0.005)	(0.201)
MaPP^{-} Shock × Nonbank		0.066***	-0.031***	-0.035***	-0.028***	0.489
		(0.010)	(0.008)	(0.007)	(0.006)	(0.328)
Firm FE	✓	✓	✓	✓		
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE			✓			
ILST FE				✓		
Firm × Time FE					✓	✓
Observations	765,143	760,089	758,164	756,977	748,188	391,970
R^2	0.687	0.685	0.725	0.793	0.876	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 B.3: Robustness checks: major country lenders

	Baseline	US	UK	JP	EA	US+UK+JP+EA
MP shock	-0.022***	-	-	-	-0.335	-0.021***
	(0.002)				(0.360)	(0.003)
MaPP shock	-0.028***	-	-	-	-0.015***	-0.028***
	(0.002)				(0.004)	(0.002)
MP shock × Nonbank	0.046***	0.076***	0.088***	-0.093*	0.042***	0.060***
	(0.003)	(0.010)	(0.020)	(0.056)	(0.004)	(0.003)
MaPP shock × Nonbank	0.028***	0.098***	0.020*	0.055***	0.025***	0.055***
	(0.003)	(0.008)	(0.010)	(0.012)	(0.005)	(0.003)
Lender FE	✓	✓	✓	✓	✓	✓
Firm × Time	✓	✓	✓	✓	✓	✓
Observations	748,188	290,777	38,185	128,527	161,797	675,770
R^2	0.876	0.841	0.820	0.914	0.867	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 Japanese 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 B.4: The role of bank characteristics

	(1) Low capital	(2) Low capital	(3) Low capital	(4) High NPL	(5) High NPL	(6) High NPL
MP shock	0.002	0.004	-0.008**	-0.001	-0.001	-0.012***
	(0.005)	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)
MaPP shock	-0.025***	-0.024***	-0.021***	-0.026***	-0.025***	-0.023***
	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Bank charact.	-0.004	-0.004	0.000	-0.012**	-0.014***	-0.023***
	(0.004)	(0.004)	(0.003)	(0.005)	(0.005)	(0.004)
MP shock × Bank charact.	-0.018***	-0.022***	-0.014***	-0.010**	-0.009**	-0.000
	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
MaPP shock × Bank charact.	0.004	0.001	0.002	0.006	0.002	0.005
	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
MP shock × Nonbank	0.046***	0.049***	0.058***	0.049***	0.052***	0.057***
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)
MaPP shock × Nonbank	0.029***	0.031***	0.029***	0.030***	0.035***	0.031***
	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.004)
Firm FE	✓	✓		✓	✓	
Lender parent FE	✓	✓	✓	✓	✓	✓
Lender controls	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓			✓		
ILST FE		✓			✓	
Firm × Time FE			✓			✓
Observations	305,502	303,559	281,829	305,513	303,572	281,842
R^2	0.715	0.788	0.870	0.715	0.788	0.870

Notes: Dependent variable is the log of new syndicated loans. *Bank charact.* in columns (1)-(3) refers to a dummy variable taking the value of one for low-capitalized banks (Tier 1 capital ratios in the first quartile of the country-time distribution), and in columns (4)-(6) it refers to a dummy variable taking the value of one for high-NPL banks (NPL in the top quartile of the country-time distribution). 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.

Table B.5: Asymmetric effects: major country lenders

	Baseline	US	UK	JP	EA	US/UK/JP/EA
MP^+ Shock × $MaPP^+$ Shock	-0.011***	-	-	-	0.002	-0.007**
	(0.003)				(0.005)	(0.003)
MP^+ Shock × $MaPP^-$ Shock	-0.034***	-	-	-	0.026**	-0.032***
	(0.005)				(0.011)	(0.006)
MP^- Shock × $MaPP^+$ Shock	-0.002	-	-	-	0.003	-0.006*
	(0.003)				(0.006)	(0.003)
MP^- Shock × $MaPP^-$ Shock	0.039***	-	-	-	-0.021**	0.038***
	(0.004)				(0.010)	(0.005)
MP^+ Shock × $MaPP^+$ Shock × Nonbank	0.006*	0.110***	-0.052**	-0.090*	0.011***	0.019***
	(0.003)	(0.021)	(0.024)	(0.054)	(0.004)	(0.004)
MP^+ Shock × $MaPP^-$ Shock × Nonbank	0.089***	0.188***	0.092***	0.187***	0.091***	0.103***
	(0.007)	(0.014)	(0.028)	(0.062)	(0.013)	(0.008)
MP^- Shock × $MaPP^+$ Shock × Nonbank	0.005	-0.027	-0.001	0.147**	-0.026***	-0.010*
	(0.005)	(0.017)	(0.019)	(0.062)	(0.007)	(0.006)
MP^- Shock × $MaPP^-$ Shock × Nonbank	-0.082***	-0.194***	-0.084***	-0.103	-0.067***	-0.099***
	(0.006)	(0.014)	(0.023)	(0.065)	(0.009)	(0.007)
Lender FE	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓
Observations	748,188	290,777	38,185	128,527	161,797	675,770
R^2	0.876	0.841	0.820	0.914	0.867	0.880

Notes: Dependent variable is the log of new syndicated loans. Column (1) refers to the baseline specification in Table 4, column (2) includes only US lenders, column (3) only UK lenders, column (4) only Japanese 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 B.6: Relationship lending and margin spread

	(1) Pre-relation	(2) Pre-relation	(3) Pre-relation	(4) Duration	(5) Duration	(6) Duration
MP shock	0.208	0.127	0.248**	0.186	0.170	0.201*
	(0.353)	(0.319)	(0.106)	(0.350)	(0.316)	(0.105)
MaPP shock	0.100	-0.014	0.176**	0.113	-0.013	0.122
	(0.298)	(0.267)	(0.080)	(0.293)	(0.261)	(0.080)
Relation	-1.267**	-1.208**	-0.078	-0.924***	-0.895***	-0.026
	(0.517)	(0.480)	(0.114)	(0.202)	(0.181)	(0.037)
Relation × Nonbank	-2.075***	-1.856***	-0.325**	-0.741***	-0.622***	-0.083
	(0.527)	(0.480)	(0.141)	(0.201)	(0.181)	(0.051)
MP shock × Nonbank	-2.659***	-2.389***	-0.716***	-3.015***	-2.845***	-0.660***
	(0.588)	(0.527)	(0.178)	(0.601)	(0.543)	(0.181)
MaPP shock × Nonbank	1.426***	1.396***	-0.426**	1.797***	1.761***	-0.313*
	(0.535)	(0.495)	(0.194)	(0.538)	(0.495)	(0.190)
MP shock × Relation	-0.697	-0.429	-0.096	-0.214	-0.177	0.002
	(0.505)	(0.461)	(0.112)	(0.180)	(0.161)	(0.036)
MaPP shock × Relation	0.029	0.048	-0.112	0.023	0.037	0.001
	(0.380)	(0.346)	(0.094)	(0.131)	(0.121)	(0.031)
MP shock × Nonbank × Relation	1.583**	0.973	0.483**	0.716***	0.604***	0.124**
	(0.672)	(0.609)	(0.190)	(0.252)	(0.227)	(0.062)
MaPP shock × Nonbank × Relation	0.521	0.681	0.611***	-0.252	-0.184	0.128*
	(0.657)	(0.608)	(0.203)	(0.231)	(0.212)	(0.066)
Firm FE	✓	✓		✓	✓	
Lender FE	✓	✓	✓	✓	✓	✓
Country × Sector × Time FE	✓			✓		
ILST FE		✓			✓	
Firm × Time FE			✓			✓
Observations	394,480	394,325	391,970	394,480	394,325	391,970
R^2	0.839	0.855	0.988	0.839	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 given lender over the past five years, and 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 B.7: Funding models of nonbanks

	(1)	(2)	(3)
MP shock	-0.022***	-0.025***	-0.022***
	(0.003)	(0.003)	(0.002)
MaPP shock	-0.027***	-0.029***	-0.028***
	(0.002)	(0.002)	(0.002)
MP shock × Stable nonbanks	-0.134***	-0.113***	-0.094***
	(0.026)	(0.024)	(0.018)
MP shock × Unstable nonbanks	0.056***	0.058***	0.048***
	(0.004)	(0.004)	(0.003)
MaPP shock × Stable nonbanks	-0.038**	-0.031*	-0.012
	(0.019)	(0.017)	(0.014)
MaPP shock × Unstable nonbanks	0.030***	0.033***	0.029***
	(0.004)	(0.003)	(0.003)
Firm FE	✓	✓	
Lender FE	✓	✓	✓
Country × Sector × Time FE	✓		
ILST FE		✓	
Firm × Time FE			✓
Observations	758,164	756,977	748,188
R^2	0.725	0.794	0.876

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.8: 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	-0.022***	-0.021***	-0.024***	-0.023***	-0.008***	-0.017***
	(0.002)	(0.003)	(0.002)	(0.003)	(0.001)	(0.002)
MaPP shock	-0.028***	-0.033***	-0.028***	-0.032***	-0.011***	-0.027***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)
MP shock × Nonbank	0.046***	0.031***	0.056***	0.070***	0.016***	0.024***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.002)	(0.003)
MaPP shock × Nonbank	0.028***	0.023***	0.031***	0.049***	0.011***	0.002
	(0.003)	(0.004)	(0.003)	(0.004)	(0.001)	(0.003)
Lender FE	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓
Observations	748,188	352,410	529,213	748,188	2,034,478	697,942
R^2	0.876	0.898	0.896	0.817	0.933	0.878

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.9: Alternative MaPP shocks

	(1)	(2)	(3)	(4)
MP shock	-0.022***	-0.020***	-0.018***	-0.022***
	(0.002)	(0.002)	(0.002)	(0.002)
MaPP shock	-0.028***	-0.021***	-0.028***	-0.014***
	(0.002)	(0.002)	(0.002)	(0.002)
MP shock × Nonbank	0.046***	0.045***	0.043***	0.047***
	(0.003)	(0.003)	(0.003)	(0.003)
MaPP shock × Nonbank	0.028***	0.016***	0.025***	0.010***
	(0.003)	(0.003)	(0.003)	(0.002)
Lender FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	748,188	748,188	748,188	748,188
R^2	0.876	0.876	0.876	0.876

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

Table B.10: 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	-0.022***	-0.021***	-0.022***	-0.023***	-0.022***	-0.018***	-0.021***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
MaPP shock	-0.028***	-0.027***	-0.028***	-0.029***	-0.026***	-0.030***	-0.024***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)
MP shock × Nonbank	0.046***	0.049***	0.053***	0.050***	0.046***	0.037***	0.044***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
MaPP shock × Nonbank	0.028***	0.026***	0.026***	0.026***	0.028***	0.032***	0.022***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.006)	(0.002)	(0.002)
Lender FE	✓	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓	✓
Observations	748,188	739,721	731,660	724,539	724,539	748,188	748,188
R^2	0.876	0.877	0.878	0.879	0.878	0.876	0.876

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 B.11: 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	-0.022***	-0.006	-0.008***	-0.026***	-0.017***	-0.020***	-	-0.023***	-0.018***
	(0.002)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)		(0.002)	(0.007)
MaPP shock	-0.028***	-0.000	-0.019***	-0.026***	-0.028***	-0.018***	-	-0.028***	-0.021***
	(0.002)	(0.005)	(0.003)	(0.002)	(0.003)	(0.002)		(0.002)	(0.006)
MP shock × Nonbank	0.046***	0.014	0.009**	0.056***	0.024***	0.031***	0.069***	0.047***	0.039***
	(0.003)	(0.009)	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)	(0.003)	(0.010)
MaPP shock × Nonbank	0.028***	0.012	0.017***	0.039***	0.003	0.019***	0.034***	0.026***	0.056***
	(0.003)	(0.012)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)	(0.003)	(0.010)
Lender FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE × Time	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	748,188	284,509	403,927	454,180	308,004	239,715	480,495	704,628	42,938
R^2	0.876	0.852	0.893	0.830	0.908	0.836	0.891	0.879	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.

Table B.12: Alternative clustering methods

	(1)	(2)	(3)	(4)
MP shock	-0.022***	-0.022***	-0.022***	-0.022***
	(0.002)	(0.003)	(0.008)	(0.008)
MaPP shock	-0.028***	-0.028***	-0.028***	-0.028***
	(0.002)	(0.003)	(0.007)	(0.007)
MP shock × Nonbank	0.046***	0.046***	0.046**	0.046**
	(0.003)	(0.005)	(0.019)	(0.019)
MaPP shock × Nonbank	0.028***	0.028***	0.028*	0.028*
	(0.003)	(0.005)	(0.017)	(0.017)
Lender FE	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓
Observations	748,188	748,188	748,188	748,188
R^2	0.876	0.876	0.876	0.876

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.

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