

Foreign Banks and International Transmission of Monetary Policy: Evidence from the Syndicated Loan Market¹

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Abstract: This paper uses loan-level data from 124 countries over 1995–2015 to examine the transmission of monetary policy through the cross-border syndicated loan market. An expansion of monetary policy increases cross-border credit supply especially to weaker firms. However, greater foreign bank presence in the borrower country appears to reduce the potentially destabilizing impact of lower policy interest rates on cross-border lending volume. The mitigating effect of foreign banking presence on the transmission of monetary policy is robust to controlling for borrower-country economic and financial development, and a range of borrower and lender country policies and institutions, including the strength of bank regulation and supervision, exchange rate flexibility, and restrictions on capital flows. These findings qualify the characterization of international banks as sources of credit instability, and suggest that foreign bank entry can improve the stability of cross-border credit in the face of international monetary policy shocks.

Keywords: Cross-border lending; Monetary transmission; Banking FDI; Bank regulation; Capital controls

JEL classification: E44; E52; F34; F38; F42; G15; G20

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1. Introduction

International banks operate in foreign countries through local affiliates and cross-border lending. They offer opportunities to promote economic development as they bring in capital, liquidity, expertise, and new technologies, which can promote greater competition and improved resource allocation. International banks also have a risk sharing role which implies that they help host countries stabilize their credit supply during a local downturn and that they shift resources back to the home country when conditions there worsen. This risk sharing role can also expose host countries to greater volatility from time to time, and in the aftermath of the financial crisis, academics and policy makers have voiced concerns that monetary policies pursued by lending countries can have negative spillovers on emerging markets' financial stability (Rey, 2013; Rajan, 2014; Fischer, 2014).

Consistent with these arguments, recent studies find significant evidence of international transmission of monetary policy through its effect on the supply of cross-border loans. Using a VAR framework, Bruno and Shin (2015a) estimate that a contractionary shock to US monetary policy leads to a decrease in cross-border bank lending, as international banks reduce their leverage. Micro studies provide additional evidence on how international monetary policy shocks affect bank lending to borrowers in particular countries. Morais, Peydró and Ruiz (2015), for instance, investigate the impact of monetary policy in three financial centers (the US, the UK, and the Eurozone) on the provision of credit by subsidiaries of banks from these centers to corporations in Mexico, finding a positive supply effect of a lower monetary policy interest rate, especially towards riskier borrowers.

The impact of monetary policy on the international supply of bank credit, however, is likely to differ not only across borrowers with different risk profiles, but also across different borrower and lender countries, depending on their level of economic and financial development and on a range of economic policies and institutions. The transmission of

monetary policy, for instance, is potentially affected by the foreign bank penetration in the borrower country (c.f. De Haas and Van Lelyveld, 2006; Claessens and Van Horen, 2012; Ongena et al., 2015), the quality of bank supervision and regulation in borrower and lender countries (Ongena et al., 2013), the exchange rate system of the borrower country, and also the existence of restrictions on capital inflows into the borrower country (Rey, 2016).

In this paper, we investigate the role of foreign banks in the international transmission of monetary policy through the cross-border syndicated loan market using loan level data in 124 countries over the 1995-2015 period. Use of loan level data for multiple lender and borrower countries has two main advantages. First, including borrower*time fixed effects allows us to control for time-varying loan demand at the individual borrower level. Second, examining multiple countries allows us to investigate the impact of varying borrower and lender country policies and institutions on the transmission of lender-country monetary policy. Identification of an effect of monetary policy on loan supply volume is achieved by considering variation in the monetary policies relevant for banks in different countries that lend to the same firm in the same time period.

Our main finding is that the transmission of lender-country monetary policy through the cross-border syndicated loan market depends importantly on the existence of banking FDI in the borrowing country. Specifically, greater foreign banking presence reduces the sensitivity of the international loan supply to lender-country policy interest rates. This may to some extent reflect that an international bank with a local presence in the borrower country can substitute local funding for more expensive international funding if the lender-country monetary policy interest rate rises. Consistent with this, we find that the mitigating impact of banking FDI on the international transmission of monetary policy to loan volume is weaker if the borrower-country policy interest rate is higher, since this reduces the ability of a multinational bank to substitute borrower-country funding for lender-country funding. Our

findings are robust to controlling for a range of country-level institutional and policy variables, such as the strength of bank regulation and supervision, exchange rate flexibility and restrictions on capital flows.

Our main contribution in this paper is to investigate the role of the structure of the international banking market in the international transmission of monetary policy. The literature on the effect of monetary policy on cross-border lending builds on several papers investigating the bank lending channel domestically. Bank balance sheet strength (Jiménez et al., 2012a; Jiménez et al., 2014b; Gambacorta, 2005) and bank risk (Altunbas et al., 2010) have been shown to affect the impact of monetary policy on bank credit supply. Further, low monetary policy rates induce risk taking (e.g. Jiménez et al., 2014a; Ioannidou et al. 2015), and there is evidence of a portfolio rebalancing channel as well (den Haan et al., 2007).

The paper most closely related to ours is Cerutti, Claessens and Ratnovski (2014), who study drivers of cross-border bank flows using aggregate, bilateral credit flow data published by the BIS. They find that these flows are largely driven by global factors (e.g. VIX volatility and the slope of the US yield curve). These authors also find that the transmission of monetary policy to cross-border credit is affected by certain borrowing country policies, such as exchange rate flexibility, capital controls and bank regulation. Unlike Cerutti et al. (2014), we use granular data on syndicated loans, which enables us to control for credit demand at the borrower firm level so that our findings are more likely to reflect supply side conditions. In addition, our focus is on the role of foreign bank presence in the international transmission of monetary policy.

Our paper is related to the literature showing how banks reduce cross-border lending in response to non-policy funding shocks at home. Peek and Rosengren (1997), in particular, exploit the Japanese stock market crash in the 1990s, while various other papers look at the effect of the global financial crisis on cross-border lending (Aiyar, 2012; Cetorelli and

Goldberg 2011; Cetorelli and Goldberg, 2012b; Gambacorta and Marques-Ibanez, 2011; Giannetti and Laeven, 2012a,b; de Haas and van Horen, 2011; de Haas and van Horen, 2013; Ivashina et al., 2015).

Several studies show a potentially destabilizing role for international banks, as monetary policy changes in their countries of residence are transmitted as international credit supply shocks to borrowing countries. Miranda-Agrippino and Rey (2015), for instance, find evidence of a “global financial cycle”, showing that cross-border credit flows are to a large extent driven by US monetary policy. Several additional papers (Kim, 2001; Bruno and Shin, 2015a; Temesvary et al., 2015) also find that cross-border lending increases when US monetary policy eases. Furthermore, Cetorelli and Goldberg (2012a) show that US global banks actively reallocate capital from their foreign affiliates to their headquarters when US monetary policy tightens.

Consistent with a destabilizing role for international banks, Bertay, Demirguc-Kunt and Huizinga (2015) find that lending by foreign-owned banks in a country tends to be relatively procyclical compared to domestic banks. Our paper importantly qualifies the picture that emerges of international banks as sources of credit instability, since we find that foreign banking presence in the form of banking FDI reduces the sensitivity of cross-border loan supply to lender-country monetary policy. Cross-border credit is an important source of funding for many countries, and for these countries additional banking FDI may well serve to stabilize the overall supply of credit.

In the remainder, section 2 discusses the data and the methodology. Section 3 presents empirical evidence on the role of foreign bank presence in the international transmission of monetary policy through the cross-border syndicated loan market. Section 4 concludes.

2. Data and methodology

2.1 Data

Our cross-border lending data come from the Loan Pricing Corporation's (LPC) Dealscan database, which contains detailed data on syndicated loans originated all around the world. The database contains information on individual loan volume, pricing, as well as other loan terms and conditions. Our data set comprises lenders in 50 countries, and borrowing non-financial firms in 124 countries over the 1995-2015 period. Table A1 in the appendix shows the number of lenders and loans by lender country, while the number of borrowers and loans by borrower country is shown in Table A2.

A feature of the data is that loans are organized by packages and facilities. A package is a loan agreement signed by a borrower and one or more lenders, and each of them may contain one or more facilities. The basic level of observation in Dealscan is a facility. A further characteristic of syndicated loans is that lenders may assume different roles in a deal. Most importantly, lead arrangers are responsible for negotiating the terms with borrowers, and they are also responsible for monitoring borrowers. Several papers provide extensive information about the syndicated loan market as well as LPC's Dealscan, see e.g. Chava and Roberts (2008).

The main variable of interest is Volume, which is the natural logarithm of the dollar amount of a bank's share in syndicated lending aggregated at the borrower-lender-time level (see Table A3 in the appendix for variable descriptions and data sources). The sample includes only non-financial borrowing companies, and the data are monthly from January 1995 to March 2015.² If the information about a bank's share in a loan is missing, the loan is

² We exclude the years before 1995, because Dealscan contains significantly fewer observations in these years.

discarded in constructing the volume variable. Since we focus on cross-border lending, we also exclude observations if the borrower's and lender's country of location coincide.

Following the literature, e.g. de Haas and van Horen (2012), we define the nationality of a bank based on the location of the ultimate parent. Table 1 shows that the average borrower-lender loan volume is US\$55.6 million and ranges between US\$1 million and US\$410 million. As seen in Figure 1, the total volume of cross-border syndicated loans rose rapidly before the crisis, fell back substantially during 2008-2009, and subsequently recovered to pre-crisis levels towards the end of the sample period.

We matched Dealscan with monetary policy rates from the International Financial Statistics (IFS) database of the IMF. Our main dependent variable, IR, is the lender-country central bank policy rate (replaced by the discount rate at which commercial banks can borrow from the central bank against eligible securities in case of a few countries where the central bank policy rate data was missing). Similarly, IR (Borrower) is the borrower-country central bank policy rate or the discount rate. In some specifications we use deviations from an estimated Taylor rule type monetary policy rate for the lender country as an alternative measure of the stance of monetary policy in this country. To calculate this variable, called Taylor residual, we regress the monetary policy rate, IR, on real GDP growth and the inflation rate separately for each country, and then take the errors from these regressions. According to Table 1, the average monetary policy rate, IR, over the whole sample period was 2.48%, while Taylor residuals averaged -0.005. An additional lender-country monetary policy variable is QE, which indicates that a quantitative easing program was in place in a lender country in a given month. This variable reflects that the Fed, the European Central Bank, the Bank of England, and the Bank of Japan implemented various quantitative easing

programs at different points in time (see the appendix for the exact dates³) in efforts to simulate depressed and stagnant economies. CPI and GDP stand for lender-country consumer price inflation and real GDP growth, and are obtained from the IFS.

We also matched Dealscan with Worldscope to obtain data on a borrower's equity-to-assets ratio, named E/A (Borrower).⁴ This variable is calculated as the lagged book value of common equity over total assets. To exclude the impact of outliers, we winsorized E/A (Borrower) (and also Volume) at the 1st and 99th percentiles. After this adjustment, the average borrower equity-to-assets ratio is 0.387.

Several variables capture the relationships that international banks have developed with borrower countries through the ownership of local banks or through the prior provision of syndicated loans. FOB represents the assets of foreign-owned banks located in the borrower country as a share of total banking system assets (this variable is taken from Barth et al., 2013). On average, foreign-owned banks hold 16.5% of banking system assets in borrower countries. Alternatively, FDI is the number of subsidiaries in the borrower country owned by banks in the lender country based on data collected by Claessens and van Horen (2015). The average number of foreign-owned banks in a lender country-borrower country relationship is 1.6. A bank's own experience in the borrowing country is captured by the experience variable, which is the natural logarithm of 1 + the number of loans extended by the relevant lender in the country of the borrower in the three years prior to the loan. In addition, subsidiaries is a dummy variable that equals one if the lender company has at least

³ In the reported regressions we do not distinguish between the different rounds of QE in the United States. The results are robust, however, to specifying the QE to reflect the three periods corresponding to QE1, QE2 and QE3, as follows: December 2008 to March 2010, November 2010 to June 2011, and September 2012 to December 2013.

⁴ We thank Ferreira and Matos (2012) for sharing their link between Dealscan and Worldscope identifiers.

one subsidiary in the borrower country during the sample period and it is zero otherwise. The subsidiaries variable has a mean of 0.7.

Next, we consider a set of bank regulatory variables for the borrower and lender countries (from Barth et al., 2013) as potential determinants of syndicated loan volume. Official supervisory power, Borrower (Lender), measures the extent to which the supervisory authorities in the borrower's (lender's) country have the authority to take specific actions to prevent and correct banking problems. This variable ranges between 0 and 16, with higher values indicating greater power, and has a mean of 11.7 in borrowers' countries and 10.2 in lenders' countries. Overall capital stringency, Borrower (Lender), is a variable that measures whether the capital requirement in the borrower's (lender's) country reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined. This variable is an index ranging between 0 and 7, with higher values indicating greater stringency. Overall capital stringency, Borrower (Lender) has a sample mean of 4.4 (4.3). As a final regulatory variable, Overall restrictions on banking activities, Borrower (Lender) measures the extent to which banks in the borrower's (lender's) country can engage in securities, insurance and real estate activities. This variable ranges between 3 and 12, with higher values indicating more restrictions; the average Overall restrictions on banking activities index is 7.2 for borrower countries, and 6.1 for lender countries.

Additionally, we consider ER flexibility, which is a dummy variable indicating that a borrower's country has a flexible exchange rate regime. In particular, it takes the value of one if a country's exchange rate regime falls in one of the following categories in the database compiled by Ilzetzky, Reinhart and Rogoff (2011): pre-announced crawling band that is wider than or equal to $\pm 2\%$; de facto crawling band that is narrower than or equal to $\pm 5\%$; moving band that is narrower than or equal to $\pm 2\%$ (i.e., allows for both appreciation and

depreciation over time); managed floating; and freely floating. Table 1 shows that 78.5% of borrowers are located in countries with flexible exchange rates. Further, Credit constraints (in), is a dummy variable indicating the presence of restrictions on the inflow of commercial credit in the country of the borrower based on the data from Fernández, Klein, Rebucci, Schindler and Uribe (2015). A share of 14.6% of borrowers face credit constraints on credit inflows into their countries.

In some specifications, we control for proxies of economic and financial development. Among these, GDP per capita is GDP per capita calculated at constant 2005 US dollar prices with a sample mean of USD 31,363; Credit is domestic credit to the private sector by banks as a percentage of GDP with a mean of 81.8%; Domestic credit is domestic credit provided by the financial sector relative to GDP with a mean of 153.1%; Market cap is the market capitalization of listed companies relative to GDP with a mean of 115.9%; and Turnover ratio is the total value of shares traded during the period as a percentage of the average market capitalization for the period with a mean of 119.3%. These variables are from the WDI database.

2.2 Methodology

We estimate the following panel model for an international sample of non-financial borrowers:

$$\text{Volume}_{ijt} = \beta_0 \text{IR}_{jt} + \beta_1 \text{IR}_{jt} \times \text{FOB}_{it} + \beta_2 \text{IR}_{jt} \times \text{Z}_{ijt} + \beta_3 \text{X}_{it} + \beta_4 \text{QE}_{jt} + \gamma_{it} + \delta_j + \varepsilon_{ijt}$$

Volume_{ijt} is the logarithm of the amount of cross-border lending to borrower i by bank j in month t , and IR_{jt} is the monetary policy interest rate in the home country of bank j at time t . We expect to find $\beta_0 < 0$, indicating a negative transmission of lender-country monetary policy interest rates to cross-border loan supply.

To gauge how foreign bank presence affects monetary transmission, we include the interaction term $IR_{jt} \times FOB_{it}$ where FOB_{it} is foreign bank ownership in the country of borrower i at time t (alternatively, foreign bank presence is represented by the FDI variable). A positive estimate of β_1 suggests that foreign bank presence mitigates the impact of lender-country monetary policy interest rates on cross-border loan supply, and vice versa. An attenuating effect of foreign bank presence, i.e. $\beta_1 > 0$, could arise if foreign bank presence makes it easier for international banks to engage local borrowers and to be more informed about them, rendering international credit relationships more valuable and providing lender banks with an incentive to make cross-border loan provision less sensitive to lender-country monetary policy rates (de Haas and van Horen, 2013). Alternatively, foreign bank presence could reinforce the transmission of monetary policy interest rates, i.e. $\beta_1 < 0$, if multinational banks are inclined to reallocate capital from foreign subsidiaries to headquarters when parent-country monetary conditions tighten (Cetorelli and Goldberg, 2012), rendering the provision of international syndicated loans more sensitive to lender-country policy interest rates.

In the estimating equation, Z_{ijt} is a set of controls that could affect the transmission of monetary policy. In varying specifications, Z_{ijt} is a borrower-country (or creditor-country) policy, institutional or macroeconomic variables. Alternatively, we consider how any attenuating impact of overall foreign bank presence on the transmission of monetary policy is affected by the inclusion of an interaction of IR with a proxy of foreign-bank specific involvement in a borrower country (measured either by the experience variable or the subsidiaries variable). X_{it} is a set of two borrower-country macroeconomic control variables (inflation and GDP growth). QE_{jt} is a dummy variable indicating whether lender-country j was engaged in quantitative easing at time t . Finally, the specification includes borrower*time fixed effects, γ_{it} , and lender-bank fixed effects, δ_j . The borrower*time fixed effects control for variation in firm-level loan demand, enabling us to identify the impact of

the lender-country monetary policy interest rate on the supply of credit from banks in different lender countries. Specifically, identification relies on variation in policy interest rates among creditor countries in a particular month. The lender fixed effects control for invariant lender characteristics, for instance a lender's general proclivity to provide cross-border syndicated lending. Errors are clustered at the lender company and borrower country levels to allow for commonality in shocks to a bank's lending to firms in a particular borrowing country.

3. Empirical evidence

In section 3.1, we present evidence of monetary transmission to cross-border loan supply without taking into account foreign bank presence. Section 3.2 expands the analysis to include foreign bank presence. Finally, section 3.3 presents additional tests where we investigate whether our measures of overall foreign bank presence in a country affect the monetary transmission process once we control for proxies of foreign bank-specific involvement in borrower countries.

3.1 Evidence on transmission without taking into account foreign bank presence

Table 2 presents baseline regressions relating loan volume to monetary policy variables, information on the borrower equity-to-assets ratio, and borrower-country macroeconomic controls. In regression 1, the policy interest rate obtains a negative coefficient suggesting that a lower policy interest rate increases credit supply, but the coefficient is statistically insignificant. Regression 2 includes an interaction of the policy interest rate with the borrowing firm's equity-to-assets ratio. In this regression, the policy interest rate and its interaction with equity-to-assets obtain negative and positive coefficients that are both significant at 10%. These results suggest that a lower policy interest rate causes banks to increase credit, especially to riskier borrowers.

In recent years central banks have actively conducted nonconventional monetary policies, most importantly in the form of asset purchases that expanded the money supply and also central banks' balance sheets. The Federal Reserve, for instance, started a program of quantitative easing in January 2009. Next, we control for such policies by including a dummy variable (QE) that distinguishes periods of quantitative easing by major lender-country central banks. Specifically, we additionally include the QE variable in regressions 1-2 of Table 2, and report the results as regressions 3-4.

In regression 3, the IR and QE variables obtain coefficients of -0.818 and -0.0713 that are significant at 5% and 1%, respectively. The estimated coefficient of -0.818 for the IR variable suggests that a reduction in the monetary policy rate by 1 percentage point increases cross-border lending supply by 0.818%, which is a sizeable effect and is well within the range of 0.3-3.7% that Morais et al. (2015) find for banks located in the US, Euro area, or the UK. All the same, changes in monetary policy interest rates can explain only a small part of the overall variation in cross-border lending, as a one-standard-deviation increase in the monetary policy rate of 0.0214 (from Table 1) reduces cross-border lending by 1.5% ($=0.0214 \times -0.818 / 1.162$) of its standard deviation. The negative estimated coefficient for the QE variable is likely to reflect that central banks undertook quantitative easing at times of economic weakness and bank fragility. Hence, the QE variable de facto is a dummy variable that signals economic and financial crisis and hence is associated with lower lending volumes.

In regression 4, the magnitudes of the estimated coefficients for the IR variable and its interaction with borrower capitalization are similar to those of the corresponding coefficients in regression 2, but controlling for crisis periods associated with QE allows the coefficients to be estimated more precisely: the coefficient for IR is significant at 1%, and the coefficient for

IR * E/A (Borrower) is significant at 5%. In this regression, QE has a negative and significant coefficient.

The transmission of conventional monetary policy changes to credit supply potentially is less effective during periods of economic and financial weakness when QE is applied. To test this, regressions 5 and 6 excludes observations where the creditor bank is located in a country that applies QE. In regression 6, the IR variable and its interaction with E/A (Borrower) obtain coefficients of -1.276 and 2.865 that are significant at 5% and 10%, respectively, and larger in absolute value than the corresponding coefficients in regression 2. This is consistent with a relatively strong transmission of traditional monetary policy changes when QE is not applied.

Alternatively to including the interaction IR * E/A (Borrower) as in regression 4, regressions 7 and 8 are based on samples with observations of E/A (Borrower) below and above its median, respectively. In regression 7, the monetary policy variable obtains a coefficient of -1.318 that is significant at 1%, while in regression 8 the corresponding coefficient is -0.147 and insignificant. This is additional evidence that the supply of cross-border syndicated loans to high-leverage borrowers rises relatively more following a decline in the creditor country monetary policy rate.

Lower interest rates provide borrowers with an incentive to refinance their earlier loans. Hence, the tendency for high-leverage firms to increase their borrowing relatively much following a reduction in the monetary policy interest rate could reflect a greater scope for refinancing earlier loans. If so, the greater tendency for high-leverage borrowers to increase their borrowing at a lower interest rate can be risk-reducing rather than risk-enhancing, at least from the perspective of the borrowing firm. In regressions 9 and 10, we only include first-time borrowers in the sample for which refinancing deals are less likely. In regression 9, the coefficient for IR is negative and significant at 10%, while in regression 10

IR and the interaction of IR with E/A (Borrower) fail to be significant. Hence, there is some evidence that lower policy interest rates cause banks to increase credit to first-time cross-border borrowers for which refinancings are less probable.

Policy interest rates in lender countries can reasonably be assumed to be exogenous to economic developments in foreign borrower countries. All the same, policy interest rates that reflect economic developments in lender countries may be correlated with economic developments in borrower countries to the extent that business cycles are correlated across countries. Such a potential correlation, however, does not pose a problem for our identification strategy, as we control for borrower-country economic conditions by including borrower*time fixed effects.

Somewhat less straightforwardly, the business cycle in lender countries could simultaneously affect lender-country policy interest rates and the demand for syndicated loans from a particular lender country in case there are perceived to be synergies between the provision of syndicated loans by banks from that lender country and the provision of trade credit by the same banks in order to finance business-cycle dependent trade between the pertinent borrower and lender countries.

To counter this potential challenge to our identification strategy, in regressions 11 and 12 we replace the actual lender-country policy interest rate in regressions 3 and 4 by the component of the policy interest rate that is exogenous to the lender-country business cycle, estimated as the Taylor-rule residual of regressions of the policy interest rates on lender-country GDP growth and inflation rates. In regression 11, the Taylor residual obtains a negative coefficient that is significant at 1%. In regression 12, the Taylor residual and its interaction with E/A (Borrower) obtain negative and positive coefficients, respectively, that are both significant at 1%. These various estimated coefficients are larger in absolute value than the corresponding coefficients in regressions 3 and 4. This suggest that the part of

monetary policy that is exogenous to the creditor-country business cycle has a relatively strong effect on cross-border syndicated loan supply.

3.2 Evidence on transmission taking into account foreign bank presence

In this section, we examine how the sensitivity of cross-border credit supply to creditor country monetary policy interest rates depends on the presence of foreign-owned banks in the borrower country. To this end, regression 1 of Table 3 includes an interaction of IR with FOB in regression 1 of Table 2. The IR variable and its interaction with FOB are estimated with negative and positive coefficients, respectively, that are both significant at 1%. This is evidence that foreign bank presence mitigates the negative impact of creditor-country monetary policy rates on cross-border credit supply. This effect is economically significant, as the sensitivity of cross-border loan supply to lender-country interest rates is reduced by about half if borrower country foreign bank presence is increased from zero to its mean value (16.51% as seen in Table 1). Specifically, a one percentage point increase in the lender country policy rate is associated with a 1.8% decline in cross-border loan supply to a borrower country without foreign bank presence (based on the coefficient of IR in regression 1 of Table 3), while this figure is only about 0.9% = $(-1.781 + 0.0527 \cdot 16.51)$ when FOB equals its sample mean. Alternatively, a one standard deviation increase in FOB reduces the sensitivity of loan volume slightly more, as the standard deviation of FOB (of 19.67%) is about 19% higher than its sample mean.

Analogously to regressions 7 and 8 of Table 2, we consider two subsamples of observations with values of E/A (Borrower) below and above the mean, respectively, to see how the mitigating impact of foreign bank presence on monetary transmission depends on borrower-firm leverage. In regression 2 for high-leverage firms, the IR variable and its interaction with the borrower equity-to-assets ratio receive significant negative and positive coefficients that are larger in absolute value than in regression 1. In regression 3 for the low-

leverage firms, the corresponding coefficients are estimated to be insignificant. This is evidence that the attenuating effect of foreign bank presence on the cross-border transmission of monetary policy is relatively strong for high-leverage borrowers.

In regression 4, we replace the FOB variable in regression 1 by the FOB variable at the beginning of the period to minimize the effect on the estimation of any potential endogeneity of foreign bank presence in a country to the cross-border credit supply to this country. In this regression, the estimated coefficients for the IR variable and its interaction with FOB are very similar to those in regression 1, which suggests that any estimation bias due to the potential endogeneity of FOB is only moderate.

In regression 5, we replace FOB by FDI as an alternative measure of foreign bank ownership, yielding a negative coefficient for IR of -0.846 that is significant at 10% and a positive coefficient for IR*FDI that is insignificant. In regression 6, we replace the FDI variable in regression 5 by the value of FDI at the beginning of the period. This results in a negative coefficient for IR of -1.093 and a positive coefficient for IR*FDI of 0.344 that are both significant at 5%, similarly to regression 1 that includes FOB. Overall, Table 3 provides evidence of a mitigating impact of foreign-bank presence on the transmission of monetary policy interest rates to cross-border credit supply.

Next, we examine whether our finding of a mitigating effect of foreign bank presence on the transmission of monetary policy is robust to controlling for a range of other borrower-country and creditor-country institutional and policy variables that could possibly affect monetary policy transmission. In particular, Table 4 presents regressions based on regression 1 of Table 3 that include an additional institutional or policy variable (if not subsumed by the fixed effects), and its interaction with IR. To start, regressions 1-3 additionally contain interest rate interactions of borrower-country bank supervisory and regulatory indices (supervisory power, capital stringency, and restrictions). In these regressions, the interactions

of the included borrower-country policy variable with IR are insignificant. Regressions 4-6 include analogous interest rate interactions with lender-country supervisory and regulatory indices, yielding a negative and significant coefficient for the interaction of IR with the Overall capital stringency (Lender) variable in regression 5. Stringent capitalization policies in the lender country thus are estimated to amplify the impact of policy interest rates on credit supply, potentially because such policies make banks stronger so that they have the capacity to increase their loan supply more in case policy interest rates decline. Regressions 7 and 8 include interactions of the IR variable with the ER flexibility and Credit constraint (in) variables, respectively, that receive insignificant coefficients.

Next, we recognize that foreign bank presence could possibly be related to the borrower country's overall economic and financial development (Claessens and van Horen, 2014). In the last five regressions of Table 4, we investigate whether the mitigating role of foreign bank presence in the transmission of monetary policy is robust to controlling for various proxies of economic and financial development. In regressions 9, 11, 12 and 13 the interactions between IR and alternatively GDP per capita, Domestic credit, Market cap and Turnover ratio obtain positive and significant coefficients, providing some evidence that borrower-country economic and financial development mitigates the transmission of monetary policy via the syndicated loan market.

In Table 4 the IR variable is estimated with negative and significant coefficients in regressions 2 and 6-13, while the interactions of IR with FOB obtain positive and significant coefficients in all regressions.⁵ Our finding that foreign bank presence attenuates the transmission of monetary policy interest rates to cross-border loan supply thus is robust to

⁵ If we replace FOB by FDI in Table 4, the interaction of IR with FDI receives positive and significant coefficients in regressions 1, 2, 3, 4, and 7 (unreported).

controlling for a range of borrower-country and lender-country characteristics that potentially affect this transmission.

3.3 Additional tests

Overall foreign bank presence in a borrower country may matter for the transmission of monetary policy through the cross-border loan market either because it proxies for a foreign bank's presence in the borrower country, or alternatively because of the role played by other foreign banks in the borrower country, for instance through improving the quantity and quality of information that is available on potential new borrowers.

To gain more insight into the role of a bank's own presence in a borrower country in the monetary transmission process, we next include proxies for this presence into the analysis. To start, regression 1 in Panel A of Table 5 (with FOB proxying for overall foreign bank presence) includes the experience variable and its interaction with IR in regression 1 of Table 3, yielding positive and significant coefficients for these two additional variables. This suggests that a bank's own experience in the borrower country mitigates the monetary transmission process, perhaps because a bank's prior experience in a borrower country provides it with incentives to shield its existing customers from changes in the lender-country policy interest rate. In this regression, the IR * FOB variable has a coefficient of 0.0272 that is significant at 10% and smaller than the corresponding coefficient of 0.0527 in regression 1 of Table 3. This suggests that the FOB variable to some extent captures a bank's past operations in a borrower country as captured by the experience variable. The result that the IR*FOB variable remains positive and significant in regression 1 of Table 5 could mean that the experience variable imperfectly captures the role of a bank's prior operations in a borrower country, or alternatively that other foreign banks' presence in a borrower country matters for the monetary transmission process.

Regression 3 includes the subsidiary variable as a proxy for a foreign bank's presence, and an interaction of this variable with IR. In this regression, the subsidiary variable and its interaction with IR receive positive significant and positive insignificant coefficients, respectively, while the IR * FOB variable is estimated with a positive and significant coefficient. The significance of the IR*FOB variable could mean that either the subsidiary variable imperfectly summarizes a foreign bank's operations in a borrower country, or that foreign bank presence generally affects monetary transmission. Regression 4 in addition includes a triple interaction of the IR, Subsidiaries, and FOB variables, which is insignificant.

Following a higher lender-country policy interest rate, an international bank that has a subsidiary in the borrowing country has the option to substitute local funding for parent-country funding that has become more expensive. This could explain why foreign bank presence reduces the sensitivity of syndicated loan supply to the lender-country policy interest rate. Next, we consider the sensitivity of syndicated loan supply to the lender-country policy interest rate while controlling for the effect of the borrower country policy interest rate. Specifically, regression 5 includes an interaction of the policy interest rates in lender and borrower countries in regression 1 of Table 3. This interaction variable receives a negative coefficient that is significant at 10%, consistent with a heightened sensitivity of loan volume to the lender-country policy interest rate in borrower countries with high policy rates. Regression 6 in addition includes the triple interaction variable IR * IR (Borrower) * FOB, which is estimated with an insignificant coefficient.

So far, we have considered loan volume as aggregated at the level of the parent bank even if this parent bank has foreign subsidiaries. For these foreign subsidiaries, however, the relevant monetary policy rate may be the policy rate of the respective host countries rather than the policy rate of the country where the parent bank resides. To allow for this, we next disaggregate a multinational bank's cross-border loans into lending stemming from the parent

country, and lending coming from any of the foreign countries where the multinational bank has at least one foreign subsidiary. Lending coming from the various countries where a multinational bank operates are then treated as separate observations and related to the monetary policy rate of a lending unit's country of location. Regression 7 reports results analogous to regression 1 of Table 3. In this regression, the IR variable obtains a negative and significant coefficient, while the interaction IR * FOB obtains a positive and significant coefficient. Thus our finding of a mitigating impact of foreign bank presence on monetary policy transmission is robust to disaggregating a multinational bank's lending to the respective host countries where the constituent lending units reside.

Lending provided through an international bank's borrower-country subsidiaries strictly speaking is not cross-border lending. Next, we consider how an international bank's loan supply net of the loan supply through local subsidiaries is affected by lender-country policy interest rates. Specifically, regression 8 relates loan volume net of lending by borrower-country subsidiaries to the lender country policy rate and its interaction with the foreign-owned banks variable. The interaction variable is estimated with a positive and significant coefficient analogously to regression 1 of Table 3, implying an attenuating influence of foreign bank presence on the sensitivity of truly cross-border loans to the lender-country monetary policy rate.

To conclude this section, we re-estimate the robustness checks reported in Panel A of Table 5 after replacing FOB by FDI, with the resulting regressions (including the FDI variable) reported in Panel B of Table 5. In regression 3 (analogous to regression 4 of Panel A), the estimated coefficient for the double interaction IR * FDI is 0.534, while the estimated coefficient for the triple interaction IR * Subsidiaries * FDI is -0.409, with both of these coefficients being significant at 5%. These estimated coefficients imply that the mitigating impact of banking FDI on monetary policy is reduced but not eliminated when we control for

a bank's own subsidiary presence in a borrower country. In regression 5 (analogous to regression 6 of Panel A), the triple interaction variable $IR * IR (\text{Borrower}) * FDI$ receives a negative and significant coefficient, indicating that foreign bank presence mitigates the sensitivity of the loan volume to the lender-country policy interest rate less if the borrower-country policy rate is relatively high. This likely reflects that a multinational's borrower-country and lender-country funding are less substitutable if the borrower-country policy interest rate is relatively high (as in that instance lender-country funding may be much cheaper).

Overall, Table 5 provides some evidence that the attenuating effect of overall banking FDI in a country on loan volume is reduced but not eliminated by a multinational bank itself having a subsidiary in the borrower country. The finding that foreign banking as measured by the FDI variable continues to have a mitigating effect on monetary policy transmission when we control for foreign bank subsidiary presence can mean that the subsidiary variable does not fully capture the role of a foreign bank's own presence, or alternatively that foreign bank presence generally mitigates monetary policy transmission, perhaps because foreign bank presence generally leads to an increase in the quality of borrower information that makes lending relationships profitable and hence more stable.

4. Conclusion

This paper investigates the role of foreign banks in the international transmission of monetary policy changes to foreign countries through the market for cross-border syndicated loans. Our data set includes lenders in 50 countries, and borrowers in 124 countries. The inclusion of multiple lender and borrower countries has two main advantages. First, we can include borrower*time fixed effects to control for potentially time-varying loan demand at the individual borrower level. Second, the inclusion of multiple borrower countries enables

us to investigate the impact of varying borrower-country policies and institutions on the transmission of lender-country monetary policy.

We find that an expansion of monetary policy through a lower policy interest rate increases cross-border credit supply especially to weaker firms as measured by the equity-to-assets ratio in line with earlier research.

Our main result is that foreign ownership of banking in the borrower country reduces the tendency for loan volume to increase following a lender-country policy interest rate reduction. This finding is robust to controlling for the level of economic and financial development in the borrower country, and for a range of financial policies and institutions in the borrower and lender countries, including the strength of bank regulation and supervision, exchange rate flexibility and restrictions on capital flows.

A local presence of a multinational bank in a borrower country is found to reduce, but not eliminate, the attenuating effect of overall foreign bank presence on the transmission of monetary policy to loan volume. This could reflect that our proxy for a foreign bank's local experience does not fully capture the effect of the bank's own presence, or alternatively that foreign bank presence generally mitigates monetary policy transmission, perhaps because foreign bank presence improves conditions in the borrower country so as to make cross-border lending relationships more profitable and hence more stable. Moreover, the mitigating impact of banking FDI on the international transmission of monetary policy to loan volume is weaker, if the borrower-country policy interest rate is higher. This potentially reflects that a multinational's local and international funding are less substitutable if the borrower-country interest rate is higher.

Our finding that banking FDI in borrower countries could stabilize the international supply of cross-border loans importantly qualifies the picture of international banks as sources of credit instability in borrower countries that transmit international monetary policy

changes in the form of international credit supply shocks. Our evidence also suggests that countries that currently restrict the foreign ownership of local banks can potentially obtain a more stable supply of cross-border credit in the face of international monetary policy shocks if they allow additional foreign bank entry.

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Appendix

Table A1: List of lender countries

Country	Number of lenders	Number of loans	Country	Number of lenders	Number of loans
Austria	21	815	Korea, Rep.	24	734
Belgium	8	2,143	Luxembourg	3	122
Brazil	3	121	Malaysia	8	392
Canada	16	8,034	Mauritius	2	13
Chile	3	19	Mexico	1	2
China	25	1,774	Morocco	3	21
Colombia	1	6	Netherlands	15	3,165
Cyprus	2	7	Norway	6	1,446
Denmark	8	598	Philippines	13	74
Egypt, Arab Rep.	4	18	Portugal	6	386
Finland	4	25	Qatar	3	38
France	20	9,670	Romania	1	5
Germany	36	9,907	Russian Federation	4	16
Greece	4	47	Saudi Arabia	4	22
Hong Kong SAR, China	22	812	Singapore	16	2,417
Hungary	1	2	Slovenia	1	2
Iceland	2	14	South Africa	6	173
India	20	506	Spain	19	2,864
Indonesia	5	106	Sri Lanka	1	2
Iran, Islamic Rep.	1	2	Sweden	6	559
Ireland	5	564	Switzerland	19	3,754
Israel	3	423	Thailand	9	231
Italy	19	3,712	Turkey	3	26
Japan	81	16,967	United States	103	6,550
Jordan	1	61	United Kingdom	26	13,856
			Total	617	93,223

Table A2: List of borrower countries

Country	Number of borrowers	Number of loans	Country	Number of borrowers	Number of loans
Algeria	3	16	Denmark	23	217
Angola	2	60	Ecuador	2	4
Argentina	22	158	Egypt, Arab Rep.	5	88
Australia	483	4,088	El Salvador	1	3
Austria	16	168	Estonia	5	23
Azerbaijan	3	28	Finland	58	574
Bahamas	9	38	France	178	2,291
Bahrain	5	42	Gabon	2	16
Bangladesh	8	60	Georgia	1	2
Barbados	2	22	Germany	139	1,435
Belarus	1	7	Ghana	5	172
Belgium	53	466	Gibraltar	1	3
Bermuda	59	837	Greece	41	198
Bolivia	1	12	Guinea	1	6
Botswana	1	4	Hong Kong SAR, China	518	5,958
Brazil	71	681	Hungary	14	160
British Virgin Islands	26	349	Iceland	8	105
Brunei	3	23	India	194	2,024
Bulgaria	6	16	Indonesia	291	2,671
Cambodia	2	9	Iran, Islamic Rep.	5	36
Cameroon	2	10	Ireland	37	237
Canada	147	1,105	Israel	12	110
Cayman Islands	39	174	Italy	104	794
Chile	33	328	Côte d'Ivoire	4	11
China	407	2,865	Jamaica	1	2
Colombia	17	85	Japan	79	743
Congo	1	2	Jordan	3	6
Costa Rica	1	7	Kazakhstan	14	91
Croatia	17	108	Kenya	4	13
Cyprus	15	109	Korea, Rep.	226	2,480
Czech Republic	19	179	Kosovo	1	3

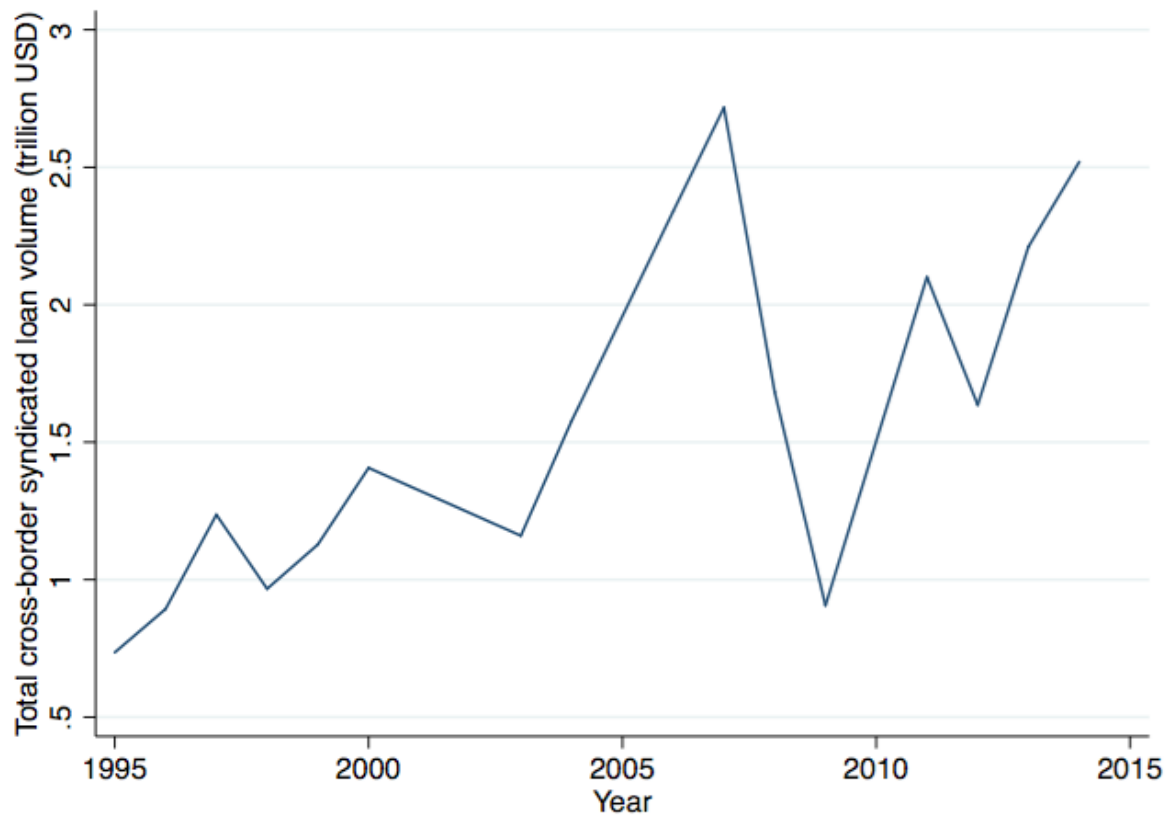
Country	Number of borrowers	Number of loans	Country	Number of borrowers	Number of loans
Kuwait	7	38	Qatar	19	239
Lao PDR	5	32	Romania	31	121
Latvia	3	8	Russian Federation	84	847
Liberia	6	35	Rwanda	1	2
Lithuania	3	8	Saudi Arabia	13	94
Luxembourg	31	398	Serbia	1	6
Macau	14	183	Singapore	251	2,045
Malawi	1	3	Slovak Republic	16	91
Malaysia	141	1,043	Slovenia	3	19
Mali	1	4	South Africa	28	413
Malta	3	21	Spain	297	2,926
Mauritius	9	85	Sri Lanka	2	9
Mexico	84	973	Sweden	82	1,076
Moldova	1	9	Switzerland	60	1,353
Monaco	2	5	Taiwan, China	196	1,274
Mongolia	2	4	Tanzania	3	23
Morocco	5	30	Thailand	167	1,350
Netherlands	191	2,149	Trinidad and Tobago	2	11
Netherlands Antilles	1	5	Tunisia	5	33
New Zealand	49	333	Turkey	37	288
Nicaragua	1	4	Turkmenistan	3	7
Nigeria	6	27	United States	2,996	36,162
Norway	82	632	Ukraine	19	103
Oman	9	76	United Arab Emirates	42	384
Pakistan	25	149	United Kingdom	349	3,365
Panama	33	158	Uruguay	1	2
Papua New Guinea	8	92	Uzbekistan	4	22
Peru	17	119	Venezuela, RB	6	46
Philippines	63	904	Vietnam	42	240
Poland	31	298	Yemen	1	16
Portugal	30	289	Zambia	3	10
			Total	9,079	93,223

Table A3: Variable definitions

Variable	Description	Source
Volume	Natural logarithm of the dollar amount of a banks' share in a syndicated loan, aggregated at the borrower-lender-time level	Dealscan
IR	The central bank policy rate or the discount rate in the lender's country	IFS
IR (Borrower)	The central bank policy rate or the discount rate in the borrower's country	IFS
Taylor residual	Error from a regression of the monetary policy rate (IR) on the real GDP growth rate and the inflation rate (CPI) separately for each lender country	IFS
QE	Dummy variable indicating that a quantitative easing program was in place in the following economies and periods: U.S.: 2009M1 to 2015M12; Eurozone: 20015M3 to 2015M12; U.K.: 2009M3 to 2015M12; and Japan: 2001M3 to 2006M3 and 2013M4 to 2015M12	
E/A (Borrower)	Book value of common equity to book value of total assets, lagged by one year	Worldscope
FOB	Fraction of the banking system's assets in the borrower's country that is foreign owned, in percentage points	World Bank Regulation and Supervision Survey (Barth et al. (2013))
FDI	Number of subsidiaries in the country of the borrower owned by banks in the lender's country	Claessens and van Horen (2015)
Experience	Natural logarithm of 1 + the number of loans extended by the lender in the country of the borrower in the three years prior to the loan	Dealscan
Subsidiaries	Dummy variable that equals one if the lender company has at least one subsidiary in the borrower country during the sample period and zero otherwise	Dealscan
Official supervisory power (Borrower)	Index of the power of the supervisory authorities in the borrower's country to take specific actions to prevent and correct problems in banks, with higher values indicating greater power	World Bank Regulation and Supervision Survey (Barth et al. (2013))
Overall capital stringency (Borrower)	Index measuring the stringency in determining minimum capital adequacy in the borrower's country, with higher values indicating greater stringency	World Bank Regulation and Supervision Survey (Barth et al. (2013))
Overall restrictions on banking activities (Borrower)	Index of the extent to which banks in the borrower's country can engage in securities, insurance and real estate activities, with higher values indicating more restrictions	World Bank Regulation and Supervision Survey (Barth et al. (2013))
Official supervisory power (Lender)	Index of the power of the supervisory authorities in the lender's country to take specific actions to prevent and correct problems in banks, with higher values indicating greater power	World Bank Regulation and Supervision Survey (Barth et al. (2013))
Overall capital stringency (Lender)	Index measuring the stringency in determining minimum capital adequacy in the lender's country, with higher values indicating greater stringency	World Bank Regulation and Supervision Survey (Barth et al. (2013))
Overall restrictions on banking activities (Lender)	Index of the extent to which banks in the lender's country can engage in securities, insurance and real estate activities, with higher values indicating more restrictions	World Bank Regulation and Supervision Survey (Barth et al. (2013))

ER flexibility	Dummy variable indicating that the borrower's country has a flexible exchange rate regime. It takes the value of one if a country's exchange rate regime falls in one of the following categories: pre-announced crawling band that is wider than or equal to +/-2%; de facto crawling band that is narrower than or equal to +/-5%; moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time); managed floating; and freely floating	Iizetzky, Reinhart and Rogoff (2011)
Credit constraints (in)	Dummy variable indicating the presence of restrictions on the inflow of commercial credit in the borrower's country	Fernández, Klein, Rebucci, Schindler and Uribe (2015)
GDP per capita	GDP per capita in constant 2005 US dollars	WDI
Credit	Domestic credit to the private sector by banks as a percentage of GDP	WDI
Domestic credit	Domestic credit provided by the financial sector as a percentage of GDP	WDI
Market cap	Market capitalization of listed companies as a percentage of GDP	WDI
Turnover ratio	Total value of shares traded during the period as a percentage of the average market capitalization for the period in percentage points	WDI
CPI	Annual percentage change of the consumer price index in the lender's country	IFS
GDP growth	Annual percentage change of real GDP in the lender's country	IFS

Figure 1: Total cross-border syndicated lending



Note: This graph shows the total amount of cross-border lending to non-financial borrowers over the sample period. The graph excludes 2015 because the sample period does not cover the whole year.

Table 1: Descriptive statistics

Volume is the natural logarithm of the dollar amount of a banks' share in a syndicated loan, aggregated at the borrower-lender-time level. IR is the central bank policy rate or the discount rate in the lender's country. IR (Borrower) is IR is the central bank policy rate or the discount rate in the borrower's country. Taylor residual is a variable containing the errors from regressions of monetary policy rates (IR) in the lender's country on the real GDP growth rate and the inflation rate (CPI) separately for each lender country. QE is a dummy variable indicating that a quantitative easing program was in place in the lender's country. E/A (Borrower) is the book value of common equity to the book value of total assets, lagged by one year. FOB is the fraction of the banking system's assets in the borrower's country that is foreign owned, in percentage points. FDI is the number of subsidiaries in the country of the borrower owned by banks in the lender's country. Experience is the natural logarithm of 1 + the number of loans extended by the lender in the country of the borrower in the three years prior to the loan. Subsidiaries is a dummy variable that equals one if the lender company has at least one subsidiary in the borrower country during the sample period and zero otherwise. Official supervisory power (Borrower) is an index of the power of the supervisory authorities in the borrower's country to take specific actions to prevent and correct problems in banks, with higher values indicating greater power. Overall capital stringency (Borrower) is an index measuring the stringency in determining minimum capital adequacy in the borrower's country, with higher values indicating greater stringency. Overall restrictions on banking activities (Borrower) is an index of the extent to which banks in the borrower's country can engage in securities, insurance and real estate activities, with higher values indicating more restrictions. ER flexibility is a dummy variable indicating that the borrower's country has a flexible exchange rate regime. Credit constraints (in) is a dummy variable indicating the presence of restrictions on the inflow of commercial credit in the borrower's country. GDP per capita is GDP per capita in constant 2005 US dollars. Credit is domestic credit to the private sector by banks as a percentage of GDP. Domestic credit is domestic credit provided by the financial sector as a percentage of GDP. Market cap is the market capitalization of listed companies as a percentage of GDP. Turnover ratio is the total value of shares traded during the period as a percentage of the average market capitalization for the period. CPI is the annual percentage change of the consumer price index in the lender's country. GDP growth is the annual percentage change of real GDP in the lender's country. All summary statistics are for the sample used in regression 1 of Table 2.

	Obs	Mean	SD	Min	Max
Volume (in millions of USD)	93223	55.638	72.394	1	410
Volume	93223	17.21	1.162	13.82	19.83
IR	93223	0.0248	0.0214	-0.00250	0.480
IR (Borrower)	82660	0.0393	0.0472	-0.00250	1.500
Taylor residual	85189	-0.00509	0.0171	-0.0879	0.128
QE	93223	0.121	0.326	0	1
E/A (Borrower)	49073	0.387	0.169	0.0269	0.942
FOB	66345	16.51	19.67	0	100
FDI	93223	1.565	1.859	0	22
Experience	73540	4.241	2.101	0	7.627
Subsidiaries	93223	0.686	0.464	0	1
Official supervisory power (Borrower)	86243	11.69	2.214	4	16
Overall capital stringency (Borrower)	81954	4.405	1.611	0	7
Overall restrictions on banking activities (Borrower)	85760	7.223	2.133	3	12
Official supervisory power (Lender)	83646	10.20	2.333	4	16
Overall capital stringency (Lender)	84477	4.271	1.655	1	7
Overall restrictions on banking activities (Lender)	84609	6.116	2.334	3	12
ER flexibility	70833	0.785	0.411	0	1
Credit constraints (in)	84386	0.146	0.353	0	1
GDP per capita	90472	31363.3	16448.9	162.9	87772.7
Credit	80301	81.81	46.41	2.521	305.0
Domestic credit	80285	153.1	62.85	-27.96	349.0

Market cap	80922	115.9	83.16	0.139	606.0
Turnover ratio	80880	119.3	74.77	0	497.4
CPI	93223	1.761	1.501	-5.258	46.22
GDP growth	93223	2.382	2.461	-9.274	19.30

Table 2: Monetary policy and cross-border lending volume

The dependent variable in all regressions is Volume, which is the natural logarithm of the dollar amount of a banks' share in a syndicated loan, aggregated at the borrower-lender-time level. IR is the central bank policy rate or the discount rate in the lender's country. Taylor residual is the error from a regression of the monetary policy rate (IR) on the real GDP growth rate and the inflation rate (CPI) separately for each lender country. E/A (Borrower) is the book value of common equity to the book value of total assets, lagged by one year. QE is a dummy variable indicating that a quantitative easing program was in place in the lender's country. CPI is the annual percentage change of the consumer price index in the lender's country. GDP growth is the annual percentage change of real GDP in the lender's country. The sample includes non-financial borrowers only. Standard errors clustered at the lender company and borrower country levels are reported in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%. Observations in columns 5 and 6 are limited to those where QE is zero. Observations in columns 7 and 8 have E/A (Borrower) below and above the median. Observations in columns 9 and 10 are for first time borrowers in the data set. In columns 11 and 12, IR is the Taylor residual. The sample includes non-financial borrowers only. Standard errors clustered at the lender company and borrower country levels are reported in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%.

	Baseline				QE = 0		E/A (Borrower)		First time borrowers		Taylor residuals	
	(1)	(2)	(3)	(4)	(5)	(6)	below median	above median	(9)	(10)	(11)	(12)
IR	-0.307 (0.264)	-1.013* (0.550)	-0.818** (0.406)	-1.844*** (0.558)	-0.575 (0.545)	-1.276** (0.641)	-1.318*** (0.491)	-0.147 (0.493)	-1.053* (0.584)	-1.322 (1.112)	-1.075*** (0.377)	-2.963*** (0.618)
IR * E/A (borrower)		2.614* (1.385)		2.829** (1.334)		2.865* (1.542)				2.522 (1.974)		3.779*** (1.184)
QE			-0.0713*** (0.0269)	-0.0862*** (0.0249)			-0.103*** (0.0236)	-0.0686** (0.0321)	-0.103*** (0.0302)	-0.141*** (0.0284)	-0.0906*** (0.0200)	-0.112*** (0.0183)
CPI	0.00460 (0.00355)	0.000431 (0.00344)	0.00892** (0.00372)	0.00401 (0.00348)	0.0000697 (0.00470)	-0.00287 (0.00451)	0.00503 (0.00525)	0.00317 (0.00443)	0.00231 (0.00412)	0.00313 (0.00706)	0.00385 (0.00335)	-0.00315 (0.00355)
GDP growth	0.00563** (0.00232)	0.00672** (0.00273)	0.00609*+*** (0.00230)	0.00673** (0.00267)	0.00626** (0.00268)	0.00706** (0.00293)	0.00333 (0.00361)	0.0108*** (0.00302)	0.00611 (0.00419)	0.00327 (0.00519)	0.00488** (0.00240)	0.00548* (0.00299)
Observations	93223	48959	93223	48959	81188	43846	24415	24422	31032	11135	84505	43673
Adjusted R-squared	0.813	0.806	0.813	0.806	0.810	0.806	0.798	0.814	0.829	0.817	0.817	0.812
Borrower*Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3: Foreign banking presence, monetary policy and cross-border lending volume

The dependent variable in all regressions is Volume, which is the natural logarithm of the dollar amount of a banks' share in a syndicated loan, aggregated at the borrower-lender-time level. IR is the central bank policy rate or the discount rate in the lender's country. FOB is the fraction of the banking system's assets in the borrower's country that is foreign owned, in percentage points. FDI is the number of subsidiaries in the country of the borrower owned by banks in the lender's country. QE is a dummy variable indicating that a quantitative easing program was in place in the lender's country. CPI is the annual percentage change of the consumer price index in the lender's country. GDP growth is the annual percentage change of real GDP in the lender's country. Observations in columns 2 and 3 have E/A (Borrower) below and above the median. In column 4 FOB is the value for the beginning of the period. In column 6 FDI is the value for the beginning of the period. The sample includes non-financial borrowers only. Standard errors clustered at the lender company and borrower country levels are reported in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%.

	Baseline	E/A (Borrower)		Beginning of period FOB	FDI	Beginning of period FDI
		below median	above median			
	(1)	(2)	(3)	(4)	(5)	(6)
IR	-1.781*** (0.605)	-2.403*** (0.594)	-0.347 (0.484)	-1.522** (0.590)	-0.846* (0.476)	-1.093** (0.426)
IR * FOB	0.0527*** (0.0144)	0.113** (0.0491)	0.0316 (0.0222)	0.0379** (0.0180)		
IR * FDI					0.215 (0.143)	0.344** (0.137)
FDI					0.0234** (0.0110)	0.0140* (0.00729)
QE	-0.0729*** (0.0224)	-0.0852*** (0.0299)	-0.0555* (0.0290)	-0.0801*** (0.0208)	-0.0578** (0.0258)	-0.0632** (0.0256)
CPI	0.00671 (0.00449)	0.00229 (0.00550)	0.00502 (0.00409)	0.00794* (0.00455)	0.00764** (0.00368)	0.00887** (0.00363)
GDP growth	0.00286* (0.00165)	0.00277 (0.00339)	0.00621** (0.00236)	0.00268 (0.00165)	0.00552*** (0.00207)	0.00570** (0.00220)
Observations	66276	18850	18272	66276	93223	93223

Adjusted R-squared	0.803	0.786	0.800	0.803	0.814	0.813
Borrower*Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4: Foreign banking presence, monetary policy and cross-border lending volume: additional controls

The dependent variable in all regressions is Volume, which is the natural logarithm of the dollar amount of a banks' share in a syndicated loan, aggregated at the borrower-lender-time level. IR is the central bank policy rate or the discount rate in the lender's country. FOB is the fraction of the banking system's assets in the borrower's country that is foreign owned, in percentage points. Official supervisory power (Borrower, Lender) is an index of the power of the supervisory authorities in the borrower's (lender's) country to take specific actions to prevent and correct problems in banks, with higher values indicating greater power. Overall capital stringency (Borrower, Lender) is an index measuring the stringency in determining minimum capital adequacy in the borrower's (lender's) country, with higher values indicating greater stringency. Overall Restrictions on banking activities (Borrower, Lender) is an index of the extent to which banks in the borrower's (lender's) country can engage in securities, insurance and real estate activities, with higher values indicating more restrictions. ER flexibility is a dummy variable indicating that the borrower's country has a flexible exchange rate regime. Credit constraints (in) is a dummy variable indicating the presence of restrictions on the inflow of commercial credit in the borrower's country. GDP per capita is GDP per capita in constant 2005 US dollars. Credit is domestic credit to the private sector by banks as a percentage of GDP. Domestic credit is domestic credit provided by the financial sector as a percentage of GDP. Market cap is the market capitalization of listed companies as a percentage of GDP. Turnover ratio is the total value of shares traded during the period as a percentage of the average market capitalization for the period. QE is a dummy variable indicating that a quantitative easing program was in place in the lender's country. CPI is the annual percentage change of the consumer price index in the lender's country. GDP growth is the annual percentage change of real GDP in the lender's country. The sample includes non-financial borrowers only. Standard errors clustered at the lender company and borrower country levels are reported in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
IR	-2.657 (2.127)	-1.861** (0.902)	-1.570 (2.050)	0.356 (2.053)	1.584 (1.519)	-2.788*** (1.058)	-1.351* (0.756)	-1.398** (0.535)	-2.930*** (0.716)	-2.276** (0.914)	-3.583*** (1.019)	-2.919*** (0.736)	-2.761*** (0.591)
IR * FOB	0.0533*** (0.0149)	0.0534*** (0.0144)	0.0523*** (0.0152)	0.0578*** (0.0161)	0.0492*** (0.0135)	0.0525*** (0.0136)	0.0501*** (0.0165)	0.0472** (0.0195)	0.0563*** (0.0177)	0.0435** (0.0169)	0.0617*** (0.0213)	0.0495** (0.0212)	0.0584*** (0.0177)
IR * Official supervisory power (Borrower)	0.0761 (0.185)												
IR * Overall capital stringency (Borrower)		0.0213 (0.224)											
IR * Overall restrictions on banking activities (Borrower)			-0.0239 (0.227)										
IR * Official supervisory power (Lender)				-0.243 (0.193)									

Official supervisory power (Lender)					0.00313 (0.00404)									
IR * Overall capital stringency (Lender)					-0.826*** (0.242)									
Overall capital stringency (Lender)					0.00895 (0.00736)									
IR * Overall restrictions on banking activities (Lender)						0.148 (0.133)								
Overall restrictions on banking activities (Lender)						-0.00743 (0.00605)								
IR * ER flexibility (dummy)							-0.231 (0.922)							
IR * Credit constraints (in)								-1.258 (0.775)						
IR * GDP per capita									0.0000450* (0.0000250)					
IR * Credit										0.0112 (0.00869)				
IR * Domestic credit											0.0139** (0.00639)			
IR * Market cap												0.0138** (0.00623)		
IR * Turnover ratio													0.0101*** (0.00344)	
QE	-0.072*** (0.0224)	-0.073*** (0.0223)	-0.073*** (0.0233)	-0.091*** (0.0184)	-0.104*** (0.0216)	-0.088*** (0.0241)	-0.079*** (0.0231)	-0.073*** (0.0231)	-0.0668*** (0.0226)	-0.074*** (0.0238)	-0.0655** (0.0250)	-0.071*** (0.0232)	-0.068*** (0.0247)	
CPI	0.00667 (0.00445)	0.00661 (0.00443)	0.00681 (0.00448)	0.00530 (0.00421)	-0.00294 (0.00477)	0.00420 (0.00451)	0.00421 (0.00373)	0.00511 (0.00407)	0.00601 (0.00407)	0.00476 (0.00401)	0.00492 (0.00387)	0.00491 (0.00387)	0.00356 (0.00389)	
GDP growth	0.00291 (0.00177)	0.00279 (0.00169)	0.00294* (0.00171)	0.00281 (0.00202)	0.00448* (0.00240)	0.00350* (0.00180)	0.00397** (0.00167)	0.00354** (0.00166)	0.00279* (0.00166)	0.00327** (0.00156)	0.00280* (0.00156)	0.00296** (0.00126)	0.00317** (0.00139)	
Observations	65826	66021	65977	63913	64196	64090	53326	61828	64771	60034	60034	60213	60192	
Adjusted R-squared	0.802	0.803	0.802	0.800	0.803	0.803	0.796	0.800	0.802	0.801	0.801	0.801	0.801	
Borrower*Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
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Table 5: Lending experience in borrower countries, the role of subsidiaries and borrower country monetary policy

The dependent variable in all regressions is Volume, which is the natural logarithm of the dollar amount of a banks' share in a syndicated loan, aggregated at the borrower-lender-time level. IR is the central bank policy rate or the discount rate in the lender's country. FOB is the fraction of the banking system's assets in the borrower's country that is foreign owned, in percentage points. FDI is the number of subsidiaries in the country of the borrower owned by banks in the lender's country. Experience is the natural logarithm of 1 + the number of loans extended by the lender in the country of the borrower in the three years prior to the loan. Subsidiaries is a dummy variable that equals one if the lender company has at least one subsidiary in the borrower country during the sample period and zero otherwise. IR (Borrower) is the central bank policy rate or the discount rate in the borrower's country. QE is a dummy variable indicating that a quantitative easing program was in place in the lender's country. CPI is the annual percentage change of the consumer price index in the lender's country. GDP growth is the annual percentage change of real GDP in the lender's country. In Panel A and B, foreign ownership of banks is represented by FBO and FDI, respectively. In column 7 of Panel A and column 6 of Panel B, lending by foreign subsidiaries is not assigned to their parent companies and for these lenders IR is taken to be the host country monetary policy interest rate. In column 8 of Panel A and column 7 of Panel B, foreign subsidiaries' domestic lending is excluded. The sample includes non-financial borrowers only. Standard errors clustered at the lender company and borrower country levels are reported in parentheses. *, **, and *** denote significance at 10%, 5%, and 1%.

Panel A: FOB		Baseline sample					Subsidiaries and parents separately	Subsidiaries' domestic lending excluded
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IR	-0.526 (0.906)	-0.972 (0.603)	-2.157*** (0.693)	-2.268*** (0.712)	-0.518 (0.644)	-0.177 (0.953)	-1.208*** (0.452)	-1.768*** (0.562)
IR * FOB	0.0272* (0.0147)		0.0508*** (0.0146)	0.0531*** (0.0153)	0.0560** (0.0235)	0.0443 (0.0292)	0.0381** (0.0146)	0.0464*** (0.0161)
IR * Experience	0.219* (0.123)							
IR * Subsidiaries		0.250 (0.451)	0.639 (0.513)	0.821 (0.580)				
IR * Subsidiaries * FOB				-0.00655 (0.0260)				
Experience	0.113*** (0.00820)							
Subsidiaries		0.0739*** (0.0182)	0.0684*** (0.0179)	0.0484** (0.0234)				
Subsidiaries * FOB				0.000937 (0.000846)				

IR * IR (Borrower)					-12.28*	-18.24		
					(6.742)	(13.60)		
IR * IR (Borrower) * FOB						0.185		
						(0.270)		
QE	-0.0376**	-0.0681***	-0.0689***	-0.0695***	-0.0592**	-0.0578**	-0.0603***	-0.0816***
	(0.0183)	(0.0257)	(0.0212)	(0.0213)	(0.0228)	(0.0228)	(0.0182)	(0.0183)
CPI	-0.00174	0.00893**	0.00679	0.00696	0.00755*	0.00706*	0.00152	0.00861**
	(0.00386)	(0.00364)	(0.00421)	(0.00433)	(0.00445)	(0.00416)	(0.00320)	(0.00413)
GDP growth	-0.00187	0.00596***	0.00265	0.00262	0.00384**	0.00383**	0.00236	0.00453*
	(0.00301)	(0.00226)	(0.00168)	(0.00180)	(0.00149)	(0.00149)	(0.00227)	(0.00234)
Observations	51218	93223	66276	66276	58562	58562	56883	57151
Adjusted R-squared	0.789	0.813	0.803	0.803	0.794	0.794	0.816	0.814
Borrower*Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Panel B: FDI							
	Baseline sample					Subsidiaries and parents separately	Subsidiaries' domestic lending excluded
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
IR	1.189*	-1.009	-1.177*	0.122	-0.0180	-0.633**	-0.856*
	(0.647)	(0.619)	(0.652)	(0.413)	(0.428)	(0.283)	(0.441)
IR * FDI	0.183*	0.222	0.534**	0.0784	0.287	0.237**	0.193
	(0.108)	(0.143)	(0.213)	(0.127)	(0.190)	(0.0950)	(0.137)
IR * Experience	-0.0706						
	(0.114)						
IR * Subsidiaries		0.206	0.567				
		(0.447)	(0.515)				
IR * Subsidiaries * FDI			-0.409**				
			(0.181)				
Experience	0.119***						
	(0.00921)						
FDI	0.00732	0.0208*	0.00951	0.0274**	0.0265*	0.0170**	0.0183*
	(0.00672)	(0.0110)	(0.0106)	(0.0113)	(0.0147)	(0.00837)	(0.0102)
Subsidiaries		0.0589***	0.0452***				
		(0.0144)	(0.0154)				
Subsidiaries * FDI			0.0148*				
			(0.00844)				
IR * IR (Borrower)				-5.555*	-3.210		
				(3.312)	(3.577)		
IR * IR (Borrower) * FDI					-3.505*		
					(2.029)		
IR (Borrower) * FDI					0.00838		
					(0.0757)		
QE	-0.0265*	-0.0558**	-0.0561**	-0.0482**	-0.0464*	-0.0519***	-0.0583***
	(0.0158)	(0.0254)	(0.0248)	(0.0234)	(0.0240)	(0.0146)	(0.0215)
CPI	-0.00155	0.00781**	0.00755**	0.00772**	0.00790**	0.00129	0.00775*
	(0.00349)	(0.00365)	(0.00367)	(0.00350)	(0.00345)	(0.00312)	(0.00423)
GDP growth	0.000174	0.00548***	0.00542**	0.00641**	0.00640***	0.00212	0.00660***
	(0.00343)	(0.00205)	(0.00204)	(0.00221)	(0.00224)	(0.00224)	(0.00244)
Observations	73509	93223	93223	82622	82622	79586	79664
Adjusted R-squared	0.802	0.814	0.814	0.810	0.810	0.823	0.821
Borrower*Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes