Cross-Border Bank Flows and Monetary Policy*

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Abstract

Using a novel BIS dataset on bilateral cross-border claims, we study the determinants of cross-border bank flows within a matrix of source and recipient country pairs over the past two decades. The richness of the panel dataset and the econometric specification with country-time fixed effects allow us to distinguish between the supply and demand-side determinants of cross-border bank flows. Controlling for demand conditions in recipient countries, we find that the supply of cross-border bank flows increases when monetary policy in source countries is tightened. Importantly, a tightening of monetary policy in source countries coincides with a slowdown in domestic credit and an acceleration in bank flows toward foreign non-bank borrowers from advanced economies. The result provides empirical support for the existence of an international portfolio rebalancing channel, whereby tighter monetary policy in source countries leads to a decrease in the net worth and collateral values of domestic borrowers, which prompts banks to substitute away from domestic credit and toward foreign credit to safer locations and borrower types. Our findings shed new light on the differentiated impact of monetary policy in source countries on the cross-border banking flows and financial stability in recipient countries.

JEL classification: F34, F36, G01

Key words: cross-border bank flows, monetary policy, country-specific vs. global determinants, portfolio rebalancing.

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1. Introduction

The rapid growth in cross-border bank linkages over the past three decades has led to a more interconnected global financial system with both positive and negative consequences. As a result of the recent Global Financial Crisis, understanding the factors that trigger sharp fluctuations in cross-border bank flows around the world has become a priority. In particular, academic and policymakers need a better understanding of the role played by monetary policy in the allocation of bank credit between domestic and foreign markets, as well as across the foreign destinations themselves. Assessing the reaction of internationally-active banks to monetary policy shocks should shed more light on the international financial spillovers that unfold through the banking sector, with implications for both monetary policy and financial stability in recipient countries.

In this context, we examine the effect of domestic monetary policy on cross-border banking flows, with particular focus on several questions: (1) What is the effect of domestic monetary policy on the supply of cross-border banking flows to foreign economies? (2) How does this effect differ across different types of foreign borrowers, i.e. banks vs. non-banks, and foreign country characteristics? (3) Aside global factors, is there a role for country-specific factors (including monetary policy in source countries) as determinants of cross-border banking flows?

To rationalize the domestic and international transmission of monetary policy shocks, the theoretical literature has long established the existence of a bank lending channel, whereby monetary tightening leads to a decline in the supply of bank loans, which in turn increases borrowers' cost of capital and dampens real economic activity (Bernanke and Gertler, 1995). On the empirical side, some studies have found that monetary tightenings decrease the aggregate supply of bank loans (Kashyap et al, 1993), but the effect of tightenings on the supply of loans varies across banks depending on their size (Kashyap and Stein, 2000). Moreover, the effect of monetary tightenings varies across loan types, as banks appear to respond by rebalancing their portfolios away from loans deemed riskier in the context of higher interest rates, such as consumer and residential real estate loans, and more toward loans deemed to be safer, such as commercial and industrial loans or commercial real estate mortgages. Depending on the strength of this substitution, this "portfolio rebalancing" effect may offset the bank lending channel, whereby monetary tightening actually leads to an increase in the supply of loans for certain sectors (Den Haan et al., 2007; Den Haan et al., 2009).

There is a similar lack of consensus regarding the international transmission of monetary policy shocks. Global banks are known to facilitate the propagation of monetary policy changes across borders through their internal liquidity management operations; for instance, domestic monetary tightening may prompt the domestic offices of global banks to increase their reliance on foreign liquidity, which in turn decreases the supply of bank loans abroad (Cetorelli and Goldberg, 2012a, 2012b). However, the international transmission of domestic monetary policy shocks varies with the global banks' funding and investment priorities across countries (Cetorelli and Goldberg, 2012b). In fact, the international transmission of monetary policy shocks through cross-border banking flows may go beyond the realm of global banks, and thus may depend on other factors such as the type of foreign borrowers (i.e., banks vs. non-banks) or on country-specific characteristics. Nonetheless, there is only limited evidence on the importance of country-specific supply factors, in addition to the global factors, as determinants of cross-border banking flows (Bruno and Shin, 2015a).

As shown by these studies, identifying the impact of changes in domestic monetary policy on the supply of cross-border banking flows is a challenge. Monetary policy cycles may overlap across countries, and results that appear as supply-driven increases in cross-border credit due to domestic monetary policy may be explained by changes in credit demand in the host country. To isolate the pure supply effect of domestic monetary policy on cross-border flows one needs to fully control for credit conditions in recipient countries. We are able to solve this identification issue by using information on bilateral cross-border bank claims from the locational banking statistics by residence compiled by the Bank for International Settlements (BIS). These statistics are published at an aggregate level by the BIS, but the bilateral claims dataset, which contains information on bilateral cross-border bank flows by reporting (source) and counterparty (recipient) country at a quarterly frequency is available to reporting central banks. We use a sample covering the period between 1995Q1 and 2014Q1, which allows us to cover several monetary cycles for the 29 reporting countries in our sample.[1]

The dyadic structure of this dataset allows us to identify the supply of cross-border bank flows by using different sets of fixed effects. For example, in our more restrictive specification, we

[1] In this paper we use 'reporting' and 'source' country interchangeably. The same applies to 'counterparty' and 'recipient' country.

introduce counterparty-time fixed effects, which allow us to control for unobserved (time-variant) counterparty-country fundamentals that may shift the demand for cross-border flows. In this case, the identification of the effect of monetary policy stances on the supply of cross-border flows arises from the comparison of these flows from different reporting countries to one counterparty country at a given point in time. This test, which is similar in nature to that applied to firms by Khwaja and Mian (2008), allows us to isolate factors that affect the supply of cross-border flows from those that affect the demand of these flows.[2]

A concern in any study dealing with monetary policy is how to measure the stance of policy set by the central bank. We follow Herrmann and Mihaljek (2010) and use the nominal policy rate as the main measure to capture the monetary policy stance in our set of reporting countries. A potential problem with our strategy is that policy rates in the domestic economy may be endogenously determined by the cross-border flows supplied by its banks. However, we believe that this concern is not material. Central banks typically adjust their monetary policy stances to achieve their mandates of price stability and, for some, employment in their domestic economies (Bernanke, 2013). Cross-border bank flows only enter a central bank's policy reaction function if they either affect domestic financial stability or if these flows have a significant effect on world output that, in turn, affect the domestic economy. We consider these channels second order effects, as central bank may use other policies to mitigate financial instability (prudential policies) and the feedback effect from global growth may not be substantial enough to alter the monetary policy stance. Thus, the impact of domestic monetary policy on cross-border flows may be considered as a spillover, which allows us to treat the policy rate as exogenous in our tests.

With this estimating framework in mind, our main results are as follows: (1) While controlling for foreign demand, we find that tighter monetary policy domestically has a positive and significant effect on the growth of cross-border claims to non-bank residents in foreign economies. Similarly, this positive relation between monetary policy rates and the growth in cross-border claims to foreign residents is also present for total claims and claims on foreign

[2] A concern may be that different reporting banking countries face different borrowers in the same country, which would prevent us from controlling for the demand for cross-border flows using only fixed effects. However, as shown by Cerutti, Hale, and Minoiu (2015), a large fraction of cross-border claims on non-banks are intermediated through the global syndicated loan market. Borrowers on this market are likely to be more homogenous, as they have to satisfy a minimum credit quality to be able to seek funds from the global banks that participate on it.

banks, even though its robustness varies across specifications. Thus, our results relying on bilateral cross-border banking flows do not provide evidence for an international bank lending channel, whereby tighter monetary policy at home would decrease the supply of cross-border bank flows. (2) Instead, comparing domestic credit growth to cross-border flows, we find that tighter monetary policy domestically is associated with slower credit growth at home and faster bank lending to foreign non-bank counterparties, providing support to a "portfolio rebalancing channel"; the portfolio rebalancing also works toward foreign advanced economies and against emerging market economies. (3) Lastly, while controlling for global factors, we find that country-specific characteristics are important determinants of cross-border bank flows. Thus, faster GDP and faster credit growth in the destination economy are associated with higher bank inflows; on the contrary, higher aggregate leverage in the destination economy leads to lower bank inflows.

Our paper is related to three branches of the empirical literature. First, it is related to empirical work on the transmission of monetary policy through the bank lending channel both domestically and internationally (Kashyap et al., 1993; Kashyap and Stein, 2000; Cetorelli and Goldberg, 2012a, 2012b). It also adds to recent evidence that monetary tightening leads to a portfolio rebalancing effect that actually increases the supply of certain loans (commercial and industrial loans) domestically, which can offsets the bank lending channel (Den Haan et al., 2007). Our evidence for a portfolio rebalancing effect is consistent with Ippolito et al. (2015), which shows that firms that that are unhedged and borrow from banks at floating rates may become riskier during periods of monetary tightening and thus are more likely to lose access to bank credit. Second, our paper adds to the sparse literature on the determinants of cross-border banking flows, such as Cerutti et al. (2014), which emphasizes the role of global factors such as uncertainty, U.S. monetary policy, and U.K. and Euro Area bank conditions; it is also related to Cerutti and Claessens (2014), which focuses on role of bank-specific vulnerabilities in the reduction of cross-border and local affiliate lending during the Global Financial Crisis in 2008, and finds a role for country-specific characteristics like the U.S. policy rate. Finally, our paper is related to a growing literature on the determinants of international capital flows, but which focuses on total or portfolio flows rather than on cross-border banking flows (Forbes and Warnock, 2012; Ahmed and Zlate, 2014, Ghosh et al., 2014).

The rest of the paper is structured as follows. Section 2 presents the data and section 3 the methodology. Sections 4 and 5 describe the main results on the role of monetary policy, portfolio rebalancing, and the role of other country-specific factors as drivers of cross-border bank flows. Section 6 presents the robustness results. Section 7 concludes.

2. Data

2.1 Cross-Border Bank Flows

The Locational Banking Statistics (LBS) by residence, compiled by the Bank for International Settlements (BIS), is the main data source for the empirical tests conducted in the paper. The dataset is confidential and is made available by the BIS to the central banks of reporting countries. The LBS provide quarterly data on the aggregate cross-border claims and liabilities of banks residing in 45 reporting countries (Bank for International Settlements, 2013).[3] The first-difference of cross-border bank claims, which are already adjusted for exchange rate fluctuations across quarters by the BIS, gives the corresponding bank flows. An advantage of these data, compared to the banking flows collected from balance of payments statistics, is the detailed breakdowns of the reported series by destination. In fact, reporting countries produce information on their bank claims (and liabilities) on roughly 200 counterparty countries, with a breakdown by currency, instrument (loan and debt securities), and type of counterparty (bank or non-bank).

The LBS dataset includes information dating back to 1977. However, some countries, especially emerging market economies, started reporting these data only later. This factor, plus the availability of other data used in the empirical tests, limits our sample to the period between 1995:Q1 and 2014:Q1, for 29 reporting countries and 77 counterparty countries. We also exclude from our sample the offshore centers that report to the LBS.[4] Table 1 presents the list of countries included in the sample and the number of observations per country. As shown in the table, France, Germany, Switzerland, and the United Kingdom have the largest number of

[3] The BIS LBS started collecting information on domestic claims and liabilities as of 2012:Q2.
[4] We exclude financial centers from our sample for two reasons. First, these locations are typically used by corporations or banks to arrange financial transactions whose funds are redirected elsewhere for their final use (Avdjiev, et al., 2014). Second, this pass-through nature of offshore centers makes their monetary policy irrelevant to the banking flow originated in these locations.

observations as reporting countries, while the United Kingdom and the United States appear with the highest frequency as counterparty countries. These cursory statistics outline the importance of these European countries as hosts for large global banks and the United States as a large financial center in the global banking network.

The dyadic structure of the LBS data (i.e., multiple reporting countries to multiple counterparties) allows for the use of different types of fixed effects in the econometric panel specifications, which are crucial to control for unobservable variation in country-specific drivers of cross-border bank flows. Figure 1 provides a schematic representation of the dyadic data. In this hypothetical example, banks from three reporting countries have cross-border exposures to borrowers from five counterparty countries. This structure allows to disentangle changes in cross-border bank flows that are driven by supply factors specific to the source country from those arising from changes in the demand for credit in the destination. An additional advantage of the LBS dataset arises from the way that cross-border claims are reported. Countries are required to report to the BIS the amount outstanding of cross-border claims of banks residing in their jurisdiction, converted to U.S. dollars using the end-of-quarter exchange rate. Note that the currency composition of these claims are also reported, which allows the BIS to calculate the exchange rate-adjusted changes in cross-border claims for each country. This is akin to a real measure of bank flows stripping out any currency variation.

Using these data, we construct the dependent variable used in our estimation, the quarterly growth of cross-border bank claims, which is equivalent to the cross-border bank flows normalized by the outstanding bank claims lagged one period. Specifically, we construct this variable by dividing the exchange rate-adjusted change in outstanding claims from quarter *t-1* to quarter *t* by the outstanding claims at *t-1*. Before computing this growth rate, we drop reporting-counterparty pairs where the minimum outstanding claims in a given quarter are worth less than $5 million or the total outstanding claims are negative. This final growth rate is expressed in percent and winsorized at the 2.5 percentile.

Table 2 presents a set of summary statistics for the cross-border bank flows (CBF) computed as the growth in cross-border claims for our sample of countries. As shown in the table, the quarterly total CBFs (to bank and non-bank counterparties) average around 4 percent of the lagged outstanding claims during our sample period. By type of counterparties, the CBFs to

banks average around 9 percent, while the CBFs to non-banks average almost 5 percent. The volatility of flows to banks is also larger than that of flows to non-bank counterparties, as shown by their standard deviations.

A drawback of the LBS is that it does not contain the historical claims of domestic banks on borrowers residing in their home country. Some of our tests require the complete portfolio of claims of reporting banks to assess whether banks substitute domestic claims for foreign claims. For this purpose, we construct a new dataset of domestic banks' claims on the domestic non-bank sector. These claims include both loans and securities, and thus are consistent with the data in the LBS. To construct the series of bank claims on the domestic non-bank sector, we use two sources. First, we use data on total credit to the *private* non-financial sector, also constructed by the BIS (Dembiermont et al., 2013). Second, we collect data on domestic bank claims, loans, and securities holdings vis-a-vis the *public* sector, from national sources consistent with those used by the BIS. The resulting series on bank credit to the domestic public sector in local currency is added to the series on bank credit to the private sector to construct the aggregate bank claims to the domestic non-bank sector. Using these series, we compute growth rates for the outstanding claims that are compatible with those described above for cross-border claims.

2.2 Monetary policy rates and other explanatory variables

Our main variable of interest is the monetary policy rate, which is targeted by the 29 BIS reporting countries in our sample. We collect data on this variable from several sources including central banks and the International Monetary Fund. Some monetary authorities do not target specific rates, in which case we use the reference rate most widely used by market participants to assess the monetary stance of the central bank. For euro area countries, we use the individual countries' policy rates until the introduction of the euro and then the rate for Main Refinancing Operations (minimum bid rate) set by the European Central Bank for the rest of the sample period.

In our main specifications, we use the nominal policy rate as the reference rate. As noted by Herrmann and Mihaljek (2010), there are two reasons why nominal rates should be preferred to real rates when estimating the determinants of cross-border bank flows. First, banks typically calculate their expected profits, when making a loan, using nominal rates rather than real rates.

Second, it is difficult to select the correct deflator when dealing with cross-border claims. There are various reasons to use a deflator for the reporting country as well as the counterparty country, depending on where the bank profits for the loan would be reinvested. That said, we are aware that real policy rates differ with price inflation across reporting countries. Therefore, we explicitly add the inflation rate for the reporting countries in our estimation, as well as other control variables described below.

We present a cursory assessment of the relationship between cross-border bank claims and monetary policy rates in Figure 2. The top left panel shows the mean policy rate for our sample of 29 reporting countries and the mean growth in cross-border claims for the sample period. As the pattern of time series shows, the correlation between these two variables appears to be positive in the sample period. A similar correlation is observed for the cross-border claims originated in the banking sectors of Great Britain and the United States in the top right and bottom left panels, respectively. In contrast, the correlation between these two variables appears to the weaker for the German banking sector, as shown in the bottom right panel. These graphs provide some basic evidence that higher monetary policy rates are associated with larger cross-border bank flows. But these cross-border bank flows may also result from other macroeconomic conditions in both reporting and counterparty countries, which require the use of a series of controls to capture these factors.

The monetary policy rate is an informative indicator of the monetary policy stance of a country under normal circumstances. However, in our sample period, three central banks implemented unconventional monetary policy measures as their reference rate hit the zero lower bound. For these three countries, Japan, the United Kingdom, and the United States, we construct an indicator variable equaling one for the duration of the countries' quantitative easing program and zero otherwise. For countries not using unconventional tools, the indicator variable equals zero for the full sample period. More details about these indicator variables and other regressors are in the Appendix.

In addition to the monetary policy rate, other macroeconomic factors can potentially have a significant impact on cross-border bank flows. For instance, weak domestic credit demand as a result of slow economic growth may induce global banks to lend more abroad. Controlling for these additional factors is crucial to identify the effect of monetary policy rates on cross-border

claims. Following the existent literature, we consider the quarterly real GDP growth, the quarterly inflation rate, and the debt-to-GDP ratio as explanatory variables, as in Bruno and Shin (2015a), who point out that these factors can potentially affect credit conditions, citing for instance, that a higher inflation rate could limit the supply of credit. Similarly, in our estimations we also use bank equity returns at a quarterly frequency, a country-specific variable that measures the health of the banking system (Bruno and Shin, 2015a; Ghosh et al., 2015). To capture the reporting countries' domestic demand for credit, we include the quarter-over-quarter growth in the domestic credit to the non-financial private sector among the explanatory variables, constructed using the BIS dataset described before.

Lastly, for the specifications that do not use counterparty-time fixed effects to control for demand, we collect similar variables for counterparty countries to control for factors that may affect the demand for cross-border flows.

3. Methodology

We start our analysis estimating variants of the following specification:

$$CrossBorderFlows_{i,j,t} = \alpha_{j,t} + \beta\, MP_{i,t-1} + X'_{i,t-1} + \varepsilon_{i,j,t}$$

where *i* and *j* indicate the reporting ('source') country and counterparty ('recipient') countries respectively, and *t* denotes time at quarterly frequency.[5] We use three different cross-border flow measures: first, the ratio between the (exchange-rate and break adjusted) current minus previous quarter outstanding claims on all sectors in a counterparty country (numerator) scaled by the lagged outstanding claims of a reporting country in a given quarter (denominator), which is our measure of cross-border bank flows; second, the same measure based on claims via-a-vis foreign bank counterparties; and third, the same measure but for claims on foreign non-bank counterparties.

We use two different fixed effect estimators. First, $\alpha_{j,t}$ represents a counterparty-time fixed effect, which accounts for the time variation in country-specific characteristics for the counterparty

[5] We use the terms reporting and source country interchangeably; the same applies for counterparty and recipient country.

countries. Using this approach ensures that the relationship between monetary policy in the source country and cross-border flows is not driven by demand for credit in the recipient country, since the latter is accounted for by the counterparty-time fixed effect. This method therefore achieves a cleaner identification of the impact of factors specific to the source country on the supply of cross-border credit. Therefore, the coefficient β should be interpreted as the impact of the monetary policy stance in reporting countries on the supply of cross-border flows to the same recipient in a given year-quarter. The upper graph of Figure 3 provides graphical representation of the counterparty-time identification.

Given this estimation method, we expect the coefficient on monetary policy rates β to be positive, that is, reporting countries with higher monetary policy rates lend more abroad compared to reporting countries with lower monetary policy rate in a particular quarter. Our explanation is that, because monetary policy tightening at home decreases borrowers' net worth and collateral values through the balance sheet channel, borrowers become more risky (Ippolito et al., 2015). Therefore, domestic banks invest in less risky loans to safeguard their capital ratios (e.g., Den Haan et al., 2007). Because borrowers at home become more risky, banks opt for cross-border claims, presumably in countries where monetary policy rate is relatively lower and borrowers are less risky. This behavior is also consistent with the risk-taking channel of monetary policy in which banks tend to lend to risker borrowers when monetary policy is accommodative (e.g., Jimenez et al., 2014).

In our second specification, we include reporting-counterparty fixed effects $\alpha_{i,j}$ and we separately account for trend effects at the year-quarter level α_t (these fixed effects replace $\alpha_{j,t}$ in the equation above). This specification allows us to estimate the relationship between the interest rate differential of reporting and counterparty countries ($MP_{i,t-1} - MP_{j,t-1}$) and cross-border flows. This estimator controls for persistent characteristics of a reporting-counterparty pair and for the time variation in global factors, which allows to isolate some of the effect of time-varying characteristics at the reporter and counterparty levels. However, it also makes it harder to disentangle the effects of supply from those of demand characteristics, to the extent that explanatory variables do not entirely capture such variation for the source or destination countries. The lower graph in Figure 3 shows graphically how the identification is achieved.

We also include a set of push ($X'_{i,t-1}$) and pull factors ($X'_{j,t-1}$) that have been found to explain cross-border banks flows. For instance, macroeconomic conditions in host and home countries drive banking flows, though the evidence is mixed. Bruno and Shin (2015b) find a negative impact of foreign growth on banking inflows. Goldberg (2002) finds mixed results. The general "pull" evidence seems to suggest that banking flows are directed to countries with strong economic activity (e.g., Portes and Rey, 2005). We measure economic activity as the GDP growth in reporting and counterparty countries (*GDPgr_rep* and *GDPgr_cp*). We also include variables that measure credit growth (*CRgr_rep, CRgr_cp*) and banking sector equity performance (*BankRet_rep, BankRet_cp*) for reporting and counterparty countries. In addition, to understand whether higher external debt reduces bank inflows as in Bruno and Shin (2015a), we include the ratio of debt to GDP (*Debt/GDP_rep, Debt/GDP_cp*). All controls are winsorized at the 2.5% level and the standards errors are clustered at the reporting country level.

4. Monetary policy and cross-border flows

In this section we explore the relationship between monetary policy rates and cross border credit. We employ different estimation techniques and specifications to ascertain that our main result is robust and we discuss the potential effect of a global factor.

4.1 Main results on supply-side determinants

Table 3 presents the fixed effects estimates of the effect of reporting-country monetary policy (*Mprate_rep*) on cross-border flows. In column (1) the dependent variable is the growth of cross-border claims on both bank and non-bank sectors of recipient countries' economies. The estimate on *Mprate_rep* suggests that one percent increase in the monetary policy rate in the source country is associated with an additional 0.26 percentage points in cross-border flows relative to the outstanding claims per destination. Since we rely on counterparty-time fixed effects, this estimate is relevant for the cross-section of reporting countries that have a common counterparty in a given year-quarter. In columns (2) and (3) we split the cross-border bank flows into those with banking and non-banking foreign counterparties and find a similar relation between the monetary policy rate and cross-border flows. However, it appears that the effect of higher interest rates is larger for flows to counterparties in the non-bank sector (0.41 percentage points)

than for either total flows or flows to bank counterparties (0.26 and 0.30 percentage points, respectively).

Previous literature provides mixed evidence on the relationship between interest rates and cross-border credit (Cerutti and Claessens, 2014; Goldberg, 2002). For example, Bruno and Shin (2015b) find a negative relationship, arguing that banks' financing costs are closely tied to central bank policy rates, and hence affect bank's willingness to lend internationally. Another related explanation is that higher interest rates in the source countries reflect strong economic conditions that results in higher confidence of international lenders. Yet, an additional explanation could be that banks are searching for less risky investments that may not be present in their home countries, since higher interest rates suppress the net worth of local borrowers and hence make them riskier. In section 5 we develop this argument in detail.

We also find that GDP growth in the source country affects cross-border flows positively, which happens mostly through the flows to non-bank foreign counterparties. Holding all else equal, this result is consistent with the view that strong economic activity facilitates credit growth, presumably in both the domestic and foreign economies. In fact, monetary policy and economic activity may affect cross-border credit jointly, a hypothesis which is addressed in Section 6. Aside from the monetary policy rate and GDP growth in the source country, none of the other estimates are statistically significant.[6]

4.2 Sensitivity to the sample period

Given that the full sample includes a spike in global uncertainty during the global financial crisis, and also given that the pre/post-crisis periods differ dramatically—through the implementation of quantitative easing and new regulatory requirements for banks, among other factors— we examine whether the results described above are preserved when the pre/post-crisis periods are considered separately. In Table 4, we split the sample into two periods before and after 2007:Q2. In columns (1)-(3) we focus on the period before 2007:Q2. The coefficient on the monetary

[6] In unreported regressions, we also include exchange rates between country pairs, because when the local currency appreciates, local borrowers' balance sheets become stronger, resulting in lower credit risk and hence expanded bank lending capacity. Due to data availability on the exchange rates series, this specification leads to substantial drop of observations and we omit it from the main analysis.

policy rate is positive for all three types of cross-border bank flows, but it is statistically significant at the 1 percent level only for flows to foreign non-bank counterparties. Beyond the flows to foreign non-bank counterparties, the significance of the monetary policy rate for either the total cross-border flows or for those to bank counterparties is weak at best. In columns (4)-(6), for the period during and after the crisis, the coefficient on the monetary policy rate is positive and significant for all flow types.

To sum up, the robustness of the effect of monetary policy on cross-border bank flows differs across flow types and time periods. Thus, the coefficient on the monetary policy rate is positive and statistically significant mainly for the bank flows to foreign non-bank counterparties, which suggests a portfolio rebalancing toward foreign non-bank borrowers.

4.3 Reporter and counterparty country characteristics

In Table 5 we report estimates from specifications that simultaneously include reporter-counterparty fixed effects and time fixed effects, which allow to isolate the effect of time-varying characteristics of the reporting- and counterparty countries on cross-border bank flows. In columns (1)-(3) we include separately the interest rates in the source and recipient countries, while in columns (4)-(6) we include the interest rate differential (*MPrate_diff*) instead. As in the previous table, we also account for a set of push and pull factors found to play a role in cross-border credit (e.g., Ahmed and Zlate, 2014; Ahmed et al., 2015). The only difference with the previous specification is that now we can account for source and recipient country controls separately.

In column (1), the sign on the interest rate in reporting countries (*Mprate_rep*) is positive and significant, suggesting that higher monetary policy rates in reporting countries are associated with higher cross-border bank flows to foreign counterparties. Similarly, the negative coefficient on the interest rates in the counterparty countries (*Mprate_cp*) suggests that high interest rates do not necessarily attract bank inflows. Thus, using the within reporting and counterparty estimates, we find that cross-border credit moves away from countries with tighter monetary policy, where borrowers have likely become more risky and where central banks are cooling demand, and moves to countries with lower interest rates, holding all else equal. In column (2), where the dependent variable is cross-border flows on banks, the monetary policy rates in counterparty

countries enter negatively, while in column (3), for cross-border claims on non-banks, the monetary policy rates in reporting countries matter positively. In columns (4) to (6) we include a specification with the interest rate differential between reporting and counterparty countries, *MPrate_diff*, whose positive coefficients are consistent with the results in columns (1)-(3): higher interest rates in the reporter vs. counterparty countries are associated with larger bank flows from reporters to counterparty countries.

Looking at country characteristics other than monetary policy, GDP growth in the recipient country (*GDPgr_cp*) has a positive and significant effect on all three types of cross-border bank flows. This result is in line with previous studies showing that faster growth attracts more bank inflows (e.g., Portes and Rey, 2005). In addition, we use country-specific variables that measure the health of banking systems and the strength of macroeconomic fundamentals in both the reporting and counterparty countries, such as credit growth to the private non-financial sector, bank returns, inflation, and total gross debt to GDP. Two results stand out. As a measure of demand, faster credit growth to the non-financial sector in the counterparty country (*CRgr_cp*) is positively correlated with cross-border banking flows to both the banking and non-banking sectors. Although this result may be partially mechanic, as our measure of total domestic credit growth to the private non-financial sector includes cross-border credit, the use of lagged credit growth mitigates the concern of reverse causation. In addition, greater indebtedness in recipient countries deters bank flows to the non-bank counterparties, consistent with the findings in Bruno and Shin (2015b), but has no effect on cross-border flows to bank counterparties.

To assess the impact of unconventional monetary policy on cross-border bank flows, we use a dummy variable (*QE_rep*) that equals one for reporter countries in quarters when quantitative easing was in place. The coefficient on that indicator variable is positive and significant, but only for cross-border banking flows to the non-bank sector.

More recently, a series of studies have documented that permissive credit conditions in countries with accommodative monetary policy—and hence low interest rates—are transmitted across borders. Miranda-Agrippino and Rey (2015) highlight the highly synchronized nature of financial conditions across borders and the co-movement in debt flows that accompanies them. There is also robust evidence that banking flows respond negatively to an increase in global risk aversion, when central banks usually lower interest rates (Bruno and Shin (2015b)). Hence, it is

possible that the positive effect of monetary policy rates on cross border bank flows that we highlight above is driven by a "global factor" (e.g., risk aversion) that is correlated with interest rates, rather than by interest rates as country-specific characteristics. However, the estimation technique used in Table 5 appeases this concern. Since the global factor is likely unobservable, and to the extent that it operates in the same way across reporting and counterparty countries, the time fixed effect accounts for it. Accounting for the global factor in this manner, the country-specific interest rates are still statistically significant determinants of cross-border banking flows.

5. Monetary policy and bank portfolio rebalancing

The results in the previous section showed a positive relation between monetary policy rates in sources countries and cross-border bank flows, especially to foreign counterparties in the non-bank sector. As noted earlier, this result is inconsistent with the traditional bank lending channel, which states that the cross-border flow of new loans should decrease as monetary policy tightens. However, our findings are consistent with a broader portfolio rebalancing conducted by global banks, whereby these institutions decrease domestic lending, in line with the bank lending channel, but at the same time increase their foreign lending, in line with the portfolio rebalancing channel described in Den Haan et al. (2007).

In the previous sections we only used information on the growth of cross-border claims as our main dependent variable. To determine whether banks rebalance their portfolios as monetary policy rates increase, we use a new database that includes not only cross-border claims to the non-bank sector, but also claims on the domestic non-bank sector. We focus on cross-border bank flows to non-bank counterparties, for which we found the most robust evidence for a positive relation between interest rates in source countries and cross-border bank flows.

Table 6 reports the results from a specification similar to that in equation (1), in which the dependent variable also includes the growth in domestic claims of banks from reporter country *i* on non-banks from country *i* itself; these are stacked with the growth in cross-border claims by banks from source country *i* on non-bank counterparties from recipient countries *j*. The control variables are the same as before, and we still use counterparty-time fixed effects to control for demand conditions in the recipient countries. In addition, we introduce a domestic indicator

variable (*Domestic ind*.) that equals one when the claim is on the domestic non-bank sector; this domestic counterparty indicator is interacted with the monetary policy rate. Thus, in Table 6, the specification in column (1) simply replicates the estimations from Table 3 (column 3), but with the growth in domestic claims included in the dependent variable. As is shown by the coefficient of the monetary policy rate, the results are robust to the inclusion of domestic claims, as this coefficient remains positive and significant.

Also in Table 6, columns (2) and (3) present results with the monetary policy rate interacted with the domestic indicator. A negative coefficient on this interaction term would present evidence that banks adjust their domestic and foreign portfolios differently in response to changes in monetary policy rates. The negative and statistically significant coefficient on the interacted term suggests that, when monetary policy in a source country is tighter, banks increase cross-border flows to foreign non-bank counterparties, while at the same time they decrease or maintain constant the growth in the claims to domestic non-bank counterparties. As reported in column (3), this result is robust for the pre-Global Financial Crisis period, with the sample used in that specification ending in 2007:Q2. These results are consistent with the existence of both an international portfolio rebalancing channel and a domestic balance sheet channel.

To rationalize the international portfolio rebalancing channel, we reckon that as monetary policy rates in sources countries increase, domestic borrowers may become riskier (Ippolito et al., 2013), which may lead banks to invest in safer assets issued by foreign residents. But are banks rebalancing their portfolios toward safer foreign assets? We test this hypothesis in Table 7, in which we differentiate banks' reaction to monetary policy rates (and to the other control variables) depending on whether the counterparty is located in an advanced or an emerging economy. Although this is a simple definition of risky borrowers, it is consistent with market perceptions on the riskiness of borrowers across countries. To differentiate between foreign advanced and emerging market economies, we construct an indicator variable that equals one when the counterparty country is in the latter group. Then, we interact this indicator variable (EME) with all our regressors. Once again, the variables of interest are the monetary policy rate of the reporting country (*Mprate_rep*) and its interaction with the EME indicator variable.

In columns (1) and (2) of Table 7, the dependent variables are the cross-border bank flows, both total and to bank counterparties. As shown by the coefficient on the monetary policy rate and its

interaction with the EME indicator, banks in source countries with higher monetary policy rates send higher cross-border flows to advanced economies rather than to emerging market economies. Thus, banks appear to shift their portfolios toward safer assets issued by counterparties in advanced economies. Column (3) repeats the exercise with cross-border flows to foreign non-bank counterparties as the dependent variable. In this case, we find that no statistically-significant difference in the effect of monetary policy rates on cross-border flows to non-banks counterparties in advanced vs. emerging economies.

6. Robustness

In this section we present two robustness tests of our main results. First, we examine whether the business cycle and the monetary policy stance drive together the relationship between interest rates and cross-border bank flows. Second, we investigate whether the relationship between cross-border flows and monetary policy rates differ for EME and non-EME recipient countries before and after the crisis.

6.1 Economic Activity

As noted before, cross-border flows may be affected by the economic activity in the source country. If the monetary policy and the economic cycles overlap, then the relationship between cross-border flows and interest rates may be driven by economic conditions. It is possible that if economic activity in the source country is booming, and monetary policy is reacting in order to slow down economic growth and control inflation, that banks may choose to increase foreign claims because their risk-adjusted returns may be better outside the home country. Alternatively, if economic conditions are worsening while monetary policy is tightening, then there may not be enough domestic demand for credit, which may lead banks to increase the supply of credit abroad. Ideally, to isolate the effect of economic activity from the effect of monetary policy, we would need a setting in which monetary policy is exogenous to economic conditions, which is not feasible to attain.

As an alternative, we examine whether the relationship between cross-border flows and monetary policy varies with the business cycle. In Table 8, we report results from specifications

similar to the ones used in Table 3, but we add an interaction term between the monetary policy rate and GDP growth in the reporting countries. Our focus is on the interaction term and also on the base coefficient on *Mprate_rep*. Starting with column (1), in which the dependent variable is the growth in cross-border flows to all sectors, we observe that the base coefficient on *Mprate_rep* is positive and significant. The interaction term between the monetary policy rate and GDP growth is negative and significant, suggesting that as *GDPgr_rep* increases, the relationship between monetary policy and cross-border flows weakens. This result is not surprising, as it is consistent with an increase in domestic credit demand when GDP growth is elevated and monetary policy is tightening.

In column (2), the dependent variable is cross-border flows on the banking sector. The result is similar to the one reported in column (1). In column (3), we note that *GDPgr_rep* does not play a role in influencing the growth in cross-border flows to non-banks. Overall, we find that GDP and monetary policy affect cross-border flows independently and our result is likely not being affected by the confounding effects of economic activity.

6.2 EMEs vs. Non EMEs Before and During the Financial Crisis

In Table 9, we estimate our main specifications separately for EME and non-EME recipient countries, and also for the period before and after the Global Financial Crisis. In previous specifications, we tested our main hypothesis separately using these breakdowns, but it is informative to combine both features to assess if any new relationships can be revealed. In columns (1)-(12) we look at EME countries before 2007:Q2, followed by non-EME countries before 2007:Q2, EME countries after 2007:Q2, and non-EME countries after 2007:Q2.

We find that the relationship between cross-border flows and monetary policy for non-EME countries is very similar before and after 2007:Q2, which is consistent with the portfolio rebalancing channel. This is potentially explained by banks' perception that borrowers in non-EME countries are safer, even after the Global Financial Crisis.

In contrast, we also find that there are differences in the reaction of cross-border flows to EME borrowers to monetary policy rates before and after 2007:Q2. As shown in column (2), the coefficient on the monetary policy rate is negative and significant for cross-border flows on banks after 2007:Q2, but it plays a positive role for flows to the non-bank sector in the same

period, as shown in column (3). As for the period before 2007:Q2, we find that cross-border flows to banks in EME countries are not significantly related to monetary policy rates in the reporting country. For non-banks, the relationship is positive and significant.

These results show that the relationship between cross-border flows and monetary policy rates is complex and depends on both the time period and the country of destination. However, these findings support our main explanation that bank flows go to safer locations as a result of a bank portfolio rebalancing channel.

7. Conclusions

As cross-border bank flows increased rapidly over the past three decades, it became crucial to understand the main drivers of these international transactions, as well as the risks that they generate to both creditors and borrowers. This paper focuses on a specific but important link in this cross-border transmission mechanism, the relation between monetary policy and cross-border bank flows. In particular, we ask whether global banks adjust their cross-border flows according to an international bank lending channel, or if they adjust their flows in a way that rebalances their portfolios towards riskier or safer securities.

To answer these questions, we use information from the BIS locational banking statistics, as well as a novel dataset with information on banks' claims on the domestic non-bank sector. The dyadic structure of these data allows us to control for factors affecting the demand for cross-border flows, which helps in the identification of changes in the supply of cross-border flows as a result of movements in monetary policy rates.

There are three main results that arise from our tests. First, monetary policy tightening episodes during periods of conventional monetary policy are associated with an increase in cross-border flows, particularly to non-banks. Second, banks appear to rebalance their portfolios away from domestic claims to non-banks and into cross-border flows to non-banks. This may be the result of domestic borrowers becoming riskier relative to foreign borrowers. To test whether those foreign borrowers are safer, we separate the effect of the monetary policy rate on cross-border flows to borrowers in emerging and advanced economies. This exercise leads to our third result.

Global banks lend more to banks in advanced economies and to non-banks in both emerging and advanced economies as policy rates increase. The result is consistent with a partial flight to safety as monetary policy tightens.

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Figure 1: Data Structure of BIS Locational Banking Statistics

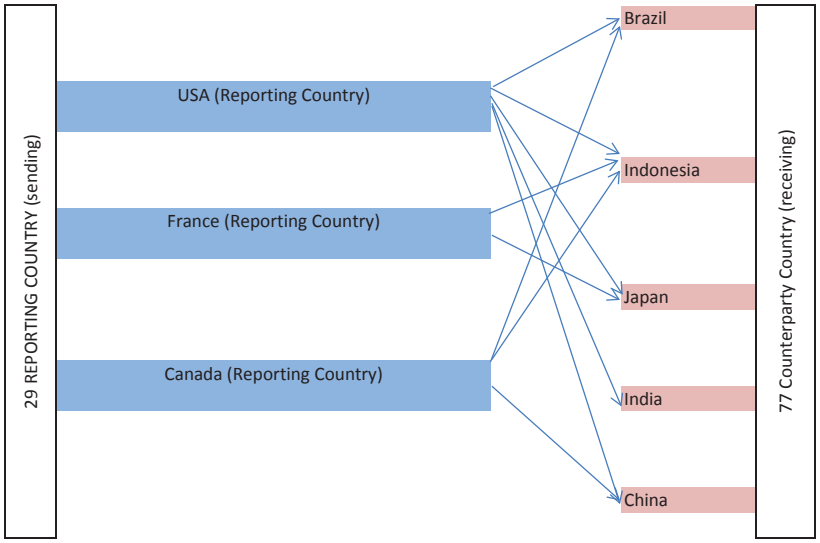
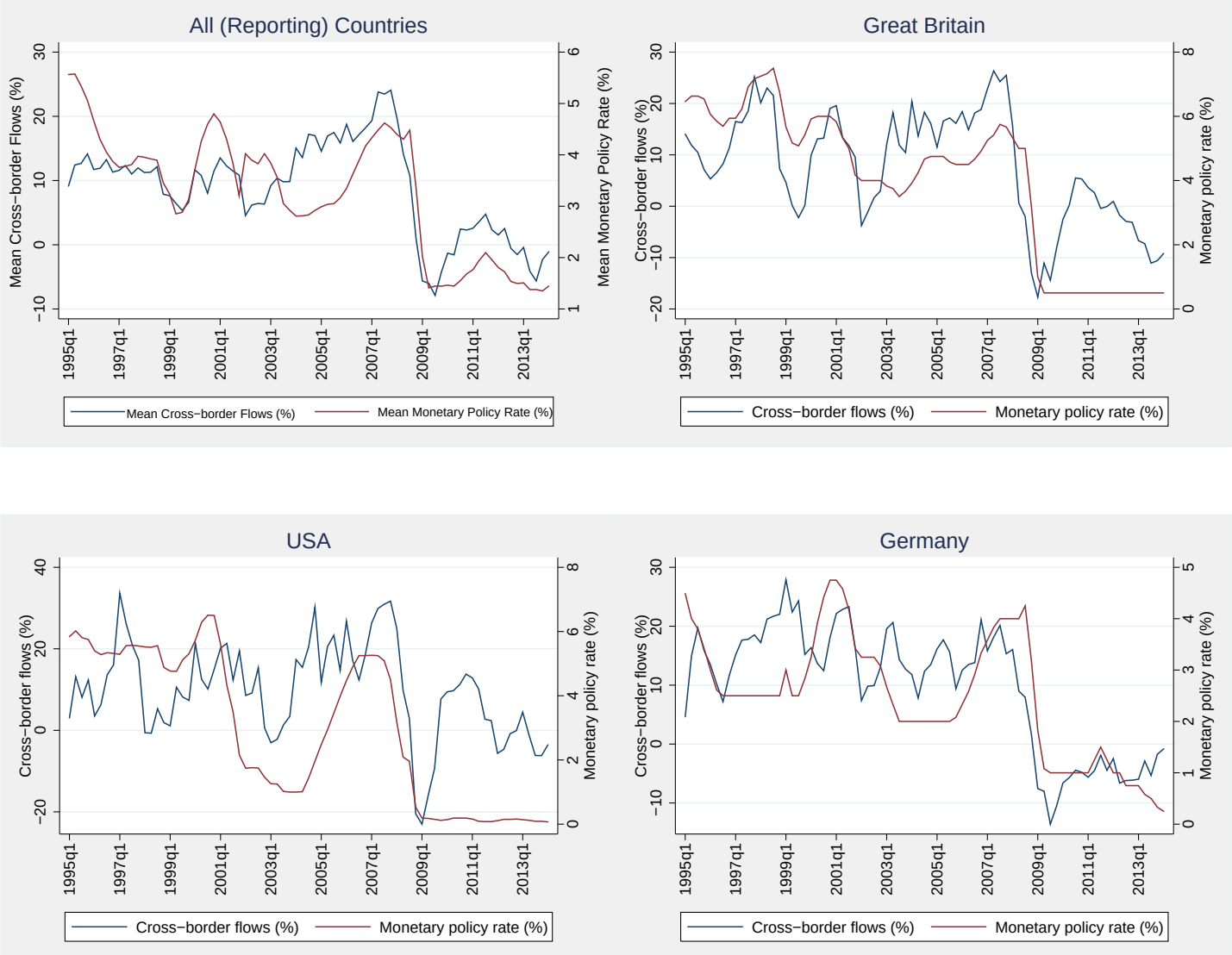


Figure 2: Cross-Border Flow and Monetary Policy



These graphs show quarterly monetary policy rates and cross-border flows to all sectors defined as the ratio of current cross-border claims over total outstanding lagged claims.

Figure 3: Graphical Presentation of Our Identification

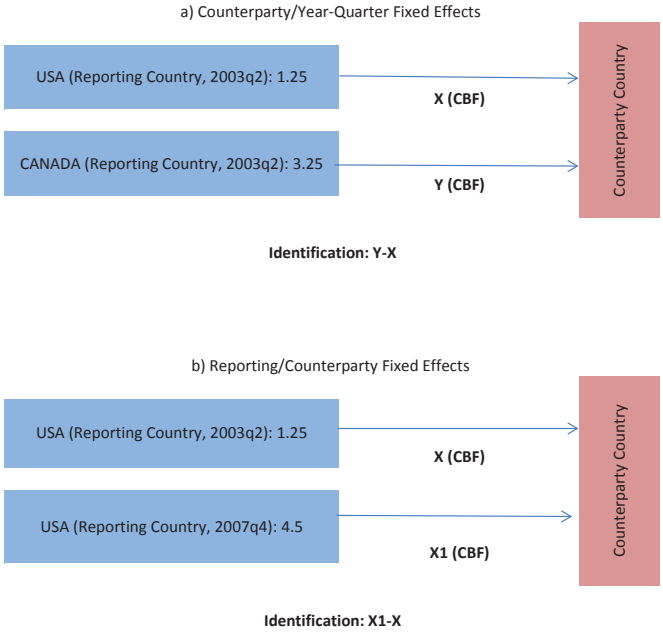


Table 1: **List of reporting and counterparty countries**
EME_reporting (EME_counterparty) takes one if the reporting (counteraprty) country is classified as an emerging economy and zero otherwise.

Reporting Country	Observations	EME_reporting	Counterparty Country	Observations	EME_counterparty
AUSTRALIA	1,467	0	ALGERIA	456	1
AUSTRIA	3,832	0	ARGENTINA	1,014	1
BELGIUM	4,034	0	AUSTRALIA	1,316	0
BRAZIL	819	1	AUSTRIA	1,389	0
CANADA	2,333	0	BELGIUM	1,498	0
DENMARK	2,238	0	BOLIVIA	123	1
FINLAND	1,581	0	BRAZIL	1,276	1
FRANCE	5,228	0	BULGARIA	672	1
GERMANY	5,318	0	CANADA	1,402	0
GREECE	845	1	CHILE	1,171	1
HONG KONG	2,184	1	CHINA	1,376	1
INDIA	1,764	1	COLOMBIA	700	1
INDONESIA	274	1	COTE D'IVOIRE	231	1
IRELAND	2,265	0	CROATIA	473	1
ITALY	3,348	0	CYPRUS	777	1
JAPAN	3,410	0	CZECH REPUBLIC	951	1
KOREA	2,160	0	DENMARK	1,394	0
LUXEMBURG	2,549	0	ESTONIA	122	1
MALAYSIA	866	1	FINLAND	1,270	0
MEXICO	170	1	FRANCE	1,636	0
NETHERLANDS	4,094	0	GERMANY	1,598	0
PORTUGAL	1,479	0	GHANA	346	1
SOUTH AFRICA	373	0	GREECE	1,143	1
SPAIN	3,285	0	GUATEMALA	345	1
SWEDEN	2,227	0	HONG KONG	1,362	1
SWITZERLAND	5,236	0	HUNGARY	936	1
TURKEY	794	1	ICELAND	838	0
UNITED KINGDOM	5,236	0	INDIA	1,074	1
UNITED STATES	3,889	0	INDONESIA	1,308	1
TOTAL	73,298	29	IRELAND	1,505	0
			ISRAEL	1,017	1
			ITALY	1,508	0
			JAMAICA	231	1
			JAPAN	1,561	0
			JORDAN	406	1
			KOREA	1,134	1
			KUWAIT	557	1
			LATVIA	73	1
			LIBYA	169	1
			LITHUANIA	270	1
			LUXEMBOURG	1,487	0
			MALAYSIA	933	1
			MAURITIUS	388	1
			MEXICO	1,219	1
			MOROCCO	892	1
			NETHERLANDS	1,612	0
			NEW ZEALAND	901	0
			NORWAY	1,391	0
			OMAN	500	1
			PAKISTAN	707	1
			PANAMA	1,097	1
			PARAGUAY	341	1
			PERU	918	1
			PHILIPPINES	1,004	1
			POLAND	1,128	1
			PORTUGAL	1,295	0
			QATAR	564	1
			ROMANIA	647	1
			RUSSIA	1,314	1
			SAUDI ARABIA	1,004	1
			SENEGAL	172	1
			SINGAPORE	1,483	1
			SLOVAK REPUBLIC	555	1
			SLOVENIA	582	1
			SOUTH AFRICA	1,195	1
			SPAIN	1,406	0
			SRI LANKA	538	1
			SWEDEN	1,393	0
			SWITZERLAND	1,595	1
			TAIWAN	946	1
			THAILAND	940	1
			TUNISIA	635	1
			TURKEY	1,317	1
			UKRAINE	309	1
			UNITED KINGDOM	1,652	0
			UNITED STATES	1,647	0
			VENEZUELA	963	1
			TOTAL	73,298	77

Table 2: **Sample Statistics**
This table reports summary statistics for cross-border flows, reporting and counterparty countries. All variables are defined in the Appendix.

	Observations	Mean	Median	StDev	Min	Max
Cross-Border Flows (CBF)						
CBF to Banks and Non-Banks (%)	73,298	4.08	0.87	24.29	-44.10	89.25
CBF to Banks (%)	70,844	9.01	0.54	46.99	-66.59	195.74
CBF to Non-Banks (%)	71,623	4.85	0.57	27.11	-47.58	107.35
Reporting Country						
MPrate_rep	73,298	3.10	2.67	3.24	0.00	61.00
CRgr_rep	73,298	1.94	1.79	4.97	-18.99	20.97
Bankret_rep	73,298	2.68	3.02	17.03	-83.43	90.74
GDPgr_rep	73,298	2.16	2.29	4.10	-27.60	29.33
Debt/GDP_rep	73,298	67.90	62.58	38.98	3.08	244.25
Infl_rep	73,298	2.19	1.97	2.72	-13.67	39.18
QE_rep	73,298	0.05	0.00	0.23	0.00	1.00
Counterparty Country						
MPrate_cp	44,990	5.54	3.83	9.86	0.00	300.00
CRgr_cp	44,990	2.32	2.20	5.57	-37.97	22.89
Bankret_cp	44,990	3.50	3.11	19.25	-83.43	232.17
GDPgr_cp	44,990	2.93	3.02	5.55	-52.53	53.33
Debt/GDP_cp	44,990	56.20	48.60	35.28	1.85	244.25
Infl_cp	44,990	4.73	2.69	20.28	-29.50	1551.20

Table 3: **Main Regression: Cross-Border Flows and Monetary Policy of Reporting Countries**

This table reports within counterparty/year-quarter estimates. All variables are one quarter lagged. Variable definitions are listed in the Appendix. Standard errors are clustered at the reporting country level. *** denotes 1% significant level, ** denotes 5% significant level, and * denotes 10% significant level.

	Cross-Border Credit (CBF) to:		
	Banks&Non-Banks	Banks	Non-Banks
	(1)	(2)	(3)
Mprate_rep	0.259***	0.298**	0.413***
	[0.090]	[0.114]	[0.107]
GDPgr_rep	0.084**	0.014	0.099*
	[0.038]	[0.067]	[0.049]
CRgr_rep	0.040	0.122	0.074
	[0.059]	[0.087]	[0.072]
Bankret_rep	-0.003	-0.000	-0.005
	[0.010]	[0.019]	[0.014]
Debt/GDP_rep	-0.006	-0.014	-0.003
	[0.005]	[0.009]	[0.006]
Infl_rep	-0.013	0.082	0.060
	[0.069]	[0.152]	[0.082]
QE_rep	0.859	-0.663	1.206
	[0.857]	[1.364]	[1.420]
Observations	73,298	70,877	71,704
R^2	0.12	0.12	0.11
Fixed Effects	Count./Year-Quarter	Count./Year-Quarter	Count./Year-Quarter

Table 4: **Cross-Border Credit and Monetary Policy of Reporting Countries Before/After 2007Q2**
This table reports within counterparty/year-quarter estimates. The dependent variable is cross-border flows defined in the Appendix. All variables are lagged at the previous quarter. Variable definitions are listed in the Appendix. Standard errors are clustered at the reporting country level. *** denotes 1% significant level, ** denotes 5% significant level, and * denotes 10% significant level.

	Banks and Non-Banks	Banks	Non-Banks	Banks and Non-Banks	Banks	Non-Banks
	Before 2007Q2			**After 2007Q2**		
	(1)	(2)	(3)	(4)	(5)	(6)
Mprate_rep	0.157*	0.180	0.335***	0.563***	0.767***	0.663***
	[0.080]	[0.114]	[0.112]	[0.127]	[0.200]	[0.205]
GDPgr_rep	-0.005	-0.003	0.007	0.093*	0.009	0.132**
	[0.007]	[0.017]	[0.009]	[0.047]	[0.085]	[0.061]
CRgr_rep	-0.002	0.003	0.086	0.074	0.219	0.071
	[0.074]	[0.131]	[0.103]	[0.085]	[0.130]	[0.072]
Bankret_rep	-0.018	-0.015	-0.004	0.009	0.009	-0.006
	[0.019]	[0.038]	[0.018]	[0.012]	[0.028]	[0.019]
Debt/GDP_rep	-0.004	-0.005	0.009	-0.005	-0.014**	-0.009
	[0.007]	[0.017]	[0.009]	[0.004]	[0.006]	[0.006]
Infl_rep	0.136	0.171	0.116	-0.165*	-0.068	-0.021
	[0.084]	[0.193]	[0.104]	[0.093]	[0.183]	[0.133]
QE_rep	1.219	-3.314*	1.641	0.998	0.439	0.990
	[0.790]	[1.850]	[1.174]	[1.066]	[1.643]	[1.746]
Observations	42,850	41,562	41,894	30,448	29,315	29,810
R^2	0.12	0.12	0.12	0.11	0.11	0.10
Counter./Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: **Where Do Cross-Border Flows Go?**
This table reports regressions results of within reporting-counterparty estimator. $MPrate\_diff$ is the difference between the rates of reporting and counterparty countries. All variables are lagged at the previous quarter. Variable definitions are listed in the Appendix. All specifications include year-quarter fixed effects. Standard errors are clustered at the reporting country level. *** denotes 1% significant level, ** denotes 5% significant level, and * denotes 10% significant level.

	Banks&Non-Banks	Banks	Non-Banks	Banks&Non-Banks	Banks	Non-Banks
	(1)	(2)	(3)	(4)	(5)	(6)
Mprate_rep	0.154*	0.183	0.238***			
	[0.079]	[0.122]	[0.082]			
Mprate_cp	-0.097**	-0.237***	-0.065			
	[0.046]	[0.079]	[0.056]			
MPrate_diff				0.119***	0.216***	0.118**
				[0.041]	[0.077]	[0.055]
GDPgr_rep	0.026	-0.019	0.035	0.026	-0.019	0.035
	[0.052]	[0.079]	[0.063]	[0.052]	[0.080]	[0.063]
CRgr_rep	0.021	0.088	0.019	0.021	0.088	0.019
	[0.056]	[0.077]	[0.067]	[0.056]	[0.077]	[0.067]
Bankret_rep	-0.010	-0.005	-0.008	-0.010	-0.005	-0.008
	[0.011]	[0.021]	[0.015]	[0.011]	[0.021]	[0.015]
Debt/GDP_rep	-0.032*	-0.033	-0.038**	-0.031*	-0.034	-0.035**
	[0.016]	[0.028]	[0.015]	[0.016]	[0.027]	[0.015]
Infl_rep	-0.093	-0.068	0.006	-0.081	-0.079	0.035
	[0.085]	[0.138]	[0.095]	[0.076]	[0.123]	[0.091]
QE_rep	1.754*	2.498	2.683**	1.697*	2.552	2.497**
	[0.914]	[1.702]	[1.021]	[0.894]	[1.710]	[0.993]
GDPgr_cp	0.110***	0.180***	0.055*	0.200***	0.345***	0.090**
	[0.034]	[0.060]	[0.032]	[0.029]	[0.040]	[0.040]
CRgr_cp	0.199***	0.346***	0.089**	0.200***	0.345***	0.090**
	[0.029]	[0.041]	[0.040]	[0.029]	[0.040]	[0.040]
Bankret_cp	0.011	0.027	0.000	0.011	0.026	0.000
	[0.010]	[0.017]	[0.009]	[0.010]	[0.017]	[0.009]
Debt/GDP_cp	-0.022***	0.014	-0.049***	-0.021***	0.013	-0.048***
	[0.008]	[0.013]	[0.009]	[0.007]	[0.012]	[0.009]
Infl_cp	0.068*	0.046	0.064	0.075*	0.039	0.080
	[0.038]	[0.075]	[0.062]	[0.037]	[0.076]	[0.059]
Observations	44,990	44,244	43,848	44,990	44,244	43,848
R^2	0.04	0.04	0.04	0.04	0.04	0.04
Fixed Effects	Count/Report	Count/Report	Count/Report	Count/Report	Count/Report	Count/Report

Table 6: **Is There a Substitution Between Domestic and Cross-border Flows?**
This table reports regression results from within counterparty/year-quarter estimation. All variables are one quarter lagged. Variable definitions are listed in the Appendix. Standard errors are clustered at the reporting country level. *** denotes 1% significant level, ** denotes 5% significant level, and * denotes 10% significant level.

	Cross-Border Flows (CBF) *to non-banks*		
	(1)	(2)	(3)
Mprate_rep	0.379***	0.432***	0.348***
	[0.100]	[0.108]	[0.110]
Mprate_rep Domestic ind.		-0.575***	-0.593**
		[0.159]	[0.215]
QE_rep	1.092	1.127	1.458
	[1.421]	[1.428]	[1.059]
Bankret_rep	-0.005	-0.005	-0.005
	[0.012]	[0.012]	[0.017]
GDPgr_rep	0.394**	0.387**	0.166
	[0.188]	[0.186]	[0.270]
Debt/GDP_rep	-0.004	-0.004	0.006
	[0.006]	[0.006]	[0.009]
Infl_rep	0.082	0.079	0.137
	[0.069]	[0.071]	[0.084]
Observations	77,182	77,182	44,463
R^2	0.10	0.10	0.11
Fixed Effects	Count./Year-Quarter	Count./Year-Quarter	Count./Year-Quarter

Table 7: **How Does Country Destination Affect Cross-border Flows: EME vs non-EMEs**

This table reports regression results from within counterparty/year-quarter estimation. All variables are one quarter lagged. Variable definitions are listed in the Appendix. Standard errors are clustered at the reporting country level. *** denotes 1% significant level, ** denotes 5% significant level, and * denotes 10% significant level.

	Cross-Border Flows (CBF) to:		
	Banks&Non-Banks	Banks	Non-Banks
	(1)	(2)	(3)
Mprate_rep	0.341***	0.509***	0.381***
	[0.096]	[0.144]	[0.130]
Mprate_rep× EME	-0.242**	-0.748***	0.106
	[0.096]	[0.172]	[0.196]
GDPgr_rep	0.039	0.022	0.015
	[0.060]	[0.107]	[0.065]
GDPgr_rep× EME	0.102	-0.001	0.181*
	[0.070]	[0.135]	[0.091]
CRgr_rep	0.064	0.123	0.117
	[0.074]	[0.115]	[0.090]
CRgr_rep× EME	-0.045	0.001	-0.081
	[0.069]	[0.126]	[0.076]
Bankret_rep	-0.014	-0.009	0.009
	[0.018]	[0.024]	[0.020]
Bankret_rep× EME	0.021	0.017	-0.027
	[0.025]	[0.036]	[0.020]
Debt/GDP_rep	-0.007	-0.006	-0.005
	[0.007]	[0.014]	[0.009]
Debt/GDP_rep× EME	0.001	-0.018	0.006
	[0.007]	[0.016]	[0.008]
Infl_rep	-0.109	-0.072	0.087
	[0.111]	[0.209]	[0.116]
Infl_rep× EME	0.200*	0.348	-0.064
	[0.114]	[0.256]	[0.112]
QE_rep	-0.228	-2.560*	0.310
	[0.772]	[1.365]	[1.189]
QE_rep× EME	1.646**	2.746**	1.501
	[0.710]	[1.211]	[1.045]
Observations	73,298	70,877	71,704
R^2	0.12	0.12	0.11
Fixed Effects	Count./Year-Quarter	Count./Year-Quarter	Count./Year-Quarter

Table 8: **Do Economic Activity and Monetary Policy Affect Cross-border Flows Independently?**

This table reports regression results of within counterparty/year-quarter estimation. All variables are lagged one quarter. Variable definitions are listed in the Appendix. Standard errors are clustered at the reporting country level. *** denotes 1% significant level, ** denotes 5% significant level, and * denotes 10% significant level.

	Cross Border Flows to:		
	Banks&Non-Banks	Banks	Non-Banks
	(1)	(2)	(3)
Mprate_rep	0.345***	0.466***	0.369***
	[0.076]	[0.112]	[0.117]
GDPgr_rep	0.140***	0.125*	0.070
	[0.035]	[0.066]	[0.051]
GDPgr_rep× MPrate_rep	-0.015***	-0.029***	0.009
	[0.004]	[0.007]	[0.006]
CRgr_rep	0.042	0.126	0.073
	[0.058]	[0.085]	[0.073]
Bankret_rep	-0.002	0.002	-0.005
	[0.010]	[0.018]	[0.014]
Debt/GDP_rep	-0.004	-0.011	-0.003
	[0.005]	[0.009]	[0.006]
Infl_rep	-0.017	0.075	0.062
	[0.068]	[0.150]	[0.081]
QE_rep	0.902	-0.579	1.185
	[0.854]	[1.360]	[1.426]
Observations	73,298	70,877	71,704
R^2	0.12	0.12	0.11
Fixed Effects	Count./Year-Quarter	Count./Year-Quarter	Count./Year-Quarter

Table 9: **How Does Country Destination Affect Cross-border Flows: EME vs non-EMEs before 2007Q2**
This table reports regression results from within counterparty/year-quarter estimation. All variables are one quarter lagged. Variable definitions are listed in the Appendix. Standard errors are clustered at the reporting country level. *** denotes 1% significant level, ** denotes 5% significant level, and * denotes 10% significant level.

	EME before 2007Q2			**non-EME before 2007Q2**			**EME after 2007Q2**			**non-EME after 2007Q2**		
	All	Banks	Non-Banks	All	Banks	Non-Banks	All	Banks	Non-Banks	All	Banks	Non-Banks
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Mprate_rep	-0.069	-0.403*	0.412**	0.276***	0.413**	0.331***	0.527***	0.307	0.651**	0.586***	0.993***	0.642**
	[0.157]	[0.211]	[0.160]	[0.092]	[0.152]	[0.113]	[0.153]	[0.325]	[0.303]	[0.149]	[0.241]	[0.234]
QE_rep	1.987*	-2.614	2.676*	-0.054	-4.820*	0.290	1.724	1.560	1.581	-0.231	-1.798	0.082
	[0.984]	[3.332]	[1.371]	[1.222]	[2.467]	[2.078]	[1.384]	[2.020]	[2.102]	[0.777]	[1.507]	[1.342]
CRgr_rep	-0.022	-0.064	0.032	0.022	0.083	0.137	0.057	0.288*	0.047	0.094	0.132	0.096
	[0.087]	[0.148]	[0.132]	[0.098]	[0.176]	[0.114]	[0.078]	[0.145]	[0.080]	[0.113]	[0.158]	[0.100]
Bankret_rep	0.015	0.030	0.002	-0.056**	-0.067*	-0.011	0.002	-0.009	-0.033	0.015	0.028	0.020
	[0.030]	[0.054]	[0.020]	[0.020]	[0.038]	[0.029]	[0.014]	[0.034]	[0.021]	[0.020]	[0.037]	[0.022]
GDPgr_rep	0.090	0.051	0.075	0.046	-0.013	0.030	0.169***	-0.019	0.294***	0.031	0.050	-0.005
	[0.055]	[0.132]	[0.087]	[0.077]	[0.161]	[0.091]	[0.048]	[0.107]	[0.085]	[0.073]	[0.155]	[0.074]
Debt/GDP rep	-0.006	-0.017	0.008	-0.004	0.009	0.006	-0.005	-0.021**	-0.006	-0.006	-0.007	-0.011
	[0.007]	[0.024]	[0.010]	[0.012]	[0.027]	[0.016]	[0.004]	[0.010]	[0.006]	[0.005]	[0.010]	[0.009]
Infl_rep	0.321**	0.406*	0.184	0.022	0.083	0.137	-0.112*	0.121	-0.099	-0.227	-0.230	0.053
	[0.115]	[0.234]	[0.144]	[0.098]	[0.176]	[0.114]	[0.056]	[0.239]	[0.109]	[0.153]	[0.243]	[0.196]
Observations	24,146	22,921	23,793	18,704	18,641	18,101	16,715	15,764	16,531	13,733	13,551	13,279
R-squared	0.15	0.15	0.16	0.08	0.09	0.08	0.14	0.13	0.12	0.08	0.07	0.06
Count./Year-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Appendix

Shortened Name	Full Name	Description	Source	Units
Cl_allinst_allsecro	CBF to banks and non-banks	Cross-border bank claims on banks and nonbanks. Calculated as the flow of claims in the quarter, adjusted for exchange rate changes, over the previous quarter's outstanding amount in percent, winsorized at the 2.5 percentile.	Bank of International Settlements	Percent
Cl_allinst_banksro	CBF to banks	Cross-border bank claims on banks. Calculated as the flow of claims in the quarter, adjusted for exchange rate changes, over the previous quarter's outstanding amount in percent, winsorized at the 2.5 percentile.	Bank of International Settlements	Percent
Cl_allinst_nbanksro	CBF to non-banks	Cross-border bank claims on non-banks. Calculated as the flow of claims in the quarter, adjusted for exchange rate changes, over the previous quarter's outstanding amount in percent, winsorized at the 2.5 percentile.	Bank of International Settlements	Percent
MPrate_rep	Monetary policy rate for reporting country	Central bank monetary policy rate for reporting countries in percent.	Central banks, International Monetary Fund, CEIC	Percent
CRgr_rep	Growth in credit to domestic private non-financial sector for reporting country	Quarter-over-quarter growth rate of outstanding credit from all sectors to the private non-financial sector for reporting countries in percent.	Bank of International Settlements	Percent

Bankret_rep	Banking sector returns for reporting country	Quarter-over-quarter growth rate of banking sector stock return index for reporting countries in percent.	Datastream	Percent
GDPgr_rep	Real GDP growth rate for reporting country	Quarter-over-quarter real/chained GDP growth for reporting countries in percent.	Haver	Percent
Debt/GDP_rep	Gross debt to GDP for reporting country	Gross debt as a percentage of nominal GDP for reporting countries in percent. Quarterly data interpolated from annual data.	International Monetary Fund, World Economic Outlook, Haver	Percent
Infl_rep	Inflation rate for reporting country	Quarter-over-quarter inflation for reporting countries in percent, calculated using consumer price indices.	Haver	Percent
QE_rep	Quantitative easing indicator for reporting country	Dummy variable indicating quantitative easing policies during the quarter for reporters U.S., U.K., and Japan. The U.S. QE period is 12/31/2008 to 12/31/2014. The U.K. QE period is 3/31/2009 to 12/31/2014. The Japan periods are 3/31/2001 to 3/31/2006 and 6/30/2013 to 12/31/2014.		1/0
Exchangegr_rep	Real exchange rate growth for reporting country	Quarter over quarter growth rate of the real exchange rate (interpreted as amount of counterparty's currency per unit of reporter's currency) for reporting countries in percent.	New York Fed, Bloomberg	Percent

MPrate_cp	Monetary policy rate for counterparty country	Central bank monetary policy rate for counterparty countries	Central banks, International Monetary Fund, CEIC	Percent
CRgr_cp	Credit to domestic private non-financial sector for counterparty country	Quarter-over-quarter growth rate of outstanding credit from all sectors to the private non-financial sector for counterparty countries in percent.	Bank of International Settlements	Percent
Bankret_cp	Banking sector returns for counterparty country	Quarter-over-quarter growth rate of banking sector stock return index for reporting countries in percent.	Datastream	Percent
GDPgr_cp	Real GDP growth rate for counterparty country	Quarter-over-quarter real/chained GDP growth for counterparty countries in percent.	Haver	Percent
Debt/GDP_cp	Gross debt to GDP for counterparty country	Gross debt as a percentage of nominal GDP for counterparty countries in percent. Quarterly data interpolated from annual data.	International Monetary Fund, World Economic Outlook, Haver	Percent
Infl_cp	Inflation rate for counterparty country	Quarter-over-quarter inflation for counterparty countries in percent, calculated using consumer price indices.	Haver	Percent
MPrate_diff	Monetary policy rate difference	Difference between the monetary policy rates of reporting and counterparty countries in percent.	Central banks, International Monetary Fund, CEIC	Percent